Appendix E

Action Specific Implementation Plan

Alternative Intake Project

Action Specific Implementation Plan

Appendix E-1 to the

Draft Environmental Impact Report/
Environmental Impact Statement

May 2006

CONTRA COSTA WATER DISTRICT

Action Specific Implementation Plan (ASIP)
for the
Contra Costa Water District
Alternative Intake Project

Appendix E-1 to the
Draft Environmental Impact Report / Environmental Impact Statement

Prepared by:

Contra Costa Water District
1331 Concord Avenue
Concord, CA 94524
Contact: Samantha Salvia
(925) 688-8057

and

Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way
Sacramento, CA 95825-1898
Contact: Erika Kegel
(916) 978-5081

With Technical Assistance From:

EDAW
2022 J Street
Sacramento, CA 95814
Contact: Phil Dunn
(916) 414-5800

Hanson Environmental
132 Cottage Lane
Walnut Creek, CA 94595
Contact: Charles Hanson, Ph.D.
(925) 937-4606

May 2006

Table of Contents

Table of Contents (continued)

Section **Page**

Attachments

Table of Contents (continued)

Section **Page**

Exhibits

Table of Contents (continued)

Section **Page**

Exhibits (Continued)

Tables

Table of Contents (continued)

Section **Page**

Tables (Continued)

Table of Contents (continued)

Section **Page**

Tables (Continued)

Abbreviations and Acronyms

6 pacs	small six-passenger boats
ASIP	Action Specific Implementation Plan
BMPs	best management practices
CCWD	Contra Costa Water District
CESA	California Endangered Species Act
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSC	California species of special concern
CVP	Central Valley Project
dB	decibel
Delta	Sacramento-San Joaquin Delta
DFG	California Department of Fish and Game
DPS	distinct population segments
DSLS	Delta Smelt Larval Survey
EFH	essential fish habitat
EIR/EIS	environmental impact report/environmental impact statement
ERP	Ecological Restoration Program
ESA	Federal Endangered Species Act
ESU	evolutionarily significant unit
FMP	federal Fishery Management Plan
IEP	Interagency Ecological Program
LSZ	Low Salinity Zone
mm	millimeter
MSFCMA	Magnuson-Stevens Fisheries Conservation and Management Act
MSCS	Multi-Species Conservation Strategy
NCCP	Natural Community Conservation Planning
NCCPA	Natural Community Conservation Planning Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTUs	Nephelometric Turbidity Units

OCAP	Long-term Operations, Criteria, and Plan
OHWM	ordinary high water mark
PFMC	Pacific Fisheries Management Council
PG&E	Pacific Gas & Electric Company
POD	pelagic organism decline
ppt	parts per thousand
RBDD	Red Bluff Diversion Dam
RTM	real-time monitoring
RWQCB	Regional Water Quality Control Board
SJMSCP	San Joaquin County Multi-Species Conservation and Open Space Plan
SWP	State Water Project
SWPPP	stormwater pollution prevention plan
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VAMP	Vernalis Adaptive Management Plan
X2	2-part-per-thousand salinity isohaline
WAPA	Western Area Power Administration

1 Introduction

1.1 Project Overview

The Contra Costa Water District's (CCWD's) mission is to "strategically provide a reliable supply of high-quality water at the lowest cost possible, in an environmentally responsible manner." CCWD obtains its water supply exclusively from the Sacramento-San Joaquin Delta (Delta) and serves treated and untreated water to approximately 500,000 people in central and eastern Contra Costa County. CCWD strives not only to protect the quality of its source and delivered water, but to improve the quality of water delivered to its customers. Notwithstanding these efforts, Delta water quality at CCWD's intakes declines at times, affecting CCWD's ability to consistently provide high-quality water to its customers. In addition, Federal and State drinking water regulations are becoming more stringent. CCWD is proposing the Alternative Intake Project to relocate some of CCWD's diversions to obtain better source water quality. An alternative intake could access higher-quality water than is currently available at CCWD's existing intakes during certain times of the year. CCWD's existing intakes are all located in the western Delta, where water quality can be diminished due to seasonal seawater intrusion into the Delta and other reasons. An intake in the central Delta would increase CCWD's flexibility to access source water of better quality. The Bureau of Reclamation (Reclamation) is assisting CCWD in this action in a manner and to the extent consistent with the long-term renewal contract for Central Valley Project (CVP) water service between Reclamation and CCWD (Contract No. I75r-3401A-LTR1), water right permits issued to Reclamation for operation of CVP, and CVP operational requirements.

The project purpose is to protect and improve the quality of water delivered to CCWD's untreated- and treated-water customers.

The need for this project derives from the following conditions:

- Delta water quality at CCWD's current intakes does not meet CCWD's Board-adopted water quality objectives during late summer and fall, as well as during drought periods.
- Future and more stringent Federal and State drinking water standards will be increasingly difficult to meet.
- Los Vaqueros Project benefits can be affected by periods of insufficient Delta water quality for reservoir filling or for direct diversion.
- Unforeseen events, such as levee failure, chemical and hazardous spills, and other events can seriously compromise water quality at CCWD's intakes.

The Proposed Action includes CCWD's construction of a new drinking water intake with a capacity of up to 250 cubic feet per second (cfs) and fish screen in the south Delta, a pumping plant, and an associated conveyance pipeline from the new intake to CCWD's existing Old River conveyance system. The alternative intake would allow CCWD to relocate some of its diversions to a Delta location with better source water quality than is currently available at its Old River and Rock Slough intakes. Although it would change the location (and quality) of some of CCWD's existing diversions, the Proposed Action would not increase CCWD's total Delta diversion capacity (rate or average annual quantity).

The project facilities would be located in Contra Costa and San Joaquin Counties. CCWD proposes to construct the new water intake facility and fish screens along the lower third of Victoria Canal on Victoria Island. A pipeline would be constructed to convey water from the new intake and associated pumping plant approximately 12,000–14,000 feet across agricultural lands on Victoria Island toward Old River to the west, and a pipeline would be installed under Old River to convey the water to the Old River Pumping Plant and conveyance system on Byron Tract. The pipeline would either be tunneled under Old River and its levees or would cross over the top of the levees and be buried just beneath the bottom of Old River and would tie into the existing Old River facilities.

CCWD and Reclamation are the lead agencies for preparation of an environmental impact report/environmental impact statement (EIR/EIS) on the Proposed Action. Information on the Proposed Action has been used as the basis for identifying the mechanisms and magnitude of potential incidental take of protected species and their habitats. Detailed information on the purpose and need/objectives, project background, and alternatives (including the Proposed Action), is provided in Chapters 1–3 of the EIR/EIS and should be reviewed for further information.

1.2 Action Specific Implementation Plan Process

Because neither the programmatic biological opinions nor the programmatic Natural Community Conservation Planning Act (NCCPA) determination for the CALFED Program authorized incidental take of species covered by the Multi-Species Conservation Strategy (MSCS), a comprehensive consultation document, an action specific implementation plan (ASIP), is required for each individual CALFED project that will require approval of a signatory agency, such as Reclamation. Take authorization for entities implementing CALFED Program actions follow a simplified compliance process that is consistent with the MSCS and programmatic determinations. Entities implementing actions that may affect covered species are required to prepare an ASIP for each action or group of actions. The ASIP will be based on and be consistent with the data, information, analyses, and conservation measures in the MSCS. CCWD and Reclamation coordinated development of the ASIP with the National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), and California Department of Fish and Game (DFG) to ensure that the ASIP incorporates appropriate conservation measures for the proposed CALFED Program action(s), consistent with the MSCS.

The CALFED Program MSCS evaluates 244 species and 20 natural communities. Included within the MSCS are species identified by USFWS, NMFS, and DFG that are covered under existing biological opinions and NCCPA determination. An ASIP covers species covered under the Federal Endangered Species Act (ESA), California Endangered Species Act (CESA), and NCCPA potentially affected by a CALFED Program project. Typically, as in the case with the Alternative Intake Project ASIP, the species evaluated are a subset of the overall 244 species included in the MSCS.

1.2.1 ASIP Development

The Alternative Intake Project EIR/EIS and ASIP have been developed against a backdrop of existing and ongoing Federal, State, and local efforts intended to conserve covered and other sensitive species within the Project Action Area. The CVP is operated in compliance with two key biological opinions (NMFS 2004, USFWS 2005a) on the long-term CVP and State Water Project (SWP) Operations Criteria and Plan (OCAP). CCWD operates its system in accordance with several other biological documents (NOAA Fisheries 1993, USFWS 1993, DFG and CCWD 1994, USFWS 2005b, 2005c). To comply with NEPA, CEQA, and ASIP requirements, analyses of CVP and CCWD operations in the Alternative Intake Project EIR/EIS and ASIP focus on all direct, indirect, and cumulative effects associated with the Proposed Action. Any biological impacts associated with existing and future CVP and SWP operations not affected by the Proposed Action, however, have already been addressed in the referenced OCAP biological opinions, are not part of the Proposed Action, and are not evaluated in the EIR/EIS or ASIP as part of the Proposed Action.

Implementation of the Proposed Action would be consistent with existing wildlife protection and recovery programs. Consultation with USFWS, NMFS, and DFG regarding effects of the Proposed Action on special-status species is based on the ESA policy for each agency and existing biological opinions and NCCPA guidance. The biological opinions and guidance documents used as general background references for the development of this ASIP are listed below:

- CALFED Programmatic EIS/EIR (CALFED 2000a);
- CALFED Multi-Species Conservation Strategy (CALFED 2000b);
- 2004 NMFS Biological Opinion on the CVP Long-term Operations, Criteria, and Plan (OCAP) (NMFS 2004);
- 2005 USFWS Biological Opinion on the OCAP (USFWS 2005a);
- USFWS CALFED Bay-Delta Program Programmatic Biological Opinion (USFWS 2000);
- NMFS CALFED Bay-Delta Program Programmatic Biological Opinion (NMFS 2000);
- DFG's NCPPA approval of the CALFED Bay-Delta Program MSCS (DFG 2000a);

- 2005 USFWS Biological Opinion on CCWD's Future Water Supply Implementation Program (USFWS 2005b);
- 1993 NOAA Fisheries Biological Opinion on Winter-run Chinook Salmon for the Los Vaqueros Project (NOAA Fisheries 1993);
- 1993 USFWS Biological Opinion for Delta Smelt for the Los Vaqueros Project (USFWS 1993); and
- 1994 Memorandum of Understanding between DFG and CCWD for the Los Vaqueros Project (DFG and CCWD 1994).

1.2.2 ASIP Requirements

To fulfill the requirements of ESA Section 7 and California Fish and Game Code Sections 2835 and 2081, as applicable, the ASIP includes the following information:

- the list of covered species and any other special-status species that occur in the Action Area (Chapter 1);
- a detailed description of the Proposed Action (Chapter 2 herein and see EIR/EIS Chapter 3, "Alternatives, Including the Proposed Action");
- a discussion of critical and essential fish habitat, NCCPA habitats, and species descriptions (Chapter 3);
- the analyses identifying the mechanisms and estimated incidental take associated with direct, indirect, and cumulative impacts on the covered species, other special-status species occurring in the Action Area (along with an analysis of impacts on any designated critical habitat) likely to result from the Proposed Action (Chapter 4);
- the conservation measures that CCWD and Reclamation will undertake to minimize adverse effects to species; appropriate measures to enhance the condition of Natural Community Conservation Planning (NCCP) communities and covered species; description of how and to what extent the action addressed in the ASIP will help the CALFED Program achieve the MSCS goals for the affected species; the funding that will be made available to undertake the measures, cooperating landowners; the procedures to address changed circumstances and any additional measures that USFWS, NMFS, and DFG may require as necessary or appropriate for compliance with ESA, CESA, and NCCPA (Chapter 5); and
- a plan to monitor the impacts and the implementation and effectiveness of these measures, including adaptive management (Chapter 6).

The Alternative Intake Project ASIP has been developed to be consistent with the species goals, prescriptions, and conservation measures in the MSCS for covered species affected by the Proposed Action, but does not tier off of any of the CALFED programmatic documents; this ASIP is a stand-alone, project-specific document. Conservation measures developed for the MSCS have been reviewed for use in minimizing or eliminating the effects of the Proposed Action. The ASIP includes conservation measures to address actions not considered in the MSCS relative to the Proposed Action.

1.2.3 Informal and Formal Consultation Processes

Informal consultation is often conducted in coordination with ASIP development. For the Proposed Action, CCWD and Reclamation initiated informal consultation with USFWS and NMFS in June 2005, pursuant to the ESA, the Fish and Wildlife Coordination Act, and the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA) regarding essential fish habitat (EFH). In addition, informal consultation also was initiated with DFG under the NCCPA. Under these acts, CCWD and Reclamation participated in meetings with State and Federal resource agencies throughout the development of this ASIP to:

- identify covered species and endangered, threatened, and proposed or candidate species that may occur in the Action Area;
- develop an appropriate approach for assessing species listed and proposed for listing as part of the Section 7 consultations required by ESA; and
- determine to what extent the action may affect any of the identified species, including impacts to EFH.

The Alternative Intake Project ASIP has been submitted to USFWS, NMFS, and DFG to initiate informal consultation. USFWS and NMFS will review the ASIP for compliance with the ESA, under Section 7. NMFS will also review the ASIP for compliance with the MSFCMA. If the impacts of the project can be avoided or minimized such that special-status species would not be adversely affected, it would not be necessary to initiate formal consultation. If Reclamation makes a finding during informal consultation that the Proposed Action “may affect, but is not likely to adversely affect” listed species or critical habitat, Reclamation would request written concurrence from NMFS and USFWS for this finding. If a finding of “not likely to adversely affect” cannot be made by Reclamation, or NMFS or USFWS is unable to concur with Reclamation’s finding, then formal consultation is required and NMFS and USFWS would prepare biological opinions on the species or their habitats that the Proposed Action is likely to adversely affect (incidental take). As part of these biological opinions, USFWS and NMFS may authorize incidental take of endangered and threatened species.

DFG will determine whether the ASIP complies with the NCCPA and CESA. If the ASIP is in compliance with the NCCPA, DFG will prepare an NCCPA approval and issue supporting findings. As part of these findings, DFG may authorize take of covered species, including endangered and threatened species, whose conservation and management are provided for in an approved NCCP. Because the NCCPA allows DFG to authorize incidental take of endangered and threatened species, a Natural Community Conservation Plan (NCCP) also may be used to comply with CESA (Fish and Game Code Sections 2081[b] and 2835).

The lead agencies have held meetings with NMFS, USFWS, and DFG throughout the development of the Proposed Action and this ASIP. At these meetings, issues pertaining to development of the ASIP were discussed by the ASIP team members, which included representatives from CCWD, Reclamation, NMFS, USFWS, and DFG. In addition, as noted above, a preliminary draft of this ASIP was reviewed by NMFS, USFWS, and DFG as part of informal consultation on the Proposed Action. Comments received during review of the preliminary draft ASIP were also used in developing the Alternative Intake Project EIR/EIS.

1.2.4 Compliance with Federal Endangered Species Act

USFWS and NMFS share responsibility for administering ESA. NMFS has primary responsibility for implementing ESA with respect to marine fishes and mammals, including migratory or anadromous fish species such as salmon and steelhead. USFWS has primary responsibility for other species.

The purpose of the ESA Section 7(a)(2) consultation requirement is to ensure that any action authorized, funded, or carried out by any Federal agency is not likely to jeopardize the continued existence of any covered species or result in the destruction or adverse modification of critical habitat. Typically, a biological assessment is prepared to analyze effects on listed and proposed species and designated and proposed critical habitat in order to comply with ESA. This ASIP is intended to act as a biological assessment and fulfill the requirements of the Proposed Action pursuant to the ESA, as amended.

1.2.5 Compliance with Magnuson-Stevens Fishery Conservation and Management Act

The MSFCMA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH. Federal agencies are required to consult with NMFS on all actions that may adversely affect EFH (MSFCMA Section 305(b)(2)). The EFH mandate applies to all species managed under a Federal Fishery Management Plan (FMP). In California, there are three fishery management plans covering Pacific salmon, coastal pelagic species, and groundfish. NMFS, under Section 305(b)(1) of the MSFCMA, is required to provide EFH conservation and enhancement recommendations to Federal and State agencies for actions that adversely affect EFH.

The objective of an EFH assessment is to determine whether the Proposed Action “may adversely affect” designated EFH for relevant commercially, Federally managed fisheries species within the Action Area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the Proposed Action.

This ASIP will meet all the compliance requirements that have been identified for consulting with NMFS on effects to EFH, as outlined in the MSFCMA.

1.2.6 Compliance with California Endangered Species Act and the Natural Community Conservation Planning Act

CESA (Fish and Game Code Sections 2050 to 2097) is similar to ESA. California's Fish and Game Commission is responsible for maintaining lists of threatened and endangered species under CESA. CESA prohibits the "take" of listed and candidate (petitioned to be listed) species. "Take" under California law means to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch capture, or kill" (California Fish and Game Code, Section 86). Because DFG may authorize incidental take of listed species pursuant to a DFG-approved NCCP, the Proposed Action will not require a separate incidental take permit pursuant to CESA for ASIP-covered species, if the Proposed Action adheres to MSCS goals and DFG's NCCP approval.

The NCCPA, California Fish and Game Code, section 2800, et seq., was enacted to provide for effective protection and conservation of the State's wildlife heritage, while continuing to allow appropriate development and growth. State of California NCCP General Process Guidelines defines an NCCP as "…a plan for the conservation of natural communities that takes an ecosystem approach and encourages cooperation between private and governmental interests. The plan identifies and provides for the regional or area-wide protection and perpetuation of plants, animals, and their habitats, while allowing compatible land use and economic activity. An NCCP seeks to anticipate and prevent the controversies caused by species' listings by focusing on the long-term stability of natural communities" (NCCP 2002). The purpose of natural community conservation planning is to sustain and restore those species and their habitat identified by DFG that are necessary to maintain the continued viability of biological communities impacted by human changes to the landscape. An NCCP identifies and provides for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible use of the land. DFG may authorize the take of any identified species, including listed and non-listed species, pursuant to Section 2835 of the NCCPA, if the conservation and management of such species is provided for in an NCCP approved by DFG.

The Proposed Action will comply with the NCCPA through the ASIP, which contains all the necessary components of a project-level NCCP for the project Action Area.

On February 2, 2002, Governor Davis signed SB 107, which completely repealed and replaced the NCCPA with a new NCCPA. SB 107 became effective on January 1, 2003. However, in accordance with Section 2830 (c) of SB 107, the MSCS will remain in place as an approved NCCP, and DFG may authorize take of covered species pursuant to the MSCS and DFG's NCCP approval.

This ASIP serves as the project-specific NCCP for the proposed Alternative Intake Project. The document meets all the compliance requirements that have been identified for (a) preparing an NCCP and (b) other requirements associated with CESA consultation. This ASIP will fulfill the requirements of the California Fish and Game Code Sections 2835 and 2081. Additionally, it will incorporate appropriate conservation measures relevant to the Proposed Action. This approach is consistent with the NCCP conservation strategy for the conservation of natural communities and related species before these species reach a point of being listed.

1.3 Listed Species and Habitats Potentially Affected by the Proposed Action

1.3.1 Methods

To comply with the requirements of ESA, CESA, and NCCPA, special-status species that could be affected by the Proposed Action have been identified for evaluation in this ASIP. Species were selected according to the following criteria:

- may be affected directly or indirectly by construction or operation of the proposed intake structure, fish screen, pump station, levee improvements, and/or pipeline conveyance facilities;
- are MSCS-covered species identified in the programmatic biological opinions and NCCP approval for the CALFED Program;
- are listed as threatened or endangered under either ESA (Federal) or CESA (State) or are proposed for listing;
- are candidates for listing;
- have been identified to have associated EFH by NMFS;
- are plants listed as rare under the California Native Plant Protection Act;
- are fully protected species or specified birds under various sections of the California Fish and Game Code;
- are California species of special concern (CSC);
- are plants included on California Native Plant Society (CNPS) List 1A, 1B, 2, or 3; or
- are native species of concern under the CALFED Program.

For purposes of analysis, the Action Area was defined as the area in which direct or indirect environmental consequences would likely occur. The Action Area is functionally defined as follows:

- for fish and aquatic macroinvertebrates: the areas within 1,000 feet of proposed in-water facilities in Victoria Canal or existing CCWD intakes with operational changes (but extended throughout the Sacramento-San Joaquin River system as needed to evaluate indirect effects);
- for nesting raptors: the area within 0.5 mile of any project-related construction activities;

- for all other terrestrial species: the area within 100 feet of any project-related construction activities.

The species addressed in this ASIP were identified with the assistance of USFWS, NMFS, and DFG personnel during the planning process for this project. An official list of Federally endangered and threatened species that may be affected by projects in the Woodward Island, Clifton Court Forebay, Honker Bay, and Vine Hill 7.5-minute topographical quadrangles was obtained from USFWS (Attachment A), as was a list of Federally protected anadromous species from NMFS (Attachment B) and State-protected species and species of concern, provided by DFG (Attachment C). These three lists of species with occurrences in the U.S. Geological Survey (USGS) quadrangles in which the Proposed Action is located were then modified to reflect results of habitat analyses, as described below.

In addition to the lists provided by USFWS, NMFS, and DFG, a quadrangle-by-quadrangle review of records in the 2001 and 2004 California Natural Diversity Database (CNDDB) was undertaken. This review was followed up by a series of biological field surveys. These surveys extended well beyond the immediate footprint of the Proposed Action. Field surveys for plant and wildlife species conducted in the vicinity of the Proposed Action site are as follows, none of which were protocol-level surveys:

- April 18, 2005 – Biological Survey;
- April 18-25, 2005 – Wetland Delineations;
- July 15, 19, and 22, 2005 – Botanical Surveys and General Biological Surveys; and
- October 25, 2005 – Giant Garter Snake Survey.

Data from DFG and USFWS fishery surveys were analyzed to assess the occurrence (e.g., presence or absence) and relative abundance of selected species within the south and central Delta. Data were also reviewed from salvage operations at the CVP and SWP export facilities for the occurrence of protected fish species.

1.3.2 Species of Interest and MSCS Conservation Goals

The suite of special-status aquatic and terrestrial species that could occur in the Action Area and may be directly or indirectly affected by the Proposed Action are listed in Table 1.3-1, with listing status and MSCS conservation goals.

The MSCS assigns a goal to each MSCS evaluated species. Three alternative goals are Recovery (“R”), contribute to recovery (r”), and maintain (“m”), which are further defined below. The definitions that appear here are different than those that appear in State or Federal statutes or regulations. The goals are not intended to substitute for any statuatory or regulatory requirement. However, the goals generally are intended to enable NMFS, USFWS, and DFG to make necessary findings and determinations under FESA, CESA,

Table 1.3-1
Special-status Species of Interest for the Alternative Intake Project

Common Name	Scientific Name	Listing Status[2]			Designated Habitat	MSCS Conservation Goal[6]
		USFWS	NMFS	DFG		
Aquatic Species						
Winter-run Chinook salmon	*Oncorhynchus tshawytscha*	--	FE	SE	Critical Habitat	R
Central Valley spring-run Chinook salmon	*Oncorhynchus tshawytscha*	--	FT	ST	Critical Habitat	R
Central Valley fall/late fall-run Chinook salmon	*Oncorhynchus tshawytscha*	--	FSC	CSC	--	R
Pacific Salmon[1]	--	--	--	--	Essential Fish Habitat[3]	--
Central Valley steelhead	*Oncorhynchus mykiss*	--	FT	--	Critical Habitat	R
Delta smelt	*Hypomesus transpacificus*	FT	--	ST	--	R
Longfin smelt	*Spirinchus thaleichthys*	FSC	--	CSC	--	R
Green sturgeon	*Acipenser medirostris*	--	FP	CSC	--	R
River lamprey	*Lampetra tridentate*	FSC	--	CSC	--	--
Hardhead	*Mylopharcodon concephalus*	--	--	CSC	--	m
Sacramento splittail	*Pogonichthys macrolepidotus*	FSC	--	CSC	--	R
Northern anchovy	*Engraulis mordax*	--	--	--	Essential Fish Habitat[4]	--
Pacific sardine	*Sardinops sagax*	--	--	--	Essential Fish Habitat[4]	--
Starry flounder	*Platichthys stellatus*	--	--	--	Essential Fish Habitat[5]	--
Terrestrial Animal Species						
Common Name	**Scientific Name**	**Listing Status[2] USFWS**	**DFG**	**CNPS**	**MSCS Conservation Goal[6]**	
Giant Garter Snake	*Thamnophis gigas*	FT	ST	--	--	
Northwest Pond Turtle	*Actinemys marmorata*	FSC	CSC	--	m	
Swainson's Hawk	*Buteo swainsoni*	FSC	ST	--	r	

Table 1.3-1
Special-status Species of Interest for the Alternative Intake Project

White-tailed Kite	*Elanus leucurus*	FSC	SFP	--	m
Northern Harrier	*Circus cyanus*	--	CSC	--	m
Western Burrowing Owl	*Athene cunicularia*	FSC	CSC	--	m
Greater Sandhill Crane	*Grus Canadensis tabida*	FT	ST, SFP	--	r
Loggerhead Shrike	*Lanus ludovicianus*	FSC	CSC	--	--
Tricolored Blackbird	*Agelaius tricolor*	FSC	CSC	--	m
California Horned Lark	*Eremophila alpestris actia*	--	CSC	--	--
Terrestrial Plant Species					
Mason's lilaeopsis	*Lilaeopsis masonii*	--	SR	CNPS List 1B	R
Rose-mallow	*Hibiscus lasiocarpus*	--	--	CNPS List 2	m

Notes: [1] Pacific salmon includes winter-run, spring-run, and fall/late fall-run Chinook salmon.

[2] Listing Status:

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories
FE Endangered (legally protected)
FT Threatened (legally protected)
FP Proposed (legally protected)
FSC Federal Species of Concern (no formal protection)

California Department of Fish and Game (DFG) State Listing Categories
SE Endangered (legally protected)
ST Threatened (legally protected)
SR Rare (legally protected)
SFP Fully Protected (legally protected)
CSC California Species of Special Concern (no formal protection)

California Native Plant Society (CNPS) Categories
1A Plants species presumed extinct in California
1B Plant species considered rare or endangered in California and elsewhere
2 Plants rare, threatened, or endangered in California but more common elsewhere

Sources: Data Compiled by EDAW in 2005

[3] Covered under the amended MSFCMA.

[4] Covered under the Coastal Pelagic Fishery Management Plan.

[5] Covered under the Pacific Coast Groundfish Fishery Management Plan.

[6] Species Goals:
R Recovery. Recover species populations within the MSCS focus area to levels that ensure the species long-term survival in nature.
r Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations within the MSCS focus area.
m Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED actions will be fully offset through implementation of actions beneficial to the species.

and NCCPA. The MSCS species goals have been incorporated into the CALFED Program. The MSCS conservation goals for each species addressed in this ASIP are presented in Table 1.3-1.

For species designated "R," CALFED has established a goal to recover the species with the CALFED Ecological Restoration Program (ERP) ecological management zones. A goal of "recovery" was assigned to those species whose recovery is dependent on restoration of the Delta and Suisun Bay/Marsh ecosystems and for which CALFED could reasonably be expected to undertake all or most of the actions necessary to recover the species. Recovery is achieved when the decline of the species is arrested or reversed, threats to the species are neutralized, and the species' long-term survival in nature is assured.

For species designated "r," CALFED will make specific contributions toward the recovery of the species. The goal "contribute to recovery" was assigned to species for which CALFED actions affect only a limited portion of the species' range and/or CALFED actions have limited effects on the species. To achieve the goal of contributing to a species recovery, CALFED is expected to undertake some of the actions under its control and within its scope that are necessary to recover the species.

For species designated "m," CALFED will take actions to maintain the species. This category is less rigorous than "contribute to recovery." The goal "maintain" was assigned to species expected to be minimally affected by CALFED actions. For this category, CALFED will avoid, minimize, and compensate for any adverse effects to the species commensurate with the level of effect on the species. Actions may not actually contribute to the recovery of the species; however, at a minimum, they will be expected to not contribute to the need to list a species or degrade the status of a listed species. CALFED will also, to the extent practicable, improve habitat conditions for the species.

1.3.3 Critical Habitat

The south and central Delta, Sacramento River, and the Bay-Delta estuary serve as a migration corridor for anadromous salmonids, which have been listed for protection under CESA and/or ESA. Listed salmonids that would potentially occur seasonally in the Action Area include winter-run Chinook salmon, spring-run Chinook salmon, and steelhead trout. The Sacramento River and Bay-Delta estuary (but not the south or central Delta in the Action Area) are areas designated as critical habitat by NMFS for winter-run and spring-run Chinook salmon. In 2005, NMFS identified the Sacramento and San Joaquin rivers and the Delta, including the Action Area, as critical habitat for Central Valley steelhead. The Bay-Delta estuary, including the Action Area, has been designated as critical habitat by USFWS for delta smelt.

1.3.4 Essential Fish Habitat

The Delta, San Francisco Bay, and Suisun Bay, have been designated as EFH by the Pacific Fisheries Management Council (PFMC) to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries, such as Pacific salmon. The amended MSFCMA, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all Federal agencies to consult with the Secretary of

Commerce (NMFS) on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect EFH of commercially managed marine and anadromous fish species (Office of Habitat Conservation 1999). The EFH provisions of the Sustainable Fisheries Act are designed to protect fishery habitat from being lost due to disturbance and degradation. The act requires that EFH must be identified for all species Federally managed under PFMC. PFMC is responsible for managing commercial fisheries resources along the coasts of California, Oregon, and Washington. Three fisheries management plans all cover species that occur in the Action Area and could be affected by the Proposed Action, and include the entire San Francisco Bay-Delta estuary (which would include Victoria Canal) as EFH for species as follows:

- Pacific Salmon Fishery Management Plan: spring-, fall-, late fall-, and winter-run Central Valley Chinook salmon (Pacific salmon),

- Coastal Pelagic Fishery Management Plan: northern anchovy and Pacific sardine, and

- Pacific Groundfish Fishery Management Plan: starry flounder.

1.3.5 NCCP Habitats

Habitat types were determined within the footprint of proposed project facilities and the adjacent areas. Certain habitats were evaluated, however, that were not consistent with NCCP habitats and those are noted below:

- Tidal Freshwater Emergent Marsh,
- Tidal Perennial Aquatic,
- Managed Seasonal Wetland,
- Upland Crops,
- Fallow Fields and Ruderal Habitat (not a designated NCCP habitat), and
- Riparian Scrub (not a designated NCCP habitat).

Chapter 5 of this ASIP presents conservation measures that will assist with overall achievement of MSCS goals for species and NCCP habitats. The Alternative Intake Project would meet CALFED objectives by substantially improving drinking water quality while having essentially no effect on the water supply reliability, ecosystem restoration, and levee system integrity objectives. In general, project accomplishment of MSCS goals for species and NCCP habitats would be achieved by:

- installing and maintaining a state-of-the-art fish screen at the new intake,

- achieving shifts in CCWD diversions from unscreened to screened diversions,

- achieving shifts in CCWD diversions from Delta locations with greater fish densities and higher survival rates to Delta locations with lower fish densities and lower survival rates,

- achieving shifts in CCWD diversions from the Rock Slough intake located at a dead-end slough to intakes located on channels without passage restrictions,

- burying facilities (i.e., conveyance pipeline) where feasible,
- fully mitigating for loss of important habitat types, and
- instituting mitigation monitoring and adaptive management programs acceptable to NMFS, USFWS, and DFG.

1.4 ASIP Organization

This ASIP is a combined ESA and California NCCPA compliance document. To address the requirements of both acts, the ASIP is organized as follows:

- Chapter 1, “Introduction,” provides an introduction to the Proposed Action and the ASIP process, describes the relationship of the ASIP to the CALFED Program, lists the species and habitats to be addressed in this document, and outlines the organization of the document.
- Chapter 2, “Description of the Proposed Action,” refers the reader to the general description of the Proposed Action in Section 1.1, “Project Overview,” herein; and to the more detailed description of the Proposed Action in Chapters 1-3 of the EIR/EIS.
- Chapter 3, “Description of Species and NCCP Habitats,” provides the species accounts for ASIP-covered species and descriptions of NCCP communities potentially affected by the Proposed Action.
- Chapter 4, “Effects of the Proposed Action on Species and Habitats,” provides an analysis of the direct, indirect, and cumulative effects on covered species, critical habitat, EFH, and NCCP communities potentially affected by the Proposed Action.
- Chapter 5, “Description of Conservation Measures,” defines conservation measures associated with the Proposed Action to avoid, minimize, and compensate for potential project effects, and related information.
- Chapter 6, “Monitoring Plan and Adaptive Management Plan,” provides the plan to monitor the impacts and the implementation and effectiveness of these measures, including adaptive management.
- Chapter 7, “Other Alternatives Considered,” briefly lists other alternatives considered to meet the project purpose and need/objectives, refers the reader to the detailed description of other alternatives considered and presented in the EIR/EIS, and summarizes Alternative 3, Modified Operations Alternative, because of the interest shown by resource agencies for this alternative.
- Chapter 8, “Determination of Effects on Protected Species,” provides definitive ESA-based conclusion statements of the effects of the Proposed Action.
- Chapter 9, “List of ASIP Preparers,” lists the primary authors of the ASIP.

- Chapter 10, "References," lists all sources cited in this ASIP.
- The following attachments include additional information to support the ASIP:
  - Attachment A – USFWS List of Special-Status Species,
  - Attachment B – NMFS List of Special-Status Species,
  - Attachment C – DFG List of Special-Status Species,
  - Attachment D – DFG Delta Fisheries Surveys,
  - Attachment E – Estimated Net Entrainment and Impingement Losses Based on CALSIM II Water Quality Modeling and Central Valley Project Salvage Data (1979-2005), and
  - Attachment F – Fish Rescue Plan.

2 Description of the Proposed Action

The Proposed Action is briefly summarized in Section 1.1, “Project Overview.” The Alternative Intake Project EIR/EIS, Chapters 1–3, provides detailed information on the purpose and need/objectives, project background, and a detailed description of the Proposed Action, and should be reviewed for further information.

3 Description of Species and NCCP Habitats

This chapter provides the environmental baseline for species and NCCP habitats potentially affected by the Proposed Action.

3.1 Action Area

Short-term construction-related activities for the Proposed Action would occur generally in the southern- and western-most quarter of Victoria Island, and in Victoria Canal in the vicinity of the new intake site. Project-related operations and maintenance activities could extend to any affected aquatic areas in the Delta, especially near CCWD's Alternative, Old River, and Rock Slough intakes, where diversions would change. The Action Area, the area potentially directly or indirectly affected by the Proposed Action, is functionally defined below.

3.1.1 Fisheries and Aquatic Resources

For fish, the Action Area is focused on Victoria Canal where CCWD has proposed the installation of a new intake. The Action Area within Victoria Canal is approximately 1,000 feet upstream and downstream of the site within the canal where the new intake would be installed; this area would be affected by underwater noise, diver activity, and suspended sediment/turbidity during construction/demolition activities. Underwater noise would be primarily associated with the initial installation of the cofferdam, when percussion or vibratory hammers are used to drive pilings into the riverbed. Although noise travels well under water, the meandering river and the rip-rapped banks would attenuate noise. Percussion from installation of cofferdams would be attenuated upstream and downstream of the proposed pumping plant and positive barrier fish screen.

The Action Area related to potential suspended sediment and turbidity effects is the area from the immediate vicinity of in-river construction activities to not more than 1,000 feet downstream. Pile driving would resuspend sediments only in the immediate vicinity of the pile being driven and would result in intermittent "puffs" of sediment created by the impact. These would rise only several feet from the substrate and would thus be carried downstream for only a short distance before settling out of the water column. Some very fine particles may cause a below surface turbidity plume extending about 1,000 feet.

The Action Area also includes any other portions of the Delta where Delta hydraulics or hydrodynamics are changed such that there could be project-related effects on fish or other aquatic organisms. Consequently, the Action Area includes the areas within the immediate vicinity (i.e., within 1,000 feet) of CCWD intakes with changed diversions under the Alternative Intake Project: Rock Slough intake, Old River intake, and the proposed Victoria Canal intake. Moreover, the Action Area also extends throughout the Delta as needed to evaluate indirect effects from project operations.

3.1.2 Terrestrial Resources

For nesting raptors, based on DFG guidelines, the Action Area is represented by the area within 0.5 mile of any project-related construction activities, which could affect nesting raptors during construction activities. Practically, the Action Area may be smaller, because levees and vegetation may limit line-of-sight disturbance effects. For purposes of this analysis, however, the 0.5-mile perimeter was used.

For all other terrestrial species, the area within 100 feet of any project-related construction activities was considered to be the Action Area.

3.2 Baseline Conditions (Aquatic Resources)

3.2.1 South Delta Channels

The CCWD Alternative Intake Project pumping plant and positive barrier fish screen would be located in the southern region of the Sacramento-San Joaquin Delta (south Delta), which provides shallow open water and emergent marsh habitat for a variety of resident and migratory fish and macroinvertebrates. The primarily open water habitat within the Delta is relatively shallow (typically less than 20 feet deep) with a relatively uniform bottom comprised of silt, sand, peat, and other organic matter. Tules (*Scirpus* spp.) and other emergent and submerged aquatic vegetation occur both within the open water areas and along the shoreline margins of sloughs and channels that provide habitat for spawning, juvenile rearing, and adult holding and foraging. The proposed CCWD intake on Victoria Canal would be located within the area of the estuary influenced by freshwater inflow from the Sacramento and San Joaquin River systems, the hydraulic effects of CVP and SWP export operations, and tidal effects from coastal marine waters and San Francisco Bay. Waters within the south Delta are characterized by low salinity levels under most environmental conditions; however, salinity intrusion upstream into the south Delta does occur under critical drought conditions and in response to catastrophic levee breaching and the dynamic balance between freshwater inflow and marine water intrusion into the estuary. Although much of the Delta primarily provides shallow open water aquatic habitat, the channels within the south Delta vary in size and hydraulic complexity. Levees surrounding the sloughs and channels within the south Delta are vegetated by native and non-native grasses and shrubs. Mature riparian trees are not abundant along south Delta levees. Substrate within the sloughs and channels is primarily soft silt, clay, and mud, with deposits of organic material such as peat and decaying tules and reeds.

Levees bordering the larger south Delta sloughs and channels have been stabilized by riprap and other materials placed along the channel margins. Tidal fluctuations within the estuary result in tidal currents entering and exiting the south Delta that provide opportunities for fish and macroinvertebrate movement from the south Delta channels upstream into the tributary rivers and downstream into Suisun Bay and the lower reaches of the estuary.

Water quality and hydrodynamic conditions affecting fishery habitat within the south Delta are influenced by a variety of factors including the magnitude of seasonal freshwater inflow to the Bay-Delta estuary from the Sacramento and San Joaquin rivers, tidal circulation patterns within the south Delta, salinity, and seasonal variation in water temperature conditions. Turbidity and suspended sediment concentrations within the south Delta are influenced by wind- and wave-induced turbulence and resuspension of sediments within the shallow open waters and the resulting fetch associated with the relatively large surface areas such as Mildred Island.

Results of fishery sampling within the Bay-Delta estuary have shown that 55 fish species inhabit the estuary (Baxter et al. 1999), of which approximately half are non-native introduced species. Many of the fish species inhabiting the estuary, such as striped bass and American shad, were purposefully introduced to provide recreational and commercial fishing opportunities. A number of the fish species have been introduced accidentally to the estuary through movement among connecting waterways (e.g., threadfin shad and inland silversides). A number of fish and macroinvertebrate species have been accidentally introduced into the estuary, primarily from Asia and the orient, through ballast water discharges resulting from commercial cargo transport (e.g., yellowfin and chameleon gobies). In addition, an estimated 100 macroinvertebrates have also been introduced into the estuary, primarily through ballast water discharge (Carlton 1979). The purposeful and unintentional introductions of non-native fish and macroinvertebrates have contributed to a substantial change in the species composition, trophic dynamics, and competitive interactions affecting the population dynamics of native species. Many of the introduced fish and macroinvertebrates have colonized and inhabit the central Delta.

The Delta provides habitat to a diverse assemblage of resident and migratory fish (Table 3.1-1) and other freshwater and estuarine organisms. The biological environment is a complex community of plants and animals inhabiting various regions of the Bay-Delta estuary. This section summarizes information available on the aquatic resources inhabiting the Bay-Delta estuary, and specifically the south Delta adjacent to the proposed CCWD intake structure and fish screen, including phytoplankton, zooplankton, benthic macroinvertebrates, and common fish populations. The estuary and south Delta provide habitat for a variety of resident and migratory fish species, several of which have been listed for protection under the California and/or Federal ESA, including delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, and Central Valley steelhead. The Delta has been designated as critical habitat for delta smelt and Central Valley steelhead and as EFH by NMFS for managed species including Pacific salmon. As a result of the sensitivity and importance of aquatic habitat within the Delta, this section provides additional information specifically focusing on these sensitive and protected species and their habitat.

Table 3.1-1
Fish Species Inhabiting the Delta Potentially Affected by Construction or Operation of the Proposed Action

Common Name	Scientific Name
Pacific lamprey *	*Lampetra tridentate*
River lamprey *	*Lampetra ayersi*
White sturgeon *	*Acipenser transmontanus*
Green sturgeon *	*Acipenser medirostris*
American shad	*Alosa sapidissima*
Threadfin shad	*Dorosoma petenense*
Central Valley steelhead *	*Oncorhynchus mykiss*
Chum salmon	*Oncorhynchus keta*
Chinook salmon (winter, spring, fall, and late-fall runs) *	*Oncorhynchus tshawytscha*
Longfin smelt *	*Spirinchus thaleichthys*
Delta smelt *	*Hypomesus transpacificus*
Wakasagi	*Hypomesus nipponensis*
Northern anchovy*	*Engraulis mordax*
Pacific sardine*	*Sardinops sagax*
Starry flounder*	*Platichthys stellatus*
Hitch *	*Lavinia exilicauda*
Sacramento blackfish *	*Orthodon microlepidotus*
Sacramento splittail *	*Pogonichthys macrolepidotus*
Hardhead *	*Mylopharodon conocephalus*
Sacramento pikeminnow *	*Ptychocheilus grandis*
Fathead minnow	*Pimephales promelas*
Golden shiner	*Notemigonus chrysoleucas*
Common carp	*Cyprinus carpio*
Goldfish	*Carassius auratus*
Sacramento sucker *	*Catostomus occidentalis*
Black bullhead	*Ameiurus melas*
Brown bullhead	*Ameiurus nebulosus*
Yellow bullhead	*Ameiurus natalis*
White catfish	*Ameiurus catus*
Channel catfish	*Ictalurus punctatus*
Western mosquitofish	*Gambusia affinis*
Rainwater killfish	*Lucania parva*
Striped bass	*Morone saxatilis*
Inland silverside	*Menidia beryllina*
Bigscale logperch	*Percina macrolepida*
Bluegill	*Lepomis macrochirus*
Redear sunfish	*Lepomis microlophus*
Green sunfish	*Lepomis cyanellus*
Warmouth	*Lepomis gluosus*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Largemouth bass	*Micorpterus salmoides*
Smallmouth bass	*Micropterus dolomieui*
Bigscale logperch	*Percina macrolepida*
Tule perch *	*Hysterocarpus traski*
Threespine stickleback *	*Gasterosteus aculeatus*
Yellowfin goby	*Acanthogobius flavimanus*
Chameleon goby	*Tridentiger trigonocephalus*
Prickly sculpin *	*Cottus asper*

* indicates a native species

Source: DFG 2005b

3.2.2 Aquatic Resources and Fish Community

The Bay-Delta is a complex estuarine ecosystem, a transition zone between inland sources of freshwater and saltwater from the ocean. Along the salinity gradient extending from the Golden Gate upstream into the south Delta and its tributaries, the species composition of the aquatic community changes dramatically, although the basic functional relationships among organisms (e.g., predator-prey, etc.) remain similar throughout the system.

The primary energy input to the system is solar radiation, which is used, along with nutrients, by the primary producers (phytoplankton, vascular plants, and macroalgae) to convert inorganic carbon and nutrients to organic matter through photosynthesis. Zooplankton (e.g., copepods, cladocerans, and mysid shrimp) prey on the phytoplankton. The vascular plants and macroalgae are grazed on and also produce detritus, which is decomposed by microbes and consumed by detritivores (e.g., polychaete worms, amphipods, cladocerans, and a diverse group of other fish and macroinvertebrates). The primary consumers are in turn preyed upon by secondary consumers, consisting mainly of a variety of invertebrates (polychaete worms, snails, copepods, mysid shrimp, bay shrimp, and crabs) and fishes (delta smelt, threadfin and American shad, gobies, sculpin, juvenile Chinook salmon, and other resident and migratory fish species). These species in turn are preyed on by top consumers, such as fish (striped bass, catfish, sturgeon, largemouth bass, Sacramento pikeminnow), marine mammals, birds, and humans. The role of a species in the food web may be different at different life stages, or it may utilize various levels of the food web simultaneously.

Fish, shrimp, and crabs use habitats within the south Delta for a number of functions including, but not limited to:

- adult and juvenile foraging,
- spawning,
- egg incubation and larval development,
- juvenile nursery areas, and
- migratory corridors.

Species use of aquatic habitats for any of these functions may vary in response to a suite of factors, and many of these factors may vary daily, seasonally, and annually.

The south Delta aquatic environment is dynamic, varying in response to factors such as the magnitude of freshwater inflow from the Sacramento and San Joaquin River systems and other tributaries to the estuary, and resultant changes in salinity gradients, wind, and tidally driven current patterns, seasonal variation in water temperatures, and a variety of other physical and biological processes. The habitat use and functions of areas within the south Delta vary in response to these physical factors, as well as to differences in life history characteristics and habitat requirements for the wide variety of fish and macroinvertebrates inhabiting the estuary. In short, at any given site, the conditions that may affect habitat use by a species may vary and use of habitats at the site by a species, at any particular life history stage, may vary. It is possible to generally predict whether a species is likely to utilize a site and what that use might be under a given set of circumstances. But in an ecosystem where conditions such as salinity and freshwater flow may change rapidly and somewhat unpredictably, it may be difficult to predict the distribution and abundance of aquatic species with precision. The DFG fishery studies provide general insight into how many aquatic species may respond to some of the varying conditions in the south Delta.

Baxter et al. (1999) described the geographic distribution of various fish, shrimp, and crabs inhabiting the estuary and their response to seasonal and geographic variation in salinity gradients and water temperature. The geographic distribution of many of these species is determined, in large part, by salinity tolerance and preference. Within the Bay-Delta estuary, freshwater and saltwater mix, forming a highly dynamic and productive estuarine habitat characterized by a wide range of salinities, both geographically and seasonally. The geographic distribution and habitat usage patterns for the fish, shrimp, and crabs, which may vary by different life stages of the species, reflect in large part the response to these salinity conditions and other physical habitat conditions including water depths, substrate, availability of suitable cover, and other factors.

Baxter et al. (1999) categorized the fish, shrimp, and crabs inhabiting the Bay-Delta estuary based on three different life history strategies, including the following:

- species that reside in the estuary year-round;
- species that seasonally inhabit the estuary, typically as foraging, spawning, or juvenile nursery habitat; and
- anadromous or migratory species that move through the estuary during passage to or from freshwater and coastal marine habitats. The vast majority of anadromous fish species, including Chinook salmon, steelhead, striped bass, American shad, and sturgeon, migrate through the central Delta and the Sacramento and San Joaquin rivers during their upstream and downstream migrations through the estuary.

Among the seasonal inhabitants, many species use the Bay-Delta estuary as a spawning area and/or juvenile nursery habitat on either an obligatory or nonobligatory basis (Baxter et al. 1999). For obligate species, reproduction and rearing of juveniles occurs almost exclusively within a bay or estuarine environment. Baxter et al. (1999) identifies Pacific herring, jacksmelt, and many surfperch as examples of obligate species that migrate into the estuary to reproduce. Other estuarine obligate species such as starry flounder and bay shrimp reproduce in coastal marine waters, with larvae and/or early juvenile life stages migrating into the estuary to rear.

Nonobligate species may or may not inhabit the estuary during any given year. The occurrence of nonobligate species varies substantially from one year to the next within the Bay-Delta estuary. Nonobligate species include Dungeness crab, brown rockfish, and English sole, which reproduce in the ocean and enter the estuary as small juveniles for rearing (Baxter et al. 1999). These species are typically found in the more marine areas of the estuary and are generally not abundant upstream within the central Delta.

Opportunistic species use the Bay-Delta estuary as an extension of their habitat based on the suitability of environmental conditions. Baxter et al. (1999) notes that several freshwater or low-saline species, such as white catfish and threadfin shad, may opportunistically use habitats within the western Delta and Suisun Bay, San Pablo Bay, or Central Bay during periods of high freshwater outflow from the river systems that result in lower salinity and more suitable habitat conditions for these species farther downstream within the system.

Anadromous species such as Chinook salmon and steelhead spawn within freshwater portions of rivers and creeks tributary to the Bay-Delta estuary. Juvenile rearing habitat for these species is also primarily within the freshwater or low-saline portions of the system. Juvenile Chinook salmon and steelhead emigrate from freshwater habitats and move downstream through the estuary, which is used primarily as a migratory corridor and short-term foraging habitat, as they move into coastal waters for rearing. The central Delta serves as foraging habitat for salmon fry during rearing within the Delta and as smolts migrate downstream from the tributary river systems. Adult Chinook salmon and steelhead subsequently migrate back upstream to spawn, again using the Bay–Delta estuary as a migratory corridor. Other anadromous species such as striped bass have high salinity tolerance and may inhabit freshwater, estuarine, and marine waters over an extended period of time as both juveniles and adults. Juvenile and adult striped bass reside year-round within the central Delta.

A wide range of life history strategies and habitat requirements characterize fish, shrimp, and crabs inhabiting the Bay-Delta estuary. As briefly noted above, habitat requirements of the various species and their life history stages are determined by a variety of factors including, but not limited to:

- salinity gradients;
- seasonal variation in water temperature conditions;
- variation in water depth;
- substrate;
- variation in water velocity and current patterns; and
- availability of foraging and cover habitat and physical structures such as pilings and emergent vegetation, high velocity areas adjacent to levee breaches, and riprap that provide both foraging areas and shelter and cover.

Species functional habitat use in the central Delta varies in response to these physical habitat features and the life history of the species. Species such as Chinook salmon and steelhead use the estuary as a temporary foraging and migratory corridor during juvenile emigration from freshwater rearing areas to coastal marine waters and again as adults to migrate from coastal marine waters upstream to freshwater spawning habitat.

The abundance (density) of various species within an area provides important information on the values, uses, and functions of various habitats for different life stages of a species. For example, high abundance of a species or life stage within a specific area indicates that physical and chemical habitat characteristics (e.g., water depth, substrate, salinity, temperature, availability of prey, and availability of cover and shelter) are being met for that species during the time they occupy that habitat. Information on seasonal abundance patterns within an area can be used, in combination with information on the life history characteristics of the species, to help identify the functional use of different habitats for activities such as adult foraging, spawning and egg incubation, larval dispersal, juvenile nursery and rearing, seasonal migration patterns, and other habitat functions. The association between abundance and specific habitat types can also be used as part of the information on habitat function. Available data were examined from the DFG fishery sampling program, and other fishery studies, to provide information on habitat use by various species and life stages within the areas of the south Delta.

In the following sections, the major components of the Bay-Delta aquatic community are briefly discussed, including phytoplankton, zooplankton, benthic macroinvertebrates, fish, shrimp, and crabs.

3.2.2.1 Phytoplankton

Phytoplankton are small photosynthetic plants that form the base of the estuarine food web. They are usually microscopic in size and consist of single cells or chains of cells. Major groups of phytoplankton in the estuary include diatoms, dinoflagellates, and cryptomonads (Herbold et al. 1992). Phytoplankton are of prime importance to the ecology of the Bay-Delta estuary because of their position at the base of the food web. The seasonal abundance (standing crop) of copepods, cladocerans, and other pelagic herbivores closely follows the seasonal cycle of phytoplankton abundance in the estuary. Juvenile survival and growth of many fish species, such as striped bass and threadfin shad, within the Delta and elsewhere within the estuary largely depends on the quality and quantity of phytoplankton and/or associated zooplankton available as a direct or indirect food resource.

In the low-salinity and freshwater areas of the estuary, including the Delta, diatoms are the dominant phytoplankton. Green algae are abundant during winter and spring and may constitute as much as 60–70% of the phytoplankton populations of the Delta and Suisun Bay. Green algae are generally less abundant in the more saline regions of the estuary, but may be common in the fresh, slowly flowing waters of the interior Delta. The highest abundance of phytoplankton within the estuary typically occurs within the Suisun Bay freshwater and saltwater mixing zone. Abundance of phytoplankton is typically low during the winter, increasing substantially during spring and summer, followed by a reduction in abundance during fall. Factors affecting the geographic and seasonal distribution of phytoplankton within the estuary include seasonal patterns of solar radiation, seasonal water temperatures, availability of nutrients, current patterns and residence time, and salinity gradients. Turbidity, suspended sediments, and water depth also affect availability of sunlight and the abundance of phytoplankton within different areas of the estuary including the shallow open waters of the Delta where sediment resuspension rates and turbidity are typically high.

In the Delta, interannual variability of phytoplankton is largely reflected in the corresponding variability in Delta inflow and outflow. Phytoplankton productivity is overwhelmingly dominated by shallow-water shoal productivity, and interannual variability therefore reflects fluctuations in shoal, rather than channel productivity (Herbold et al. 1992). Net water column productivity in the deeper open water areas and channels is almost always negative because of the small portion of the water column in the photic zone, so biomass must be imported from the shallow-water shoal and channel areas. Advective transport, particularly on ebb tide, is an important mechanism for transporting chlorophyll downstream in estuaries, and Delta outflow therefore is a major factor in controlling variability of phytoplankton productivity. Another major process appears to be consumption by benthic herbivores (Lucas et al. 2002) including the recently introduced Asian clam (*Corbula amurensis*) and the freshwater Asian clam (*Corbicula fluminea*), especially during low-flow periods where benthic invertebrates can become established in high enough densities to filter large quantities of water, affecting phytoplankton biomass.

Lehman (1998) discusses the importance of high concentrations of large diatoms (e.g., *Skeletonema costatum, Coscinodiscus* spp. and *Cyclotella* spp.) that, during the spring in the 1970s, accumulated in the Low Salinity Zone (LSZ) where salinity ranges between 0.6 and 4 ppt in Suisun Bay. This accumulation was considered to be a primary factor controlling interannual variation in fish populations within the estuary because it supported zooplankton production. However, since the early 1980s, chlorophyll concentrations and shifts in species composition have occurred throughout the estuary. A 10-fold decrease in chlorophyll concentrations in Suisun Bay has occurred since 1986. This decrease is associated with, and may be the result of, the introduction of the Asian clam. These recent trends have raised questions about the ability of phytoplankton production in the Bay-Delta estuary to support zooplankton production.

3.2.2.2 Zooplankton

Zooplankton are microscopic and macroscopic animals that are planktonic (free-floating) or weak swimming fish and invertebrates. Animals that are planktonic throughout their life cycle are known as holoplankton. Others, such as eggs, larvae, and juveniles of benthic invertebrates and fish, are plankton only during early life stages and are known as meroplankton. A number of zooplankton species have been introduced into the estuary (Kimmerer 1998) through ballast water discharges from commercial shipping and have impacted native species inhabiting the estuary.

Zooplankton, the primary consumers within the estuary, are at the center of the estuary food web and therefore are not only important to lower trophic levels upon which they feed (phytoplankton, detritus), but also to the higher trophic levels for which they serve as prey (fish and macroinvertebrates). Zooplankton include herbivores, which forage mainly on phytoplankton, and detritivores that feed on detritus and microbes. Zooplankton are primarily suspension feeders. Zooplankton include small macroinvertebrates such as calanoid copepods and cladocerans but also include fish and macroinvertebrate eggs and larvae, including delta smelt larvae, threadfin shad, striped bass eggs and larvae, crabs, and bay shrimp. The abundance and distribution of zooplankton vary substantially within the estuary in response to seasonal cycles and environmental factors such as salinity gradients and river flow and tidal currents. In the low-salinity regions of the Delta, the primary zooplankton are calanoid copepods (*Eurytemora affinis* and *Acartia clausi*) and the opossum shrimp (*Neomysis mercedis*). The cladocerans (*Daphnia pulex* and *D. parvula*) and calanoid copepods (*Diaptomus* spp. and *Limnocalanus macrurus*) are the primary zooplankton species occurring within the freshwater portions of the Delta.

Salinity is one of the major factors affecting the distribution and abundance of zooplankton within the estuary as evidenced by the changes in species composition that occur within various regions of the estuary. The distribution and abundance of zooplankton is also related to the availability of food. Physical and chemical conditions that promote phytoplankton productivity (e.g., warm temperatures, high solar radiation, high nutrients, slow-moving water, low turbidity and suspended sediment concentrations, shallow waters, etc.) indirectly promote the productivity of zooplankton. Water body configuration and bathymetry also affect phytoplankton productivity and, therefore, zooplankton productivity. The shallow areas of Suisun Bay are highly productive, as are many of the shallow slow-moving open and backwater areas farther upstream within the Delta. The location of the salt water and freshwater mixing zone during spring also influences the abundance of both phytoplankton and zooplankton within the estuary. When the mixing zone is located in the shallow portions of Suisun Bay, the abundance of both phytoplankton and zooplankton increases. When the mixing zone is upstream in the deeper channels of the lower Sacramento and lower San Joaquin rivers in response to reduced freshwater inflow that occurs during drought conditions, productivity and abundance of both phytoplankton and zooplankton are reduced.

Seasonal variations in zooplankton abundance are determined by temperature or photoperiod, seasonal cycles of phytoplankton, and Delta inflow and outflow (Kimmerer 2002a, 2002b). Zooplankton biomass tends to be highest in the Bay-Delta estuary during spring and early summer. The abundance of several important zooplankton species inhabiting the Delta has decreased substantially over the past several decades. The most dramatic change occurred with the introduction of the Asian clam, *Corbula amurensis,* in 1986 (Kimmerer and Orsi 1996). *Corbula amurensis* plays a significant role in grazing zooplankton, consuming not only diatoms but also nauplii of the copepod *Eurytemora affinis*, which is a dominant species in the estuary, and other holoplanktonic and meroplanktonic invertebrates (Carlton et al. 1990). At the time of the invasion, the copepod *Pseudodiaptomus forbesi*, the mysid *Acanthomysis* spp., and amphipods became abundant in the regions formerly occupied by *E. affinis* (Kimmerer and Orsi 1996; Kimmerer et al. 1999). The introduction of nonnative fish and invertebrates such as *C. amurensis* has been identified as a major factor affecting the abundance and species composition of zooplankton, and the fish and macroinvertebrate community in general, within the Bay-Delta estuary.

3.2.2.3 Benthic and Epibenthic Macroinvertebrates

Within the estuary, benthic macroinvertebrates typically live within the top 12 inches of sediment on the Bay-Delta floor. Epibenthic macroinvertebrates typically live on the sediment surface. Within the Delta, benthic and epibenthic species include bay shrimp, opossum shrimp, amphipods, polychaetes, oligochaetes, and clams. A recently introduced clam species (*C. amurensis*) has rapidly expanded its geographic distribution and abundance within Suisun Bay and the Delta (Thompson and Peterson 1998) and has achieved sufficiently high population abundance that feeding (clams are filter feeders) has significantly altered the abundance of phytoplankton and zooplankton within the estuary.

Characteristics of the benthic and epibenthic macroinvertebrate community are influenced by a variety of physical and water quality conditions that occur within the estuary, the most important being flow velocities, substrate characteristics, and salinity gradients (Thompson et al. 2000). As stated in Herbold et al. (1992), the factors most affecting the abundance, composition, and health of the benthic community from year-to-year are outflow from the Delta, local runoff, and pollution (Nichols and Pamatmat 1988). Lower outflows are associated with lower phytoplankton biomass and hence lower productivity during periods of low flow. High outflows lead to lower salinities, which particularly control the species abundance and composition in shallow areas where animals are exposed to less saline surface water.

Benthic communities in the Bay-Delta estuary have also been influenced by disturbances such as dredging and filling activities. Sediment grain-size distributions show that sandy sediments persist in areas of high current velocities such as the channel areas (Rubin and McCulloch 1979), while finer sediments settle in areas of lower current velocity such as in the shoals and small channels (Krone 1979) and within the shallow open water habitat within the Delta. Benthic and epibenthic invertebrate populations are generally most abundant in areas having reduced water velocities, fine-grained sediments, and relatively stable benthic environments (little sediment resuspension, movement or disturbance, slow rates of accretion or depletion of sediments). In deeper water channels, and high velocity areas characterized by sand and coarse substrate with substantial daily, seasonal, or interannual substrate movement and accretions and depletions, benthic and epibenthic macroinvertebrate communities characteristically have reduced species diversity and abundance.

Many of the more common benthic species that inhabit the estuary are not native to the region but have been transported and introduced into the estuary through the discharge of ballast water from commercial ships, or on the shells of oysters brought from the East Coast for commercial farming in the late 19th century (Carlton 1979). Today, over 40% of the individuals comprising the benthic community in a given area of the estuary can be nonindigenous species (Carlton 1979; Cohen 2000). Many of these introduced species may serve ecological functions similar to native species that they may have displaced; however, some species may be detrimental to the aquatic ecosystem of the estuary.

All but two of the benthic mollusks (i.e., oysters, clams) inhabiting the Delta are introduced. Within the Delta, one of the dominant mollusks, the Asiatic clam (*Corbicula fluminea*), is intolerant of saline waters. The more recently introduced *Corbula amurensis* has higher salinity tolerance and has achieved high abundance levels in Suisun Bay.

Unlike the mollusks, the epibenthic crustaceans (e.g., crabs and shrimp) inhabiting the Delta are still made up of many native species, particularly Bay shrimp (*Crangon* spp.).

The smaller epibenthic fauna in the estuary are dominated by four species of shrimp commonly called bay shrimp (*Crangon franciscorum* – California bay shrimp, *C. nigricauda* – blacktail bay shrimp, *C. nigromaculata* – blackspotted bay shrimp, and *Palaemon macrodactylus*). The California bay shrimp are most abundant in lower salinities, blacktail bay shrimp prefer salinities of 25 parts per thousand (ppt) or more, and blackspotted bay shrimp are seldom found at salinities below 30 ppt (Baxter et al. 1999). *P. macrodactylus*, which was introduced from Korea, is found only in the upper estuary, particularly Suisun Bay. All three *Crangon* shrimps show responses to flow patterns, where the mechanism appears to be greater transport of post-larval shrimp into the estuary by bottom currents in years of high freshwater outflow. Crabs inhabiting the Delta are dominated by the introduced Chinese mitten crab (Veldhuizen and Grimaldo 2003; DFG 2005b).

Processes that regulate the abundance and distribution of benthic communities also affect the colonization of the bottom after disturbances, such as modifying or removing habitat by dredging or sediment disposal. Patterns of reproduction and the availability of colonists can also have a profound effect on benthic community recovery. Polychaete worms, bivalve mollusks, crabs, and shrimp recruit by small larval stages that can be planktonic and capable of dispersal over large geographic areas, or by larger crawl-away larvae that remain near the bottom and the adult habitat. Amphipods and other similar crustaceans brood their young until they are small juveniles that disperse much like crawl-away larvae. In some species, the adults are the dispersal stage and the first colonists after disturbance. Benthic macroinvertebrates typically have high fecundity and dispersal mechanisms that facilitate colonization of habitat within the estuarine environment.

3.2.2.4 Fish

Fish species may utilize the south and central Delta and other regions of the estuary for any or all of their life history stages. They may have planktonic, epibenthic (demersal), and pelagic (open water) life histories. The majority of fish species (e.g., delta smelt, threadfin shad, striped bass, gobies, etc.) inhabiting the estuary have planktonic larval stages; as plankton, they feed on zooplankton and in some cases, phytoplankton. Many of these species forage on plankton during the larval and early juvenile life stages, and then as juveniles and adults become more selective predators and feed on large invertebrates and fish. Demersal fish such as sturgeon, gobies, sculpin, and striped bass are planktivorous as larvae but begin to feed on epibenthic invertebrates and fish as juveniles. Many smaller fish, including delta smelt and threadfin shad, are planktivorous throughout their lives.

Some estuarine fish do not rely on plankton as a major food source at any life stage. The live-bearing tule perch, for example, predominantly feed on epibenthic invertebrates, such as mollusks, crustaceans, and polychaetes throughout their life. Many freshwater fish such as juvenile Chinook salmon prey primarily on benthic and drifting insect larvae and crustaceans, because zooplankton abundance is low in the swifter flowing freshwater sloughs and rivers.

The abundance and species composition of fish inhabiting the estuary vary in response to salinity gradients (Baxter et al. 1999). In the low-salinity areas of the central Delta, the most abundant taxa include striped bass, American shad, threadfin shad, white catfish, delta smelt, Chinook salmon, and largemouth bass. Anadromous fish species such as Chinook salmon, steelhead, American shad, striped bass, and sturgeon utilize the entire estuarine system as a seasonal migration corridor and foraging habitat.

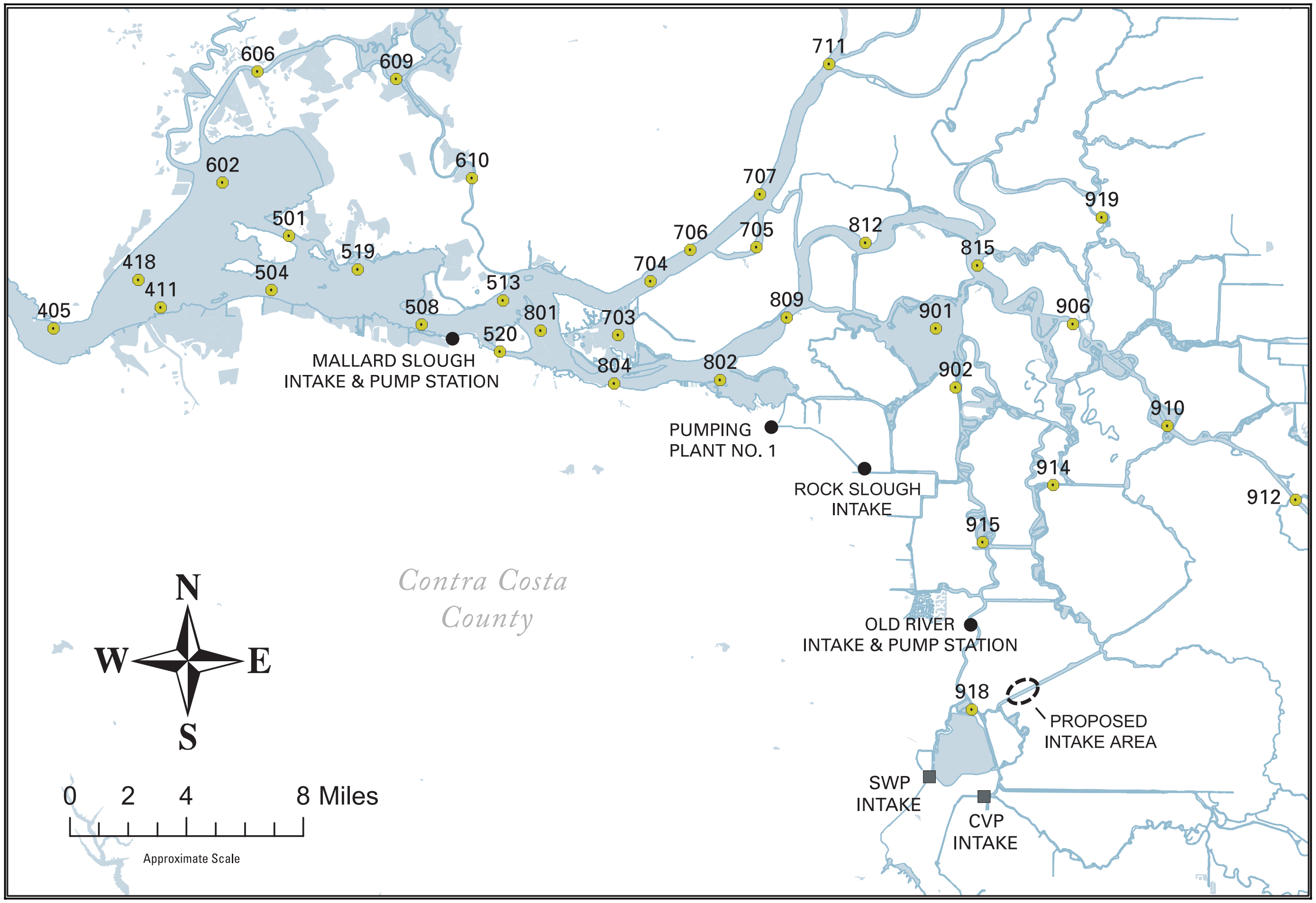
Factors affecting the abundance and geographic distribution of fish within the estuary include water velocities, substrate, salinity gradients, water temperature, and food availability. Many of the fish that inhabit the estuary reside in coastal marine waters, entering the estuary on a seasonal basis for foraging or reproduction. The seasonal cycles of fish abundance vary in response to migration patterns, reproductive cycles, foraging patterns, and environmental conditions occurring both within the estuary and coastal marine waters.

The fish community inhabiting the Bay-Delta estuary is diverse and dynamic (Table 3.1-1). Abundance of the species may fluctuate substantially within and among years (Baxter et al. 1999) in response to both population dynamics and environmental conditions. Life-history strategies and habitat requirements also vary substantially among species within the fish community. The following sections briefly describe the species composition of the fish community inhabiting the south and central Delta. The primary sources of information used to describe species composition and seasonal patterns in abundance and geographic distribution for various fish species were the extensive DFG fishery monitoring program known as the Bay Study (Baxter et al. 1999), the DFG 20 millimeter (mm) delta smelt surveys, and results of fish salvage monitoring at the CVP and SWP fish salvage facilities (see "Resident and Migratory Fish" for discussion of how these datasets were selected as those most appropriate for this analysis). Exhibit 3.1-1 provides sampling locations, and DFG Delta fisheries surveys are summarized in Attachment D.

Eggs and Larvae

Ichthyoplankton are the egg and larval forms of estuarine fishes. Many species of fish release their eggs into the water column, or larvae are resuspended into the water column after hatching. Larvae initially depend on yolk sac reserves for nutrition, then feed as planktonic forms as they gradually transform from their larval morphology to their juvenile, free-swimming form (nekton). Seasonal abundance and geographic distribution of ichthyoplankton species within the estuary are dependent on the reproductive cycles of the adults and circulation patterns within the estuary. Generally, fish larvae are present in the plankton community during peaks of phytoplankton and zooplankton in winter and spring (Ambler et al. 1985). Common ichthyoplankton present in the Delta include the eggs and larval forms of fish species such as striped bass, longfin smelt, delta smelt, threadfin shad, and gobies. Delta smelt larvae are most abundant during spring (March–May), when spawning occurs. The abundance of longfin smelt larvae tends to be highest during late winter (Wang 1986; Baxter et al. 1999). Striped bass eggs and larvae are most abundant from April through June.

Because ichthyoplankton are planktonic and/or weak swimmers (depending on life history stage), they are transported by water currents within various regions of the estuary. Information is available from extensive fishery monitoring studies conducted throughout the estuary by DFG (Baxter et al. 1999; DFG 2005b) and others (Wang 1986)



Source: Hanson Environmental 2006; DWR 2006; DFG 2006

Exhibit 3.1-1
Major Delta Fish Sampling Survey Locations within the Delta

that provide data on the species composition and densities of ichthyoplankton within the south and central Delta.

Resident and Migratory Fish

As part of the scientific and technical foundation used to characterize the fishery community of the south Delta, information is needed regarding the species composition, occurrence of species of special concern, geographic distribution, and abundance (density) of species inhabiting the area. The species composition and abundance vary within and among years in response to a variety of environmental and biological factors including variation in Delta inflow, tidal currents and hydraulics, salinity, water temperature, and other factors, which are affected in large part by seasonal and interannual variation in freshwater inflow from the Sacramento and San Joaquin River systems, water depth, and habitat use. Habitat use includes seasonal migrations for spawning and emigration, and seasonal usage by various species including threatened and endangered species for reproduction and/or foraging and nursery habitat. The south Delta is within the area of the estuary that has been designated as critical habitat for delta smelt and Central Valley steelhead. The mainstem Sacramento River and lower regions of the estuary have been identified as critical habitat for winter-run and spring-run Chinook salmon. The San Francisco Bay and Sacramento-San Joaquin River Delta, including the central and south Delta, have also been designated as EFH by NMFS reflecting the importance of the estuarine habitats within the bay for managed fish species. Therefore, a detailed knowledge of the characteristics and the variation in these biological communities is an important component in the environmental analysis of potential impacts resulting from construction and operation of the Proposed Action.

The following sections briefly summarize and analyze information from fisheries surveys to characterize:

- species composition within the south and central Delta,
- differences in species composition by location/habitat,
- occurrence of threatened and endangered species, and
- interannual variation in species abundance and distribution.

CVP and SWP Fish Salvage Data

Fish salvage data collected at the Tracy and Skinner fish facilities were used primarily to characterize the fishery populations in the south Delta near the Proposed Action intake site. The fish facilities are located a few miles from the Proposed Action intake site at Victoria Canal near Clifton Court Forebay. Salvage data have been collected since the late 1950s up until the present and have become a source of information on fisheries within the south Delta.

Bay Study

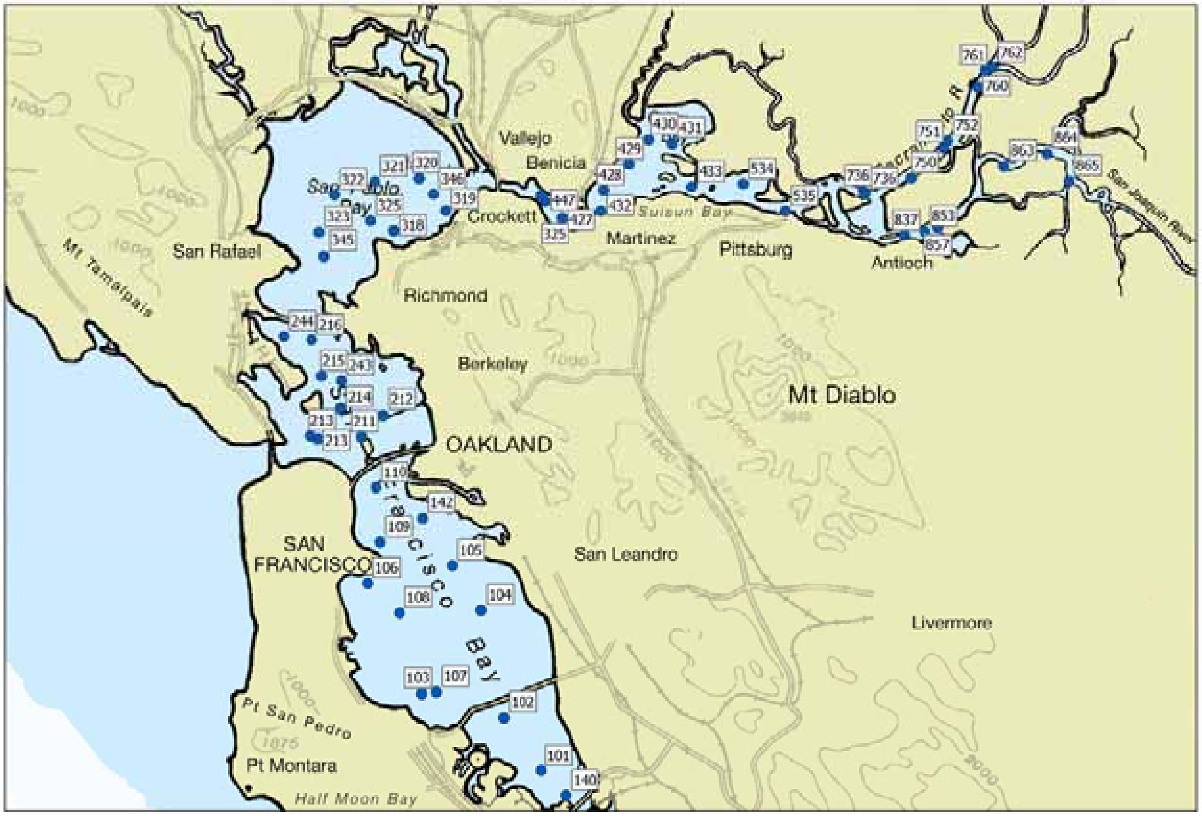
Methods

The Bay Study fishery survey program designed and implemented by DFG (Baxter et al. 1999) is a long-term study that began in 1980 and continues to date, with data collected monthly using multiple gear types to sample both juvenile and adult fish and macroinvertebrates (Table 3.1-2 and Exhibit 3.1-2). In the past, the fishery monitoring program also sampled fish eggs and larvae. The delta smelt 20 mm surveys, conducted throughout spring within the Delta since 1995, provide additional information on the seasonal and geographic distribution of delta smelt larvae within various regions of the Delta (Exhibit 3.1-3). Detailed data are also available on the size, density, species composition, and seasonal distribution of fish collected as part of CVP and SWP salvage, which was initiated in the 1950s and accrues data year round (DFG and DWR 2005). While this study may effectively characterize fishery populations in the central Delta, its shortcoming, as far as appropriateness for this analysis, is that its sampling sites do not extend into the south Delta. The Bay Study provides useful information on fishery populations at two CCWD intake sites: Mallard Slough and Rock Slough.

Table 3.1-2
San Francisco Bay Study Sampling Months by Year and Gear Type
(1980 to Present)

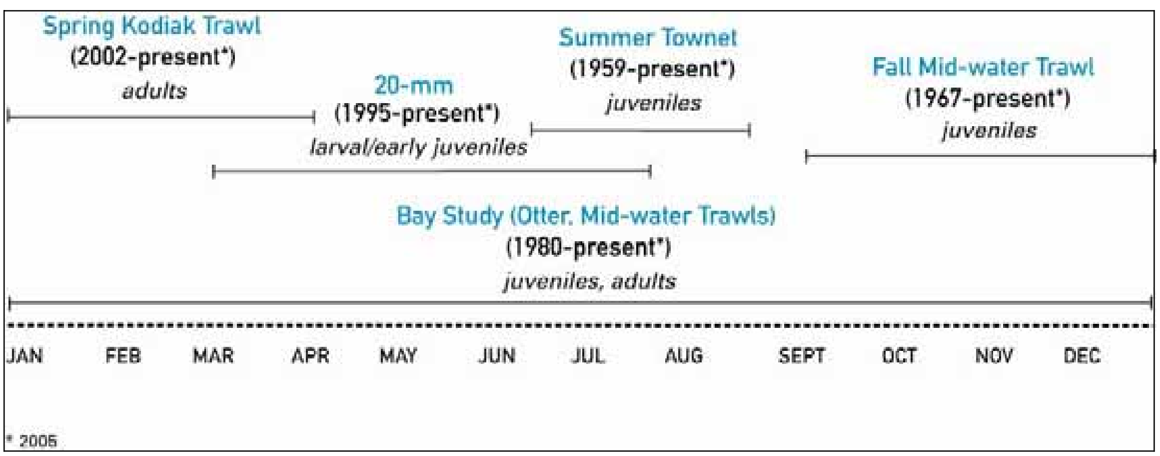
Year	Midwater and Otter Trawls	Plankton Net	Beach Seine
1980	February – December	February – December	August – December
1981	January – December	January – December	January – December
1982	January – December	January – December	January – December
1983	January – December	January – December	January – December
1984	January – December	January – December	January – December
1985	January – December	January – December	January – December
1986	January – December	January – December	January – December
1987	January – December	January – December	January
1988	January – December	January – December	
1989	January – August	January – July	
1990	February – October		
1991	February – October		
1992	February – October		
1993	February – October		
1994	February – October		
1995	January – December		
1996	January – December		
1997	January – December		
1998	January – December		
1999	January – December		
2000	January – December		
2001	January – December		
2002	January – December		
2003	January – December		
2004	January – December		
2005	January – December		
2006	January – December		

Note: The ringnet survey, not listed above, was the other component conducted as part of the Bay Study from 1982 to 1992, which caught crabs.



Source: Baxter et al. 1999, modified by Hanson Environmental, Inc.

Exhibit 3.1-2
California Department of Fish and Game
San Francisco Bay Study Open Water Sampling Stations



Source: Hanson Environmental 2005

Exhibit 3.1-3
Time Periods of DFG Delta Fish Surveys

DFG sampled at approximately monthly intervals during the ongoing Bay Study using midwater trawls and otter trawls from 1980 to present. The otter trawl was towed on the bottom against the current for 5 minutes and then retrieved. The midwater trawl was towed with the current for 12 minutes and retrieved obliquely. The plankton net (505 µm mesh) mounted on a steel sled was towed on the bottom for 5 minutes and retrieved obliquely at Station 837. Inshore fishery sampling (Station 857) has been conducted using a beach seine.

The 35 station locations from the South Bay upstream into the Sacramento River to Sherman Island and the San Joaquin River at Antioch (Baxter et al. 1999), with an additional 17 stations added between 1988 and 1994, represent a variety of hydrological and environmental conditions within the Bay-Delta estuary and provide important information on the seasonal distribution of the fishery community. The Bay Study is the primary source of data used to characterize the central Delta fishery community. DFG's Bay Study sampling stations were examined as a component of the analysis of the fishery community of the central Delta. Sampling stations selected include Stations 837, 857, 863, 864, and 865 (Exhibit 3.1-2).

Results

The variation in sampling methods expectedly yields different results. The otter trawl samples more effectively from the near substrate area (epibenthic), the midwater trawl samples more effectively in the open-water column, and the plankton net samples the smaller components of the aquatic community more effectively. The beach seine samples the inshore fishery community inhabiting shallow water areas immediately adjacent to the shoreline. It is necessary to review the results of all four methods to gain an understanding of the overall aquatic community inhabiting the central Delta. Because many of the fish inhabiting the area, particularly as adults, are not effectively sampled by these conventional survey methods, additional information from limited electrofishing surveys and reports from recreational anglers have been used to augment results of the DFG fishery sampling.

Survey results should be interpreted with caution. Fishery sampling using plankton nets, otter trawls, beach seines, and midwater trawls, as conducted by DFG, primarily collect the early life stages of fish species. Larger subadult and adult fish are able to avoid capture by these sampling methods and therefore are either absent or underrepresented as members of the fish community. For example, juvenile steelhead emigrating through the central Delta effectively avoid capture and, therefore, although present in the central Delta during their migration period, may not be detected using these conventional fishery sampling techniques. A number of fish species that inhabit areas associated with pilings, docks, or other structures, such as largemouth bass, may also be underrepresented in the sampling effort. Species that inhabit shallow water areas or intertidal habitat are also underrepresented in results of DFG open water fishery surveys conducted in deeper subtidal habitats. Larger individuals, such as adult striped bass and sturgeon, although present within the central Delta, are not represented in collections using these sampling techniques. Analysis and interpretation of the DFG fishery data, although a useful and powerful source of information, need to be read in combination with information from other surveys and general information on habitat conditions within the estuary when establishing a foundation for characterizing fish and macroinvertebrate communities within the central Delta and other regions of the estuary.

Sampling in the central Delta using otter trawls and midwater trawls at Stations 863, 864, and 865 (Exhibit 3.1-2 and Tables 3.1-3, 3.1-4, and 3.1-5) shows that the most abundant fish species inhabiting the area include striped bass, American shad, threadfin shad, white catfish, yellowfin goby, and Chinook salmon. In total, 31 fish species have been collected from these central Delta sampling stations using the otter trawl and midwater trawl. Delta smelt were the eleventh most abundant fish species collected, but are known to be in decline.

Data on the occurrence and abundance of crab and shrimp were summarized from the DFG otter trawl surveys. As would be expected, the crab community inhabiting the central Delta is dominated by the recently introduced Chinese mitten crab. Bay shrimp (*Palaemon macrodactylus* and *Crangon* spp.) were the most common shrimp species in the central Delta.

Table 3.1-3
1994–2002 San Francisco Bay Study Otter Trawl and Midwater Trawl (Station 863) Species Composition and Relative Abundance of Fish Collected from the Central Delta

Species	Midwater Trawl		Species	Otter Trawl	
	Percentage Collected	Number Collected		Percentage Collected	Number Collected
American shad	67.64%	1,766	striped bass	80.89%	1,630
threadfin shad	29.38%	767	starry flounder	3.37%	68
striped bass	1.49%	39	yellowfin goby	3.08%	62
chinook salmon	0.88%	23	American shad	2.63%	53
delta smelt	0.15%	4	white catfish	2.43%	49
longfin smelt	0.08%	2	channel catfish	1.54%	31
steelhead trout	0.08%	2	threadfin shad	1.44%	29
threespine stickleback	0.08%	2	bigscale logperch	1.24%	25
white catfish	0.04%	1	delta smelt	0.99%	20
splittail	0.04%	1	splittail	0.60%	12
yellowfin goby	0.04%	1	tule perch	0.55%	11
Pacific staghorn sculpin	0.04%	1	shimofuri goby	0.50%	10
bluegill	0.04%	1	Pacific staghorn sculpin	0.30%	6
black crappie	0.04%	1	chinook salmon	0.20%	4
			prickly sculpin	0.10%	2
			common carp	0.10%	2
			bluegill	0.05%	1
Total collected		**2,611**	**Total collected**		**2,015**

Source: DFG 2005b

Table 3.1-4
1994–2002 San Francisco Bay Study Otter Trawl and Midwater Trawl (Station 864) Species Composition and Relative Abundance of Fish Collected from the Central Delta

Species	Midwater Trawl		Species	Otter Trawl	
	Percentage Collected	Number Collected		Percentage Collected	Number Collected
American shad	64.65%	664	white catfish	51.71%	634
threadfin shad	20.84%	214	channel catfish	27.24%	334
striped bass	5.94%	61	striped bass	12.15%	149
chinook salmon	4.67%	48	yellowfin goby	3.75%	46
white catfish	2.34%	24	tule perch	0.98%	12
delta smelt	0.49%	5	starry flounder	0.73%	9
channel catfish	0.49%	5	threadfin shad	0.65%	8
splittail	0.19%	2	American shad	0.65%	8
longfin smelt	0.19%	2	prickly sculpin	0.41%	5
yellowfin goby	0.19%	2	shimofuri goby	0.33%	4
			white sturgeon	0.33%	4
			splittail	0.16%	2
			delta smelt	0.16%	2
			Pacific lamprey	0.16%	2
			river lamprey	0.16%	2
			bearded goby	0.16%	2
			bigscale logperch	0.08%	1
			longfin smelt	0.08%	1
			blue catfish	0.08%	1
Total collected		**1,027**	**Total collected**		**1,226**

Source: DFG 2005b

Table 3.1-5 1994–2002 San Francisco Bay Study Otter Trawl and Midwater Trawl (Station 865) Species Composition and Relative Abundance of Fish Collected from the Central Delta					
Species	Midwater Trawl		Species	Otter Trawl	
	Percentage Collected	Number Collected		Percentage Collected	Number Collected
American shad	56.62%	1,287	striped bass	82.44%	2,605
threadfin shad	39.77%	904	threadfin shad	4.18%	132
striped bass	1.63%	37	American shad	3.07%	97
chinook salmon	1.19%	27	splittail	2.53%	80
delta smelt	0.40%	9	redear sunfish	1.74%	55
longfin smelt	0.22%	5	tule perch	1.68%	53
steelhead trout	0.04%	1	bigscale logperch	1.17%	37
threespine	0.04%	1	delta smelt	0.70%	22
white catfish	0.04%	1	yellowfin goby	0.70%	22
yellowfin goby	0.04%	1	white catfish	0.44%	14
			starry flounder	0.32%	10
			chinook salmon	0.19%	6
			channel catfish	0.19%	6
			shimofuri goby	0.16%	5
			largemouth bass	0.13%	4
			bluegill	0.09%	3
			longfin smelt	0.06%	2
			common carp	0.06%	2
			green sturgeon	0.03%	1
			white sturgeon	0.03%	1
			wakasagi	0.03%	1
			inland silverside	0.03%	1
			prickly sculpin	0.03%	1
Total collected		2,273	**Total collected**		3,160
Source: DFG 2005b					

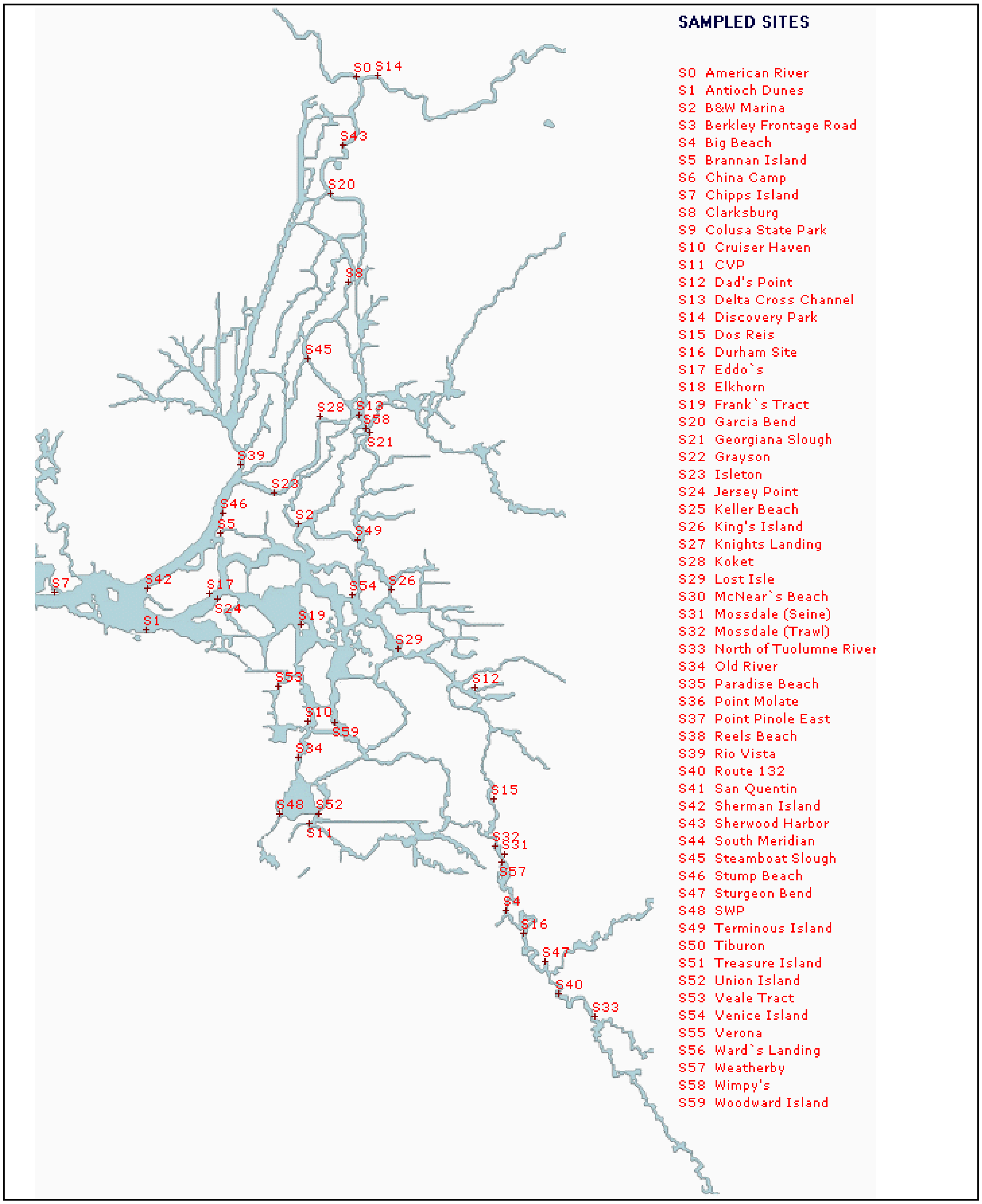
Results of inshore beach seine surveys in the central Delta (Station 857) showed that inland silversides dominate the near-shore fishery community (Table 3.1-6). Other fish species included striped bass, threadfin shad, Sacramento splittail, Sacramento pikeminnow, Chinook salmon, tule perch, yellowfin goby, threespine stickleback, delta smelt, and nine other species.

Table 3.1-6 1980-1987 San Francisco Bay Study Beach Seine (Station 857) Species Composition and Relative Abundance of Fish Collected from the Central Delta		
Species	**Percentage Collected**	**Number Collected**
Inland Silverside	70.54%	1,104
Striped Bass	12.72%	199
Threadfin Shad	5.88%	92
Splittail	2.81%	44
Sacramento Pikeminnow	2.49%	39
Chinook Salmon	1.21%	19
Tule Perch	1.15%	18
Yellowfin Goby	0.83%	13
Threespine Stickleback	0.77%	12
Delta Smelt	0.51%	8
American Shad	0.32%	5
Northern Anchovy	0.13%	2
Pacific Staghorn Sculpin	0.13%	2
Surf Smelt	0.13%	2
White Catfish	0.13%	2
Channel Catfish	0.06%	1
Common Carp	0.06%	1
Jacksmelt	0.06%	1
Largemouth Bass	0.06%	1
Total collected		**1,565**
Total surveys		**77**
Source: DFG 2005b		

Striped bass, longfin smelt, unidentified smelt, threadfin shad, and prickly sculpin eggs and larvae were the most common ichthyoplankton collected in the central Delta (Station 837). In total, 22 taxa of fish and larvae were collected in central Delta plankton sampling.

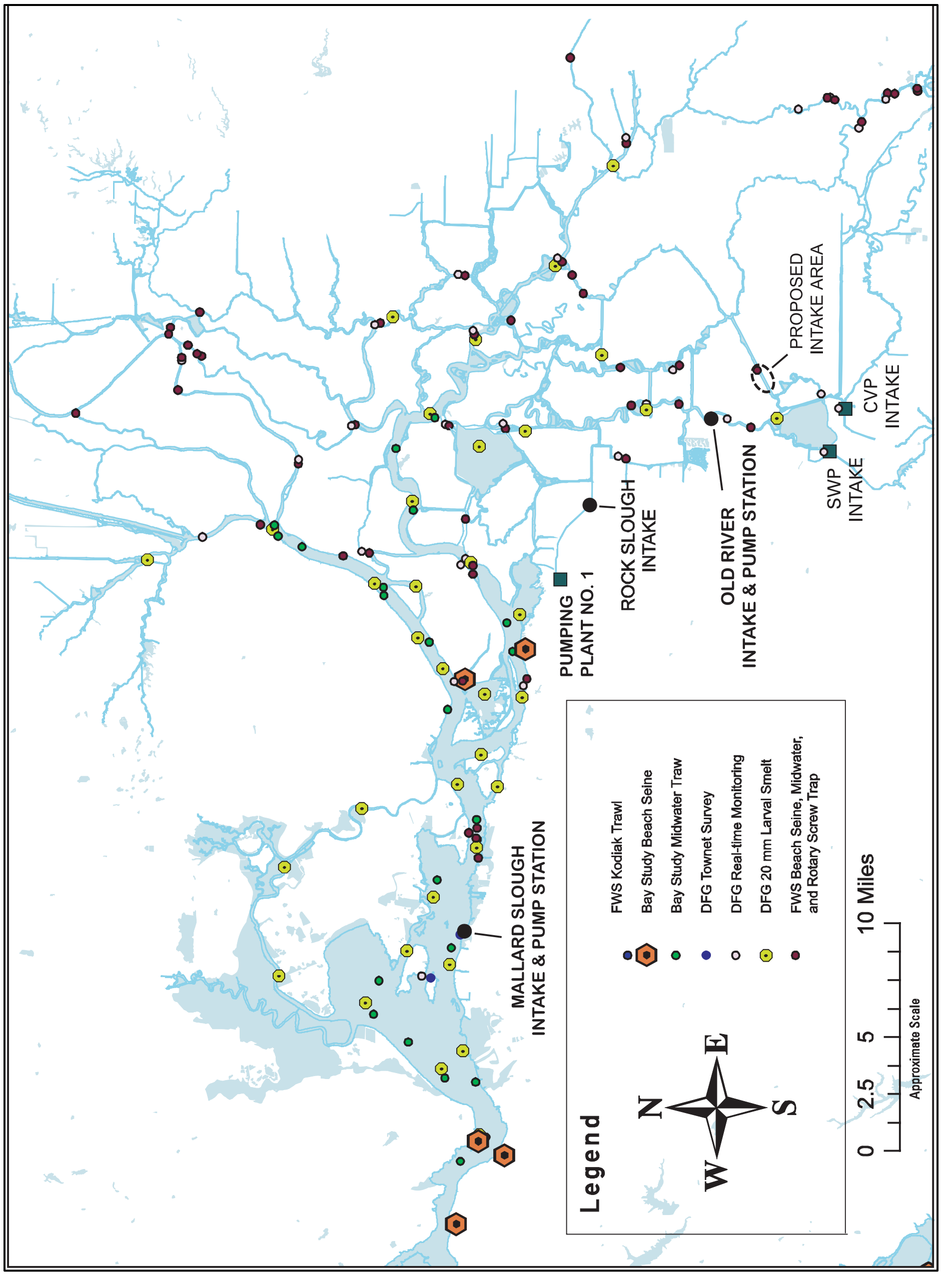
Other DFG and USFWS Fish Survey Programs

Additional information of varying degrees of usefulness in terms of examining the fishery community in the central and south Delta for the Proposed Action is available from DFG and USFWS sampling programs, performed as a collaborative effort of the Interagency Ecological Program (IEP). DFG surveys such as real-time monitoring (RTM) (Exhibit 3.1-4); 20 mm delta smelt surveys (Exhibit 3.1-5); summer townet and fall midwater trawl surveys (Exhibits 3.1-6 through 3.1-10); and the spring Kodiak trawl surveys, which replaced the spring midwater trawl survey in 2002, all sample fish in the central and south Delta (Exhibit 3.1-11). Detailed information on these surveys are



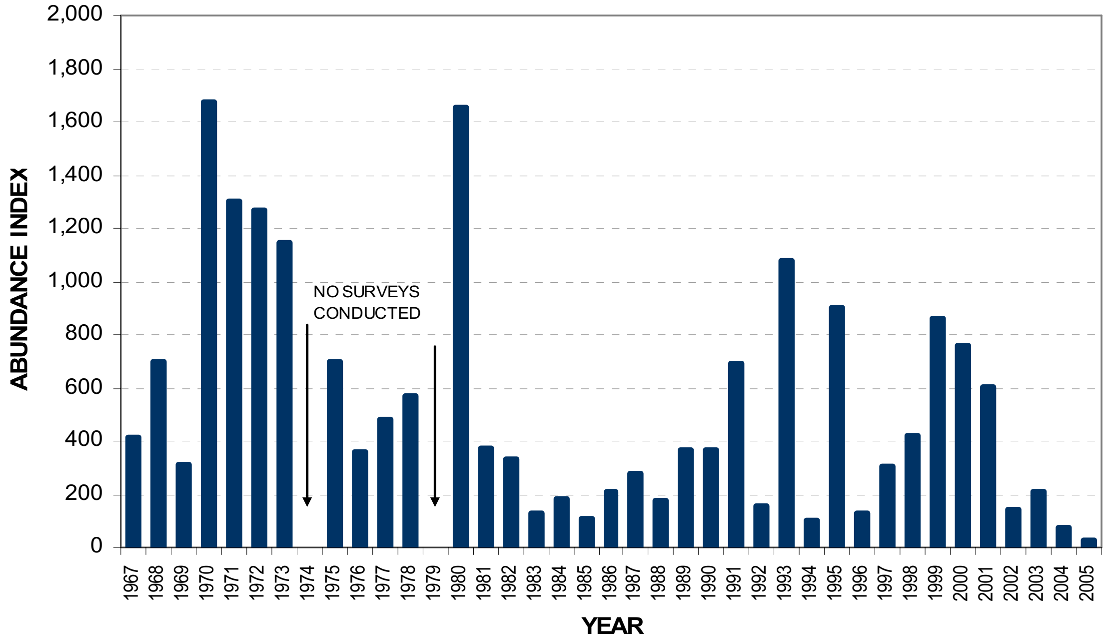
Source: DFG 2005b. Central Valley Bay-Delta Branch Real-Time Monitoring.
http://www.delta.dfg.ca.gov/data/rtm2004/sample-sites.asp.

Exhibit 3.1-4
2005 DFG Real-Time Fishery Monitoring Locations



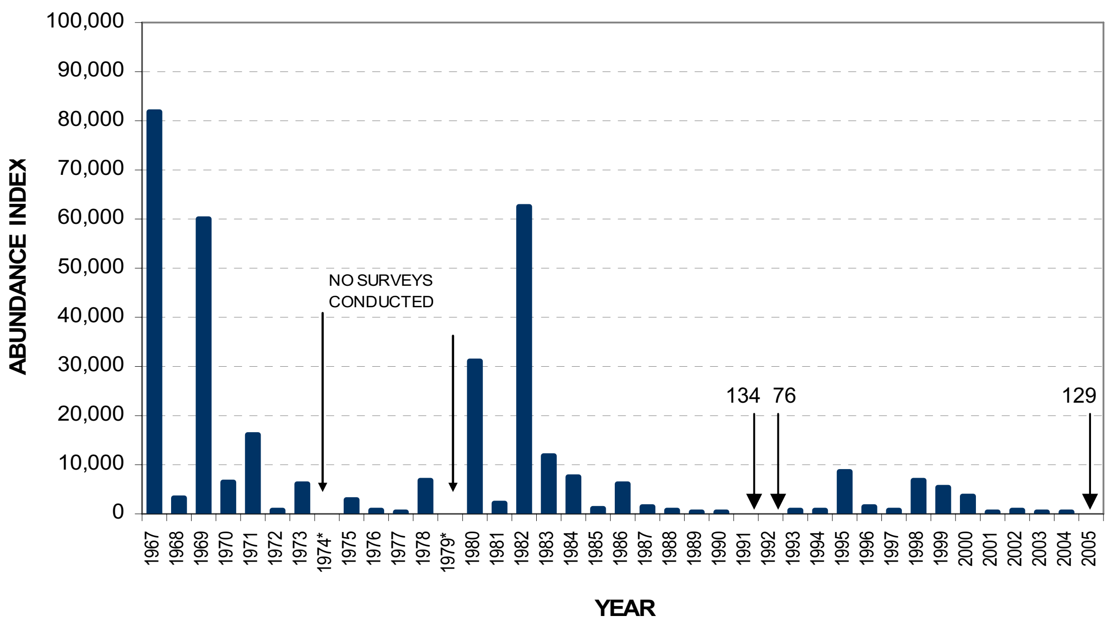
Source: Hanson Environmental 2006; DFG 2006; DWR 2006

Exhibit 3.1-5
DFG 20 mm Delta Smelt Survey Sites within the Delta



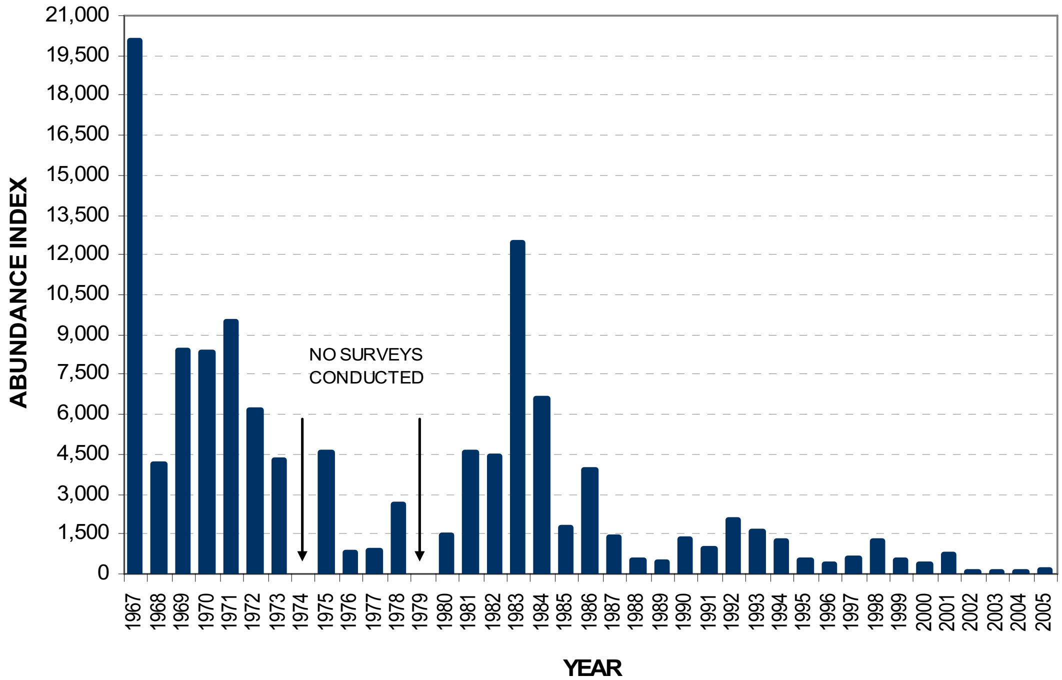
Source: DFG 2005b

Exhibit 3.1-6
DFG Fall Midwater Trawl Abundance Indices for Delta Smelt, 1967–2005



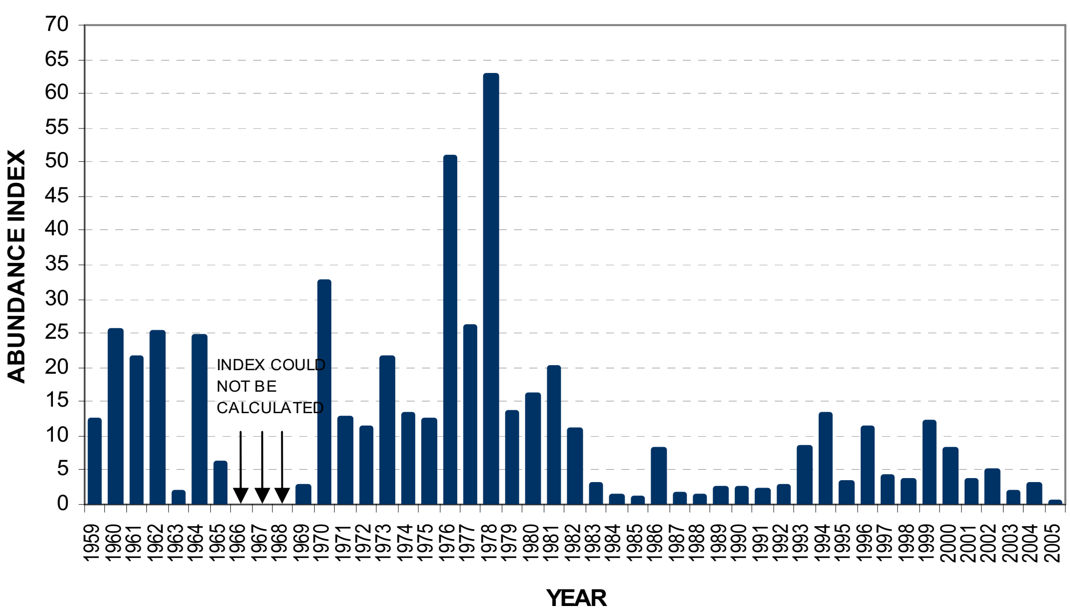
Source: DFG 2005b

Exhibit 3.1-7
DFG Fall Midwater Trawl Abundance Indices for Longfin Smelt, 1967–2005



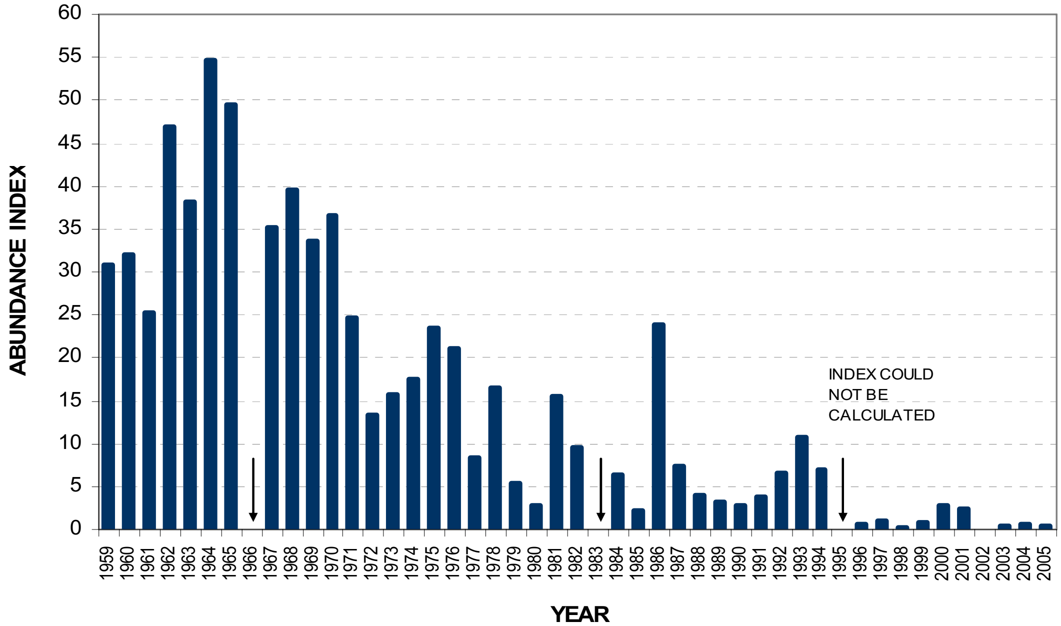
Source: DFG 2005b

Exhibit 3.1-8
DFG Fall Midwater Trawl Abundance Indices for Young-of-the-Year Striped Bass, 1967–2005



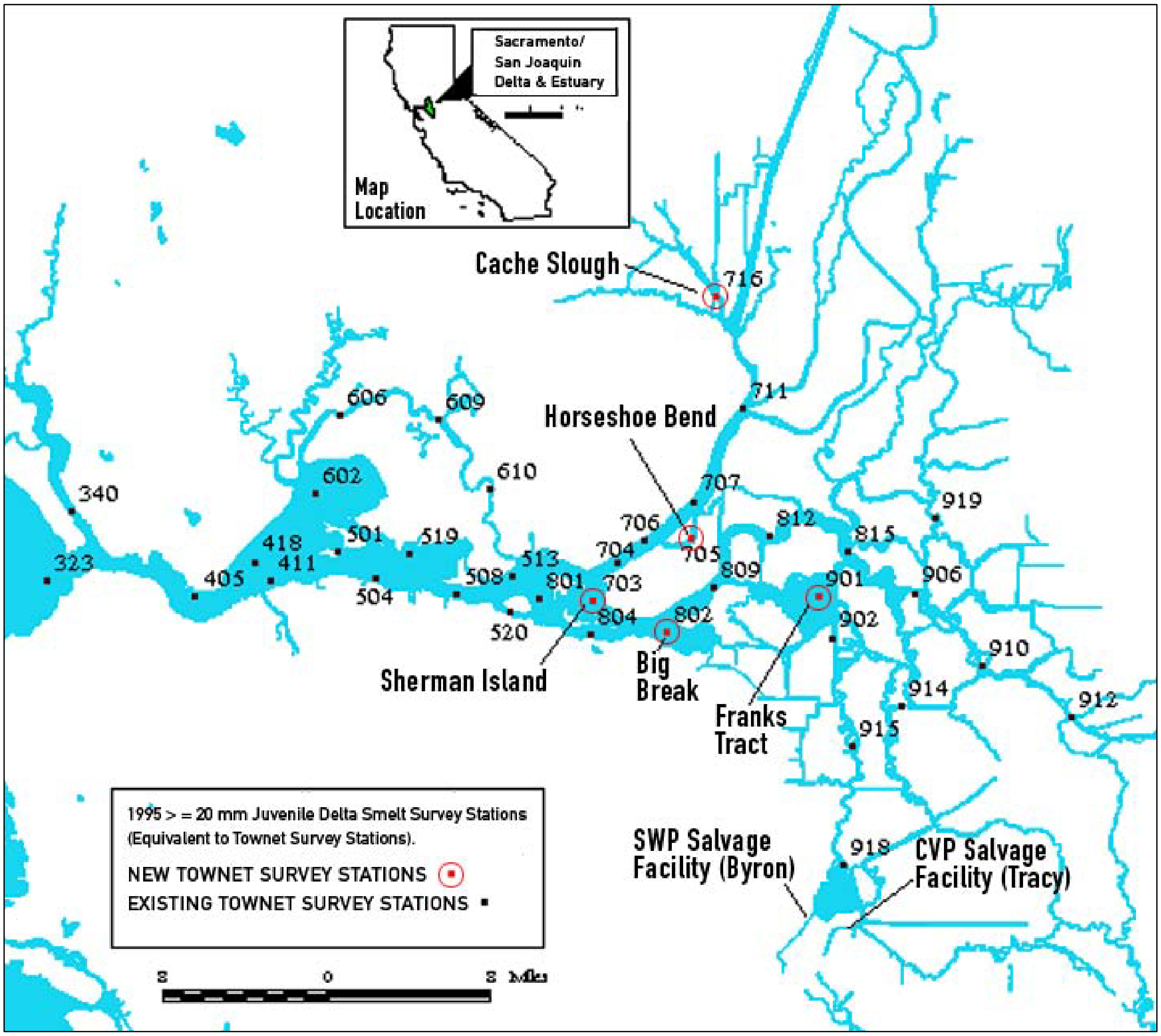
Source: DFG 2005b

Exhibit 3.1-9
DFG Summer Townet Abundance Indices for Delta Smelt, 1959–2005



Source: DFG 2005b

Exhibit 3.1-10
DFG Summer Townet Abundance Indices for Striped Bass, 1959–2005



Source: DFG 2005b. Central Valley Bay-Delta Branch Summer Townet Surveys. http://www.delta.dfg.ca.gov/data/townet/.

Exhibit 3.1-11
DFG Summer Townet Survey Locations

Table 3.1-7
Major Fish Surveys Conducted in the San Francisco Bay-Delta Estuary

Source: Honey et al. 2004

Program	Agency	Mandate Information	Design	Years Surveyed	Months	Survey Interval	Gear
Survey Group 1: Multiple, Fixed Location Sampling							
1. Beach Seine	FWS	Soft mandate in NOAA OCAP as part of Oct-May RTM	Systematic	1976 to present	All	Weekly	Beach Seine
2. Bay Study	DFG	"Soft" mandate in water rights decision D 1641	Systematic	1980 to present	All	Monthly	Otter Trawl, Midwater Trawl
3. Fall Midwater Trawl	DFG	Spring 2004 OCAP for delta smelt	Systematic	1967 to present (no data 1974, 1979)	Sep-Dec	Monthly	Midwater Trawl
4. Summer Townet	DFG	Spring 2004 OCAP for delta smelt	Systematic	1959 to present (no data 1966; no striped bass index 1995 or 2002)	Jun-Aug	2 weeks	Townet
5. 20 mm Survey	DFG	Spring 2004 OCAP for delta smelt	Systematic	1995 to present	Mar-Jul	2 weeks	20 mm
6. Spring Kodiak Trawl	DFG	Spring 2004 OCAP for delta smelt	Systematic	2002 to present	Jan-Apr	2 weeks	Kodiak Trawl
7. Juvenile Sturgeon	DFG	Not mandated	Systematic	1991 to present (no data 1992, 1993, 1994, or 2003)	Jun-Aug	Monthly	Long-line
8. Suisun Marsh	UCD	"Soft" mandate in D 1641	Systematic	1980 to present	All	Monthly	Otter Trawl, Beach Seine
9. North Bay Aqueduct	DFG	Pilot study for a broad, within-delta larva survey is mandated in the spring 2004 OCAP for delta smelt	Systematic	1995 to 2004	Feb-Jul	2-4 days	Plankton Net
Survey Group 2: Fixed Regional Strata, Random Location							
10. Resident Fishes	DFG	Not mandated	Stratified	1995, 1997, 1999, 2001-present	All	Monthly	Boat Electrofishing
Survey Group 3: Single, Fixed Location Sampling							
11. SWP and CVP Fish Salvage	DFG in conjunction with DWR and USBR	Spring 2004 OCAP for delta smelt	Temporally Systematic	1979 to 1992 involved less comprehensive sampling compared to post-1992 to present	All	Daily from as frequent as hourly counts	Screened Louvers and Holding Tanks
12. Chipps Island Trawl	FWS	Soft mandate in NOAA OCAP as part of Oct-May RTM	Temporally Systematic	1976 to present	All	2-3 days (daily May-June)	Midwater Trawl
13-14. Sacramento River and Mossdale Trawls	FWS	Soft mandate in NOAA OCAP as part of Oct-May RTM	Temporally Systematic	1976 to present (no data 1982 to 1987)	All (M)	2-3 days	Midwater Trawl, Kodiak Trawl
Survey Group 4: Flexible Location Sampling							
15. Adult Sturgeon Tagging	DFG	Not mandated	Mark Recapture	1967,1968, 1974, 1979, 1984, 1985, 1987, 1990, 1997, 1998, 2001, 2002	Sep-Oct	opportunistically (San Pablo Bay)	Trammel Net
16. Adult Striped Bass Tagging	DFG	Not mandated	Mark Recapture	1969 to present (no data 1995, 1997, 1999, 2001)	Apr-May tagging & some recovery; Creel Check All	Annual 1969-1994, 2003+;Biannual 1995-2002	Gill Net, Fyke Traps and Creel Check

presented in Attachment D, "Delta Fisheries Surveys." Many of the DFG and USFWS fishery survey programs are targeted at the collection of specific species during limited times of the year (e.g., fall midwater trawl surveys in September through December target striped bass abundance; summer townet surveys occur in early June through mid-August and target the abundance index of striped bass larger than 38 mm), conduct sampling with irregular frequencies and time periods (e.g., summer townet), and employ inconsistent methods of surveying (Table 3.1-7). The sampling irregularities make it difficult to draw long-term conclusions on the general fishery populations in the south and central Delta. The sampling design, methodology, and calculations used to develop the summer townet and midwater trawl abundance indices have all been called into serious question, prompting a recent effort within the scientific community and from stakeholders to more critically examine data resulting from these surveys, and to develop a more accurate means for comparative analyses (Bennett 2005).

The abundance indices derived from the summer townet and fall midwater trawl (Exhibits 3.1-6 through 3.1-10), which were examined while making the determination of the most appropriate data pertaining to the Proposed Action, have been scrutinized for failing to characterize population abundance among the various life stages of delta smelt and other species (Bennett 2005).

USFWS Beach Seine and Trapping

Various seining and trapping methods (e.g., pushnet rotary screw trap) have been conducted in the past (Table 3.1-8). Beach seining has been conducted by USFWS since 1976 on the Sacramento River and in the north and central Delta, with the south Delta and San Joaquin Regions added to the survey in 1993 and 1994, respectively. The chief purpose of the survey, which samples weekly using a 15 m by 1.3 m beach seine net, is to estimate the inter- and intra-abundance and distribution of all races of salmon, though the subsequent catch of other fish species provides additional information. This survey was identified as a potential data source as over 20 of its sampling stations are located in the south Delta, with stations located: within several hundred yards of the Proposed Action site in Victoria Canal (station VC002N), in proximity to the Mallard Slough intake (station SB019S), downstream in the vicinity of the Rock Slough intake (station WD002W), and upstream and downstream of the Old River intake (stations OR018W, OR016W, OR019W). See Tables 3.1-9, 3.1-10, 3.1-11, and 3.1-12. (Note that the USFWS's beach seining survey map that is available may not depict all stations.)

Upon examination of these data, among approximately 30 beach seines conducted near the Proposed Action project site from 1993 to 1996, only ten species were collected, none of which included critical species such as delta smelt and Chinook salmon. Limited data were collected at the sampling site near Mallard Slough (i.e., data were only collected during 1976 and 1979 with fewer than 10 fish collected). Data from the beach seine station located near the Tracy Fish Facility appeared to be collected in 1976 only, although fish facility and other monitoring studies were conducted by USFWS. While data near the Rock Slough and Old River intakes spanned a longer period of time and a greater number of surveys, relatively low catches of species known to inhabit the area do not provide accurate samples of fishery populations. Beach seining, conducted near docks and boat ramps, is prone to catching high densities of the particular species (e.g., inland silverside, bass) known to inhabit these areas.

Table 3.1-8
1994 USFWS Pushnet Survey at CCWD Rock Slough Intake
(Sum of Stations RS001S, South; RS001SN, North; RS001M Middle)
Species Composition and Relative Abundance of Fish Collected

Species	Percentage Collected	Number Collected
Bluegill	61.69%	219
Inland silverside	19.15%	68
Largemouth bass	5.92%	21
Threadfin shad	3.10%	11
Tule perch	1.41%	5
Redear Sunfish	1.41%	5
Bigscale logperch	1.13%	4
Delta smelt	0.85%	3
Chinook salmon	0.85%	3
Smallmouth bass	0.85%	3
Golden shiner	0.85%	3
Striped bass	0.56%	2
Prickly sculpin	0.56%	2
Black crappie	0.56%	2
Yellowfin goby	0.28%	1
Common carp	0.28%	1
Green sunfish	0.28%	1
White catfish	0.28%	1
Total collected		**355**

NOTE: 1994 was the only year USFWS conducted the pushnet survey.
Source: USFWS 2005d

Table 3.1-9 1976-2005 USFWS Beach Seine at Old River (Station OR016W) South of CCWD's Old River Intake Species Composition and Relative Abundance of Fish Collected		
Species	Percentage Collected	Number Collected
Inland silverside	27.97%	690
Chinook salmon	19.94%	492
Yellowfin goby	19.46%	480
Threadfin shad	12.81%	316
Striped bass	7.34%	181
Tule perch	2.23%	55
Sacramento pike minnow	2.11%	52
Splittail	1.91%	47
Delta smelt	0.85%	21
Golden shiner	0.73%	18
Prickly sculpin	0.65%	16
American shad	0.61%	15
Goby unknown	0.41%	10
Western mosquitofish	0.41%	10
Shimofuri goby	0.32%	8
Hitch	0.28%	7
Bigscale logperch	0.20%	5
Fathead minnow	0.20%	5
Pacific staghorn sculpin	0.20%	5
(No catch surveys)	*0.16%*	*4*
Sacramento sucker	0.16%	4
Sculpin unknown	0.16%	4
Bass unknown	0.12%	3
Chinese mitten crab	0.12%	3
White crappie	0.12%	3
Chameleon goby	0.08%	2
Siberian prawn	0.08%	2
Threespine stickleback	0.08%	2
California roach	0.04%	1
Common carp	0.04%	1
Goldfish	0.04%	1
Hardhead	0.04%	1
Lamprey unknown	0.04%	1
Red shiner	0.04%	1
Sacramento blackfish	0.04%	1
Total collected		**2,463**
Source: USFWS 2005d		

Table 3.1-10
1976–2005 USFWS Beach Seine at Old River (Station ORO18W) South of CCWD's Old River Intake Species Composition and Relative Abundance of Fish Collected

Species	Percentage Collected	Number Collected
Inland silverside	44.1%	922
Striped bass	28.7%	601
Threadfin shad	5.6%	118
Bigscale logperch	3.4%	72
Sacramento pike minnow	3.1%	64
Splittail	3.1%	64
Yellowfin goby	2.5%	52
Chinook salmon	1.8%	37
Goby unknown	1.6%	33
Western mosquitofish	1.3%	27
No catch surveys	*1.1%*	*23*
Golden shiner	0.9%	18
Bluegill	0.8%	16
Pacific Staghorn Sculpin	0.7%	15
Prickly sculpin	0.7%	14
Longfin smelt	0.3%	6
Starry flounder	0.3%	6
American shad	0.2%	4
Delta smelt	0.2%	4
Tule perch	0.2%	4
Largemouth bass	0.1%	3
Green sunfish	0.1%	2
Threespine stickleback	0.1%	2
Bass unknown	0.0%	1
Black crappie	0.0%	1
Minnow unknown	0.0%	1
Pacific Herring	0.0%	1
Redear sunfish	0.0%	1
Sculpin unknown	0.0%	1
White catfish	0.0%	1
Total collected		**2,091**

Note: Total number of records 2115, differs by total of sums of each species by 1 record.
Source: USFWS 2005d

Table 3.1-11 1993-1996 USFWS Beach Seine at Victoria Canal (Station VC002N) North of CCWD's Proposed Intake Species Composition and Relative Abundance of Fish Collected		
Species	**Percentage Collected**	**Number Collected**
Inland silverside	78.7%	391
Threadfin shad	14.3%	71
American shad	1.4%	7
Golden shiner	1.2%	6
Largemouth bass	1.2%	6
Yellowfin goby	1.2%	6
Bluegill	1.0%	5
Redear sunfish	0.4%	2
Western mosquitofish	0.4%	2
Sacramento pikeminnow	0.2%	1
Total collected		**479**
Total number of surveys		**30**
Source: USFWS 2005d		

Table 3.1-12 1976 and-1979 USFWS Beach Seine near Mallard Slough (Station SB19S) near CCWD's Mallard Slough Intake Species Composition and Relative Abundance of Fish Collected		
Species	**Percentage Collected**	**Number Collected**
Inland Silverside	88.89%	8
(No catch)	*11.11%*	*1*
Sacramento Pike Minnow	11.11%	1
Total collected		**9**
Total number of surveys		**3**
Source: USFWS 2005d		

DFG Summer Townet

Six surveys are typically conducted during summer from June until August at locations identical to those of the 20 mm larval smelt surveys. Initially implemented to monitor the abundance of young striped bass, and spanning a time period of over 40 years beginning in 1959 up to the present, these surveys provide useful information regarding the abundance of various life stages during these months.

DFG Real-Time Monitoring

Implemented in 1995 as a pilot-scale study and continuing in 1996 and up to the present as an effort to improve flexibility in water export timing, the 2005 DFG Real-Time Monitoring summary (DFG 2005b) lists 59 sampling sites in the Delta, over 15 of which are located in the south Delta, including sample sites which are located near CCWD intakes, including the proposed Victoria Canal intake site. Examination of data from real-time monitoring station 59 (Woodward Island), station 34 (Old River), and station 52 (at Union Island near the radial gate entrance to Clifton Court Forebay) reveals that these locations were sampled no more than 11 times (station 59) and as few as once (station 34) during the 1995-2005 sampling period (DFG 2005b). For example, these relatively few samples, which were taken in 2005, caught no delta smelt at Woodward Island, Old River, or Union Island stations, which is contrary to present knowledge that there are smelt within these vicinities (Moyle 2002; Morinaka 2000). In addition, DFG has issued the following disclaimer about these Real-Time Monitoring data:

> Direct quantitative comparisons of effort corrected catch (catch per 10,000 cubic meters of water sampled or catch per cubic meter of water sampled) should not be made between the Real Time Monitoring sites where different gear types were used, e.g., between a site where a Kodiak trawl was used and a site where a Midwater trawl was used or between a trawl site or seine site and one or both of the water transfer facilities (SWP or CVP). Each gear type has its own sampling efficiencies and caveats as do the State and Federal water projects. Qualitative comparisons of trends between the RTM data and the water transfer facilities data can be made as can quantitative analysis of data within any given gear type (DFG 2005b).

This lack of consistency in sampling efficiency serves to highlight the concern that fish density data derived from other DFG real-time monitoring stations in the Delta could not be effectively compared or contrasted, nor combined with data from other real-time stations to accurately describe fishery populations and abundance in the Bay-Delta. Thus, these data were not included as part of this analysis.

To assess fisheries in the Action Area, the DFG survey data have been used to determine species composition in the aquatic community as the total numbers of a species collected at each survey station or for each group of surveyed stations. Species composition is therefore a measure of the number of individuals of each species caught, not a measure of the biomass represented by the species. Results of the DFG real-time monitoring provide information regarding species composition, geographic distribution, and seasonal periods of occurrence for various fish species inhabiting the south Delta.

Table 3.1-13 presents a summary of the listed species collected near CCWD Rock Slough Intake between December 1994 and August 1996 by Morinaka (1998).

Table 3.1-13
Summary of the Numbers of Listed Species Collected in the Sieve Net at PP1 December 1994–August 1996 Near the CCWD Rock Slough Intake

Species	Year			Total
	1994	1995	1996	
Chinook salmon (all run-sizes combined)*	101	95	40	236
Winter-run Chinook salmon	2	6	4	12
Spring-run Chinook salmon	29	54	25	108
Steelhead	10	13	12	35
Delta smelt	2	0	2	4

*Lengths of salmon were not reported in Morinaka (1998), although winter run sized salmon were recorded separately.
** Data regarding the collection of spring-run salmon was received from J. Morinaka in 2005.
Source: Tenera 2005

Introduced species comprised the majority of total number of fishes collected in 1994, 1995, and 1996. Two introduced species, striped bass and American shad, were the most abundant species collected in 1994 and 1996, comprising over 50% of the total catch each year. Sacramento splittail, a native species, was the most abundant species collected in 1995. Morinaka (1998) reports that 1994 was a relatively dry water year, while 1995 was a very wet year with a wet spring, and 1996 was a wet water year, with a moderately wet spring. The very wet conditions of 1996 may have provided optimal conditions for the large numbers of Sacramento splittail. A summary of listed species collected during the 1994–1996 PP1 sieve net surveys is provided in Table 3.1-14.

Table 3.1-14
Summary of Information Regarding Collection of Listed Fish Species at Rock Slough Headworks Near the CCWD Rock Slough Intake During Monitoring, 1998–2005

Year	Months	Chinook salmon winter-run			Chinook salmon spring-run			Chinook salmon (run unknown)			Central Valley steelhead			Delta smelt		
		Month Collected	Total #	Fork Length (mm)	Month Collected	Total#	Fork Length (mm)	Month Collected	Total #	Fork Length (mm)	Month Collected	Total #	Fork Length (mm)	Month Collected	Total #	Fork Length (mm)
1998	Aug 21–Dec 10	Dec	1	Not recorded	–	0	–	–	0	–	–	0	–	–	0	–
1999	Mar 18–Dec 16	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2000	Mar 30–Nov 21	–	0	–	–	0	–	May	3	88[1]	–	0	–	–	0	–
2001	Jan–Aug	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2002	Jan–Dec[2]	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2003	Jan–Dec[3]	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2004	Jan–Dec	–	0	–	Mar	1	86	–	0	–	–	0	–	–	0	–
					Apr	2	80, 103									
2005	Jan–May	–	0	–	May	4	101, 93, 98, 107	–	0	–	Feb	1	207	Feb	1	66
											Mar	2	223, 216			
											Apr	1	243			
Total			**1**			**7**			**3**			**5**			**1**	

1 Only the mean length was reported. Spring-run size Chinook salmon during May range from 89–109 mm (Fisher 1994).
2 No surveys were conducted from February 21–March 3 and from May 8–May 22, 2002 because the intake was shut down for the protection of Delta fishes.
3 No surveys were conducted during February–March in 2003 (no reason was given).
4 No surveys were conducted from May 5–19, 2004 because the intake was shut down for the protection of Delta fishes. No surveys were conducted from October 1–December 20, 2004 because the intake was shut down during a box culvert construction project.
Source: Tenera 2005

Table 3.1-15 presents the total number of fishes collected in the sieve net for the most abundant species at the Contra Costa Canal headworks near the CCWD Rock Slough Intake from March 2004 through May 2005.

Table 3.1-15
Total Number of Fishes Collected in the Sieve Net and Minimum and Maximum Lengths for the Six most Abundant Species at the Contra Costa Canal Headworks Near the CCWD Rock Slough Intake During Monitoring, March 2004–May 2005

Species	Total Number Collected	Percent of Total	Length Range (mm)
Threadfin shad	294	42.1	21–54
Largemouth bass	158	22.6	15–328
Bluegill	73	10.5	12–244
Inland silverside	45	6.5	20–72
Redear sunfish	36	5.2	60–197
White catfish	34	4.9	20–430
Fall-run Chinook salmon	14	2.0	
Spring-run Chinook salmon	7	1.0	
Rainwater killifish	7	1.0	
Western mosquitofish	5	0.7	
Striped bass	4	0.6	
Steelhead	4	0.6	
Yellowfin goby	4	0.6	
Centrarchidae	3	0.4	
Brown bullhead	2	0.3	
American shad	2	0.3	
Black crappie	1	0.1	
Golden shiner	1	0.1	
Lepomis spp.	1	0.1	
Prickly sculpin	1	0.1	
Goldfish	1	0.1	
Delta smelt	1	0.1	
All Species	698	99.9	

Source: Tenera 2005

Table 3.1-16 compares fish densities from Middle River and Old River from DFG data. Relative fish densities are similar between the two sites.

Table 3.1-16 Comparison of Fish Densities (No./10,000 m3) from DFG Fish Surveys Conducted in Middle River and Old River							
Taxa	MIDDLE RIVER (914)			OLD RIVER (915)			Significance
	Avg.	Min.	Max.	Avg.	Min.	Max.	
DFG Townet (1959–2000)							
American Shad	0.62	0.00	13.61	0.25	0.00	4.76	Not significant
Catfish	3.42	0.00	117.91	2.76	0.00	226.76	Not significant
Chinook Salmon	0.00	0.00	0.45	0.00	0.00	0.45	Not significant
Delta Smelt	0.75	0.00	17.23	0.48	0.00	23.58	Not significant
Splittail	0.06	0.00	1.81	0.01	0.00	0.45	Not significant
Striped Bass	23.84	0.00	395.46	20.93	0.00	162.81	Significant
Fall Midwater Trawl (1991–2001)							
Shad	1.48	0.00	34.00	7.77	0.00	142.00	Not determined
Chinook Salmon	0.07	0.00	1.00	0.14	0.00	3.00	Not determined
YOY Stripers	0.11	0.00	3.00	0.19	0.00	4.00	Not determined
Steelhead	0.04	0.00	1.00	0.00	0.00	0.00	Not determined
20 mm Survey (1995–2001)							
American Shad	20.66	3.28	79.08	34.54	3.60	110.66	Not significant
Delta Smelt	10.41	3.56	31.59	13.48	3.29	29.37	Not significant
Splittail	0.00	0.00	0.00	3.30	3.30	3.30	Not significant
Striped Bass	80.24	3.36	370.45	148.29	3.73	862.81	Significant
Longfin Smelt	6.59	3.12	15.67	30.60	30.60	30.60	Not significant

3.2.3 Essential Fish Habitats

The Delta, San Francisco Bay, and Suisun Bay, have been designated as EFH by PFMC to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries such as Pacific salmon. The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all Federal agencies to consult with the Secretary of Commerce (NOAA/NMFS) on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect EFH of commercially managed marine and anadromous fish species (Office of Habitat Conservation 1999). The EFH provisions of the Sustainable Fisheries Act are designed to protect fishery habitat from being lost due to disturbance and degradation. The act requires that EFH must be identified for all species Federally managed under PFMC. PFMC is responsible for managing commercial fisheries resources along the coasts of Washington, Oregon, and California. Managed species are covered under three fisheries management plans:

- Pacific Groundfish Fishery Management Plan,
- Coastal Pelagic Fishery Management Plan, and
- Pacific Salmon Fishery Management Plan.

The Groundfish Fishery Management Plan defines the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem. The groundfish fishery EFH includes all waters from the mean higher high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of California, Oregon, and Washington seaward to the boundary of the U.S. exclusive economic zone. The Groundfish Fishery Management Plan covers starry flounder, which has been found infrequently near the Old River intake.

The Coastal Pelagic Fishery Management Plan east-west boundary of EFH is defined as all marine and estuarine waters from the shoreline along the coast of California, Oregon, and Washington offshore to the limits of the exclusive economic zone and above the thermocline where sea surface temperature range between 10 to 26°C (44 to 79°F). (http://swr.nmfs.noaa.gov/hcd/cpsefh.pdf). The Coastal Pelagic Fishery Management Plan covers northern anchovy and Pacific sardine, which have been found infrequently in the central and south Delta.

Under the Pacific Coast Salmon Fishery Management Plan, the entire San Francisco Bay-Delta estuary (including Victoria Canal) has been designated as EFH for spring-, fall-, late fall- and winter-run Central Valley Chinook salmon (Pacific salmon). These areas serve as a migratory corridor, holding area, and rearing habitat for both adult and juvenile salmon.

3.2.3.1 Critical Habitat

The Delta, Sacramento River, and the Bay-Delta estuary serve as a migration corridor for anadromous salmonids, which have been listed for protection under the California and/or Federal ESA. Listed salmonids that would potentially occur seasonally in the vicinity of the proposed CCWD intake structure and fish screen include winter-run Chinook salmon, spring-run Chinook salmon, and steelhead trout. The Sacramento River and Bay-Delta estuary (but not the south Delta in the project area) are areas designated as critical habitat by NMFS for winter-run and spring-run Chinook salmon. In 2005, NMFS identified the Sacramento and San Joaquin rivers and the Delta, including the Action Area, as critical habitat for Central Valley steelhead. The Bay-Delta estuary, including the Action Area, has been designated as critical habitat by USFWS for delta smelt.

3.2.4 Special-status Fish Species

The Action Area serves as habitat for a variety of special-status fish species, several of which have been listed for protection under the Federal and/or California ESA (see Table 1.3-1).

The following is a brief discussion of the status, life history, and factors affecting population abundance, and status of the protected fish species that seasonally inhabit the Action Area. Although fall-run/late-fall-run Chinook salmon have not been listed for protection under either the California or Federal ESA, they are included as part of this discussion of the Delta fishery community because of EFH designations covering these species.

3.2.4.1 Delta Smelt

Delta smelt are listed as a threatened species under both the California and Federal ESAs. Delta smelt are endemic to the Sacramento-San Joaquin Delta estuary and inhabit the freshwater portions of the Delta, Sacramento and San Joaquin rivers, and the low-salinity portions of Suisun Bay. Delta smelt typically have a 1-year lifecycle, although a small percentage of the adults may live up to 2 years. Adult delta smelt migrate upstream into channels and sloughs of the eastern Delta during fall and winter to prepare for spawning. Delta smelt live their entire lifecycle within the Sacramento-San Joaquin Delta. USFWS has prepared a recovery plan for delta smelt (USFWS 1996), which identifies a number of criteria for use in evaluating the status of the delta smelt population. These criteria include both annual indices of abundance and geographic distribution within the estuary, as determined through the DFG fall midwater trawl surveys.

The DFG fall midwater trawl surveys provide an index of pre-spawning adult delta smelt abundance during late fall and early winter. Indices of delta smelt abundance have varied substantially among years (Exhibits 3.1-6 and 3.1-9). Abundance indices were generally high during the early 1970s followed by a general decline in abundance extending through the mid-1980s (with the exception of 1980). Abundance indices increased during the late 1980s and were characterized by high variability during the early 1990s. Beginning in 1996 and continuing through 1999, abundance indices showed a general pattern of increasing abundance. During the early 2000s, however, the abundance indices for delta smelt derived from fall midwater trawl surveys showed a marked decline reaching the lowest level on record in 2004 (Exhibit 3.1-6). Results of preliminary fall midwater trawl surveys conducted during 2005 suggest that delta smelt abundance remains at extremely low levels. There is an emergency petition to USFWS to relist delta smelt as endangered.

Substantial declines in delta smelt abundance indices in recent years, as well as declines in other pelagic fish species, have led to widespread concerns regarding the factors adversely affecting the pelagic fish community inhabiting the Bay-Delta estuary. In response to the marked decline in the pelagic fish community, USFWS, DFG, and other interested parties have recently expanded and intensified existing efforts (Table 3.1-17 and Exhibit 3.1-3) to monitor delta smelt and other fish species, as well as to increase the level of effort focused on data analysis of the population dynamics of delta smelt and other pelagic fish species. A number of recent and ongoing analyses have focused on identifying the factors potentially influencing the status and abundance of delta smelt and other pelagic fish species within the estuary in the past several years.

USFWS and DFG continue to evaluate the available scientific information regarding the status of delta smelt and the performance of various management actions designed to improve protection, reduce mortality, and enhance habitat quality and availability for delta smelt within the estuary (USFWS 2002). Furthermore, additional measures have been taken since the beginning of 2005 to aide in determining the magnitude of entrainment at the CVP and SWP intakes, such as the Delta Smelt Larval Survey (DSLS) conducted by DFG to monitor and provide additional information on delta smelt abundance and distribution within the Delta, and the vulnerability of delta smelt to entrainment at the SWP and CVP pumps (DFG 2005b).

Table 3.1-17 Fish Monitoring Surveys Sampling Delta Smelt in the San Francisco Bay-Delta Estuary				
Survey/Gear Type (Institution[1])	**Year**	**Months (Frequency)**	**Locations (Stations)**	**Life Stages**
Fall Midwater Trawl (MWT, DFG)	1967-present	September – March (Monthly)	San Pablo Bay – Delta (53-113)	juvenile – adult
Summer Tow-Net (TNS, DFG)	1959-present	June – August (biweekly)	Suisun Bay – Delta (~30)	juvenile – adult
20-mm Tow-Net (DFG)	1995-present	March – June (biweekly)	Napa River – Delta (~30)	larvae – juvenile
Spring Kodiak Trawl (DFG)	2002-present	March – May (~biweekly)	Suisun Bay – Delta (30-40)	maturing – spawning
Bay Study Midwater Trawl (DFG)	1980-present	January – December (monthly)	South San Francisco Bay – Suisun Bay (42)	juvenile – adult
Otter Trawl (UCD)	1979-present	January – December (monthly)	Suisun Marsh (~18)	juvenile – adult
SWP/CVP Water Projects (DWR, Reclamation)	1979-present	January – December (daily)	South Delta near Tracy (2)	20-mm post larvae – adult
Midwater Trawl (USFWS)	1976-present	April – June (~daily)	Chipps Island (1)	juvenile – adult
Beach Seine (USFWS)	1977-present	~January – June (~biweekly)	Delta – Sacramento River (23)	juvenile – adult
Source: Bennett 2005				

Life History

Delta smelt is a short-lived estuarine species endemic to the Sacramento-San Joaquin estuary. Adult delta smelt typically range in length from approximately 60–70 mm (standard length), although some individuals within the population have been reported to be as large as 100–120 mm (Moyle 2002). Juvenile and adult delta smelt typically inhabit open waters of the central Delta and Suisun Bay, including the area in the vicinity of the proposed CCWD intake and fish screen site. Delta smelt inhabit shallow-water areas (typically less than 9 feet deep at the lower low water [a tidal datum referring to the lower low water height of each tidal day observed over the National Tidal Datum Epoch]); however, juvenile and adult delta smelt are also known to occur within the deeper channel areas (Hanson, unpublished data). Juvenile and adult delta smelt are generally found in the lower reaches of the Sacramento River downstream of Rio Vista, the San Joaquin River downstream of Mossdale, and within Suisun Bay where salinity typically ranges from approximately 2 to 7 ppt.

During winter, adult delta smelt migrate upstream into the freshwater channels and sloughs of the central Delta and lower reaches of the Sacramento and San Joaquin rivers to prepare for spawning. Spawning occurs between January and July; peak spawning occurs during April through mid-May (Moyle 2002). Spawning occurs in shallow edge waters within the Delta channels and sloughs, such as Cash, Lindsay, and Barker sloughs, and the lower reaches of the Sacramento River. Delta smelt have adhesive eggs, which are broadcast over the bottom and other hard substrate, including rocks, woody material, and aquatic vegetation (Wang 1986). Eggs remain attached to the substrate during the 12–14 day incubation period. After hatching, the larval delta smelt drift downstream (planktonic) with river and tidal currents. Larval delta smelt feed on zooplankton during spring and early summer. As the larval and early juvenile delta smelt grow, they are distributed farther downstream within low-salinity habitats of the central Delta and Suisun Bay, where they continue to rear through summer and fall (Moyle 2002; Dege and Brown 2004).

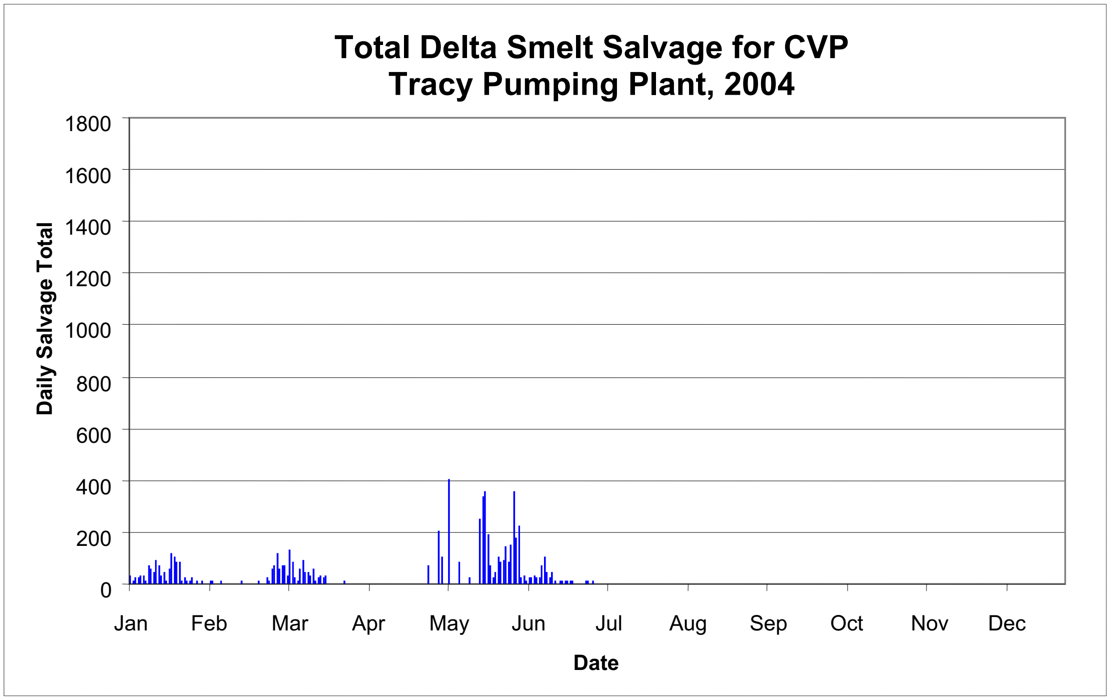
Factors Affecting Abundance

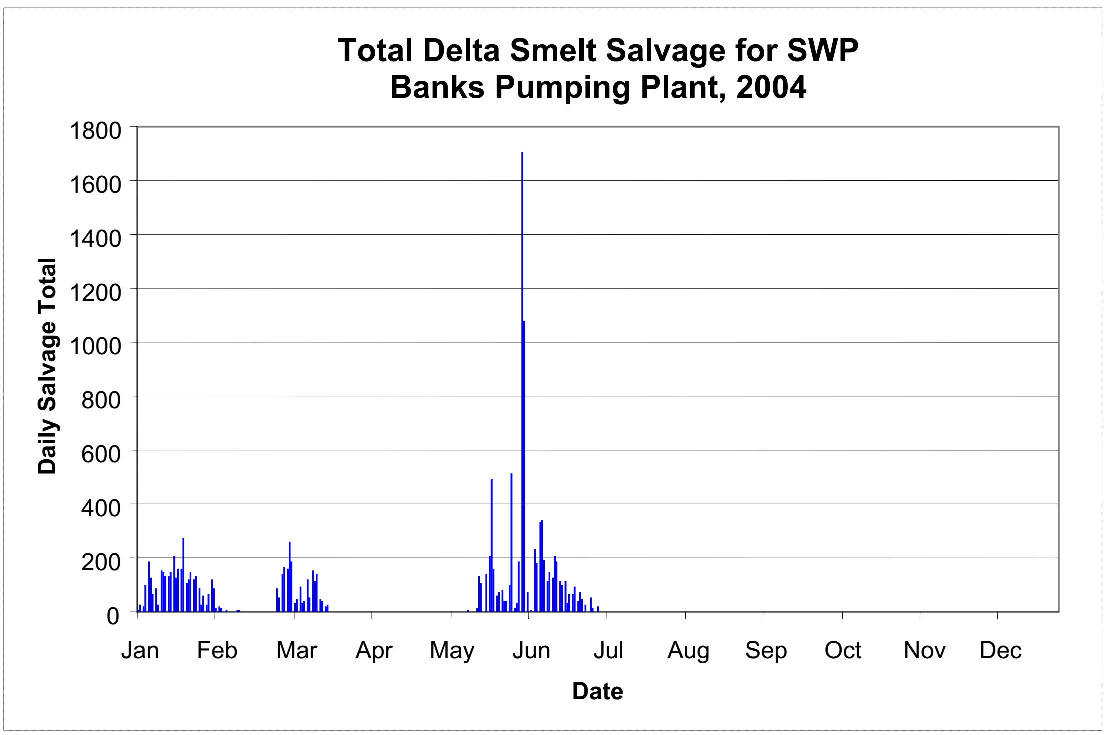
A variety of environmental and biological factors have been identified as affecting the abundance of delta smelt within the estuary (USFWS 1996; Moyle 2002). These factors include, but are not limited to, changes in the seasonal timing and magnitude of freshwater inflow to the Delta; entrainment of larval, juvenile, and adult delta smelt into a large number of unscreened water diversions located throughout the Delta; and entrainment and salvage mortality occurring at the CVP and SWP water export facilities (DWR and Reclamation 1994). In addition, changes in the species composition and abundance of zooplankton, thought to be in response to competition with introduced zooplankton species, affect food availability for delta smelt (DFG 2005a). Predation by striped bass, largemouth bass, and a number of other fish species inhabiting the estuary has also been identified as a source of mortality for delta smelt (DFG 2005a). Toxic substances, interbreeding with introduced Wagasaki smelt, and variation in the quality and availability of low-salinity habitat within the central Delta and Suisun Bay, in response to seasonal and interannual variability in hydrologic conditions within the Delta, have also been identified as factors affecting the population abundance of delta smelt.

Status

Juvenile and adult delta smelt are most abundant within the south Delta in the vicinity of the Proposed Action during fall, winter, and spring, as reflected in SWP and CVP fish salvage records (Exhibit 3.1-12). Juvenile and adult delta smelt do not typically inhabit the south Delta during summer when water temperatures exceed approximately 25°C (77°F) (Mager et al. 2004). Adult delta smelt potentially spawn within the south Delta and the lower reaches of the Sacramento and San Joaquin river systems during late winter and spring. Delta smelt larvae occur within the Delta during spring. As a result of their life history and geographic distribution, delta smelt may occur seasonally within Victoria Canal as larvae, juveniles, and adult life stages. Data from surveys such as the spring Kodiak trawl, collected during the sampling period of late winter to early spring, shows a pattern of characteristically higher adult smelt densities in the Central Bay and Suisun Bay (e.g., Rock Slough and Mallard Slough), as compared to other areas in the south Delta near Victoria Canal and Old River (Exhibit 3.1-13).

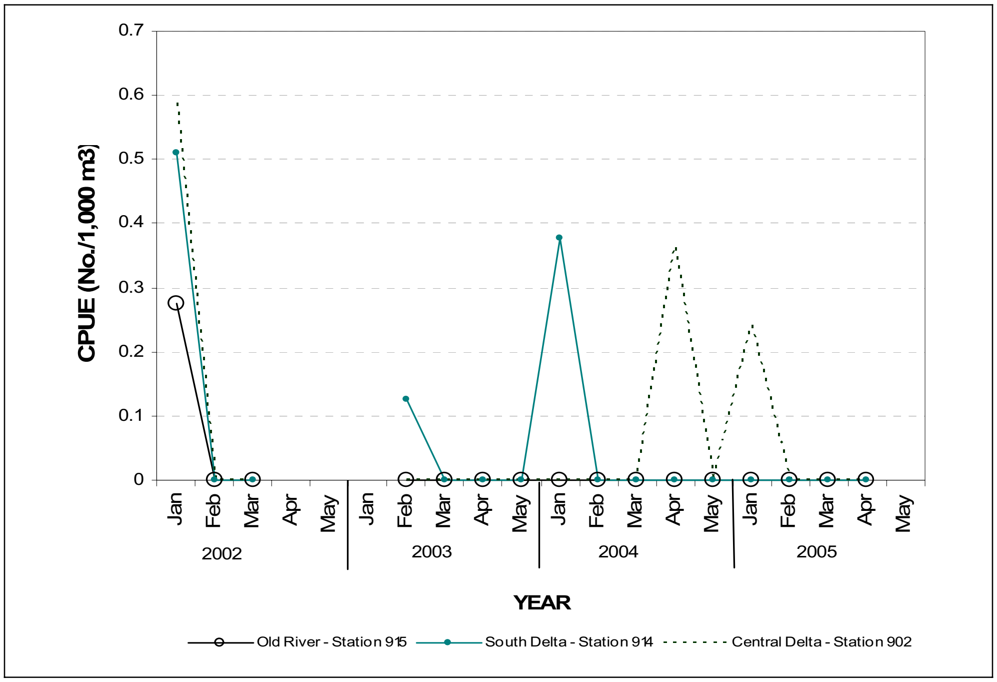
Data from the DFG 20-mm Delta Smelt Surveys shows that 2004–2005 densities in Rock Slough, Old River, and Victoria Canal are relatively low compared to densities throughout the 1995–2005 period of the survey, with zero densities for smelt recorded at both the Old River and Rock Slough sampling stations for 2005 (Table 3.1-18). Data from the 2005 DSLS, an additional survey implemented by DFG starting in 2005 to more

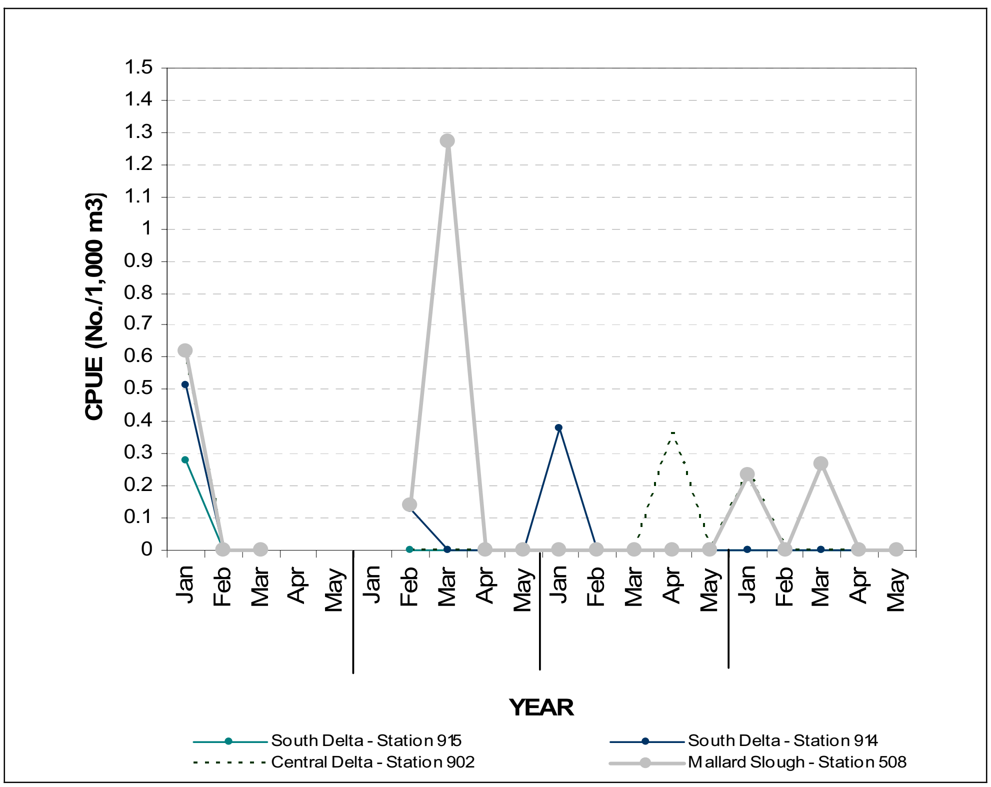




Source: DFG 2005b. Central Valley Bay-Delta Branch Fish Salvage Monitoring. http://www.delta.dfg.ca.gov/Data/Salvage/

Exhibit 3.1-12
2004 Seasonal (Daily) Distribution of Juvenile and Adult Delta Smelt in CVP and SWP Fish Salvage Operations





Source: DFG 2005b

Exhibit 3.1-13
DFG Spring Kodiak Trawl Adult Delta Smelt Densities
Near CCWD Intakes and Other South Delta Locations, 2002–2005

Table 3.1-18
Mean Average Larval Smelt Densities Measured by the 1995-2005 DFG 20 mm Surveys Near CCWD Intakes, no./TAF (ten thousand acre-feet)

YEAR	STATION 902 ROCK SLOUGH						STATION 915 OLD RIVER						STATION 918 VICTORIA CANAL					
	MAR	APR	MAY	JUN	JUL	AUG	MAR	APR	MAY	JUN	JUL	AUG	MAR	APR	MAY	JUN	JUL	AUG
1995	ND	0	0	0	0	ND	ND	0	0	0	0	ND	0	0	0	0	0	ND
1996	ND	8	4	0	0	ND	ND	4	0	0	0	ND	0	0	2	0	0	ND
1997	0	13	8	0	0	ND	0	26	0	0	0	ND	0	2	0	0	0	ND
1998	ND	0	2	0	0	ND	ND	0	0	1	0	ND	0	0	0	0	0	ND
1999	ND	2	87	20	0	ND	ND	13	10	12	0	ND	0	5	15	6	0	ND
2000	0	7	6	3	0	ND	3	11	16	2	0	ND	0	0	20	2	0	ND
2001	0	14	15	0	0	ND	0	6	2	0	0	ND	0	5	6	0	0	ND
2002	0	14	14	4	0	ND	0	23	4	0	0	ND	0	20	0	0	0	ND
2003	3	0	4	1	0	ND	3	2	0	0	0	ND	3	4	2	0	0	ND
2004	0	2	3	0	0	ND	0	0	2	0	0	ND	0	0	3	3	0	ND
2005	0	0	0	0	0	ND	0	0	0	0	0	ND	2	1	0	0	0	ND
Average	0	6	13	3	0	ND	1	8	3	1	0	ND	0	3	4	1	0	ND
no/af	0	1	2	0	0	ND	0	1	0	0	0	ND	0	0	1	0	0	ND
No/TAF	**55**	**681**	**1,598**	**311**	**0**	**ND***	**116**	**950**	**376**	**167**	**0**	**ND***	**54**	**412**	**530**	**119**	**0**	**ND***

YEAR	STATION 508 MALLARD SLOUGH						STATION 520 MALLARD SLOUGH					
	MAR	APR	MAY	JUN	JUL	AUG	MAR	APR	MAY	JUN	JUL	AUG
1995	ND	0	4	2	22	3	ND	15	0	22	8	7
1996	ND	23	148	286	113	ND	ND	18	139	297	16	ND
1997	ND	2	9	12	17	ND	ND	0	140	34	11	ND
1998	ND	0	2	6	0	ND	ND	4	8	21	0	ND
1999	ND	14	2	59	84	ND	ND	2	105	240	54	ND
2000	32	2	64	115	8	ND	16	30	69	113	7	ND
2001	0	0	1	6	ND	ND	4	0	2	10	ND	ND
2002	0	0	0	0	ND	ND	0	0	4	7	ND	ND
2003	6	0	2	11	0	ND	0	0	7	40	14	ND
2004	0	1	0	0	3	ND	ND	4	0	2	7	ND
2005	0	3	17	8	29	ND	0	3	44	9	0	ND
Average	6	4	23	46	31	3	4	7	47	72	13	7
no/af	1	1	3	6	4	0	0	1	6	9	2	1
No/TAF	**781**	**511**	**2,790**	**5,661**	**3,783**	**425****	**497**	**851**	**5,792**	**8,924**	**1,596**	**881****

ND = No data, no sampling done

** = Not true averages as only one data point exists from which to draw our conclusions. We have no other data from this survey to indicate whether or not the density measured during the one survey conducted in 1995 is characteristic of the larval smelt densities in this vicinity.

Note: Numbers presented in the table are rounded to whole numbers; numbers used to calculate No/TAF (number per thousand acre-feet) are decimal values.

closely monitor the presence and fluctuations of the delta smelt population, showed that delta smelt represented 1% of the total catch for all stations (stations are the same as surveyed for the 20-mm Delta Smelt Surveys) based on a catch-per-unit effort ratio, highlighting the concern of the decline in smelt population when contrasted with historical abundance data (see Attachment D). The DSLS conducted 12 surveys in 2005 from March through July, with sampling efforts focused on stations in closest proximity to the CVP and SWP export pumps and stations farther from this area (e.g., stations in Suisun Bay such as 508 near the Mallard Slough intake). Catch data from the 2005 DSLS showed that no delta smelt were caught at the sites relevant to this analysis: Old River (Station 915), Middle River (Station 914), Rock Slough (Station 902), Mallard Slough (Station 508), and Victoria Canal (Station 918) survey sites (Table 3.1-19).

Table 3.1-19
Larval Smelt Densities Measured by the 2005 Delta Smelt Larval Survey (DSLS) Near CCWD Intakes

Date	Survey	Station						
		902	918	915	508	Date	Survey	520
January 31, 2005	1	0	0	0	NS	--	1	NS
February 14, 2005	2	0	0	0	NS	--	2	NS
February 28, 2005	3	0	0	0	NS	--	3	NS
March 14, 2005	4	0	0	0	NS	--	4	NS
March 28, 2005	5	0	0	0	NS	--	5	NS
April, 11, 2005	6	0	0	0	NS	--	6	NS
May 9, 2005	8	0	0	0	0	May 11, 2005	8	4
May 23, 2005	9	0	0	0	0	May 25, 2005	9	0
June 6, 2005	10	0	0	0	0	June 8, 2005	10	0
June 20, 2005	11	0	0	0	0	June 22, 2005	11	0
July 5, 2005	12	0	0	NS	0	July 9, 2005	12	0

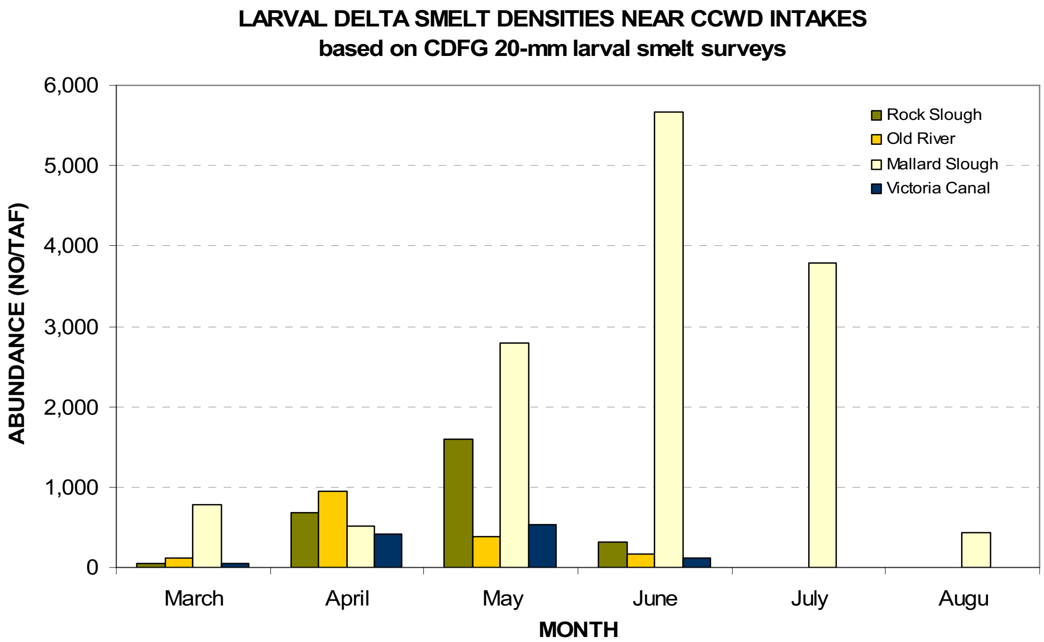
NS = No survey
Note: DFG database did not contain any data for a survey 7 for any stations
Note: decimal values are presented as whole numbers (rounded) in this table, however, all zeroes shown are true zeroes.

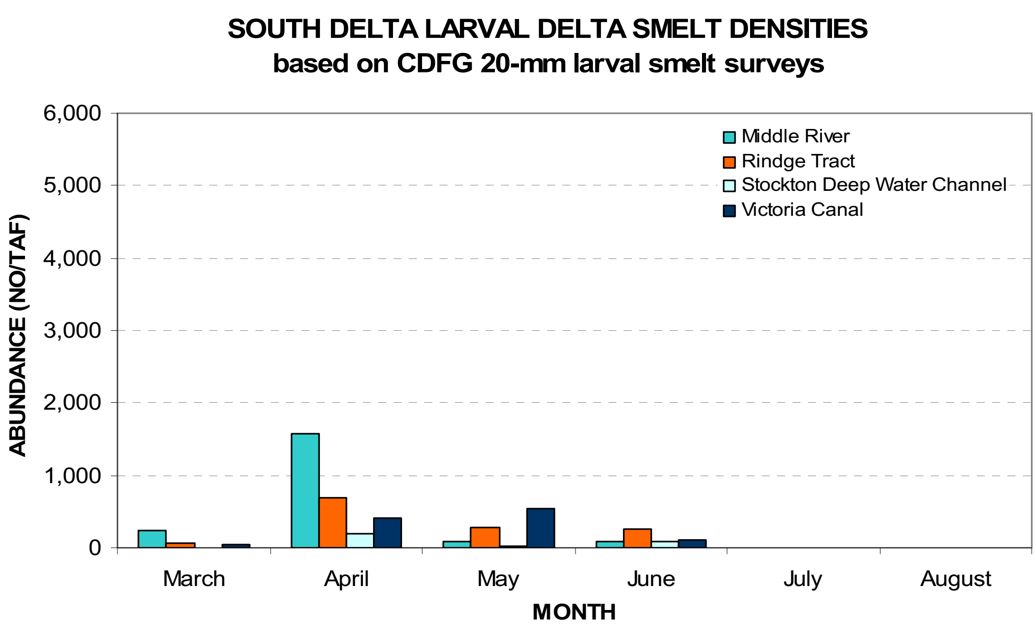
Other DFG 20-mm survey stations in the south Delta were analyzed for purposes of evaluating relative abundance at the proposed project site as compared to other locations in the vicinity (Table 3.1-20 and Exhibit 3.1-14).

Table 3.1-20
Larval Smelt Densities Measured by the 2005 Delta Smelt Larval Survey (DSLS) at Other South Delta Survey Sites

Date	Survey	Station					
		910	912	914	Date	Survey	906
January 31, 2005	1	0	0	0	February 1, 2005	1	0
February 14, 2005	2	0	0	0	February 15, 2005	2	0
February 28, 2005	3	0	0	0	March 1, 2005	3	0
March 14, 2005	4	0	0	0	March 15, 2005	4	0
March 28, 2005	5	0	0	0	March 29, 2005	5	9
April 11, 2005	6	0	0	0	April 12, 2005	6	0
May 9, 2005	8	0	0	0	May 12, 2005	8	0
May 23, 2005	9	NS*	0	0	May 24, 2005	9	0
June 6, 2005	10	0	0	0	June 7, 2005	10	0
June 20, 2005	11	0	0	0	June 21, 2005	11	0
July 5, 2005	12	NS	NS	0	--	12	NS

*[sic] DFG database displays 0 values for two survey 8, though no data for survey 9
NS = No survey
Note: DFG database did not contain any data for a survey 7 for any stations
Note: decimal values are presented as whole numbers (rounded) in this table, however, all zeroes shown are true zeroes.





Source: DFG 2005b. http://www.delta.dfg.ca.gov/Data/20mm/

Exhibit 3.1-14
1995–2005 DFG 20-mm Larval Smelt Survey Average Densities in the South Delta Near CCWD Intakes and the Vicinity

3.2.4.2 Winter-run Chinook Salmon

Winter-run Chinook salmon are listed as an endangered species under both the California and Federal ESA. NMFS has recently proposed downgrading the listing status of winter-run Chinook salmon from endangered to threatened status under the Federal ESA.

Winter-run Chinook salmon historically migrated into the upper tributaries of the Sacramento River for spawning and juvenile rearing. With construction of Shasta and Keswick dams, winter-run salmon no longer had access to historic spawning habitat within the upper watersheds. As a result of migration blockage, spawning and juvenile rearing habitat for winter-run Chinook is limited to the mainstem Sacramento River downstream of Keswick Dam. During the mid-1960s, adult winter-run Chinook salmon returns to the Sacramento River were relatively high (approximately 80,000 returning adults). However, the population declined substantially during the 1970s and 1980s. The population decline continued until 1991 when the adult winter-run Chinook salmon population returning to Sacramento River was estimated to be less than 200 fish. As a result of the substantial decline in abundance, the species was listed as endangered under both the California and Federal ESAs. During the mid- and late 1990s, the numbers of adult winter-run salmon returning to the Sacramento River gradually increased and the trend of increasing abundance continues to date. Approximately 8,200 adult winter-run salmon returned to the river to spawn in 2001; 7,400 adults in 2002; and 8,200 adults in 2003 (DFG 2005b). As with other Chinook salmon stocks, NMFS continues to evaluate the status of the winter-run Chinook salmon population and the effectiveness of various management actions implemented within the Sacramento River, Delta, and ocean to provide improved protection and reduced mortality for winter-run salmon, In addition, NMFS has prepared a draft recovery plan for winter-run Chinook salmon.

Life History

Winter-run Chinook salmon are an anadromous species spending 1–3 years within the ocean before migrating upstream into the Sacramento River to spawn. The majority of adult winter-run Chinook salmon returning to spawn are three-year-olds; however, the adult population also includes two-year-old and four-year-old Chinook salmon. Adult winter-run salmon migrate upstream through San Francisco Bay, Suisun Bay, and the Delta during winter and early spring (Table 3.1-21) with peak migration occurring during March (Moyle 2002). Adult winter-run Chinook salmon migrate upstream within the Sacramento River with the majority of adults spawning in the reach upstream of Red Bluff. Winter-run Chinook salmon spawn within the mainstem of the Sacramento River in areas where gravel substrate, water temperatures, and water velocities are suitable. Spawning occurs during spring and summer (mid-April through August) (Moyle 2002). Egg incubation continues through fall. Juvenile winter-run Chinook salmon rear within the Sacramento River throughout the year, feeding primarily on aquatic insects. Juvenile winter-run salmon (smolts) migrate downstream through the lower reaches of the Sacramento River, Delta, Suisun Bay, and San Francisco Bay during winter and early spring (December through May) as they migrate from the freshwater spawning and juvenile rearing areas into the coastal marine waters of the Pacific Ocean (Table 3.1-21). The Sacramento River mainstem is the primary upstream and downstream migration corridor for winter-run Chinook salmon. Juvenile winter-run Chinook salmon may migrate from the Sacramento River into the central Delta, passing into the Delta through the Delta Cross-Channel, Georgiana Slough, or Three Mile Slough during their downstream migration. The migration timing of juvenile winter-run Chinook salmon varies within and among years in response to a variety of factors including increases in river flow and turbidity resulting from winter storms.

Table 3.1-21
Seasonal Timing of Chinook Salmon Migration Through the Sacramento-San Joaquin Delta

Sacramento River					San Joaquin River Fall-run
Lifestage	Fall-run	Late fall-run	Winter-run	Spring-run	
Adult upstream migration	July – December	October – April	Late November – June	January – June	July – December
Juvenile Rearing and Emigration	January – June (fry/smolts) October – December (yearlings)	April – December	September – May	October – June (young-of-the-year) mid-October March (yearlings)	January – June

Sources: Reclamation 1997; DFG 1998; SWRCB 1999

Factors Affecting Abundance

A variety of environmental and biological factors have been identified that affect the abundance, mortality, and population dynamics of winter-run Chinook salmon. One of the primary factors that has affected population abundance of winter-run Chinook salmon has been the loss of access to historic spawning and juvenile rearing habitat within the upper reaches of the Sacramento River and its tributaries as a result of the migration barrier caused by Shasta and Keswick dams. Operation of the Red Bluff Diversion Dam (RBDD), which impedes adult upstream migration and increases vulnerability of juvenile winter-run Chinook salmon to predation mortality, has been identified as a factor affecting mortality within the river. In recent years, changes to RBDD gate operations have been made to provide improved access for upstream and downstream migrating winter-run Chinook salmon. Water temperatures within the mainstem Sacramento River have also been identified as a factor affecting incubating eggs, holding adults, and growth and survival of juvenile winter-run Chinook salmon rearing in the upper Sacramento River. Modifications to Shasta Reservoir storage and operations and water temperature management have been implemented in recent years to improve water temperature conditions within the upper reaches of the Sacramento River. Juvenile winter-run Chinook salmon are also vulnerable to entrainment at a large number of unscreened water diversions located along the Sacramento River and within the Delta, in addition to entrainment and salvage mortality at the CVP and SWP export facilities. Changes in habitat quality and availability for spawning and juvenile rearing; exposure to contaminants and acid mine drainage; predation mortality by Sacramento pikeminnow, striped bass, largemouth bass, and other predators; and competition and interactions with hatchery-produced Chinook salmon have all been identified as factors affecting winter-run Chinook salmon abundance. In addition, subadult and adult winter-run Chinook salmon are vulnerable to recreational and commercial fishing, ocean survival is affected by climatic and oceanographic conditions, and adults are vulnerable to predation mortality by marine mammals.

In recent years, a number of changes have been made to improve the survival and habitat conditions for winter-run Chinook salmon. Modifications have been made to reservoir operations for instream flow and temperature management, RBDD gate operations, and large previously unscreened water diversions that have been equipped with positive barrier fish screens. Changes to ocean salmon fishing regulations have also been made to improve the survival of adult winter-run Chinook salmon. Modifications to CVP and SWP export operations have also been made in recent years to improve survival of juvenile salmon during migration through the Delta. These changes in management actions, in combination with favorable hydrologic and oceanographic conditions in recent years, are thought to have contributed to the trend of increasing abundance of adult winter-run Chinook salmon returning to the upper Sacramento River to spawn since the mid-1990s.

Status

Adult and juvenile winter-run Chinook salmon primarily migrate upstream and downstream within the mainstem Sacramento River. Juvenile winter-run Chinook salmon may migrate from the Sacramento River into the central Delta during their downstream migration; the central Delta serves as a temporary foraging area and migration pathway during the winter and early spring migration period. The occurrence of juvenile winter-run Chinook salmon within the central Delta would be expected during late fall through early spring when water temperatures within the Delta would be suitable for juvenile winter-run Chinook salmon migration.

Although the majority of adult winter-run Chinook salmon migrate upstream within the mainstem Sacramento River, there is a probability, although low, that adults may migrate into the central Delta. The occurrence of adult winter-run Chinook salmon within the central Delta, although expected to be very low, would be limited to the winter and early spring period of adult upstream migration.

Because winter-run Chinook salmon do not spawn within the Delta, neither construction nor operation of the proposed CCWD intake structure and fish screen would adversely affect winter-run Chinook salmon spawning or egg incubation.

3.2.4.3 Central Valley Spring-run Chinook Salmon

Spring-run Chinook salmon are listed as a threatened species under both the California and Federal ESAs and critical habitat was designated by NMFS on September 2, 2005.

Spring-run Chinook salmon were historically widely distributed and abundant within the Sacramento and San Joaquin river systems (Yoshiyama et al. 1998). Spring-run Chinook salmon historically migrated upstream into the upper reaches of the mainstem rivers and tributaries for spawning and juvenile rearing. Construction of major dams and reservoirs on these river systems eliminated access to the upper reaches for spawning and juvenile rearing and completely eliminated the spring-run salmon population from the San Joaquin River system. Spring-run Chinook salmon abundance has declined substantially, and the geographic distribution of the species within the Central Valley has also declined substantially. Spring-run spawning and juvenile rearing currently occurs on a consistent basis within only a small fraction of their previous geographic distribution, including populations inhabiting Deer, Mill, and Butte creeks; the mainstem Sacramento River; several other local tributaries on an intermittent basis; and the lower Feather River. Recent genetics studies have shown that spring-run like Chinook salmon returning to the lower Feather River are genetically similar to fall-run Chinook salmon.

Hybridization between spring-run and fall-run Chinook salmon, particularly on the Feather River where both stocks are produced within the Feather River hatchery, is a factor affecting the status of the spring-run salmon population. NMFS is in the process of developing a recovery plan for Central Valley spring-run Chinook salmon.

Life History
Spring-run Chinook salmon are an anadromous species, spawning in freshwater and spending a portion of their life cycle within the Pacific Ocean. Adult spring-run Chinook salmon migrate upstream into the Sacramento River system during spring, but are sexually immature. Adult spring-run Chinook salmon hold in deep cold pools within the rivers and tributaries over the summer prior to spawning. Spawning occurs during late summer and early fall (late August through October) in areas characterized by suitable spawning gravels, water temperatures, and water velocities. Eggs incubate within the gravel nests (redds) and emerge as fry during late fall and winter. A portion of the fry appears to migrate downstream soon after emerging where they rear within the lower river channels, and potentially within the Delta, during winter and spring. After emergence, a portion of the spring-run Chinook salmon fry remain resident in the creeks and rear for a period of approximately one year. The juvenile spring-run Chinook salmon that remain in the creeks migrate downstream as yearlings primarily during late fall, winter, and early spring with peak yearling migration occurring in November (Hill and Weber 1999). The downstream migration of both spring-run Chinook salmon fry and yearlings during late fall and winter typically coincides with increased flow and turbidity associated with winter stormwater runoff.

Factors Affecting Abundance
A variety of environmental and biological factors have been identified that affect the abundance, mortality, and population dynamics of spring-run Chinook salmon. One of the primary factors that have affected population abundance of spring-run Chinook salmon has been the loss of access to historic spawning and juvenile rearing habitat within the upper reaches of the Sacramento River and its tributaries and the San Joaquin River as a result of the migration barriers caused by construction of major dams and reservoirs. RBDD operations, which impede adult upstream migration and increase vulnerability of juvenile spring-run Chinook salmon to predation mortality, have been identified as a factor affecting mortality within the river. Water temperatures within the rivers and creeks have also been identified as a factor affecting incubating eggs, holding adults, and growth and survival of juvenile spring-run Chinook salmon. Juvenile spring-run Chinook salmon are also vulnerable to entrainment at a large number of unscreened water diversions located along the Sacramento River and within the Delta, in addition to entrainment and salvage mortality at the CVP and SWP export facilities. Changes in habitat quality and availability for spawning and juvenile rearing; exposure to contaminants; predation mortality by Sacramento pikeminnow, striped bass, largemouth bass, and other predators; and competition and interactions with hatchery-produced

Chinook salmon have all been identified as factors affecting spring-run Chinook salmon abundance. In addition, subadult and adult spring-run Chinook salmon are vulnerable to recreational and commercial fishing, ocean survival is affected by climatic and oceanographic conditions, and adults are vulnerable to predation mortality by marine mammals.

In recent years, a number of changes have been made to improve the survival and habitat conditions for spring-run Chinook salmon. Several large previously unscreened water diversions have been equipped with positive barrier fish screens. Changes to ocean salmon fishing regulations have been made to improve the survival of adult spring-run Chinook salmon. Modifications to CVP and SWP export operations have been made in recent years to improve survival of juvenile Chinook salmon migrating through the Delta. Improvements in fish passage facilities have also been made to improve migration and access to Butte Creek. These changes and management actions, in combination with favorable hydrologic and oceanographic conditions in recent years, are thought to have contributed to the trend of increasing abundance of adult spring-run Chinook salmon returning to spawn in Butte Creek and other habitats within the upper Sacramento River system in recent years.

Status

Adult and juvenile spring-run Chinook salmon primarily migrate upstream and downstream within the mainstem Sacramento River. Juvenile spring-run Chinook salmon may migrate from the Sacramento River into the central Delta during their downstream migration and may also use the central Delta as a temporary foraging area and migration pathway during the winter and early spring migration period. The occurrence of juvenile spring-run Chinook salmon within the Delta would be expected to occur during late fall through early spring when water temperatures within the Delta would be suitable for juvenile spring-run Chinook salmon migration.

Although the majority of adult spring-run Chinook salmon migrate upstream within the mainstem Sacramento River, there is a probability, although low, that adults may migrate into the central Delta. The occurrence of adult spring-run Chinook salmon within the central Delta, although expected to be very low, would be limited to the late winter and spring period of adult upstream migration.

Because spring-run Chinook salmon do not spawn within the Delta, neither construction nor operation of the proposed CCWD intake structure and fish screen would adversely affect spring-run Chinook salmon spawning or egg incubation.

3.2.4.4 Central Valley Steelhead

Central Valley steelhead have been listed as a threatened species under the Federal ESA. Steelhead are not listed for protection under the California ESA.

Central Valley steelhead historically migrated upstream into the high gradient upper reaches of Central Valley streams and rivers for spawning and juvenile rearing. Construction of dams and impoundments on the majority of Central Valley rivers has created impassable barriers to upstream migration and substantially reduced the geographic distribution of steelhead. Although quantitative estimates of the number of adult steelhead returning to Central Valley streams to spawn are not available, anecdotal information and observations indicate that population abundance is low. Steelhead distribution is currently restricted to the mainstem Sacramento River downstream of Keswick Dam, the Feather River downstream of Oroville Dam, the American River downstream of Nimbus Dam, the Mokelumne River downstream of Comanche Dam, Cosumnes River, and a number of smaller tributaries to the Sacramento River system, Delta, and San Francisco Bay. Steelhead have also been reported from tributaries to the San Joaquin River; however, the status of these populations is under investigation.

The Central Valley steelhead population is composed of both naturally spawning steelhead and steelhead produced in hatcheries. NMFS continues to evaluate the status of steelhead and develop a recovery plan for the species.

Life History

Central Valley steelhead, like Chinook salmon, are anadromous. Adult steelhead spawn in freshwater and the juveniles migrate to the Pacific Ocean where they reside for a period of years before returning to the river system to spawn. Steelhead that do not migrate to the ocean, but spend their entire life in freshwater, are known as resident rainbow trout.

Adult steelhead migrate upstream during fall and winter (September through approximately February), with steelhead migration into the upper Sacramento River typically occurring during fall and adult migration into lower tributaries typically occurring during late fall and winter. Steelhead spawn in areas characterized by clean spawning gravels, cold-water temperatures, and moderately high velocity. Spawning typically occurs during winter and spring (December–April), with the majority of spawning activity occurring during January and March. Unlike Chinook salmon that die after spawning, adult steelhead may migrate downstream after spawning and return to spawn in subsequent years.

Steelhead spawn by creating a depression in the spawning gravels where eggs are deposited and fertilized (redd). The eggs incubate within the redd for a variable period of time, which is dependent upon the water temperature. After hatching, the young steelhead emerge from the gravel redd as fry. The young steelhead rear within the stream system, foraging on insects for 1–2 years or longer before migrating to the ocean. After rearing within the stream, the juvenile steelhead undergo a physiological transformation (smolting) that allows the juvenile steelhead to migrate from the freshwater rearing areas downstream to coastal marine waters. Downstream migration of steelhead smolts typically occurs during late winter and early spring (January–May), as reflected in the seasonal occurrence in CVP and SWP fish salvage (Exhibit 3.1-15). The seasonal timing of downstream migration of steelhead smolts may vary in response to a variety of environmental and physiological factors including changes in water temperature, changes in stream flow, and increased turbidity resulting from stormwater runoff. The juvenile steelhead rear within the coastal marine waters for approximately 2–3 years before returning to their natal stream as spawning adults.

The steelhead life cycle is characterized by a high degree of flexibility in the duration of both their freshwater and marine rearing phases. The steelhead life cycle is adapted to respond to environmental variability in stream hydrology and other environmental conditions.

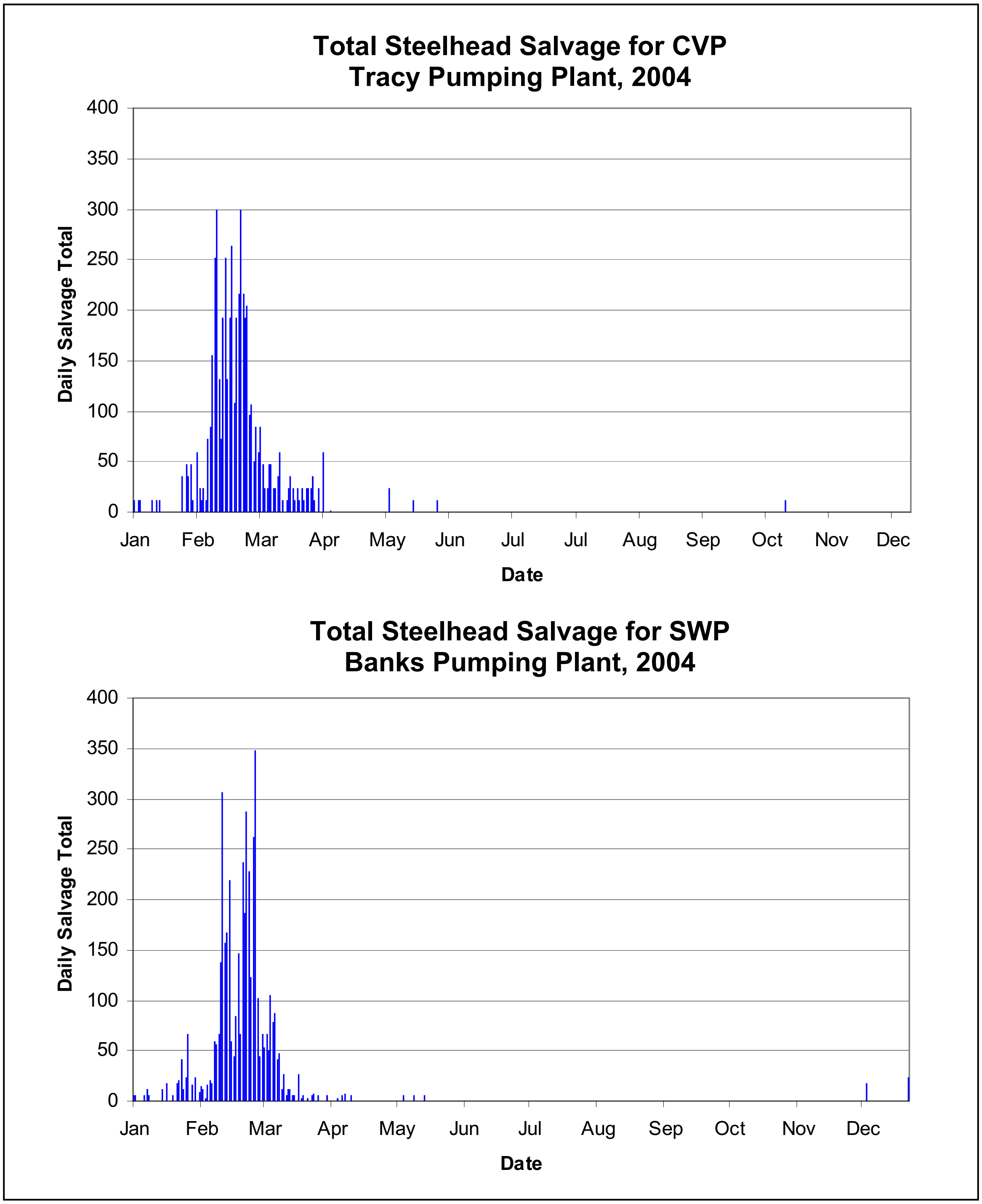
Factors Affecting Abundance

Factors affecting steelhead abundance are similar to those described for winter-run and spring-run Chinook salmon. One of the primary factors affecting population abundance of steelhead has been the loss of access to historic spawning and juvenile rearing habitat within the upper reaches of the Sacramento River and its tributaries and San Joaquin River as a result of the migration barriers caused by construction of major dams and reservoirs. Water temperatures within the rivers and creeks, particularly during summer and early fall, have also been identified as a factor affecting the growth and survival of juvenile steelhead. Juvenile steelhead are vulnerable to entrainment at a large number of unscreened water diversions located along the Sacramento River and within the Delta, and entrainment and salvage mortality at the CVP and SWP export facilities. Changes in habitat quality and availability for spawning and juvenile rearing, exposure to contaminants, predation mortality, passage barriers and impediments to migration, changes in land use practices, and competition and interactions with hatchery-produced steelhead have all been identified as factors affecting steelhead abundance. Unlike Chinook salmon, steelhead are not vulnerable to recreational and commercial fishing within the ocean, although steelhead support a small inland recreational fishery for hatchery produced fish. Ocean survival is affected by climatic and oceanographic conditions, and adults are vulnerable to predation mortality by marine mammals.

In recent years, a number of changes have been made to improve the survival and habitat conditions for steelhead. Several large previously unscreened water diversions have been equipped with positive barrier fish screens. Improvements to fish passage facilities have also been made to improve migration and access to spawning and juvenile rearing habitat.

Status

Adult and juvenile steelhead primarily migrate upstream and downstream within the mainstem Sacramento River and its tributaries, Mokelumne River, and Cosumnes River. Juvenile steelhead migrate from the upstream spawning and rearing areas through the Delta, Suisun Bay, and San Francisco Bay during the winter and early spring migration period. Steelhead do not spawn within the Delta; however, juvenile steelhead may temporarily forage within the Delta during emigration and hence they would be present within the vicinity of CCWD intake structure and fish screen during the seasonal migration period. The occurrence of juvenile steelhead within the Delta would be expected during the winter and early spring migration period, when water temperatures within the Delta would be suitable for juvenile steelhead migration.



Source: DFG 2005b. Central Valley Bay-Delta Branch Fish Salvage Monitoring. http://www.delta.dfg.ca.gov/Data/Salvage/

Exhibit 3.1-15
2004 Seasonal (Daily) Distribution of Juvenile Steelhead in CVP and SWP Fish Salvage Operations

Although the majority of adult steelhead migrate upstream within the mainstem Sacramento River, adult steelhead migrate through the central Delta into the Mokelumne and Cosumnes rivers and would be present seasonally within the vicinity of the proposed CCWD intake structure and fish screen. The occurrence of adult steelhead within the Delta would be limited to the winter and early spring period of adult upstream migration.

Because steelhead do not spawn within the Delta, neither construction nor operation of the proposed CCWD intake structure and fish screen would adversely affect steelhead spawning or egg incubation.

3.2.4.5 Pacific Salmon (including Fall-run and Late Fall-run Chinook Salmon)

Fall-run Chinook salmon are the most abundant species of Pacific salmon inhabiting the Sacramento and San Joaquin river systems. Fall-run Chinook salmon are not listed for protection under either the California or Federal ESA, but are a California Species of Special Concern and a Federal Species of Concern. In addition to fall-run Chinook salmon, the group of Pacific salmon is comprised of late fall-run Chinook salmon (which are not listed under either the California or Federal ESA, but are a California Species of Special Concern and Federal Species of Concern), spring-run Chinook salmon, and winter-run Chinook salmon, which are discussed above. Although fall-run and late fall-run Chinook salmon are not listed for protection under the ESA, they are included in this analysis because they occur seasonally within the central Delta within the area identified as EFH for Pacific salmon, and are a California Species of Special Concern and a Federal Species of Concern.

In 1998, NMFS proposed that Central Valley fall-run and late fall-run Chinook salmon be listed under the Federal ESA as a threatened species. Based upon further analysis and public comment, NMFS decided that fall-run and late fall-run Chinook salmon did not warrant listing but should remain a Species of Concern for further analysis and evaluation.

Although fall-run and late fall-run Chinook salmon inhabit a number of watersheds within the Central Valley for spawning and juvenile rearing, the largest populations occur within the mainstem Sacramento, Feather, Yuba, American, Mokelumne, Merced, Tuolumne, and Stanislaus rivers. Fall-run Chinook salmon, in addition to spawning in these river systems, are also produced in fish hatcheries located on the Sacramento River, Feather River, American River, Mokelumne River, and Merced River. Hatchery operations are intended to mitigate for the loss of access to upstream spawning and juvenile rearing habitat resulting from construction of dams and reservoirs within the Central Valley, in addition to producing fall-run Chinook salmon as part of the ocean salmon enhancement program to support commercial and recreational ocean salmon fisheries. Fall-run Chinook salmon also support an inland recreational fishery.

Life History

Fall-run Chinook salmon are anadromous, with spawning and juvenile rearing occurring within freshwater rivers and streams and juvenile and adult rearing occurring within coastal marine waters. Adult fall-run Chinook salmon migrate from the coastal marine waters upstream through San Francisco Bay, Suisun Bay, and the Delta during late summer and early fall (approximately late July–early December). Adult fall-run Chinook salmon migrate up rivers to areas characterized by suitable spawning conditions, which include the availability of clean spawning gravels, cold water (less than 56°F), and relatively high water velocities. Fall-run Chinook salmon spawning is similar to other Chinook salmon with the creation of redds where eggs are deposited and incubate. Fall-run Chinook salmon spawning occurs between October and December, with the greatest spawning activity occurring typically in November and early December.

The success of fall-run Chinook salmon spawning is dependent, in part, upon seasonal water temperatures. After incubating and hatching, the young salmon emerge from the gravel redd as fry. A portion of the fry population migrate downstream soon after emergence, where they rear within the lower river channels; the Delta, including the area adjacent to the proposed CCWD intake structure and fish screen location; and Suisun Bay during spring. The remaining portion of juvenile salmon continue to rear in the upstream stream systems through spring until they are physiologically adapted to migration into saltwater (smolting), which typically occurs between April and early June. A small proportion of the fall-run Chinook salmon juveniles may, in some systems, rear through summer and fall, migrating downstream during the fall, winter, or early spring as yearlings.

The juvenile and adult Chinook salmon rear within coastal marine waters, foraging on the fish and macroinvertebrates (e.g., northern anchovy, Pacific herring, squid, krill, etc.), until they reach maturation. Adult Chinook salmon spawn at ages ranging from approximately two to five-years-old, with the majority of adult fall-run Chinook salmon returning at age three. Chinook salmon, unlike steelhead, die after spawning.

Late fall-run Chinook salmon have a similar life history as described for other Pacific salmon, but migrate into rivers later in fall and spawn in December and January.

Factors Affecting Abundance

A variety of environmental and biological factors have been identified that affect reproductive success, mortality, and population dynamics of fall-run and late fall-run Chinook salmon. The loss of access to historic spawning and juvenile rearing areas from construction of dams and reservoirs on many of the Central Valley river systems is a factor affecting population abundance. In addition, exposure to seasonal water temperatures during both the upstream migration of adults and downstream migration of juveniles, changes in instream flows resulting from reservoir operations, degradation of the quality and availability of suitable spawning habitat and juvenile rearing areas, and the effects of hatchery operations on Chinook salmon have been identified as important factors affecting abundance. Juvenile Chinook salmon are also susceptible to entrainment at unscreened water diversions, losses resulting from salvage and handling at the CVP and SWP export facilities, and predation mortality by native and non-native fish species. Interannual variability in hydrologic conditions within the streams and river systems, and variability in ocean rearing conditions, have also been identified as factors affecting the reproduction, growth, and survival of Chinook salmon. Concerns have also been expressed regarding the effects of contaminant exposure, barriers to upstream and downstream migration, ocean commercial and recreational angler harvest, and inland recreational harvest.

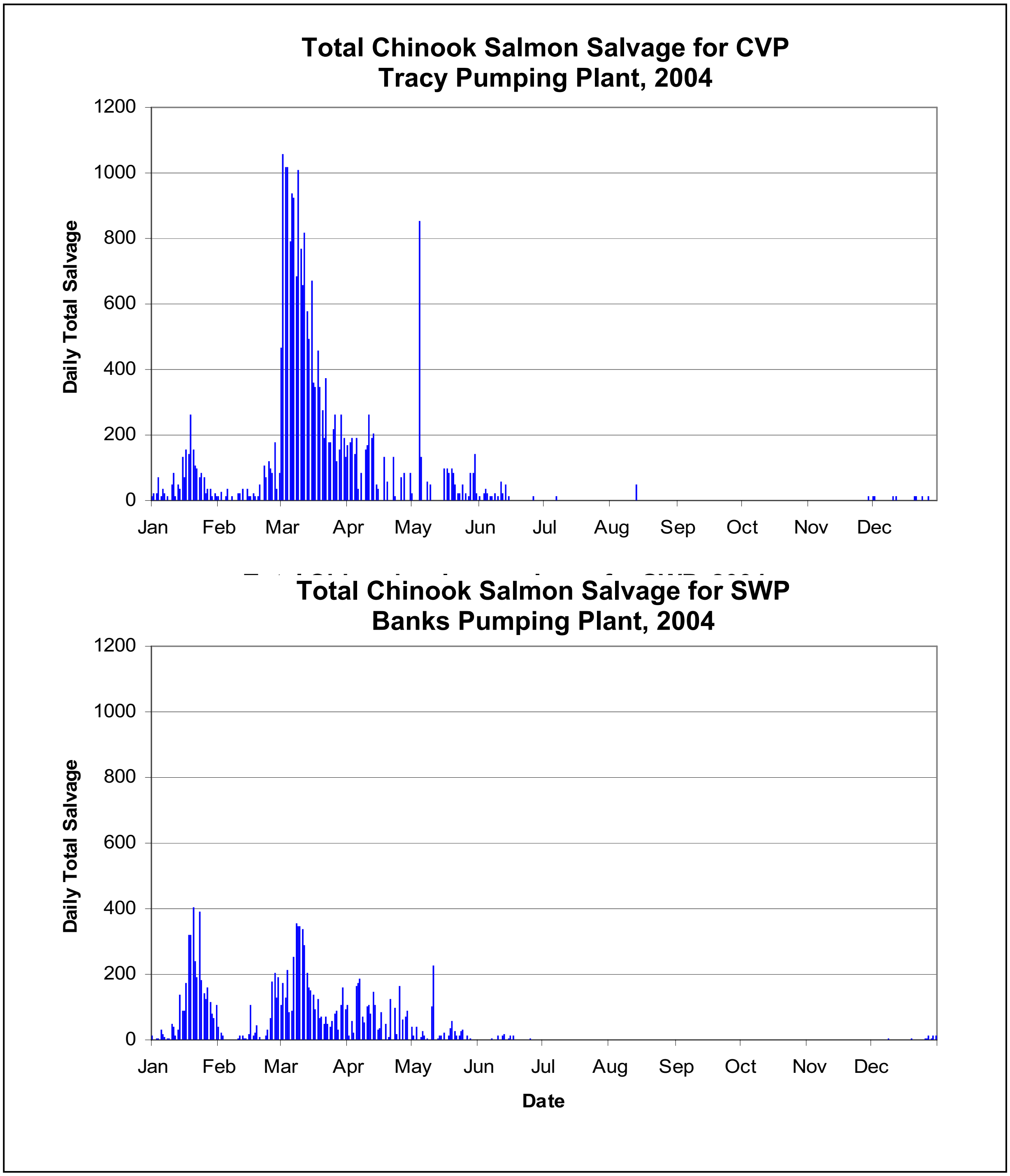
In March 2006, the Pacific Fishery Management Council (PFMC) decided to completely close California Coastal waters to all harvest of Chinook salmon in the commercial fisheries. PFMC also decided to close coastal waters between Point Arena (below Fort Bragg) and Point Sur (south of Monterey) to recreational salmon fishing. The closure of the commercial and recreational fisheries was in response to low numbers of adult salmon, including fall-run and late fall-run Chinook salmon, returning to the Klamath River. Final decisions regarding the closures are expected by PFMC in early April 2006. In mid-April 2006, the California Fish and Game Commission will consider conforming California fishing regulations to those adopted by PFMC.

Other management changes have occurred to regulate commercial and recreational angler harvest; and improve instream flow conditions, water temperature downstream of reservoirs, quality and availability of spawning and juvenile rearing habitat, and fish passage facilities at a number of existing migration impediments and barriers. Management changes have also occurred to minimize contaminant exposure, improve fish handling and salvage at the CVP and SWP export facilities, and screen a number of unscreened water diversions located on both the Sacramento and San Joaquin river systems to reduce or eliminate juvenile salmon entrainment mortality. These management changes, in combination with favorable hydrology and ocean rearing conditions in recent years, have contributed to an increasing trend in adult fall-run Chinook salmon abundance within the ocean and Central Valley river systems.

Status

Adult and juvenile Chinook salmon primarily migrate upstream and downstream within the mainstem Sacramento, San Joaquin, and Mokelumne rivers, and therefore both adult and juvenile Chinook salmon migrate through central Delta channels. Juvenile Chinook salmon, particularly in the fry stage (fish generally 1.5 to 3 inches in length), may rear within the Delta and Suisun Bay, foraging along channel and shoreline margins and lower velocity backwater habitats. The occurrence of juvenile fall-run Chinook salmon within the Delta would be expected to occur during late winter (fry) through early spring (smolts), when water temperatures within the Delta would be suitable for juvenile Chinook salmon migration; the timing of late-fall-run juvenile Chinook salmon in the Delta would slightly lag that of fall-run fish. The seasonal occurrence of juvenile Chinook salmon (all runs) observed within CVP and SWP fish salvage (Exhibit 3.1-16) reflects the seasonal distribution of Pacific salmon within the CCWD project area. The occurrence of adult fall-run Chinook salmon within the south Delta in the vicinity of the proposed CCWD intake structure and fish screen would be limited to the fall period (primarily September-December) of adult upstream migration.

Because fall-run and late fall-run Chinook salmon do not spawn within the Delta, neither construction nor operation of the proposed CCWD intake structure and fish screen would adversely affect Chinook salmon spawning or egg incubation.



Source: DFG 2005b. Central Valley Bay-Delta Branch Fish Salvage Monitoring. http://www.delta.dfg.ca.gov/Data/Salvage/

Exhibit 3.1-16
2004 Seasonal (Daily) Distribution of Juvenile Chinook Salmon in CVP and SWP Fish Salvage Operations

3.2.4.6 Other Special-Status Species

Green Sturgeon

San Francisco Bay, San Pablo Bay, Suisun Bay, and the Delta support the southernmost reproducing population of green sturgeon. White sturgeon are the most abundant sturgeon in the system, and green sturgeon have always been comparatively uncommon. Habitat requirements of green sturgeon are poorly known, but spawning and larval ecologies probably are similar to those of white sturgeon. Adult green sturgeon are more marine than white sturgeon, spending limited time in estuaries or freshwater (California State Water Resources Control Board 1999).

The green sturgeon is a California Species of Special Concern (DFG 2003). NMFS recently (2002) completed its ESA status review for North American green sturgeon and concluded that two distinct population segments (DPS) exist, each of which would qualify as a separate species under ESA. The southern DPS includes the Sacramento River and adjacent coastal waters. Based on the 2002 analysis, NMFS concluded that listing was not warranted (NMFS 2003). In April 2005, NMFS revised the status of green sturgeon, reaffirming that the northern DPS did not warrant listing under ESA, but that it would remain a Species of Concern, while the Southern DPS, including the Sacramento River and Bay-Delta estuary has been proposed to be listed as a threatened species (NMFS 2005). As a result of the proposed listing as a threatened species within the estuary, green sturgeon have been included in this ASIP.

Life History

Indirect evidence indicates that green sturgeon spawn mainly in the Sacramento River; spawning has been reported in the mainstem as far north as Red Bluff. Spawning times in the Sacramento River are presumed to be from March through July, peaking from mid-April to mid-June. Adult sturgeon are in the river, presumably spawning, when temperatures range from 46°F to 57°F. Their preferred spawning substrate is large cobble, but substrates range from clean sand to bedrock. Eggs are broadcast spawned and externally fertilized in relatively high water velocities and at depths of less than 10 feet.

Female green sturgeon produce 60,000 to 140,000 eggs, each approximately 0.15 inch in diameter. Eggs hatch approximately 196 hours after spawning, and larvae are 8 to 19 millimeters long. Juveniles range in size from less than one inch to almost five feet. Juveniles migrate to sea before 2 years of age, primarily during summer and fall. The occurrence of green sturgeon in fishery sampling and CVP/SWP fish salvage is extremely low and therefore has not been used to represent the seasonal period of juvenile movement through the Delta. They remain near estuaries at first but may migrate considerable distances as they grow larger (California State Water Resources Control Board 1999).

Green sturgeon grow approximately 3 inches per year until they reach maturity at 4–5 feet in length, around age 15 to 20. Thereafter, growth slows down. The largest fish are thought to be 40 years old, but this estimate may be low. Adults can reach sizes of 7.5 feet and 350 pounds, but in the San Francisco Bay, most are less than 100 pounds (California State Water Resources Control Board 1999).

Both juvenile and adult green sturgeon are benthic feeders and may also eat small fish. Juveniles in the Delta feed on opossum shrimp (*Neomysis mercedis*) and amphipods (*Corophium* sp.). The green sturgeon is apparently reduced in numbers throughout its range, although evidence is limited. Rough estimates of the numbers of green sturgeon longer than 3 feet in the estuary between 1954 and 1991 range from 200 to 1,800 fish, based on intermittent studies by DFG (Kolhorst, unpublished data). There is no direct evidence of a decline in the numbers of green sturgeon in the Sacramento River. However, the population is so small that a collapse could occur, and it would hardly be noticed because of limited occurrence in conventional fishery sampling programs (California State Water Resources Control Board 1999).

Factors Affecting Abundance

Recent habitat evaluations conducted in the upper Sacramento and Feather rivers for salmonid recovery planning suggest that significant potential green sturgeon spawning habitat was made inaccessible or altered by dams (historical habitat characteristics, temperature, and geology summarized by NMFS 2004). Though no green sturgeon have been documented in the San Joaquin River mainstem upstream of the Delta or in the Stanislaus, Tuolumne, and Merced rivers (DFG 2002; Beamesderfer *et al.* 2004), the San Joaquin River and its tributaries have been modified in ways that reduce suitability for sturgeon since the 1940s, so the lack of contemporary information cannot be considered evidence of historical green sturgeon absence.

Results of habitat assessments indicate that the geographic extent of spawning has been reduced as a result of construction of impassable barriers (e.g., Keswick and Shasta dams) in the upper Sacramento River. Potential adult migration barriers to green sturgeon include the Red Bluff Diversion Dam, Sacramento Deep Water Ship Channel Locks, Fremont Weir, Sutter Bypass, and the Delta Cross Channel Gates on the Sacramento River; and Shanghai Bench and Sunset Pumps on the Feather River.

The introduction and rapid colonization of the estuary by invasive fish and macroinvertebrates is thought to have affected native species including green sturgeon. For example, the non-native clam (*Corbula amurensis*) introduced in 1986, has become the most common food of white sturgeon and was present in the diet of green sturgeon (DFG 2002). Larval and juvenile sturgeon are susceptible to predation by non-native fish including both striped bass and largemouth bass inhabiting the estuary. The significance of the positive and adverse effects of non-native species on the population dynamics of various life stages of green sturgeon has not been determined.

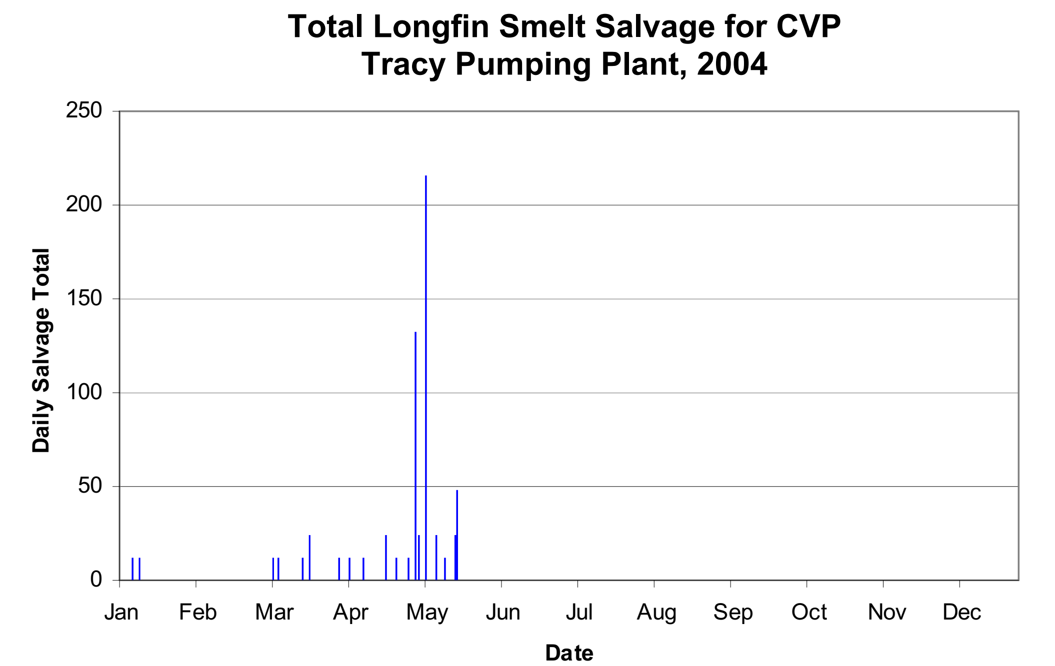
In the Delta, the major factors that may negatively affect juvenile and adult sturgeon abundance may be harvest in the recreational sport fisheries. Additionally, DFG has conducted investigations since 2003 into sturgeon poachers on the Sacramento River near Sacramento, and a number of arrests have been made on operations that were catching large numbers of white sturgeon to sell. The harvest rate and importance of harvest of green sturgeon (white sturgeon are the primary sturgeon harvested) on the abundance and population status is unknown. The cumulative effects of white sturgeon poaching may have contributed to their lowered abundance, but have not been quantified.

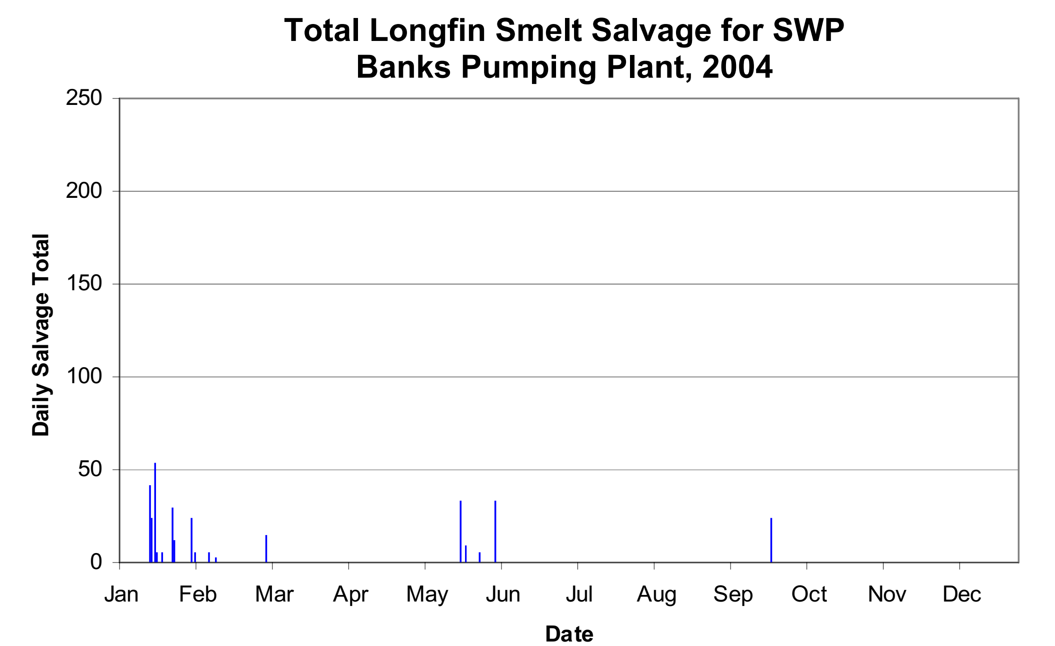
The abundance of green sturgeon is apparently reduced throughout its range. Rough estimates of the numbers of green sturgeon longer than 3 feet in the estuary between 1954 and 1991 range from 200 to 1,800 fish, based on intermittent studies by DFG (Kolhorst, unpublished data). While population estimates are not precise, the population is so small that a collapse could occur, but would be difficult to detect due to a limited occurrence in conventional fishery sampling programs (California State Water Resources Control Board 1999).

Status
Juvenile green sturgeon rear throughout San Francisco and San Pablo Bays, the Sacramento-San Joaquin Delta, and the Sacramento River. During spawning migrations, adult green sturgeon pass through the San Francisco Bay estuary and the Sacramento-San Joaquin Delta on their way to spawning grounds in the Sacramento River (NMFS 2002; Moyle 2002). Larval and juvenile green sturgeon are somewhat likely to be present within the vicinity of the Action Area. Because green sturgeon are thought to spawn farther upstream in the mainstem Sacramento River (Adams et al. 2002), spawning and egg incubation is not expected near the proposed CCWD intake structure and fish screen.

Longfin Smelt
The longfin smelt is a small, planktivorous fish found in several Pacific coast estuaries from San Francisco Bay to Prince William Sound, Alaska. This smelt is a Federal Species of Concern and a California Species of Special Concern. Longfin smelt can tolerate a broad range of salinity concentrations, ranging from freshwater to seawater. Spawning occurs in fresh-to-brackish water over sandy-gravel substrates, rocks, or aquatic vegetation. In the Bay-Delta Estuary, the longfin smelt life cycle begins with spawning in the lower Sacramento and San Joaquin rivers, the Delta, and freshwater portions of Suisun Bay. Spawning may take place as early as November and may extend into June, with the peak spawning period occurring from February to April. The eggs are adhesive, and after hatching, the larvae are carried downstream by freshwater river flow to nursery areas in the lower Delta and Suisun and San Pablo bays. Adult longfin smelt are found mainly in Suisun, San Pablo, and San Francisco Bays, although their distribution is shifted upstream in years of low outflow (California State Water Resources Control Board 1999). The seasonal occurrence of longfin smelt in CVP and SWP salvage (Exhibit 3.1-17) is considered to be representative of the seasonal periods when juvenile and adult longfin smelt would be in the vicinity of the proposed CCWD intake structure and fish screen.

Like delta smelt, longfin smelt spawn adhesive eggs in river channels of the eastern estuary and have larvae that are carried to nursery areas by freshwater outflow; otherwise, the two species differ substantially. A measurable portion of the longfin smelt population consistently survives into a second year. During the second year of life, they inhabit the San Francisco Bay and, occasionally, the Gulf of the Farallones. Therefore, longfin smelt are often considered anadromous (California State Water Resources Control Board 1999).





Source: DFG 2005b. Central Valley Bay-Delta Branch Fish Salvage Monitoring. http://www.delta.dfg.ca.gov/Data/Salvage/

Exhibit 3.1-17
2004 Seasonal (Daily) Distribution of Longfin Smelt in CVP and SWP Fish Salvage Operations

Longfin smelt are also more broadly distributed throughout the Delta and are found at higher salinities than delta smelt. Because longfin smelt seldom occur in freshwater except to spawn, but are widely dispersed in brackish waters of the Bay, it is likely that their range formerly extended as far up into the Delta as saltwater intruded. The easternmost catch of longfin smelt in fall midwater trawl samples has been at Medford Island in the central Delta. The depth of habitat is a pronounced difference between the two species in their region of overlap in Suisun Bay; longfin smelt are caught in greater quantities at deep stations (more than 32 feet), whereas delta smelt are more abundant at shallow stations (less than 10 feet) (California State Water Resources Control Board 1999).

The main food of longfin smelt is the opossum shrimp (*Neomysis mercedi*s), although copepods and other crustaceans are important at times, especially to small fish. Longfin smelt, in turn, are eaten by a variety of predatory fishes, birds, and marine mammals (California State Water Resources Control Board 1999).

Longfin smelt were once one of the most common fish in the Delta. Their abundance has fluctuated widely in the past, but, since 1982, abundance has declined significantly, reaching its lowest levels during drought years. The abundance of longfin smelt also has declined relative to other fishes, dropping from first or second in abundance in most trawl surveys during the 1960s and 1970s, to seventh or eighth in abundance. Abundance improved substantially in 1995 but was again relatively low in 1996 and 1997. Longfin abundance indices, although variable, were at low levels in recent years (e.g., 2004). The causes of decline are multiple and synergistic, including reduction in outflows, entrainment losses to water diversions, climatic variation, toxic substances, predation, and introduced species (California State Water Resources Control Board 1999). The longfin smelt is a Federal Species of Concern and a California Species of Special Concern.

Sacramento Splittail

The Sacramento splittail is a large minnow endemic to the Bay-Delta Estuary. Once found throughout low-elevation lakes and rivers of the Central Valley from Redding to Fresno, this native species now occurs in the lower reaches of the Sacramento and San Joaquin rivers and tributaries, the Delta, Suisun and Napa marshes, the Sutter and Yolo bypasses, and the tributaries of north San Pablo Bay. Although the Sacramento splittail is generally considered a freshwater species, the adults and sub-adults have an unusually high tolerance for saline waters (up to 18 ppt) for a member of the minnow family. The salt tolerance of splittail larvae is unknown, but they have been observed in water with salinities of 10 to 18 ppt (California State Water Resources Control Board 1999).

The Sacramento splittail, which has a high reproductive capacity, can live 5 to 7 years, and generally begins spawning at 2 years of age. Spawning, which seems to be triggered by increasing water temperatures and day length, occurs over beds of submerged vegetation in slow-moving stretches of water (such as flooded terrestrial areas and dead-end sloughs) (Baxter et al. 1996). Adults spawn from February through May in the Delta, upstream tributaries, Napa Marsh, Napa and Petaluma rivers, Suisun Bay and Marsh, and the Sutter and Yolo bypasses (Meng and Moyle 1995). Hatched larvae remain in shallow, weedy areas until they move to deeper offshore habitat later in summer (Young and Cech 1996). Young splittail may occur in shallow and open waters of the Delta and San Pablo Bay, but they are particularly abundant in the northern and western Delta (California State Water Resources Control Board 1999). The seasonal occurrence of juvenile splittail in CVP and SWP fish salvage (Exhibit 3.1-18) is representative of the periods when juvenile splittail would potentially inhabit the region of the south Delta in the vicinity of the proposed CCWD intake structure and fish screen.

Splittail are bottom foragers that feed extensively on opossum shrimp and opportunistically on earthworms, clams, insect larvae, and other invertebrates. They are preyed on by striped bass and other predatory fish in the estuary. In the past, anglers commonly used splittail as bait when fishing for striped bass (California State Water Resources Control Board 1999).

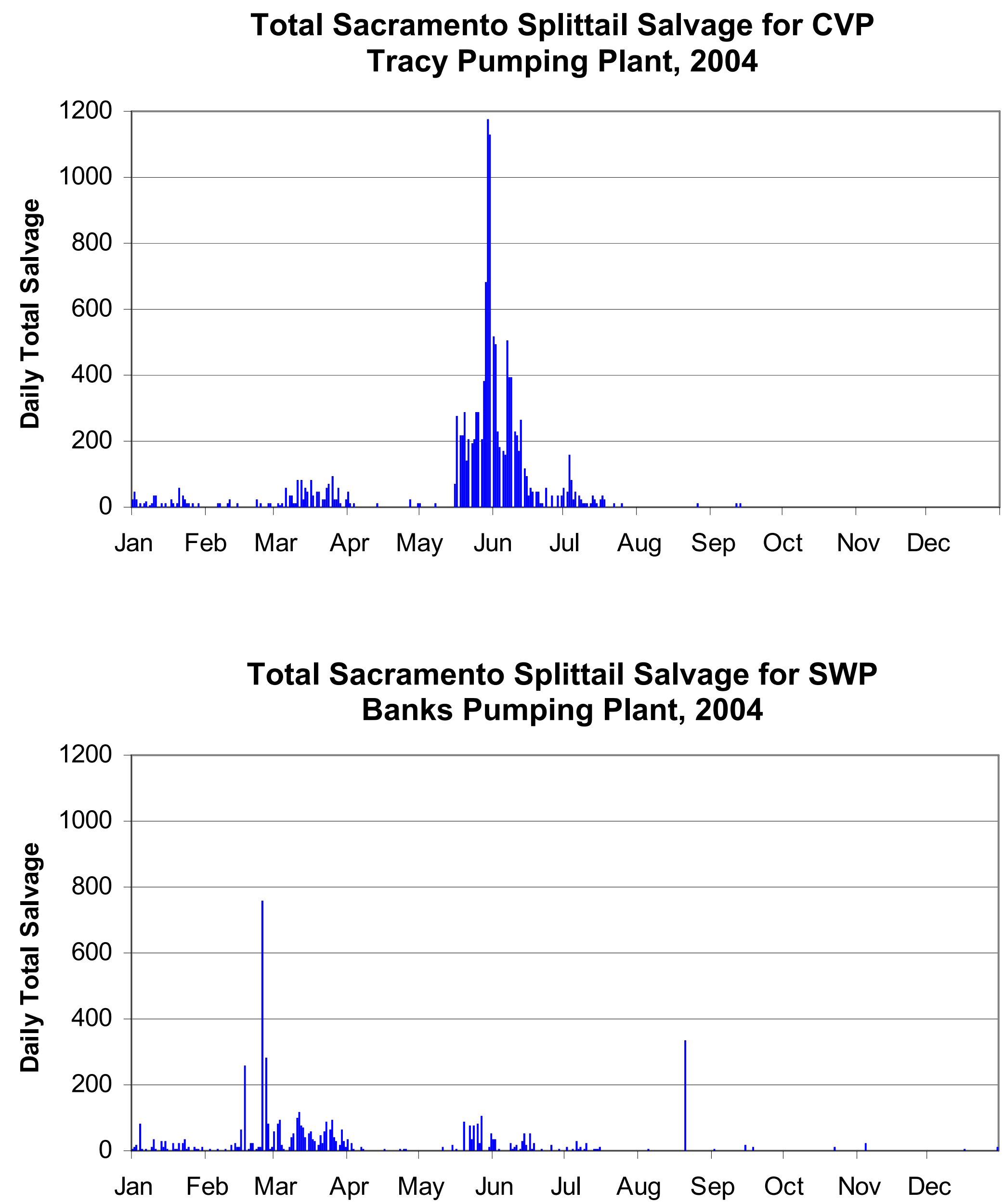
Splittail have disappeared from much of their native range because dams, diversions, and agricultural development have eliminated or altered much of the lowland habitat these fish once occupied. Access to spawning areas or upstream habitat is now blocked by dams on the large rivers (California State Water Resources Control Board 1999).

Young-of-the-year splittail abundance appears to fluctuate widely from year to year. Young splittail abundance dropped dramatically during the 1987 to 1992 drought (Baxter 1996). However, wet conditions in 1995 resulted in high indices for most measures of young-of-the-year abundance. Abundance was relatively low in 1996 and 1997, but higher than during the drought years (Baxter 1996). In 1998, young-of-the-year abundance, indexed by the summer townet survey, was again relatively high (California State Water Resources Control Board 1999). In recent years, indices of juvenile splittail abundance have continued to fluctuate substantially among years (Sommer et al. 1997).

In contrast to young splittail, adult abundance shows no obvious decline during the 1987 to 1992 drought (Sommer et al. 1997). The species' long lifespan and multiple year classes moderate adult population variation. Factors affecting abundance of young splittail include variations in flooding of terrestrial areas that provide spawning and rearing habitat; changed estuarine hydraulics, especially reduced outflow; modifications of spawning habitat; climatic variation; toxic substances; introduced species; predation; and exploitation (California State Water Resources Control Board 1999). The Sacramento splittail is a Federal Species of Concern and a California Species of Special Concern (USFWS 2003).

River Lamprey

The river lamprey has been captured mostly in the upper portion of the Sacramento-San Joaquin estuary and its tributaries in California. Habitat requirements of spawning adults and ammocoetes (larvae) have not been studied in California. Presumably, the adults need clean gravelly riffles in permanent streams for spawning in April and May, while



Source: DFG 2005b. Central Valley Bay-Delta Branch Fish Salvage Monitoring. http://www.delta.dfg.ca.gov/Data/Salvage/

Exhibit 3.1-18
2004 Seasonal (Daily) Distribution of Juvenile and Subadult Sacramento Splittail in CVP and SWP Fish Salvage Operations

the ammocoetes require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25°C (77°F). (California Department of Fish and Game 1995.)

Adults migrate back into freshwater in fall and spawn during winter or spring in small tributary streams. While maturing in streams, river lampreys shrink in length by about 20%. They dig saucer-shaped depressions in gravelly riffles for spawning. Adults die after spawning. Ammocoetes remain in silt-sand backwaters and eddies and feed on algae and microorganisms. The length of the ammocoetes stage is not known but it is probably 3 to 5 years, so the total life span of river lamprey would be 6 to 7 years. (California Department of Fish and Game 1995.)

The ammocoetes begin their transformation into adults when they are about 4.5 inches total length during summer. The process of metamorphosis may take 9 to 10 months, the longest known for any lamprey. Lampreys in the final stages of metamorphosis congregate immediately upriver from saltwater and enter the ocean in late spring. Adults apparently only spend 3 to 4 months in saltwater, where they grow rapidly reaching 10 to 12 inches total length. (California Department of Fish and Game 1995.)

River lamprey ammocoetes are morphologically similar to those of the Pacific lamprey. This, coupled with their overlapping distributions, makes positive identification of ammocoetes very difficult. No information concerning incubation and development time exists. The ammocoete stage lasts several years. Ammocoetes have no teeth, and they feed on microscopic plants and animals. The ammocoetes, transforming adults, and newly transformed adults have been collected in plankton nets in Suisun Bay, Montezuma Slough, and Delta sloughs (DFG 2005b). The presence of river lamprey in collections made above dams, such as upper Sonoma Creek, indicate that some river lamprey may spend their entire life in fresh water. The adults are parasitic in California rivers; most common prey are herring and salmon. River lampreys can apparently feed in either salt or fresh water. There is no accurate assessment of the damage to fish populations. (California Department of Fish and Game 1995.)

The river lamprey has become uncommon in California, and it is likely that the populations are declining because the Sacramento, San Joaquin, and Russian rivers and their tributaries have been severely altered by dams, diversions, pollution, and other factors. Two tributary streams where spawning has been recorded in the past (Sonoma and Cache creeks) are both severely altered by channelization, urbanization, and other problems (California Department of Fish and Game 1995). The river lamprey is a Federal Species of Concern and a California Species of Special Concern.

Northern Anchovy and Pacific Sardine

Northern anchovy and Pacific sardine are managed together under the Coastal Pelagic Species Fishery Management Plan because of similarities in their life histories and habitat requirements.

The northern anchovy ranges from Cape San Lucas, Baja California, to Queen Charlotte Island, British Columbia. It is one of the most prolific fish in terms of numbers and biomass along the northeastern coastal waters of the Pacific Ocean. There are three subpopulations with the northern subpopulation only occurring in the estuary. This species can be the most abundant species in San Francisco Bay, constituting 85% of all fish. Northern anchovy eggs have been observed in Suisun Bay during summer, as seawater intruded up the river. An individual anchovy can spawn 2 to 3 times a year. Postlarvae swim near the surface and are most abundant in San Francisco Bay and San Pablo Bay. As the salt wedge moves up to the estuary in summer, anchovy larvae can be found in Suisun Bay and the lower Delta. The juveniles use inshore bays and estuaries as their nursery ground, while the offshore waters are adult recruitment areas. Given the typical salinity gradient in the Delta, it is highly unlikely that northern anchovy would be found in Victoria Canal.

The Pacific sardine is a schooling pelagic species distributed from northern Mexico to southeastern Alaska. Each year, beginning in their second summer, sardines migrate northwards early in summer and travel south again in fall. They form large schools (up to 10 million individuals) and are often associated with anchovy. Main spawning areas are off the coast of southern California. Similar to northern anchovy, there are three stocks, with the northern stock entering the estuary. Given the typical salinity gradient in the Delta, it is highly unlikely that Pacific sardine would be found in Victoria Canal.

Starry Flounder
Starry flounder occur from the coast off Santa Barbara to Alaska. They occur over sand, mud, and gravel bottoms in coastal ocean waters, bays, sloughs, and even fresh water. Starry flounder are one of the most numerous fishes in San Francisco Bay and can occur in Old River. Small starry flounder eat mostly worms and small crustaceans. As they grow, they eat progressively more crabs, clams, and fish. Males spawn at the end of their second year and females in their third year. The spawning season extends from November through February with greatest activity in December and January.

3.2.5 Recreational Fisheries

The Delta, including Victoria Canal, supports recreational fisheries for a variety of resident and migratory fish. Recreationally important fish species include striped bass, Chinook salmon, largemouth bass, catfish, and sturgeon. Recreational fishing within the Delta includes shore fishing, small boat fishing, and charter boat fishing. Information on these fisheries is briefly summarized below.

3.2.5.1 Shore Fishing

Shore fishing is conducted throughout the Delta, including along many of the levees bordering the river channels. There is relatively little shore angling within Victoria Canal because of poor access. Shore anglers primarily target species such as striped bass, catfish, and sturgeon. Anglers fish from levees and several public and private access locations.

3.2.5.2 Small Boat Fishing

Recreational angling from small boats (e.g., 12–40 feet) is common throughout the Delta and within Victoria Canal. The majority of angling occurs on weekends from April through October or November. Public boat launches and a number of marinas exist within the Delta in the general vicinity of Victoria Canal. Several hundred small boats may launch at the marinas in the area on a weekend day, depending on the time of year and the weather, to fish within the Delta channels. Although small boat angling occurs throughout the year, peak months for recreational fishing are April, May, and June, when target species are striped bass, largemouth bass, and catfish. Many of the recreational anglers fishing within the central Delta participate in local bass tournaments.

3.2.5.3 Charter Boat Fishing

As many as 50 commercial party boats operate out of the Bay-Delta ports, but many of them are small six-passenger boats (6 pacs) that operate seasonally. Many party boats are focused on salmon, rockfish, sanddab, Dungeness crab, and occasionally albacore tuna fishing outside the Golden Gate. Commercial party boats also target striped bass and sturgeon within Suisun Bay and the Delta. Small 6-pac charter boats fish within the central Delta targeting species such as striped bass and sturgeon. Although party boats fish within the estuary throughout the year, the peak months for fishing are April, May, and June, when striped bass are most abundant.

3.3 Baseline Conditions (Terrestrial Biological Resources)

Common and sensitive terrestrial biological resources that occur or potentially occur at the proposed project site (Victoria Island/Byron Tract) are discussed in this section. The terrestrial biology evaluation is based on data collected during reconnaissance field surveys, supplemented by reviews of aerial photographs and information from previously completed studies/analyses that addressed biological resources in the area. A reconnaissance-level field survey was conducted by an EDAW biologist on April 18, 2005, to characterize general biological resources present and document areas that could support special-status species and sensitive habitats. Special-status plant surveys were conducted on July 15, 19, and 22, 2005 at the proposed project site. The Victoria Island/Byron Tract area was also visited on numerous occasions by EDAW biologists to collect information related to the wetland delineation.

3.3.1 Plant Communities and Wildlife Habitats

This section describes the common plant communities and wildlife habitats in the proposed project area. The focus of the section is terrestrial biological resources; however, semi-aquatic wildlife and plant species and their habitats are also described in this section, which primarily relates to how aquatic areas provide habitat for plants, amphibians, and reptiles, issues typically addressed in terrestrial biology sections.

A habitat map was not prepared due to the small patch size of plant communities in relation to the agricultural areas. Representative photographs of the plant communities at Victoria Island/Byron Tract are shown in Exhibits 3.3-1 and 3.3-2. The following description of habitat types within the project area is consistent with NCCP habitats as described in the MSCS, but also includes habitat types not evaluated in the MSCS.

Agricultural fields (asparagus and alfalfa) on Victoria Island (April 18, 2005)

Emergent freshwater marsh and open water on west side of Victoria Island, across from existing Old River Intake and Pump Station (April 18, 2005)

Exhibit 3.3-1
Representative Photographs from Victoria Island/Bryon Tract

Typical drainage ditch on Victoria Island with scant freshwater marsh, aquatic vegetation, and open water (April 18, 2005)

Byron Tract: fallow fields, ruderal habitat, and irrigation canal (April 18, 2005)

Exhibit 3.3-2
Representative Photographs from Victoria Island/Bryon Tract

3.3.1.1 Upland Cropland

Row crops, the dominant vegetation community within the proposed project site, consisted of asparagus (*Asparagus officinalis* ssp. *officinalis*), alfalfa (*Medicago sativa*), and wheat (*Triticum aestivum*) during surveys in spring and summer 2005. Tomato and silage (fodder converted into succulent feed for livestock through processes of anaerobic acid fermentation) also comprise acreages at the proposed project site.

Agricultural habitats such as those present at Victoria Island generally provide limited value for wildlife species. However, alfalfa fields can be used by a number of wildlife species. Alfalfa often supports small mammals, such as Botta's pocket gopher (*Thomomys bottae*), western harvest mouse (*Reithrodontomys megalotis*), and California meadow vole (*Microtus californicus*). These small mammals are prey for a variety of raptor species known to be present in the Victoria Island/Byron Tract area, including American kestrel (*Falco sparverius*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and Swainson's hawk (*Buteo swainsonii*).

3.3.1.2 Fallow Fields and Ruderal Habitat

Several agricultural fields on Byron Tract are not in active agricultural production and are fallow. Dominant vegetation in the fallow agricultural fields is Italian ryegrass (*Lolium multiflorum*) and perennial ryegrass (*Lolium perenne*). The fallow fields on Byron Tract have almost 100% vegetative cover.

The agricultural field boundaries, roadsides, and banks and levees along Old River and Victoria Canal are primarily devoid of vegetation. Where vegetation is present, it is dominated by nonnative grasses and forbs. These ruderal areas often include patches of invasive weeds, including Himalayan blackberry (*Rubus discolor*), poison hemlock (*Conium maculatum*), milk thistle (*Silybum marianum*), and artichoke thistle (*Cynara cardunculus*). Also present are species such as shepherd's purse (*Capsella bursa-pastoris*), wild radish (*Raphanus sativa*), perennial pepperweed (*Lepidium latifolium*), annual bluegrass (*Poa annua*), and common cudweed (*Gnaphalium luteo-album*). Agricultural field boundaries, roadsides, and banks and levees on Byron Tract are also dominated by the same suite of nonnative grasses and forbs that dominate similar areas on Victoria Island; however, the total cover of such species is much higher on Byron Tract.

As with agricultural habitats, low vegetation diversity in fallow fields and ruderal habitats limits their value to wildlife. However, these habitats are expected to support common mammals, such as California ground squirrel (*Spermophilius beecheyi*), western harvest mouse, California meadow vole, and desert cottontail (*Sylvilagus audubonii*). They also provide habitat for birds, such as white-crowned sparrow (*Zonotrichia leucophrys*), western meadowlark (*Sturnella neglecta*), and American goldfinch (*Carduelis tristis*).

3.3.1.3 Tidal Freshwater Emergent Habitat

Most tidal freshwater emergent habitats in the Delta occur as narrow bands along island levees and small to large swaths on in-channel islands and along shorelines. Freshwater emergent habitat within the Victoria Island/Byron Tract area is found along the shorelines of Old River and Victoria Canal, along in-channel islands, and in irrigation ditches. It ranges from sparse pockets of emergent vegetation in some areas to almost complete coverage of smaller drainages in other areas. Dominant vegetation includes California bulrush (*Scirpus californicus*), tule (*S. acutus*), common three-square (*S. robustus*), broadleaf cattail (*Typha latifolia*), narrowleaf cattail (*T. angustifolia*), Nevada bulrush (*S. nevadensis*), river bulrush (*S. fluviatilis*), slenderbeaked sedge (*Carex athrostachya*), southern cattail (*T. domingensis*), and umbrella flatsedge (*Cyperus eragrostis*).

Wildlife diversity in irrigation ditches that are regularly cleared to improve water flow is limited due to the repeated disturbance and absence of natural vegetation in uplands adjacent to the ditches (e.g., agricultural lands). Areas that are not regularly disturbed, such as shorelines of Old River and Victoria Canal and along in-channel islands, provide more valuable habitat for wildlife. Marsh wrens (*Cistothorus palustris*) and song sparrows (*Melospiza melodia*) were observed in the freshwater marsh during field surveys; western aquatic garter snake (*Thamnophis couchii*) and Pacific tree frog (*Hyla regilla*) also could occur in areas with marsh vegetation.

3.3.1.4 Tidal Perennial Aquatic Habitat

Old River and Victoria Canal provide open water habitat. This habitat type is generally unvegetated, but it does support some aquatic vegetation, especially in permanently to intermittently inundated shallow areas. Aquatic vegetation is commonly differentiated into two categories: submerged vegetation that grows below the water surface and is rooted to the substrate, and floating vegetation that floats freely and does not attach to a substrate (Cowardin et al. 1979). The boundaries for vegetated areas within the drainages and waterways are difficult to delimit because of seasonal variations in extent and presence. Native floating aquatic species at the Victoria Island/Byron Tract project site include water primrose (*Ludwigia peploides* ssp. *peploides*), duckweed (*Lemna* spp.), water-meal (*Wolffia* spp.), mosquito fern (*Azolla filiculoides*), and algae.

Open water areas provide habitat for pond turtle (*Actinemys marmorata*), Pacific treefrog, and bullfrog (*Rana catesbeiana*). Both submerged vegetation and floating aquatic vegetation are used as basking or foraging habitat and provide cover for aquatic wildlife species. Deeper open water areas without vegetation provide habitat for species that forage for fish, crayfish, or other aquatic organisms, such as terns (*Sterna* spp.), gulls (*Larus* spp.), river otter (*Lutra canadensis*), and sea lion (*Zalophus californianus*).

3.3.1.5 Managed Seasonal Wetland

Managed seasonal wetland habitat includes wetlands dominated by native or nonnative herbaceous plants. Ditches and drains associated with the upland cropland are also included in this category. Submerged aquatic vegetation within drainages on Victoria Island is dominated by two nonnative invasive species: parrot feather watermilfoil (*Myriophyllum aquaticum*) and water hyacinth (*Eichhornia crassipes*). Floating aquatic vegetation is found in most perennially inundated drainages. The ditches and drains on Victoria Island are rigorously managed for irrigation conveyance and appear to be dredged and re-contoured frequently.

The managed seasonal wetlands, and ditches and drains, may provide habitat for wildlife species associated with shallow water. However, their active management substantially reduces the likelihood that these features provide the stable or permanent habitat required for the survival, growth, and reproduction of most wildlife species. Few amphibian, reptile, or fish species were observed in the ditches and drains during a habitat assessment conducted by Eric Hansen in October 2005 (Hansen, pers. comm., 2005) or during EDAW reconnaissance-level biological surveys.

3.3.1.6 Riparian Scrub

Very small patches of riparian scrub are present on Victoria Island/Byron Tract. Riparian scrub consists primarily of shrubs and short trees such as sandbar willow (*Salix exigua),* arroyo willow (*S. lasiolepis*), and red alder (*Alnus rubra*) in the Victoria Island/Byron Tract area. A few larger trees, including valley oak (*Quercus lobata*) and California buckeye (*Aesculus californica*), are present on Victoria Island along Old River. Nonnative Himalayan blackberry, which commonly creates dense, impenetrable thickets along levee surfaces, and nonnative arundo (*Arundo donax*) are present in patches along the levees.

Riparian habitat provides nesting habitat for a variety of bird species, including black phoebe (*Sayornis nigricans*), western kingbird (*Tyrannus verticalis*), western scrub-jay (*Aphelocoma californica*), oak titmouse (*Baeolophus inornatus*), and Bewick's wren (*Thryomanes bewickii*). Riparian trees and shrubs also may provide nest sites for raptors, such as Swainson's hawk, red-tailed hawk, white-tailed kite (*Elanus leucurus*), and great horned owl (*Bubo virginianus*). Other wildlife observed during field surveys or expected to occur in riparian habitat in the Victoria Island/Byron Tract area include western fence lizard (*Sceloporus occidentalis*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), and opossum (*Didelphis viginiana*).

3.3.2 Sensitive Biological Resources

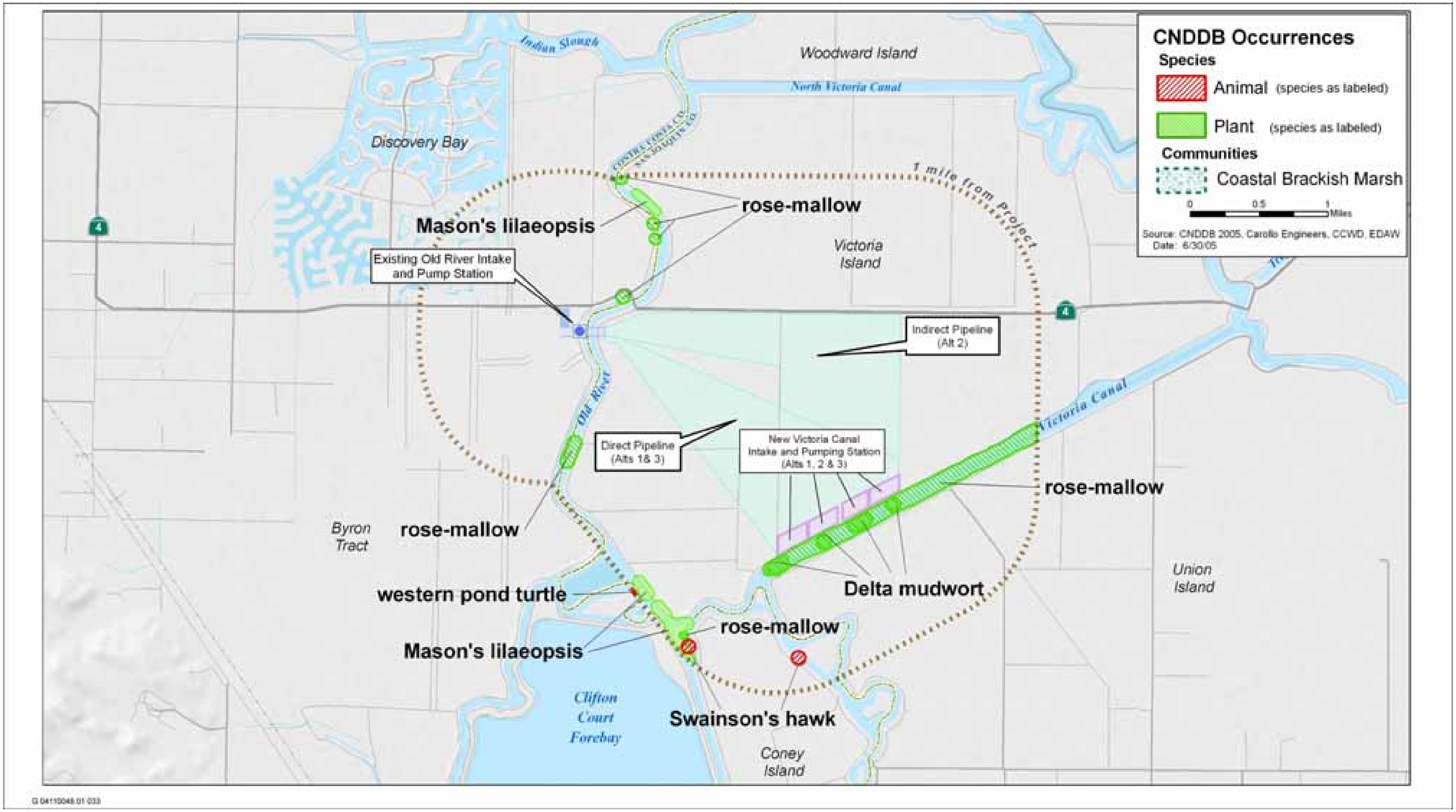
Sensitive biological resources include any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS. Also included are riparian habitat and other sensitive natural communities identified in local or regional plans, policies, or regulations, or by DFG or USFWS; Federally protected wetlands; and established native resident or migratory wildlife corridors or native wildlife nursery sites.

For the purpose of this ASIP, special-status species are defined as plants and animals that are legally protected or that are otherwise considered sensitive by Federal, State, or local resource conservation agencies and organizations. Specifically, this includes species that are State and/or Federally listed as rare, threatened, or endangered; those considered as candidates for listing as threatened or endangered; species identified by USFWS, NMFS, and/or DFG as Species of Special Concern; animals protected by the California Fish and Game Code; and plants considered by the California Native Plant Society (CNPS) to be threatened, endangered, or rare, (i.e., plants on CNPS Lists 1 and 2).

A special-status species list was developed for the Proposed Action by conducting a records search of the California Natural Diversity Data Base (CNDDB) (California Natural Diversity Data Base 2005) for the Clifton Court Forebay and Woodward Island 7.5 minute USGS quadrangles. Exhibit 3.3-3 shows known CNDDB sitings within 1 mile of the project site on Victoria Island and Byron Tract. Additional information regarding the potential occurrence of special-status plants was obtained by searching the CNPS's On-line Inventory of Rare and Endangered Plants for quadrangles including and surrounding Victoria Island and Byron Tract (Clifton Court Forebay, Woodward Island, Holt, Union Island, Tracy, Midway, Altamont, Byron Hot Springs, Brentwood, Jersey Island, Bouldin Island, and Terminous) (California Native Plant Society 2005). Lists of special-status species with potential to occur in the area were also requested from USFWS and DFG, and are included as Attachments A and B to this ASIP.

Several listed species were eliminated from further consideration because typical habitat required by the species does not occur on Victoria Island or Byron Tract. Explanation for elimination of listed species follows. No vernal pools or stockponds are present on Victoria Island or Byron Tract; therefore, there is no suitable habitat for vernal pool fairy shrimp (*Branchinecta lynchi*), longhorn fairy shrimp (*B. longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), or California tiger salamander (*Ambystoma californiense*). Elderberry shrubs, required by valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), were not observed on Victoria Island or Byron Tract. California red-legged frog (*Rana aurora draytonii*) are not expected to occur because Old River and Victoria Canal are likely too deep and large and lack adequate emergent vegetation to support breeding red-legged frogs; in addition, the regular disturbance and variable hydrologic regime in the irrigation ditches likely make them unsuitable for red-legged frogs. Bald eagle (*Haliaeetus leucocephalus*) is not expected to breed in the Delta due to a lack of suitable nesting habitat. Although the species may be present in the Delta during the non-breeding season, Victoria Island and Byron Tract do not contain any historical sites where concentrated populations of eagles are known to winter. Typical habitat for California black rail (*Rallus longirostris obsoletus*), consisting of large patches of marsh with adjacent undisturbed uplands, is not present at the project site. Undisturbed grassland habitat is not present in the area and therefore San Joaquin kit fox (*Vulpes macrotis mutica*) is not expected to occur. Alameda whipsnake (*Masticophis lateralis euryxanthus*) is also not expected to occur due to a lack of chaparral habitat in or adjacent to Victoria Island and Byron Tract. In addition, the primary constituent elements of habitat for vernal pool fairy shrimp and Contra Costa goldfields (*Lasthenia conjugens*) are not present on Victoria Island or Byron Tract, and no areas within the proposed project site are designated as Critical Habitat for these or any other species.

Although a portion of Byron Tract is within the range of San Joaquin kit fox (*Vulpes macrotis mutica)*, the species is not likely to occur along the extreme eastern edge of Byron Tract. San Joaquin kit fox occurrences have been recently analyzed and habitat has been modeled for eastern Contra Costa County during development of the draft Eastern Contra Costa HCP/NCCP (Jones and Stokes 2005). A recent survey of Contra Costa and Alameda Counties within the known range of the San Joaquin kit fox found no evidence of recent occupancy (Clark et al. 2003 in Jones and Stokes 2005). Furthermore, the Proposed Action area does not include any areas identified as suitable habitat for San Joaquin kit fox. Areas identified as core habitat are almost 5 miles to the southwest of the Proposed Action area and low use habitat is over 2 miles away (Jones and Stokes 2005). Therefore, San Joaquin kit fox was eliminated from further consideration in the analysis.



Source: EDAW 2006

Exhibit 3.3-3
Known CNDDB Sitings within 1 mile of the Victoria Island/Byron Tract Project Site

3.3.2.1 Sensitive Natural Communities and Waters of the United States

Coastal and valley freshwater marsh is a wetland plant community recognized as a sensitive habitat by DFG and USACE. This sensitive natural community occurs on and adjacent to Victoria Island and Byron Tract and is described above under Emergent Tidal Freshwater Marsh.

Waters of the United States, including wetlands, are subject to USACE jurisdiction under Section 404 of the Clean Water Act. Section 404 establishes a requirement to obtain a permit prior to any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. Based on preliminary wetland delineation field work, Old River and Victoria Canal, numerous small drainages, several seasonal wetlands and swales, and freshwater marshes on Victoria Island and Byron Tract may be under the jurisdiction of USACE. However, the preliminary wetland delineation has not yet been submitted to, or verified by, USACE.

3.3.2.2 Special-status Plants

The Delta is home to several special-status species, many of which are endemic. The emergent tidal freshwater marsh, mud banks, and other wet places at the proposed project site (Victoria Island/Byron Tract) provide potential habitat for 11 special-status plant species. Focused special-status plant surveys were conducted in July 2005 at the Victoria Island/Byron Tract project site. Two special-status species, Mason’s lilaeopsis (*Lilaeopsis masonii*) and rose-mallow (*Hibiscus lasiocarpus*), were documented.

Mason’s lilaeopsis (*Lilaeopsis masonii*)

Mason’s lilaeopsis is considered rare by DFG. In addition, it is listed on CNPS List 1B (considered rare, threatened, or endangered in California and elsewhere) and is a Federal Species of Concern. It is a small, rhizomatous perennial herb in the carrot family that flowers from April to November. It produces narrow, grass-like, bright green leaves and small inconspicuous flowers in umbels. This species grows in freshwater and brackish marshes, generally found in tidal zones on depositional soils. At the proposed project site, it grows in linear colonies in silt in the grooves of logs that have washed up on the shore or rip-rap along the west bank of Old River. The first occurrence was documented adjacent to a remnant of tule marsh on the west bank of Old River, south of the existing intake and pump station. The second occurrence was documented south of the first occurrence on the rip-rap of the west bank of Old River.

Rose-mallow (*Hibiscus lasiocarpus*)

Rose-mallow is on CNPS List 2 (considered rare, threatened, or endangered in California, but more common elsewhere). It is an erect, rhizomatous perennial herb in the mallow family that flowers from June through September. It produces heart-shaped leaves and large white flowers that are rose-colored at the base. This species grows in freshwater marshes, generally found on wet riverbanks and low peat islands in sloughs. At the proposed project site, four occurrences of rose-mallow were observed along Old River and Victoria Canal at the base of the rip-rap. The first occurrence (one plant) was documented on the north bank of Victoria Canal, growing with common bog rush (*Juncus effusus*). The second occurrence (one plant) was documented growing on the west bank of Old River, in a mud flat adjacent to a large fragment of tule marsh (*Scirpus* *acutus*). The third occurrence (15 plants) was documented in several locations on the east bank of Old River adjacent to a large stand of blackberry. The fourth occurrence (one plant) was documented on the east bank of Old River by a small fragment of tule marsh also have the potential to occur in the freshwater marsh on Victoria Island and Byron Tract.

No other special-status plants were observed during focused surveys in July 2005 and no other special-status plants are likely to be present at the proposed project site.

3.3.2.3 Special-status Wildlife

The existing habitat types at the Victoria Island/Byron Tract project site support potential habitat for three wildlife species that are State or Federally listed as threatened or endangered: giant garter snake (*Thamnophis gigas*), greater sandhill crane (*Grus canadensis tabida*), and Swainson's hawk. Seven non-listed special-status wildlife species are known to or could potentially occur on Victoria Island/Byron Tract: western pond turtle, white-tailed kite, northern harrier, burrowing owl (*Athene cunicularia hypugaea*), California horned lark (*Eremophila alpestris actia*), loggerhead shrike (*Lanius ludovicianus*), and tricolored blackbird (*Agelaius tricolor*). Each of these species is evaluated in more detail below. Table 3.3-1 presents information on these special-status wildlife species.

Giant Garter Snake

The giant garter snake is State and Federally listed as threatened. The giant garter snake inhabits agricultural wetlands and associated waterways, including irrigation and drainage canals, rice fields, marshes, sloughs, ponds, low-gradient streams, and adjacent uplands. Giant garter snakes are believed to be most numerous in rice growing regions. Giant garter snakes are typically absent from the larger rivers; wetlands with sand, gravel, or rock substrates; and riparian areas lacking suitable basking sites or suitable prey populations (U.S. Fish and Wildlife Service 1999). They are primarily restricted to aquatic habitat and nearby basking areas during their active period (April 1–October 1). From late October to late March, giant garter snakes hibernate in underground refugia (e.g., abandoned rodent burrows and deep crevasses) above the high-water line.

Although the historical and current distribution of giant garter snake in the Delta is poorly understood, Victoria Island lies well outside of the species' documented range. The nearest giant garter snake record lies more than 9 air miles northeast of Victoria Island on Medford Island (CNDDB occurrence number 151). Although there is a scattering of additional giant garter snake occurrences to the north of Victoria Island spanning from east to west, all are 12 miles or farther from the project site. Furthermore, all are observations of individual snakes with none known to represent extant populations. Victoria Island is also south of the known boundary of the northern giant garter snake population clusters. The nearest locality record south of Victoria Island lies more than 50 air miles distant in Madera County; no giant garter snake occurrences are documented in Stanislaus County between Victoria Island and San Joaquin Valley populations (Hansen, pers. comm., 2005). Additionally, general biological surveys for numerous nearby CCWD projects, such as the Rock Slough and Old River Water Quality Improvement Projects, and numerous focused surveys for giant garter snake by giant

Table 3.3-1
Special-Status Wildlife Species With Potential to Occur at the Victoria Island/Byron Tract Project Site

Species	Legal Status[1] USFWS	Legal Status[1] DFG	Habitat	Potential for Occurrence[2] at the Victoria Island/ Byron Tract Project Site
Reptiles				
Giant garter snake *Thamnophis gigas*	T	T	Streams and sloughs	Unlikely to occur; no known established populations in vicinity
Western pond turtle *Actinemys marmorata*	FSC	CSC	Ponds, marshes, rivers, streams, sloughs	Likely to occur
Birds				
White-tailed kite *Elanus leucurus*	FSC	FP	Forage in grasslands and agricultural fields; nest in isolated trees or small woodland patches	Likely to occur
Northern harrier *Circus cyanus*	--	CSC	Grasslands, agricultural fields, and freshwater marsh	Likely to occur
Swainson's hawk *Buteo swainsoni*	FSC	T	Woodlands for nesting, grasslands for foraging	Likely to occur
Greater sandhill crane *Grus canadensis. tabida*	--	T, FP	Agricultural fields and pastures	Could occur
Burrowing owl *Athene cunicularia*	FSC	CSC	Grasslands and agricultural fields	Known to occur
Loggerhead shrike *Lanus ludovicianus*	FSC	CSC	Woodland shrubs for nesting, grasslands and agricultural fields for foraging	Likely to occur
California horned lark *Eremophila alpestris actia*	--	CSC	Sparse or short grasslands or barren areas	Likely to occur
Tricolored blackbird *Agelaius tricolor*	FSC	CSC	Freshwater marsh with dense cattails and tules, riparian scrub, and other dense shrubs and herbs for nesting, grasslands and agricultural fields for foraging	Could occur

[1]**Legal status:**

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories
- E Endangered (legally protected)
- FSC Federal Species of Concern (no formal protection)
- T Threatened (legally protected)

California Department of Fish and Game (DFG) State Listing Categories
- E Endangered (legally protected)
- FP Fully protected (legally protected, no take allowed)
- T Threatened (legally protected)
- CSC California Species of Concern (no formal protection)

[2]**Potential occurrence definitions:**

Unlikely to occur: Only a minor amount of suitable habitat is available in the project area, and established populations are sufficiently distant that it is unlikely that the species would occur in the project area.

Could occur: Suitable habitat is available in the project area; however, there are few or no other indicators that the species might be present.

Likely to occur: Habitat conditions, species behavior, known occurrences in the project vicinity, or other factors indicate a relatively high likelihood that the species would occur in the project area.

Known to occur: The species, or evidence of its presence, was observed in the project area during reconnaissance surveys, or was reported by others.

garter snake expert Eric Hansen in the southern and central Delta, have failed to locate any giant garter snakes.

Although giant garter snake is not expected to occur on Victoria Island or Byron Tract because of a lack of known populations in the area and the high level of giant garter snake surveys that have been conducted in the south and central Delta without any observations of giant garter snake, potentially suitable habitat is present. A habitat assessment of the project site on Victoria Island was conducted by Eric Hansen in October 2005 to evaluate habitat suitability for giant garter snake (Hansen, pers. comm., 2005). The assessment covered those areas with potential to provide habitat for this species (ditches and drains and adjacent upland areas). Most (64%) of the observed ditches and drains on Victoria Island were categorized as marginally suitable habitat for giant garter snake. A small area (0.9 mile or 3% of the surveyed area) along the inner toe of the levee along Victoria Canal was categorized as suitable habitat. The remainder of the surveyed area (33%) was categorized as unsuitable. (Hansen, pers. comm., 2005.)

Both Victoria Canal and Old River demonstrate a species composition and flow regime characteristic of large rivers, which are generally unsuitable for giant garter snake because of the presence of predatory gamefish, diminished densities of prey species, and lack of suitable cover and foraging habitat. Therefore, while the outer levee banks of Victoria Island may possess characteristics associated with giant garter snake habitat, these characteristics occur in a proportion and configuration unlikely to support the species long-term (Hansen, pers. comm., 2005). The interior levee slopes, ditches, and drains are also largely unfavorable for giant garter snake because of lack of upland refuge and prey species and frequent disturbance from vigorous maintenance associated with Victoria Island's irrigation system.

Focused surveys for giant garter snake were not conducted, but no giant garter snakes were seen during the reconnaissance biological surveys in April and July 2005, or during the giant garter snake habitat assessment in October 2005.

Greater Sandhill Crane

The greater sandhill crane is State-listed as threatened and is a fully protected species. This subspecies of the sandhill crane primarily winters in the Delta and forages and roosts in agricultural fields and pastures. Habitats used by the sandhill crane include seasonal and freshwater emergent wetlands, grasslands, and agricultural lands. Generally, crane wintering habitat consists of shallowly flooded grasslands that are used as loafing and roosting sites, and nearby agricultural areas that provide food sources, including rice, sorghum, barley, and corn. The fallow fields on Byron Tract are potential habitat for greater sandhill crane, but the quality of the potential habitat is low due to the lack of preferred types of agricultural crops nearby. No sandhill cranes were observed in the area during the reconnaissance-level field survey; however, the survey was conducted in spring, when sandhill cranes have already left central California for breeding grounds to the north.

Swainson's Hawk, White-tailed Kite, Northern Harrier
Swainson's hawk is State listed as a threatened species. Swainson's hawks are known to nest throughout the Delta in the vicinity of Victoria Island (California Natural Diversity Data Base 2005). Potential nest trees for this species occur on and adjacent to Victoria Island. Grasslands, alfalfa fields, and other row crops provide suitable foraging habitat for Swainson's hawks. This species was observed foraging on Victoria Island during the field surveys. The CNDDB reports two Swainson's hawk nests near the confluence of Old River and Victoria Canal.

White-tailed kite is fully protected by DFG and is a Federal Species of Concern. Northern harrier is a California Species of Special Concern. The trees along the western and northern side of Victoria Island provide suitable nesting habitat for white-tailed kite. Northern harrier could nest in the agricultural fields and fallow fields on Victoria Island and Byron Tract.

Western Burrowing Owl
Western burrowing owl is a California Species of Special Concern. Burrowing owl typically use burrows made by fossorial animals, such as ground squirrels. One burrowing owl was observed on Victoria Island during the field surveys. Pellets and white-wash were also observed at several burrow entrances, but a complete survey was not conducted as part of the site reconnaissance. Burrowing owl was also identified on Victoria Island during a levee habitat assessment conducted by DFG in September 2002. Because burrowing owls may occupy different burrows from year to year, conducting a complete survey at this stage of project development (i.e., several years before construction and without knowing the exact project footprint) would not accurately identify the location and number of burrowing owls that could be affected. Therefore, focused surveys for burrowing owl should be conducted closer to project construction (i.e., the non-breeding season prior to construction). Suitable habitat for burrowing owl occurs along the edges of the agricultural fields, irrigation ditches, roadways, and levees.

Western Pond Turtle
Western pond turtle is a California Species of Special Concern. Suitable habitat consists of ponds, marshes, rivers, streams, and irrigation ditches supporting aquatic vegetation. The irrigation ditches, Victoria Canal, and Old River provide suitable aquatic habitat. The rip-rapped banks and in-channel vegetation in Victoria Canal, Old River, and irrigation ditches could provide basking sites for pond turtle. The CNDDB reports several western pond turtle individuals in Old River within 0.5 mile of the confluence with Victoria Canal; therefore, both Old River and Victoria Canal are considered occupied habitat for western pond turtle. Focused surveys for western pond turtle were not conducted, but none were seen during the reconnaissance survey.

California Horned Lark and Loggerhead Shrike
The California horned lark and loggerhead shrike are California Species of Special Concern. The loggerhead shrike is also a Federal species of special concern. Horned larks nest on the ground in open areas, grasslands, or agricultural areas. Loggerhead shrikes require open grassland or agricultural areas with scattered shrubs or small trees for perching, hunting, and nesting. The ruderal grassland and fallow fields provide suitable

nesting and foraging habitat for California horned lark and loggerhead shrike. Shrikes may also nest in the riparian shrub habitat on Victoria Island and Byron Tract. Focused surveys for giant horned lark and loggerhead shrike were not conducted, but none were seen during the reconnaissance survey.

Tricolored Blackbird

The tricolored blackbird is a Federal and California species of special concern. Tricolored blackbirds nest in small (hundreds of birds) to large colonies (hundred-thousands of birds) and typically use marsh habitats or thorny shrubs such as blackberry brambles or thistle stands. The larger patches of emergent marsh and blackberry brambles on Victoria Island and Byron Tract provide suitable nesting for tricolored blackbird. No tricolored blackbirds were observed during the site visit. Because tricolored blackbird colonies may move to different locations between years, it is possible in future years for tricolored blackbirds to nest in suitable habitat in the area.

4 Effects of the Proposed Action on Species and Habitats

One of the primary objectives of an ASIP is to determine the environmental effects of the Proposed Action and minimize any adverse effects pertaining to ESA and CESA requirements. This chapter identifies potential direct, indirect, and cumulative effects to special-status species likely to result from the Proposed Action.

4.1 Fishery and Aquatic Resources

4.1.1 Methodology and Approach

The impact analysis for fishery and aquatic resources was based on consideration of: (1) construction activities and the area anticipated to be disturbed, (2) existing habitat conditions in the Action Area, (3) known or presumed occurrence of protected species near the existing CCWD intakes and the proposed intake location in Victoria Canal, and (4) hydrologic modeling combined with biological information on screening efficiencies and fish distribution and densities to evaluate and minimize fish entrainment and impingement mortality.

4.1.1.1 Data Sources

Data sources used in the impact analysis included:

- studies and monitoring reports prepared by DFG, USFWS, DWR, and the Interagency Ecological Program; the Vernalis Adaptive Management Plan (VAMP) San Joaquin River salmon survival studies; and others;
- monitoring reports for CCWD's unscreened Rock Slough and Old River diversions, and CCWD surveys; and
- DFG surveys:
    - 20 mm delta smelt surveys,
    - delta smelt larval survey,
    - spring Kodiak trawl surveys,
    - summer townet surveys,
    - fall mid-water trawl surveys,
    - San Francisco Bay Study fishery surveys,

- fish salvage monitoring conducted at the CVP and SWP water diversions located in the south Delta, and
- real-time monitoring.

Data from these surveys were used to document species composition, geographic and seasonal distribution, and seasonal abundance (density) of selected aquatic species for use in evaluating temporary and long-term impacts of diversion operations. Emphasis was placed on surveys that provided the most representative sampling both spatially and temporally in the vicinity of the proposed, Old River, and Rock Slough intakes. Additionally, the potential for fish eggs and larvae, and small invertebrates to be entrained into conventional intake screens has been realized by previous monitoring conducted by Jerry Morinaka at the Old River and Rock Slough intakes. Monitoring conducted at the Old River intake to gage screen effectiveness has provided a basis for anticipating the likelihood of this effect from the Proposed Action's similarly designed fish screen. These screen effectiveness monitoring surveys, DFG 20-mm larval smelt surveys, and fish facility salvage data provide the most consistent, representative information on the seasonal distribution of various life stages of fish species (i.e., eggs and larvae, larvae, and juveniles, respectively) and were used to assess vulnerability to net entrainment and impingement loss as a potential result of the Proposed Action. Attachment D provides a summary of Delta fisheries surveys.

Information used in developing this impact analysis also characterizes basic aquatic habitat at the proposed intake site which would be disturbed during construction of the positive barrier fish screen. Additional information, complementing evaluation of best available data, was obtained during a site visit and field reconnaissance surveys by Chuck Hanson of Hanson Environmental.

The general design parameters of the new fish screen at the proposed intake are equivalent to those of the existing intake screen at the Old River diversion. CCWD's monitoring at the Old River intake screen, as well as at its other Delta intakes, has provided valuable and relevant data on adverse effects to fish and other aquatic species resulting from intake operation.

Old River Fish Monitoring Program

The Old River intake and fish screen facilities, located along the west bank of Old River just south of the State Route 4 Bridge, began operating in early 1998. Shortly thereafter, DFG initiated a long-term biological monitoring program that is still underway to meet the requirements of the Federal biological opinions and the ESA MOU on the effects of the Los Vaqueros Project on delta smelt and winter-run Chinook salmon (Morinaka 2000, 2003). The monitoring conducted at the Old River Fish Screen Facility includes measures to evaluate the effectiveness of the fish screens, real-time monitoring for delta smelt, and monitoring to determine "take" levels of delta smelt and winter-run Chinook salmon at the intake facility.

Fish monitoring is conducted behind and in front of the fish screens. Monitoring with a large sieve net behind the screens occurs up to three times per week from January through June, and once per week from July through December. A smaller sieve-net is deployed in front of the screen facility from January through June. Few fish have been caught throughout the year. Among the four different fish species caught, only one young-of-the-year Chinook was caught in February 1999 (Morinaka 2000). Morinaka (2000) concluded that "the results demonstrate that a properly designed and operated screen can reduce entrainment losses." The low approach velocity of screens designed to these criteria almost eliminates entrainment and allows juvenile fish to swim away from the screen face.

Contra Costa Canal Intake Entrainment Study
The purpose of the Contra Costa Canal Intake Entrainment Study is to determine the impacts on Delta fish species resulting from the diversion of Delta waters through the unscreened Rock Slough intake of the Contra Costa Canal, and provide information for the assessment of how, where, and if the intake channel should be screened. Sampling, which was initiated in 1994 by DFG, and taken over by Tenera in June 2003 (Tenera 2005), is ongoing. Targeted fish species are juvenile and adult Delta fish species, including winter-run Chinook salmon, delta smelt, longfin smelt, and splittail. A large, single-fyked variable mesh sieve net with wings is used to sample the canal downstream of Pumping Plant #1. Sampling occurs October through August and varies with intensity throughout this period. A 500-micron mesh plankton net samples for small juvenile smelt and splittail from January through July and varies with intensity throughout the period. Water temperature, conductivity, and turbidity are measured during each sampling effort at the sample site.

Mallard Slough Monitoring Program
The purpose of the Mallard Slough Monitoring Program is to monitor the relative abundance of fish species vulnerable to entrainment when Delta waters are being diverted through the Mallard Slough Pumping Plant. Sampling was initiated in 1995 by Jerry Morinaka (Interagency Ecological Program 1995) and is ongoing. A fish screen was installed at Mallard Slough Pumping Plant in 2002. Target species are juvenile and adult Delta fish species, with an emphasis on winter-run Chinook salmon and delta smelt. In the pilot sampling year, 1995, various gear types were used in the intake channel to determine the most effective gear for juvenile salmon (e.g., fyke net, boat deployed seine, modified trawl net). Sampling has occurred only when the Mallard Slough Pumping Plant is in operation. Larval and small juvenile fish were sampled using a 505-micron mesh plankton net towed within the intake channel and outside in the Sacramento River every 8 days, April 15–July 15 (Interagency Ecological Program 2006; Tenera 2005).

4.1.1.2 Species Evaluated
Potential impacts were evaluated with respect to the key fish and aquatic species, previously identified in Table 1.3-1, expected to occur in the vicinity of CCWD's intakes on Old River and Rock Slough, and the new intake proposed for Victoria Canal.

4.1.1.3 Methods and Assumptions
A fishery and aquatic resources impact assessment was performed to evaluate the potential effects of construction and operation of the Proposed Action on fish and macroinvertebrates inhabiting Victoria Canal and the Bay-Delta estuary. The evaluation,

combining the hydrologic modeling results with the best and most representative Delta fisheries data, assesses potential fishery and aquatic resource impacts as described below.

Hydrologic Modeling

The evaluation of potential fishery and aquatic resource impacts is based, in part, on hydrologic modeling results describing water diversion operations over a range of environmental/hydrologic conditions (see EIR/EIS Appendix C for full details on the modeling methodology and results). The seasonal timing and magnitude of water diversions from the Delta may affect aquatic species directly through entrainment and/or impingement, or indirectly through changes in hydrologic conditions and aquatic habitat. Hydrologic modeling results provide the technical foundation for assessing adverse effects of diversion operations on fish species and their habitat within the Bay-Delta estuary. The assessment relies on a comparative analysis of operational and resulting environmental conditions within the estuary under assumed baseline operations and with the Proposed Action (including both existing conditions and future cumulative conditions).

Results of modeling[1] for a 72-year hydrologic period were used to investigate the potential effects of the Proposed Action on habitat conditions supporting fish and macroinvertebrates within the Delta. Comparative analysis of monthly hydrologic modeling results between the baseline conditions and the project alternatives for current level of demand and future level of demand (2020) was conducted to assess changes in potential net entrainment and impingement losses. Modeling output evaluated as part of the fisheries analysis included:

- water diversion export operations at the SWP Banks Pumping Plant and CVP Tracy Pumping Plant, as well as local CCWD diversions at the Rock Slough intake, Old River intake, and the proposed alternative intake in Victoria Canal;
- hydrologic conditions in the Delta, as reflected by calculations of Georgiana Slough flows, Delta cross-channel flows, total Delta inflow and outflow, and Yolo Bypass flows;
- river flows including Sacramento River flow, Mokelumne River inflow to the Delta, Calavaras River flows, San Joaquin River flow at Vernalis, and San Joaquin River inflow to the Delta;
- export/inflow ratio; and
- location of the 2-part-per-thousand salinity isohaline (X2).

1 CALSIM II, DSM2, and the CCWD Solver Model were used to model the Proposed Action and alternatives. See EIR/EIS Appendix C-2 for a complete description of modeling methodology.

Compliance with the existing biological documents for the Los Vaqueros Project[2] is included as part of the Proposed Action and all other alternatives. Hydrologic modeling using CALSIM II for existing and future conditions includes operations to meet terms of the biological opinions. With the Proposed Action, CCWD would continue to operate consistent with these existing biological opinions to minimize fisheries impacts during spring. The biological opinions specify:

- **No-Fill Period:** CCWD will avoid filling Los Vaqueros Reservoir for 75 days each spring. The default no-fill period is March 15 through May 31.

- **No-Diversion Period:** CCWD will avoid Delta diversions for 30 days each spring, concurrent with part of the no-fill period. The default no-diversion period is the month of April.

- **Emergency Storage:** The no-fill and no-diversion restrictions are in effect only when Los Vaqueros Reservoir is above emergency storage levels. Emergency storage is defined as 70,000 acre-feet in below-normal, above-normal, and wet years, and 44,000 acre-feet in dry and critical years.

- **X2 Restrictions:** Los Vaqueros Reservoir may be filled when X2 is west of Chipps Island in February through May, and Collinsville in January, June, and December. X2 restrictions on filling in December only exist when adult delta smelt are present at the Old River intake.

CCWD has worked with the fisheries agencies annually since Los Vaqueros Project operations were initiated to adaptively manage the timing of the no-fill/no-diversion period. The operational rules described above were developed before the fish screen at the Old River pump station went into service in 1998. Since then, monitoring has demonstrated that the Old River fish screen is working well and protecting fish as designed. CCWD continues to work with the fisheries agencies on an annual basis to develop plans to implement the no-fill/no-diversion periods to more effectively protect fish from April through June.

The CVPIA includes a requirement for Reclamation to develop and implement a program to mitigate for fishery impacts resulting from the operation of the Contra Costa Canal Pumping Plant No. 1.[3] This program may include a fish screen at Rock Slough, modified operations, or other measures to mitigate fishery impacts. The timing and elements of the program, and any environmental requirements associated with it, are highly uncertain and no funding has been appropriated for its implementation. For the purposes of modeling the future conditions for the Proposed Action, this analysis has conservatively assumed that there is no fish screen at Rock Slough. If a fish screen were to be installed, modeling results would predict lower entrainment losses at the Rock Slough Intake and the potential for new impingement losses. This would reduce some of the entrainment

[2] CCWD's operations are governed in part by three biological documents: (a) 1993 NOAA Fisheries Biological Opinion for winter-run Chinook salmon, (b) 1993 USFWS Biological Opinion for Delta smelt, and (c) 1994 Memorandum of Understanding between DFG and CCWD regarding the Los Vaqueros Project.

[3] P.L 102-575 Sec 3406(b)(5)

benefits the modeling analysis predicts resulting from the Proposed Action's reductions in Rock Slough pumping.

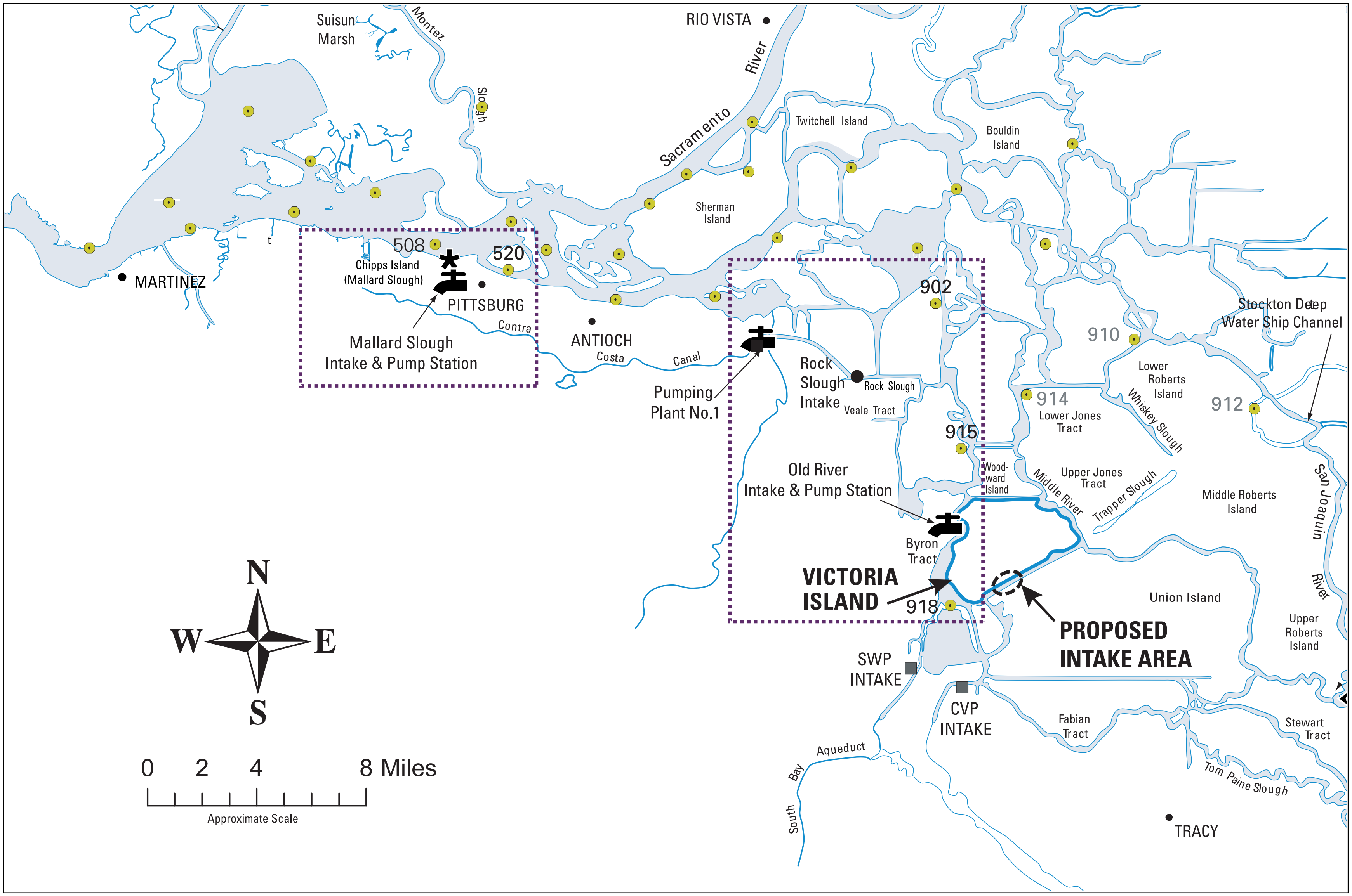
Fisheries and Biological Data

Biological relationships have been established based upon results of fishery investigations conducted by USFWS, DFG, DWR, and others to evaluate the biological effects of changes in many of the habitat-related parameters potentially affected by proposed CVP and SWP operations (DWR and Reclamation 2000). For example, USFWS developed preliminary relationships between Sacramento and San Joaquin River flows and juvenile Chinook salmon survival. Biological relationships, however, have not been established for a number of the environmental parameters (e.g., E/I ratio, Delta inflow and outflow, Georgiana Slough flows, etc.), and analyses thus rely largely on professional judgment. The entrainment/impingement analysis was based on average monthly densities of each of the target species and life stages, and corresponding monthly estimates of water diversions at the CCWD diversion sites (i.e., Rock Slough, Old River, Mallard Slough, and proposed intake in Victoria Canal) under current conditions and assuming operations of the alterative intake over the 72-year simulation period.

The analysis of potential diversion operations on fish and macroinvertebrates also included consideration of the design and operational criteria for the proposed positive barrier fish screen. Fish screen design criteria utilized in developing the proposed intake structure, and as a basis for this impact analysis on fishery populations, assumed that the positive barrier fish screen would be designed and operated in conformance with the general DFG, NMFS, and USFWS design criteria (DFG 2000b; NMFS 1997; Morinaka 2000; URS and CH2M Hill 2001).

Fishery impact assessment modeling was conducted using the following assumptions:

- 20-mm delta smelt survey densities (derived from 1995 through 2005 data) at Stations 902, 915, and 918 represent Rock Slough, Old River, and Victoria Canal, respectively (Exhibit 4.1-1).
- Larval delta smelt are not effectively excluded by the fish screen (entrainment is proportional to fish density).
- Average monthly salvage densities at the CVP (1979 through mid-2005) are representative of juvenile fish densities at Rock Slough, Old River, and Victoria Canal.
- Fish screen performance would be 95% effective in avoiding impingement when compared to an unscreened diversion, and the design and operation of a functional positive barrier fish screen meeting DFG, NMFS and USFWS design criteria (e.g., approach velocity of 0.2 ft/sec, screen openings 1.75 mm, etc.) would provide year-round protection for juvenile (fish greater than approximately 1 inch in length) and adult fish.



Source: Hanson Environmental 2006; Data provided by CCWD, DWR, and DFG

Exhibit 4.1-1
DFG 20-mm Larval Smelt Survey Sites Used as a Basis for Entrainment Loss Modeling

- Impingement risk is directly proportional to monthly diversion rate.
- The potential environmental consequences of the proposed water diversion and positive barrier fish screen construction, operations, and maintenance (i.e., impact mechanisms) are expected to be generally similar for each of the evaluated species, and hence impacts are discussed collectively.

4.1.2 Impact Analysis Results

Construction of the positive barrier fish screen and intake structure associated with the Proposed Action is anticipated to result in temporary, localized changes in fishery habitat in the immediate vicinity of the Proposed Action site on Victoria Canal. Construction of the intake would occur within a cofferdam, which contributes substantially to a reduction and avoidance of potential construction-related adverse impacts to water quality and fishery habitat. Installation of the cofferdam and excavation as part of site preparation would, however, result in temporary localized increases in turbidity and suspended sediment concentrations and may expose fish and macroinvertebrates to underwater sound pressure levels (e.g., noise) that may temporarily affect the behavior and local distribution of fish and macroinvertebrates in the immediate vicinity of the construction site. Installation and dewatering the cofferdam would also increase risks that fish may be trapped and stranded within the cofferdam during dewatering. These short-term localized construction-related impacts to fishery resources and their habitat are described below. Standard construction-related measures designed to reduce these effects are identified in Chapter 5, "Description of Conservation Measures."

Operation of the proposed intake structure has the potential to directly and indirectly affect fishery resources and aquatic habitat within Victoria Canal and the Bay-Delta estuary through (1) net entrainment or impingement of fish eggs and larvae that are not effectively excluded from the diversion by the positive barrier fish screen, and (2) changes in hydrologic conditions within various portions of the estuary as a result of Proposed Action water diversions, and the potential for resultant changes to flows and other hydrologic conditions affecting quality and availability of habitat for fish and other aquatic resources inhabiting the estuary. These potential adverse impacts of water diversion operations on fish and aquatic resources are discussed below. The comprehensive estimated net fish entrainment and impingement losses based on CALSIM II water quality modeling and CVP and SWP salvage data (1979–2005) are presented in Attachment E.

The following analysis evaluates the potential direct, indirect, and cumulative impacts to fishery and aquatic resources resulting from implementation of the Proposed Action. Cumulative impacts are embodied in the analysis of monthly hydrologic modeling results (see EIR/EIS Appendix C-3, "CALSIM II Modeling"). Table 4.1-1 summarizes potential effects on fish. Impacts are numbered to be consistent with the Alternative Intake Project EIR/EIS.

Table 4.1-1 Summary of Potential Effects on Fish Species by Project Element				
Project Element	**Mechanism for Effect (D = Direct; I = Indirect)**	**Location/Area of Effect**	**Life History Stage**	**Timing/Duration**
Install cofferdam, fish screen, and intake	Modification of 2.23 acres of aquatic habitat and function (D)	Victoria Canal at new intake site; 2.23 acres	All life stages	Permanent
	Noise from pile driving (D)	Victoria Canal 1,000 ft. upstream and downstream of new intake site	Juveniles and Adults	Up to 60 days
	Sediment resuspension, turbidity, and contamination; and/or chemical spill (D)	Victoria Canal 1,000 ft. upstream and downstream of new intake site	All life stages	Up to 60 days
	Fish mortality from dewatering behind cofferdam (D)	Behind cofferdam at new intake site	All life stages, but primarily juveniles	One time, species and life history stage dependent on timing of cofferdam construction
	Fish mortality if cofferdam overtopped; fish rescue implemented (D)	Behind cofferdam at new intake site	All life stages, but primarily juveniles	Exposure during floods only; unknown
Remove cofferdam	Divers, resuspension of sediments, turbidity, and contaminants (D)	Victoria Canal 1,000 ft. upstream and downstream of new intake site	All life stages, but primarily juveniles	Up to 30 days
Re-operate diversions with new Victoria Canal intake	Net reduction in entrainment and impingement mortality at CCWD intakes (D, I)	Cumulative at proposed Victoria Canal, Old River, and Rock Slough intake sites	Juvenile salmonid migration; delta smelt eggs, larvae, juveniles, and adults; early life stages of most fish	Permanent, but operations are always modifiable
	Modification of hydraulic conditions at fish screen and potential predation (D, I)	Proposed Victoria Canal, Old River, and Rock Slough intake sites	All life stages	Permanent, but operations are always modifiable
	Modification of hydraulic conditions throughout the Delta (D, I)	Central and south Delta, primarily near CCWD intakes	All life stages	Permanent, but operations are always modifiable
Periodic maintenance dredging	Sediment resuspension, turbidity, and contamination; and/or chemical spill (D)	Victoria Canal 1,000 ft. upstream and downstream of new intake site	All life stages, but primarily juveniles	Up to 30 days on an as-needed basis, but may be necessary only once every 7 or more years based on Old River intake

Impact 4.3-a. Intake Construction and Increased Sedimentation, Turbidity, and Contaminants. *In-water construction activities would increase short-term localized suspended sediment, turbidity, and possibly contaminant concentrations within Victoria Canal at the construction site, which could increase exposure to various life stages and species of fish. The suspended sediment, turbidity, and other contaminant concentrations and duration of exposure to fish are expected to be below levels that cause adverse effects. The potentially adverse effects would be temporary and localized in the immediate vicinity of the new intake.* ***This impact mechanism may adversely affect special-status fish and their habitats. With conservation measures, this impact mechanism is not likely to adversely affect special-status fish and their habitats.***

To provide additional depth for the fish screen, excavation may be required in Victoria Canal in the immediate vicinity of the intake in an area up to 50,000 square feet to depths within 1–2 feet of the existing channel bottom. The need for excavation would be determined during final design based on the results of the field data. Pre-construction dredging and cofferdam construction would temporarily increase turbidity levels within a localized area of Victoria Canal. The area temporarily affected by sedimentation and turbidity is expected to be approximately 500 feet wide and 500 feet long, varying in size and shape depending on tidal conditions and the width of the channel (based on experience at recently constructed fish screens within the Sacramento River). It has been conservatively assumed that the impact could affect habitat up to 1,000 feet upstream or downstream of the intake site on Victoria Canal. These effects would occur during the approximately 60-day period at the beginning of construction and during the specified work window, when construction activity may disturb sediments and increase turbidity during construction, or during any maintenance dredging, which is expected to be minimal and infrequent.

Construction activity would increase exposure of various life stages and species of fish to temporary turbidity, suspended sediment, and potentially other contaminant increases. Migration of Chinook salmon and steelhead through the construction area may be affected through a behavioral change and avoidance of areas with elevated contaminant concentrations, depending on the seasonal period when site preparation and installation/removal of the cofferdam occurs. Site preparation and installation of the cofferdam is most likely to occur during lower managed flow periods in late spring, summer, or early fall; these are seasonal periods when the likelihood of adverse effects to Chinook salmon and steelhead migration and critical habitat is substantially reduced. Resident fish species inhabiting Victoria Canal and the Bay-Delta estuary are frequently exposed to naturally-occurring increased suspended sediment concentrations, typically have high tolerance, and would be able to avoid temporary, localized exposure to a suspended sediment plume, thereby reducing the risk of adverse impacts.

A substantial body of scientific information exists regarding the response of juvenile and adult Chinook salmon, steelhead, and other fish and macroinvertebrates to elevated suspended sediment concentrations and turbidity (Hanson et al. 2004). Wilber and Clarke (2001), Clark and Wilber (2000), Newcombe and Jensen (1996), Burton (1985), Gregory and Levings (1996), Johnston (1981), Newcombe and MacDonald (1991), Newell et al. (1998), O’Connor et al. (1976), Peddicord et al. (1976), Peddicord and McFarland

(1978), Servizi and Martens (1991), Sherk (1971), Sherk et al. (1974, 1975), Sigler et al. (1984), Stern and Stickle (1978), Whitman et al. (1982), and other investigators have synthesized and reviewed the available scientific information on the effects of suspended sediments on various species and life stages of fish and macroinvertebrates. Phillips (1970) reported reduced feeding activity by adult Chinook salmon exposed to suspended sediment concentrations of 25 mg/l over a 4-hour exposure period. Newcombe and Flagg (1983) reported 50% mortality for juvenile Chinook salmon after a 36-hour exposure to volcanic ash at a concentration of 9,400 mg/l. Newcombe and Flagg (1983) also reported that adult Chinook salmon experienced no mortality or apparent adverse effects after a 24-hour exposure to volcanic ash at a suspended sediment concentration in excess of 39,000 mg/l.

The extensive body of information available on suspended sediment and turbidity effects on various life stages of Chinook salmon and many other fish and macroinvertebrate species has been used in determining potential impacts to aquatic species inhabiting Victoria Canal and other areas within the estuary. The potential for adverse effects resulting from suspended sediment and/or turbidity exposure is a dose response that varies depending on the magnitude of the concentration of sediments, the duration of exposure, the type of material, the species and life stage of the organism, and other factors.

The suspended sediment and turbidity concentrations and duration of exposure for Chinook salmon, steelhead, and other species to conditions within Victoria Canal during construction of the proposed intake structure and fish screen are expected to be below levels reported in the literature that cause adverse effects. The potentially adverse effects would be temporary and localized. With conservation measures, this impact mechanism may affect, but is not likely to adversely affect, special-status fish and their habitats. Nonetheless, conservation measures are proposed to minimize this effect (see Chapter 5, "Description of Conservation Measures").

Impact 4.3-b. Underwater Sound Pressure Impact from Cofferdam Installation. *During installation of the cofferdam, exposure of sensitive fish to underwater sound pressure levels may result in behavioral avoidance or migration delays for Chinook salmon, delta smelt, and other fish species.* ***This impact mechanism may affect, but is not likely to adversely affect, special-status fish, but not their habitats. With conservation measures, this impact mechanism is not likely to adversely affect special-status species.***

Installation of the cofferdam may be performed using either a vibration hammer and/or percussion hammer, depending on substrate conditions. Information from the scientific literature and through field observations at other construction sites within the Bay-Delta estuary indicates that exposure of sensitive fish species to underwater sound pressure levels exceeding approximately 180 decibels (dB) may result in sublethal or lethal effects. Exposure of sensitive fish to underwater sound pressure levels exceeding approximately 160 dB may result in behavioral avoidance or migration delays. Because Victoria Canal serves as the migration corridor for juvenile and adult Chinook salmon migrating to and from San Joaquin River tributaries and also serves as seasonal habitat for delta smelt (DFG 2005b), installation of the cofferdam may need to be conducted when populations of special-status species in Victoria Canal are low or by using techniques that minimize sound pressure impacts to the extent feasible (see Chapter 5, "Description of Conservation Measures").

Impact 4.3-c. Potential Chemical Spill During Construction. *Various hazardous materials, such as gasoline, oil, grease, concrete, and a variety of other chemicals and substances, would be used during construction of the Proposed Action. These materials could be harmful to fishery and aquatic resources if a construction-related chemical spill releases such materials into the aquatic environment.* ***This impact mechanism may adversely affect special-status fish and their habitats. With conservation measures, this impact mechanism is not likely to adversely affect special-status fish and their habitats.***

Gasoline, oil, grease, concrete, and a variety of other chemicals and substances would be used during construction of the Proposed Action. Installation of the cofferdam provides a number of environmental benefits for reducing the potential risk of exposure to elevated concentrations of suspended sediments and these types of chemicals typically used during construction. Nonetheless, the major construction activities could result in a chemical spill that could be a potentially adverse effect to special-status species and their habitats. Conservation measures are proposed to minimize this effect (see Chapter 5, "Description of Conservation Measures").

Chemical spills at the pipeline under-crossing of Old River are highly unlikely as the pipeline is proposed to be buried at least 50 feet below Old River under the micro-tunneling option and 5-10 feet below Old River with the over-the-levee option. There would be a minimal risk of impact to fish.

Impact 4.3-d. Potential Fish and Macroinvertebrate Stranding During Dewatering of the Cofferdam. *Dewatering of the cofferdam associated with intake construction has the potential to strand fish and macroinvertebrates during the dewatering process.* ***This impact mechanism may adversely affect special-status fish and their habitats. With conservation measures, this impact mechanism is not likely to adversely affect special-status fish and their habitats.***

Dewatering of the cofferdam associated with intake construction has the potential to strand fish and macroinvertebrates during the dewatering process. As water is lowered from the pool behind the cofferdam, the trapped fish and macroinvertebrates have no opportunity to escape. Without conservation measures, all aquatic fish and most macroinvertebrates would be stranded and fish mortality would be 100%. Because stranded fish and macroinvertebrates could suffer substantial mortality, this impact mechanism may adversely affect special-status fish and their habitats. Conservation measures are proposed to minimize this effect (see Chapter 5, "Description of Conservation Measures").

Impact 4.3-e. Aquatic Habitat Loss at Intake Structure Site along Victoria Canal Shoreline. *The proposed fish screen and intake along the existing levee in Victoria Canal would physically exclude fish from a small area of existing habitat or modify the existing habitat. The volume of riprap proposed to be used is relatively small and would cover*

1.0 acre of existing riprap and 0.04 acre of natural bed. The rip-rapped area represents only a fraction of the available low-quality habitat for rearing fish. The loss of aquatic habitat is not likely to adversely affect any fish species, critical habitat, or EFH within Victoria Canal and the Bay-Delta. ***The increment of habitat loss, however, when considered with other habitat losses in the Delta, may adversely affect special-status fish and their habitats on a cumulative basis. With conservation measures, this impact mechanism is not likely to adversely affect special-status fish and their habitats.***

The fish screen and intake structure would be constructed along the existing levee in Victoria Canal and would exclude fish from a small area of existing habitat or modify the existing habitat (additional detail on the amount of habitat lost is discussed in Chapter 5, "Description of Conservation Measures"). Although various fish species are present in the area, the habitat within Victoria Canal at the proposed intake site is characterized by riprap-stabilized levees and silt and sand substrate. Tules and other emergent vegetation associated with shallow water habitat occur in the general area but are not abundant in the portion of the canal being considered for the intake. Aquatic habitat at the intake site is characterized as highly disturbed. The area is not used as spawning habitat by either Chinook salmon or steelhead, and is not known to be used by green sturgeon. (Changes in green and white sturgeon habitat quality and availability for spawning and juvenile rearing have not been quantified and there is considerable uncertainty as to how changes in spawning habitat have affected green sturgeon population viability.)

Adult and juvenile Chinook salmon and steelhead use the area as a migratory corridor and juvenile rearing area during downstream migration. Resident fish species inhabit the area year-round. Habitat in the vicinity of the proposed intake location is used by resident fish and macroinvertebrates for spawning, juvenile rearing, migration, foraging, and adult holding.

Installation and sealing of the cofferdam used for construction of the intake structure may require the use of riprap. Riprap has been used extensively within Victoria Canal (and throughout the Delta) in the general vicinity of the proposed intake site as part of bank and levee stabilization. Riprap may be used to help seal off the cofferdam in addition to providing bank stabilization within the immediate levee area where intake construction is occurring. Bank stabilization would be required for the intake structure to ensure that channel margin erosion does not occur in the area that may otherwise adversely affect the stability and reliability of the intake structure. Riprap would be required for the intake structure, and the addition of riprap would affect localized substrate conditions and localized habitat for both fish and benthic macroinvertebrates. The change in habitat quality and availability associated with replacing existing riprap with new riprap would be minimal (1.03 acres) and only an additional 0.05 acre of shallow-water tidal freshwater emergent habitat would be replaced with new riprap, which would silt over with time. An additional 1.15 acres of shallow-water tidal freshwater emergent habitat in front of the proposed intake would be excavated about 10–15 feet deeper and would no longer constitute shallow-water habitat. The volume of riprap proposed to be used is relatively small, and its use would be limited to the area immediately adjacent to the intake structure. Furthermore, fishery aquatic habitat conditions at the proposed intake site are currently degraded, and not unique.

Although the use of riprap as part of the Proposed Action has been identified as relatively minor on aquatic habitat characteristics, primarily because mostly existing riprap habitat is being affected, these changes to aquatic habitat as a result of construction of the proposed intake structure would incrementally contribute to cumulative adverse impacts to the quality and availability of aquatic habitat within the Bay-Delta estuary. Construction of the proposed intake would generally not alter habitat (channel sides and substrate) for resident or migratory species, with the exception that the footprint area for the intake structure would be removed as available aquatic habitat and some existing riprap levee would be further stabilized and protected. Specifically, construction of the fish screen would exclude fish from 100–200 feet of shoreline along the channel margin of Victoria Canal. Because the new fish screen would be set back from the existing bank, no surface area of aquatic habitat would be lost. The linear shoreline habitat where exclusion by the proposed fish screen would occur represents only a fraction of the available habitat in the south Delta and is of low quality for rearing salmon, steelhead, and other species. This loss of aquatic habitat is not likely to adversely affect Chinook salmon or steelhead populations, critical habitat for delta smelt or steelhead, or EFH for Pacific salmon within Victoria Canal and the Bay-Delta. No spawning or vegetated juvenile rearing habitat would be lost. The aquatic habitat is currently disturbed and is not unique. The increment of habitat loss, however, when considered with other habitat losses in the Delta, may adversely affect special-status fish and their habitats on a cumulative basis. Conservation measures are proposed to minimize this effect (see Chapter 5, “Description of Conservation Measures”).

Impact 4.3-f. Hydraulic Modifications to Habitat in Victoria Canal and Adjacent to the Proposed Intake. *The new intake structure on Victoria Canal would modify hydraulic and habitat conditions adjacent to the intake structure and could attract predatory fish. These changes, however, would not represent a physical barrier or impediment to fish migration in Victoria Canal. The overall abundance of predatory fish inhabiting Victoria Canal in the vicinity of the Proposed Action is not expected to increase.* ***This impact mechanism may affect, but is not likely to adversely affect, special-status fish and their habitats.***

The presence of an intake structure on Victoria Canal would contribute to localized changes in hydraulic conditions (e.g., water velocities, water depths, and water circulation periods), and the availability of cover habitat utilized by various fish species, including salmon, steelhead, and delta smelt. Changes in local hydraulics within the immediate area adjacent to the intake structure may affect sediment deposition and erosion patterns, thereby affecting benthic macroinvertebrate habitat in the localized area. Additionally, these changes in current patterns may affect localized movement patterns for fish and macroinvertebrates within the area. Changes in water velocities and current patterns associated with the intake structure, however, are not expected to be significant or represent a barrier or impediment to either adult or juvenile fish movement in Victoria Canal because the intake structure would be set back from the existing bank and would not extend into Victoria Canal.

Changes in habitat characteristics in the immediate vicinity of the proposed intake structure, including localized changes in current patterns, sediment deposition, and erosion; riprap as part of construction and channel bank stabilization; and the potential for the intake structure to attract predatory fish, have been identified, but would be less than significant. The intake structure would not result in velocity changes or changes to current patterns expected to result in a barrier to either upstream or downstream migration of fish within Victoria Canal. The intake structure would not affect channel cross-section and would not create a physical barrier or impediment to migration.

Physical structures, such as a water intake and diversion facility, modify physical habitat and cover that may attract various species of fish to the area. A number of predatory fish species, such as striped bass and largemouth bass, are attracted to water intake facilities where predation on juvenile fish may occur. The behavioral response and attraction of these predatory fish species to the proposed intake structure, or the potential risk of increased predation mortality, cannot be quantitatively assessed. Attraction of predatory fish to the intake structure may change the localized distribution of these individuals within the area immediately adjacent to the proposed intake structure, but are not anticipated to result in an increase in the overall abundance of predatory fish inhabiting Victoria Canal in the vicinity of the Proposed Action. The Proposed Action would also reduce diversions from unscreened Rock Slough, where predatory fish densities are high. Minimizing diversions from Rock Slough would be a beneficial effect because special-status species would presumably avoid predatory fish better in the on-river Victoria Canal and Old River channels than in the 4-mile-long, dead-end Rock Slough/Contra Costa Canal channel.

Based on these considerations, incremental changes in localized hydraulics and aquatic habitat characteristics, including predator attraction, are expected to be relatively minor. This impact mechanism may affect, but is not likely to adversely affect, special-status fish and their habitats.

Impact 4.3-g. Fish Losses through Entrainment and Impingement at CCWD Intakes. *Installation and long-term operation of the positive barrier fish screen at the proposed intake site would reduce net entrainment and impingement losses of target life stages and species from CCWD diversion facilities. Relocation of some CCWD diversions to the proposed Victoria Canal intake would result in new entrainment and impingement losses at that site. However, the state-of-the-art positive barrier fish screen, reduced diversions at the unscreened Rock Slough intake and screened Old River intake, shifts in some CCWD diversions from spring to fall, and higher fish population densities in the greater Delta as compared to Victoria Canal would provide an overall benefit by reducing net entrainment and impingement losses at CCWD intakes under existing and future conditions.* ***This impact mechanism would be a direct and indirect beneficial effect to all fish species with life stages subject to entrainment and impingement.***

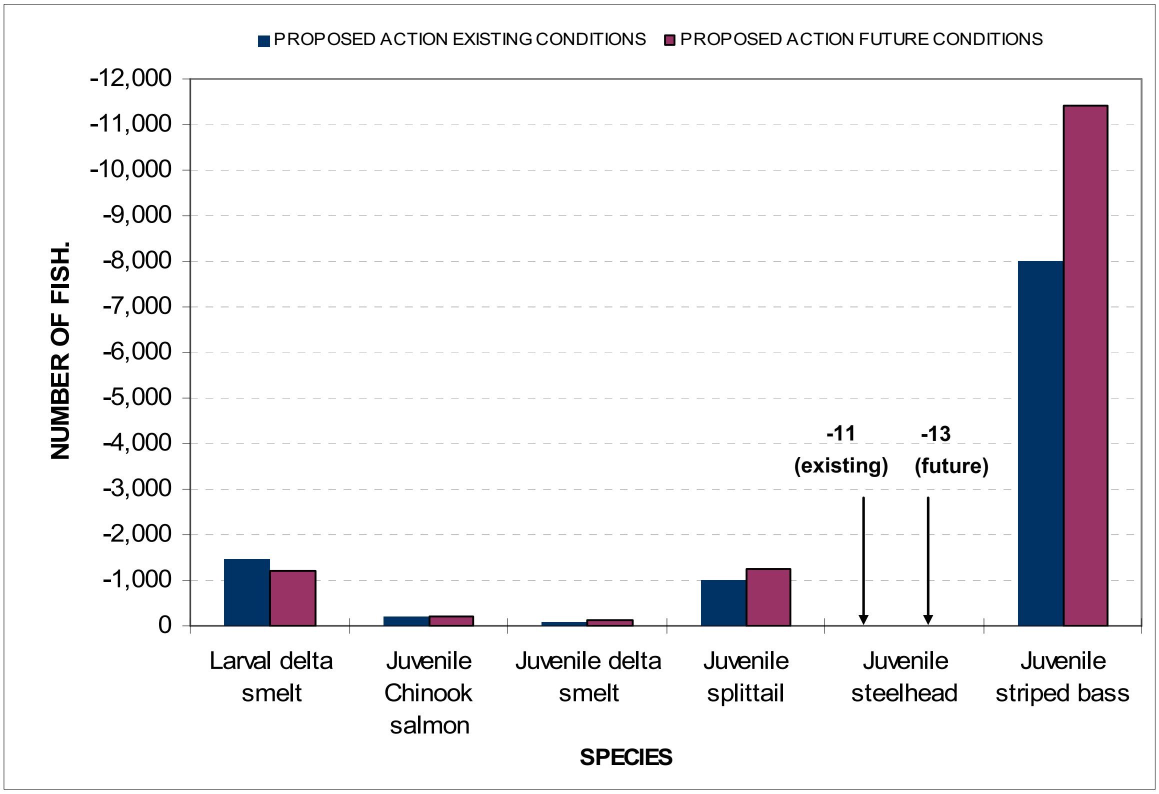
Although relocation of some CCWD diversions to the new intake in Victoria Canal would result in some new entrainment and impingement losses at that site, a net environmental benefit (i.e., reduced net entrainment and impingement losses) would result from the combination of diversion through a state-of-the-art positive barrier fish screen, reduced diversions at the unscreened Rock Slough intake and screened Old River intake, shifts in timing of some CCWD diversions from spring to fall relative to existing conditions and the future baseline, and higher fish population densities subject to entrainment near the Rock Slough and Old River intakes as compared to in Victoria Canal, where diversions would increase. The Rock Slough intake is located in a dead-end slough in an area with greater fish densities and presumed higher fish survival rates than occurs in Victoria Canal, such that relocating diversions to Victoria Canal and Old River, which are both located on the banks of channels, is preferable even if the Rock Slough intake is screened or other fisheries mitigation measures for Rock Slough are taken in the future. Modeling results summarized in Exhibit 4.1-2 and Tables 4.1-2 and 4.1-3 estimate the entrainment/impingement losses for the Proposed Action.

The proposed Victoria Canal intake would be operated in coordination with CCWD's existing Delta intakes at Rock Slough, Old River, and Mallard Slough. The Rock Slough intake is currently unscreened. Operations modeling of the Proposed Action showed diversions at the unscreened Rock Slough intake would be reduced. Relocating some portion of diversions from Rock Slough to Old River or the Alternative Intake could directly contribute to reduced vulnerability of fish to entrainment mortality at the unscreened diversion.

Operations modeling also shows that the Proposed Action would shift the timing of some CCWD diversions from spring to fall. Data from numerous studies show that the greatest vulnerability of fish eggs (all species combined) to entrainment occurs during spring (April through June), although fish eggs were also observed during winter (January through March) at lower densities (DFG 2005b). Historical salvage data at the CVP and SWP salvage facilities, for example, show that peak total monthly salvage occurs during May and June (DFG 2005b). A variety of fish species spawn within the Delta and upstream river areas during spring, including striped bass and delta smelt, whose lack of recent observed abundance is of critical concern. Known to be particularly vulnerable to mortality during the larval stage, delta smelt could benefit from the shift in timing of diversions that the Proposed Action would allow and there could be a net reduction in entrainment mortality and impingement for delta smelt, in addition to the eggs of other fish species.

A potential indirect impact could arise if the Proposed Action modified Delta conditions such that CVP, SWP, or other Delta diversions entrained more fish with current operations or diversions were somehow modified such that more fish would be exposed to entrainment. Modeling results shown in EIR/EIS Section 4.2, "Delta Water Resources," however, indicate that changes caused by CCWD operations under the Proposed Action would be very small and would not affect CVP/SWP operations or deliveries. Consequently, there would only be minimal, if any, adverse effects on fish at other Delta diversions.

Because Chinook salmon and steelhead do not spawn in the Action Area, the small emergent life stages (e.g., swim-up fry) would not be vulnerable to diversion operations. The proposed fish screen would substantially reduce or eliminate entrainment of juvenile and older life stages (i.e., fry, smolts, yearlings, and adults) of Chinook salmon, steelhead, and other resident and migratory fish species and macroinvertebrates.



NOTE: Negative numbers represent a net reduction in entrainment and impingement.

Exhibit 4.1-2
Overall Net Benefit to Entrainment/Impingement Assuming the Proposed Action

Table 4.1-2
Index of Estimated Net Entrainment/Impingement Losses for the Proposed Action (250 cfs diversion and existing conditions) Compared to Existing Conditions

Taxa	Rock Slough	Old River	Victoria Canal	Overall Net Change
Larval delta smelt	-318	-2,144	1,009	-1,454
Juvenile Chinook salmon	-204	-67	48	-223
Juvenile delta smelt	-53	-51	24	-81
Juvenile splittail	-984	-182	153	-1,014
Juvenile steelhead	-10	-4	3	-11
Juvenile striped bass	-7,901	-1,530	1,442	-7,988

Note: Negative values denote a net reduction in entrainment/impingement with the Proposed Action under existing conditions.
Source: Modeling conducted by Hanson Environmental, Inc. in 2005

Table 4.1-3
Index of Estimated Net Entrainment/Impingement Losses for the Proposed Action (320 cfs diversion and future conditions) Compared to the No-Action Alternative (Future Conditions)

Taxa	Rock Slough	Old River	Victoria Canal	Overall Net Change
Larval delta smelt	-250	-1,990	1,032	-1,208
Juvenile Chinook salmon	-207	-77	56	-227
Juvenile delta smelt	-88	-60	26	-121
Juvenile splittail	-1,256	-164	152	-1,268
Juvenile steelhead	-12	-5	4	-13
Juvenile striped bass	-11,559	-1,394	1,519	-11,434

Note: Negative values denote a net reduction in entrainment/impingement with the Proposed Action under future conditions.
Source: Modeling conducted by Hanson Environmental, Inc. in 2005

The threat of entrainment of juvenile green sturgeon into screened and unscreened agricultural, municipal, and industrial water diversions on the Sacramento River and Delta is largely unknown. Juvenile sturgeon are often not identified, and current DFG and NMFS screen criteria do not specifically address sturgeon. Based on the temporal occurrence of juvenile sturgeon and the high density of water diversion structures along rearing and migration corridors, entrainment has been identified as a potential factor contributing to mortality to larval and juvenile green sturgeon (NMFS 2004).

DFG (1992) and USFWS (1995) found a strong correlation between mean daily freshwater outflow (April to July) and white sturgeon year class strength in the Sacramento-San Joaquin estuary. Although no similar information or analyses are available for the relationship between river flow and green sturgeon growth, survival, or year class strength, seasonal river flows have been identified as a potential factor affecting green sturgeon. The Proposed Action, while having some hydraulic effects at CCWD intakes and other areas of the Delta, would not adversely affect the habitat or populations of green sturgeon.

Northern anchovy, Pacific sardine, and starry flounder would typically be found only incidentally in Victoria Canal. Given the decreasing salinity gradient from the Rock Slough intake to the proposed Victoria Canal intake, it is highly likely that reduced diversions from Rock Slough and increased diversions from the Victoria Canal intake would be slightly beneficial to these species as their densities would be substantially greater near the Rock Slough intake compared to the proposed Victoria Canal intake.

The CVPIA includes a requirement for Reclamation to develop and implement a program to mitigate for fishery impacts resulting from the operation of the Contra Costa Canal Pumping Plant No. 1. This program may include a fish screen at Rock Slough, modified operations, or other measures to mitigate fishery impacts. If a fish screen were to be installed, modeling results would predict lower entrainment losses at the Rock Slough

Intake and the potential for new impingement losses. This would reduce some of the entrainment benefits the modeling analysis predicts resulting from the Proposed Action's reductions in Rock Slough pumping. However, the Proposed Action would still provide an overall net benefit to fisheries entrainment and impingement by:

- shifting the timing of some CCWD diversions from spring to fall (when fish are less vulnerable),
- shifting some CCWD diversions from a dead-end slough prone to substantially higher fish mortalities (i.e., Rock Slough intake) to an on-river fish screen subject to less mortality (i.e., proposed Victoria Canal intake), and
- shifting some CCWD diversions from a Delta location with generally higher fish densities and survival rates (i.e., central Delta) to a Delta location with generally lower fish densities and survival rates (i.e., south Delta).

While the fisheries benefits of the Proposed Action would be reduced with the screening of the Rock Slough intake, there would still be short- and long-term fisheries benefits associated with implementing the Proposed Action. Moreover, the Proposed Action would not affect Reclamation's ability to meet its CVPIA requirement to implement a program to mitigate for fishery impacts from operation of the Contra Costa Canal Pumping Plant No. 1.

Installation and long-term operation of the positive barrier fish screen, designed and operated in accordance with DFG, NMFS, and USFWS criteria, would minimize net entrainment and impingement of juvenile, sub-adult, and adult fish at the new intake. The technology being utilized is known and reliable. CCWD personnel would inspect and repair the facility, as needed to meet criteria, and would maintain a stock of replacement screens that would be installed rapidly in case repair is needed. Long-term operation is therefore expected to be reliable; periods of non-function would be brief. Given that approach velocities to the screen would be low (the maximum screen approach velocity is 0.2 feet/second), the net effect on fish swimming behavior in the vicinity of the diversion is predicted to be insignificant (Morinaka 2000). The fish screen would be equipped with a continuous mechanical cleaning system to remove impinged debris and maintain approach velocities within the tidal region of the Delta where sweeping velocities are affected by tidal currents. In addition, the fish screen would provide only minimal cover for ambush predators such as bass. Typically, the performance of a positive barrier fish screen is expected to reduce net entrainment and impingement of fish and macroinvertebrates by 95% or more when compared to an unscreened diversion.

Incidental take of certain life stages of any of the target special-status species could occur at the new Victoria Canal intake. However, CCWD operates its intakes conjunctively, and overall the net effect would be an overall reduction in entrainment and impingement losses for all species under existing and future operating conditions. This impact mechanism would be a direct and indirect beneficial effect to all fish species with life stages subject to entrainment and impingement, but would not affect habitats.

Impact 4.3-h. Effects on Delta Fisheries and Aquatic Habitat as Indicated by Changes in Key Hydrologic Indicators. *Several key hydrologic indicators are used to evaluate Delta fisheries resources and aquatic habitat; the Proposed Action would result in less than a 1% change in all of these indicators under existing, future, and cumulative conditions. There would not be a significant or measurable reduction in fish populations or the quality or quantity of aquatic habitat within the Sacramento-San Joaquin River system, including the Delta.* ***Therefore, this impact mechanism may affect, but is not likely to adversely affect, special-status fish and their habitats.***

Several key hydrologic indicators are used to evaluate fisheries resources (e.g., total Delta outflow, total Delta inflow, Sacramento River flow, San Joaquin River inflow, Export/Inflow ratio, X2 location, and CVP and SWP exports). Any significant changes to these hydrologic indicators would be suggestive of significant changes to aquatic habitat and fishery populations near the location of the hydrologic indicator. The key hydrologic indicators of estuarine habitat conditions within the Bay-Delta system are described below:

- **Total Delta Outflow** is the net amount of water (not including tidal flows) at a given time flowing out of the Delta towards the San Francisco Bay. Total Delta outflow provides an indicator of freshwater flow passing through the Delta and habitat conditions farther downstream within the San Pablo Bay and central San Francisco Bay. Delta outflow affects salinity gradients within these downstream aquatic habitats and the geographic distribution and abundance of various fish and macroinvertebrates (Baxter et al., 1999).

- **Total Delta Inflow** is the combined water flow entering the Delta at a given time from the Sacramento River, San Joaquin River, and other tributaries. Total Delta inflow from the Sacramento and San Joaquin river systems provides an indicator of several key ecological processes, including: (1) migration and transport of various life stages of resident and anadromous fishes using the Delta, (2) salinity levels at various locations within the Delta as measured by the locations of X2, and (3) the Delta's primary (phytoplankton) and secondary (zooplankton) production.

- **Sacramento River Flow** is the total flow from the Sacramento River entering the Delta, typically measured at Rio Vista. The Sacramento River is used by a number of fish species, either as direct habitat during one or more of their life stages or as a migration corridor to upstream habitat in other river systems. Flows within the Sacramento River are important in providing physical habitat for a variety of fish species (water depths and velocities); migratory corridors for anadromous fish species including Chinook salmon, steelhead, striped bass, and American shad; and downstream transport and dispersal of planktonic fish eggs and larvae for species such as striped bass and delta smelt.

- **San Joaquin River Inflow** is the total flow from the San Joaquin River entering the Delta, typically measured at Mossdale. The San Joaquin River is used as a migratory corridor for fall-run Chinook salmon and as habitat for a variety of resident and migratory fish species. Data available to date from the VAMP investigation, and analysis of historic adult salmon escapement to the river, show a general trend suggesting that salmon survival increases as a function of increased flow in the San Joaquin River. Flow from the San Joaquin River into the Delta also contributes to salinity gradients, physical habitat conditions, and other factors affecting habitat quality and availability within the Bay-Delta estuary for resident and migratory fish and macroinvertebrate species.

- **Export-to-Inflow (E/I) Ratio** is the percentage of Delta inflow diverted as exports from the Sacramento and San Joaquin river systems and the Delta. The ratio provides an indicator of several key ecological processes, including: (1) migration and transport of various life stages of resident and anadromous fishes using the Delta; (2) salinity levels at various locations within the Delta, as measured by the locations of X2; and (3) the risk of direct and indirect fish losses resulting from export operations. An increase in the E/I ratio, indicating greater exports from the Delta relative to the inflow of freshwater from the tributary rivers, would be an indicator of a potential increase in the risk of fish entrainment and salvage mortality at the CVP and SWP export facilities.

- **X2 location** is the Delta location where the 2-part-per-thousand salinity isohaline is established. The X2 location has been identified as an important indicator of estuarine habitat conditions within the Bay-Delta system. The location of X2 within Suisun Bay during the February through June period is thought to be directly and/or indirectly related to the reproductive success and survival of the early life stages for a number of estuarine species. Results of statistical regression analyses suggest that the abundance of several estuarine species is greater when the X2 location during spring occurs within the western portion of Suisun Bay, and that abundance is lower for those years when the X2 location is farther to the east, near the confluence between the Sacramento and San Joaquin rivers.

- **CVP and SWP Diversions** are measured as the amount of water diverted from the Delta at the Tracy Pumping Plant and Harvey O. Banks Pumping Plant, respectively. Changes in CVP and SWP diversions are an indicator of potential for direct and indirect fish losses. An increase in these Delta exports would indicate a potential increase in the risk of fish entrainment and salvage mortality at the CVP and SWP export facilities.

Monthly hydrologic modeling results with Proposed Action operations show no significant changes in any of the indicators above (see EIR/EIS Section 4.2, “Delta Water Resources,” and EIR/EIS Appendices C-3, C-4, and C-5). In those months with changes, the majority of changes is 1% or less and is within the error of the models. The Proposed Action would shift the location and timing of a portion of CCWD’s diversions. CCWD’s diversions are small compared to overall flows in the Delta, including total Delta outflow and Delta CVP and SWP exports. (Note: The entrainment and impingement effects for Impact 4.3-g represent cumulative effects as the modeling-based analyses incorporate several future actions in the operational modeling for future conditions.) It is not anticipated that small changes in location or timing of CCWD diversions would affect overall Delta aquatic habitat. Modeling of key habitat indicators confirms this statement.

There would not be a significant reduction in fish populations or the quality or quantity of aquatic habitat within the Sacramento-San Joaquin River system, including the Delta, for any fish species as a result of the Proposed Action. This impact mechanism may affect, but is not likely to adversely affect, special-status fish and their habitats.

Impact 4.3-i. Periodic Maintenance Dredging and Associated Effects on Fish. *Periodic maintenance dredging in front of the new fish screen may occur and expose fish to increased levels of sedimentation, turbidity, or other contaminants. The suspended sediment, turbidity, and other contaminant concentrations and duration of exposure to fish are expected to be below levels that cause adverse effects. The potentially adverse effects would be temporary and localized in the immediate vicinity of the new intake.* ***This impact mechanism may affect, but is not likely to adversely affect, special-status fish and their habitats.***

The area immediately in front of the new Victoria Canal intake and fish screen may require periodic maintenance dredging to ensure proper flows and hydraulics at the fish screen face so that the intake and screen function properly. The existing Old River intake and fish screen have not required any maintenance dredging since project operations were initiated in 1998, but an intake on Victoria Canal could experience different sedimentation conditions. Any periodic dredging would cause similar effects as described in detail in Impact 4.3-a above for in-water construction activities associated with the proposed intake and fish screen. Most fish would simply move away from the dredging activity. The suspended sediment, turbidity, and other contaminant concentrations and duration of exposure to fish are expected to be below levels that cause adverse effects to fish. The potentially adverse effects would also be temporary and localized in the immediate vicinity of the new intake. This impact mechanism may affect, but is not likely to adversely affect, special-status fish and their habitats.

4.1.2.1 Cumulative Impacts to Delta Fisheries

The Proposed Action operations would not have a long-term adverse effect on fisheries and would be beneficial with regard to net impingement and entrainment. (Note: the entrainment and impingement effects described under Impact 4.3-g represent cumulative effects as the modeling-based analyses consider several future actions.) Therefore, this project would not contribute to a long-term cumulative adverse effect on fisheries from project operations and would provide an overall beneficial effect when implemented with conservation measures described in Chapter 5, “Description of Conservation Measures.”

The expansion of Los Vaqueros Reservoir, a potential future project, may also change the timing and pattern of diversions in the Delta, but is not anticipated to have long-term adverse effects on fisheries; one of the project purposes is to provide a fisheries protection benefit by providing water for the Environmental Water Account. The Environmental Water Account provides a mechanism whereby water is diverted from the Delta when fewer fish are affected and diversions are curtailed when higher densities of fish are present such that the net effect is beneficial for Delta fisheries. Another proposed CCWD project, the Contra Costa Canal Encasement Project, would encase a portion of the Contra Costa Canal that has high fish mortality rates from substantial predation, and consequently is expected to have a beneficial effect on Delta fisheries. If Rock Slough is screened in the future, the Proposed Action would still provide benefits to fish, albeit reduced, as discussed above. When considered with all other reasonably foreseeable or probable future projects, the Proposed Action would not have an incremental effect that is cumulatively considerable, but would provide a fisheries benefit with conservation measures proposed in Chapter 5, “Description of Conservation Measures.”

A variety of factors have been identified that may individually or cumulatively result in significant changes in the abundance, species composition, geographic distribution, survival, and reproductive success of fish and macroinvertebrates inhabiting the Bay-Delta estuary. Evidence from fishery monitoring conducted by USFWS, DFG, and others has shown a dramatic decline in indices of abundance for a variety of pelagic fish species such as delta smelt and longfin smelt. The recent pelagic organism decline (POD) has heightened sensitivity and concern regarding factors affecting the overall health and condition of these resident and migratory fish species, zooplankton, and phytoplankton that form the basis for the tropic food web, and habitat conditions within the estuary. The four primary factors that have been hypothesized by State and Federal resource agencies to affect these conditions include, but are not limited to, the following (Armor et al. 2005):

- changes in the estuarine food web resulting from the introduction and rapid expansion of exotic fish, macroinvertebrates, zooplankton, and aquatic plants;

- entrainment and impingement losses resulting from water diversions associated with the CVP, SWP, and the large number of agricultural, industrial, and municipal water diversions within the estuary;

- changes in the seasonal timing of hydrologic conditions occurring within the estuary including an increase in CVP and SWP exports during winter in response to reduced water exports and other operational constraints during spring as identified in the 1995 Bay-Delta Accord and subsequent State Water Resources Control Board decision; and

- chronic and acute toxicity effects from point and non-point source discharges of contaminants, including pesticides and herbicides (e.g., pyrethroids), associated with regional land-use within the Central Valley.

Although these four factors are thought to be important in affecting habitat conditions and fish abundance, no conclusions have been drawn regarding the individual or cumulative importance of each of these various factors (Armor et al. 2005). The Proposed Action would not adversely contribute directly or indirectly to any of the potential factors identified above:

- the Proposed Action would not result in the introduction, increase in abundance, or change in the geographic distribution of introduced aquatic species;

- the Proposed Action would contribute to a reduction in the overall cumulative impacts of fish entrainment and impingement within the estuary. The Proposed Action would reduce water diversions at CCWD’s unscreened Rock Slough intake and increase water diversions from the proposed intake equipped with a state-of-the-art positive barrier fish screen located on Victoria Canal. The Proposed Action would therefore reduce cumulative entrainment and impingement mortality occurring within the estuary and would contribute beneficially to the protection of resident and anadromous fish species;

- the Proposed Action would not change CVP or SWP exports or operations;
- the Proposed Action would not change contaminant loading to the estuary, either during project construction or as a result of long-term operations and maintenance; and
- the Proposed Action would not affect the Tracy Fish Facility Improvement Program, which could potentially reduce fish entrainment and impingement at the CVP/SWP intake facilities.

Global warming, increased Delta inflow from San Joaquin releases, and other potential future environmental changes are likely to occur, but are speculative. The effects of these changes on fish populations and their habitats could vary considerably. Slightly higher Delta water surface elevations or lower summer/fall flows from less snowmelt would be expected to have little effect on Proposed Action operations or effects on fish populations. An Adaptive Management Plan (see Chapter 6) would be employed to address any of these long-term changes as they arise.

4.2 Terrestrial Biological Resources

4.2.1 Methodology and Approach

The impact analysis for terrestrial biological resources was based on consideration of: (1) construction activities and the area anticipated to be disturbed, (2) existing habitat conditions in the portions of the Action Area proposed for construction activities and nearby areas, and (3) known or presumed occurrence of protected species near construction area. Hydrologic modeling results were not used to evaluate terrestrial species.

All available information regarding sensitive terrestrial biological resources that could be affected by the Proposed Action was reviewed. Because the project footprint for the Proposed Action has not been specifically determined and the wetland delineation has not been finalized, specific acreages of sensitive habitats (e.g., jurisdictional waters of the United States and freshwater marsh) that could be affected by project construction, as well as acreages gained through restoration efforts, could not be precisely determined. Impacts to sensitive habitats are discussed in terms of potential direct and indirect effects. Focused surveys for special-status plants (in July 2005) and reconnaissance-level surveys for special-status wildlife (in April 2005) were conducted on Victoria Island/Byron Tract. For this evaluation, the analysis of impacts on special-status wildlife was based on the habitat types that would be affected. Focused pre-construction wildlife surveys would be required and conducted, as appropriate, prior to any construction activities. Impacts to special-status species were assessed in terms of potential changes in the amount and distribution of suitable habitat, the relative importance of affected habitats, and the potential for direct loss of individuals.

4.2.2 Impact Analysis Results

The following analysis evaluates the potential direct, indirect, and cumulative impacts to terrestrial biological resources resulting from implementation of the Proposed Action. Impacts are numbered to be consistent with the EIR/EIS.

4.2.2.1 Direct and Indirect Impacts

Impact 4.6-a. Potential Fill of Jurisdictional Waters of the United States and Loss of Sensitive Habitat during Construction. *Construction of the new intake structure and pump station in Victoria Canal, and construction of the conveyance pipeline across Victoria Island and connection to the existing Old River Pump Station could result in fill of jurisdictional waters of the United States and freshwater marsh habitat, which is considered a sensitive habitat by DFG and USACE.* ***This direct impact mechanism may adversely affect jurisdictional waters of the United States and associated sensitive habitats. With conservation measures, this impact mechanism is not likely to adversely affect sensitive habitats.***

Construction of the new intake structure would penetrate the levee and be placed within the ordinary high water mark (OHWM) of Victoria Canal. The proposed intake and fish screens would range from approximately 145 to 200 feet long, depending of the depth of the fish screen, which is anticipated to be 10 to 15 feet. Final sizing would be based on confirmation of fish screen design details with fishery agencies, levee geotechnical design considerations, and channel bathymetry. To provide additional depth for the fish screen, excavation may be required in Victoria Canal in the immediate vicinity of the intake in an area up to 50,000 square feet within 1–2 feet of the existing channel bottom. The existing levee would be reinforced and reconfigured to allow installation of the new intake structure. A 36-inch layer of riprap would be installed on the water side of the existing levee approximately 400–500 feet upstream and downstream from the new intake, resulting in approximately 4,500 cubic yards of replaced riprap and 200 cubic yards of new riprap. The installation of the new intake and construction of the new levee would also result in permanent fill of approximately 900 linear feet of a drainage ditch at the toe of the levee. A new, 1,050-foot long drainage ditch would be constructed at the toe of the new levee and provide additional permanent habitat greater than presently exists.

Victoria Island and Byron Tract contain many irrigation ditches, which may be considered jurisdictional wetlands by USACE. Although the exact route of the new pipeline across Victoria Island has not been determined, construction of the new pipeline from the new intake structure to the existing Old River Pump Station across Victoria Island could result in fill of wetlands and loss of freshwater marsh vegetation. The new conveyance pipeline would be installed using conventional trenching methods. Any ditches that potentially could be affected by the pipeline routing would be siphoned under, rerouted, crossed over, or replaced. Some of these irrigation ditches and canals may contain sensitive wetland habitat; however, in over 33 miles of ditches and canals on Victoria Island and Byron Tract, less than 0.2 acre of potential wetlands was identified. Approximately 2.71 acres of potential wetlands, including freshwater marsh, seasonal wetlands, and swales, were observed along Old River from the confluence with Victoria Canal to the State Route (SR) 4 bridge. The anticipated acreage affected by the Proposed Action is expected to be a very small fraction of the total acreage present.

The conveyance pipeline to connect the new Victoria Canal intake with the existing Old River Pump Station would either be tunneled under Old River or would cross over the levee. The tunneling option would involve constructing a launching and receiving pit outside of the levees on the west (Byron Tract) and east sides (Victoria Island) of Old River. This work likely would not result in fill of Old River or loss of freshwater marsh vegetation. If the conveyance pipeline crosses over the levee, it would penetrate the levee above the 100-year flood stage and follow the existing riprap-covered bank approximately 65–75 feet to the river bottom. Along the bottom of the river channel, the pipeline would be buried to a depth of 5–10 feet. This option may result in permanent fill (approximately 700 cubic yards assuming 6-foot diameter pipe along 75 feet of levee slope) of waters of the United States and loss of freshwater marsh and would be subject to USACE and DFG authorization.

Because the exact project footprint has not been determined, the actual fill of waters of the United States cannot be precisely calculated. However, the volume of potential fill below the OHWM was estimated based on current design specifications using the maximum values. A total estimate of fill of waters associated with Victoria Canal and Old River is approximately 10,000 cubic feet. This direct impact mechanism may adversely affect jurisdictional waters of the United States, including wetlands (e.g., freshwater marsh). Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

Impact 4.6-b. Potential Loss of Special-status Plants during Construction. *Two special-status plant species, Mason's lilaeopsis and rose-mallow, are known to occur on Victoria Island/Byron Tract. These populations could be disturbed during project construction, resulting in destruction of these plants, their root system, or seed bank.* ***This direct impact mechanism may adversely affect special-status plants during construction. With conservation measures, this impact mechanism is not likely to adversely affect special-status plants.***

Two special-status plant species, Mason's lilaeopsis and rose-mallow, were documented on Victoria Island/Byron Tract during focused botanical surveys in July 2005. Mason's lilaeopsis plants were observed in two locations on the west bank of Old River, south of the existing intake and pump station. Several rose-mallow plants were observed in four locations: on the north bank of Victoria Canal, on the west bank of Old River, in several locations on the east bank of Old River south of the intake station, and on the east bank of Old River directly across from the intake station. No other special-status plant species were observed on Victoria Island/Byron Tract in the survey area.

Ground-disturbing construction activities could destroy individual plants, their root system, or seed bank. Constructing a new intake structure on Victoria Canal and associated levee improvements could disturb the rose-mallow population on the north bank of Victoria Canal. Connecting the conveyance pipeline from Victoria Island to the existing Old River intake and pump station by either tunneling or crossing the levee could disturb one or more populations of Mason's lilaeopsis and/or rose-mallow. Loss of one or more of these special-status plant populations would be an adverse effect. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

Impact 4.6-c. Potential Construction Effects on Giant Garter Snake. *The open water and freshwater marsh in the irrigation ditches on Victoria Island/ Byron Tract provide mostly marginally suitable and some suitable habitat for giant garter snake.* ***During construction activities, potential take of giant garter snake would be a direct adverse effect. However, the levee drainage ditch would be lengthened by 150 feet, creating additional ditch habitat. With conservation measures, this impact mechanism is not likely to adversely affect this species or its habitat.***

Although the presence of giant garter snake on Victoria Island/Byron Tract is highly unlikely and giant garter snakes have never been documented in the south Delta despite numerous biological surveys, certain aspects of the Proposed Action may result in an increased risk of mortality or species take should a giant garter snake occur on the project site, well beyond its current range. Giant garter snakes could be injured or killed during excavation for levee improvements, during the construction of proposed intake facilities, or during the installation of the proposed pipeline wherever it intersects with potential habitat. Any ditches that potentially could be affected by the construction of the conveyance pipeline (e.g., trenching) across Victoria Island and Byron Tract would be siphoned under, rerouted, crossed over, or replaced. The levees would be temporarily disturbed during installation of the new intake structure on Victoria Canal. Because these areas would be temporarily disturbed during construction, individual giant garter snakes could be killed if they are present. During construction activities, potential take of giant garter snake, which is a Federally and State-listed threatened species, would be a direct adverse effect. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

Potential aquatic habitat for giant garter snake would be temporarily disturbed during construction, but no permanent habitat loss is anticipated. To the contrary, an existing ditch along the toe of the levee would have 900 feet filled, but a new ditch would be constructed that would be 1,050 feet long. This long-term effect would be beneficial.

Impact 4.6-d. Potential Effects on Greater Sandhill Crane. *The fallow fields on Byron Tract are potential habitat for greater sandhill crane. Construction of a launching or receiving pit on Byron Tract associated with the Old River crossing of the conveyance pipeline could result in temporary disturbance to wintering sandhill cranes.* ***Because the construction disturbance would be temporary and other suitable habitat is present in the immediate vicinity, this impact mechanism may affect, but is not likely to adversely affect, greater sandhill crane.***

Although greater sandhill crane is present in the Delta in the winter, it is unlikely that the habitats on Victoria Island and Byron Tract would support large concentrations of the species because most of the area is in asparagus production, which does not provide preferred foraging areas for sandhill crane. Fields of other agricultural crops, such as rice, sorghum, and barley, in the Delta are preferred foraging areas for sandhill crane. Installation of the new intake on Victoria Canal, construction of the conveyance pipeline across Victoria Island, and connection to the existing Old River Pump Station is not likely to substantially disturb wintering crane populations during project construction and would not result in permanent loss of preferred habitat for sandhill crane. Therefore, the project may affect, but is not likely to adversely affect, greater sandhill crane.

Impact 4.6-e. Potential Effects on Swainson's Hawk, White-Tailed Kite, Northern Harrier, And Other Raptors. A *few isolated trees could provide potential nesting habitat for various raptor species. Some agricultural fields could provide potential nesting habitat for northern harrier or foraging habitat for Swainson's hawk. Removal or disturbance of raptors nests, which could result in loss of eggs or young, would be a direct adverse effect. Electrocution from the new powerlines is highly unlikely with proper power line design. Potential loss of Swainson's hawk foraging habitat would not be an adverse effect because of the small amount of habitat affected either temporarily or permanently, relative to the substantial surrounding foraging area and limited roosting and nesting trees on and near Victoria Island.* ***Removal or disturbance of nesting habitat may adversely affect raptors and their habitats. With conservation measures, this impact mechanism is not likely to adversely affect these species or their habitats.***

A few isolated trees that provide potential nesting habitat for Swainson's hawk, white-tailed kite, or other raptors are present on the west side of Victoria Island. No active raptor nests were observed on Victoria Island during the reconnaissance survey, but an active red-tailed hawk nest was observed on Byron Tract adjacent to the SR 4 bridge. Red-tailed hawk and Swainson's hawk were also observed foraging on Victoria Island. Construction-related disturbance, such as trenching or tunneling, on Victoria Island and Byron Tract could disturb nearby nesting pairs, potentially resulting in nest abandonment, which is a potentially significant direct impact.

Suitable nesting habitat also exists for northern harrier. Construction-related activities in these areas also could result in destruction or abandonment of northern harrier nests if such nests are present in or near the construction area. Construction-related activities related to the conveyance pipeline also could result in destruction and abandonment of northern harrier nests, if such nests are present in or near the construction area. This would be a potentially adverse effect on raptor nesting. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

The Victoria Island/Byron Tract project site that would be potentially affected by the Proposed Action is currently planted in asparagus, alfalfa, wheat, and tomato; used for silage; or is fallow. All of these agricultural areas, except those fields with tomato, provide foraging habitat for raptors. Approximately 200–470 acres of agricultural lands may be temporarily affected during installation of the pipeline, intake and pump station, access roads, and borrow and staging areas. However, the pipeline would be constructed in segments and agricultural lands would only be affected on a portion of the total acreage at any given point in time. After construction, all pipeline areas, access roads, and staging areas would be returned to agricultural use and, therefore, no permanent loss of foraging habitat would occur from installation of the new pipeline.

Borrow may be obtained on- or off-site. On-site borrow would be via a shallow “land-leveling” technique that would not cause permanent loss of agriculture and habitat. At most, up to an additional 135 acres of agricultural land may be used temporarily as borrow. After it is used for borrow, however, the area could be regraded and agricultural uses could continue. Therefore, no permanent loss of foraging habitat would occur from the temporary borrow area.

The entire project construction would result in the permanent loss of approximately 6–8 acres of agricultural land, all from the new setback levee associated with the installation of the new intake on Victoria Canal and a single structure.

If the tunneling option is used to cross Old River, approximately 1 acre of land near the crossing would be temporarily affected during construction and staging. The entire area would be restored to pre-construction conditions, with the exception of a 25-foot by 50-foot area, where a permanent structure would be located. The structure would be directly across from the existing Old River intake station on the dry-side of the levee, likely in an area that is currently covered with ruderal vegetation. If the pipeline is routed up and over the levee, less than 1 acre of land would be disturbed during construction. The pipeline would penetrate the levee above the 100-year flood stage and follow the rip-rap covered bank to the river bottom. Under either method to cross Old River, no freshwater marsh, agricultural land, or other areas that provide valuable wildlife habitat would be permanently affected.

In summary, the Proposed Action would result in a maximum permanent loss of approximately 6–8 acres of foraging habitat for Swainson’s hawk and other raptors. Two historical Swainson’s hawk nest locations are known to occur within 1 mile of the Proposed Action. Loss of 6–8 acres of foraging habitat would result in loss of no more than 0.4% of area within a 1-mile radius (2,010 acres) of the nest locations. The loss of 6–8 acres of potential foraging area for Swainson’s hawk and other raptors in this area is not considered to be an adverse effect that would result in incidental take. Moreover, nesting habitat, not foraging habitat, is likely the limiting factor for Swainson’s hawk in this area.

The Proposed Action also includes constructing power transmissions lines from either the Pacific Gas & Electric Company (PG&E) or the Western Area Power Administration (WAPA) distribution systems to the new power substation to be constructed on-site. Utility poles can benefit most raptors by providing perching and/or nesting structures in areas where few natural perches or nest sites exist. However, utility structures can also pose a threat to raptors and other birds through electrocutions or collisions. Mortality is most common with large birds, such as eagles or cranes. Electrocution can occur when a bird simultaneously touches two energized parts or an energized part and a grounded part of the electrical equipment. CCWD has consulted with WAPA, and WAPA typically can use standard devices that minimize bird electrocutions. Consequently, this impact mechanism may affect, but is not likely to adversely affect, raptors and other birds.

Impact 4.6-f. Potential Effects on Burrowing Owl. *Suitable burrowing owl habitat (e.g., ground squirrel burrows) exists along the banks of Old River, Victoria Canal, and edges of agricultural fields and irrigation ditches. One burrowing owl and other signs of burrowing owl activity were observed on Victoria Island. Construction-related activities, such as trenching, could destroy burrows or disturb individuals.* ***Destruction of active burrowing owl burrows or disturbance that results in nest abandonment would be an adverse direct effect on burrowing owl. With conservation measures, this impact mechanism is not likely to adversely affect this species or its habitat.***

Burrowing owl is known to be present on Victoria Island in at least one location. Signs of burrowing owl activity (e.g., whitewash and pellets) were observed at several burrow entrances. Suitable habitat occurs throughout Victoria Island and Byron Tract along the levee banks and edges of agricultural fields and irrigation ditches. Although focused surveys have not been conducted, burrowing owl may occur in several locations on Victoria Island and Byron Tract due to the presence of suitable habitat for the species. Installation of the new intake on Victoria Canal, construction of the conveyance pipeline, and connection with the existing Old River Pump Station could destroy burrows occupied by burrowing owl if such burrows are present in the construction area, resulting in loss of adults, young, or eggs. Construction activities occurring adjacent to active burrows could also disturb individuals resulting in nest abandonment by the adults and loss of eggs or young. Loss of adult, eggs, or young burrowing owls from construction activities would be a potential adverse direct impact.

A total of 6–8 acres of agricultural land would be permanently lost from construction of the new setback levee and intake structure. Although suitable habitat for burrowing owl occurs throughout the area, one occupied burrow was observed in the north-central portion of the project site. This area would not be affected by the new setback levee construction or use of borrow. Because the surrounding areas are primarily agricultural and provide thousands of acres of foraging habitat, the loss of 6–8 acres of potential foraging areas for burrowing owl is not considered to be a substantial adverse effect and, therefore, potential loss of foraging habitat may affect, but is not likely to adversely affect, this species. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

Impact 4.6-g. Potential Effects on Western Pond Turtle. *Western pond turtle could inhabit the open water habitat of the irrigation ditches, Old River, and Victoria Canal. While potential construction-related disturbances would be temporary, individual pond turtles could be killed if they are present within these areas during construction. Loss of pond turtles would be a* ***direct adverse effect. With conservation measures, this impact mechanism is not likely to adversely affect this species.***

Pond turtles are known to occur throughout the Delta region in a variety of aquatic habitats, including rivers, canals, and irrigation ditches. Although no pond turtles were observed during the reconnaissance survey, suitable open water habitat for the species is present in the irrigation ditches on Victoria Island and in Old River and Victoria Canal. Potential basking sites, such as logs, rocks, and aquatic vegetation, were observed in the open water habitat as well. It is unlikely that this species will nest at the proposed project site because the upland habitats are routinely and substantially disturbed by ongoing agricultural activities. Pond turtles could be destroyed during installation of the new intake on Victoria Canal or conveyance pipeline across irrigation ditches if they are present at the proposed project site. Crossing the levee to connect the conveyance pipeline to the existing Old River intake and pump station could also adversely affect pond turtles. Western pond turtles may also be injured during construction in aquatic habitat from underwater sound pressure, chemical spills, and dewatering of the coffer dam. Tunneling of the conveyance pipeline under Old River is not expected to affect open water habitat and therefore no impacts to pond turtle are expected during this construction activity. Destruction of pond turtles during construction in Victoria Canal or in irrigation ditches would be a direct adverse effect. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

Impact 4.6-h. Potential Effects on California Horned Lark and Loggerhead Shrike. *Suitable nesting and foraging habitat for California horned lark and loggerhead shrike is present in the fallow fields and ruderal and riparian scrub habitats on Victoria Island/Byron Tract. These habitat types are abundant in the surrounding areas. Nesting habitat for both species is of marginal quality due to the disturbance from active agricultural operations. Because Victoria Island and Byron Tract are not likely to provide important nesting or foraging habitat to the local or regional populations of these species,* ***California horned lark and loggerhead shrike could be affected, but not adversely affected.***

Project construction may disturb fallow fields, and ruderal and riparian scrub habitats, which could provide both nesting and foraging habitat for California horned lark and loggerhead shrike. Loss of foraging habitat is not considered an adverse effect because this habitat type is abundant in the surrounding areas. It is unlikely that these species would nest on Victoria Island or Byron Tract due to the high disturbance level (i.e., regular agricultural activities) of the site. Construction activities have the potential, although unlikely, of destroying an active nest if this species did nest on the project site; however, the Proposed Action would not substantially affect the local or regional population of this species. Therefore, California horned lark and loggerhead shrike would be affected, but not adversely affected.

Impact 4.6-i. Potential Effects on Tricolored Blackbird. *Suitable nesting habitat for tricolored blackbird is present in emergent marsh and blackberry brambles on Victoria Island/Byron Tract. Disturbance during construction could result in nest abandonment and failure of the nesting colony.* ***Due to the potential for large numbers of nesting tricolored blackbirds to be lost, this impact mechanism would be a direct adverse effect. With conservation measures, this impact mechanism is not likely to adversely affect this species or its habitat.***

Although no nesting colonies are known to have historically occurred on Victoria Island or Byron Tract, the emergent marsh and blackberry brambles in the area could provide suitable nesting habitat. In particular, the large patch of emergent marsh across Old River from the existing pump station could be used by nesting tricolored blackbirds. Other smaller patches of emergent marsh in the irrigation ditches are likely too small in size to provide adequate cover and protection from predators required for successful nesting. The blackberry brambles on Byron Tract, lining the large irrigation ditch, and on the east bank of Old River also could provide nesting substrate for tricolored blackbirds.

Construction of the conveyance pipeline near Old River, tunneling under Old River, or crossing over the levee to connect to the existing Old River pump station could cause ground disturbance and vibrations that would cause nesting tricolored blackbirds to abandon a colony. No suitable habitat for tricolored blackbird occurs near Victoria Canal, and installation of the new intake would not adversely affect tricolored blackbirds. The failure of a nesting tricolored blackbird colony if present in or near the construction area could represent a substantial loss to the local population of tricolored blackbirds and would be a direct adverse effect. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

Impact 4.6-j. Potential Effects to NCCP Habitat Types. *Potential effects to Natural Communities Conservation Plan (NCCP) habitats are discussed throughout many of the impact mechanisms described above.* ***NCCP habitats covered under USACE jurisdiction may be adversely affected (e.g., tidal freshwater emergent habitat, tidal perennial aquatic habitat, and managed seasonal wetland habitat). With conservation measures, this impact mechanism is not likely to adversely affect NCCP habitat types.***

Although the exact project footprint has not been determined, the impacts to NCCP habitat types were estimated (Table 4.1-4). These approximations are based on acreage calculations of each habitat type in the study area and estimates of the size of the proposed facilities. Because the precise location of the proposed facilities has not yet been determined, the actual acreage of impact to each habitat type may increase or decrease. However, the calculations provide an estimate of the order of magnitude of the effect on each habitat type, and many of the habitat types are fairly homogeneous on Victoria Island. Without conservation measures, NCCP habitats covered under USACE jurisdiction may be adversely affected. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

The Proposed Action would affect, but would not adversely affect, NCCP terrestrial habitats on a cumulative basis. These effects would be less than considerable in relation to any potential cumulative effect; the removal of ruderal and agricultural areas associated with project implementation would be minor in relation to the total amount of these habitats present locally and regionally.

Table 4.1-4 NCCP Habitats Affected by the Proposed Action			
NCCP Habitat Type	Approximate Acreage Potentially Affected by Proposed Action (acres)		Total Approximate Acreage in Study Area (acres)
	Temporary	Permanent	
Upland Cropland	200–470 (pipeline, access roads, staging area, and borrow area)	6–8 (VC intake and levee improvement)	2,000
Grassland	1 (Fallow field on Byron Tract)	0	68
Tidal Freshwater Emergent Habitat	2.23	<0.1 (Old River crossing)	2.5
Tidal Perennial Aquatic Habitat	None	<0.1 (VC intake 10-15 feet by 100-200 feet, Old River crossing)	175 (only includes Old River acreage, not VC or drainage ditches)
Managed Seasonal Wetland Habitat	<0.05 (9 drainage crossings, 15 feet wide by 10 feet long)	<0.1 (fill on land side of VC levee 1,000–1,200 feet long by 20 feet wide)	62 (includes seasonal wetlands and swales and drainage ditches and canals)
Valley/Foothill Riparian	<0.02 (Old River crossing)	0	<0.5

Impact 4.6-k. Potential Cumulative Effects on Terrestrial Special-status Species and Habitats. *The Proposed Action has the potential to adversely affect these resources, as identified above, and contribute to significant cumulative effects.* ***The Proposed Action's contribution to cumulative impacts would be an adverse effect for those species and/or habitats. With conservation measures, this impact mechanism is not likely to adversely affect these species or their habitats.***

The Proposed Action would have less-than-significant direct and indirect impacts on common biological resources, greater sandhill crane, California horned lark, and loggerhead shrike. These effects would be less than considerable in relation to any potential cumulative effect; the removal of ruderal and agricultural areas associated with project implementation would be minor in relation to the total amount of these habitats present locally and regionally and no important sandhill crane wintering sites would be affected by the Proposed Action.

As stated above, construction activities associated with the Proposed Action could have potential adverse effects on the following resources: jurisdictional waters of the United States, including wetlands; special-status plants; giant garter snake; burrowing owl; Swainson's hawk, white-tailed kite, and other raptors; western pond turtle; and tricolored blackbird. The only other known projects having similar potential adverse effects on any of these species at the proposed project site are other water resource projects in the Delta being planned and implemented by CCWD, DWR, and others (see EIR/EIS Section 4.1, "Approach to the Environmental Analysis"). In addition to these projects, numerous development projects are planned within the region (see EIR/EIS Appendix F-1, "Local

Development Projects Considered in Cumulative Impact Analysis"), and many of these are likely to have the potential to contribute to adverse effects on these species through temporary disturbance or permanent conversion of potential habitat (e.g., open ruderal and grassland areas and ditches and adjacent lands).

The Los Vaqueros Reservoir Expansion Project would be constructed on a later time schedule than the Proposed Action so there would not be any temporal overlap of any temporary construction-related impacts. The long-term impacts on terrestrial biological resources from the Proposed Action would not provide a cumulatively considerable contribution to any future adverse cumulative impact with or without implementation of the Los Vaqueros Reservoir Expansion Project, as the habitat types affected by both projects differ substantially.

Populations of special-status plants, giant garter snake, burrowing owl, raptors, western pond turtle, and tricolored blackbird have declined for numerous reasons, most significantly because of the loss and fragmentation of habitat as a result of urban development; for wildlife species, because of the loss of movement corridors; and, in the case of giant garter snake, because of increased predation resulting from the introduction of exotic species. Jurisdictional waters of the United States, including wetlands, have also declined regionally in large part as a result of urban development and associated land uses (e.g., recreation and vehicular use in wetland areas) and agricultural land uses such as grazing. Any effects of the Proposed Action on these resources are expected to be relatively minor because they would mainly be limited to the construction period; however, because of the sensitive status of the resources, any contribution to potentially adverse cumulative effects would be an adverse effect. Therefore, the adverse effects of the Proposed Action on these resources would be a cumulatively considerable contribution to potentially adverse cumulative impacts. Conservation measures are proposed to minimize these potential effects (see Chapter 5, "Description of Conservation Measures").

5 Description of Conservation Measures

Conservation measures designed to protect listed fish and terrestrial species and minimize the risk of adverse effects and incidental take from implementing the Proposed Action are proposed in this chapter. CCWD is committed to implementing all of these measures as part of the Proposed Action. Conservation measures are proposed for potential effects presented in Chapter 4, and are based on the more stringent ESA and CESA standards for protecting habitats and individuals of special-status species. This chapter provides conservation measures to meet ESA and CESA requirements. Conservation measures are numbered to be consistent with the EIR/EIS.

5.1 Conservation Measures and Monitoring to Protect Listed Species and Their Habitats

5.1.1 Fishery and Aquatic Species

Based on results of an evaluation of the potential adverse effects that may directly or indirectly affect special-status fish species populations, individuals, or their habitats, a series of conservation measures were identified. Key conservation measures to be implemented by CCWD are summarized in Table 5.1-1 and described in more detail below. These conservation measures are designed to reduce and avoid incidental take of Chinook salmon (winter-run, spring-run, and late fall-run), steelhead, delta smelt, green sturgeon, and other special-status species, as well as protect winter-run Chinook salmon critical habitat, proposed critical habitat for spring-run Chinook salmon and Central Valley steelhead, and EFH. The conservation measures would also serve to protect and minimize impacts to other resident and migratory fish (e.g., white sturgeon, longfin smelt, Pacific lamprey, Sacramento splittail, hardhead, California roach, striped bass, American shad), their habitats, and macroinvertebrates.

The Proposed Action would generally have low potential to cause adverse effects to special-status species and their habitats. Moreover, for fish species, the Proposed Action would have a long-term beneficial effect by reducing net fish entrainment and impingement losses at CCWD intakes. As part of designing, constructing, and operating the Proposed Action, however, a suite of conservation measures would be implemented to avoid and minimize the potential effects to fisheries and aquatic resources, including incidental take and adverse effects on habitat.

Table 5.1-1
Summary of Conservation Measures
for Special-status Aquatic Species and Their Habitats

Impact Mechanism/Objective	Conservation Measure	
	Physical Action	Management Action
4.3-a Minimize Turbidity, Sedimentation, and Other Water Quality Impacts during Construction	► Conduct twice daily turbidity monitoring during periods when construction may create turbid conditions	► Obtain and comply with RWQCB Section 401 Water Quality Certification, DFG Streambed Alteration Agreement, and USACE Clean Water Act Section 404 permit as necessary
	► Conduct water quality surveys during dredging operations and installation/removal of cofferdam; project field manager responsible for monitoring in accordance with established protocols/ procedures	► Develop and comply with a hazardous materials management plan similar to those that have been approved by RWQCB for similar fish screen projects
	► Verify construction documents contain Erosion Control Plan measures and Best Management Practices (BMPs) ► Conduct periodic inspections during construction ► Site intake on existing rip-rapped banks to avoid effects on higher-quality tule beds ► Install cofferdam to minimize in-water work	► Construction contractor to prepare and implement an Erosion Control Plan and Stormwater Prevention Plan prior to grading and excavation that shall include BMPs to minimize erosion and sedimentation as verified by RWQCB
4.3-b Implement Measures to Reduce and/or Avoid Underwater Sound Pressure Impacts	► Install cofferdam during the designated work window between August 1 and November 30 or modify the work window using the best available fish survey data to determine another appropriate work window for underwater construction activities to avoid and minimize impacts to special-status fish species ► If reasonable, use a vibration hammer for in-water work that minimizes underwater sound pressure levels	
4.3-c Develop and Implement a Hazardous Materials Control and Spill Prevention and Response Plan to Prevent/Avoid Hazardous Materials Impacts	► Implement Plan as written. Conduct periodic inspection during construction	► Construction contractor to prepare and implement a Hazardous Materials Control and Spill Prevention and Response Plan prior to construction

Table 5.1-1
Summary of Conservation Measures
for Special-status Aquatic Species and Their Habitats

Impact Mechanism/Objective	Conservation Measure	
	Physical Action	Management Action
4.3-d Develop and Implement a Fish Rescue Program during Construction to Prevent Stranding in the Cofferdam	▸ Develop and implement a Fish Rescue Program ▸ Conduct fish rescue and relocation to Victoria Canal as dewatering proceeds	
4.3-e Compensate for the Permanent Loss of Shallow-water Aquatic Habitat at Victoria Canal Intake Site	▸ Determine the area of shallow water habitat lost in Victoria Canal due to the project footprint ▸ Purchase mitigation credits for shallow-water aquatic habitat at appropriate mitigation ratios at the Kimball Island Mitigation Bank or other mitigation bank	
4.3-g Minimize Fish Entrainment and Impingement at the New Victoria Canal Intake	▸ Conduct on-going monitoring of Alternative Intake screen condition and performance; monitoring of debris; and periodic visual inspection ▸ Conduct routine screen maintenance annually and make repairs as needed if screen performance is affected by damage or debris ▸ Conduct fish monitoring at the new Victoria Canal intake, consistent with monitoring at the Old River intake, for a period of 1 year beginning immediately upon operation ▸ After 12 months of fish monitoring, reassess the need for further monitoring at the intake site in consultation with NMFS, USFWS, and DFG	Operate new Victoria Canal intake consistent with Los Vaqueros Project Biological Opinion operational restrictions on filling Los Vaqueros Reservoir and diverting Delta water, and consistent with any Biological Opinion and DFG MOU issued for the Proposed Action*

* CCWD's operations are governed in part by three biological documents: (a) 1993 NOAA Fisheries Biological Opinion for winter-run Chinook salmon, (b) 1993 USFWS Biological Opinion for Delta smelt, and (c) 1994 Memorandum of Understanding between DFG and CCWD regarding the Los Vaqueros Project.

The conservation measures for the Proposed Action that would protect salmonids and other protected fish species and their habitats (critical habitat for delta smelt and steelhead, and EFH for Pacific salmon) would also protect other fish and macroinvertebrates in Victoria Canal and the Bay-Delta Estuary because impact mechanisms are similar. Measures that are protective of salmonids would generally provide even greater protection for the non-salmonid species; for example, salmonids are more sensitive to turbidity than many estuarine fish species. The conservation measures for the Proposed Action are consistent with avoidance and mitigation measures for other Bay-Delta fish screening projects and were developed in consultation with NMFS, USFWS, and DFG. The measures are intended to fully mitigate for incidental take and loss of habitat for fish species listed under CESA and ESA and would therefore support a consistency determination with the Federal biological opinions by DFG.

5.1.1.1 Conservation Measure 4.3-a: Minimize Turbidity, Sedimentation, and Other Water Quality Impacts during Construction.

To reduce turbidity in Victoria Canal during project-related construction activities (primarily excavation and cofferdam installation), CCWD shall:

- obtain and comply with RWQCB Section 401 Water Quality Certification and DFG Streambed Alteration Agreement, as needed;

- monitor periods of construction activity and coordinate with the contractor to identify periods when localized increases in turbidity may occur;

- install a silt curtain to reduce the dissipation of suspended sediments during dredging and cofferdam installation; and

- conduct cofferdam installation and removal, to the extent possible, during summer to avoid the potential risk of adverse impacts to Chinook salmon, steelhead, and delta smelt, which are all more abundant in the area during fall, winter, and spring. Installation of the cofferdam will occur during the designated in-water work window between August 1 and November 30, unless modified by written agreement with NMFS, USFWS, and DFG.

In addition, successful project-related turbidity control shall be accomplished by installation and subsequent removal of the temporary cofferdam, while maintaining suspended sediment and turbidity levels to the extent possible within the water quality criteria established by RWQCB. CCWD would be required to comply with water quality criteria established by applicable State and Federal permits and approvals for the Proposed Action. In addition, CCWD shall implement the following measures during project-related dredging and soil disposal that comply with the Fisheries Management Plan for EFH for Pacific Salmon:

- monitor project construction-related dredging activities especially any contaminated sediments, regularly report effects on EFH, and re-evaluate activities based on monitoring results;

- employ best engineering and management practices for all project construction-related dredging projects to minimize water-column discharges; and

- consider upland disposal options as an alternative to open water disposal during project construction activities. Dredged sediments removed during intake construction will be used beneficially on-site or disposed of at an upland site.

Appendix E-1. Action Specific Implementation Plan

Avoidance and minimization measures would be implemented in accordance with standard RWQCB requirements that have been used in other similar fish screen construction projects. CCWD shall be responsible for implementing the following measures to the extent practicable during project construction activities:

- The discharge of petroleum products or other excavated materials to surface waters is prohibited;
- Project construction activities shall minimize substrate disturbance;
- Project construction activities shall not cause turbidity increases in surface waters as follows:
  - where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU;
  - where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20%;
  - where natural turbidity is between 50 and 100 NTUs, increase shall not exceed 10 NTUs; and
  - where natural turbidity is greater than 100 NTUs, increases shall not exceed 10%.

  These limits would be eased during in-water working periods to allow a turbidity increase of 15 NTU over background turbidity as measured in surface waters 300 feet downstream from the working area. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses would be fully protected;
- Project construction activities shall not cause settleable matter to exceed 0.1 ml/l in surface waters as measured in surface waters 300 feet downstream from the project;
- Project construction activities shall not cause visible oil, grease, or foam in the work area or downstream;
- All areas disturbed by project construction activities shall be protected from washout or erosion;
- In the event that project construction activities create a visible plume in surface waters, CCWD will initiate monitoring of turbidity levels at the discharge site and 300 feet downstream, taking grab samples for analysis of NTU levels twice per day during the work period while the visible plume persists;
- CCWD shall notify RWQCB, DFG, USFWS, and NMFS immediately if the above criteria for turbidity, oil/grease, or foam are exceeded; and

- CCWD shall notify RWQCB, DFG, USFWS, and NMFS immediately of any spill of petroleum products or other organic or earthen materials.

CCWD shall prepare a soil erosion control plan and stormwater pollution prevention plan (SWPPP) prior to project grading and excavation activities to minimize potential project construction-related silt from entering waterways and increasing turbidity. The plans would include, but would not be limited to, the following measures to minimize project-related erosion and sedimentation:

- use sedimentation basins and straw bales or other measures to trap sediment and prevent sediment and silt loads to waterways during project construction;
- cover graded areas adjacent to levees and in other areas that may be subject to erosion (as appropriate) with protective material, such as mulch, and re-seed with adapted native plant species after project construction is complete;
- incorporate bank stabilization (riprap) into the project design on both the east and west sides of the intake to minimize channel margin erosion of soils into Victoria Canal. To the extent practicable, the aerial extend of riprap will be minimized and small (<8 inch diameter) riprap will be used for levee protection;
- minimize project construction-related surface disturbance of soil and vegetation and restore terrestrial habitats immediately after construction to the extent feasible;
- place any project construction-related stockpiled soil where it would not be subject to accelerated erosion; and
- commence re-vegetation with grasses native to the Delta and placement of erosion control devices, such as crushed rock, as soon as a graded area has attained finish grade.

CCWD shall ensure that a certified erosion control specialist or California-registered civil engineer prepare the plan. A project field manager would be responsible for monitoring in accordance with established protocols/procedures. If needed, RWQCB staff would review the plan prior to project construction to verify that physical best management practices (BMPs) have been incorporated to reduce project construction-related erosion and sedimentation to the maximum extent possible and ensure compliance with this measure.

Implementation of these measures would further minimize effects such that there would not be an adverse effect on species or habitats related to increased turbidity, sedimentation, or other contaminants.

Effects associated with periodic maintenance dredging in front of the fish screen are not covered in these conservation measures, but would be addressed at such time in the future that maintenance dredging is needed, as recommended by DFG. It is expected that a conservation measure similar to Conservation Measure 4.3-a herein would be developed and implemented at that time by CCWD.

5.1.1.2 Conservation Measure 4.3-b: Implement Measures to Reduce and/or Avoid Underwater Sound Pressure Impacts.

Potential risk of adverse impacts and incidental take of steelhead, Chinook salmon, delta smelt, and other fish species shall be avoided by installing the sheet pile cofferdam using a vibration hammer that minimizes underwater sound pressure levels to the greatest extent feasible to minimize effects to sensitive fish species. If it is determined that a higher intensity percussion hammer would be required for installing the cofferdam, avoidance of potential adverse effects would be achieved by consulting with USFWS, NMFS, and DFG to determine the appropriate actions, which may include surveying Victoria Canal at the intake site to determine fish presence prior to installation, and possibly modifying the work window accordingly. Installation of the cofferdam, however, is expected to occur during the designated in-water work-window in summer and early fall when water temperatures within the central and south Delta are seasonally elevated and aquatic habitat in these areas is considered to be generally unsuitable for both salmonids and delta smelt. Chinook salmon and delta smelt avoid habitats, including Victoria Canal, when seasonal water temperatures increase during late spring and early summer reaching levels above 25°C (77°F). Installation of the cofferdam using percussion hammers during summer would reduce and avoid potential adverse effects to these species.

Implementation of this measure would minimize otherwise adverse effects related to underwater sound pressure and reduce the risk of incidental take of protected fish species.

5.1.1.3 Conservation Measure 4.3-c: Develop and Implement a Hazardous Materials Control and Spill Prevention and Response Plan to Prevent/Avoid Hazardous Materials Impacts.

CCWD shall prepare and implement a hazardous materials control and spill prevention and response plan prior to construction. Measures that would be included in the plan to minimize project construction-related effects will include the following:

- establish a spill prevention and countermeasure plan before the commencement of project construction that includes strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways;
- prevent project-related raw cement, concrete, or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses, including Victoria Canal;
- clean up all project-related spills immediately according to the spill prevention and countermeasure plan, and notify RWQCB immediately of spills and cleanup procedures;
- provide staging and storage areas for project-related equipment, materials, fuels, lubricants, solvents, and other possible contaminants away from watercourses and their watersheds; and

- conduct periodic inspection during construction.

USFWS, NMFS, DFG, and RWQCB shall review the plan prior to construction to verify that hazardous material control and spill response measures have been incorporated to control the use of hazardous materials and reduce the chance of spills to the maximum extent practicable. USFWS, NMFS, and DFG shall have access to inspect construction activities to ensure compliance.

Preparation and implementation of a hazardous materials control and spill prevention and response plan would reduce the risk of incidental take of protected fish species related to potential chemical spills during construction such that there may be an effect, but the Proposed Action is not likely to adversely affect special-status species.

5.1.1.4 Conservation Measure 4.3-d: Develop and Implement a Fish Rescue Plan during Construction to Prevent Stranding in the Cofferdam.

Installation of the cofferdam and dewatering a portion of the proposed intake structure site during fish screen construction may result in fish stranding. CCWD shall develop and implement a Fish Rescue Plan acceptable to DFG, USFWS, and NMFS; a draft Fish Rescue Plan is presented in Attachment F and summarized herein. CCWD shall ensure that a qualified fishery biologist with a current DFG collections permit designs and conducts the fish rescue and relocation effort to collect fish from the area behind the cofferdam. The fish rescue effort would be implemented during the dewatering of the area behind the cofferdam and would involve capture and return of those fish to suitable habitat within Victoria Canal. To ensure compliance, a fisheries biologist shall be present on-site during initial pumping (dewatering) activities.

CCWD shall monitor progress of installation of the cofferdam and the schedule for dewatering. CCWD shall coordinate the dewatering schedule with the construction contractor and fishery biologist to allow for the fish rescue to occur prior to completely closing the cofferdam and again when water depths are approximately 2 feet. USFWS, NMFS, and DFG shall be notified at least 48 hours prior to the fish rescue. Information on the species and sizes of fish collected in the rescue and estimates of survival immediately before release would be recorded during the time of the fish rescue and provided in a letter report to be submitted within 30 days after the fish rescue to USFWS, NMFS, and DFG.

The success of this dewatering measure would be the effective capture and removal of fish from the area to be dewatered with a minimum of capture and handling mortality for those fish returned to Victoria Canal. The Fish Rescue Plan developed as part of this ASIP contains a framework on how to minimize the risk of incidental take and stress to listed species that have the potential to occur within the impact area in Victoria Canal during installation of the cofferdam.

Implementation of the Fish Rescue Plan would result in an effect, but not an adverse effect, and would minimize the risk of incidental take related to fish stranding during dewatering activities associated with the construction of the Proposed Action.

5.1.1.5 Conservation Measure 4.3-e: Compensate for the Permanent Loss of Shallow-water Aquatic Habitat at Victoria Canal Intake Site.

Construction of the proposed intake structure in Victoria Canal would result in the modification of shallow-water aquatic habitat estimated as follows:

- 1.03 acres of existing rip-rap shallow-water tidal freshwater emergent habitat along the existing levee would be replaced by 1.03 acre of new rip-rap habitat immediately in front of the fish screen and along each side of the shallow-water fish screen along the existing levee;

- 0.05 acre of shallow-water tidal freshwater emergent habitat presumed to be earthen bottom would be replaced by 0.05 acre of new rip-rap habitat; and

- 1.15 acres of shallow-water tidal freshwater emergent habitat presumed to be earthen bottom would be excavated about 10–15 feet deeper, but would retain the same substrate characteristics; the resulting depth would not constitute shallow-water habitat but would provide habitat complexity in the existing channel.

These habitats are marginal, low-quality habitats. They are classified as shallow-water tidal freshwater emergent habitat based on physical characteristics that could potentially support emergent vegetation, but the intake has been sited to avoid existent emergent vegetation to the degree possible. CCWD would mitigate some of these existing habitats with high-quality emergent marsh habitat at the Kimball Island Mitigation Bank or another mitigation bank. The purchased mitigation credits would be for emergent marsh habitat that is far superior to the habitat being disturbed in Victoria Canal. Mitigation, determined in consultation with NMFS, USFWS, and DFG, is calculated as follows:

- 1.03 acres – no mitigation is necessary as the existing habitat would not be modified in a manner that adversely affects available habitat in Victoria Canal. The existing rip-rap would be replaced with similarly sized riprap in Victoria Canal (very little change in habitat).

- 0.05 acre – a 3:1 mitigation ratio is used because a presumed existing earthen bottom is being replaced with rip-rap, even though the rip-rap will quickly silt over and a natural earthen bottom will occur over the long-term. CCWD would purchase 0.15 acre of shallow-water emergent marsh habitat at the Kimball Island Mitigation Bank or other mitigation bank. This more than compensates for the modified habitat; and

- 1.15 acres – a 3:1 mitigation ratio is used because the shallow-water habitat would be replaced with open-water habitat. CCWD would purchase 3.45 acres of shallow-water emergent marsh habitat at the Kimball Island Mitigation Bank or other mitigation bank.

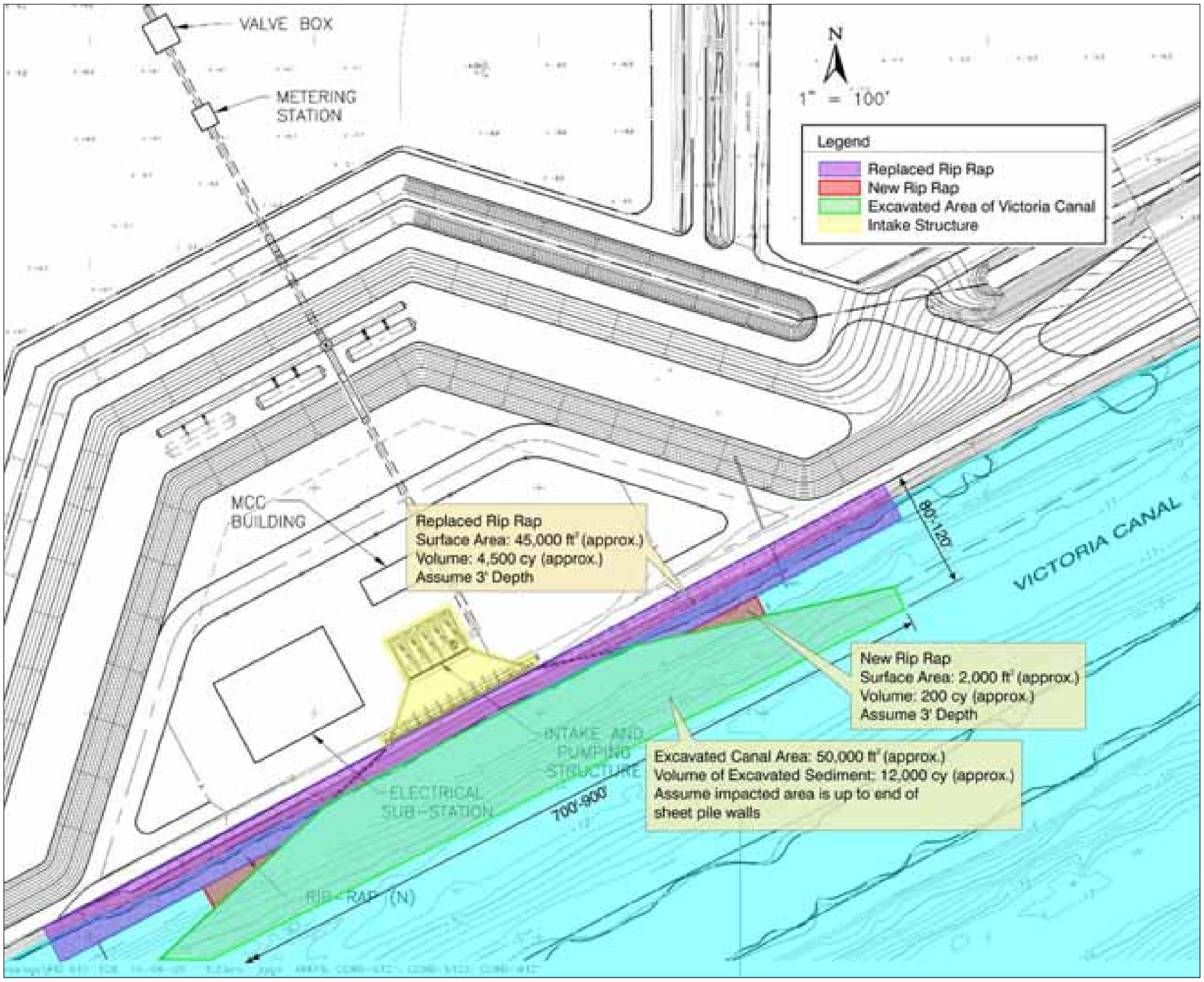


Exhibit 5.1-1
Victoria Canal Intake Site and Habitat Modifications

To fully compensate for physical habitat modifications at the Victoria Canal intake site, CCWD will purchase mitigation credits for 3.60 acres of shallow-water emergent marsh aquatic habitat. With this measure, there is no loss in aquatic habitat associated with the Proposed Action.

CCWD considered using other potential measures for bank and bed stabilization including: 1) incorporating a floodplain terrace or bench into the shoreline being stabilized, 2) using small rock less than 8 inches in diameter for rip-rapping the banks, 3) covering riprap with soil and planting with willows, and 4) designing bank slopes greater than a 3:1 ratio. These measures are not consistent with RD 2040 design standards for its levees and could compromise levee integrity. Based on input from the RD 2040 engineer, these measures were eliminated from further consideration. CCWD did remove the concrete apron, originally proposed as part of the project design, to minimize effects on habitat.

Application of the Standard Assessment Methodology for quantifying habitats and fish behavior to the modified rip-rapped banks does not appear applicable because the site-specific hydraulic characteristics would be substantially changed, and the Standard Assessment Methodology has not been used to evaluate conditions at fish screens, intakes, or in the Delta.

5.1.1.6 Conservation Measure 4.3-g: Minimize Fish Entrainment and Impingement at the New Victoria Canal Intake.

As part of the Proposed Action, CCWD would install a state-of-the-art positive barrier fish screen that would minimize fish entrainment and impingement at the new Victoria Canal intake. To ensure that the fish screen operates as intended and the risk of incidental take associated with diversions at this facility are in conformance with ESA and CESA, long-term monitoring of operation and maintenance of the positive barrier screen shall be conducted. Monitoring at the onset of diversions through the Victoria Canal intake would include approach velocity measurements immediately after initiation of the positive barrier screen operations, with fine-tuning of velocity control baffles or other modifications as necessary, to achieve uniformity of velocities in conformance with the screen criteria ($\leq$0.2 feet/second) established by DFG and NMFS, and mandated by USFWS in a number of biological opinions. Long-term velocity tests have been scheduled at 5-year intervals for the Old River Fish Screen Facility, and a similar schedule to test for effectiveness will be implemented for ensuring proper functionality of the Proposed Action's positive barrier fish screen.

CCWD shall also monitor the condition of the positive barrier screen on an annual basis for as long as diversions are occurring at Victoria Canal. CCWD shall conduct periodic visual inspections at least monthly, during periods of the year when the intake is in operation, to remove accumulated debris and repair screen panels as necessary. NMFS, USFWS, and DFG shall have access to the positive barrier screen for underwater inspections following completion of intake screen construction. The standards for success would be long-term reliable operation of the fish screen, and conformance with intake screen design criteria.

CCWD will also operate the new Victoria Canal intake consistent with the existing Los Vaqueros Project Biological Opinion operational restrictions on filling Los Vaqueros Reservoir and diverting Delta water, and consistent with any future changes to that Biological Opinion. CCWD will also operate the new Victoria Canal intake consistent with any Biological Opinion issued for the Proposed Action.

In addition, CCWD will incorporate entrainment monitoring for fish eggs, larvae, and juveniles at the new Victoria Canal intake consistent with the on-going fishery monitoring being conducted at the Old River Fish Facility. Informal consultation with NMFS, USFWS, and DFG has indicated that a monitoring program as frequent and long-term as that at the Old River Fish Screen Facility is likely not necessary due to the similarities in screen design and the proven effectiveness of the Old River screen. Consequently, entrainment monitoring will be conducted at the Victoria Canal intake for the first year of operation. Following one year of entrainment monitoring, CCWD will issue a performance report within 60 days to NMFS, USFWS, and DFG as a cumulative record of monitoring and communications with the regulatory agencies. Using the 1-year monitoring results, CCWD will recommend continuation, modification, or discontinuation of the biological monitoring program for approval by NMFS, USFWS, and DFG, and then an assessment will be made whether further sampling is necessary, or should be integrated with Old River intake sampling.

Previous monitoring conducted for the Old River Fish Screen Facility to evaluate the effectiveness of the screen to reduce and avoid entraining fish eggs and larvae has provided a technical basis for evaluating the effectiveness of the new Victoria Canal positive barrier fish screen. Juvenile Chinook salmon nor other species are substantially being entrained into the state-of-the-art positive barrier fish screen that was installed and fully operable at the Old River intake by 1998. This determination has been made by Morinaka (2000) following fishery sampling behind the screen with a large sieve net that caught few fish, and among them was only one delta smelt and no Chinook salmon. Morinaka concluded, “the results demonstrate that a properly designed and operated fish screen can reduce entrainment losses.” The low approach velocities of these screens (e.g., at Victoria Canal and Old River intakes) designed to meet agency criteria is such that juvenile fish can usually escape entrainment.

Implementation of this multi-faceted measure will minimize adverse effects and the risk of incidental take related to increased fish losses through entrainment and impingement by ensuring that the positive barrier fish screen is operating effectively and efficiently.

5.1.2 Terrestrial Biological Resources

Based on results of an evaluation of the potential adverse effects that may directly or indirectly affect jurisdictional waters of the United States, and special-status plants and wildlife species and their habitat as a result of the Proposed Action, a series of conservation measures will be implemented by CCWD. Conservation measures are summarized in Table 5.1-2 and described in more detail below.

5.1.2.1 Conservation Measure 4.6-a: Minimize Potential Fill of Jurisdictional Waters of the United States and Loss of Sensitive Habitat, and Compensate for Unavoidable Impacts.

CCWD shall implement the following measures:

- CCWD shall minimize fill of waters of the United States and loss of freshwater marsh habitat to the greatest extent feasible.

For those waters of the United States that cannot be avoided during construction, authorization for fill of jurisdictional waters of the United States shall be secured from USACE via the Section 404 permitting process prior to project implementation. Any measures determined necessary during the 404 permitting process shall be implemented. As required, CCWD shall implement waste discharge Best Management Practices

(BMPs) during dredging and minimize the disturbance of the river channel bottom and release of sediment into the water to the extent possible.

Table 5.1-2
Summary of Conservation Measures for Special-status Terrestrial Species and Their Habitats

4.6-a	Minimize potential fill of jurisdictional waters of the United States and loss of sensitive habitat, and compensate for unavoidable impacts
4.6-b	Minimize potential effects on special-status plants, and mitigate for loss if required
4.6-c	Implement measures as needed to minimize potential effects on giant garter snake
4.6-e	Conduct surveys and implement protective measures, if needed, to minimize potential effects on Swainson's hawk, white-tailed kite, northern harrier, and other raptors
4.6-f	Conduct surveys and implement protective measures, if required, to minimize potential effects on burrowing owl
4.6-g	Conduct surveys and implement protective measures, if required, to minimize potential effects on western pond turtle
4.6-i	Conduct surveys and minimize potential effects on tricolored blackbird, if required
4.6-j	Implement measures 4.6-a through 4.6-i to minimize potential effects to NCCP terrestrial habitat types
4.6-k	Implement measures 4.6-a through 4.6-c, 4.6-e through 4.6-g, and 4.6-i to minimize potential effects on sensitive resources

- If the Proposed Action results in the loss of jurisdictional wetlands, a conceptual wetlands mitigation plan, including an agreed upon replacement ratio of wetlands with USACE, will be developed by a qualified biologist. The mitigation plan shall quantify the total jurisdictional acreage lost, describe creation/replacement ratios for acres filled, annual success criteria, mitigation sites, and monitoring and maintenance requirements. The plan shall be prepared by a qualified wetland biologist pursuant to, and through consultation with, USACE. Implementation of the plan would compensate for any loss of wetland resulting from project construction activities and result in no net loss of wetlands.

- CCWD shall obtain a Letter of Permission or permit from the USACE under Section 10 of the Rivers and Harbors Act prior to any work being completed within navigable waters. Any conditions associated with the authorization shall be implemented.

- Water Quality certification pursuant to Section 401 of the Clean Water Act will be required as a condition of issuance of the 404 permit. CCWD shall obtain water quality certification from the Regional Water Quality Control Board (RWQCB) prior to project implementation. Any measures required as part to the issuance of water quality certification shall be implemented.

- A DFG Streambed Alteration Agreement will be required. Issuance of the Agreement may require the preparation of a habitat mitigation plan. The wetland mitigation plan developed for impacts to wetland and other waters of the United States may be suitable, if it adequately covers impacts to the stream channel of Victoria Canal and impacts to riparian habitat occurring on Victoria Island or Byron Tract from project construction activities. Any conditions of issuance of the Streambed Alteration Agreement shall be implemented as part of project implementation.

- If the Proposed Action results in loss of freshwater marsh habitat in an area that is not a jurisdictional wetland, a wetland mitigation plan shall be developed by a qualified biologist, in consultation with DFG. The mitigation plan shall quantify the total freshwater marsh acreage lost, describe creation/replacement ratios for habitat lost, annual success criteria, mitigation sites, and monitoring and maintenance requirements. Implementation of the plan would be required to compensate for any loss of freshwater marsh habitat and result in no net loss of such habitat.

Implementation of this measure would result in no adverse affect on these habitats.

5.1.2.2 Conservation Measure 4.6-b: Minimize Potential Effects on Special-status Plants, and Mitigate for Loss If Required.

The following measures shall be implemented to protect the documented populations of Mason's lilaeopsis and rose-mallow at the proposed project site:

- Information on the special-status plant populations shall be recorded in the field on CNDDB data forms. These forms shall be submitted to the CNDDB upon completion of the survey;

- If the populations can be avoided during project implementation, they shall be clearly marked in the field by a qualified botanist for avoidance during construction activities. Before ground disturbance, all on-site construction personnel shall be given instruction regarding the presence of this species and the importance of avoiding impacts to this species and its habitat;

- If special-status plant populations cannot be avoided, consultations with DFG and/or USFWS would be required. If needed, CCWD shall develop a mitigation plan to compensate for the loss of Mason's lilaeopsis and rose-mallow. The plan would detail appropriate replacement ratios determined through consultation with the resource agencies, methods for implementation, success criteria, monitoring and reporting protocols, and contingency measures that would be implemented should the initial mitigation fail. Because CCWD would not own the land outside the project facility footprint, mitigation through replacement is likely to be impractical at the project site and would need to be achieved at an appropriate off-site location. The plan shall be developed in consultation with the appropriate agencies prior to beginning construction activities in the area of concern.

If mitigation is required, CCWD shall maintain and monitor the mitigation area for 3 years following the completion of construction and restoration activities. Monitoring reports documenting the restoration effort should be submitted to DFG and/or USFWS upon the completion of the restoration implementation and 3 years after the restoration implementation. Monitoring reports should include photo-documentation, when restoration was completed, a description of materials that were used, specified plantings, and justifications of any substitutions to the mitigation plan. Implementation of this measure would result in no adverse effects to special-status plants.

5.1.2.3 Conservation Measure 4.6-c: Implement Measures as Needed to Minimize Potential Effects on Giant Garter Snake.

Although it is highly unlikely for giant garter snake to be present in the aquatic or upland areas on Victoria Island, there is potentially suitable and marginal habitat present (4,800 feet of suitable habitat and 21,900 feet of marginal habitat out of 178,385 linear feet of potential habitat within the potential impact area). For any work that has the potential to affect giant garter snake or its habitat, CCWD shall consult with USFWS and USACE under ESA Section 7 to develop conservation measures. Work that may affect giant garter snake habitat includes constructing the new intake station and levee improvements on Victoria Canal, installing the conveyance pipeline across irrigation ditches, and connecting the conveyance pipeline to the existing facilities at the Old River intake and pump station (either by tunneling or crossing the levee). Minimization and avoidance measures may include the following:

- All project-related construction activity within giant garter snake habitat (aquatic habitat and adjacent suitable upland habitat within 200 feet) shall be conducted between May 1 and October 1 to the extent feasible. For any project-related construction outside of the May 1–October 1 period, CCWD shall contact the USFWS Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.

- Dewatering of aquatic habitat for project-related construction purposes shall not occur between October 1 and April 15, with the exception of the area within the cofferdam, unless authorized by USFWS. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat. If complete dewatering is not possible, potential snake prey (i.e., fish and tadpoles) will be removed so that snakes and other wildlife are not attracted to the project construction area.

- Within 24 hours prior to commencement of project-related construction activities, the site shall be inspected by a qualified biologist who is approved by the USFWS Sacramento Fish and Wildlife Office. The construction area shall be re-inspected whenever a lapse in project-related construction activity of 2 weeks or greater has occurred. If a giant garter snake is encountered during project-related construction, all project-related construction activities shall cease in the immediate area until appropriate corrective measures have been completed or it has been determined by the biologist that the snake will not be harmed. USFWS shall be contacted by telephone immediately.

- Movement of heavy equipment to and from the project site during project-related construction activities shall be restricted to established roadways and haul routes to minimize habitat disturbance, and project construction equipment shall be stored in established staging areas.

- Before ground disturbance, all on-site project-related construction personnel shall be given instruction regarding the presence of the giant garter snake and the importance of avoiding impacts to this species and its habitat.

- After completion of project-related construction activities, any temporary fill and construction debris shall be removed, and wherever feasible, disturbed areas shall be restored to pre-project conditions.

- No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on the project site when working within 200 feet of potential snake habitat during their active period of April 1 until October 1.

The 900 feet of drainage ditch at the toe of the levee that would be filled during construction of the intake would be replaced as soon as practical, and in no case more than 12 months after filling, by a new 1,050-foot-long drainage ditch that wraps around the new levee at the intake site, an increase of 150 feet of potential giant garter snake habitat of equal habitat quality on a long-term basis. This permanent habitat enhancement offsets the temporary loss of this habitat during construction.

Implementation of this measure would result in no adverse effect on or incidental take of giant garter snake.

5.1.2.4 Conservation Measure 4.6-e: Conduct Surveys and Implement Protective Measures, If Needed, to Minimize Potential Effects on Swainson's Hawk, White-Tailed Kite, Northern Harrier, and Other Raptors.

CCWD shall implement the following measures:

- If feasible, in order to avoid impacts to northern harrier, all vegetation within the project's construction footprint and on-site borrow areas shall be cleared in the non-breeding season.

- Complete avoidance of project construction-related activity during the breeding and nesting season is not feasible. Consequently, pre-construction surveys shall be conducted by a qualified biologist to identify active Swainson's hawk nests within ½ mile of the proposed project site and nests of other raptors within 500 feet of the proposed project site. The survey shall be conducted no less than 14 days and no more than 30 days prior to the beginning of construction. To the extent feasible, guidelines provided in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley* (Technical Advisory Committee 2000) shall be followed.

- If active nests are found, project-related construction impacts shall be avoided by establishment of appropriate buffers to limit project-related construction activities. The size of the buffers shall be determined by a qualified biologist in consultation with DFG. No project-related construction activity shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active or consultations with DFG specifically allow certain construction activities to continue.

Monitoring of the nest by a qualified biologist may be required if the project-related construction activity has potential to adversely affect the nest.

Implementation of this measure would incur a substantial reduction in the potential effects of the Proposed Project to Swainson's hawk, white-tailed kite, northern harrier, and other species of raptors.

To the extent feasible, CCWD will follow Avian Protection Plan guidelines for power lines (Edison Electric Institute's Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service 2005):

- provide 60-inch minimum horizontal separation between energized conductors and/or energized conductors and grounded hardware,
- insulate hardware or conductors against simultaneous contact if adequate spacing is not possible,
- use WAPA-approved poles that minimize impacts to birds, and/or
- increase the visibility of conductors or shield wires to prevent avian collisions.

This measure will result in no adverse effects to raptors.

5.1.2.5 Conservation Measure 4.6-f: Conduct Surveys and Implement Protective Measures, If Required, to Minimize Potential Effects on Burrowing Owl.

Prior to any ground-disturbing project-related construction activity, CCWD shall retain a qualified biologist to conduct preconstruction surveys for burrowing owls in suitable habitat within 250 feet of the project footprint, including the ruderal areas, and along the levees, roads, channel banks, and irrigation ditches on Victoria Island/Byron Tract. Surveys shall be conducted in accordance with DFG protocol (California Department of Fish and Game 1995).

If no occupied burrows are found in the survey area, a letter report documenting survey methods and findings shall be submitted to DFG, and no further measures are necessary.

If occupied burrows are found, impacts to them shall be avoided by establishing a buffer of 165 feet during the nonbreeding season (September 1 through January 31) or 250 feet during the breeding season (February 1 through August 31) for all project-related construction activities. The size of the buffer area may be adjusted if a qualified biologist and DFG determine project-related construction activities would not be likely to have adverse effects. No project-related construction activity shall commence within the buffer area until a qualified biologist confirms that the burrow is no longer occupied, or consultations with DFG specifically allow certain construction activities to continue.

If avoidance of occupied burrows is infeasible for project-related construction activities, on-site passive relocation techniques approved by DFG shall be used to encourage owls to move to alternative burrows outside of the impact area. However, no occupied burrows shall be disturbed by project-related construction activities during the nesting season unless a qualified biologist verifies through noninvasive methods that the burrow is no longer occupied.

This measure will result in no adverse effects to burrowing owl.

5.1.2.6 Conservation Measure 4.6-g: Conduct Surveys and Implement Protective Measures, If Required, to Minimize Potential Effects on Western Pond Turtle.

Impacts on potential basking sites (i.e., logs and rocks) shall be avoided during project-related construction activities, wherever feasible. Measures to reduce and/or avoid underwater sound pressure and minimize the risk of hazardous spills, as described above for Measures 4.3-b and 4.3-c, would also protect western pond turtle during construction activities.

Preconstruction surveys in any aquatic habitat, including Old River, Victoria Canal, and irrigation ditches and canals, shall be conducted by a qualified biologist immediately prior to (within 24 hours of) commencement of project construction.

If western pond turtles are found during field surveys, a qualified biologist shall move the turtle(s) to the nearest suitable habitat outside the project construction area. A qualified biologist shall also be present during installation and dewatering of the cofferdam and during any dredging. Any dredge spoils shall be dumped and inspected for western pond turtles by the biologist.

This measure will result in no adverse effects to western pond turtle.

5.1.2.7 Conservation Measure 4.6-i: Conduct Surveys and Minimize Potential Effects on Tricolored Blackbird, If Required.

To minimize potential project-related construction disturbance to nesting tricolored blackbirds during the breeding season, vegetation within the impact area footprint shall be removed during the non-breeding season (August to mid-April). Project-related construction disturbance to vegetation outside of the impact area shall be avoided.

If project-related construction activities are expected to occur during the breeding season for tricolored blackbirds (mid-April to July), preconstruction surveys shall be conducted by a qualified biologist in any areas of potentially suitable habitat. These areas specifically include emergent marsh in Old River across from existing pump station and blackberry brambles on Byron Tract and along Old River.

If no nesting tricolored blackbirds are observed during the preconstruction surveys, then no further measures are required.

If tricolored blackbirds are observed nesting on Victoria Island or Byron Tract, project-related construction impacts shall be avoided and minimized by establishment of a 0.25-mile buffer around the colony during the nesting period (mid-April to July) for all project-related construction activities.

This measure will result in no adverse effects to tricolored blackbird.

5.1.2.8 Conservation Measure 4.6-j: Implement Mitigation Measures 4.6-a through 4.6-i to Minimize Potential Effects to NCCP Terrestrial Habitat Types.

CCWD shall implement Measures 4.6-a through 4.6-i for the Proposed Action to address potential direct and indirect effects on NCCP terrestrial habitat types. Any unavoidable effects on waters of the United States, including wetlands, would be addressed through restoration or replacement according to methods and terms agreed upon through consultation with USACE and/or DFG, ensuring no net loss of the affected resources. Surveys, maintenance of buffer areas where practicable, and other avoidance measures described in the conservation measures described above would ensure minimization of any potential temporary effects of construction on special-status plants, giant garter snake, western pond turtle, tricolored blackbird, burrowing owl, and nesting Swainson's hawk and other raptors.

With implementation of these conservation measures, the Proposed Action would not result in permanent loss of NCCP terrestrial habitat types. The Proposed Action, therefore, may affect but is not likely to adversely affect, NCCP terrestrial habitat types.

5.1.2.9 Conservation Measure 4.6-k: Implement Measures 4.6-a Through 4.6-c, 4.6-e through 4.6-g, and 4.6-i to Minimize Potential Effects on Sensitive Resources.

CCWD shall implement Measures 4.6-a through 4.6-c, 4.6-e through 4.6-g, and 4.6-i for the Proposed Action to address potential cumulative effects on sensitive terrestrial biological resources. Any unavoidable effects on waters of the United States, including wetlands, would be addressed through restoration or replacement according to methods and terms agreed upon through consultation with USACE and/or DFG, ensuring no net loss of the affected resources. Surveys, maintenance of buffer areas where practicable, and other avoidance measures described in the conservation measures described above would ensure minimization of any potential temporary effects of construction on special-status plants, giant garter snake, western pond turtle, tricolored blackbird, burrowing owl, and nesting Swainson's hawk and other raptors.

The Los Vaqueros Reservoir Expansion Project would be constructed on a later time schedule than the Proposed Action so there would not be any temporal overlap of any temporary construction-related impacts. The long-term impacts on terrestrial biological resources from the Proposed Action would not provide a cumulatively considerable contribution to any future adverse cumulative impact with or without implementation of the Los Vaqueros Reservoir Expansion Project, as the habitat types affected by both projects differ substantially.

Other sizeable projects would be required to implement measures similar to those that would be undertaken for the Proposed Action to ensure minimization of impacts on these potentially affected species, most of which are protected by the Federal ESA and/or sections of the California Fish and Game Code, including CESA.

With implementation of these conservation measures, the Proposed Action would not result in permanent loss of habitat or take of listed species. The Proposed Action, therefore, may affect but is not likely to adversely affect, special-status species and habitats.

5.2 Funding Commitment

An ASIP must include a description of how conservation measures will be funded. CCWD will be responsible for implementing, and administering funding for, all conservation measures presented in Chapter 5. The measures will be fully implemented in accordance with their descriptions above, and consistent with the goals set forth in the MSCS. With the exception of the long-term monitoring of the fish screen performance, conservation measures for the Proposed Action are short term and construction-related. The costs for these measures will be included in the construction costs of the Proposed Action. The costs associated with monitoring at the Alternative Intake fish screen will be included as part of CCWD's costs to operate and maintain the facilities.

5.3 Landowner Assurances

For a typical CALFED project, CALFED agencies or other entities may enter into agreements to provide limited ESA, CESA, and NCCPA compliance with cooperating landowners. The Proposed Action and the conservation measures proposed do not require landowner assurances.

CALFED agencies or other entities implementing certain CALFED projects may enter into agreements to provide limited ESA, CESA, and NCCPA compliance with cooperating landowners. The Proposed Action and the conservation measures proposed do not require landowner assurances.

5.4 Changed Circumstances

The planning, implementation, monitoring, and adaptive management attributes of various conservation measures cannot be completely known at this time. Changed circumstances resulting from unforeseen changes to species populations, their habitats, project facilities and operations, or conservation measures could occur. CCWD will construct, operate, and maintain the Proposed Action as specified in the EIR/EIS and in compliance with all environmental regulations and permits that it obtains. Should changed circumstances arise, however, CCWD would take all reasonable and cost-effective actions and consultations with CALFED, regulatory agencies, and other entities to ensure that the project purpose and need/objectives, and the intent of environmental commitments that CCWD agrees to implement, are fully implemented and maintained.

6 Monitoring Plan and Adaptive Management Plan

6.1 Monitoring Plan

6.1.1 Introduction

An ASIP must include a monitoring plan that will be used to determine the actual effects of the Proposed Action on protected species and NCCP habitats (if appropriate) and to document the implementation and effectiveness of the ASIP conservation measures. Information gathered during monitoring will also be used to adaptively manage implementation of the measures. A monitoring plan must be reviewed by the fishery agencies prior to approval and should include a description of:

- the responsible party for implementing the monitoring plan;
- the elements of the Proposed Action, including conservation measures, to be monitored;
- monitoring objectives, methods, schedule, and duration;
- performance standards; and
- the frequency of reporting to the CALFED Bay-Delta Authority and fisheries agencies.

CCWD initially presented the potential impacts and associated conservation measures to the fishery agencies for discussion prior to developing a monitoring plan. The conservation measures agreed to by CCWD and the appropriate fishery agencies form the basis for developing the monitoring plan. In addition, the monitoring plan was developed in conjunction with the Mitigation Monitoring and Reporting Program requirements under CEQA so that it meets both ASIP and CEQA monitoring requirements.

6.1.2 Mitigation and Monitoring Plan

6.1.2.1 Responsible Party

CCWD is the responsible party for implementing the Mitigation and Monitoring Plan and all of the conservation measures proposed in Chapter 5, "Description of Conservation Measures," of this ASIP.

6.1.2.2 Elements of the Proposed Action and Conservation Measures

Elements of the Proposed Action are presented in detail in Chapter 3 of the EIR/EIS. Conservation measures are presented in detail in Chapter 5 of this ASIP. To minimize redundancy, neither is presented in this chapter.

6.1.2.3 Monitoring Objectives, Methods, Schedule, and Duration

Monitoring objectives, methods, schedule, and duration are presented individually for each conservation measure, to the extent feasible, in Chapter 5 of this ASIP. In general, the objective of monitoring is to ensure that conservation measures are being implemented, as stated in Chapter 5, and are effective in minimizing the impacts they were designed to minimize. Monitoring methods, schedule, and duration vary between conservation measures and are presented in Chapter 5. For the most part, the duration of monitoring is throughout the construction period. The only long-term monitoring of the Proposed Action is the fish screen monitoring described in Chapter 5 and summarized below.

6.1.2.4 Performance Standards

Explicit performance standards generally were not developed for the Proposed Action, with the exception of the fish screen. The desired performance standard is to minimize impacts so that no take of listed species would occur and no special-status species or their habitats would be adversely affected. The performance standards for the fish screen would be long-term reliable operation of the fish screen, and conformance with intake screen design criteria.

6.1.2.5 Reporting Frequency

CCWD will report to NMFS, USFWS, and DFG as stated in Chapter 5 of this ASIP for individual conservation measures. This reporting will be folded into annual reporting by April 1 of each year and covering the previous calendar year.

6.1.2.6 Fish Screen Efficiency and Effectiveness

Prior to removal of the cofferdam and flooding the intake structure, NMFS, USFWS, and DFG staff will have an opportunity to visually inspect the intake structure and fish screens to ensure proper alignment and fit. In the event that screen panels or other intake components require modification, CCWD will be responsible for structural modifications or adjustments to the intake structure prior to removing the cofferdam.

To ensure that the fish screen operates as intended and the risk of incidental take associated with diversions at this facility are in conformance with ESA and CESA, long-term monitoring of operation and maintenance of the positive barrier screen would be conducted. Monitoring would include approach velocity measurements immediately after initiation of the positive barrier screen operations, with fine-tuning of velocity control baffles as necessary, to achieve uniformity of velocities in conformance with the screen criteria (<0.2 ft/sec) established by DFG and NMFS, and mandated by USFWS in a number of biological opinions. Long-term velocity tests have been scheduled at 5-year intervals for the Old River Fish Screen Facility, and a similar schedule to test for effectiveness would be implemented for ensuring proper functionality of the Proposed Action's positive barrier fish screen.

CCWD would also monitor the condition of the positive barrier screen on an annual basis for as long as diversions are occurring at Victoria Canal. CCWD shall conduct periodic visual inspections at least monthly during periods of the year when the intake is in operation to remove accumulated debris and repair screen panels as necessary. NMFS, USFWS, and DFG would have access to the positive barrier screen for underwater inspections following completion of intake screen construction. The standards for success would be long-term reliable operation of the fish screen and conformance with intake screen design criteria.

Fish screen efficiency and effectiveness tests at the new Victoria Canal intake would be conducted similarly to those at the Old River Fish Screen Facility, including notification of the agencies that the screen meets the required approach velocity following construction and once operations commence. NMFS, USFWS, and DFG may periodically and without advance notice make visits to the new intake site and/or send divers to ensure that the screen is fully functional and operating under the required criteria.

6.1.2.7 Fish Entrainment Monitoring

CCWD will incorporate entrainment monitoring for fish eggs, larvae, and juveniles at the new Victoria Canal intake consistent with the on-going fishery monitoring being conducted at the Old River Fish Facility. Informal consultation with NMFS, USFWS, and DFG has indicated that a monitoring program as frequent and long-term as that at the Old River Fish Screen Facility is likely not necessary due to the similarities in screen design and the proven effectiveness of the Old River screen. Consequently, entrainment monitoring will be conducted at the Victoria Canal intake for the first year of operation. Following one year of entrainment monitoring, CCWD will issue a performance report within 60 days to NMFS, USFWS, and DFG as a cumulative record of monitoring and communications with the regulatory agencies. Using the 1-year monitoring results, CCWD will recommend continuation, modification, or discontinuation of the biological monitoring program for approval by NMFS, USFWS, and DFG, and then an assessment will be made whether further sampling is necessary, or should be integrated with Old River intake sampling.

CCWD would have no biological monitoring obligation for evaluating performance of mitigation credits purchased in the Kimball Island Mitigation Bank or any other mitigation bank. Management and monitoring at the mitigation bank is the responsibility of the owners of the mitigation bank.

6.1.2.8 Construction-related Monitoring

Construction-related impacts associated with the Proposed Action could affect both aquatic and terrestrial resources. Consequently, CCWD has incorporated monitoring of both aquatic and terrestrial habitats during construction activities. Monitoring throughout the construction period, with notification of appropriate agencies as needed, will occur. Monitoring is specific to each conservation measure, presented in detail in Chapter 5 and summarized below.

CCWD will conduct monitoring of the aquatic environment during construction as follows:

- monitor periods of construction activity and coordinate with the contractor to identify periods when localized increases in turbidity may occur;

- monitor suspended sediment and turbidity levels to meet water quality criteria established by RWQCB;
- monitor project construction-related dredging activities, regularly report effects on EFH, and re-evaluate activities based on monitoring results;
- monitor turbidity levels at the discharge site and 300 feet downstream in the event that project construction activities create a visible plume in surface waters;
- as part of the erosion control plan, a project field manager would be responsible for monitoring in accordance with established protocols/procedures;
- monitor cofferdam installation, dewatering, and implementation of the fish rescue plan;
- conduct periodic inspections during construction; and
- allow access to USFWS, NMFS, and DFG to inspect construction activities to ensure compliance.

CCWD will conduct monitoring of the terrestrial environment during construction as follows:

- retain a qualified biologist to conduct preconstruction surveys for burrowing owl, raptors, tricolored blackbird, giant garter snake, and western pond turtle prior to any ground-disturbing project-related construction activities;
- develop and implement a wetland mitigation plan, if needed, that would include annual success criteria, mitigation sites, and monitoring and maintenance requirements; and
- develop and implement a mitigation plan, if needed, to compensate for the loss of Mason's lilaeopsis and rose-mallow and include success criteria, monitoring and reporting protocols, and contingency measures that would be implemented should the initial mitigation fail. If mitigation is required, CCWD shall maintain and monitor the mitigation area for 3 years following the completion of construction and restoration activities. Monitoring reports documenting the restoration effort should be submitted to DFG and/or USFWS upon completion of the restoration implementation and 1 year after the restoration implementation. Monitoring reports should include photo-documentation, when restoration was completed, a description of materials that were used, specified plantings, and justifications of any substitutions to the mitigation plan.

6.2 Adaptive Management Plan

6.2.1 Introduction

Adaptive management is a requirement under the NCCPA and therefore is required for ASIPs. An adaptive management plan should describe:

- how the ASIP will provide for a flexible, iterative approach to long-term management of natural communities, habitat types, and species within the project area;
- conservation measures subject to adaptive management;
- an estimate of the range of possible changes in ASIP implementation that could be associated with project or conservation measures;
- any research that would be undertaken to inform the adaptive management process; and
- the decision making and approval process for making changes to the project or conservation measures.

CCWD initially presented the potential impacts and associated conservation measures to the fishery agencies for discussion prior to developing this adaptive management plan. The conservation measures agreed to by CCWD and the appropriate fishery agencies form the basis for developing the adaptive management plan.

6.2.2 Adaptive Management Plan

CCWD will adaptively respond to ongoing environmental issues associated with Delta conditions that are associated with or substantially affected by construction and operation of the Proposed Action. In addition, results of performance monitoring as part of routine intake operations will also provide information that will be used by CCWD to consider feasible adjustments to project facilities' operations and/or maintenance.

The planning, implementation, monitoring, and adaptive management attributes of the various conservation measures cannot be completely known at this time. Changed circumstances resulting from unforeseen changes to species populations, their habitats, project facilities and operations, or conservation measures could occur. CCWD will construct, operate, and maintain the Proposed Action as specified in the EIR/EIS and in compliance with all environmental regulations and permits that it obtains. Should changed circumstances arise, however, CCWD would take all reasonable and cost-effective actions and consultations with CALFED, regulatory agencies, and other entities to ensure that the project purpose and need/objectives, and the intent of environmental commitments that CCWD agrees to implement, are fully implemented and maintained.

The substantial physical and biological monitoring associated with the Proposed Action provides for adaptive management and the flexible, iterative approach to long-term management of natural communities, habitat types, and species within the project area that an ASIP requires. Additionally, conservation measures are specific to ensure potential environmental impacts are avoided or minimized, but these measures are subject to adaptive management. Changes in ASIP implementation are expected to be minor because the construction-related and fish screen impacts are reasonably straightforward.

No research is explicitly proposed in this ASIP. The biological monitoring, however, will provide additional information on the distribution and abundance of special-status species in the south Delta.

Changes to conservation measures or agency requests for project modification would need to be agreed to between CCWD and the appropriate Federal or State agencies (NMFS, USFWS, and DFG for biological resources) with authority over the requested change.

6.2.2.1 Example of Adaptive Management - Screen Baffle and Operational Adjustments

It is difficult to predict specific adaptive management changes that could occur. As an example, however, the approach to adaptive management of operational adjustments to the new fish screen is presented herein. Should the approach velocity measurements at the proposed intake demonstrate that the performance criteria are not being met, CCWD would adopt an action such as adjusting and/or installing baffles as needed. Baffle adjustment and continued approach velocity measurement would be made iteratively until the approach velocities meet the 0.2-ft/sec criteria. Should the screen fail to meet the established performance criteria, CCWD would adaptively take appropriate action. For example, CCWD would maintain one or more spare screen panels that can be used to immediately replace a damaged panel. CCWD would immediately curtail diversion operations at the Victoria Canal intake in the event that damage to the intake or screen panel increases the risk of entrainment until the integrity of the intake has been reestablished.

The addition of a point of diversion in Victoria Canal offers CCWD flexibility to adaptively manage diversions in response to geographical variation in salinity or other factors. Operation of the Proposed Action will be routinely examined in conjunction with operations of the other CCWD intakes. Assessment and examination of the Proposed Action's operations will be ongoing and could provide opportunities to minimize fisheries entrainment and impingement. Should other environmental concerns arise in conjunction with the Proposed Action, CCWD will work in conjunction with the regulatory agencies to respond adaptively to potential conflicts.

7 Other Alternatives Considered

This chapter briefly lists the other alternatives considered in detail in the EIR/EIS but focuses on Alternative 3, Modified Operations Alternative, because of the interest shown by resource agencies for this alternative, especially NMFS. For all other alternatives, detailed information is presented in the appropriate sections of the Alternative Intake Project EIR/EIS as follows:

- Appendix B, "Alternatives Screening for the Alternative Intake Project;"
- Chapter 3, "Alternatives, Including the Proposed Action;" and
- Chapter 4, "Affected Environment and Environmental Consequences."

7.1 Alternatives Evaluated in Detail in the EIR/EIS

The following five alternatives are evaluated in detail in the Alternative Intake Project EIR/EIS and described in EIR/EIS Chapter 3, "Alternatives, Including the Proposed Action":

- No-Action Alternative,
- Alternative 1: Alternative Intake with Direct Pipeline Route (Proposed Action),
- Alternative 2: Alternative Intake with Indirect Pipeline Route (Indirect Pipeline Alternative),
- Alternative 3: Alternative Intake with Modified Operations (Modified Operations Alternative), and
- Alternative 4: Desalination Alternative.

7.2 Alternative 3, Modified Operations Alternative

Alternative 3 was developed based on scoping comments by NMFS to examine an alternative that would enable more pumping to be relocated from the currently unscreened Rock Slough intake to screened diversions at the Old River intake and/or the proposed Victoria Canal intake. Alternative 3 would have the same physical features of the Proposed Action but would involve modifying CCWD permitted operations to enable CCWD to shift additional pumping from Rock Slough to the screened intake at Victoria Canal. Delta fisheries, including threatened and endangered species, would benefit because fish mortality is reduced with screened diversions compared to unscreened diversions. Operations under Alternative 3 would differ from the Proposed Action as follows: CCWD would immediately apply to change its permits to allow diversion of up to 320 cubic feet per second (cfs) through the Old River conveyance system rather than in the future, as planned. Combined diversions from the 250 cfs Old River pump station and the proposed 250 cfs alternative intake would be limited to 320 cfs by the capacity of the pipeline connecting the Old River pump station to CCWD's transfer station that routes water either to the Los Vaqueros Reservoir or the Contra Costa Canal. CCWD would not increase the average total annual quantity diverted from the Delta. This change would enable CCWD to relocate up to half of the current Rock Slough diversions to the screened Old River conveyance system in the near-term. Rock Slough would continue to provide a portion of CCWD supply, but would be used less frequently in the near-term than under the Proposed Action. Mallard Slough operations would be similar under both alternatives.

7.2.1 Fishery and Aquatic Resources

Construction-related impacts under Alternative 3 would be identical to construction-related impacts under the Proposed Action (see Section 4.1.2, "Impact Analysis Results"). Compensation measures would be identical as well.

Compared to operations under the Proposed Action, operations under Alternative 3 would divert up to an additional 70 cfs from the screened Victoria Canal and Old River intakes, with 70 cfs less diverted from the unscreened Rock Slough. Monthly hydrologic modeling with Alternative 3 operations show no significant changes in any of the key hydrologic indicators of Delta aquatic habitat conditions (see EIR/EIS Section 4.2, "Delta Water Resources"). The change in the diversion point from Rock Slough to Old River/Victoria Canal for the additional 70 cfs is insufficient to cause significant impacts to Delta hydrology, hydraulics, or habitats. However, estimated net entrainment/impingement losses would be reduced under existing conditions compared to the Proposed Action, with a net benefit occurring (Table 7.2-1).

Table 7.2-1
Index of Estimated Net Entrainment/Impingement Losses for the Modified Operations Alternative (320 cfs diversion under existing conditions) Compared to Existing Conditions

Taxa	Rock Slough	Old River	Victoria Canal	Overall Net Change
Larval delta smelt	-730	-2,404	1,619	-1,515
Juvenile Chinook salmon	-251	-61	45	-267
Juvenile delta smelt	-93	-52	25	-120
Juvenile splittail	-1,669	-174	175	-1,668
Juvenile steelhead	-13	-202	2	-213
Juvenile striped bass	-13,541	-1,422	1,582	-13,381

Note: Negative values denote a net reduction in entrainment/impingement with the Modified Operations Alternative under existing conditions.
Source: Modeling conducted by Hanson Environmental, Inc. in 2005

Overall, the Modified Operations Alternative would have beneficial effects on entrainment and impingement under existing conditions. Under future conditions, Alternative 3 would operate the same as Alternatives 1 and 2 because capacity at Old River Pump Station is assumed to increase to 320 cfs in the future case, consistent with the CCWD Future Water Supply Implementation EIR (Contra Costa Water District 1998). Even if fisheries mitigation actions are taken by Reclamation at Rock Slough as part of CVPIA requirements, Alternative 3 would still provide a slight fisheries benefit over the Proposed Action for reasons stated in Chapter 4, "Effects of the Proposed Action on Species and Habitat," under Impact 4.3-g (Fish Losses through Entrainment and Impingement at CCWD Intakes). Consequently, Alternative 3 would result in the least environmental effects to fisheries of all the alternatives, and would provide the greatest benefits by reducing entrainment and impingement losses to the greatest degree.

7.2.2 Terrestrial Biological Resources

The impacts of Alternative 3 on terrestrial biological resources would be identical to those described for the Proposed Action. Implementation of the compensation measures described for the Proposed Action would reduce these effects to a less-than-significant level with no adverse effects or incidental take expected. Alternative 3 would not contribute considerably to any cumulative impact related to biological resources.

8 Determination of Effects on Protected Species

Information on the Proposed Action, in combination with information on the geographic distribution, seasonal periods of occurrence, and ecology for various special-status species within the Action Area were used to assess the potential for adverse effects on these species and their habitat. CCWD has minimized the project's potential environmental effects by:

- selecting an alternative that minimizes conveyance pipeline length and width (i.e., substrate disturbance);
- siting project facilities generally on already disturbed lands;
- minimizing facility sizing to the minimum necessary to divert, pump, and convey 250 cfs and removing the concrete apron from the intake design;
- conducting any periodic maintenance dredging in front of the intake only when necessary;
- using existing topographic features such as roads to the extent feasible; and
- implementing conservation measures to minimize disturbance.

Additionally, CCWD has minimized disturbance to freshwater marsh by:

- selecting an alternative from a wide array of alternatives, some with greater impacts to freshwater marsh, that minimizes impacts to freshwater marsh;
- siting project facilities on already rip-rapped levee banks;
- minimizing intake sizing to the minimum necessary to divert 250 cfs and removing the concrete apron from the intake design;
- conducting any periodic maintenance dredging in front of the intake only when necessary;
- avoiding the site-specific tule areas within Victoria Canal to the extent possible such that impacts to existing tule beds would be minimized;
- burying the pipeline to the greatest extent possible, including under Old River; and
- implementing full compensation as recommended by USFWS, NMFS, and DFG for any freshwater marsh habitat that cannot be avoided.

Information considered in the assessment also included conservation measures that have been developed to avoid or minimize the potential for adverse effects on special-status species. Results of these analyses and the determination of affects regarding each of the special-status species considered in this ASIP are briefly summarized below.

The Alternative Intake Project ASIP has been submitted to USFWS, NMFS, and DFG to initiate informal consultation. USFWS and NMFS will review the ASIP for compliance with the ESA, under Section 7. NMFS will also review the ASIP for compliance with the Magnuson-Stevens Fishery Conservation Act (MSFCMA). If the impacts of the project can be avoided or minimized such that special-status species would not be adversely affected, it would not be necessary to initiate formal consultation. If Reclamation makes a finding during informal consultation that the Proposed Action “may affect, but is not likely to adversely affect” listed species or critical habitat, Reclamation would request written concurrence from NMFS and USFWS for this finding. If a finding of “not likely to adversely affect” cannot be made by Reclamation, or NMFS or USFWS is unable to concur with Reclamation’s finding, then formal consultation is required and NMFS and USFWS would prepare biological opinions on the species or their habitats that the Proposed Action is likely to adversely affect (incidental take), based on this ASIP. As part of these biological opinions, USFWS and NMFS may authorize incidental take of endangered and threatened species.

DFG will determine whether the ASIP complies with the NCCPA and CESA. If the ASIP is in compliance with the NCCPA, DFG will prepare an NCCPA approval and issue supporting findings. As part of these findings, DFG may authorize take of covered species, including endangered and threatened species, whose conservation and management are provided for in an approved NCCP.

NMFS, USFWS, and DFG have reviewed this ASIP and the relevant portions of the Alternative Intake Project EIR/EIS and provided extensive input. Based on the analyses conducted in the EIR/EIS and the ASIP, input received by the agencies, use of the best scientific and commercial information currently available, project construction and operation as described in the Alternative Intake Project ASIP and EIR/EIS, and implementation of the conservation measures specified in this ASIP, it is expected that the resource agencies will make findings that the Proposed Action may affect, but is not likely to adversely affect, any of the special-status species in the Action Area. Reclamation will request written concurrence from NMFS and USFWS for this finding.

There is no incidental take expected in association with the Proposed Action with the exception of potential entrainment and impingement of winter-run, spring-run, fall-run/late-fall-run Chinook salmon fry; steelhead fry; and delta smelt eggs, larvae, and juveniles at the new Victoria Canal intake. This incidental take, however, is more than compensated for by the expected greater reduction in incidental take at both the Rock Slough and Old River intakes. The net effect of the Proposed Action is a net reduction in losses of special-status fish species at CCWD diversions. The Proposed Action contributes to meeting MSCS goals for these fish species by reducing net entrainment and impingement losses at CCWD intakes.

9 List of Preparers

This ASIP was prepared under the direction of CCWD and Reclamation. A list of persons who prepared various sections of the ASIP is presented below.

Contra Costa Water District

Samantha Salvia	Project Manager and Principal Engineer
Rachel Martin	Associate Engineer

EDAW

Phil Dunn	Senior Fisheries Biologist
Linda Leeman	Wildlife Biologist
John Hunter, Ph.D.	Riparian Ecologist
Ellen Dean	Botanist

Hanson Environmental

Charles Hanson, Ph.D.	Senior Fisheries Biologist
Kristie Karkanen	Modeling Assistant

The following agency representatives were also involved in reviewing and providing comments on various portions of the ASIP:

Bureau of Reclamation

Erika Kegel, Bob Eckart, and Erwin Van Nieuwenhuyse

National Marine Fisheries Service

Bruce Oppenheim and Michael Aceituno

U.S. Fish and Wildlife Service

A. Leigh Bartoo and Kim Squires

California Department of Fish and Game

Anna Holmes and James Starr

10 References

10.1 General

CALFED. 2000a (July). *Final EIS/EIR for the CALFED Bay-Delta Program*. Prepared by Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Natural Resources Conservation Service, U.S. Army Corps of Engineers, and California Resources Agency. Sacramento, CA.

CALFED. 2000b. *Multi-Species Conservation Strategy; Final Programmatic EIS/EIR Technical Appendix*. Available <http://calfed.ca.gov/Programs/EcosystemRestoration/EcosystemMultiSpeciesConservationStrategy.html>.

California Department of Fish and Game. 2000 (August 28). DFG's Natural Community Conservation Planning Act (NCPPA) Approval of the CALFED Bay-Delta Program Multi-Species Conservation Strategy (MSCS).

California Department of Fish and Game and Contra Costa Water District. 1994. Memorandum of Understanding for the Los Vaqueros Project.

Contra Costa Water District. 1998 (September). *Future Water Supply Implementation Draft Environmental Impact Report*. State Clearinghouse #97072064. Concord, CA.

DFG and CCWD. *See* California Department of Fish and Game and Contra Costa Water District.

National Marine Fisheries Service. 2004. Biological Opinion on the Effects of the Proposed Long-term Operations, Criteria, and Plan (OCAP) for the Central Valley Project (CVP). Long Beach, CA.

National Marine Fisheries Service. 2000. CALFED Bay-Delta Program Programmatic Biological Opinion.

National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 1993 (March 18). Biological Opinion on Winter-run Chinook Salmon for the Los Vaqueros Project.

Natural Community Conservation Planning. 2002. Natural Community Conservation Planning Act, Section 2800-2835 of the California Department of Fish and Game Code. Available <http://www.dfg.ca.gov/nccp/Proc%20Guid/genproc2.htm http://www.dfg.ca.gov/nccp/displaycode.html>.

NCCP. *See* Natural Community Conservation Planning.

NOAA Fisheries. *See* National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

NMFS. *See* National Marine Fisheries Service.

U.S. Fish and Wildlife Service. 2005a. Biological Opinion on the Coordinated Operations of the Central Valley Project and the State Water Project and the Operational Criteria and Plan on Delta Smelt. Sacramento, CA.

U.S. Fish and Wildlife Service. 2005b. Biological Opinion on Contra Costa Water District's Future Water Supply Implementation Program for the Renewal of the Central Valley Project Long-term Water Service Contract, Contra Costa County, California. Sacramento, CA.

U.S. Fish and Wildlife Service. 2005c (March 11). Reinitiation and Amendment of Formal Consultation and Conference on Contra Costa Water District's Future Water Supply Implementation Program (Service File no. 1-1-99-F-0093) for the Renewal of the Central Valley Project Long Term Water Service Contract. Contra Costa County, CA.

U.S. Fish and Wildlife Service. 2000 (August 28). CALFED Bay-Delta Program Programmatic Biological Opinion.

U.S. Fish and Wildlife Service. 1993 (September 9). Biological Opinion on Delta Smelt for the Los Vaqueros Project.

USFWS. *See* U.S. Fish and Wildlife Service.

10.2 Fishery and Aquatic Resources

Ambler, J. W., J. E. Cloern, and A. Hutchinson. 1985. Seasonal Cycles of Zooplankton from San Francisco Bay. *Hydrobiologia* 129: 177–179.

Armor, C., R. Baxter, B. Bennett, R. Breuer, M. Chotkowski, P. Coulston, D. Denton, B. Herbold, W. Kimmerer, K. Larsen, M. Nobriga, K. Rose, T. Sommer, and M. Stacey. 2005. Draft Interagency Ecological Program Synthesis of 2005 Work to Evaluate the Pelagic Organism Decline (POD) in the Upper San Francisco Estuary. The Interagency Ecological Program for the Sacramento-San Joaquin Estuary.

Baxter, R. 1996 (Winter). *Splittail and Longfin Smelt*. Interagency Ecological Program for the Sacramento-San Joaquin Estuary *Newsletter*.

Baxter, R., W. Harrell, and L. Grimaldo. 1996. *1995 Splittail Spawning Investigations*. Interagency Ecological Program for the Sacramento-San Joaquin Estuary *Newsletter* 9(4):27–31.

Baxter, R, K. Hieb, S. DeLeon, K. Fleming, and J. Orsi. 1999 (November). *Report on the 1980–1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California.* The Interagency Ecological Program for the Sacramento-San Joaquin Estuary. Technical Report 63.

Beamesderfer, R., M. Simpson, G. Kopp, J. Inman, A. Fuller, and D. Demko. 2004. *Historical and Current Information on Green Sturgeon Occurrence in the Sacramento and San Joaquin Rivers and Tributaries.* S.P. Cramer & Associates, Inc. 44 p. Gresham, OR.

Bennett, W. A. 2005. Critical Assessment of the Delta Smelt Population in the San Francisco Bay Estuary, California. *San Francisco Estuary and Watershed Science* Vol. 3, Iss. 2 [September 2005], Art. 1 Available <http://repositories.cdlib.org/jmie/sfews/vol3/iss2/art1>

Bureau of Reclamation. 1999. *Meeting Flow Objectives for the San Joaquin River Agreement, 1999–2010, Final Environmental Impact Statement/ Environmental Impact Report*.

Burton, M. N. 1985. The Effects of Suspenoids on Fish. *Hydrobiologia* 125: 221–241.

California Department of Fish and Game. 2005a (April). California Department of Fish and Game In-channel Project Review Guidelines for Protection of Delta Smelt (*Hypomesus transpacificus*), Winter-run Chinook Salmon (*Oncorhynchus tshawytscha*), and Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento-San Joaquin Estuary.

California Department of Fish and Game. 2005b. Central Valley Bay-Delta Branch. Available <http://delta.dfg.ca.gov/>.

California Department of Fish and Game. 2003. *Habitat Conservation Planning Branch. California's Plants and Animals: Green Sturgeon*. Available <http://www.dfg.ca.gov/hcpb/species/jsp/more_info.jsp?specy=fish&idNum=75>. Accessed May 2003.

California Department of Fish and Game. 2002. California Department of Fish and Game Comments to NMFS Regarding Green Sturgeon Listing. 129 pp.

California Department of Fish and Game. 2000 (June 19). Fish Screening Criteria. Available <http://iep.water.ca.gov/cvffrt/DFGCriteria2.htm>.

California Department of Fish and Game. 1995. *Fish Species of Special Concern in California, River Lamprey*.

California Department of Fish and Game. 1992. Sturgeon in Relation to Water Development in the Sacramento-San Joaquin Estuary. Entered by the California Department of Fish and Game for the State Water Resources Control Board 1992 Water Rights Phase of the Bay-Delta Estuary Proceedings.

California Department of Fish and Game and California Department of Water Resources. 2005. DFG and DWR Fish Salvage Data. Available <ftp://ftp.delta.dfg.ca.gov/salvage/>.

California Department of Water Resources and U.S. Bureau of Reclamation. 2000. *Biological Assessment. Effects of the Central Valley Project and State Water Project on Steelhead and Spring-run Chinook Salmon.*

California Department of Water Resources and U.S. Bureau of Reclamation. 1994. *Effects of the Central Valley Project and State Water Project on Delta Smelt*. Draft Biological Assessment Prepared for the U.S. Fish and Wildlife Service.

Carlton J. T. 1979. Introduced invertebrates of San Francisco Bay. pp. 427–444 In *San Francisco Bay - The Urbanized Estuary*. T. J. Conomos (ed). Am. Assoc. Adv. Sci., Pacific Division, San Francisco, CA.

Carlton J. T., J. Thompson, L. E. Schemel, and F. H. Nichols. 1990. Remarkable Invasion of San Francisco Bay (California, USA) by the Asian Clam *Potamocorbula amurensis* I. Introduction and dispersal. *Marine Ecol. Prog.* Series 66: 81–94.

Clark, D. G. and D. H. Wilber. 2000. Assessment of Potential Impacts of Dredging Operations Due to Sediment Resuspension. DOER. Technical Note E9. 14 pp.

Cohen, A. N. 2000. Invasions Status and Policy on the U.S. West Coast. Pages 40–45 *In*: *Proceedings of the First National Conference on Marine Bioinvasions*, Jan. 24–27, 1999, Cambridge, MA.

Dege, M. and L. R. Brown. 2004. Effect of Outflow on Spring and Summertime Distribution and Abundance of Larval and Juvenile Fishes in the Upper San Francisco Estuary, pp. 49–65) In: Feyrer, F., L. R. Brown, R. L. Brown, and J. J. Orsi, (eds.). *Early Life History of Fishes in the San Francisco Estuary and Watershed.* American Fisheries Society, Symposium 39, Bethesda, MD.

DFG. *See* California Department of Fish and Game.

DWR. *See* California Department of Water Resources.

Fisher, F. W. 1994. Past and Present Status of Central Valley Chinook Salmon. *Conservation Biology* 8: 870–873.

Gregory, R. S. and C. D. Levings. 1996. The Effects of Turbidity and Vegetation on the Risk of Juvenile Salmonids, *Oncorhynchus* spp., to Predation by Adult Cutthroat Trout, *O. clarkia. Environmental Biology of Fishes*. 47: 279–288.

Hanson, C. H., J. Coil, B. Keller, J. Johnson, J. Taplin, and J. Monroe. 2004. *Assessment and Evaluation of the Effects of Sand Mining on Aquatic Habitat and Fishery Populations of Central San Francisco Bay and the Sacramento-San Joaquin Estuary*.

Herbold, B., A. D. Jassby, and P. B. Moyle. 1992 (March). *San Francisco Estuary Project: Status and Trends Report on Aquatic Resources in the San Francisco Estuary*.

Hill, K. A. and J. D. Weber. 1999. Butte Creek Spring run Chinook salmon, *Oncorhynchus tshawytscha,* Juvenile Out Migration and Life History, 1995–1998. California Department of Fish and Game, Inland Fisheries Administrative Report No. 99-5.

Honey, K., R. Baxter, Z. Hymanson, T. Sommer, M. Gingras, and P. Cadrett. 2004. *IEP Long-Term Fish Monitoring Program Review Element*.

Interagency Ecological Program. 2006. Project Work Teams, Monitoring, and Collaborative Studies. Available <http://iep.water.ca.gov/pwt.html>.

Interagency Ecological Program. 1995. *Mallard Slough Monitoring Program*. Prepared by J. Morinaka. Newsletter 8.

Johnston Jr., S. A. 1981. Estuarine Dredge and Fill Activities: A Review of Impacts. *Environ. Man.* 5(5): 427–440.

Kimmerer, W. 2002a. Physical, Biological, and Management Responses to Variable Freshwater Flow into the San Francisco Estuary. *Estuaries* 25(6B): 1275–1290.

Kimmerer, W. 2002b. Effects of Freshwater Flow on Abundance of Estuarine Organisms: Physical Effects or Trophic Linkages. *Marine Ecology Progress Series* 243: 39–55.

Kimmerer, W. J. 1998. Zooplankton of San Francisco Bay: Report of a Pilot Monitoring Program. *Interagency Ecological Program Newsletter* 11(2): 19–23.

Kimmerer, W. J. and J. J. Orsi. 1996. Changes in the Zooplankton of the San Francisco Bay Estuary since the Introduction of the Clam *Potamocorbula amurensis*. Pages 403–425 in J.T. Hollibaugh (ed.) *San Francisco Bay: The Ecosystem.* Seventy-fifth annual meeting, Pacific Division, Amer. Assoc. Adv. Sci., San Francisco, CA.

Kimmerer W., C. Peñalva, S. Bollens, S. Avent, and J. Cordell. 1999. Zooplankton in the Lower San Francisco Estuary. IEP Newsletter 12(2):16-21. Available <http://www.iep.water.ca.gov/report/newsletter>.

Kolhorst, D. Unpublished data. Department of Fish and Game Sturgeon Study.

Krone, R. B. 1979. Sedimentation in the San Francisco Bay system. Pages 85–96 in T. J. Conomos (ed.) *San Francisco Bay – The Urbanized Estuary.* Am. Assoc. Adv. Sci., Pacific Division, San Francisco, CA.

Lehman, P. 1998. *Phytoplankton Species Composition, Size Structure, and Biomass and Their Possible Effect on Copepod Food Availability in the Low Salinity Zone of the San Francisco Bay-Delta Estuary*. Interagency Ecological Program for the San Francisco Bay-Delta Estuary Technical Report 62.

Lucas, L. V., J. E. Cloern, *et al*. 2002. Functional variability of habitats within the Sacramento-San Joaquin Delta: Restoration implications. *Ecological Applications* 12(5): 1,528–1,547.

Mager, R. C., S. I. Doroshov, J. P. Van Eenennaam, and R. L. Brown. 2004. Early Life Stages of Delta Smelt. Pages 169–180 in F. Feyrer, L. R. Brown, R. L. Brown, and J. J. Orsi (eds.). *Early Life History of Fishes in the San Francisco Estuary and Watershed.* American Fisheries Society, Symposium 39, Bethesda, MD.

Meng, L., and .P. B. Moyle. 1995. Status of Splittail in the Sacramento-San Joaquin Estuary. *Transactions of the American Fisheries Society* 124:538–549.

Morinaka, J. 2003. *Old River Fish Screen Facility Biological Monitoring. 1999 Summary Report.* Prepared for the Contra Costa Water District and the U.S. Bureau of Reclamation.

Morinaka, J. 2000. *Old River Fish Screen Facility Biological Monitoring. 1999 Summary Report*. Prepared for the Contra Costa Water District and the U.S. Bureau of Reclamation.

Morinaka, J. 1998. *Contra Costa Canal Fish Entrainment Sampling*. Draft Three-Year Summary Report. Prepared for the California Department of Fish and Game.

Moyle, P. B. 2002. *Inland Fishes of California.* University of California Press. Berkeley, Los Angeles, CA; London, UK.

National Marine Fisheries Service. 2005. Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for Southern Distinct Population Segment of North American Green Sturgeon. 50 CFR Part 223 [Docket No. 050323081–5081–01; I.D. 031505C]. Federal Register 70 (65). April 6, 2005. Proposed Rules.

National Marine Fisheries Service. 2004 (June 14). Endangered and Threatened Species: Proposed Listing Determinations for 27 ESUs of West Coast Salmonids; Proposed Rule. Federal Register 50(113): 33102–33179.

National Marine Fisheries Service, Southwest Fisheries Science Center, Northwest Fisheries Science Center. 2003. Endangered and Threatened Wildlife and Plants; 12-month Finding on a Petition to List North American Green Sturgeon as a Threatened or Endangered Species. Federal Register 68(19): 4433.

National Marine Fisheries Service. 2002. *A Status Review for North American Green Sturgeon* (Acipenser medirostris).

National Marine Fisheries Service. 1997. Fish Screening Criteria for Anadromous Salmonids. National Marine Fisheries Service, Southwest Region, Santa Rosa, CA. January 1997. Available <http://swr.nmfs.noaa.gov/hcd/fishscrn.htm>.

Newcombe, C. P. and D. D. MacDonald. 1991. Effects of Suspended Sediments on Aquatic Ecosystems. *N. Amer. J. Fish. Man.* 11: 72–81.

Newcombe, C. P. and J. O. T. Jensen. 1996. Channel Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact. *N. Amer. J. Fish. Man.* 16:693–727.

Newcombe, C. P. and T. A. Flagg. 1983. Some Effects of Mt. Saint Helens Ash on Juvenile Salmon Smolts. *Fisheries Review* 45(2): 8–12.

Newell, R. C., L. J. Seiderer and D. R. Hitchcock. 1998. The Impact of Dredging Works in Coastal Waters: A Review of the Sensitivity to Disturbance and Subsequent Recovery of Biological Resources on the Sea Bed. *Oceanog. and Mar. Biol:* Annual Review 36: 127–178.

Nichols, F. H. and M. M. Pamatmat. 1988. The Ecology of the Soft-Bottom Benthos of San Francisco Bay: A Community Profile. Prepared for the U.S. Department of the Interior, Fish and Wildlife Service. Biological Report 85 (7.23). 73 pp.

NMFS. *See* National Marine Fisheries Service.

O'Connor, J. M., D. A. Neumann, and J. A. Sherk. 1976. Lethal Effects of Suspended Sediment on Estuarine Fish. U.S. Army Engineer Coastal Engineering Research Center, Technical Paper 76-20, Fort Belvoir, VA.

Office of Habitat Conservation. 1999. *Essential Fish Habitat Consultation Guidance.* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Habitat Conservation, Silver Spring, MD.

Peddicord, R. K., V. A. McFarland, D. P. Belfiori, and T. E. Byrd. 1976. *Effects of Suspended Solids on San Francisco Bay Organisms*. Report to U.S. Army Engineer District, San Francisco, Dredge Disposal Study.

Peddicord, R. K. and V. McFarland. 1978. *Effects of Suspended Dredged Material on Aquatic Animals*. Prepared for U.S. Army Corps of Engineers Dredged Material Research Program. Tech. Rept. No. 78-20.

Phillips, R. W. 1970. Effects of Sediment on the Gravel Environment and Fish Production. pp 64–74 In *Proceedings of the Symposium on Forest Land and Stream Environment*. Oregon State University.

Rubin, D. M. and D. S. McCulloch. 1979. The Movement and Equilibrium of Bedforms in Central San Francisco Bay. pp 97–113 In T. J. Conomos (ed), *San Francisco Bay – The Urbanized Estuary*. Pacific Division Amer. Assoc. Advance. Sci. San Francisco, CA.

Servizi, J. A. and D. Martens. 1991. Effect of Temperature, Season, and Fish Size on Acute Lethality of Suspended Sediments to Coho Salmon (*Oncorhynchus kisutch*). *Can. J. Fish. Aquatic Sci*. 48: 493–497.

Sherk, J. A. 1971. The effects of suspended and deposited sediments on estuarine organisms. Literature summary and research needs. *Chesapeake Biological Laboratory Contribution* No. 443. February 1971.

Sherk, J. A., J. M. O'Connor, and D. A. Neumann. 1975. Effects of Suspended and Deposited Sediments on Estuarine Environments. Pp 541–548. In*:* L. E. Cronin, (ed). *Estuarine Research 2*. Academic Press, NY.

Sherk, J. A., J. M. O'Connor, D. A. Neumann, R. D. Prince, and K. V. Wood. 1974. The Effects of Suspended and Deposited Sediments on Estuarine Organisms. Phase II. University of Maryland Natural Resources Institute. Reference 74-20, Solomons.

Sigler, J. W., T. C. Bjornn, and F. H. Everest. 1984. Effects of Chronic Turbidity on Density and Growth of Steelhead and Coho Salmon. *Trans. Amer. Fish. Soc*. 113: 142–150.

Sommer, T., R. Baxter, and B. Herbold. 1997. Resiliance of Splittail in the Sacramento-San Joaquin Estuary. *Trans. Amer. Fish. Soc*: 961–976.

State Water Resources Control Board. 1999. *Final Environmental Impact Report for Implementation of the 1995 Bay/Delta Water Quality Control Plan*.

State Water Resources Control Board. 1999, revised 2000. Water Right Decision 1641. In the Matter of Implementation of Water Quality Objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; A Petition to Change Points of Diversion of the Central Valley project and the State water Project in the Southern Delta; and A Petition to Change Places of Use and Purposes of Use of the Central Valley Project. December 29, 1999, revised March 15, 2000.

Stern, E. M. and W. B. Stickle. 1978. Effects of Turbidity and Suspended Material in Aquatic Environments. Dredged Material Research Program. Tech. Rept. No. D-78-21:1–117.

SWRCB. *See* State Water Resources Control Board.

Tenera, Inc. 2005 (September). *Contra Costa Canal Improvement Project Biological Resources Report*.

Thompson, B. and H. Peterson. 1998. Benthic Macrofaunal Assemblages of San Francisco Bay and Delta. *IEP Newsletter*, Spring 1998. 11(2): 26–32.

Thompson, B., S. Lowe, and M. Kellogg. 2000. Results of the benthic pilot study, 1994–1997, Part 1 - Macrobenthic assemblages of the San Francisco Bay-Delta and their responses to abiotic factors. San Francisco Estuary Institute, San Francisco, CA.

URS Corporation and CH2M Hill. 2001 (December). Evaluation of Delta Wetlands Proposed Fish Screens, Siphons and Pumping Stations Prepared for Department of Water Resources' Consulting Panel on December 12, 2001 Task Order Number IDS 001-1747-001 (Agreement Number 46000001747).

U.S. Fish and Wildlife Service. 2005d. Bay Delta and Tributaries Project. Available <http://bdat.ca.gov/>.

U.S. Fish and Wildlife Service. 2003. Notice of Remanded Determination of Status for the Sacramento Splittail (*Pogonichthys macrolepidotus*); Final Rule. 50 CFR Part 17. September 22.

U.S. Fish and Wildlife Service. 2002. Threatened and endangered fish, delta smelt. Endangered Species Division, Sacramento Fish and Wildlife Service Office, Sacramento, CA. Available <http://sacramento.fws.gov/es/animal_spp_acct/delta_smelt.htm>.

U.S. Fish and Wildlife Service. 1996. *Sacramento-San Joaquin Delta Native Fishes Recovery Plan*. Portland, OR.

U.S. Fish and Wildlife Service. 1995. Working Paper on Restoration Needs: Habitat Restoration Actions to Double Natural Production of Anadromous Fish in the Central Valley of California. Volume 3. May 5, 1995. Prepared for USFWS under the direction of the Anadromous Fish Restoration Program Core Group. Stockton, CA.

USFWS. *See* U.S. Fish and Wildlife Service.

Veldhuizen, T. C. and L. F. Grimaldo. 2003. *Habitat Use of Juvenile Chinese Mitten Crabs in the Sacramento-San Joaquin Delta*. California Department of Water Resources.

Wang, J. C. S. 1986 (January). Fishes of the Sacramento-San Joaquin Estuary and Adjacent Waters, California: A Guide to the Early Life Histories. Interagency Ecological Study Program for the Sacramento-San Joaquin Estuary. Technical Report 9.

Whitman, R. P., T. P. Quinn, and E. L. Brannon. 1982. Influence of Suspended Volcanic Ash on Homing Behavior of Adult Chinook Salmon. *Trans. Amer. Fish. Soc*. 111: 63–69.

Wilber, D. H. and D. G. Clark. 2001. Biological Effects of Suspended Sediments: A Review of Suspended Sediment Impacts on Fish and Shellfish with Relation to Dredging Activities in Estuaries. *N. Amer. J. Fish. Man.* 21: 855–875.

Yoshiyama, R. M., F. W. Fisher, and P. B. Moyle. 1998. Historical Abundance and Decline of Chinook Salmon in the Central Valley Region of California. *N. Am. J. Fish. Manage*. 18: 487–521.

Young, P. S. and J. J. Cech. Jr. 1996. Environmental Tolerances and Requirements of Splittail. *Trans. Amer. Fish. Soc*. 125: 664–678.

10.3 Terrestrial Biological Resources

California Department of Fish and Game. 1995. *Staff Report on Burrowing Owl Mitigation*. Sacramento, California.

California Native Plant Society. 2005. On-line Inventory of Rare and Endangered Plants. Available <http://www.cal.net/~levinel/cgi-bin/cnps/sensinv.cgi>. Sacramento, CA.

California Natural Diversity Data Base. 2005. Data Base Record Search for Clifton Court Forebay, Woodward Island, Honker Bay, and Vine Hill U.S. Geological Survey 7.5-minute quadrangles. California Department of Fish and Game. Sacramento, CA.

Clark, Jr., H. O., D. A. Smith, B. L. Cypher, and P. A. Kelly. 2003. *Detection Dog Surveys for San Joaquin Kit Foxes in the Northern Range*. Prepared for: Pacific Gas & Electric Company, Technical and Ecological Services. San Ramon, CA.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. USDI, Fish and Wildlife Service, Biological Services Program. Washington, D.C.

Edison Electric Institute's Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service. 2005. Avian Protection Plan (APP) Guidelines. Available <http://www.eei.org/industry_issues/environment/land/wildlife_and_endangered_species/AvianProtectionPlanGuidelines.pdf>.

Hansen, Eric. Consulting herpetologist. Sacramento, CA. February 10, 2005 – telephone conversation with Linda Leeman of EDAW regarding giant garter snake occurrences in the Delta, including Veale Tract and Rock Slough, and Eric Hansen's recent survey and trapping efforts in the Delta.

Jones and Stokes. 2005 (June). *Draft East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan*. San Jose, CA.

Technical Advisory Committee. 2000 (May 31). *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley*.

U. S. Fish and Wildlife Service. 1999. *Draft Recovery Plan for the Giant Garter Snake (*Thamnopsis gigas*)*. U. S. Fish and Wildlife Service, Portland, OR.

USFWS. *See* U.S. Fish and Wildlife Service.

Attachment A

U.S. Fish and Wildlife Service (USFWS)
List of Special-Status Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

April 29, 2005

Document Number: 050429124732

Linda Leeman
EDAW, Inc.
2022 J Street
Sacramento, CA 95814

Subject: Species List for CCWD Alternative Intake Project

Dear: Ms. Leeman

We are sending this official species list in response to your April 29, 2005 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested. You have stated that this list is not for consultation with the Fish & Wildlife Service.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area.* For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be July 28, 2005.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found at sacramento.fws.gov/es/branches.htm.

Endangered Species Division

TAKE PRIDE IN AMERICA

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 050429125248

Database Last Updated: April 21, 2005

Quad Lists

WOODWARD ISLAND (463A)

Listed Species

Invertebrates

Branchinecta longiantenna - longhorn fairy shrimp (E)
Branchinecta lynchi - vernal pool fairy shrimp (T)
Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)
Lepidurus packardi - vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus - Critical habitat, delta smelt (X)
Hypomesus transpacificus - delta smelt (T)
Oncorhynchus mykiss - Central Valley steelhead (T)

Amphibians

Ambystoma californiense - California tiger salamander (T)
Rana aurora draytonii - California red-legged frog (T)

Reptiles

Thamnophis gigas - giant garter snake (T)

Birds

Haliaeetus leucocephalus - bald eagle (T)

Mammals

Vulpes macrotis mutica - San Joaquin kit fox (E)

Candidate Species

Fish

Acipenser medirostris - green sturgeon (C)
Oncorhynchus tshawytscha - Central Valley fall/late fall-run chinook salmon (C)

Species of Concern

Invertebrates

Anthicus antiochensis - Antioch Dunes anthicid beetle (SC)
Anthicus sacramento - Sacramento anthicid beetle (SC)
Linderiella occidentalis - California linderiella fairy shrimp (SC)

Lytta molesta - molestan blister beetle (SC)

Fish

Lampetra ayresi - river lamprey (SC)
Lampetra tridentata - Pacific lamprey (SC)
Pogonichthys macrolepidotus - Sacramento splittail (SC)
Spirinchus thaleichthys - longfin smelt (SC)

Amphibians

Spea hammondii (was Scaphiopus h.) - western spadefoot toad (SC)

Reptiles

Anniella pulchra pulchra - silvery legless lizard (SC)
Clemmys marmorata marmorata - northwestern pond turtle (SC)
Clemmys marmorata pallida - southwestern pond turtle (SC)
Masticophis flagellum ruddocki - San Joaquin coachwhip (=whipsnake) (SC)
Phrynosoma coronatum frontale - California horned lizard (SC)

Birds

Agelaius tricolor - tricolored blackbird (SC)
Athene cunicularia hypugaea - western burrowing owl (SC)
Branta canadensis leucopareia - Aleutian Canada goose (D)
Buteo regalis - ferruginous hawk (SC)
Buteo Swainsoni - Swainson's hawk (CA)
Calypte costae - Costa's hummingbird (SC)
Carduelis lawrencei - Lawrence's goldfinch (SC)
Chaetura vauxi - Vaux's swift (SC)
Charadrius montanus - mountain plover (SC)
Elanus leucurus - white-tailed (=black shouldered) kite (SC)
Empidonax traillii brewsteri - little willow flycatcher (CA)
Falco peregrinus anatum - American peregrine falcon (D)
Grus canadensis tabida - greater sandhill crane (CA)
Lanius ludovicianus - loggerhead shrike (SC)
Limosa fedoa - marbled godwit (SC)
Melanerpes lewis - Lewis' woodpecker (SC)
Numenius americanus - long-billed curlew (SC)
Picoides nuttallii - Nuttall's woodpecker (SLC)
Plegadis chihi - white-faced ibis (SC)
Riparia riparia - bank swallow (CA)
Selasphorus rufus - rufous hummingbird (SC)
Selasphorus sasin - Allen's hummingbird (SC)

Mammals

Corynorhinus (=Plecotus) townsendii townsendii - Pacific western big-eared bat (SC)
Eumops perotis californicus - greater western mastiff-bat (SC)
Myotis ciliolabrum - small-footed myotis bat (SC)
Myotis volans - long-legged myotis bat (SC)
Myotis yumanensis - Yuma myotis bat (SC)
Neotoma fuscipes annectens - San Francisco dusky-footed woodrat (SC)
Perognathus inornatus - San Joaquin pocket mouse (SC)

Plants

Aster lentus - Suisun Marsh aster (SC)
Atriplex joaquiniana - San Joaquin spearscale (=saltbush) (SC)
Eryngium racemosum - delta coyote-thistle (=button-celery) (CA)
Lathyrus jepsonii var. jepsonii - delta tule-pea (SC)
Lilaeopsis masonii - Mason's lilaeopsis (SC)

CLIFTON COURT FOREBAY (463D)

Listed Species

Invertebrates

Branchinecta longiantenna - longhorn fairy shrimp (E)
Branchinecta lynchi - Critical habitat, vernal pool fairy shrimp (X)
Branchinecta lynchi - vernal pool fairy shrimp (T)
Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)
Lepidurus packardi - vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus - Critical habitat, delta smelt (X)
Hypomesus transpacificus - delta smelt (T)
Oncorhynchus mykiss - Central Valley steelhead (T)
Oncorhynchus tshawytscha - Central Valley spring-run chinook salmon (T)
Oncorhynchus tshawytscha - winter-run chinook salmon, Sacramento River (E)

Amphibians

Ambystoma californiense - California tiger salamander (T)
Rana aurora draytonii - California red-legged frog (T)

Reptiles

Masticophis lateralis euryxanthus - Alameda whipsnake (T)
Thamnophis gigas - giant garter snake (T)

Birds

Haliaeetus leucocephalus - bald eagle (T)

Mammals

Vulpes macrotis mutica - San Joaquin kit fox (E)

Plants

Lasthenia conjugens - Critical habitat, Contra Costa goldfields (X)

Proposed Species

Amphibians

Ambystoma californiense - Critical habitat, CA tiger salamander - proposed Central Valley pop. (PX)
Rana aurora draytonii - Critical habitat, California red-legged frog (Proposed) (PX)

Candidate Species

Fish

Acipenser medirostris - green sturgeon (C)
Oncorhynchus tshawytscha - Central Valley fall/late fall-run chinook salmon (C)

Species of Concern

Invertebrates

Hygrotus curvipes - curved-foot hygrotus diving beetle (SC)
Linderiella occidentalis - California linderiella fairy shrimp (SC)
Lytta molesta - molestan blister beetle (SC)

Fish

Lampetra ayresi - river lamprey (SC)
Lampetra tridentata - Pacific lamprey (SC)
Pogonichthys macrolepidotus - Sacramento splittail (SC)
Spirinchus thaleichthys - longfin smelt (SC)

Amphibians

Rana boylii - foothill yellow-legged frog (SC)

Reptiles

Anniella pulchra pulchra - silvery legless lizard (SC)
Clemmys marmorata marmorata - northwestern pond turtle (SC)
Clemmys marmorata pallida - southwestern pond turtle (SC)
Masticophis flagellum ruddocki - San Joaquin coachwhip (=whipsnake) (SC)
Phrynosoma coronatum frontale - California horned lizard (SC)

Birds

Agelaius tricolor - tricolored blackbird (SC)
Amphispiza belli belli - Bell's sage sparrow (SC)
Athene cunicularia hypugaea - western burrowing owl (SC)
Branta canadensis leucopareia - Aleutian Canada goose (D)
Buteo regalis - ferruginous hawk (SC)
Buteo Swainsoni - Swainson's hawk (CA)
Calypte costae - Costa's hummingbird (SC)
Carduelis lawrencei - Lawrence's goldfinch (SC)
Chaetura vauxi - Vaux's swift (SC)
Charadrius montanus - mountain plover (SC)
Elanus leucurus - white-tailed (=black shouldered) kite (SC)
Empidonax traillii brewsteri - little willow flycatcher (CA)
Falco peregrinus anatum - American peregrine falcon (D)
Grus canadensis tabida - greater sandhill crane (CA)
Lanius ludovicianus - loggerhead shrike (SC)
Limosa fedoa - marbled godwit (SC)
Melanerpes lewis - Lewis' woodpecker (SC)
Numenius americanus - long-billed curlew (SC)
Picoides nuttallii - Nuttall's woodpecker (SLC)
Plegadis chihi - white-faced ibis (SC)

Selasphorus rufus - rufous hummingbird (SC)
Selasphorus sasin - Allen's hummingbird (SC)
Toxostoma redivivum - California thrasher (SC)

Mammals

Corynorhinus (=Plecotus) townsendii townsendii - Pacific western big-eared bat (SC)
Eumops perotis californicus - greater western mastiff-bat (SC)
Myotis ciliolabrum - small-footed myotis bat (SC)
Myotis evotis - long-eared myotis bat (SC)
Myotis thysanodes - fringed myotis bat (SC)
Myotis volans - long-legged myotis bat (SC)
Myotis yumanensis - Yuma myotis bat (SC)
Neotoma fuscipes annectens - San Francisco dusky-footed woodrat (SC)
Perognathus inornatus - San Joaquin pocket mouse (SC)

Plants

Atriplex cordulata - heartscale (SC)
Atriplex joaquiniana - San Joaquin spearscale (=saltbush) (SC)
Delphinium recurvatum - recurved larkspur (SC)
Lilaeopsis masonii - Mason's lilaeopsis (SC)
Myosurus minimus ssp. apus - little mousetail (SC)

HONKER BAY (481C)

Listed Species

Invertebrates

Branchinecta lynchi - vernal pool fairy shrimp (T)
Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)
Elaphrus viridis - delta green ground beetle (T)

Fish

Hypomesus transpacificus - Critical habitat, delta smelt (X)
Hypomesus transpacificus - delta smelt (T)
Oncorhynchus mykiss - Central Valley steelhead (T)
Oncorhynchus tshawytscha - Central Valley spring-run chinook salmon (T)
Oncorhynchus tshawytscha - Critical habitat, winter-run chinook salmon (X)
Oncorhynchus tshawytscha - winter-run chinook salmon, Sacramento River (E)

Amphibians

Ambystoma californiense - California tiger salamander (T)
Rana aurora draytonii - California red-legged frog (T)

Reptiles

Masticophis lateralis euryxanthus - Alameda whipsnake (T)
Thamnophis gigas - giant garter snake (T)

Birds

Haliaeetus leucocephalus - bald eagle (T)

Rallus longirostris obsoletus - California clapper rail (E)
Sterna antillarum (=albifrons) browni - California least tern (E)

Mammals

Reithrodontomys raviventris - salt marsh harvest mouse (E)

Plants

Cordylanthus mollis ssp. mollis - soft bird's-beak (E)
Oenothera deltoides ssp. howellii - Antioch Dunes evening-primrose (E)

Proposed Species

Fish

Oncorhynchus tshawytscha - Critical Habitat, Central Valley spring-run chinook (PX)

Amphibians

Ambystoma californiense - Critical habitat, CA tiger salamander - proposed Central Valley pop. (PX)

Candidate Species

Fish

Acipenser medirostris - green sturgeon (C)
Oncorhynchus tshawytscha - Central Valley fall/late fall-run chinook salmon (C)
Oncorhynchus tshawytscha - Critical habitat, Central Valley fall/late fall-run chinook (C)

Species of Concern

Invertebrates

Anthicus antiochensis - Antioch Dunes anthicid beetle (SC)
Anthicus sacramento - Sacramento anthicid beetle (SC)
Branchinecta mesovallensis - Midvalley fairy shrimp (SC)
Coelus gracilis - San Joaquin dune beetle (SC)
Hydrochara rickseckeri - Ricksecker's water scavenger beetle (SC)
Hygrotus curvipes - curved-foot hygrotus diving beetle (SC)
Linderiella occidentalis - California linderiella fairy shrimp (SC)

Fish

Lampetra ayresi - river lamprey (SC)
Lampetra tridentata - Pacific lamprey (SC)
Pogonichthys macrolepidotus - Sacramento splittail (SC)
Spirinchus thaleichthys - longfin smelt (SC)

Amphibians

Spea hammondii (was Scaphiopus h.) - western spadefoot toad (SC)

Reptiles

Anniella pulchra pulchra - silvery legless lizard (SC)
Clemmys marmorata marmorata - northwestern pond turtle (SC)

Clemmys marmorata pallida - southwestern pond turtle (SC)
Masticophis flagellum ruddocki - San Joaquin coachwhip (=whipsnake) (SC)
Phrynosoma coronatum frontale - California horned lizard (SC)

Birds

Agelaius tricolor - tricolored blackbird (SC)
Athene cunicularia hypugaea - western burrowing owl (SC)
Baeolophus inornatus - oak titmouse (SLC)
Branta canadensis leucopareia - Aleutian Canada goose (D)
Buteo regalis - ferruginous hawk (SC)
Calypte costae - Costa's hummingbird (SC)
Carduelis lawrencei - Lawrence's goldfinch (SC)
Chaetura vauxi - Vaux's swift (SC)
Charadrius montanus - mountain plover (SC)
Cypseloides niger - black swift (SC)
Elanus leucurus - white-tailed (=black shouldered) kite (SC)
Empidonax traillii brewsteri - little willow flycatcher (CA)
Falco peregrinus anatum - American peregrine falcon (D)
Grus canadensis tabida - greater sandhill crane (CA)
Lanius ludovicianus - loggerhead shrike (SC)
Laterallus jamaicensis coturniculus - black rail (CA)
Limosa fedoa - marbled godwit (SC)
Melanerpes lewis - Lewis' woodpecker (SC)
Melospiza melodia maxillaris - Suisun song sparrow (SC)
Numenius americanus - long-billed curlew (SC)
Picoides nuttallii - Nuttall's woodpecker (SLC)
Riparia riparia - bank swallow (CA)
Selasphorus rufus - rufous hummingbird (SC)
Selasphorus sasin - Allen's hummingbird (SC)

Mammals

Corynorhinus (=Plecotus) townsendii townsendii - Pacific western big-eared bat (SC)
Eumops perotis californicus - greater western mastiff-bat (SC)
Myotis ciliolabrum - small-footed myotis bat (SC)
Myotis evotis - long-eared myotis bat (SC)
Myotis thysanodes - fringed myotis bat (SC)
Myotis volans - long-legged myotis bat (SC)
Myotis yumanensis - Yuma myotis bat (SC)
Neotoma fuscipes annectens - San Francisco dusky-footed woodrat (SC)
Perognathus inornatus - San Joaquin pocket mouse (SC)
Sorex ornatus sinuosus - Suisun ornate shrew (SC)

Plants

Aster lentus - Suisun Marsh aster (SC)
Atriplex cordulata - heartscale (SC)
Lathyrus jepsonii var. jepsonii - delta tule-pea (SC)
Lilaeopsis masonii - Mason's lilaeopsis (SC)

VINE HILL (482D)

Listed Species

Invertebrates

Branchinecta lynchi - vernal pool fairy shrimp (T)
Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)
Elaphrus viridis - delta green ground beetle (T)
Speyeria callippe callippe - callippe silverspot butterfly (E)
Syncaris pacifica - California freshwater shrimp (E)

Fish

Hypomesus transpacificus - Critical habitat, delta smelt (X)
Hypomesus transpacificus - delta smelt (T)
Oncorhynchus mykiss - Central Valley steelhead (T)
Oncorhynchus tshawytscha - Central Valley spring-run chinook salmon (T)
Oncorhynchus tshawytscha - Critical habitat, winter-run chinook salmon (X)
Oncorhynchus tshawytscha - winter-run chinook salmon, Sacramento River (E)

Amphibians

Rana aurora draytonii - California red-legged frog (T)

Reptiles

Masticophis lateralis euryxanthus - Alameda whipsnake (T)
Thamnophis gigas - giant garter snake (T)

Birds

Haliaeetus leucocephalus - bald eagle (T)
Rallus longirostris obsoletus - California clapper rail (E)
Sterna antillarum (=albifrons) browni - California least tern (E)

Mammals

Reithrodontomys raviventris - salt marsh harvest mouse (E)

Plants

Cordylanthus mollis ssp. mollis - soft bird's-beak (E)

Proposed Species

Fish

Oncorhynchus tshawytscha - Critical Habitat, Central Valley spring-run chinook (PX)

Amphibians

Rana aurora draytonii - Critical habitat, California red-legged frog (Proposed) (PX)

Candidate Species

Fish

Acipenser medirostris - green sturgeon (C)
Oncorhynchus tshawytscha - Central Valley fall/late fall-run chinook salmon (C)
Oncorhynchus tshawytscha - Critical habitat, Central Valley fall/late fall-run chinook (C)

Species of Concern

Invertebrates

Anthicus antiochensis - Antioch Dunes anthicid beetle (SC)
Anthicus sacramento - Sacramento anthicid beetle (SC)
Branchinecta mesovallensis - Midvalley fairy shrimp (SC)
Hydrochara rickseckeri - Ricksecker's water scavenger beetle (SC)
Hygrotus curvipes - curved-foot hygrotus diving beetle (SC)
Linderiella occidentalis - California linderiella fairy shrimp (SC)

Fish

Lampetra ayresi - river lamprey (SC)
Lampetra tridentata - Pacific lamprey (SC)
Pogonichthys macrolepidotus - Sacramento splittail (SC)
Spirinchus thaleichthys - longfin smelt (SC)

Amphibians

Rana boylii - foothill yellow-legged frog (SC)
Spea hammondii (was Scaphiopus h.) - western spadefoot toad (SC)

Reptiles

Anniella pulchra pulchra - silvery legless lizard (SC)
Clemmys marmorata marmorata - northwestern pond turtle (SC)
Clemmys marmorata pallida - southwestern pond turtle (SC)
Phrynosoma coronatum frontale - California horned lizard (SC)

Birds

Agelaius tricolor - tricolored blackbird (SC)
Athene cunicularia hypugaea - western burrowing owl (SC)
Baeolophus inornatus - oak titmouse (SLC)
Branta canadensis leucopareia - Aleutian Canada goose (D)
Buteo regalis - ferruginous hawk (SC)
Calidris canutus - red knot (SC)
Calypte costae - Costa's hummingbird (SC)
Carduelis lawrencei - Lawrence's goldfinch (SC)
Chaetura vauxi - Vaux's swift (SC)
Charadrius montanus - mountain plover (SC)
Cypseloides niger - black swift (SC)
Elanus leucurus - white-tailed (=black shouldered) kite (SC)
Empidonax traillii brewsteri - little willow flycatcher (CA)
Falco peregrinus anatum - American peregrine falcon (D)
Geothlypis trichas sinuosa - saltmarsh common yellowthroat (SC)
Grus canadensis tabida - greater sandhill crane (CA)
Lanius ludovicianus - loggerhead shrike (SC)
Laterallus jamaicensis coturniculus - black rail (CA)
Limosa fedoa - marbled godwit (SC)
Melanerpes lewis - Lewis' woodpecker (SC)
Melospiza melodia maxillaris - Suisun song sparrow (SC)
Numenius americanus - long-billed curlew (SC)
Riparia riparia - bank swallow (CA)
Rynchops niger - black skimmer (SC)

Selasphorus rufus - rufous hummingbird (SC)
Selasphorus sasin - Allen's hummingbird (SC)

Mammals

Corynorhinus (=Plecotus) townsendii townsendii - Pacific western big-eared bat (SC)
Eumops perotis californicus - greater western mastiff-bat (SC)
Myotis ciliolabrum - small-footed myotis bat (SC)
Myotis evotis - long-eared myotis bat (SC)
Myotis thysanodes - fringed myotis bat (SC)
Myotis volans - long-legged myotis bat (SC)
Myotis yumanensis - Yuma myotis bat (SC)
Neotoma fuscipes annectens - San Francisco dusky-footed woodrat (SC)
Perognathus inornatus - San Joaquin pocket mouse (SC)
Sorex ornatus sinuosus - Suisun ornate shrew (SC)

Plants

Aster lentus - Suisun Marsh aster (SC)
Lathyrus jepsonii var. jepsonii - delta tule-pea (SC)
Lilaeopsis masonii - Mason's lilaeopsis (SC)
Monardella villosa ssp globosa - robust monardella (=robust coyote mint) (SLC)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed (in the Federal Register) as being in danger of extinction.
(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
(P) *Proposed* - Officially proposed (in the Federal Register) for listing as endangered or threatened.
(NMFS) Species under the Jurisdiction of the National Marine Fisheries Service. Consult with them directly about these species.
Critical Habitat - Area essential to the conservation of a species.
(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
(C) *Candidate* - Candidate to become a proposed species.
(CA) Listed by the State of California but not by the Fish & Wildlife Service.
(D) *Delisted* - Species will be monitored for 5 years.
(SC) *Species of Concern*/(SLC) Species of Local Concern - Other species of concern to the Sacramento Fish & Wildlife Office.
(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regard-less of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the quad or quads covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the nine surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. However you should contact the California Department of Fish and Game Wildlife and Habitat Data Analysis Branch for official information about these species.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compen-sates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our critical habitat page for maps.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

Your list may contain a section called Species of Concern. This is an informal term that refers to those species that the Sacramento Fish and Wildlife Office believes might be in need of concentrated conservation actions. Such conservation actions vary depending on the health of the populations and degree and types of threats. At one extreme, there may only need to be periodic monitoring of populations and threats to the species and its habitat. At the other extreme, a species may need to be listed as a Federal threatened or endangered species. Species of concern receive no legal protection and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be July 28, 2005.

Attachment B

National Marine Fisheries Service
List of Special-Status Species

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

July 22, 2005

In response reply to:
151422SWR2005SA20268:BFO

Frank Michny
Regional Environmental Officer
U.S. Bureau of Reclamation
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

Dear Mr. Michny:

This is in response to your letter of June 28, 2005, requesting informal consultation under section 7 of the Endangered Species Act (ESA) for the proposed Contra Costa Water District (CCWD) Alternative Intake Project (Project). The Project is an alternative to CCWD's current pumping plant on Old River with no increase in capacity. The Project has been assigned a file number SWR2005SA20268 for all future correspondence.

The Bureau of Reclamation (BOR) in cooperation with CCWD is proposing to build a new screened water intake and pumping plant on Victoria Island in the Sacramento/San Joaquin Delta with a capacity of 250 cubic feet per second. This new diversion point will connect via a pipeline across Victoria Island to CCWD's existing diversion facility on Old River. The proposed Project would improve the quality of water for drinking water supplies at certain times of the year when existing facilities are impaired. The proposed action would not increase CCWD's total Delta diversion capacity, but would allow it to alternate between intakes depending on water quality.

NOAA's National Marine Fisheries Service (NMFS) is responsible for the management, conservation, and restoration of anadromous fish species listed as threatened or endangered under the ESA. In addition, the Magnuson-Stevens Fisheries Conservation Act requires Federal agencies to consult with the NMFS regarding any action or proposed action that may adversely affect Essential Fish Habitat (EFH) for Federally managed marine fish. NMFS has provided comments to CCWD (letter to Samantha Salvia dated March 15, 2005), concerning a "Notice of Preparation" of a joint environmental impact statement for the proposed Project. At that time we provided a species list and information that would be helpful during informal consultation. We have provided an updated species list below in order to include recently proposed species.

Available information indicates that the following Federally listed fish species may occur in the proposed project area:

Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) - endangered
Central Valley spring-run Chinook salmon (*O. tshawytscha*) - threatened
Central Valley steelhead (*O. mykiss*) - threatened
Central Valley fall/late fall-run Chinook salmon (*O. tshawytscha*) – candidate
Green Sturgeon *(Acipenser medirostris)* – proposed for listing, April 5, 2005

In addition, designated critical habitat has been proposed for Central Valley steelhead and is within the Project area, a determination is expected by August 15, 2005. A conferencing process is recommended for green sturgeon since a final listing determination is not expected until April 2006.

Regarding EFH, the proposed action is located in areas of the Bay-Delta occupied by various life stages of fish species Federally managed under the Pacific Salmon, Pacific Groundfish, and Coastal Pelagic Fisheries Management Plans. For more information on EFH and species distribution, please see our website at http://swr.nmfs.noaa.gov/sac/index.htm.

My staff is available to assist CCWD in developing the Action Specific Implementation Plan (ASIP), which will act as a biological assessment for this Project, and participate with other fish agencies in its review. Through informal consultation, NMFS and the BOR may exchange information, analyze effects of the proposed action, and develop plans to avoid and minimize any potential impacts. If the impacts of the project can be avoided or minimized such that listed or proposed fish species will not be adversely affected, it would not be necessary to initiate formal ESA consultation.

The following information should be provided in the draft ASIP in order to assist NMFS during the informal consultation:

(1) A detailed description of the proposed Project

(2) A description of the specific area that may be affected by the action.

(3) A description of any listed, proposed species, or critical habitat that may be affected by the action.

(4) A complete description of the manner in which the action may affect any listed or proposed species or critical habitat, and an analysis of any cumulative effects. This should include an assessment of habitat conditions, including the amount and extent of salmonid habitat within the action area. In addition, this description should include an assessment of the specific life history stages that will be affected.

(5) Relevant reports, including environmental impact statements, environmental assessments, biological assessments or other analyses prepared for the Project.

(6) Consistency with the BOR's long-term operations, criteria and plan for the Central Valley Project and the proposed South Delta Improvement Program for the State Water Project.

If the BOR makes a finding prior to or during informal consultation that the proposed action "may affect, but is not likely to adversely affect" listed species or critical habitat, the BOR may request written concurrence from NMFS for this finding. NMFS will usually respond within 30 calendar days when possible. If a finding of "not likely to adversely affect" cannot be made by the BOR, or NMFS is unable to concur with the BOR's finding, formal consultation is required.

Please contact Mr. Oppenheim at (916) 930-3603, or via e-mail at bruce.oppenheim@noaa.gov if you have any questions or require additional information.

Sincerely,

for Rodney R. McInnis
Regional Administrator

cc: NMFS-PRD, Long Beach, CA
Leigh Bartoo, U.S. Fish & Wildlife Service, 2800 Cottage Way, Sacramento, CA 95825
Samantha Salvia, CCWD, P.O. Box H20, Concord, CA 94524

Attachment C

DFG List of Special-Status Species

State of California – The Resources Agency
ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
Central Valley Bay-Delta Branch
4001 North Wilson Way
Stockton, California 95205-2486
(209) 948-7800

June 21, 2005

Ms. Samantha Salvia
Principal Engineer
Contra Costa Water District
1331 Concord Avenue
Concord, California 94524

Subject: Species List for the CCWD Alternative Intake Project

Dear Ms. Salvia:

The Department of Fish and Game has received your request for a list of State endangered, threatened, or sensitive species that occur in or near your project area. This species list covers the following USGS 7.5 minute quadrangles: Clifton Court Forebay, Holt, Union Island, and Woodward Island. This list is by no means exhaustive, and if additional species distribution information becomes available, we will update this list as necessary.

If you have any questions regarding the enclosed list or need additional information, please contact Ms. Anna Holmes of my staff at 209-948-7163 or email her at aholmes@delta.dfg.ca.gov.

Sincerely,

Perry L. Herrgesell

Dr. Perry L. Herrgesell
Branch Chief

Enclosure

cc: Department of Fish and Game
Stockton, California
Ms. Anna Holmes

PH05F005.doc/ce

JUN 2005
RECEIVED
CONTRA COSTA WATER DISTRICT
CALFED

Species List for the Alternative Intake Project
State Endangered, Threatened, and Special Status Species
June 20, 2005

Species	Status
Fish	
Delta Smelt (Hypomesus transpacificus)	ST
Splittail (Pogonichthys macrolepidotus)	SSC
Fall/Late Fall-Run Chinook Salmon (Onchorynchus tshawytscha)	SSC
Spring-Run Chinook Salmon (Onchorynchus tshawytscha)	ST
Winter-Run Chinook Salmon (Onchorynchus tshawytscha)	SE
Amphibians	
California Red-Legged Frog (Rana aurora draytonii)	SSC
California Tiger Salamander (Ambystoma californiense)	SSC
Reptiles	
Western Pond Turtle (Clemmys marmorata)	SSC
Birds	
Burrowing Owl (Athene cunicularia)	SSC
California Black Rail (Laterallus jamaicensis coturniculus)	ST
California Horned Lark (Eremophila alpestris actia)	SSC
Swainson's Hawk (Buteo swainsoni)	ST
Tricolored Blackbird (Agelaius tricolor)	SSC
White-Tailed Kite (Elanus leucurus)	SFP
Mammals	
American Badger (Taxidea taxus)	SSC
San Joaquin Kit Fox (Vulpes macrotis mutica)	ST
Plants	
Alkali Milk-vetch (Astragalus tener var. tener)	1B
Big Tarplant (Blepharizonia plumosa)	1B
Bristly Sedge (Carex comosa)	2
Delta Button-celery (Eryngium racemosum)	SE
Delta Mudwort (Limosella subulata)	2
Delta Tule Pea (Lathyrus jepsonii var. jepsonii)	1B
Diamond-petaled California Poppy (Eschschoizia rhombipetala)	1B
Marsh Skullcap (Scutellaria galericulata)	2
Mason's Lilaeopsi s (Lilaeopsis masonii)	SR
Recurved Larkspur (Delphinium recurvatum)	1B

Rose Mallow (Hibiscus lasiocarpus)	2
San Joaquin Spearscale (Atriplex joaquiniana)	1B
Suisun Marsh Aster (Aster lentus)	1B

State Designation

SE = State Endangered
ST = State Threatened
SR = State Rare
SSC = Species of Special Concern
SFP = State Fully Protected

California Native Plant Society Designation

List 1B = Plants Rare, Threatened, or Endangered in California and elsewhere
List 2 = Plants Rare, Threatened, or Endangered in California, but more common elsewhere

Attachment D

DFG Salvage Data and 20-mm Larval Smelt Survey Data
and other Interagency Ecological Program
Delta Fisheries Survey Investigations

NAME OF STUDY: 20-MM SURVEY

Program element: 033

Program manager: Kevin Fleming, kfleming@delta.dfg.ca.gov

Project Lead: Michael Dege, mdege@delta.dfg.ca.gov

Agency: Department of Fish and Game, Bay Delta Division
Address: 4001 North Wilson Way, Stockton, CA 95205
Phone: (209) 948-7800, Fax: (209) 946-6355

Purpose/Objective: Monitor and provide information on delta smelt abundance and distribution in the upper San Francisco Estuary.

Conduct larval fish surveys to determine the timing, distribution, and abundance of delta smelt larvae and their food supply. Help estimate larval delta smelt fish losses and determine the magnitude of entrainment of both larval and juvenile delta smelt at CVP and SWP intakes.

Data collected: temperature, electro-conductivity, water transparency, water volume, tidal stage, fish, and zooplankton.

Geographic range of field work: upper San Francisco Estuary.

Number of sites: between 41 and 49 stations have been sampled since 1995.

Period of record (start year): 1995.

Size for complete data base for program element in KB (MB): 20+ megabytes.

Number of individual files: one file or database contains all data.

Sample frequency per time unit (second, week, month): starting in early spring (March/April) sampling is conducted every other week and continues through mid-summer (July/August) when catch efficiency decreases or delta smelt are not endanger of being entrained at the CVP and SWP.

Field sampling: The 20-mm net is a conical plankton net 5.1 m in length with a mouth opening of 1.5 m^2, and is mounted on a weighted tow frame with skids. The net features a 1,600 μm (1/16 in.) knotless nylon Delta mesh (35 lb. test) or 1,600 μm (1/16 in.) Nitex monofilament. Durable canvas mouth and cod-end sections are attached to the net to prevent premature wear from contact with the substrate. Fish are collected in a removable 2.2 L screened (474 μm stainless steel wire bolting cloth) cod-end jar. Zooplankton are collected with a Clarke-Bumpus (CB) net attached to the top of the 20-mm net frame. The CB net consists of 160 μm knotless nylon mesh and measures 78 cm long with a 12 cm mouth diameter. A General Oceananics flowmeter is mounted in the mouth of the 20-mm and CB nets to estimate the volume (m^3) of water sampled. To sample the entire water column efficiently, three 10-minute stepped oblique tows (1.2 m per step) are completed at each station (the CB net is only fished during the first tow). After each tow, the entire sample is transferred to a labeled holding jar containing 10% formalin neutralized with sodium borate. Rose Bengal dye is added to each jar to aid in separating animals from detritus.

Laboratory analysis: sample jars are taken to the laboratory at the California Department of Fish and Game' s Bay Delta Branch, Stockton. For fish samples, the complete contents are sorted and any larval fish present are identified and counted. All fish are identified to species or lowest possible taxon. The first 300 fish (1995-98), or 100 fish (1999-00), or 50 fish (2001-) from each tow are randomly selected and measured (FL) to the nearest millimeter. All delta smelt are measured regardless of catch size. Individual zooplankton samples are diluted in a beaker to a concentration that will give approximately 200 organisms per ml. The sample is thoroughly mixed and a one millimeter aliquot is extracted and placed on a Sedgewick-Rafter slide cell. All zooplankton are counted and identified down to Genus or family. All lab data is recorded on data sheets corresponding to field measurements and entered into a relational database.

Relative density analysis:

The mean number of fish per volume water sampled (standardized to 10,000 m^3) is calculated using the following equations:

$$V_t = A * K * D$$

Where: V = volume of water (m^3) filtered through the net per tow (t)

A = mouth opening of the net (m^2)

K = calibration factor for the flow meter

D = difference in flow meter counts from start to finish of tow

$$n_t = F_t / V_t * 10{,}000\ m^3$$

Where: n = number of fish per 10,000 m^3 per tow (t)

F = fish sampled per tow

V = volume of water filtered through the net (m^3) per tow

$$N = \Sigma n_t / 3$$

Where: N = mean number of fish per 10,000 m^3 per station.

The number of each zooplankton taxon per cubic meter taken in the Clarke-Bumpus net is calculated using the following equations:

$$V = A * K * D$$

Where: V = volume of water (m^3) filtered through the net

A = mouth opening of the net (m^2)

K = calibration factor for the flow meter

D = difference in flow meter counts from start to finish of tow

$$Z = CX / S / V$$

Where: Z = the number of zooplankton per m^3

C = the number of specimens counted

X = the sample volume

S = the number of Sedgewick-Rafter cells counted

V = the volume of water filtered by the net $m^{3.}$

Changes over time:

1995 – N/A

1996 – Napa River Stations (341, 342, 343, 344, 345, 346, & 347) added to sampling program.

1997 – Napa River stations (341 & 347) and Big Break station (802) discontinued from sampling program.

1998 – zooplankton taxa stages (*Eurytermora* copepodid & *Pseudodiaptomus* copepodid) added to database.

1999 – Number of fish measured reduced from 300 to 100 (all delta smelt are measured regardless of catch size).

2000 – N/A

2001 – Number of fish measured reduced from 100 to 50 (all delta smelt are measured regardless of catch size).

2002 – Napa River stations 347, 348, & 349 added to sampling program when higher outflow conditions persist in Napa River.

2003 – zooplankton taxon *Pseudodiaptomus* spp. speciated to include *Pseudodiaptomus euryhalinus, Pseudodiaptomus forbesi,* and *Pseudodiaptomus marinus*.

Revised: January 26, 2004

NAME OF STUDY: DELTA SMELT LARVAL SURVEY (DSLS)

Program element: 096

Program manager: Kevin Fleming, kfleming@delta.dfg.ca.gov

Project Lead: Michael Dege, mdege@delta.dfg.ca.gov

Agency: Department of Fish and Game, Bay Delta Division
Address: 4001 North Wilson Way, Stockton, CA 95205
Phone: (209) 948-7800, Fax: (209) 946-6355

Purpose/Objective: Monitor and provide information on larval delta smelt abundance and distribution in the upper San Francisco Estuary.

Conduct larval fish surveys to determine the timing, distribution, and abundance of delta smelt larvae. Help estimate larval delta smelt fish losses and determine the magnitude of entrainment of larval delta smelt at CVP and SWP intakes.

Data collected: temperature, electro-conductivity, water transparency, water volume, tidal stage, and fish.

Geographic range of field work: upper San Francisco Estuary.

Number of sites: between 41 and 49 stations.

Period of record (start year): 2005.

Size for complete database for program element in KB (MB): 5+ megabytes.

Number of individual files: one file or database contains all data.

Sample frequency per time unit (second, week, month): starting in mid-winter (January/ February) sampling is conducted every other week and continues through early summer (June/July) or until catch efficiency decreases and/or delta smelt are not in danger of being entrained at the CVP and SWP.

Field sampling: The DSLS nets include two larval nets deployed near the bow of the boat (fore nets) and two larval nets deployed from the stern of the boat (aft nets). The fore nets are conical plankton nets 3.35 m in length with a mouth opening of 0.196 m^2 and are secured to a bridle attached to aluminum poles. These nets have a 505 μm Nitex monofilament mesh with canvas cod-end sections. The aft nets are made of the same material and mesh as the fore nets but also have a durable canvas mouth as well as cod-end sections are attached to the net to prevent premature wear from contact with the substrate. All nets can be deployed at once. Aft net deployment can vary depending on sharing boat resources with the 20-mm Survey program. Fish are collected in a removable 2.2 L screened (474 μm stainless steel wire bolting cloth) cod-end jar. A General Oceananics flowmeter is mounted in the mouth of each net to estimate the volume (m^3) of water sampled. After the tow, the entire sample is transferred to a labeled holding jar containing 10% formalin neutralized with sodium borate. Rose Bengal dye is added to each jar to aid in separating animals from detritus.

Laboratory analysis: Sample jars are taken to the laboratory at the California Department of Fish and Game' s Bay Delta Branch, Stockton. For fish samples, the complete contents are sorted and any larval fish present are identified and counted. All fish are identified to species or lowest possible taxon. The first 50 fish from each tow are randomly selected and measured (FL) to the nearest millimeter. All delta smelt are measured regardless of catch size. All lab data is recorded on data sheets corresponding to field measurements and entered into a relational database.

Relative density analysis:

The mean number of fish per volume water sampled (standardized to 1,000 m^3) is calculated using the following equations:

$$V_t = A * K * D$$

Where: V = volume of water (m^3) filtered through the net per tow (t)
A = mouth opening of the net (m^2)
K = calibration factor for the flow meter
D = difference in flow meter counts from start to finish of tow

$$n_t = F_t / V_t * 1{,}000\ m^3$$

Where: n = number of fish per 1,000 m^3 per tow (t)
F = fish sampled per tow
V = volume of water filtered through the net (m^3) per tow

$$N = \Sigma n_t / 3$$

Where: N = mean number of fish per 1,000 m^3 per station.

Changes over time:

2006 - Expansion of field stations further westward (20-mm Survey Stations).

Source: http://delta.dfg.ca.gov/data/20mm/

NAME OF STUDY: FALL MIDWATER TRAWL SURVEY

Purpose: To evaluate potential water project effects on survival of young striped bass.

The objective of the fall midwater trawl survey is to produce an index of monthly abundance of young striped bass. The sum of the monthly indices is compared to the summer townet abundance index to evaluate survival.

Midwater Trawl Field Activities: From 1967 to 1978 the survey length was variable, sometimes starting in July or August, with September the usual starting month. The survey was never run beyond March. In 1980 the survey was shortened to cover the period of September to December due to variability in abundance indices associated with winter storm events.

Midwater trawl Sampling stations cover a broad range of habitats.

Equipment Net Description: It has a mouth opening of 12 foot by 12 foot (3.7 m^2). The mesh size decreases from 8 inch mesh in the forward panel to one half inch mesh at the cod end.

Midwater Trawl Indices for striped bass (*Morone saxatilis*), delta smelt (*Hypomesus transpacificus*), American shad (*Alosa sapidissima*), longfin smelt (*Sprinchus thaleichthys*),threadfin shad (*Dorosoma petenense*) and splittail (Pogonichtys macrolepidotus) from 1967-2003; please note no surveys were done in 1974 and 1979.

Midwater Trawl Young-of-the-Year Striped Bass Abundance Indices

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Sept	12,111	1,711	4,048	2,288	4,004	3,172	1,517		1,772	237	307	1,118		715	583	1,476	1,934
Oct	3,788	1,439	1,621	1,822	1,855	977	441		681	117	204	561		384	913	938	1,994
Nov	1,852	644	1,451	2,751	1,354	1,377	1,005		1,284	243	180	339		102	1,037	924	5,272
Dec	2,287	349	1,280	1,432	2,296	605	1,324		811	177	192	587		268	1,995	1,113	3,276
Index	**20,038**	**4,143**	**8,400**	**8,293**	**9,509**	**6,131**	**4,287**		**4,548**	**774**	**883**	**2,605**		**1,469**	**4,531**	**4,451**	**12,476**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sept	125	2,706	603	106	154	234	262	621	509	206	116	71	287	234	154	93	181
Oct	825	532	169	98	152	235	128	246	513	188	137	46	143	290	68	156	217
Nov	58	508	206	129	76	398	115	546	281	206	141	32	69	126	134	90	114
Dec	752	197	372	144	60	454	439	632	254	659	90	243	69	574	185	51	219
Index	**1,760**	**3,943**	**1,350**	**477**	**442**	**1,321**	**944**	**2,045**	**1,557**	**1,259**	**484**	**392**	**568**	**1,224**	**541**	**390**	**731**

Midwater Trawl Delta Smelt Abundance Indices

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Sept	93	234	148	742	197	572	308		290	70	98	167		369	132	45	2
Oct	165	253	78	342	471	470	312		214	42	243	65		274	27	47	28
Nov	31	120	56	82	428	81	198		102	121	52	31		587	54	76	78
Dec	125	89	33	507	207	142	327		91	127	88	309		423	161	162	24
Index	**414**	**696**	**315**	**1,673**	**1,303**	**1,265**	**1,145**		**697**	**360**	**481**	**572**		**1,653**	**374**	**330**	**132**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sept	41	92	71	58	88	109	126	72	375	65	120	19	15	238	198	430	75
Oct	24	15	40	67	75	50	249	3	470	12	349	23	109	97	380	128	481
Nov	28	34	69	19	158	188	279	57	94	7	352	13	71	15	114	56	17
Dec	17	71	100	30	45	17	35	24	139	18	78	72	108	70	172	142	30
Index	**110**	**212**	**280**	**174**	**366**	**364**	**689**	**156**	**1,078**	**102**	**899**	**127**	**303**	**420**	**864**	**756**	**603**

Midwater Trawl American Shad Abundance Indices (all ages)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Sept	1,505	268	1,579	366	357	140	599		1,240	96	126	830		1,284	286	2,246	962
Oct	1,117	286	1,172	254	488	56	193		587	69	147	1,063		1,697	522	1,609	852
Nov	612	140	816	178	403	112	211		486	102	233	332		524	349	1,313	958
Dec	206	71	460	69	258	30	82		178	80	144	221		401	277	210	177
Index	**3,440**	**765**	**4,027**	**867**	**1,506**	**338**	**1,085**		**2,491**	**347**	**650**	**2,446**		**3,906**	**1,434**	**5,378**	**2,949**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sept	316	694	261	805	569	1,494	1,076	755	1,972	439	3,255	1,806	265	1,318	346	253	337
Oct	332	567	292	310	339	947	780	530	1,567	387	2,276	1,072	565	2,093	155	326	239
Nov	564	313	222	300	592	1,369	872	463	908	391	808	941	639	515	145	126	110
Dec	386	286	124	135	378	507	260	262	710	117	573	523	1,125	214	69	59	78
Index	**1,598**	**1,860**	**899**	**1,550**	**1,878**	**4,317**	**2,988**	**2,014**	**5,157**	**1,334**	**6,912**	**4,342**	**2,594**	**4,140**	**715**	**764**	**764**

Midwater Trawl Longfin Smelt Abundance Indices (all ages)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Sept	15,485	1,408	35,804	889	2,442	138	2,795		318	15	29	1,800		15,202	222	7,899	152
Oct	49,995	771	9,980	410	5,722	118	1,237		598	12	17	1,173		6,071	398	13,962	3,106
Nov	7,482	452	8,085	1,067	5,022	106	808		1,198	90	83	1,450		3,527	179	27,812	5,407
Dec	8,828	669	6,190	4,169	2,801	398	1,057		705	541	81	2,252		6,355	1,403	12,876	3,210
Index	**81,790**	**3,300**	**60,059**	**6,535**	**15,987**	**760**	**5,897**		**2,819**	**658**	**210**	**6,675**		**31,155**	**2,202**	**62,549**	**11,875**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sept	20	972	134	16	11	10	8	3	99	4	5,867	5	106	149	1,953	1,635	74
Oct	31	1,543	70	17	32	1	7	0	112	10	931	27	51	1,578	2,736	49	46
Nov	219	1,857	384	207	37	81	27	12	128	79	1,520	14	194	2,032	330	938	27
Dec	722	1,788	932	551	376	151	92	61	459	452	328	1,342	339	2,895	223	816	100
Index	**992**	**6,160**	**1,520**	**791**	**456**	**243**	**134**	**76**	**798**	**545**	**8,646**	**1,388**	**690**	**6,654**	**5,242**	**3,438**	**247**

Source: http://delta.dfg.ca.gov/data/mwt/

Midwater Trawl Splittail Abundance Indices (all ages)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Sept	43	6	7	21	4	3	2		2	0	0	14		11	9	76	54
Oct	10	7	11	0	5	0	0		1	0	0	16		4	3	20	26
Nov	3	3	7	2	8	1	2		0	1	0	4		1	3	12	63
Dec	9	2	3	2	1	9	0		1	0	0	3		0	3	10	11
Index	65	18	28	25	18	13	4		4	1	0	37		16	18	118	154

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sept	3	14	10	3	3	5	10	2	4	0	43	13	1	127	24	0	10
Oct	4	25	3	4	1	2	2	0	3	1	27	0	0	92	3	4	2
Nov	0	8	4	2	0	1	6	1	1	0	5	0	0	45	12	3	0
Dec	8	11	12	0	0	0	0	0	2	2	1	9	0	17	0	1	15
Index	15	58	29	9	4	8	18	3	10	3	76	22	1	281	39	8	27

Midwater Trawl Threadfin Shad Abundance Indices

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Sept	6,805	1,605	6,030	1,596	1,064	1,527	1,044		292		2,703	984		1,242	1,165	304	583
Oct	3,656	1,567	1,160	820	3,474	1,858	46		24	421	2,847	481		4,023	3,428	375	587
Nov	930	1,608	27	786	1,786	1,106	113		267	323	2,897	152		1,472	1,824	1,197	653
Dec	1,347	598	512	865	629	622	30		135		569	485		541	259	225	268
Index	12,738	5,378	7,729	4,067	6,953	5,113	1,233		718	744	9,016	2,102		7,278	6,676	2,101	2,091

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sept	278	742	891	409	1,808	405	631	742	1,521	331	1,631	146	797	1,922	2,670	68	4,382
Oct	258	342	72	287	564	898	420	1,054	2,538	819	592	1,150	3,543	2,070	772	1,879	1,616
Nov	60	1,657	1,984	1,555	4,210	1,710	1,399	372	1,927	836	730	934	6,141	959	2,392	1,218	1,407
Dec	225	88	528	158	316	2,846	866	791	693	319	384	2,528	4,787	797	1,693	9,812	6,997
Index	821	2,829	3,475	2,409	6,898	5,859	3,316	2,959	6,679	2,305	3,337	4,758	15,268	5,748	7,527	12,977	14,402

Source: http://delta.dfg.ca.gov/data/mwt/

NAME OF STUDY: MIDSUMMER TOWNET SURVEY

Since 1959, this townet survey has indexed the abundance of young striped bass when the average size is 38 mm by sampling 31 stations from San Pablo Bay through the Delta. The original purpose was to predict recruitment to the adult stock but the index has proven valuable in gauging the environmental health of the estuary.

Important species

- striped bass *Morone saxatilis*
- delta smelt *Hypomesus transpacificus*
- Sacramento splittail *Pogonichthys macrolepidotus*

Calculation of abundance index: For each survey, the catch for each sample site is summed and multiplied by the water volume in acre feet at the site to derive the weighted catch. The weighted catches are then summed and divided by 1,000 to calculate the index for that survey. The index is the estimated abundance when the mean size equals 38.1 mm.

Water quality parameters sampled

- electrical conductivity (surface and bottom)
- transparency (secchi disk)
- temperature

Significant results of monitoring

- *The young striped bass abundance index has declined from levels exceeding 100 in the 1960's to a record low of 4.3 in 1990.*
- *From 1959 to 1970, fluctuations in the annual index were closely associated with both Delta outflow and the percent of inflow being diverted by Central Valley Project, State Water Project and Delta agriculture. Since 1971, the index has been lower than expected mainly due to diversions in the Delta.*
- *The most probable cause of the decline in young striped bass production is that the adult population, reduced due to cumulative past entrainment losses, is not producing enough eggs to maintain the population under present conditions.*

Source: http://delta.dfg.ca.gov/baydelta/monitoring/townet.asp

FISH FACILITIES UNIT

Monitoring and Operations Projects

The State Water Project (SWP), operated by the California Department of Water Resources (DWR), and the Central Valley Project (CVP), operated by the U.S. Bureau of Reclamation, export water out of the San Francisco Bay Delta for urban and agricultural use in California. When water is exported, fish become entrained into the diversion. Since 1957, the U.S. Bureau of Reclamation (USBR) has salvaged fish at the Tracy Fish Collection Facility (TFCF). The Department of Fish and Game's Fish Facilities Unit, in cooperation with DWR, began salvaging fish at the Skinner Delta Fish Protective Facility (SDFPF) in 1968. The salvaged fish are trucked daily and released at several sites in the western Delta. The schedule of fish hauling is dependent on salvage rates, debris loading, and special-status-species procedures. Salvage of fish at both facilities is conducted 24 hours a day, seven days a week at regular intervals. Sampling of entrained fish at the SDFPF and TFCF is the source for DFG's daily salvage and loss estimates for the monitoring of incidental take of listed fish species.

Fish salvage and loss information at the SDFPF and TFCF is used extensively in water project monitoring and planning. The Fish Facilities Monitoring Project manages the data collected on fish entrained and salvaged at the SDFPF and TFCF. Directed by cooperative agreements and funded by USBR and DWR, project staff are responsible for key entry, quality assurance, data processing, data reporting, and other database management activities for these facilities. This project maintains one of the largest historical databases on Delta species available and has been used in assessing the effects of new facilities and programs, water project operations proposals, and evaluation of proposed CALFED alternatives. Data can be obtained via FTP from the Bay-Delta server.

Source: ftp://ftp.delta.dfg.ca.gov/salvage

Central Valley Project (CVP) Fish Facility Densities, Fish/1,000 ACRE-FEET

Month	Salmon	Month	Steelhead	Month	Striped Bass	Month	Splittail	Month	Delta Smelt
Jan	14	Jan	3	Jan	140	Jan	4	Jan	4
Feb	91	Feb	4	Feb	150	Feb	9	Feb	6
Mar	31	Mar	5	Mar	77	Mar	9	Mar	6
Apr	157	Apr	3	Apr	40	Apr	18	Apr	11
May	218	May	2	May	1900	May	420	May	94
Jun	47	Jun	0	Jun	5635	Jun	874	Jun	29
Jul	2	Jul	0	Jul	1934	Jul	192	Jul	9
Aug	0	Aug	0	Aug	287	Aug	12	Aug	9
Sept	0	Sept	0	Sept	115	Sept	3	Sept	2
Oct	5	Oct	0	Oct	121	Oct	1	Oct	7
Nov	7	Nov	0	Nov	137	Nov	1	Nov	2
Dec	12	Dec	1	Dec	100	Dec	1	Dec	3

Source: ftp://ftp.delta.dfg.ca.gov/salvage/

Central Valley Project (CVP) Average Monthly Fish Densities by Species

Month/Year	Salmon	Steelhead	Striped Bass	Splittail	Delta Smelt
Jun-79	7	0	5271	147	47
Jun-80	46	0	961	314	7
Jun-81	25	0	28406	162	254
Jun-82	379	0	1254	364	16
Jun-83	176	0	94	1020	10
Jun-84	10	0	9616	214	33
Jun-85	9	0	3692	46	10
Jun-86	242	0	14498	1162	1
Jun-87	0	0	4392	4	0
Jun-88	1	0	2294	14	11
Jun-89	13	0	5109	12	1
Jun-90	4	0	2811	132	6
Jun-91	6	0	13862	71	0
Jun-92	0	0	9785	56	0
Jun-93	8	0	23806	498	22
Jun-94	0	0	12070	21	73
Jun-95	103	0	72	11504	0
Jun-96	12	0	214	70	4
Jun-97	14	0	1323	36	6
Jun-98	87	0	8	6309	0
Jun-99	72	0	2323	22	137
Jun-00	17	0	2025	176	71
Jun-01	6	3	4946	31	21
Jun-02	10	3	1638	6	43
Jun-03	2	0	188	40	9
Jun-04	5	0	1348	30	4
Jun-05	9	2	136	1127	5
Jul-79	0	0	3324	18	12
Jul-80	4	0	2325	114	9
Jul-81	0	0	2734	9	201
Jul-82	6	0	3532	647	0
Jul-83	4	0	82	219	4
Jul-84	4	0	6520	54	0
Jul-85	0	0	2001	36	14
Jul-86	37	0	5027	64	1
Jul-87	0	0	283	1	0

Central Valley Project (CVP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	**Salmon**	**Steelhead**	**Striped Bass**	**Splittail**	**Delta Smelt**
Jul-88	0	0	641	4	0
Jul-89	0	0	909	0	3
Jul-90	0	0	1759	13	1
Jul-91	0	0	9956	2	0
Jul-92	0	0	1270	0	0
Jul-93	0	0	5230	36	1
Jul-94	0	0	3322	2	0
Jul-95	4	0	223	930	0
Jul-96	0	0	138	13	0
Jul-97	0	0	154	3	0
Jul-98	1	1	280	2873	0
Jul-99	0	0	862	39	1
Jul-00	0	0	507	3	1
Jul-01	0	0	378	4	0
Jul-02	1	0	402	2	1
Jul-03	0	0	97	3	1
Jul-04	1	0	202	4	0
Jul-05	1	1	71	78	0
Aug-79	0	0	441	3	9
Aug-80	0	0	457	9	1
Aug-81	0	0	384	4	200
Aug-82	1	0	1332	105	2
Aug-83	0	0	284	103	0
Aug-84	0	0	519	9	3
Aug-85	0	0	372	13	8
Aug-86	0	0	923	10	5
Aug-87	0	0	81	1	0
Aug-88	0	0	171	0	0
Aug-89	0	0	103	0	1
Aug-90	0	0	425	0	0
Aug-91	0	0	749	0	0
Aug-92	0	0	109	1	0
Aug-93	0	0	214	0	0
Aug-94	0	0	187	0	0
Aug-95	0	0	122	22	0
Aug-96	0	0	51	4	0
Aug-97	0	0	45	0	0
Aug-98	0	0	139	31	0
Aug-99	0	0	82	1	0
Aug-00	0	0	69	0	0
Aug-01	1	0	35	1	0
Aug-02	1	0	41	1	0
Aug-03	0	0	45	1	0
Aug-04	5	0	94	1	0
Sep-79	1	0	217	3	0
Sep-80	0	0	302	1	8
Sep-81	0	0	255	0	16
Sep-82	0	0	287	14	7
Sep-83	0	0	74	18	0

Central Valley Project (CVP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	**Salmon**	**Steelhead**	**Striped Bass**	**Splittail**	**Delta Smelt**
Sep-84	0	0	157	0	0
Sep-85	0	0	88	2	2
Sep-86	0	0	372	10	0
Sep-87	0	0	69	1	1
Sep-88	0	0	66	0	0
Sep-89	0	0	62	0	1
Sep-90	0	0	128	0	0
Sep-91	0	0	156	0	5
Sep-92	0	0	96	0	0
Sep-93	0	0	185	0	0
Sep-94	0	0	64	0	0
Sep-95	0	0	107	2	0
Sep-96	0	0	32	1	0
Sep-97	0	0	37	0	0
Sep-98	0	0	61	5	0
Sep-99	0	0	28	1	0
Sep-00	1	0	57	0	0
Sep-01	0	0	24	2	0
Sep-02	0	0	7	1	0
Sep-03	0	0	23	1	0
Sep-04	0	0	33	1	0
Oct-79	0	0	304	0	95
Oct-80	1	0	319	1	58
Oct-81	23	0	350	0	10
Oct-82	0	0	164	1	5
Oct-83	14	0	9	5	0
Oct-84	44	0	913	0	1
Oct-85	33	0	55	0	0
Oct-86	3	0	191	3	1
Oct-87	0	0	23	0	0
Oct-88	0	0	32	0	1
Oct-89	0	0	48	0	0
Oct-90	0	0	31	0	0
Oct-91	0	0	56	0	0
Oct-92	0	0	206	0	0
Oct-93	0	0	93	0	0
Oct-94	0	0	47	0	0
Oct-95	1	0	63	3	0
Oct-96	0	0	62	2	0
Oct-97	0	0	37	0	0
Oct-98	0	0	15	2	0
Oct-99	0	0	40	0	0
Oct-00	1	0	49	1	0
Oct-01	0	0	11	1	0
Oct-02	2	0	4	0	0
Oct-03	1	0	20	0	0
Oct-04	0	0	10	0	0
Nov-79	11	0	448	0	2
Nov-80	6	0	611	0	14

Central Valley Project (CVP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	Salmon	Steelhead	Striped Bass	Splittail	Delta Smelt
Nov-81	3	0	454	0	33
Nov-82	74	0	265	0	2
Nov-83	4	0	49	0	0
Nov-84	30	0	465	0	1
Nov-85	19	0	88	6	0
Nov-86	0	0	306	2	0
Nov-87	0	0	21	0	0
Nov-88	0	0	19	0	0
Nov-89	0	0	16	0	0
Nov-91	22	0	31	0	0
Nov-90	0	0	18	0	0
Nov-92	0	0	132	0	0
Nov-93	2	0	82	0	0
Nov-94	0	0	35	0	0
Nov-95	0	0	33	1	0
Nov-96	1	0	55	0	0
Nov-97	0	0	39	0	0
Nov-98	1	0	20	0	0
Nov-99	0	0	48	0	0
Nov-00	2	1	181	0	2
Nov-01	0	0	77	1	0
Nov-02	2	0	24	1	0
Nov-03	4	0	16	0	0
Nov-04	1	1	24	0	0
Dec-79					
Dec-80	1	1	299	1	29
Dec-81	129	0	379	0	0
Dec-82	69	10	168	8	0
Dec-83	1	0	51	1	6
Dec-84	21	0	354	0	10
Dec-85	21	0	148	0	0
Dec-86	4	0	124	0	0
Dec-87	10	0	86	1	6
Dec-88	1	1	107	0	0
Dec-89	0	0	18	0	0
Dec-90	0	0	113	0	1
Dec-91	2	0	42	0	0
Dec-92	0	0	92	0	0
Dec-93	4	0	55	0	0
Dec-94	10	0	41	0	0
Dec-95	1	0	38	1	0
Dec-96	0	0	57	0	0
Dec-97	1	0	49	0	0
Dec-98	0	0	0	0	0
Dec-99	1	0	23	0	0
Dec-00	2	1	49	2	2
Dec-01	1	0	84	5	3
Dec-02	5	3	64	1	10
Dec-03	5	1	32	1	3
Dec-04	2	0	23	0	0

State Water Project (SWP) Fish Facility Densities, Fish/1,000 ACRE-FEET

Month	**Salmon**	Month	**Steelhead**	Month	**Striped Bass**	Month	**Splittail**	Month	**Delta Smelt**
Jan	8	Jan	1	Jan	113	Jan	11	Jan	7
Feb	19	Feb	5	Feb	74	Feb	22	Feb	5
Mar	31	Mar	5	Mar	19	Mar	9	Mar	3
Apr	135	Apr	5	Apr	8	Apr	18	Apr	2
May	210	May	3	May	3523	May	207	May	114
Jun	78	Jun	0	Jun	13217	Jun	637	Jun	109
Jul	2	Jul	0	Jul	5406	Jul	149	Jul	29
Aug	0	Aug	0	Aug	598	Aug	19	Aug	3
Sept	0	Sept	0	Sept	76	Sept	2	Sept	0
Oct	3	Oct	0	Oct	76	Oct	0	Oct	0
Nov	6	Nov	0	Nov	302	Nov	0	Nov	1
Dec	14	Dec	1	Dec	297	Dec	2	Dec	3

State Water Project (SWP) Average Monthly Fish Densities by Species

Month/Year	**Salmon**	**Steelhead**	**Striped Bass**	**Splittail**	**Delta Smelt**
Jan-79	25	0	405	0	10
Jan-80	16	1	84	108	13
Jan-81	7	1	244	3	43
Jan-82	41	3	299	62	17
Jan-83	33	1	36	1	7
Jan-84	0	0	29	0	0
Jan-85	1	0	130	1	0
Jan-86	5	0	116	0	3
Jan-87	1	0	100	2	0
Jan-88	8	0	60	48	12
Jan-89	8	0	64	1	3
Jan-90	6	0	142	3	1
Jan-91	0	0	61	0	3
Jan-92	5	1	122	1	1
Jan-93	3	3	572	49	6
Jan-94	1	0	6	0	0
Jan-95	10	1	218	5	4
Jan-96	8	6	16	1	8
Jan-97	1	0	63	0	0
Jan-98	3	0	26	2	1
Jan-99	0	0	5	0	0
Jan-00	2	2	19	0	1
Jan-01	2	3	24	1	1
Jan-02	3	2	73	6	13
Jan-03	16	11	37	3	21
Jan-04	9	1	36	1	8
Jan-05	1	3	52	3	6
Feb-79	11	0	109	3	13
Feb-80	2	5	41	313	0
Feb-81	16	7	103	23	49
Feb-82	78	4	103	73	11
Feb-83	37	0	21	9	2
Feb-84	1	0	15	6	0
Feb-85	4	1	50	30	2

State Water Project (SWP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	**Salmon**	**Steelhead**	**Striped Bass**	**Splittail**	**Delta Smelt**
Feb-86	264	1	89	2	7
Feb-87	3	0	99	7	4
Feb-88	12	7	140	42	1
Feb-89	1	2	45	3	0
Feb-90	3	4	102	17	2
Feb-91	0	0	44	1	5
Feb-92	30	19	218	7	2
Feb-93	3	28	271	21	4
Feb-94	2	1	9	0	1
Feb-95	4	2	207	1	2
Feb-96	1	3	6	1	5
Feb-97	0	0	7	0	1
Feb-98	6	1	9	0	0
Feb-99	11	0	2	1	1
Feb-00	14	10	24	8	13
Feb-01	5	11	40	7	8
Feb-02	2	2	93	3	1
Feb-03	3	4	47	1	3
Feb-04	4	8	63	6	4
Feb-05	2	3	37	1	2
Mar-79	16	3	5	13	11
Mar-80	1	0	7	7	3
Mar-81	33	18	23	15	20
Mar-82	59	3	37	22	5
Mar-83	85	0	11	24	6
Mar-84	9	0	4	8	0
Mar-85	9	4	9	10	2
Mar-86	427	1	19	15	9
Mar-87	23	18	11	11	1
Mar-88	15	4	15	14	1
Mar-89	22	13	21	17	1
Mar-90	12	6	38	9	1
Mar-91	12	15	14	8	3
Mar-92	24	10	81	6	1
Mar-93	2	11	18	4	1
Mar-94	2	1	3	0	0
Mar-95	0	2	20	0	0
Mar-96	2	1	3	2	1
Mar-97	8	0	1	8	1
Mar-98	0	0	0	0	0
Mar-99	11	1	0	4	1
Mar-00	9	2	11	17	5
Mar-01	18	12	39	11	7
Mar-02	3	3	22	4	2
Mar-03	9	2	18	1	1
Mar-04	10	4	68	4	6
Mar-05	3	2	20	2	0
Apr-79	145	6	2	8	8
Apr-80	229	1	3	19	3
Apr-81	219	19	5	11	15

State Water Project (SWP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	**Salmon**	**Steelhead**	**Striped Bass**	**Splittail**	**Delta Smelt**
Apr-82	78	30	18	10	1
Apr-83	0	0	0	0	0
Apr-84	125	2	5	19	0
Apr-85	159	5	8	21	6
Apr-86	1103	8	6	216	3
Apr-87	326	8	4	5	5
Apr-88	152	9	1	13	0
Apr-89	133	6	4	28	0
Apr-90	60	3	2	4	1
Apr-91	93	8	54	29	4
Apr-92	38	3	3	2	0
Apr-93	12	3	0	2	0
Apr-94	12	2	1	0	10
Apr-95	5	0	0	2	0
Apr-96	19	1	0	0	0
Apr-97	56	1	3	40	1
Apr-98	0	0	0	0	0
Apr-99	154	3	9	4	1
Apr-00	151	1	2	8	1
Apr-01	223	4	53	28	4
Apr-02	26	3	9	8	0
Apr-03	87	3	7	1	0
Apr-04	24	3	18	2	0
Apr-05	24	2	8	3	0
May-79	325	6	67	159	11
May-80	296	3	3	586	4
May-81	111	0	2125	11	81
May-82	632	20	8	112	0
May-83	5	8	228	59	0
May-84	211	0	95	17	3
May-85	525	3	2085	19	8
May-86	948	3	408	3274	1
May-87	619	2	55227	22	1
May-88	354	2	3000	22	47
May-89	210	2	8154	56	7
May-90	397	1	5625	37	23
May-91	164	1	154	8	5
May-92	34	1	11584	1	41
May-93	27	2	3151	120	117
May-94	30	2	1897	1	226
May-95	36	1	2	275	0
May-96	28	1	21	107	81
May-97	41	0	52	7	183
May-98	21	0	0	112	0
May-99	216	2	40	3	425
May-00	88	0	380	120	206
May-01	175	6	326	7	599
May-02	73	5	45	7	722
May-03	42	6	311	9	184
May-04	18	4	119	39	87
May-05	47	2	6	393	10

State Water Project (SWP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	**Salmon**	**Steelhead**	**Striped Bass**	**Splittail**	**Delta Smelt**
Jun-79	45	0	4944	214	34
Jun-80	138	0	2857	557	76
Jun-81	3	0	18106	0	174
Jun-82	350	8	593	524	1
Jun-83	362	0	127	575	28
Jun-84	282	0	14624	72	13
Jun-85	55	0	13222	88	42
Jun-86	495	0	45623	2832	0
Jun-87	85	0	48724	1031	113
Jun-88	130	0	53820	63	361
Jun-89	5	0	40197	23	20
Jun-90	38	0	10209	0	229
Jun-91	16	0	23412	187	175
Jun-92	0	0	16530	2	38
Jun-93	6	0	32091	59	51
Jun-94	1	0	8323	1	233
Jun-95	41	0	360	8734	0
Jun-96	5	0	1262	37	38
Jun-97	5	0	3705	17	51
Jun-98	17	0	15	1881	0
Jun-99	10	1	1351	7	784
Jun-00	12	0	7694	112	140
Jun-01	0	0	3553	10	133
Jun-02	2	1	3720	3	101
Jun-03	1	0	990	13	30
Jun-04	2	0	723	5	66
Jun-05	7	1	80	158	6
Jul-79	21	0	4283	42	35
Jul-80	7	0	10216	115	109
Jul-81	0	0	7671	0	170
Jul-82	0	0	3715	182	12
Jul-83	5	0	200	162	16
Jul-84	0	0	12583	113	10
Jul-85	1	0	3132	11	0
Jul-86	0	0	23838	174	1
Jul-87	2	0	5488	23	8
Jul-88	10	0	23723	30	20
Jul-89	0	0	7463	11	21
Jul-90	0	0	5344	1	180
Jul-91	0	0	6929	33	110
Jul-92	0	0	3117	0	0
Jul-93	0	0	14631	6	3
Jul-94	0	0	1253	0	18
Jul-95	0	0	2172	296	0
Jul-96	0	0	821	3	0
Jul-97	0	0	446	3	1
Jul-98	1	0	424	2736	1
Jul-99	0	0	2935	25	56
Jul-00	0	0	2263	14	3
Jul-01	0	0	1170	5	1
Jul-02	0	1	876	2	0

State Water Project (SWP) Average Monthly Fish Densities by Species (CONT'D)

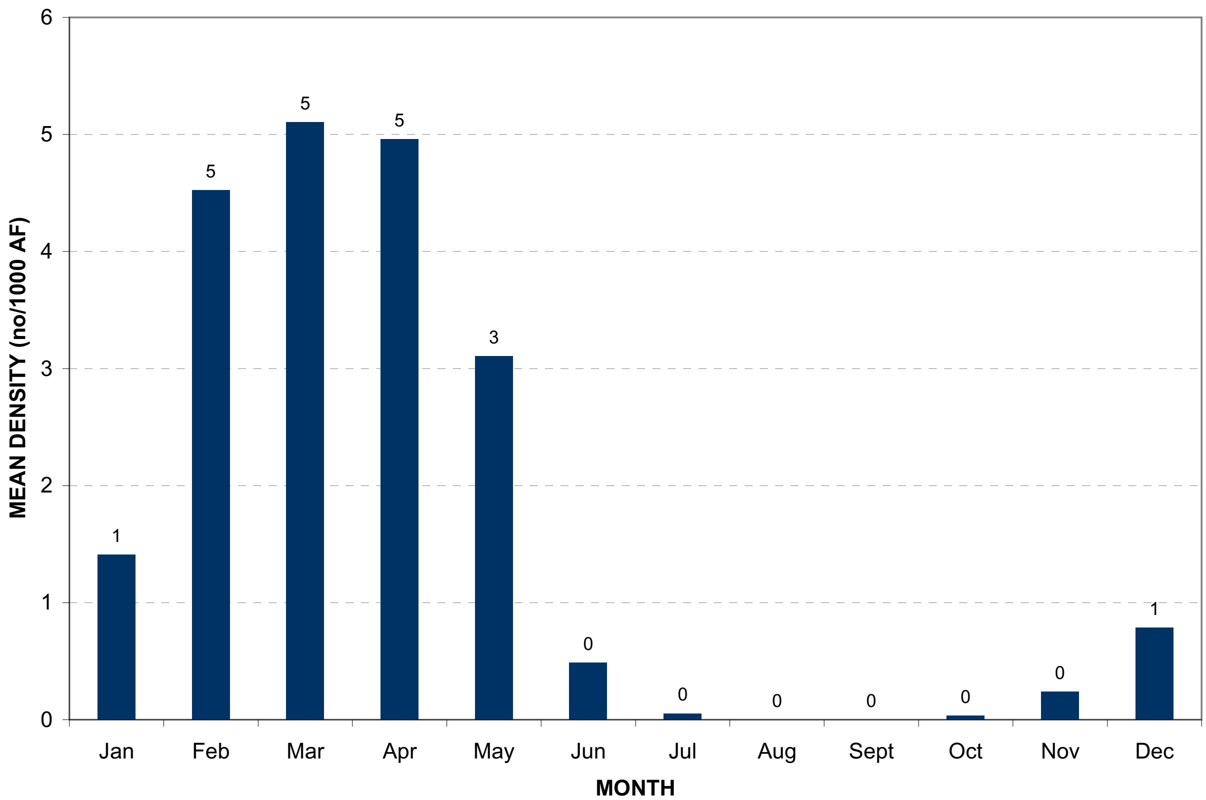
Month/Year	Salmon	Steelhead	Striped Bass	Splittail	Delta Smelt
Jul-03	0	0	704	1	0
Jul-04	0	0	224	1	3
Jul-05	1	0	340	19	0
Aug-79	1	0	982	11	2
Aug-80	0	0	1762	18	27
Aug-81	0	0	553	0	0
Aug-82	0	0	1498	224	5
Aug-83	0	0	222	69	0
Aug-84	2	0	362	25	0
Aug-85	0	0	331	1	0
Aug-86	0	0	1218	28	0
Aug-87	0	0	95	2	9
Aug-88	1	0	1432	1	0
Aug-89	0	0	554	25	2
Aug-90	0	0	1112	0	0
Aug-91	0	0	1316	0	26
Aug-92	0	0	258	0	0
Aug-93	0	0	1022	1	0
Aug-94	0	0	61	0	0
Aug-95	0	0	510	16	0
Aug-96	0	0	17	1	0
Aug-97	0	0	17	0	0
Aug-98	0	0	608	56	0
Aug-99	0	0	1153	5	0
Aug-00	0	0	318	1	0
Aug-01	0	0	38	2	0
Aug-02	1	0	31	1	0
Aug-03	0	0	54	1	0
Aug-04	0	0	24	12	0
Sep-79	0	0	36	1	0
Sep-80	5	0	343	3	1
Sep-81	0	0	27	0	0
Sep-82	0	0	189	1	0
Sep-83	0	0	53	3	5
Sep-84	0	0	110	3	0
Sep-85	0	0	52	1	2
Sep-86	0	0	343	12	0
Sep-87	0	0	65	1	0
Sep-88	0	0	24	2	0
Sep-89	0	0	37	4	0
Sep-90	0	0	60	0	0
Sep-91	0	0	108	0	0
Sep-92	0	0	7	0	0
Sep-93	0	0	62	0	0
Sep-94	0	0	63	0	0
Sep-95	0	0	39	1	0
Sep-96	0	0	26	0	0
Sep-97	0	0	10	0	0
Sep-98	0	0	170	5	0
Sep-99	0	0	11	1	0

State Water Project (SWP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	Salmon	Steelhead	Striped Bass	Splittail	Delta Smelt
Sep-00	1	0	30	0	0
Sep-01	0	0	3	9	0
Sep-02	0	0	67	1	0
Sep-03	0	0	17	0	0
Sep-04	0	0	17	1	0
Oct-79	6	0	244	0	1
Oct-80	7	0	54	0	2
Oct-81	2	0	19	0	0
Oct-82	0	0	118	0	0
Oct-83	0	0	9	0	0
Oct-84	63	0	651	0	0
Oct-85	5	0	23	1	0
Oct-86	0	0	210	1	0
Oct-87	0	0	2	0	0
Oct-88	1	0	30	0	1
Oct-89	0	0	13	0	0
Oct-90	0	0	22	0	0
Oct-91	0	0	28	1	2
Oct-92	0	0	1	0	0
Oct-93	0	0	14	0	0
Oct-94	0	0	1	0	0
Oct-95	0	0	12	0	0
Oct-96	0	0	187	0	0
Oct-97	0	0	95	0	0
Oct-98	0	0	127	3	0
Oct-99	0	0	0	0	0
Oct-00	1	0	49	1	0
Oct-01	0	0	3	0	0
Oct-02	0	0	31	0	0
Oct-03	0	0	9	1	0
Oct-04	0	0	9	2	0
Nov-79	23	0	404	0	5
Nov-80	6	0	474	0	2
Nov-81	12	0	218	1	2
Nov-82	34	0	344	0	2
Nov-83	3	0	91	0	0
Nov-84	39	0	579	1	0
Nov-85	5	0	486	1	0
Nov-86	1	0	437	0	0
Nov-87	0	0	238	0	0
Nov-88	3	0	428	1	0
Nov-89	2	0	100	0	1
Nov-90	0	0	332	0	0
Nov-91	33	5	99	0	0
Nov-92	0	0	344	0	0
Nov-93	0	0	463	1	0
Nov-94	0	0	381	0	0
Nov-95	0	0	49	0	0
Nov-96	0	0	389	0	0
Nov-97	0	0	7	0	0

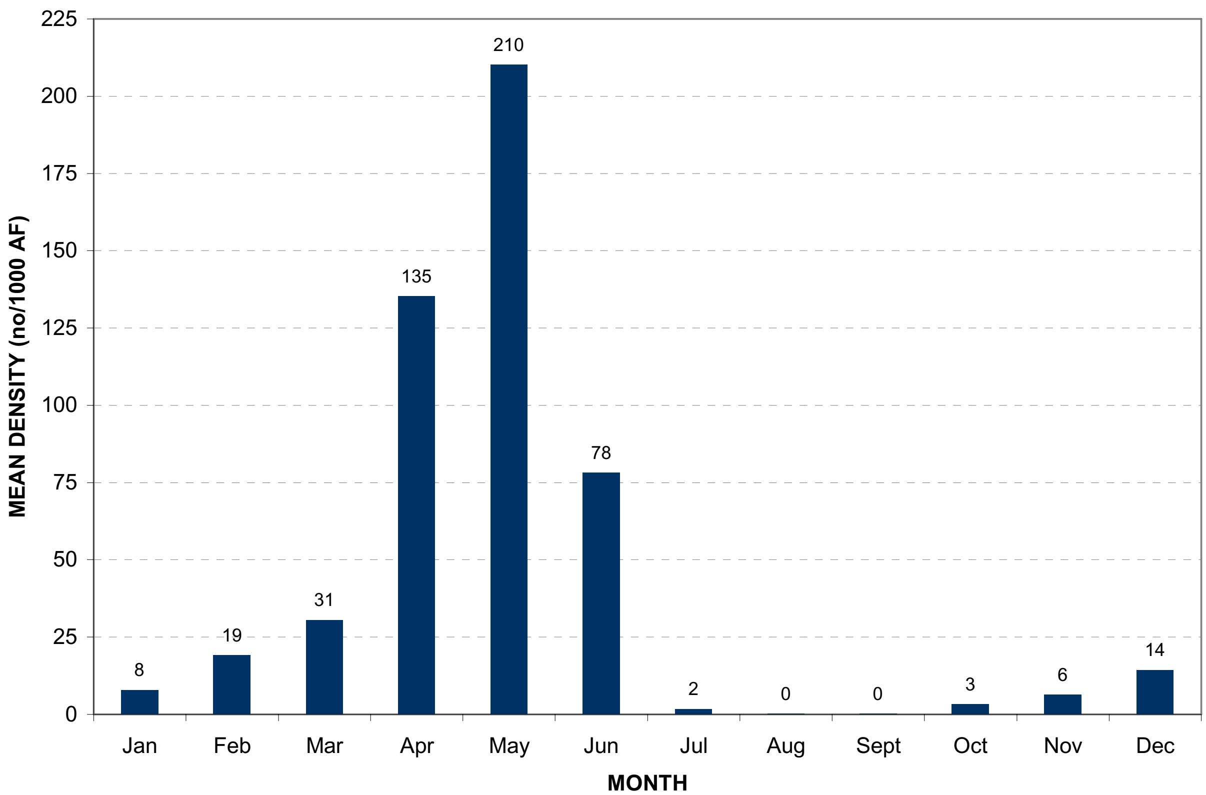
State Water Project (SWP) Average Monthly Fish Densities by Species (CONT'D)

Month/Year	**Salmon**	**Steelhead**	**Striped Bass**	**Splittail**	**Delta Smelt**
Nov-98	0	0	97	1	0
Nov-99	0	0	0	0	0
Nov-00	2	1	181	0	2
Nov-01	0	0	452	0	0
Nov-02	1	0	958	3	0
Nov-03	0	0	125	1	0
Nov-04	0	0	183	2	0
Dec-79	16	0	440	3	0
Dec-80	9	0	670	1	12
Dec-81	54	2	246	4	3
Dec-82	148	0	532	2	2
Dec-83	0	0	647	0	0
Dec-84	34	0	473	5	1
Dec-85	5	0	256	0	1
Dec-86	2	9	321	6	2
Dec-87	78	2	631	9	18
Dec-88	4	0	956	1	2
Dec-89	3	0	30	0	0
Dec-90	0	0	102	0	0
Dec-91	0	0	960	0	0
Dec-92	1	0	199	0	0
Dec-93	2	0	15	0	0
Dec-94	3	0	80	0	0
Dec-95	0	0	7	0	0
Dec-96	0	0	27	0	0
Dec-97	1	0	395	3	1
Dec-98	0	0	20	0	0
Dec-99	0	0	0	0	0
Dec-00	2	1	49	2	2
Dec-01	2	0	315	3	4
Dec-02	5	2	171	3	20
Dec-03	3	1	75	3	1
Dec-04	1	3	96	1	0



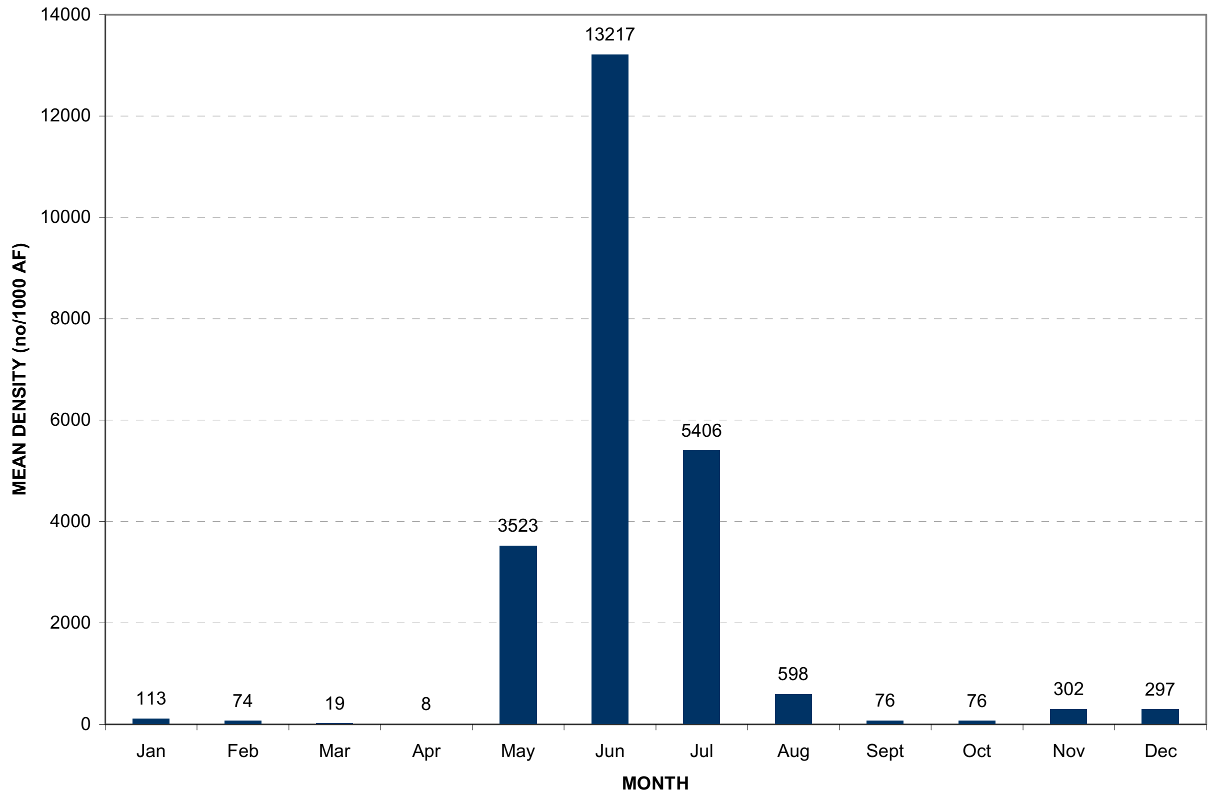
Average monthly densities of steelhead at the SWP salvage facility, 1979-2005*.

*Note: 2005 data is from January-July only.



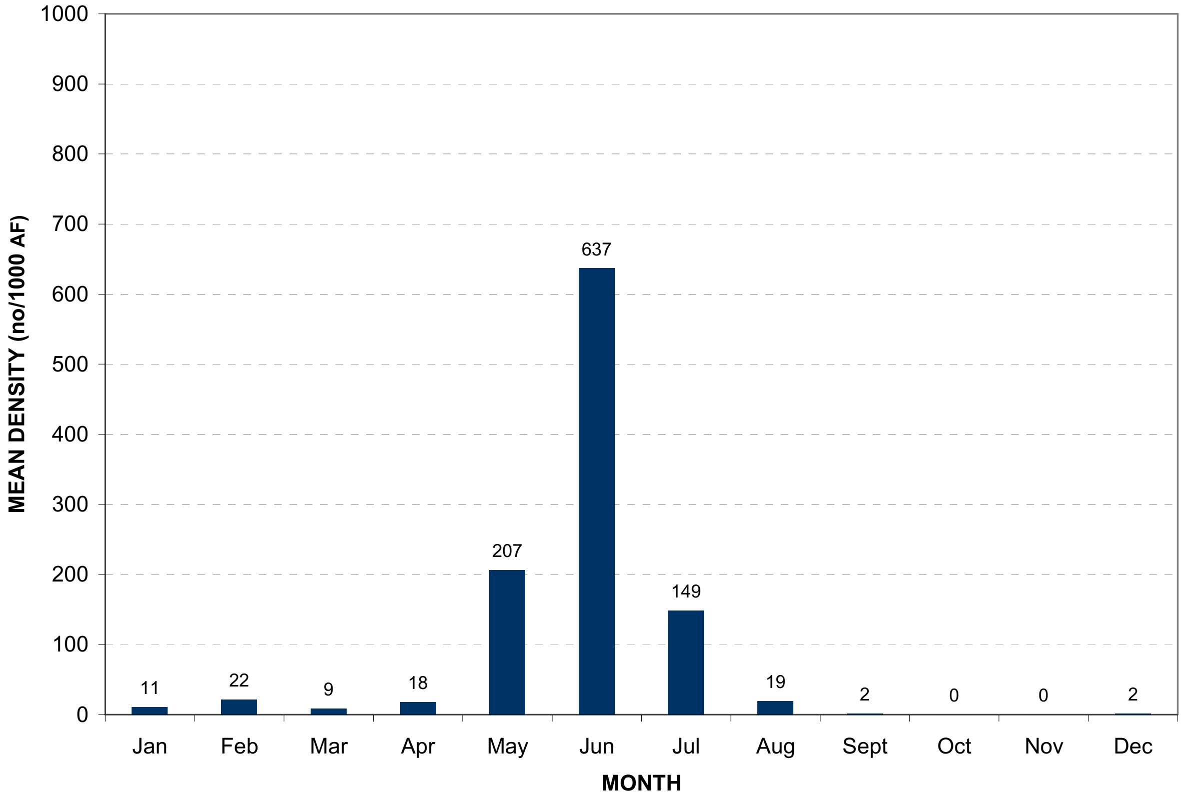
Average monthly densities of salmon at the SWP salvage facility, 1979-2005*.

*Note: 2005 data is from January-July only.



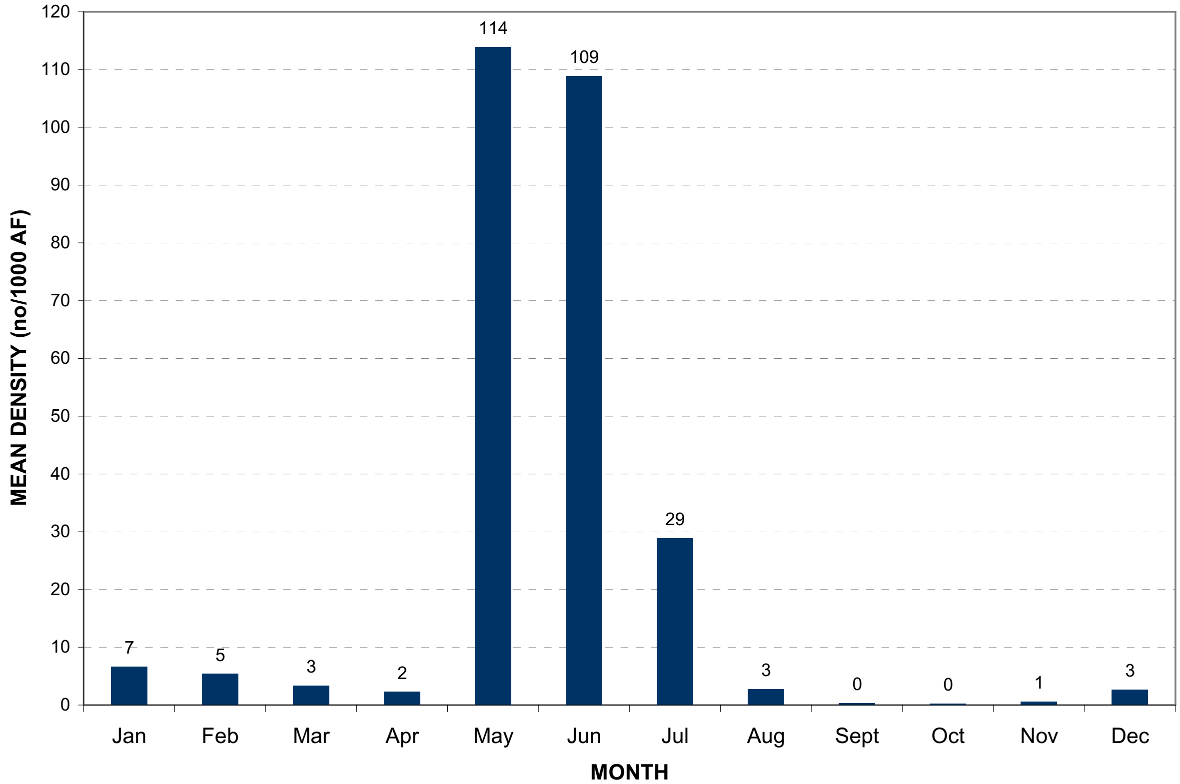
Average monthly densities of striped bass at the SWP salvage facility, 1979-2005*.

*Note: 2005 data is from January-July only.



Average monthly densities of splittail at the SWP salvage facility, 1979-2005*.

*Note: 2005 data is from January-July only.



Average monthly densities of delta smelt at the SWP salvage facility, 1979-2005*.

*Note: 2005 data is from January-July only.

Station 508: Mallard Slough (west of)					
Month	Year	Date	Survey	Station	CPUE
MARCH	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	*No Sampling Conducted*			
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	22-Mar-00	1	508	**31.51**
	2001	21-Mar-01	1	508	**0.00**
	2002	20-Mar-02	1	508	**0.00**
	2003	26-Mar-03	1	508	**6.48**
	2004	19-Mar-05	1	508	**0.00**
	2005	30-Mar-05	2	508	**0.00**
APRIL	1995	28-Apr-95	1	508	**0.00**
	1996	12-Apr-96	1	508	31.54
		26-Apr-96	2	508	14.40
				AVG	**22.97**
	1997	16-Apr-97	2	508	0.00
		30-Apr-97	3	508	4.23
				AVG	**2.11**
	1998	23-Apr-98	2	508	**0.00**
	1999	14-Apr-99	1	508	**0.00**
		29-Apr-99	2	508	**14.43**
	2000	5-Apr-00	2	508	0.00
		19-Apr-00	3	508	3.68
				AVG	**1.84**
	2001	4-Apr-01	2	508	0.00
		18-Apr-01	3	508	0.00
				AVG	**0.00**
	2002	4-Apr-02	2	508	0.00
		17-Apr-02	3	508	0.00
				AVG	**0.00**
	2003	9-Apr-03	2	508	0.00
		23-Apr-03	3	508	0.00
				AVG	**0.00**
	2004	1-Apr-04	1	508	0.00
		14-Apr-04	2	508	3.43
		28-Apr-04	3	508	0.00
				AVG	**1.14**
	2005	13-Apr-05	3	508	0.00
		27-Apr-05	4	508	6.07
				AVG	**3.03**
MAY	1995	10-May-95	2	508	**4.03**
	1996	11-May-96	3	508	179.12
		23-May-96	4	508	116.12
				AVG	**147.62**
	1997	14-May-97	4	508	0.00
		31-May-97	5	508	18.12
				AVG	**9.06**
	1998	6-May-98	3	508	0.00
		20-May-98	4	508	3.96
				AVG	**1.98**
	1999	12-May-99	3	508	4.02
		23-May-99	4	508	0.00
				AVG	**2.01**
	2000	3-May-00	4	508	3.39
		8-May-00	10	508	0.00

Station 520: Mallard Slough (east of)					
Month	Year	Date	Survey	Station	CPUE
MARCH	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	*No Sampling Conducted*			
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	22-Mar-00	1	520	**16.28**
	2001	21-Mar-01	1	520	**3.84**
	2002	20-Mar-02	1	520	**0.00**
	2003	26-Mar-03	1	520	**0.00**
	2004	*No Sampling Conducted*			
	2005	19-Mar-05	1	520	0.00
		30-Mar-05	2	520	0.00
				AVG	**0.00**
APRIL	1995	27-Apr-95	1	520	**15.11**
	1996	12-Apr-96	1	520	31.93
		26-Apr-96	2	520	3.68
				AVG	**17.80**
	1997	16-Apr-97	2	520	0.00
		30-Apr-97	3	520	0.00
				AVG	0.00
	1998	23-Apr-98	2	520	**3.90**
	1999	14-Apr-99	1	520	4.08
		26-Apr-99	2	520	0.00
				AVG	**2.04**
	2000	5-Apr-00	2	520	8.23
		19-Apr-00	3	520	50.97
				AVG	**29.60**
	2001	4-Apr-01	2	520	0.00
		18-Apr-01	3	520	0.00
				AVG	**0.00**
	2002	4-Apr-02	2	520	0.00
		17-Apr-02	3	520	0.00
				AVG	**0.00**
	2003	9-Apr-03	2	520	0.00
		23-Apr-03	3	520	0.00
				AVG	**0.00**
	2004	1-Apr-04	1	520	10.00
		14-Apr-04	2	520	0.00
		28-Apr-04	3	520	3.00
				AVG	**4.00**
	2005	13-Apr-05	3	520	0.00
		27-Apr-05	4	520	6.00
				AVG	**3.00**
MAY	1995	10-May-95	2	520	0.00
		24-May-95	3	520	0.00
				AVG	**0.00**
	1996	11-May-96	3	520	242.00
		23-May-96	4	520	35.00
				AVG	**139.00**
	1997	14-May-97	4	520	107.00
		31-May-97	5	520	173.00
				AVG	**140.00**
	1998	6-May-98	3	520	11.00
		20-May-98	4	520	4.00
				AVG	**8.00**

Station 508: Mallard Slough (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
		17-May-00	5	508	63.73
		23-May-00	11	508	115.88
		31-May-00	6	508	136.96
				AVG	**63.99**
	2001	3-May-01	4	508	0.00
		16-May-01	5	508	0.00
		31-May-01	6	508	3.72
				AVG	**1.24**
	2002	1-May-02	4	508	0.00
		15-May-02	5	508	0.00
		30-May-02	6	508	0.00
				AVG	**0.00**
	2003	7-May-03	4	508	3.30
		21-May-03	5	508	0.00
				AVG	**1.65**
	2004	12-May-04	4	508	0.00
		26-May-04	5	508	0.00
				AVG	**0.00**
	2005	11-May-05	5	508	30.72
		25-May-05	6	508	3.70
				AVG	**17.21**
JUNE	1995	7-Jun-95	4	508	3.39
		24-Jun-95	5	508	0.00
				AVG	**1.70**
	1996	10-Jun-96	5	508	489.52
		26-Jun-96	6	508	81.49
				AVG	**285.50**
	1997	11-Jun-97	6	508	0.00
		26-Jun-97	7	508	23.67
				AVG	**11.84**
	1998	3-Jun-98	5	508	15.09
		17-Jun-98	6	508	3.75
		30-Jun-98	7	508	0.00
				AVG	**6.28**
	1999	9-Jun-99	5	508	76.07
		23-Jun-99	6	508	41.80
				AVG	**58.94**
	2000	6-Jun-00	12	508	0.00
		14-Jun-00	7	508	334.33
		30-Jun-00	8	508	10.86
				AVG	**115.06**
	2001	16-Jun-01	7	508	0.00
		30-Jun-01	8	508	11.72
				AVG	**5.86**
	2002	14-Jun-02	7	508	0.00
		29-Jun-02	8	508	0.00
				AVG	**0.00**
	2003	7-Jun-03	6	508	0.00
		18-Jun-03	7	508	22.74
				AVG	**11.37**
	2004	12-Jun-04	6	508	0.00
		23-Jun-04	7	508	0.00
				AVG	**0.00**
	2005	8-Jun-05	7	508	16.49
		22-Jun-05	8	508	0.00
				AVG	**8.25**

Station 520: Mallard Slough (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
	1999	12-May-99	3	520	25.00
		28-May-99	4	520	184.00
				AVG	**105.00**
	2000	3-May-00	4	520	32.00
		8-May-00	10	520	0.00
		17-May-00	5	520	175.00
		23-May-00	11	520	16.00
		31-May-00	6	520	119.00
				AVG	**69.00**
	2001	1-May-01	4	520	7.00
		16-May-01	5	520	0.00
		31-May-01	6	520	0.00
				AVG	**2.00**
	2002	1-May-02	4	520	0.00
		15-May-02	5	520	3.00
		30-May-02	6	520	7.00
				AVG	**4.00**
	2003	7-May-03	4	520	3.00
		21-May-03	5	520	12.00
				AVG	**7.00**
	2004	12-May-04	4	520	0.00
		26-May-04	5	520	0.00
				AVG	**0.00**
	2005	11-May-05	5	520	26.00
		25-May-05	6	520	62.00
				AVG	**44.00**
JUNE	1995	7-Jun-95	4	520	3.42
		24-Jun-95	5	520	41.53
				AVG	**22.48**
	1996	10-Jun-96	5	520	319.90
		26-Jun-96	6	520	273.24
				AVG	**296.57**
	1997	11-Jun-97	6	520	19.14
		26-Jun-97	7	520	49.60
				AVG	**34.37**
	1998	3-Jun-98	5	520	46.03
		17-Jun-98	6	520	4.28
		30-Jun-98	7	520	12.00
				AVG	**20.77**
	1999	9-Jun-99	5	520	199.14
		23-Jun-99	6	520	281.26
				AVG	**240.20**
	2000	7-Jun-00	12	520	204.21
		14-Jun-00	7	520	122.07
		30-Jun-00	8	520	12.93
				AVG	**113.07**
	2001	16-Jun-01	7	520	12.16
		30-Jun-01	8	520	8.47
				AVG	**10.32**
	2002	14-Jun-02	7	520	0.00
		29-Jun-02	8	520	14.62
				AVG	**7.31**
	2003	7-Jun-03	6	520	13.99
		18-Jun-03	7	520	66.38
				AVG	**40.19**
	2004	12-Jun-04	6	520	3.31

Station 508: Mallard Slough (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
JULY	1995	7-Jul-95	6	508	18.51
		21-Jul-95	7	508	25.03
				AVG	**21.77**
	1996	10-Jul-96	7	508	145.68
		24-Jul-96	8	508	79.44
				AVG	**112.56**
	1997	10-Jul-97	8	508	11.56
		24-Jul-97	9	508	23.41
				AVG	**17.49**
	1998	15-Jul-98	8	508	0.00
		29-Jul-98	9	508	0.00
				AVG	**0.00**
	1999	8-Jul-99	7	508	157.03
		21-Jul-99	8	508	11.91
				AVG	**84.47**
	2000	14-Jul-00	9	508	**7.65**
	2001	*No Sampling Conducted*			
	2002	*No Sampling Conducted*			
	2003	2-Jul-03	8	508	**0.00**
	2004	8-Jul-04	8	508	**3.37**
	2005	9-Jul-05	9	508	**28.68**
AUG	1995	7-Aug-95	8	508	**3.45**

* Sampling not normally conducted in August

Station 520: Mallard Slough (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
		23-Jun-04	7	520	0.00
				AVG	**1.66**
	2005	8-Jun-05	7	520	3.61
		22-Jun-05	8	520	14.12
				AVG	**8.87**
JULY	1995	5-Jul-95	6	520	12.79
		19-Jul-95	7	520	3.44
				AVG	**8.12**
	1996	10-Jul-96	7	520	20.72
		24-Jul-96	8	520	10.33
				AVG	**15.52**
	1997	10-Jul-97	8	520	21.53
		24-Jul-97	9	520	0.00
				AVG	**10.76**
	1998	15-Jul-98	8	520	0.00
		29-Jul-98	9	520	0.00
				AVG	**0.00**
	1999	8-Jul-99	7	520	91.22
		21-Jul-99	8	520	16.82
				AVG	**54.02**
	2000	14-Jul-00	9	520	**7.26**
	2001	*No Sampling Conducted*			
	2002	*No Sampling Conducted*			
	2003	2-Jul-03	8	520	**14.23**
	2004	8-Jul-04	8	520	**6.55**
	2005	9-Jul-05	9	520	**0.00**
AUG	1995	7-Aug-95	8	520	**7.14**

Station 902: Rock Slough Intake					
Month	Year	Date	Survey	Station	CPUE
MARCH	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	31-Mar-97	1	902	**0.00**
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	20-Mar-00	1	902	**0.00**
	2001	19-Mar-01	1	902	**0.00**
	2002	18-Mar-02	1	902	**0.00**
	2003	24-Mar-03	1	902	**3.13**
	2004	29-Mar-04	1	902	**0.00**
	2005	14-Mar-05	1	902	0.00
		28-Mar-05	2	902	0.00
				AVG	**0.00**
APRIL	1995	24-Apr-95	1	902	**0.00**
	1996	10-Apr-96	1	902	13.73
		24-Apr-96	2	902	11.42
				AVG	**8.38**
	1997	14-Apr-97	2	902	17.67
		28-Apr-97	3	902	7.44
				AVG	**12.56**
	1998	6-Apr-98	1	902	0.00
		21-Apr-98	2	902	0.00
				AVG	**0.00**
	1999	12-Apr-99	1	902	0.00
		27-Apr-99	2	902	4.79
				AVG	**2.39**
	2000	3-Apr-00	2	902	0.00
		17-Apr-00	3	902	14.35
				AVG	**7.18**
	2001	2-Apr-01	2	902	0.00
		16-Apr-01	3	902	0.00
		30-Apr-01	4	902	42.63
				AVG	**14.21**
	2002	2-Apr-02	2	902	6.96
		15-Apr-02	3	902	28.45
		29-Apr-02	4	902	7.24
				AVG	**14.22**
	2003	7-Apr-03	2	902	0.00
		21-Apr-03	3	902	0.00
				AVG	**0.00**
	2004	12-Apr-04	2	902	0.00
		26-Apr-04	3	902	3.54
				AVG	**1.77**
	2005	11-Apr-05	3	902	0.00
		25-Apr-05	4	902	0.00
				AVG	**0.00**
MAY	1995	8-May-95	2	902	0.00
		22-May-95	3	902	0.00
				AVG	**0.00**
	1996	9-May-96	3	902	0.00
		21-May-96	4	902	7.23
				AVG	**3.62**
	1997	12-May-97	4	902	16.07
		27-May-97	5	902	0.00
				AVG	**8.04**

Station 910: Rindge Tract					
Month	Year	Date	Survey	Station	CPUE
MARCH	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	31-Mar-97	1	910	**0.00**
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	20-Mar-00	1	910	**0.00**
	2001	19-Mar-01	1	910	**0.00**
	2002	18-Mar-02	1	910	**0.00**
	2003	25-Mar-03	1	910	**3.44**
	2004	29-Mar-04	1	910	**0.00**
	2005	14-Mar-05	1	910	0.00
		28-Mar-05	2	910	0.00
			AVG		**0.00**
APRIL	1995	24-Apr-95	1	910	**0.00**
	1996	10-Apr-96	1	910	0.00
		24-Apr-96	2	910	0.00
			AVG		**0.00**
	1997	14-Apr-97	2	910	0.00
		28-Apr-97	3	910	7.18
			AVG		**3.59**
	1998	6-Apr-98	1	910	0.00
		21-Apr-98	2	910	0.00
			AVG		**0.00**
	1999	12-Apr-99	1	910	3.87
		27-Apr-99	2	910	8.59
			AVG		**6.23**
	2000	3-Apr-00	2	910	0.00
		17-Apr-00	3	910	0.00
			AVG		**0.00**
	2001	2-Apr-01	2	910	12.13
		16-Apr-01	3	910	3.80
		30-Apr-01	4	910	7.51
			AVG		**7.81**
	2002	2-Apr-02	2	910	28.61
		15-Apr-02	3	910	7.13
		29-Apr-02	4	910	0.00
			AVG		**11.91**
	2003	7-Apr-03	2	910	61.26
		22-Apr-03	3	910	3.66
			AVG		**32.46**
	2004	12-Apr-04	2	910	0.00
		26-Apr-04	3	910	0.00
			AVG		**0.00**
	2005	11-Apr-05	3	910	0.00
		25-Apr-05	4	910	0.00
			AVG		**0.00**
MAY	1995	8-May-95	2	910	0.00
		22-May-95	3	910	0.00
			AVG		**0.00**
	1996	9-May-96	3	910	0.00
		21-May-96	4	910	0.00
			AVG		**0.00**
	1997	12-May-97	4	910	0.00
		27-May-97	5	910	0.00
			AVG		**0.00**

Station 902: Rock Slough Intake (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
	1998	4-May-98	3	902	3.90
		18-May-98	4	902	0.00
				AVG	**1.95**
	1999	10-May-99	3	902	73.98
		24-May-99	4	902	100.24
				AVG	**87.11**
	2000	1-May-00	4	902	19.36
		7-May-00	10	902	0.00
		15-May-00	5	902	10.92
		22-May-00	11	902	0.00
		29-May-00	6	902	0.00
				AVG	**6.06**
	2001	14-May-01	5	902	26.26
		29-May-01	6	902	3.78
					15.02
	2002	13-May-02	5	902	27.42
		28-May-02	6	902	0.00
				AVG	**13.71**
	2003	5-May-03	4	902	3.50
		19-May-03	5	902	3.80
				AVG	**3.65**
	2004	10-May-04	4	902	6.68
		24-May-04	5	902	0.00
				AVG	**3.34**
	2005	9-May-05	5	902	0.00
		23-May-05	6	902	0.00
				AVG	**0.00**
JUNE	1995	5-Jun-95	4	902	0.00
		20-Jun-95	5	902	0.00
				AVG	**0.00**
	1996	8-Jun-96	5	902	0.00
		24-Jun-96	6	902	0.00
				AVG	**0.00**
	1997	9-Jun-97	6	902	0.00
		24-Jun-97	7	902	0.00
				AVG	**0.00**
	1998	1-Jun-98	5	902	0.00
		15-Jun-98	6	902	0.00
		28-Jun-98	7	902	0.00
				AVG	**0.00**
	1999	7-Jun-99	5	902	39.81
		21-Jun-99	6	902	0.00
				AVG	**19.90**
	2000	5-Jun-00	12	902	5.40
		12-Jun-00	7	902	0.00
		26-Jun-00	8	902	3.55
				AVG	**2.98**
	2001	11-Jun-01	7	902	0.00
		25-Jun-01	8	902	0.00
				AVG	**0.00**
	2002	10-Jun-02	7	902	3.48
		24-Jun-02	8	902	3.69
				AVG	**3.58**
	2003	2-Jun-03	6	902	0.00
		16-Jun-03	7	902	3.74
		30-Jun-03	8	902	0.00

Station 910: Rindge Tract (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
	1998	4-May-98	3	910	0.00
		18-May-98	4	910	0.00
			AVG		**0.00**
	1999	10-May-99	3	910	20.13
		24-May-99	4	910	16.25
			AVG		**18.19**
	2000	1-May-00	4	910	0.00
		7-May-00	10	910	0.00
		15-May-00	5	910	7.00
		22-May-00	11	910	16.14
		29-May-00	6	910	0.00
			AVG		**4.63**
	2001	14-May-01	5	910	0.00
		29-May-01	6	910	3.56
			AVG		**1.78**
	2002	13-May-02	5	910	0.00
		28-May-02	6	910	0.00
			AVG		**0.00**
	2003	5-May-03	4	910	0.00
		19-May-03	5	910	0.00
			AVG		**0.00**
	2004	10-May-04	4	910	0.00
		24-May-04	5	910	0.00
			AVG		**0.00**
	2005	10-May-05	5	910	0.00
		23-May-05	6	910	0.00
			AVG		**0.00**
JUNE	1995	6-Jun-95	4	910	0.00
		21-Jun-95	5	910	0.00
			AVG		**0.00**
	1996	8-Jun-96	5	910	0.00
		25-Jun-96	6	910	0.00
			AVG		**0.00**
	1997	9-Jun-97	6	910	0.00
		24-Jun-97	7	910	0.00
			AVG		**0.00**
	1998	1-Jun-98	5	910	0.00
		15-Jun-98	6	910	0.00
		28-Jun-98	7	910	0.00
			AVG		**0.00**
	1999	7-Jun-99	5	910	8.06
		21-Jun-99	6	910	7.82
			AVG		**7.94**
	2000	5-Jun-00	12	910	30.03
		12-Jun-00	7	910	6.54
		26-Jun-00	8	910	6.31
			AVG		**14.29**
	2001	11-Jun-01	7	910	0.00
		26-Jun-01	8	910	0.00
			AVG		**0.00**
	2002	10-Jun-02	7	910	0.00
		24-Jun-02	8	910	0.00
			AVG		**0.00**
	2003	2-Jun-03	6	910	0.00
		16-Jun-03	7	910	0.00
		30-Jun-03	8	910	0.00

Station 902: Rock Slough Intake (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
				AVG	**1.25**
	2004	11-Jun-04	6	902	0.00
		21-Jun-04	7	902	0.00
				AVG	**0.00**
	2005	6-Jun-05	7	902	0.00
		20-Jun-05	8	902	0.00
				AVG	**0.00**
JULY	1995	3-Jul-95	6	902	0.00
		17-Jul-95	7	902	0.00
		31-Jul-95	8	902	0.00
				AVG	**0.00**
	1996	8-Jul-96	7	902	0.00
		22-Jul-96	8	902	0.00
				AVG	**0.00**
	1997	8-Jul-97	8	902	0.00
		22-Jul-97	9	902	0.00
				AVG	**0.00**
	1998	13-Jul-98	8	902	0.00
		27-Jul-98	9	902	0.00
				AVG	**0.00**
	1999	6-Jul-99	7	902	0.00
		19-Jul-99	8	902	0.00
				AVG	**0.00**
	2000	10-Jul-00	9	902	**0.00**
	2001	9-Jul-01	9	902	**0.00**
	2002	*No Sampling Conducted*			
	2003	*No Sampling Conducted*			
	2004	6-Jul-04	8	902	**0.00**
	2005	5-Jul-05	9	902	**0.00**

Station 910: Rindge Tract (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
			AVG		**0.00**
	2004	9-Jun-04	6	910	3.14
		21-Jun-04	7	910	0.00
			AVG		**1.57**
	2005	6-Jun-05	7	910	0.00
		20-Jun-05	8	910	0.00
			AVG		**0.00**
JULY	1995	3-Jul-95	6	910	0.00
		17-Jul-95	7	910	0.00
		31-Jul-95	8	910	0.00
			AVG		**0.00**
	1996	8-Jul-96	7	910	0.00
		22-Jul-96	8	910	0.00
			AVG		**0.00**
	1997	8-Jul-97	8	910	0.00
		22-Jul-97	9	910	0.00
			AVG		**0.00**
	1998	14-Jul-98	8	910	0.00
		27-Jul-98	9	910	0.00
			AVG		**0.00**
	1999	6-Jul-99	7	910	0.00
		19-Jul-99	8	910	0.00
			AVG		**0.00**
	2000	10-Jul-00	9	910	0.00
	2001	*No Sampling Conducted*			
	2002	*No Sampling Conducted*			
	2003	*No Sampling Conducted*			
	2004	6-Jul-04	8	910	**0.00**
	2005	6-Jul-05	9	910	**0.00**

Station 912: Stockton Deep Water Ship Channel					
Month	Year	Date	Survey	Station	CPUE
MARCH	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	*No Sampling Conducted*			
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	20-Mar-00	1	912	**0.00**
	2001	19-Mar-01	1	912	**0.00**
	2002	18-Mar-02	1	912	**0.00**
	2003	24-Mar-03	1	912	**0.00**
	2004	29-Mar-04	1	912	**0.00**
	2005	14-Mar-05	1	912	0.00
		28-Mar-05	2	912	0.00
			AVG		**0.00**
APRIL	1995	24-Apr-95	1	912	**0.00**
	1996	10-Apr-96	1	912	**0.00**
		24-Apr-96	2	912	0.00
			AVG		**0.00**
	1997	14-Apr-97	2	912	0.00
		28-Apr-97	3	912	0.00
			AVG		**0.00**
	1998	21-Apr-98	2	912	**0.00**
	1999	12-Apr-99	1	912	7.67
		27-Apr-99	2	912	0.00
			AVG		**3.84**
	2000	3-Apr-00	2	912	0.00
		17-Apr-00	3	912	0.00
			AVG		**0.00**
	2001	2-Apr-01	2	912	7.48
		16-Apr-01	3	912	0.00
		30-Apr-01	4	912	0.00
			AVG		**2.49**
	2002	2-Apr-02	2	912	0.00
		15-Apr-02	3	912	0.00
		29-Apr-02	4	912	0.00
			AVG		**0.00**
	2003	7-Apr-03	2	912	0.00
		21-Apr-03	3	912	0.00
			AVG		**0.00**
	2004	12-Apr-04	2	912	17.23
		26-Apr-04	3	912	3.21
			AVG		**10.22**
	2005	11-Apr-05	3	912	0.00
		25-Apr-05	4	912	0.00
			AVG		**0.00**
MAY	1995	8-May-95	2	912	0.00
		22-May-95	3	912	0.00
			AVG		**0.00**
	1996	9-May-96	3	912	0.00
		21-May-96	4	912	0.00
			AVG		**0.00**
	1997	12-May-97	4	912	0.00
		27-May-97	5	912	0.00
			AVG		**0.00**
	1998	4-May-98	3	912	0.00

Station 914: Middle River					
Month	Year	Date	Survey	Station	CPUE
MARCH	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	31-Mar-97	1	914	7.40
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	20-Mar-00	1	914	**0.00**
	2001	19-Mar-01	1	914	**0.00**
	2002	18-Mar-02	1	914	**0.00**
	2003	24-Mar-03	1	914	**0.00**
	2004	29-Mar-04	1	914	**3.45**
	2005	14-Mar-05	1	914	0.00
		28-Mar-05	2	914	6.37
			AVG		**3.18**
APRIL	1995	24-Apr-95	1	914	0.00
			AVG		**0.00**
	1996	10-Apr-96	1	914	7.18
		24-Apr-96	2	914	3.60
			AVG		**5.39**
	1997	14-Apr-97	2	914	20.30
		28-Apr-97	3	914	3.56
			AVG		**11.93**
	1998	6-Apr-98	1	914	0.00
		21-Apr-98	2	914	0.00
			AVG		**0.00**
	1999	12-Apr-99	1	914	31.59
		27-Apr-99	2	914	4.06
			AVG		**17.82**
	2000	3-Apr-00	2	914	0.00
		17-Apr-00	3	914	31.14
			AVG		**15.57**
	2001	2-Apr-01	2	914	0.00
		16-Apr-01	3	914	11.32
		30-Apr-01	4	914	3.86
			AVG		**5.06**
	2002	2-Apr-02	2	914	3.57
		15-Apr-02	3	914	97.42
		29-Apr-02	4	914	33.23
			AVG		**44.74**
	2003	7-Apr-03	2	914	28.48
		21-Apr-03	3	914	46.07
			AVG		**37.28**
	2004	12-Apr-04	2	914	3.27
		26-Apr-04	3	914	0.00
			AVG		**1.63**
	2005	11-Apr-05	3	914	0.00
		25-Apr-05	4	914	2.97
			AVG		**1.49**
MAY	1995	8-May-95	2	914	0.00
		22-May-95	3	914	0.00
			AVG		**0.00**
	1996	9-May-96	3	914	0.00
		21-May-96	4	914	0.00
			AVG		**0.00**
	1997	12-May-97	4	914	0.00

Station 912: Stockton Deep Water Ship Channel (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
		18-May-98	4	912	0.00
			AVG		**0.00**
	1999	10-May-99	3	912	0.00
		24-May-99	4	912	4.21
			AVG		**2.10**
	2000	1-May-00	4	912	0.00
		7-May-00	10	912	0.00
		15-May-00	5	912	0.00
		22-May-00	11	912	0.00
		29-May-00	6	912	0.00
			AVG		**0.00**
	2001	14-May-01	5	912	0.00
		29-May-01	6	912	0.00
			AVG		**0.00**
	2002	13-May-02	5	912	0.00
		28-May-02	6	912	0.00
			AVG		**0.00**
	2003	5-May-03	4	912	0.00
		19-May-03	5	912	0.00
			AVG		**0.00**
	2004	10-May-04	4	912	0.00
		24-May-04	5	912	0.00
			AVG		**0.00**
	2005	10-May-05	5	912	0.00
		23-May-05	6	912	0.00
			AVG		**0.00**
JUNE	1995	6-Jun-95	4	912	0.00
		20-Jun-95	5	912	0.00
			AVG		**0.00**
	1996	8-Jun-96	5	912	3.68
		24-Jun-96	6	912	0.00
			AVG		**1.84**
	1997	9-Jun-97	6	912	3.52
		24-Jun-97	7	912	0.00
			AVG		**1.76**
	1998	1-Jun-98	5	912	0.00
		15-Jun-98	6	912	0.00
		28-Jun-98	7	912	0.00
			AVG		**0.00**
	1999	7-Jun-99	5	912	4.24
		21-Jun-99	6	912	0.00
			AVG		**2.12**
	2000	5-Jun-00	12	912	5.06
		12-Jun-00	7	912	0.00
		26-Jun-00	8	912	3.06
			AVG		**2.71**
	2001	11-Jun-01	7	912	0.00
		26-Jun-01	8	912	0.00
			AVG		**0.00**
	2002	10-Jun-02	7	912	0.00
		24-Jun-02	8	912	0.00
			AVG		**0.00**
	2003	2-Jun-03	6	912	0.00
		16-Jun-03	7	912	0.00

Station 914: Middle River (CONT'D)					
Month	Year	Date	Survey	Station	CPUE
		27-May-97	5	914	3.91
			AVG		**1.95**
	1998	4-May-98	3	914	0.00
		18-May-98	4	914	0.00
			AVG		**0.00**
	1999	10-May-99	3	914	4.29
		24-May-99	4	914	0.00
			AVG		**2.14**
	2000	1-May-00	4	914	3.65
		7-May-00	10	914	0.00
		15-May-00	5	914	0.00
		22-May-00	11	914	0.00
		29-May-00	6	914	0.00
			AVG		**0.73**
	2001	14-May-01	5	914	0.00
		29-May-01	6	914	0.00
			AVG		**0.00**
	2002	13-May-02	5	914	3.50
		28-May-02	6	914	0.00
			AVG		**1.75**
	2003	5-May-03	4	914	7.00
		19-May-03	5	914	7.60
			AVG		**7.30**
	2004	10-May-04	4	914	0.00
		24-May-04	5	914	0.00
			AVG		**0.00**
	2005	9-May-05	5	914	3.12
		23-May-05	6	914	0.00
			AVG		**1.56**
JUNE	1995	5-Jun-95	4	914	0.00
		20-Jun-95	5	914	0.00
			AVG		**0.00**
	1996	24-Jun-96	6	914	0.00
	1997	9-Jun-97	6	914	0.00
		24-Jun-97	7	914	0.00
			AVG		**0.00**
	1998	1-Jun-98	5	914	0.00
		15-Jun-98	6	914	0.00
		28-Jun-98	7	914	0.00
			AVG		**0.00**
	1999	7-Jun-99	5	914	4.30
		21-Jun-99	6	914	0.00
			AVG		**2.15**
	2000	5-Jun-00	12	914	0.00
		12-Jun-00	7	914	0.00
		26-Jun-00	8	914	0.00
			AVG		**0.00**
	2001	11-Jun-01	7	914	0.00
		25-Jun-01	8	914	0.00
			AVG		**0.00**
	2002	10-Jun-02	7	914	0.00
		24-Jun-02	8	914	0.00
			AVG		**0.00**
	2003	2-Jun-03	6	914	7.10

Station 912: Stockton Deep Water Ship Channel (CONT'D)					
		30-Jun-03	8	912	0.00
			AVG		**0.00**
	2004	21-Jun-04	7	912	0.00
		6-Jul-04	8	912	0.00
			AVG		**0.00**
	2005	6-Jun-05	7	912	0.00
		20-Jun-05	8	912	0.00
			AVG		**0.00**
JULY	1995	3-Jul-95	6	912	0.00
		17-Jul-95	7	912	0.00
		31-Jul-95	8	912	0.00
			AVG		**0.00**
	1996	8-Jul-96	7	912	0.00
		22-Jul-96	8	912	0.00
			AVG		**0.00**
	1997	8-Jul-97	8	912	0.00
		22-Jul-97	9	912	0.00
			AVG		**0.00**
	1998	14-Jul-98	8	912	0.00
		27-Jul-98	9	912	0.00
			AVG		**0.00**
	1999	6-Jul-99	7	912	0.00
		19-Jul-99	8	912	0.00
			AVG		**0.00**
	2000	10-Jul-00	9	912	**0.00**
	2001	*No Sampling Conducted*			
	2002	*No Sampling Conducted*			
	2003	*No Sampling Conducted*			
	2004	6-Jul-04	8	912	**0.00**
	2005	6-Jul-05	9	912	**0.00**

Station 914: Middle River (CONT'D)					
		16-Jun-03	7	914	0.00
		30-Jun-03	8	914	0.00
			AVG		**2.37**
	2004	8-Jun-04	6	914	6.16
		21-Jun-04	7	914	0.00
			AVG		**3.08**
	2005	6-Jun-05	7	914	0.00
		20-Jun-05	8	914	0.00
			AVG		**0.00**
JULY	1995	3-Jul-95	6	914	0.00
		17-Jul-95	7	914	0.00
		31-Jul-95	8	914	0.00
			AVG		**0.00**
	1996	8-Jul-96	7	914	0.00
		22-Jul-96	8	914	0.00
			AVG		**0.00**
	1997	8-Jul-97	8	914	0.00
		22-Jul-97	9	914	0.00
			AVG		**0.00**
	1998	27-Jul-98	9	914	**0.00**
	1999	6-Jul-99	7	914	0.00
		19-Jul-99	8	914	0.00
			AVG		**0.00**
	2000	10-Jul-00	9	914	**0.00**
	2001	*No Sampling Conducted*			
	2002	*No Sampling Conducted*			
	2003	*No Sampling Conducted*			
	2004	6-Jul-04	8	914	**0.00**
	2005	5-Jul-05	9	914	**0.00**

Station 915: Old River					
Month	Year	Date	Survey	Station	CPUE
MAR	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	31-Mar-97	1	915	**0.00**
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	20-Mar-00	1	915	**3.29**
	2001	19-Mar-01	1	915	**0.00**
	2002	18-Mar-02	1	915	**0.00**
	2003	24-Mar-03	1	915	**3.27**
	2004	29-Mar-04	1	915	**0.00**
	2005	14-Mar-05	1	915	0.00
		28-Mar-05	2	915	0.00
			AVG		**0.00**
APRIL	1995	24-Apr-95	1	915	**0.00**
	1996	10-Apr-96	1	915	3.58
		24-Apr-96	2	915	3.77
			AVG		**3.68**
	1997	14-Apr-97	2	915	29.24
		28-Apr-97	3	915	23.18
			AVG		**26.21**
	1998	6-Apr-98	1	915	0.00
		21-Apr-98	2	915	0.00
			AVG		**0.00**
	1999	12-Apr-99	1	915	16.53
		27-Apr-99	2	915	8.59
			AVG		**12.56**
	2000	3-Apr-00	2	915	3.80
		17-Apr-00	3	915	18.66
			AVG		**11.23**
	2001	2-Apr-01	2	915	0.00
		16-Apr-01	3	915	7.07
		30-Apr-01	4	915	11.38
			AVG		**6.15**
	2002	2-Apr-02	2	915	24.34
		15-Apr-02	3	915	32.09
		29-Apr-02	4	915	11.45
			AVG		**22.63**
	2003	7-Apr-03	2	915	0.00
		21-Apr-03	3	915	4.48
			AVG		**2.24**
	2004	12-Apr-04	2	915	0.00
		26-Apr-04	3	915	0.00
			AVG		**0.00**
	2005	11-Apr-05	3	915	0.00
		25-Apr-05	4	915	0.00
			AVG		**0.00**
MAY	1995	22-May-95	3	915	**0.00**
	1996	9-May-96	3	915	0.00
		21-May-96	4	915	0.00
			AVG		**0.00**
	1997	12-May-97	4	915	0.00
		27-May-97	5	915	0.00
			AVG		**0.00**
	1998	4-May-98	3	915	0.00
		18-May-98	4	915	0.00

Station 918: Victoria Canal (upstream of Proposed Project)					
Month	Year	Date	Survey	Station	CPUE
MAR	1995	*No Sampling Conducted*			
	1996	*No Sampling Conducted*			
	1997	31-Mar-97	1	918	**0.00**
	1998	*No Sampling Conducted*			
	1999	*No Sampling Conducted*			
	2000	20-Mar-00	1	918	**0.00**
	2001	19-Mar-01	1	918	**0.00**
	2002	18-Mar-02	1	918	**0.00**
	2003	24-Mar-03	1	918	**3.00**
	2004	29-Mar-04	1	918	**0.00**
	2005	14-Mar-05	1	918	0.00
		28-Mar-05	2	918	3.00
			AVG		**2.00**
APRIL	1995	24-Apr-95	1	918	**0.00**
	1996	10-Apr-96	1	918	3.00
		30-Apr-96	2	918	0.00
			AVG		**2.00**
	1997	14-Apr-97	2	918	0.00
		28-Apr-97	3	918	4.00
			AVG		**2.00**
	1998	6-Apr-98	1	918	0.00
		21-Apr-98	2	918	0.00
			AVG		**0.00**
	1999	12-Apr-99	1	918	9.00
		27-Apr-99	2	918	0.00
			AVG		**5.00**
	2000	3-Apr-00	2	918	0.00
		17-Apr-00	3	918	0.00
			AVG		**0.00**
	2001	2-Apr-01	2	918	0.00
		16-Apr-01	3	918	8.00
		30-Apr-01	4	918	8.00
			AVG		**5.00**
	2002	2-Apr-02	2	918	21.00
		15-Apr-02	3	918	35.00
		29-Apr-02	4	918	4.00
			AVG		**20.00**
	2003	7-Apr-03	2	918	0.00
		21-Apr-03	3	918	7.00
			AVG		**4.00**
	2004	12-Apr-04	2	918	**0.00**
	2005	11-Apr-05	3	918	0.00
		25-Apr-05	4	918	3.00
			AVG		**1.00**
MAY	1995	22-May-95	3	918	**0.00**
	1996	9-May-96	3	918	4.00
		21-May-96	4	918	0.00
			AVG		**2.00**
	1997	28-May-97	5	918	**0.00**
	1998	4-May-98	3	918	0.00
		18-May-98	4	918	0.00
			AVG		**0.00**
	1999	10-May-99	3	918	17.00
		24-May-99	4	918	12.00
			AVG		**15.00**

Station 915: Old River (CONT'D)					
			AVG		**0.00**
	1999	10-May-99	3	915	16.35
		24-May-99	4	915	4.13
			AVG		**10.24**
	2000	1-May-00	4	915	15.89
		7-May-00	10	915	33.06
		15-May-00	5	915	29.37
		22-May-00	11	915	0.00
		29-May-00	6	915	0.00
			AVG		**15.66**
	2001	14-May-01	5	915	3.69
		29-May-01	6	915	0.00
			AVG		**1.85**
	2002	13-May-02	5	915	4.60
		28-May-02	6	915	3.42
			AVG		**4.01**
	2003	5-May-03	4	915	0.00
		19-May-03	5	915	0.00
			AVG		**0.00**
	2004	10-May-04	4	915	3.54
		24-May-04	5	915	0.00
			AVG		**1.77**
	2005	9-May-05	5	915	0.00
		23-May-05	6	915	0.00
			AVG		**0.00**
JUNE	1995	5-Jun-95	4	915	0.00
		20-Jun-95	5	915	0.00
			AVG		**0.00**
	1996	8-Jun-96	5	915	0.00
		24-Jun-96	6	915	0.00
			AVG		**0.00**
	1997	9-Jun-97	6	915	0.00
		24-Jun-97	7	915	0.00
			AVG		**0.00**
	1998	1-Jun-98	5	915	3.86
		15-Jun-98	6	915	0.00
		28-Jun-98	7	915	0.00
			AVG		**1.29**
	1999	7-Jun-99	5	915	26.54
		21-Jun-99	6	915	8.82
		28-Jun-99	12	915	0.00
			AVG		**11.79**
	2000	5-Jun-00	12	915	5.37
		12-Jun-00	7	915	0.00
		26-Jun-00	8	915	0.00
			AVG		**1.79**
	2001	11-Jun-01	7	915	0.00
		25-Jun-01	8	915	0.00
			AVG		**0.00**
	2002	10-Jun-02	7	915	0.00
		24-Jun-02	8	915	0.00
			AVG		**0.00**
	2003	2-Jun-03	6	915	0.00
		16-Jun-03	7	915	0.00
		30-Jun-03	8	915	0.00
			AVG		**0.00**

Station 918: Victoria Canal (downstream of Proposed Project) (CONT'D)					
	2000	1-May-00	4	918	74.00
		7-May-00	10	918	11.00
		15-May-00	5	918	15.00
		22-May-00	11	918	0.00
		29-May-00	6	918	0.00
			AVG		**20.00**
	2001	14-May-01	5	918	4.00
		29-May-01	6	918	8.00
			AVG		**6.00**
	2002	13-May-02	5	918	0.00
		28-May-02	6	918	0.00
			AVG		**0.00**
	2003	5-May-03	4	918	0.00
		19-May-03	5	918	4.00
			AVG		**2.00**
	2004	10-May-04	4	918	7.00
		24-May-04	5	918	0.00
			AVG		**3.00**
	2005	9-May-05	5	918	0.00
		23-May-05	6	918	0.00
			AVG		**0.00**
JUNE	1995	5-Jun-95	4	918	0.00
		20-Jun-95	5	918	0.00
			AVG		**0.00**
	1996	8-Jun-96	5	918	0.00
		24-Jun-96	6	918	0.00
			AVG		**0.00**
	1997	9-Jun-97	6	918	0.00
		24-Jun-97	7	918	0.00
			AVG		**0.00**
	1998	1-Jun-98	5	918	0.00
		15-Jun-98	6	918	0.00
		28-Jun-98	7	918	0.00
			AVG		**0.00**
	1999	7-Jun-99	5	918	13.00
		21-Jun-99	6	918	4.00
		28-Jun-99	12	918	0.00
			AVG		**6.00**
	2000	5-Jun-00	12	918	5.00
		12-Jun-00	7	918	0.00
		26-Jun-00	8	918	0.00
			AVG		**2.00**
	2001	11-Jun-01	7	918	0.00
		25-Jun-01	8	918	0.00
			AVG		**0.00**
	2002	10-Jun-02	7	918	0.00
		24-Jun-02	8	918	0.00
			AVG		**0.00**
	2003	2-Jun-03	6	918	0.00
		16-Jun-03	7	918	0.00
		30-Jun-03	8	918	0.00
			AVG		**0.00**
	2004	8-Jun-04	6	918	7.00
		21-Jun-04	7	918	0.00
			AVG		**3.00**
	2005	6-Jun-05	7	918	0.00

Station 915: Old River (CONT'D)					
	2004	8-Jun-04	6	915	0.00
		21-Jun-04	7	915	0.00
			AVG		**0.00**
	2005	6-Jun-05	7	915	0.00
		20-Jun-05	8	915	0.00
			AVG		**0.00**
JUL	1995	3-Jul-95	6	915	0.00
		17-Jul-95	7	915	0.00
		31-Jul-95	8	915	0.00
			AVG		**0.00**
	1996	8-Jul-96	7	915	0.00
		22-Jul-96	8	915	0.00
			AVG		**0.00**
	1997	8-Jul-97	8	915	0.00
		22-Jul-97	9	915	0.00
			AVG		**0.00**
	1998	13-Jul-98	8	915	0.00
		27-Jul-98	9	915	0.00
			AVG		**0.00**
	1999	6-Jul-99	7	915	0.00
		19-Jul-99	8	915	0.00
			AVG		**0.00**
	2000	10-Jul-00	9	915	**0.00**
	2001	9-Jul-01	9	915	**0.00**
	2002	*No Sampling Conducted*			
	2003	*No Sampling Conducted*			
	2004	6-Jul-04	8	915	**0.00**
	2005	5-Jul-05	9	915	**0.00**

Station 918: Victoria Canal (downstream of Proposed Project) (CONT'D)					
		20-Jun-05	8	918	0.00
			AVG		**0.00**
JULY	1995	3-Jul-95	6	918	0.00
		17-Jul-95	7	918	0.00
			AVG		**0.00**
	1996	8-Jul-96	7	918	0.00
		22-Jul-96	8	918	0.00
			AVG		**0.00**
	1997	8-Jul-97	8	918	0.00
		22-Jul-97	9	918	0.00
			AVG		**0.00**
	1998	13-Jul-98	8	918	0.00
		27-Jul-98	9	918	0.00
			AVG		**0.00**
	1999	6-Jul-99	7	918	0.00
		19-Jul-99	8	918	0.00
			AVG		**0.00**
	2000	10-Jul-00	9	918	**0.00**
	2001	9-Jul-01	9	918	**0.00**
	2002	*No Sampling Conducted*			
	2003	*No Sampling Conducted*			
	2004	6-Jul-04	8	918	**0.00**
	2005	5-Jul-05	9	918	**0.00**

Attachment E

Estimated Net Entrainment and Impingement Losses Based on
CALSIM II Water Quality Modeling and
Central Valley Project (CVP) Salvage Data (1979-2005)

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Methods: Entrainment/Impingement Fish Loss Modeling

	AC	AD	AE	AF
6	Year	Oct	Vol	**121**
7		31		
8	1922	=B8-P8	=(AD8*1.98*31)/1000	**=(AE8*AF6)**
9	1923	=B9-P9	=(AD9*1.98*31)/1000	**=(AE9*AF6)**
10	1924	=B10-P10	=(AD10*1.98*31)/1000	**=(AE11*AF6)**
	…	…	…	…
80	1994	=B80-P80	=(AD80*1.98*31)/1000	**=(AE80*AF6)**
81	**Mean**			**=AVERAGE(AF8:AF80)**
82	Max			**=MAX(AF8:AF80)**
83	Min			**=MIN(AF8:AF80)**

*   *Sample modeling from Excel spreadsheet used to estimate larval delta smelt losses*
** *Values displayed in the example above are rounded to nearest hundreth*

Assumptions:

1 cfs (cubic-foot-per-second) = 1.983471099 acre-foot per day

AC = Years 1922-1994; 72-year period (n)
AD6 = Month
AD7 = Number of days in each month
AF6 = Average monthly density per thousand-acre-feet;

- *for larval delta smelt, based on 1995-2005 average density for all surveys in a given month throughout the time period*
- *for juvenile life stages (delta smelt, Chinook salmon, steelhead, splittail, striped bass), CVP fish facility average densities per month from years 1979-2005 (7/2005).*

AD = Alternative minus base flow, cubic-foot-per-second per day (based on CALSIM II hydrologic modeling)
AE = Total flow during month in thousand acre-feet
AF = Estimated density of fish per thousand-acre-feet subject to mortality with a conditional factor of *.05 for juvenile fish excluded by the screen and *1.0 for fish eggs and larvae vulnerable to entrainment (x)
AC81 = Average monthly loss over 72 years of modeling (L)

Conditions:

- If estimating entrainment for larval delta smelt (occurring in spring/early summer months), assume 100% mortality (all pass through the screen) at all CCWD intake locations
- If estimating entrainment/impingement for juvenile fishes, assume:
  Rock Slough Intake screen: 100% mortality
  Old River Intake screen: 5% mortality
  Alternative Intake screen: 5%

Total Monthly Estimated Loss (L) Per Species:

$$L = \frac{\sum(x)}{n}$$

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Larval Delta Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	55	Apr	Vol	681	May	Vol	1,59	Jun	Vol	311	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-123	-7	0
1923	0	0	0	0	0	0	-80	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	0	0	0	0	0	0	0	0	0	0	-144	-9	-2,654	-29	-2	0	0	0	0	-235	-14	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	7	0	81	5	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	4	0	0	0	0
1927	0	0	0	0	0	0	-64	-4	0	-88	-5	0	-62	-3	0	-41	-3	-140	0	0	0	0	0	0	-60	-4	-1,117	-49	-3	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-103	-6	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	0	-7	0	-22	0	0	0	0	0	0	0	0	0	-200	-12	0	7	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	5	0	-48	-3	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	0	-19	-1	-64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	64	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
1934	-167	-10	0	0	0	0	0	0	0	0	0	0	-111	-6	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-187	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	0	-46	-3	-156	0	0	0	0	0	0	-38	-2	-708	-138	-8	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	-46	-3	-156	0	0	0	0	0	0	-38	-2	-696	-186	-11	0	-110	-7	0	-111	-7	0
1938	0	0	0	0	0	0	-83	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	-93	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	0	7	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-320	-186	-11	0	-46	-3	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-140	0	0	0	0	0	0	-66	-4	-1,212	-16	-1	0	0	0	0	0	0	0
1943	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	0	19	1	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	0	-13	-1	-45	0	0	0	0	0	0	-35	-2	-650	-186	-11	0	19	1	0	0	0	0
1946	0	0	0	0	0	0	-6	0	0	0	0	0	0	0	0	-13	-1	-45	0	0	0	0	0	0	-36	-2	-658	-122	-7	0	19	1	0	0	0	0
1947	0	0	0	0	0	0	45	3	0	0	0	0	-11	-1	0	-18	-1	-62	0	0	0	0	0	0	0	0	0	9	1	0	7	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-142	-109	-6	-4,411	0	0	0	0	0	0	0	0	0	133	8	0	0	0	0
1949	0	0	0	0	0	0	18	1	0	0	0	0	0	0	0	-1	0	-3	0	0	0	0	0	0	0	0	0	-186	-11	0	19	1	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-45	0	0	0	0	0	0	-36	-2	-658	-186	-11	0	16	1	0	0	0	0
1951	0	0	0	0	0	0	-83	-5	0	-65	-4	0	-101	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	-66	-4	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	-34	-2	0	0	0	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	0	0	0
1956	0	0	0	0	0	0	-15	-1	0	0	0	0	-54	-3	0	-1	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	9	1	0	-57	-4	0	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	0	-89	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	204	12	0	15	1	0	0	0	0
1961	0	0	0	0	0	0	21	1	0	0	0	0	0	0	0	-18	-1	-62	0	0	0	0	0	0	0	0	0	5	0	0	7	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-56	0	0	0	0	0	0	0	0	0	-186	-11	0	19	1	0	0	0	0
1963	0	0	0	0	0	0	-83	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	0
1964	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	0	-11	-1	-36	0	0	0	0	0	0	-61	-4	-1,128	-101	-6	0	0	0	0	-81	-5	0
1966	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	0	0	0
1967	0	0	0	0	0	0	-79	-5	0	0	0	0	-41	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1	0	0	0	0
1969	0	0	0	0	0	0	27	2	0	0	0	0	-48	-3	0	-25	-2	-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-92	-5	0
1971	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	-63	-4	0	0	0	0	0	0	0	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	-51	-3	0
1973	0	0	0	0	0	0	0	0	0	-65	-4	0	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	0
1974	0	0	0	0	0	0	-80	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	0	-25	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	14	1	0	0	0	0	-71	-4	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-225	0	0	0	0	0	0	-250	-15	-4,616	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	0	-46	-3	-156	0	0	0	0	0	0	-36	-2	-669	-91	-5	0	19	1	0	0	0	0
1980	0	0	0	0	0	0	-7	0	0	0	0	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	0	-54	-3	-184	0	0	0	0	0	0	0	0	0	28	2	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	0	-82	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-85	-5	0
1985	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	16	1	0	0	0	0	24	1	0	-29	-2	-99	0	0	0	0	0	0	-59	-4	-1,097	-186	-11	0	-114	-7	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	0	-28	-2	-96	0	0	0	0	0	0	0	0	0	-186	-11	0	19	1	0	0	0	0
1988	0	0	0	0	0	0	19	1	0	0	0	0	-30	-2	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	-200	-12	0	7	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	0	0	0	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	33	2	0	0	0	0	0	0	0
Mean			0			0			0			0			0			-34			-63			0			-222			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			-225			-4,411			0			-4,616			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	-94	-6	**-39**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-123	-7	**0**
1923	0	0	**0**	0	0	**0**	-80	-5	**-57**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-98	-5	**-494**	0	0	**0**	0	0	**0**	0	0	**0**	-144	-9	**-399**	-29	-2	**-4**	0	0	**0**	-235	-14	**-1**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	114	7	**2**	81	5	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	9	0	**44**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	73	4	**2**	0	0	**0**
1927	0	0	**0**	0	0	**0**	-64	-4	**-46**	-88	-5	**-78**	-62	-3	**-312**	-41	-3	**-79**	0	0	**0**	0	0	**0**	-60	-4	**-168**	-49	-3	**-7**	0	0	**0**	0	0	**0**
1928	0	0	**0**	0	0	**0**	-43	-3	**-30**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-103	-6	**0**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-83	-5	**-418**	-7	0	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	-200	-12	**-28**	7	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-111	-6	**-560**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	77	5	**2**	-48	-3	**0**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-132	-7	**-668**	-19	-1	**-36**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	64	4	**323**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-33	-2	**0**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	7	0	**0**	0	0	**0**
1934	-167	-10	**-48**	0	0	**0**	0	0	**0**	0	0	**0**	-111	-6	**-560**	-32	-2	**-62**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	7	0	**0**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**-43**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-27	-1	**-134**	-46	-3	**-88**	0	0	**0**	0	0	**0**	-38	-2	**-107**	-138	-8	**-20**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	9	1	**6**	0	0	**0**	0	0	**0**	-46	-3	**-88**	0	0	**0**	0	0	**0**	-38	-2	**-105**	-186	-11	**-26**	-110	-7	**-2**	-111	-7	**0**
1938	0	0	**0**	0	0	**0**	-83	-5	**-60**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	0	0	**0**	0	0	**0**	-93	-6	**-66**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	28	2	**4**	7	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-48**	-186	-11	**-26**	-46	-3	**-1**	0	0	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-201**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-41	-3	**-79**	0	0	**0**	0	0	**0**	-66	-4	**-182**	-16	-1	**-2**	0	0	**0**	0	0	**0**
1943	-9	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-119	-7	**-17**	19	1	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-415**	-13	-1	**-25**	0	0	**0**	0	0	**0**	-35	-2	**-98**	-186	-11	**-26**	19	1	**0**	0	0	**0**
1946	0	0	**0**	0	0	**0**	-6	0	**-4**	0	0	**0**	0	0	**0**	-13	-1	**-25**	0	0	**0**	0	0	**0**	-36	-2	**-99**	-122	-7	**-17**	19	1	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	45	3	**32**	0	0	**0**	-11	-1	**-58**	-18	-1	**-35**	0	0	**0**	0	0	**0**	0	0	**0**	9	1	**1**	7	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-42	-3	**-81**	-109	-6	**-1,015**	0	0	**0**	0	0	**0**	0	0	**0**	133	8	**3**	0	0	**0**
1949	0	0	**0**	0	0	**0**	18	1	**13**	0	0	**0**	0	0	**0**	-1	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	-186	-11	**-26**	19	1	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-25**	0	0	**0**	0	0	**0**	-36	-2	**-99**	-186	-11	**-26**	16	1	**0**	0	0	**0**
1951	0	0	**0**	0	0	**0**	-83	-5	**-60**	-65	-4	**-58**	-101	-6	**-513**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	-66	-4	**-47**	0	0	**0**	-19	-1	**-95**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-42	-2	**-213**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	0	0	**0**	0	0	**0**	-34	-2	**-25**	0	0	**0**	-40	-2	**-201**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**0**	0	0	**0**
1956	0	0	**0**	0	0	**0**	-15	-1	**-11**	0	0	**0**	-54	-3	**-275**	-1	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	9	1	**4**	-57	-4	**-41**	-9	-1	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	-81	-5	**-58**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-112	-7	**-100**	-89	-5	**-450**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	204	12	**29**	15	1	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	21	1	**15**	0	0	**0**	0	0	**0**	-18	-1	**-35**	0	0	**0**	0	0	**0**	0	0	**0**	5	0	**1**	7	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-32**	0	0	**0**	0	0	**0**	0	0	**0**	-186	-11	**-26**	19	1	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	-83	-5	**-60**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-119	-7	**0**
1964	0	0	**0**	0	0	**0**	-43	-3	**-30**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	9	1	**1**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-415**	-11	-1	**-21**	0	0	**0**	0	0	**0**	-61	-4	**-170**	-101	-6	**-14**	0	0	**0**	-81	-5	**0**
1966	0	0	**0**	0	0	**0**	-43	-3	**-30**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	-79	-5	**-56**	0	0	**0**	-41	-2	**-207**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	17	1	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	27	2	**19**	0	0	**0**	-48	-3	**-244**	-25	-2	**-47**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-92	-5	**0**
1971	0	0	**0**	0	0	**0**	-43	-3	**-30**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	0	0	**0**	-63	-4	**-26**	0	0	**0**	0	0	**0**	-9	0	**-43**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**0**	-51	-3	**0**
1973	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-58**	-28	-2	**-140**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-89	-5	**0**
1974	0	0	**0**	0	0	**0**	-80	-5	**-57**	-2	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	-9	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-31**	-25	-1	**-124**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	14	1	**2**	0	0	**0**	-71	-4	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-66	-4	**-127**	0	0	**0**	0	0	**0**	-250	-15	**-695**	0	0	**0**	0	0	**0**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-201**	-46	-3	**-88**	0	0	**0**	0	0	**0**	-36	-2	**-101**	-91	-5	**-13**	19	1	**0**	0	0	**0**
1980	0	0	**0**	0	0	**0**	-7	0	**-5**	0	0	**0**	-40	-2	**-203**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-201**	-54	-3	**-104**	0	0	**0**	0	0	**0**	0	0	**0**	28	2	**4**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	-64	-4	**-57**	-82	-5	**-415**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-85	-5	**0**
1985	0	0	**0**	0	0	**0**	-43	-3	**-30**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	28	2	**4**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	16	1	**12**	0	0	**0**	24	1	**123**	-29	-2	**-56**	0	0	**0**	0	0	**0**	-59	-4	**-165**	-186	-11	**-26**	-114	-7	**-3**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**-164**	-28	-2	**-55**	0	0	**0**	0	0	**0**	0	0	**0**	-186	-11	**-26**	19	1	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	19	1	**14**	0	0	**0**	-30	-2	**-151**	-32	-2	**-62**	0	0	**0**	0	0	**0**	0	0	**0**	-200	-12	**-28**	7	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-161	-9	**-813**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	26	2	**1**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-138	-8	**-123**	0	0	**0**	-32	-2	**-62**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**-62**	0	0	**0**	0	0	**0**	0	0	**0**	33	2	**5**	0	0	**0**	0	0	**0**
Mean			**-1**			**-1**			**-9**			**-7**			**-115**			**-19**			**-14**			**0**			**-33**			**-4**			**0**			**0**
Max			**0**			**4**			**32**			**0**			**323**			**0**			**0**			**0**			**0**			**29**			**3**			**0**
Min			**-48**			**-39**			**-66**			**-123**			**-813**			**-127**			**-1,015**			**0**			**-695**			**-28**			**-3**			**-1**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-123	-7	-18
1923	0	0	0	0	0	0	-80	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	-47	0	0	0	0	0	0	0	0	0	-144	-9	-7,460	-29	-2	-332	0	0	0	-235	-14	-35
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	7	86	81	5	12
1926	0	0	0	0	0	0	0	0	0	0	0	0	9	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	4	55	0	0	0
1927	0	0	0	0	0	0	-64	-4	-3	-88	-5	-22	-62	-3	-30	-41	-3	-24	0	0	0	0	0	0	-60	-4	-3,140	-49	-3	-553	0	0	0	0	0	0
1928	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-103	-6	-15
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	-40	-7	0	-4	0	0	0	0	0	0	0	0	0	-200	-12	-2,276	7	0	5	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	-53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	5	58	-48	-3	-7
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	-63	-19	-1	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	64	4	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	-5
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	5	0	0	0
1934	-167	-10	-8	0	0	0	0	0	0	0	0	0	-111	-6	-53	-32	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	7	0	5	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	-13	-46	-3	-26	0	0	0	0	0	0	-38	-2	-1,990	-138	-8	-1,567	0	0	0	0	0	0
1937	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	-46	-3	-26	0	0	0	0	0	0	-38	-2	-1,957	-186	-11	-2,119	-110	-7	-84	-111	-7	-17
1938	0	0	0	0	0	0	-83	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	-93	-6	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	315	7	0	5	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-898	-186	-11	-2,119	-46	-3	-35	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-24	0	0	0	0	0	0	-66	-4	-3,406	-16	-1	-185	0	0	0	0	0	0
1943	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	-1,354	19	1	14	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-39	-13	-1	-8	0	0	0	0	0	0	-35	-2	-1,826	-186	-11	-2,119	19	1	14	0	0	0
1946	0	0	0	0	0	0	-6	0	0	0	0	0	0	0	0	-13	-1	-8	0	0	0	0	0	0	-36	-2	-1,850	-122	-7	-1,387	19	1	14	0	0	0
1947	0	0	0	0	0	0	45	3	2	0	0	0	-11	-1	-5	-18	-1	-11	0	0	0	0	0	0	0	0	0	9	1	97	7	0	5	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-24	-109	-6	-117	0	0	0	0	0	0	0	0	0	133	8	101	0	0	0
1949	0	0	0	0	0	0	18	1	1	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-186	-11	-2,120	19	1	14	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-8	0	0	0	0	0	0	-36	-2	-1,850	-186	-11	-2,119	16	1	12	0	0	0
1951	0	0	0	0	0	0	-83	-5	-4	-65	-4	-16	-101	-6	-49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	-66	-4	-3	0	0	0	-19	-1	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	-34	-2	-2	0	0	0	-40	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	14	0	0	0
1956	0	0	0	0	0	0	-15	-1	-1	0	0	0	-54	-3	-26	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	9	1	0	-57	-4	-3	-9	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	-81	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	14	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	-28	-89	-5	-43	0	0	0	0	0	0	0	0	0	0	0	0	204	12	2,322	15	1	11	0	0	0
1961	0	0	0	0	0	0	21	1	1	0	0	0	0	0	0	-18	-1	-11	0	0	0	0	0	0	0	0	0	5	0	55	7	0	5	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-10	0	0	0	0	0	0	0	0	0	-186	-11	-2,119	19	1	14	0	0	0
1963	0	0	0	0	0	0	-83	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	-18
1964	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	102	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-39	-11	-1	-6	0	0	0	0	0	0	-61	-4	-3,171	-101	-6	-1,146	0	0	0	-81	-5	-12
1966	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	14	0	0	0
1967	0	0	0	0	0	0	-79	-5	-4	0	0	0	-41	-2	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1	13	0	0	0
1969	0	0	0	0	0	0	27	2	1	0	0	0	-48	-3	-23	-25	-2	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-92	-5	-14
1971	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	-63	-4	-2	0	0	0	0	0	0	-9	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	14	-51	-3	-8
1973	0	0	0	0	0	0	0	0	0	-65	-4	-16	-28	-2	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	-13
1974	0	0	0	0	0	0	-80	-5	-4	-2	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	-9	-25	-1	-12	0	0	0	0	0	0	0	0	0	0	0	0	14	1	159	0	0	0	-71	-4	-11
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-38	0	0	0	0	0	0	-250	-15	-12,974	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-19	-46	-3	-26	0	0	0	0	0	0	-36	-2	-1,881	-91	-5	-1,034	19	1	14	0	0	0
1980	0	0	0	0	0	0	-7	0	0	0	0	0	-40	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-19	-54	-3	-31	0	0	0	0	0	0	0	0	0	28	2	315	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	-16	-82	-5	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-85	-5	-13
1985	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	315	0	0	0	0	0	0
1986	0	0	0	0	0	0	16	1	1	0	0	0	24	1	12	-29	-2	-17	0	0	0	0	0	0	-59	-4	-3,084	-186	-11	-2,119	-114	-7	-87	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-16	-28	-2	-16	0	0	0	0	0	0	0	0	0	-186	-11	-2,119	19	1	14	0	0	0
1988	0	0	0	0	0	0	19	1	1	0	0	0	-30	-2	-14	-32	-2	-19	0	0	0	0	0	0	0	0	0	-200	-12	-2,276	7	0	5	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2	20	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	-34	0	0	0	-32	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-19	0	0	0	0	0	0	0	0	0	33	2	372	0	0	0	0	0	0
Mean			0			0			-1			-2			-11			-6			-2			0			-623			-343			5			-2
Max			0			0			2			0			31			0			0			0			0			2,322			101			12
Min			-8			-3			-5			-34			-77			-38			-117			0			-12,974			-2,276			-87			-35

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entraiment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	-94	-6	**-12**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-123	-7	**-11**
1923	0	0	**0**	0	0	**0**	-80	-5	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-98	-5	**-33**	0	0	**0**	0	0	**0**	0	0	**0**	-144	-9	**-250**	-29	-2	**-16**	0	0	**0**	-235	-14	**-22**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	114	7	**62**	81	5	**7**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	9	0	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	73	4	**40**	0	0	**0**
1927	0	0	**0**	0	0	**0**	-64	-4	**-11**	-88	-5	**-23**	-62	-3	**-21**	-41	-3	**-14**	0	0	**0**	0	0	**0**	-60	-4	**-105**	-49	-3	**-27**	0	0	**0**	0	0	**0**
1928	0	0	**0**	0	0	**0**	-43	-3	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-103	-6	**-9**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-83	-5	**-28**	-7	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	-200	-12	**-111**	7	0	**4**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-111	-6	**-37**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	77	5	**42**	-48	-3	**-4**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-132	-7	**-44**	-19	-1	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	64	4	**21**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-33	-2	**-3**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	7	0	**4**	0	0	**0**
1934	-167	-10	**-67**	0	0	**0**	0	0	**0**	0	0	**0**	-111	-6	**-37**	-32	-2	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	7	0	**4**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-27	-1	**-9**	-46	-3	**-16**	0	0	**0**	0	0	**0**	-38	-2	**-67**	-138	-8	**-76**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	9	1	**2**	0	0	**0**	0	0	**0**	-46	-3	**-16**	0	0	**0**	0	0	**0**	-38	-2	**-66**	-186	-11	**-103**	-110	-7	**-60**	-111	-7	**-10**
1938	0	0	**0**	0	0	**0**	-83	-5	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	0	0	**0**	0	0	**0**	-93	-6	**-16**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	28	2	**15**	7	0	**4**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-30**	-186	-11	**-103**	-46	-3	**-25**	0	0	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-41	-3	**-14**	0	0	**0**	0	0	**0**	-66	-4	**-114**	-16	-1	**-9**	0	0	**0**	0	0	**0**
1943	-9	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-119	-7	**-66**	19	1	**10**	0	0	**0**
1945	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-27**	-13	-1	**-5**	0	0	**0**	0	0	**0**	-35	-2	**-61**	-186	-11	**-103**	19	1	**10**	0	0	**0**
1946	0	0	**0**	0	0	**0**	-6	0	**-1**	0	0	**0**	0	0	**0**	-13	-1	**-5**	0	0	**0**	0	0	**0**	-36	-2	**-62**	-122	-7	**-67**	19	1	**10**	0	0	**0**
1947	0	0	**0**	0	0	**0**	45	3	**8**	0	0	**0**	-11	-1	**-4**	-18	-1	**-6**	0	0	**0**	0	0	**0**	0	0	**0**	9	1	**5**	7	0	**4**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-42	-3	**-15**	-109	-6	**-70**	0	0	**0**	0	0	**0**	0	0	**0**	133	8	**72**	0	0	**0**
1949	0	0	**0**	0	0	**0**	18	1	**3**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-186	-11	**-103**	19	1	**10**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-5**	0	0	**0**	0	0	**0**	-36	-2	**-62**	-186	-11	**-103**	16	1	**9**	0	0	**0**
1951	0	0	**0**	0	0	**0**	-83	-5	**-14**	-65	-4	**-17**	-101	-6	**-34**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	-66	-4	**-11**	0	0	**0**	-19	-1	**-6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-42	-2	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	0	0	**0**	0	0	**0**	-34	-2	**-6**	0	0	**0**	-40	-2	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**10**	0	0	**0**
1956	0	0	**0**	0	0	**0**	-15	-1	**-3**	0	0	**0**	-54	-3	**-18**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	9	1	**1**	-57	-4	**-10**	-9	-1	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	-81	-5	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**10**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-112	-7	**-30**	-89	-5	**-30**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	204	12	**113**	15	1	**8**	0	0	**0**
1961	0	0	**0**	0	0	**0**	21	1	**4**	0	0	**0**	0	0	**0**	-18	-1	**-6**	0	0	**0**	0	0	**0**	0	0	**0**	5	0	**3**	7	0	**4**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-6**	0	0	**0**	0	0	**0**	0	0	**0**	-186	-11	**-103**	19	1	**10**	0	0	**0**
1963	0	0	**0**	0	0	**0**	-83	-5	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-119	-7	**-11**
1964	0	0	**0**	0	0	**0**	-43	-3	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	9	1	**5**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-27**	-11	-1	**-4**	0	0	**0**	0	0	**0**	-61	-4	**-106**	-101	-6	**-56**	0	0	**0**	-81	-5	**-7**
1966	0	0	**0**	0	0	**0**	-43	-3	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**10**	0	0	**0**
1967	0	0	**0**	0	0	**0**	-79	-5	**-14**	0	0	**0**	-41	-2	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	17	1	**9**	0	0	**0**
1969	0	0	**0**	0	0	**0**	27	2	**5**	0	0	**0**	-48	-3	**-16**	-25	-2	**-9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-92	-5	**-8**
1971	0	0	**0**	0	0	**0**	-43	-3	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	0	0	**0**	-63	-4	**-8**	0	0	**0**	0	0	**0**	-9	0	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	19	1	**10**	-51	-3	**-5**
1973	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-17**	-28	-2	**-9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-89	-5	**-8**
1974	0	0	**0**	0	0	**0**	-80	-5	**-14**	-2	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	-9	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-9**	-25	-1	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	14	1	**8**	0	0	**0**	-71	-4	**-7**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-66	-4	**-23**	0	0	**0**	0	0	**0**	-250	-15	**-435**	0	0	**0**	0	0	**0**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-13**	-46	-3	**-16**	0	0	**0**	0	0	**0**	-36	-2	**-63**	-91	-5	**-50**	19	1	**10**	0	0	**0**
1980	0	0	**0**	0	0	**0**	-7	0	**-1**	0	0	**0**	-40	-2	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-13**	-54	-3	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	28	2	**15**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	-64	-4	**-17**	-82	-5	**-27**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-85	-5	**-8**
1985	0	0	**0**	0	0	**0**	-43	-3	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	28	2	**15**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	16	1	**3**	0	0	**0**	24	1	**8**	-29	-2	**-10**	0	0	**0**	0	0	**0**	-59	-4	**-103**	-186	-11	**-103**	-114	-7	**-62**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**-11**	-28	-2	**-10**	0	0	**0**	0	0	**0**	0	0	**0**	-186	-11	**-103**	19	1	**10**	0	0	**0**
1988	0	0	**0**	0	0	**0**	19	1	**3**	0	0	**0**	-30	-2	**-10**	-32	-2	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	-200	-12	**-111**	7	0	**4**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-161	-9	**-54**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	26	2	**14**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-138	-8	**-37**	0	0	**0**	-32	-2	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	33	2	**18**	0	0	**0**	0	0	**0**
Mean			**-1**			**0**			**-2**			**-2**			**-8**			**-3**			**-1**			**0**			**-21**			**-17**			**3**			**-1**
Max			**0**			**1**			**8**			**0**			**21**			**0**			**0**			**0**			**0**			**113**			**72**			**7**
Min			**-67**			**-12**			**-16**			**-37**			**-54**			**-23**			**-70**			**0**			**-435**			**-111**			**-62**			**-22**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entraiment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	No	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	-764	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-123	-7	-842
1923	0	0	0	0	0	0	-80	-5	-490	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	-810	0	0	0	0	0	0	0	0	0	-144	-9	-48,114	-29	-2	-3,350	0	0	0	-235	-14	-1606
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	7	2,006	81	5	552
1926	0	0	0	0	0	0	0	0	0	0	0	0	9	0	71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	4	1,288	0	0	0
1927	0	0	0	0	0	0	-64	-4	-392	-88	-5	-756	-62	-3	-511	-41	-3	-195	0	0	0	0	0	0	-60	-4	-20,250	-49	-3	-5,585	0	0	0	0	0	0
1928	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-103	-6	-702
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	-685	-7	0	-31	0	0	0	0	0	0	0	0	0	-200	-12	-22,981	7	0	118	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	-919	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	5	1,353	-48	-3	-326
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	-1,094	-19	-1	-89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	64	4	529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	-224
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	118	0	0	0
1934	-167	-10	-1,245	0	0	0	0	0	0	0	0	0	-111	-6	-919	-32	-2	-152	0	0	0	0	0	0	0	0	0	0	0	0	7	0	118	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	-220	-46	-3	-217	0	0	0	0	0	0	-38	-2	-12,836	-138	-8	-15,827	0	0	0	0	0	0
1937	0	0	0	0	0	0	9	1	53	0	0	0	0	0	0	-46	-3	-217	0	0	0	0	0	0	-38	-2	-12,623	-186	-11	-21,397	-110	-7	[illegible]	-111	-7	-755
1938	0	0	0	0	0	0	-83	-5	-511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	-93	-6	-567	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	3,183	7	0	117	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-5,794	-186	-11	-21,397	-46	-3	-815	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-195	0	0	0	0	0	0	-66	-4	-21,969	-16	-1	-1,872	0	0	0	0	0	0
1943	-9	-1	-69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	-13,673	19	1	334	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-681	-13	-1	-62	0	0	0	0	0	0	-35	-2	-11,777	-186	-11	-21,397	19	1	335	0	0	0
1946	0	0	0	0	0	0	-6	0	-34	0	0	0	0	0	0	-13	-1	-62	0	0	0	0	0	0	-36	-2	-11,933	-122	-7	-14,004	19	1	335	0	0	0
1947	0	0	0	0	0	0	45	3	276	0	0	0	-11	-1	-94	-18	-1	-87	0	0	0	0	0	0	0	0	0	9	1	979	7	0	117	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-198	-109	-6	-259	0	0	0	0	0	0	0	0	0	133	8	2,341	0	0	0
1949	0	0	0	0	0	0	18	1	109	0	0	0	0	0	0	-1	0	-4	0	0	0	0	0	0	0	0	0	-186	-11	-21,406	19	1	333	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-62	0	0	0	0	0	0	-36	-2	-11,931	-186	-11	-21,397	16	1	281	0	0	0
1951	0	0	0	0	0	0	-83	-5	-511	-65	-4	-557	-101	-6	-841	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	-66	-4	-402	0	0	0	-19	-1	-156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	-348	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	-34	-2	-211	0	0	0	-40	-2	-329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	334	0	0	0
1956	0	0	0	0	0	0	-15	-1	-94	0	0	0	-54	-3	-451	-1	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	9	1	69	-57	-4	-350	-9	-1	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	-81	-5	-495	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	335	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	-966	-89	-5	-737	0	0	0	0	0	0	0	0	0	0	0	0	204	12	23,451	15	1	261	0	0	0
1961	0	0	0	0	0	0	21	1	128	0	0	0	0	0	0	-18	-1	-87	0	0	0	0	0	0	0	0	0	5	0	556	7	0	117	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-78	0	0	0	0	0	0	0	0	0	-186	-11	-21,399	19	1	335	0	0	0
1963	0	0	0	0	0	0	-83	-5	-511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	-809
1964	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	1,030	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-681	-11	-1	-51	0	0	0	0	0	0	-61	-4	-20,454	-101	-6	-11,576	0	0	0	-81	-5	-553
1966	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	335	0	0	0
1967	0	0	0	0	0	0	-79	-5	-483	0	0	0	-41	-2	-340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1	308	0	0	0
1969	0	0	0	0	0	0	27	2	165	0	0	0	-48	-3	-399	-25	-2	-116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-92	-5	-630
1971	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	-63	-4	-513	0	0	0	0	0	0	-9	0	-71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	335	-51	-3	-349
1973	0	0	0	0	0	0	0	0	0	-65	-4	-557	-28	-2	-229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	-604
1974	0	0	0	0	0	0	-80	-5	-490	-2	0	-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	-9	-1	-69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	-302	-25	-1	-204	0	0	0	0	0	0	0	0	0	0	0	0	14	1	1,606	0	0	0	-71	-4	-485
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-313	0	0	0	0	0	0	-250	-15	-83,680	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-329	-46	-3	-217	0	0	0	0	0	0	-36	-2	-12,133	-91	-5	-10,438	19	1	335	0	0	0
1980	0	0	0	0	0	0	-7	0	-40	0	0	0	-40	-2	-333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-329	-54	-3	-256	0	0	0	0	0	0	0	0	0	28	2	3,183	0	0	1	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	-548	-82	-5	-681	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-85	-5	-579
1985	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	3,183	0	0	0	0	0	0
1986	0	0	0	0	0	0	16	1	101	0	0	0	24	1	202	-29	-2	-137	0	0	0	0	0	0	-59	-4	-19,893	-186	-11	-21,397	-114	-7	-2,011	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-268	-28	-2	-134	0	0	0	0	0	0	0	0	0	-186	-11	-21,397	19	1	334	0	0	0
1988	0	0	0	0	0	0	19	1	117	0	0	0	-30	-2	-248	-32	-2	-152	0	0	0	0	0	0	0	0	0	-200	-12	-22,981	7	0	118	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	-1,333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2	466	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	-1,186	0	0	0	-32	-2	-152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-152	0	0	0	0	0	0	0	0	0	33	2	3,757	0	0	0	0	0	0
Mean			-19			-17			-81			-68			-188			-47			-4			0			-4,019			-3,460			110			-108
Max			0			69			276			0			529			0			0			0			0			23,451			2,341			552
Min			-1,245			-764			-567			-1,186			-1,333			-313			-259			0			-83,680			-22,981			-2,011			[illegible]

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entraiment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-123	-7	0
1923	0	0	0	0	0	0	-80	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	-20	0	0	0	0	0	0	0	0	0	-144	-9	-3	-29	-2	0	0	0	0	-235	-14	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	7	0	81	5	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	9	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	4	0	0	0	0
1927	0	0	0	0	0	0	-64	-4	-3	-88	-5	-14	-62	-3	-13	-41	-3	-13	0	0	0	0	0	0	-60	-4	-1	-49	-3	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-103	-6	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	-17	-7	0	-2	0	0	0	0	0	0	0	0	0	-200	-12	-1	7	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	5	0	-48	-3	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	-27	-19	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	64	4	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
1934	-167	-10	0	0	0	0	0	0	0	0	0	0	-111	-6	-23	-32	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	-5	-46	-3	-14	0	0	0	0	0	0	-38	-2	-1	-138	-8	-1	0	0	0	0	0	0
1937	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	-46	-3	-14	0	0	0	0	0	0	-38	-2	-1	-186	-11	-1	-110	-7	0	-111	-7	0
1938	0	0	0	0	0	0	-83	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	-93	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	0	7	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0	-186	-11	-1	-46	-3	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-13	0	0	0	0	0	0	-66	-4	-1	-16	-1	0	0	0	0	0	0	0
1943	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	-1	19	1	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-17	-13	-1	-4	0	0	0	0	0	0	-35	-2	-1	-186	-11	-1	19	1	0	0	0	0
1946	0	0	0	0	0	0	-6	0	0	0	0	0	0	0	0	-13	-1	-4	0	0	0	0	0	0	-36	-2	-1	-122	-7	-1	19	1	0	0	0	0
1947	0	0	0	0	0	0	45	3	2	0	0	0	-11	-1	-2	-18	-1	-6	0	0	0	0	0	0	0	0	0	9	1	0	7	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-13	-109	-6	-20	0	0	0	0	0	0	0	0	0	133	8	0	0	0	0
1949	0	0	0	0	0	0	18	1	1	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-186	-11	-1	19	1	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-4	0	0	0	0	0	0	-36	-2	-1	-186	-11	-1	16	1	0	0	0	0
1951	0	0	0	0	0	0	-83	-5	-4	-65	-4	-10	-101	-6	-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	-66	-4	-3	0	0	0	-19	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	-34	-2	-2	0	0	0	-40	-2	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	0	0	0
1956	0	0	0	0	0	0	-15	-1	-1	0	0	0	-54	-3	-11	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	9	1	0	-57	-4	-3	-9	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	-81	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	-18	-89	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	204	12	1	15	1	0	0	0	0
1961	0	0	0	0	0	0	21	1	1	0	0	0	0	0	0	-18	-1	-6	0	0	0	0	0	0	0	0	0	5	0	0	7	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-5	0	0	0	0	0	0	0	0	0	-186	-11	-1	19	1	0	0	0	0
1963	0	0	0	0	0	0	-83	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-119	-7	0
1964	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-17	-11	-1	-3	0	0	0	0	0	0	-61	-4	-1	-101	-6	0	0	0	0	-81	-5	0
1966	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	0	0	0
1967	0	0	0	0	0	0	-79	-5	-4	0	0	0	-41	-2	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1	0	0	0	0
1969	0	0	0	0	0	0	27	2	1	0	0	0	-48	-3	-10	-25	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-92	-5	0
1971	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	-63	-4	0	0	0	0	0	0	0	-9	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	-51	-3	0
1973	0	0	0	0	0	0	0	0	0	-65	-4	-10	-28	-2	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	0
1974	0	0	0	0	0	0	-80	-5	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	-6	-25	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	14	1	0	0	0	0	-71	-4	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-20	0	0	0	0	0	0	-250	-15	-5	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-8	-46	-3	-14	0	0	0	0	0	0	-36	-2	-1	-91	-5	0	19	1	0	0	0	0
1980	0	0	0	0	0	0	-7	0	0	0	0	0	-40	-2	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-8	-54	-3	-16	0	0	0	0	0	0	0	0	0	28	2	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	-10	-82	-5	-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-85	-5	0
1985	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	16	1	1	0	0	0	24	1	5	-29	-2	-9	0	0	0	0	0	0	-59	-4	-1	-186	-11	-1	-114	-7	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-7	-28	-2	-9	0	0	0	0	0	0	0	0	0	-186	-11	-1	19	1	0	0	0	0
1988	0	0	0	0	0	0	19	1	1	0	0	0	-30	-2	-6	-32	-2	-10	0	0	0	0	0	0	0	0	0	-200	-12	-1	7	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	-22	0	0	0	-32	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-10	0	0	0	0	0	0	0	0	0	33	2	0	0	0	0	0	0	0
Mean			0			0			-1			-1			-5			-3			0			0			0			0			0			0
Max			0			0			2			0			13			0			0			0			0			1			0			0
Min			0			-1			-4			-22			-33			-20			-20			0			-5			-1			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entraiment and Impingement Loss Calculations – Larval Delta Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	116	Apr	Vol	950	May	Vol	376	Jun	Vol	167	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-89	-5	0	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	0	-58	-3	0	-250	-15	0	-5	0	0	-124	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-62	-4	0
1924	-41	-3	0	-38	-2	0	-83	-5	0	-114	-7	0	0	0	0	-108	-7	-770	0	0	0	0	0	-10	0	0	0	0	0	0	-250	-15	0	0	0	0
1925	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-138	-8	0
1926	-41	-3	0	-35	-2	0	-112	-7	0	-137	-8	0	-250	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-250	-15	0	-93	-6	0
1927	-36	-2	0	-68	-4	0	0	0	0	-114	-7	0	-129	-7	0	-82	-5	-579	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-73	-4	0
1928	-47	-3	0	-51	-3	0	-48	-3	0	-168	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1929	-53	-3	0	-55	-3	0	-64	-4	0	-40	-2	0	0	0	0	-10	-1	-73	0	0	0	0	0	0	-161	-10	-1,591	-250	-15	0	-146	-9	0	-70	-4	0
1930	-28	-2	0	-25	-1	0	-81	-5	0	-147	-9	0	-89	-5	0	0	0	0	0	0	0	0	0	0	-200	-12	-1,980	-250	-15	0	-116	-7	0	0	0	0
1931	-21	-1	0	-156	-9	0	-143	-9	0	-136	-8	0	0	0	0	-77	-5	-550	-132	-8	-7,440	0	0	0	-250	-15	-2,475	-250	-15	0	-250	-15	0	-235	-14	0
1932	-198	-12	0	-165	-10	0	-152	-9	0	0	0	0	95	5	0	0	0	0	-72	-4	-4,058	-5	0	-112	0	0	0	0	0	0	-250	-15	0	0	0	0
1933	-34	-2	0	-32	-2	0	-49	-3	0	-96	-6	0	-94	-5	0	0	0	0	0	0	0	0	0	0	-110	-7	-1,089	-250	-15	0	-207	-13	0	-111	-7	0
1934	0	0	0	-165	-10	0	-151	-9	0	-147	-9	0	-89	-5	0	-53	-3	-377	0	0	0	0	0	0	-38	-2	-377	-250	-15	0	-176	-11	0	-223	-13	0
1935	-198	-12	0	-165	-10	0	-152	-9	0	-144	-9	0	0	0	0	0	0	0	5	0	261	-5	0	-112	0	0	0	0	0	0	-250	-15	0	-52	-3	0
1936	-34	-2	0	-32	-2	0	-104	-6	0	-111	-7	0	-1	0	0	-78	-5	-553	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-59	-4	0
1937	-34	-2	0	-38	-2	0	-94	-6	0	-109	-7	0	-81	-4	0	-101	-6	-720	0	0	0	-170	-10	-3,931	0	0	0	0	0	0	-250	-15	0	0	0	0
1938	-46	-3	0	-89	-5	0	-124	-8	0	-130	-8	0	0	0	0	-67	-4	-477	0	0	0	-150	-9	-3,463	-250	-15	-2,475	0	0	0	0	0	0	-214	-13	0
1939	-203	-12	0	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	0	-86	-5	0	-51	-3	0
1940	-40	-2	0	-64	-4	0	-64	-4	0	-128	-8	0	0	0	0	0	0	0	-75	-4	-4,233	-7	0	-173	0	0	0	0	0	0	-250	-15	0	-59	-4	0
1941	-35	-2	0	-56	-3	0	0	0	0	-24	-1	0	-250	-14	0	-28	-2	-200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	0
1942	-83	-5	0	-63	-4	0	-76	-5	0	-38	-2	0	-92	-5	0	-86	-5	-610	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-156	-9	0
1943	-250	-15	0	-131	-8	0	0	0	0	-55	-3	0	0	0	0	-78	-5	-555	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-85	-5	0
1944	-54	-3	0	-47	-3	0	-59	-4	0	-37	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-94	-6	0	-41	-2	0
1945	-37	-2	0	-123	-7	0	0	0	0	0	0	0	-12	-1	0	-79	-5	-559	0	0	0	0	0	0	0	0	0	0	0	0	-192	-12	0	-59	-3	0
1946	-38	-2	0	-149	-9	0	0	0	0	-1	0	0	-35	-2	0	-76	-5	-540	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	0	-65	-4	0
1947	-47	-3	0	-73	-4	0	-132	-8	0	-115	-7	0	-250	-14	0	-69	-4	-489	0	0	0	0	0	0	-192	-11	-1,899	-250	-15	0	-64	-4	0	-32	-2	0
1948	-29	-2	0	-71	-4	0	-80	-5	0	-43	-3	0	-117	-7	0	-158	-10	-1,121	-173	-10	-9,741	-32	-2	-741	0	0	0	0	0	0	-226	-14	0	-61	-4	0
1949	-50	-3	0	-139	-8	0	-131	-8	0	-114	-7	0	-48	-3	0	0	0	0	0	0	0	0	0	0	-10	-1	-95	-250	-15	0	-134	-8	0	-98	-6	0
1950	-46	-3	0	-49	-3	0	-77	-5	0	-86	-5	0	0	0	0	-139	-9	-985	-161	-10	-9,099	-8	0	-176	0	0	0	0	0	0	-250	-15	0	-85	-5	0
1951	-58	-4	0	-109	-6	0	-129	-8	0	-142	-9	0	-37	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-72	-4	0
1952	-52	-3	0	-52	-3	0	0	0	0	-17	-1	0	-164	-9	0	-81	-5	-576	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-228	-14	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-108	-6	0
1954	-109	-7	0	-75	-4	0	-92	-6	0	-83	-5	0	-158	-9	0	-75	-5	-533	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-75	-4	0
1955	-52	-3	0	-61	-4	0	-250	-15	0	-3	0	0	-159	-9	0	-42	-3	-300	0	0	0	0	0	0	0	0	0	-250	-15	0	-202	-12	0	-94	-6	0
1956	-41	-3	0	-55	-3	0	-250	-15	0	-138	-8	0	-250	-14	0	-80	-5	-568	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	0
1957	-30	-2	0	-138	-8	0	-73	-5	0	-38	-2	0	-159	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-58	-3	0
1958	-55	-3	0	-139	-8	0	-250	-15	0	0	0	0	-146	-8	0	0	0	0	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-227	-14	0
1959	0	0	0	0	0	0	0	0	0	-83	-5	0	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-237	-15	0	-52	-3	0
1960	-32	-2	0	-36	-2	0	-133	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	0	-94	-6	0	-73	-4	0
1961	-40	-2	0	-160	-10	0	-143	-9	0	-138	-8	0	-131	-7	0	-69	-4	-487	-74	-4	-4,174	-5	0	-116	-116	-7	-1,148	-250	-15	0	-71	-4	0	-139	-8	0
1962	-199	-12	0	-162	-10	0	-143	-9	0	0	0	0	0	0	0	-81	-5	-576	-189	-11	-10,680	-8	0	-178	-35	-2	-345	-250	-15	0	-129	-8	0	-44	-3	0
1963	-136	-8	0	0	0	0	-250	-15	0	-95	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	0	-28	-2	0	-20	-1	0	-230	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-65	-4	0	-43	-3	0
1965	-33	-2	0	-62	-4	0	0	0	0	0	0	0	-56	-3	0	-81	-5	-577	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1966	-49	-3	0	-112	-7	0	-167	-10	0	-94	-6	0	12	1	0	-10	-1	-74	0	0	0	0	0	0	0	0	0	-250	-15	0	-166	-10	0	-64	-4	0
1967	-54	-3	0	-94	-6	0	-250	-15	0	-29	-2	0	-154	-9	0	-46	-3	-329	0	0	0	-150	-9	-3,463	-250	-15	-2,475	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-170	-10	0	-45	-3	0
1969	-44	-3	0	-99	-6	0	-250	-15	0	-115	-7	0	-127	-7	0	-166	-10	-1,182	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-227	-14	0
1970	-189	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	0	-53	-3	0	-60	-4	0	-135	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-153	-9	0
1972	-183	-11	0	0	0	0	-44	-3	0	-54	-3	0	-250	-14	0	-9	-1	-63	0	0	0	0	0	0	0	0	0	0	0	0	-184	-11	0	0	0	0
1973	-30	-2	0	-81	-5	0	-250	-15	0	-143	-9	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1974	-35	-2	0	-61	-4	0	-8	-1	0	-158	-10	0	0	0	0	0	0	0	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	-250	-15	0	-155	-9	0
1975	-60	-4	0	-2	0	0	-63	-4	0	-53	-3	0	-149	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-171	-10	0
1976	-54	-3	0	0	0	0	-73	-5	0	0	0	0	0	0	0	-135	-8	-959	0	0	0	-2	0	-36	-163	-10	-1,610	-218	-13	0	-250	-15	0	0	0	0
1977	-40	-2	0	-130	-8	0	-152	-9	0	-147	-9	0	-161	-9	0	-77	-5	-550	-66	-4	-3,731	-222	-14	-5,119	0	0	0	-250	-15	0	-250	-15	0	-235	-14	0
1978	-198	-12	0	-165	-10	0	-152	-9	0	0	0	0	-250	-14	0	0	0	0	-7	0	-385	-149	-9	-3,447	0	0	0	0	0	0	-250	-15	0	-83	-5	0
1979	-57	-4	0	-47	-3	0	-56	-3	0	-95	-6	0	-126	-7	0	-80	-5	-570	0	0	0	0	0	0	0	0	0	0	0	0	-193	-12	0	-59	-3	0
1980	-40	-2	0	-67	-4	0	-250	-15	0	-115	-7	0	-250	-14	0	-130	-8	-924	0	0	0	-149	-9	-3,447	0	0	0	0	0	0	-250	-15	0	-112	-7	0
1981	-74	-5	0	-50	-3	0	-65	-4	0	-98	-6	0	-160	-9	0	-71	-4	-504	0	0	0	0	0	0	-11	-1	-106	-239	-14	0	-76	-5	0	-46	-3	0
1982	-42	-3	0	-133	-8	0	0	0	0	-134	-8	0	-250	-14	0	-94	-6	-669	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-225	-13	0
1983	0	0	0	0	0	0	-73	-5	0	-42	-3	0	0	0	0	0	0	0	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1985	-44	-3	0	-43	-3	0	-29	-2	0	-166	-10	0	-90	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	-227	-13	0	-74	-5	0	-55	-3	0
1986	-50	-3	0	-58	-3	0	-120	-7	0	0	0	0	-131	-7	0	-250	-15	-1,775	-102	-6	-5,735	-7	0	-173	0	0	0	0	0	0	-250	-15	0	-148	-9	0
1987	-72	-4	0	-46	-3	0	-40	-2	0	-42	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	-1	-95	-250	-15	0	-116	-7	0	-45	-3	0
1988	-34	-2	0	-56	-3	0	-74	-5	0	-138	-8	0	0	0	0	-49	-3	-345	0	0	0	0	0	0	-183	-11	-1,813	-250	-15	0	-169	-10	0	-71	-4	0
1989	-26	-2	0	-22	-1	0	-135	-8	0	-147	-9	0	0	0	0	0	0	0	-37	-2	-2,111	-5	0	-118	0	0	0	-250	-15	0	-67	-4	0	-50	-3	0
1990	-199	-12	0	-162	-10	0	-143	-9	0	0	0	0	-132	-7	0	-29	-2	-209	-99	-6	-5,587	-4	0	-85	-146	-9	-1,450	-136	-8	0	-250	-15	0	-235	-14	0
1991	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	-137	-8	0	-2	0	-12	-35	-2	-1,959	-5	0	-116	0	0	0	-250	-15	0	-250	-15	0	-235	-14	0
1992	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	-155	-9	0	0	0	0	5	0	279	0	0	0	0	0	0	-250	-15	0	-250	-15	0	-235	-14	0
1993	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-94	-6	0
1994	-44	-3	0	-38	-2	0	-90	-6	0	-77	-5	0	-52	-3	0	-48	-3	-342	0	0	0	0	0	0	0	0	0	-90	-5	0	-54	-3	0	-125	-7	0
Mean			0			0			0			0			0			-292			-937			-627			-288			0			0			0
Max			0			0			0			0			0			0			279			0			0			0			0			0
Min			0			0			0			0			0			-1,775			-10,680			-5,119			-2,475			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entraiment and Impingement Loss Calculations – Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-89	-5	-2	-50	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-1	-58	-3	-1	-250	-15	-9	-5	0	0	-124	-7	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-62	-4	0
1924	-41	-3	-1	-38	-2	-1	-83	-5	-3	-114	-7	-5	0	0	0	-108	-7	-10	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1925	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-138	-8	-1
1926	-41	-3	-1	-35	-2	-1	-112	-7	-4	-137	-8	-6	-250	-14	-63	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-250	-15	-5	-93	-6	0
1927	-36	-2	-1	-68	-4	-1	0	0	0	-114	-7	-5	-129	-7	-33	-82	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-73	-4	0
1928	-47	-3	-1	-51	-3	-1	-48	-3	-2	-168	-10	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1929	-53	-3	-1	-55	-3	-1	-64	-4	-2	-40	-2	-2	0	0	0	-10	-1	-1	0	0	0	0	0	0	-161	-10	-22	-250	-15	-2	-146	-9	-3	-70	-4	0
1930	-28	-2	0	-25	-1	-1	-81	-5	-3	-147	-9	-7	-89	-5	-23	0	0	0	0	0	0	0	0	0	-200	-12	-28	-250	-15	-2	-116	-7	-3	0	0	0
1931	-21	-1	0	-156	-9	-3	-143	-9	-5	-136	-8	-6	0	0	0	-77	-5	-7	-132	-8	-61	0	0	0	-250	-15	-35	-250	-15	-2	-250	-15	-5	-235	-14	-1
1932	-198	-12	-3	-165	-10	-3	-152	-9	-5	0	0	0	95	5	24	0	0	0	-72	-4	-33	-5	0	-3	0	0	0	0	0	0	-250	-15	-5	0	0	0
1933	-34	-2	0	-32	-2	-1	-49	-3	-2	-96	-6	-4	-94	-5	-24	0	0	0	0	0	0	0	0	0	-110	-7	-15	-250	-15	-2	-207	-13	-5	-111	-7	0
1934	0	0	0	-165	-10	-3	-151	-9	-5	-147	-9	-7	-89	-5	-23	-53	-3	-5	0	0	0	0	0	0	-38	-2	-5	-250	-15	-2	-176	-11	-4	-223	-13	-1
1935	-198	-12	-3	-165	-10	-3	-152	-9	-5	-144	-9	-6	0	0	0	0	0	0	5	0	2	-5	0	-3	0	0	0	0	0	0	-250	-15	-5	-52	-3	0
1936	-34	-2	0	-32	-2	-1	-104	-6	-4	-111	-7	-5	-1	0	0	-78	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-59	-4	0
1937	-34	-2	0	-38	-2	-1	-94	-6	-3	-109	-7	-5	-81	-4	-20	-101	-6	-10	0	0	0	-170	-10	-114	0	0	0	0	0	0	-250	-15	-5	0	0	0
1938	-46	-3	-1	-89	-5	-2	-124	-8	-4	-130	-8	-6	0	0	0	-67	-4	-6	0	0	0	-150	-9	-100	-250	-15	-35	0	0	0	0	0	0	-214	-13	-1
1939	-203	-12	-3	0	0	0	0	0	0	-81	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-2	-86	-5	-2	-51	-3	0
1940	-40	-2	-1	-64	-4	-1	-64	-4	-2	-128	-8	-6	0	0	0	0	0	0	-75	-4	-35	-7	0	-5	0	0	0	0	0	0	-250	-15	-5	-59	-4	0
1941	-35	-2	-1	-56	-3	-1	0	0	0	-24	-1	-1	-250	-14	-63	-28	-2	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-1
1942	-83	-5	-1	-63	-4	-1	-76	-5	-3	-38	-2	-2	-92	-5	-23	-86	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-156	-9	-1
1943	-250	-15	-4	-131	-8	-3	0	0	0	-55	-3	-2	0	0	0	-78	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-85	-5	0
1944	-54	-3	-1	-47	-3	-1	-59	-4	-2	-37	-2	-2	-34	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-94	-6	-2	-41	-2	0
1945	-37	-2	-1	-123	-7	-3	0	0	0	0	0	0	-12	-1	-3	-79	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-192	-12	-4	-59	-3	0
1946	-38	-2	-1	-149	-9	-3	0	0	0	-1	0	0	-35	-2	-9	-76	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-4	-65	-4	0
1947	-47	-3	-1	-73	-4	-2	-132	-8	-5	-115	-7	-5	-250	-14	-63	-69	-4	-7	0	0	0	0	0	0	-192	-11	-27	-250	-15	-2	-64	-4	-1	-32	-2	0
1948	-29	-2	0	-71	-4	-1	-80	-5	-3	-43	-3	-2	-117	-7	-30	-158	-10	-15	-173	-10	-80	-32	-2	-21	0	0	0	0	0	0	-226	-14	-5	-61	-4	0
1949	-50	-3	-1	-139	-8	-3	-131	-8	-5	-114	-7	-5	-48	-3	-12	0	0	0	0	0	0	0	0	0	-10	-1	-1	-250	-15	-2	-134	-8	-3	-98	-6	0
1950	-46	-3	-1	-49	-3	-1	-77	-5	-3	-86	-5	-4	0	0	0	-139	-9	-13	-161	-10	-75	-8	0	-5	0	0	0	0	0	0	-250	-15	-5	-85	-5	0
1951	-58	-4	-1	-109	-6	-2	-129	-8	-5	-142	-9	-6	-37	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-72	-4	0
1952	-52	-3	-1	-52	-3	-1	0	0	0	-17	-1	-1	-164	-9	-42	-81	-5	-8	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-228	-14	-1
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-108	-6	0
1954	-109	-7	-2	-75	-4	-2	-92	-6	-3	-83	-5	-4	-158	-9	-40	-75	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-75	-4	0
1955	-52	-3	-1	-61	-4	-1	-250	-15	-9	-3	0	0	-159	-9	-40	-42	-3	-4	0	0	0	0	0	0	0	0	0	-250	-15	-2	-202	-12	-4	-94	-6	0
1956	-41	-3	-1	-55	-3	-1	-250	-15	-9	-138	-8	-6	-250	-14	-63	-80	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-1
1957	-30	-2	0	-138	-8	-3	-73	-5	-3	-38	-2	-2	-159	-9	-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-58	-3	0
1958	-55	-3	-1	-139	-8	-3	-250	-15	-9	0	0	0	-146	-8	-37	0	0	0	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-227	-14	-1
1959	0	0	0	0	0	0	0	0	0	-83	-5	-4	-7	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-237	-15	-5	-52	-3	0
1960	-32	-2	0	-36	-2	-1	-133	-8	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-2	-94	-6	-2	-73	-4	0
1961	-40	-2	-1	-160	-10	-3	-143	-9	-5	-138	-8	-6	-131	-7	-33	-69	-4	-7	-74	-4	-34	-5	0	-3	-116	-7	-16	-250	-15	-2	-71	-4	-2	-139	-8	-1
1962	-199	-12	-3	-162	-10	-3	-143	-9	-5	0	0	0	0	0	0	-81	-5	-8	-189	-11	-88	-8	0	-5	-35	-2	-5	-250	-15	-2	-129	-8	-3	-44	-3	0
1963	-136	-8	-2	0	0	0	-250	-15	-9	-95	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-1	-28	-2	-1	-20	-1	-1	-230	-14	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-65	-4	-1	-43	-3	0
1965	-33	-2	0	-62	-4	-1	0	0	0	0	0	0	-56	-3	-14	-81	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1966	-49	-3	-1	-112	-7	-2	-167	-10	-6	-94	-6	-4	12	1	3	-10	-1	-1	0	0	0	0	0	0	0	0	0	-250	-15	-2	-166	-10	-4	-64	-4	0
1967	-54	-3	-1	-94	-6	-2	-250	-15	-9	-29	-2	-1	-154	-9	-39	-46	-3	-4	0	0	0	-150	-9	-100	-250	-15	-35	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-170	-10	-4	-45	-3	0
1969	-44	-3	-1	-99	-6	-2	-250	-15	-9	-115	-7	-5	-127	-7	-32	-166	-10	-16	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-227	-14	-1
1970	-189	-12	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-1	-53	-3	-1	-60	-4	-2	-135	-8	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-153	-9	-1
1972	-183	-11	-3	0	0	0	-44	-3	-2	-54	-3	-2	-250	-14	-63	-9	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-184	-11	-4	0	0	0
1973	-30	-2	0	-81	-5	-2	-250	-15	-9	-143	-9	-6	-35	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1974	-35	-2	-1	-61	-4	-1	-8	-1	0	-158	-10	-7	0	0	0	0	0	0	0	0	0	-150	-9	-100	0	0	0	0	0	0	-250	-15	-5	-155	-9	-1
1975	-60	-4	-1	-2	0	0	-63	-4	-2	-53	-3	-2	-149	-8	-38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-171	-10	-1
1976	-54	-3	-1	0	0	0	-73	-5	-3	0	0	0	0	0	0	-135	-8	-13	0	0	0	-2	0	-1	-163	-10	-23	-218	-13	-2	-250	-15	-5	0	0	0
1977	-40	-2	-1	-130	-8	-3	-152	-9	-5	-147	-9	-7	-161	-9	-41	-77	-5	-7	-66	-4	-31	-222	-14	-148	0	0	0	-250	-15	-2	-250	-15	-5	-235	-14	-1
1978	-198	-12	-3	-165	-10	-3	-152	-9	-5	0	0	0	-250	-14	-63	0	0	0	-7	0	-3	-149	-9	-100	0	0	0	0	0	0	-250	-15	-5	-83	-5	0
1979	-57	-4	-1	-47	-3	-1	-56	-3	-2	-95	-6	-4	-126	-7	-32	-80	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-193	-12	-4	-59	-3	0
1980	-40	-2	-1	-67	-4	-1	-250	-15	-9	-115	-7	-5	-250	-14	-63	-130	-8	-12	0	0	0	-149	-9	-100	0	0	0	0	0	0	-250	-15	-5	-112	-7	0
1981	-74	-5	-1	-50	-3	-1	-65	-4	-2	-98	-6	-4	-160	-9	-40	-71	-4	-7	0	0	0	0	0	0	-11	-1	-1	-239	-14	-2	-76	-5	-2	-46	-3	0
1982	-42	-3	-1	-133	-8	-3	0	0	0	-134	-8	-6	-250	-14	-63	-94	-6	-9	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-225	-13	-1
1983	0	0	0	0	0	0	-73	-5	-3	-42	-3	-2	0	0	0	0	0	0	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1985	-44	-3	-1	-43	-3	-1	-29	-2	-1	-166	-10	-7	-90	-5	-23	0	0	0	0	0	0	0	0	0	0	0	0	-227	-13	-2	-74	-5	-2	-55	-3	0
1986	-50	-3	-1	-58	-3	-1	-120	-7	-4	0	0	0	-131	-7	-33	-250	-15	-24	-102	-6	-47	-7	0	-5	0	0	0	0	0	0	-250	-15	-5	-148	-9	-1
1987	-72	-4	-1	-46	-3	-1	-40	-2	-1	-42	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	-10	-1	-1	-250	-15	-2	-116	-7	-3	-45	-3	0
1988	-34	-2	0	-56	-3	-1	-74	-5	-3	-138	-8	-6	0	0	0	-49	-3	-5	0	0	0	0	0	0	-183	-11	-25	-250	-15	-2	-169	-10	-4	-71	-4	0
1989	-26	-2	0	-22	-1	0	-135	-8	-5	-147	-9	-7	0	0	0	0	0	0	-37	-2	-17	-5	0	-3	0	0	0	-250	-15	-2	-67	-4	-1	-50	-3	0
1990	-199	-12	-3	-162	-10	-3	-143	-9	-5	0	0	0	-132	-7	-33	-29	-2	-3	-99	-6	-46	-4	0	-2	-146	-9	-20	-136	-8	-1	-250	-15	-5	-235	-14	-1
1991	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	-137	-8	-35	-2	0	0	-35	-2	-16	-5	0	-3	0	0	0	-250	-15	-2	-250	-15	-5	-235	-14	-1
1992	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	-155	-9	-39	0	0	0	5	0	2	0	0	0	0	0	0	-250	-15	-2	-250	-15	-5	-235	-14	-1
1993	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-94	-6	0
1994	-44	-3	-1	-38	-2	-1	-90	-6	-3	-77	-5	-3	-52	-3	-13	-48	-3	-5	0	0	0	0	0	0	0	0	0	-90	-5	-1	-54	-3	-1	-125	-7	0
Mean			-1			-2			-4			-4			-19			-4			-8			-18			-4			-1			-4			0
Max			0			0			0			0			24			0			2			0			0			0			0			0
Min			-4			-3			-9			-10			-63			-24			-88			-148			-35			-2			-5			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entraiment and Impingement Loss Calculations – Juvenile Delta Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-89	-5	-1	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-22	-58	-3	0	-250	-15	-2	-5	0	0	-124	-7	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-62	-4	0
1924	-41	-3	-17	-38	-2	0	-83	-5	-1	-114	-7	-2	0	0	0	-108	-7	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1925	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-138	-8	-1
1926	-41	-3	-16	-35	-2	0	-112	-7	-1	-137	-8	-2	-250	-14	-4	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-250	-15	-7	-93	-6	0
1927	-36	-2	-15	-68	-4	0	0	0	0	-114	-7	-2	-129	-7	-2	-82	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-73	-4	0
1928	-47	-3	-19	-51	-3	0	-48	-3	0	-168	-10	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1929	-53	-3	-21	-55	-3	0	-64	-4	-1	-40	-2	-1	0	0	0	-10	-1	0	0	0	0	0	0	0	-161	-10	-14	-250	-15	-7	-146	-9	-4	-70	-4	0
1930	-28	-2	-11	-25	-1	0	-81	-5	-1	-147	-9	-2	-89	-5	-1	0	0	0	0	0	0	0	0	0	-200	-12	-17	-250	-15	-7	-116	-7	-3	0	0	0
1931	-21	-1	-9	-156	-9	-1	-143	-9	-1	-136	-8	-2	0	0	0	-77	-5	-1	-132	-8	-4	0	0	0	-250	-15	-22	-250	-15	-7	-250	-15	-7	-235	-14	-1
1932	-198	-12	-80	-165	-10	-1	-152	-9	-1	0	0	0	95	5	2	0	0	0	-72	-4	-2	-5	0	-1	0	0	0	0	0	0	-250	-15	-7	0	0	0
1933	-34	-2	-14	-32	-2	0	-49	-3	0	-96	-6	-1	-94	-5	-2	0	0	0	0	0	0	0	0	0	-110	-7	-10	-250	-15	-7	-207	-13	-6	-111	-7	-1
1934	0	0	0	-165	-10	-1	-151	-9	-1	-147	-9	-2	-89	-5	-1	-53	-3	-1	0	0	0	0	0	0	-38	-2	-3	-250	-15	-7	-176	-11	-5	-223	-13	-1
1935	-198	-12	-80	-165	-10	-1	-152	-9	-1	-144	-9	-2	0	0	0	0	0	0	5	0	0	-5	0	-1	0	0	0	0	0	0	-250	-15	-7	-52	-3	0
1936	-34	-2	-14	-32	-2	0	-104	-6	-1	-111	-7	-1	-1	0	0	-78	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-59	-4	0
1937	-34	-2	-14	-38	-2	0	-94	-6	-1	-109	-7	-1	-81	-4	-1	-101	-6	-2	0	0	0	-170	-10	-49	0	0	0	0	0	0	-250	-15	-7	0	0	0
1938	-46	-3	-18	-89	-5	-1	-124	-8	-1	-130	-8	-2	0	0	0	-67	-4	-1	0	0	0	-150	-9	-43	-250	-15	-22	0	0	0	0	0	0	-214	-13	-1
1939	-203	-12	-82	0	0	0	0	0	0	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-7	-86	-5	-2	-51	-3	0
1940	-40	-2	-16	-64	-4	0	-64	-4	-1	-128	-8	-2	0	0	0	0	0	0	-75	-4	-2	-7	0	-2	0	0	0	0	0	0	-250	-15	-7	-59	-4	0
1941	-35	-2	-14	-56	-3	0	0	0	0	-24	-1	0	-250	-14	-4	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-1
1942	-83	-5	-34	-63	-4	0	-76	-5	-1	-38	-2	-1	-92	-5	-2	-86	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-156	-9	-1
1943	-250	-15	-101	-131	-8	-1	0	0	0	-55	-3	-1	0	0	0	-78	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-85	-5	0
1944	-54	-3	-22	-47	-3	0	-59	-4	-1	-37	-2	0	-34	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-94	-6	-3	-41	-2	0
1945	-37	-2	-15	-123	-7	-1	0	0	0	0	0	0	-12	-1	0	-79	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-192	-12	-5	-59	-3	0
1946	-38	-2	-15	-149	-9	-1	0	0	0	-1	0	0	-35	-2	-1	-76	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-5	-65	-4	0
1947	-47	-3	-19	-73	-4	0	-132	-8	-1	-115	-7	-2	-250	-14	-4	-69	-4	-1	0	0	0	0	0	0	-192	-11	-17	-250	-15	-7	-64	-4	-2	-32	-2	0
1948	-29	-2	-12	-71	-4	0	-80	-5	-1	-43	-3	-1	-117	-7	-2	-158	-10	-3	-173	-10	-6	-32	-2	-9	0	0	0	0	0	0	-226	-14	-6	-61	-4	0
1949	-50	-3	-20	-139	-8	-1	-131	-8	-1	-114	-7	-2	-48	-3	-1	0	0	0	0	0	0	0	0	0	-10	-1	-1	-250	-15	-7	-134	-8	-4	-98	-6	0
1950	-46	-3	-18	-49	-3	0	-77	-5	-1	-86	-5	-1	0	0	0	-139	-9	-2	-161	-10	-5	-8	0	-2	0	0	0	0	0	0	-250	-15	-7	-85	-5	0
1951	-58	-4	-23	-109	-6	-1	-129	-8	-1	-142	-9	-2	-37	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-72	-4	0
1952	-52	-3	-21	-52	-3	0	0	0	0	-17	-1	0	-164	-9	-3	-81	-5	-1	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-228	-14	-1
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-108	-6	0
1954	-109	-7	-44	-75	-4	0	-92	-6	-1	-83	-5	-1	-158	-9	-3	-75	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-75	-4	0
1955	-52	-3	-21	-61	-4	0	-250	-15	-2	-3	0	0	-159	-9	-3	-42	-3	-1	0	0	0	0	0	0	0	0	0	-250	-15	-7	-202	-12	-5	-94	-6	0
1956	-41	-3	-16	-55	-3	0	-250	-15	-2	-138	-8	-2	-250	-14	-4	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-1
1957	-30	-2	-12	-138	-8	-1	-73	-5	-1	-38	-2	-1	-159	-9	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-58	-3	0
1958	-55	-3	-22	-139	-8	-1	-250	-15	-2	0	0	0	-146	-8	-2	0	0	0	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-227	-14	-1
1959	0	0	0	0	0	0	0	0	0	-83	-5	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-237	-15	-6	-52	-3	0
1960	-32	-2	-13	-36	-2	0	-133	-8	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-7	-94	-6	-3	-73	-4	0
1961	-40	-2	-16	-160	-10	-1	-143	-9	-1	-138	-8	-2	-131	-7	-2	-69	-4	-1	-74	-4	-2	-5	0	-1	-116	-7	-10	-250	-15	-7	-71	-4	-2	-139	-8	-1
1962	-199	-12	-80	-162	-10	-1	-143	-9	-1	0	0	0	0	0	0	-81	-5	-1	-189	-11	-6	-8	0	-2	-35	-2	-3	-250	-15	-7	-129	-8	-3	-44	-3	0
1963	-136	-8	-55	0	0	0	-250	-15	-2	-95	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-17	-28	-2	0	-20	-1	0	-230	-14	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-65	-4	-2	-43	-3	0
1965	-33	-2	-13	-62	-4	0	0	0	0	0	0	0	-56	-3	-1	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1966	-49	-3	-20	-112	-7	-1	-167	-10	-1	-94	-6	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-166	-10	-4	-64	-4	0
1967	-54	-3	-22	-94	-6	-1	-250	-15	-2	-29	-2	0	-154	-9	-3	-46	-3	-1	0	0	0	-150	-9	-43	-250	-15	-22	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-170	-10	-5	-45	-3	0
1969	-44	-3	-18	-99	-6	-1	-250	-15	-2	-115	-7	-2	-127	-7	-2	-166	-10	-3	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-227	-14	-1
1970	-189	-12	-76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-16	-53	-3	0	-60	-4	-1	-135	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-153	-9	-1
1972	-183	-11	-74	0	0	0	-44	-3	0	-54	-3	-1	-250	-14	-4	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-184	-11	-5	0	0	0
1973	-30	-2	-12	-81	-5	-1	-250	-15	-2	-143	-9	-2	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1974	-35	-2	-14	-61	-4	0	-8	-1	0	-158	-10	-2	0	0	0	0	0	0	0	0	0	-150	-9	-43	0	0	0	0	0	0	-250	-15	-7	-155	-9	-1
1975	-60	-4	-24	-2	0	0	-63	-4	-1	-53	-3	-1	-149	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-171	-10	-1
1976	-54	-3	-22	0	0	0	-73	-5	-1	0	0	0	0	0	0	-135	-8	-2	0	0	0	-2	0	0	-163	-10	-14	-218	-13	-6	-250	-15	-7	0	0	0
1977	-40	-2	-16	-130	-8	-1	-152	-9	-1	-147	-9	-2	-161	-9	-3	-77	-5	-1	-66	-4	-2	-222	-14	-64	0	0	0	-250	-15	-7	-250	-15	-7	-235	-14	-1
1978	-198	-12	-80	-165	-10	-1	-152	-9	-1	0	0	0	-250	-14	-4	0	0	0	-7	0	0	-149	-9	-43	0	0	0	0	0	0	-250	-15	-7	-83	-5	0
1979	-57	-4	-23	-47	-3	0	-56	-3	0	-95	-6	-1	-126	-7	-2	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-193	-12	-5	-59	-3	0
1980	-40	-2	-16	-67	-4	0	-250	-15	-2	-115	-7	-2	-250	-14	-4	-130	-8	-2	0	0	0	-149	-9	-43	0	0	0	0	0	0	-250	-15	-7	-112	-7	-1
1981	-74	-5	-30	-50	-3	0	-65	-4	-1	-98	-6	-1	-160	-9	-3	-71	-4	-1	0	0	0	0	0	0	-11	-1	-1	-239	-14	-7	-76	-5	-2	-46	-3	0
1982	-42	-3	-17	-133	-8	-1	0	0	0	-134	-8	-2	-250	-14	-4	-94	-6	-2	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-225	-13	-1
1983	0	0	0	0	0	0	-73	-5	-1	-42	-3	-1	0	0	0	0	0	0	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1985	-44	-3	-18	-43	-3	0	-29	-2	0	-166	-10	-2	-90	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-227	-13	-6	-74	-5	-2	-55	-3	0
1986	-50	-3	-20	-58	-3	0	-120	-7	-1	0	0	0	-131	-7	-2	-250	-15	-4	-102	-6	-3	-7	0	-2	0	0	0	0	0	0	-250	-15	-7	-148	-9	-1
1987	-72	-4	-29	-46	-3	0	-40	-2	0	-42	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-10	-1	-1	-250	-15	-7	-116	-7	-3	-45	-3	0
1988	-34	-2	-14	-56	-3	0	-74	-5	-1	-138	-8	-2	0	0	0	-49	-3	-1	0	0	0	0	0	0	-183	-11	-16	-250	-15	-7	-169	-10	-5	-71	-4	0
1989	-26	-2	-11	-22	-1	0	-135	-8	-1	-147	-9	-2	0	0	0	0	0	0	-37	-2	-1	-5	0	-1	0	0	0	-250	-15	-7	-67	-4	-2	-50	-3	0
1990	-199	-12	-80	-162	-10	-1	-143	-9	-1	0	0	0	-132	-7	-2	-29	-2	-1	-99	-6	-3	-4	0	-1	-146	-9	-13	-136	-8	-4	-250	-15	-7	-235	-14	-1
1991	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	-137	-8	-2	-2	0	0	-35	-2	-1	-5	0	-1	0	0	0	-250	-15	-7	-250	-15	-7	-235	-14	-1
1992	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	-155	-9	-3	0	0	0	5	0	0	0	0	0	0	0	0	-250	-15	-7	-250	-15	-7	-235	-14	-1
1993	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-94	-6	0
1994	-44	-3	-18	-38	-2	0	-90	-6	-1	-77	-5	-1	-52	-3	-1	-48	-3	-1	0	0	0	0	0	0	0	0	0	-90	-5	-2	-54	-3	-1	-125	-7	-1
Mean			-28			0			-1			-1			-1			-1			-1			-8			-3			-3			-5			0
Max			0			0			0			0			2			0			0			0			0			0			0			0
Min			-101			-1			-2			-3			-4			-4			-6			-64			-22			-7			-7			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-89	-5	-3	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-3	-58	-3	-2	-250	-15	-1	-5	0	0	-124	-7	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-62	-4	0
1924	-41	-3	-2	-38	-2	-1	-83	-5	0	-114	-7	-1	0	0	0	-108	-7	-3	0	0	0	0	0	-1	0	0	0	0	0	0	-250	-15	-9	0	0	0
1925	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-138	-8	-1
1926	-41	-3	-2	-35	-2	-1	-112	-7	0	-137	-8	-2	-250	-14	-6	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-250	-15	-9	-93	-6	-1
1927	-36	-2	-2	-68	-4	-2	0	0	0	-114	-7	-1	-129	-7	-3	-82	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-73	-4	-1
1928	-47	-3	-2	-51	-3	-2	-48	-3	0	-168	-10	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1929	-53	-3	-3	-55	-3	-2	-64	-4	0	-40	-2	0	0	0	0	-10	-1	0	0	0	0	0	0	0	-161	-10	-417	-250	-15	-142	-146	-9	-6	-70	-4	-1
1930	-28	-2	-1	-25	-1	-1	-81	-5	0	-147	-9	-2	-89	-5	-2	0	0	0	0	0	0	0	0	0	-200	-12	-519	-250	-15	-142	-116	-7	-4	0	0	0
1931	-21	-1	-1	-156	-9	-5	-143	-9	0	-136	-8	-2	0	0	0	-77	-5	-2	-132	-8	-7	0	0	0	-250	-15	-649	-250	-15	-142	-250	-15	-9	-235	-14	-2
1932	-198	-12	-9	-165	-10	-5	-152	-9	0	0	0	0	95	5	2	0	0	0	-72	-4	-4	-5	0	-6	0	0	0	0	0	0	-250	-15	-9	0	0	0
1933	-34	-2	-2	-32	-2	-1	-49	-3	0	-96	-6	-1	-94	-5	-2	0	0	0	0	0	0	0	0	0	-110	-7	-285	-250	-15	-142	-207	-13	-8	-111	-7	-1
1934	0	0	0	-165	-10	-5	-151	-9	0	-147	-9	-2	-89	-5	-2	-53	-3	-2	0	0	0	0	0	0	-38	-2	-99	-250	-15	-142	-176	-11	-7	-223	-13	-2
1935	-198	-12	-9	-165	-10	-5	-152	-9	0	-144	-9	-2	0	0	0	0	0	0	5	0	0	-5	0	-6	0	0	0	0	0	0	-250	-15	-9	-52	-3	0
1936	-34	-2	-2	-32	-2	-1	-104	-6	0	-111	-7	-1	-1	0	0	-78	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-59	-4	0
1937	-34	-2	-2	-38	-2	-1	-94	-6	0	-109	-7	-1	-81	-4	-2	-101	-6	-3	0	0	0	-170	-10	-220	0	0	0	0	0	0	-250	-15	-9	0	0	0
1938	-46	-3	-2	-89	-5	-3	-124	-8	0	-130	-8	-2	0	0	0	-67	-4	-2	0	0	0	-150	-9	-193	-250	-15	-649	0	0	0	0	0	0	-214	-13	-2
1939	-203	-12	-10	0	0	0	0	0	0	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-135	-86	-5	-3	-51	-3	0
1940	-40	-2	-2	-64	-4	-2	-64	-4	0	-128	-8	-2	0	0	0	0	0	0	-75	-4	-4	-7	0	-10	0	0	0	0	0	0	-250	-15	-9	-59	-4	0
1941	-35	-2	-2	-56	-3	-2	0	0	0	-24	-1	0	-250	-14	-6	-28	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-1
1942	-83	-5	-4	-63	-4	-2	-76	-5	0	-38	-2	0	-92	-5	-2	-86	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-156	-9	-1
1943	-250	-15	-12	-131	-8	-4	0	0	0	-55	-3	-1	0	0	0	-78	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-85	-5	-1
1944	-54	-3	-3	-47	-3	-1	-59	-4	0	-37	-2	0	-34	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-94	-6	-4	-41	-2	0
1945	-37	-2	-2	-123	-7	-4	0	0	0	0	0	0	-12	-1	0	-79	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-192	-12	-7	-59	-3	0
1946	-38	-2	-2	-149	-9	-5	0	0	0	-1	0	0	-35	-2	-1	-76	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-7	-65	-4	0
1947	-47	-3	-2	-73	-4	-2	-132	-8	0	-115	-7	-1	-250	-14	-6	-69	-4	-2	0	0	0	0	0	0	-192	-11	-498	-250	-15	-142	-64	-4	-2	-32	-2	0
1948	-29	-2	-1	-71	-4	-2	-80	-5	0	-43	-3	-1	-117	-7	-3	-158	-10	-5	-173	-10	-9	-32	-2	-41	0	0	0	0	0	0	-226	-14	-9	-61	-4	0
1949	-50	-3	-2	-139	-8	-4	-131	-8	0	-114	-7	-1	-48	-3	-1	0	0	0	0	0	0	0	0	0	-10	-1	-25	-250	-15	-142	-134	-8	-5	-98	-6	-1
1950	-46	-3	-2	-49	-3	-1	-77	-5	0	-86	-5	-1	0	0	0	-139	-9	-4	-161	-10	-9	-8	0	-10	0	0	0	0	0	0	-250	-15	-9	-85	-5	-1
1951	-58	-4	-3	-109	-6	-3	-129	-8	0	-142	-9	-2	-37	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-72	-4	-1
1952	-52	-3	-2	-52	-3	-2	0	0	0	-17	-1	0	-164	-9	-4	-81	-5	-2	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-228	-14	-2
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-108	-6	-1
1954	-109	-7	-5	-75	-4	-2	-92	-6	0	-83	-5	-1	-158	-9	-4	-75	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-75	-4	-1
1955	-52	-3	-3	-61	-4	-2	-250	-15	-1	-3	0	0	-159	-9	-4	-42	-3	-1	0	0	0	0	0	0	0	0	0	-250	-15	-142	-202	-12	-8	-94	-6	-1
1956	-41	-3	-2	-55	-3	-2	-250	-15	-1	-138	-8	-2	-250	-14	-6	-80	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-1
1957	-30	-2	-1	-138	-8	-4	-73	-5	0	-38	-2	0	-159	-9	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-58	-3	0
1958	-55	-3	-3	-139	-8	-4	-250	-15	-1	0	0	0	-146	-8	-3	0	0	0	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-227	-14	-2
1959	0	0	0	0	0	0	0	0	0	-83	-5	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-237	-15	-9	-52	-3	0
1960	-32	-2	-2	-36	-2	-1	-133	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-138	-94	-6	-4	-73	-4	-1
1961	-40	-2	-2	-160	-10	-5	-143	-9	0	-138	-8	-2	-131	-7	-3	-69	-4	-2	-74	-4	-4	-5	0	-6	-116	-7	-301	-250	-15	-142	-71	-4	-3	-139	-8	-1
1962	-199	-12	-10	-162	-10	-5	-143	-9	0	0	0	0	0	0	0	-81	-5	-2	-189	-11	-10	-8	0	-10	-35	-2	-91	-250	-15	-142	-129	-8	-5	-44	-3	0
1963	-136	-8	-7	0	0	0	-250	-15	-1	-95	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-2	-28	-2	-1	-20	-1	0	-230	-14	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-65	-4	-2	-43	-3	0
1965	-33	-2	-2	-62	-4	-2	0	0	0	0	0	0	-56	-3	-1	-81	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1966	-49	-3	-2	-112	-7	-3	-167	-10	0	-94	-6	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-166	-10	-6	-64	-4	0
1967	-54	-3	-3	-94	-6	-3	-250	-15	-1	-29	-2	0	-154	-9	-4	-46	-3	-1	0	0	0	-150	-9	-193	-250	-15	-649	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-170	-10	-6	-45	-3	0
1969	-44	-3	-2	-99	-6	-3	-250	-15	-1	-115	-7	-1	-127	-7	-3	-166	-10	-5	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-227	-14	-2
1970	-189	-12	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-2	-53	-3	-2	-60	-4	0	-135	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-153	-9	-1
1972	-183	-11	-9	0	0	0	-44	-3	0	-54	-3	-1	-250	-14	-6	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-184	-11	-7	0	0	0
1973	-30	-2	-1	-81	-5	-2	-250	-15	-1	-143	-9	-2	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1974	-35	-2	-2	-61	-4	-2	-8	-1	0	-158	-10	-2	0	0	0	0	0	0	0	0	0	-150	-9	-193	0	0	0	0	0	0	-250	-15	-9	-155	-9	-1
1975	-60	-4	-3	-2	0	0	-63	-4	0	-53	-3	-1	-149	-8	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-171	-10	-1
1976	-54	-3	-3	0	0	0	-73	-5	0	0	0	0	0	0	0	-135	-8	-4	0	0	0	-2	0	-2	-163	-10	-422	-218	-13	-124	-250	-15	-9	0	0	0
1977	-40	-2	-2	-130	-8	-4	-152	-9	0	-147	-9	-2	-161	-9	-4	-77	-5	-2	-66	-4	-4	-222	-14	-286	0	0	0	-250	-15	-142	-250	-15	-9	-235	-14	-2
1978	-198	-12	-9	-165	-10	-5	-152	-9	0	0	0	0	-250	-14	-6	0	0	0	-7	0	0	-149	-9	-193	0	0	0	0	0	0	-250	-15	-9	-83	-5	-1
1979	-57	-4	-3	-47	-3	-1	-56	-3	0	-95	-6	-1	-126	-7	-3	-80	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-193	-12	-7	-59	-3	0
1980	-40	-2	-2	-67	-4	-2	-250	-15	-1	-115	-7	-1	-250	-14	-6	-130	-8	-4	0	0	0	-149	-9	-193	0	0	0	0	0	0	-250	-15	-9	-112	-7	-1
1981	-74	-5	-4	-50	-3	-2	-65	-4	0	-98	-6	-1	-160	-9	-4	-71	-4	-2	0	0	0	0	0	0	-11	-1	-28	-239	-14	-136	-76	-5	-3	-46	-3	0
1982	-42	-3	-2	-133	-8	-4	0	0	0	-134	-8	-2	-250	-14	-6	-94	-6	-3	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-225	-13	-2
1983	0	0	0	0	0	0	-73	-5	0	-42	-3	-1	0	0	0	0	0	0	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1985	-44	-3	-2	-43	-3	-1	-29	-2	0	-166	-10	-2	-90	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-227	-13	-129	-74	-5	-3	-55	-3	0
1986	-50	-3	-2	-58	-3	-2	-120	-7	0	0	0	0	-131	-7	-3	-250	-15	-7	-102	-6	-5	-7	0	-10	0	0	0	0	0	0	-250	-15	-9	-148	-9	-1
1987	-72	-4	-3	-46	-3	-1	-40	-2	0	-42	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-10	-1	-25	-250	-15	-142	-116	-7	-4	-45	-3	0
1988	-34	-2	-2	-56	-3	-2	-74	-5	0	-138	-8	-2	0	0	0	-49	-3	-1	0	0	0	0	0	0	-183	-11	-475	-250	-15	-142	-169	-10	-6	-71	-4	-1
1989	-26	-2	-1	-22	-1	-1	-135	-8	0	-147	-9	-2	0	0	0	0	0	0	-37	-2	-2	-5	0	-7	0	0	0	-250	-15	-142	-67	-4	-3	-50	-3	0
1990	-199	-12	-10	-162	-10	-5	-143	-9	0	0	0	0	-132	-7	-3	-29	-2	-1	-99	-6	-5	-4	0	-5	-146	-9	-380	-136	-8	-77	-250	-15	-9	-235	-14	-2
1991	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	-137	-8	-3	-2	0	0	-35	-2	-2	-5	0	-6	0	0	0	-250	-15	-142	-250	-15	-9	-235	-14	-2
1992	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	-155	-9	-4	0	0	0	5	0	0	0	0	0	0	0	0	-250	-15	-142	-250	-15	-9	-235	-14	-2
1993	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-94	-6	-1
1994	-44	-3	-2	-38	-2	-1	-90	-6	0	-77	-5	-1	-52	-3	-1	-48	-3	-1	0	0	0	0	0	0	0	0	0	-90	-5	-51	-54	-3	-2	-125	-7	-1
Mean			-3			-2			0			-1			-2			-1			-1			-35			-75			-54			-6			-1
Max			0			0			0			0			2			0			0			0			0			0			0			0
Min			-12			-5			-1			-3			-6			-7			-10			-286			-649			-142			-9			-2

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-89	-5	-36	-50	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-21	-58	-3	-24	-250	-15	-77	-5	0	-2	-124	-7	-51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-62	-4	-21
1924	-41	-3	-15	-38	-2	-16	-83	-5	-26	-114	-7	-49	0	0	0	-108	-7	-26	0	0	0	0	0	-3	0	0	0	0	0	0	-250	-15	-221	0	0	0
1925	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-138	-8	-47
1926	-41	-3	-15	-35	-2	-14	-112	-7	-34	-137	-8	-59	-250	-14	-104	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-250	-15	-221	-93	-6	-32
1927	-36	-2	-13	-68	-4	-27	0	0	0	-114	-7	-49	-129	-7	-53	-82	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-73	-4	-25
1928	-47	-3	-18	-51	-3	-21	-48	-3	-15	-168	-10	-72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1929	-53	-3	-20	-55	-3	-22	-64	-4	-20	-40	-2	-17	0	0	0	-10	-1	-2	0	0	0	0	0	0	-161	-10	-2,690	-250	-15	-1,436	-146	-9	-128	-70	-4	-24
1930	-28	-2	-10	-25	-1	-10	-81	-5	-25	-147	-9	-63	-89	-5	-37	0	0	0	0	0	0	0	0	0	-200	-12	-3,347	-250	-15	-1,436	-116	-7	-103	0	0	0
1931	-21	-1	-8	-156	-9	-63	-143	-9	-44	-136	-8	-59	0	0	0	-77	-5	-18	-132	-8	-16	0	0	0	-250	-15	-4,184	-250	-15	-1,436	-250	-15	-221	-235	-14	-80
1932	-198	-12	-73	-165	-10	-67	-152	-9	-46	0	0	0	95	5	39	0	0	0	-72	-4	-9	-5	0	-28	0	0	0	0	0	0	-250	-15	-221	0	0	0
1933	-34	-2	-13	-32	-2	-13	-49	-3	-15	-96	-6	-41	-94	-5	-39	0	0	0	0	0	0	0	0	0	-110	-7	-1,840	-250	-15	-1,436	-207	-13	-183	-111	-7	-38
1934	0	0	0	-165	-10	-67	-151	-9	-46	-147	-9	-63	-89	-5	-37	-53	-3	-12	0	0	0	0	0	0	-38	-2	-638	-250	-15	-1,436	-176	-11	-156	-223	-13	-76
1935	-198	-12	-73	-165	-10	-67	-152	-9	-46	-144	-9	-62	0	0	0	0	0	0	5	0	1	-5	0	-28	0	0	0	0	0	0	-250	-15	-221	-52	-3	-18
1936	-34	-2	-13	-32	-2	-13	-104	-6	-32	-111	-7	-48	-1	0	0	-78	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-59	-4	-20
1937	-34	-2	-13	-38	-2	-15	-94	-6	-29	-109	-7	-47	-81	-4	-33	-101	-6	-24	0	0	0	-170	-10	-993	0	0	0	0	0	0	-250	-15	-221	0	0	0
1938	-46	-3	-17	-89	-5	-36	-124	-8	-38	-130	-8	-56	0	0	0	-67	-4	-16	0	0	0	-150	-9	-875	-250	-15	-4,184	0	0	0	0	0	0	-214	-13	-73
1939	-203	-12	-75	0	0	0	0	0	0	-81	-5	-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-1,358	-86	-5	-76	-51	-3	-17
1940	-40	-2	-15	-64	-4	-26	-64	-4	-20	-128	-8	-55	0	0	0	0	0	0	-75	-4	-9	-7	0	-44	0	0	0	0	0	0	-250	-15	-221	-59	-4	-20
1941	-35	-2	-13	-56	-3	-23	0	0	0	-24	-1	-10	-250	-14	-104	-28	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-49
1942	-83	-5	-31	-63	-4	-25	-76	-5	-23	-38	-2	-17	-92	-5	-38	-86	-5	-20	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-156	-9	-53
1943	-250	-15	-93	-131	-8	-53	0	0	0	-55	-3	-23	0	0	0	-78	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-85	-5	-29
1944	-54	-3	-20	-47	-3	-19	-59	-4	-18	-37	-2	-16	-34	-2	-14	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-94	-6	-83	-41	-2	-14
1945	-37	-2	-14	-123	-7	-50	0	0	0	0	0	0	-12	-1	-5	-79	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-192	-12	-170	-59	-3	-20
1946	-38	-2	-14	-149	-9	-61	0	0	0	-1	0	0	-35	-2	-15	-76	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-153	-65	-4	-22
1947	-47	-3	-18	-73	-4	-30	-132	-8	-40	-115	-7	-49	-250	-14	-104	-69	-4	-16	0	0	0	0	0	0	-192	-11	-3,210	-250	-15	-1,436	-64	-4	-57	-32	-2	-11
1948	-29	-2	-11	-71	-4	-29	-80	-5	-25	-43	-3	-19	-117	-7	-49	-158	-10	-37	-173	-10	-20	-32	-2	-187	0	0	0	0	0	0	-226	-14	-200	-61	-4	-21
1949	-50	-3	-18	-139	-8	-57	-131	-8	-40	-114	-7	-49	-48	-3	-20	0	0	0	0	0	0	0	0	0	-10	-1	-161	-250	-15	-1,436	-134	-8	-119	-98	-6	-33
1950	-46	-3	-17	-49	-3	-20	-77	-5	-24	-86	-5	-37	0	0	0	-139	-9	-33	-161	-10	-19	-8	0	-45	0	0	0	0	0	0	-250	-15	-221	-85	-5	-29
1951	-58	-4	-22	-109	-6	-44	-129	-8	-40	-142	-9	-61	-37	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-72	-4	-25
1952	-52	-3	-19	-52	-3	-21	0	0	0	-17	-1	-7	-164	-9	-68	-81	-5	-19	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-228	-14	-78
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-108	-6	-37
1954	-109	-7	-41	-75	-4	-30	-92	-6	-28	-83	-5	-36	-158	-9	-65	-75	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-75	-4	-26
1955	-52	-3	-20	-61	-4	-25	-250	-15	-77	-3	0	-1	-159	-9	-66	-42	-3	-10	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-202	-12	-178	-94	-6	-32
1956	-41	-3	-15	-55	-3	-22	-250	-15	-77	-138	-8	-59	-250	-14	-104	-80	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-67
1957	-30	-2	-11	-138	-8	-56	-73	-5	-22	-38	-2	-16	-159	-9	-66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-58	-3	-20
1958	-55	-3	-21	-139	-8	-56	-250	-15	-77	0	0	0	-146	-8	-60	0	0	0	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-227	-14	-78
1959	0	0	0	0	0	0	0	0	0	-83	-5	-36	-7	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-237	-15	-209	-52	-3	-18
1960	-32	-2	-12	-36	-2	-15	-133	-8	-41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-1,393	-94	-6	-83	-73	-4	-25
1961	-40	-2	-15	-160	-10	-65	-143	-9	-44	-138	-8	-59	-131	-7	-54	-69	-4	-16	-74	-4	-9	-5	0	-29	-116	-7	-1,940	-250	-15	-1,436	-71	-4	-63	-139	-8	-48
1962	-199	-12	-74	-162	-10	-66	-143	-9	-44	0	0	0	0	0	0	-81	-5	-19	-189	-11	-22	-8	0	-45	-35	-2	-584	-250	-15	-1,436	-129	-8	-114	-44	-3	-15
1963	-136	-8	-51	0	0	0	-250	-15	-77	-95	-6	-41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-15	-28	-2	-12	-20	-1	-6	-230	-14	-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-65	-4	-57	-43	-3	-15
1965	-33	-2	-12	-62	-4	-25	0	0	0	0	0	0	-56	-3	-23	-81	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1966	-49	-3	-18	-112	-7	-45	-167	-10	-51	-94	-6	-40	12	1	5	-10	-1	-2	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-166	-10	-146	-64	-4	-22
1967	-54	-3	-20	-94	-6	-38	-250	-15	-77	-29	-2	-12	-154	-9	-64	-46	-3	-11	0	0	0	-150	-9	-875	-250	-15	-4,184	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-170	-10	-150	-45	-3	-15
1969	-44	-3	-17	-99	-6	-40	-250	-15	-77	-115	-7	-49	-127	-7	-52	-166	-10	-39	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-227	-14	-78
1970	-189	-12	-70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-15	-53	-3	-21	-60	-4	-18	-135	-8	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-153	-9	-52
1972	-183	-11	-68	0	0	0	-44	-3	-14	-54	-3	-23	-250	-14	-104	-9	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	-184	-11	-162	0	0	0
1973	-30	-2	-11	-81	-5	-33	-250	-15	-77	-143	-9	-62	-35	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1974	-35	-2	-13	-61	-4	-25	-8	-1	-3	-158	-10	-68	0	0	0	0	0	0	0	0	0	-150	-9	-875	0	0	0	0	0	0	-250	-15	-221	-155	-9	-53
1975	-60	-4	-22	-2	0	-1	-63	-4	-19	-53	-3	-23	-149	-8	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-171	-10	-58
1976	-54	-3	-20	0	0	0	-73	-5	-22	0	0	0	0	0	0	-135	-8	-32	0	0	0	-2	0	-9	-163	-10	-2,721	-218	-13	-1,250	-250	-15	-221	0	0	0
1977	-40	-2	-15	-130	-8	-53	-152	-9	-46	-147	-9	-63	-161	-9	-67	-77	-5	-18	-66	-4	-8	-222	-14	-1,293	0	0	0	-250	-15	-1,436	-250	-15	-221	-235	-14	-80
1978	-198	-12	-73	-165	-10	-67	-152	-9	-46	0	0	0	-250	-14	-104	0	0	0	-7	0	-1	-149	-9	-871	0	0	0	0	0	0	-250	-15	-221	-83	-5	-28
1979	-57	-4	-21	-47	-3	-19	-56	-3	-17	-95	-6	-41	-126	-7	-52	-80	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-193	-12	-170	-59	-3	-20
1980	-40	-2	-15	-67	-4	-27	-250	-15	-77	-115	-7	-49	-250	-14	-104	-130	-8	-31	0	0	0	-149	-9	-871	0	0	0	0	0	0	-250	-15	-221	-112	-7	-38
1981	-74	-5	-27	-50	-3	-20	-65	-4	-20	-98	-6	-42	-160	-9	-66	-71	-4	-17	0	0	0	0	0	0	-11	-1	-179	-239	-14	-1,375	-76	-5	-67	-46	-3	-16
1982	-42	-3	-16	-133	-8	-54	0	0	0	-134	-8	-58	-250	-14	-104	-94	-6	-22	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-225	-13	-77
1983	0	0	0	0	0	0	-73	-5	-22	-42	-3	-18	0	0	0	0	0	0	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1985	-44	-3	-16	-43	-3	-17	-29	-2	-9	-166	-10	-71	-90	-5	-37	0	0	0	0	0	0	0	0	0	0	0	0	-227	-13	-1,301	-74	-5	-65	-55	-3	-19
1986	-50	-3	-19	-58	-3	-24	-120	-7	-37	0	0	0	-131	-7	-54	-250	-15	-59	-102	-6	-12	-7	0	-44	0	0	0	0	0	0	-250	-15	-221	-148	-9	-51
1987	-72	-4	-27	-46	-3	-18	-40	-2	-12	-42	-3	-18	0	0	0	0	0	0	0	0	0	0	0	0	-10	-1	-161	-250	-15	-1,436	-116	-7	-102	-45	-3	-15
1988	-34	-2	-13	-56	-3	-23	-74	-5	-23	-138	-8	-59	0	0	0	-49	-3	-11	0	0	0	0	0	0	-183	-11	-3,065	-250	-15	-1,436	-169	-10	-149	-71	-4	-24
1989	-26	-2	-10	-22	-1	-9	-135	-8	-41	-147	-9	-63	0	0	0	0	0	0	-37	-2	-4	-5	0	-30	0	0	0	-250	-15	-1,436	-67	-4	-59	-50	-3	-17
1990	-199	-12	-74	-162	-10	-66	-143	-9	-44	0	0	0	-132	-7	-55	-29	-2	-7	-99	-6	-12	-4	0	-22	-146	-9	-2,451	-136	-8	-782	-250	-15	-221	-235	-14	-80
1991	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	-137	-8	-57	-2	0	0	-35	-2	-4	-5	0	-29	0	0	0	-250	-15	-1,436	-250	-15	-221	-235	-14	-80
1992	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	-155	-9	-64	0	0	0	5	0	1	0	0	0	0	0	0	-250	-15	-1,436	-250	-15	-221	-235	-14	-80
1993	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-94	-6	-32
1994	-44	-3	-16	-38	-2	-15	-90	-6	-28	-77	-5	-33	-52	-3	-22	-48	-3	-11	0	0	0	0	0	0	0	0	0	-90	-5	-515	-54	-3	-48	-125	-7	-43
Mean			-26			-30			-31			-34			-31			-10			-2			-159			-487			-542			-147			-31
Max			0			0			0			0			39			0			1			0			0			0			0			0
Min			-93			-67			-77			-99			-104			-59			-22			-1,293			-4,184			-1,436			-221			-80

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-89	-5	-1	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	0	-58	-3	0	-250	-15	-1	-5	0	0	-124	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-62	-4	0
1924	-41	-3	0	-38	-2	0	-83	-5	0	-114	-7	-1	0	0	0	-108	-7	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1925	-198	-12	0	-165	-10	-1	-152	-9	0	-147	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-138	-8	0
1926	-41	-3	0	-35	-2	0	-112	-7	0	-137	-8	-1	-250	-14	-3	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-250	-15	0	-93	-6	0
1927	-36	-2	0	-68	-4	0	0	0	0	-114	-7	-1	-129	-7	-1	-82	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-73	-4	0
1928	-47	-3	0	-51	-3	0	-48	-3	0	-168	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1929	-53	-3	0	-55	-3	0	-64	-4	0	-40	-2	0	0	0	0	-10	-1	0	0	0	0	0	0	0	-161	-10	0	-250	-15	-1	-146	-9	0	-70	-4	0
1930	-28	-2	0	-25	-1	0	-81	-5	0	-147	-9	-1	-89	-5	-1	0	0	0	0	0	0	0	0	0	-200	-12	0	-250	-15	-1	-116	-7	0	0	0	0
1931	-21	-1	0	-156	-9	-1	-143	-9	0	-136	-8	-1	0	0	0	-77	-5	-1	-132	-8	-1	0	0	0	-250	-15	0	-250	-15	-1	-250	-15	0	-235	-14	0
1932	-198	-12	0	-165	-10	-1	-152	-9	0	0	0	0	95	5	1	0	0	0	-72	-4	-1	-5	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1933	-34	-2	0	-32	-2	0	-49	-3	0	-96	-6	-1	-94	-5	-1	0	0	0	0	0	0	0	0	0	-110	-7	0	-250	-15	-1	-207	-13	0	-111	-7	0
1934	0	0	0	-165	-10	-1	-151	-9	0	-147	-9	-1	-89	-5	-1	-53	-3	-1	0	0	0	0	0	0	-38	-2	0	-250	-15	-1	-176	-11	0	-223	-13	0
1935	-198	-12	0	-165	-10	-1	-152	-9	0	-144	-9	-1	0	0	0	0	0	0	5	0	0	-5	0	0	0	0	0	0	0	0	-250	-15	0	-52	-3	0
1936	-34	-2	0	-32	-2	0	-104	-6	0	-111	-7	-1	-1	0	0	-78	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-59	-4	0
1937	-34	-2	0	-38	-2	0	-94	-6	0	-109	-7	-1	-81	-4	-1	-101	-6	-2	0	0	0	-170	-10	-1	0	0	0	0	0	0	-250	-15	0	0	0	0
1938	-46	-3	0	-89	-5	-1	-124	-8	0	-130	-8	-1	0	0	0	-67	-4	-1	0	0	0	-150	-9	-1	-250	-15	0	0	0	0	0	0	0	-214	-13	0
1939	-203	-12	0	0	0	0	0	0	0	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-1	-86	-5	0	-51	-3	0
1940	-40	-2	0	-64	-4	0	-64	-4	0	-128	-8	-1	0	0	0	0	0	0	-75	-4	-1	-7	0	0	0	0	0	0	0	0	-250	-15	0	-59	-4	0
1941	-35	-2	0	-56	-3	0	0	0	0	-24	-1	0	-250	-14	-3	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	0
1942	-83	-5	0	-63	-4	0	-76	-5	0	-38	-2	0	-92	-5	-1	-86	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-156	-9	0
1943	-250	-15	0	-131	-8	-1	0	0	0	-55	-3	0	0	0	0	-78	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-85	-5	0
1944	-54	-3	0	-47	-3	0	-59	-4	0	-37	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-94	-6	0	-41	-2	0
1945	-37	-2	0	-123	-7	-1	0	0	0	0	0	0	-12	-1	0	-79	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-192	-12	0	-59	-3	0
1946	-38	-2	0	-149	-9	-1	0	0	0	-1	0	0	-35	-2	0	-76	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	0	-65	-4	0
1947	-47	-3	0	-73	-4	-1	-132	-8	0	-115	-7	-1	-250	-14	-3	-69	-4	-1	0	0	0	0	0	0	-192	-11	0	-250	-15	-1	-64	-4	0	-32	-2	0
1948	-29	-2	0	-71	-4	-1	-80	-5	0	-43	-3	0	-117	-7	-1	-158	-10	-2	-173	-10	-2	-32	-2	0	0	0	0	0	0	0	-226	-14	0	-61	-4	0
1949	-50	-3	0	-139	-8	-1	-131	-8	0	-114	-7	-1	-48	-3	0	0	0	0	0	0	0	0	0	0	-10	-1	0	-250	-15	-1	-134	-8	0	-98	-6	0
1950	-46	-3	0	-49	-3	0	-77	-5	0	-86	-5	-1	0	0	0	-139	-9	-2	-161	-10	-1	-8	0	0	0	0	0	0	0	0	-250	-15	0	-85	-5	0
1951	-58	-4	0	-109	-6	-1	-129	-8	0	-142	-9	-1	-37	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-72	-4	0
1952	-52	-3	0	-52	-3	0	0	0	0	-17	-1	0	-164	-9	-2	-81	-5	-1	0	0	0	-150	-9	-1	0	0	0	0	0	0	0	0	0	-228	-14	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-108	-6	0
1954	-109	-7	0	-75	-4	-1	-92	-6	0	-83	-5	-1	-158	-9	-2	-75	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-75	-4	0
1955	-52	-3	0	-61	-4	0	-250	-15	-1	-3	0	0	-159	-9	-2	-42	-3	-1	0	0	0	0	0	0	0	0	0	-250	-15	-1	-202	-12	0	-94	-6	0
1956	-41	-3	0	-55	-3	0	-250	-15	-1	-138	-8	-1	-250	-14	-3	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	0
1957	-30	-2	0	-138	-8	-1	-73	-5	0	-38	-2	0	-159	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-58	-3	0
1958	-55	-3	0	-139	-8	-1	-250	-15	-1	0	0	0	-146	-8	-2	0	0	0	0	0	0	-150	-9	-1	0	0	0	0	0	0	0	0	0	-227	-14	0
1959	0	0	0	0	0	0	0	0	0	-83	-5	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-237	-15	0	-52	-3	0
1960	-32	-2	0	-36	-2	0	-133	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-1	-94	-6	0	-73	-4	0
1961	-40	-2	0	-160	-10	-1	-143	-9	0	-138	-8	-1	-131	-7	-1	-69	-4	-1	-74	-4	-1	-5	0	0	-116	-7	0	-250	-15	-1	-71	-4	0	-139	-8	0
1962	-199	-12	0	-162	-10	-1	-143	-9	0	0	0	0	0	0	0	-81	-5	-1	-189	-11	-2	-8	0	0	-35	-2	0	-250	-15	-1	-129	-8	0	-44	-3	0
1963	-136	-8	0	0	0	0	-250	-15	-1	-95	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	0	-28	-2	0	-20	-1	0	-230	-14	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-65	-4	0	-43	-3	0
1965	-33	-2	0	-62	-4	0	0	0	0	0	0	0	-56	-3	-1	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1966	-49	-3	0	-112	-7	-1	-167	-10	0	-94	-6	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-166	-10	0	-64	-4	0
1967	-54	-3	0	-94	-6	-1	-250	-15	-1	-29	-2	0	-154	-9	-2	-46	-3	-1	0	0	0	-150	-9	-1	-250	-15	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-170	-10	0	-45	-3	0
1969	-44	-3	0	-99	-6	-1	-250	-15	-1	-115	-7	-1	-127	-7	-1	-166	-10	-3	0	0	0	-150	-9	-1	0	0	0	0	0	0	0	0	0	-227	-14	0
1970	-189	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	0	-53	-3	0	-60	-4	0	-135	-8	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-153	-9	0
1972	-183	-11	0	0	0	0	-44	-3	0	-54	-3	0	-250	-14	-3	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-184	-11	0	0	0	0
1973	-30	-2	0	-81	-5	-1	-250	-15	-1	-143	-9	-1	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1974	-35	-2	0	-61	-4	0	-8	-1	0	-158	-10	-1	0	0	0	0	0	0	0	0	0	-150	-9	-1	0	0	0	0	0	0	-250	-15	0	-155	-9	0
1975	-60	-4	0	-2	0	0	-63	-4	0	-53	-3	0	-149	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-171	-10	0
1976	-54	-3	0	0	0	0	-73	-5	0	0	0	0	0	0	0	-135	-8	-2	0	0	0	-2	0	0	-163	-10	0	-218	-13	-1	-250	-15	0	0	0	0
1977	-40	-2	0	-130	-8	-1	-152	-9	0	-147	-9	-1	-161	-9	-2	-77	-5	-1	-66	-4	-1	-222	-14	-1	0	0	0	-250	-15	-1	-250	-15	0	-235	-14	0
1978	-198	-12	0	-165	-10	-1	-152	-9	0	0	0	0	-250	-14	-3	0	0	0	-7	0	0	-149	-9	-1	0	0	0	0	0	0	-250	-15	0	-83	-5	0
1979	-57	-4	0	-47	-3	0	-56	-3	0	-95	-6	-1	-126	-7	-1	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-193	-12	0	-59	-3	0
1980	-40	-2	0	-67	-4	0	-250	-15	-1	-115	-7	-1	-250	-14	-3	-130	-8	-2	0	0	0	-149	-9	-1	0	0	0	0	0	0	-250	-15	0	-112	-7	0
1981	-74	-5	0	-50	-3	0	-65	-4	0	-98	-6	-1	-160	-9	-2	-71	-4	-1	0	0	0	0	0	0	-11	-1	0	-239	-14	-1	-76	-5	0	-46	-3	0
1982	-42	-3	0	-133	-8	-1	0	0	0	-134	-8	-1	-250	-14	-3	-94	-6	-1	0	0	0	-150	-9	-1	0	0	0	0	0	0	0	0	0	-225	-13	0
1983	0	0	0	0	0	0	-73	-5	0	-42	-3	0	0	0	0	0	0	0	0	0	0	-150	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1985	-44	-3	0	-43	-3	0	-29	-2	0	-166	-10	-1	-90	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-227	-13	-1	-74	-5	0	-55	-3	0
1986	-50	-3	0	-58	-3	0	-120	-7	0	0	0	0	-131	-7	-1	-250	-15	-4	-102	-6	-1	-7	0	0	0	0	0	0	0	0	-250	-15	0	-148	-9	0
1987	-72	-4	0	-46	-3	0	-40	-2	0	-42	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	-1	0	-250	-15	-1	-116	-7	0	-45	-3	0
1988	-34	-2	0	-56	-3	0	-74	-5	0	-138	-8	-1	0	0	0	-49	-3	-1	0	0	0	0	0	0	-183	-11	0	-250	-15	-1	-169	-10	0	-71	-4	0
1989	-26	-2	0	-22	-1	0	-135	-8	0	-147	-9	-1	0	0	0	0	0	0	-37	-2	0	-5	0	0	0	0	0	-250	-15	-1	-67	-4	0	-50	-3	0
1990	-199	-12	0	-162	-10	-1	-143	-9	0	0	0	0	-132	-7	-1	-29	-2	0	-99	-6	-1	-4	0	0	-146	-9	0	-136	-8	-1	-250	-15	0	-235	-14	0
1991	-198	-12	0	-165	-10	-1	-152	-9	0	-147	-9	-1	-137	-8	-1	-2	0	0	-35	-2	0	-5	0	0	0	0	0	-250	-15	-1	-250	-15	0	-235	-14	0
1992	-198	-12	0	-165	-10	-1	-152	-9	0	-147	-9	-1	-155	-9	-2	0	0	0	5	0	0	0	0	0	0	0	0	-250	-15	-1	-250	-15	0	-235	-14	0
1993	-198	-12	0	-165	-10	-1	-152	-9	0	-147	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-94	-6	0
1994	-44	-3	0	-38	-2	0	-90	-6	0	-77	-5	-1	-52	-3	-1	-48	-3	-1	0	0	0	0	0	0	0	0	0	-90	-5	0	-54	-3	0	-125	-7	0
Mean			0			-1			0			-1			-1			-1			0			0			0			0			0			0
Max			0			0			0			0			1			0			0			0			0			0			0			0
Min			0			-1			-1			-2			-3			-4			-2			-1			0			-1			0			0

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Larval Delta Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	54	Apr	Vol	412	May	Vol	530	Jun	Vol	119	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	236	14	**0**
1923	141	9	**0**	142	8	**0**	171	10	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	184	11	**0**
1924	101	6	**0**	85	5	**0**	132	8	**0**	96	6	**0**	52	3	**0**	112	7	**368**	0	0	**0**	0	0	**0**	151	9	**1,062**	0	0	**0**	250	15	**0**	214	13	**0**
1925	67	4	**0**	144	9	**0**	150	9	**0**	147	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**
1926	101	6	**0**	68	4	**0**	62	4	**0**	122	8	**0**	250	14	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	243	14	**0**
1927	91	6	**0**	133	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1928	107	7	**0**	103	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	236	14	**0**
1929	114	7	**0**	110	7	**0**	244	15	**0**	98	6	**0**	47	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	182	11	**0**
1930	70	4	**0**	51	3	**0**	139	9	**0**	147	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	233	14	**0**
1931	64	4	**0**	67	4	**0**	105	6	**0**	103	6	**0**	50	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**1,762**	250	15	**0**	250	15	**0**	235	14	**0**
1932	198	12	**0**	165	10	**0**	152	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**
1933	112	7	**0**	44	3	**0**	103	6	**0**	106	7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	235	14	**0**
1934	96	6	**0**	56	3	**0**	132	8	**0**	147	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	235	14	**0**
1935	196	12	**0**	164	10	**0**	152	9	**0**	147	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	204	12	**0**
1936	108	7	**0**	79	5	**0**	161	10	**0**	115	7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	234	14	**0**
1937	100	6	**0**	82	5	**0**	250	15	**0**	93	6	**0**	146	8	**0**	0	0	**0**	0	0	**0**	170	10	**5,542**	0	0	**0**	0	0	**0**	250	15	**0**	235	14	**0**
1938	122	7	**0**	234	14	**0**	0	0	**0**	0	0	**0**	0	0	**0**	67	4	**221**	0	0	**0**	150	9	**4,883**	250	15	**1,762**	0	0	**0**	0	0	**0**	227	14	**0**
1939	190	12	**0**	0	0	**0**	93	6	**0**	81	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	141	8	**0**
1940	77	5	**0**	86	5	**0**	101	6	**0**	138	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	189	11	**0**
1941	83	5	**0**	73	4	**0**	0	0	**0**	0	0	**0**	60	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	228	14	**0**
1942	190	12	**0**	136	8	**0**	74	5	**0**	0	0	**0**	79	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	227	14	**0**
1943	190	12	**0**	131	8	**0**	0	0	**0**	55	3	**0**	0	0	**0**	78	5	**258**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1944	116	7	**0**	82	5	**0**	77	5	**0**	83	5	**0**	52	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	120	7	**0**
1945	72	4	**0**	132	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	177	11	**0**
1946	99	6	**0**	106	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	186	11	**0**
1947	105	6	**0**	110	7	**0**	250	15	**0**	115	7	**0**	123	7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	112	7	**0**
1948	67	4	**0**	105	6	**0**	140	9	**0**	124	8	**0**	67	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	198	12	**0**
1949	112	7	**0**	100	6	**0**	250	15	**0**	115	7	**0**	7	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	243	14	**0**
1950	104	6	**0**	84	5	**0**	117	7	**0**	138	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	234	14	**0**
1951	132	8	**0**	218	13	**0**	0	0	**0**	0	0	**0**	99	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	210	12	**0**
1952	115	7	**0**	109	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**267**	0	0	**0**	150	9	**4,883**	0	0	**0**	0	0	**0**	0	0	**0**	228	14	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1954	191	12	**0**	136	8	**0**	93	6	**0**	81	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	236	14	**0**
1955	109	7	**0**	117	7	**0**	243	15	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	242	14	**0**
1956	81	5	**0**	83	5	**0**	250	15	**0**	124	8	**0**	124	7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	227	13	**0**
1957	0	0	**0**	138	8	**0**	94	6	**0**	81	5	**0**	89	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	201	12	**0**
1958	122	7	**0**	250	15	**0**	127	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**4,883**	0	0	**0**	0	0	**0**	0	0	**0**	227	14	**0**
1959	0	0	**0**	0	0	**0**	93	6	**0**	77	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	182	11	**0**
1960	84	5	**0**	69	4	**0**	132	8	**0**	115	7	**0**	55	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	247	15	**0**
1961	86	5	**0**	119	7	**0**	250	15	**0**	138	8	**0**	162	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	153	9	**0**
1962	75	5	**0**	104	6	**0**	143	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	137	8	**0**
1963	78	5	**0**	0	0	**0**	143	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	227	13	**0**
1964	118	7	**0**	64	4	**0**	0	0	**0**	76	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	234	14	**0**	138	8	**0**
1965	74	5	**0**	133	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1966	104	6	**0**	221	13	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	181	11	**0**
1967	99	6	**0**	247	15	**0**	170	10	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**4,883**	250	15	**1,762**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	92	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	129	8	**0**
1969	89	5	**0**	124	7	**0**	250	15	**0**	115	7	**0**	0	0	**0**	73	4	**242**	0	0	**0**	150	9	**4,883**	0	0	**0**	0	0	**0**	0	0	**0**	227	14	**0**
1970	189	12	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	227	14	**0**
1971	98	6	**0**	104	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	227	14	**0**
1972	191	12	**0**	137	8	**0**	88	5	**0**	83	5	**0**	30	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	164	10	**0**
1973	70	4	**0**	111	7	**0**	250	15	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	235	14	**0**
1974	95	6	**0**	110	7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**4,883**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1975	0	0	**0**	2	0	**0**	90	6	**0**	83	5	**0**	86	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1976	0	0	**0**	0	0	**0**	94	6	**0**	83	5	**0**	39	2	**0**	138	8	**454**	0	0	**0**	0	0	**0**	195	12	**1,376**	250	15	**0**	250	15	**0**	210	12	**0**
1977	88	5	**0**	137	8	**0**	107	7	**0**	89	5	**0**	70	4	**0**	55	3	**180**	0	0	**0**	222	14	**7,217**	250	15	**1,762**	250	15	**0**	250	15	**0**	235	14	**0**
1978	198	12	**0**	165	10	**0**	152	9	**0**	0	0	**0**	250	14	**0**	0	0	**0**	0	0	**0**	149	9	**4,860**	0	0	**0**	0	0	**0**	250	15	**0**	235	14	**0**
1979	200	12	**0**	111	7	**0**	103	6	**0**	98	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	176	10	**0**
1980	96	6	**0**	123	7	**0**	250	15	**0**	94	6	**0**	55	3	**0**	76	5	**250**	0	0	**0**	149	9	**4,860**	0	0	**0**	0	0	**0**	250	15	**0**	236	14	**0**
1981	200	12	**0**	147	9	**0**	128	8	**0**	92	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	141	8	**0**
1982	88	5	**0**	150	9	**0**	0	0	**0**	0	0	**0**	125	7	**0**	33	2	**110**	0	0	**0**	150	9	**4,883**	0	0	**0**	0	0	**0**	0	0	**0**	225	13	**0**
1983	0	0	**0**	0	0	**0**	73	5	**0**	42	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**4,883**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	81	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1985	106	6	**0**	80	5	**0**	0	0	**0**	0	0	**0**	90	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**	152	9	**0**
1986	110	7	**0**	101	6	**0**	250	15	**0**	0	0	**0**	250	14	**0**	74	5	**243**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	227	13	**0**
1987	169	10	**0**	116	7	**0**	75	5	**0**	83	5	**0**	48	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	151	9	**0**
1988	70	4	**0**	92	5	**0**	250	15	**0**	138	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	190	11	**0**
1989	67	4	**0**	56	3	**0**	106	6	**0**	147	9	**0**	79	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	176	10	**0**
1990	97	6	**0**	99	6	**0**	205	13	**0**	67	4	**0**	95	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	238	14	**0**	250	15	**0**	228	14	**0**
1991	72	4	**0**	150	9	**0**	152	9	**0**	147	9	**0**	161	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	235	14	**0**
1992	198	12	**0**	165	10	**0**	152	9	**0**	147	9	**0**	155	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**	235	14	**0**
1993	198	12	**0**	165	10	**0**	152	9	**0**	147	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	236	14	**0**
1994	172	11	**0**	131	8	**0**	169	10	**0**	97	6	**0**	87	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	231	14	**0**	102	6	**0**
Mean			**0**			**0**			**0**			**0**			**0**			**36**			**0**			**843**			**130**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**0**			**454**			**0**			**7,217**			**1,762**			**0**			**0**			**0**
Min			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	236	14	**1**
1923	141	9	**2**	142	8	**3**	171	10	**6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	184	11	**1**
1924	101	6	**1**	85	5	**2**	132	8	**5**	96	6	**4**	52	3	**13**	112	7	**11**	0	0	**0**	0	0	**0**	151	9	**21**	0	0	**0**	250	15	**5**	214	13	**1**
1925	67	4	**1**	144	9	**3**	150	9	**5**	147	9	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	250	15	**1**
1926	101	6	**1**	68	4	**1**	62	4	**2**	122	8	**5**	250	14	**63**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	243	14	**1**
1927	91	6	**1**	133	8	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	228	14	**1**
1928	107	7	**2**	103	6	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	236	14	**1**
1929	114	7	**2**	110	7	**2**	244	15	**9**	98	6	**4**	47	3	**12**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	182	11	**1**
1930	70	4	**1**	51	3	**1**	139	9	**5**	147	9	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	233	14	**1**
1931	64	4	**1**	67	4	**1**	105	6	**4**	103	6	**5**	50	3	**13**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**35**	250	15	**2**	250	15	**5**	235	14	**1**
1932	198	12	**3**	165	10	**3**	152	9	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	250	15	**1**
1933	112	7	**2**	44	3	**1**	103	6	**4**	106	7	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	235	14	**1**
1934	96	6	**1**	56	3	**1**	132	8	**5**	147	9	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	235	14	**1**
1935	196	12	**3**	164	10	**3**	152	9	**5**	147	9	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	204	12	**1**
1936	108	7	**2**	79	5	**2**	161	10	**6**	115	7	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	234	14	**1**
1937	100	6	**1**	82	5	**2**	250	15	**9**	93	6	**4**	146	8	**37**	0	0	**0**	0	0	**0**	170	10	**114**	0	0	**0**	0	0	**0**	250	15	**5**	235	14	**1**
1938	122	7	**2**	234	14	**5**	0	0	**0**	0	0	**0**	0	0	**0**	67	4	**6**	0	0	**0**	150	9	**100**	250	15	**35**	0	0	**0**	0	0	**0**	227	14	**1**
1939	190	12	**3**	0	0	**0**	93	6	**3**	81	5	**4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	141	8	**1**
1940	77	5	**1**	86	5	**2**	101	6	**4**	138	8	**6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	189	11	**1**
1941	83	5	**1**	73	4	**2**	0	0	**0**	0	0	**0**	60	3	**15**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	228	14	**1**
1942	190	12	**3**	136	8	**3**	74	5	**3**	0	0	**0**	79	4	**20**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	227	14	**1**
1943	190	12	**3**	131	8	**3**	0	0	**0**	55	3	**2**	0	0	**0**	78	5	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	228	14	**1**
1944	116	7	**2**	82	5	**2**	77	5	**3**	83	5	**4**	52	3	**13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	120	7	**0**
1945	72	4	**1**	132	8	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	177	11	**1**
1946	99	6	**1**	106	6	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	186	11	**1**
1947	105	6	**2**	110	7	**2**	250	15	**9**	115	7	**5**	123	7	**31**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	112	7	**0**
1948	67	4	**1**	105	6	**2**	140	9	**5**	124	8	**5**	67	4	**17**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	198	12	**1**
1949	112	7	**2**	100	6	**2**	250	15	**9**	115	7	**5**	7	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	243	14	**1**
1950	104	6	**2**	84	5	**2**	117	7	**4**	138	8	**6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	234	14	**1**
1951	132	8	**2**	218	13	**5**	0	0	**0**	0	0	**0**	99	5	**25**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	210	12	**1**
1952	115	7	**2**	109	6	**2**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**8**	0	0	**0**	150	9	**100**	0	0	**0**	0	0	**0**	0	0	**0**	228	14	**1**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	228	14	**1**
1954	191	12	**3**	136	8	**3**	93	6	**3**	81	5	**4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	236	14	**1**
1955	109	7	**2**	117	7	**2**	243	15	**9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	242	14	**1**
1956	81	5	**1**	83	5	**2**	250	15	**9**	124	8	**6**	124	7	**31**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	227	13	**1**
1957	0	0	**0**	138	8	**3**	94	6	**3**	81	5	**4**	89	5	**23**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	201	12	**1**
1958	122	7	**2**	250	15	**5**	127	8	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**100**	0	0	**0**	0	0	**0**	0	0	**0**	227	14	**1**
1959	0	0	**0**	0	0	**0**	93	6	**3**	77	5	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	182	11	**1**
1960	84	5	**1**	69	4	**1**	132	8	**5**	115	7	**5**	55	3	**14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	247	15	**1**
1961	86	5	**1**	119	7	**2**	250	15	**9**	138	8	**6**	162	9	**41**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	153	9	**1**
1962	75	5	**1**	104	6	**2**	143	9	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	137	8	**1**
1963	78	5	**1**	0	0	**0**	143	9	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	227	13	**1**
1964	118	7	**2**	64	4	**1**	0	0	**0**	76	5	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	234	14	**5**	138	8	**1**
1965	74	5	**1**	133	8	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	228	14	**1**
1966	104	6	**2**	221	13	**5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	181	11	**1**
1967	99	6	**1**	247	15	**5**	170	10	**6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**100**	250	15	**35**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	92	6	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	129	8	**0**
1969	89	5	**1**	124	7	**3**	250	15	**9**	115	7	**5**	0	0	**0**	73	4	**7**	0	0	**0**	150	9	**100**	0	0	**0**	0	0	**0**	0	0	**0**	227	14	**1**
1970	189	12	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	227	14	**1**
1971	98	6	**1**	104	6	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	227	14	**1**
1972	191	12	**3**	137	8	**3**	88	5	**3**	83	5	**4**	30	2	**8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	164	10	**1**
1973	70	4	**1**	111	7	**2**	250	15	**9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	235	14	**1**
1974	95	6	**1**	110	7	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**100**	0	0	**0**	0	0	**0**	250	15	**5**	228	14	**1**
1975	0	0	**0**	2	0	**0**	90	6	**3**	83	5	**4**	86	5	**22**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	228	14	**1**
1976	0	0	**0**	0	0	**0**	94	6	**3**	83	5	**4**	39	2	**10**	138	8	**13**	0	0	**0**	0	0	**0**	195	12	**27**	250	15	**2**	250	15	**5**	210	12	**1**
1977	88	5	**1**	137	8	**3**	107	7	**4**	89	5	**4**	70	4	**18**	55	3	**5**	0	0	**0**	222	14	**148**	250	15	**35**	250	15	**2**	250	15	**5**	235	14	**1**
1978	198	12	**3**	165	10	**3**	152	9	**5**	0	0	**0**	250	14	**63**	0	0	**0**	0	0	**0**	149	9	**100**	0	0	**0**	0	0	**0**	250	15	**5**	235	14	**1**
1979	200	12	**3**	111	7	**2**	103	6	**4**	98	6	**4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	176	10	**1**
1980	96	6	**1**	123	7	**3**	250	15	**9**	94	6	**4**	55	3	**14**	76	5	**7**	0	0	**0**	149	9	**100**	0	0	**0**	0	0	**0**	250	15	**5**	236	14	**1**
1981	200	12	**3**	147	9	**3**	128	8	**5**	92	6	**4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	141	8	**1**
1982	88	5	**1**	150	9	**3**	0	0	**0**	0	0	**0**	125	7	**32**	33	2	**3**	0	0	**0**	150	9	**100**	0	0	**0**	0	0	**0**	0	0	**0**	225	13	**1**
1983	0	0	**0**	0	0	**0**	73	5	**3**	42	3	**2**	0	0	**0**	0	0	**0**	0	0	**0**	150	9	**100**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	81	5	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	228	14	**1**
1985	106	6	**2**	80	5	**2**	0	0	**0**	0	0	**0**	90	5	**23**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	228	14	**5**	152	9	**1**
1986	110	7	**2**	101	6	**2**	250	15	**9**	0	0	**0**	250	14	**63**	74	5	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	227	13	**1**
1987	169	10	**2**	116	7	**2**	75	5	**3**	83	5	**4**	48	3	**12**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	151	9	**1**
1988	70	4	**1**	92	5	**2**	250	15	**9**	138	8	**6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	190	11	**1**
1989	67	4	**1**	56	3	**1**	106	6	**4**	147	9	**7**	79	4	**20**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	176	10	**1**
1990	97	6	**1**	99	6	**2**	205	13	**7**	67	4	**3**	95	5	**24**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	238	14	**2**	250	15	**5**	228	14	**1**
1991	72	4	**1**	150	9	**3**	152	9	**5**	147	9	**7**	161	9	**41**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	235	14	**1**
1992	198	12	**3**	165	10	**3**	152	9	**5**	147	9	**7**	155	9	**39**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	250	15	**5**	235	14	**1**
1993	198	12	**3**	165	10	**3**	152	9	**5**	147	9	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**5**	236	14	**1**
1994	172	11	**2**	131	8	**3**	169	10	**6**	97	6	**4**	87	5	**22**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**2**	231	14	**5**	102	6	**0**
Mean			**1**			**2**			**4**			**3**			**11**			**1**			**0**			**17**			**3**			**1**			**5**			**1**
Max			**3**			**5**			**9**			**7**			**63**			**13**			**0**			**148**			**35**			**2**			**5**			**1**
Min			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Juvenile Delta Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	14	1
1923	141	9	3	142	8	1	171	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	184	11	1
1924	101	6	2	85	5	1	132	8	1	96	6	1	52	3	1	112	7	2	0	0	0	0	0	0	151	9	13	0	0	0	250	15	7	214	13	1
1925	67	4	1	144	9	1	150	9	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1926	101	6	2	68	4	0	62	4	1	122	8	2	250	14	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	243	14	1
1927	91	6	2	133	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1928	107	7	2	103	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	236	14	1
1929	114	7	2	110	7	1	244	15	2	98	6	1	47	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	182	11	1
1930	70	4	1	51	3	0	139	9	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	233	14	1
1931	64	4	1	67	4	0	105	6	1	103	6	1	50	3	1	0	0	0	0	0	0	0	0	0	250	15	22	250	15	7	250	15	7	235	14	1
1932	198	12	4	165	10	1	152	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1933	112	7	2	44	3	0	103	6	1	106	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1934	96	6	2	56	3	0	132	8	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1935	196	12	4	164	10	1	152	9	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	204	12	1
1936	108	7	2	79	5	0	161	10	1	115	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	234	14	1
1937	100	6	2	82	5	1	250	15	2	93	6	1	146	8	2	0	0	0	0	0	0	170	10	49	0	0	0	0	0	0	250	15	7	235	14	1
1938	122	7	2	234	14	1	0	0	0	0	0	0	0	0	0	67	4	1	0	0	0	150	9	43	250	15	22	0	0	0	0	0	0	227	14	1
1939	190	12	4	0	0	0	93	6	1	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	141	8	1
1940	77	5	2	86	5	1	101	6	1	138	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	189	11	1
1941	83	5	2	73	4	0	0	0	0	0	0	0	60	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228	14	1
1942	190	12	4	136	8	1	74	5	1	0	0	0	79	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	227	14	1
1943	190	12	4	131	8	1	0	0	0	55	3	1	0	0	0	78	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1944	116	7	2	82	5	1	77	5	1	83	5	1	52	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	120	7	1
1945	72	4	1	132	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	177	11	1
1946	99	6	2	106	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	186	11	1
1947	105	6	2	110	7	1	250	15	2	115	7	2	123	7	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	112	7	1
1948	67	4	1	105	6	1	140	9	1	124	8	2	67	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	198	12	1
1949	112	7	2	100	6	1	250	15	2	115	7	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	243	14	1
1950	104	6	2	84	5	1	117	7	1	138	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	234	14	1
1951	132	8	3	218	13	1	0	0	0	0	0	0	99	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	210	12	1
1952	115	7	2	109	6	1	0	0	0	0	0	0	0	0	0	81	5	1	0	0	0	150	9	43	0	0	0	0	0	0	0	0	0	228	14	1
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1954	191	12	4	136	8	1	93	6	1	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	236	14	1
1955	109	7	2	117	7	1	243	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	242	14	1
1956	81	5	2	83	5	1	250	15	2	124	8	2	124	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	1
1957	0	0	0	138	8	1	94	6	1	81	5	1	89	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	201	12	1
1958	122	7	2	250	15	2	127	8	1	0	0	0	0	0	0	0	0	0	0	0	0	150	9	43	0	0	0	0	0	0	0	0	0	227	14	1
1959	0	0	0	0	0	0	93	6	1	77	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	182	11	1
1960	84	5	2	69	4	0	132	8	1	115	7	2	55	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	247	15	1
1961	86	5	2	119	7	1	250	15	2	138	8	2	162	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	153	9	1
1962	75	5	2	104	6	1	143	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	137	8	1
1963	78	5	2	0	0	0	143	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	1
1964	118	7	2	64	4	0	0	0	0	76	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	234	14	6	138	8	1
1965	74	5	1	133	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1966	104	6	2	221	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	181	11	1
1967	99	6	2	247	15	2	170	10	1	0	0	0	0	0	0	0	0	0	0	0	0	150	9	43	250	15	22	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	92	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	129	8	1
1969	89	5	2	124	7	1	250	15	2	115	7	2	0	0	0	73	4	1	0	0	0	150	9	43	0	0	0	0	0	0	0	0	0	227	14	1
1970	189	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	14	1
1971	98	6	2	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	227	14	1
1972	191	12	4	137	8	1	88	5	1	83	5	1	30	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	164	10	1
1973	70	4	1	111	7	1	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	235	14	1
1974	95	6	2	110	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	43	0	0	0	0	0	0	250	15	7	228	14	1
1975	0	0	0	2	0	0	90	6	1	83	5	1	86	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1976	0	0	0	0	0	0	94	6	1	83	5	1	39	2	1	138	8	2	0	0	0	0	0	0	195	12	17	250	15	7	250	15	7	210	12	1
1977	88	5	2	137	8	1	107	7	1	89	5	1	70	4	1	55	3	1	0	0	0	222	14	64	250	15	22	250	15	7	250	15	7	235	14	1
1978	198	12	4	165	10	1	152	9	1	0	0	0	250	14	4	0	0	0	0	0	0	149	9	43	0	0	0	0	0	0	250	15	7	235	14	1
1979	200	12	4	111	7	1	103	6	1	98	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	176	10	1
1980	96	6	2	123	7	1	250	15	2	94	6	1	55	3	1	76	5	1	0	0	0	149	9	43	0	0	0	0	0	0	250	15	7	236	14	1
1981	200	12	4	147	9	1	128	8	1	92	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	141	8	1
1982	88	5	2	150	9	1	0	0	0	0	0	0	125	7	2	33	2	1	0	0	0	150	9	43	0	0	0	0	0	0	0	0	0	225	13	1
1983	0	0	0	0	0	0	73	5	1	42	3	1	0	0	0	0	0	0	0	0	0	150	9	43	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1985	106	6	2	80	5	1	0	0	0	0	0	0	90	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	6	152	9	1
1986	110	7	2	101	6	1	250	15	2	0	0	0	250	14	4	74	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	227	13	1
1987	169	10	3	116	7	1	75	5	1	83	5	1	48	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	151	9	1
1988	70	4	1	92	5	1	250	15	2	138	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	190	11	1
1989	67	4	1	56	3	0	106	6	1	147	9	2	79	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	176	10	1
1990	97	6	2	99	6	1	205	13	2	67	4	1	95	5	2	0	0	0	0	0	0	0	0	0	0	0	0	238	14	7	250	15	7	228	14	1
1991	72	4	1	150	9	1	152	9	1	147	9	2	161	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1992	198	12	4	165	10	1	152	9	1	147	9	2	155	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1993	198	12	4	165	10	1	152	9	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	236	14	1
1994	172	11	3	131	8	1	169	10	1	97	6	1	87	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	231	14	6	102	6	0
Mean			2			1			1			1			1			0			0			7			2			3			6			1
Max			4			2			2			2			4			2			0			64			22			7			7			1
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	14	2
1923	141	9	0	142	8	4	171	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	184	11	1
1924	101	6	0	85	5	3	132	8	0	96	6	1	52	3	1	112	7	3	0	0	0	0	0	0	151	9	391	0	0	0	250	15	9	214	13	2
1925	67	4	0	144	9	4	150	9	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1926	101	6	0	68	4	2	62	4	0	122	8	2	250	14	6	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	243	14	2
1927	91	6	0	133	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1928	107	7	0	103	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	236	14	2
1929	114	7	0	110	7	3	244	15	1	98	6	1	47	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	182	11	1
1930	70	4	0	51	3	2	139	9	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	233	14	2
1931	64	4	0	67	4	2	105	6	0	103	6	1	50	3	1	0	0	0	0	0	0	0	0	0	250	15	649	250	15	142	250	15	9	235	14	2
1932	198	12	0	165	10	5	152	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1933	112	7	0	44	3	1	103	6	0	106	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1934	96	6	0	56	3	2	132	8	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1935	196	12	0	164	10	5	152	9	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	204	12	2
1936	108	7	0	79	5	2	161	10	0	115	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	234	14	2
1937	100	6	0	82	5	2	250	15	1	93	6	1	146	8	4	0	0	0	0	0	0	170	10	220	0	0	0	0	0	0	250	15	9	235	14	2
1938	122	7	0	234	14	7	0	0	0	0	0	0	0	0	0	67	4	2	0	0	0	150	9	193	250	15	649	0	0	0	0	0	0	227	14	2
1939	190	12	0	0	0	0	93	6	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	141	8	1
1940	77	5	0	86	5	3	101	6	0	138	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	189	11	1
1941	83	5	0	73	4	2	0	0	0	0	0	0	60	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228	14	2
1942	190	12	0	136	8	4	74	5	0	0	0	0	79	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	227	14	2
1943	190	12	0	131	8	4	0	0	0	55	3	1	0	0	0	78	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1944	116	7	0	82	5	2	77	5	0	83	5	1	52	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	120	7	1
1945	72	4	0	132	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	177	11	1
1946	99	6	0	106	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	186	11	1
1947	105	6	0	110	7	3	250	15	1	115	7	1	123	7	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	112	7	1
1948	67	4	0	105	6	3	140	9	0	124	8	2	67	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	198	12	1
1949	112	7	0	100	6	3	250	15	1	115	7	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	243	14	2
1950	104	6	0	84	5	3	117	7	0	138	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	234	14	2
1951	132	8	0	218	13	7	0	0	0	0	0	0	99	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	210	12	2
1952	115	7	0	109	6	3	0	0	0	0	0	0	0	0	0	81	5	2	0	0	0	150	9	193	0	0	0	0	0	0	0	0	0	228	14	2
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1954	191	12	0	136	8	4	93	6	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	236	14	2
1955	109	7	0	117	7	4	243	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	242	14	2
1956	81	5	0	83	5	2	250	15	1	124	8	2	124	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	2
1957	0	0	0	138	8	4	94	6	0	81	5	1	89	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	201	12	2
1958	122	7	0	250	15	8	127	8	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	193	0	0	0	0	0	0	0	0	0	227	14	2
1959	0	0	0	0	0	0	93	6	0	77	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	182	11	1
1960	84	5	0	69	4	2	132	8	0	115	7	1	55	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	247	15	2
1961	86	5	0	119	7	4	250	15	1	138	8	2	162	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	153	9	1
1962	75	5	0	104	6	3	143	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	137	8	1
1963	78	5	0	0	0	0	143	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	2
1964	118	7	0	64	4	2	0	0	0	76	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	234	14	9	138	8	1
1965	74	5	0	133	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1966	104	6	0	221	13	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	181	11	1
1967	99	6	0	247	15	7	170	10	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	193	250	15	649	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	92	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	129	8	1
1969	89	5	0	124	7	4	250	15	1	115	7	1	0	0	0	73	4	2	0	0	0	150	9	193	0	0	0	0	0	0	0	0	0	227	14	2
1970	189	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	14	2
1971	98	6	0	104	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	227	14	2
1972	191	12	0	137	8	4	88	5	0	83	5	1	30	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	164	10	1
1973	70	4	0	111	7	3	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	235	14	2
1974	95	6	0	110	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	193	0	0	0	0	0	0	250	15	9	228	14	2
1975	0	0	0	2	0	0	90	6	0	83	5	1	86	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1976	0	0	0	0	0	0	94	6	0	83	5	1	39	2	1	138	8	4	0	0	0	0	0	0	195	12	506	250	15	142	250	15	9	210	12	2
1977	88	5	0	137	8	4	107	7	0	89	5	1	70	4	2	55	3	2	0	0	0	222	14	286	250	15	649	250	15	142	250	15	9	235	14	2
1978	198	12	0	165	10	5	152	9	0	0	0	0	250	14	6	0	0	0	0	0	0	149	9	193	0	0	0	0	0	0	250	15	9	235	14	2
1979	200	12	0	111	7	3	103	6	0	98	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	176	10	1
1980	96	6	0	123	7	4	250	15	1	94	6	1	55	3	1	76	5	2	0	0	0	149	9	193	0	0	0	0	0	0	250	15	9	236	14	2
1981	200	12	0	147	9	4	128	8	0	92	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	141	8	1
1982	88	5	0	150	9	5	0	0	0	0	0	0	125	7	3	33	2	1	0	0	0	150	9	193	0	0	0	0	0	0	0	0	0	225	13	2
1983	0	0	0	0	0	0	73	5	0	42	3	1	0	0	0	0	0	0	0	0	0	150	9	193	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	81	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1985	106	6	0	80	5	2	0	0	0	0	0	0	90	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	228	14	9	152	9	1
1986	110	7	0	101	6	3	250	15	1	0	0	0	250	14	6	74	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	227	13	2
1987	169	10	0	116	7	4	75	5	0	83	5	1	48	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	151	9	1
1988	70	4	0	92	5	3	250	15	1	138	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	190	11	1
1989	67	4	0	56	3	2	106	6	0	147	9	2	79	4	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	176	10	1
1990	97	6	0	99	6	3	205	13	1	67	4	1	95	5	2	0	0	0	0	0	0	0	0	0	0	0	0	238	14	136	250	15	9	228	14	2
1991	72	4	0	150	9	5	152	9	0	147	9	2	161	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1992	198	12	0	165	10	5	152	9	0	147	9	2	155	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1993	198	12	0	165	10	5	152	9	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	236	14	2
1994	172	11	0	131	8	4	169	10	0	97	6	1	87	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	231	14	9	102	6	1
Mean			0			3			0			1			1			0			0			33			48			56			8			2
Max			0			8			1			2			6			4			0			286			649			142			9			2
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	14	80
1923	141	9	52	142	8	57	171	10	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	184	11	63
1924	101	6	38	85	5	35	132	8	41	96	6	41	52	3	22	112	7	26	0	0	0	0	0	0	151	9	2,521	0	0	0	250	15	221	214	13	73
1925	67	4	25	144	9	58	150	9	46	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1926	101	6	38	68	4	27	62	4	19	122	8	53	250	14	104	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	243	14	83
1927	91	6	34	133	8	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1928	107	7	40	103	6	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	236	14	80
1929	114	7	42	110	7	45	244	15	75	98	6	42	47	3	19	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	182	11	62
1930	70	4	26	51	3	21	139	9	43	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	233	14	80
1931	64	4	24	67	4	27	105	6	32	103	6	44	50	3	21	0	0	0	0	0	0	0	0	0	250	15	4,184	250	15	1,436	250	15	221	235	14	80
1932	198	12	73	165	10	67	152	9	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1933	112	7	42	44	3	18	103	6	32	106	7	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1934	96	6	36	56	3	23	132	8	41	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1935	196	12	73	164	10	66	152	9	46	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	204	12	70
1936	108	7	40	79	5	32	161	10	49	115	7	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	234	14	80
1937	100	6	37	82	5	33	250	15	77	93	6	40	146	8	61	0	0	0	0	0	0	170	10	993	0	0	0	0	0	0	250	15	221	235	14	80
1938	122	7	45	234	14	95	0	0	0	0	0	0	0	0	0	67	4	16	0	0	0	150	9	875	250	15	4,184	0	0	0	0	0	0	227	14	78
1939	190	12	71	0	0	0	93	6	28	81	5	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	141	8	48
1940	77	5	29	86	5	35	101	6	31	138	8	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	189	11	64
1941	83	5	31	73	4	30	0	0	0	0	0	0	60	3	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228	14	78
1942	190	12	71	136	8	55	74	5	23	0	0	0	79	4	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	227	14	78
1943	190	12	71	131	8	53	0	0	0	55	3	23	0	0	0	78	5	18	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1944	116	7	43	82	5	33	77	5	24	83	5	36	52	3	22	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	120	7	41
1945	72	4	27	132	8	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	177	11	60
1946	99	6	37	106	6	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	186	11	64
1947	105	6	39	110	7	45	250	15	77	115	7	49	123	7	51	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	112	7	38
1948	67	4	25	105	6	43	140	9	43	124	8	53	67	4	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	198	12	67
1949	112	7	41	100	6	41	250	15	77	115	7	49	7	0	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	243	14	83
1950	104	6	39	84	5	34	117	7	36	138	8	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	234	14	80
1951	132	8	49	218	13	89	0	0	0	0	0	0	99	5	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	210	12	72
1952	115	7	43	109	6	44	0	0	0	0	0	0	0	0	0	81	5	19	0	0	0	150	9	875	0	0	0	0	0	0	0	0	0	228	14	78
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1954	191	12	71	136	8	55	93	6	28	81	5	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	236	14	80
1955	109	7	40	117	7	48	243	15	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	242	14	83
1956	81	5	30	83	5	34	250	15	77	124	8	53	124	7	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	77
1957	0	0	0	138	8	56	94	6	29	81	5	35	89	5	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	201	12	69
1958	122	7	45	250	15	101	127	8	39	0	0	0	0	0	0	0	0	0	0	0	0	150	9	875	0	0	0	0	0	0	0	0	0	227	14	78
1959	0	0	0	0	0	0	93	6	28	77	5	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	182	11	62
1960	84	5	31	69	4	28	132	8	40	115	7	49	55	3	23	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	247	15	84
1961	86	5	32	119	7	48	250	15	77	138	8	59	162	9	67	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	153	9	52
1962	75	5	28	104	6	42	143	9	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	137	8	47
1963	78	5	29	0	0	0	143	9	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	78
1964	118	7	44	64	4	26	0	0	0	76	5	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	234	14	207	138	8	47
1965	74	5	27	133	8	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1966	104	6	39	221	13	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	181	11	62
1967	99	6	37	247	15	100	170	10	52	0	0	0	0	0	0	0	0	0	0	0	0	150	9	875	250	15	4,184	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	92	6	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	129	8	44
1969	89	5	33	124	7	50	250	15	77	115	7	49	0	0	0	73	4	17	0	0	0	150	9	875	0	0	0	0	0	0	0	0	0	227	14	78
1970	189	12	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	14	78
1971	98	6	36	104	6	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	227	14	78
1972	191	12	71	137	8	55	88	5	27	83	5	35	30	2	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	164	10	56
1973	70	4	26	111	7	45	250	15	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	235	14	80
1974	95	6	35	110	7	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	875	0	0	0	0	0	0	250	15	221	228	14	78
1975	0	0	0	2	0	1	90	6	28	83	5	36	86	5	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1976	0	0	0	0	0	0	94	6	29	83	5	36	39	2	16	138	8	32	0	0	0	0	0	0	195	12	3,267	250	15	1,436	250	15	221	210	12	72
1977	88	5	33	137	8	56	107	7	33	89	5	38	70	4	29	55	3	13	0	0	0	222	14	1,293	250	15	4,184	250	15	1,436	250	15	221	235	14	80
1978	198	12	73	165	10	67	152	9	46	0	0	0	250	14	104	0	0	0	0	0	0	149	9	871	0	0	0	0	0	0	250	15	221	235	14	80
1979	200	12	74	111	7	45	103	6	32	98	6	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	176	10	60
1980	96	6	36	123	7	50	250	15	77	94	6	40	55	3	23	76	5	18	0	0	0	149	9	871	0	0	0	0	0	0	250	15	221	236	14	80
1981	200	12	74	147	9	60	128	8	39	92	6	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	141	8	48
1982	88	5	33	150	9	61	0	0	0	0	0	0	125	7	52	33	2	8	0	0	0	150	9	875	0	0	0	0	0	0	0	0	0	225	13	77
1983	0	0	0	0	0	0	73	5	22	42	3	18	0	0	0	0	0	0	0	0	0	150	9	875	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	81	5	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1985	106	6	39	80	5	33	0	0	0	0	0	0	90	5	37	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	228	14	201	152	9	52
1986	110	7	41	101	6	41	250	15	77	0	0	0	250	14	104	74	5	17	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	227	13	77
1987	169	10	63	116	7	47	75	5	23	83	5	36	48	3	20	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	151	9	51
1988	70	4	26	92	5	37	250	15	77	138	8	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	190	11	65
1989	67	4	25	56	3	23	106	6	32	147	9	63	79	4	33	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	176	10	60
1990	97	6	36	99	6	40	205	13	63	67	4	29	95	5	39	0	0	0	0	0	0	0	0	0	0	0	0	238	14	1,368	250	15	221	228	14	78
1991	72	4	27	150	9	61	152	9	46	147	9	63	161	9	67	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1992	198	12	73	165	10	67	152	9	46	147	9	63	155	9	64	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1993	198	12	73	165	10	67	152	9	46	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	236	14	80
1994	172	11	64	131	8	53	169	10	52	97	6	42	87	5	36	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	231	14	204	102	6	35
Mean			38			41			34			27			18			3			0			151			309			570			184			69
Max			74			101			77			63			104			32			0			1,293			4,184			1,436			221			85
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	14	0
1923	141	9	0	142	8	1	171	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	184	11	0
1924	101	6	0	85	5	1	132	8	0	96	6	1	52	3	1	112	7	2	0	0	0	0	0	0	151	9	0	0	0	0	250	15	0	214	13	0
1925	67	4	0	144	9	1	150	9	0	147	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1926	101	6	0	68	4	0	62	4	0	122	8	1	250	14	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	243	14	0
1927	91	6	0	133	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1928	107	7	0	103	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	236	14	0
1929	114	7	0	110	7	1	244	15	1	98	6	1	47	3	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	182	11	0
1930	70	4	0	51	3	0	139	9	0	147	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	233	14	0
1931	64	4	0	67	4	0	105	6	0	103	6	1	50	3	1	0	0	0	0	0	0	0	0	0	250	15	0	250	15	1	250	15	0	235	14	0
1932	198	12	0	165	10	1	152	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1933	112	7	0	44	3	0	103	6	0	106	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	235	14	0
1934	96	6	0	56	3	0	132	8	0	147	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	235	14	0
1935	196	12	0	164	10	1	152	9	0	147	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	204	12	0
1936	108	7	0	79	5	1	161	10	0	115	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	234	14	0
1937	100	6	0	82	5	1	250	15	1	93	6	1	146	8	2	0	0	0	0	0	0	170	10	1	0	0	0	0	0	0	250	15	0	235	14	0
1938	122	7	0	234	14	2	0	0	0	0	0	0	0	0	0	67	4	1	0	0	0	150	9	1	250	15	0	0	0	0	0	0	0	227	14	0
1939	190	12	0	0	0	0	93	6	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	141	8	0
1940	77	5	0	86	5	1	101	6	0	138	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	189	11	0
1941	83	5	0	73	4	1	0	0	0	0	0	0	60	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228	14	0
1942	190	12	0	136	8	1	74	5	0	0	0	0	79	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	227	14	0
1943	190	12	0	131	8	1	0	0	0	55	3	0	0	0	0	78	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1944	116	7	0	82	5	1	77	5	0	83	5	1	52	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	120	7	0
1945	72	4	0	132	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	177	11	0
1946	99	6	0	106	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	186	11	0
1947	105	6	0	110	7	1	250	15	1	115	7	1	123	7	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	112	7	0
1948	67	4	0	105	6	1	140	9	0	124	8	1	67	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	198	12	0
1949	112	7	0	100	6	1	250	15	1	115	7	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	243	14	0
1950	104	6	0	84	5	1	117	7	0	138	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	234	14	0
1951	132	8	0	218	13	2	0	0	0	0	0	0	99	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	210	12	0
1952	115	7	0	109	6	1	0	0	0	0	0	0	0	0	0	81	5	1	0	0	0	150	9	1	0	0	0	0	0	0	0	0	0	228	14	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1954	191	12	0	136	8	1	93	6	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	236	14	0
1955	109	7	0	117	7	1	243	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	242	14	0
1956	81	5	0	83	5	1	250	15	1	124	8	1	124	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	0
1957	0	0	0	138	8	1	94	6	0	81	5	1	89	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	201	12	0
1958	122	7	0	250	15	2	127	8	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	1	0	0	0	0	0	0	0	0	0	227	14	0
1959	0	0	0	0	0	0	93	6	0	77	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	182	11	0
1960	84	5	0	69	4	1	132	8	0	115	7	1	55	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	247	15	0
1961	86	5	0	119	7	1	250	15	1	138	8	1	162	9	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	153	9	0
1962	75	5	0	104	6	1	143	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	137	8	0
1963	78	5	0	0	0	0	143	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	13	0
1964	118	7	0	64	4	0	0	0	0	76	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	234	14	0	138	8	0
1965	74	5	0	133	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1966	104	6	0	221	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	181	11	0
1967	99	6	0	247	15	2	170	10	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	1	250	15	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	92	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	129	8	0
1969	89	5	0	124	7	1	250	15	1	115	7	1	0	0	0	73	4	1	0	0	0	150	9	1	0	0	0	0	0	0	0	0	0	227	14	0
1970	189	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	14	0
1971	98	6	0	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	227	14	0
1972	191	12	0	137	8	1	88	5	0	83	5	1	30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	164	10	0
1973	70	4	0	111	7	1	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	235	14	0
1974	95	6	0	110	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	1	0	0	0	0	0	0	250	15	0	228	14	0
1975	0	0	0	2	0	0	90	6	0	83	5	1	86	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1976	0	0	0	0	0	0	94	6	0	83	5	1	39	2	0	138	8	2	0	0	0	0	0	0	195	12	0	250	15	1	250	15	0	210	12	0
1977	88	5	0	137	8	1	107	7	0	89	5	1	70	4	1	55	3	1	0	0	0	222	14	1	250	15	0	250	15	1	250	15	0	235	14	0
1978	198	12	0	165	10	1	152	9	0	0	0	0	250	14	3	0	0	0	0	0	0	149	9	1	0	0	0	0	0	0	250	15	0	235	14	0
1979	200	12	0	111	7	1	103	6	0	98	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	176	10	0
1980	96	6	0	123	7	1	250	15	1	94	6	1	55	3	1	76	5	1	0	0	0	149	9	1	0	0	0	0	0	0	250	15	0	236	14	0
1981	200	12	0	147	9	1	128	8	0	92	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	141	8	0
1982	88	5	0	150	9	1	0	0	0	0	0	0	125	7	1	33	2	1	0	0	0	150	9	1	0	0	0	0	0	0	0	0	0	225	13	0
1983	0	0	0	0	0	0	73	5	0	42	3	0	0	0	0	0	0	0	0	0	0	150	9	1	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	81	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1985	106	6	0	80	5	1	0	0	0	0	0	0	90	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	228	14	0	152	9	0
1986	110	7	0	101	6	1	250	15	1	0	0	0	250	14	3	74	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	227	13	0
1987	169	10	0	116	7	1	75	5	0	83	5	1	48	3	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	151	9	0
1988	70	4	0	92	5	1	250	15	1	138	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	190	11	0
1989	67	4	0	56	3	0	106	6	0	147	9	1	79	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	176	10	0
1990	97	6	0	99	6	1	205	13	0	67	4	1	95	5	1	0	0	0	0	0	0	0	0	0	0	0	0	238	14	1	250	15	0	228	14	0
1991	72	4	0	150	9	1	152	9	0	147	9	1	161	9	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	235	14	0
1992	198	12	0	165	10	1	152	9	0	147	9	1	155	9	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	235	14	0
1993	198	12	0	165	10	1	152	9	0	147	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	236	14	0
1994	172	11	0	131	8	1	169	10	0	97	6	1	87	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	231	14	0	102	6	0
Mean			0			1			0			1			0			0			0			0			0			0			0			0
Max			0			2			1			1			3			2			0			1			0			1			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Larval Delta Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	55	Apr	Vol	681	May	Vol	1,598	Jun	Vol	311	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-172	-10	**0**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	10	1	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	-136	-8	**0**	-125	-7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-149	-9	**-2,748**	-37	-2	**0**	-250	-15	**0**	-290	-17	**0**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-56	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-129	-8	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-24	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-200	-12	**0**	-199	-12	**0**	-230	-14	**0**
1927	-48	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	53	3	**181**	0	0	**0**	0	0	**0**	3	0	**63**	0	0	**0**	-238	-15	**0**	-59	-4	**0**
1928	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-89	-5	**0**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-115	-6	**0**	-32	-2	**-109**	0	0	**0**	0	0	**0**	0	0	**0**	-152	-9	**0**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-78	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-93	-6	**0**	0	0	**0**	-39	-2	**0**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-166	-9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-250	-15	**-4,616**	0	0	**0**	0	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-21	-1	**0**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-245	-15	**0**	0	0	**0**	0	0	**0**	-180	-11	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-242	-14	**0**	0	0	**0**	0	0	**0**
1935	-245	-15	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-2**	4	0	**180**	167	10	**16,360**	0	0	**0**	0	0	**0**	95	6	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-204**	0	0	**0**	0	0	**0**	0	0	**0**	-111	-7	**0**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**0**	-60	-4	**-204**	0	0	**0**	0	0	**0**	0	0	**0**	-102	-6	**0**	0	0	**0**	-133	-8	**0**
1938	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-218	-13	**0**
1939	0	0	**0**	0	0	**0**	-59	-4	**0**	-41	-3	**0**	-54	-3	**0**	-31	-2	**-104**	0	0	**0**	0	0	**0**	0	0	**0**	55	3	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-37	-2	**-1,480**	0	0	**0**	0	0	**0**	-186	-11	**0**	10	1	**0**	-80	-5	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-175	-10	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**0**
1943	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-238	-15	**0**	-81	-5	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	-51	-3	**0**	0	0	**0**	-31	-2	**-104**	0	0	**0**	0	0	**0**	0	0	**0**	-155	-9	**0**	5	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	-46	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-183	-11	**0**	10	1	**0**	-75	-4	**0**
1946	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	31	2	**106**	0	0	**0**	0	0	**0**	0	0	**0**	-234	-14	**0**	10	1	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**0**	0	0	**0**	-31	-2	**-104**	0	0	**0**	0	0	**0**	0	0	**0**	-42	-2	**0**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	-94	-6	**0**	-160	-9	**0**	-98	-6	**-331**	-146	-9	**-5,885**	-51	-3	**-4,957**	0	0	**0**	0	0	**0**	123	8	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-24	-1	**-81**	0	0	**0**	0	0	**0**	0	0	**0**	-152	-9	**0**	11	1	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	-142	-9	**0**	-46	-3	**0**	-35	-2	**-117**	-45	-3	**-1,814**	0	0	**0**	0	0	**0**	0	0	**0**	2	0	**0**	0	0	**0**
1951	-76	-5	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-238	-15	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-76	-5	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-75	-4	**0**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-44**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	11	1	**0**	-102	-6	**0**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**0**	-3	0	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-238	-15	**0**	-84	-5	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	-54	-3	**-183**	0	0	**0**	0	0	**0**	0	0	**0**	-101	-6	**0**	-238	-15	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	-116	-7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	10	1	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-99	-6	**0**	-116	-6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-133	-8	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	-2	0	**0**	-55	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-26	-2	**0**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	-46	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-134	-8	**0**	10	1	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	-159	-10	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-102	-6	**0**
1964	0	0	**0**	-22	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-196	-12	**0**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**0**	-18	-1	**-60**	0	0	**0**	0	0	**0**	-33	-2	**-600**	-183	-11	**0**	-114	-7	**0**	0	0	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-54**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	10	1	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-157	-10	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-241	-14	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-238	-15	**0**	-81	-5	**0**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-79	-5	**0**
1972	0	0	**0**	0	0	**0**	0	0	**0**	-39	-2	**0**	0	0	**0**	-60	-4	**-204**	0	0	**0**	0	0	**0**	0	0	**0**	-184	-11	**0**	10	1	**0**	-68	-4	**0**
1973	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**0**	-28	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-81	-5	**0**
1974	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-238	-15	**0**	0	0	**0**
1975	0	0	**0**	-78	-5	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-238	-15	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	-63	-4	**0**	0	0	**0**	0	0	**0**	-47	-3	**-160**	0	0	**0**	0	0	**0**	-171	-10	**-3,153**	4	0	**0**	0	0	**0**	0	0	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-87	-5	**-294**	-43	-3	**-1,743**	-2	0	**-175**	-250	-15	**-4,616**	0	0	**0**	0	0	**0**	-250	-15	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-68	-4	**0**	0	0	**0**	-36	-2	**-1,474**	72	4	**7,109**	0	0	**0**	0	0	**0**	59	4	**0**	-157	-9	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-204**	0	0	**0**	0	0	**0**	0	0	**0**	-50	-3	**0**	0	0	**0**	-81	-5	**0**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-241	-14	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-98**	0	0	**0**	0	0	**0**	0	0	**0**	-116	-7	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	-49	-3	**0**	-46	-3	**0**	-53	-3	**-181**	0	0	**0**	0	0	**0**	-40	-2	**-748**	-25	-1	**0**	0	0	**0**	-243	-14	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-238	-15	**0**	-94	-6	**0**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-150	-9	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	2	0	**0**	0	0	**0**	46	3	**0**	0	0	**0**	-22	-1	**-905**	-42	-3	**-4,095**	0	0	**0**	-183	-11	**0**	0	0	**0**	-241	-14	**0**
1987	-73	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-53	-3	**0**	-70	-4	**-238**	0	0	**0**	0	0	**0**	0	0	**0**	-200	-12	**0**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	40	2	**134**	0	0	**0**	0	0	**0**	0	0	**0**	-200	-12	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-198	-11	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-169	-10	**0**	0	0	**0**	-47	-3	**-160**	0	0	**0**	0	0	**0**	0	0	**0**	8	0	**0**	0	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**3**	0	0	**0**	0	0	**0**	8	0	**0**	0	0	**0**	0	0	**0**
1992	-245	-15	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-242	-14	**0**	0	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-62**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-100	-6	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-48**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**0**			**0**			**0**			**0**			**0**			**-40**			**-180**			**195**			**-225**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**0**			**181**			**180**			**16,360**			**63**			**0**			**0**			**0**
Min			**0**			**0**			**0**			**0**			**0**			**-331**			**-5,885**			**-4,957**			**-4,616**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	-1
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	-136	-8	-121	-125	-7	-630	0	0	0	0	0	0	0	0	0	-149	-9	-413	-37	-2	-5	-250	-15	-5	-290	-17	-1
1925	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-283	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-129	-8	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-120	0	0	0	0	0	0	0	0	0	0	0	0	-200	-12	-28	-199	-12	-4	-230	-14	-1
1927	-48	-3	-14	0	0	0	0	0	0	0	0	0	0	0	0	53	3	102	0	0	0	0	0	0	3	0	9	0	0	0	-238	-15	-5	-59	-4	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-115	-6	-582	-32	-2	-62	0	0	0	0	0	0	0	0	0	-152	-9	-22	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-78	-4	-395	0	0	0	0	0	0	0	0	0	0	0	0	-93	-6	-13	0	0	0	-39	-2	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-166	-9	-838	0	0	0	0	0	0	0	0	0	-250	-15	-695	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-232	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-245	-15	-71	0	0	0	0	0	0	-180	-11	-160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-34	0	0	0	0	0	0
1935	-245	-15	-71	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-1	4	0	41	167	10	2,22	0	0	0	0	0	0	95	6	2	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-116	0	0	0	0	0	0	0	0	0	-111	-7	-16	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-29	-60	-4	-116	0	0	0	0	0	0	0	0	0	-102	-6	-14	0	0	0	-133	-8	0
1938	0	0	0	0	0	0	0	0	0	-3	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-218	-13	-1
1939	0	0	0	0	0	0	-59	-4	-42	-41	-3	-36	-54	-3	-272	-31	-2	-59	0	0	0	0	0	0	0	0	0	55	3	8	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-341	0	0	0	0	0	0	-186	-11	-26	10	1	0	-80	-5	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-175	-10	-1
1942	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-5	-81	-5	0
1944	0	0	0	0	0	0	0	0	0	-51	-3	-45	0	0	0	-31	-2	-59	0	0	0	0	0	0	0	0	0	-155	-9	-22	5	0	0	0	0	0
1945	0	0	0	0	0	0	-2	0	-2	0	0	0	-46	-3	-232	0	0	0	0	0	0	0	0	0	0	0	0	-183	-11	-26	10	1	0	-75	-4	0
1946	0	0	0	0	0	0	0	0	0	-1	0	-1	0	0	0	31	2	60	0	0	0	0	0	0	0	0	0	-234	-14	-33	10	1	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	-65	-4	-58	0	0	0	-31	-2	-59	0	0	0	0	0	0	0	0	0	-42	-2	-6	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-94	-6	-83	-160	-9	-810	-98	-6	-187	-146	-9	-1,354	-51	-3	-675	0	0	0	0	0	0	123	8	3	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-46	0	0	0	0	0	0	0	0	0	-152	-9	-22	11	1	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	-142	-9	-126	-46	-3	-232	-35	-2	-66	-45	-3	-417	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
1951	-76	-5	-22	0	0	0	0	0	0	-7	0	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-5	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-76	-5	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-4	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-25	0	0	0	0	0	0	0	0	0	0	0	0	11	1	0	-102	-6	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-203	-3	0	-6	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-5	-84	-5	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-5	-54	-3	-104	0	0	0	0	0	0	0	0	0	-101	-6	-14	-238	-15	-5	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-116	-7	-48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-99	-6	-88	-116	-6	-585	0	0	0	0	0	0	0	0	0	0	0	0	-133	-8	-19	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	-2	-55	-3	-49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	-4	0	0	0	0	0	0
1962	0	0	0	0	0	0	-2	0	-2	0	0	0	-46	-3	-232	0	0	0	0	0	0	0	0	0	0	0	0	-134	-8	-19	10	1	0	0	0	0
1963	0	0	0	0	0	0	-159	-10	-113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-102	-6	0
1964	0	0	0	-22	-1	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-196	-12	-28	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-26	-18	-1	-34	0	0	0	0	0	0	-33	-2	-90	-183	-11	-26	-114	-7	-3	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-31	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-157	-10	-3	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-1
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-5	-81	-5	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	0
1972	0	0	0	0	0	0	0	0	0	-39	-2	-34	0	0	0	-60	-4	-116	0	0	0	0	0	0	0	0	0	-184	-11	-26	10	1	0	-68	-4	0
1973	0	0	0	0	0	0	0	0	0	-16	-1	-14	-28	-2	-140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-81	-5	0
1974	0	0	0	0	0	0	0	0	0	-6	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-5	0	0	0
1975	0	0	0	-78	-5	-33	0	0	0	0	0	0	-1	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-5	0	0	0
1976	0	0	0	0	0	0	-63	-4	-45	0	0	0	0	0	0	-47	-3	-91	0	0	0	0	0	0	-171	-10	-475	4	0	1	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-167	-43	-3	-401	-2	0	-24	-250	-15	-695	0	0	0	0	0	0	-250	-15	-1
1978	0	0	0	0	0	0	0	0	0	0	0	0	-68	-4	-344	0	0	0	-36	-2	-339	72	4	968	0	0	0	0	0	0	59	4	1	-157	-9	-1
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-116	0	0	0	0	0	0	0	0	0	-50	-3	-7	0	0	0	-81	-5	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-1
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-55	0	0	0	0	0	0	0	0	0	-116	-7	-17	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-49	-3	-43	-46	-3	-232	-53	-3	-102	0	0	0	0	0	0	-40	-2	-113	-25	-1	-4	0	0	0	-243	-14	-1
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-5	-94	-6	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-21	0	0	0	0	0	0
1986	0	0	0	0	0	0	2	0	2	0	0	0	46	3	232	0	0	0	-22	-1	-208	-42	-3	-557	0	0	0	-183	-11	-26	0	0	0	-241	-14	-1
1987	-73	-4	-21	0	0	0	0	0	0	0	0	0	-53	-3	-266	-70	-4	-135	0	0	0	0	0	0	0	0	0	-200	-12	-28	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	76	0	0	0	0	0	0	0	0	0	-200	-12	-28	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-198	-11	-1,002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-169	-10	-150	0	0	0	-47	-3	-91	0	0	0	0	0	0	0	0	0	8	0	1	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	8	0	1	0	0	0	0	0	0
1992	-245	-15	-71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-34	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	-6	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-4			-1			-3			-14			-105			-23			-41			27			-34			-8			-1			0
Max			0			0			2			0			232			102			41			2,22			9			8			3			0
Min			-71			-48			-113			-160			-1,002			-187			-1,354			-675			-695			-34			-5			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	-26
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	7	0	0	0
1924	0	0	0	0	0	0	0	0	0	-136	-8	-34	-125	-7	-60	0	0	0	0	0	0	0	0	0	-149	-9	-7,723	-37	-2	-424	-250	-15	-190	-290	-17	-43
1925	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-129	-8	-19
1926	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-11	0	0	0	0	0	0	0	0	0	0	0	0	-200	-12	-2,276	-199	-12	-151	-230	-14	-34
1927	-48	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	53	3	31	0	0	0	0	0	0	3	0	177	0	0	0	-238	-15	-181	-59	-4	-9
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	-13
1929	0	0	0	0	0	0	0	0	0	0	0	0	-115	-6	-55	-32	-2	-18	0	0	0	0	0	0	0	0	0	-152	-9	-1,732	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-78	-4	-38	0	0	0	0	0	0	0	0	0	0	0	0	-93	-6	-1,055	0	0	0	-39	-2	-6
1931	0	0	0	0	0	0	0	0	0	0	0	0	-166	-9	-80	0	0	0	0	0	0	0	0	0	-250	-15	-12,974	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-3
1933	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-245	-15	-12	0	0	0	0	0	0	-180	-11	-44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-2,758	0	0	0	0	0	0
1935	-245	-15	-12	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	4	0	5	167	10	4,302	0	0	0	0	0	0	95	6	72	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-35	0	0	0	0	0	0	0	0	-1	-111	-7	-1,261	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-3	-60	-4	-35	0	0	0	0	0	0	0	0	0	-102	-6	-1,160	0	0	0	-133	-8	-20
1938	0	0	0	0	0	0	0	0	0	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-218	-13	-33
1939	0	0	0	0	0	0	-59	-4	-3	-41	-3	-10	-54	-3	-26	-31	-2	-18	0	0	0	0	0	0	0	0	0	55	3	627	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-39	0	0	0	0	0	0	-186	-11	-2,119	10	1	8	-80	-5	-12
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-175	-10	-26
1942	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-12
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-181	-81	-5	-12
1944	0	0	0	0	0	0	0	0	0	-51	-3	-12	0	0	0	-31	-2	-18	0	0	0	0	0	0	0	0	0	-155	-9	-1,769	5	0	4	0	0	0
1945	0	0	0	0	0	0	-2	0	0	0	0	0	-46	-3	-22	0	0	0	0	0	0	0	0	0	0	0	0	-183	-11	-2,085	10	1	7	-75	-4	-11
1946	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	31	2	18	0	0	0	0	0	0	0	0	0	-234	-14	-2,659	10	1	7	0	0	0
1947	0	0	0	0	0	0	0	0	0	-65	-4	-16	0	0	0	-31	-2	-18	0	0	0	0	0	0	0	0	0	-42	-2	-477	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-94	-6	-23	-160	-9	-77	-98	-6	-56	-146	-9	-157	-51	-3	-1,303	0	0	0	0	0	0	123	8	94	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-14	0	0	0	0	0	0	0	0	0	-152	-9	-1,733	11	1	8	0	0	0
1950	0	0	0	0	0	0	0	0	0	-142	-9	-35	-46	-3	-22	-35	-2	-20	-45	-3	-48	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0
1951	-76	-5	-4	0	0	0	0	0	0	-7	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-181	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-76	-5	-11
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-4	-11
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	11	1	8	-102	-6	-15
1956	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-19	-3	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-181	-84	-5	-13
1957	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	-54	-3	-31	0	0	0	0	0	0	0	0	0	-101	-6	-1,152	-238	-15	-181	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-116	-7	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	7	0	0	0
1960	0	0	0	0	0	0	0	0	0	-99	-6	-24	-116	-6	-55	0	0	0	0	0	0	0	0	0	0	0	0	-133	-8	-1,519	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	0	-55	-3	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	-296	0	0	0	0	0	0
1962	0	0	0	0	0	0	-2	0	0	0	0	0	-46	-3	-22	0	0	0	0	0	0	0	0	0	0	0	0	-134	-8	-1,530	10	1	7	0	0	0
1963	0	0	0	0	0	0	-159	-10	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-102	-6	-15
1964	0	0	0	-22	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-196	-12	-2,225	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-2	-18	-1	-10	0	0	0	0	0	0	-33	-2	-1,687	-183	-11	-2,078	-114	-7	-87	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-9	0	0	0	0	0	0	0	0	0	0	0	0	10	1	7	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-157	-10	-119	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-36
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-181	-81	-5	-12
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	-12
1972	0	0	0	0	0	0	0	0	0	-39	-2	-10	0	0	0	-60	-4	-35	0	0	0	0	0	0	0	0	0	-184	-11	-2,093	10	1	7	-68	-4	-10
1973	0	0	0	0	0	0	0	0	0	-16	-1	-4	-28	-2	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-81	-5	-12
1974	0	0	0	0	0	0	0	0	0	-6	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-181	0	0	0
1975	0	0	0	-78	-5	-2	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-181	0	0	0
1976	0	0	0	0	0	0	-63	-4	-3	0	0	0	0	0	0	-47	-3	-27	0	0	0	0	0	0	-171	-10	-8,863	4	0	51	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-50	-43	-3	-46	-2	0	-46	-250	-15	-12,974	0	0	0	0	0	0	-250	-15	-37
1978	0	0	0	0	0	0	0	0	0	0	0	0	-68	-4	-33	0	0	0	-36	-2	-39	72	4	1,869	0	0	0	0	0	0	59	4	45	-157	-9	-23
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-35	0	0	0	0	0	0	0	0	0	-50	-3	-570	0	0	0	-81	-5	-12
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-36
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-17	0	0	0	0	0	0	0	0	0	-116	-7	-1,324	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-49	-3	-12	-46	-3	-22	-53	-3	-31	0	0	0	0	0	0	-40	-2	-2,101	-25	-1	-282	0	0	0	-243	-14	-36
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-181	-94	-6	-14
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-1,702	0	0	0	0	0	0
1986	0	0	0	0	0	0	2	0	0	0	0	0	46	3	22	0	0	0	-22	-1	-24	-42	-3	-1,077	0	0	0	-183	-11	-2,078	0	0	0	-241	-14	-36
1987	-73	-4	-4	0	0	0	0	0	0	0	0	0	-53	-3	-25	-70	-4	-40	0	0	0	0	0	0	0	0	0	-200	-12	-2,276	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	23	0	0	0	0	0	0	0	0	0	-200	-12	-2,276	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-198	-11	-95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-169	-10	-42	0	0	0	-47	-3	-27	0	0	0	0	0	0	0	0	0	8	0	86	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	86	0	0	0	0	0	0
1992	-245	-15	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-2,758	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	-6	-15
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-1			0			0			-4			-10			-7			-5			51			-632			-614			-26			-9
Max			0			0			0			0			22			31			5			4,302			177			627			94			0
Min			-12			-4			-8			-44			-95			-56			-157			-1,303			-12,974			-2,758			-190			-43

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Existing Conditions
Entraiment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	-16
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	5	0	0	0
1924	0	0	0	0	0	0	0	0	0	-136	-8	-36	-125	-7	-42	0	0	0	0	0	0	0	0	0	-149	-9	-259	-37	-2	-21	-250	-15	-135	-290	-17	-27
1925	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-129	-8	-12
1926	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	-200	-12	-111	-199	-12	-108	-230	-14	-21
1927	-48	-3	-19	0	0	0	0	0	0	0	0	0	0	0	0	53	3	19	0	0	0	0	0	0	3	0	6	0	0	0	-238	-15	-129	-59	-4	-5
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	-8
1929	0	0	0	0	0	0	0	0	0	0	0	0	-115	-6	-38	-32	-2	-11	0	0	0	0	0	0	0	0	0	-152	-9	-84	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-78	-4	-26	0	0	0	0	0	0	0	0	0	0	0	0	-93	-6	-51	0	0	0	-39	-2	-4
1931	0	0	0	0	0	0	0	0	0	0	0	0	-166	-9	-55	0	0	0	0	0	0	0	0	0	-250	-15	-435	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-2
1933	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-245	-15	-99	0	0	0	0	0	0	-180	-11	-48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-134	0	0	0	0	0	0
1935	-245	-15	-99	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	4	0	3	167	10	961	0	0	0	0	0	0	95	6	51	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-21	0	0	0	0	0	0	0	0	0	-111	-7	-61	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-2	-60	-4	-21	0	0	0	0	0	0	0	0	0	-102	-6	-56	0	0	0	-133	-8	-12
1938	0	0	0	0	0	0	0	0	0	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-218	-13	-20
1939	0	0	0	0	0	0	-59	-4	-10	-41	-3	-11	-54	-3	-18	-31	-2	-11	0	0	0	0	0	0	0	0	0	55	3	30	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-23	0	0	0	0	0	0	-186	-11	-103	10	1	5	-80	-5	-7
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-175	-10	-16
1942	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-8
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-129	-81	-5	-7
1944	0	0	0	0	0	0	0	0	0	-51	-3	-13	0	0	0	-31	-2	-11	0	0	0	0	0	0	0	0	0	-155	-9	-86	5	0	3	0	0	0
1945	0	0	0	0	0	0	-2	0	0	0	0	0	-46	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	-183	-11	-101	10	1	5	-75	-4	-7
1946	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	31	2	11	0	0	0	0	0	0	0	0	0	-234	-14	-129	10	1	5	0	0	0
1947	0	0	0	0	0	0	0	0	0	-65	-4	-17	0	0	0	-31	-2	-11	0	0	0	0	0	0	0	0	0	-42	-2	-23	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-94	-6	-25	-160	-9	-53	-98	-6	-34	-146	-9	-93	-51	-3	-	0	0	0	0	0	0	123	8	67	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-8	0	0	0	0	0	0	0	0	0	-152	-9	-84	11	1	6	0	0	0
1950	0	0	0	0	0	0	0	0	0	-142	-9	-38	-46	-3	-15	-35	-2	-12	-45	-3	-29	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0
1951	-76	-5	-31	0	0	0	0	0	0	-7	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-129	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-76	-5	-7
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-4	-7
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	11	1	6	-102	-6	-9
1956	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-13	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-129	-84	-5	-8
1957	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	-54	-3	-19	0	0	0	0	0	0	0	0	0	-101	-6	-56	-238	-15	-129	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-116	-7	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	5	0	0	0
1960	0	0	0	0	0	0	0	0	0	-99	-6	-26	-116	-6	-39	0	0	0	0	0	0	0	0	0	0	0	0	-133	-8	-74	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	0	-55	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	-14	0	0	0	0	0	0
1962	0	0	0	0	0	0	-2	0	0	0	0	0	-46	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	-134	-8	-74	10	1	5	0	0	0
1963	0	0	0	0	0	0	-159	-10	-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-102	-6	-9
1964	0	0	0	-22	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-196	-12	-108	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-2	-18	-1	-6	0	0	0	0	0	0	-33	-2	-57	-183	-11	-101	-114	-7	-62	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	10	1	5	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-157	-10	-85	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-22
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-129	-81	-5	-7
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	-7
1972	0	0	0	0	0	0	0	0	0	-39	-2	-10	0	0	0	-60	-4	-21	0	0	0	0	0	0	0	0	0	-184	-11	-102	10	1	5	-68	-4	-6
1973	0	0	0	0	0	0	0	0	0	-16	-1	-4	-28	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-81	-5	-7
1974	0	0	0	0	0	0	0	0	0	-6	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-129	0	0	0
1975	0	0	0	-78	-5	-10	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-129	0	0	0
1976	0	0	0	0	0	0	-63	-4	-11	0	0	0	0	0	0	-47	-3	-16	0	0	0	0	0	0	-171	-10	-297	4	0	2	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-30	-43	-3	-28	-2	0	-10	-250	-15	-435	0	0	0	0	0	0	-250	-15	-23
1978	0	0	0	0	0	0	0	0	0	0	0	0	-68	-4	-23	0	0	0	-36	-2	-23	72	4	418	0	0	0	0	0	0	59	4	32	-157	-9	-14
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-21	0	0	0	0	0	0	0	0	0	-50	-3	-28	0	0	0	-81	-5	-7
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-22
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-10	0	0	0	0	0	0	0	0	0	-116	-7	-64	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-49	-3	-13	-46	-3	-15	-53	-3	-19	0	0	0	0	0	0	-40	-2	-71	-25	-1	-14	0	0	0	-243	-14	-22
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-129	-94	-6	-9
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-83	0	0	0	0	0	0
1986	0	0	0	0	0	0	2	0	0	0	0	0	46	3	15	0	0	0	-22	-1	-14	-42	-3	-	0	0	0	-183	-11	-101	0	0	0	-241	-14	-22
1987	-73	-4	-30	0	0	0	0	0	0	0	0	0	-53	-3	-18	-70	-4	-24	0	0	0	0	0	0	0	0	0	-200	-12	-111	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	14	0	0	0	0	0	0	0	0	0	-200	-12	-111	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-198	-11	-66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-169	-10	-45	0	0	0	-47	-3	-16	0	0	0	0	0	0	0	0	0	8	0	4	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	0	0	0	0	0	0
1992	-245	-15	-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-134	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	-6	-9
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-5			0			-1			-4			-7			-4			-3			11			-21			-30			-18			-5
Max			0			0			0			0			15			19			3			961			6			30			67			0
Min			-99			-15			-27			-48			-66			-34			-93			-			-435			-134			-135			-27

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entraiment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	-1177
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	172	0	0	0
1924	0	0	0	0	0	0	0	0	0	-136	-8	-1,169	-125	-7	-1,033	0	0	0	0	0	0	0	0	0	-149	-9	-49,810	-37	-2	-4,283	-250	-15	-4,411	-290	-17	-1980
1925	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-464	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-129	-8	-878
1926	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-196	0	0	0	0	0	0	0	0	0	0	0	0	-200	-12	-22,981	-199	-12	-3,506	-230	-14	-1567
1927	-48	-3	-359	0	0	0	0	0	0	0	0	0	0	0	0	53	3	252	0	0	0	0	0	0	3	0	1,139	0	0	0	-238	-15	-4,195	-59	-4	-405
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	-609
1929	0	0	0	0	0	0	0	0	0	0	0	0	-115	-6	-954	-32	-2	-151	0	0	0	0	0	0	0	0	0	-152	-9	-17,491	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-78	-4	-648	0	0	0	0	0	0	0	0	0	0	0	0	-93	-6	-10,658	0	0	0	-39	-2	-264
1931	0	0	0	0	0	0	0	0	0	0	0	0	-166	-9	-1,374	0	0	0	0	0	0	0	0	0	-250	-15	-83,680	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-147
1933	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-380	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-245	-15	-1,823	0	0	0	0	0	0	-180	-11	-1,545	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-27,857	0	0	0	0	0	0
1935	-245	-15	-1,823	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-2	4	0	11	167	10	19,458	0	0	0	0	0	0	95	6	1,678	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-284	0	0	0	0	0	0	0	0	-9	-111	-7	-12,738	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-47	-60	-4	-284	0	0	0	0	0	0	0	0	0	-102	-6	-11,718	0	0	0	-133	-8	-911
1938	0	0	0	0	0	0	0	0	0	-3	0	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-218	-13	-1486
1939	0	0	0	0	0	0	-59	-4	-364	-41	-3	-350	-54	-3	-446	-31	-2	-145	0	0	0	0	0	0	0	0	0	55	3	6,331	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-87	0	0	0	0	0	0	-186	-11	-21,397	10	1	176	-80	-5	-549
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-175	-10	-1195
1942	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-561
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-4,195	-81	-5	-556
1944	0	0	0	0	0	0	0	0	0	-51	-3	-435	0	0	0	-31	-2	-145	0	0	0	0	0	0	0	0	0	-155	-9	-17,867	5	0	89	0	0	0
1945	0	0	0	0	0	0	-2	0	-14	0	0	0	-46	-3	-380	0	0	0	0	0	0	0	0	0	0	0	0	-183	-11	-21,053	10	1	172	-75	-4	-510
1946	0	0	0	0	0	0	0	0	0	-1	0	-8	0	0	0	31	2	148	0	0	0	0	0	0	0	0	0	-234	-14	-26,851	10	1	172	0	0	0
1947	0	0	0	0	0	0	0	0	0	-65	-4	-562	0	0	0	-31	-2	-145	0	0	0	0	0	0	0	0	0	-42	-2	-4,817	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-94	-6	-803	-160	-9	-1,328	-98	-6	-461	-146	-9	-345	-51	-3	-5,895	0	0	0	0	0	0	123	8	2,179	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-113	0	0	0	0	0	0	0	0	0	-152	-9	-17,500	11	1	192	0	0	0
1950	0	0	0	0	0	0	0	0	0	-142	-9	-1,218	-46	-3	-380	-35	-2	-163	-45	-3	-106	0	0	0	0	0	0	0	0	0	2	0	44	0	0	0
1951	-76	-5	-565	0	0	0	0	0	0	-7	0	-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-4,195	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-76	-5	-522
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-4	-510
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-62	0	0	0	0	0	0	0	0	0	0	0	0	11	1	193	-102	-6	-697
1956	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-333	-3	0	-15	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-4,195	-84	-5	-575
1957	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-8	-54	-3	-255	0	0	0	0	0	0	0	0	0	-101	-6	-11,638	-238	-15	-4,195	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-116	-7	-945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	172	0	0	0
1960	0	0	0	0	0	0	0	0	0	-99	-6	-846	-116	-6	-958	0	0	0	0	0	0	0	0	0	0	0	0	-133	-8	-15,337	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	-14	-55	-3	-471	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	-2,988	0	0	0	0	0	0
1962	0	0	0	0	0	0	-2	0	-14	0	0	0	-46	-3	-380	0	0	0	0	0	0	0	0	0	0	0	0	-134	-8	-15,448	10	1	172	0	0	0
1963	0	0	0	0	0	0	-159	-10	-972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-102	-6	-699
1964	0	0	0	-22	-1	-181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-196	-12	-22,466	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-42	-18	-1	-84	0	0	0	0	0	0	-33	-2	-10,884	-183	-11	-20,984	-114	-7	-2,010	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-75	0	0	0	0	0	0	0	0	0	0	0	0	10	1	172	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-157	-10	-2,767	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-1644
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-4,195	-81	-5	-552
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	-538
1972	0	0	0	0	0	0	0	0	0	-39	-2	-331	0	0	0	-60	-4	-284	0	0	0	0	0	0	0	0	0	-184	-11	-21,137	10	1	172	-68	-4	-465
1973	0	0	0	0	0	0	0	0	0	-16	-1	-138	-28	-2	-229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-81	-5	-553
1974	0	0	0	0	0	0	0	0	0	-6	0	-52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-4,195	0	0	0
1975	0	0	0	-78	-5	-635	0	0	0	0	0	0	-1	0	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-4,204	0	0	0
1976	0	0	0	0	0	0	-63	-4	-386	0	0	0	0	0	0	-47	-3	-223	0	0	0	0	0	0	-171	-10	-57,163	4	0	515	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-410	-43	-3	-102	-2	0	-209	-250	-15	-83,680	0	0	0	0	0	0	-250	-15	-1706
1978	0	0	0	0	0	0	0	0	0	0	0	0	-68	-4	-563	0	0	0	-36	-2	-87	72	4	8,455	0	0	0	0	0	0	59	4	1,038	-157	-9	-1070
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-284	0	0	0	0	0	0	0	0	0	-50	-3	-5,752	0	0	0	-81	-5	-551
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	-1643
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-136	0	0	0	0	0	0	0	0	0	-116	-7	-13,372	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-49	-3	-419	-46	-3	-380	-53	-3	-252	0	0	0	0	0	0	-40	-2	-13,554	-25	-1	-2,844	0	0	0	-243	-14	-1660
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	-4,196	-94	-6	-641
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-17,193	0	0	0	0	0	0
1986	0	0	0	0	0	0	2	0	14	0	0	0	46	3	380	0	0	0	-22	-1	-53	-42	-3	-4,870	0	0	0	-183	-11	-20,984	0	0	0	-241	-14	-1648
1987	-73	-4	-545	0	0	0	0	0	0	0	0	0	-53	-3	-436	-70	-4	-331	0	0	0	0	0	0	0	0	0	-200	-12	-22,981	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	187	0	0	0	0	0	0	0	0	0	-200	-12	-22,981	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-198	-11	-1,643	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-169	-10	-1,450	0	0	0	-47	-3	-223	0	0	0	0	0	0	0	0	0	8	0	869	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	869	0	0	0	0	0	0
1992	-245	-15	-1,823	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-27,857	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	-6	-682
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-95			-24			-24			-135			-172			-56			-11			232			-4,077			-6,200			-598			-399
Max			0			0			14			0			380			252			11			19,458			1,139			6,331			2,179			0
Min			-1,823			-945			-972			-1,545			-1,643			-461			-345			-5,895			-83,680			-27,857			-4,411			-1,980

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entraiment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	-136	-8	-22	-125	-7	-26	0	0	0	0	0	0	0	0	0	-149	-9	-3	-37	-2	0	-250	-15	0	-290	-17	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-129	-8	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	-200	-12	-1	-199	-12	0	-230	-14	0
1927	-48	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	53	3	16	0	0	0	0	0	0	3	0	0	0	0	0	-238	-15	0	-59	-4	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-89	-5	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-115	-6	-24	-32	-2	-10	0	0	0	0	0	0	0	0	0	-152	-9	-1	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-78	-4	-16	0	0	0	0	0	0	0	0	0	0	0	0	-93	-6	0	0	0	0	-39	-2	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-166	-9	-34	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-245	-15	0	0	0	0	0	0	0	-180	-11	-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-1	0	0	0	0	0	0
1935	-245	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	4	0	1	167	10	22	0	0	0	0	0	0	95	6	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-18	0	0	0	0	0	0	0	0	0	-111	-7	-1	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-1	-60	-4	-18	0	0	0	0	0	0	0	0	0	-102	-6	-1	0	0	0	-133	-8	0
1938	0	0	0	0	0	0	0	0	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-218	-13	0
1939	0	0	0	0	0	0	-59	-4	-3	-41	-3	-6	-54	-3	-11	-31	-2	-9	0	0	0	0	0	0	0	0	0	55	3	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-7	0	0	0	0	0	0	-186	-11	-1	10	1	0	-80	-5	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-175	-10	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	0	-81	-5	0
1944	0	0	0	0	0	0	0	0	0	-51	-3	-8	0	0	0	-31	-2	-9	0	0	0	0	0	0	0	0	0	-155	-9	-1	5	0	0	0	0	0
1945	0	0	0	0	0	0	-2	0	0	0	0	0	-46	-3	-9	0	0	0	0	0	0	0	0	0	0	0	0	-183	-11	-1	10	1	0	-75	-4	0
1946	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	31	2	9	0	0	0	0	0	0	0	0	0	-234	-14	-1	10	1	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	-65	-4	-10	0	0	0	-31	-2	-9	0	0	0	0	0	0	0	0	0	-42	-2	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-94	-6	-15	-160	-9	-33	-98	-6	-30	-146	-9	-27	-51	-3	-7	0	0	0	0	0	0	123	8	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1	-7	0	0	0	0	0	0	0	0	0	-152	-9	-1	11	1	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	-142	-9	-22	-46	-3	-9	-35	-2	-10	-45	-3	-8	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
1951	-76	-5	0	0	0	0	0	0	0	-7	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-76	-5	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-4	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	11	1	0	-102	-6	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-8	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	0	-84	-5	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	-54	-3	-16	0	0	0	0	0	0	0	0	0	-101	-6	-1	-238	-15	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-116	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-99	-6	-16	-116	-6	-24	0	0	0	0	0	0	0	0	0	0	0	0	-133	-8	-1	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	0	-55	-3	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	-2	0	0	0	0	0	-46	-3	-9	0	0	0	0	0	0	0	0	0	0	0	0	-134	-8	-1	10	1	0	0	0	0
1963	0	0	0	0	0	0	-159	-10	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-102	-6	0
1964	0	0	0	-22	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-196	-12	-1	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-1	-18	-1	-5	0	0	0	0	0	0	-33	-2	-1	-183	-11	-1	-114	-7	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-157	-10	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	0	-81	-5	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	0
1972	0	0	0	0	0	0	0	0	0	-39	-2	-6	0	0	0	-60	-4	-18	0	0	0	0	0	0	0	0	0	-184	-11	-1	10	1	0	-68	-4	0
1973	0	0	0	0	0	0	0	0	0	-16	-1	-3	-28	-2	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-81	-5	0
1974	0	0	0	0	0	0	0	0	0	-6	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	0	0	0	0
1975	0	0	0	-78	-5	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	0	0	0	0
1976	0	0	0	0	0	0	-63	-4	-3	0	0	0	0	0	0	-47	-3	-14	0	0	0	0	0	0	-171	-10	-3	4	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-26	-43	-3	-8	-2	0	0	-250	-15	-5	0	0	0	0	0	0	-250	-15	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	-68	-4	-14	0	0	0	-36	-2	-7	72	4	9	0	0	0	0	0	0	59	4	0	-157	-9	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-18	0	0	0	0	0	0	0	0	0	-50	-3	0	0	0	0	-81	-5	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-241	-14	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-9	0	0	0	0	0	0	0	0	0	-116	-7	-1	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-49	-3	-8	-46	-3	-9	-53	-3	-16	0	0	0	0	0	0	-40	-2	-1	-25	-1	0	0	0	0	-243	-14	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238	-15	0	-94	-6	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-1	0	0	0	0	0	0
1986	0	0	0	0	0	0	2	0	0	0	0	0	46	3	9	0	0	0	-22	-1	-4	-42	-3	-5	0	0	0	-183	-11	-1	0	0	0	-241	-14	0
1987	-73	-4	0	0	0	0	0	0	0	0	0	0	-53	-3	-11	-70	-4	-21	0	0	0	0	0	0	0	0	0	-200	-12	-1	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	12	0	0	0	0	0	0	0	0	0	-200	-12	-1	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-198	-11	-41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-169	-10	-27	0	0	0	-47	-3	-14	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
1992	-245	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-242	-14	-1	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	-6	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			-2			-4			-4			-1			0			0			0			0			0
Max			0			0			0			0			9			16			1			22			0			0			0			0
Min			0			0			-7			-28			-41			-30			-27			-7			-5			-1			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entraiment and Impingement Loss Calculations – Larval Delta Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	116	Apr	Vol	950	May	Vol	376	Jun	Vol	167	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	195	12	0	134	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-61	-4	0	-59	-4	0	-303	-19	0	-5	0	0	-159	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	0	-82	-5	0
1924	-64	-4	0	-179	-11	0	-50	-3	0	0	0	0	0	0	0	-121	-7	-857	0	0	0	5	0	113	0	0	0	-8	0	0	0	0	0	0	0	0
1925	-245	-15	0	-202	-12	0	-133	-8	0	-180	-11	0	-108	-6	0	2	0	11	69	4	3,878	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1926	-40	-2	0	-37	-2	0	-66	-4	0	-168	-10	0	-250	-14	0	0	0	0	0	0	0	0	0	0	-142	-8	-1,406	-250	-15	0	-251	-15	0	0	0	0
1927	0	0	0	-57	-3	0	-250	-15	0	0	0	0	0	0	0	86	5	612	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1928	-44	-3	0	-48	-3	0	-259	-16	0	-105	-6	0	-200	-11	0	-97	-6	-692	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1929	-51	-3	0	-50	-3	0	-86	-5	0	-77	-5	0	0	0	0	-32	-2	-224	0	0	0	0	0	0	-200	-12	-1,980	-250	-15	0	-58	-4	0	-62	-4	0
1930	-54	-3	0	-202	-12	0	-139	-9	0	-171	-10	0	-320	-18	0	0	0	0	0	0	0	0	0	0	-200	-12	-1,980	-250	-15	0	-74	-5	0	0	0	0
1931	-241	-15	0	-199	-12	0	-122	-8	0	-168	-10	0	0	0	0	-87	-5	-618	0	0	0	0	0	0	0	0	0	-250	-15	0	-250	-15	0	-250	-15	0
1932	-245	-15	0	-202	-12	0	-133	-8	0	-180	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1933	-44	-3	0	-36	-2	0	-68	-4	0	-124	-8	0	-102	-6	0	0	0	0	0	0	0	0	0	0	-200	-12	-1,980	-250	-15	0	-135	-8	0	-115	-7	0
1934	0	0	0	-202	-12	0	-133	-8	0	0	0	0	-197	-11	0	-35	-2	-248	-113	-7	-6,369	0	0	0	0	0	0	-8	0	0	-250	-15	0	-250	-15	0
1935	0	0	0	-202	-12	0	-133	-8	0	-180	-11	0	7	0	0	-199	-12	-1,416	-4	0	-251	-71	-4	-1,648	0	0	0	0	0	0	-250	-15	0	-61	-4	0
1936	-47	-3	0	-102	-6	0	-111	-7	0	-136	-8	0	0	0	0	-16	-1	-114	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-96	-6	0
1937	-52	-3	0	-46	-3	0	-111	-7	0	-64	-4	0	-320	-18	0	-220	-14	-1,564	0	0	0	-214	-13	-4,949	0	0	0	0	0	0	-250	-15	0	0	0	0
1938	-48	-3	0	-74	-4	0	-68	-4	0	-200	-12	0	-3	0	0	-91	-6	-647	0	0	0	0	0	0	-250	-15	-2,475	0	0	0	0	0	0	0	0	0
1939	-127	-8	0	-303	-18	0	0	0	0	0	0	0	0	0	0	-35	-2	-252	0	0	0	0	0	0	0	0	0	-233	-14	0	-75	-5	0	-51	-3	0
1940	-41	-3	0	-70	-4	0	-81	-5	0	-158	-10	0	0	0	0	-102	-6	-725	-183	-11	-10,324	0	0	0	-16	-1	-161	0	0	0	-209	-13	0	0	0	0
1941	-94	-6	0	-170	-10	0	0	0	0	0	0	0	-315	-17	0	-29	-2	-209	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-62	-4	0	-54	-3	0	-259	-16	0	-38	-2	0	-87	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1943	-90	-6	0	-75	-4	0	-136	-8	0	-105	-6	0	-202	-11	0	-196	-12	-1,389	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1944	-55	-3	0	-49	-3	0	-250	-15	0	0	0	0	-95	-5	0	-86	-5	-610	0	0	0	0	0	0	0	0	0	-250	-15	0	-69	-4	0	-76	-5	0
1945	-43	-3	0	-59	-4	0	-253	-15	0	-162	-10	0	-110	-6	0	-144	-9	-1,021	0	0	0	0	0	0	0	0	0	0	0	0	-221	-14	0	0	0	0
1946	-43	-3	0	-169	-10	0	-2	0	0	0	0	0	-197	-11	0	-135	-8	-956	0	0	0	0	0	0	0	0	0	-16	-1	0	-69	-4	0	-62	-4	0
1947	-166	-10	0	-178	-11	0	-250	-15	0	0	0	0	-127	-7	0	-89	-5	-633	0	0	0	0	0	0	-200	-12	-1,980	-208	-12	0	-68	-4	0	-67	-4	0
1948	-37	-2	0	-50	-3	0	-184	-11	0	0	0	0	0	0	0	20	1	144	-156	-9	-8,791	-33	-2	-757	0	0	0	-250	-15	0	-132	-8	0	-68	-4	0
1949	-161	-10	0	-179	-11	0	-86	-5	0	-98	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-116	-7	0	-86	-5	0
1950	-49	-3	0	-107	-6	0	-146	-9	0	0	0	0	-320	-18	0	-43	-3	-304	-224	-13	-12,652	0	0	0	0	0	0	-250	-15	0	-250	-15	0	-133	-8	0
1951	0	0	0	-141	-8	0	-213	-13	0	-174	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-71	-4	0
1952	-57	-4	0	-77	-5	0	0	0	0	0	0	0	-180	-10	0	-79	-5	-561	0	0	0	-193	-12	-4,463	0	0	0	0	0	0	0	0	0	-178	-11	0
1953	-307	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1954	-54	-3	0	-55	-3	0	-212	-13	0	-105	-6	0	-199	-11	0	-115	-7	-816	0	0	0	0	0	0	0	0	0	-250	-15	0	-250	-15	0	0	0	0
1955	-62	-4	0	-62	-4	0	-272	-17	0	-123	-8	0	-315	-17	0	-85	-5	-607	0	0	0	0	0	0	0	0	0	-250	-15	0	-216	-13	0	0	0	0
1956	-46	-3	0	-54	-3	0	-250	-15	0	-169	-10	0	-320	-18	0	-103	-6	-731	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1957	-70	-4	0	-55	-3	0	-82	-5	0	-45	-3	0	-320	-18	0	-105	-6	-742	0	0	0	0	0	0	-19	-1	-188	0	0	0	-12	-1	0	-66	-4	0
1958	-46	-3	0	-96	-6	0	-250	-15	0	0	0	0	-210	-12	0	-65	-4	-463	0	0	0	-193	-12	-4,463	0	0	0	0	0	0	-250	-15	0	-121	-7	0
1959	-210	-13	0	0	0	0	-105	-6	0	-105	-6	0	-158	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-155	-9	0	-59	-4	0
1960	-81	-5	0	-179	-11	0	-87	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43	-3	-422	-250	-15	0	-84	-5	0	-219	-13	0
1961	-55	-3	0	-48	-3	0	-319	-20	0	0	0	0	-79	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-101	-6	0	-250	-15	0
1962	-246	-15	0	-199	-12	0	-320	-20	0	-169	-10	0	-88	-5	0	0	0	0	-80	-5	-4,511	-7	0	-170	0	0	0	-250	-15	0	-45	-3	0	-123	-7	0
1963	-234	-14	0	0	0	0	-148	-9	0	-18	-1	0	-85	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-45	-3	0	0	0	0	-259	-16	0	-305	-19	0	-57	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	0	-54	-3	0	-46	-3	0
1965	-28	-2	0	-44	-3	0	0	0	0	0	0	0	0	0	0	-104	-6	-740	-2	0	-114	-8	0	-181	0	0	0	-4	0	0	-250	-15	0	-75	-4	0
1966	-58	-4	0	-60	-4	0	-259	-16	0	-204	-13	0	100	6	0	-96	-6	-679	0	0	0	0	0	0	0	0	0	-250	-15	0	-100	-6	0	-71	-4	0
1967	-127	-8	0	-176	-10	0	-250	-15	0	0	0	0	-186	-10	0	-53	-3	-378	0	0	0	-193	-12	-4,463	0	0	0	0	0	0	-250	-15	0	-217	-13	0
1968	-32	-2	0	0	0	0	-59	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0	-51	-3	0
1969	-80	-5	0	-178	-11	0	-250	-15	0	-136	-8	0	-109	-6	0	-141	-9	-999	0	0	0	-193	-12	-4,463	0	0	0	0	0	0	0	0	0	-9	-1	0
1970	-178	-11	0	-59	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1971	-57	-3	0	-50	-3	0	-60	-4	0	-5	0	0	-199	-11	0	-56	-3	-397	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1972	-72	-4	0	-51	-3	0	-94	-6	0	0	0	0	-89	-5	0	-95	-6	-673	-19	-1	-1,075	-7	0	-168	0	0	0	-250	-15	0	-128	-8	0	0	0	0
1973	-211	-13	0	-169	-10	0	-250	-15	0	-127	-8	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1974	-41	-3	0	-66	-4	0	-39	-2	0	-200	-12	0	-52	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-93	-6	0
1975	-170	-10	0	0	0	0	-111	-7	0	-60	-4	0	-320	-18	0	-101	-6	-714	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-76	-4	0
1976	-156	-10	0	-112	-7	0	0	0	0	-36	-2	0	-47	-3	0	-247	-15	-1,753	0	0	0	5	0	104	0	0	0	-151	-9	0	-250	-15	0	-249	-15	0
1977	-245	-15	0	-202	-12	0	-107	-7	0	-180	-11	0	-198	-11	0	-87	-5	-618	26	2	1,478	-216	-13	-4,992	0	0	0	-250	-15	0	-250	-15	0	0	0	0
1978	-245	-15	0	-202	-12	0	-133	-8	0	0	0	0	0	0	0	-151	-9	-1,071	-25	-1	-1,397	-65	-4	-1,507	0	0	0	0	0	0	-250	-15	0	0	0	0
1979	-68	-4	0	-53	-3	0	-101	-6	0	-87	-5	0	-127	-7	0	-101	-6	-718	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1980	-48	-3	0	-78	-5	0	-251	-15	0	-136	-8	0	-320	-18	0	-138	-8	-977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	0
1981	-88	-5	0	-58	-3	0	-113	-7	0	-77	-5	0	-244	-14	0	-50	-3	-352	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	0	-67	-4	0
1982	-53	-3	0	-47	-3	0	0	0	0	-118	-7	0	-320	-18	0	-115	-7	-814	0	0	0	-193	-12	-4,463	0	0	0	-4	0	0	0	0	0	-7	0	0
1983	-235	-14	0	0	0	0	0	0	0	-65	-4	0	0	0	0	0	0	0	0	0	0	-193	-12	-4,463	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-48	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1985	-52	-3	0	-41	-2	0	0	0	0	-305	-19	0	-197	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	0	-68	-4	0
1986	-59	-4	0	-68	-4	0	-128	-8	0	-108	-7	0	-50	-3	0	-307	-19	-2,179	-320	-19	-18,054	-209	-13	-4,818	-31	-2	-305	-4	0	0	-73	-4	0	-9	-1	0
1987	0	0	0	-47	-3	0	-83	-5	0	-44	-3	0	0	0	0	-51	-3	-360	0	0	0	0	0	0	-41	-2	-402	-250	-15	0	-58	-4	0	-52	-3	0
1988	-38	-2	0	-59	-4	0	-107	-7	0	-169	-10	0	0	0	0	-160	-10	-1,135	0	0	0	0	0	0	-200	-12	-1,980	-250	-15	0	-78	-5	0	-68	-4	0
1989	-135	-8	0	-202	-12	0	-132	-8	0	-180	-11	0	0	0	0	0	0	0	0	0	-10	0	0	0	0	0	0	-250	-15	0	-41	-3	0	-157	-9	0
1990	-246	-15	0	-199	-12	0	-122	-8	0	0	0	0	-166	-9	0	-64	-4	-456	113	7	6,388	-4	0	-85	-92	-5	-911	-182	-11	0	-250	-15	0	-250	-15	0
1991	-245	-15	0	-202	-12	0	-133	-8	0	-180	-11	0	-175	-10	0	-174	-11	-1,235	1	0	33	0	0	0	0	0	0	-241	-14	0	-261	-16	0	-250	-15	0
1992	0	0	0	-202	-12	0	-133	-8	0	-180	-11	0	-191	-11	0	0	0	0	-6	0	-337	0	0	0	-48	-3	-473	-8	0	0	-223	-14	0	-250	-15	0
1993	-245	-15	0	-202	-12	0	-133	-8	0	-180	-11	0	0	0	0	18	1	131	19	1	1,068	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1994	-47	-3	0	-40	-2	0	-303	-19	0	-58	-4	0	-76	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	0	-51	-3	0	-202	-12	0
Mean			0			0			0			0			0			-435			-699			-628			-228			0			0			0
Max			0			0			0			0			0			612			6,388			113			0			0			0			0
Min			0			0			0			0			0			-2,179			-18,054			-4,992			-2,475			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entraiment and Impingement Loss Calculations – Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	195	12	3	134	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-61	-4	-1	-59	-4	-1	-303	-19	-11	-5	0	0	-159	-9	-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-3	-82	-5	0
1924	-64	-4	-1	-179	-11	-4	-50	-3	-2	0	0	0	0	0	0	-121	-7	-12	0	0	0	5	0	3	0	0	0	-8	0	0	0	0	0	0	0	0
1925	-245	-15	-4	-202	-12	-4	-133	-8	-5	-180	-11	-8	-108	-6	-27	2	0	0	69	4	32	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1926	-40	-2	-1	-37	-2	-1	-66	-4	-2	-168	-10	-7	-250	-14	-63	0	0	0	0	0	0	0	0	0	-142	-8	-20	-250	-15	-2	-251	-15	-6	0	0	0
1927	0	0	0	-57	-3	-1	-250	-15	-9	0	0	0	0	0	0	86	5	8	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1928	-44	-3	-1	-48	-3	-1	-259	-16	-9	-105	-6	-5	-200	-11	-51	-97	-6	-9	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1929	-51	-3	-1	-50	-3	-1	-86	-5	-3	-77	-5	-3	0	0	0	-32	-2	-3	0	0	0	0	0	0	-200	-12	-28	-250	-15	-2	-58	-4	-1	-62	-4	0
1930	-54	-3	-1	-202	-12	-4	-139	-9	-5	-171	-10	-8	-320	-18	-81	0	0	0	0	0	0	0	0	0	-200	-12	-28	-250	-15	-2	-74	-5	-2	0	0	0
1931	-241	-15	-3	-199	-12	-4	-122	-8	-4	-168	-10	-7	0	0	0	-87	-5	-8	0	0	0	0	0	0	0	0	0	-250	-15	-2	-250	-15	-5	-250	-15	-1
1932	-245	-15	-4	-202	-12	-4	-133	-8	-5	-180	-11	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1933	-44	-3	-1	-36	-2	-1	-68	-4	-2	-124	-8	-5	-102	-6	-26	0	0	0	0	0	0	0	0	0	-200	-12	-28	-250	-15	-2	-135	-8	-3	-115	-7	0
1934	0	0	0	-202	-12	-4	-133	-8	-5	0	0	0	-197	-11	-50	-35	-2	-3	-113	-7	-53	0	0	0	0	0	0	-8	0	0	-250	-15	-5	-250	-15	-1
1935	0	0	0	-202	-12	-4	-133	-8	-5	-180	-11	-8	7	0	2	-199	-12	-19	-4	0	-2	-71	-4	-48	0	0	0	0	0	0	-250	-15	-5	-61	-4	0
1936	-47	-3	-1	-102	-6	-2	-111	-7	-4	-136	-8	-6	0	0	0	-16	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	-96	-6	0
1937	-52	-3	-1	-46	-3	-1	-111	-7	-4	-64	-4	-3	-320	-18	-81	-220	-14	-21	0	0	0	-214	-13	-143	0	0	0	0	0	0	-250	-15	-5	0	0	0
1938	-48	-3	-1	-74	-4	-2	-68	-4	-2	-200	-12	-9	-3	0	-1	-91	-6	-9	0	0	0	0	0	0	-250	-15	-35	0	0	0	0	0	0	0	0	0
1939	-127	-8	-2	-303	-18	-6	0	0	0	0	0	0	0	0	0	-35	-2	-3	0	0	0	0	0	0	0	0	0	-233	-14	-2	-75	-5	-2	-51	-3	0
1940	-41	-3	-1	-70	-4	-1	-81	-5	-3	-158	-10	-7	0	0	0	-102	-6	-10	-183	-11	-85	0	0	0	-16	-1	-2	0	0	0	-209	-13	-5	0	0	0
1941	-94	-6	-1	-170	-10	-4	0	0	0	0	0	0	-315	-17	-80	-29	-2	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-62	-4	-1	-54	-3	-1	-259	-16	-9	-38	-2	-2	-87	-5	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1943	-90	-6	-1	-75	-4	-2	-136	-8	-5	-105	-6	-5	-202	-11	-51	-196	-12	-19	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1944	-55	-3	-1	-49	-3	-1	-250	-15	-9	0	0	0	-95	-5	-24	-86	-5	-8	0	0	0	0	0	0	0	0	0	-250	-15	-2	-69	-4	-2	-76	-5	0
1945	-43	-3	-1	-59	-4	-1	-253	-15	-9	-162	-10	-7	-110	-6	-28	-144	-9	-14	0	0	0	0	0	0	0	0	0	0	0	0	-221	-14	-5	0	0	0
1946	-43	-3	-1	-169	-10	-4	-2	0	0	0	0	0	-197	-11	-50	-135	-8	-13	0	0	0	0	0	0	0	0	0	-16	-1	0	-69	-4	-2	-62	-4	0
1947	-166	-10	-2	-178	-11	-4	-250	-15	-9	0	0	0	-127	-7	-32	-89	-5	-9	0	0	0	0	0	0	-200	-12	-28	-208	-12	-1	-68	-4	-2	-67	-4	0
1948	-37	-2	-1	-50	-3	-1	-184	-11	-7	0	0	0	0	0	0	20	1	2	-156	-9	-72	-33	-2	-22	0	0	0	-250	-15	-2	-132	-8	-3	-68	-4	0
1949	-161	-10	-2	-179	-11	-4	-86	-5	-3	-98	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-116	-7	-3	-86	-5	0
1950	-49	-3	-1	-107	-6	-2	-146	-9	-5	0	0	0	-320	-18	-81	-43	-3	-4	-224	-13	-104	0	0	0	0	0	0	-250	-15	-2	-250	-15	-5	-133	-8	0
1951	0	0	0	-141	-8	-3	-213	-13	-8	-174	-11	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-71	-4	0
1952	-57	-4	-1	-77	-5	-2	0	0	0	0	0	0	-180	-10	-46	-79	-5	-8	0	0	0	-193	-12	-129	0	0	0	0	0	0	0	0	0	-178	-11	-1
1953	-307	-19	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1954	-54	-3	-1	-55	-3	-1	-212	-13	-8	-105	-6	-5	-199	-11	-50	-115	-7	-11	0	0	0	0	0	0	0	0	0	-250	-15	-2	-250	-15	-5	0	0	0
1955	-62	-4	-1	-62	-4	-1	-272	-17	-10	-123	-8	-5	-315	-17	-80	-85	-5	-8	0	0	0	0	0	0	0	0	0	-250	-15	-2	-216	-13	-5	0	0	0
1956	-46	-3	-1	-54	-3	-1	-250	-15	-9	-169	-10	-7	-320	-18	-81	-103	-6	-10	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1957	-70	-4	-1	-55	-3	-1	-82	-5	-3	-45	-3	-2	-320	-18	-81	-105	-6	-10	0	0	0	0	0	0	-19	-1	-3	0	0	0	-12	-1	0	-66	-4	0
1958	-46	-3	-1	-96	-6	-2	-250	-15	-9	0	0	0	-210	-12	-53	-65	-4	-6	0	0	0	-193	-12	-129	0	0	0	0	0	0	-250	-15	-5	-121	-7	0
1959	-210	-13	-3	0	0	0	-105	-6	-4	-105	-6	-5	-158	-9	-40	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-155	-9	-3	-59	-4	0
1960	-81	-5	-1	-179	-11	-4	-87	-5	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43	-3	-6	-250	-15	-2	-84	-5	-2	-219	-13	-1
1961	-55	-3	-1	-48	-3	-1	-319	-20	-11	0	0	0	-79	-4	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-101	-6	-2	-250	-15	-1
1962	-246	-15	-4	-199	-12	-4	-320	-20	-11	-169	-10	-7	-88	-5	-22	0	0	0	-80	-5	-37	-7	0	-5	0	0	0	-250	-15	-2	-45	-3	-1	-123	-7	0
1963	-234	-14	-3	0	0	0	-148	-9	-5	-18	-1	-1	-85	-5	-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-45	-3	-1	0	0	0	-259	-16	-9	-305	-19	-14	-57	-3	-14	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	0	-54	-3	-1	-46	-3	0
1965	-28	-2	0	-44	-3	-1	0	0	0	0	0	0	0	0	0	-104	-6	-10	-2	0	-1	-8	0	-5	0	0	0	-4	0	0	-250	-15	-5	-75	-4	0
1966	-58	-4	-1	-60	-4	-1	-259	-16	-9	-204	-13	-9	100	6	25	-96	-6	-9	0	0	0	0	0	0	0	0	0	-250	-15	-2	-100	-6	-2	-71	-4	0
1967	-127	-8	-2	-176	-10	-4	-250	-15	-9	0	0	0	-186	-10	-47	-53	-3	-5	0	0	0	-193	-12	-129	0	0	0	0	0	0	-250	-15	-5	-217	-13	-1
1968	-32	-2	0	0	0	0	-59	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	0	0	0	-51	-3	0
1969	-80	-5	-1	-178	-11	-4	-250	-15	-9	-136	-8	-6	-109	-6	-27	-141	-9	-13	0	0	0	-193	-12	-129	0	0	0	0	0	0	0	0	0	-9	-1	0
1970	-178	-11	-3	-59	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1971	-57	-3	-1	-50	-3	-1	-60	-4	-2	-5	0	0	-199	-11	-50	-56	-3	-5	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1972	-72	-4	-1	-51	-3	-1	-94	-6	-3	0	0	0	-89	-5	-23	-95	-6	-9	-19	-1	-9	-7	0	-5	0	0	0	-250	-15	-2	-128	-8	-3	0	0	0
1973	-211	-13	-3	-169	-10	-4	-250	-15	-9	-127	-8	-6	-35	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1974	-41	-3	-1	-66	-4	-1	-39	-2	-1	-200	-12	-9	-52	-3	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-93	-6	0
1975	-170	-10	-2	0	0	0	-111	-7	-4	-60	-4	-3	-320	-18	-81	-101	-6	-10	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-76	-4	0
1976	-156	-10	-2	-112	-7	-2	0	0	0	-36	-2	-2	-47	-3	-12	-247	-15	-24	0	0	0	5	0	3	0	0	0	-151	-9	-1	-250	-15	-5	-249	-15	-1
1977	-245	-15	-4	-202	-12	-4	-107	-7	-4	-180	-11	-8	-198	-11	-50	-87	-5	-8	26	2	12	-216	-13	-144	0	0	0	-250	-15	-2	-250	-15	-5	0	0	0
1978	-245	-15	-4	-202	-12	-4	-133	-8	-5	0	0	0	0	0	0	-151	-9	-14	-25	-1	-12	-65	-4	-44	0	0	0	0	0	0	-250	-15	-5	0	0	0
1979	-68	-4	-1	-53	-3	-1	-101	-6	-4	-87	-5	-4	-127	-7	-32	-101	-6	-10	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1980	-48	-3	-1	-78	-5	-2	-251	-15	-9	-136	-8	-6	-320	-18	-81	-138	-8	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	0
1981	-88	-5	-1	-58	-3	-1	-113	-7	-4	-77	-5	-3	-244	-14	-62	-50	-3	-5	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-2	-67	-4	0
1982	-53	-3	-1	-47	-3	-1	0	0	0	-118	-7	-5	-320	-18	-81	-115	-7	-11	0	0	0	-193	-12	-129	0	0	0	-4	0	0	0	0	0	-7	0	0
1983	-235	-14	-3	0	0	0	0	0	0	-65	-4	-3	0	0	0	0	0	0	0	0	0	-193	-12	-129	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-48	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1985	-52	-3	-1	-41	-2	-1	0	0	0	-305	-19	-14	-197	-11	-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	-2	-68	-4	0
1986	-59	-4	-1	-68	-4	-1	-128	-8	-5	-108	-7	-5	-50	-3	-13	-307	-19	-29	-320	-19	-149	-209	-13	-139	-31	-2	-4	-4	0	0	-73	-4	-2	-9	-1	0
1987	0	0	0	-47	-3	-1	-83	-5	-3	-44	-3	-2	0	0	0	-51	-3	-5	0	0	0	0	0	0	-41	-2	-6	-250	-15	-2	-58	-4	-1	-52	-3	0
1988	-38	-2	-1	-59	-4	-1	-107	-7	-4	-169	-10	-7	0	0	0	-160	-10	-15	0	0	0	0	0	0	-200	-12	-28	-250	-15	-2	-78	-5	-2	-68	-4	0
1989	-135	-8	-2	-202	-12	-4	-132	-8	-5	-180	-11	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-2	-41	-3	-1	-157	-9	-1
1990	-246	-15	-4	-199	-12	-4	-122	-8	-4	0	0	0	-166	-9	-42	-64	-4	-6	113	7	53	-4	0	-2	-92	-5	-13	-182	-11	-1	-250	-15	-5	-250	-15	-1
1991	-245	-15	-4	-202	-12	-4	-133	-8	-5	-180	-11	-8	-175	-10	-44	-174	-11	-17	1	0	0	0	0	0	0	0	0	-241	-14	-2	-261	-16	-6	-250	-15	-1
1992	0	0	0	-202	-12	-4	-133	-8	-5	-180	-11	-8	-191	-11	-48	0	0	0	-6	0	-3	0	0	0	-48	-3	-7	-8	0	0	-223	-14	-5	-250	-15	-1
1993	-245	-15	-4	-202	-12	-4	-133	-8	-5	-180	-11	-8	0	0	0	18	1	2	19	1	9	0	0	0	0	0	0	0	0	0	-250	-15	-5	0	0	0
1994	-47	-3	-1	-40	-2	-1	-303	-19	-11	-58	-4	-3	-76	-4	-19	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	0	-51	-3	-1	-202	-12	-1
Mean			-1			-2			-5			-4			-28			-6			-6			-18			-3			-1			-3			0
Max			3			3			0			0			25			8			53			3			0			0			0			0
Min			-4			-6			-11			-14			-81			-29			-149			-144			-35			-2			-6			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entraiment and Impingement Loss Calculations – Juvenile Delta Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	195	12	78	134	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-61	-4	-25	-59	-4	0	-303	-19	-3	-5	0	0	-159	-9	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-4	-82	-5	0
1924	-64	-4	-26	-179	-11	-1	-50	-3	0	0	0	0	0	0	0	-121	-7	-2	0	0	0	5	0	1	0	0	0	-8	0	0	0	0	0	0	0	0
1925	-245	-15	-99	-202	-12	-1	-133	-8	-1	-180	-11	-2	-108	-6	-2	2	0	0	69	4	2	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1926	-40	-2	-16	-37	-2	0	-66	-4	-1	-168	-10	-2	-250	-14	-4	0	0	0	0	0	0	0	0	0	-142	-8	-12	-250	-15	-7	-251	-15	-7	0	0	0
1927	0	0	0	-57	-3	0	-250	-15	-2	0	0	0	0	0	0	86	5	1	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1928	-44	-3	-18	-48	-3	0	-259	-16	-2	-105	-6	-1	-200	-11	-3	-97	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1929	-51	-3	-21	-50	-3	0	-86	-5	-1	-77	-5	-1	0	0	0	-32	-2	-1	0	0	0	0	0	0	-200	-12	-17	-250	-15	-7	-58	-4	-2	-62	-4	0
1930	-54	-3	-22	-202	-12	-1	-139	-9	-1	-171	-10	-2	-320	-18	-5	0	0	0	0	0	0	0	0	0	-200	-12	-17	-250	-15	-7	-74	-5	-2	0	0	0
1931	-241	-15	-97	-199	-12	-1	-122	-8	-1	-168	-10	-2	0	0	0	-87	-5	-2	0	0	0	0	0	0	0	0	0	-250	-15	-7	-250	-15	-7	-250	-15	-1
1932	-245	-15	-99	-202	-12	-1	-133	-8	-1	-180	-11	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1933	-44	-3	-18	-36	-2	0	-68	-4	-1	-124	-8	-2	-102	-6	-2	0	0	0	0	0	0	0	0	0	-200	-12	-17	-250	-15	-7	-135	-8	-4	-115	-7	-1
1934	0	0	0	-202	-12	-1	-133	-8	-1	0	0	0	-197	-11	-3	-35	-2	-1	-113	-7	-4	0	0	0	0	0	0	-8	0	0	-250	-15	-7	-250	-15	-1
1935	0	0	0	-202	-12	-1	-133	-8	-1	-180	-11	-2	7	0	0	-199	-12	-3	-4	0	0	-71	-4	-21	0	0	0	0	0	0	-250	-15	-7	-61	-4	0
1936	-47	-3	-19	-102	-6	-1	-111	-7	-1	-136	-8	-2	0	0	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-96	-6	0
1937	-52	-3	-21	-46	-3	0	-111	-7	-1	-64	-4	-1	-320	-18	-5	-220	-14	-4	0	0	0	-214	-13	-62	0	0	0	0	0	0	-250	-15	-7	0	0	0
1938	-48	-3	-19	-74	-4	0	-68	-4	-1	-200	-12	-3	-3	0	0	-91	-6	-2	0	0	0	0	0	0	-250	-15	-22	0	0	0	0	0	0	0	0	0
1939	-127	-8	-51	-303	-18	-2	0	0	0	0	0	0	0	0	0	-35	-2	-1	0	0	0	0	0	0	0	0	0	-233	-14	-6	-75	-5	-2	-51	-3	0
1940	-41	-3	-17	-70	-4	0	-81	-5	-1	-158	-10	-2	0	0	0	-102	-6	-2	-183	-11	-6	0	0	0	-16	-1	-1	0	0	0	-209	-13	-6	0	0	0
1941	-94	-6	-38	-170	-10	-1	0	0	0	0	0	0	-315	-17	-5	-29	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-62	-4	-25	-54	-3	0	-259	-16	-2	-38	-2	-1	-87	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1943	-90	-6	-36	-75	-4	0	-136	-8	-1	-105	-6	-1	-202	-11	-3	-196	-12	-3	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1944	-55	-3	-22	-49	-3	0	-250	-15	-2	0	0	0	-95	-5	-2	-86	-5	-1	0	0	0	0	0	0	0	0	0	-250	-15	-7	-69	-4	-2	-76	-5	0
1945	-43	-3	-17	-59	-4	0	-253	-15	-2	-162	-10	-2	-110	-6	-2	-144	-9	-3	0	0	0	0	0	0	0	0	0	0	0	0	-221	-14	-6	0	0	0
1946	-43	-3	-17	-169	-10	-1	-2	0	0	0	0	0	-197	-11	-3	-135	-8	-2	0	0	0	0	0	0	0	0	0	-16	-1	0	-69	-4	-2	-62	-4	0
1947	-166	-10	-67	-178	-11	-1	-250	-15	-2	0	0	0	-127	-7	-2	-89	-5	-2	0	0	0	0	0	0	-200	-12	-17	-208	-12	-6	-68	-4	-2	-67	-4	0
1948	-37	-2	-15	-50	-3	0	-184	-11	-2	0	0	0	0	0	0	20	1	0	-156	-9	-5	-33	-2	-9	0	0	0	-250	-15	-7	-132	-8	-4	-68	-4	0
1949	-161	-10	-65	-179	-11	-1	-86	-5	-1	-98	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-116	-7	-3	-86	-5	0
1950	-49	-3	-20	-107	-6	-1	-146	-9	-1	0	0	0	-320	-18	-5	-43	-3	-1	-224	-13	-7	0	0	0	0	0	0	-250	-15	-7	-250	-15	-7	-133	-8	-1
1951	0	0	0	-141	-8	-1	-213	-13	-2	-174	-11	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-71	-4	0
1952	-57	-4	-23	-77	-5	0	0	0	0	0	0	0	-180	-10	-3	-79	-5	-1	0	0	0	-193	-12	-56	0	0	0	0	0	0	0	0	0	-178	-11	-1
1953	-307	-19	-124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1954	-54	-3	-22	-55	-3	0	-212	-13	-2	-105	-6	-1	-199	-11	-3	-115	-7	-2	0	0	0	0	0	0	0	0	0	-250	-15	-7	-250	-15	-7	0	0	0
1955	-62	-4	-25	-62	-4	0	-272	-17	-2	-123	-8	-2	-315	-17	-5	-85	-5	-1	0	0	0	0	0	0	0	0	0	-250	-15	-7	-216	-13	-6	0	0	0
1956	-46	-3	-19	-54	-3	0	-250	-15	-2	-169	-10	-2	-320	-18	-5	-103	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1957	-70	-4	-28	-55	-3	0	-82	-5	-1	-45	-3	-1	-320	-18	-5	-105	-6	-2	0	0	0	0	0	0	-19	-1	-2	0	0	0	-12	-1	0	-66	-4	0
1958	-46	-3	-19	-96	-6	-1	-250	-15	-2	0	0	0	-210	-12	-3	-65	-4	-1	0	0	0	-193	-12	-56	0	0	0	0	0	0	-250	-15	-7	-121	-7	-1
1959	-210	-13	-85	0	0	0	-105	-6	-1	-105	-6	-1	-158	-9	-3	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-155	-9	-4	-59	-4	0
1960	-81	-5	-33	-179	-11	-1	-87	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43	-3	-4	-250	-15	-7	-84	-5	-2	-219	-13	-1
1961	-55	-3	-22	-48	-3	0	-319	-20	-3	0	0	0	-79	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-101	-6	-3	-250	-15	-1
1962	-246	-15	-99	-199	-12	-1	-320	-20	-3	-169	-10	-2	-88	-5	-1	0	0	0	-80	-5	-3	-7	0	-2	0	0	0	-250	-15	-7	-45	-3	-1	-123	-7	-1
1963	-234	-14	-94	0	0	0	-148	-9	-1	-18	-1	0	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-45	-3	-18	0	0	0	-259	-16	-2	-305	-19	-4	-57	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-2	-54	-3	-1	-46	-3	0
1965	-28	-2	-11	-44	-3	0	0	0	0	0	0	0	0	0	0	-104	-6	-2	-2	0	0	-8	0	-2	0	0	0	-4	0	0	-250	-15	-7	-75	-4	0
1966	-58	-4	-23	-60	-4	0	-259	-16	-2	-204	-13	-3	100	6	2	-96	-6	-2	0	0	0	0	0	0	0	0	0	-250	-15	-7	-100	-6	-3	-71	-4	0
1967	-127	-8	-51	-176	-10	-1	-250	-15	-2	0	0	0	-186	-10	-3	-53	-3	-1	0	0	0	-193	-12	-56	0	0	0	0	0	0	-250	-15	-7	-217	-13	-1
1968	-32	-2	-13	0	0	0	-59	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0	-51	-3	0
1969	-80	-5	-32	-178	-11	-1	-250	-15	-2	-136	-8	-2	-109	-6	-2	-141	-9	-2	0	0	0	-193	-12	-56	0	0	0	0	0	0	0	0	0	-9	-1	0
1970	-178	-11	-72	-59	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1971	-57	-3	-23	-50	-3	0	-60	-4	-1	-5	0	0	-199	-11	-3	-56	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1972	-72	-4	-29	-51	-3	0	-94	-6	-1	0	0	0	-89	-5	-1	-95	-6	-2	-19	-1	-1	-7	0	-2	0	0	0	-250	-15	-7	-128	-8	-3	0	0	0
1973	-211	-13	-85	-169	-10	-1	-250	-15	-2	-127	-8	-2	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1974	-41	-3	-16	-66	-4	0	-39	-2	0	-200	-12	-3	-52	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-93	-6	0
1975	-170	-10	-68	0	0	0	-111	-7	-1	-60	-4	-1	-320	-18	-5	-101	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-76	-4	0
1976	-156	-10	-63	-112	-7	-1	0	0	0	-36	-2	0	-47	-3	-1	-247	-15	-4	0	0	0	5	0	1	0	0	0	-151	-9	-4	-250	-15	-7	-249	-15	-1
1977	-245	-15	-99	-202	-12	-1	-107	-7	-1	-180	-11	-2	-198	-11	-3	-87	-5	-2	26	2	1	-216	-13	-62	0	0	0	-250	-15	-7	-250	-15	-7	0	0	0
1978	-245	-15	-99	-202	-12	-1	-133	-8	-1	0	0	0	0	0	0	-151	-9	-3	-25	-1	-1	-65	-4	-19	0	0	0	0	0	0	-250	-15	-7	0	0	0
1979	-68	-4	-27	-53	-3	0	-101	-6	-1	-87	-5	-1	-127	-7	-2	-101	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1980	-48	-3	-19	-78	-5	0	-251	-15	-2	-136	-8	-2	-320	-18	-5	-138	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	0
1981	-88	-5	-35	-58	-3	0	-113	-7	-1	-77	-5	-1	-244	-14	-4	-50	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-2	-67	-4	0
1982	-53	-3	-21	-47	-3	0	0	0	0	-118	-7	-2	-320	-18	-5	-115	-7	-2	0	0	0	-193	-12	-56	0	0	0	-4	0	0	0	0	0	-7	0	0
1983	-235	-14	-95	0	0	0	0	0	0	-65	-4	-1	0	0	0	0	0	0	0	0	0	-193	-12	-56	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-48	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1985	-52	-3	-21	-41	-2	0	0	0	0	-305	-19	-4	-197	-11	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	-2	-68	-4	0
1986	-59	-4	-24	-68	-4	0	-128	-8	-1	-108	-7	-1	-50	-3	-1	-307	-19	-5	-320	-19	-10	-209	-13	-60	-31	-2	-3	-4	0	0	-73	-4	-2	-9	-1	0
1987	0	0	0	-47	-3	0	-83	-5	-1	-44	-3	-1	0	0	0	-51	-3	-1	0	0	0	0	0	0	-41	-2	-4	-250	-15	-7	-58	-4	-2	-52	-3	0
1988	-38	-2	-15	-59	-4	0	-107	-7	-1	-169	-10	-2	0	0	0	-160	-10	-3	0	0	0	0	0	0	-200	-12	-17	-250	-15	-7	-78	-5	-2	-68	-4	0
1989	-135	-8	-54	-202	-12	-1	-132	-8	-1	-180	-11	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-7	-41	-3	-1	-157	-9	-1
1990	-246	-15	-99	-199	-12	-1	-122	-8	-1	0	0	0	-166	-9	-3	-64	-4	-1	113	7	4	-4	0	-1	-92	-5	-8	-182	-11	-5	-250	-15	-7	-250	-15	-1
1991	-245	-15	-99	-202	-12	-1	-133	-8	-1	-180	-11	-2	-175	-10	-3	-174	-11	-3	1	0	0	0	0	0	0	0	0	-241	-14	-7	-261	-16	-7	-250	-15	-1
1992	0	0	0	-202	-12	-1	-133	-8	-1	-180	-11	-2	-191	-11	-3	0	0	0	-6	0	0	0	0	0	-48	-3	-4	-8	0	0	-223	-14	-6	-250	-15	-1
1993	-245	-15	-99	-202	-12	-1	-133	-8	-1	-180	-11	-2	0	0	0	18	1	0	19	1	1	0	0	0	0	0	0	0	0	0	-250	-15	-7	0	0	0
1994	-47	-3	-19	-40	-2	0	-303	-19	-3	-58	-4	-1	-76	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	-1	-51	-3	-1	-202	-12	-1
Mean			-37			-1			-1			-1			-2			-1			0			-8			-2			-2			-3			0
Max			78			1			0			0			2			1			4			1			0			0			0			0
Min			-124			-2			-3			-4			-5			-5			-10			-62			-22			-7			-7			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	195	12	9	134	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-61	-4	-3	-59	-4	-2	-303	-19	-1	-5	0	0	-159	-9	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-6	-82	-5	-1
1924	-64	-4	-3	-179	-11	-5	-50	-3	0	0	0	0	0	0	0	-121	-7	-3	0	0	0	5	0	6	0	0	0	-8	0	-4	0	0	0	0	0	0
1925	-245	-15	-12	-202	-12	-6	-133	-8	0	-180	-11	-2	-108	-6	-3	2	0	0	69	4	4	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1926	-40	-2	-2	-37	-2	-1	-66	-4	0	-168	-10	-2	-250	-14	-6	0	0	0	0	0	0	0	0	0	-142	-8	-368	-250	-15	-142	-251	-15	-10	0	0	0
1927	0	0	0	-57	-3	-2	-250	-15	-1	0	0	0	0	0	0	86	5	2	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1928	-44	-3	-2	-48	-3	-1	-259	-16	-1	-105	-6	-1	-200	-11	-5	-97	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1929	-51	-3	-2	-50	-3	-2	-86	-5	0	-77	-5	-1	0	0	0	-32	-2	-1	0	0	0	0	0	0	-200	-12	-519	-250	-15	-142	-58	-4	-2	-62	-4	0
1930	-54	-3	-3	-202	-12	-6	-139	-9	0	-171	-10	-2	-320	-18	-8	0	0	0	0	0	0	0	0	0	-200	-12	-519	-250	-15	-142	-74	-5	-3	0	0	0
1931	-241	-15	-12	-199	-12	-6	-122	-8	0	-168	-10	-2	0	0	0	-87	-5	-3	0	0	0	0	0	0	0	0	0	-250	-15	-142	-250	-15	-9	-250	-15	-2
1932	-245	-15	-12	-202	-12	-6	-133	-8	0	-180	-11	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1933	-44	-3	-2	-36	-2	-1	-68	-4	0	-124	-8	-2	-102	-6	-2	0	0	0	0	0	0	0	0	0	-200	-12	-519	-250	-15	-142	-135	-8	-5	-115	-7	-1
1934	0	0	0	-202	-12	-6	-133	-8	0	0	0	0	-197	-11	-5	-35	-2	-1	-113	-7	-6	0	0	0	0	0	0	-8	0	-4	-250	-15	-9	-250	-15	-2
1935	0	0	0	-202	-12	-6	-133	-8	0	-180	-11	-2	7	0	0	-199	-12	-6	-4	0	0	-71	-4	-92	0	0	0	0	0	0	-250	-15	-9	-61	-4	0
1936	-47	-3	-2	-102	-6	-3	-111	-7	0	-136	-8	-2	0	0	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	-96	-6	-1
1937	-52	-3	-2	-46	-3	-1	-111	-7	0	-64	-4	-1	-320	-18	-8	-220	-14	-6	0	0	0	-214	-13	-277	0	0	0	0	0	0	-250	-15	-9	0	0	0
1938	-48	-3	-2	-74	-4	-2	-68	-4	0	-200	-12	-2	-3	0	0	-91	-6	-3	0	0	0	0	0	0	-250	-15	-649	0	0	0	0	0	0	0	0	0
1939	-127	-8	-6	-303	-18	-9	0	0	0	0	0	0	0	0	0	-35	-2	-1	0	0	0	0	0	0	0	0	0	-233	-14	-133	-75	-5	-3	-51	-3	0
1940	-41	-3	-2	-70	-4	-2	-81	-5	0	-158	-10	-2	0	0	0	-102	-6	-3	-183	-11	-10	0	0	0	-16	-1	-42	0	0	0	-209	-13	-8	0	0	0
1941	-94	-6	-5	-170	-10	-5	0	0	0	0	0	0	-315	-17	-8	-29	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-62	-4	-3	-54	-3	-2	-259	-16	-1	-38	-2	0	-87	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1943	-90	-6	-4	-75	-4	-2	-136	-8	0	-105	-6	-1	-202	-11	-5	-196	-12	-6	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1944	-55	-3	-3	-49	-3	-1	-250	-15	-1	0	0	0	-95	-5	-2	-86	-5	-2	0	0	0	0	0	0	0	0	0	-250	-15	-142	-69	-4	-3	-76	-5	-1
1945	-43	-3	-2	-59	-4	-2	-253	-15	-1	-162	-10	-2	-110	-6	-3	-144	-9	-4	0	0	0	0	0	0	0	0	0	0	0	0	-221	-14	-8	0	0	0
1946	-43	-3	-2	-169	-10	-5	-2	0	0	0	0	0	-197	-11	-5	-135	-8	-4	0	0	0	0	0	0	0	0	0	-16	-1	-9	-69	-4	-3	-62	-4	0
1947	-166	-10	-8	-178	-11	-5	-250	-15	-1	0	0	0	-127	-7	-3	-89	-5	-3	0	0	0	0	0	0	-200	-12	-519	-208	-12	-118	-68	-4	-3	-67	-4	-1
1948	-37	-2	-2	-50	-3	-2	-184	-11	0	0	0	0	0	0	0	20	1	1	-156	-9	-8	-33	-2	-42	0	0	0	-250	-15	-142	-132	-8	-5	-68	-4	-1
1949	-161	-10	-8	-179	-11	-5	-86	-5	0	-98	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-116	-7	-4	-86	-5	-1
1950	-49	-3	-2	-107	-6	-3	-146	-9	0	0	0	0	-320	-18	-8	-43	-3	-1	-224	-13	-12	0	0	0	0	0	0	-250	-15	-142	-250	-15	-9	-133	-8	-1
1951	0	0	0	-141	-8	-4	-213	-13	-1	-174	-11	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-71	-4	-1
1952	-57	-4	-3	-77	-5	-2	0	0	0	0	0	0	-180	-10	-4	-79	-5	-2	0	0	0	-193	-12	-249	0	0	0	0	0	0	0	0	0	-178	-11	-1
1953	-307	-19	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1954	-54	-3	-3	-55	-3	-2	-212	-13	-1	-105	-6	-1	-199	-11	-5	-115	-7	-3	0	0	0	0	0	0	0	0	0	-250	-15	-142	-250	-15	-9	0	0	0
1955	-62	-4	-3	-62	-4	-2	-272	-17	-1	-123	-8	-2	-315	-17	-8	-85	-5	-2	0	0	0	0	0	0	0	0	0	-250	-15	-142	-216	-13	-8	0	0	0
1956	-46	-3	-2	-54	-3	-2	-250	-15	-1	-169	-10	-2	-320	-18	-8	-103	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1957	-70	-4	-3	-55	-3	-2	-82	-5	0	-45	-3	-1	-320	-18	-8	-105	-6	-3	0	0	0	0	0	0	-19	-1	-49	0	0	0	-12	-1	0	-66	-4	0
1958	-46	-3	-2	-96	-6	-3	-250	-15	-1	0	0	0	-210	-12	-5	-65	-4	-2	0	0	0	-193	-12	-249	0	0	0	0	0	0	-250	-15	-9	-121	-7	-1
1959	-210	-13	-10	0	0	0	-105	-6	0	-105	-6	-1	-158	-9	-4	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-155	-9	-6	-59	-4	0
1960	-81	-5	-4	-179	-11	-5	-87	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43	-3	-111	-250	-15	-142	-84	-5	-3	-219	-13	-2
1961	-55	-3	-3	-48	-3	-1	-319	-20	-1	0	0	0	-79	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-101	-6	-4	-250	-15	-2
1962	-246	-15	-12	-199	-12	-6	-320	-20	-1	-169	-10	-2	-88	-5	-2	0	0	0	-80	-5	-4	-7	0	-9	0	0	0	-250	-15	-142	-45	-3	-2	-123	-7	-1
1963	-234	-14	-11	0	0	0	-148	-9	0	-18	-1	0	-85	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-45	-3	-2	0	0	0	-259	-16	-1	-305	-19	-4	-57	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-31	-54	-3	-2	-46	-3	0
1965	-28	-2	-1	-44	-3	-1	0	0	0	0	0	0	0	0	0	-104	-6	-3	-2	0	0	-8	0	-10	0	0	0	-4	0	-2	-250	-15	-9	-75	-4	-1
1966	-58	-4	-3	-60	-4	-2	-259	-16	-1	-204	-13	-3	100	6	2	-96	-6	-3	0	0	0	0	0	0	0	0	0	-250	-15	-142	-100	-6	-4	-71	-4	-1
1967	-127	-8	-6	-176	-10	-5	-250	-15	-1	0	0	0	-186	-10	-4	-53	-3	-2	0	0	0	-193	-12	-249	0	0	0	0	0	0	-250	-15	-9	-217	-13	-2
1968	-32	-2	-2	0	0	0	-59	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	0	0	0	-51	-3	0
1969	-80	-5	-4	-178	-11	-5	-250	-15	-1	-136	-8	-2	-109	-6	-3	-141	-9	-4	0	0	0	-193	-12	-249	0	0	0	0	0	0	0	0	0	-9	-1	0
1970	-178	-11	-9	-59	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1971	-57	-3	-3	-50	-3	-2	-60	-4	0	-5	0	0	-199	-11	-5	-56	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1972	-72	-4	-3	-51	-3	-2	-94	-6	0	0	0	0	-89	-5	-2	-95	-6	-3	-19	-1	-1	-7	0	-9	0	0	0	-250	-15	-142	-128	-8	-5	0	0	0
1973	-211	-13	-10	-169	-10	-5	-250	-15	-1	-127	-8	-2	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1974	-41	-3	-2	-66	-4	-2	-39	-2	0	-200	-12	-2	-52	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-93	-6	-1
1975	-170	-10	-8	0	0	0	-111	-7	0	-60	-4	-1	-320	-18	-8	-101	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-76	-4	-1
1976	-156	-10	-7	-112	-7	-3	0	0	0	-36	-2	0	-47	-3	-1	-247	-15	-7	0	0	0	5	0	6	0	0	0	-151	-9	-86	-250	-15	-9	-249	-15	-2
1977	-245	-15	-12	-202	-12	-6	-107	-7	0	-180	-11	-2	-198	-11	-5	-87	-5	-3	26	2	1	-216	-13	-279	0	0	0	-250	-15	-142	-250	-15	-9	0	0	0
1978	-245	-15	-12	-202	-12	-6	-133	-8	0	0	0	0	0	0	0	-151	-9	-4	-25	-1	-1	-65	-4	-84	0	0	0	0	0	0	-250	-15	-9	0	0	0
1979	-68	-4	-3	-53	-3	-2	-101	-6	0	-87	-5	-1	-127	-7	-3	-101	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1980	-48	-3	-2	-78	-5	-2	-251	-15	-1	-136	-8	-2	-320	-18	-8	-138	-8	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	0
1981	-88	-5	-4	-58	-3	-2	-113	-7	0	-77	-5	-1	-244	-14	-6	-50	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-3	-67	-4	-1
1982	-53	-3	-3	-47	-3	-1	0	0	0	-118	-7	-1	-320	-18	-8	-115	-7	-3	0	0	0	-193	-12	-249	0	0	0	-4	0	-2	0	0	0	-7	0	0
1983	-235	-14	-11	0	0	0	0	0	0	-65	-4	-1	0	0	0	0	0	0	0	0	0	-193	-12	-249	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-48	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1985	-52	-3	-2	-41	-2	-1	0	0	0	-305	-19	-4	-197	-11	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	-3	-68	-4	-1
1986	-59	-4	-3	-68	-4	-2	-128	-8	0	-108	-7	-1	-50	-3	-1	-307	-19	-9	-320	-19	-17	-209	-13	-269	-31	-2	-80	-4	0	-2	-73	-4	-3	-9	-1	0
1987	0	0	0	-47	-3	-1	-83	-5	0	-44	-3	-1	0	0	0	-51	-3	-1	0	0	0	0	0	0	-41	-2	-105	-250	-15	-142	-58	-4	-2	-52	-3	0
1988	-38	-2	-2	-59	-4	-2	-107	-7	0	-169	-10	-2	0	0	0	-160	-10	-5	0	0	0	0	0	0	-200	-12	-519	-250	-15	-142	-78	-5	-3	-68	-4	-1
1989	-135	-8	-6	-202	-12	-6	-132	-8	0	-180	-11	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-142	-41	-3	-2	-157	-9	-1
1990	-246	-15	-12	-199	-12	-6	-122	-8	0	0	0	0	-166	-9	-4	-64	-4	-2	113	7	6	-4	0	-5	-92	-5	-239	-182	-11	-104	-250	-15	-9	-250	-15	-2
1991	-245	-15	-12	-202	-12	-6	-133	-8	0	-180	-11	-2	-175	-10	-4	-174	-11	-5	1	0	0	0	0	0	0	0	0	-241	-14	-137	-261	-16	-10	-250	-15	-2
1992	0	0	0	-202	-12	-6	-133	-8	0	-180	-11	-2	-191	-11	-5	0	0	0	-6	0	0	0	0	0	-48	-3	-124	-8	0	-4	-223	-14	-8	-250	-15	-2
1993	-245	-15	-12	-202	-12	-6	-133	-8	0	-180	-11	-2	0	0	0	18	1	1	19	1	1	0	0	0	0	0	0	0	0	0	-250	-15	-9	0	0	0
1994	-47	-3	-2	-40	-2	-1	-303	-19	-1	-58	-4	-1	-76	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	-20	-51	-3	-2	-202	-12	-2
Mean			-4			-3			0			-1			-3			-2			-1			-35			-60			-50			-5			0
Max			9			4			0			0			2			2			6			6			0			0			0			0
Min			-15			-9			-1			-4			-8			-9			-17			-279			-649			-142			-10			-2

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	195	12	72	134	8	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-61	-4	-23	-59	-4	-24	-303	-19	-93	-5	0	-2	-159	-9	-66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	-133	-82	-5	-28
1924	-64	-4	-24	-179	-11	-73	-50	-3	-15	0	0	0	0	0	0	-121	-7	-28	0	0	0	5	0	29	0	0	0	-8	0	-43	0	0	0	0	0	0
1925	-245	-15	-91	-202	-12	-82	-133	-8	-41	-180	-11	-77	-108	-6	-45	2	0	0	69	4	8	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1926	-40	-2	-15	-37	-2	-15	-66	-4	-20	-168	-10	-72	-250	-14	-104	0	0	0	0	0	0	0	0	0	-142	-8	-2,376	-250	-15	-1,436	-251	-15	-222	0	0	0
1927	0	0	0	-57	-3	-23	-250	-15	-77	0	0	0	0	0	0	86	5	20	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	0	0	0
1928	-44	-3	-16	-48	-3	-20	-259	-16	-79	-105	-6	-45	-200	-11	-83	-97	-6	-23	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1929	-51	-3	-19	-50	-3	-20	-86	-5	-26	-77	-5	-33	0	0	0	-32	-2	-7	0	0	0	0	0	0	-200	-12	-3,347	-250	-15	-1,436	-58	-4	-51	-62	-4	-21
1930	-54	-3	-20	-202	-12	-82	-139	-9	-43	-171	-10	-73	-320	-18	-133	0	0	0	0	0	0	0	0	0	-200	-12	-3,347	-250	-15	-1,436	-74	-5	-65	0	0	0
1931	-241	-15	-90	-199	-12	-81	-122	-8	-37	-168	-10	-72	0	0	0	-87	-5	-20	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-250	-15	-221	-250	-15	-85
1932	-245	-15	-91	-202	-12	-82	-133	-8	-41	-180	-11	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1933	-44	-3	-16	-36	-2	-15	-68	-4	-21	-124	-8	-53	-102	-6	-42	0	0	0	0	0	0	0	0	0	-200	-12	-3,347	-250	-15	-1,436	-135	-8	-119	-115	-7	-39
1934	0	0	0	-202	-12	-82	-133	-8	-41	0	0	0	-197	-11	-82	-35	-2	-8	-113	-7	-13	0	0	0	0	0	0	-8	0	-43	-250	-15	-221	-250	-15	-85
1935	0	0	0	-202	-12	-82	-133	-8	-41	-180	-11	-77	7	0	3	-199	-12	-47	-4	0	-1	-71	-4	-416	0	0	0	0	0	0	-250	-15	-221	-61	-4	-21
1936	-47	-3	-18	-102	-6	-42	-111	-7	-34	-136	-8	-58	0	0	0	-16	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	-96	-6	-33
1937	-52	-3	-19	-46	-3	-19	-111	-7	-34	-64	-4	-27	-320	-18	-133	-220	-14	-52	0	0	0	-214	-13	-1,251	0	0	0	0	0	0	-250	-15	-221	0	0	0
1938	-48	-3	-18	-74	-4	-30	-68	-4	-21	-200	-12	-86	-3	0	-1	-91	-6	-21	0	0	0	0	0	0	-250	-15	-4,184	0	0	0	0	0	0	0	0	0
1939	-127	-8	-47	-303	-18	-123	0	0	0	0	0	0	0	0	0	-35	-2	-8	0	0	0	0	0	0	0	0	0	-233	-14	-1,339	-75	-5	-67	-51	-3	-17
1940	-41	-3	-15	-70	-4	-28	-81	-5	-25	-158	-10	-68	0	0	0	-102	-6	-24	-183	-11	-22	0	0	0	-16	-1	-273	0	0	0	-209	-13	-185	0	0	0
1941	-94	-6	-35	-170	-10	-69	0	0	0	0	0	0	-315	-17	-131	-29	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-62	-4	-23	-54	-3	-22	-259	-16	-79	-38	-2	-17	-87	-5	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	0	0	0
1943	-90	-6	-33	-75	-4	-30	-136	-8	-42	-105	-6	-45	-202	-11	-84	-196	-12	-46	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	0	0	0
1944	-55	-3	-20	-49	-3	-20	-250	-15	-77	0	0	0	-95	-5	-40	-86	-5	-20	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-69	-4	-61	-76	-5	-26
1945	-43	-3	-16	-59	-4	-24	-253	-15	-77	-162	-10	-69	-110	-6	-45	-144	-9	-34	0	0	0	0	0	0	0	0	0	0	0	0	-221	-14	-195	0	0	0
1946	-43	-3	-16	-169	-10	-69	-2	0	-1	0	0	0	-197	-11	-82	-135	-8	-32	0	0	0	0	0	0	0	0	0	-16	-1	-94	-69	-4	-61	-62	-4	-21
1947	-166	-10	-62	-178	-11	-72	-250	-15	-77	0	0	0	-127	-7	-53	-89	-5	-21	0	0	0	0	0	0	-200	-12	-3,347	-208	-12	-1,195	-68	-4	-60	-67	-4	-23
1948	-37	-2	-14	-50	-3	-20	-184	-11	-56	0	0	0	0	0	0	20	1	5	-156	-9	-18	-33	-2	-191	0	0	0	-250	-15	-1,436	-132	-8	-117	-68	-4	-23
1949	-161	-10	-60	-179	-11	-73	-86	-5	-26	-98	-6	-42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-116	-7	-102	-86	-5	-29
1950	-49	-3	-18	-107	-6	-43	-146	-9	-45	0	0	0	-320	-18	-133	-43	-3	-10	-224	-13	-27	0	0	0	0	0	0	-250	-15	-1,436	-250	-15	-221	-133	-8	-45
1951	0	0	0	-141	-8	-57	-213	-13	-65	-174	-11	-75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	-71	-4	-24
1952	-57	-4	-21	-77	-5	-31	0	0	0	0	0	0	-180	-10	-75	-79	-5	-19	0	0	0	-193	-12	-1,128	0	0	0	0	0	0	0	0	0	-178	-11	-61
1953	-307	-19	-114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1954	-54	-3	-20	-55	-3	-22	-212	-13	-65	-105	-6	-45	-199	-11	-82	-115	-7	-27	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-250	-15	-221	0	0	0
1955	-62	-4	-23	-62	-4	-25	-272	-17	-83	-123	-8	-53	-315	-17	-131	-85	-5	-20	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-216	-13	-191	0	0	0
1956	-46	-3	-17	-54	-3	-22	-250	-15	-77	-169	-10	-73	-320	-18	-133	-103	-6	-24	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	0	0	0
1957	-70	-4	-26	-55	-3	-22	-82	-5	-25	-45	-3	-19	-320	-18	-133	-105	-6	-25	0	0	0	0	0	0	-19	-1	-317	0	0	0	-12	-1	-11	-66	-4	-22
1958	-46	-3	-17	-96	-6	-39	-250	-15	-77	0	0	0	-210	-12	-87	-65	-4	-15	0	0	0	-193	-12	-1,128	0	0	0	0	0	0	-250	-15	-221	-121	-7	-41
1959	-210	-13	-78	0	0	0	-105	-6	-32	-105	-6	-45	-158	-9	-65	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-155	-9	-136	-59	-4	-20
1960	-81	-5	-30	-179	-11	-73	-87	-5	-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43	-3	-713	-250	-15	-1,436	-84	-5	-74	-219	-13	-75
1961	-55	-3	-20	-48	-3	-20	-319	-20	-98	0	0	0	-79	-4	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-101	-6	-89	-250	-15	-85
1962	-246	-15	-91	-199	-12	-81	-320	-20	-98	-169	-10	-73	-88	-5	-37	0	0	0	-80	-5	-9	-7	0	-43	0	0	0	-250	-15	-1,436	-45	-3	-40	-123	-7	-42
1963	-234	-14	-87	0	0	0	-148	-9	-45	-18	-1	-8	-85	-5	-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-45	-3	-17	0	0	0	-259	-16	-79	-305	-19	-131	-57	-3	-24	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-313	-54	-3	-48	-46	-3	-16
1965	-28	-2	-11	-44	-3	-18	0	0	0	0	0	0	0	0	0	-104	-6	-25	-2	0	0	-8	0	-46	0	0	0	-4	0	-21	-250	-15	-221	-75	-4	-25
1966	-58	-4	-22	-60	-4	-24	-259	-16	-79	-204	-13	-88	100	6	42	-96	-6	-23	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-100	-6	-88	-71	-4	-24
1967	-127	-8	-47	-176	-10	-71	-250	-15	-77	0	0	0	-186	-10	-77	-53	-3	-13	0	0	0	-193	-12	-1,128	0	0	0	0	0	0	-250	-15	-221	-217	-13	-74
1968	-32	-2	-12	0	0	0	-59	-4	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	0	0	0	-51	-3	-18
1969	-80	-5	-30	-178	-11	-72	-250	-15	-77	-136	-8	-58	-109	-6	-45	-141	-9	-33	0	0	0	-193	-12	-1,128	0	0	0	0	0	0	0	0	0	-9	-1	-3
1970	-178	-11	-66	-59	-4	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	0	0	0
1971	-57	-3	-21	-50	-3	-20	-60	-4	-19	-5	0	-2	-199	-11	-83	-56	-3	-13	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1972	-72	-4	-27	-51	-3	-21	-94	-6	-29	0	0	0	-89	-5	-37	-95	-6	-22	-19	-1	-2	-7	0	-43	0	0	0	-250	-15	-1,436	-128	-8	-113	0	0	0
1973	-211	-13	-79	-169	-10	-69	-250	-15	-77	-127	-8	-54	-35	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1974	-41	-3	-15	-66	-4	-27	-39	-2	-12	-200	-12	-86	-52	-3	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	-93	-6	-32
1975	-170	-10	-63	0	0	0	-111	-7	-34	-60	-4	-26	-320	-18	-133	-101	-6	-24	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-10	-76	-4	-26
1976	-156	-10	-58	-112	-7	-46	0	0	0	-36	-2	-16	-47	-3	-20	-247	-15	-58	0	0	0	5	0	26	0	0	0	-151	-9	-870	-250	-15	-221	-249	-15	-85
1977	-245	-15	-91	-202	-12	-82	-107	-7	-33	-180	-11	-77	-198	-11	-82	-87	-5	-20	26	2	3	-216	-13	-1,261	0	0	0	-250	-15	-1,436	-250	-15	-221	0	0	0
1978	-245	-15	-91	-202	-12	-82	-133	-8	-41	0	0	0	0	0	0	-151	-9	-36	-25	-1	-3	-65	-4	-381	0	0	0	0	0	0	-250	-15	-221	0	0	0
1979	-68	-4	-25	-53	-3	-22	-101	-6	-31	-87	-5	-37	-127	-7	-53	-101	-6	-24	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1980	-48	-3	-18	-78	-5	-32	-251	-15	-77	-136	-8	-58	-320	-18	-133	-138	-8	-32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	-3
1981	-88	-5	-33	-58	-3	-23	-113	-7	-35	-77	-5	-33	-244	-14	-101	-50	-3	-12	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	-77	-67	-4	-23
1982	-53	-3	-20	-47	-3	-19	0	0	0	-118	-7	-51	-320	-18	-133	-115	-7	-27	0	0	0	-193	-12	-1,128	0	0	0	-4	0	-21	0	0	0	-7	0	-2
1983	-235	-14	-87	0	0	0	0	0	0	-65	-4	-28	0	0	0	0	0	0	0	0	0	-193	-12	-1,128	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-48	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	-11	0	0	0
1985	-52	-3	-19	-41	-2	-17	0	0	0	-305	-19	-131	-197	-11	-82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	-68	-68	-4	-23
1986	-59	-4	-22	-68	-4	-28	-128	-8	-39	-108	-7	-46	-50	-3	-21	-307	-19	-72	-320	-19	-38	-209	-13	-1,218	-31	-2	-516	-4	0	-21	-73	-4	-64	-9	-1	-3
1987	0	0	0	-47	-3	-19	-83	-5	-26	-44	-3	-19	0	0	0	-51	-3	-12	0	0	0	0	0	0	-41	-2	-680	-250	-15	-1,436	-58	-4	-51	-52	-3	-18
1988	-38	-2	-14	-59	-4	-24	-107	-7	-33	-169	-10	-73	0	0	0	-160	-10	-38	0	0	0	0	0	0	-200	-12	-3,347	-250	-15	-1,436	-78	-5	-69	-68	-4	-23
1989	-135	-8	-50	-202	-12	-82	-132	-8	-40	-180	-11	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1,436	-41	-3	-36	-157	-9	-54
1990	-246	-15	-91	-199	-12	-81	-122	-8	-37	0	0	0	-166	-9	-69	-64	-4	-15	113	7	13	-4	0	-21	-92	-5	-1,540	-182	-11	-1,046	-250	-15	-221	-250	-15	-85
1991	-245	-15	-91	-202	-12	-82	-133	-8	-41	-180	-11	-77	-175	-10	-73	-174	-11	-41	1	0	0	0	0	0	0	0	0	-241	-14	-1,382	-261	-16	-230	-250	-15	-85
1992	0	0	0	-202	-12	-82	-133	-8	-41	-180	-11	-77	-191	-11	-79	0	0	0	-6	0	-1	0	0	0	-48	-3	-799	-8	0	-43	-223	-14	-197	-250	-15	-85
1993	-245	-15	-91	-202	-12	-82	-133	-8	-41	-180	-11	-77	0	0	0	18	1	4	19	1	2	0	0	0	0	0	0	0	0	0	-250	-15	-221	0	0	0
1994	-47	-3	-17	-40	-2	-16	-303	-19	-93	-58	-4	-25	-76	-4	-31	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	-199	-51	-3	-45	-202	-12	-69
Mean			-35			-39			-41			-37			-46			-14			-1			-159			-385			-504			-110			-23
Max			72			54			0			0			42			20			13			29			0			0			0			0
Min			-114			-123			-98			-131			-133			-72			-38			-1,261			-4,184			-1,436			-230			-85

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	195	12	0	134	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-61	-4	0	-59	-4	0	-303	-19	-1	-5	0	0	-159	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-150	-9	0	-82	-5	0
1924	-64	-4	0	-179	-11	-1	-50	-3	0	0	0	0	0	0	0	-121	-7	-2	0	0	0	5	0	0	0	0	0	-8	0	0	0	0	0	0	0	0
1925	-245	-15	0	-202	-12	-1	-133	-8	0	-180	-11	-1	-108	-6	-1	2	0	0	69	4	1	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1926	-40	-2	0	-37	-2	0	-66	-4	0	-168	-10	-1	-250	-14	-3	0	0	0	0	0	0	0	0	0	-142	-8	0	-250	-15	-1	-251	-15	0	0	0	0
1927	0	0	0	-57	-3	0	-250	-15	-1	0	0	0	0	0	0	86	5	1	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1928	-44	-3	0	-48	-3	0	-259	-16	-1	-105	-6	-1	-200	-11	-2	-97	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1929	-51	-3	0	-50	-3	0	-86	-5	0	-77	-5	-1	0	0	0	-32	-2	0	0	0	0	0	0	0	-200	-12	0	-250	-15	-1	-58	-4	0	-62	-4	0
1930	-54	-3	0	-202	-12	-1	-139	-9	0	-171	-10	-1	-320	-18	-3	0	0	0	0	0	0	0	0	0	-200	-12	0	-250	-15	-1	-74	-5	0	0	0	0
1931	-241	-15	0	-199	-12	-1	-122	-8	0	-168	-10	-1	0	0	0	-87	-5	-1	0	0	0	0	0	0	0	0	0	-250	-15	-1	-250	-15	0	-250	-15	0
1932	-245	-15	0	-202	-12	-1	-133	-8	0	-180	-11	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1933	-44	-3	0	-36	-2	0	-68	-4	0	-124	-8	-1	-102	-6	-1	0	0	0	0	0	0	0	0	0	-200	-12	0	-250	-15	-1	-135	-8	0	-115	-7	0
1934	0	0	0	-202	-12	-1	-133	-8	0	0	0	0	-197	-11	-2	-35	-2	-1	-113	-7	-1	0	0	0	0	0	0	-8	0	0	-250	-15	0	-250	-15	0
1935	0	0	0	-202	-12	-1	-133	-8	0	-180	-11	-1	7	0	0	-199	-12	-3	-4	0	0	-71	-4	0	0	0	0	0	0	0	-250	-15	0	-61	-4	0
1936	-47	-3	0	-102	-6	-1	-111	-7	0	-136	-8	-1	0	0	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	-96	-6	0
1937	-52	-3	0	-46	-3	0	-111	-7	0	-64	-4	-1	-320	-18	-3	-220	-14	-3	0	0	0	-214	-13	-1	0	0	0	0	0	0	-250	-15	0	0	0	0
1938	-48	-3	0	-74	-4	-1	-68	-4	0	-200	-12	-2	-3	0	0	-91	-6	-1	0	0	0	0	0	0	-250	-15	0	0	0	0	0	0	0	0	0	0
1939	-127	-8	0	-303	-18	-2	0	0	0	0	0	0	0	0	0	-35	-2	-1	0	0	0	0	0	0	0	0	0	-233	-14	-1	-75	-5	0	-51	-3	0
1940	-41	-3	0	-70	-4	-1	-81	-5	0	-158	-10	-1	0	0	0	-102	-6	-2	-183	-11	-2	0	0	0	-16	-1	0	0	0	0	-209	-13	0	0	0	0
1941	-94	-6	0	-170	-10	-1	0	0	0	0	0	0	-315	-17	-3	-29	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-62	-4	0	-54	-3	0	-259	-16	-1	-38	-2	0	-87	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1943	-90	-6	0	-75	-4	-1	-136	-8	0	-105	-6	-1	-202	-11	-2	-196	-12	-3	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1944	-55	-3	0	-49	-3	0	-250	-15	-1	0	0	0	-95	-5	-1	-86	-5	-1	0	0	0	0	0	0	0	0	0	-250	-15	-1	-69	-4	0	-76	-5	0
1945	-43	-3	0	-59	-4	0	-253	-15	-1	-162	-10	-1	-110	-6	-1	-144	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	-221	-14	0	0	0	0
1946	-43	-3	0	-169	-10	-1	-2	0	0	0	0	0	-197	-11	-2	-135	-8	-2	0	0	0	0	0	0	0	0	0	-16	-1	0	-69	-4	0	-62	-4	0
1947	-166	-10	0	-178	-11	-1	-250	-15	-1	0	0	0	-127	-7	-1	-89	-5	-1	0	0	0	0	0	0	-200	-12	0	-208	-12	-1	-68	-4	0	-67	-4	0
1948	-37	-2	0	-50	-3	0	-184	-11	0	0	0	0	0	0	0	20	1	0	-156	-9	-1	-33	-2	0	0	0	0	-250	-15	-1	-132	-8	0	-68	-4	0
1949	-161	-10	0	-179	-11	-1	-86	-5	0	-98	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-116	-7	0	-86	-5	0
1950	-49	-3	0	-107	-6	-1	-146	-9	0	0	0	0	-320	-18	-3	-43	-3	-1	-224	-13	-2	0	0	0	0	0	0	-250	-15	-1	-250	-15	0	-133	-8	0
1951	0	0	0	-141	-8	-1	-213	-13	0	-174	-11	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-71	-4	0
1952	-57	-4	0	-77	-5	-1	0	0	0	0	0	0	-180	-10	-2	-79	-5	-1	0	0	0	-193	-12	-1	0	0	0	0	0	0	0	0	0	-178	-11	0
1953	-307	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1954	-54	-3	0	-55	-3	0	-212	-13	0	-105	-6	-1	-199	-11	-2	-115	-7	-2	0	0	0	0	0	0	0	0	0	-250	-15	-1	-250	-15	0	0	0	0
1955	-62	-4	0	-62	-4	0	-272	-17	-1	-123	-8	-1	-315	-17	-3	-85	-5	-1	0	0	0	0	0	0	0	0	0	-250	-15	-1	-216	-13	0	0	0	0
1956	-46	-3	0	-54	-3	0	-250	-15	-1	-169	-10	-1	-320	-18	-3	-103	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1957	-70	-4	0	-55	-3	0	-82	-5	0	-45	-3	0	-320	-18	-3	-105	-6	-2	0	0	0	0	0	0	-19	-1	0	0	0	0	-12	-1	0	-66	-4	0
1958	-46	-3	0	-96	-6	-1	-250	-15	-1	0	0	0	-210	-12	-2	-65	-4	-1	0	0	0	-193	-12	-1	0	0	0	0	0	0	-250	-15	0	-121	-7	0
1959	-210	-13	0	0	0	0	-105	-6	0	-105	-6	-1	-158	-9	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-155	-9	0	-59	-4	0
1960	-81	-5	0	-179	-11	-1	-87	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43	-3	0	-250	-15	-1	-84	-5	0	-219	-13	0
1961	-55	-3	0	-48	-3	0	-319	-20	-1	0	0	0	-79	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-101	-6	0	-250	-15	0
1962	-246	-15	0	-199	-12	-1	-320	-20	-1	-169	-10	-1	-88	-5	-1	0	0	0	-80	-5	-1	-7	0	0	0	0	0	-250	-15	-1	-45	-3	0	-123	-7	0
1963	-234	-14	0	0	0	0	-148	-9	0	-18	-1	0	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-45	-3	0	0	0	0	-259	-16	-1	-305	-19	-2	-57	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	0	-54	-3	0	-46	-3	0
1965	-28	-2	0	-44	-3	0	0	0	0	0	0	0	0	0	0	-104	-6	-2	-2	0	0	-8	0	0	0	0	0	-4	0	0	-250	-15	0	-75	-4	0
1966	-58	-4	0	-60	-4	0	-259	-16	-1	-204	-13	-2	100	6	1	-96	-6	-1	0	0	0	0	0	0	0	0	0	-250	-15	-1	-100	-6	0	-71	-4	0
1967	-127	-8	0	-176	-10	-1	-250	-15	-1	0	0	0	-186	-10	-2	-53	-3	-1	0	0	0	-193	-12	-1	0	0	0	0	0	0	-250	-15	0	-217	-13	0
1968	-32	-2	0	0	0	0	-59	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	0	0	0	-51	-3	0
1969	-80	-5	0	-178	-11	-1	-250	-15	-1	-136	-8	-1	-109	-6	-1	-141	-9	-2	0	0	0	-193	-12	-1	0	0	0	0	0	0	0	0	0	-9	-1	0
1970	-178	-11	0	-59	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1971	-57	-3	0	-50	-3	0	-60	-4	0	-5	0	0	-199	-11	-2	-56	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1972	-72	-4	0	-51	-3	0	-94	-6	0	0	0	0	-89	-5	-1	-95	-6	-1	-19	-1	0	-7	0	0	0	0	0	-250	-15	-1	-128	-8	0	0	0	0
1973	-211	-13	0	-169	-10	-1	-250	-15	-1	-127	-8	-1	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1974	-41	-3	0	-66	-4	0	-39	-2	0	-200	-12	-2	-52	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-93	-6	0
1975	-170	-10	0	0	0	0	-111	-7	0	-60	-4	0	-320	-18	-3	-101	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	-76	-4	0
1976	-156	-10	0	-112	-7	-1	0	0	0	-36	-2	0	-47	-3	0	-247	-15	-4	0	0	0	5	0	0	0	0	0	-151	-9	-1	-250	-15	0	-249	-15	0
1977	-245	-15	0	-202	-12	-1	-107	-7	0	-180	-11	-1	-198	-11	-2	-87	-5	-1	26	2	0	-216	-13	-1	0	0	0	-250	-15	-1	-250	-15	0	0	0	0
1978	-245	-15	0	-202	-12	-1	-133	-8	0	0	0	0	0	0	0	-151	-9	-2	-25	-1	0	-65	-4	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1979	-68	-4	0	-53	-3	0	-101	-6	0	-87	-5	-1	-127	-7	-1	-101	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1980	-48	-3	0	-78	-5	-1	-251	-15	-1	-136	-8	-1	-320	-18	-3	-138	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-1	0
1981	-88	-5	0	-58	-3	0	-113	-7	0	-77	-5	-1	-244	-14	-3	-50	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-87	-5	0	-67	-4	0
1982	-53	-3	0	-47	-3	0	0	0	0	-118	-7	-1	-320	-18	-3	-115	-7	-2	0	0	0	-193	-12	-1	0	0	0	-4	0	0	0	0	0	-7	0	0
1983	-235	-14	0	0	0	0	0	0	0	-65	-4	-1	0	0	0	0	0	0	0	0	0	-193	-12	-1	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-48	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	-1	0	0	0	0
1985	-52	-3	0	-41	-2	0	0	0	0	-305	-19	-2	-197	-11	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	0	-68	-4	0
1986	-59	-4	0	-68	-4	0	-128	-8	0	-108	-7	-1	-50	-3	-1	-307	-19	-5	-320	-19	-3	-209	-13	-1	-31	-2	0	-4	0	0	-73	-4	0	-9	-1	0
1987	0	0	0	-47	-3	0	-83	-5	0	-44	-3	0	0	0	0	-51	-3	-1	0	0	0	0	0	0	-41	-2	0	-250	-15	-1	-58	-4	0	-52	-3	0
1988	-38	-2	0	-59	-4	0	-107	-7	0	-169	-10	-1	0	0	0	-160	-10	-2	0	0	0	0	0	0	-200	-12	0	-250	-15	-1	-78	-5	0	-68	-4	0
1989	-135	-8	0	-202	-12	-1	-132	-8	0	-180	-11	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-250	-15	-1	-41	-3	0	-157	-9	0
1990	-246	-15	0	-199	-12	-1	-122	-8	0	0	0	0	-166	-9	-2	-64	-4	-1	113	7	1	-4	0	0	-92	-5	0	-182	-11	-1	-250	-15	0	-250	-15	0
1991	-245	-15	0	-202	-12	-1	-133	-8	0	-180	-11	-1	-175	-10	-2	-174	-11	-3	1	0	0	0	0	0	0	0	0	-241	-14	-1	-261	-16	0	-250	-15	0
1992	0	0	0	-202	-12	-1	-133	-8	0	-180	-11	-1	-191	-11	-2	0	0	0	-6	0	0	0	0	0	-48	-3	0	-8	0	0	-223	-14	0	-250	-15	0
1993	-245	-15	0	-202	-12	-1	-133	-8	0	-180	-11	-1	0	0	0	18	1	0	19	1	0	0	0	0	0	0	0	0	0	0	-250	-15	0	0	0	0
1994	-47	-3	0	-40	-2	0	-303	-19	-1	-58	-4	0	-76	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	0	-51	-3	0	-202	-12	0
Mean			0			-1			0			-1			-1			-1			0			0			0			0			0			0
Max			0			1			0			0			1			1			1			0			0			0			0			0
Min			0			-2			-1			-2			-3			-5			-3			-1			0			-1			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions Entrainment and Impingement Loss Calculations – Larval Delta Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	54	Apr	Vol	412	May	Vol	530	Jun	Vol	119	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1923	166	10	0	144	9	0	189	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1924	139	9	0	96	6	0	250	15	0	123	8	0	64	4	0	140	9	462	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	218	13	0
1925	122	7	0	202	12	0	189	12	0	180	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1926	109	7	0	78	5	0	86	5	0	158	10	0	250	14	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1927	116	7	0	152	9	0	250	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1928	129	8	0	100	6	0	226	14	0	104	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1929	122	7	0	104	6	0	250	15	0	123	8	0	56	3	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	183	11	0
1930	77	5	0	59	4	0	133	8	0	180	11	0	198	11	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1931	114	7	0	199	12	0	122	8	0	168	10	0	166	9	0	87	5	287	0	0	0	0	0	0	250	15	1,762	250	15	0	250	15	0	250	15	0
1932	245	15	0	202	12	0	133	8	0	180	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1933	156	10	0	62	4	0	195	12	0	146	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1934	105	6	0	66	4	0	133	8	0	180	11	0	198	11	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1935	245	15	0	202	12	0	133	8	0	180	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1936	137	8	0	102	6	0	29	2	0	136	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1937	135	8	0	89	5	0	250	15	0	120	7	0	120	7	0	98	6	323	0	0	0	214	13	6,978	0	0	0	0	0	0	250	15	0	250	15	0
1938	128	8	0	157	9	0	0	0	0	0	0	0	0	0	0	91	6	301	0	0	0	0	0	0	250	15	1,762	0	0	0	0	0	0	250	15	0
1939	236	15	0	158	9	0	59	4	0	96	6	0	72	4	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	162	10	0
1940	89	5	0	93	6	0	250	15	0	169	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1941	98	6	0	78	5	0	0	0	0	0	0	0	108	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1942	161	10	0	116	7	0	155	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	250	15	0
1943	237	15	0	152	9	0	56	3	0	77	5	0	0	0	0	102	6	337	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	244	15	0
1944	119	7	0	76	5	0	250	15	0	98	6	0	152	8	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1945	104	6	0	110	7	0	250	15	0	169	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1946	119	7	0	107	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	173	10	0
1947	115	7	0	127	8	0	250	15	0	136	8	0	183	10	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1948	98	6	0	94	6	0	122	8	0	169	10	0	86	5	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	233	14	0
1949	131	8	0	124	7	0	250	15	0	136	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1950	107	7	0	95	6	0	129	8	0	129	8	0	166	9	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1951	171	11	0	250	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	206	12	0
1952	134	8	0	118	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	6,292	0	0	0	0	0	0	0	0	0	250	15	0
1953	238	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1954	126	8	0	118	7	0	209	13	0	104	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1955	139	9	0	121	7	0	250	15	0	120	7	0	116	6	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1956	105	6	0	89	5	0	250	15	0	169	10	0	173	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1957	236	15	0	158	9	0	60	4	0	104	6	0	118	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	222	13	0
1958	123	8	0	121	7	0	250	15	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	6,292	0	0	0	0	0	0	250	15	0	250	15	0
1959	238	15	0	158	9	0	60	4	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	189	11	0
1960	100	6	0	77	5	0	250	15	0	136	8	0	76	4	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1961	117	7	0	97	6	0	250	15	0	169	10	0	155	9	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1962	116	7	0	94	6	0	122	8	0	169	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	152	9	0
1963	76	5	0	0	0	0	203	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1964	146	9	0	56	3	0	243	15	0	99	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	201	12	0
1965	90	6	0	115	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1966	138	8	0	250	15	0	49	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	197	12	0
1967	110	7	0	139	8	0	250	15	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	6,292	0	0	0	0	0	0	250	15	0	250	15	0
1968	0	0	0	0	0	0	59	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	148	9	0
1969	101	6	0	118	7	0	250	15	0	136	8	0	0	0	0	97	6	321	0	0	0	193	12	6,292	0	0	0	0	0	0	0	0	0	250	15	0
1970	236	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1971	132	8	0	114	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1972	162	10	0	113	7	0	174	11	0	105	6	0	118	7	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	208	12	0
1973	86	5	0	110	7	0	250	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1974	112	7	0	125	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1975	236	15	0	144	9	0	70	4	0	105	6	0	115	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1976	235	14	0	158	9	0	60	4	0	91	6	0	74	4	0	234	14	771	0	0	0	0	0	0	196	12	1,379	250	15	0	250	15	0	216	13	0
1977	101	6	0	140	8	0	250	15	0	97	6	0	75	4	0	61	4	202	0	0	0	218	13	7,096	250	15	1,762	250	15	0	250	15	0	250	15	0
1978	245	15	0	202	12	0	133	8	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	6,269	0	0	0	0	0	0	250	15	0	250	15	0
1979	225	14	0	160	9	0	41	3	0	123	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1980	121	7	0	128	8	0	250	15	0	115	7	0	82	5	0	100	6	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1981	246	15	0	160	9	0	114	7	0	117	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1982	124	8	0	93	6	0	0	0	0	0	0	0	159	9	0	0	0	0	0	0	0	193	12	6,292	0	0	0	0	0	0	0	0	0	250	15	0
1983	235	14	0	0	0	0	0	0	0	65	4	0	0	0	0	0	0	0	0	0	0	193	12	6,292	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1985	126	8	0	82	5	0	0	0	0	109	7	0	119	7	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	225	14	0	187	11	0
1986	127	8	0	109	7	0	250	15	0	169	10	0	250	14	0	111	7	364	0	0	0	193	12	6,292	0	0	0	0	0	0	0	0	0	250	15	0
1987	158	10	0	95	6	0	201	12	0	104	6	0	76	4	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	184	11	0
1988	82	5	0	98	6	0	133	8	0	169	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	185	11	0
1989	78	5	0	98	6	0	134	8	0	177	11	0	198	11	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	173	10	0
1990	108	7	0	131	8	0	222	14	0	89	5	0	123	7	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1991	245	15	0	202	12	0	133	8	0	180	11	0	192	11	0	174	11	574	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1992	245	15	0	202	12	0	133	8	0	180	11	0	191	11	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	250	15	0
1993	245	15	0	202	12	0	133	8	0	180	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1994	167	10	0	112	7	0	238	15	0	123	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	214	13	0	125	7	0
Mean			0			0			0			0			0			59			0			882			91			0			0			0
Max			0			0			0			0			0			771			0			7,096			1,762			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1923	166	10	2	144	9	3	189	12	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1924	139	9	2	96	6	2	250	15	9	123	8	5	64	4	16	140	9	13	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	218	13	1
1925	122	7	2	202	12	4	189	12	7	180	11	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1926	109	7	2	78	5	2	86	5	3	158	10	7	250	14	63	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1927	116	7	2	152	9	3	250	15	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1928	129	8	2	100	6	2	226	14	8	104	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1929	122	7	2	104	6	2	250	15	9	123	8	5	56	3	14	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	183	11	1
1930	77	5	1	59	4	1	133	8	5	180	11	8	198	11	50	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1931	114	7	2	199	12	4	122	8	4	168	10	7	166	9	42	87	5	8	0	0	0	0	0	0	250	15	35	250	15	2	250	15	5	250	15	1
1932	245	15	4	202	12	4	133	8	5	180	11	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1933	156	10	2	62	4	1	195	12	7	146	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1934	105	6	2	66	4	1	133	8	5	180	11	8	198	11	50	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1935	245	15	4	202	12	4	133	8	5	180	11	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1936	137	8	2	102	6	2	29	2	1	136	8	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1937	135	8	2	89	5	2	250	15	9	120	7	5	120	7	30	98	6	9	0	0	0	214	13	143	0	0	0	0	0	0	250	15	5	250	15	1
1938	128	8	2	157	9	3	0	0	0	0	0	0	0	0	0	91	6	9	0	0	0	0	0	0	250	15	35	0	0	0	0	0	0	250	15	1
1939	236	15	3	158	9	3	59	4	2	96	6	4	72	4	18	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	162	10	1
1940	89	5	1	93	6	2	250	15	9	169	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1941	98	6	1	78	5	2	0	0	0	0	0	0	108	6	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1942	161	10	2	116	7	2	155	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	250	15	1
1943	237	15	3	152	9	3	56	3	2	77	5	3	0	0	0	102	6	10	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	244	15	1
1944	119	7	2	76	5	2	250	15	9	98	6	4	152	8	38	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1945	104	6	1	110	7	2	250	15	9	169	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1946	119	7	2	107	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	173	10	1
1947	115	7	2	127	8	3	250	15	9	136	8	6	183	10	46	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1948	98	6	1	94	6	2	122	8	4	169	10	7	86	5	22	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	233	14	1
1949	131	8	2	124	7	3	250	15	9	136	8	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1950	107	7	2	95	6	2	129	8	5	129	8	6	166	9	42	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1951	171	11	2	250	15	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	206	12	1
1952	134	8	2	118	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	129	0	0	0	0	0	0	0	0	0	250	15	1
1953	238	15	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1954	126	8	2	118	7	2	209	13	7	104	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1955	139	9	2	121	7	3	250	15	9	120	7	5	116	6	29	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1956	105	6	2	89	5	2	250	15	9	169	10	7	173	10	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1957	236	15	3	158	9	3	60	4	2	104	6	5	118	7	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	222	13	1
1958	123	8	2	121	7	3	250	15	9	0	0	0	0	0	0	0	0	0	0	0	0	193	12	129	0	0	0	0	0	0	250	15	5	250	15	1
1959	238	15	3	158	9	3	60	4	2	100	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	189	11	1
1960	100	6	1	77	5	2	250	15	9	136	8	6	76	4	19	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1961	117	7	2	97	6	2	250	15	9	169	10	7	155	9	39	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1962	116	7	2	94	6	2	122	8	4	169	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	152	9	1
1963	76	5	1	0	0	0	203	12	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1964	146	9	2	56	3	1	243	15	9	99	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	201	12	1
1965	90	6	1	115	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1966	138	8	2	250	15	5	49	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	197	12	1
1967	110	7	2	139	8	3	250	15	9	0	0	0	0	0	0	0	0	0	0	0	0	193	12	129	0	0	0	0	0	0	250	15	5	250	15	1
1968	0	0	0	0	0	0	59	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	148	9	1
1969	101	6	1	118	7	2	250	15	9	136	8	6	0	0	0	97	6	9	0	0	0	193	12	129	0	0	0	0	0	0	0	0	0	250	15	1
1970	236	14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1971	132	8	2	114	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1972	162	10	2	113	7	2	174	11	6	105	6	5	118	7	30	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	208	12	1
1973	86	5	1	110	7	2	250	15	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1974	112	7	2	125	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1975	236	15	3	144	9	3	70	4	3	105	6	5	115	6	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1976	235	14	3	158	9	3	60	4	2	91	6	4	74	4	19	234	14	22	0	0	0	0	0	0	196	12	27	250	15	2	250	15	5	216	13	1
1977	101	6	1	140	8	3	250	15	9	97	6	4	75	4	19	61	4	6	0	0	0	218	13	146	250	15	35	250	15	2	250	15	5	250	15	1
1978	245	15	4	202	12	4	133	8	5	0	0	0	0	0	0	0	0	0	0	0	0	193	12	129	0	0	0	0	0	0	250	15	5	250	15	1
1979	225	14	3	160	9	3	41	3	1	123	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1980	121	7	2	128	8	3	250	15	9	115	7	5	82	5	21	100	6	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1981	246	15	4	160	9	3	114	7	4	117	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1982	124	8	2	93	6	2	0	0	0	0	0	0	159	9	40	0	0	0	0	0	0	193	12	129	0	0	0	0	0	0	0	0	0	250	15	1
1983	235	14	3	0	0	0	0	0	0	65	4	3	0	0	0	0	0	0	0	0	0	193	12	129	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	100	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1985	126	8	2	82	5	2	0	0	0	109	7	5	119	7	30	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	225	14	5	187	11	1
1986	127	8	2	109	7	2	250	15	9	169	10	7	250	14	63	111	7	11	0	0	0	193	12	129	0	0	0	0	0	0	0	0	0	250	15	1
1987	158	10	2	95	6	2	201	12	7	104	6	5	76	4	19	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	184	11	1
1988	82	5	1	98	6	2	133	8	5	169	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	185	11	1
1989	78	5	1	98	6	2	134	8	5	177	11	8	198	11	50	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	173	10	1
1990	108	7	2	131	8	3	222	14	8	89	5	4	123	7	31	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1991	245	15	4	202	12	4	133	8	5	180	11	8	192	11	49	174	11	17	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1992	245	15	4	202	12	4	133	8	5	180	11	8	191	11	48	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	250	15	1
1993	245	15	4	202	12	4	133	8	5	180	11	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1994	167	10	2	112	7	2	238	15	8	123	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	214	13	5	125	7	0
Mean			2			2			5			4			15			2			0			18			2			1			5			1
Max			4			5			9			8			63			22			0			146			35			2			5			1
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Juvenile Delta Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1923	166	10	3	144	9	1	189	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1924	139	9	3	96	6	1	250	15	2	123	8	2	64	4	1	140	9	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	218	13	1
1925	122	7	2	202	12	1	189	12	2	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1926	109	7	2	78	5	0	86	5	1	158	10	2	250	14	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1927	116	7	2	152	9	1	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1928	129	8	3	100	6	1	226	14	2	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1929	122	7	2	104	6	1	250	15	2	123	8	2	56	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	183	11	1
1930	77	5	2	59	4	0	133	8	1	180	11	2	198	11	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1931	114	7	2	199	12	1	122	8	1	168	10	2	166	9	3	87	5	2	0	0	0	0	0	0	250	15	22	250	15	7	250	15	7	250	15	1
1932	245	15	5	202	12	1	133	8	1	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1933	156	10	3	62	4	0	195	12	2	146	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1934	105	6	2	66	4	0	133	8	1	180	11	2	198	11	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1935	245	15	5	202	12	1	133	8	1	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1936	137	8	3	102	6	1	29	2	0	136	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1937	135	8	3	89	5	1	250	15	2	120	7	2	120	7	2	98	6	2	0	0	0	214	13	62	0	0	0	0	0	0	250	15	7	250	15	1
1938	128	8	3	157	9	1	0	0	0	0	0	0	0	0	0	91	6	2	0	0	0	0	0	0	250	15	22	0	0	0	0	0	0	250	15	1
1939	236	15	5	158	9	1	59	4	1	96	6	1	72	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	162	10	1
1940	89	5	2	93	6	1	250	15	2	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1941	98	6	2	78	5	0	0	0	0	0	0	0	108	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1942	161	10	3	116	7	1	155	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	250	15	1
1943	237	15	5	152	9	1	56	3	0	77	5	1	0	0	0	102	6	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	244	15	1
1944	119	7	2	76	5	0	250	15	2	98	6	1	152	8	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1945	104	6	2	110	7	1	250	15	2	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1946	119	7	2	107	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	173	10	1
1947	115	7	2	127	8	1	250	15	2	136	8	2	183	10	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1948	98	6	2	94	6	1	122	8	1	169	10	2	86	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	233	14	1
1949	131	8	3	124	7	1	250	15	2	136	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1950	107	7	2	95	6	1	129	8	1	129	8	2	166	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1951	171	11	3	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	206	12	1
1952	134	8	3	118	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	56	0	0	0	0	0	0	0	0	0	250	15	1
1953	238	15	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1954	126	8	3	118	7	1	209	13	2	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1955	139	9	3	121	7	1	250	15	2	120	7	2	116	6	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1956	105	6	2	89	5	1	250	15	2	169	10	2	173	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1957	236	15	5	158	9	1	60	4	1	104	6	1	118	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	222	13	1
1958	123	8	2	121	7	1	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	193	12	56	0	0	0	0	0	0	250	15	7	250	15	1
1959	238	15	5	158	9	1	60	4	1	100	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	189	11	1
1960	100	6	2	77	5	0	250	15	2	136	8	2	76	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1961	117	7	2	97	6	1	250	15	2	169	10	2	155	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1962	116	7	2	94	6	1	122	8	1	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	152	9	1
1963	76	5	2	0	0	0	203	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1964	146	9	3	56	3	0	243	15	2	99	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	201	12	1
1965	90	6	2	115	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1966	138	8	3	250	15	2	49	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	197	12	1
1967	110	7	2	139	8	1	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	193	12	56	0	0	0	0	0	0	250	15	7	250	15	1
1968	0	0	0	0	0	0	59	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	148	9	1
1969	101	6	2	118	7	1	250	15	2	136	8	2	0	0	0	97	6	2	0	0	0	193	12	56	0	0	0	0	0	0	0	0	0	250	15	1
1970	236	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1971	132	8	3	114	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1972	162	10	3	113	7	1	174	11	2	105	6	1	118	7	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	208	12	1
1973	86	5	2	110	7	1	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1974	112	7	2	125	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1975	236	15	5	144	9	1	70	4	1	105	6	1	115	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1976	235	14	5	158	9	1	60	4	1	91	6	1	74	4	1	234	14	4	0	0	0	0	0	0	196	12	17	250	15	7	250	15	7	216	13	1
1977	101	6	2	140	8	1	250	15	2	97	6	1	75	4	1	61	4	1	0	0	0	218	13	63	250	15	22	250	15	7	250	15	7	250	15	1
1978	245	15	5	202	12	1	133	8	1	0	0	0	0	0	0	0	0	0	0	0	0	193	12	55	0	0	0	0	0	0	250	15	7	250	15	1
1979	225	14	5	160	9	1	41	3	0	123	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1980	121	7	2	128	8	1	250	15	2	115	7	2	82	5	1	100	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1
1981	246	15	5	160	9	1	114	7	1	117	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1982	124	8	3	93	6	1	0	0	0	0	0	0	159	9	3	0	0	0	0	0	0	193	12	56	0	0	0	0	0	0	0	0	0	250	15	1
1983	235	14	5	0	0	0	0	0	0	65	4	1	0	0	0	0	0	0	0	0	0	193	12	56	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	100	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1985	126	8	3	82	5	1	0	0	0	109	7	1	119	7	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	225	14	6	187	11	1
1986	127	8	3	109	7	1	250	15	2	169	10	2	250	14	4	111	7	2	0	0	0	193	12	56	0	0	0	0	0	0	0	0	0	250	15	1
1987	158	10	3	95	6	1	201	12	2	104	6	1	76	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	184	11	1
1988	82	5	2	98	6	1	133	8	1	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	185	11	1
1989	78	5	2	98	6	1	134	8	1	177	11	2	198	11	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	173	10	1
1990	108	7	2	131	8	1	222	14	2	89	5	1	123	7	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1991	245	15	5	202	12	1	133	8	1	180	11	2	192	11	3	174	11	3	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1992	245	15	5	202	12	1	133	8	1	180	11	2	191	11	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	250	15	1
1993	245	15	5	202	12	1	133	8	1	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1994	167	10	3	112	7	1	238	15	2	123	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	214	13	6	125	7	1
Mean			3			1			1			1			1			0			0			8			1			3			6			1
Max			5			2			2			2			4			4			0			63			22			7			7			1
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2
1923	166	10	0	144	9	4	189	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1924	139	9	0	96	6	3	250	15	1	123	8	2	64	4	2	140	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	218	13	2
1925	122	7	0	202	12	6	189	12	0	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1926	109	7	0	78	5	2	86	5	0	158	10	2	250	14	6	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1927	116	7	0	152	9	5	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1928	129	8	0	100	6	3	226	14	1	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1929	122	7	0	104	6	3	250	15	1	123	8	2	56	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	183	11	1
1930	77	5	0	59	4	2	133	8	0	180	11	2	198	11	5	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1931	114	7	0	199	12	6	122	8	0	168	10	2	166	9	4	87	5	3	0	0	0	0	0	0	250	15	649	250	15	142	250	15	9	250	15	2
1932	245	15	1	202	12	6	133	8	0	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1933	156	10	0	62	4	2	195	12	1	146	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1934	105	6	0	66	4	2	133	8	0	180	11	2	198	11	5	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1935	245	15	1	202	12	6	133	8	0	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1936	137	8	0	102	6	3	29	2	0	136	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1937	135	8	0	89	5	3	250	15	1	120	7	1	120	7	3	98	6	3	0	0	0	214	13	277	0	0	0	0	0	0	250	15	9	250	15	2
1938	128	8	0	157	9	5	0	0	0	0	0	0	0	0	0	91	6	3	0	0	0	0	0	0	250	15	649	0	0	0	0	0	0	250	15	2
1939	236	15	1	158	9	5	59	4	0	96	6	1	72	4	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	162	10	1
1940	89	5	0	93	6	3	250	15	1	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1941	98	6	0	78	5	2	0	0	0	0	0	0	108	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2
1942	161	10	0	116	7	4	155	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	250	15	2
1943	237	15	1	152	9	5	56	3	0	77	5	1	0	0	0	102	6	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	244	15	2
1944	119	7	0	76	5	2	250	15	1	98	6	1	152	8	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1945	104	6	0	110	7	3	250	15	1	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1946	119	7	0	107	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	173	10	1
1947	115	7	0	127	8	4	250	15	1	136	8	2	183	10	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1948	98	6	0	94	6	3	122	8	0	169	10	2	86	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	233	14	2
1949	131	8	0	124	7	4	250	15	1	136	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1950	107	7	0	95	6	3	129	8	0	129	8	2	166	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1951	171	11	0	250	15	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	206	12	2
1952	134	8	0	118	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	249	0	0	0	0	0	0	0	0	0	250	15	2
1953	238	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1954	126	8	0	118	7	4	209	13	1	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1955	139	9	0	121	7	4	250	15	1	120	7	1	116	6	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1956	105	6	0	89	5	3	250	15	1	169	10	2	173	10	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1957	236	15	1	158	9	5	60	4	0	104	6	1	118	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	222	13	2
1958	123	8	0	121	7	4	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	193	12	249	0	0	0	0	0	0	250	15	9	250	15	2
1959	238	15	1	158	9	5	60	4	0	100	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	189	11	1
1960	100	6	0	77	5	2	250	15	1	136	8	2	76	4	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1961	117	7	0	97	6	3	250	15	1	169	10	2	155	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1962	116	7	0	94	6	3	122	8	0	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	152	9	1
1963	76	5	0	0	0	0	203	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2
1964	146	9	0	56	3	2	243	15	1	99	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	201	12	2
1965	90	6	0	115	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1966	138	8	0	250	15	8	49	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	197	12	1
1967	110	7	0	139	8	4	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	193	12	249	0	0	0	0	0	0	250	15	9	250	15	2
1968	0	0	0	0	0	0	59	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	148	9	1
1969	101	6	0	118	7	4	250	15	1	136	8	2	0	0	0	97	6	3	0	0	0	193	12	249	0	0	0	0	0	0	0	0	0	250	15	2
1970	236	14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1971	132	8	0	114	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1972	162	10	0	113	7	3	174	11	0	105	6	1	118	7	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	208	12	2
1973	86	5	0	110	7	3	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1974	112	7	0	125	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1975	236	15	1	144	9	4	70	4	0	105	6	1	115	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1976	235	14	1	158	9	5	60	4	0	91	6	1	74	4	2	234	14	7	0	0	0	0	0	0	196	12	508	250	15	142	250	15	9	216	13	2
1977	101	6	0	140	8	4	250	15	1	97	6	1	75	4	2	61	4	2	0	0	0	218	13	281	250	15	649	250	15	142	250	15	9	250	15	2
1978	245	15	1	202	12	6	133	8	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	248	0	0	0	0	0	0	250	15	9	250	15	2
1979	225	14	1	160	9	5	41	3	0	123	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1980	121	7	0	128	8	4	250	15	1	115	7	1	82	5	2	100	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2
1981	246	15	1	160	9	5	114	7	0	117	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1982	124	8	0	93	6	3	0	0	0	0	0	0	159	9	4	0	0	0	0	0	0	193	12	249	0	0	0	0	0	0	0	0	0	250	15	2
1983	235	14	1	0	0	0	0	0	0	65	4	1	0	0	0	0	0	0	0	0	0	193	12	249	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1985	126	8	0	82	5	2	0	0	0	109	7	1	119	7	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	225	14	9	187	11	1
1986	127	8	0	109	7	3	250	15	1	169	10	2	250	14	6	111	7	3	0	0	0	193	12	249	0	0	0	0	0	0	0	0	0	250	15	2
1987	158	10	0	95	6	3	201	12	1	104	6	1	76	4	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	184	11	1
1988	82	5	0	98	6	3	133	8	0	169	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	185	11	1
1989	78	5	0	98	6	3	134	8	0	177	11	2	198	11	5	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	173	10	1
1990	108	7	0	131	8	4	222	14	1	89	5	1	123	7	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1991	245	15	1	202	12	6	133	8	0	180	11	2	192	11	5	174	11	5	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1992	245	15	1	202	12	6	133	8	0	180	11	2	191	11	5	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	250	15	2
1993	245	15	1	202	12	6	133	8	0	180	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1994	167	10	0	112	7	3	238	15	1	123	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	214	13	8	125	7	1
Mean			0			3			0			1			1			1			0			35			34			66			8			2
Max			1			8			1			2			6			7			0			281			649			142			9			2
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions
Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	85
1923	166	10	62	144	9	58	189	12	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1924	139	9	52	96	6	39	250	15	77	123	8	53	64	4	26	140	9	33	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	218	13	74
1925	122	7	45	202	12	82	189	12	58	180	11	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1926	109	7	41	78	5	32	86	5	26	158	10	68	250	14	104	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1927	116	7	43	152	9	62	250	15	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1928	129	8	48	100	6	41	226	14	69	104	6	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1929	122	7	45	104	6	42	250	15	77	123	8	53	56	3	23	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	183	11	62
1930	77	5	29	59	4	24	133	8	41	180	11	77	198	11	82	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1931	114	7	42	199	12	81	122	8	37	168	10	72	166	9	69	87	5	20	0	0	0	0	0	0	250	15	4,184	250	15	1,436	250	15	221	250	15	85
1932	245	15	91	202	12	82	133	8	41	180	11	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1933	156	10	58	62	4	25	195	12	60	146	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1934	105	6	39	66	4	27	133	8	41	180	11	77	198	11	82	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1935	245	15	91	202	12	82	133	8	41	180	11	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1936	137	8	51	102	6	41	29	2	9	136	8	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1937	135	8	50	89	5	36	250	15	77	120	7	52	120	7	50	98	6	23	0	0	0	214	13	1,251	0	0	0	0	0	0	250	15	221	250	15	85
1938	128	8	48	157	9	64	0	0	0	0	0	0	0	0	0	91	6	21	0	0	0	0	0	0	250	15	4,184	0	0	0	0	0	0	250	15	85
1939	236	15	88	158	9	64	59	4	18	96	6	41	72	4	30	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	162	10	55
1940	89	5	33	93	6	38	250	15	77	169	10	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1941	98	6	36	78	5	32	0	0	0	0	0	0	108	6	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	85
1942	161	10	60	116	7	47	155	10	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	11	250	15	85
1943	237	15	88	152	9	62	56	3	17	77	5	33	0	0	0	102	6	24	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	244	15	83
1944	119	7	44	76	5	31	250	15	77	98	6	42	152	8	63	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1945	104	6	39	110	7	45	250	15	77	169	10	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1946	119	7	44	107	6	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	173	10	59
1947	115	7	43	127	8	52	250	15	77	136	8	58	183	10	76	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1948	98	6	36	94	6	38	122	8	37	169	10	73	86	5	36	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	233	14	80
1949	131	8	49	124	7	50	250	15	77	136	8	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1950	107	7	40	95	6	39	129	8	39	129	8	55	166	9	69	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1951	171	11	64	250	15	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	206	12	70
1952	134	8	50	118	7	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1,128	0	0	0	0	0	0	0	0	0	250	15	85
1953	238	15	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1954	126	8	47	118	7	48	209	13	64	104	6	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1955	139	9	52	121	7	49	250	15	77	120	7	51	116	6	48	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1956	105	6	39	89	5	36	250	15	77	169	10	73	173	10	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1957	236	15	88	158	9	64	60	4	19	104	6	44	118	7	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	222	13	76
1958	123	8	46	121	7	49	250	15	77	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1,128	0	0	0	0	0	0	250	15	221	250	15	85
1959	238	15	88	158	9	64	60	4	18	100	6	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	189	11	64
1960	100	6	37	77	5	31	250	15	77	136	8	58	76	4	31	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1961	117	7	43	97	6	39	250	15	77	169	10	73	155	9	64	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1962	116	7	43	94	6	38	122	8	37	169	10	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	152	9	52
1963	76	5	28	0	0	0	203	12	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	85
1964	146	9	54	56	3	23	243	15	75	99	6	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	201	12	69
1965	90	6	34	115	7	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1966	138	8	51	250	15	101	49	3	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	197	12	67
1967	110	7	41	139	8	56	250	15	77	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1,128	0	0	0	0	0	0	250	15	221	250	15	85
1968	0	0	0	0	0	0	59	4	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	148	9	50
1969	101	6	38	118	7	48	250	15	77	136	8	58	0	0	0	97	6	23	0	0	0	193	12	1,128	0	0	0	0	0	0	0	0	0	250	15	85
1970	236	14	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1971	132	8	49	114	7	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1972	162	10	60	113	7	46	174	11	53	105	6	45	118	7	49	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	208	12	71
1973	86	5	32	110	7	45	250	15	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1974	112	7	42	125	7	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1975	236	15	88	144	9	58	70	4	22	105	6	45	115	6	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1976	235	14	87	158	9	64	60	4	19	91	6	39	74	4	31	234	14	55	0	0	0	0	0	0	196	12	3,275	250	15	1,436	250	15	221	216	13	74
1977	101	6	38	140	8	57	250	15	77	97	6	42	75	4	31	61	4	14	0	0	0	218	13	1,272	250	15	4,184	250	15	1,436	250	15	221	250	15	85
1978	245	15	91	202	12	82	133	8	41	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1,124	0	0	0	0	0	0	250	15	221	250	15	85
1979	225	14	84	160	9	65	41	3	13	123	8	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1980	121	7	45	128	8	52	250	15	77	115	7	50	82	5	34	100	6	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	85
1981	246	15	92	160	9	65	114	7	35	117	7	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1982	124	8	46	93	6	38	0	0	0	0	0	0	159	9	66	0	0	0	0	0	0	193	12	1,128	0	0	0	0	0	0	0	0	0	250	15	85
1983	235	14	87	0	0	0	0	0	0	65	4	28	0	0	0	0	0	0	0	0	0	193	12	1,128	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	100	6	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1985	126	8	47	82	5	33	0	0	0	109	7	47	119	7	49	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	225	14	199	187	11	64
1986	127	8	47	109	7	44	250	15	77	169	10	73	250	14	104	111	7	26	0	0	0	193	12	1,128	0	0	0	0	0	0	0	0	0	250	15	85
1987	158	10	59	95	6	39	201	12	62	104	6	45	76	4	31	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	184	11	63
1988	82	5	30	98	6	40	133	8	41	169	10	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	185	11	63
1989	78	5	29	98	6	40	134	8	41	177	11	76	198	11	82	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	173	10	59
1990	108	7	40	131	8	53	222	14	68	89	5	38	123	7	51	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1991	245	15	91	202	12	82	133	8	41	180	11	77	192	11	80	174	11	41	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1992	245	15	91	202	12	82	133	8	41	180	11	77	191	11	79	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	250	15	85
1993	245	15	91	202	12	82	133	8	41	180	11	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1994	167	10	62	112	7	45	238	15	73	123	8	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	214	13	189	125	7	43
Mean			53			47			42			40			24			4			0			158			217			669			187			79
Max			92			101			77			77			104			55			0			1,272			4,184			1,436			221			85
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 250 CFS Future Conditions Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1923	166	10	0	144	9	1	189	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1924	139	9	0	96	6	1	250	15	1	123	8	1	64	4	1	140	9	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	218	13	0
1925	122	7	0	202	12	1	189	12	0	180	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1926	109	7	0	78	5	1	86	5	0	158	10	1	250	14	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1927	116	7	0	152	9	1	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1928	129	8	0	100	6	1	226	14	1	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1929	122	7	0	104	6	1	250	15	1	123	8	1	56	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	183	11	0
1930	77	5	0	59	4	0	133	8	0	180	11	1	198	11	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1931	114	7	0	199	12	1	122	8	0	168	10	1	166	9	2	87	5	1	0	0	0	0	0	0	250	15	0	250	15	1	250	15	0	250	15	0
1932	245	15	0	202	12	1	133	8	0	180	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1933	156	10	0	62	4	0	195	12	0	146	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1934	105	6	0	66	4	0	133	8	0	180	11	1	198	11	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1935	245	15	0	202	12	1	133	8	0	180	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1936	137	8	0	102	6	1	29	2	0	136	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1937	135	8	0	89	5	1	250	15	1	120	7	1	120	7	1	98	6	1	0	0	0	214	13	1	0	0	0	0	0	0	250	15	0	250	15	0
1938	128	8	0	157	9	1	0	0	0	0	0	0	0	0	0	91	6	1	0	0	0	0	0	0	250	15	0	0	0	0	0	0	0	250	15	0
1939	236	15	0	158	9	1	59	4	0	96	6	1	72	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	162	10	0
1940	89	5	0	93	6	1	250	15	1	169	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1941	98	6	0	78	5	1	0	0	0	0	0	0	108	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1942	161	10	0	116	7	1	155	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	250	15	0
1943	237	15	0	152	9	1	56	3	0	77	5	1	0	0	0	102	6	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	244	15	0
1944	119	7	0	76	5	1	250	15	1	98	6	1	152	8	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1945	104	6	0	110	7	1	250	15	1	169	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1946	119	7	0	107	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	173	10	0
1947	115	7	0	127	8	1	250	15	1	136	8	1	183	10	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1948	98	6	0	94	6	1	122	8	0	169	10	1	86	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	233	14	0
1949	131	8	0	124	7	1	250	15	1	136	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1950	107	7	0	95	6	1	129	8	0	129	8	1	166	9	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1951	171	11	0	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	206	12	0
1952	134	8	0	118	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1	0	0	0	0	0	0	0	0	0	250	15	0
1953	238	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1954	126	8	0	118	7	1	209	13	0	104	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1955	139	9	0	121	7	1	250	15	1	120	7	1	116	6	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1956	105	6	0	89	5	1	250	15	1	169	10	1	173	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1957	236	15	0	158	9	1	60	4	0	104	6	1	118	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	222	13	0
1958	123	8	0	121	7	1	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1	0	0	0	0	0	0	250	15	0	250	15	0
1959	238	15	0	158	9	1	60	4	0	100	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	189	11	0
1960	100	6	0	77	5	1	250	15	1	136	8	1	76	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1961	117	7	0	97	6	1	250	15	1	169	10	1	155	9	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1962	116	7	0	94	6	1	122	8	0	169	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	152	9	0
1963	76	5	0	0	0	0	203	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1964	146	9	0	56	3	0	243	15	1	99	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	201	12	0
1965	90	6	0	115	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1966	138	8	0	250	15	2	49	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	197	12	0
1967	110	7	0	139	8	1	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1	0	0	0	0	0	0	250	15	0	250	15	0
1968	0	0	0	0	0	0	59	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	148	9	0
1969	101	6	0	118	7	1	250	15	1	136	8	1	0	0	0	97	6	1	0	0	0	193	12	1	0	0	0	0	0	0	0	0	0	250	15	0
1970	236	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1971	132	8	0	114	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1972	162	10	0	113	7	1	174	11	0	105	6	1	118	7	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	208	12	0
1973	86	5	0	110	7	1	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1974	112	7	0	125	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1975	236	15	0	144	9	1	70	4	0	105	6	1	115	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1976	235	14	0	158	9	1	60	4	0	91	6	1	74	4	1	234	14	4	0	0	0	0	0	0	196	12	0	250	15	1	250	15	0	216	13	0
1977	101	6	0	140	8	1	250	15	1	97	6	1	75	4	1	61	4	1	0	0	0	218	13	1	250	15	0	250	15	1	250	15	0	250	15	0
1978	245	15	0	202	12	1	133	8	0	0	0	0	0	0	0	0	0	0	0	0	0	193	12	1	0	0	0	0	0	0	250	15	0	250	15	0
1979	225	14	0	160	9	1	41	3	0	123	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1980	121	7	0	128	8	1	250	15	1	115	7	1	82	5	1	100	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0
1981	246	15	0	160	9	1	114	7	0	117	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1982	124	8	0	93	6	1	0	0	0	0	0	0	159	9	2	0	0	0	0	0	0	193	12	1	0	0	0	0	0	0	0	0	0	250	15	0
1983	235	14	0	0	0	0	0	0	0	65	4	1	0	0	0	0	0	0	0	0	0	193	12	1	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1985	126	8	0	82	5	1	0	0	0	109	7	1	119	7	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	225	14	0	187	11	0
1986	127	8	0	109	7	1	250	15	1	169	10	1	250	14	3	111	7	2	0	0	0	193	12	1	0	0	0	0	0	0	0	0	0	250	15	0
1987	158	10	0	95	6	1	201	12	0	104	6	1	76	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	184	11	0
1988	82	5	0	98	6	1	133	8	0	169	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	185	11	0
1989	78	5	0	98	6	1	134	8	0	177	11	1	198	11	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	173	10	0
1990	108	7	0	131	8	1	222	14	1	89	5	1	123	7	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1991	245	15	0	202	12	1	133	8	0	180	11	1	192	11	2	174	11	3	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1992	245	15	0	202	12	1	133	8	0	180	11	1	191	11	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	250	15	0	250	15	0
1993	245	15	0	202	12	1	133	8	0	180	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1994	167	10	0	112	7	1	238	15	1	123	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1	214	13	0	125	7	0
Mean			0			1			0			1			1			0			0			0			0			1			0			0
Max			0			2			1			1			3			4			0			1			0			1			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	-764	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-23,430	-8	0	-888	-19	-1	-335	-123	-7	-842
1923	0	0	0	0	0	0	-80	-5	-490	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-1,750	-19	-1	-335	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	-810	0	0	0	0	0	0	0	0	0	-144	-9	-48,114	-30	-2	-3,477	-7	0	-118	-235	-14	-1606
1925	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	-34	-18	-1	-87	0	0	0	0	0	0	0	0	0	-70	-4	-8,043	100	6	1,762	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	-276	12	1	56	0	0	0	0	0	0	0	0	0	-70	-4	-8,043	22	1	388	0	0	0
1927	0	0	0	0	0	0	-93	-6	-569	-88	-5	-756	-62	-3	-511	-41	-3	-195	0	0	0	0	0	0	-60	-4	-20,250	-51	-3	-5,900	-15	-1	-265	0	0	0
1928	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-888	-19	-1	-335	-103	-6	-702
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	-685	-7	0	-31	0	0	0	0	0	0	0	0	0	-214	-13	-24,587	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	-919	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-8,043	0	0	0	-48	-3	-326
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	-1,094	-19	-1	-91	0	0	0	0	0	0	-3	0	-1,085	-14	-1	-1,606	-7	0	-118	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	35	2	292	12	1	56	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1,235	-33	-2	-226
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-1,606	0	0	0	0	0	0
1934	-167	-10	-1,245	0	0	0	0	0	0	0	0	0	-111	-6	-919	-32	-2	-152	0	0	0	0	0	0	0	0	0	-14	-1	-1,606	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-198	29	2	70	56	3	6,586	0	0	0	0	0	0	-45	-3	-790	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	-220	-46	-3	-217	0	0	0	0	0	0	-38	-2	-12,836	-153	-9	-17,573	-19	-1	-335	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-217	0	0	0	0	0	0	-38	-2	-12,623	-186	-11	-21,397	-129	-8	-2,278	-111	-7	-755
1938	0	0	0	0	0	0	-83	-5	-511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-23,430	-3	0	-315	-15	-1	-265	0	0	0
1939	0	0	0	0	0	0	-93	-6	-567	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-382	-23	-1	-108	0	0	0	0	0	0	-52	-3	-17,436	-194	-12	-22,284	-65	-4	-1,150	0	0	0
1941	0	0	0	0	0	0	-70	-4	-429	0	0	0	-40	-2	-329	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-315	-15	-1	-265	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-195	0	0	0	0	0	0	-66	-4	-21,969	-16	-1	-1,872	-15	-1	-265	0	0	0
1943	-9	-1	-69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-265	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	56	0	0	0	0	0	0	0	0	0	-214	-13	-24,580	0	0	0	0	0	0
1945	0	0	0	0	0	0	-46	-3	-281	0	0	0	-82	-5	-681	-13	-1	-62	0	0	0	0	0	0	-35	-2	-11,777	-201	-12	-23,147	0	0	0	0	0	0
1946	0	0	0	0	0	0	-73	-4	-444	0	0	0	0	0	0	-13	-1	-62	0	0	0	0	0	0	-36	-2	-11,933	-137	-8	-15,752	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-94	-18	-1	-87	0	0	0	0	0	0	0	0	0	-193	-11	-22,234	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-88	-109	-6	-259	0	0	0	0	0	0	-70	-4	-8,043	63	4	1,106	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-256	0	0	0	0	0	0	0	0	0	-214	-13	-24,580	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-580	-13	-1	-62	0	0	0	0	0	0	-36	-2	-11,931	-201	-12	-23,147	-3	0	-54	0	0	0
1951	0	0	0	0	0	0	-83	-5	-511	-65	-4	-557	-101	-6	-841	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-888	-19	-1	-335	0	0	0
1952	0	0	0	0	0	0	-80	-5	-490	0	0	0	-19	-1	-156	0	0	0	0	0	0	0	0	0	-70	-4	-23,430	-3	0	-313	-15	-1	-265	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-315	-15	-1	-263	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	-348	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-888	-19	-1	-334	0	0	0
1955	0	0	0	0	0	0	-34	-2	-211	0	0	0	-40	-2	-329	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	-3,183	0	0	0	0	0	0
1956	0	0	0	0	0	0	-62	-4	-377	0	0	0	-54	-3	-451	-1	0	-4	0	0	0	0	0	0	0	0	0	-3	0	-315	-15	-1	-265	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-888	-19	-1	-335	0	0	0
1958	0	0	0	0	0	0	-57	-4	-350	-9	-1	-77	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	-9,153	-3	0	-315	-15	-1	-263	0	0	0
1959	0	0	0	0	0	0	-81	-5	-495	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-1,750	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	-966	-89	-5	-737	12	1	56	0	0	0	0	0	0	0	0	0	91	5	10,498	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-87	0	0	0	0	0	0	0	0	0	-124	-7	-14,237	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-580	7	0	32	0	0	0	0	0	0	0	0	0	-154	-9	-17,688	0	0	0	0	0	0
1963	0	0	0	0	0	0	-83	-5	-511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-315	-15	-1	-265	-119	-7	-809
1964	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-2,151	0	0	0	0	0	0
1965	0	0	0	0	0	0	-70	-4	-429	0	0	0	-82	-5	-681	-11	-1	-51	0	0	0	0	0	0	-61	-4	-20,454	-101	-6	-11,576	-14	-1	-255	-81	-5	-553
1966	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-1,725	0	0	0	0	0	0
1967	0	0	0	0	0	0	-79	-5	-483	0	0	0	-41	-2	-340	0	0	0	0	0	0	0	0	0	-69	-4	-23,212	-3	0	-315	-15	-1	-265	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-1,750	0	0	0	0	0	0
1969	0	0	0	0	0	0	1	0	7	0	0	0	-48	-3	-399	-25	-2	-116	0	0	0	0	0	0	-70	-4	-23,430	-3	0	-315	-15	-1	-265	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-315	-15	-1	-265	-92	-5	-630
1971	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-315	-15	-1	-265	0	0	0
1972	0	0	0	-63	-4	-513	0	0	0	0	0	0	-9	0	-71	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-1,750	0	0	0	-51	-3	-349
1973	0	0	0	0	0	0	-70	-4	-429	-65	-4	-557	-28	-2	-229	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-888	-19	-1	-335	-89	-5	-604
1974	0	0	0	0	0	0	-80	-5	-490	-2	0	-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-234	-15	-1	-265	0	0	0
1975	-9	-1	-69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-290	-15	-1	-256	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	-302	-25	-1	-204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-118	-71	-4	-485
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-313	0	0	0	0	0	0	-250	-15	-83,680	-14	-1	-1,606	-7	0	-118	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	10	-33	-2	-158	0	0	0	0	0	0	-70	-4	-23,430	-70	-4	-8,043	-70	-4	-1,235	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-329	-46	-3	-217	0	0	0	0	0	0	-36	-2	-12,133	-106	-6	-12,172	0	0	0	0	0	0
1980	0	0	0	0	0	0	-74	-5	-453	0	0	0	-40	-2	-333	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-822	-19	-1	-335	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-329	-54	-3	-256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	-548	-82	-5	-681	0	0	0	0	0	0	0	0	0	-70	-4	-23,430	-3	0	-315	-15	-1	-265	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-23,430	-3	0	-315	-15	-1	-263	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-315	-15	-1	-264	-85	-5	-579
1985	0	0	0	0	0	0	-43	-3	-261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	11	1	65	0	0	0	0	0	0	-29	-2	-137	0	0	0	0	0	0	-59	-4	-19,893	-186	-11	-21,397	-129	-8	-2,276	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-268	-54	-3	-256	0	0	0	0	0	0	0	0	0	-214	-13	-24,580	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-580	-32	-2	-152	0	0	0	0	0	0	0	0	0	-214	-13	-24,587	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	-1,333	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-8,043	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	-1,186	0	0	0	-32	-2	-152	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-118	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-1,606	-7	0	-118	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	74	0	0	0	0	0	0	0	0	0	-14	-1	-1,606	-7	0	-118	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-468	-34	-2	-161	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1,235	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-19			-18			-134			-68			-232			-55			-3			90			-6,883			-5,881			-221			-116
Max			0			0			65			0			292			74			70			6,586			0			10,498			1,762			0
Min			-1,245			-764			-569			-1,186			-1,333			-313			-259			0			-83,680			-24,587			-2,278			-1,606

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	-94	-6	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-3,633**	-8	0	**-88**	-19	-1	**-14**	-123	-7	**-18**
1923	0	0	**0**	0	0	**0**	-80	-5	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-173**	-19	-1	**-14**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-98	-5	**-47**	0	0	**0**	0	0	**0**	0	0	**0**	-144	-9	**-7,460**	-30	-2	**-344**	-7	0	**-5**	-235	-14	**-35**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-4	0	**-2**	-18	-1	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-796**	100	6	**76**	0	0	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-33	-2	**-16**	12	1	**7**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-796**	22	1	**17**	0	0	**0**
1927	0	0	**0**	0	0	**0**	-93	-6	**-5**	-88	-5	**-22**	-62	-3	**-30**	-41	-3	**-24**	0	0	**0**	0	0	**0**	-60	-4	**-3,140**	-51	-3	**-584**	-15	-1	**-11**	0	0	**0**
1928	0	0	**0**	0	0	**0**	-43	-3	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-8	0	**-88**	-19	-1	**-14**	-103	-6	**-15**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-83	-5	**-40**	-7	0	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	-214	-13	**-2,435**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-111	-6	**-53**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-796**	0	0	**0**	-48	-3	**-7**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-132	-7	**-63**	-19	-1	**-11**	0	0	**0**	0	0	**0**	-3	0	**-168**	-14	-1	**-159**	-7	0	**-5**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	35	2	**17**	12	1	**7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-53**	-33	-2	**-5**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-159**	0	0	**0**	0	0	**0**
1934	-167	-10	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	-111	-6	**-53**	-32	-2	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-159**	0	0	**0**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-42	-3	**-24**	29	2	**32**	56	3	**1,456**	0	0	**0**	0	0	**0**	-45	-3	**-34**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-27	-1	**-13**	-46	-3	**-26**	0	0	**0**	0	0	**0**	-38	-2	**-1,990**	-153	-9	**-1,740**	-19	-1	**-14**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**-26**	0	0	**0**	0	0	**0**	-38	-2	**-1,957**	-186	-11	**-2,119**	-129	-8	**-98**	-111	-7	**-17**
1938	0	0	**0**	0	0	**0**	-83	-5	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-3,633**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1939	0	0	**0**	0	0	**0**	-93	-6	**-5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**-22**	-23	-1	**-13**	0	0	**0**	0	0	**0**	-52	-3	**-2,703**	-194	-12	**-2,207**	-65	-4	**-49**	0	0	**0**
1941	0	0	**0**	0	0	**0**	-70	-4	**-4**	0	0	**0**	-40	-2	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-41	-3	**-24**	0	0	**0**	0	0	**0**	-66	-4	**-3,406**	-16	-1	**-185**	-15	-1	**-11**	0	0	**0**
1943	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-11**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	12	1	**7**	0	0	**0**	0	0	**0**	0	0	**0**	-214	-13	**-2,434**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	-46	-3	**-2**	0	0	**0**	-82	-5	**-39**	-13	-1	**-8**	0	0	**0**	0	0	**0**	-35	-2	**-1,826**	-201	-12	**-2,292**	0	0	**0**	0	0	**0**
1946	0	0	**0**	0	0	**0**	-73	-4	**-4**	0	0	**0**	0	0	**0**	-13	-1	**-8**	0	0	**0**	0	0	**0**	-36	-2	**-1,850**	-137	-8	**-1,560**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-11	-1	**-5**	-18	-1	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	-193	-11	**-2,202**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**-11**	-109	-6	**-117**	0	0	**0**	0	0	**0**	-70	-4	**-796**	63	4	**48**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-54	-3	**-31**	0	0	**0**	0	0	**0**	0	0	**0**	-214	-13	**-2,434**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-34**	-13	-1	**-8**	0	0	**0**	0	0	**0**	-36	-2	**-1,850**	-201	-12	**-2,292**	-3	0	**-2**	0	0	**0**
1951	0	0	**0**	0	0	**0**	-83	-5	**-4**	-65	-4	**-16**	-101	-6	**-49**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-8	0	**-88**	-19	-1	**-14**	0	0	**0**
1952	0	0	**0**	0	0	**0**	-80	-5	**-4**	0	0	**0**	-19	-1	**-9**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-3,633**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-42	-2	**-20**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-8	0	**-88**	-19	-1	**-14**	0	0	**0**
1955	0	0	**0**	0	0	**0**	-34	-2	**-2**	0	0	**0**	-40	-2	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-28	-2	**-315**	0	0	**0**	0	0	**0**
1956	0	0	**0**	0	0	**0**	-62	-4	**-3**	0	0	**0**	-54	-3	**-26**	-1	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-8	0	**-88**	-19	-1	**-14**	0	0	**0**
1958	0	0	**0**	0	0	**0**	-57	-4	**-3**	-9	-1	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-27	-2	**-1,419**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1959	0	0	**0**	0	0	**0**	-81	-5	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-173**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-112	-7	**-28**	-89	-5	**-43**	12	1	**7**	0	0	**0**	0	0	**0**	0	0	**0**	91	5	**1,040**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	-124	-7	**-1,410**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-34**	7	0	**4**	0	0	**0**	0	0	**0**	0	0	**0**	-154	-9	**-1,751**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	-83	-5	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-31**	-15	-1	**-11**	-119	-7	**-18**
1964	0	0	**0**	0	0	**0**	-43	-3	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**-213**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	-70	-4	**-4**	0	0	**0**	-82	-5	**-39**	-11	-1	**-6**	0	0	**0**	0	0	**0**	-61	-4	**-3,171**	-101	-6	**-1,146**	-14	-1	**-11**	-81	-5	**-12**
1966	0	0	**0**	0	0	**0**	-43	-3	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-171**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	-79	-5	**-4**	0	0	**0**	-41	-2	**-20**	0	0	**0**	0	0	**0**	0	0	**0**	-69	-4	**-3,599**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-173**	0	0	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	1	0	**0**	0	0	**0**	-48	-3	**-23**	-25	-2	**-14**	0	0	**0**	0	0	**0**	-70	-4	**-3,633**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-31**	-15	-1	**-11**	-92	-5	**-14**
1971	0	0	**0**	0	0	**0**	-43	-3	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1972	0	0	**0**	-63	-4	**-2**	0	0	**0**	0	0	**0**	-9	0	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-173**	0	0	**0**	-51	-3	**-8**
1973	0	0	**0**	0	0	**0**	-70	-4	**-4**	-65	-4	**-16**	-28	-2	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-8	0	**-88**	-19	-1	**-14**	-89	-5	**-13**
1974	0	0	**0**	0	0	**0**	-80	-5	**-4**	-2	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-23**	-15	-1	**-11**	0	0	**0**
1975	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-29**	-15	-1	**-11**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-9**	-25	-1	**-12**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**-5**	-71	-4	**-11**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-66	-4	**-38**	0	0	**0**	0	0	**0**	-250	-15	**-12,974**	-14	-1	**-159**	-7	0	**-5**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**	-33	-2	**-19**	0	0	**0**	0	0	**0**	-70	-4	**-3,633**	-70	-4	**-796**	-70	-4	**-53**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-19**	-46	-3	**-26**	0	0	**0**	0	0	**0**	-36	-2	**-1,881**	-106	-6	**-1,205**	0	0	**0**	0	0	**0**
1980	0	0	**0**	0	0	**0**	-74	-5	**-4**	0	0	**0**	-40	-2	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**-81**	-19	-1	**-14**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-19**	-54	-3	**-31**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	-64	-4	**-16**	-82	-5	**-39**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-3,633**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-3,633**	-3	0	**-31**	-15	-1	**-11**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-31**	-15	-1	**-11**	-85	-5	**-13**
1985	0	0	**0**	0	0	**0**	-43	-3	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	11	1	**1**	0	0	**0**	0	0	**0**	-29	-2	**-17**	0	0	**0**	0	0	**0**	-59	-4	**-3,084**	-186	-11	**-2,119**	-129	-8	**-98**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**-16**	-54	-3	**-31**	0	0	**0**	0	0	**0**	0	0	**0**	-214	-13	**-2,434**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-34**	-32	-2	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	-214	-13	**-2,435**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-161	-9	**-77**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-796**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-138	-8	**-34**	0	0	**0**	-32	-2	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**-5**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-159**	-7	0	**-5**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	16	1	**9**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-159**	-7	0	**-5**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-56	-3	**-27**	-34	-2	**-20**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-53**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**0**			**0**			**-1**			**-2**			**-13**			**-7**			**-1**			**20**			**-1,067**			**-582**			**-9**			**-3**
Max			**0**			**0**			**1**			**0**			**17**			**9**			**32**			**1,456**			**0**			**1,040**			**76**			**0**
Min			**-8**			**-3**			**-5**			**-34**			**-77**			**-38**			**-117**			**0**			**-12,974**			**-2,435**			**-98**			**-35**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1	-8	0	0	-19	-1	0	-123	-7	0
1923	0	0	0	0	0	0	-80	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	-19	-1	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	-20	0	0	0	0	0	0	0	0	0	-144	-9	-3	-30	-2	0	-7	0	0	-235	-14	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	-1	-18	-1	-6	0	0	0	0	0	0	0	0	0	-70	-4	0	100	6	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	-7	12	1	4	0	0	0	0	0	0	0	0	0	-70	-4	0	22	1	0	0	0	0
1927	0	0	0	0	0	0	-93	-6	-4	-88	-5	-14	-62	-3	-13	-41	-3	-13	0	0	0	0	0	0	-60	-4	-1	-51	-3	0	-15	-1	0	0	0	0
1928	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	-103	-6	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	-17	-7	0	-2	0	0	0	0	0	0	0	0	0	-214	-13	-1	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	-23	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	0	0	0	-48	-3	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	-27	-19	-1	-6	0	0	0	0	0	0	-3	0	0	-14	-1	0	-7	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	35	2	7	12	1	4	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	-33	-2	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0	0	0	0	0	0	0
1934	-167	-10	0	0	0	0	0	0	0	0	0	0	-111	-6	-23	-32	-2	-10	0	0	0	0	0	0	0	0	0	-14	-1	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-13	29	2	5	56	3	7	0	0	0	0	0	0	-45	-3	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	-5	-46	-3	-14	0	0	0	0	0	0	-38	-2	-1	-153	-9	-1	-19	-1	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-14	0	0	0	0	0	0	-38	-2	-1	-186	-11	-1	-129	-8	0	-111	-7	0
1938	0	0	0	0	0	0	-83	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1	-3	0	0	-15	-1	0	0	0	0
1939	0	0	0	0	0	0	-93	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-10	-23	-1	-7	0	0	0	0	0	0	-52	-3	-1	-194	-12	-1	-65	-4	0	0	0	0
1941	0	0	0	0	0	0	-70	-4	-3	0	0	0	-40	-2	-8	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-13	0	0	0	0	0	0	-66	-4	-1	-16	-1	0	-15	-1	0	0	0	0
1943	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	4	0	0	0	0	0	0	0	0	0	-214	-13	-1	0	0	0	0	0	0
1945	0	0	0	0	0	0	-46	-3	-2	0	0	0	-82	-5	-17	-13	-1	-4	0	0	0	0	0	0	-35	-2	-1	-201	-12	-1	0	0	0	0	0	0
1946	0	0	0	0	0	0	-73	-4	-3	0	0	0	0	0	0	-13	-1	-4	0	0	0	0	0	0	-36	-2	-1	-137	-8	-1	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-2	-18	-1	-6	0	0	0	0	0	0	0	0	0	-193	-11	-1	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-6	-109	-6	-20	0	0	0	0	0	0	-70	-4	0	63	4	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-16	0	0	0	0	0	0	0	0	0	-214	-13	-1	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-14	-13	-1	-4	0	0	0	0	0	0	-36	-2	-1	-201	-12	-1	-3	0	0	0	0	0
1951	0	0	0	0	0	0	-83	-5	-4	-65	-4	-10	-101	-6	-21	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	0	0	0
1952	0	0	0	0	0	0	-80	-5	-4	0	0	0	-19	-1	-4	0	0	0	0	0	0	0	0	0	-70	-4	-1	-3	0	0	-15	-1	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	0	0	0
1955	0	0	0	0	0	0	-34	-2	-2	0	0	0	-40	-2	-8	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	-62	-4	-3	0	0	0	-54	-3	-11	-1	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	0	0	0
1958	0	0	0	0	0	0	-57	-4	-3	-9	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	-1	-3	0	0	-15	-1	0	0	0	0
1959	0	0	0	0	0	0	-81	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	-18	-89	-5	-18	12	1	4	0	0	0	0	0	0	0	0	0	91	5	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-6	0	0	0	0	0	0	0	0	0	-124	-7	-1	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-14	7	0	2	0	0	0	0	0	0	0	0	0	-154	-9	-1	0	0	0	0	0	0
1963	0	0	0	0	0	0	-83	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-119	-7	0
1964	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	-70	-4	-3	0	0	0	-82	-5	-17	-11	-1	-3	0	0	0	0	0	0	-61	-4	-1	-101	-6	0	-14	-1	0	-81	-5	0
1966	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	-79	-5	-4	0	0	0	-41	-2	-8	0	0	0	0	0	0	0	0	0	-69	-4	-1	-3	0	0	-15	-1	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	1	0	0	0	0	0	-48	-3	-10	-25	-2	-7	0	0	0	0	0	0	-70	-4	-1	-3	0	0	-15	-1	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-92	-5	0
1971	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1972	0	0	0	-63	-4	0	0	0	0	0	0	0	-9	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	-51	-3	0
1973	0	0	0	0	0	0	-70	-4	-3	-65	-4	-10	-28	-2	-6	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	-89	-5	0
1974	0	0	0	0	0	0	-80	-5	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	-15	-1	0	0	0	0
1975	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	-6	-25	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	-71	-4	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-20	0	0	0	0	0	0	-250	-15	-5	-14	-1	0	-7	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-33	-2	-10	0	0	0	0	0	0	-70	-4	-1	-70	-4	0	-70	-4	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-8	-46	-3	-14	0	0	0	0	0	0	-36	-2	-1	-106	-6	-1	0	0	0	0	0	0
1980	0	0	0	0	0	0	-74	-5	-3	0	0	0	-40	-2	-8	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	-19	-1	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-8	-54	-3	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	-10	-82	-5	-17	0	0	0	0	0	0	0	0	0	-70	-4	-1	-3	0	0	-15	-1	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1	-3	0	0	-15	-1	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-85	-5	0
1985	0	0	0	0	0	0	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	11	1	0	0	0	0	0	0	0	-29	-2	-9	0	0	0	0	0	0	-59	-4	-1	-186	-11	-1	-129	-8	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-7	-54	-3	-16	0	0	0	0	0	0	0	0	0	-214	-13	-1	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-14	-32	-2	-10	0	0	0	0	0	0	0	0	0	-214	-13	-1	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	-33	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	-22	0	0	0	-32	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0	-7	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	5	0	0	0	0	0	0	0	0	0	-14	-1	0	-7	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-12	-34	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			**0**			**0**			**-1**			**-1**			**-6**			**-4**			**0**			**0**			**0**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**7**			**5**			**5**			**7**			**0**			**0**			**0**			**0**
Min			**0**			**-1**			**-4**			**-22**			**-33**			**-20**			**-20**			**0**			**-5**			**-1**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	55	Apr	Vol	681	May	Vol	1,598	Jun	Vol	311	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1,292	-8	0	0	-19	-1	0	-123	-7	0
1923	0	0	0	0	0	0	-80	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	-19	-1	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	0	0	0	0	0	0	0	0	0	0	-144	-9	-2,654	-30	-2	0	-7	0	0	-235	-14	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	0	-18	-1	-62	0	0	0	0	0	0	0	0	0	-70	-4	0	100	6	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	0	12	1	40	0	0	0	0	0	0	0	0	0	-70	-4	0	22	1	0	0	0	0
1927	0	0	0	0	0	0	-93	-6	0	-88	-5	0	-62	-3	0	-41	-3	-140	0	0	0	0	0	0	-60	-4	-1,117	-51	-3	0	-15	-1	0	0	0	0
1928	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	-103	-6	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	0	-7	0	-22	0	0	0	0	0	0	0	0	0	-214	-13	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	0	0	0	-48	-3	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	0	-19	-1	-65	0	0	0	0	0	0	-3	0	-60	-14	-1	0	-7	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	35	2	0	12	1	40	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	-33	-2	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0	0	0	0	0	0	0
1934	-167	-10	0	0	0	0	0	0	0	0	0	0	-111	-6	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	-14	-1	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-142	29	2	1,191	56	3	5,537	0	0	0	0	0	0	-45	-3	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	0	-46	-3	-156	0	0	0	0	0	0	-38	-2	-708	-153	-9	0	-19	-1	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-156	0	0	0	0	0	0	-38	-2	-696	-186	-11	0	-129	-8	0	-111	-7	0
1938	0	0	0	0	0	0	-83	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1,292	-3	0	0	-15	-1	0	0	0	0
1939	0	0	0	0	0	0	-93	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	0	-23	-1	-77	0	0	0	0	0	0	-52	-3	-962	-194	-12	0	-65	-4	0	0	0	0
1941	0	0	0	0	0	0	-70	-4	0	0	0	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-140	0	0	0	0	0	0	-66	-4	-1,212	-16	-1	0	-15	-1	0	0	0	0
1943	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	40	0	0	0	0	0	0	0	0	0	-214	-13	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	-46	-3	0	0	0	0	-82	-5	0	-13	-1	-45	0	0	0	0	0	0	-35	-2	-650	-201	-12	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	-73	-4	0	0	0	0	0	0	0	-13	-1	-45	0	0	0	0	0	0	-36	-2	-658	-137	-8	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	0	-18	-1	-62	0	0	0	0	0	0	0	0	0	-193	-11	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-63	-109	-6	-4,411	0	0	0	0	0	0	-70	-4	0	63	4	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-184	0	0	0	0	0	0	0	0	0	-214	-13	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	-13	-1	-45	0	0	0	0	0	0	-36	-2	-658	-201	-12	0	-3	0	0	0	0	0
1951	0	0	0	0	0	0	-83	-5	0	-65	-4	0	-101	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	0	0	0
1952	0	0	0	0	0	0	-80	-5	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	-70	-4	-1,292	-3	0	0	-15	-1	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	0	0	0
1955	0	0	0	0	0	0	-34	-2	0	0	0	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	-62	-4	0	0	0	0	-54	-3	0	-1	0	-3	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	0	0	0
1958	0	0	0	0	0	0	-57	-4	0	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	-505	-3	0	0	-15	-1	0	0	0	0
1959	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	0	-89	-5	0	12	1	40	0	0	0	0	0	0	0	0	0	91	5	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-62	0	0	0	0	0	0	0	0	0	-124	-7	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	7	0	23	0	0	0	0	0	0	0	0	0	-154	-9	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	-83	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-119	-7	0
1964	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	-70	-4	0	0	0	0	-82	-5	0	-11	-1	-36	0	0	0	0	0	0	-61	-4	-1,128	-101	-6	0	-14	-1	0	-81	-5	0
1966	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	-79	-5	0	0	0	0	-41	-2	0	0	0	0	0	0	0	0	0	0	-69	-4	-1,280	-3	0	0	-15	-1	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	1	0	0	0	0	0	-48	-3	0	-25	-2	-83	0	0	0	0	0	0	-70	-4	-1,292	-3	0	0	-15	-1	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-92	-5	0
1971	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1972	0	0	0	-63	-4	0	0	0	0	0	0	0	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0	-51	-3	0
1973	0	0	0	0	0	0	-70	-4	0	-65	-4	0	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	-19	-1	0	-89	-5	0
1974	0	0	0	0	0	0	-80	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	-15	-1	0	0	0	0
1975	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	0	-25	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	-71	-4	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-225	0	0	0	0	0	0	-250	-15	-4,616	-14	-1	0	-7	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-33	-2	-113	0	0	0	0	0	0	-70	-4	-1,292	-70	-4	0	-70	-4	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	0	-46	-3	-156	0	0	0	0	0	0	-36	-2	-669	-106	-6	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	-74	-5	0	0	0	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	-19	-1	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	0	-54	-3	-184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	0	-82	-5	0	0	0	0	0	0	0	0	0	0	-70	-4	-1,292	-3	0	0	-15	-1	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-1,292	-3	0	0	-15	-1	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-85	-5	0
1985	0	0	0	0	0	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	11	1	0	0	0	0	0	0	0	-29	-2	-99	0	0	0	0	0	0	-59	-4	-1,097	-186	-11	0	-129	-8	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	0	-54	-3	-184	0	0	0	0	0	0	0	0	0	-214	-13	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	-214	-13	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	0	0	0	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0	-7	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	53	0	0	0	0	0	0	0	0	0	-14	-1	0	-7	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	0	-34	-2	-116	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			-39			-44			76			-380			0			0			0
Max			0			0			0			0			0			53			1,191			5,537			0			0			0			0
Min			0			0			0			0			0			-225			-4,411			0			-4,616			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-122	-8	0	-4	-19	-1	-10	-123	-7	-11
1923	0	0	0	0	0	0	-80	-5	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-8	-19	-1	-10	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	-33	0	0	0	0	0	0	0	0	0	-144	-9	-250	-30	-2	-17	-7	0	-4	-235	-14	-22
1925	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	-1	-18	-1	-6	0	0	0	0	0	0	0	0	0	-70	-4	-39	100	6	54	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	-11	12	1	4	0	0	0	0	0	0	0	0	0	-70	-4	-39	22	1	12	0	0	0
1927	0	0	0	0	0	0	-93	-6	-16	-88	-5	-23	-62	-3	-21	-41	-3	-14	0	0	0	0	0	0	-60	-4	-105	-51	-3	-28	-15	-1	-8	0	0	0
1928	0	0	0	0	0	0	-43	-3	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-4	-19	-1	-10	-103	-6	-9
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	-28	-7	0	-2	0	0	0	0	0	0	0	0	0	-214	-13	-118	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	-37	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-39	0	0	0	-48	-3	-4
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	-44	-19	-1	-7	0	0	0	0	0	0	-3	0	-6	-14	-1	-8	-7	0	-4	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	35	2	12	12	1	4	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-38	-33	-2	-3
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-8	0	0	0	0	0	0
1934	-167	-10	-67	0	0	0	0	0	0	0	0	0	-111	-6	-37	-32	-2	-11	0	0	0	0	0	0	0	0	0	-14	-1	-8	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-15	29	2	19	56	3	325	0	0	0	0	0	0	-45	-3	-24	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	-9	-46	-3	-16	0	0	0	0	0	0	-38	-2	-67	-153	-9	-85	-19	-1	-10	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-16	0	0	0	0	0	0	-38	-2	-66	-186	-11	-103	-129	-8	-70	-111	-7	-10
1938	0	0	0	0	0	0	-83	-5	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-122	-3	0	-2	-15	-1	-8	0	0	0
1939	0	0	0	0	0	0	-93	-6	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-15	-23	-1	-8	0	0	0	0	0	0	-52	-3	-91	-194	-12	-107	-65	-4	-35	0	0	0
1941	0	0	0	0	0	0	-70	-4	-12	0	0	0	-40	-2	-13	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	-15	-1	-8	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-14	0	0	0	0	0	0	-66	-4	-114	-16	-1	-9	-15	-1	-8	0	0	0
1943	-9	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-8	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	4	0	0	0	0	0	0	0	0	0	-214	-13	-118	0	0	0	0	0	0
1945	0	0	0	0	0	0	-46	-3	-8	0	0	0	-82	-5	-27	-13	-1	-5	0	0	0	0	0	0	-35	-2	-61	-201	-12	-111	0	0	0	0	0	0
1946	0	0	0	0	0	0	-73	-4	-13	0	0	0	0	0	0	-13	-1	-5	0	0	0	0	0	0	-36	-2	-62	-137	-8	-76	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-4	-18	-1	-6	0	0	0	0	0	0	0	0	0	-193	-11	-107	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-7	-109	-6	-70	0	0	0	0	0	0	-70	-4	-39	63	4	34	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-19	0	0	0	0	0	0	0	0	0	-214	-13	-118	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-23	-13	-1	-5	0	0	0	0	0	0	-36	-2	-62	-201	-12	-111	-3	0	-2	0	0	0
1951	0	0	0	0	0	0	-83	-5	-14	-65	-4	-17	-101	-6	-34	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-4	-19	-1	-10	0	0	0
1952	0	0	0	0	0	0	-80	-5	-14	0	0	0	-19	-1	-6	0	0	0	0	0	0	0	0	0	-70	-4	-122	-3	0	-2	-15	-1	-8	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	-15	-1	-8	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	-14	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-4	-19	-1	-10	0	0	0
1955	0	0	0	0	0	0	-34	-2	-6	0	0	0	-40	-2	-13	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	-15	0	0	0	0	0	0
1956	0	0	0	0	0	0	-62	-4	-11	0	0	0	-54	-3	-18	-1	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	-15	-1	-8	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-4	-19	-1	-10	0	0	0
1958	0	0	0	0	0	0	-57	-4	-10	-9	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	-48	-3	0	-2	-15	-1	-8	0	0	0
1959	0	0	0	0	0	0	-81	-5	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-8	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	-30	-89	-5	-30	12	1	4	0	0	0	0	0	0	0	0	0	91	5	51	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-6	0	0	0	0	0	0	0	0	0	-124	-7	-69	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-23	7	0	2	0	0	0	0	0	0	0	0	0	-154	-9	-85	0	0	0	0	0	0
1963	0	0	0	0	0	0	-83	-5	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	-15	-1	-8	-119	-7	-11
1964	0	0	0	0	0	0	-43	-3	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-10	0	0	0	0	0	0
1965	0	0	0	0	0	0	-70	-4	-12	0	0	0	-82	-5	-27	-11	-1	-4	0	0	0	0	0	0	-61	-4	-106	-101	-6	-56	-14	-1	-8	-81	-5	-7
1966	0	0	0	0	0	0	-43	-3	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-8	0	0	0	0	0	0
1967	0	0	0	0	0	0	-79	-5	-14	0	0	0	-41	-2	-14	0	0	0	0	0	0	0	0	0	-69	-4	-121	-3	0	-2	-15	-1	-8	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-8	0	0	0	0	0	0
1969	0	0	0	0	0	0	1	0	0	0	0	0	-48	-3	-16	-25	-2	-9	0	0	0	0	0	0	-70	-4	-122	-3	0	-2	-15	-1	-8	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	-15	-1	-8	-92	-5	-8
1971	0	0	0	0	0	0	-43	-3	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	-15	-1	-8	0	0	0
1972	0	0	0	-63	-4	-8	0	0	0	0	0	0	-9	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-8	0	0	0	-51	-3	-5
1973	0	0	0	0	0	0	-70	-4	-12	-65	-4	-17	-28	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-4	-19	-1	-10	-89	-5	-8
1974	0	0	0	0	0	0	-80	-5	-14	-2	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-1	-15	-1	-8	0	0	0
1975	-9	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-1	-15	-1	-8	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	-9	-25	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-4	-71	-4	-7
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-23	0	0	0	0	0	0	-250	-15	-435	-14	-1	-8	-7	0	-4	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-33	-2	-12	0	0	0	0	0	0	-70	-4	-122	-70	-4	-39	-70	-4	-38	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-13	-46	-3	-16	0	0	0	0	0	0	-36	-2	-63	-106	-6	-59	0	0	0	0	0	0
1980	0	0	0	0	0	0	-74	-5	-13	0	0	0	-40	-2	-13	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-4	-19	-1	-10	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-13	-54	-3	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	-17	-82	-5	-27	0	0	0	0	0	0	0	0	0	-70	-4	-122	-3	0	-2	-15	-1	-8	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-122	-3	0	-2	-15	-1	-8	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	-15	-1	-8	-85	-5	-8
1985	0	0	0	0	0	0	-43	-3	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	11	1	2	0	0	0	0	0	0	-29	-2	-10	0	0	0	0	0	0	-59	-4	-103	-186	-11	-103	-129	-8	-70	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-11	-54	-3	-19	0	0	0	0	0	0	0	0	0	-214	-13	-118	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-23	-32	-2	-11	0	0	0	0	0	0	0	0	0	-214	-13	-118	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	-54	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-39	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	-37	0	0	0	-32	-2	-11	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-4	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-8	-7	0	-4	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	5	0	0	0	0	0	0	0	0	0	-14	-1	-8	-7	0	-4	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-19	-34	-2	-12	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-38	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-1			0			-4			-2			-9			-4			-1			0			-36			-28			-7			-2
Max			0			0			2			0			12			5			19			325			0			51			54			0
Min			-67			-12			-16			-37			-54			-23			-70			0			-435			-118			-70			-22

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-94	-6	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-194	-8	0	-1	-19	-1	0	-123	-7	0
1923	0	0	0	0	0	0	-80	-5	-57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-2	-19	-1	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-98	-5	-494	0	0	0	0	0	0	0	0	0	-144	-9	-399	-30	-2	-4	-7	0	0	-235	-14	-1
1925	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	-20	-18	-1	-35	0	0	0	0	0	0	0	0	0	-70	-4	-10	100	6	2	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	-168	12	1	23	0	0	0	0	0	0	0	0	0	-70	-4	-10	22	1	0	0	0	0
1927	0	0	0	0	0	0	-93	-6	-66	-88	-5	-78	-62	-3	-312	-41	-3	-79	0	0	0	0	0	0	-60	-4	-168	-51	-3	-7	-15	-1	0	0	0	0
1928	0	0	0	0	0	0	-43	-3	-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-1	-19	-1	0	-103	-6	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-83	-5	-418	-7	0	-13	0	0	0	0	0	0	0	0	0	-214	-13	-30	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	-111	-6	-560	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-10	0	0	0	-48	-3	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-132	-7	-668	-19	-1	-37	0	0	0	0	0	0	-3	0	-9	-14	-1	-2	-7	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	35	2	178	12	1	23	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-2	-33	-2	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-2	0	0	0	0	0	0
1934	-167	-10	-48	0	0	0	0	0	0	0	0	0	-111	-6	-560	-32	-2	-62	0	0	0	0	0	0	0	0	0	-14	-1	-2	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-42	-3	-81	29	2	274	56	3	754	0	0	0	0	0	0	-45	-3	-1	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	-27	-1	-134	-46	-3	-88	0	0	0	0	0	0	-38	-2	-107	-153	-9	-22	-19	-1	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-88	0	0	0	0	0	0	-38	-2	-105	-186	-11	-26	-129	-8	-3	-111	-7	0
1938	0	0	0	0	0	0	-83	-5	-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-194	-3	0	0	-15	-1	0	0	0	0
1939	0	0	0	0	0	0	-93	-6	-66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-233	-23	-1	-44	0	0	0	0	0	0	-52	-3	-145	-194	-12	-28	-65	-4	-1	0	0	0
1941	0	0	0	0	0	0	-70	-4	-50	0	0	0	-40	-2	-201	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-79	0	0	0	0	0	0	-66	-4	-182	-16	-1	-2	-15	-1	0	0	0	0
1943	-9	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	23	0	0	0	0	0	0	0	0	0	-214	-13	-30	0	0	0	0	0	0
1945	0	0	0	0	0	0	-46	-3	-33	0	0	0	-82	-5	-415	-13	-1	-25	0	0	0	0	0	0	-35	-2	-98	-201	-12	-29	0	0	0	0	0	0
1946	0	0	0	0	0	0	-73	-4	-52	0	0	0	0	0	0	-13	-1	-25	0	0	0	0	0	0	-36	-2	-99	-137	-8	-19	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-58	-18	-1	-35	0	0	0	0	0	0	0	0	0	-193	-11	-27	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-36	-109	-6	-1,015	0	0	0	0	0	0	-70	-4	-10	63	4	1	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-104	0	0	0	0	0	0	0	0	0	-214	-13	-30	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-354	-13	-1	-25	0	0	0	0	0	0	-36	-2	-99	-201	-12	-29	-3	0	0	0	0	0
1951	0	0	0	0	0	0	-83	-5	-60	-65	-4	-58	-101	-6	-513	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-1	-19	-1	0	0	0	0
1952	0	0	0	0	0	0	-80	-5	-57	0	0	0	-19	-1	-95	0	0	0	0	0	0	0	0	0	-70	-4	-194	-3	0	0	-15	-1	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-42	-2	-213	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-1	-19	-1	0	0	0	0
1955	0	0	0	0	0	0	-34	-2	-25	0	0	0	-40	-2	-201	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	-4	0	0	0	0	0	0
1956	0	0	0	0	0	0	-62	-4	-44	0	0	0	-54	-3	-275	-1	0	-2	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-1	-19	-1	0	0	0	0
1958	0	0	0	0	0	0	-57	-4	-41	-9	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	-76	-3	0	0	-15	-1	0	0	0	0
1959	0	0	0	0	0	0	-81	-5	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-2	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-112	-7	-100	-89	-5	-450	12	1	23	0	0	0	0	0	0	0	0	0	91	5	13	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-35	0	0	0	0	0	0	0	0	0	-124	-7	-18	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-354	7	0	13	0	0	0	0	0	0	0	0	0	-154	-9	-22	0	0	0	0	0	0
1963	0	0	0	0	0	0	-83	-5	-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-119	-7	0
1964	0	0	0	0	0	0	-43	-3	-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-3	0	0	0	0	0	0
1965	0	0	0	0	0	0	-70	-4	-50	0	0	0	-82	-5	-415	-11	-1	-21	0	0	0	0	0	0	-61	-4	-170	-101	-6	-14	-14	-1	0	-81	-5	0
1966	0	0	0	0	0	0	-43	-3	-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-2	0	0	0	0	0	0
1967	0	0	0	0	0	0	-79	-5	-56	0	0	0	-41	-2	-207	0	0	0	0	0	0	0	0	0	-69	-4	-193	-3	0	0	-15	-1	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-2	0	0	0	0	0	0
1969	0	0	0	0	0	0	1	0	1	0	0	0	-48	-3	-244	-25	-2	-47	0	0	0	0	0	0	-70	-4	-194	-3	0	0	-15	-1	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-92	-5	0
1971	0	0	0	0	0	0	-43	-3	-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1972	0	0	0	-63	-4	-26	0	0	0	0	0	0	-9	0	-43	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	-2	0	0	0	-51	-3	0
1973	0	0	0	0	0	0	-70	-4	-50	-65	-4	-58	-28	-2	-140	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	-1	-19	-1	0	-89	-5	0
1974	0	0	0	0	0	0	-80	-5	-57	-2	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	-15	-1	0	0	0	0
1975	-9	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-35	-2	-31	-25	-1	-124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	-71	-4	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-127	0	0	0	0	0	0	-250	-15	-695	-14	-1	-2	-7	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	-33	-2	-64	0	0	0	0	0	0	-70	-4	-194	-70	-4	-10	-70	-4	-2	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-201	-46	-3	-88	0	0	0	0	0	0	-36	-2	-101	-106	-6	-15	0	0	0	0	0	0
1980	0	0	0	0	0	0	-74	-5	-53	0	0	0	-40	-2	-203	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-1	-19	-1	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-201	-54	-3	-104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	-64	-4	-57	-82	-5	-415	0	0	0	0	0	0	0	0	0	-70	-4	-194	-3	0	0	-15	-1	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-194	-3	0	0	-15	-1	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	-15	-1	0	-85	-5	0
1985	0	0	0	0	0	0	-43	-3	-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	11	1	8	0	0	0	0	0	0	-29	-2	-56	0	0	0	0	0	0	-59	-4	-165	-186	-11	-26	-129	-8	-3	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-164	-54	-3	-104	0	0	0	0	0	0	0	0	0	-214	-13	-30	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-354	-32	-2	-62	0	0	0	0	0	0	0	0	0	-214	-13	-30	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-161	-9	-813	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-10	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-138	-8	-123	0	0	0	-32	-2	-62	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-2	-7	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	30	0	0	0	0	0	0	0	0	0	-14	-1	-2	-7	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	-56	-3	-285	-34	-2	-66	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-2	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-1			-1			-16			-7			-141			-22			-10			10			-57			-7			0			0
Max			0			0			8			0			178			30			274			754			0			13			2			0
Min			-48			-39			-66			-123			-813			-127			-1,015			0			-695			-30			-3			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-106	-6	-43	-50	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-21	-58	-3	-24	-250	-15	-77	-5	0	-2	-124	-7	-51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-204	-62	-4	-21
1924	-41	-3	-15	-38	-2	-16	-83	-5	-26	-114	-7	-49	0	0	0	-108	-7	-26	0	0	0	-2	0	-12	0	0	0	0	0	0	-243	-15	-215	0	0	0
1925	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	0	0	0	-24	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	-180	-11	-159	-76	-4	-26
1926	-41	-3	-15	-35	-2	-14	-112	-7	-34	-137	-8	-59	-250	-14	-104	35	2	8	0	0	0	0	0	0	0	0	0	-180	-11	-1,034	-180	-11	-159	-93	-6	-32
1927	-36	-2	-13	-68	-4	-27	0	0	0	-114	-7	-49	-129	-7	-53	-82	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-207	-73	-4	-25
1928	-47	-3	-18	-51	-3	-21	-47	-3	-14	-168	-10	-72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-204	0	0	0
1929	-53	-3	-20	-55	-3	-22	-64	-4	-20	-40	-2	-17	0	0	0	-10	-1	-2	0	0	0	0	0	0	-182	-11	-3,041	-236	-14	-1,356	-139	-9	-123	-70	-4	-24
1930	-28	-2	-10	-25	-1	-10	-81	-5	-25	-147	-9	-63	-89	-5	-37	35	2	8	0	0	0	0	0	0	-160	-10	-2,678	-180	-11	-1,034	-110	-7	-97	0	0	0
1931	-21	-1	-8	-156	-9	-63	-143	-9	-44	-136	-8	-59	0	0	0	-77	-5	-18	-113	-7	-13	0	0	0	-247	-15	-4,130	-236	-14	-1,356	-243	-15	-215	-235	-14	-80
1932	-198	-12	-73	-165	-10	-67	-152	-9	-46	0	0	0	95	5	39	35	2	8	-72	-4	-9	-5	0	-28	0	0	0	0	0	0	-180	-11	-159	0	0	0
1933	-34	-2	-13	-32	-2	-13	-49	-3	-15	-96	-6	-41	-94	-5	-39	35	2	8	0	0	0	0	0	0	-134	-8	-2,243	-236	-14	-1,356	-200	-12	-177	-111	-7	-38
1934	0	0	0	-165	-10	-67	-151	-9	-46	-147	-9	-63	-89	-5	-37	-53	-3	-12	0	0	0	0	0	0	-38	-2	-638	-236	-14	-1,356	-170	-10	-150	-223	-13	-76
1935	-198	-12	-73	-165	-10	-67	-152	-9	-46	-144	-9	-62	0	0	0	-89	-5	-21	-29	-2	-3	43	3	248	0	0	0	0	0	0	-180	-11	-159	-52	-3	-18
1936	-34	-2	-13	-32	-2	-13	-104	-6	-32	-111	-7	-48	0	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-204	-59	-4	-20
1937	-34	-2	-13	-38	-2	-15	-44	-3	-14	-109	-7	-47	-81	-4	-33	-101	-6	-24	0	0	0	-170	-10	-993	0	0	0	0	0	0	-231	-14	-204	0	0	0
1938	-46	-3	-17	-89	-5	-36	-124	-8	-38	-130	-8	-56	0	0	0	-67	-4	-16	0	0	0	-150	-9	-875	-180	-11	-3,012	0	0	0	0	0	0	-214	-13	-73
1939	-203	-12	-75	0	0	0	0	0	0	-81	-5	-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-209	-12	-1,199	-79	-5	-70	-51	-3	-17
1940	-40	-2	-15	-64	-4	-26	-64	-4	-20	-128	-8	-55	0	0	0	35	2	8	-75	-4	-9	-7	0	-44	0	0	0	0	0	0	-231	-14	-204	-59	-4	-20
1941	-35	-2	-13	-56	-3	-23	0	0	0	-21	-1	-9	-250	-14	-104	-28	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-49
1942	-83	-5	-31	-63	-4	-25	-76	-5	-23	-38	-2	-17	-92	-5	-38	-86	-5	-20	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-207	-156	-9	-53
1943	-250	-15	-93	-131	-8	-53	0	0	0	-55	-3	-23	0	0	0	-78	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-207	-85	-5	-29
1944	-54	-3	-20	-47	-3	-19	-59	-4	-18	-37	-2	-16	-34	-2	-14	35	2	8	0	0	0	0	0	0	0	0	0	-199	-12	-1,143	-75	-5	-66	-41	-2	-14
1945	-37	-2	-14	-123	-7	-50	0	0	0	0	0	0	-37	-2	-15	-79	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-173	-11	-153	-59	-3	-20
1946	-38	-2	-14	-149	-9	-61	0	0	0	-1	0	0	-35	-2	-15	-76	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-155	-9	-136	-65	-4	-22
1947	-47	-3	-18	-73	-4	-30	-100	-6	-31	-115	-7	-49	-250	-14	-104	-71	-4	-17	0	0	0	0	0	0	-200	-12	-3,347	-236	-14	-1,356	-58	-4	-51	-32	-2	-11
1948	-29	-2	-11	-71	-4	-29	-80	-5	-25	-43	-3	-19	-117	-7	-49	-1	0	0	-112	-7	-13	-32	-2	-187	0	0	0	0	0	0	-156	-10	-138	-61	-4	-21
1949	-50	-3	-18	-139	-8	-57	-68	-4	-21	-114	-7	-49	-48	-3	-20	21	1	5	0	0	0	0	0	0	-10	-1	-161	-222	-13	-1,278	-116	-7	-102	-98	-6	-33
1950	-46	-3	-17	-49	-3	-20	-77	-5	-24	-86	-5	-37	0	0	0	-121	-7	-29	-161	-10	-19	-8	0	-45	0	0	0	0	0	0	-231	-14	-204	-85	-5	-29
1951	-58	-4	-22	-109	-6	-44	-129	-8	-40	-142	-9	-61	-37	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-204	-72	-4	-25
1952	-52	-3	-19	-52	-3	-21	0	0	0	-17	-1	-7	-164	-9	-68	-81	-5	-19	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-228	-14	-78
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-207	-108	-6	-37
1954	-109	-7	-41	-75	-4	-30	-92	-6	-28	-83	-5	-36	-158	-9	-65	-75	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-204	-75	-4	-26
1955	-52	-3	-20	-61	-4	-25	-250	-15	-77	-3	0	-1	-159	-9	-66	-42	-3	-10	0	0	0	0	0	0	0	0	0	-222	-13	-1,277	-196	-12	-173	-94	-6	-32
1956	-41	-3	-15	-55	-3	-22	-180	-11	-55	-138	-8	-59	-250	-14	-104	-80	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-67
1957	-30	-2	-11	-138	-8	-56	-73	-5	-22	-38	-2	-16	-159	-9	-66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-204	-58	-3	-20
1958	-55	-3	-21	-128	-8	-52	-250	-15	-77	0	0	0	-146	-8	-60	0	0	0	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-227	-14	-78
1959	0	0	0	0	0	0	0	0	0	-83	-5	-36	-7	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-1,349	-218	-13	-192	-52	-3	-18
1960	-32	-2	-12	-36	-2	-15	-133	-8	-41	0	0	0	0	0	0	35	2	8	0	0	0	0	0	0	0	0	0	-172	-10	-991	-75	-5	-66	-73	-4	-25
1961	-40	-2	-15	-160	-10	-65	-133	-8	-41	-138	-8	-59	-131	-7	-54	-39	-2	-9	-74	-4	-9	-5	0	-29	-200	-12	-3,347	-236	-14	-1,356	-65	-4	-57	-139	-8	-48
1962	-199	-12	-74	-162	-10	-66	-143	-9	-44	0	0	0	0	0	0	-44	-3	-10	-189	-11	-22	-8	0	-45	0	0	0	-180	-11	-1,034	-110	-7	-97	-44	-3	-15
1963	-136	-8	-51	0	0	0	-250	-15	-77	-95	-6	-41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-15	-28	-2	-12	-22	-1	-7	-230	-14	-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-222	-13	-1,277	-65	-4	-57	-43	-3	-15
1965	-33	-2	-12	-62	-4	-25	0	0	0	0	0	0	-58	-3	-24	-81	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-208	0	0	0
1966	-49	-3	-18	-112	-7	-45	-167	-10	-51	-94	-6	-40	12	1	5	-10	-1	-2	0	0	0	0	0	0	0	0	0	-235	-14	-1,350	-147	-9	-130	-64	-4	-22
1967	-54	-3	-20	-86	-5	-35	-250	-15	-77	-38	-2	-16	-154	-9	-64	-46	-3	-11	0	0	0	-150	-9	-875	-181	-11	-3,023	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-1,349	-152	-9	-135	-45	-3	-15
1969	-44	-3	-17	-99	-6	-40	-180	-11	-55	-115	-7	-49	-175	-10	-73	-166	-10	-39	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-227	-14	-78
1970	-189	-12	-70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-15	-53	-3	-21	-58	-4	-18	-135	-8	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-207	-153	-9	-52
1972	-183	-11	-68	0	0	0	-44	-3	-14	-54	-3	-23	-250	-14	-104	-9	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	-165	-10	-146	0	0	0
1973	-30	-2	-11	-81	-5	-33	-180	-11	-55	-141	-9	-60	-35	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-204	0	0	0
1974	-35	-2	-13	-61	-4	-25	-7	0	-2	-158	-10	-68	0	0	0	0	0	0	0	0	0	-150	-9	-875	0	0	0	0	0	0	-235	-14	-207	-155	-9	-53
1975	-60	-4	-22	-2	0	-1	-63	-4	-19	-53	-3	-23	-149	-8	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-208	-171	-10	-58
1976	-54	-3	-20	0	0	0	-73	-5	-22	0	0	0	0	0	0	-135	-8	-32	0	0	0	-2	0	-12	-163	-10	-2,721	-204	-12	-1,170	-243	-15	-215	0	0	0
1977	-40	-2	-15	-130	-8	-53	-152	-9	-46	-147	-9	-63	-161	-9	-67	-77	-5	-18	-62	-4	-7	-222	-14	-1,293	0	0	0	-236	-14	-1,356	-243	-15	-215	-235	-14	-80
1978	-198	-12	-73	-165	-10	-67	-152	-9	-46	0	0	0	-180	-10	-75	0	0	0	40	2	5	-98	-6	-573	0	0	0	0	0	0	-180	-11	-159	-83	-5	-28
1979	-57	-4	-21	-47	-3	-19	-56	-3	-17	-95	-6	-41	-161	-9	-67	-80	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-153	-59	-3	-20
1980	-40	-2	-15	-67	-4	-27	-181	-11	-55	-115	-7	-49	-250	-14	-104	-130	-8	-31	0	0	0	-149	-9	-871	0	0	0	0	0	0	-231	-14	-204	-112	-7	-38
1981	-74	-5	-27	-50	-3	-20	-65	-4	-20	-98	-6	-42	-160	-9	-66	-71	-4	-17	0	0	0	0	0	0	-11	-1	-179	-212	-13	-1,215	-75	-5	-67	-46	-3	-16
1982	-42	-3	-16	-133	-8	-54	0	0	0	-132	-8	-57	-250	-14	-104	-94	-6	-22	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	-225	-13	-77
1983	0	0	0	0	0	0	-73	-5	-22	-42	-3	-18	0	0	0	0	0	0	0	0	0	-150	-9	-875	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-207	0	0	0
1985	-44	-3	-16	-43	-3	-17	-28	-2	-9	-166	-10	-71	-90	-5	-37	0	0	0	0	0	0	0	0	0	0	0	0	-199	-12	-1,142	-74	-5	-65	-55	-3	-19
1986	-50	-3	-19	-58	-3	-24	-50	-3	-15	0	0	0	-131	-7	-54	-250	-15	-59	-102	-6	-12	-7	0	-44	0	0	0	0	0	0	-235	-14	-207	-148	-9	-51
1987	-72	-4	-27	-46	-3	-18	-40	-2	-12	-42	-3	-18	0	0	0	28	2	7	0	0	0	0	0	0	-10	-1	-161	-222	-13	-1,277	-97	-6	-86	-45	-3	-15
1988	-34	-2	-13	-56	-3	-23	-74	-5	-23	-138	-8	-59	0	0	0	6	0	1	0	0	0	0	0	0	-193	-11	-3,233	-236	-14	-1,356	-162	-10	-143	-71	-4	-24
1989	-26	-2	-10	-22	-1	-9	-135	-8	-41	-147	-9	-63	0	0	0	35	2	8	-37	-2	-4	-5	0	-30	0	0	0	-180	-11	-1,034	-30	-2	-27	-50	-3	-17
1990	-199	-12	-74	-162	-10	-66	-143	-9	-44	0	0	0	-132	-7	-55	-53	-3	-12	-99	-6	-12	-4	0	-22	-146	-9	-2,451	-136	-8	-782	-243	-15	-215	-235	-14	-80
1991	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	-137	-8	-57	0	0	0	-35	-2	-4	-5	0	-29	0	0	0	-236	-14	-1,356	-243	-15	-215	-235	-14	-80
1992	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	-155	-9	-64	35	2	8	-47	-3	-6	0	0	0	0	0	0	-236	-14	-1,356	-243	-15	-215	-235	-14	-80
1993	-198	-12	-73	-165	-10	-67	-152	-9	-46	-147	-9	-63	0	0	0	0	0	0	-13	-1	-1	0	0	0	0	0	0	0	0	0	-180	-11	-159	-94	-6	-32
1994	-44	-3	-16	-38	-2	-15	-90	-6	-28	-77	-5	-33	-52	-3	-22	-48	-3	-11	0	0	0	0	0	0	0	0	0	-57	-3	-327	-54	-3	-48	-125	-7	-43
Mean			-26			-30			-29			-34			-31			-8			-2			-151			-471			-477			-133			-30
Max			0			0			0			0			39			8			5			248			0			0			0			0
Min			-93			-67			-77			-99			-104			-59			-22			-1,293			-4,130			-1,356			-215			-80

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-106	-6	-3	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-3	-58	-3	-2	-250	-15	-1	-5	0	0	-124	-7	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-9	-62	-4	0
1924	-41	-3	-2	-38	-2	-1	-83	-5	0	-114	-7	-1	0	0	0	-108	-7	-3	0	0	0	-2	0	-3	0	0	0	0	0	0	-243	-15	-9	0	0	0
1925	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	0	0	0	-24	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-180	-11	-7	-76	-4	-1
1926	-41	-3	-2	-35	-2	-1	-112	-7	0	-137	-8	-2	-250	-14	-6	35	2	1	0	0	0	0	0	0	0	0	0	-180	-11	-102	-180	-11	-7	-93	-6	-1
1927	-36	-2	-2	-68	-4	-2	0	0	0	-114	-7	-1	-129	-7	-3	-82	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-9	-73	-4	-1
1928	-47	-3	-2	-51	-3	-2	-47	-3	0	-168	-10	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-9	0	0	0
1929	-53	-3	-3	-55	-3	-2	-64	-4	0	-40	-2	0	0	0	0	-10	-1	0	0	0	0	0	0	0	-182	-11	-471	-236	-14	-134	-139	-9	-5	-70	-4	-1
1930	-28	-2	-1	-25	-1	-1	-81	-5	0	-147	-9	-2	-89	-5	-2	35	2	1	0	0	0	0	0	0	-160	-10	-415	-180	-11	-102	-110	-7	-4	0	0	0
1931	-21	-1	-1	-156	-9	-5	-143	-9	0	-136	-8	-2	0	0	0	-77	-5	-2	-113	-7	-6	0	0	0	-247	-15	-640	-236	-14	-134	-243	-15	-9	-235	-14	-2
1932	-198	-12	-9	-165	-10	-5	-152	-9	0	0	0	0	95	5	2	35	2	1	-72	-4	-4	-5	0	-6	0	0	0	0	0	0	-180	-11	-7	0	0	0
1933	-34	-2	-2	-32	-2	-1	-49	-3	0	-96	-6	-1	-94	-5	-2	35	2	1	0	0	0	0	0	0	-134	-8	-348	-236	-14	-134	-200	-12	-8	-111	-7	-1
1934	0	0	0	-165	-10	-5	-151	-9	0	-147	-9	-2	-89	-5	-2	-53	-3	-2	0	0	0	0	0	0	-38	-2	-99	-236	-14	-134	-170	-10	-6	-223	-13	-2
1935	-198	-12	-9	-165	-10	-5	-152	-9	0	-144	-9	-2	0	0	0	-89	-5	-3	-29	-2	-2	43	3	55	0	0	0	0	0	0	-180	-11	-7	-52	-3	0
1936	-34	-2	-2	-32	-2	-1	-104	-6	0	-111	-7	-1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-9	-59	-4	0
1937	-34	-2	-2	-38	-2	-1	-44	-3	0	-109	-7	-1	-81	-4	-2	-101	-6	-3	0	0	0	-170	-10	-220	0	0	0	0	0	0	-231	-14	-9	0	0	0
1938	-46	-3	-2	-89	-5	-3	-124	-8	0	-130	-8	-2	0	0	0	-67	-4	-2	0	0	0	-150	-9	-193	-180	-11	-467	0	0	0	0	0	0	-214	-13	-2
1939	-203	-12	-10	0	0	0	0	0	0	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-209	-12	-119	-79	-5	-3	-51	-3	0
1940	-40	-2	-2	-64	-4	-2	-64	-4	0	-128	-8	-2	0	0	0	35	2	1	-75	-4	-4	-7	0	-10	0	0	0	0	0	0	-231	-14	-9	-59	-4	0
1941	-35	-2	-2	-56	-3	-2	0	0	0	-21	-1	0	-250	-14	-6	-28	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-1
1942	-83	-5	-4	-63	-4	-2	-76	-5	0	-38	-2	0	-92	-5	-2	-86	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-9	-156	-9	-1
1943	-250	-15	-12	-131	-8	-4	0	0	0	-55	-3	-1	0	0	0	-78	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-9	-85	-5	-1
1944	-54	-3	-3	-47	-3	-1	-59	-4	0	-37	-2	0	-34	-2	-1	35	2	1	0	0	0	0	0	0	0	0	0	-199	-12	-113	-75	-5	-3	-41	-2	0
1945	-37	-2	-2	-123	-7	-4	0	0	0	0	0	0	-37	-2	-1	-79	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-173	-11	-7	-59	-3	0
1946	-38	-2	-2	-149	-9	-5	0	0	0	-1	0	0	-35	-2	-1	-76	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-155	-9	-6	-65	-4	0
1947	-47	-3	-2	-73	-4	-2	-100	-6	0	-115	-7	-1	-250	-14	-6	-71	-4	-2	0	0	0	0	0	0	-200	-12	-519	-236	-14	-134	-58	-4	-2	-32	-2	0
1948	-29	-2	-1	-71	-4	-2	-80	-5	0	-43	-3	-1	-117	-7	-3	-1	0	0	-112	-7	-6	-32	-2	-41	0	0	0	0	0	0	-156	-10	-6	-61	-4	0
1949	-50	-3	-2	-139	-8	-4	-68	-4	0	-114	-7	-1	-48	-3	-1	21	1	1	0	0	0	0	0	0	-10	-1	-25	-222	-13	-127	-116	-7	-4	-98	-6	-1
1950	-46	-3	-2	-49	-3	-1	-77	-5	0	-86	-5	-1	0	0	0	-121	-7	-3	-161	-10	-9	-8	0	-10	0	0	0	0	0	0	-231	-14	-9	-85	-5	-1
1951	-58	-4	-3	-109	-6	-3	-129	-8	0	-142	-9	-2	-37	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-9	-72	-4	-1
1952	-52	-3	-2	-52	-3	-2	0	0	0	-17	-1	0	-164	-9	-4	-81	-5	-2	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-228	-14	-2
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-9	-108	-6	-1
1954	-109	-7	-5	-75	-4	-2	-92	-6	0	-83	-5	-1	-158	-9	-4	-75	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-9	-75	-4	-1
1955	-52	-3	-3	-61	-4	-2	-250	-15	-1	-3	0	0	-159	-9	-4	-42	-3	-1	0	0	0	0	0	0	0	0	0	-222	-13	-126	-196	-12	-7	-94	-6	-1
1956	-41	-3	-2	-55	-3	-2	-180	-11	0	-138	-8	-2	-250	-14	-6	-80	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-1
1957	-30	-2	-1	-138	-8	-4	-73	-5	0	-38	-2	0	-159	-9	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-9	-58	-3	0
1958	-55	-3	-3	-128	-8	-4	-250	-15	-1	0	0	0	-146	-8	-3	0	0	0	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-227	-14	-2
1959	0	0	0	0	0	0	0	0	0	-83	-5	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-134	-218	-13	-8	-52	-3	0
1960	-32	-2	-2	-36	-2	-1	-133	-8	0	0	0	0	0	0	0	35	2	1	0	0	0	0	0	0	0	0	0	-172	-10	-98	-75	-5	-3	-73	-4	-1
1961	-40	-2	-2	-160	-10	-5	-133	-8	0	-138	-8	-2	-131	-7	-3	-39	-2	-1	-74	-4	-4	-5	0	-6	-200	-12	-519	-236	-14	-134	-65	-4	-2	-139	-8	-1
1962	-199	-12	-10	-162	-10	-5	-143	-9	0	0	0	0	0	0	0	-44	-3	-1	-189	-11	-10	-8	0	-10	0	0	0	-180	-11	-102	-110	-7	-4	-44	-3	0
1963	-136	-8	-7	0	0	0	-250	-15	-1	-95	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-2	-28	-2	-1	-22	-1	0	-230	-14	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-222	-13	-126	-65	-4	-2	-43	-3	0
1965	-33	-2	-2	-62	-4	-2	0	0	0	0	0	0	-58	-3	-1	-81	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-9	0	0	0
1966	-49	-3	-2	-112	-7	-3	-167	-10	0	-94	-6	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	-235	-14	-134	-147	-9	-6	-64	-4	0
1967	-54	-3	-3	-86	-5	-3	-250	-15	-1	-38	-2	0	-154	-9	-4	-46	-3	-1	0	0	0	-150	-9	-193	-181	-11	-469	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-134	-152	-9	-6	-45	-3	0
1969	-44	-3	-2	-99	-6	-3	-180	-11	0	-115	-7	-1	-175	-10	-4	-166	-10	-5	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-227	-14	-2
1970	-189	-12	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-2	-53	-3	-2	-58	-4	0	-135	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-9	-153	-9	-1
1972	-183	-11	-9	0	0	0	-44	-3	0	-54	-3	-1	-250	-14	-6	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-165	-10	-6	0	0	0
1973	-30	-2	-1	-81	-5	-2	-180	-11	0	-141	-9	-2	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-9	0	0	0
1974	-35	-2	-2	-61	-4	-2	-7	0	0	-158	-10	-2	0	0	0	0	0	0	0	0	0	-150	-9	-193	0	0	0	0	0	0	-235	-14	-9	-155	-9	-1
1975	-60	-4	-3	-2	0	0	-63	-4	0	-53	-3	-1	-149	-8	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-9	-171	-10	-1
1976	-54	-3	-3	0	0	0	-73	-5	0	0	0	0	0	0	0	-135	-8	-4	0	0	0	-2	0	-3	-163	-10	-422	-204	-12	-116	-243	-15	-9	0	0	0
1977	-40	-2	-2	-130	-8	-4	-152	-9	0	-147	-9	-2	-161	-9	-4	-77	-5	-2	-62	-4	-3	-222	-14	-286	0	0	0	-236	-14	-134	-243	-15	-9	-235	-14	-2
1978	-198	-12	-9	-165	-10	-5	-152	-9	0	0	0	0	-180	-10	-4	0	0	0	40	2	2	-98	-6	-127	0	0	0	0	0	0	-180	-11	-7	-83	-5	-1
1979	-57	-4	-3	-47	-3	-1	-56	-3	0	-95	-6	-1	-161	-9	-4	-80	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-7	-59	-3	0
1980	-40	-2	-2	-67	-4	-2	-181	-11	0	-115	-7	-1	-250	-14	-6	-130	-8	-4	0	0	0	-149	-9	-193	0	0	0	0	0	0	-231	-14	-9	-112	-7	-1
1981	-74	-5	-4	-50	-3	-2	-65	-4	0	-98	-6	-1	-160	-9	-4	-71	-4	-2	0	0	0	0	0	0	-11	-1	-28	-212	-13	-120	-75	-5	-3	-46	-3	0
1982	-42	-3	-2	-133	-8	-4	0	0	0	-132	-8	-2	-250	-14	-6	-94	-6	-3	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	-225	-13	-2
1983	0	0	0	0	0	0	-73	-5	0	-42	-3	-1	0	0	0	0	0	0	0	0	0	-150	-9	-193	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-9	0	0	0
1985	-44	-3	-2	-43	-3	-1	-28	-2	0	-166	-10	-2	-90	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-199	-12	-113	-74	-5	-3	-55	-3	0
1986	-50	-3	-2	-58	-3	-2	-50	-3	0	0	0	0	-131	-7	-3	-250	-15	-7	-102	-6	-5	-7	0	-10	0	0	0	0	0	0	-235	-14	-9	-148	-9	-1
1987	-72	-4	-3	-46	-3	-1	-40	-2	0	-42	-3	-1	0	0	0	28	2	1	0	0	0	0	0	0	-10	-1	-25	-222	-13	-126	-97	-6	-4	-45	-3	0
1988	-34	-2	-2	-56	-3	-2	-74	-5	0	-138	-8	-2	0	0	0	6	0	0	0	0	0	0	0	0	-193	-11	-501	-236	-14	-134	-162	-10	-6	-71	-4	-1
1989	-26	-2	-1	-22	-1	-1	-135	-8	0	-147	-9	-2	0	0	0	35	2	1	-37	-2	-2	-5	0	-7	0	0	0	-180	-11	-102	-30	-2	-1	-50	-3	0
1990	-199	-12	-10	-162	-10	-5	-143	-9	0	0	0	0	-132	-7	-3	-53	-3	-2	-99	-6	-5	-4	0	-5	-146	-9	-380	-136	-8	-77	-243	-15	-9	-235	-14	-2
1991	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	-137	-8	-3	0	0	0	-35	-2	-2	-5	0	-6	0	0	0	-236	-14	-134	-243	-15	-9	-235	-14	-2
1992	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	-155	-9	-4	35	2	1	-47	-3	-3	0	0	0	0	0	0	-236	-14	-134	-243	-15	-9	-235	-14	-2
1993	-198	-12	-9	-165	-10	-5	-152	-9	0	-147	-9	-2	0	0	0	0	0	0	-13	-1	-1	0	0	0	0	0	0	0	0	0	-180	-11	-7	-94	-6	-1
1994	-44	-3	-2	-38	-2	-1	-90	-6	0	-77	-5	-1	-52	-3	-1	-48	-3	-1	0	0	0	0	0	0	0	0	0	-57	-3	-32	-54	-3	-2	-125	-7	-1
Mean			-3			-2			0			-1			-2			-1			-1			-33			-73			-47			-6			-1
Max			0			0			0			0			2			1			2			55			0			0			0			0
Min			-12			-5			-1			-3			-6			-7			-10			-286			-640			-134			-9			-2

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Volumne	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-106	-6	0	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	0	-58	-3	0	-250	-15	-1	-5	0	-1	-124	-7	-138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-62	-4	0
1924	-41	-3	0	-38	-2	0	-83	-5	0	-114	-7	-21	0	0	0	-108	-7	-233	0	0	0	-2	0	-1	0	0	0	0	0	0	-243	-15	0	0	0	0
1925	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	-27	0	0	0	-24	-1	-51	0	0	0	0	0	0	0	0	0	0	0	0	-180	-11	0	-76	-4	0
1926	-41	-3	0	-35	-2	0	-112	-7	0	-137	-8	-25	-250	-14	-277	35	2	75	0	0	0	0	0	0	0	0	0	-180	-11	0	-180	-11	0	-93	-6	0
1927	-36	-2	0	-68	-4	0	0	0	0	-114	-7	-21	-129	-7	-143	-82	-5	-175	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-73	-4	0
1928	-47	-3	0	-51	-3	0	-47	-3	0	-168	-10	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	0	0	0
1929	-53	-3	0	-55	-3	0	-64	-4	0	-40	-2	-7	0	0	0	-10	-1	-22	0	0	0	0	0	0	-182	-11	0	-236	-14	0	-139	-9	0	-70	-4	0
1930	-28	-2	0	-25	-1	0	-81	-5	0	-147	-9	-27	-89	-5	-99	35	2	75	0	0	0	0	0	0	-160	-10	0	-180	-11	0	-110	-7	0	0	0	0
1931	-21	-1	0	-156	-9	0	-143	-9	0	-136	-8	-25	0	0	0	-77	-5	-166	-113	-7	-141	0	0	0	-247	-15	0	-236	-14	0	-243	-15	0	-235	-14	0
1932	-198	-12	0	-165	-10	0	-152	-9	0	0	0	0	95	5	105	35	2	75	-72	-4	-90	-5	0	-2	0	0	0	0	0	0	-180	-11	0	0	0	0
1933	-34	-2	0	-32	-2	0	-49	-3	0	-96	-6	-18	-94	-5	-104	35	2	75	0	0	0	0	0	0	-134	-8	0	-236	-14	0	-200	-12	0	-111	-7	0
1934	0	0	0	-165	-10	0	-151	-9	0	-147	-9	-27	-89	-5	-99	-53	-3	-114	0	0	0	0	0	0	-38	-2	0	-236	-14	0	-170	-10	0	-223	-13	0
1935	-198	-12	0	-165	-10	0	-152	-9	0	-144	-9	-27	0	0	0	-89	-5	-190	-29	-2	-37	43	3	21	0	0	0	0	0	0	-180	-11	0	-52	-3	0
1936	-34	-2	0	-32	-2	0	-104	-6	0	-111	-7	-20	0	0	0	6	0	13	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-59	-4	0
1937	-34	-2	0	-38	-2	0	-44	-3	0	-109	-7	-20	-81	-4	-90	-101	-6	-218	0	0	0	-170	-10	-84	0	0	0	0	0	0	-231	-14	0	0	0	0
1938	-46	-3	0	-89	-5	0	-124	-8	0	-130	-8	-24	0	0	0	-67	-4	-144	0	0	0	-150	-9	-74	-180	-11	0	0	0	0	0	0	0	-214	-13	0
1939	-203	-12	0	0	0	0	0	0	0	-81	-5	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-209	-12	0	-79	-5	0	-51	-3	0
1940	-40	-2	0	-64	-4	0	-64	-4	0	-128	-8	-24	0	0	0	35	2	75	-75	-4	-94	-7	0	-4	0	0	0	0	0	0	-231	-14	0	-59	-4	0
1941	-35	-2	0	-56	-3	0	0	0	0	-21	-1	-4	-250	-14	-277	-28	-2	-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	0
1942	-83	-5	0	-63	-4	0	-76	-5	0	-38	-2	-7	-92	-5	-102	-86	-5	-185	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-156	-9	0
1943	-250	-15	0	-131	-8	0	0	0	0	-55	-3	-10	0	0	0	-78	-5	-168	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-85	-5	0
1944	-54	-3	0	-47	-3	0	-59	-4	0	-37	-2	-7	-34	-2	-37	35	2	75	0	0	0	0	0	0	0	0	0	-199	-12	0	-75	-5	0	-41	-2	0
1945	-37	-2	0	-123	-7	0	0	0	0	0	0	0	-37	-2	-40	-79	-5	-169	0	0	0	0	0	0	0	0	0	0	0	0	-173	-11	0	-59	-3	0
1946	-38	-2	0	-149	-9	0	0	0	0	-1	0	0	-35	-2	-39	-76	-5	-163	0	0	0	0	0	0	0	0	0	0	0	0	-155	-9	0	-65	-4	0
1947	-47	-3	0	-73	-4	0	-100	-6	0	-115	-7	-21	-250	-14	-277	-71	-4	-152	0	0	0	0	0	0	-200	-12	0	-236	-14	0	-58	-4	0	-32	-2	0
1948	-29	-2	0	-71	-4	0	-80	-5	0	-43	-3	-8	-117	-7	-130	-1	0	-2	-112	-7	-139	-32	-2	-16	0	0	0	0	0	0	-156	-10	0	-61	-4	0
1949	-50	-3	0	-139	-8	0	-68	-4	0	-114	-7	-21	-48	-3	-53	21	1	45	0	0	0	0	0	0	-10	-1	0	-222	-13	0	-116	-7	0	-98	-6	0
1950	-46	-3	0	-49	-3	0	-77	-5	0	-86	-5	-16	0	0	0	-121	-7	-261	-161	-10	-201	-8	0	-4	0	0	0	0	0	0	-231	-14	0	-85	-5	0
1951	-58	-4	0	-109	-6	0	-129	-8	0	-142	-9	-26	-37	-2	-41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-72	-4	0
1952	-52	-3	0	-52	-3	0	0	0	0	-17	-1	-3	-164	-9	-182	-81	-5	-174	0	0	0	-150	-9	-74	0	0	0	0	0	0	0	0	0	-228	-14	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-108	-6	0
1954	-109	-7	0	-75	-4	0	-92	-6	0	-83	-5	-15	-158	-9	-175	-75	-5	-161	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-75	-4	0
1955	-52	-3	0	-61	-4	0	-250	-15	-1	-3	0	-1	-159	-9	-176	-42	-3	-91	0	0	0	0	0	0	0	0	0	-222	-13	0	-196	-12	0	-94	-6	0
1956	-41	-3	0	-55	-3	0	-180	-11	-1	-138	-8	-25	-250	-14	-277	-80	-5	-172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	0
1957	-30	-2	0	-138	-8	0	-73	-5	0	-38	-2	-7	-159	-9	-176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-58	-3	0
1958	-55	-3	0	-128	-8	0	-250	-15	-1	0	0	0	-146	-8	-162	0	0	0	0	0	0	-150	-9	-74	0	0	0	0	0	0	0	0	0	-227	-14	0
1959	0	0	0	0	0	0	0	0	0	-83	-5	-15	-7	0	-8	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-218	-13	0	-52	-3	0
1960	-32	-2	0	-36	-2	0	-133	-8	0	0	0	0	0	0	0	35	2	75	0	0	0	0	0	0	0	0	0	-172	-10	0	-75	-5	0	-73	-4	0
1961	-40	-2	0	-160	-10	0	-133	-8	0	-138	-8	-25	-131	-7	-145	-39	-2	-84	-74	-4	-92	-5	0	-2	-200	-12	0	-236	-14	0	-65	-4	0	-139	-8	0
1962	-199	-12	0	-162	-10	0	-143	-9	0	0	0	0	0	0	0	-44	-3	-94	-189	-11	-236	-8	0	-4	0	0	0	-180	-11	0	-110	-7	0	-44	-3	0
1963	-136	-8	0	0	0	0	-250	-15	-1	-95	-6	-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	0	-28	-2	0	-22	-1	0	-230	-14	-42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-222	-13	0	-65	-4	0	-43	-3	0
1965	-33	-2	0	-62	-4	0	0	0	0	0	0	0	-58	-3	-65	-81	-5	-175	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	0	0	0	0
1966	-49	-3	0	-112	-7	0	-167	-10	-1	-94	-6	-17	12	1	13	-10	-1	-22	0	0	0	0	0	0	0	0	0	-235	-14	0	-147	-9	0	-64	-4	0
1967	-54	-3	0	-86	-5	0	-250	-15	-1	-38	-2	-7	-154	-9	-170	-46	-3	-100	0	0	0	-150	-9	-74	-181	-11	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-152	-9	0	-45	-3	0
1969	-44	-3	0	-99	-6	0	-180	-11	-1	-115	-7	-21	-175	-10	-195	-166	-10	-358	0	0	0	-150	-9	-74	0	0	0	0	0	0	0	0	0	-227	-14	0
1970	-189	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	0	-53	-3	0	-58	-4	0	-135	-8	-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-153	-9	0
1972	-183	-11	0	0	0	0	-44	-3	0	-54	-3	-10	-250	-14	-277	-9	-1	-19	0	0	0	0	0	0	0	0	0	0	0	0	-165	-10	0	0	0	0
1973	-30	-2	0	-81	-5	0	-180	-11	-1	-141	-9	-26	-35	-2	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	0	0	0
1974	-35	-2	0	-61	-4	0	-7	0	0	-158	-10	-29	0	0	0	0	0	0	0	0	0	-150	-9	-74	0	0	0	0	0	0	-235	-14	0	-155	-9	0
1975	-60	-4	0	-2	0	0	-63	-4	0	-53	-3	-10	-149	-8	-165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-171	-10	0
1976	-54	-3	0	0	0	0	-73	-5	0	0	0	0	0	0	0	-135	-8	-290	0	0	0	-2	0	-1	-163	-10	0	-204	-12	0	-243	-15	0	0	0	0
1977	-40	-2	0	-130	-8	0	-152	-9	0	-147	-9	-27	-161	-9	-178	-77	-5	-166	-62	-4	-77	-222	-14	-109	0	0	0	-236	-14	0	-243	-15	0	-235	-14	0
1978	-198	-12	0	-165	-10	0	-152	-9	0	0	0	0	-180	-10	-200	0	0	0	40	2	50	-98	-6	-48	0	0	0	0	0	0	-180	-11	0	-83	-5	0
1979	-57	-4	0	-47	-3	0	-56	-3	0	-95	-6	-17	-161	-9	-178	-80	-5	-172	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	0	-59	-3	0
1980	-40	-2	0	-67	-4	0	-181	-11	-1	-115	-7	-21	-250	-14	-277	-130	-8	-280	0	0	0	-149	-9	-73	0	0	0	0	0	0	-231	-14	0	-112	-7	0
1981	-74	-5	0	-50	-3	0	-65	-4	0	-98	-6	-18	-160	-9	-177	-71	-4	-153	0	0	0	0	0	0	-11	-1	0	-212	-13	0	-75	-5	0	-46	-3	0
1982	-42	-3	0	-133	-8	0	0	0	0	-132	-8	-24	-250	-14	-277	-94	-6	-203	0	0	0	-150	-9	-74	0	0	0	0	0	0	0	0	0	-225	-13	0
1983	0	0	0	0	0	0	-73	-5	0	-42	-3	-8	0	0	0	0	0	0	0	0	0	-150	-9	-74	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	0	0	0
1985	-44	-3	0	-43	-3	0	-28	-2	0	-166	-10	-30	-90	-5	-100	0	0	0	0	0	0	0	0	0	0	0	0	-199	-12	0	-74	-5	0	-55	-3	0
1986	-50	-3	0	-58	-3	0	-50	-3	0	0	0	0	-131	-7	-145	-250	-15	-537	-102	-6	-127	-7	0	-4	0	0	0	0	0	0	-235	-14	0	-148	-9	0
1987	-72	-4	0	-46	-3	0	-40	-2	0	-42	-3	-8	0	0	0	28	2	61	0	0	0	0	0	0	-10	-1	0	-222	-13	0	-97	-6	0	-45	-3	0
1988	-34	-2	0	-56	-3	0	-74	-5	0	-138	-8	-25	0	0	0	6	0	13	0	0	0	0	0	0	-193	-11	0	-236	-14	0	-162	-10	0	-71	-4	0
1989	-26	-2	0	-22	-1	0	-135	-8	0	-147	-9	-27	0	0	0	35	2	75	-37	-2	-47	-5	0	-3	0	0	0	-180	-11	0	-30	-2	0	-50	-3	0
1990	-199	-12	0	-162	-10	0	-143	-9	0	0	0	0	-132	-7	-146	-53	-3	-114	-99	-6	-124	-4	0	-2	-146	-9	0	-136	-8	0	-243	-15	0	-235	-14	0
1991	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	-27	-137	-8	-152	0	0	-1	-35	-2	-43	-5	0	-2	0	0	0	-236	-14	0	-243	-15	0	-235	-14	0
1992	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	-27	-155	-9	-172	35	2	75	-47	-3	-59	0	0	0	0	0	0	-236	-14	0	-243	-15	0	-235	-14	0
1993	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	-27	0	0	0	0	0	0	-13	-1	-16	0	0	0	0	0	0	0	0	0	-180	-11	0	-94	-6	0
1994	-44	-3	0	-38	-2	0	-90	-6	0	-77	-5	-14	-52	-3	-58	-48	-3	-103	0	0	0	0	0	0	0	0	0	-57	-3	0	-54	-3	0	-125	-7	0
Mean			0			0			0			-15			-84			-70			-20			-13			0			0			0			0
Max			0			0			0			0			105			75			50			21			0			0			0			0
Min			0			0			-1			-42			-277			-537			-236			-109			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	116	Apr	Vol	950	May	Vol	376	Jun	Vol	167	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-106	-6	0	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	0	-58	-3	0	-250	-15	0	-5	0	0	-124	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-62	-4	0
1924	-41	-3	0	-38	-2	0	-83	-5	0	-114	-7	0	0	0	0	-108	-7	-770	0	0	0	-2	0	-48	0	0	0	0	0	0	-243	-15	0	0	0	0
1925	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	0	0	0	-24	-1	-167	0	0	0	0	0	0	0	0	0	0	0	0	-180	-11	0	-76	-4	0
1926	-41	-3	0	-35	-2	0	-112	-7	0	-137	-8	0	-250	-14	0	35	2	248	0	0	0	0	0	0	0	0	0	-180	-11	0	-180	-11	0	-93	-6	0
1927	-36	-2	0	-68	-4	0	0	0	0	-114	-7	0	-129	-7	0	-82	-5	-579	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-73	-4	0
1928	-47	-3	0	-51	-3	0	-47	-3	0	-168	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	0	0	0
1929	-53	-3	0	-55	-3	0	-64	-4	0	-40	-2	0	0	0	0	-10	-1	-71	0	0	0	0	0	0	-182	-11	-1,799	-236	-14	0	-139	-9	0	-70	-4	0
1930	-28	-2	0	-25	-1	0	-81	-5	0	-147	-9	0	-89	-5	0	35	2	248	0	0	0	0	0	0	-160	-10	-1,584	-180	-11	0	-110	-7	0	0	0	0
1931	-21	-1	0	-156	-9	0	-143	-9	0	-136	-8	0	0	0	0	-77	-5	-550	-113	-7	-6,361	0	0	0	-247	-15	-2,443	-236	-14	0	-243	-15	0	-235	-14	0
1932	-198	-12	0	-165	-10	0	-152	-9	0	0	0	0	95	5	0	35	2	248	-72	-4	-4,058	-5	0	-112	0	0	0	0	0	0	-180	-11	0	0	0	0
1933	-34	-2	0	-32	-2	0	-49	-3	0	-96	-6	0	-94	-5	0	35	2	248	0	0	0	0	0	0	-134	-8	-1,327	-236	-14	0	-200	-12	0	-111	-7	0
1934	0	0	0	-165	-10	0	-151	-9	0	-147	-9	0	-89	-5	0	-53	-3	-377	0	0	0	0	0	0	-38	-2	-377	-236	-14	0	-170	-10	0	-223	-13	0
1935	-198	-12	0	-165	-10	0	-152	-9	0	-144	-9	0	0	0	0	-89	-5	-629	-29	-2	-1,662	43	3	982	0	0	0	0	0	0	-180	-11	0	-52	-3	0
1936	-34	-2	0	-32	-2	0	-104	-6	0	-111	-7	0	0	0	0	6	0	43	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-59	-4	0
1937	-34	-2	0	-38	-2	0	-44	-3	0	-109	-7	0	-81	-4	0	-101	-6	-720	0	0	0	-170	-10	-3,931	0	0	0	0	0	0	-231	-14	0	0	0	0
1938	-46	-3	0	-89	-5	0	-124	-8	0	-130	-8	0	0	0	0	-67	-4	-477	0	0	0	-150	-9	-3,463	-180	-11	-1,782	0	0	0	0	0	0	-214	-13	0
1939	-203	-12	0	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-209	-12	0	-79	-5	0	-51	-3	0
1940	-40	-2	0	-64	-4	0	-64	-4	0	-128	-8	0	0	0	0	35	2	248	-75	-4	-4,233	-7	0	-173	0	0	0	0	0	0	-231	-14	0	-59	-4	0
1941	-35	-2	0	-56	-3	0	0	0	0	-21	-1	0	-250	-14	0	-28	-2	-200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	0
1942	-83	-5	0	-63	-4	0	-76	-5	0	-38	-2	0	-92	-5	0	-86	-5	-610	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-156	-9	0
1943	-250	-15	0	-131	-8	0	0	0	0	-55	-3	0	0	0	0	-78	-5	-555	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-85	-5	0
1944	-54	-3	0	-47	-3	0	-59	-4	0	-37	-2	0	-34	-2	0	35	2	248	0	0	0	0	0	0	0	0	0	-199	-12	0	-75	-5	0	-41	-2	0
1945	-37	-2	0	-123	-7	0	0	0	0	0	0	0	-37	-2	0	-79	-5	-559	0	0	0	0	0	0	0	0	0	0	0	0	-173	-11	0	-59	-3	0
1946	-38	-2	0	-149	-9	0	0	0	0	-1	0	0	-35	-2	0	-76	-5	-540	0	0	0	0	0	0	0	0	0	0	0	0	-155	-9	0	-65	-4	0
1947	-47	-3	0	-73	-4	0	-100	-6	0	-115	-7	0	-250	-14	0	-71	-4	-502	0	0	0	0	0	0	-200	-12	-1,980	-236	-14	0	-58	-4	0	-32	-2	0
1948	-29	-2	0	-71	-4	0	-80	-5	0	-43	-3	0	-117	-7	0	-1	0	-8	-112	-7	-6,297	-32	-2	-741	0	0	0	0	0	0	-156	-10	0	-61	-4	0
1949	-50	-3	0	-139	-8	0	-68	-4	0	-114	-7	0	-48	-3	0	21	1	149	0	0	0	0	0	0	-10	-1	-95	-222	-13	0	-116	-7	0	-98	-6	0
1950	-46	-3	0	-49	-3	0	-77	-5	0	-86	-5	0	0	0	0	-121	-7	-863	-161	-10	-9,099	-8	0	-176	0	0	0	0	0	0	-231	-14	0	-85	-5	0
1951	-58	-4	0	-109	-6	0	-129	-8	0	-142	-9	0	-37	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-72	-4	0
1952	-52	-3	0	-52	-3	0	0	0	0	-17	-1	0	-164	-9	0	-81	-5	-576	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-228	-14	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-108	-6	0
1954	-109	-7	0	-75	-4	0	-92	-6	0	-83	-5	0	-158	-9	0	-75	-5	-533	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-75	-4	0
1955	-52	-3	0	-61	-4	0	-250	-15	0	-3	0	0	-159	-9	0	-42	-3	-300	0	0	0	0	0	0	0	0	0	-222	-13	0	-196	-12	0	-94	-6	0
1956	-41	-3	0	-55	-3	0	-180	-11	0	-138	-8	0	-250	-14	0	-80	-5	-568	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	0
1957	-30	-2	0	-138	-8	0	-73	-5	0	-38	-2	0	-159	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	-58	-3	0
1958	-55	-3	0	-128	-8	0	-250	-15	0	0	0	0	-146	-8	0	0	0	0	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-227	-14	0
1959	0	0	0	0	0	0	0	0	0	-83	-5	0	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-218	-13	0	-52	-3	0
1960	-32	-2	0	-36	-2	0	-133	-8	0	0	0	0	0	0	0	35	2	248	0	0	0	0	0	0	0	0	0	-172	-10	0	-75	-5	0	-73	-4	0
1961	-40	-2	0	-160	-10	0	-133	-8	0	-138	-8	0	-131	-7	0	-39	-2	-276	-74	-4	-4,174	-5	0	-116	-200	-12	-1,980	-236	-14	0	-65	-4	0	-139	-8	0
1962	-199	-12	0	-162	-10	0	-143	-9	0	0	0	0	0	0	0	-44	-3	-312	-189	-11	-10,680	-8	0	-178	0	0	0	-180	-11	0	-110	-7	0	-44	-3	0
1963	-136	-8	0	0	0	0	-250	-15	0	-95	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	0	-28	-2	0	-22	-1	0	-230	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-222	-13	0	-65	-4	0	-43	-3	0
1965	-33	-2	0	-62	-4	0	0	0	0	0	0	0	-58	-3	0	-81	-5	-577	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	0	0	0	0
1966	-49	-3	0	-112	-7	0	-167	-10	0	-94	-6	0	12	1	0	-10	-1	-74	0	0	0	0	0	0	0	0	0	-235	-14	0	-147	-9	0	-64	-4	0
1967	-54	-3	0	-86	-5	0	-250	-15	0	-38	-2	0	-154	-9	0	-46	-3	-329	0	0	0	-150	-9	-3,463	-181	-11	-1,789	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-152	-9	0	-45	-3	0
1969	-44	-3	0	-99	-6	0	-180	-11	0	-115	-7	0	-175	-10	0	-166	-10	-1,182	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-227	-14	0
1970	-189	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	0	-53	-3	0	-58	-4	0	-135	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-153	-9	0
1972	-183	-11	0	0	0	0	-44	-3	0	-54	-3	0	-250	-14	0	-9	-1	-63	0	0	0	0	0	0	0	0	0	0	0	0	-165	-10	0	0	0	0
1973	-30	-2	0	-81	-5	0	-180	-11	0	-141	-9	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	0	0	0	0
1974	-35	-2	0	-61	-4	0	-7	0	0	-158	-10	0	0	0	0	0	0	0	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	-235	-14	0	-155	-9	0
1975	-60	-4	0	-2	0	0	-63	-4	0	-53	-3	0	-149	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	-171	-10	0
1976	-54	-3	0	0	0	0	-73	-5	0	0	0	0	0	0	0	-135	-8	-959	0	0	0	-2	0	-48	-163	-10	-1,610	-204	-12	0	-243	-15	0	0	0	0
1977	-40	-2	0	-130	-8	0	-152	-9	0	-147	-9	0	-161	-9	0	-77	-5	-550	-62	-4	-3,486	-222	-14	-5,119	0	0	0	-236	-14	0	-243	-15	0	-235	-14	0
1978	-198	-12	0	-165	-10	0	-152	-9	0	0	0	0	-180	-10	0	0	0	0	40	2	2,261	-98	-6	-2,268	0	0	0	0	0	0	-180	-11	0	-83	-5	0
1979	-57	-4	0	-47	-3	0	-56	-3	0	-95	-6	0	-161	-9	0	-80	-5	-570	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	0	-59	-3	0
1980	-40	-2	0	-67	-4	0	-181	-11	0	-115	-7	0	-250	-14	0	-130	-8	-924	0	0	0	-149	-9	-3,447	0	0	0	0	0	0	-231	-14	0	-112	-7	0
1981	-74	-5	0	-50	-3	0	-65	-4	0	-98	-6	0	-160	-9	0	-71	-4	-504	0	0	0	0	0	0	-11	-1	-106	-212	-13	0	-75	-5	0	-46	-3	0
1982	-42	-3	0	-133	-8	0	0	0	0	-132	-8	0	-250	-14	0	-94	-6	-669	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	-225	-13	0
1983	0	0	0	0	0	0	-73	-5	0	-42	-3	0	0	0	0	0	0	0	0	0	0	-150	-9	-3,463	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	0	0	0	0
1985	-44	-3	0	-43	-3	0	-28	-2	0	-166	-10	0	-90	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	-199	-12	0	-74	-5	0	-55	-3	0
1986	-50	-3	0	-58	-3	0	-50	-3	0	0	0	0	-131	-7	0	-250	-15	-1,775	-102	-6	-5,735	-7	0	-173	0	0	0	0	0	0	-235	-14	0	-148	-9	0
1987	-72	-4	0	-46	-3	0	-40	-2	0	-42	-3	0	0	0	0	28	2	202	0	0	0	0	0	0	-10	-1	-95	-222	-13	0	-97	-6	0	-45	-3	0
1988	-34	-2	0	-56	-3	0	-74	-5	0	-138	-8	0	0	0	0	6	0	43	0	0	0	0	0	0	-193	-11	-1,912	-236	-14	0	-162	-10	0	-71	-4	0
1989	-26	-2	0	-22	-1	0	-135	-8	0	-147	-9	0	0	0	0	35	2	248	-37	-2	-2,111	-5	0	-118	0	0	0	-180	-11	0	-30	-2	0	-50	-3	0
1990	-199	-12	0	-162	-10	0	-143	-9	0	0	0	0	-132	-7	0	-53	-3	-377	-99	-6	-5,587	-4	0	-85	-146	-9	-1,450	-136	-8	0	-243	-15	0	-235	-14	0
1991	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	-137	-8	0	0	0	-4	-35	-2	-1,959	-5	0	-116	0	0	0	-236	-14	0	-243	-15	0	-235	-14	0
1992	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	-155	-9	0	35	2	248	-47	-3	-2,664	0	0	0	0	0	0	-236	-14	0	-243	-15	0	-235	-14	0
1993	-198	-12	0	-165	-10	0	-152	-9	0	-147	-9	0	0	0	0	0	0	0	-13	-1	-712	0	0	0	0	0	0	0	0	0	-180	-11	0	-94	-6	0
1994	-44	-3	0	-38	-2	0	-90	-6	0	-77	-5	0	-52	-3	0	-48	-3	-342	0	0	0	0	0	0	0	0	0	-57	-3	0	-54	-3	0	-125	-7	0
Mean			0			0			0			0			0			-232			-912			-597			-278			0			0			0
Max			0			0			0			0			0			248			2,261			982			0			0			0			0
Min			0			0			0			0			0			-1,775			-10,680			-5,119			-2,443			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-106	-6	-1	-50	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-22	-58	-3	0	-250	-15	-2	-5	0	0	-124	-7	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-6	-62	-4	0
1924	-41	-3	-17	-38	-2	0	-83	-5	-1	-114	-7	-2	0	0	0	-108	-7	-2	0	0	0	-2	0	-1	0	0	0	0	0	0	-243	-15	-7	0	0	0
1925	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	0	0	0	-24	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-180	-11	-5	-76	-4	0
1926	-41	-3	-16	-35	-2	0	-112	-7	-1	-137	-8	-2	-250	-14	-4	35	2	1	0	0	0	0	0	0	0	0	0	-180	-11	-5	-180	-11	-5	-93	-6	0
1927	-36	-2	-15	-68	-4	0	0	0	0	-114	-7	-2	-129	-7	-2	-82	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-73	-4	0
1928	-47	-3	-19	-51	-3	0	-47	-3	0	-168	-10	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-6	0	0	0
1929	-53	-3	-21	-55	-3	0	-64	-4	-1	-40	-2	-1	0	0	0	-10	-1	0	0	0	0	0	0	0	-182	-11	-16	-236	-14	-7	-139	-9	-4	-70	-4	0
1930	-28	-2	-11	-25	-1	0	-81	-5	-1	-147	-9	-2	-89	-5	-1	35	2	1	0	0	0	0	0	0	-160	-10	-14	-180	-11	-5	-110	-7	-3	0	0	0
1931	-21	-1	-9	-156	-9	-1	-143	-9	-1	-136	-8	-2	0	0	0	-77	-5	-1	-113	-7	-4	0	0	0	-247	-15	-21	-236	-14	-7	-243	-15	-7	-235	-14	-1
1932	-198	-12	-80	-165	-10	-1	-152	-9	-1	0	0	0	95	5	2	35	2	1	-72	-4	-2	-5	0	-1	0	0	0	0	0	0	-180	-11	-5	0	0	0
1933	-34	-2	-14	-32	-2	0	-49	-3	0	-96	-6	-1	-94	-5	-2	35	2	1	0	0	0	0	0	0	-134	-8	-12	-236	-14	-7	-200	-12	-5	-111	-7	-1
1934	0	0	0	-165	-10	-1	-151	-9	-1	-147	-9	-2	-89	-5	-1	-53	-3	-1	0	0	0	0	0	0	-38	-2	-3	-236	-14	-7	-170	-10	-5	-223	-13	-1
1935	-198	-12	-80	-165	-10	-1	-152	-9	-1	-144	-9	-2	0	0	0	-89	-5	-2	-29	-2	-1	43	3	12	0	0	0	0	0	0	-180	-11	-5	-52	-3	0
1936	-34	-2	-14	-32	-2	0	-104	-6	-1	-111	-7	-1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-6	-59	-4	0
1937	-34	-2	-14	-38	-2	0	-44	-3	0	-109	-7	-1	-81	-4	-1	-101	-6	-2	0	0	0	-170	-10	-49	0	0	0	0	0	0	-231	-14	-6	0	0	0
1938	-46	-3	-18	-89	-5	-1	-124	-8	-1	-130	-8	-2	0	0	0	-67	-4	-1	0	0	0	-150	-9	-43	-180	-11	-16	0	0	0	0	0	0	-214	-13	-1
1939	-203	-12	-82	0	0	0	0	0	0	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-209	-12	-6	-79	-5	-2	-51	-3	0
1940	-40	-2	-16	-64	-4	0	-64	-4	-1	-128	-8	-2	0	0	0	35	2	1	-75	-4	-2	-7	0	-2	0	0	0	0	0	0	-231	-14	-6	-59	-4	0
1941	-35	-2	-14	-56	-3	0	0	0	0	-21	-1	0	-250	-14	-4	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-1
1942	-83	-5	-34	-63	-4	0	-76	-5	-1	-38	-2	-1	-92	-5	-2	-86	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-156	-9	-1
1943	-250	-15	-101	-131	-8	-1	0	0	0	-55	-3	-1	0	0	0	-78	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-85	-5	0
1944	-54	-3	-22	-47	-3	0	-59	-4	-1	-37	-2	0	-34	-2	-1	35	2	1	0	0	0	0	0	0	0	0	0	-199	-12	-6	-75	-5	-2	-41	-2	0
1945	-37	-2	-15	-123	-7	-1	0	0	0	0	0	0	-37	-2	-1	-79	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-173	-11	-5	-59	-3	0
1946	-38	-2	-15	-149	-9	-1	0	0	0	-1	0	0	-35	-2	-1	-76	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-155	-9	-4	-65	-4	0
1947	-47	-3	-19	-73	-4	0	-100	-6	-1	-115	-7	-2	-250	-14	-4	-71	-4	-1	0	0	0	0	0	0	-200	-12	-17	-236	-14	-7	-58	-4	-2	-32	-2	0
1948	-29	-2	-12	-71	-4	0	-80	-5	-1	-43	-3	-1	-117	-7	-2	-1	0	0	-112	-7	-4	-32	-2	-9	0	0	0	0	0	0	-156	-10	-4	-61	-4	0
1949	-50	-3	-20	-139	-8	-1	-68	-4	-1	-114	-7	-2	-48	-3	-1	21	1	0	0	0	0	0	0	0	-10	-1	-1	-222	-13	-6	-116	-7	-3	-98	-6	0
1950	-46	-3	-18	-49	-3	0	-77	-5	-1	-86	-5	-1	0	0	0	-121	-7	-2	-161	-10	-5	-8	0	-2	0	0	0	0	0	0	-231	-14	-6	-85	-5	0
1951	-58	-4	-23	-109	-6	-1	-129	-8	-1	-142	-9	-2	-37	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-6	-72	-4	0
1952	-52	-3	-21	-52	-3	0	0	0	0	-17	-1	0	-164	-9	-3	-81	-5	-1	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-228	-14	-1
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-108	-6	0
1954	-109	-7	-44	-75	-4	0	-92	-6	-1	-83	-5	-1	-158	-9	-3	-75	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-6	-75	-4	0
1955	-52	-3	-21	-61	-4	0	-250	-15	-2	-3	0	0	-159	-9	-3	-42	-3	-1	0	0	0	0	0	0	0	0	0	-222	-13	-6	-196	-12	-5	-94	-6	0
1956	-41	-3	-16	-55	-3	0	-180	-11	-2	-138	-8	-2	-250	-14	-4	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-1
1957	-30	-2	-12	-138	-8	-1	-73	-5	-1	-38	-2	-1	-159	-9	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-6	-58	-3	0
1958	-55	-3	-22	-128	-8	-1	-250	-15	-2	0	0	0	-146	-8	-2	0	0	0	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-227	-14	-1
1959	0	0	0	0	0	0	0	0	0	-83	-5	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-218	-13	-6	-52	-3	0
1960	-32	-2	-13	-36	-2	0	-133	-8	-1	0	0	0	0	0	0	35	2	1	0	0	0	0	0	0	0	0	0	-172	-10	-5	-75	-5	-2	-73	-4	0
1961	-40	-2	-16	-160	-10	-1	-133	-8	-1	-138	-8	-2	-131	-7	-2	-39	-2	-1	-74	-4	-2	-5	0	-1	-200	-12	-17	-236	-14	-7	-65	-4	-2	-139	-8	-1
1962	-199	-12	-80	-162	-10	-1	-143	-9	-1	0	0	0	0	0	0	-44	-3	-1	-189	-11	-6	-8	0	-2	0	0	0	-180	-11	-5	-110	-7	-3	-44	-3	0
1963	-136	-8	-55	0	0	0	-250	-15	-2	-95	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-17	-28	-2	0	-22	-1	0	-230	-14	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-222	-13	-6	-65	-4	-2	-43	-3	0
1965	-33	-2	-13	-62	-4	0	0	0	0	0	0	0	-58	-3	-1	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-6	0	0	0
1966	-49	-3	-20	-112	-7	-1	-167	-10	-1	-94	-6	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	-235	-14	-7	-147	-9	-4	-64	-4	0
1967	-54	-3	-22	-86	-5	-1	-250	-15	-2	-38	-2	-1	-154	-9	-3	-46	-3	-1	0	0	0	-150	-9	-43	-181	-11	-16	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-152	-9	-4	-45	-3	0
1969	-44	-3	-18	-99	-6	-1	-180	-11	-2	-115	-7	-2	-175	-10	-3	-166	-10	-3	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-227	-14	-1
1970	-189	-12	-76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-16	-53	-3	0	-58	-4	-1	-135	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-153	-9	-1
1972	-183	-11	-74	0	0	0	-44	-3	0	-54	-3	-1	-250	-14	-4	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-165	-10	-4	0	0	0
1973	-30	-2	-12	-81	-5	-1	-180	-11	-2	-141	-9	-2	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-6	0	0	0
1974	-35	-2	-14	-61	-4	0	-7	0	0	-158	-10	-2	0	0	0	0	0	0	0	0	0	-150	-9	-43	0	0	0	0	0	0	-235	-14	-6	-155	-9	-1
1975	-60	-4	-24	-2	0	0	-63	-4	-1	-53	-3	-1	-149	-8	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	-171	-10	-1
1976	-54	-3	-22	0	0	0	-73	-5	-1	0	0	0	0	0	0	-135	-8	-2	0	0	0	-2	0	-1	-163	-10	-14	-204	-12	-6	-243	-15	-7	0	0	0
1977	-40	-2	-16	-130	-8	-1	-152	-9	-1	-147	-9	-2	-161	-9	-3	-77	-5	-1	-62	-4	-2	-222	-14	-64	0	0	0	-236	-14	-7	-243	-15	-7	-235	-14	-1
1978	-198	-12	-80	-165	-10	-1	-152	-9	-1	0	0	0	-180	-10	-3	0	0	0	40	2	1	-98	-6	-28	0	0	0	0	0	0	-180	-11	-5	-83	-5	0
1979	-57	-4	-23	-47	-3	0	-56	-3	0	-95	-6	-1	-161	-9	-3	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-5	-59	-3	0
1980	-40	-2	-16	-67	-4	0	-181	-11	-2	-115	-7	-2	-250	-14	-4	-130	-8	-2	0	0	0	-149	-9	-43	0	0	0	0	0	0	-231	-14	-6	-112	-7	-1
1981	-74	-5	-30	-50	-3	0	-65	-4	-1	-98	-6	-1	-160	-9	-3	-71	-4	-1	0	0	0	0	0	0	-11	-1	-1	-212	-13	-6	-75	-5	-2	-46	-3	0
1982	-42	-3	-17	-133	-8	-1	0	0	0	-132	-8	-2	-250	-14	-4	-94	-6	-2	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	-225	-13	-1
1983	0	0	0	0	0	0	-73	-5	-1	-42	-3	-1	0	0	0	0	0	0	0	0	0	-150	-9	-43	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-6	0	0	0
1985	-44	-3	-18	-43	-3	0	-28	-2	0	-166	-10	-2	-90	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-199	-12	-5	-74	-5	-2	-55	-3	0
1986	-50	-3	-20	-58	-3	0	-50	-3	0	0	0	0	-131	-7	-2	-250	-15	-4	-102	-6	-3	-7	0	-2	0	0	0	0	0	0	-235	-14	-6	-148	-9	-1
1987	-72	-4	-29	-46	-3	0	-40	-2	0	-42	-3	-1	0	0	0	28	2	0	0	0	0	0	0	0	-10	-1	-1	-222	-13	-6	-97	-6	-3	-45	-3	0
1988	-34	-2	-14	-56	-3	0	-74	-5	-1	-138	-8	-2	0	0	0	6	0	0	0	0	0	0	0	0	-193	-11	-17	-236	-14	-7	-162	-10	-4	-71	-4	0
1989	-26	-2	-11	-22	-1	0	-135	-8	-1	-147	-9	-2	0	0	0	35	2	1	-37	-2	-1	-5	0	-1	0	0	0	-180	-11	-5	-30	-2	-1	-50	-3	0
1990	-199	-12	-80	-162	-10	-1	-143	-9	-1	0	0	0	-132	-7	-2	-53	-3	-1	-99	-6	-3	-4	0	-1	-146	-9	-13	-136	-8	-4	-243	-15	-7	-235	-14	-1
1991	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	-137	-8	-2	0	0	0	-35	-2	-1	-5	0	-1	0	0	0	-236	-14	-7	-243	-15	-7	-235	-14	-1
1992	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	-155	-9	-3	35	2	1	-47	-3	-2	0	0	0	0	0	0	-236	-14	-7	-243	-15	-7	-235	-14	-1
1993	-198	-12	-80	-165	-10	-1	-152	-9	-1	-147	-9	-2	0	0	0	0	0	0	-13	-1	0	0	0	0	0	0	0	0	0	0	-180	-11	-5	-94	-6	0
1994	-44	-3	-18	-38	-2	0	-90	-6	-1	-77	-5	-1	-52	-3	-1	-48	-3	-1	0	0	0	0	0	0	0	0	0	-57	-3	-2	-54	-3	-1	-125	-7	-1
Mean			-28			0			-1			-1			-1			-1			-1			-7			-2			-2			-4			0
Max			0			0			0			0			2			1			1			12			0			0			0			0
Min			-101			-1			-2			-3			-4			-4			-6			-64			-21			-7			-7			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	-106	-6	-2	-50	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-55	-3	-1	-58	-3	-1	-250	-15	-9	-5	0	0	-124	-7	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-5	-62	-4	0
1924	-41	-3	-1	-38	-2	-1	-83	-5	-3	-114	-7	-5	0	0	0	-108	-7	-10	0	0	0	-2	0	-1	0	0	0	0	0	0	-243	-15	-5	0	0	0
1925	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	0	0	0	-24	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	-180	-11	-4	-76	-4	0
1926	-41	-3	-1	-35	-2	-1	-112	-7	-4	-137	-8	-6	-250	-14	-63	35	2	3	0	0	0	0	0	0	0	0	0	-180	-11	-1	-180	-11	-4	-93	-6	0
1927	-36	-2	-1	-68	-4	-1	0	0	0	-114	-7	-5	-129	-7	-33	-82	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-5	-73	-4	0
1928	-47	-3	-1	-51	-3	-1	-47	-3	-2	-168	-10	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-5	0	0	0
1929	-53	-3	-1	-55	-3	-1	-64	-4	-2	-40	-2	-2	0	0	0	-10	-1	-1	0	0	0	0	0	0	-182	-11	-25	-236	-14	-2	-139	-9	-3	-70	-4	0
1930	-28	-2	0	-25	-1	-1	-81	-5	-3	-147	-9	-7	-89	-5	-23	35	2	3	0	0	0	0	0	0	-160	-10	-22	-180	-11	-1	-110	-7	-2	0	0	0
1931	-21	-1	0	-156	-9	-3	-143	-9	-5	-136	-8	-6	0	0	0	-77	-5	-7	-113	-7	-52	0	0	0	-247	-15	-34	-236	-14	-2	-243	-15	-5	-235	-14	-1
1932	-198	-12	-3	-165	-10	-3	-152	-9	-5	0	0	0	95	5	24	35	2	3	-72	-4	-33	-5	0	-3	0	0	0	0	0	0	-180	-11	-4	0	0	0
1933	-34	-2	0	-32	-2	-1	-49	-3	-2	-96	-6	-4	-94	-5	-24	35	2	3	0	0	0	0	0	0	-134	-8	-19	-236	-14	-2	-200	-12	-4	-111	-7	0
1934	0	0	0	-165	-10	-3	-151	-9	-5	-147	-9	-7	-89	-5	-23	-53	-3	-5	0	0	0	0	0	0	-38	-2	-5	-236	-14	-2	-170	-10	-4	-223	-13	-1
1935	-198	-12	-3	-165	-10	-3	-152	-9	-5	-144	-9	-6	0	0	0	-89	-5	-8	-29	-2	-14	43	3	28	0	0	0	0	0	0	-180	-11	-4	-52	-3	0
1936	-34	-2	0	-32	-2	-1	-104	-6	-4	-111	-7	-5	0	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-5	-59	-4	0
1937	-34	-2	0	-38	-2	-1	-44	-3	-2	-109	-7	-5	-81	-4	-20	-101	-6	-10	0	0	0	-170	-10	-114	0	0	0	0	0	0	-231	-14	-5	0	0	0
1938	-46	-3	-1	-89	-5	-2	-124	-8	-4	-130	-8	-6	0	0	0	-67	-4	-6	0	0	0	-150	-9	-100	-180	-11	-25	0	0	0	0	0	0	-214	-13	-1
1939	-203	-12	-3	0	0	0	0	0	0	-81	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-209	-12	-1	-79	-5	-2	-51	-3	0
1940	-40	-2	-1	-64	-4	-1	-64	-4	-2	-128	-8	-6	0	0	0	35	2	3	-75	-4	-35	-7	0	-5	0	0	0	0	0	0	-231	-14	-5	-59	-4	0
1941	-35	-2	-1	-56	-3	-1	0	0	0	-21	-1	-1	-250	-14	-63	-28	-2	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-142	-8	-1
1942	-83	-5	-1	-63	-4	-1	-76	-5	-3	-38	-2	-2	-92	-5	-23	-86	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-5	-156	-9	-1
1943	-250	-15	-4	-131	-8	-3	0	0	0	-55	-3	-2	0	0	0	-78	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-5	-85	-5	0
1944	-54	-3	-1	-47	-3	-1	-59	-4	-2	-37	-2	-2	-34	-2	-9	35	2	3	0	0	0	0	0	0	0	0	0	-199	-12	-1	-75	-5	-2	-41	-2	0
1945	-37	-2	-1	-123	-7	-3	0	0	0	0	0	0	-37	-2	-9	-79	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-173	-11	-4	-59	-3	0
1946	-38	-2	-1	-149	-9	-3	0	0	0	-1	0	0	-35	-2	-9	-76	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-155	-9	-3	-65	-4	0
1947	-47	-3	-1	-73	-4	-2	-100	-6	-4	-115	-7	-5	-250	-14	-63	-71	-4	-7	0	0	0	0	0	0	-200	-12	-28	-236	-14	-2	-58	-4	-1	-32	-2	0
1948	-29	-2	0	-71	-4	-1	-80	-5	-3	-43	-3	-2	-117	-7	-30	-1	0	0	-112	-7	-52	-32	-2	-21	0	0	0	0	0	0	-156	-10	-3	-61	-4	0
1949	-50	-3	-1	-139	-8	-3	-68	-4	-2	-114	-7	-5	-48	-3	-12	21	1	2	0	0	0	0	0	0	-10	-1	-1	-222	-13	-2	-116	-7	-3	-98	-6	0
1950	-46	-3	-1	-49	-3	-1	-77	-5	-3	-86	-5	-4	0	0	0	-121	-7	-12	-161	-10	-75	-8	0	-5	0	0	0	0	0	0	-231	-14	-5	-85	-5	0
1951	-58	-4	-1	-109	-6	-2	-129	-8	-5	-142	-9	-6	-37	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-5	-72	-4	0
1952	-52	-3	-1	-52	-3	-1	0	0	0	-17	-1	-1	-164	-9	-42	-81	-5	-8	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-228	-14	-1
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-5	-108	-6	0
1954	-109	-7	-2	-75	-4	-2	-92	-6	-3	-83	-5	-4	-158	-9	-40	-75	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-5	-75	-4	0
1955	-52	-3	-1	-61	-4	-1	-250	-15	-9	-3	0	0	-159	-9	-40	-42	-3	-4	0	0	0	0	0	0	0	0	0	-222	-13	-2	-196	-12	-4	-94	-6	0
1956	-41	-3	-1	-55	-3	-1	-180	-11	-6	-138	-8	-6	-250	-14	-63	-80	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-195	-12	-1
1957	-30	-2	0	-138	-8	-3	-73	-5	-3	-38	-2	-2	-159	-9	-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-5	-58	-3	0
1958	-55	-3	-1	-128	-8	-3	-250	-15	-9	0	0	0	-146	-8	-37	0	0	0	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-227	-14	-1
1959	0	0	0	0	0	0	0	0	0	-83	-5	-4	-7	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-2	-218	-13	-5	-52	-3	0
1960	-32	-2	0	-36	-2	-1	-133	-8	-5	0	0	0	0	0	0	35	2	3	0	0	0	0	0	0	0	0	0	-172	-10	-1	-75	-5	-2	-73	-4	0
1961	-40	-2	-1	-160	-10	-3	-133	-8	-5	-138	-8	-6	-131	-7	-33	-39	-2	-4	-74	-4	-34	-5	0	-3	-200	-12	-28	-236	-14	-2	-65	-4	-1	-139	-8	-1
1962	-199	-12	-3	-162	-10	-3	-143	-9	-5	0	0	0	0	0	0	-44	-3	-4	-189	-11	-88	-8	0	-5	0	0	0	-180	-11	-1	-110	-7	-2	-44	-3	0
1963	-136	-8	-2	0	0	0	-250	-15	-9	-95	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-41	-3	-1	-28	-2	-1	-22	-1	-1	-230	-14	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-222	-13	-2	-65	-4	-1	-43	-3	0
1965	-33	-2	0	-62	-4	-1	0	0	0	0	0	0	-58	-3	-15	-81	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-236	-14	-5	0	0	0
1966	-49	-3	-1	-112	-7	-2	-167	-10	-6	-94	-6	-4	12	1	3	-10	-1	-1	0	0	0	0	0	0	0	0	0	-235	-14	-2	-147	-9	-3	-64	-4	0
1967	-54	-3	-1	-86	-5	-2	-250	-15	-9	-38	-2	-2	-154	-9	-39	-46	-3	-4	0	0	0	-150	-9	-100	-181	-11	-25	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	-92	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-2	-152	-9	-3	-45	-3	0
1969	-44	-3	-1	-99	-6	-2	-180	-11	-6	-115	-7	-5	-175	-10	-44	-166	-10	-16	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-227	-14	-1
1970	-189	-12	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-41	-2	-1	-53	-3	-1	-58	-4	-2	-135	-8	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-5	-153	-9	-1
1972	-183	-11	-3	0	0	0	-44	-3	-2	-54	-3	-2	-250	-14	-63	-9	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-165	-10	-4	0	0	0
1973	-30	-2	0	-81	-5	-2	-180	-11	-6	-141	-9	-6	-35	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-231	-14	-5	0	0	0
1974	-35	-2	-1	-61	-4	-1	-7	0	0	-158	-10	-7	0	0	0	0	0	0	0	0	0	-150	-9	-100	0	0	0	0	0	0	-235	-14	-5	-155	-9	-1
1975	-60	-4	-1	-2	0	0	-63	-4	-2	-53	-3	-2	-149	-8	-38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-5	-171	-10	-1
1976	-54	-3	-1	0	0	0	-73	-5	-3	0	0	0	0	0	0	-135	-8	-13	0	0	0	-2	0	-1	-163	-10	-23	-204	-12	-1	-243	-15	-5	0	0	0
1977	-40	-2	-1	-130	-8	-3	-152	-9	-5	-147	-9	-7	-161	-9	-41	-77	-5	-7	-62	-4	-29	-222	-14	-148	0	0	0	-236	-14	-2	-243	-15	-5	-235	-14	-1
1978	-198	-12	-3	-165	-10	-3	-152	-9	-5	0	0	0	-180	-10	-46	0	0	0	40	2	19	-98	-6	-66	0	0	0	0	0	0	-180	-11	-4	-83	-5	0
1979	-57	-4	-1	-47	-3	-1	-56	-3	-2	-95	-6	-4	-161	-9	-41	-80	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-174	-11	-4	-59	-3	0
1980	-40	-2	-1	-67	-4	-1	-181	-11	-6	-115	-7	-5	-250	-14	-63	-130	-8	-12	0	0	0	-149	-9	-100	0	0	0	0	0	0	-231	-14	-5	-112	-7	0
1981	-74	-5	-1	-50	-3	-1	-65	-4	-2	-98	-6	-4	-160	-9	-40	-71	-4	-7	0	0	0	0	0	0	-11	-1	-1	-212	-13	-2	-75	-5	-2	-46	-3	0
1982	-42	-3	-1	-133	-8	-3	0	0	0	-132	-8	-6	-250	-14	-63	-94	-6	-9	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	-225	-13	-1
1983	0	0	0	0	0	0	-73	-5	-3	-42	-3	-2	0	0	0	0	0	0	0	0	0	-150	-9	-100	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	-81	-5	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-235	-14	-5	0	0	0
1985	-44	-3	-1	-43	-3	-1	-28	-2	-1	-166	-10	-7	-90	-5	-23	0	0	0	0	0	0	0	0	0	0	0	0	-199	-12	-1	-74	-5	-2	-55	-3	0
1986	-50	-3	-1	-58	-3	-1	-50	-3	-2	0	0	0	-131	-7	-33	-250	-15	-24	-102	-6	-47	-7	0	-5	0	0	0	0	0	0	-235	-14	-5	-148	-9	-1
1987	-72	-4	-1	-46	-3	-1	-40	-2	-1	-42	-3	-2	0	0	0	28	2	3	0	0	0	0	0	0	-10	-1	-1	-222	-13	-2	-97	-6	-2	-45	-3	0
1988	-34	-2	0	-56	-3	-1	-74	-5	-3	-138	-8	-6	0	0	0	6	0	1	0	0	0	0	0	0	-193	-11	-27	-236	-14	-2	-162	-10	-4	-71	-4	0
1989	-26	-2	0	-22	-1	0	-135	-8	-5	-147	-9	-7	0	0	0	35	2	3	-37	-2	-17	-5	0	-3	0	0	0	-180	-11	-1	-30	-2	-1	-50	-3	0
1990	-199	-12	-3	-162	-10	-3	-143	-9	-5	0	0	0	-132	-7	-33	-53	-3	-5	-99	-6	-46	-4	0	-2	-146	-9	-20	-136	-8	-1	-243	-15	-5	-235	-14	-1
1991	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	-137	-8	-35	0	0	0	-35	-2	-16	-5	0	-3	0	0	0	-236	-14	-2	-243	-15	-5	-235	-14	-1
1992	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	-155	-9	-39	35	2	3	-47	-3	-22	0	0	0	0	0	0	-236	-14	-2	-243	-15	-5	-235	-14	-1
1993	-198	-12	-3	-165	-10	-3	-152	-9	-5	-147	-9	-7	0	0	0	0	0	0	-13	-1	-6	0	0	0	0	0	0	0	0	0	-180	-11	-4	-94	-6	0
1994	-44	-3	-1	-38	-2	-1	-90	-6	-3	-77	-5	-3	-52	-3	-13	-48	-3	-5	0	0	0	0	0	0	0	0	0	-57	-3	0	-54	-3	-1	-125	-7	0
Mean			-1			-2			-3			-4			-19			-3			-8			-17			-4			-1			-3			0
Max			0			0			0			0			24			3			19			28			0			0			0			0
Min			-4			-3			-9			-10			-63			-24			-88			-148			-34			-2			-5			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	4	1,172	8	0	44	19	1	17	236	14	80
1923	139	9	52	141	8	57	173	11	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	87	250	15	221	183	11	62
1924	100	6	37	84	5	34	132	8	40	95	6	41	51	3	21	111	7	26	0	0	0	0	0	0	149	9	2,486	0	0	0	250	15	221	213	13	73
1925	65	4	24	158	9	64	150	9	46	147	9	63	70	4	29	0	0	0	0	0	0	0	0	0	0	0	0	70	4	402	250	15	221	250	15	85
1926	100	6	37	65	4	27	60	4	18	122	7	52	164	9	68	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	243	14	83
1927	90	6	33	133	8	54	30	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	250	15	221	228	14	78
1928	106	7	39	102	6	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	44	250	15	221	236	14	80
1929	113	7	42	110	7	45	245	15	75	98	6	42	47	3	19	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	182	11	62
1930	70	4	26	51	3	21	139	9	43	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	233	14	80
1931	64	4	24	67	4	27	105	6	32	103	6	44	49	3	21	0	0	0	0	0	0	0	0	0	250	15	4,184	250	15	1,436	250	15	221	235	14	80
1932	198	12	73	165	10	67	152	9	46	0	0	0	70	4	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	250	15	85
1933	108	7	40	0	0	0	103	6	32	106	6	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1934	96	6	36	56	3	23	132	8	41	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1935	154	9	57	164	10	66	152	9	46	147	9	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	204	12	70
1936	108	7	40	79	5	32	32	2	10	115	7	49	48	3	20	0	0	0	0	0	0	0	0	0	0	0	0	15	1	87	250	15	221	234	14	80
1937	101	6	38	83	5	34	250	15	77	93	6	40	99	6	41	0	0	0	0	0	0	170	10	993	0	0	0	0	0	0	250	15	221	235	14	80
1938	122	7	45	234	14	95	0	0	0	0	0	0	0	0	0	67	4	16	0	0	0	150	9	875	250	15	4,184	3	0	16	15	1	13	227	14	78
1939	190	12	71	0	0	0	93	6	28	81	5	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	141	8	48
1940	77	5	28	86	5	35	101	6	31	138	8	59	70	4	29	0	0	0	0	0	0	0	0	0	0	0	0	8	0	44	250	15	221	188	11	64
1941	82	5	30	72	4	29	70	4	21	0	0	0	60	3	25	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	15	1	13	228	14	78
1942	190	12	71	136	8	55	74	5	23	0	0	0	79	4	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	227	14	78
1943	190	12	71	131	8	53	0	0	0	55	3	23	0	0	0	78	5	18	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1944	116	7	43	82	5	33	77	5	24	83	5	36	52	3	22	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	119	7	41
1945	71	4	27	132	8	53	70	4	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	87	250	15	221	176	10	60
1946	98	6	36	106	6	43	70	4	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	87	250	15	221	185	11	63
1947	103	6	38	109	7	44	250	15	77	115	7	49	101	6	42	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	109	6	37
1948	64	4	24	104	6	42	140	9	43	123	8	53	66	4	27	0	0	0	0	0	0	0	0	0	0	0	0	70	4	402	250	15	221	196	12	67
1949	109	7	40	99	6	40	250	15	77	114	7	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	236	14	80
1950	100	6	37	80	5	33	113	7	35	138	8	59	70	4	29	0	0	0	0	0	0	0	0	0	0	0	0	15	1	87	250	15	221	234	14	80
1951	130	8	48	221	13	90	0	0	0	0	0	0	99	5	41	0	0	0	0	0	0	0	0	0	0	0	0	8	0	44	250	15	221	209	12	71
1952	113	7	42	108	6	44	19	1	6	0	0	0	0	0	0	81	5	19	0	0	0	150	9	875	70	4	1,172	3	0	16	15	1	13	228	14	78
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	250	15	221	228	14	78
1954	191	12	71	136	8	55	93	6	28	81	5	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	44	250	15	221	236	14	80
1955	107	7	40	116	7	47	245	15	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	233	14	80
1956	79	5	29	81	5	33	250	15	77	124	8	53	124	7	52	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	15	1	13	227	13	77
1957	0	0	0	138	8	56	94	6	29	81	5	35	89	5	37	0	0	0	0	0	0	0	0	0	0	0	0	8	0	44	250	15	221	200	12	68
1958	120	7	45	250	15	101	127	8	39	0	0	0	0	0	0	0	0	0	0	0	0	150	9	875	27	2	458	3	0	16	15	1	13	227	14	78
1959	0	0	0	0	0	0	93	6	28	77	5	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	182	11	62
1960	82	5	31	68	4	28	132	8	41	115	7	49	54	3	22	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	243	14	83
1961	84	5	31	118	7	48	250	15	77	138	8	59	146	8	60	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	151	9	52
1962	72	4	27	103	6	42	143	9	44	0	0	0	70	4	29	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	139	8	48
1963	80	5	30	0	0	0	140	9	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	15	1	13	227	13	78
1964	119	7	44	64	4	26	0	0	0	76	5	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	235	14	207	139	8	48
1965	75	5	28	134	8	54	70	4	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	228	14	78
1966	105	6	39	221	13	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	181	11	62
1967	99	6	37	250	15	101	167	10	51	0	0	0	0	0	0	0	0	0	0	0	0	150	9	875	250	15	4,184	3	0	16	15	1	13	0	0	0
1968	0	0	0	0	0	0	92	6	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	129	8	44
1969	89	5	33	124	7	50	250	15	77	115	7	49	0	0	0	73	4	17	0	0	0	150	9	875	70	4	1,172	3	0	16	15	1	13	227	14	78
1970	189	12	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	15	1	13	227	14	78
1971	96	6	36	103	6	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	250	15	221	227	14	78
1972	191	12	71	137	8	55	88	5	27	83	5	35	30	2	13	0	0	0	0	0	0	0	0	0	0	0	0	15	1	87	250	15	221	163	10	56
1973	69	4	26	111	7	45	250	15	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	44	250	15	221	235	14	80
1974	94	6	35	109	6	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	875	0	0	0	2	0	12	250	15	221	228	14	78
1975	0	0	0	2	0	1	90	6	28	83	5	36	86	5	36	0	0	0	0	0	0	0	0	0	0	0	0	3	0	15	250	15	221	228	14	78
1976	0	0	0	0	0	0	94	6	29	83	5	36	39	2	16	138	8	32	0	0	0	0	0	0	195	12	3,258	250	15	1,436	250	15	221	210	12	72
1977	88	5	33	137	8	56	107	7	33	89	5	38	69	4	29	54	3	13	0	0	0	222	14	1,293	250	15	4,184	250	15	1,436	250	15	221	235	14	80
1978	198	12	73	165	10	67	152	9	46	0	0	0	250	14	104	34	2	8	34	2	4	149	9	871	70	4	1,172	70	4	402	250	15	221	235	14	80
1979	200	12	74	143	9	58	103	6	32	98	6	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	87	250	15	221	175	10	60
1980	96	6	36	122	7	50	250	15	77	94	6	40	55	3	23	76	5	18	0	0	0	149	9	871	0	0	0	7	0	41	250	15	221	236	14	80
1981	200	12	74	147	9	60	128	8	39	92	6	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	140	8	48
1982	87	5	32	150	9	61	0	0	0	0	0	0	125	7	52	33	2	8	0	0	0	150	9	875	70	4	1,172	3	0	16	15	1	13	225	13	77
1983	0	0	0	0	0	0	73	5	22	42	3	18	0	0	0	0	0	0	0	0	0	150	9	875	70	4	1,172	3	0	16	15	1	13	0	0	0
1984	0	0	0	0	0	0	81	5	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	250	15	221	228	14	78
1985	105	6	39	80	5	33	0	0	0	0	0	0	90	5	37	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	227	14	201	152	9	52
1986	109	7	41	100	6	41	250	15	77	0	0	0	205	11	85	74	5	17	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	227	13	77
1987	168	10	63	116	7	47	75	5	23	83	5	36	47	3	20	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	148	9	51
1988	68	4	25	91	5	37	192	12	59	138	8	59	70	4	29	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	190	11	65
1989	67	4	25	56	3	23	106	6	32	147	9	63	79	4	33	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	174	10	59
1990	95	6	36	97	6	39	143	9	44	67	4	29	94	5	39	0	0	0	0	0	0	0	0	0	0	0	0	238	14	1,368	250	15	221	233	14	79
1991	106	7	40	165	10	67	152	9	46	147	9	63	161	9	67	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1992	198	12	73	165	10	67	152	9	46	147	9	63	155	9	64	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	250	15	221	235	14	80
1993	198	12	73	165	10	67	152	9	46	147	9	63	70	4	29	34	2	8	0	0	0	0	0	0	0	0	0	0	0	0	250	15	221	236	14	80
1994	172	11	64	130	8	53	170	10	52	97	6	42	87	5	36	0	0	0	0	0	0	0	0	0	0	0	0	250	15	1,436	231	14	204	102	6	35
Mean			38			41			34			27			19			3			0			151			411			603			186			69
Max			74			101			77			63			104			32			4			1,293			4,184			1,436			221			85
Min			0			0			0			0			0			0			0			0			0			0			13			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	4	182	8	0	4	19	1	1	236	14	2
1923	139	9	0	141	8	4	173	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	9	250	15	9	183	11	1
1924	100	6	0	84	5	3	132	8	0	95	6	1	51	3	1	111	7	3	0	0	0	0	0	0	149	9	386	0	0	0	250	15	9	213	13	2
1925	65	4	0	158	9	5	150	9	0	147	9	2	70	4	2	0	0	0	0	0	0	0	0	0	0	0	0	70	4	40	250	15	9	250	15	2
1926	100	6	0	65	4	2	60	4	0	122	7	1	164	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	243	14	2
1927	90	6	0	133	8	4	30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	250	15	9	228	14	2
1928	106	7	0	102	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	250	15	9	236	14	2
1929	113	7	0	110	7	3	245	15	1	98	6	1	47	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	182	11	1
1930	70	4	0	51	3	2	139	9	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	233	14	2
1931	64	4	0	67	4	2	105	6	0	103	6	1	49	3	1	0	0	0	0	0	0	0	0	0	250	15	649	250	15	142	250	15	9	235	14	2
1932	198	12	0	165	10	5	152	9	0	0	0	0	70	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	250	15	2
1933	108	7	0	0	0	0	103	6	0	106	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1934	96	6	0	56	3	2	132	8	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1935	154	9	0	164	10	5	152	9	0	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	204	12	2
1936	108	7	0	79	5	2	32	2	0	115	7	1	48	3	1	0	0	0	0	0	0	0	0	0	0	0	0	15	1	9	250	15	9	234	14	2
1937	101	6	0	83	5	3	250	15	1	93	6	1	99	6	2	0	0	0	0	0	0	170	10	220	0	0	0	0	0	0	250	15	9	235	14	2
1938	122	7	0	234	14	7	0	0	0	0	0	0	0	0	0	67	4	2	0	0	0	150	9	193	250	15	649	3	0	2	15	1	1	227	14	2
1939	190	12	0	0	0	0	93	6	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	141	8	1
1940	77	5	0	86	5	3	101	6	0	138	8	2	70	4	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	250	15	9	188	11	1
1941	82	5	0	72	4	2	70	4	0	0	0	0	60	3	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	15	1	1	228	14	2
1942	190	12	0	136	8	4	74	5	0	0	0	0	79	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	227	14	2
1943	190	12	0	131	8	4	0	0	0	55	3	1	0	0	0	78	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1944	116	7	0	82	5	2	77	5	0	83	5	1	52	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	119	7	1
1945	71	4	0	132	8	4	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	9	250	15	9	176	10	1
1946	98	6	0	106	6	3	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	9	250	15	9	185	11	1
1947	103	6	0	109	7	3	250	15	1	115	7	1	101	6	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	109	6	1
1948	64	4	0	104	6	3	140	9	0	123	8	2	66	4	2	0	0	0	0	0	0	0	0	0	0	0	0	70	4	40	250	15	9	196	12	1
1949	109	7	0	99	6	3	250	15	1	114	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	236	14	2
1950	100	6	0	80	5	2	113	7	0	138	8	2	70	4	2	0	0	0	0	0	0	0	0	0	0	0	0	15	1	9	250	15	9	234	14	2
1951	130	8	0	221	13	7	0	0	0	0	0	0	99	5	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	250	15	9	209	12	2
1952	113	7	0	108	6	3	19	1	0	0	0	0	0	0	0	81	5	2	0	0	0	150	9	193	70	4	182	3	0	2	15	1	1	228	14	2
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	250	15	9	228	14	2
1954	191	12	0	136	8	4	93	6	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	250	15	9	236	14	2
1955	107	7	0	116	7	4	245	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	233	14	2
1956	79	5	0	81	5	2	250	15	1	124	8	2	124	7	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	15	1	1	227	13	2
1957	0	0	0	138	8	4	94	6	0	81	5	1	89	5	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	250	15	9	200	12	2
1958	120	7	0	250	15	8	127	8	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	193	27	2	71	3	0	2	15	1	1	227	14	2
1959	0	0	0	0	0	0	93	6	0	77	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	182	11	1
1960	82	5	0	68	4	2	132	8	0	115	7	1	54	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	243	14	2
1961	84	5	0	118	7	4	250	15	1	138	8	2	146	8	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	151	9	1
1962	72	4	0	103	6	3	143	9	0	0	0	0	70	4	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	139	8	1
1963	80	5	0	0	0	0	140	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	15	1	1	227	13	2
1964	119	7	0	64	4	2	0	0	0	76	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	235	14	9	139	8	1
1965	75	5	0	134	8	4	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	228	14	2
1966	105	6	0	221	13	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	181	11	1
1967	99	6	0	250	15	8	167	10	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	193	250	15	649	3	0	2	15	1	1	0	0	0
1968	0	0	0	0	0	0	92	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	129	8	1
1969	89	5	0	124	7	4	250	15	1	115	7	1	0	0	0	73	4	2	0	0	0	150	9	193	70	4	182	3	0	2	15	1	1	227	14	2
1970	189	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	15	1	1	227	14	2
1971	96	6	0	103	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	250	15	9	227	14	2
1972	191	12	0	137	8	4	88	5	0	83	5	1	30	2	1	0	0	0	0	0	0	0	0	0	0	0	0	15	1	9	250	15	9	163	10	1
1973	69	4	0	111	7	3	250	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	250	15	9	235	14	2
1974	94	6	0	109	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	193	0	0	0	2	0	1	250	15	9	228	14	2
1975	0	0	0	2	0	0	90	6	0	83	5	1	86	5	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	250	15	9	228	14	2
1976	0	0	0	0	0	0	94	6	0	83	5	1	39	2	1	138	8	4	0	0	0	0	0	0	195	12	505	250	15	142	250	15	9	210	12	2
1977	88	5	0	137	8	4	107	7	0	89	5	1	69	4	2	54	3	2	0	0	0	222	14	286	250	15	649	250	15	142	250	15	9	235	14	2
1978	198	12	0	165	10	5	152	9	0	0	0	0	250	14	6	34	2	1	34	2	2	149	9	193	70	4	182	70	4	40	250	15	9	235	14	2
1979	200	12	0	143	9	4	103	6	0	98	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	9	250	15	9	175	10	1
1980	96	6	0	122	7	4	250	15	1	94	6	1	55	3	1	76	5	2	0	0	0	149	9	193	0	0	0	7	0	4	250	15	9	236	14	2
1981	200	12	0	147	9	4	128	8	0	92	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	140	8	1
1982	87	5	0	150	9	5	0	0	0	0	0	0	125	7	3	33	2	1	0	0	0	150	9	193	70	4	182	3	0	2	15	1	1	225	13	2
1983	0	0	0	0	0	0	73	5	0	42	3	1	0	0	0	0	0	0	0	0	0	150	9	193	70	4	182	3	0	2	15	1	1	0	0	0
1984	0	0	0	0	0	0	81	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	250	15	9	228	14	2
1985	105	6	0	80	5	2	0	0	0	0	0	0	90	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	227	14	9	152	9	1
1986	109	7	0	100	6	3	250	15	1	0	0	0	205	11	5	74	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	227	13	2
1987	168	10	0	116	7	3	75	5	0	83	5	1	47	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	148	9	1
1988	68	4	0	91	5	3	192	12	1	138	8	2	70	4	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	190	11	1
1989	67	4	0	56	3	2	106	6	0	147	9	2	79	4	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	174	10	1
1990	95	6	0	97	6	3	143	9	0	67	4	1	94	5	2	0	0	0	0	0	0	0	0	0	0	0	0	238	14	135	250	15	9	233	14	2
1991	106	7	0	165	10	5	152	9	0	147	9	2	161	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1992	198	12	0	165	10	5	152	9	0	147	9	2	155	9	4	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	250	15	9	235	14	2
1993	198	12	0	165	10	5	152	9	0	147	9	2	70	4	2	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	9	236	14	2
1994	172	11	0	130	8	4	170	10	0	97	6	1	87	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	142	231	14	9	102	6	1
Mean			0			3			0			1			1			0			0			33			64			60			8			2
Max			0			8			1			2			6			4			2			286			649			142			9			2
Min			0			0			0			0			0			0			0			0			0			0			1			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	70	4	**0**	8	0	**0**	19	1	**0**	236	14	**0**
1923	139	9	**0**	141	8	**1**	173	11	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	15	1	**0**	250	15	**0**	183	11	**0**
1924	100	6	**0**	84	5	**1**	132	8	**0**	95	6	**1**	51	3	**1**	111	7	**2**	0	0	0	0	0	**0**	149	9	**0**	0	0	**0**	250	15	**0**	213	13	**0**
1925	65	4	**0**	158	9	**1**	150	9	**0**	147	9	**1**	70	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	70	4	**0**	250	15	**0**	250	15	**0**
1926	100	6	**0**	65	4	**0**	60	4	**0**	122	7	**1**	164	9	**2**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	243	14	**0**
1927	90	6	**0**	133	8	**1**	30	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	250	15	**0**	228	14	**0**
1928	106	7	**0**	102	6	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	8	0	**0**	250	15	**0**	236	14	**0**
1929	113	7	**0**	110	7	**1**	245	15	**1**	98	6	**1**	47	3	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	182	11	**0**
1930	70	4	**0**	51	3	**0**	139	9	**0**	147	9	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	233	14	**0**
1931	64	4	**0**	67	4	**0**	105	6	**0**	103	6	**1**	49	3	**1**	0	0	**0**	0	0	0	0	0	**0**	250	15	**0**	250	15	**1**	250	15	**0**	235	14	**0**
1932	198	12	**0**	165	10	**1**	152	9	**0**	0	0	**0**	70	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	250	15	**0**
1933	108	7	**0**	0	0	**0**	103	6	**0**	106	6	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	235	14	**0**
1934	96	6	**0**	56	3	**0**	132	8	**0**	147	9	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	235	14	**0**
1935	154	9	**0**	164	10	**1**	152	9	**0**	147	9	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	204	12	**0**
1936	108	7	**0**	79	5	**1**	32	2	**0**	115	7	**1**	48	3	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	15	1	**0**	250	15	**0**	234	14	**0**
1937	101	6	**0**	83	5	**1**	250	15	**1**	93	6	**1**	99	6	**1**	0	0	**0**	0	0	0	170	10	**1**	0	0	**0**	0	0	**0**	250	15	**0**	235	14	**0**
1938	122	7	**0**	234	14	**2**	0	0	**0**	0	0	**0**	0	0	**0**	67	4	**1**	0	0	0	150	9	**1**	250	15	**0**	3	0	**0**	15	1	**0**	227	14	**0**
1939	190	12	**0**	0	0	**0**	93	6	**0**	81	5	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	141	8	**0**
1940	77	5	**0**	86	5	**1**	101	6	**0**	138	8	**1**	70	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	8	0	**0**	250	15	**0**	188	11	**0**
1941	82	5	**0**	72	4	**1**	70	4	**0**	0	0	**0**	60	3	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	15	1	**0**	228	14	**0**
1942	190	12	**0**	136	8	**1**	74	5	**0**	0	0	**0**	79	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	227	14	**0**
1943	190	12	**0**	131	8	**1**	0	0	**0**	55	3	**0**	0	0	**0**	78	5	**1**	0	0	0	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1944	116	7	**0**	82	5	**1**	77	5	**0**	83	5	**1**	52	3	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	119	7	**0**
1945	71	4	**0**	132	8	**1**	70	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	15	1	**0**	250	15	**0**	176	10	**0**
1946	98	6	**0**	106	6	**1**	70	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	15	1	**0**	250	15	**0**	185	11	**0**
1947	103	6	**0**	109	7	**1**	250	15	**1**	115	7	**1**	101	6	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	109	6	**0**
1948	64	4	**0**	104	6	**1**	140	9	**0**	123	8	**1**	66	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	70	4	**0**	250	15	**0**	196	12	**0**
1949	109	7	**0**	99	6	**1**	250	15	**1**	114	7	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	236	14	**0**
1950	100	6	**0**	80	5	**1**	113	7	**0**	138	8	**1**	70	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	15	1	**0**	250	15	**0**	234	14	**0**
1951	130	8	**0**	221	13	**2**	0	0	**0**	0	0	**0**	99	5	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	8	0	**0**	250	15	**0**	209	12	**0**
1952	113	7	**0**	108	6	**1**	19	1	**0**	0	0	**0**	0	0	**0**	81	5	**1**	0	0	0	150	9	**1**	70	4	**0**	3	0	**0**	15	1	**0**	228	14	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	250	15	**0**	228	14	**0**
1954	191	12	**0**	136	8	**1**	93	6	**0**	81	5	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	8	0	**0**	250	15	**0**	236	14	**0**
1955	107	7	**0**	116	7	**1**	245	15	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	233	14	**0**
1956	79	5	**0**	81	5	**1**	250	15	**1**	124	8	**1**	124	7	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	15	1	**0**	227	13	**0**
1957	0	0	**0**	138	8	**1**	94	6	**0**	81	5	**1**	89	5	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	8	0	**0**	250	15	**0**	200	12	**0**
1958	120	7	**0**	250	15	**2**	127	8	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	150	9	**1**	27	2	**0**	3	0	**0**	15	1	**0**	227	14	**0**
1959	0	0	**0**	0	0	**0**	93	6	**0**	77	5	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	182	11	**0**
1960	82	5	**0**	68	4	**0**	132	8	**0**	115	7	**1**	54	3	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	243	14	**0**
1961	84	5	**0**	118	7	**1**	250	15	**1**	138	8	**1**	146	8	**2**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	151	9	**0**
1962	72	4	**0**	103	6	**1**	143	9	**0**	0	0	**0**	70	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	139	8	**0**
1963	80	5	**0**	0	0	**0**	140	9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	15	1	**0**	227	13	**0**
1964	119	7	**0**	64	4	**0**	0	0	**0**	76	5	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	235	14	**0**	139	8	**0**
1965	75	5	**0**	134	8	**1**	70	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	228	14	**0**
1966	105	6	**0**	221	13	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	181	11	**0**
1967	99	6	**0**	250	15	**2**	167	10	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	150	9	**1**	250	15	**0**	3	0	**0**	15	1	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	92	6	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	129	8	**0**
1969	89	5	**0**	124	7	**1**	250	15	**1**	115	7	**1**	0	0	**0**	73	4	**1**	0	0	0	150	9	**1**	70	4	**0**	3	0	**0**	15	1	**0**	227	14	**0**
1970	189	12	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	15	1	**0**	227	14	**0**
1971	96	6	**0**	103	6	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	250	15	**0**	227	14	**0**
1972	191	12	**0**	137	8	**1**	88	5	**0**	83	5	**1**	30	2	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	15	1	**0**	250	15	**0**	163	10	**0**
1973	69	4	**0**	111	7	**1**	250	15	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	8	0	**0**	250	15	**0**	235	14	**0**
1974	94	6	**0**	109	6	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	150	9	**1**	0	0	**0**	2	0	**0**	250	15	**0**	228	14	**0**
1975	0	0	**0**	2	0	**0**	90	6	**0**	83	5	**1**	86	5	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	250	15	**0**	228	14	**0**
1976	0	0	**0**	0	0	**0**	94	6	**0**	83	5	**1**	39	2	**0**	138	8	**2**	0	0	0	0	0	**0**	195	12	**0**	250	15	**1**	250	15	**0**	210	12	**0**
1977	88	5	**0**	137	8	**1**	107	7	**0**	89	5	**1**	69	4	**1**	54	3	**1**	0	0	0	222	14	**1**	250	15	**0**	250	15	**1**	250	15	**0**	235	14	**0**
1978	198	12	**0**	165	10	**1**	152	9	**0**	0	0	**0**	250	14	**3**	34	2	**1**	34	2	0	149	9	**1**	70	4	**0**	70	4	**0**	250	15	**0**	235	14	**0**
1979	200	12	**0**	143	9	**1**	103	6	**0**	98	6	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	15	1	**0**	250	15	**0**	175	10	**0**
1980	96	6	**0**	122	7	**1**	250	15	**1**	94	6	**1**	55	3	**1**	76	5	**1**	0	0	0	149	9	**1**	0	0	**0**	7	0	**0**	250	15	**0**	236	14	**0**
1981	200	12	**0**	147	9	**1**	128	8	**0**	92	6	**1**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	140	8	**0**
1982	87	5	**0**	150	9	**1**	0	0	**0**	0	0	**0**	125	7	**1**	33	2	**1**	0	0	0	150	9	**1**	70	4	**0**	3	0	**0**	15	1	**0**	225	13	**0**
1983	0	0	**0**	0	0	**0**	73	5	**0**	42	3	**0**	0	0	**0**	0	0	**0**	0	0	0	150	9	**1**	70	4	**0**	3	0	**0**	15	1	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	81	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	3	0	**0**	250	15	**0**	228	14	**0**
1985	105	6	**0**	80	5	**1**	0	0	**0**	0	0	**0**	90	5	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	227	14	**0**	152	9	**0**
1986	109	7	**0**	100	6	**1**	250	15	**1**	0	0	**0**	205	11	**2**	74	5	**1**	0	0	0	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	227	13	**0**
1987	168	10	**0**	116	7	**1**	75	5	**0**	83	5	**1**	47	3	**0**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	148	9	**0**
1988	68	4	**0**	91	5	**1**	192	12	**0**	138	8	**1**	70	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	190	11	**0**
1989	67	4	**0**	56	3	**0**	106	6	**0**	147	9	**1**	79	4	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	174	10	**0**
1990	95	6	**0**	97	6	**1**	143	9	**0**	67	4	**1**	94	5	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	238	14	**1**	250	15	**0**	233	14	**0**
1991	106	7	**0**	165	10	**1**	152	9	**0**	147	9	**1**	161	9	**2**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	235	14	**0**
1992	198	12	**0**	165	10	**1**	152	9	**0**	147	9	**1**	155	9	**2**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	250	15	**0**	235	14	**0**
1993	198	12	**0**	165	10	**1**	152	9	**0**	147	9	**1**	70	4	**1**	34	2	**1**	0	0	0	0	0	**0**	0	0	**0**	0	0	**0**	250	15	**0**	236	14	**0**
1994	172	11	**0**	130	8	**1**	170	10	**0**	97	6	**1**	87	5	**1**	0	0	**0**	0	0	0	0	0	**0**	0	0	**0**	250	15	**1**	231	14	**0**	102	6	**0**
Mean			**0**			**1**			**0**			**0**			**0**			**0**			0			**0**			**0**			**1**			**0**			**0**
Max			**0**			**2**			**1**			**1**			**3**			**2**			0			**1**			**0**			**1**			**0**			**0**
Min			**0**			**0**			**0**			**0**			**0**			**0**			0			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	54	Apr	Vol	412	May	Vol	530	Jun	Vol	119	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	4	493	8	0	0	19	1	0	236	14	0
1923	139	9	0	141	8	0	173	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	0	183	11	0
1924	100	6	0	84	5	0	132	8	0	95	6	0	51	3	0	111	7	366	0	0	0	0	0	0	149	9	1,047	0	0	0	250	15	0	213	13	0
1925	65	4	0	158	9	0	150	9	0	147	9	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	70	4	0	250	15	0	250	15	0
1926	100	6	0	65	4	0	60	4	0	122	7	0	164	9	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	243	14	0
1927	90	6	0	133	8	0	30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	0	228	14	0
1928	106	7	0	102	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	0	236	14	0
1929	113	7	0	110	7	0	245	15	0	98	6	0	47	3	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	182	11	0
1930	70	4	0	51	3	0	139	9	0	147	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	233	14	0
1931	64	4	0	67	4	0	105	6	0	103	6	0	49	3	0	0	0	0	0	0	0	0	0	0	250	15	1,762	250	15	0	250	15	0	235	14	0
1932	198	12	0	165	10	0	152	9	0	0	0	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0
1933	108	7	0	0	0	0	103	6	0	106	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	235	14	0
1934	96	6	0	56	3	0	132	8	0	147	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	235	14	0
1935	154	9	0	164	10	0	152	9	0	147	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	204	12	0
1936	108	7	0	79	5	0	32	2	0	115	7	0	48	3	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	0	234	14	0
1937	101	6	0	83	5	0	250	15	0	93	6	0	99	6	0	0	0	0	0	0	0	170	10	5,542	0	0	0	0	0	0	250	15	0	235	14	0
1938	122	7	0	234	14	0	0	0	0	0	0	0	0	0	0	67	4	221	0	0	0	150	9	4,883	250	15	1,762	3	0	0	15	1	0	227	14	0
1939	190	12	0	0	0	0	93	6	0	81	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	141	8	0
1940	77	5	0	86	5	0	101	6	0	138	8	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	0	188	11	0
1941	82	5	0	72	4	0	70	4	0	0	0	0	60	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	228	14	0
1942	190	12	0	136	8	0	74	5	0	0	0	0	79	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	227	14	0
1943	190	12	0	131	8	0	0	0	0	55	3	0	0	0	0	78	5	258	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1944	116	7	0	82	5	0	77	5	0	83	5	0	52	3	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	119	7	0
1945	71	4	0	132	8	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	0	176	10	0
1946	98	6	0	106	6	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	0	185	11	0
1947	103	6	0	109	7	0	250	15	0	115	7	0	101	6	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	109	6	0
1948	64	4	0	104	6	0	140	9	0	123	8	0	66	4	0	0	0	0	0	0	0	0	0	0	0	0	0	70	4	0	250	15	0	196	12	0
1949	109	7	0	99	6	0	250	15	0	114	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	236	14	0
1950	100	6	0	80	5	0	113	7	0	138	8	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	0	234	14	0
1951	130	8	0	221	13	0	0	0	0	0	0	0	99	5	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	0	209	12	0
1952	113	7	0	108	6	0	19	1	0	0	0	0	0	0	0	81	5	267	0	0	0	150	9	4,883	70	4	493	3	0	0	15	1	0	228	14	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	0	228	14	0
1954	191	12	0	136	8	0	93	6	0	81	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	0	236	14	0
1955	107	7	0	116	7	0	245	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	233	14	0
1956	79	5	0	81	5	0	250	15	0	124	8	0	124	7	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	13	0
1957	0	0	0	138	8	0	94	6	0	81	5	0	89	5	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	0	200	12	0
1958	120	7	0	250	15	0	127	8	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	4,883	27	2	193	3	0	0	15	1	0	227	14	0
1959	0	0	0	0	0	0	93	6	0	77	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	182	11	0
1960	82	5	0	68	4	0	132	8	0	115	7	0	54	3	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	243	14	0
1961	84	5	0	118	7	0	250	15	0	138	8	0	146	8	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	151	9	0
1962	72	4	0	103	6	0	143	9	0	0	0	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	139	8	0
1963	80	5	0	0	0	0	140	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	13	0
1964	119	7	0	64	4	0	0	0	0	76	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	235	14	0	139	8	0
1965	75	5	0	134	8	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	228	14	0
1966	105	6	0	221	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	181	11	0
1967	99	6	0	250	15	0	167	10	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	4,883	250	15	1,762	3	0	0	15	1	0	0	0	0
1968	0	0	0	0	0	0	92	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	129	8	0
1969	89	5	0	124	7	0	250	15	0	115	7	0	0	0	0	73	4	242	0	0	0	150	9	4,883	70	4	493	3	0	0	15	1	0	227	14	0
1970	189	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	14	0
1971	96	6	0	103	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	0	227	14	0
1972	191	12	0	137	8	0	88	5	0	83	5	0	30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	0	163	10	0
1973	69	4	0	111	7	0	250	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	0	235	14	0
1974	94	6	0	109	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	4,883	0	0	0	2	0	0	250	15	0	228	14	0
1975	0	0	0	2	0	0	90	6	0	83	5	0	86	5	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	0	228	14	0
1976	0	0	0	0	0	0	94	6	0	83	5	0	39	2	0	138	8	454	0	0	0	0	0	0	195	12	1,372	250	15	0	250	15	0	210	12	0
1977	88	5	0	137	8	0	107	7	0	89	5	0	69	4	0	54	3	178	0	0	0	222	14	7,217	250	15	1,762	250	15	0	250	15	0	235	14	0
1978	198	12	0	165	10	0	152	9	0	0	0	0	250	14	0	34	2	113	34	2	837	149	9	4,860	70	4	493	70	4	0	250	15	0	235	14	0
1979	200	12	0	143	9	0	103	6	0	98	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	0	175	10	0
1980	96	6	0	122	7	0	250	15	0	94	6	0	55	3	0	76	5	250	0	0	0	149	9	4,860	0	0	0	7	0	0	250	15	0	236	14	0
1981	200	12	0	147	9	0	128	8	0	92	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	140	8	0
1982	87	5	0	150	9	0	0	0	0	0	0	0	125	7	0	33	2	110	0	0	0	150	9	4,883	70	4	493	3	0	0	15	1	0	225	13	0
1983	0	0	0	0	0	0	73	5	0	42	3	0	0	0	0	0	0	0	0	0	0	150	9	4,883	70	4	493	3	0	0	15	1	0	0	0	0
1984	0	0	0	0	0	0	81	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	0	228	14	0
1985	105	6	0	80	5	0	0	0	0	0	0	0	90	5	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	227	14	0	152	9	0
1986	109	7	0	100	6	0	250	15	0	0	0	0	205	11	0	74	5	243	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	227	13	0
1987	168	10	0	116	7	0	75	5	0	83	5	0	47	3	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	148	9	0
1988	68	4	0	91	5	0	192	12	0	138	8	0	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	190	11	0
1989	67	4	0	56	3	0	106	6	0	147	9	0	79	4	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	174	10	0
1990	95	6	0	97	6	0	143	9	0	67	4	0	94	5	0	0	0	0	0	0	0	0	0	0	0	0	0	238	14	0	250	15	0	233	14	0
1991	106	7	0	165	10	0	152	9	0	147	9	0	161	9	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	235	14	0
1992	198	12	0	165	10	0	152	9	0	147	9	0	155	9	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	250	15	0	235	14	0
1993	198	12	0	165	10	0	152	9	0	147	9	0	70	4	0	34	2	113	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	236	14	0
1994	172	11	0	130	8	0	170	10	0	97	6	0	87	5	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	0	231	14	0	102	6	0
Mean			0			0			0			0			0			39			11			843			173			0			0			0
Max			0			0			0			0			0			454			837			7,217			1,762			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions
Entrainment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	4	6	8	0	0	19	1	1	236	14	1
1923	139	9	3	141	8	1	173	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	7	183	11	1
1924	100	6	2	84	5	1	132	8	1	95	6	1	51	3	1	111	7	2	0	0	0	0	0	0	149	9	13	0	0	0	250	15	7	213	13	1
1925	65	4	1	158	9	1	150	9	1	147	9	2	70	4	1	0	0	0	0	0	0	0	0	0	0	0	0	70	4	2	250	15	7	250	15	1
1926	100	6	2	65	4	0	60	4	0	122	7	2	164	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	243	14	1
1927	90	6	2	133	8	1	30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	7	228	14	1
1928	106	7	2	102	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	7	236	14	1
1929	113	7	2	110	7	1	245	15	2	98	6	1	47	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	182	11	1
1930	70	4	1	51	3	0	139	9	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	233	14	1
1931	64	4	1	67	4	0	105	6	1	103	6	1	49	3	1	0	0	0	0	0	0	0	0	0	250	15	22	250	15	7	250	15	7	235	14	1
1932	198	12	4	165	10	1	152	9	1	0	0	0	70	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	1
1933	108	7	2	0	0	0	103	6	1	106	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1934	96	6	2	56	3	0	132	8	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1935	154	9	3	164	10	1	152	9	1	147	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	204	12	1
1936	108	7	2	79	5	0	32	2	0	115	7	2	48	3	1	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	7	234	14	1
1937	101	6	2	83	5	1	250	15	2	93	6	1	99	6	2	0	0	0	0	0	0	170	10	49	0	0	0	0	0	0	250	15	7	235	14	1
1938	122	7	2	234	14	1	0	0	0	0	0	0	0	0	0	67	4	1	0	0	0	150	9	43	250	15	22	3	0	0	15	1	0	227	14	1
1939	190	12	4	0	0	0	93	6	1	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	141	8	1
1940	77	5	2	86	5	1	101	6	1	138	8	2	70	4	1	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	7	188	11	1
1941	82	5	2	72	4	0	70	4	0	0	0	0	60	3	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	228	14	1
1942	190	12	4	136	8	1	74	5	0	0	0	0	79	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	227	14	1
1943	190	12	4	131	8	1	0	0	0	55	3	1	0	0	0	78	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1944	116	7	2	82	5	1	77	5	0	83	5	1	52	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	119	7	1
1945	71	4	1	132	8	1	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	7	176	10	1
1946	98	6	2	106	6	1	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	7	185	11	1
1947	103	6	2	109	7	1	250	15	2	115	7	2	101	6	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	109	6	0
1948	64	4	1	104	6	1	140	9	1	123	8	2	66	4	1	0	0	0	0	0	0	0	0	0	0	0	0	70	4	2	250	15	7	196	12	1
1949	109	7	2	99	6	1	250	15	2	114	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	236	14	1
1950	100	6	2	80	5	1	113	7	1	138	8	2	70	4	1	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	7	234	14	1
1951	130	8	3	221	13	1	0	0	0	0	0	0	99	5	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	7	209	12	1
1952	113	7	2	108	6	1	19	1	0	0	0	0	0	0	0	81	5	1	0	0	0	150	9	43	70	4	6	3	0	0	15	1	0	228	14	1
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	7	228	14	1
1954	191	12	4	136	8	1	93	6	1	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	7	236	14	1
1955	107	7	2	116	7	1	245	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	233	14	1
1956	79	5	2	81	5	1	250	15	2	124	8	2	124	7	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	13	1
1957	0	0	0	138	8	1	94	6	1	81	5	1	89	5	1	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	7	200	12	1
1958	120	7	2	250	15	2	127	8	1	0	0	0	0	0	0	0	0	0	0	0	0	150	9	43	27	2	2	3	0	0	15	1	0	227	14	1
1959	0	0	0	0	0	0	93	6	1	77	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	182	11	1
1960	82	5	2	68	4	0	132	8	1	115	7	2	54	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	243	14	1
1961	84	5	2	118	7	1	250	15	2	138	8	2	146	8	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	151	9	1
1962	72	4	1	103	6	1	143	9	1	0	0	0	70	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	139	8	1
1963	80	5	2	0	0	0	140	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	13	1
1964	119	7	2	64	4	0	0	0	0	76	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	235	14	6	139	8	1
1965	75	5	2	134	8	1	70	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	228	14	1
1966	105	6	2	221	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	181	11	1
1967	99	6	2	250	15	2	167	10	1	0	0	0	0	0	0	0	0	0	0	0	0	150	9	43	250	15	22	3	0	0	15	1	0	0	0	0
1968	0	0	0	0	0	0	92	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	129	8	1
1969	89	5	2	124	7	1	250	15	2	115	7	2	0	0	0	73	4	1	0	0	0	150	9	43	70	4	6	3	0	0	15	1	0	227	14	1
1970	189	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	14	1
1971	96	6	2	103	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	7	227	14	1
1972	191	12	4	137	8	1	88	5	1	83	5	1	30	2	1	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	7	163	10	1
1973	69	4	1	111	7	1	250	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	7	235	14	1
1974	94	6	2	109	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	43	0	0	0	2	0	0	250	15	7	228	14	1
1975	0	0	0	2	0	0	90	6	1	83	5	1	86	5	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	7	228	14	1
1976	0	0	0	0	0	0	94	6	1	83	5	1	39	2	1	138	8	2	0	0	0	0	0	0	195	12	17	250	15	7	250	15	7	210	12	1
1977	88	5	2	137	8	1	107	7	1	89	5	1	69	4	1	54	3	1	0	0	0	222	14	64	250	15	22	250	15	7	250	15	7	235	14	1
1978	198	12	4	165	10	1	152	9	1	0	0	0	250	14	4	34	2	1	34	2	1	149	9	43	70	4	6	70	4	2	250	15	7	235	14	1
1979	200	12	4	143	9	1	103	6	1	98	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	7	175	10	1
1980	96	6	2	122	7	1	250	15	2	94	6	1	55	3	1	76	5	1	0	0	0	149	9	43	0	0	0	7	0	0	250	15	7	236	14	1
1981	200	12	4	147	9	1	128	8	1	92	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	140	8	1
1982	87	5	2	150	9	1	0	0	0	0	0	0	125	7	2	33	2	1	0	0	0	150	9	43	70	4	6	3	0	0	15	1	0	225	13	1
1983	0	0	0	0	0	0	73	5	0	42	3	1	0	0	0	0	0	0	0	0	0	150	9	43	70	4	6	3	0	0	15	1	0	0	0	0
1984	0	0	0	0	0	0	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	7	228	14	1
1985	105	6	2	80	5	0	0	0	0	0	0	0	90	5	2	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	227	14	6	152	9	1
1986	109	7	2	100	6	1	250	15	2	0	0	0	205	11	3	74	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	227	13	1
1987	168	10	3	116	7	1	75	5	0	83	5	1	47	3	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	148	9	1
1988	68	4	1	91	5	1	192	12	1	138	8	2	70	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	190	11	1
1989	67	4	1	56	3	0	106	6	1	147	9	2	79	4	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	174	10	1
1990	95	6	2	97	6	1	143	9	1	67	4	1	94	5	2	0	0	0	0	0	0	0	0	0	0	0	0	238	14	7	250	15	7	233	14	1
1991	106	7	2	165	10	1	152	9	1	147	9	2	161	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1992	198	12	4	165	10	1	152	9	1	147	9	2	155	9	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	250	15	7	235	14	1
1993	198	12	4	165	10	1	152	9	1	147	9	2	70	4	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	236	14	1
1994	172	11	3	130	8	1	170	10	1	97	6	1	87	5	1	0	0	0	0	0	0	0	0	0	0	0	0	250	15	7	231	14	6	102	6	0
Mean			**2**			**1**			**1**			**1**			**1**			**0**			**0**			**7**			**2**			**3**			**6**			**1**
Max			**4**			**2**			**2**			**2**			**4**			**2**			**1**			**64**			**22**			**7**			**7**			**1**
Min			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 320 CFS Existing Conditions Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	4	10	8	0	0	19	1	0	236	14	1
1923	139	9	2	141	8	3	173	11	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	5	183	11	1
1924	100	6	1	84	5	2	132	8	5	95	6	4	51	3	13	111	7	11	0	0	0	0	0	0	149	9	21	0	0	0	250	15	5	213	13	1
1925	65	4	1	158	9	3	150	9	5	147	9	7	70	4	18	0	0	0	0	0	0	0	0	0	0	0	0	70	4	0	250	15	5	250	15	1
1926	100	6	1	65	4	1	60	4	2	122	7	5	164	9	42	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	243	14	1
1927	90	6	1	133	8	3	30	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	5	228	14	1
1928	106	7	2	102	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	5	236	14	1
1929	113	7	2	110	7	2	245	15	9	98	6	4	47	3	12	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	182	11	1
1930	70	4	1	51	3	1	139	9	5	147	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	233	14	1
1931	64	4	1	67	4	1	105	6	4	103	6	5	49	3	13	0	0	0	0	0	0	0	0	0	250	15	35	250	15	2	250	15	5	235	14	1
1932	198	12	3	165	10	3	152	9	5	0	0	0	70	4	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	250	15	1
1933	108	7	2	0	0	0	103	6	4	106	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	235	14	1
1934	96	6	1	56	3	1	132	8	5	147	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	235	14	1
1935	154	9	2	164	10	3	152	9	5	147	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	204	12	1
1936	108	7	2	79	5	2	32	2	1	115	7	5	48	3	12	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	5	234	14	1
1937	101	6	1	83	5	2	250	15	9	93	6	4	99	6	25	0	0	0	0	0	0	170	10	114	0	0	0	0	0	0	250	15	5	235	14	1
1938	122	7	2	234	14	5	0	0	0	0	0	0	0	0	0	67	4	6	0	0	0	150	9	100	250	15	35	3	0	0	15	1	0	227	14	1
1939	190	12	3	0	0	0	93	6	3	81	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	141	8	1
1940	77	5	1	86	5	2	101	6	4	138	8	6	70	4	18	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	5	188	11	1
1941	82	5	1	72	4	2	70	4	3	0	0	0	60	3	15	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	228	14	1
1942	190	12	3	136	8	3	74	5	3	0	0	0	79	4	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	227	14	1
1943	190	12	3	131	8	3	0	0	0	55	3	2	0	0	0	78	5	7	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	228	14	1
1944	116	7	2	82	5	2	77	5	3	83	5	4	52	3	13	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	119	7	0
1945	71	4	1	132	8	3	70	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	5	176	10	1
1946	98	6	1	106	6	2	70	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	5	185	11	1
1947	103	6	1	109	7	2	250	15	9	115	7	5	101	6	26	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	109	6	0
1948	64	4	1	104	6	2	140	9	5	123	8	5	66	4	17	0	0	0	0	0	0	0	0	0	0	0	0	70	4	0	250	15	5	196	12	1
1949	109	7	2	99	6	2	250	15	9	114	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	236	14	1
1950	100	6	1	80	5	2	113	7	4	138	8	6	70	4	18	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	5	234	14	1
1951	130	8	2	221	13	5	0	0	0	0	0	0	99	5	25	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	5	209	12	1
1952	113	7	2	108	6	2	19	1	1	0	0	0	0	0	0	81	5	8	0	0	0	150	9	100	70	4	10	3	0	0	15	1	0	228	14	1
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	5	228	14	1
1954	191	12	3	136	8	3	93	6	3	81	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	5	236	14	1
1955	107	7	2	116	7	2	245	15	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	233	14	1
1956	79	5	1	81	5	2	250	15	9	124	8	6	124	7	31	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	13	1
1957	0	0	0	138	8	3	94	6	3	81	5	4	89	5	23	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	5	200	12	1
1958	120	7	2	250	15	5	127	8	5	0	0	0	0	0	0	0	0	0	0	0	0	150	9	100	27	2	4	3	0	0	15	1	0	227	14	1
1959	0	0	0	0	0	0	93	6	3	77	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	182	11	1
1960	82	5	1	68	4	1	132	8	5	115	7	5	54	3	14	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	243	14	1
1961	84	5	1	118	7	2	250	15	9	138	8	6	146	8	37	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	151	9	1
1962	72	4	1	103	6	2	143	9	5	0	0	0	70	4	18	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	139	8	1
1963	80	5	1	0	0	0	140	9	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	13	1
1964	119	7	2	64	4	1	0	0	0	76	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	235	14	5	139	8	1
1965	75	5	1	134	8	3	70	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	228	14	1
1966	105	6	2	221	13	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	181	11	1
1967	99	6	1	250	15	5	167	10	6	0	0	0	0	0	0	0	0	0	0	0	0	150	9	100	250	15	35	3	0	0	15	1	0	0	0	0
1968	0	0	0	0	0	0	92	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	129	8	0
1969	89	5	1	124	7	3	250	15	9	115	7	5	0	0	0	73	4	7	0	0	0	150	9	100	70	4	10	3	0	0	15	1	0	227	14	1
1970	189	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15	1	0	227	14	1
1971	96	6	1	103	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	5	227	14	1
1972	191	12	3	137	8	3	88	5	3	83	5	4	30	2	8	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	5	163	10	1
1973	69	4	1	111	7	2	250	15	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	250	15	5	235	14	1
1974	94	6	1	109	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	9	100	0	0	0	2	0	0	250	15	5	228	14	1
1975	0	0	0	2	0	0	90	6	3	83	5	4	86	5	22	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	5	228	14	1
1976	0	0	0	0	0	0	94	6	3	83	5	4	39	2	10	138	8	13	0	0	0	0	0	0	195	12	27	250	15	2	250	15	5	210	12	1
1977	88	5	1	137	8	3	107	7	4	89	5	4	69	4	17	54	3	5	0	0	0	222	14	148	250	15	35	250	15	2	250	15	5	235	14	1
1978	198	12	3	165	10	3	152	9	5	0	0	0	250	14	63	34	2	3	34	2	16	149	9	100	70	4	10	70	4	0	250	15	5	235	14	1
1979	200	12	3	143	9	3	103	6	4	98	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	250	15	5	175	10	1
1980	96	6	1	122	7	3	250	15	9	94	6	4	55	3	14	76	5	7	0	0	0	149	9	100	0	0	0	7	0	0	250	15	5	236	14	1
1981	200	12	3	147	9	3	128	8	5	92	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	140	8	1
1982	87	5	1	150	9	3	0	0	0	0	0	0	125	7	32	33	2	3	0	0	0	150	9	100	70	4	10	3	0	0	15	1	0	225	13	1
1983	0	0	0	0	0	0	73	5	3	42	3	2	0	0	0	0	0	0	0	0	0	150	9	100	70	4	10	3	0	0	15	1	0	0	0	0
1984	0	0	0	0	0	0	81	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	250	15	5	228	14	1
1985	105	6	2	80	5	2	0	0	0	0	0	0	90	5	23	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	227	14	5	152	9	1
1986	109	7	2	100	6	2	250	15	9	0	0	0	205	11	52	74	5	7	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	227	13	1
1987	168	10	2	116	7	2	75	5	3	83	5	4	47	3	12	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	148	9	1
1988	68	4	1	91	5	2	192	12	7	138	8	6	70	4	18	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	190	11	1
1989	67	4	1	56	3	1	106	6	4	147	9	7	79	4	20	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	174	10	1
1990	95	6	1	97	6	2	143	9	5	67	4	3	94	5	24	0	0	0	0	0	0	0	0	0	0	0	0	238	14	2	250	15	5	233	14	1
1991	106	7	2	165	10	3	152	9	5	147	9	7	161	9	41	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	235	14	1
1992	198	12	3	165	10	3	152	9	5	147	9	7	155	9	39	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	250	15	5	235	14	1
1993	198	12	3	165	10	3	152	9	5	147	9	7	70	4	18	34	2	3	0	0	0	0	0	0	0	0	0	0	0	0	250	15	5	236	14	1
1994	172	11	2	130	8	3	170	10	6	97	6	4	87	5	22	0	0	0	0	0	0	0	0	0	0	0	0	250	15	2	231	14	5	102	6	0
Mean			1			2			4			3			12			1			0			17			3			1			5			1
Max			3			5			9			7			63			13			16			148			35			2			5			1
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	-77	-4	-37	0	0	0	0	0	0	0	0	0	-60	-4	-3,126	-116	-7	-1,370	-7	0	-5	-72	-4	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-1	0	0	0	0	0	0	-60	-4	-3,140	-57	-3	-670	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-68	-4	-32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15	-1	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-114	-6	-55	-38	-2	-22	0	0	0	0	0	0	-3	0	-168	-14	-1	-164	-7	0	-5	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	64	4	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	82	5	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-146	-9	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	-6	-1,178	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-81	-5	-61	-36	-2	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-61	-46	-3	-35	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-1	0	0	0	0	0	0	-66	-4	-3,406	-16	-1	-192	0	0	0	0	0	0
1943	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-8	0	0	0	0	0	0	-35	-2	-1,826	-186	-11	-2,189	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-8	0	0	0	0	0	0	-36	-2	-1,850	-122	-7	-1,433	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	-303	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-17	-109	-6	-117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-1	0	0	0
1951	0	0	0	0	0	0	0	0	0	-65	-4	-16	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	-23	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	-30	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-78	-5	-19	-68	-4	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-39	-2	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-220	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-6	0	0	0	0	0	0	-61	-4	-3,171	-101	-6	-1,184	0	0	0	-29	-2	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	-41	-2	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	-19	-1	-1	0	0	0	0	0	0	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1973	0	0	0	0	0	0	0	0	0	-65	-4	-16	-28	-2	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0
1974	0	0	0	0	0	0	0	0	0	-2	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	-15	-1	-4	-10	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	-79	-5	-4,100	-14	-1	-164	-7	0	-5	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-1	0	0	0	0	0	0	-36	-2	-1,881	-91	-6	-1,068	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	-1	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	-82	-5	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-4	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	-406	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-122	-7	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-48	-3	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-5	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-164	-7	0	-5	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-5	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			-1			-4			-1			-2			0			-311			-148			-2			0
Max			0			0			0			0			39			2			0			0			0			0			0			0
Min			-7			-1			-2			-19			-58			-22			-117			0			-4,100			-2,189			-61			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination
Entraiment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-34	-2	**0**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-77	-4	**-16**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-1**	-116	-7	**-1**	-7	0	**0**	-72	-4	**0**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1927	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-1**	-57	-3	**0**	0	0	**0**	0	0	**0**
1928	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**0**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-68	-4	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**0**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-114	-6	**-23**	-38	-2	**-11**	0	0	**0**	0	0	**0**	-3	0	**0**	-14	-1	**0**	-7	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	64	4	**13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	82	5	**17**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-146	-9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-100	-6	**-1**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-81	-5	**0**	-36	-2	**0**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**0**	-46	-3	**0**	0	0	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-1**	0	0	**0**	0	0	**0**	-66	-4	**-1**	-16	-1	**0**	0	0	**0**	0	0	**0**
1943	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-4**	0	0	**0**	0	0	**0**	-35	-2	**-1**	-186	-11	**-1**	0	0	**0**	0	0	**0**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-4**	0	0	**0**	0	0	**0**	-36	-2	**-1**	-122	-7	**-1**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-26	-2	**0**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-9**	-109	-6	**-20**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**
1951	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-10**	-3	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-10**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	-30	-2	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-78	-5	**-12**	-68	-4	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-39	-2	**0**
1964	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-11	-1	**-3**	0	0	**0**	0	0	**0**	-61	-4	**-1**	-101	-6	**-1**	0	0	**0**	-29	-2	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-41	-2	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**0**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	-3	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**0**
1973	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-10**	-28	-2	**-6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**
1974	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-2**	-10	-1	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	4	0	**1**	0	0	**0**	0	0	**0**	-79	-5	**-2**	-14	-1	**0**	-7	0	**0**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-1**	-91	-6	**0**	0	0	**0**	0	0	**0**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-17**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-28	-2	**0**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**0**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**0**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-122	-7	**-25**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**0**	-7	0	**0**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**0**			**0**			**0**			**-1**			**-2**			**-1**			**0**			**0**			**0**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**17**			**1**			**0**			**0**			**0**			**0**			**0**			**0**
Min			**0**			**0**			**-1**			**-12**			**-25**			**-11**			**-20**			**0**			**-2**			**-1**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination
Entraiment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	55	Apr	Vol	681	May	Vol	1,598	Jun	Vol	311	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-34	-2	**0**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-77	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-1,112**	-116	-7	**0**	-7	0	**0**	-72	-4	**0**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1927	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-3**	0	0	**0**	0	0	**0**	-60	-4	**-1,117**	-57	-3	**0**	0	0	**0**	0	0	**0**
1928	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**0**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-68	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**0**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-114	-6	**0**	-38	-2	**-128**	0	0	**0**	0	0	**0**	-3	0	**-60**	-14	-1	**0**	-7	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	64	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	82	5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-146	-9	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-100	-6	**0**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-81	-5	**0**	-36	-2	**0**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**0**	-46	-3	**0**	0	0	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-8**	0	0	**0**	0	0	**0**	-66	-4	**-1,212**	-16	-1	**0**	0	0	**0**	0	0	**0**
1943	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-45**	0	0	**0**	0	0	**0**	-35	-2	**-650**	-186	-11	**0**	0	0	**0**	0	0	**0**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-45**	0	0	**0**	0	0	**0**	-36	-2	**-658**	-122	-7	**0**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-26	-2	**0**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-98**	-109	-6	**-4,411**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**
1951	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**0**	-3	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**0**	-1	0	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	-30	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-78	-5	**0**	-68	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-39	-2	**0**
1964	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-11	-1	**-36**	0	0	**0**	0	0	**0**	-61	-4	**-1,128**	-101	-6	**0**	0	0	**0**	-29	-2	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-41	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**-83**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**0**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	-3	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**0**
1973	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**0**	-28	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**
1974	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	-9	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**0**	-10	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	4	0	**12**	0	0	**0**	0	0	**0**	-79	-5	**-1,459**	-14	-1	**0**	-7	0	**0**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-4**	0	0	**0**	0	0	**0**	-36	-2	**-669**	-91	-6	**0**	0	0	**0**	0	0	**0**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-60**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-28	-2	**0**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**0**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**0**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-122	-7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**0**	-7	0	**0**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**0**			**0**			**0**			**0**			**0**			**-7**			**-60**			**0**			**-110**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**0**			**12**			**0**			**0**			**0**			**0**			**0**			**0**
Min			**0**			**0**			**0**			**0**			**0**			**-128**			**-4,411**			**0**			**-1,459**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination
Entraiment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-34	-2	**-3**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-77	-4	**-26**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-105**	-116	-7	**-67**	-7	0	**-4**	-72	-4	**-7**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1927	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-105**	-57	-3	**-33**	0	0	**0**	0	0	**0**
1928	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-3**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-68	-4	**-23**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-1**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-114	-6	**-38**	-38	-2	**-13**	0	0	**0**	0	0	**0**	-3	0	**-6**	-14	-1	**-8**	-7	0	**-4**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	64	4	**21**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-3**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	82	5	**27**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-146	-9	**-59**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-100	-6	**-57**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-81	-5	**-44**	-36	-2	**-3**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**-3**	-46	-3	**-25**	0	0	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-1**	0	0	**0**	0	0	**0**	-66	-4	**-114**	-16	-1	**-9**	0	0	**0**	0	0	**0**
1943	-9	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-5**	0	0	**0**	0	0	**0**	-35	-2	**-61**	-186	-11	**-106**	0	0	**0**	0	0	**0**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-5**	0	0	**0**	0	0	**0**	-36	-2	**-62**	-122	-7	**-70**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-26	-2	**-15**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-10**	-109	-6	**-70**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-1**	0	0	**0**
1951	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-17**	-3	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**-6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-16**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	-30	-2	**-5**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-78	-5	**-21**	-68	-4	**-23**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-39	-2	**-4**
1964	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**-11**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-11	-1	**-4**	0	0	**0**	0	0	**0**	-61	-4	**-106**	-101	-6	**-58**	0	0	**0**	-29	-2	**-3**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-41	-2	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**-9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**-3**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	0	0	**0**	-19	-1	**-2**	0	0	**0**	0	0	**0**	-3	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-2**
1973	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-17**	-28	-2	**-9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-3**
1974	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	-9	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-4**	-10	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**-2**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	4	0	**1**	0	0	**0**	0	0	**0**	-79	-5	**-138**	-14	-1	**-8**	-7	0	**-4**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-63**	-91	-6	**-52**	0	0	**0**	0	0	**0**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-6**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-27**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-28	-2	**-3**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**-3**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-20**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-122	-7	**-41**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**-4**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-8**	-7	0	**-4**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**-4**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**-1**			**0**			**0**			**-1**			**-3**			**-1**			**-1**			**0**			**-10**			**-7**			**-1**			**-1**
Max			**0**			**0**			**0**			**0**			**27**			**1**			**0**			**0**			**0**			**0**			**0**			**0**
Min			**-59**			**-2**			**-5**			**-21**			**-41**			**-13**			**-70**			**0**			**-138**			**-106**			**-44**			**-7**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination
Entraiment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-34	-2	**0**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**-31**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-77	-4	**-389**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-167**	-116	-7	**-17**	-7	0	**0**	-72	-4	**0**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1927	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-2**	0	0	**0**	0	0	**0**	-60	-4	**-168**	-57	-3	**-8**	0	0	**0**	0	0	**0**
1928	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**0**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-68	-4	**-342**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**0**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-114	-6	**-575**	-38	-2	**-73**	0	0	**0**	0	0	**0**	-3	0	**-9**	-14	-1	**-2**	-7	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	64	4	**323**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	82	5	**415**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-146	-9	**-42**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-100	-6	**-15**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-81	-5	**#**	-36	-2	**0**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**-1**	-46	-3	**-1**	0	0	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-201**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-4**	0	0	**0**	0	0	**0**	-66	-4	**-182**	-16	-1	**-2**	0	0	**0**	0	0	**0**
1943	-9	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-25**	0	0	**0**	0	0	**0**	-35	-2	**-98**	-186	-11	**-27**	0	0	**0**	0	0	**0**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-25**	0	0	**0**	0	0	**0**	-36	-2	**-99**	-122	-7	**-18**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-26	-2	**-4**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-55**	-109	-6	**-1,015**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**
1951	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-58**	-3	0	**-13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**-95**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-201**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-241**	-1	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	-30	-2	**-21**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-78	-5	**-69**	-68	-4	**-346**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-39	-2	**0**
1964	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**-3**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-11	-1	**-21**	0	0	**0**	0	0	**0**	-61	-4	**-170**	-101	-6	**-15**	0	0	**0**	-29	-2	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-41	-2	**-207**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**-1**	-25	-2	**-47**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**0**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	0	0	**0**	-19	-1	**-8**	0	0	**0**	0	0	**0**	-3	0	**-15**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**0**
1973	0	0	**0**	0	0	**0**	0	0	**0**	-65	-4	**-58**	-28	-2	**-140**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**
1974	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	-9	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	-15	-1	**-13**	-10	-1	**-51**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	4	0	**7**	0	0	**0**	0	0	**0**	-79	-5	**-220**	-14	-1	**-2**	-7	0	**0**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-2**	0	0	**0**	0	0	**0**	-36	-2	**-101**	-91	-6	**-13**	0	0	**0**	0	0	**0**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-203**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-34**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-415**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-28	-2	**0**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**0**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-65**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-5**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-122	-7	**-616**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-43**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-2**	-7	0	**0**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**-1**			**0**			**0**			**-3**			**-47**			**-4**			**-14**			**0**			**-17**			**-2**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**415**			**7**			**0**			**0**			**0**			**0**			**0**			**0**
Min			**-42**			**-8**			**-21**			**-69**			**-616**			**-73**			**-1,015**			**0**			**-220**			**-27**			**-2**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination
Entraiment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-13	-1	-5	-13	-1	-5	0	0	0	0	0	0	-112	-6	-46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-6
1924	-10	-1	-4	-8	0	-3	-68	-4	-21	-93	-6	-40	0	0	0	-30	-2	-7	0	0	0	-41	-3	-240	0	0	0	0	0	0	-85	-5	-75	0	0	0
1925	-57	-3	-21	-39	-2	-16	-34	-2	-10	-35	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-2	-14
1926	-11	-1	-4	-8	0	-3	-97	-6	-30	-85	-5	-37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	-9
1927	-10	-1	-4	-16	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	-9
1928	-16	-1	-6	-16	-1	-7	0	0	0	-106	-7	-46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-17	-1	-6	-16	-1	-7	-18	-1	-6	-15	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	-41	-22	-1	-8
1930	-8	-1	-3	-6	0	-3	-23	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-33	0	0	0
1931	-6	0	-2	-138	-8	-56	-113	-7	-35	-114	-7	-49	0	0	0	-77	-5	-18	-11	-1	-1	-66	-4	-385	-76	-5	-1,268	-72	-4	-428	-74	-5	-66	-72	-4	-25
1932	-57	-3	-21	-39	-2	-16	-34	-2	-10	0	0	0	95	5	39	0	0	0	-72	-4	-9	-5	0	-28	0	0	0	0	0	0	0	0	0	0	0	0
1933	-10	-1	-4	-7	0	-3	-12	-1	-4	-51	-3	-22	11	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	-56	-32	-2	-11
1934	0	0	0	-148	-9	-60	-113	-7	-35	-93	-6	-40	0	0	0	0	0	0	0	0	0	0	0	0	28	2	475	0	0	0	-56	-3	-49	-126	-7	-43
1935	-57	-3	-21	-39	-2	-16	-34	-2	-10	-35	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-6
1936	-10	-1	-4	-8	0	-3	-50	-3	-15	-47	-3	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-7
1937	-11	-1	-4	-11	-1	-4	-25	-2	-8	-77	-5	-33	-43	-2	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-14	-1	-5	-23	-1	-9	0	0	0	-93	-6	-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	-24
1939	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-78	-5	-460	-28	-2	-25	-17	-1	-6
1940	-12	-1	-5	-16	-1	-7	-16	-1	-5	-33	-2	-14	0	0	0	0	0	0	-75	-4	-9	-7	0	-44	0	0	0	0	0	0	0	0	0	-19	-1	-6
1941	-10	-1	-4	-25	-2	-10	0	0	0	0	0	0	-129	-7	-54	-28	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	-16
1942	-25	-2	-9	-18	-1	-7	-28	-2	-8	0	0	0	-36	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	-18
1943	-10	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	-10
1944	-17	-1	-6	-13	-1	-5	-22	-1	-7	-16	-1	-7	-14	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-26	-12	-1	-4
1945	-10	-1	-4	-29	-2	-12	0	0	0	0	0	0	0	0	0	-2	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-55	-20	-1	-7
1946	-12	-1	-5	-117	-7	-47	0	0	0	0	0	0	148	8	61	-76	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	-50	-22	-1	-8
1947	-15	-1	-6	-31	-2	-13	-36	-2	-11	-52	-3	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-18	-10	-1	-3
1948	-8	-1	-3	-17	-1	-7	-20	-1	-6	-11	-1	-5	-87	-5	-36	0	0	0	-88	-5	-10	-32	-2	-187	0	0	0	0	0	0	-72	-4	-64	-21	-1	-7
1949	-16	-1	-6	-96	-6	-39	-71	-4	-22	-41	-3	-18	18	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	-39	-32	-2	-11
1950	-14	-1	-5	-13	-1	-5	-19	-1	-6	-23	-1	-10	0	0	0	-79	-5	-19	-143	-9	-17	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-10
1951	-20	-1	-7	-30	-2	-12	0	0	0	-66	-4	-28	-37	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-1	-9
1952	-17	-1	-6	-16	-1	-6	0	0	0	0	0	0	-97	-5	-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-13
1954	-35	-2	-13	-22	-1	-9	-34	-2	-10	0	0	0	0	0	0	-72	-4	-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	-9
1955	-17	-1	-6	-17	-1	-7	0	0	0	0	0	0	-32	-2	-13	-42	-3	-10	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	-57	-30	-2	-10
1956	-13	-1	-5	-14	-1	-6	0	0	0	0	0	0	0	0	0	-80	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	-22
1957	-7	0	-3	0	0	0	-28	-2	-9	-17	-1	-7	-27	-2	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-6
1958	-17	-1	-6	-38	-2	-15	0	0	0	0	0	0	-103	-6	-43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	-66	-17	-1	-6
1960	-10	-1	-4	-11	-1	-4	-68	-4	-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	-469	-30	-2	-26	-23	-1	-8
1961	-12	-1	-5	-114	-7	-46	-87	-5	-27	0	0	0	-43	-2	-18	0	0	0	-45	-3	-5	0	0	0	0	0	0	0	0	0	-23	-1	-20	-111	-7	-38
1962	-74	-5	-28	-40	-2	-16	-34	-2	-11	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-36	-14	-1	-5
1963	-108	-7	-40	0	0	0	0	0	0	-45	-3	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-13	-1	-5	-8	0	-3	0	0	0	-106	-6	-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	-346	-20	-1	-18	-13	-1	-5
1965	-9	-1	-3	-15	-1	-6	0	0	0	0	0	0	0	0	0	-24	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	-17	-1	-6	-33	-2	-13	0	0	0	-88	-5	-38	12	1	5	-10	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	-49	-23	-1	-8
1967	-18	-1	-7	-26	-2	-10	0	0	0	0	0	0	-47	-3	-20	-46	-3	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	-48	-15	-1	-5
1969	-14	-1	-5	-47	-3	-19	0	0	0	0	0	0	0	0	0	-92	-6	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-13	-1	-5	-16	-1	-6	0	0	0	-106	-7	-46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	-18
1972	-57	-4	-21	0	0	0	-17	-1	-5	-23	-1	-10	0	0	0	-64	-4	-15	0	0	0	0	0	0	0	0	0	0	0	0	-59	-4	-52	0	0	0
1973	-9	-1	-3	-38	-2	-15	0	0	0	-2	0	-1	-35	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-11	-1	-4	-17	-1	-7	0	0	0	-106	-7	-46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	-18
1975	-10	-1	-4	0	0	0	-24	-1	-7	-23	-1	-10	-25	-1	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	-19
1976	-15	-1	-5	0	0	0	-28	-2	-8	0	0	0	0	0	0	-40	-2	-9	0	0	0	-49	-3	-286	-51	-3	-860	-71	-4	-424	0	0	0	0	0	0
1977	-12	-1	-4	-89	-5	-36	-117	-7	-36	-105	-6	-45	-36	-2	-15	-46	-3	-11	0	0	0	-66	-4	-385	0	0	0	-72	-4	-428	-74	-5	-66	-72	-4	-25
1978	-57	-3	-21	-39	-2	-16	-34	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	-9
1979	-17	-1	-6	-13	-1	-5	-15	-1	-5	-34	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-55	-20	-1	-7
1980	-13	-1	-5	-24	-1	-10	0	0	0	0	0	0	-40	-2	-16	-54	-3	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-13
1981	-23	-1	-8	-14	-1	-6	-18	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-179	-78	-5	-465	-25	-2	-22	-15	-1	-5
1982	-13	-1	-5	-33	-2	-13	0	0	0	0	0	0	-125	-7	-52	-61	-4	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	-5	-13	-1	-5	0	0	0	-111	-7	-48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	-440	-24	-1	-21	-17	-1	-6
1986	-15	-1	-5	-14	-1	-6	-29	-2	-9	0	0	0	-35	-2	-14	-84	-5	-20	-102	-6	-12	-7	0	-44	0	0	0	0	0	0	0	0	0	-49	-3	-17
1987	-22	-1	-8	-13	-1	-5	-15	-1	-5	-18	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-31	-13	-1	-5
1988	-9	-1	-3	-13	-1	-5	-17	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50	-3	-44	-19	-1	-6
1989	-6	0	-2	-4	0	-2	-99	-6	-30	-110	-7	-47	0	0	0	0	0	0	-37	-2	-4	-5	0	-30	0	0	0	0	0	0	-20	-1	-18	-20	-1	-7
1990	-176	-11	-66	-132	-8	-54	-101	-6	-31	0	0	0	-37	-2	-15	0	0	0	-1	0	0	0	0	0	22	1	369	-61	-4	-364	-114	-7	-100	-72	-4	-25
1991	-57	-3	-21	-39	-2	-16	-34	-2	-10	-35	-2	-15	-12	-1	-5	-42	-3	-10	-28	-2	-3	0	0	0	0	0	0	-72	-4	-428	-74	-5	-66	-72	-4	-25
1992	-57	-3	-21	-39	-2	-16	-34	-2	-10	-35	-2	-15	-36	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	-66	-72	-4	-25
1993	-57	-3	-21	-39	-2	-16	-34	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	-10
1994	-13	-1	-5	-10	-1	-4	-24	-1	-7	-28	-2	-12	-21	-1	-9	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-170	-17	-1	-15	-104	-6	-35
Mean			-8			-11			-7			-12			-5			-3			-1			-22			-20			-61			-20			-9
Max			0			0			0			0			61			0			0			0			475			0			0			0
Min			-66			-60			-36			-49			-54			-22			-17			-385			-1,268			-469			-100			-43

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-13	-1	0	-13	-1	0	0	0	0	0	0	0	-112	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1924	-10	-1	0	-8	0	0	-68	-4	0	-93	-6	-1	0	0	0	-30	-2	-1	0	0	0	-41	-3	-53	0	0	0	0	0	0	-85	-5	-3	0	0	0
1925	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-2	0
1926	-11	-1	0	-8	0	0	-97	-6	0	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1927	-10	-1	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	0
1928	-16	-1	0	-16	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-17	-1	0	-16	-1	0	-18	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	-2	-22	-1	0
1930	-8	-1	0	-6	0	0	-23	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-1	0	0	0
1931	-6	0	0	-138	-8	0	-113	-7	0	-114	-7	-1	0	0	0	-77	-5	-2	-11	-1	-1	-66	-4	-85	-76	-5	-197	-72	-4	-42	-74	-5	-3	-72	-4	-1
1932	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	95	5	2	0	0	0	-72	-4	-4	-5	0	-6	0	0	0	0	0	0	0	0	0	0	0	0
1933	-10	-1	0	-7	0	0	-12	-1	0	-51	-3	-1	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	-2	-32	-2	0
1934	0	0	0	-148	-9	0	-113	-7	0	-93	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	28	2	74	0	0	0	-56	-3	-2	-126	-7	-1
1935	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-10	-1	0	-8	0	0	-50	-3	0	-47	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1937	-11	-1	0	-11	-1	0	-25	-2	0	-77	-5	-1	-43	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-14	-1	0	-23	-1	0	0	0	0	-93	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	-1
1939	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-78	-5	-46	-28	-2	-1	-17	-1	0
1940	-12	-1	0	-16	-1	0	-16	-1	0	-33	-2	0	0	0	0	0	0	0	-75	-4	-4	-7	0	-10	0	0	0	0	0	0	0	0	0	-19	-1	0
1941	-10	-1	0	-25	-2	0	0	0	0	0	0	0	-129	-7	-3	-28	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0
1942	-25	-2	0	-18	-1	0	-28	-2	0	0	0	0	-36	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1943	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1944	-17	-1	0	-13	-1	0	-22	-1	0	-16	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-1	-12	-1	0
1945	-10	-1	0	-29	-2	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-2	-20	-1	0
1946	-12	-1	0	-117	-7	0	0	0	0	0	0	0	148	8	4	-76	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	-2	-22	-1	0
1947	-15	-1	0	-31	-2	0	-36	-2	0	-52	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-1	-10	-1	0
1948	-8	-1	0	-17	-1	0	-20	-1	0	-11	-1	0	-87	-5	-2	0	0	0	-88	-5	-5	-32	-2	-41	0	0	0	0	0	0	-72	-4	-3	-21	-1	0
1949	-16	-1	0	-96	-6	0	-71	-4	0	-41	-3	-1	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	-2	-32	-2	0
1950	-14	-1	0	-13	-1	0	-19	-1	0	-23	-1	0	0	0	0	-79	-5	-2	-143	-9	-8	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1951	-20	-1	0	-30	-2	0	0	0	0	-66	-4	-1	-37	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-1	0
1952	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-97	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1954	-35	-2	0	-22	-1	0	-34	-2	0	0	0	0	0	0	0	-72	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1955	-17	-1	0	-17	-1	0	0	0	0	0	0	0	-32	-2	-1	-42	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	-2	-30	-2	0
1956	-13	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	-80	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0
1957	-7	0	0	0	0	0	-28	-2	0	-17	-1	0	-27	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0
1958	-17	-1	0	-38	-2	0	0	0	0	0	0	0	-103	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	-3	-17	-1	0
1960	-10	-1	0	-11	-1	0	-68	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	-46	-30	-2	-1	-23	-1	0
1961	-12	-1	0	-114	-7	0	-87	-5	0	0	0	0	-43	-2	-1	0	0	0	-45	-3	-2	0	0	0	0	0	0	0	0	0	-23	-1	-1	-111	-7	-1
1962	-74	-5	0	-40	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-2	-14	-1	0
1963	-108	-7	0	0	0	0	0	0	0	-45	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-13	-1	0	-8	0	0	0	0	0	-106	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	-34	-20	-1	-1	-13	-1	0
1965	-9	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	-24	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	-17	-1	0	-33	-2	0	0	0	0	-88	-5	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	-2	-23	-1	0
1967	-18	-1	0	-26	-2	0	0	0	0	0	0	0	-47	-3	-1	-46	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	-2	-15	-1	0
1969	-14	-1	0	-47	-3	0	0	0	0	0	0	0	0	0	0	-92	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-13	-1	0	-16	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1972	-57	-4	0	0	0	0	-17	-1	0	-23	-1	0	0	0	0	-64	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	-59	-4	-2	0	0	0
1973	-9	-1	0	-38	-2	0	0	0	0	-2	0	0	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-11	-1	0	-17	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1975	-10	-1	0	0	0	0	-24	-1	0	-23	-1	0	-25	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1976	-15	-1	0	0	0	0	-28	-2	0	0	0	0	0	0	0	-40	-2	-1	0	0	0	-49	-3	-63	-51	-3	-133	-71	-4	-42	0	0	0	0	0	0
1977	-12	-1	0	-89	-5	0	-117	-7	0	-105	-6	-1	-36	-2	-1	-46	-3	-1	0	0	0	-66	-4	-85	0	0	0	-72	-4	-42	-74	-5	-3	-72	-4	-1
1978	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	0
1979	-17	-1	0	-13	-1	0	-15	-1	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-2	-20	-1	0
1980	-13	-1	0	-24	-1	0	0	0	0	0	0	0	-40	-2	-1	-54	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1981	-23	-1	0	-14	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-28	-78	-5	-46	-25	-2	-1	-15	-1	0
1982	-13	-1	0	-33	-2	0	0	0	0	0	0	0	-125	-7	-3	-61	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-13	-1	0	0	0	0	-111	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	-44	-24	-1	-1	-17	-1	0
1986	-15	-1	0	-14	-1	0	-29	-2	0	0	0	0	-35	-2	-1	-84	-5	-2	-102	-6	-5	-7	0	-10	0	0	0	0	0	0	0	0	0	-49	-3	0
1987	-22	-1	0	-13	-1	0	-15	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-1	-13	-1	0
1988	-9	-1	0	-13	-1	0	-17	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50	-3	-2	-19	-1	0
1989	-6	0	0	-4	0	0	-99	-6	0	-110	-7	-1	0	0	0	0	0	0	-37	-2	-2	-5	0	-7	0	0	0	0	0	0	-20	-1	-1	-20	-1	0
1990	-176	-11	0	-132	-8	0	-101	-6	0	0	0	0	-37	-2	-1	0	0	0	-1	0	0	0	0	0	22	1	57	-61	-4	-36	-114	-7	-4	-72	-4	-1
1991	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-12	-1	0	-42	-3	-1	-28	-2	-2	0	0	0	0	0	0	-72	-4	-42	-74	-5	-3	-72	-4	-1
1992	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	-3	-72	-4	-1
1993	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1994	-13	-1	0	-10	-1	0	-24	-1	0	-28	-2	0	-21	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-17	-17	-1	-1	-104	-6	-1
Mean			0			0			0			0			0			0			0			-5			-3			-6			-1			0
Max			0			0			0			0			4			0			0			0			74			0			0			0
Min			0			0			0			-1			-3			-3			-8			-85			-197			-46			-4			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination
Entraiment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-13	-1	0	-13	-1	0	0	0	0	0	0	0	-112	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1924	-10	-1	0	-8	0	0	-68	-4	0	-93	-6	-1	0	0	0	-30	-2	0	0	0	0	-41	-3	0	0	0	0	0	0	0	-85	-5	0	0	0	0
1925	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-2	0
1926	-11	-1	0	-8	0	0	-97	-6	0	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1927	-10	-1	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	0
1928	-16	-1	0	-16	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-17	-1	0	-16	-1	0	-18	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0	-22	-1	0
1930	-8	-1	0	-6	0	0	-23	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0	0	0	0
1931	-6	0	0	-138	-8	0	-113	-7	0	-114	-7	-1	0	0	0	-77	-5	-1	-11	-1	0	-66	-4	0	-76	-5	0	-72	-4	0	-74	-5	0	-72	-4	0
1932	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	95	5	1	0	0	0	-72	-4	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	-10	-1	0	-7	0	0	-12	-1	0	-51	-3	0	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	0	-32	-2	0
1934	0	0	0	-148	-9	0	-113	-7	0	-93	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	28	2	0	0	0	0	-56	-3	0	-126	-7	0
1935	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-10	-1	0	-8	0	0	-50	-3	0	-47	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1937	-11	-1	0	-11	-1	0	-25	-2	0	-77	-5	-1	-43	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-14	-1	0	-23	-1	0	0	0	0	-93	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	0
1939	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-78	-5	0	-28	-2	0	-17	-1	0
1940	-12	-1	0	-16	-1	0	-16	-1	0	-33	-2	0	0	0	0	0	0	0	-75	-4	-1	-7	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0
1941	-10	-1	0	-25	-2	0	0	0	0	0	0	0	-129	-7	-1	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0
1942	-25	-2	0	-18	-1	0	-28	-2	0	0	0	0	-36	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1943	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1944	-17	-1	0	-13	-1	0	-22	-1	0	-16	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-12	-1	0
1945	-10	-1	0	-29	-2	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	-20	-1	0
1946	-12	-1	0	-117	-7	0	0	0	0	0	0	0	148	8	2	-76	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0	-22	-1	0
1947	-15	-1	0	-31	-2	0	-36	-2	0	-52	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0	-10	-1	0
1948	-8	-1	0	-17	-1	0	-20	-1	0	-11	-1	0	-87	-5	-1	0	0	0	-88	-5	-1	-32	-2	0	0	0	0	0	0	0	-72	-4	0	-21	-1	0
1949	-16	-1	0	-96	-6	0	-71	-4	0	-41	-3	0	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0	-32	-2	0
1950	-14	-1	0	-13	-1	0	-19	-1	0	-23	-1	0	0	0	0	-79	-5	-1	-143	-9	-1	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1951	-20	-1	0	-30	-2	0	0	0	0	-66	-4	-1	-37	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-1	0
1952	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-97	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1954	-35	-2	0	-22	-1	0	-34	-2	0	0	0	0	0	0	0	-72	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1955	-17	-1	0	-17	-1	0	0	0	0	0	0	0	-32	-2	0	-42	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0	-30	-2	0
1956	-13	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0
1957	-7	0	0	0	0	0	-28	-2	0	-17	-1	0	-27	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0
1958	-17	-1	0	-38	-2	0	0	0	0	0	0	0	-103	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	0	-17	-1	0
1960	-10	-1	0	-11	-1	0	-68	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	0	-30	-2	0	-23	-1	0
1961	-12	-1	0	-114	-7	0	-87	-5	0	0	0	0	-43	-2	0	0	0	0	-45	-3	0	0	0	0	0	0	0	0	0	0	-23	-1	0	-111	-7	0
1962	-74	-5	0	-40	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-41	-3	0	-14	-1	0
1963	-108	-7	0	0	0	0	0	0	0	-45	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-13	-1	0	-8	0	0	0	0	0	-106	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	0	-20	-1	0	-13	-1	0
1965	-9	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	-24	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	-17	-1	0	-33	-2	0	0	0	0	-88	-5	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0	-23	-1	0
1967	-18	-1	0	-26	-2	0	0	0	0	0	0	0	-47	-3	0	-46	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0	-15	-1	0
1969	-14	-1	0	-47	-3	0	0	0	0	0	0	0	0	0	0	-92	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-13	-1	0	-16	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1972	-57	-4	0	0	0	0	-17	-1	0	-23	-1	0	0	0	0	-64	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	-59	-4	0	0	0	0
1973	-9	-1	0	-38	-2	0	0	0	0	-2	0	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-11	-1	0	-17	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1975	-10	-1	0	0	0	0	-24	-1	0	-23	-1	0	-25	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1976	-15	-1	0	0	0	0	-28	-2	0	0	0	0	0	0	0	-40	-2	-1	0	0	0	-49	-3	0	-51	-3	0	-71	-4	0	0	0	0	0	0	0
1977	-12	-1	0	-89	-5	0	-117	-7	0	-105	-6	-1	-36	-2	0	-46	-3	-1	0	0	0	-66	-4	0	0	0	0	-72	-4	0	-74	-5	0	-72	-4	0
1978	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	0
1979	-17	-1	0	-13	-1	0	-15	-1	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	-20	-1	0
1980	-13	-1	0	-24	-1	0	0	0	0	0	0	0	-40	-2	0	-54	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1981	-23	-1	0	-14	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	0	-78	-5	0	-25	-2	0	-15	-1	0
1982	-13	-1	0	-33	-2	0	0	0	0	0	0	0	-125	-7	-1	-61	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-13	-1	0	0	0	0	-111	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	0	-24	-1	0	-17	-1	0
1986	-15	-1	0	-14	-1	0	-29	-2	0	0	0	0	-35	-2	0	-84	-5	-1	-102	-6	-1	-7	0	0	0	0	0	0	0	0	0	0	0	-49	-3	0
1987	-22	-1	0	-13	-1	0	-15	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0	-13	-1	0
1988	-9	-1	0	-13	-1	0	-17	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50	-3	0	-19	-1	0
1989	-6	0	0	-4	0	0	-99	-6	0	-110	-7	-1	0	0	0	0	0	0	-37	-2	0	-5	0	0	0	0	0	0	0	0	-20	-1	0	-20	-1	0
1990	-176	-11	0	-132	-8	0	-101	-6	0	0	0	0	-37	-2	0	0	0	0	-1	0	0	0	0	0	22	1	0	-61	-4	0	-114	-7	0	-72	-4	0
1991	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-12	-1	0	-42	-3	-1	-28	-2	0	0	0	0	0	0	0	-72	-4	0	-74	-5	0	-72	-4	0
1992	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	0	-72	-4	0
1993	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1994	-13	-1	0	-10	-1	0	-24	-1	0	-28	-2	0	-21	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-17	-1	0	-104	-6	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			2			0			0			0			0			0			0			0
Min			0			0			0			-1			-1			-1			-1			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	116	Apr	Vol	950	May	Vol	376	Jun	Vol	167	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-13	-1	0	-13	-1	0	0	0	0	0	0	0	-112	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1924	-10	-1	0	-8	0	0	-68	-4	0	-93	-6	0	0	0	0	-30	-2	-210	0	0	0	-41	-3	-951	0	0	0	0	0	0	-85	-5	0	0	0	0
1925	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-2	0
1926	-11	-1	0	-8	0	0	-97	-6	0	-85	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1927	-10	-1	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	0
1928	-16	-1	0	-16	-1	0	0	0	0	-106	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-17	-1	0	-16	-1	0	-18	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0	-22	-1	0
1930	-8	-1	0	-6	0	0	-23	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0	0	0	0
1931	-6	0	0	-138	-8	0	-113	-7	0	-114	-7	0	0	0	0	-77	-5	-550	-11	-1	-618	-66	-4	-1,523	-76	-5	-750	-72	-4	0	-74	-5	0	-72	-4	0
1932	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	95	5	0	0	0	0	-72	-4	-4,058	-5	0	-112	0	0	0	0	0	0	0	0	0	0	0	0
1933	-10	-1	0	-7	0	0	-12	-1	0	-51	-3	0	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	0	-32	-2	0
1934	0	0	0	-148	-9	0	-113	-7	0	-93	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	28	2	281	0	0	0	-56	-3	0	-126	-7	0
1935	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-10	-1	0	-8	0	0	-50	-3	0	-47	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1937	-11	-1	0	-11	-1	0	-25	-2	0	-77	-5	0	-43	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-14	-1	0	-23	-1	0	0	0	0	-93	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	0
1939	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-78	-5	0	-28	-2	0	-17	-1	0
1940	-12	-1	0	-16	-1	0	-16	-1	0	-33	-2	0	0	0	0	0	0	0	-75	-4	-4,233	-7	0	-173	0	0	0	0	0	0	0	0	0	-19	-1	0
1941	-10	-1	0	-25	-2	0	0	0	0	0	0	0	-129	-7	0	-28	-2	-200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0
1942	-25	-2	0	-18	-1	0	-28	-2	0	0	0	0	-36	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1943	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1944	-17	-1	0	-13	-1	0	-22	-1	0	-16	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-12	-1	0
1945	-10	-1	0	-29	-2	0	0	0	0	0	0	0	0	0	0	-2	0	-15	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	-20	-1	0
1946	-12	-1	0	-117	-7	0	0	0	0	0	0	0	148	8	0	-76	-5	-540	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0	-22	-1	0
1947	-15	-1	0	-31	-2	0	-36	-2	0	-52	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0	-10	-1	0
1948	-8	-1	0	-17	-1	0	-20	-1	0	-11	-1	0	-87	-5	0	0	0	0	-88	-5	-4,945	-32	-2	-741	0	0	0	0	0	0	-72	-4	0	-21	-1	0
1949	-16	-1	0	-96	-6	0	-71	-4	0	-41	-3	0	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0	-32	-2	0
1950	-14	-1	0	-13	-1	0	-19	-1	0	-23	-1	0	0	0	0	-79	-5	-561	-143	-9	-8,091	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1951	-20	-1	0	-30	-2	0	0	0	0	-66	-4	0	-37	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-1	0
1952	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-97	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1954	-35	-2	0	-22	-1	0	-34	-2	0	0	0	0	0	0	0	-72	-4	-514	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1955	-17	-1	0	-17	-1	0	0	0	0	0	0	0	-32	-2	0	-42	-3	-300	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0	-30	-2	0
1956	-13	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	-80	-5	-568	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0
1957	-7	0	0	0	0	0	-28	-2	0	-17	-1	0	-27	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0
1958	-17	-1	0	-38	-2	0	0	0	0	0	0	0	-103	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	0	-17	-1	0
1960	-10	-1	0	-11	-1	0	-68	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	0	-30	-2	0	-23	-1	0
1961	-12	-1	0	-114	-7	0	-87	-5	0	0	0	0	-43	-2	0	0	0	0	-45	-3	-2,562	0	0	0	0	0	0	0	0	0	-23	-1	0	-111	-7	0
1962	-74	-5	0	-40	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	-1	0	-70	0	0	0	0	0	0	0	0	0	-41	-3	0	-14	-1	0
1963	-108	-7	0	0	0	0	0	0	0	-45	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-13	-1	0	-8	0	0	0	0	0	-106	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	0	-20	-1	0	-13	-1	0
1965	-9	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	-24	-1	-167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	-17	-1	0	-33	-2	0	0	0	0	-88	-5	0	12	1	0	-10	-1	-74	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0	-23	-1	0
1967	-18	-1	0	-26	-2	0	0	0	0	0	0	0	-47	-3	0	-46	-3	-329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0	-15	-1	0
1969	-14	-1	0	-47	-3	0	0	0	0	0	0	0	0	0	0	-92	-6	-653	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-13	-1	0	-16	-1	0	0	0	0	-106	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1972	-57	-4	0	0	0	0	-17	-1	0	-23	-1	0	0	0	0	-64	-4	-456	0	0	0	0	0	0	0	0	0	0	0	0	-59	-4	0	0	0	0
1973	-9	-1	0	-38	-2	0	0	0	0	-2	0	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-11	-1	0	-17	-1	0	0	0	0	-106	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1975	-10	-1	0	0	0	0	-24	-1	0	-23	-1	0	-25	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1976	-15	-1	0	0	0	0	-28	-2	0	0	0	0	0	0	0	-40	-2	-281	0	0	0	-49	-3	-1,130	-51	-3	-509	-71	-4	0	0	0	0	0	0	0
1977	-12	-1	0	-89	-5	0	-117	-7	0	-105	-6	0	-36	-2	0	-46	-3	-323	0	0	0	-66	-4	-1,523	0	0	0	-72	-4	0	-74	-5	0	-72	-4	0
1978	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	0
1979	-17	-1	0	-13	-1	0	-15	-1	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	-20	-1	0
1980	-13	-1	0	-24	-1	0	0	0	0	0	0	0	-40	-2	0	-54	-3	-385	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1981	-23	-1	0	-14	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-106	-78	-5	0	-25	-2	0	-15	-1	0
1982	-13	-1	0	-33	-2	0	0	0	0	0	0	0	-125	-7	0	-61	-4	-433	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-13	-1	0	0	0	0	-111	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	0	-24	-1	0	-17	-1	0
1986	-15	-1	0	-14	-1	0	-29	-2	0	0	0	0	-35	-2	0	-84	-5	-593	-102	-6	-5,735	-7	0	-173	0	0	0	0	0	0	0	0	0	-49	-3	0
1987	-22	-1	0	-13	-1	0	-15	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0	-13	-1	0
1988	-9	-1	0	-13	-1	0	-17	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50	-3	0	-19	-1	0
1989	-6	0	0	-4	0	0	-99	-6	0	-110	-7	0	0	0	0	0	0	0	-37	-2	-2,111	-5	0	-118	0	0	0	0	0	0	-20	-1	0	-20	-1	0
1990	-176	-11	0	-132	-8	0	-101	-6	0	0	0	0	-37	-2	0	0	0	0	-1	0	-78	0	0	0	22	1	218	-61	-4	0	-114	-7	0	-72	-4	0
1991	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-12	-1	0	-42	-3	-298	-28	-2	-1,580	0	0	0	0	0	0	-72	-4	0	-74	-5	0	-72	-4	0
1992	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	0	-72	-4	0
1993	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1994	-13	-1	0	-10	-1	0	-24	-1	0	-28	-2	0	-21	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-17	-1	0	-104	-6	0
Mean			0			0			0			0			0			-102			-467			-88			-12			0			0			0
Max			0			0			0			0			0			0			0			0			281			0			0			0
Min			0			0			0			0			0			-653			-8,091			-1,523			-750			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-13	-1	0	-13	-1	0	0	0	0	0	0	0	-112	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1924	-10	-1	0	-8	0	0	-68	-4	-1	-93	-6	-1	0	0	0	-30	-2	-1	0	0	0	-41	-3	-12	0	0	0	0	0	0	-85	-5	-2	0	0	0
1925	-57	-3	-1	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-2	0
1926	-11	-1	0	-8	0	0	-97	-6	-1	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1927	-10	-1	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	0
1928	-16	-1	0	-16	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-17	-1	0	-16	-1	0	-18	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	-1	-22	-1	0
1930	-8	-1	0	-6	0	0	-23	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-1	0	0	0
1931	-6	0	0	-138	-8	-1	-113	-7	-1	-114	-7	-2	0	0	0	-77	-5	-1	-11	-1	0	-66	-4	-19	-76	-5	-7	-72	-4	-2	-74	-5	-2	-72	-4	0
1932	-57	-3	-1	-39	-2	0	-34	-2	0	0	0	0	95	5	2	0	0	0	-72	-4	-2	-5	0	-1	0	0	0	0	0	0	0	0	0	0	0	0
1933	-10	-1	0	-7	0	0	-12	-1	0	-51	-3	-1	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	-2	-32	-2	0
1934	0	0	0	-148	-9	-1	-113	-7	-1	-93	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	28	2	2	0	0	0	-56	-3	-2	-126	-7	-1
1935	-57	-3	-1	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-10	-1	0	-8	0	0	-50	-3	0	-47	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1937	-11	-1	0	-11	-1	0	-25	-2	0	-77	-5	-1	-43	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-14	-1	0	-23	-1	0	0	0	0	-93	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	0
1939	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-78	-5	-2	-28	-2	-1	-17	-1	0
1940	-12	-1	0	-16	-1	0	-16	-1	0	-33	-2	0	0	0	0	0	0	0	-75	-4	-2	-7	0	-2	0	0	0	0	0	0	0	0	0	-19	-1	0
1941	-10	-1	0	-25	-2	0	0	0	0	0	0	0	-129	-7	-2	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0
1942	-25	-2	-1	-18	-1	0	-28	-2	0	0	0	0	-36	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1943	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1944	-17	-1	0	-13	-1	0	-22	-1	0	-16	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-1	-12	-1	0
1945	-10	-1	0	-29	-2	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-2	-20	-1	0
1946	-12	-1	0	-117	-7	-1	0	0	0	0	0	0	148	8	2	-76	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	-2	-22	-1	0
1947	-15	-1	0	-31	-2	0	-36	-2	0	-52	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-1	-10	-1	0
1948	-8	-1	0	-17	-1	0	-20	-1	0	-11	-1	0	-87	-5	-1	0	0	0	-88	-5	-3	-32	-2	-9	0	0	0	0	0	0	-72	-4	-2	-21	-1	0
1949	-16	-1	0	-96	-6	-1	-71	-4	-1	-41	-3	-1	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	-1	-32	-2	0
1950	-14	-1	0	-13	-1	0	-19	-1	0	-23	-1	0	0	0	0	-79	-5	-1	-143	-9	-5	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1951	-20	-1	0	-30	-2	0	0	0	0	-66	-4	-1	-37	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-1	0
1952	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-97	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1954	-35	-2	-1	-22	-1	0	-34	-2	0	0	0	0	0	0	0	-72	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1955	-17	-1	0	-17	-1	0	0	0	0	0	0	0	-32	-2	-1	-42	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	-2	-30	-2	0
1956	-13	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	-80	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0
1957	-7	0	0	0	0	0	-28	-2	0	-17	-1	0	-27	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0
1958	-17	-1	0	-38	-2	0	0	0	0	0	0	0	-103	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	-2	-17	-1	0
1960	-10	-1	0	-11	-1	0	-68	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	-2	-30	-2	-1	-23	-1	0
1961	-12	-1	0	-114	-7	-1	-87	-5	-1	0	0	0	-43	-2	-1	0	0	0	-45	-3	-1	0	0	0	0	0	0	0	0	0	-23	-1	-1	-111	-7	-1
1962	-74	-5	-1	-40	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-41	-3	-1	-14	-1	0
1963	-108	-7	-2	0	0	0	0	0	0	-45	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-13	-1	0	-8	0	0	0	0	0	-106	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	-2	-20	-1	-1	-13	-1	0
1965	-9	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	-24	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	-17	-1	0	-33	-2	0	0	0	0	-88	-5	-1	12	1	0	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	-1	-23	-1	0
1967	-18	-1	0	-26	-2	0	0	0	0	0	0	0	-47	-3	-1	-46	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	-1	-15	-1	0
1969	-14	-1	0	-47	-3	0	0	0	0	0	0	0	0	0	0	-92	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-13	-1	0	-16	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1972	-57	-4	-1	0	0	0	-17	-1	0	-23	-1	0	0	0	0	-64	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	-59	-4	-2	0	0	0
1973	-9	-1	0	-38	-2	0	0	0	0	-2	0	0	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-11	-1	0	-17	-1	0	0	0	0	-106	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1975	-10	-1	0	0	0	0	-24	-1	0	-23	-1	0	-25	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1976	-15	-1	0	0	0	0	-28	-2	0	0	0	0	0	0	0	-40	-2	-1	0	0	0	-49	-3	-14	-51	-3	-4	-71	-4	-2	0	0	0	0	0	0
1977	-12	-1	0	-89	-5	-1	-117	-7	-1	-105	-6	-1	-36	-2	-1	-46	-3	-1	0	0	0	-66	-4	-19	0	0	0	-72	-4	-2	-74	-5	-2	-72	-4	0
1978	-57	-3	-1	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	0
1979	-17	-1	0	-13	-1	0	-15	-1	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-2	-20	-1	0
1980	-13	-1	0	-24	-1	0	0	0	0	0	0	0	-40	-2	-1	-54	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1981	-23	-1	0	-14	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-1	-78	-5	-2	-25	-2	-1	-15	-1	0
1982	-13	-1	0	-33	-2	0	0	0	0	0	0	0	-125	-7	-2	-61	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-13	-1	0	0	0	0	-111	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	-2	-24	-1	-1	-17	-1	0
1986	-15	-1	0	-14	-1	0	-29	-2	0	0	0	0	-35	-2	-1	-84	-5	-1	-102	-6	-3	-7	0	-2	0	0	0	0	0	0	0	0	0	-49	-3	0
1987	-22	-1	0	-13	-1	0	-15	-1	0	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-1	-13	-1	0
1988	-9	-1	0	-13	-1	0	-17	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50	-3	-1	-19	-1	0
1989	-6	0	0	-4	0	0	-99	-6	-1	-110	-7	-1	0	0	0	0	0	0	-37	-2	-1	-5	0	-1	0	0	0	0	0	0	-20	-1	-1	-20	-1	0
1990	-176	-11	-4	-132	-8	-1	-101	-6	-1	0	0	0	-37	-2	-1	0	0	0	-1	0	0	0	0	0	22	1	2	-61	-4	-2	-114	-7	-3	-72	-4	0
1991	-57	-3	-1	-39	-2	0	-34	-2	0	-35	-2	0	-12	-1	0	-42	-3	-1	-28	-2	-1	0	0	0	0	0	0	-72	-4	-2	-74	-5	-2	-72	-4	0
1992	-57	-3	-1	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	-2	-72	-4	0
1993	-57	-3	-1	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1994	-13	-1	0	-10	-1	0	-24	-1	0	-28	-2	0	-21	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-1	-17	-1	0	-104	-6	0
Mean			0			0			0			0			0			0			0			-1			0			0			-1			0
Max			0			0			0			0			2			0			0			0			2			0			0			0
Min			-4			-1			-1			-2			-2			-2			-5			-19			-7			-2			-3			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-13	-1	0	-13	-1	0	0	0	0	0	0	0	-112	-6	-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1924	-10	-1	0	-8	0	0	-68	-4	-2	-93	-6	-4	0	0	0	-30	-2	-3	0	0	0	-41	-3	-28	0	0	0	0	0	0	-85	-5	0	0	0	0
1925	-57	-3	-1	-39	-2	-1	-34	-2	-1	-35	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-41	-2	0
1926	-11	-1	0	-8	0	0	-97	-6	-3	-85	-5	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1927	-10	-1	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-26	-2	0
1928	-16	-1	0	-16	-1	0	0	0	0	-106	-7	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-17	-1	0	-16	-1	0	-18	-1	-1	-15	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0	-22	-1	0
1930	-8	-1	0	-6	0	0	-23	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0	0	0	0
1931	-6	0	0	-138	-8	-3	-113	-7	-4	-114	-7	-5	0	0	0	-77	-5	-7	-11	-1	-5	-66	-4	-44	-76	-5	-11	-72	-4	-1	-74	-5	0	-72	-4	0
1932	-57	-3	-1	-39	-2	-1	-34	-2	-1	0	0	0	95	5	24	0	0	0	-72	-4	-33	-5	0	-3	0	0	0	0	0	0	0	0	0	0	0	0
1933	-10	-1	0	-7	0	0	-12	-1	0	-51	-3	-2	11	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	0	-32	-2	0
1934	0	0	0	-148	-9	-3	-113	-7	-4	-93	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	28	2	4	0	0	0	-56	-3	0	-126	-7	0
1935	-57	-3	-1	-39	-2	-1	-34	-2	-1	-35	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-10	-1	0	-8	0	0	-50	-3	-2	-47	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1937	-11	-1	0	-11	-1	0	-25	-2	-1	-77	-5	-3	-43	-2	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-14	-1	0	-23	-1	0	0	0	0	-93	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	0
1939	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-78	-5	-1	-28	-2	0	-17	-1	0
1940	-12	-1	0	-16	-1	0	-16	-1	-1	-33	-2	-1	0	0	0	0	0	0	-75	-4	-35	-7	0	-5	0	0	0	0	0	0	0	0	0	-19	-1	0
1941	-10	-1	0	-25	-2	-1	0	0	0	0	0	0	-129	-7	-33	-28	-2	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-47	-3	0
1942	-25	-2	0	-18	-1	0	-28	-2	-1	0	0	0	-36	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1943	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28	-2	0
1944	-17	-1	0	-13	-1	0	-22	-1	-1	-16	-1	-1	-14	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-12	-1	0
1945	-10	-1	0	-29	-2	-1	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	-20	-1	0
1946	-12	-1	0	-117	-7	-2	0	0	0	0	0	0	148	8	37	-76	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0	-22	-1	0
1947	-15	-1	0	-31	-2	-1	-36	-2	-1	-52	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0	-10	-1	0
1948	-8	-1	0	-17	-1	0	-20	-1	-1	-11	-1	-1	-87	-5	-22	0	0	0	-88	-5	-41	-32	-2	-21	0	0	0	0	0	0	-72	-4	0	-21	-1	0
1949	-16	-1	0	-96	-6	-2	-71	-4	-3	-41	-3	-2	18	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0	-32	-2	0
1950	-14	-1	0	-13	-1	0	-19	-1	-1	-23	-1	-1	0	0	0	-79	-5	-8	-143	-9	-67	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1951	-20	-1	0	-30	-2	-1	0	0	0	-66	-4	-3	-37	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-1	0
1952	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-97	-5	-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1954	-35	-2	0	-22	-1	0	-34	-2	-1	0	0	0	0	0	0	-72	-4	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1955	-17	-1	0	-17	-1	0	0	0	0	0	0	0	-32	-2	-8	-42	-3	-4	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0	-30	-2	0
1956	-13	-1	0	-14	-1	0	0	0	0	0	0	0	0	0	0	-80	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-65	-4	0
1957	-7	0	0	0	0	0	-28	-2	-1	-17	-1	-1	-27	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0
1958	-17	-1	0	-38	-2	-1	0	0	0	0	0	0	-103	-6	-26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	0	-17	-1	0
1960	-10	-1	0	-11	-1	0	-68	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-79	-5	-1	-30	-2	0	-23	-1	0
1961	-12	-1	0	-114	-7	-2	-87	-5	-3	0	0	0	-43	-2	-11	0	0	0	-45	-3	-21	0	0	0	0	0	0	0	0	0	-23	-1	0	-111	-7	0
1962	-74	-5	-1	-40	-2	-1	-34	-2	-1	0	0	0	0	0	0	0	0	0	-1	0	-1	0	0	0	0	0	0	0	0	0	-41	-3	0	-14	-1	0
1963	-108	-7	-2	0	0	0	0	0	0	-45	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-13	-1	0	-8	0	0	0	0	0	-106	-6	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	0	-20	-1	0	-13	-1	0
1965	-9	-1	0	-15	-1	0	0	0	0	0	0	0	0	0	0	-24	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	-17	-1	0	-33	-2	-1	0	0	0	-88	-5	-4	12	1	3	-10	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0	-23	-1	0
1967	-18	-1	0	-26	-2	-1	0	0	0	0	0	0	-47	-3	-12	-46	-3	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0	-15	-1	0
1969	-14	-1	0	-47	-3	-1	0	0	0	0	0	0	0	0	0	-92	-6	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-13	-1	0	-16	-1	0	0	0	0	-106	-7	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1972	-57	-4	-1	0	0	0	-17	-1	-1	-23	-1	-1	0	0	0	-64	-4	-6	0	0	0	0	0	0	0	0	0	0	0	0	-59	-4	0	0	0	0
1973	-9	-1	0	-38	-2	-1	0	0	0	-2	0	0	-35	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-11	-1	0	-17	-1	0	0	0	0	-106	-7	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0
1975	-10	-1	0	0	0	0	-24	-1	-1	-23	-1	-1	-25	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1976	-15	-1	0	0	0	0	-28	-2	-1	0	0	0	0	0	0	-40	-2	-4	0	0	0	-49	-3	-33	-51	-3	-7	-71	-4	-1	0	0	0	0	0	0
1977	-12	-1	0	-89	-5	-2	-117	-7	-4	-105	-6	-5	-36	-2	-9	-46	-3	-4	0	0	0	-66	-4	-44	0	0	0	-72	-4	-1	-74	-5	0	-72	-4	0
1978	-57	-3	-1	-39	-2	-1	-34	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	0
1979	-17	-1	0	-13	-1	0	-15	-1	-1	-34	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	-20	-1	0
1980	-13	-1	0	-24	-1	0	0	0	0	0	0	0	-40	-2	-10	-54	-3	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1981	-23	-1	0	-14	-1	0	-18	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11	-1	-1	-78	-5	-1	-25	-2	0	-15	-1	0
1982	-13	-1	0	-33	-2	-1	0	0	0	0	0	0	-125	-7	-32	-61	-4	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-13	-1	0	0	0	0	-111	-7	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	-1	-24	-1	0	-17	-1	0
1986	-15	-1	0	-14	-1	0	-29	-2	-1	0	0	0	-35	-2	-9	-84	-5	-8	-102	-6	-47	-7	0	-5	0	0	0	0	0	0	0	0	0	-49	-3	0
1987	-22	-1	0	-13	-1	0	-15	-1	-1	-18	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0	-13	-1	0
1988	-9	-1	0	-13	-1	0	-17	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50	-3	0	-19	-1	0
1989	-6	0	0	-4	0	0	-99	-6	-4	-110	-7	-5	0	0	0	0	0	0	-37	-2	-17	-5	0	-3	0	0	0	0	0	0	-20	-1	0	-20	-1	0
1990	-176	-11	-3	-132	-8	-3	-101	-6	-4	0	0	0	-37	-2	-9	0	0	0	-1	0	-1	0	0	0	22	1	3	-61	-4	0	-114	-7	0	-72	-4	0
1991	-57	-3	-1	-39	-2	-1	-34	-2	-1	-35	-2	-2	-12	-1	-3	-42	-3	-4	-28	-2	-13	0	0	0	0	0	0	-72	-4	-1	-74	-5	0	-72	-4	0
1992	-57	-3	-1	-39	-2	-1	-34	-2	-1	-35	-2	-2	-36	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-74	-5	0	-72	-4	0
1993	-57	-3	-1	-39	-2	-1	-34	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1994	-13	-1	0	-10	-1	0	-24	-1	-1	-28	-2	-1	-21	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-17	-1	0	-104	-6	0
Mean			0			-1			-1			-1			-3			-1			-4			-3			0			0			0			0
Max			0			0			0			0			37			0			0			0			4			0			0			0
Min			-3			-3			-4			-5			-33			-9			-67			-44			-11			-1			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Existing Desalination Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1923	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1924	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	66	4	385	79	5	1322	86	5	511	81	5	71	72	4	25
1925	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1926	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1927	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1928	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1929	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1930	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1931	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	66	4	385	79	5	1322	86	5	511	81	5	71	72	4	25
1932	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1933	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1934	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1935	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1936	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1937	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1938	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1940	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1941	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1942	57	3	21	39	2	16	34	2	10	0	0	0	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1944	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1945	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1946	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1947	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1948	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1949	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1950	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1951	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1952	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1954	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1955	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1956	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1957	0	0	0	0	0	0	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1958	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1960	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1961	57	3	21	39	2	16	34	2	10	0	0	0	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1962	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1963	57	3	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1964	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1965	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1966	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1967	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1969	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1971	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1972	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1973	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1974	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1975	0	0	0	0	0	0	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1976	0	0	0	0	0	0	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	66	4	385	79	5	1322	86	5	511	0	0	0	72	4	25
1977	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	66	4	385	79	5	1322	86	5	511	81	5	71	72	4	25
1978	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1979	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1980	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1981	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1982	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1985	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1986	57	3	21	39	2	16	34	2	10	0	0	0	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1987	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1988	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1989	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1990	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1991	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1992	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1993	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1994	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
MEAN			18			13			6			6			4			1			0			21			72			84			33			23
MAX			21			16			10			15			15			10			0			385			1322			511			71			25
MIN			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Existing Desalination Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1923	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1924	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	81	5	**3**	72	4	**1**
1925	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1926	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1927	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1928	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1929	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1930	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1931	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	81	5	**3**	72	4	**1**
1932	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1933	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1934	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1935	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1936	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1937	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1938	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1939	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1940	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1941	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1942	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1943	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1944	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1945	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1946	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1947	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1948	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1949	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1950	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1951	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1952	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1954	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1955	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1956	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1957	0	0	**0**	0	0	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1958	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1960	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1961	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1962	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1963	57	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1964	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1965	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1966	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1967	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1969	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1971	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1972	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1973	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1974	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1975	0	0	**0**	0	0	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1976	0	0	**0**	0	0	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	0	0	**0**	72	4	**1**
1977	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	81	5	**3**	72	4	**1**
1978	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1979	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1980	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1981	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1982	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1985	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1986	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1987	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1988	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1989	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1990	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1991	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1992	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1993	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1994	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
MEAN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**5**			**11**			**8**			**1**			**0**
MAX			**0**			**0**			**0**			**0**			**1**			**1**			**0**			**85**			**205**			**51**			**3**			**1**
MIN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Existing Desalination Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1923	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1924	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	1	0	0	0	66	4	0	79	5	0	86	5	0	81	5	0	72	4	0
1925	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1926	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1927	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1928	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1929	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1930	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1931	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	1	0	0	0	66	4	0	79	5	0	86	5	0	81	5	0	72	4	0
1932	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1933	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1934	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1935	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1936	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1937	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1938	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
1940	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1941	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1942	57	3	0	39	2	0	34	2	0	0	0	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1944	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1945	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1946	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1947	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1948	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1949	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1950	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1951	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1952	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1954	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1955	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1956	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1957	0	0	0	0	0	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1958	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1960	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
1961	57	3	0	39	2	0	34	2	0	0	0	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1962	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1963	57	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1964	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
1965	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1966	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1967	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1969	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1971	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1972	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1973	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1974	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1975	0	0	0	0	0	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1976	0	0	0	0	0	0	34	2	0	35	2	0	36	2	0	42	3	1	0	0	0	66	4	0	79	5	0	86	5	0	0	0	0	72	4	0
1977	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	1	0	0	0	66	4	0	79	5	0	86	5	0	81	5	0	72	4	0
1978	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1979	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1980	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1981	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
1982	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1985	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
1986	57	3	0	39	2	0	34	2	0	0	0	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1987	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1988	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1989	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1990	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
1991	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	1	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
1992	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1993	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1994	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	0	81	5	0	72	4	0
MEAN			0			0			0			0			0			0			0			0			0			0			0			0
MAX			0			0			0			0			0			1			0			0			0			0			0			0
MIN			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Existing Desalination Entrainment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	781	Apr	Vol	511	May	Vol	2,790	Jun	Vol	5,661	Jul	Vol	3,783	Aug	Vol	425	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1923	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1924	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	2014	0	0	0	66	4	11302	79	5	26563	86	5	19967	81	5	2113	72	4	0
1925	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1926	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1927	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1928	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1929	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1930	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1931	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	2014	0	0	0	66	4	11302	79	5	26563	86	5	19967	81	5	2113	72	4	0
1932	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1933	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1934	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1935	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1936	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1937	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1938	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
1940	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1941	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1942	57	3	0	39	2	0	34	2	0	0	0	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1944	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1945	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1946	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1947	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1948	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1949	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1950	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1951	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1952	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1954	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1955	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1956	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1957	0	0	0	0	0	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1958	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1960	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
1961	57	3	0	39	2	0	34	2	0	0	0	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1962	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1963	57	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1964	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
1965	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1966	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1967	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1969	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1971	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1972	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1973	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1974	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1975	0	0	0	0	0	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1976	0	0	0	0	0	0	34	2	0	35	2	0	36	2	0	42	3	2014	0	0	0	66	4	11302	79	5	26563	86	5	19967	0	0	0	72	4	0
1977	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	2014	0	0	0	66	4	11302	79	5	26563	86	5	19967	81	5	2113	72	4	0
1978	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1979	57	3	0	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1980	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1981	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
1982	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1985	57	3	0	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
1986	57	3	0	39	2	0	34	2	0	0	0	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1987	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1988	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1989	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1990	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
1991	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	42	3	2014	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
1992	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2113	72	4	0
1993	57	3	0	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1994	57	3	0	39	2	0	34	2	0	35	2	0	36	2	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	19967	81	5	2113	72	4	0
MEAN			0			0			0			0			0			138			0			619			1455			3282			984			0
MAX			0			0			0			0			0			2014			0			11302			26563			19967			2113			0
MIN			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Existing Desalination
Entrainment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1923	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1924	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	42	3	1	0	0	0	66	4	19	79	5	7	86	5	2	81	5	2	72	4	0
1925	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1926	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1927	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1928	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1929	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1930	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1931	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	42	3	1	0	0	0	66	4	19	79	5	7	86	5	2	81	5	2	72	4	0
1932	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1933	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1934	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1935	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1936	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1937	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1938	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
1940	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1941	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1942	57	3	1	39	2	0	34	2	0	0	0	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1944	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1945	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1946	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1947	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1948	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1949	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1950	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1951	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1952	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1954	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1955	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1956	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1957	0	0	0	0	0	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1958	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1960	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
1961	57	3	1	39	2	0	34	2	0	0	0	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1962	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1963	57	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1964	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
1965	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1966	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1967	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1969	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1971	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1972	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1973	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1974	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1975	0	0	0	0	0	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1976	0	0	0	0	0	0	34	2	0	35	2	0	36	2	1	42	3	1	0	0	0	66	4	19	79	5	7	86	5	2	0	0	0	72	4	0
1977	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	42	3	1	0	0	0	66	4	19	79	5	7	86	5	2	81	5	2	72	4	0
1978	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1979	57	3	1	39	2	0	34	2	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1980	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1981	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
1982	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1985	57	3	1	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
1986	57	3	1	39	2	0	34	2	0	0	0	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1987	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1988	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1989	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1990	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
1991	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	42	3	1	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
1992	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	2	72	4	0
1993	57	3	1	39	2	0	34	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1994	57	3	1	39	2	0	34	2	0	35	2	0	36	2	1	0	0	0	0	0	0	0	0	0	0	0	0	86	5	2	81	5	2	72	4	0
MEAN			**1**			**0**			**0**			**0**			**0**			**0**			**0**			**1**			**0**			**0**			**1**			**0**
MAX			**1**			**0**			**0**			**0**			**1**			**1**			**0**			**19**			**7**			**2**			**2**			**0**
MIN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Existing Desalination Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1923	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1924	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	66	4	44	79	5	11	86	5	1	81	5	0	72	4	0
1925	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1926	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1927	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1928	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1929	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1930	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1931	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	66	4	44	79	5	11	86	5	1	81	5	0	72	4	0
1932	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1933	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1934	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1935	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1936	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1937	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1938	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1940	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1941	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1942	57	3	1	39	2	1	34	2	1	0	0	0	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1944	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1945	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1946	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1947	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1948	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1949	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1950	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1951	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1952	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1954	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1955	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1956	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1957	0	0	0	0	0	0	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1958	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1960	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1961	57	3	1	39	2	1	34	2	1	0	0	0	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1962	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1963	57	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1964	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1965	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1966	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1967	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1969	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1971	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1972	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1973	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1974	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1975	0	0	0	0	0	0	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1976	0	0	0	0	0	0	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	66	4	44	79	5	11	86	5	1	0	0	0	72	4	0
1977	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	66	4	44	79	5	11	86	5	1	81	5	0	72	4	0
1978	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1979	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1980	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1981	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1982	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1985	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1986	57	3	1	39	2	1	34	2	1	0	0	0	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1987	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1988	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1989	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1990	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1991	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1992	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1993	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1994	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
MEAN			1			1			1			1			2			0			0			2			1			0			0			0
MAX			1			1			1			2			9			4			0			44			11			1			0			0
MIN			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination
Entraiment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	54	Apr	Vol	412	May	Vol	530	Jun	Vol	119	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 204 Existing Desalination Entraiment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entraiment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-54	-3	**-372**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**-580**	-36	-2	**-300**	0	0	**0**	0	0	**0**	0	0	**0**	-118	-7	**-39,584**	-78	-5	**-9,013**	-81	-5	**-1,429**	-72	-4	**-491**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-37	-2	**-251**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**-457**
1927	-11	-1	**-83**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**-380**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-20	-1	**-140**
1928	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-237**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-92	-5	**-759**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-62	-4	**-7,127**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-250**	0	0	**0**	-19	-1	**-132**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-299**	0	0	**0**	0	0	**0**	-53	-3	**-6,204**	-79	-5	**-26,443**	-8	0	**-869**	0	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	71	4	**591**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-44	-3	**-303**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-221	-14	**-1,645**	0	0	**0**	0	0	**0**	-36	-2	**-305**	0	0	**0**	39	2	**186**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	-57	-3	**-424**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**-14**	-1	0	**-94**	0	0	**0**	0	0	**0**	1	0	**14**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-103	-6	**-11,858**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-227**	0	0	**0**	0	0	**0**	0	0	**0**	-102	-6	**-11,718**	0	0	**0**	-50	-3	**-343**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**-459**
1939	0	0	**0**	0	0	**0**	-34	-2	**-208**	-15	-1	**-127**	-18	-1	**-145**	-31	-2	**-145**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	54	3	**255**	-37	-2	**-87**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-23	-1	**-155**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-55	-3	**-378**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-4	0	**-31**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**-202**
1943	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**-147**
1944	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-142**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-8,032**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	-2	0	**-14**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-172	-10	**-19,778**	0	0	**0**	-29	-2	**-198**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	23	1	**109**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-152**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	-42	-3	**-359**	-120	-7	**-993**	-34	-2	**-162**	-94	-6	**-224**	-51	-3	**-5,895**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	-98	-6	**-845**	0	0	**0**	-35	-2	**-163**	-45	-3	**-106**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-10**	0	0	**0**
1951	-22	-1	**-161**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**-204**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**-174**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-62**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-273**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-20**	-3	0	**-15**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-33	-2	**-227**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-136**	0	0	**0**	0	0	**0**	0	0	**0**	-101	-6	**-11,638**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	-31	-2	**-249**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-55	-3	**-474**	-53	-3	**-438**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	-2	0	**-14**	-13	-1	**-115**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-5	**-9,216**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-247**
1964	0	0	**0**	-6	0	**-47**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-5	**-9,141**	-114	-7	**-2,010**	0	0	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-75**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-62	-4	**-1,090**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**-174**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**-211**
1972	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-118**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-20	-1	**-2,299**	0	0	**0**	-19	-1	**-133**
1973	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**-204**
1974	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	0	0	**0**	-20	-1	**-165**	0	0	**0**	0	0	**0**	-1	0	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	-19	-1	**-118**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-44	-3	**-14,764**	0	0	**0**	0	0	**0**	0	0	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-2**	-54	-3	**-6,244**	-79	-5	**-26,443**	-8	0	**-869**	0	0	**0**	-72	-4	**-491**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**8**	-51	-3	**-346**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-284**	0	0	**0**	0	0	**0**	0	0	**0**	-50	-3	**-5,752**	-10	-1	**-172**	-25	-1	**-169**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**-38**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-136**	0	0	**0**	0	0	**0**	0	0	**0**	-66	-4	**-7,607**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-53	-3	**-252**	0	0	**0**	0	0	**0**	-40	-2	**-13,554**	-25	-1	**-2,844**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-27	-2	**-181**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-72	-4	**-8,233**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	53	3	**252**	-22	-1	**-53**	-42	-3	**-4,870**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	-17	-1	**-129**	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-130**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-84	-5	**-9,681**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-4	**-664**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-301**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-7**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1992	-57	-3	**-424**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-78**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-244**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**-39**			**-6**			**-5**			**-48**			**-50**			**-13**			**-7**			**-319**			**-1,655**			**-1,862**			**-64**			**-103**
Max			**0**			**0**			**0**			**0**			**591**			**255**			**0**			**0**			**0**			**0**			**14**			**0**
Min			**-1,645**			**-249**			**-208**			**-845**			**-993**			**-284**			**-224**			**-6,244**			**-39,584**			**-19,778**			**-2,010**			**-491**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination
Entraiment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-54	-3	**-8**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**-17**	-36	-2	**-17**	0	0	**0**	0	0	**0**	0	0	**0**	-118	-7	**-6,137**	-78	-5	**-892**	-81	-5	**-62**	-72	-4	**-11**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-37	-2	**-6**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**-10**
1927	-11	-1	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**-22**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-20	-1	**-3**
1928	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-5**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-92	-5	**-44**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-62	-4	**-706**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-25**	0	0	**0**	-19	-1	**-3**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-17**	0	0	**0**	0	0	**0**	-53	-3	**-1,372**	-79	-5	**-4,100**	-8	0	**-86**	0	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	71	4	**34**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-44	-3	**-7**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-221	-14	**-11**	0	0	**0**	0	0	**0**	-36	-2	**-9**	0	0	**0**	39	2	**23**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	-57	-3	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**-6**	-1	0	**-21**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-103	-6	**-1,174**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-28**	0	0	**0**	0	0	**0**	0	0	**0**	-102	-6	**-1,160**	0	0	**0**	-50	-3	**-8**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**-10**
1939	0	0	**0**	0	0	**0**	-34	-2	**-2**	-15	-1	**-4**	-18	-1	**-8**	-31	-2	**-18**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	54	3	**31**	-37	-2	**-39**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-23	-1	**-3**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-55	-3	**-8**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-4	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**-4**
1943	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**-3**
1944	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**-795**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-172	-10	**-1,958**	0	0	**0**	-29	-2	**-4**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	23	1	**13**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**-4**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	-42	-3	**-10**	-120	-7	**-57**	-34	-2	**-20**	-94	-6	**-101**	-51	-3	**-1,303**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	-98	-6	**-24**	0	0	**0**	-35	-2	**-20**	-45	-3	**-48**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**
1951	-22	-1	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**-4**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**-4**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**-6**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**-1**	-3	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-33	-2	**-5**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-17**	0	0	**0**	0	0	**0**	0	0	**0**	-101	-6	**-1,152**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	-31	-2	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-55	-3	**-14**	-53	-3	**-25**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	-2	0	**0**	-13	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-5	**-913**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-5**
1964	0	0	**0**	-6	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-5	**-905**	-114	-7	**-87**	0	0	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-62	-4	**-47**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**-4**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**-5**
1972	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-20	-1	**-228**	0	0	**0**	-19	-1	**-3**
1973	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**-4**
1974	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	0	0	**0**	-20	-1	**-1**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	-19	-1	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-44	-3	**-2,289**	0	0	**0**	0	0	**0**	0	0	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-1**	-54	-3	**-1,381**	-79	-5	**-4,100**	-8	0	**-86**	0	0	**0**	-72	-4	**-11**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-51	-3	**-8**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-35**	0	0	**0**	0	0	**0**	0	0	**0**	-50	-3	**-570**	-10	-1	**-7**	-25	-1	**-4**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-17**	0	0	**0**	0	0	**0**	0	0	**0**	-66	-4	**-753**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-53	-3	**-31**	0	0	**0**	0	0	**0**	-40	-2	**-2,102**	-25	-1	**-282**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-27	-2	**-4**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-72	-4	**-815**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	53	3	**31**	-22	-1	**-24**	-42	-3	**-1,077**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	-17	-1	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-8**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-84	-5	**-959**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-4	**-38**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**-9**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1992	-57	-3	**-3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-10**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**-5**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**0**			**0**			**0**			**-1**			**-3**			**-2**			**-3**			**-71**			**-257**			**-184**			**-3**			**-2**
Max			**0**			**0**			**0**			**0**			**34**			**31**			**0**			**0**			**0**			**0**			**1**			**0**
Min			**-11**			**-1**			**-2**			**-24**			**-57**			**-35**			**-101**			**-1,381**			**-6,137**			**-1,958**			**-87**			**-11**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination
Entraiment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	-67	-4	-12	-36	-2	-8	0	0	0	0	0	0	0	0	0	-118	-7	0	-78	-5	0	-81	-5	0	-72	-4	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-67	-4	0
1927	-11	-1	0	0	0	0	0	0	0	0	0	0	-46	-3	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-92	-5	-20	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	-19	-1	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-8	0	0	0	0	0	0	-53	-3	-7	-79	-5	0	-8	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	71	4	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-221	-14	0	0	0	0	0	0	0	-36	-2	-7	0	0	0	39	2	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	-57	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-1	-1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-103	-6	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	-15	0	0	0	0	0	0	0	0	0	-102	-6	0	0	0	0	-50	-3	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-67	-4	0
1939	0	0	0	0	0	0	-34	-2	-2	-15	-1	-3	-18	-1	-4	-31	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	3	17	-37	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	-23	-1	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	0
1944	0	0	0	0	0	0	0	0	0	-16	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	0	0	0	0	-29	-2	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	-18	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-42	-3	-8	-120	-7	-27	-34	-2	-11	-94	-6	-17	-51	-3	-6	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	-98	-6	-18	0	0	0	-35	-2	-11	-45	-3	-8	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0
1951	-22	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-1	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-9	0	0	0	0	0	0	0	0	0	-101	-6	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-31	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-55	-3	-10	-53	-3	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	0	-13	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-80	-5	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0
1964	0	0	0	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-80	-5	0	-114	-7	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1972	0	0	0	0	0	0	0	0	0	-14	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	0	0	0	0	-19	-1	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	-20	-1	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	-19	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	-54	-3	-7	-79	-5	0	-8	0	0	0	0	0	-72	-4	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-51	-3	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-19	0	0	0	0	0	0	0	0	0	-50	-3	0	-10	-1	0	-25	-1	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-9	0	0	0	0	0	0	0	0	0	-66	-4	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-53	-3	-16	0	0	0	0	0	0	-40	-2	0	-25	-1	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-72	-4	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	3	16	-22	-1	-4	-42	-3	-5	0	0	0	0	0	0	0	0	0	0	0	0
1987	-17	-1	0	0	0	0	0	0	0	0	0	0	-16	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	-84	-5	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-80	-4	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-35	-2	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	-57	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			-1			-1			-1			-1			0			0			0			0			0
Max			0			0			0			0			16			17			0			0			0			0			0			0
Min			0			0			-2			-18			-27			-19			-17			-7			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination
Entraiment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	55	Apr	Vol	681	May	Vol	1,598	Jun	Vol	311	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-54	-3	**0**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**0**	-36	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-118	-7	**-2,183**	-78	-5	**0**	-81	-5	**0**	-72	-4	**0**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-37	-2	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**0**
1927	-11	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-20	-1	**0**
1928	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**0**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-92	-5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-62	-4	**0**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	-19	-1	**0**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**0**	0	0	**0**	0	0	**0**	-53	-3	**-5,217**	-79	-5	**-1,459**	-8	0	**0**	0	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	71	4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-44	-3	**0**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	-221	-14	**0**	0	0	**0**	0	0	**0**	-36	-2	**0**	0	0	**0**	39	2	**134**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	-57	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-6	0	**-231**	-1	0	**-79**	0	0	**0**	0	0	**0**	1	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-103	-6	**0**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**-163**	0	0	**0**	0	0	**0**	0	0	**0**	-102	-6	**0**	0	0	**0**	-50	-3	**0**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-67	-4	**0**
1939	0	0	**0**	0	0	**0**	-34	-2	**0**	-15	-1	**0**	-18	-1	**0**	-31	-2	**-104**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	54	3	**183**	-37	-2	**-1,480**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-23	-1	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-55	-3	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-4	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**0**
1943	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-70	-4	**0**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-172	-10	**0**	0	0	**0**	-29	-2	**0**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	23	1	**79**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	-18	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	-42	-3	**0**	-120	-7	**0**	-34	-2	**-116**	-94	-6	**-3,810**	-51	-3	**-4,957**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	-98	-6	**0**	0	0	**0**	-35	-2	**-117**	-45	-3	**-1,814**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**
1951	-22	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**0**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-13	-1	**-44**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-40	-2	**0**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	-3	0	**-11**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-33	-2	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-98**	0	0	**0**	0	0	**0**	0	0	**0**	-101	-6	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	-31	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	-55	-3	**0**	-53	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	-2	0	**0**	-13	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-5	**0**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**0**
1964	0	0	**0**	-6	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-5	**0**	-114	-7	**0**	0	0	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**-54**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-62	-4	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**0**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**0**
1972	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-20	-1	**0**	0	0	**0**	-19	-1	**0**
1973	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**0**
1974	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	0	0	**0**	-20	-1	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-44	-3	**-814**	0	0	**0**	0	0	**0**	0	0	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**-42**	-54	-3	**-5,250**	-79	-5	**-1,459**	-8	0	**0**	0	0	**0**	-72	-4	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**-19**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-51	-3	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-60	-4	**-204**	0	0	**0**	0	0	**0**	0	0	**0**	-50	-3	**0**	-10	-1	**0**	-25	-1	**0**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-5	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**-98**	0	0	**0**	0	0	**0**	0	0	**0**	-66	-4	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-53	-3	**-181**	0	0	**0**	0	0	**0**	-40	-2	**-748**	-25	-1	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-27	-2	**0**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-72	-4	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	53	3	**181**	-22	-1	**-905**	-42	-3	**-4,095**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	-17	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-16	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-84	-5	**0**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	-35	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-3	0	**-122**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1992	-57	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**-56**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**0**			**0**			**0**			**0**			**0**			**-9**			**-115**			**-268**			**-91**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**0**			**183**			**0**			**0**			**0**			**0**			**0**			**0**
Min			**0**			**0**			**0**			**0**			**0**			**-204**			**-3,810**			**-5,250**			**-2,183**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination
Entraiment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	-5
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	-67	-4	-18	-36	-2	-12	0	0	0	0	0	0	0	0	0	-118	-7	-206	-78	-5	-43	-81	-5	-44	-72	-4	-7
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	-3
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-67	-4	-6
1927	-11	-1	-4	0	0	0	0	0	0	0	0	0	-46	-3	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	-2
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	-3
1929	0	0	0	0	0	0	0	0	0	0	0	0	-92	-5	-31	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-34	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-1	0	0	0	-19	-1	-2
1931	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-12	0	0	0	0	0	0	-53	-3	-306	-79	-5	-138	-8	0	-4	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	71	4	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	-4
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-221	-14	-89	0	0	0	0	0	0	-36	-2	-9	0	0	0	39	2	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	-57	-3	-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-4	-1	0	-5	0	0	0	0	0	0	1	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-103	-6	-57	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	-17	0	0	0	0	0	0	0	0	0	-102	-6	-56	0	0	0	-50	-3	-5
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-67	-4	-6
1939	0	0	0	0	0	0	-34	-2	-6	-15	-1	-4	-18	-1	-6	-31	-2	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	3	19	-37	-2	-23	0	0	0	0	0	0	0	0	0	0	0	0	-23	-1	-2
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	-5
1942	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	-3
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	-2
1944	0	0	0	0	0	0	0	0	0	-16	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-39	0	0	0	0	0	0
1945	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	-95	0	0	0	-29	-2	-3
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	-18	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-42	-3	-11	-120	-7	-40	-34	-2	-12	-94	-6	-60	-51	-3	-291	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	-98	-6	-26	0	0	0	-35	-2	-12	-45	-3	-29	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0
1951	-22	-1	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	-3
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	-2
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	-4
1956	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-1	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	-3
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-10	0	0	0	0	0	0	0	0	0	-101	-6	-56	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-31	-2	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-55	-3	-15	-53	-3	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	0	-13	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-44	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-3
1964	0	0	0	-6	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-44	-114	-7	-62	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-33	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	-2
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-3
1972	0	0	0	0	0	0	0	0	0	-14	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	-11	0	0	0	-19	-1	-2
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	-3
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	-20	-1	-3	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	-19	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	-77	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-1	-54	-3	-308	-79	-5	-138	-8	0	-4	0	0	0	-72	-4	-7
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-51	-3	-5
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-21	0	0	0	0	0	0	0	0	0	-50	-3	-28	-10	-1	-5	-25	-1	-2
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-10	0	0	0	0	0	0	0	0	0	-66	-4	-37	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-53	-3	-19	0	0	0	0	0	0	-40	-2	-71	-25	-1	-14	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	-2
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-72	-4	-40	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	3	19	-22	-1	-14	-42	-3	-240	0	0	0	0	0	0	0	0	0	0	0	0
1987	-17	-1	-7	0	0	0	0	0	0	0	0	0	-16	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	-84	-5	-47	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-80	-4	-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-35	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	-57	-3	-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-3
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-2			0			0			-1			-2			-1			-2			-16			-9			-9			-2			-1
Max			0			0			0			0			24			19			0			0			0			0			0			0
Min			-89			-4			-6			-26			-40			-21			-60			-308			-206			-95			-62			-7

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Rock Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-54	-3	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	-67	-4	-60	-36	-2	-183	0	0	0	0	0	0	0	0	0	-118	-7	-329	-78	-5	-11	-81	-5	-2	-72	-4	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-37	-2	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-67	-4	0
1927	-11	-1	-3	0	0	0	0	0	0	0	0	0	-46	-3	-232	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-35	-2	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	-92	-5	-463	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-9	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	-19	-1	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-182	0	0	0	0	0	0	-53	-3	-710	-79	-5	-220	-8	0	-1	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	71	4	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	-221	-14	-64	0	0	0	0	0	0	-36	-2	-32	0	0	0	39	2	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	-57	-3	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	0	-53	-1	0	-11	0	0	0	0	0	0	1	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-103	-6	-15	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	-92	0	0	0	0	0	0	0	0	0	-102	-6	-14	0	0	0	-50	-3	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-67	-4	0
1939	0	0	0	0	0	0	-34	-2	-24	-15	-1	-13	-18	-1	-89	-31	-2	-59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	3	104	-37	-2	-341	0	0	0	0	0	0	0	0	0	0	0	0	-23	-1	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-55	-3	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	0
1944	0	0	0	0	0	0	0	0	0	-16	-1	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-70	-4	-10	0	0	0	0	0	0
1945	0	0	0	0	0	0	-2	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172	-10	-24	0	0	0	-29	-2	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	1	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	-18	-1	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	-42	-3	-37	-120	-7	-606	-34	-2	-66	-94	-6	-877	-51	-3	-675	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	-98	-6	-87	0	0	0	-35	-2	-66	-45	-3	-417	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0
1951	-22	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13	-1	-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-40	-2	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-12	-3	0	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-2	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-56	0	0	0	0	0	0	0	0	0	-101	-6	-14	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	-31	-2	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	-55	-3	-49	-53	-3	-267	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	-2	0	-2	-13	-1	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-11	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0
1964	0	0	0	-6	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-11	-114	-7	-3	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-1	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-62	-4	-1	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0
1972	0	0	0	0	0	0	0	0	0	-14	-1	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	-3	0	0	0	-19	-1	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	-20	-1	-8	0	0	0	0	0	0	-1	0	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	-19	-1	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	-123	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-10	-54	-3	-715	-79	-5	-220	-8	0	-1	0	0	0	-72	-4	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	-51	-3	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60	-4	-116	0	0	0	0	0	0	0	0	0	-50	-3	-7	-10	-1	0	-25	-1	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-55	0	0	0	0	0	0	0	0	0	-66	-4	-9	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-53	-3	-102	0	0	0	0	0	0	-40	-2	-113	-25	-1	-4	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27	-2	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-72	-4	-10	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	3	102	-22	-1	-208	-42	-3	-557	0	0	0	0	0	0	0	0	0	0	0	0
1987	-17	-1	-5	0	0	0	0	0	0	0	0	0	-16	-1	-80	0	0	0	0	0	0	0	0	0	0	0	0	-84	-5	-12	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	-80	-4	-405	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	-35	-2	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	-57	-3	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-17	-1	-32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			-2			0			-1			-5			-30			-5			-27			-37			-14			-2			0			0
Max			0			0			0			0			361			104			0			0			0			0			0			0
Min			-64			-13			-24			-87			-606			-116			-877			-715			-329			-24			-3			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-15	-1	-5	-14	-1	-5	0	0	0	0	0	0	-93	-5	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	-51	-22	-1	-7
1924	-29	-2	-11	-140	-8	-57	-3	0	-1	0	0	0	0	0	0	-30	-2	-7	0	0	0	-34	-2	-200	0	0	0	-8	0	-43	0	0	0	0	0	0
1925	-57	-3	-21	-39	-2	-16	-34	-2	-10	-35	-2	-15	0	0	0	-33	-2	-8	-15	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	-10	-1	-4	-8	0	-3	-5	0	-2	-100	-6	-43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	-11	-1	-5	0	0	0	0	0	0	-102	-6	-42	-18	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	-10	-1	-4	-21	-1	-8	0	0	0	0	0	0	-18	-1	-8	-97	-6	-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-13	-1	-5	-12	-1	-5	0	0	0	-48	-3	-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-28	-15	-1	-5
1930	-37	-2	-14	-178	-11	-72	-28	-2	-8	-43	-3	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-32	0	0	0
1931	-150	-9	-56	-39	-2	-16	-34	-2	-10	-35	-2	-15	0	0	0	-42	-3	-10	0	0	0	-13	-1	-75	0	0	0	-78	-5	-451	-81	-5	-71	-72	-4	-25
1932	-57	-3	-21	-39	-2	-16	-34	-2	-10	0	0	0	129	7	53	0	0	0	-85	-5	-10	-5	0	-31	0	0	0	0	0	0	0	0	0	0	0	0
1933	-9	-1	-4	-7	0	-3	0	0	0	-65	-4	-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	-43	-46	-3	-16
1934	0	0	0	-129	-8	-52	-36	-2	-11	0	0	0	-37	-2	-15	38	2	9	-80	-5	-9	0	0	0	0	0	0	0	0	0	-81	-5	-71	-72	-4	-25
1935	0	0	0	-39	-2	-16	-34	-2	-10	-35	-2	-15	7	0	3	0	0	0	6	0	1	-6	0	-35	0	0	0	0	0	0	0	0	0	-17	-1	-6
1936	-11	-1	-4	-67	-4	-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-38	-2	-13
1937	-14	-1	-5	-12	-1	-5	0	0	0	-19	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-15	-1	-5	-20	-1	-8	0	0	0	-79	-5	-34	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	-35	-2	-13	-28	-2	-11	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-462	-31	-2	-27	-15	-1	-5
1940	-11	-1	-4	-16	-1	-6	-10	-1	-3	-42	-3	-18	0	0	0	-94	-6	-22	-167	-10	-20	7	0	42	0	0	0	0	0	0	-74	-5	-65	0	0	0
1941	-64	-4	-24	-58	-3	-24	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-16	-1	-6	-14	-1	-6	0	0	0	0	0	0	-87	-5	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	-22	-1	-8	-18	-1	-7	0	0	0	0	0	0	-40	-2	-17	-93	-6	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	-14	-1	-5	-12	-1	-5	-34	-2	-10	0	0	0	-29	-2	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	-30	-24	-1	-8
1945	-9	-1	-3	-11	-1	-4	-32	-2	-10	-33	-2	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	-68	0	0	0
1946	-11	-1	-4	-134	-8	-55	0	0	0	0	0	0	2	0	1	-85	-5	-20	0	0	0	0	0	0	0	0	0	0	0	0	-39	-2	-35	-17	-1	-6
1947	-128	-8	-48	-63	-4	-25	-34	-2	-10	0	0	0	-35	-2	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	-22	-19	-1	-6
1948	-9	-1	-3	-11	-1	-4	0	0	0	0	0	0	0	0	0	34	2	8	27	2	3	-38	-2	-223	0	0	0	0	0	0	-57	-4	-50	-20	-1	-7
1949	-122	-7	-45	-40	-2	-16	0	0	0	-59	-4	-26	81	5	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	-46	-27	-2	-9
1950	-13	-1	-5	-62	-4	-25	0	0	0	0	0	0	0	0	0	-43	-3	-10	-102	-6	-12	7	0	42	0	0	0	0	0	0	0	0	0	-49	-3	-17
1951	0	0	0	-33	-2	-13	0	0	0	-28	-2	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	-7
1952	-16	-1	-6	-33	-2	-13	0	0	0	0	0	0	-20	-1	-8	-79	-5	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	-19
1953	-15	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	-14	-1	-5	-14	-1	-6	0	0	0	0	0	0	-28	-2	-12	-115	-7	-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	-17	-1	-6	-16	-1	-6	0	0	0	0	0	0	-9	-1	-4	-85	-5	-20	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	-66	0	0	0
1956	-12	-1	-4	-12	-1	-5	0	0	0	0	0	0	0	0	0	-103	-6	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	-19	-1	-7	-15	-1	-6	0	0	0	-16	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-317	0	0	0	0	0	0	-21	-1	-7
1958	-14	-1	-5	-53	-3	-22	0	0	0	0	0	0	-15	-1	-6	-65	-4	-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	-15
1959	-53	-3	-20	0	0	0	0	0	0	0	0	0	-82	-5	-34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	-56	-18	-1	-6
1960	-52	-3	-19	-113	-7	-46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-40	-66	-4	-23
1961	-16	-1	-6	-12	-1	-5	-32	-2	-10	0	0	0	-19	-1	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-86	-5	-76	-192	-11	-65
1962	-73	-4	-27	-40	-2	-16	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-1	0	0	0	0	0	0	0	0	0	-32	-2	-29	-93	-6	-32
1963	-85	-5	-32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-12	-1	-4	0	0	0	0	0	0	-59	-4	-25	-57	-3	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-12	-10	-1	-3
1965	-6	0	-2	-7	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	-8	0	-46	0	0	0	0	0	0	0	0	0	-25	-1	-8
1966	-16	-1	-6	-24	-1	-10	0	0	0	-80	-5	-34	100	6	42	-96	-6	-23	0	0	0	0	0	0	0	0	0	0	0	0	-49	-3	-44	-21	-1	-7
1967	-83	-5	-31	-95	-6	-39	-34	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	-23
1968	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-5
1969	-41	-3	-15	-118	-7	-48	0	0	0	0	0	0	0	0	0	-14	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	-44	-3	-17	-13	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-15	-1	-5	-13	-1	-5	0	0	0	0	0	0	-63	-3	-26	-56	-3	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	-19	-1	-7	-14	-1	-6	0	0	0	0	0	0	-29	-2	-12	0	0	0	-19	-1	-2	-7	0	-43	0	0	0	0	0	0	-55	-3	-49	0	0	0
1973	-183	-11	-68	-106	-6	-43	-34	-2	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-10	-1	-4	-16	-1	-6	0	0	0	-63	-4	-27	-52	-3	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	-12
1975	-43	-3	-16	0	0	0	0	0	0	-21	-1	-9	-17	-1	-7	-101	-6	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	-10
1976	-40	-2	-15	-29	-2	-12	0	0	0	-12	-1	-5	-15	-1	-6	0	0	0	0	0	0	-52	-3	-300	0	0	0	-59	-4	-340	0	0	0	-209	-12	-71
1977	-116	-7	-43	-39	-2	-16	-34	-2	-10	-35	-2	-15	-36	-2	-15	-42	-3	-10	1	0	0	-12	-1	-73	0	0	0	-78	-5	-451	-81	-5	-71	0	0	0
1978	-57	-3	-21	-39	-2	-16	-34	-2	-10	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	-16	-1	-6	-12	-1	-5	0	0	0	-25	-2	-11	0	0	0	-19	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	-63	0	0	0
1980	-13	-1	-5	-30	-2	-12	0	0	0	0	0	0	-61	-3	-25	-38	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	-22	-1	-8	-14	-1	-6	0	0	0	-23	-1	-10	0	0	0	-76	-5	-18	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-25	-32	-2	-11
1982	-14	-1	-5	-11	-1	-4	0	0	0	0	0	0	0	0	0	-59	-4	-14	0	0	0	0	0	0	0	0	0	-4	0	-21	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	-5	-11	-1	-4	0	0	0	-45	-3	-19	-77	-4	-32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	-18	-16	-1	-6
1986	-13	-1	-5	-13	-1	-5	0	0	0	-22	-1	-10	-27	-1	-11	-56	-3	-13	-229	-14	-27	-8	0	-45	0	0	0	0	0	0	41	3	36	0	0	0
1987	0	0	0	-11	-1	-5	0	0	0	-15	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-27	-12	-1	-4
1988	-8	0	-3	-10	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-27	-12	-1	-4
1989	-113	-7	-42	-182	-11	-74	-56	-3	-17	-145	-9	-62	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-16	-125	-7	-43
1990	-65	-4	-24	-39	-2	-16	-34	-2	-10	0	0	0	-37	-2	-15	0	0	0	-1	0	0	0	0	0	28	2	476	-113	-7	-651	-81	-5	-71	-72	-4	-25
1991	-57	-3	-21	-39	-2	-16	-34	-2	-10	-35	-2	-15	-13	-1	-5	-42	-3	-10	-22	-1	-3	0	0	0	0	0	0	-83	-5	-478	-81	-5	-71	-72	-4	-25
1992	0	0	0	-39	-2	-16	-34	-2	-10	-35	-2	-15	-36	-2	-15	0	0	0	0	0	0	0	0	0	-46	-3	-768	0	0	0	-54	-3	-48	-72	-4	-25
1993	-57	-3	-21	-39	-2	-16	-34	-2	-10	0	0	0	0	0	0	17	1	4	17	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	-11	-1	-4	-9	-1	-4	-34	-2	-10	-16	-1	-7	-23	-1	-10	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	-125	-12	-1	-10	-175	-10	-60
Mean			-12			-14			-3			-7			-5			-5			-1			-14			-8			-41			-20			-9
Max			0			0			0			0			53			9			3			42			476			0			36			0
Min			-68			-74			-17			-62			-42			-27			-27			-300			-768			-651			-76			-71

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-15	-1	0	-14	-1	0	0	0	0	0	0	0	-93	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	-2	-22	-1	0
1924	-29	-2	0	-140	-8	0	-3	0	0	0	0	0	0	0	0	-30	-2	-1	0	0	0	-34	-2	-44	0	0	0	-8	0	-4	0	0	0	0	0	0
1925	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	-33	-2	-1	-15	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	-10	-1	0	-8	0	0	-5	0	0	-100	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	-11	-1	0	0	0	0	0	0	0	-102	-6	-2	-18	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	-10	-1	0	-21	-1	0	0	0	0	0	0	0	-18	-1	0	-97	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-13	-1	0	-12	-1	0	0	0	0	-48	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-1	-15	-1	0
1930	-37	-2	0	-178	-11	0	-28	-2	0	-43	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-1	0	0	0
1931	-150	-9	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	-42	-3	-1	0	0	0	-13	-1	-17	0	0	0	-78	-5	-45	-81	-5	-3	-72	-4	-1
1932	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	129	7	3	0	0	0	-85	-5	-5	-5	0	-7	0	0	0	0	0	0	0	0	0	0	0	0
1933	-9	-1	0	-7	0	0	0	0	0	-65	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	-2	-46	-3	0
1934	0	0	0	-129	-8	0	-36	-2	0	0	0	0	-37	-2	-1	38	2	1	-80	-5	-4	0	0	0	0	0	0	0	0	0	-81	-5	-3	-72	-4	-1
1935	0	0	0	-39	-2	0	-34	-2	0	-35	-2	0	7	0	0	0	0	0	6	0	0	-6	0	-8	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-11	-1	0	-67	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-38	-2	0
1937	-14	-1	0	-12	-1	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-15	-1	0	-20	-1	0	0	0	0	-79	-5	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	-35	-2	0	-28	-2	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-46	-31	-2	-1	-15	-1	0
1940	-11	-1	0	-16	-1	0	-10	-1	0	-42	-3	-1	0	0	0	-94	-6	-3	-167	-10	-9	7	0	9	0	0	0	0	0	0	-74	-5	-3	0	0	0
1941	-64	-4	0	-58	-3	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-16	-1	0	-14	-1	0	0	0	0	0	0	0	-87	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	-22	-1	0	-18	-1	0	0	0	0	0	0	0	-40	-2	-1	-93	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	-14	-1	0	-12	-1	0	-34	-2	0	0	0	0	-29	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	-1	-24	-1	0
1945	-9	-1	0	-11	-1	0	-32	-2	0	-33	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	-3	0	0	0
1946	-11	-1	0	-134	-8	0	0	0	0	0	0	0	2	0	0	-85	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-39	-2	-1	-17	-1	0
1947	-128	-8	0	-63	-4	0	-34	-2	0	0	0	0	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	-1	-19	-1	0
1948	-9	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	0	34	2	1	27	2	1	-38	-2	-49	0	0	0	0	0	0	-57	-4	-2	-20	-1	0
1949	-122	-7	0	-40	-2	0	0	0	0	-59	-4	-1	81	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	-2	-27	-2	0
1950	-13	-1	0	-62	-4	0	0	0	0	0	0	0	0	0	0	-43	-3	-1	-102	-6	-6	7	0	9	0	0	0	0	0	0	0	0	0	-49	-3	0
1951	0	0	0	-33	-2	0	0	0	0	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1952	-16	-1	0	-33	-2	0	0	0	0	0	0	0	-20	-1	0	-79	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1953	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	-14	-1	0	-14	-1	0	0	0	0	0	0	0	-28	-2	-1	-115	-7	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-9	-1	0	-85	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	-3	0	0	0
1956	-12	-1	0	-12	-1	0	0	0	0	0	0	0	0	0	0	-103	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	-19	-1	0	-15	-1	0	0	0	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-49	0	0	0	0	0	0	-21	-1	0
1958	-14	-1	0	-53	-3	0	0	0	0	0	0	0	-15	-1	0	-65	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0
1959	-53	-3	0	0	0	0	0	0	0	0	0	0	-82	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	-2	-18	-1	0
1960	-52	-3	0	-113	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-2	-66	-4	0
1961	-16	-1	0	-12	-1	0	-32	-2	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-86	-5	-3	-192	-11	-1
1962	-73	-4	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-1	-93	-6	-1
1963	-85	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-12	-1	0	0	0	0	0	0	0	-59	-4	-1	-57	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	-1	-10	-1	0
1965	-6	0	0	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	-8	0	-10	0	0	0	0	0	0	0	0	0	-25	-1	0
1966	-16	-1	0	-24	-1	0	0	0	0	-80	-5	-1	100	6	2	-96	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	-49	-3	-2	-21	-1	0
1967	-83	-5	0	-95	-6	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	0
1968	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0
1969	-41	-3	0	-118	-7	0	0	0	0	0	0	0	0	0	0	-14	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	-44	-3	0	-13	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-15	-1	0	-13	-1	0	0	0	0	0	0	0	-63	-3	-2	-56	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	-19	-1	0	-14	-1	0	0	0	0	0	0	0	-29	-2	-1	0	0	0	-19	-1	-1	-7	0	-9	0	0	0	0	0	0	-55	-3	-2	0	0	0
1973	-183	-11	0	-106	-6	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-10	-1	0	-16	-1	0	0	0	0	-63	-4	-1	-52	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	0
1975	-43	-3	0	0	0	0	0	0	0	-21	-1	0	-17	-1	0	-101	-6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1976	-40	-2	0	-29	-2	0	0	0	0	-12	-1	0	-15	-1	0	0	0	0	0	0	0	-52	-3	-66	0	0	0	-59	-4	-34	0	0	0	-209	-12	-2
1977	-116	-7	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	-1	-42	-3	-1	1	0	0	-12	-1	-16	0	0	0	-78	-5	-45	-81	-5	-3	0	0	0
1978	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	-16	-1	0	-12	-1	0	0	0	0	-25	-2	0	0	0	0	-19	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	-3	0	0	0
1980	-13	-1	0	-30	-2	0	0	0	0	0	0	0	-61	-3	-1	-38	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	-22	-1	0	-14	-1	0	0	0	0	-23	-1	0	0	0	0	-76	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-1	-32	-2	0
1982	-14	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	0	-59	-4	-2	0	0	0	0	0	0	0	0	0	-4	0	-2	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-11	-1	0	0	0	0	-45	-3	-1	-77	-4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	-1	-16	-1	0
1986	-13	-1	0	-13	-1	0	0	0	0	-22	-1	0	-27	-1	-1	-56	-3	-2	-229	-14	-12	-8	0	-10	0	0	0	0	0	0	41	3	2	0	0	0
1987	0	0	0	-11	-1	0	0	0	0	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-1	-12	-1	0
1988	-8	0	0	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-1	-12	-1	0
1989	-113	-7	0	-182	-11	0	-56	-3	0	-145	-9	-2	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-1	-125	-7	-1
1990	-65	-4	0	-39	-2	0	-34	-2	0	0	0	0	-37	-2	-1	0	0	0	-1	0	0	0	0	0	28	2	74	-113	-7	-64	-81	-5	-3	-72	-4	-1
1991	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-13	-1	0	-42	-3	-1	-22	-1	-1	0	0	0	0	0	0	-83	-5	-47	-81	-5	-3	-72	-4	-1
1992	0	0	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	-1	0	0	0	0	0	0	0	0	0	-46	-3	-119	0	0	0	-54	-3	-2	-72	-4	-1
1993	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	17	1	0	17	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	-11	-1	0	-9	-1	0	-34	-2	0	-16	-1	0	-23	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	-12	-12	-1	0	-175	-10	-1
Mean			0			0			0			0			0			-1			-1			-3			-1			-4			-1			0
Max			0			0			0			0			3			1			1			9			74			0			2			0
Min			0			0			0			-2			-2			-3			-12			-66			-119			-64			-3			-2

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1923	-15	-1	**0**	-14	-1	**0**	0	0	**0**	0	0	**0**	-93	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-58	-4	**0**	-22	-1	**0**
1924	-29	-2	**0**	-140	-8	**0**	-3	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**0**	0	0	**0**	-34	-2	**0**	0	0	**0**	-8	0	**0**	0	0	**0**	0	0	**0**
1925	-57	-3	**0**	-39	-2	**0**	-34	-2	**0**	-35	-2	**0**	0	0	**0**	-33	-2	**0**	-15	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1926	-10	-1	**0**	-8	0	**0**	-5	0	**0**	-100	-6	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1927	0	0	**0**	-11	-1	**0**	0	0	**0**	0	0	**0**	-102	-6	**-1**	-18	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1928	-10	-1	**0**	-21	-1	**0**	0	0	**0**	0	0	**0**	-18	-1	**0**	-97	-6	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1929	-13	-1	**0**	-12	-1	**0**	0	0	**0**	-48	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**0**	-15	-1	**0**
1930	-37	-2	**0**	-178	-11	**0**	-28	-2	**0**	-43	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-36	-2	**0**	0	0	**0**
1931	-150	-9	**0**	-39	-2	**0**	-34	-2	**0**	-35	-2	**0**	0	0	**0**	-42	-3	**-1**	0	0	**0**	-13	-1	**0**	0	0	**0**	-78	-5	**0**	-81	-5	**0**	-72	-4	**0**
1932	-57	-3	**0**	-39	-2	**0**	-34	-2	**0**	0	0	**0**	129	7	**1**	0	0	**0**	-85	-5	**-1**	-5	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1933	-9	-1	**0**	-7	0	**0**	0	0	**0**	-65	-4	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-48	-3	**0**	-46	-3	**0**
1934	0	0	**0**	-129	-8	**0**	-36	-2	**0**	0	0	**0**	-37	-2	**0**	38	2	**1**	-80	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	-81	-5	**0**	-72	-4	**0**
1935	0	0	**0**	-39	-2	**0**	-34	-2	**0**	-35	-2	**0**	7	0	**0**	0	0	**0**	6	0	**0**	-6	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-17	-1	**0**
1936	-11	-1	**0**	-67	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-38	-2	**0**
1937	-14	-1	**0**	-12	-1	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1938	-15	-1	**0**	-20	-1	**0**	0	0	**0**	-79	-5	**-1**	-3	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	-35	-2	**0**	-28	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-80	-5	**0**	-31	-2	**0**	-15	-1	**0**
1940	-11	-1	**0**	-16	-1	**0**	-10	-1	**0**	-42	-3	**0**	0	0	**0**	-94	-6	**-1**	-167	-10	**-2**	7	0	**0**	0	0	**0**	0	0	**0**	-74	-5	**0**	0	0	**0**
1941	-64	-4	**0**	-58	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	-16	-1	**0**	-14	-1	**0**	0	0	**0**	0	0	**0**	-87	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1943	-22	-1	**0**	-18	-1	**0**	0	0	**0**	0	0	**0**	-40	-2	**0**	-93	-6	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	-14	-1	**0**	-12	-1	**0**	-34	-2	**0**	0	0	**0**	-29	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-34	-2	**0**	-24	-1	**0**
1945	-9	-1	**0**	-11	-1	**0**	-32	-2	**0**	-33	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-77	-5	**0**	0	0	**0**
1946	-11	-1	**0**	-134	-8	**0**	0	0	**0**	0	0	**0**	2	0	**0**	-85	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-39	-2	**0**	-17	-1	**0**
1947	-128	-8	**0**	-63	-4	**0**	-34	-2	**0**	0	0	**0**	-35	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-2	**0**	-19	-1	**0**
1948	-9	-1	**0**	-11	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	34	2	**1**	27	2	**0**	-38	-2	**0**	0	0	**0**	0	0	**0**	-57	-4	**0**	-20	-1	**0**
1949	-122	-7	**0**	-40	-2	**0**	0	0	**0**	-59	-4	**0**	81	5	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-52	-3	**0**	-27	-2	**0**
1950	-13	-1	**0**	-62	-4	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-43	-3	**-1**	-102	-6	**-1**	7	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-49	-3	**0**
1951	0	0	**0**	-33	-2	**0**	0	0	**0**	-28	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-21	-1	**0**
1952	-16	-1	**0**	-33	-2	**0**	0	0	**0**	0	0	**0**	-20	-1	**0**	-79	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-57	-3	**0**
1953	-15	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	-14	-1	**0**	-14	-1	**0**	0	0	**0**	0	0	**0**	-28	-2	**0**	-115	-7	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	-17	-1	**0**	-16	-1	**0**	0	0	**0**	0	0	**0**	-9	-1	**0**	-85	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-75	-5	**0**	0	0	**0**
1956	-12	-1	**0**	-12	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-103	-6	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	-19	-1	**0**	-15	-1	**0**	0	0	**0**	-16	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	-21	-1	**0**
1958	-14	-1	**0**	-53	-3	**0**	0	0	**0**	0	0	**0**	-15	-1	**0**	-65	-4	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-44	-3	**0**
1959	-53	-3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-82	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-64	-4	**0**	-18	-1	**0**
1960	-52	-3	**0**	-113	-7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**0**	-66	-4	**0**
1961	-16	-1	**0**	-12	-1	**0**	-32	-2	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-86	-5	**0**	-192	-11	**0**
1962	-73	-4	**0**	-40	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-7	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-32	-2	**0**	-93	-6	**0**
1963	-85	-5	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1964	-12	-1	**0**	0	0	**0**	0	0	**0**	-59	-4	**0**	-57	-3	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**0**	-10	-1	**0**
1965	-6	0	**0**	-7	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	-8	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-25	-1	**0**
1966	-16	-1	**0**	-24	-1	**0**	0	0	**0**	-80	-5	**-1**	100	6	**1**	-96	-6	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-49	-3	**0**	-21	-1	**0**
1967	-83	-5	**0**	-95	-6	**0**	-34	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-66	-4	**0**
1968	-5	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**0**
1969	-41	-3	**0**	-118	-7	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-14	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	-44	-3	**0**	-13	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1971	-15	-1	**0**	-13	-1	**0**	0	0	**0**	0	0	**0**	-63	-3	**-1**	-56	-3	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	-19	-1	**0**	-14	-1	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**	0	0	**0**	-19	-1	**0**	-7	0	**0**	0	0	**0**	0	0	**0**	-55	-3	**0**	0	0	**0**
1973	-183	-11	**0**	-106	-6	**0**	-34	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1974	-10	-1	**0**	-16	-1	**0**	0	0	**0**	-63	-4	**0**	-52	-3	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-34	-2	**0**
1975	-43	-3	**0**	0	0	**0**	0	0	**0**	-21	-1	**0**	-17	-1	**0**	-101	-6	**-2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-30	-2	**0**
1976	-40	-2	**0**	-29	-2	**0**	0	0	**0**	-12	-1	**0**	-15	-1	**0**	0	0	**0**	0	0	**0**	-52	-3	**0**	0	0	**0**	-59	-4	**0**	0	0	**0**	-209	-12	**0**
1977	-116	-7	**0**	-39	-2	**0**	-34	-2	**0**	-35	-2	**0**	-36	-2	**0**	-42	-3	**-1**	1	0	**0**	-12	-1	**0**	0	0	**0**	-78	-5	**0**	-81	-5	**0**	0	0	**0**
1978	-57	-3	**0**	-39	-2	**0**	-34	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	-16	-1	**0**	-12	-1	**0**	0	0	**0**	-25	-2	**0**	0	0	**0**	-19	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-71	-4	**0**	0	0	**0**
1980	-13	-1	**0**	-30	-2	**0**	0	0	**0**	0	0	**0**	-61	-3	**-1**	-38	-2	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	-22	-1	**0**	-14	-1	**0**	0	0	**0**	-23	-1	**0**	0	0	**0**	-76	-5	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-29	-2	**0**	-32	-2	**0**
1982	-14	-1	**0**	-11	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-59	-4	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	-4	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1985	-14	-1	**0**	-11	-1	**0**	0	0	**0**	-45	-3	**0**	-77	-4	**-1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-20	-1	**0**	-16	-1	**0**
1986	-13	-1	**0**	-13	-1	**0**	0	0	**0**	-22	-1	**0**	-27	-1	**0**	-56	-3	**-1**	-229	-14	**-2**	-8	0	**0**	0	0	**0**	0	0	**0**	41	3	**0**	0	0	**0**
1987	0	0	**0**	-11	-1	**0**	0	0	**0**	-15	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**0**	-12	-1	**0**
1988	-8	0	**0**	-10	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-31	-2	**0**	-12	-1	**0**
1989	-113	-7	**0**	-182	-11	**0**	-56	-3	**0**	-145	-9	**-1**	0	0	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-19	-1	**0**	-125	-7	**0**
1990	-65	-4	**0**	-39	-2	**0**	-34	-2	**0**	0	0	**0**	-37	-2	**0**	0	0	**0**	-1	0	**0**	0	0	**0**	28	2	**0**	-113	-7	**0**	-81	-5	**0**	-72	-4	**0**
1991	-57	-3	**0**	-39	-2	**0**	-34	-2	**0**	-35	-2	**0**	-13	-1	**0**	-42	-3	**-1**	-22	-1	**0**	0	0	**0**	0	0	**0**	-83	-5	**0**	-81	-5	**0**	-72	-4	**0**
1992	0	0	**0**	-39	-2	**0**	-34	-2	**0**	-35	-2	**0**	-36	-2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-46	-3	**0**	0	0	**0**	-54	-3	**0**	-72	-4	**0**
1993	-57	-3	**0**	-39	-2	**0**	-34	-2	**0**	0	0	**0**	0	0	**0**	17	1	**0**	17	1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	-11	-1	**0**	-9	-1	**0**	-34	-2	**0**	-16	-1	**0**	-23	-1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	-22	-1	**0**	-12	-1	**0**	-175	-10	**0**
Mean			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**1**			**1**			**0**			**0**			**0**			**0**			**0**			**0**
Min			**0**			**0**			**0**			**-1**			**-1**			**-2**			**-2**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	116	Apr	Vol	950	May	Vol	376	Jun	Vol	167	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-15	-1	0	-14	-1	0	0	0	0	0	0	0	-93	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	0	-22	-1	0
1924	-29	-2	0	-140	-8	0	-3	0	0	0	0	0	0	0	-213	-30	-2	-213	0	0	0	-34	-2	-792	0	0	0	-8	0	0	0	0	0	0	0	0
1925	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	-232	-33	-2	-232	-15	-1	-856	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	-10	-1	0	-8	0	0	-5	0	0	-100	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	-11	-1	0	0	0	0	0	0	0	-102	-6	-130	-18	-1	-130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	-10	-1	0	-21	-1	0	0	0	0	0	0	0	-18	-1	-692	-97	-6	-692	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-13	-1	0	-12	-1	0	0	0	0	-48	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	0	-15	-1	0
1930	-37	-2	0	-178	-11	0	-28	-2	0	-43	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0	0	0	0
1931	-150	-9	0	-39	-2	0	-34	-2	0	-35	-2	0	0	0	-298	-42	-3	-298	0	0	0	-13	-1	-296	0	0	0	-78	-5	0	-81	-5	0	-72	-4	0
1932	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	129	7	0	0	0	0	-85	-5	-4,782	-5	0	-124	0	0	0	0	0	0	0	0	0	0	0	0
1933	-9	-1	0	-7	0	0	0	0	0	-65	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	0	-46	-3	0
1934	0	0	0	-129	-8	0	-36	-2	0	0	0	0	-37	-2	270	38	2	270	-80	-5	-4,498	0	0	0	0	0	0	0	0	0	-81	-5	0	-72	-4	0
1935	0	0	0	-39	-2	0	-34	-2	0	-35	-2	0	7	0	0	0	0	0	6	0	322	-6	0	-139	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-11	-1	0	-67	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-38	-2	0
1937	-14	-1	0	-12	-1	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-15	-1	0	-20	-1	0	0	0	0	-79	-5	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	-35	-2	0	-28	-2	0	0	0	0	0	0	0	0	0	-7	-1	0	-7	0	0	0	0	0	0	0	0	0	-80	-5	0	-31	-2	0	-15	-1	0
1940	-11	-1	0	-16	-1	0	-10	-1	0	-42	-3	0	0	0	-668	-94	-6	-668	-167	-10	-9,438	7	0	168	0	0	0	0	0	0	-74	-5	0	0	0	0
1941	-64	-4	0	-58	-3	0	0	0	0	0	0	0	0	0	-9	-1	0	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-16	-1	0	-14	-1	0	0	0	0	0	0	0	-87	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	-22	-1	0	-18	-1	0	0	0	0	0	0	0	-40	-2	-663	-93	-6	-663	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	-14	-1	0	-12	-1	0	-34	-2	0	0	0	0	-29	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	0	-24	-1	0
1945	-9	-1	0	-11	-1	0	-32	-2	0	-33	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	0	0	0	0
1946	-11	-1	0	-134	-8	0	0	0	0	0	0	0	2	0	-602	-85	-5	-602	0	0	0	0	0	0	0	0	0	0	0	0	-39	-2	0	-17	-1	0
1947	-128	-8	0	-63	-4	0	-34	-2	0	0	0	0	-35	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0	-19	-1	0
1948	-9	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	244	34	2	244	27	2	1,524	-38	-2	-883	0	0	0	0	0	0	-57	-4	0	-20	-1	0
1949	-122	-7	0	-40	-2	0	0	0	0	-59	-4	0	81	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0	-27	-2	0
1950	-13	-1	0	-62	-4	0	0	0	0	0	0	0	0	0	-304	-43	-3	-304	-102	-6	-5,775	7	0	168	0	0	0	0	0	0	0	0	0	-49	-3	0
1951	0	0	0	-33	-2	0	0	0	0	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1952	-16	-1	0	-33	-2	0	0	0	0	0	0	0	-20	-1	-561	-79	-5	-561	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1953	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	-14	-1	0	-14	-1	0	0	0	0	0	0	0	-28	-2	-816	-115	-7	-816	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-9	-1	-607	-85	-5	-607	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	0	0	0	0
1956	-12	-1	0	-12	-1	0	0	0	0	0	0	0	0	0	-731	-103	-6	-731	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	-19	-1	0	-15	-1	0	0	0	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-188	0	0	0	0	0	0	-21	-1	0
1958	-14	-1	0	-53	-3	0	0	0	0	0	0	0	-15	-1	-463	-65	-4	-463	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0
1959	-53	-3	0	0	0	0	0	0	0	0	0	0	-82	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	0	-18	-1	0
1960	-52	-3	0	-113	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	0	-66	-4	0
1961	-16	-1	0	-12	-1	0	-32	-2	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-86	-5	0	-192	-11	0
1962	-73	-4	0	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-370	0	0	0	0	0	0	0	0	0	-32	-2	0	-93	-6	0
1963	-85	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-12	-1	0	0	0	0	0	0	0	-59	-4	0	-57	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0	-10	-1	0
1965	-6	0	0	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-114	-8	0	-181	0	0	0	0	0	0	0	0	0	-25	-1	0
1966	-16	-1	0	-24	-1	0	0	0	0	-80	-5	0	100	6	-679	-96	-6	-679	0	0	0	0	0	0	0	0	0	0	0	0	-49	-3	0	-21	-1	0
1967	-83	-5	0	-95	-6	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	0
1968	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0
1969	-41	-3	0	-118	-7	0	0	0	0	0	0	0	0	0	-103	-14	-1	-103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	-44	-3	0	-13	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-15	-1	0	-13	-1	0	0	0	0	0	0	0	-63	-3	-397	-56	-3	-397	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	-19	-1	0	-14	-1	0	0	0	0	0	0	0	-29	-2	0	0	0	0	-19	-1	-1,075	-7	0	-168	0	0	0	0	0	0	-55	-3	0	0	0	0
1973	-183	-11	0	-106	-6	0	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-10	-1	0	-16	-1	0	0	0	0	-63	-4	0	-52	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	0
1975	-43	-3	0	0	0	0	0	0	0	-21	-1	0	-17	-1	-714	-101	-6	-714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1976	-40	-2	0	-29	-2	0	0	0	0	-12	-1	0	-15	-1	0	0	0	0	0	0	0	-52	-3	-1,189	0	0	0	-59	-4	0	0	0	0	-209	-12	0
1977	-116	-7	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	-298	-42	-3	-298	1	0	59	-12	-1	-288	0	0	0	-78	-5	0	-81	-5	0	0	0	0
1978	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	-2	0	-133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	-16	-1	0	-12	-1	0	0	0	0	-25	-2	0	0	0	-138	-19	-1	-138	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	0	0	0	0
1980	-13	-1	0	-30	-2	0	0	0	0	0	0	0	-61	-3	-266	-38	-2	-266	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	-22	-1	0	-14	-1	0	0	0	0	-23	-1	0	0	0	-540	-76	-5	-540	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-32	-2	0
1982	-14	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	-420	-59	-4	-420	0	0	0	0	0	0	0	0	0	-4	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-11	-1	0	0	0	0	-45	-3	0	-77	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	0	-16	-1	0
1986	-13	-1	0	-13	-1	0	0	0	0	-22	-1	0	-27	-1	-400	-56	-3	-400	-229	-14	-12,916	-8	0	-180	0	0	0	0	0	0	41	3	0	0	0	0
1987	0	0	0	-11	-1	0	0	0	0	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0	-12	-1	0
1988	-8	0	0	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0	-12	-1	0
1989	-113	-7	0	-182	-11	0	-56	-3	0	-145	-9	0	0	0	0	0	0	0	-1	0	-44	0	0	0	0	0	0	0	0	0	-19	-1	0	-125	-7	0
1990	-65	-4	0	-39	-2	0	-34	-2	0	0	0	0	-37	-2	0	0	0	0	-1	0	-78	0	0	0	28	2	282	-113	-7	0	-81	-5	0	-72	-4	0
1991	-57	-3	0	-39	-2	0	-34	-2	0	-35	-2	0	-13	-1	-298	-42	-3	-298	-22	-1	-1,219	0	0	0	0	0	0	-83	-5	0	-81	-5	0	-72	-4	0
1992	0	0	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	0	0	0	0	0	0	0	0	0	0	-46	-3	-454	0	0	0	-54	-3	0	-72	-4	0
1993	-57	-3	0	-39	-2	0	-34	-2	0	0	0	0	0	0	118	17	1	118	17	1	966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	-11	-1	0	-9	-1	0	-34	-2	0	-16	-1	0	-23	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	0	-12	-1	0	-175	-10	0
Mean			0			0			0			0			-145			-145			-526			-53			-5			0			0			0
Max			0			0			0			0			270			270			1,524			168			282			0			0			0
Min			0			0			0			0			-816			-816			-12,916			-1,189			-454			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-15	-1	0	-14	-1	0	0	0	0	0	0	0	-93	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	-2	-22	-1	0
1924	-29	-2	-1	-140	-8	-1	-3	0	0	0	0	0	0	0	0	-30	-2	-1	0	0	0	-34	-2	-10	0	0	0	-8	0	0	0	0	0	0	0	0
1925	-57	-3	-1	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	-33	-2	-1	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	-10	-1	0	-8	0	0	-5	0	0	-100	-6	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	-11	-1	0	0	0	0	0	0	0	-102	-6	-2	-18	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	-10	-1	0	-21	-1	0	0	0	0	0	0	0	-18	-1	0	-97	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-13	-1	0	-12	-1	0	0	0	0	-48	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-1	-15	-1	0
1930	-37	-2	-1	-178	-11	-1	-28	-2	0	-43	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	-1	0	0	0
1931	-150	-9	-3	-39	-2	0	-34	-2	0	-35	-2	0	0	0	0	-42	-3	-1	0	0	0	-13	-1	-4	0	0	0	-78	-5	-2	-81	-5	-2	-72	-4	0
1932	-57	-3	-1	-39	-2	0	-34	-2	0	0	0	0	129	7	2	0	0	0	-85	-5	-3	-5	0	-2	0	0	0	0	0	0	0	0	0	0	0	0
1933	-9	-1	0	-7	0	0	0	0	0	-65	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	-1	-46	-3	0
1934	0	0	0	-129	-8	-1	-36	-2	0	0	0	0	-37	-2	-1	38	2	1	-80	-5	-3	0	0	0	0	0	0	0	0	0	-81	-5	-2	-72	-4	0
1935	0	0	0	-39	-2	0	-34	-2	0	-35	-2	0	7	0	0	0	0	0	6	0	0	-6	0	-2	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-11	-1	0	-67	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-38	-2	0
1937	-14	-1	0	-12	-1	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-15	-1	0	-20	-1	0	0	0	0	-79	-5	-1	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	-35	-2	-1	-28	-2	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-2	-31	-2	-1	-15	-1	0
1940	-11	-1	0	-16	-1	0	-10	-1	0	-42	-3	-1	0	0	0	-94	-6	-2	-167	-10	-5	7	0	2	0	0	0	0	0	0	-74	-5	-2	0	0	0
1941	-64	-4	-1	-58	-3	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-16	-1	0	-14	-1	0	0	0	0	0	0	0	-87	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	-22	-1	0	-18	-1	0	0	0	0	0	0	0	-40	-2	-1	-93	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	-14	-1	0	-12	-1	0	-34	-2	0	0	0	0	-29	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	-1	-24	-1	0
1945	-9	-1	0	-11	-1	0	-32	-2	0	-33	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	-2	0	0	0
1946	-11	-1	0	-134	-8	-1	0	0	0	0	0	0	2	0	0	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-39	-2	-1	-17	-1	0
1947	-128	-8	-3	-63	-4	0	-34	-2	0	0	0	0	-35	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	-1	-19	-1	0
1948	-9	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	0	34	2	1	27	2	1	-38	-2	-11	0	0	0	0	0	0	-57	-4	-2	-20	-1	0
1949	-122	-7	-2	-40	-2	0	0	0	0	-59	-4	-1	81	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	-1	-27	-2	0
1950	-13	-1	0	-62	-4	0	0	0	0	0	0	0	0	0	0	-43	-3	-1	-102	-6	-3	7	0	2	0	0	0	0	0	0	0	0	0	-49	-3	0
1951	0	0	0	-33	-2	0	0	0	0	-28	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1952	-16	-1	0	-33	-2	0	0	0	0	0	0	0	-20	-1	0	-79	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1953	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	-14	-1	0	-14	-1	0	0	0	0	0	0	0	-28	-2	0	-115	-7	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-9	-1	0	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	-2	0	0	0
1956	-12	-1	0	-12	-1	0	0	0	0	0	0	0	0	0	0	-103	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	-19	-1	0	-15	-1	0	0	0	0	-16	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-2	0	0	0	0	0	0	-21	-1	0
1958	-14	-1	0	-53	-3	0	0	0	0	0	0	0	-15	-1	0	-65	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0
1959	-53	-3	-1	0	0	0	0	0	0	0	0	0	-82	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	-2	-18	-1	0
1960	-52	-3	-1	-113	-7	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	-1	-66	-4	0
1961	-16	-1	0	-12	-1	0	-32	-2	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-86	-5	-2	-192	-11	-1
1962	-73	-4	-1	-40	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	0	0	0	0	0	0	0	0	0	0	-32	-2	-1	-93	-6	0
1963	-85	-5	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-12	-1	0	0	0	0	0	0	0	-59	-4	-1	-57	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0	-10	-1	0
1965	-6	0	0	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	-8	0	-2	0	0	0	0	0	0	0	0	0	-25	-1	0
1966	-16	-1	0	-24	-1	0	0	0	0	-80	-5	-1	100	6	2	-96	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	-49	-3	-1	-21	-1	0
1967	-83	-5	-2	-95	-6	-1	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	0
1968	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0
1969	-41	-3	-1	-118	-7	-1	0	0	0	0	0	0	0	0	0	-14	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	-44	-3	-1	-13	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-15	-1	0	-13	-1	0	0	0	0	0	0	0	-63	-3	-1	-56	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	-19	-1	0	-14	-1	0	0	0	0	0	0	0	-29	-2	0	0	0	0	-19	-1	-1	-7	0	-2	0	0	0	0	0	0	-55	-3	-1	0	0	0
1973	-183	-11	-4	-106	-6	-1	-34	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-10	-1	0	-16	-1	0	0	0	0	-63	-4	-1	-52	-3	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	0
1975	-43	-3	-1	0	0	0	0	0	0	-21	-1	0	-17	-1	0	-101	-6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1976	-40	-2	-1	-29	-2	0	0	0	0	-12	-1	0	-15	-1	0	0	0	0	0	0	0	-52	-3	-15	0	0	0	-59	-4	-2	0	0	0	-209	-12	-1
1977	-116	-7	-2	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	-1	-42	-3	-1	1	0	0	-12	-1	-4	0	0	0	-78	-5	-2	-81	-5	-2	0	0	0
1978	-57	-3	-1	-39	-2	0	-34	-2	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	-16	-1	0	-12	-1	0	0	0	0	-25	-2	0	0	0	0	-19	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	-2	0	0	0
1980	-13	-1	0	-30	-2	0	0	0	0	0	0	0	-61	-3	-1	-38	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	-22	-1	0	-14	-1	0	0	0	0	-23	-1	0	0	0	0	-76	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	-1	-32	-2	0
1982	-14	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	0	-59	-4	-1	0	0	0	0	0	0	0	0	0	-4	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-11	-1	0	0	0	0	-45	-3	-1	-77	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	-1	-16	-1	0
1986	-13	-1	0	-13	-1	0	0	0	0	-22	-1	0	-27	-1	0	-56	-3	-1	-229	-14	-7	-8	0	-2	0	0	0	0	0	0	41	3	1	0	0	0
1987	0	0	0	-11	-1	0	0	0	0	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-1	-12	-1	0
1988	-8	0	0	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	-1	-12	-1	0
1989	-113	-7	-2	-182	-11	-1	-56	-3	0	-145	-9	-2	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-1	-125	-7	-1
1990	-65	-4	-1	-39	-2	0	-34	-2	0	0	0	0	-37	-2	-1	0	0	0	-1	0	0	0	0	0	28	2	2	-113	-7	-3	-81	-5	-2	-72	-4	0
1991	-57	-3	-1	-39	-2	0	-34	-2	0	-35	-2	0	-13	-1	0	-42	-3	-1	-22	-1	-1	0	0	0	0	0	0	-83	-5	-2	-81	-5	-2	-72	-4	0
1992	0	0	0	-39	-2	0	-34	-2	0	-35	-2	0	-36	-2	-1	0	0	0	0	0	0	0	0	0	-46	-3	-4	0	0	0	-54	-3	-1	-72	-4	0
1993	-57	-3	-1	-39	-2	0	-34	-2	0	0	0	0	0	0	0	17	1	0	17	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	-11	-1	0	-9	-1	0	-34	-2	0	-16	-1	0	-23	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	-1	-12	-1	0	-175	-10	-1
Mean			-1			0			0			0			0			0			0			-1			0			0			-1			0
Max			0			0			0			0			2			1			1			2			2			0			1			0
Min			-4			-1			0			-2			-2			-2			-7			-15			-4			-3			-2			-1

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Old River CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	-15	-1	0	-14	-1	0	0	0	0	0	0	0	-93	-5	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-58	-4	0	-22	-1	0
1924	-29	-2	0	-140	-8	-3	-3	0	0	0	0	0	0	0	0	-30	-2	-3	0	0	0	-34	-2	-23	0	0	0	-8	0	0	0	0	0	0	0	0
1925	-57	-3	-1	-39	-2	-1	-34	-2	-1	-35	-2	-2	0	0	0	-33	-2	-3	-15	-1	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	-10	-1	0	-8	0	0	-5	0	0	-100	-6	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	-11	-1	0	0	0	0	0	0	0	-102	-6	-26	-18	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	-10	-1	0	-21	-1	0	0	0	0	0	0	0	-18	-1	-5	-97	-6	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	-13	-1	0	-12	-1	0	0	0	0	-48	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32	-2	0	-15	-1	0
1930	-37	-2	-1	-178	-11	-4	-28	-2	-1	-43	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-36	-2	0	0	0	0
1931	-150	-9	-2	-39	-2	-1	-34	-2	-1	-35	-2	-2	0	0	0	-42	-3	-4	0	0	0	-13	-1	-9	0	0	0	-78	-5	-1	-81	-5	0	-72	-4	0
1932	-57	-3	-1	-39	-2	-1	-34	-2	-1	0	0	0	129	7	33	0	0	0	-85	-5	-39	-5	0	-4	0	0	0	0	0	0	0	0	0	0	0	0
1933	-9	-1	0	-7	0	0	0	0	0	-65	-4	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-48	-3	0	-46	-3	0
1934	0	0	0	-129	-8	-3	-36	-2	-1	0	0	0	-37	-2	-9	38	2	4	-80	-5	-37	0	0	0	0	0	0	0	0	0	-81	-5	0	-72	-4	0
1935	0	0	0	-39	-2	-1	-34	-2	-1	-35	-2	-2	7	0	2	0	0	0	6	0	3	-6	0	-4	0	0	0	0	0	0	0	0	0	-17	-1	0
1936	-11	-1	0	-67	-4	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-38	-2	0
1937	-14	-1	0	-12	-1	0	0	0	0	-19	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	-15	-1	0	-20	-1	0	0	0	0	-79	-5	-4	-3	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	-35	-2	-1	-28	-2	-1	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-80	-5	-1	-31	-2	0	-15	-1	0
1940	-11	-1	0	-16	-1	0	-10	-1	0	-42	-3	-2	0	0	0	-94	-6	-9	-167	-10	-78	7	0	5	0	0	0	0	0	0	-74	-5	0	0	0	0
1941	-64	-4	-1	-58	-3	-1	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	-16	-1	0	-14	-1	0	0	0	0	0	0	0	-87	-5	-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	-22	-1	0	-18	-1	0	0	0	0	0	0	0	-40	-2	-10	-93	-6	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	-14	-1	0	-12	-1	0	-34	-2	-1	0	0	0	-29	-2	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	0	-24	-1	0
1945	-9	-1	0	-11	-1	0	-32	-2	-1	-33	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-77	-5	0	0	0	0
1946	-11	-1	0	-134	-8	-3	0	0	0	0	0	0	2	0	0	-85	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-39	-2	0	-17	-1	0
1947	-128	-8	-2	-63	-4	-1	-34	-2	-1	0	0	0	-35	-2	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-25	-2	0	-19	-1	0
1948	-9	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	0	34	2	3	27	2	13	-38	-2	-26	0	0	0	0	0	0	-57	-4	0	-20	-1	0
1949	-122	-7	-2	-40	-2	-1	0	0	0	-59	-4	-3	81	5	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52	-3	0	-27	-2	0
1950	-13	-1	0	-62	-4	-1	0	0	0	0	0	0	0	0	0	-43	-3	-4	-102	-6	-48	7	0	5	0	0	0	0	0	0	0	0	0	-49	-3	0
1951	0	0	0	-33	-2	-1	0	0	0	-28	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-21	-1	0
1952	-16	-1	0	-33	-2	-1	0	0	0	0	0	0	-20	-1	-5	-79	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-57	-3	0
1953	-15	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	-14	-1	0	-14	-1	0	0	0	0	0	0	0	-28	-2	-7	-115	-7	-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	-17	-1	0	-16	-1	0	0	0	0	0	0	0	-9	-1	-2	-85	-5	-8	0	0	0	0	0	0	0	0	0	0	0	0	-75	-5	0	0	0	0
1956	-12	-1	0	-12	-1	0	0	0	0	0	0	0	0	0	0	-103	-6	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	-19	-1	0	-15	-1	0	0	0	0	-16	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-19	-1	-3	0	0	0	0	0	0	-21	-1	0
1958	-14	-1	0	-53	-3	-1	0	0	0	0	0	0	-15	-1	-4	-65	-4	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-3	0
1959	-53	-3	-1	0	0	0	0	0	0	0	0	0	-82	-5	-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64	-4	0	-18	-1	0
1960	-52	-3	-1	-113	-7	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-46	-3	0	-66	-4	0
1961	-16	-1	0	-12	-1	0	-32	-2	-1	0	0	0	-19	-1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-86	-5	0	-192	-11	0
1962	-73	-4	-1	-40	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	-7	0	-3	0	0	0	0	0	0	0	0	0	-32	-2	0	-93	-6	0
1963	-85	-5	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	-12	-1	0	0	0	0	0	0	0	-59	-4	-3	-57	-3	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0	-10	-1	0
1965	-6	0	0	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	-1	-8	0	-5	0	0	0	0	0	0	0	0	0	-25	-1	0
1966	-16	-1	0	-24	-1	-1	0	0	0	-80	-5	-4	100	6	25	-96	-6	-9	0	0	0	0	0	0	0	0	0	0	0	0	-49	-3	0	-21	-1	0
1967	-83	-5	-1	-95	-6	-2	-34	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-4	0
1968	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-1	0
1969	-41	-3	-1	-118	-7	-2	0	0	0	0	0	0	0	0	0	-14	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	-44	-3	-1	-13	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	-15	-1	0	-13	-1	0	0	0	0	0	0	0	-63	-3	-16	-56	-3	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	-19	-1	0	-14	-1	0	0	0	0	0	0	0	-29	-2	-7	0	0	0	-19	-1	-9	-7	0	-5	0	0	0	0	0	0	-55	-3	0	0	0	0
1973	-183	-11	-3	-106	-6	-2	-34	-2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	-10	-1	0	-16	-1	0	0	0	0	-63	-4	-3	-52	-3	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-2	0
1975	-43	-3	-1	0	0	0	0	0	0	-21	-1	-1	-17	-1	-4	-101	-6	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30	-2	0
1976	-40	-2	-1	-29	-2	-1	0	0	0	-12	-1	-1	-15	-1	-4	0	0	0	0	0	0	-52	-3	-34	0	0	0	-59	-4	0	0	0	0	-209	-12	0
1977	-116	-7	-2	-39	-2	-1	-34	-2	-1	-35	-2	-2	-36	-2	-9	-42	-3	-4	1	0	0	-12	-1	-8	0	0	0	-78	-5	-1	-81	-5	0	0	0	0
1978	-57	-3	-1	-39	-2	-1	-34	-2	-1	0	0	0	0	0	0	0	0	0	-2	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	-16	-1	0	-12	-1	0	0	0	0	-25	-2	-1	0	0	0	-19	-1	-2	0	0	0	0	0	0	0	0	0	0	0	0	-71	-4	0	0	0	0
1980	-13	-1	0	-30	-2	-1	0	0	0	0	0	0	-61	-3	-16	-38	-2	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	-22	-1	0	-14	-1	0	0	0	0	-23	-1	-1	0	0	0	-76	-5	-7	0	0	0	0	0	0	0	0	0	0	0	0	-29	-2	0	-32	-2	0
1982	-14	-1	0	-11	-1	0	0	0	0	0	0	0	0	0	0	-59	-4	-6	0	0	0	0	0	0	0	0	0	-4	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	-14	-1	0	-11	-1	0	0	0	0	-45	-3	-2	-77	-4	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	-1	0	-16	-1	0
1986	-13	-1	0	-13	-1	0	0	0	0	-22	-1	-1	-27	-1	-7	-56	-3	-5	-229	-14	-106	-8	0	-5	0	0	0	0	0	0	41	3	0	0	0	0
1987	0	0	0	-11	-1	0	0	0	0	-15	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0	-12	-1	0
1988	-8	0	0	-10	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31	-2	0	-12	-1	0
1989	-113	-7	-2	-182	-11	-4	-56	-3	-2	-145	-9	-6	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-19	-1	0	-125	-7	0
1990	-65	-4	-1	-39	-2	-1	-34	-2	-1	0	0	0	-37	-2	-9	0	0	0	-1	0	-1	0	0	0	28	2	4	-113	-7	-1	-81	-5	0	-72	-4	0
1991	-57	-3	-1	-39	-2	-1	-34	-2	-1	-35	-2	-2	-13	-1	-3	-42	-3	-4	-22	-1	-10	0	0	0	0	0	0	-83	-5	-1	-81	-5	0	-72	-4	0
1992	0	0	0	-39	-2	-1	-34	-2	-1	-35	-2	-2	-36	-2	-9	0	0	0	0	0	0	0	0	0	-46	-3	-6	0	0	0	-54	-3	0	-72	-4	0
1993	-57	-3	-1	-39	-2	-1	-34	-2	-1	0	0	0	0	0	0	17	1	2	17	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	-11	-1	0	-9	-1	0	-34	-2	-1	-16	-1	-1	-23	-1	-6	0	0	0	0	0	0	0	0	0	0	0	0	-22	-1	0	-12	-1	0	-175	-10	0
Mean			0			-1			0			-1			-3			-2			-4			-2			0			0			0			0
Max			0			0			0			0			33			4			13			5			4			0			0			0
Min			-3			-4			-2			-6			-26			-11			-106			-34			-6			-1			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination
Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1923	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1924	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	66	4	385	79	5	1322	86	5	511	81	5	71	72	4	25
1925	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	42	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1926	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1927	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1928	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1929	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1930	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1931	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	66	4	385	79	5	1322	86	5	511	81	5	71	72	4	25
1932	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1933	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1934	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1935	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1936	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1937	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1938	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1939	57	3	21	0	0	0	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1940	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1941	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1942	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1943	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1944	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1945	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1946	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1947	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1948	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1949	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1950	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1951	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1952	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1954	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1955	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1956	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1957	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1958	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1959	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1960	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1961	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1962	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1963	57	3	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1964	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1965	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1966	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1967	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1969	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1970	57	3	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1971	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1972	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1973	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1974	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1975	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1976	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	66	4	385	79	5	1322	86	5	511	0	0	0	72	4	25
1977	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	66	4	385	79	5	1322	86	5	511	81	5	71	72	4	25
1978	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1979	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1980	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1981	57	3	21	39	2	16	34	2	10	35	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1982	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1985	57	3	21	39	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1986	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1988	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1989	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1990	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1991	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	42	3	10	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
1992	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	71	72	4	25
1993	57	3	21	39	2	16	34	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	25
1994	57	3	21	39	2	16	34	2	10	35	2	15	36	2	15	0	0	0	0	0	0	0	0	0	0	0	0	86	5	511	81	5	71	72	4	25
MEAN			20			15			6			7			4			1			0			21			72			91			35			24
MAX			21			16			10			15			15			10			0			385			1322			511			71			25
MIN			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1923	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1924	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	81	5	**3**	72	4	**1**
1925	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	42	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1926	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1927	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1928	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1929	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1930	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1931	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	81	5	**3**	72	4	**1**
1932	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1933	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1934	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1935	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1936	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1937	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1938	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1939	57	3	**0**	0	0	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1940	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1941	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1942	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1943	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1944	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1945	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1946	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1947	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1948	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1949	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1950	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1951	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1952	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1954	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1955	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1956	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1957	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1958	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1959	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1960	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1961	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1962	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1963	57	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1964	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1965	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1966	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1967	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1969	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1970	57	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1971	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1972	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1973	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1974	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1975	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1976	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	0	0	**0**	72	4	**1**
1977	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**85**	79	5	**205**	86	5	**51**	81	5	**3**	72	4	**1**
1978	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1979	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1980	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1981	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1982	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1985	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1986	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1988	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1989	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1990	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1991	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
1992	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**3**	72	4	**1**
1993	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**1**
1994	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**51**	81	5	**3**	72	4	**1**
MEAN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**5**			**11**			**9**			**2**			**1**
MAX			**0**			**0**			**0**			**0**			**1**			**1**			**0**			**85**			**205**			**51**			**3**			**1**
MIN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1923	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1924	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**1**	0	0	**0**	66	4	**0**	79	5	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1925	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	42	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1926	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1927	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1928	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1929	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1930	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1931	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**1**	0	0	**0**	66	4	**0**	79	5	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1932	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1933	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1934	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1935	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1936	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1937	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1938	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1939	57	3	**0**	0	0	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1940	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1941	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1942	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1943	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1944	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1945	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1946	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1947	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1948	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1949	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1950	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1951	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1952	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1954	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1955	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1956	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1957	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1958	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1959	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1960	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1961	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1962	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1963	57	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1964	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1965	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1966	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1967	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1969	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1970	57	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1971	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1972	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1973	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1974	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1975	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1976	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	66	4	**0**	79	5	**0**	86	5	**0**	0	0	**0**	72	4	**0**
1977	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**1**	0	0	**0**	66	4	**0**	79	5	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1978	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1979	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1980	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1981	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1982	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1985	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1986	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1988	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1989	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1990	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1991	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
1992	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**0**	72	4	**0**
1993	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1994	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**0**	81	5	**0**	72	4	**0**
MEAN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**
MAX			**0**			**0**			**0**			**0**			**0**			**1**			**0**			**0**			**0**			**0**			**0**			**0**
MIN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	781	Apr	Vol	511	May	Vol	2,790	Jun	Vol	5,661	Jul	Vol	3,783	Aug	Vol	425	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1923	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1924	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**2,014**	0	0	**0**	66	4	**11,302**	79	5	**26,563**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1925	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	42	3	**2,014**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1926	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1927	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1928	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1929	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1930	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1931	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**2,014**	0	0	**0**	66	4	**11,302**	79	5	**26,563**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1932	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1933	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1934	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1935	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1936	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1937	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1938	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1939	57	3	**0**	0	0	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1940	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1941	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1942	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1943	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1944	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1945	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1946	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1947	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1948	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1949	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1950	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1951	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1952	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1954	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1955	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1956	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1957	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1958	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1959	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1960	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1961	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1962	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1963	57	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1964	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1965	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1966	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1967	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1969	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1970	57	3	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1971	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1972	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1973	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1974	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1975	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1976	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	66	4	**11,302**	79	5	**26,563**	86	5	**19,967**	0	0	**0**	72	4	**0**
1977	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**2,014**	0	0	**0**	66	4	**11,302**	79	5	**26,563**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1978	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1979	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1980	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1981	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1982	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1985	57	3	**0**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1986	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1988	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1989	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1990	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1991	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	42	3	**2,014**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
1992	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2,113**	72	4	**0**
1993	57	3	**0**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1994	57	3	**0**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**19,967**	81	5	**2,113**	72	4	**0**
MEAN			**0**			**0**			**0**			**0**			**0**			**138**			**0**			**619**			**1,455**			**3,556**			**1,042**			**0**
MAX			**0**			**0**			**0**			**0**			**0**			**2,014**			**0**			**11,302**			**26,563**			**19,967**			**2,113**			**0**
MIN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Juvenile Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1923	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1924	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**19**	79	5	**7**	86	5	**2**	81	5	**2**	72	4	**0**
1925	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	42	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1926	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1927	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1928	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1929	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1930	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1931	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**19**	79	5	**7**	86	5	**2**	81	5	**2**	72	4	**0**
1932	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1933	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1934	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1935	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1936	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1937	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1938	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1939	57	3	**1**	0	0	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1940	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1941	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1942	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1943	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1944	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1945	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1946	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1947	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1948	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1949	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1950	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1951	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1952	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1954	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1955	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1956	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1957	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1958	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1959	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1960	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1961	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1962	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1963	57	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1964	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1965	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1966	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1967	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1969	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1970	57	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1971	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1972	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1973	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1974	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1975	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1976	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	66	4	**19**	79	5	**7**	86	5	**2**	0	0	**0**	72	4	**0**
1977	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	66	4	**19**	79	5	**7**	86	5	**2**	81	5	**2**	72	4	**0**
1978	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1979	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1980	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1981	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1982	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1985	57	3	**1**	39	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1986	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1988	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1989	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1990	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1991	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	42	3	**1**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
1992	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	81	5	**2**	72	4	**0**
1993	57	3	**1**	39	2	**0**	34	2	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	72	4	**0**
1994	57	3	**1**	39	2	**0**	34	2	**0**	35	2	**0**	36	2	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	86	5	**2**	81	5	**2**	72	4	**0**
MEAN			**1**			**0**			**0**			**0**			**0**			**0**			**0**			**1**			**0**			**0**			**1**			**0**
MAX			**1**			**0**			**0**			**0**			**1**			**1**			**0**			**19**			**7**			**2**			**2**			**0**
MIN			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Mallard Slough CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1923	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1924	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	66	4	44	79	5	11	86	5	1	81	5	0	72	4	0
1925	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	42	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1926	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1927	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1928	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1929	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1930	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1931	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	66	4	44	79	5	11	86	5	1	81	5	0	72	4	0
1932	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1933	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1934	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1935	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1936	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1937	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1938	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1939	57	3	1	0	0	0	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1940	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1941	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1942	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1943	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1944	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1945	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1946	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1947	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1948	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1949	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1950	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1951	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1952	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1954	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1955	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1956	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1957	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1958	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1959	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1960	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1961	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1962	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1963	57	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1964	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1965	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1966	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1967	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1969	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1970	57	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1971	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1972	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1973	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1974	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1975	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1976	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	66	4	44	79	5	11	86	5	1	0	0	0	72	4	0
1977	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	66	4	44	79	5	11	86	5	1	81	5	0	72	4	0
1978	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1979	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1980	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1981	57	3	1	39	2	1	34	2	1	35	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1982	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1985	57	3	1	39	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1986	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1988	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1989	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1990	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1991	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	42	3	4	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
1992	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	5	0	72	4	0
1993	57	3	1	39	2	1	34	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4	0
1994	57	3	1	39	2	1	34	2	1	35	2	2	36	2	9	0	0	0	0	0	0	0	0	0	0	0	0	86	5	1	81	5	0	72	4	0
MEAN			1			1			1			1			3			0			0			2			1			0			0			0
MAX			1			1			1			2			9			4			0			44			11			1			0			0
MIN			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Striped Bass

Year	Oct	Vol	121	Nov	Vol	137	Dec	Vol	100	Jan	Vol	140	Feb	Vol	150	Mar	Vol	77	Apr	Vol	40	May	Vol	1900	Jun	Vol	5635	Jul	Vol	1934	Aug	Vol	287	Sep	Vol	115
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Splittail

Year	Oct	Vol	1	Nov	Vol	1	Dec	Vol	1	Jan	Vol	4	Feb	Vol	9	Mar	Vol	9	Apr	Vol	18	May	Vol	420	Jun	Vol	874	Jul	Vol	192	Aug	Vol	12	Sep	Vol	3
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1923	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1924	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1925	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1926	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1927	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1928	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1929	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1930	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1931	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1932	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1933	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1934	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1935	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1936	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1937	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1938	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1939	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1940	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1941	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1942	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1943	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1944	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1945	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1946	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1947	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1948	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1949	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1950	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1951	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1952	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1953	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1954	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1955	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1956	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1957	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1958	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1959	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1960	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1961	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1962	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1963	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1964	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1965	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1966	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1967	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1968	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1969	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1970	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1971	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1972	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1973	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1974	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1975	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1976	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1977	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1978	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1979	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1980	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1981	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1982	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1983	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1984	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1985	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1986	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1987	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1988	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1989	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1990	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1991	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1992	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1993	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
1994	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Mean			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**
Max			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**
Min			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Steelhead

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	1	Jan	Vol	3	Feb	Vol	4	Mar	Vol	5	Apr	Vol	3	May	Vol	2	Jun	Vol	0	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Juvenile Delta Smelt

Year	Oct	Vol	7	Nov	Vol	2	Dec	Vol	3	Jan	Vol	4	Feb	Vol	6	Mar	Vol	6	Apr	Vol	11	May	Vol	94	Jun	Vol	29	Jul	Vol	9	Aug	Vol	9	Sep	Vol	2
	31			30			31			31			28			31			30			31			30			31			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Larval Smelt

Year	Oct	Vol	0	Nov	Vol	0	Dec	Vol	0	Jan	Vol	0	Feb	Vol	0	Mar	Vol	54	Apr	Vol	412	May	Vol	530	Jun	Vol	119	Jul	Vol	0	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005

Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.

Vol = Vol (of water)

Alternative Intake CCWD Diversion (CFS) Difference Alt Minus Base 205 Future Desalination Entrainment and Impingement Loss Calculations – Chinook Salmon

Year	Oct	Vol	5	Nov	Vol	7	Dec	Vol	12	Jan	Vol	14	Feb	Vol	91	Mar	Vol	31	Apr	Vol	157	May	Vol	218	Jun	Vol	47	Jul	Vol	2	Aug	Vol	0	Sep	Vol	0
	31			30			31			31			28			31			30			31			30			30			31			30		
1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean			0			0			0			0			0			0			0			0			0			0			0			0
Max			0			0			0			0			0			0			0			0			0			0			0			0
Min			0			0			0			0			0			0			0			0			0			0			0			0

Source: SWRI 2005, 2006; Hanson Environmental 2006; DFG 2005
Notes: Bolded columns indicate estimated loss calculations by month and year, based on average density values in the first row.
Vol = Vol (of water)

Attachment F

Fish Rescue Plan

Attachment F
Alternative Intake Project
Fish Rescue Plan

Approach

Contra Costa Water District (CCWD) proposes to construct the Alternative Intake Project, which includes a water intake and positive barrier fish screen on Victoria Canal. Construction of the intake structure and positive barrier fish screen would require installing a cofferdam and dewatering the area within the cofferdam. Fish inhabiting Victoria Canal would potentially be trapped within the cofferdam and lost as a result of dewatering. To minimize and/or avoid these losses, a Fish Rescue Plan shall be implemented to reduce harm, harassment, and mortality from cofferdam construction and dewatering operations associated with in-water construction activities on listed fish species.

This plan has been developed in conjunction with informal consultations between CCWD and the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (DFG), and is intended to serve as a reasonable and prudent measure to minimize take of listed fish species. The plan is based on those consultations and the fish rescue plan successfully implemented by the City of Sacramento (2001), as recommended by the fisheries agencies. The Alternative Intake Project Fish Rescue Plan may be modified and/or updated pending the issuance of a Biological Opinion and/or during continuing informal or formal consultation with the fisheries agencies.

Although all fish species trapped by the cofferdam would be rescued and returned back into Victoria Canal, the primary emphasis of this effort focuses on protecting listed and special-status fish species inhabiting Victoria Canal. Special-status fish species potentially inhabiting Victoria Canal are identified below.

Endangered Fish

- Winter-run Chinook salmon

Threatened Fish

- Delta smelt
- Central Valley steelhead
- Central Valley Spring-run Chinook salmon

Special Fish Species of Concern

- Central Valley fall/late-fall run Chinook salmon
- Green sturgeon
- Longfin smelt
- River lamprey
- Hardhead
- Sacramento splittail

Methods

This Fish Rescue Plan is comprised of several phases. The intake and fish screen is to be installed in Victoria Canal within a depth of approximately 10–15 feet of water. The in-water construction area is to first be isolated from the canal with a cofferdam (e.g., sheet pile or other barrier) to reduce flows into the area. Before completely closing the cofferdam, the interior area will be swept with a net to herd any fish out of the cofferdam area and remove fish from within the water inside of the cofferdam. During this phase, the cofferdam will remain open at the bottom (see Exhibit 1). After the area has been swept through several times to catch or chase out any fish within the cofferdam, the cofferdam will be completely closed and portable pumps would be used to dewater the area enclosed by the cofferdam. The intake on the portable pumps would be equipped with a fish screen constructed using 1.75 mm screen mesh and <0.2 ft/sec calculated average approach velocity. The dewatering pumps would be used to reduce water depths within the cofferdam to a depth of approximately 1.5–2 feet to facilitate fish rescue. The fish rescue team, comprised of a qualified fishery biologist with a valid Scientific Collection Permit from DFG for the fish rescue and field technicians, would then capture fish using a 1/4-inch beach seine and/or handheld dip nets. Fish collection efforts would continue within the area until multiple pass collections deplete the fish population. Immediately after collection, fish would be placed in aerated 5-gallon buckets and/or coolers filled with Delta water, identified to species and counted, and transported to a location outside of the cofferdam for immediate release back into Victoria Canal.

Installation of the cofferdam would occur within the seasonal work window for in-water construction between August 1 and November 30, or any other work window agreed to between CCWD, NMFS, USFWS, and DFG. Once the cofferdam has been installed and the fish rescue competed, construction would continue throughout the year without the risk of adversely affecting fish inhabiting Victoria Canal.

Controls to Prevent Mortality

Specific efforts would be made to reduce collection and handling stress, minimize the time that fish are held in buckets, and minimize handling stress during processing and release. Chemical additives may be used in the holding buckets to reduce potential bacterial infection.

All captured fish will be handled pursuant to the standard NMFS protocols under the Endangered Species Act (ESA) and presented in City of Sacramento (2001). Standard protocol for the fish rescue operation follow that no employee is to remove any fish, either dead or alive, from the site for personal use. In addition, all efforts to reduce the time that live fish are out of the water should be maximized so as to reduce the chances of incidental take during the fish rescue. All fish are to be promptly returned to the water with the exception of any Chinook salmon, steelhead, or delta smelt mortality.

Up to 50 each of captured Chinook salmon, steelhead, and delta smelt and up to 30 each of other captured special-status species (i.e., green sturgeon, longfin smelt, river lamprey, hardhead, and Sacramento splittail) will be measured. The use of anesthetics during the handling of these species will help reduce any potential mortality. Dip nets or buckets will be used to remove fish from the beach seine and transferred to buckets or coolers for release.

Fish Identification

In the event that a fish cannot be positively identified, even after consulting on-site reference materials, the fish will be bagged, labeled, and brought to the office for positive identification. Bagged fish, excluding as much water as is possible from the bag, would be kept as cold as possible, and if not identified on the same day, would be put into a freezer box. Large quantities of fish exceeding 30 individuals for all species other than salmon, steelhead, and delta smelt would be “plus counted.” Salmon, steelhead, and delta smelt would be plus counted once the number of fish exceeds 50.

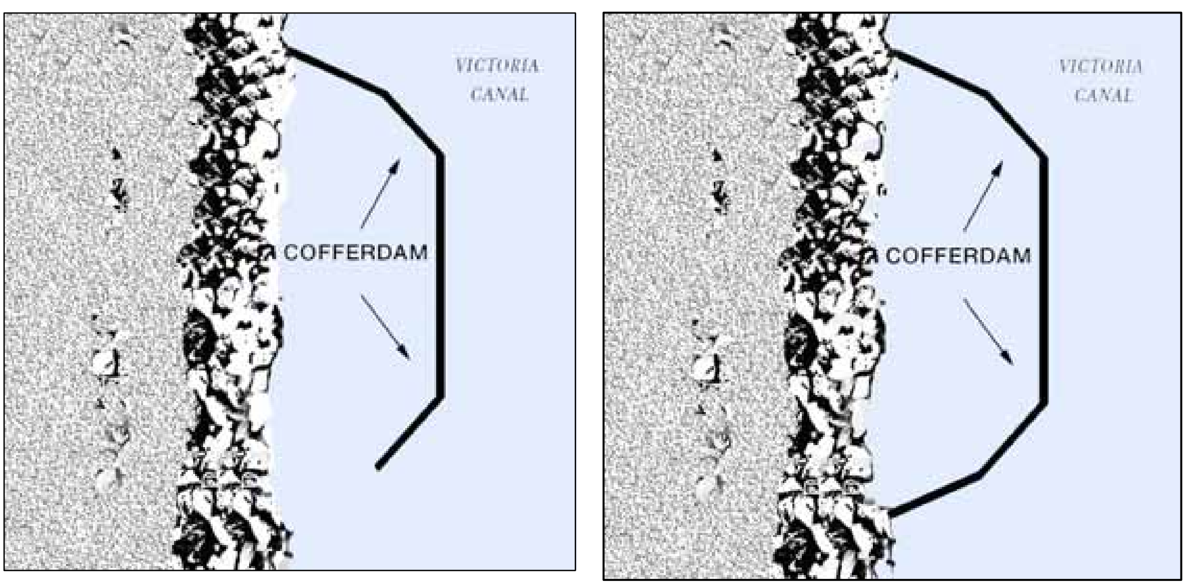
Species name, length data, and proper identification information will be recorded onto data sheets and parallel the labeling on each individual fish. Time, date, location, fork length, and gear type will be recorded onto the field sheet, along with any other pertinent observations of the fish.

Dead Fish Handling Procedures

During the fish rescue, there is the potential for some fish mortality despite the precautions taken to rescue all fish. If any special-status species suffer mortality, the individuals should be preserved via freezing or placing in a container with 10% formalin solution. Information on time and exact location of any incidental take, the method of take, length of time from death to preservation, water temperature, and any other relevant information should be recorded in writing. For any incidental take of delta smelt, the written documentation of the incidental take, along with the specimen(s), should then be delivered to the USFWS Law Enforcement Division via the USFWS's Sacramento Fish & Wildlife Office (attn: Chief, Endangered Species), or alternative delivery arrangements made. For any incidental take of Chinook salmon meeting the size-at-date length criteria and identified as either a winter-run or spring-run Chinook salmon, or for any incidental take of steelhead, the specimen will be placed in a cooler with ice and held for pickup by NMFS. The NMFS Sacramento office will be notified via telephone in the event that take of a protected salmonid occurs during the fish rescue. A follow-up written notification to NMFS shall include the date and location of the carcass or injured fish specimen, a color photograph, a description of the cause of injury or death, and name and affiliation of the person who collected this specimen. All materials would follow procedure, should any incidental take of species occur, and would be kept at the construction area in the trailer located on-site.

Reporting

After completing the fish rescue, a brief documentation report will be prepared. The report will include information on the personnel conducting the fish rescue, methods used, numbers of each species collected and relocated, length information for non-listed species, and an estimate of the survival of fish immediately after release. Photographs showing the site and rescue operation will be included. Any incidental take of a special-status species will be documented. The report will be provided by CCWD to NMFS, USFWS, and DFG within 30 days of completing the fish rescue.



Note: Not-to-scale, not intended for use as a construction document, and for illustration purposes only.

Exhibit 1
Example of Cofferdam Installed at Victoria Canal Prior to Initial Sweep-Through for Fish (left) and in Fully Closed Position Prior to Dewatering and Seining (right)

References

City of Sacramento. 2001. Sacramento River Water Treatment Plant Intake Structure Fish Screen Replacement Project Fish Rescue/Salvage Plan, Species Photographs and Handling Protocols. Sacramento, CA.