APPENDIX F
FEATHER WATER DISTRICT LONG-TERM WATER SERVICE CONTRACT

Irrigation
Contract No.
14-06-200-171-A-LTR1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
Central Valley Project, California

LONG-TERM RENEWAL CONTRACT BETWEEN THE UNITED STATES AND FEATHER WATER DISTRICT PROVIDING FOR PROJECT WATER SERVICE FROM THE SACRAMENTO RIVER DIVISION

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LONG-TERM RENEWAL CONTRACT BETWEEN THE UNITED STATES
AND
FEATHER WATER DISTRICT
PROVIDING FOR PROJECT WATER SERVICE
FROM SACRAMENTO RIVER DIVISION

THIS CONTRACT, made this _____ day of _____, 20_____, in pursuance generally of the Act of June 17, 1902 (32 Stat. 388), and acts amendatory or supplementary thereto, including, but not limited to, the Acts of August 26, 1937 (50 Stat. 844), as amended and supplemented, August 4, 1939 (53 Stat. 1187), as amended and supplemented, July 2, 1956 (70 Stat. 483), June 21, 1963 (77 Stat. 68), October 12, 1982 (96 Stat. 1263), October 27, 1986 (100 Stat. 3050), as amended, and Title XXXIV of the Act of October 30, 1992 (106 Stat. 4706), all collectively hereinafter referred to as Federal Reclamation law, between THE UNITED STATES OF AMERICA, hereinafter referred to as the United States, and FEATHER WATER DISTRICT, hereinafter referred to as the Contractor, a public agency of the State of California, duly organized, existing, and acting pursuant to the laws thereof;

WITNESSETH, That:

EXPLANATORY RECITALS

[1st] WHEREAS, the United States has constructed and is operating the Central Valley Project (Project), California, for diversion, storage, carriage, distribution and beneficial use, for flood control, irrigation, municipal, domestic, industrial, fish and wildlife mitigation, protection and restoration, generation and distribution of electric energy, salinity control, navigation and other beneficial uses, of waters of the Sacramento River, the American River, the Trinity River, and the San Joaquin River and their tributaries; and

[2nd] WHEREAS, the Contractor has obtained from the State of California Water Resources Control Board a Permit 12094 pursuant to "Application No. 14803 to Appropriate Unappropriated Water" (Permit 12094) to appropriate water by direct diversion from the Feather River on the condition, among others, that no water shall be diverted until an agreement has been consummated between the Contractor and the United States providing for a concurrent exchange of water from the Project for water diverted under the permit to the extent necessary to supply the prior rights of the Sacramento River and the Sacramento-San Joaquin delta users; and

[3rd] WHEREAS, the rights to Project Water were acquired by the United States pursuant to California law for operation of the Project; and

[4th] WHEREAS, the Contractor and the United States entered into Contract No. 14-06-200-171-A, dated June 26, 1962, which established terms for Project Water to be delivered in the Sacramento River for diversion by exchange from the Feather River by the Contractor through December 31, 1994; and

[5th] WHEREAS, the Contractor and the United States have pursuant to Subsection 3404(c)(1) of the Central Valley Project Improvement Act (CVPIA), subsequently entered into interim renewal contract(s) identified as Contract No(s). 14-06-200-171-A-IR1, 14-06-200-171-A-IR2, 14-06-200-171-A-IR3, 14-06-200-171-A-IR4, 14-06-200-171-A-IR5, 14-06-200-171-A-IR6, 14-06-200-171-A-IR7, 14-06-200-171-A-IR8, and 14-06-200-171-A-IR9, the current of which is hereinafter referred to as the “Existing Contract,” which provides for continued water service to the Contractor from March 1, 2004, through February 28, 2006; and

[6th] WHEREAS, Section 3404(c) of the CVPIA provides for long-term renewal of the Existing Contract following completion of appropriate environmental documentation, including a

programmatic environmental impact statement (PEIS) pursuant to the National Environmental Policy Act (NEPA), analyzing the direct and indirect impacts and benefits of implementing the CVPIA and the potential renewal of all existing contracts for Project Water; and

[7th] WHEREAS, the United States has completed the PEIS and all other appropriate environmental review necessary to provide for long-term renewal of the Existing Contract; and

[8th] WHEREAS, the Contractor has requested the long-term renewal of the Existing Contract, pursuant to the terms of the Existing Contract, Federal Reclamation law, and the laws of the State of California, for water service from the Project; and

[9th] WHEREAS, the United States has determined that the Contractor has fulfilled all of its obligations under the Existing Contract; and

[10th] WHEREAS, the Contractor has demonstrated to the satisfaction of the Contracting Officer that the Contractor has utilized the Project Water supplies available to it for reasonable and beneficial use and, based upon a needs analysis cooperatively prepared by the Contracting Officer and the Contractor, has demonstrated projected future demand for water use that exceeds the Contract Total to be made available to it pursuant to this Contract; and

[11th] WHEREAS, water obtained from the Project has been relied upon by urban and agricultural areas within California for more than 50 years, and is considered by the Contractor as an essential portion of its water supply; and

[12th] WHEREAS, the economies of regions within the Project, including the Contractor's, depend upon the continued availability of water, including water service from the Project; and

[13th] WHEREAS, the Secretary intends through coordination, cooperation, and partnerships to pursue measures to improve water supply, water quality, and reliability of the Project for all Project purposes; and

[14th] WHEREAS, the mutual goals of the United States and the Contractor include: to provide for reliable Project Water supplies; to control costs of those supplies; to achieve repayment of the Project as required by law; to guard reasonably against Project Water shortages; to achieve a reasonable balance among competing demands for use of Project Water and to comply with all applicable environmental statutes, all consistent with the legal obligations of the United States relative to the Project; and

[15th] WHEREAS, the parties intend by this Contract to develop a more cooperative relationship in order to achieve their mutual goals; and

[16th] WHEREAS, the United States and the Contractor are willing to enter into this Contract pursuant to Federal Reclamation law on the terms and conditions set forth below;

NOW, THEREFORE, in consideration of the mutual and dependent covenants herein contained, it is hereby mutually agreed by the parties hereto as follows:

DEFINITIONS

1. When used herein unless otherwise distinctly expressed, or manifestly incompatible with the intent of the parties as expressed in this Contract, the term:

(a) "Calendar Year" shall mean the period January 1 through December 31, both dates inclusive;

(b) "Charges" shall mean the payments required by Federal Reclamation law in addition to the Rates and Tiered Pricing Component specified in this Contract as determined annually by the Contracting Officer pursuant to this Contract;

(c) "Condition of Shortage" shall mean a condition respecting the Project during any Year such that the Contracting Officer is unable to deliver sufficient water to meet the Contract Total;

(d) "Contracting Officer" shall mean the Secretary of the Interior=s duly authorized representative acting pursuant to this Contract or applicable Federal Reclamation law or regulation;

(e) "Contract Total" shall mean the maximum amount of water to which the Contractor is entitled under subdivision (a) of Article 3 of this Contract;

(f) "Contractor's Service Area" shall mean the area to which the Contractor is permitted to provide Project Water under this Contract as described in Exhibit "A" attached thereto, which may be modified from time to time in accordance with Article 35 of this Contract without amendment of this Contract;

(g) "CVPIA" shall mean the Central Valley Project Improvement Act, Title XXXIV of the Act of October 30, 1992 (106 Stat. 4706);

(h) "Eligible Lands" shall mean all lands to which Irrigation Water may be delivered in accordance with Section 204 of the Reclamation Reform Act of October 12, 1982 (96 Stat. 1263), as amended, hereinafter referred to as RRA;

(i) "Excess Lands" shall mean all lands in excess of the limitations contained in Section 204 of the RRA, other than those lands exempt from acreage limitation under Federal Reclamation law;

(j) "Full Cost Rate" shall mean an annual rate as determined by the Contracting Officer that shall amortize the expenditures for construction properly allocable to the Project irrigation or municipal and industrial functions, as appropriate, of facilities in service including all O&M deficits funded, less payments, over such periods as may be required under Federal Reclamation law, or applicable contract provisions. Interest will accrue on both the construction expenditures and funded O&M deficits from October 12, 1982, on costs outstanding at that date, or from the date incurred in the case of costs arising subsequent to October 12, 1982,

and shall be calculated in accordance with subsections 202(3)(B) and (3)(C) of the RRA. The Full Cost Rate includes actual operation, maintenance, and replacement costs consistent with Section 426.2 of the Rules and Regulations for the RRA;

(k) "Ineligible Lands" shall mean all lands to which Irrigation Water may not be delivered in accordance with Section 204 of the RRA;

(l) "Irrigation Full Cost Water Rate" shall mean the Full Cost Rate applicable to the delivery of Irrigation Water;

(m) "Irrigation Water" shall mean water made available from the Project that is used primarily in the production of agricultural crops or livestock, including domestic use incidental thereto, and watering of livestock. Irrigation Water shall not include water used for purposes such as the watering of landscaping or pasture for animals (e.g., horses) which are kept for personal enjoyment or water delivered to landholdings operated in units of less than five acres unless the Contractor establishes to the satisfaction of the Contracting Officer that the use of water delivered to such landholding is a use described in this subdivision of this Article;

(n) "Landholder" shall mean a party that directly or indirectly owns or leases nonexempt land, as provided in 43 CFR 426.2;

(o) "Operation and Maintenance" or "O&M" shall mean normal and reasonable care, control, operation, repair, replacement (other than capital replacement), and maintenance of Project facilities;

(p) "Other Water" shall mean water made available from the Project other than Irrigation Water as described in subdivision (m) of this Article, which is used for a purpose that is considered to be an irrigation use pursuant to State law such as the watering of landscaping or pasture for animals (e.g., horses) which are kept for personal enjoyment. For purposes of this Contract, Other Water shall be paid for at Rates and Charges identical to those

established for municipal and industrial water pursuant to the then-current Municipal and Industrial (M&I) Ratesetting Policy;

(q) "Other Full Cost Water Rate" shall mean the annual rate, which, as determined by the Contracting Officer, shall amortize the expenditures for construction allocable to Project municipal and industrial facilities in service, including, O&M deficits funded, less payments, over such periods as may be required under Federal Reclamation law with interest accruing from the dates such costs were first incurred plus the applicable rate for the O&M of such Project facilities. Interest rates used in the calculation of the Other Full Cost Rate shall comply with the Interest Rate methodology contained in Section 202 (3)(B) and (C) of the RRA;

(r) "Project" shall mean the Central Valley Project owned by the United States and managed by the Department of the Interior, Bureau of Reclamation;

(s) "Project Contractors" shall mean all parties who have water service contracts for Project Water from the Project with the United States pursuant to Federal Reclamation law;

(t) "Project Water" shall mean all water that is developed, diverted, stored, or delivered by the Secretary in accordance with the statutes authorizing the Project and in accordance with the terms and conditions of water rights acquired pursuant to California law;

(u) "Rates" shall mean the payments determined annually by the Contracting Officer in accordance with the then-current applicable water ratesetting policies for the Project, as described in subdivision (a) of Article 7 of this Contract;

(v) "Recent Historic Average" shall mean the most recent five-year average of the final forecast of Water Made Available to the Contractor pursuant to this Contract or its preceding contract(s);

(w) "Replaced Water" shall mean Project Water which is delivered in the Sacramento River at the confluence with the Feather River and thence diverted by the Contractor from the Feather River by exchange at points of diversion on the Feather River which are approved by the Contracting Officer.

(x) "Secretary" shall mean the Secretary of the Interior, a duly appointed successor, or an authorized representative acting pursuant to any authority of the Secretary and through any agency of the Department of the Interior;

(y) "Tiered Pricing Component" shall be the incremental amount to be paid for each acre-foot of Water Delivered as described in subdivision (j) of Article 7 of this Contract;

(z) "Water Delivered" or "Delivered Water" shall mean Replaced Water diverted for use by the Contractor at the point(s) of delivery approved by the Contracting Officer;

(aa) "Water Made Available" shall mean the estimated amount of Project Water that can be delivered to the Contractor for the upcoming Year as declared by the Contracting Officer, pursuant to subdivision (a) of Article 4 of this Contract;

(bb) "Water Scheduled" shall mean Project Water made available to the Contractor for which times and quantities for delivery have been established by the Contractor and Contracting Officer, pursuant to subdivision (b) of Article 4 of this Contract; and

(cc) "Year" shall mean the period from and including March 1 of each Calendar Year through the last day of February of the following Calendar Year.

TERM OF CONTRACT

2. (a) This Contract shall be effective March 1, 2005, through February 28, 2030, and supersedes the Existing Contract. In the event the Contractor wishes to renew this Contract beyond February 28, 2030, the Contractor shall submit a request for renewal in writing

to the Contracting Officer no later than two years prior to the date this Contract expires. The renewal of this Contract insofar as it pertains to the furnishing of Irrigation Water to the Contractor shall be governed by subdivision (b) of this Article.

(b) (1) Under terms and conditions of a renewal contract that are mutually agreeable to the parties hereto, and upon a determination by the Contracting Officer that at the time of contract renewal the conditions set forth in subdivision (b)(2) of this Article are met, and subject to Federal and State law, this Contract shall be renewed for a period of 25 years.

(2) The conditions which must be met for this Contract to be renewed are: (i) the Contractor has prepared a water conservation plan that has been determined by the Contracting Officer in accordance with Article 26 of this Contract to meet the conservation and efficiency criteria for evaluating such plans established under Federal law; (ii) the Contractor is implementing an effective water conservation and efficiency program based on the Contractor=s water conservation plan as required by Article 26 of this Contract; (iii) the Contractor is operating and maintaining all water measuring devices and implementing all water measurement methods as approved by the Contracting Officer pursuant to Article 6 of this Contract; (iv) the Contractor has reasonably and beneficially used the Project Water supplies made available to it and, based on projected demands, is reasonably anticipated and expects to fully utilize for reasonable and beneficial use the quantity of Project Water to be made available to it pursuant to such renewal; (v) the Contractor is complying with all terms and conditions of this Contract; and (vi) the Contractor has the physical and legal ability to deliver Project Water.

(3) The terms and conditions of the renewal contract described in subdivision (b)(1) of this Article and any subsequent renewal contracts shall be developed consistent with the parties‘ respective legal rights and obligations, and in consideration of all relevant facts and circumstances, as those circumstances exist at the time of renewal, including,

without limitation, the Contractor's need for continued delivery of Project Water; environmental conditions affected by implementation of the Contract to be renewed, and specifically changes in those conditions that occurred during the life of the Contract to be renewed; the Secretary's progress toward achieving the purposes of the CVPIA as set out in Section 3402 and in implementing the specific provisions of the CVPIA; and current and anticipated economic circumstances of the region served by the Contractor.

(c) The Contracting Officer shall make a determination ten years after the date of execution of this Contract, and every five years thereafter during the term of this Contract, of whether a conversion of the relevant portion of this Contract to a contract under subsection 9(d) of the Reclamation Project Act of 1939 can be accomplished pursuant to the Act of July 2, 1956 (70 Stat 483). Notwithstanding any provision of this Contract, the Contractor reserves and shall have all rights and benefits under the Act of July 2, 1956 (70 Stat 483). The Contracting Officer anticipates that during the term of this Contract, all authorized Project construction expected to occur will have occurred, and on that basis the Contracting Officer agrees upon such completion to allocate all costs that are properly assignable to the Contractor, and agrees further that, at any time after such allocation is made, and subject to satisfaction of the condition set out in this subdivision, this Contract shall, at the request of the Contractor, be converted to a contract under subsection 9(d) of the Reclamation Project Act of 1939, subject to applicable Federal law and under stated terms and conditions mutually agreeable to the Contractor and the Contracting Officer. A condition for such conversion to occur shall be a determination by the Contracting Officer that, account being taken of the amount credited to return by the Contractor as provided for under Federal Reclamation law, the remaining amount of construction costs assignable for ultimate return by the Contractor can probably be repaid to the United States within the term of a contract under subsection 9(d). If the remaining amount of

costs that are properly assignable to the Contractor cannot be determined during the term of this Contract, the Contracting Officer shall notify the Contractor, and provide the reason(s) why such a determination could not be made. Further, the Contracting Officer shall make such a determination as soon thereafter as possible so as to permit, upon request of the Contractor and satisfaction of the condition set out above, conversion to a contract under subsection 9(d). In the event such determination of costs has not been made at a time which allows conversion of this Contract during the term of this Contract or the Contractor has not requested conversion of this Contract within such term, the parties shall incorporate in any subsequent renewal contract as described in subdivision (b) of this Article a provision that carries forth in substantially identical terms the provisions of this subdivision.

WATER TO BE MADE AVAILABLE AND DELIVERED TO THE CONTRACTOR

3. (a) During each Year, consistent with all applicable State water rights, permits, and licenses, Federal law, and subject to the provisions set forth in Articles 11 and 12 of this Contract, the Contracting Officer shall make available for delivery to the Contractor 20,000 acre-feet of Project Water for irrigation and other purposes. Water Delivered to the Contractor in accordance with this subdivision shall be scheduled and paid pursuant to the provisions of Articles 4 and 7 of this Contract.

(1) During the months of June, July, August, and September of each Year, all water diverted by the Contractor from the Feather River, except as provided for under Article 26 of this Contract, shall be deemed, solely for the purposes of this Contract, to be Replaced Water; Provided, That during these four months, the Contracting Officer shall not be obligated to deliver to the Contractor more than 18,533 acre-feet of Project Water, and the Contractor shall not divert more than 18,533 acre-feet of water from the Feather River or the quantity available to it pursuant to Articles 11 and 12 of this Contract, whichever is less.

(2) Diversions of water by the Contractor from the Feather River during any other months of the Year shall be deemed, solely for the purposes of this Contract, to be water the Contractor is entitled to divert under Permit 12094, not Replaced Water, except when the State of California Water Resources Control Board (Board) determines that insufficient water is available in the Feather River during those other months, or portions thereof, for the Contractor to divert under its Permit 12094, in which event all diversions made from the Feather River by the Contractor after the date specified in the Board's notice of unavailability of water shall necessarily be Replaced Water and the Contracting Officer, subject to the provisions set forth in Articles 11 and 12 of this Contract, shall be obligated to make available to the Contractor up to the full 20,000 acre-feet of Project Water to which the Contractor is entitled.

(3) If the date specified in the Board's notice terminating the period of curtailment falls before June 1, then water diverted from the Feather River by the Contractor after the date specified in the said notice, but before June 1, shall be deemed, solely for the purposes of this Contract, to be water the Contractor is entitled to divert under Permit 12094, not Replaced Water. If the date specified in the Board's notice terminating the period of curtailment falls after September 30, then water diverted from the Feather River by the Contractor after the date specified in the said notice shall be deemed, solely for the purposes of this Contract, to be water the Contractor is entitled to divert under Permit 12094, not Replaced Water. Water Delivered to the Contractor in accordance with this subdivision shall be scheduled and paid for pursuant to the provisions of Articles 4 and 7 of this Contract.

(b) Because the capacity of the Project to deliver Project Water has been constrained in recent years and may be constrained in the future due to many factors including hydrologic conditions and implementation of Federal and State laws, the likelihood of the Contractor actually receiving the amount of Project Water set out in subdivision (a) of this

Article in any given Year is uncertain. The Contracting Officer's modeling referenced in the PEIS projected that the Contract Total set forth in this Contract will not be available to the Contractor in many years. During the most recent five years, the Recent Historic Average of Water Made Available to the Contractor was 18,400 acre-feet. Nothing in subdivision (b) of this Article shall affect the rights and obligations of the parties under any provision of this Contract.

(c) The Contractor shall utilize the Project Water in accordance with all applicable legal requirements.

(d) The Contractor shall make reasonable and beneficial use of all water furnished pursuant to this Contract. Groundwater recharge programs (direct, indirect, or in lieu), groundwater banking programs, surface water storage programs, and other similar programs utilizing Project Water or other water furnished pursuant to this Contract conducted within the Contractor's Service Area which are consistent with applicable State law and result in use consistent with Federal Reclamation law will be allowed: Provided, That any direct recharge program(s) is (are) described in the Contractor's water conservation plan submitted pursuant to Article 26 of this Contract; Provided, further, That such water conservation plan demonstrates sufficient lawful uses exist in the Contractor's Service Area so that using a long-term average, the quantity of Delivered Water is demonstrated to be reasonable for such uses and in compliance with Federal Reclamation law. Groundwater recharge programs, groundwater banking programs, surface water storage programs, and other similar programs utilizing Project Water or other water furnished pursuant to this Contract conducted outside the Contractor's Service Area may be permitted upon written approval of the Contracting Officer, which approval will be based upon environmental documentation, Project Water rights, and Project operational concerns. The Contracting Officer will address such concerns in regulations, policies, or guidelines.

(e) The Contractor shall comply with requirements applicable to the Contractor in biological opinion(s) prepared as a result of a consultation regarding the execution of this Contract undertaken pursuant to Section 7 of the Endangered Species Act of 1973 (ESA), as amended, that are within the Contractor's legal authority to implement. The Existing Contract, which evidences in excess of 40 years of diversions for irrigation and/or other purposes of the quantities of water provided in subdivision (a) of Article 3 of this Contract, will be considered in developing an appropriate baseline for biological assessment(s) prepared pursuant to the ESA, and any other needed environmental review. Nothing herein shall be construed to prevent the Contractor from challenging or seeking judicial relief in a court of competent jurisdiction with respect to any biological opinion or other environmental documentation referred to in this Article.

(f) Following the declaration of Water Made Available under Article 4 of this Contract, the Contracting Officer will make a determination whether Project Water, or other water available to the Project, can be made available to the Contractor in addition to the Contract Total under Article 3 of this Contract during the Year without adversely impacting other Project Contractors. At the request of the Contractor, the Contracting Officer will consult with the Contractor prior to making such a determination. If the Contracting Officer determines that Project Water, or other water available to the Project, can be made available to the Contractor, the Contracting Officer will announce the availability of such water and shall so notify the Contractor as soon as practicable. The Contracting Officer will thereafter meet with the Contractor and other Project Contractors capable of taking such water to determine the most equitable and efficient allocation of such water. If the Contractor requests the delivery of any quantity of such water, the Contracting Officer shall make such water available to the Contractor in accordance with applicable statutes, regulations, guidelines, and policies.

(g) The Contractor's right pursuant to Federal Reclamation law and applicable State law to the reasonable and beneficial use of Water Delivered pursuant to this Contract during the term thereof and any subsequent renewal contracts, as described in Article 2 of this Contract, during the terms thereof shall not be disturbed so long as the Contractor shall fulfill all of its obligations under this Contract and any renewals thereof. Nothing in the preceding sentence shall affect the Contracting Officer's ability to impose shortages under Articles 11 or subdivision (b) of Article 12 of this Contract or applicable provisions of any subsequent renewal contracts.

(h) Project Water furnished to the Contractor pursuant to this Contract may be delivered for other than irrigation or municipal and industrial purposes upon written approval by the Contracting Officer in accordance with the terms and conditions of such approval.

(i) The Contracting Officer shall make reasonable efforts to protect the water rights necessary for the Project and to provide the water available under this Contract. The Contracting Officer shall not object to participation by the Contractor, in the capacity and to the extent permitted by law, in administrative proceedings related to the Project Water rights; Provided, That the Contracting Officer retains the right to object to the substance of the Contractor's position in such a proceeding; Provided, further, That in such proceedings the Contracting Officer shall recognize the Contractor has a legal right under the terms of this Contract to use Project Water.

TIME FOR DELIVERY OF WATER

(4) (a) On or about February 20 of each Calendar Year, the Contracting Officer shall announce the Contracting Officer's expected declaration of the Water Made Available. Such declaration will be expressed in terms of both Water Made Available and the Recent Historic Average and will be updated monthly, and more frequently if necessary, based on

then-current operational and hydrologic conditions and a new declaration with changes, if any, to the Water Made Available will be made. The Contracting Officer shall provide forecasts of Project operations and the basis of the estimate, with relevant supporting information, upon the written request of the Contractor. Concurrently with the declaration of the Water Made Available, the Contracting Officer shall provide the Contractor with the updated Recent Historic Average.

(b) On or before each March 1 and at such other times as necessary, the Contractor shall submit to the Contracting Officer a written schedule, satisfactory to the Contracting Officer, showing the monthly quantities of Project Water to be delivered by the United States to the Contractor pursuant to this Contract for the Year commencing on such March 1. The Contracting Officer shall use all reasonable means to deliver Project Water according to the approved schedule for the Year commencing on such March 1.

(c) The Contractor shall not schedule Project Water in excess of the quantity of Project Water the Contractor intends to put to reasonable and beneficial use within the Contractor's Service Area during any Year.

(d) Subject to the conditions set forth in subdivision (a) of Article 3 of this Contract, the United States shall deliver Project Water to the Contractor in accordance with the initial schedule submitted by the Contractor pursuant to subdivision (b) of this Article, or any written revision(s), satisfactory to the Contracting Officer, thereto submitted within a reasonable time prior to the date(s) on which the requested change(s) is/are to be implemented.

POINT OF DIVERSION AND RESPONSIBILITY FOR DISTRIBUTION OF WATER

5. (a) Project Water scheduled pursuant to subdivision (b) of Article 4 of this Contract shall be delivered to the Contractor in the Sacramento River at the confluence with the Feather River for diversion from the Feather River by exchange at such point or points on the

Feather River mutually agreed to in writing by the Contracting Officer and the Contractor consistent with Permit 12094.

(b) The Contractor shall deliver Irrigation Water in accordance with any applicable land classification provisions of Federal Reclamation law and the associated regulations. The Contractor shall not deliver Project Water to land outside the Contractor's Service Area unless approved in advance by the Contracting Officer.

(c) All Water Delivered to the Contractor pursuant to this Contract shall be measured and recorded with equipment furnished, installed, operated, and maintained by the Contractor at the point or points of delivery established pursuant to subdivision (a) of this Article. Upon the request of either party to this Contract, the Contracting Officer shall investigate the accuracy of such measurements and shall take any necessary steps to adjust any errors appearing therein. For any period of time when accurate measurements have not been made, the Contracting Officer shall consult with the Contractor prior to making a final determination of the quantity delivered for that period of time.

(d) The Contracting Officer shall not be responsible for the control, carriage, handling, use, disposal, or distribution of Water Delivered to the Contractor pursuant to this Contract beyond the delivery points specified in subdivision (a) of this Article. The Contractor shall indemnify the United States, its officers, employees, agents, and assigns on account of damage or claim of damage of any nature whatsoever for which there is legal responsibility, including property damage, personal injury, or death arising out of or connected with the control, carriage, handling, use, disposal, or distribution of such Water Delivered beyond such delivery points, except for any damage or claim arising out of (i) acts or omissions of the Contracting Officer or any of its officers, employees, agents, or assigns, with the intent of creating the

situation resulting in any damage or claim, (ii) willful misconduct of the Contracting Officer or any of its officers, employees, agents, or assigns, (iii) negligence of the Contracting Officer or any of its officers, employees, agents, or assigns, or (iv) damage or claims resulting from a malfunction of facilities owned and/or operated by the United States.

MEASUREMENT OF WATER WITHIN THE CONTRACTOR'S SERVICE AREA

6. (a) The Contractor has established a measuring program satisfactory to the Contracting Officer. The Contractor shall ensure that all surface water delivered for irrigation purposes within the Contractor's Service Area is measured at each agricultural turnout and such water delivered for municipal and industrial purposes is measured at each municipal and industrial service connection. The water measuring devices or water measuring methods of comparable effectiveness must be acceptable to the Contracting Officer. The Contractor shall be responsible for installing, operating, and maintaining and repairing all such measuring devices and implementing all such water measuring methods at no cost to the United States. The Contractor shall use the information obtained from such water measuring devices or water measuring methods to ensure its proper management of the water, to bill water users for water delivered by the Contractor; and, if applicable, to record water delivered for other purposes by customer class as defined in the Contractor's water conservation plan provided for in Article 26 of this Contract. Nothing herein contained, however, shall preclude the Contractor from establishing and collecting any charges, assessments, or other revenues authorized by State law. The Contractor shall include a summary of all its annual surface water deliveries in the annual report described in subdivision (c) of Article 26.

(b) All new surface water delivery systems installed within the Contractor's Service Area after the effective date of this Contract shall also comply with the measurement provisions described in subdivision (a) of this Article.

(c) The Contractor shall inform the Contracting Officer and the State of California in writing by April 30 of each Year of the monthly volume of surface water delivered within the Contractor's Service Area during the previous Year.

(d) The Contractor shall inform the Contracting Officer on or before the 20th calendar day of each month of the quantity of Irrigation and Other Water taken during the preceding month.

RATES AND METHOD OF PAYMENT FOR WATER

7. (a) The Contractor shall pay the United States as provided in this Article for all Delivered Water at Rates, Charges, and the Tiered Pricing Component established in accordance with: (i) the Secretary's ratesetting policy for Irrigation Water adopted in 1988 and the Secretary's then-existing ratesetting policy for municipal and industrial water. Such ratesetting policies shall be amended, modified, or superseded only through a public notice and comment procedure; (ii) applicable Federal Reclamation law and associated rules and regulations, or policies; and (iii) other applicable provisions of this Contract. Payments shall be made by cash transaction, electronic funds transfer, or any other mechanism as may be agreed to in writing by the Contractor and the Contracting Officer. The Rates, Charges, and Tiered Pricing Component applicable to the Contractor upon execution of this Contract are set forth in Exhibit "B" as may be revised annually.

(b) The Contracting Officer shall notify the Contractor of the Rates, Charges, and Tiered Pricing Component as follows:

(1) Prior to July 1 of each Calendar Year, the Contracting Officer shall provide the Contractor an estimate of the Charges for Project Water that will be applied to the period October 1, of the current Calendar Year, through September 30, of the following Calendar Year, and the basis for such estimate. The Contractor shall be allowed not less than

two months to review and comment on such estimates. On or before September 15 of each Calendar Year, the Contracting Officer shall notify the Contractor in writing of the Charges to be in effect during the period October 1 of the current Calendar Year, through September 30, of the following Calendar Year, and such notification shall revise Exhibit "B."

(2) Prior to October 1 of each Calendar Year, the Contracting Officer shall make available to the Contractor an estimate of the Rates and Tiered Pricing Component for Project Water for the following Year and the computations and cost allocations upon which those Rates are based. The Contractor shall be allowed not less than two months to review and comment on such computations and cost allocations. By December 31 of each Calendar Year, the Contracting Officer shall provide the Contractor with the final Rates and Tiered Pricing Component to be in effect for the upcoming Year, and such notification shall revise Exhibit "B."

(c) At the time the Contractor submits the initial schedule for the delivery of Project Water for each Year pursuant to subdivision (b) of Article 4 of this Contract, the Contractor shall make an advance payment to the United States equal to the total amount payable pursuant to the applicable Rate(s) set under subdivision (a) of this Article, for the Project Water scheduled to be delivered pursuant to this Contract during the first two calendar months of the Year. Before the end of the first month and before the end of each calendar month thereafter, the Contractor shall make an advance payment to the United States, at the Rate(s) set under subdivision (a) of this Article, for the Water Scheduled to be delivered pursuant to this Contract during the second month immediately following. Adjustments between advance payments for Water Scheduled and payments at Rates due for Water Delivered shall be made before the end of the following month; Provided, That any revised schedule submitted by the Contractor pursuant to Article 4 of this Contract which increases the amount of Water Delivered pursuant to this Contract during any month shall be accompanied with appropriate advance payment, at the Rates

then in effect, to assure that Project Water is not delivered to the Contractor in advance of such payment. In any month in which the quantity of Water Delivered to the Contractor pursuant to this Contract equals the quantity of Water Scheduled and paid for by the Contractor, no additional Project Water shall be delivered to the Contractor unless and until an advance payment at the Rates then in effect for such additional Project Water is made. Final adjustment between the advance payments for the Water Scheduled and payments for the quantities of Water Delivered during each Year pursuant to this Contract shall be made as soon as practicable but no later than April 30th of the following Year, or 60 days after the delivery of Project Water carried over under subdivision (f) of Article 3 of this Contract if such water is not delivered by the last day of February.

(d) The Contractor shall also make a payment in addition to the Rate(s) in subdivision (c) of this Article to the United States for Water Delivered, at the Charges and the appropriate Tiered Pricing Component then in effect, before the end of the month following the month of delivery; Provided, That the Contractor may be granted an exception from the Tiered Pricing Component pursuant to subdivision (j)(2) of this Article. The payments shall be consistent with the quantities of Irrigation Water and Other Water delivered as shown in the water delivery report for the subject month prepared by the Contracting Officer. The water delivery report shall be deemed a bill for the payment of Charges and the applicable Tiered Pricing Component for Water Delivered. Adjustment for overpayment or underpayment of Charges shall be made through the adjustment of payments due to the United States for Charges for the next month. Any amount to be paid for past due payment of Charges and the Tiered Pricing Component shall be computed pursuant to Article 20 of this Contract.

(e) The Contractor shall pay for any Water Delivered under subdivisions (a) (f), or (g) of Article 3 of this Contract as determined by the Contracting Officer pursuant to

applicable statutes, associated regulations, any applicable provisions of guidelines or ratesetting policies; Provided, That the Rate for Water Delivered under subdivision (f) of Article 3 of this Contract shall be no more than the otherwise applicable Rate for Irrigation Water or Other Water under subdivision (a) of this Article.

(f) Payments to be made by the Contractor to the United States under this Contract may be paid from any revenues available to the Contractor.

(g) All revenues received by the United States from the Contractor relating to the delivery of Project Water or the delivery of non-Project water through Project facilities shall be allocated and applied in accordance with Federal Reclamation law and the associated rules or regulations, and the then-current Project ratesetting policies for Municipal and Industrial Water or Irrigation Water.

(h) The Contracting Officer shall keep its accounts pertaining to the administration of the financial terms and conditions of its long-term contracts, in accordance with applicable Federal standards, so as to reflect the application of Project costs and revenues. The Contracting Officer shall, each Year upon request of the Contractor, provide to the Contractor a detailed accounting of all Project and Contractor expense allocations, the disposition of all Project and Contractor revenues, and a summary of all water delivery information. The Contracting Officer and the Contractor shall enter into good faith negotiations to resolve any discrepancies or disputes relating to accountings, reports, or information.

(i) The parties acknowledge and agree that the efficient administration of this Contract is their mutual goal. Recognizing that experience has demonstrated that mechanisms, policies, and procedures used for establishing Rates, Charges, and Tiered Pricing Components, and/or for making and allocating payments, other than those set forth in this Article may be in the mutual best interest of the parties, it is expressly agreed that the parties may enter into

agreements to modify the mechanisms, policies, and procedures for any of those purposes while this Contract is in effect without amending this Contract.

(j) (1) Beginning at such time as deliveries of Project Water in a Year exceed 80 percent of the Contract Total, then before the end of the month following the month of delivery the Contractor shall make an additional payment to the United States equal to the applicable Tiered Pricing Component. The Tiered Pricing Component for the amount of Water Delivered in excess of 80 percent of the Contract Total, but less than or equal to 90 percent of the Contract Total, shall equal one-half of the difference between the Rate established under subdivision (a) of this Article and the Irrigation Full Cost Water Rate or Other Full Cost Water Rate, whichever is applicable. The Tiered Pricing Component for the amount of Water Delivered which exceeds 90 percent of the Contract Total shall equal the difference between (i) the Rate established under subdivision (a) of this Article and (ii) the Irrigation Full Cost Water Rate or Other Full Cost Water Rate, whichever is applicable. For all Water Delivered pursuant to subdivision (a) of Article 3 of this Contract which is in excess of 80 percent of the Contract Total, this increment shall be deemed to be divided between Irrigation Water and Other Water in the same proportion as actual deliveries of each bear to the cumulative total Water Delivered.

(2) Subject to the Contracting Officer's written approval, the Contractor may request and receive an exemption from such Tiered Pricing Components for Project Water delivered to produce a crop which the Contracting Officer determines will provide significant and quantifiable habitat values for waterfowl in fields where the water is used and the crops are produced; Provided, That the exemption from the Tiered Pricing Components for Irrigation Water shall apply only if such habitat values can be assured consistent with the purposes of the CVPIA through binding agreements executed with or approved by the Contracting Officer prior to use of such water.

(3) For purposes of determining the applicability of the Tiered Pricing Component pursuant to this Article, Water Delivered shall include Project Water that the Contractor transfers to others but shall not include Project Water transferred to the Contractor, nor shall it include the additional water provided to the Contractor under the provisions of subdivision (f) of Article 3 of this Contract.

(k) For the term of this Contract, Rates under the respective ratesetting policies will be established to recover only reimbursable O&M (including any deficits) and capital costs of the Project, as those terms are used in the then-current Project ratesetting policies, and interest, where appropriate, except in instances where a minimum Rate is applicable in accordance with the relevant Project ratesetting policy. Changes of significance in practices which implement the Contracting Officer's ratesetting policies will not be implemented until the Contracting Officer has provided the Contractor an opportunity to discuss the nature, need, and impact of the proposed change.

(l) Except as provided in subsections 3405(a)(1)(B) and 3405(f) of the CVPIA, the Rates for Project Water transferred by the Contractor shall be the Contractor's Rates adjusted upward or downward to reflect the changed costs, if any, incurred by the Contracting Officer in the delivery of the transferred Project Water to the transferee's point of delivery in accordance with the then-applicable Project ratesetting policy. If the Contractor is receiving lower Rates and Charges because of inability to pay and is transferring Project Water to another entity whose Rates and Charges are not adjusted due to inability to pay, the Rates and Charges for transferred Project Water shall not be adjusted to reflect the Contractor's inability to pay.

(m) Pursuant to the Act of October 27, 1986 (100 Stat. 3050), the Contracting Officer is authorized to adjust determinations of ability to pay every five years.

NON-INTEREST BEARING OPERATION AND MAINTENANCE DEFICITS

8. The Contractor and the Contracting Officer concur that, as of the effective date of this Contract, the Contractor has no non-interest bearing O&M deficits and shall have no further liability therefor.

9. Omitted.

APPLICATION OF PAYMENTS AND ADJUSTMENTS

10. (a) The amount of any overpayment by the Contractor of the Contractor's O&M, capital, and deficit (if any) obligations for the Year shall be applied first to any current liabilities of the Contractor arising out of this Contract then due and payable. Overpayments of more than $1,000 shall be refunded at the Contractor's request. In lieu of a refund, any amount of such overpayment, at the option of the Contractor, may be credited against amounts to become due to the United States by the Contractor. With respect to overpayment, such refund or adjustment shall constitute the sole remedy of the Contractor or anyone having or claiming to have the right to the use of any of the Project Water supply provided for herein. All credits and refunds of overpayments shall be made within 30 days of the Contracting Officer obtaining direction as to how to credit or refund such overpayment in response to the notice to the Contractor that it has finalized the accounts for the Year in which the overpayment was made.

(b) All advances for miscellaneous costs incurred for work requested by the Contractor pursuant to Article 25 of this Contract shall be adjusted to reflect the actual costs when the work has been completed. If the advances exceed the actual costs incurred, the difference will be refunded to the Contractor. If the actual costs exceed the Contractor's advances, the Contractor will be billed for the additional costs pursuant to Article 25.

TEMPORARY REDUCTIONS--RETURN FLOWS

11. (a) Subject to: (i) the authorized purposes and priorities of the Project and the requirements of Federal law; and (ii) the obligations of the United States under existing contracts, or renewals thereof, providing for water deliveries from the Project, the Contracting Officer shall make all reasonable efforts to optimize Project Water deliveries to the Contractor as provided in this Contract.

(b) The Contracting Officer may temporarily discontinue or reduce the quantity of Water Delivered to the Contractor as herein provided for the purposes of investigation, inspection, maintenance, repair, or replacement of any of the Project facilities or any part thereof necessary for the delivery of Project Water to the Contractor, but so far as feasible the Contracting Officer will give the Contractor due notice in advance of such temporary discontinuance or reduction, except in case of emergency, in which case no notice need be given; Provided, That the United States shall use its best efforts to avoid any discontinuance or reduction in such service. Upon resumption of service after such reduction or discontinuance, and if requested by the Contractor, the United States will, if possible, deliver the quantity of Project Water which would have been delivered hereunder in the absence of such discontinuance or reduction.

(c) The United States reserves the right to all seepage and return flow water derived from Water Delivered to the Contractor hereunder which escapes or is discharged beyond the Contractor's Service Area; Provided, That this shall not be construed as claiming for the United States any right to seepage or return flow being put to reasonable and beneficial use pursuant to this Contract within the Contractor’s Service Area by the Contractor or those claiming by, through, or under the Contractor.

CONSTRAINTS ON THE AVAILABILITY OF WATER

12. (a) In its operation of the Project, the Contracting Officer will use all reasonable means to guard against a Condition of Shortage in the quantity of water to be made available to the Contractor pursuant to this Contract. In the event the Contracting Officer determines that a Condition of Shortage appears probable, the Contracting Officer will notify the Contractor of said determination as soon as practicable.

(b) If there is a Condition of Shortage because of errors in physical operations of the Project, drought, other physical causes beyond the control of the Contracting Officer or actions taken by the Contracting Officer to meet legal obligations then, except as provided in subdivision (a) of Article 18 of this Contract, no liability shall accrue against the United States or any of its officers, agents, or employees for any damage, direct or indirect, arising therefrom.

(c) In any Year in which there may occur a shortage for any of the reasons specified in subdivision (b) above, the Contracting Officer shall apportion the available Project Water supply among the Contractor and others entitled, under existing contracts and future contracts (to the extent such future contracts are permitted under subsections (a) and (b) of Section 3404 of the CVPIA) and renewals thereof, to receive Project Water consistent with the contractual obligations of the United States.

UNAVOIDABLE GROUNDWATER PERCOLATION

13. To the extent applicable, the Contractor shall not be deemed to have delivered Irrigation Water to Excess Lands or Ineligible Lands within the meaning of this Contract if such lands are irrigated with groundwater that reaches the underground strata as an unavoidable result of the delivery of Irrigation Water by the Contractor to Eligible Lands.

RULES AND REGULATIONS

14. The parties agree that the delivery of Irrigation Water or use of Federal facilities pursuant to this Contract is subject to Federal Reclamation law, including but not limited to the Reclamation Reform Act of 1982 (43 U.S.C.390aa et seq.), as amended and supplemented, and the rules and regulations promulgated by the Secretary of the Interior under Federal Reclamation law.

WATER AND AIR POLLUTION CONTROL

15. The Contractor, in carrying out this Contract, shall comply with all applicable water and air pollution laws and regulations of the United States and the State of California, and shall obtain all required permits or licenses from the appropriate Federal, State, or local authorities.

QUALITY OF WATER

16. (a) Project facilities used to deliver Project Water to the Contractor pursuant to this Contract shall be operated and maintained to enable the United States to deliver Project Water to the Contractor in accordance with the water quality standards specified in subsection 2(b) of the Act of August 26, 1937 (50 Stat. 865), as added by Section 101 of the Act of October 27, 1986 (100 Stat. 3050) or other existing Federal laws. The United States is under no obligation to construct or furnish water treatment facilities to maintain or to improve the quality of Water Delivered to the Contractor pursuant to this Contract. The United States does not warrant the quality of Water Delivered to the Contractor pursuant to this Contract.

(b) The O&M of Project facilities shall be performed in such manner as is practicable to maintain the quality of raw water made available through such facilities at the highest level reasonably attainable as determined by the Contracting Officer. The Contractor shall be responsible for compliance with all State and Federal water quality standards applicable to surface and subsurface agricultural drainage discharges generated through the use of Federal or Contractor facilities or Project Water provided by the Contractor within the Contractor's Service Area.

WATER ACQUIRED BY THE CONTRACTOR OTHER THAN FROM THE UNITED STATES

17. (a) Water or water rights now owned or hereafter acquired by the Contractor other than from the United States and Irrigation Water furnished pursuant to the terms of this Contract may be simultaneously transported through the same distribution facilities of the Contractor subject to the following: (i) if the facilities utilized for commingling Irrigation Water and non-Project water were constructed without funds made available pursuant to Federal Reclamation law, the provisions of Federal Reclamation law will be applicable only to the Landholders of lands which receive Irrigation Water; (ii) the eligibility of land to receive Irrigation Water must be established through the certification requirements as specified in the Acreage Limitation Rules and Regulations (43 CFR Part 426); (iii) the water requirements of Eligible Lands within the Contractor's Service Area can be established and the quantity of Irrigation Water to be utilized is less than or equal to the quantity necessary to irrigate such Eligible Lands; and (iv) if the facilities utilized for commingling Irrigation Water and non-Project water are/were constructed with funds made available pursuant to Federal Reclamation law, the non-Project water will be subject to the acreage limitation provisions of Federal Reclamation law, unless the Contractor pays to the United States the incremental fee described in 43 CFR 426.15. In determining the incremental fee, the Contracting Officer will calculate annually the cost to the United States, including interest on storing or delivering non-Project water, which for purposes of this Contract shall be determined as follows: The quotient shall be the unpaid distribution system costs divided by the total irrigable acreage within the Contractor’s Service Area. The incremental fee per acre is the product of such quotient times the interest rate determined using Section 202 (3) (C) of the Act of October 12, 1982 (96 Stat. 1263). Such incremental fee will be charged to each acre of Excess or Full Cost land within the Contractor’s Service Area that receives non-Project water through Federally financed or

constructed facilities. The incremental fee calculation methodology will continue during the term of this Contract absent the promulgation of a contrary Reclamation-wide rule, regulation, or policy adopted after the Contractor has been afforded the opportunity to review and comment on the proposed rule, regulation, or policy. If such rule, regulation, or policy is adopted it shall supersede this provision.

(b) Water or water rights now owned or hereafter acquired by the Contractor, other than from the United States, may be stored, conveyed, and/or diverted through Project facilities, subject to the completion of appropriate environmental documentation, with the approval of the Contracting Officer and the execution of any contract determined by the Contracting Officer to be necessary, consistent with the following provisions:

(1) The Contractor may introduce non-Project water into Project facilities and deliver said water to lands within the Contractor's Service Area, including Ineligible Lands, subject to payment to the United States of an appropriate rate as determined by the applicable Project ratesetting policy, the RRA, and the Project use power policy, if such Project use power policy is applicable, each as amended, modified, or superseded from time to time.

(2) Delivery of such non-Project water in and through Project facilities shall only be allowed to the extent such deliveries do not: (i) interfere with other Project purposes as determined by the Contracting Officer; (ii) reduce the quantity or quality of water available to other Project Contractors; (iii) interfere with the delivery of contractual water entitlements to any other Project Contractors; or (iv) interfere with the physical maintenance of the Project facilities.

(3) The United States shall not be responsible for control, care, or distribution of the non-Project water before it is introduced into or after it is delivered from the

Project facilities. The Contractor hereby releases and agrees to defend and indemnify the United States and its respective officers, agents, and employees, from any claim for damage to persons or property, direct or indirect, resulting from the acts of the Contractor, its officers', employees', agents' or assigns', act(s) in (i) extracting or diverting non-Project water from any source, or (ii) diverting such non-Project water into Project facilities.

(4) Diversion of such non-Project water into Project facilities shall be consistent with all applicable laws, and if involving groundwater, consistent with any applicable groundwater management plan for the area from which it was extracted.

(5) After Project purposes are met, as determined by the Contracting Officer, the United States and the Contractor shall share priority to utilize the remaining capacity of the facilities declared to be available by the Contracting Officer for conveyance and transportation of non-Project water prior to any such remaining capacity being made available to non-Project contractors.

OPINIONS AND DETERMINATIONS

18. (a) Where the terms of this Contract provide for actions to be based upon the opinion or determination of either party to this Contract, said terms shall not be construed as permitting such action to be predicated upon arbitrary, capricious, or unreasonable opinions or determinations. Both parties, notwithstanding any other provisions of this Contract, expressly reserve the right to seek relief from and appropriate adjustment for any such arbitrary, capricious, or unreasonable opinion or determination. Each opinion or determination by either party shall be provided in a timely manner. Nothing in this subdivision is intended to or shall affect or alter the standard of judicial review applicable under Federal law to any opinion or determination implementing a specific provision of Federal law embodied in statute or regulation.

(b) The Contracting Officer shall have the right to make determinations

necessary to administer this Contract that are consistent with the provisions of this Contract, the laws of the United States and of the State of California, and the rules and regulations promulgated by the Secretary. Such determinations shall be made in consultation with the Contractor to the extent reasonably practicable.

COORDINATION AND COOPERATION

19. (a) In order to further their mutual goals and objectives, the Contracting Officer and the Contractor shall communicate, coordinate, and cooperate with each other, and with other affected Project Contractors, in order to improve the operation and management of the Project. The communication, coordination, and cooperation regarding operations and management shall include, but not be limited to, any action which will or may materially affect the quantity or quality of Project Water supply, the allocation of Project Water supply, and Project financial matters including, but not limited to, budget issues. The communication, coordination, and cooperation provided for hereunder shall extend to all provisions of this Contract. Each party shall retain exclusive decision making authority for all actions, opinion, and determinations to be made by the respective party.

(b) Within 120 days following the effective date of this Contract, the Contractor, other affected Project Contractors, and the Contracting Officer shall arrange to meet with interested Project Contractors to develop a mutually agreeable, written Project-wide process, which may be amended as necessary separate and apart from this Contract. The goal of this process shall be to provide, to the extent practicable, the means of mutual communication and interaction regarding significant decisions concerning Project operation and management on a real-time basis.

(c) In light of the factors referred to in subdivision (b) of Article 3 of this Contract, it is the intent of the Secretary to improve water supply reliability. To carry out this intent:

(1) The Contracting Officer will, at the request of the Contractor, assist in the development of integrated resource management plans for the Contractor. Further, the Contracting Officer will, as appropriate, seek authorizations for implementation of partnerships to improve water supply, water quality, and reliability.

(2) The Secretary will, as appropriate, pursue program and project implementation and authorization in coordination with Project Contractors to improve the water supply, water quality, and reliability of the Project for all Project purposes.

(3) The Secretary will coordinate with Project Contractors and the State of California to seek improved water resource management.

(4) The Secretary will coordinate actions of agencies within the Department of the Interior that may impact the availability of water for Project purposes.

(5) The Contracting Officer shall periodically, but not less than annually, hold division level meetings to discuss Project operations, division level water management activities, and other issues as appropriate.

(d) Without limiting the contractual obligations of the Contracting Officer hereunder, nothing in this Contract shall be construed to limit or constrain the Contacting Officer's ability to communicate, coordinate, and cooperate with the Contractor or other interested stakeholders or to make decisions in a timely fashion as needed to protect health, safety, or the physical integrity of structures or facilities.

CHARGES FOR DELINQUENT PAYMENTS

20. (a) The Contractor shall be subject to interest, administrative and penalty charges on delinquent installments or payments. When a payment is not received by the due date, the Contractor shall pay an interest charge for each day the payment is delinquent beyond the due date. When a payment becomes sixty (60) days delinquent, the Contractor shall pay an administrative charge to cover additional costs of billing and processing the delinquent payment. When a payment is delinquent ninety (90) days or more, the Contractor shall pay an additional penalty charge of six (6%) percent per year for each day the payment is delinquent beyond the due date. Further, the Contractor shall pay any fees incurred for debt collection services associated with a delinquent payment.

(b) The interest charge rate shall be the greater of the rate prescribed quarterly in the Federal Register by the Department of the Treasury for application to overdue payments, or the interest rate of one-half of one (0.5%) percent per month prescribed by Section 6 of the Reclamation Project Act of 1939 (Public Law 76-260). The interest charge rate shall be determined as of the due date and remain fixed for the duration of the delinquent period.

(c) When a partial payment on a delinquent account is received, the amount received shall be applied, first to the penalty, second to the administrative charges, third to the accrued interest, and finally to the overdue payment.

EQUAL OPPORTUNITY

21. During the performance of this Contract, the Contractor agrees as follows:

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination, rates of payment or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without discrimination because of race, color, religion, sex, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Contracting Officer, advising the said labor union or workers' representative of the Contractor's commitments under Section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Contractor will furnish all information and reports required by said amended Executive Order and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Contracting Officer and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended, in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in said amended Executive Order, and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Contractor will include the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of said amended Executive Order, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

GENERAL OBLIGATION--BENEFITS CONDITIONED UPON PAYMENT

22. (a) The obligation of the Contractor to pay the United States as provided in this Contract is a general obligation of the Contractor notwithstanding the manner in which the obligation may be distributed among the Contractor's water users and notwithstanding the default of individual water users in their obligations to the Contractor.

(b) The payment of charges becoming due hereunder is a condition precedent to receiving benefits under this Contract. The United States shall not make water available to the Contractor through Project facilities during any period in which the Contractor may be in arrears

in the advance payment of water rates due the United States. The Contractor shall not furnish water made available pursuant to this Contract for lands or parties which are in arrears in the advance payment of water rates levied or established by the Contractor.

(c) With respect to subdivision (b) of this Article, the Contractor shall have no obligation to require advance payment for water rates which it levies.

COMPLIANCE WITH CIVIL RIGHTS LAWS AND REGULATIONS

23. (a) The Contractor shall comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d), Section 504 of the Rehabilitation Act of 1975 (P.L. 93-112, as amended), the Age Discrimination Act of 1975 (42 U.S.C. 6101, et seq.) and any other applicable civil rights laws, as well as with their respective implementing regulations and guidelines imposed by the U.S. Department of the Interior and/or Bureau of Reclamation.

(b) These statutes require that no person in the United States shall, on the grounds of race, color, national origin, handicap, or age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving financial assistance from the Bureau of Reclamation. By executing this Contract, the Contractor agrees to immediately take any measures necessary to implement this obligation, including permitting officials of the United States to inspect premises, programs, and documents.

(c) The Contractor makes this agreement in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property discounts, or other Federal financial assistance extended after the date hereof to the Contractor by the Bureau of Reclamation, including installment payments after such date on account of arrangements for Federal financial assistance, which were approved before such date. The Contractor recognizes and agrees that such Federal assistance will be extended in reliance on the representations and agreements made in this Article, and that the United States reserves the right to seek judicial enforcement thereof.

PRIVACY ACT COMPLIANCE

24. (a) The Contractor shall comply with the Privacy Act of 1974 (5 U.S.C. 552a) (the Act) and the Department of the Interior rules and regulations under the Act (43 CFR 2.45 et seq.) in maintaining Landholder acreage certification and reporting records, required to be submitted to the Contractor for compliance with Sections 206 and 228 of the Reclamation Reform Act of 1982 (96 Stat. 1266), and pursuant to 43 CFR 426.18.

(b) With respect to the application and administration of the criminal penalty provisions of the Act (5 U.S.C. 552a(i)), the Contractor and the Contractor's employees responsible for maintaining the certification and reporting records referenced in (a) above are considered to be employees of the Department of the Interior. See 5 U.S.C. 552a(m).

(c) The Contracting Officer or a designated representative shall provide the Contractor with current copies of the Interior Department Privacy Act regulations and the Bureau of Reclamation Federal Register Privacy Act System of Records Notice (Acreage Limitation--Interior, Reclamation-31) which govern the maintenance, safeguarding, and disclosure of information contained in the Landholder's certification and reporting records.

(d) The Contracting Officer shall designate a full-time employee of the Bureau of Reclamation to be the System Manager who shall be responsible for making decisions on denials pursuant to 43 CFR 2.61 and 2.64 amendment requests pursuant to 43 CFR 2.72. The Contractor is authorized to grant requests by individuals for access to their own records.

(e) The Contractor shall forward promptly to the System Manager each proposed denial of access under 43 CFR 2.64; and each request for amendment of records filed under 43 CFR 2.71; notify the requester accordingly of such referral; and provide the System Manager with information and records necessary to prepare an appropriate response to the requester. These requirements do not apply to individuals seeking access to their own certification and reporting forms filed with the Contractor pursuant to 43 CFR 426.18, unless the requester elects to cite the Privacy Act as a basis for the request.

CONTRACTOR TO PAY CERTAIN MISCELLANEOUS COSTS

25. In addition to all other payments to be made by the Contractor pursuant to this Contract, the Contractor shall pay to the United States, within 60 days after receipt of a bill and detailed statement submitted by the Contracting Officer to the Contractor for such specific items of direct cost incurred by the United States for work requested by the Contractor associated with this Contract plus indirect costs in accordance with applicable Reclamation policies and procedures. All such amounts referred to in this Article shall not exceed the amount agreed to in writing in advance by the Contractor. This Article shall not apply to costs for routine contract administration.

WATER CONSERVATION

26. (a) Prior to the delivery of water provided from or conveyed through Federally constructed or Federally financed facilities pursuant to this Contract, the Contractor shall be implementing an effective water conservation and efficiency program based on the Contractor's water conservation plan that has been determined by the Contracting Officer to meet the conservation and efficiency criteria for evaluating water conservation plans established under

Federal law. The water conservation and efficiency program shall contain definite water conservation objectives, appropriate economically feasible water conservation measures, and time schedules for meeting those objectives. Continued Project Water delivery pursuant to this Contract shall be contingent upon the Contractor's continued implementation of such water conservation program. In the event the Contractor's water conservation plan or any revised water conservation plan completed pursuant to subdivision (d) of Article 26 of this Contract have not yet been determined by the Contracting Officer to meet such criteria, due to circumstances which the Contracting Officer determines are beyond the control of the Contractor, water deliveries shall be made under this Contract so long as the Contractor diligently works with the Contracting Officer to obtain such determination at the earliest practicable date, and thereafter the Contractor immediately begins implementing its water conservation and efficiency program in accordance with the time schedules therein.

(b) Should the amount of Other Water delivered pursuant to subdivision (a) of Article 3 of this Contract equal or exceed 2,000 acre-feet per Year, the Contractor shall implement the Best Management Practices identified by the time frames issued by the California Urban Water Conservation Council for municipal and industrial water unless any such practice is determined by the Contracting Officer to be inappropriate for the Contractor.

(c) The Contractor shall submit to the Contracting Officer a report on the status of its implementation of the water conservation plan on the reporting dates specified in the then-existing conservation and efficiency criteria established under Federal law.

(d) At five-year intervals, the Contractor shall revise its water conservation plan to reflect the then-current conservation and efficiency criteria for evaluating water conservation plans established under Federal law and submit such revised water management plan to the Contracting Officer for review and evaluation. The Contracting Officer will then

determine if the water conservation plan meets Reclamation's then-current conservation and efficiency criteria for evaluating water conservation plans established under Federal law.

(e) If the Contractor is engaged in direct groundwater recharge, such activity shall be described in the Contractor's water conservation plan.

EXISTING OR ACQUIRED WATER OR WATER RIGHTS

27. Except as specifically provided in Article 17 of this Contract, the provisions of this Contract shall not be applicable to or affect non-Project water or water rights now owned or hereafter acquired by the Contractor or any user of such water within the Contractor's Service Area. Any such water shall not be considered Project Water under this Contract. In addition, this Contract shall not be construed as limiting or curtailing any rights which the Contractor or any water user within the Contractor's Service Area acquires or has available under any other contract pursuant to Federal Reclamation law.

28. Omitted.

CONTINGENT UPON APPROPRIATION OR ALLOTMENT OF FUNDS

29. The expenditure or advance of any money or the performance of any obligation of the United States under this Contract shall be contingent upon appropriation or allotment of funds. Absence of appropriation or allotment of funds shall not relieve the Contractor from any obligations under this Contract. No liability shall accrue to the United States in case funds are not appropriated or allotted.

BOOKS, RECORDS, AND REPORTS

30. (a) The Contractor shall establish and maintain accounts and other books and records pertaining to administration of the terms and conditions of this Contract, including: the Contractor's financial transactions, water supply data, and Project land and right-of-way agreements; the water users' land-use (crop census), land ownership, land-leasing and water use data; and other matters that the Contracting Officer may require. Reports thereon shall be furnished to the Contracting Officer in such form and on such date or dates as the Contracting Officer may require. Subject to applicable Federal laws and regulations, each party to this Contract shall have the right during office hours to examine and make copies of the other party's books and records relating to matters covered by this Contract.

(b) Notwithstanding the provisions of subdivision (a) of this Article, no books, records, or other information shall be requested from the Contractor by the Contracting Officer unless such books, records, or information are reasonably related to the administration or performance of this Contract. Any such request shall allow the Contractor a reasonable period of time within which to provide the requested books, records, or information.

(c) Omitted.

ASSIGNMENT LIMITED--SUCCESSORS AND ASSIGNS OBLIGATED

31. (a) The provisions of this Contract shall apply to and bind the successors and assigns of the parties hereto, but no assignment or transfer of this Contract or any right or interest therein shall be valid until approved in writing by the Contracting Officer.

(b) The assignment of any right or interest in this Contract by either party shall not interfere with the rights or obligations of the other party to this Contract absent the written concurrence of said other party.

(c) The Contracting Officer shall not unreasonably condition or withhold his approval of any proposed assignment.

SEVERABILITY

32. In the event that a person or entity who is neither (i) a party to a Project contract, nor (ii) a person or entity that receives Project Water from a party to a Project contract, nor (iii) an association or other form of organization whose primary function is to represent parties to Project contracts, brings an action in a court of competent jurisdiction challenging the legality or enforceability of a provision included in this Contract and said person, entity, association, or organization obtains a final court decision holding that such provision is legally invalid or unenforceable and the Contractor has not intervened in that lawsuit in support of the plaintiff(s), the parties to this Contract shall use their best efforts to (i) within 30 days of the date of such final court decision identify by mutual agreement the provisions in this Contract which must be revised, and (ii) within three months thereafter promptly agree on the appropriate revision(s).

The time periods specified above may be extended by mutual agreement of the parties. Pending the completion of the actions designated above, to the extent it can do so without violating any applicable provisions of law, the United States shall continue to make the quantities of Project Water specified in this Contract available to the Contractor pursuant to the provisions of this Contract which were not found to be legally invalid or unenforceable in the final court decision.

RESOLUTION OF DISPUTES

33. Should any dispute arise concerning any provisions of this Contract, or the parties' rights and obligations thereunder, the parties shall meet and confer in an attempt to resolve the dispute. Prior to the Contractor commencing any legal action, or the Contracting Officer referring any matter to Department of Justice, the party shall provide to the other party 30 days' written notice of the intent to take such action; Provided, That such notice shall not be required where a delay in commencing an action would prejudice the interests of the party that intends to file suit. During the 30-day notice period, the Contractor and the Contracting Officer shall meet and confer in an attempt to resolve the dispute. Except as specifically provided, nothing herein is intended to waive or abridge any right or remedy that the Contractor or the United States may have.

OFFICIALS NOT TO BENEFIT

34. No Member of or Delegate to Congress, Resident Commissioner, or official of the Contractor shall benefit from this Contract other than as a water user or landowner in the same manner as other water users or landowners.

CHANGES IN CONTRACTOR'S SERVICE AREA

35. (a) While this Contract is in effect, no change may be made in the Contractor's Service Area, by inclusion or exclusion of lands, dissolution, consolidation, merger, or otherwise, except upon the Contracting Officer's written consent.

(b) Within 30 days of receipt of a request for such a change, the Contracting Officer will notify the Contractor of any additional information required by the Contracting Officer for processing said request, and both parties will meet to establish a mutually agreeable

schedule for timely completion of the process. Such process will analyze whether the proposed change is likely to: (i) result in the use of Project Water contrary to the terms of this Contract; (ii) impair the ability of the Contractor to pay for Project Water furnished under this Contract or to pay for any Federally-constructed facilities for which the Contractor is responsible; and (iii) have an impact on any Project Water rights applications, permits, or licenses. In addition, the Contracting Officer shall comply with the NEPA and the ESA. The Contractor will be responsible for all costs incurred by the Contracting Officer in this process, and such costs will be paid in accordance with Article 25 of this Contract.

FEDERAL LAWS

36. By entering into this Contract, the Contractor does not waive its rights to contest the validity or application in connection with the performance of the terms and conditions of this Contract of any Federal law or regulation; Provided, That the Contractor agrees to comply with the terms and conditions of this Contract unless and until relief from application of such Federal law or regulation to the implementing provision of the Contract is granted by a court of competent jurisdiction.

NOTICES

37. Any notice, demand, or request authorized or required by this Contract shall be deemed to have been given, on behalf of the Contractor, when mailed, postage prepaid, or delivered to the Area Manager, Bureau of Reclamation, Northern California Area Office, 16349 Shasta Dam Boulevard, Shasta Lake, California 96019-8400, and on behalf of the United States, when mailed, postage prepaid, or delivered to the Board of Directors of the Feather Water District, 280 Wilkie Avenue, Yuba City, California 95991. The designation of the addressee or the address may be changed by notice given in the same manner as provided in this Article for other notices.

CONFIRMATION OF CONTRACT

38. The Contractor, after the execution of this Contract, shall promptly seek to secure a decree of a court of competent jurisdiction of the State of California, confirming the execution of this Contract. The Contractor shall furnish the United States a certified copy of the final decree, the validation proceedings, and all pertinent supporting records of the court approving

and confirming this Contract, and decreeing and adjudging it to be lawful, valid, and binding on the Contractor.

IN WITNESS WHEREOF, the parties hereto have executed this Contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

By: _____
Regional Director, Mid-Pacific Region
Bureau of Reclamation

(-SEAL)

FEATHER WATER DISTRICT

By: _____
President of the Board of Directors

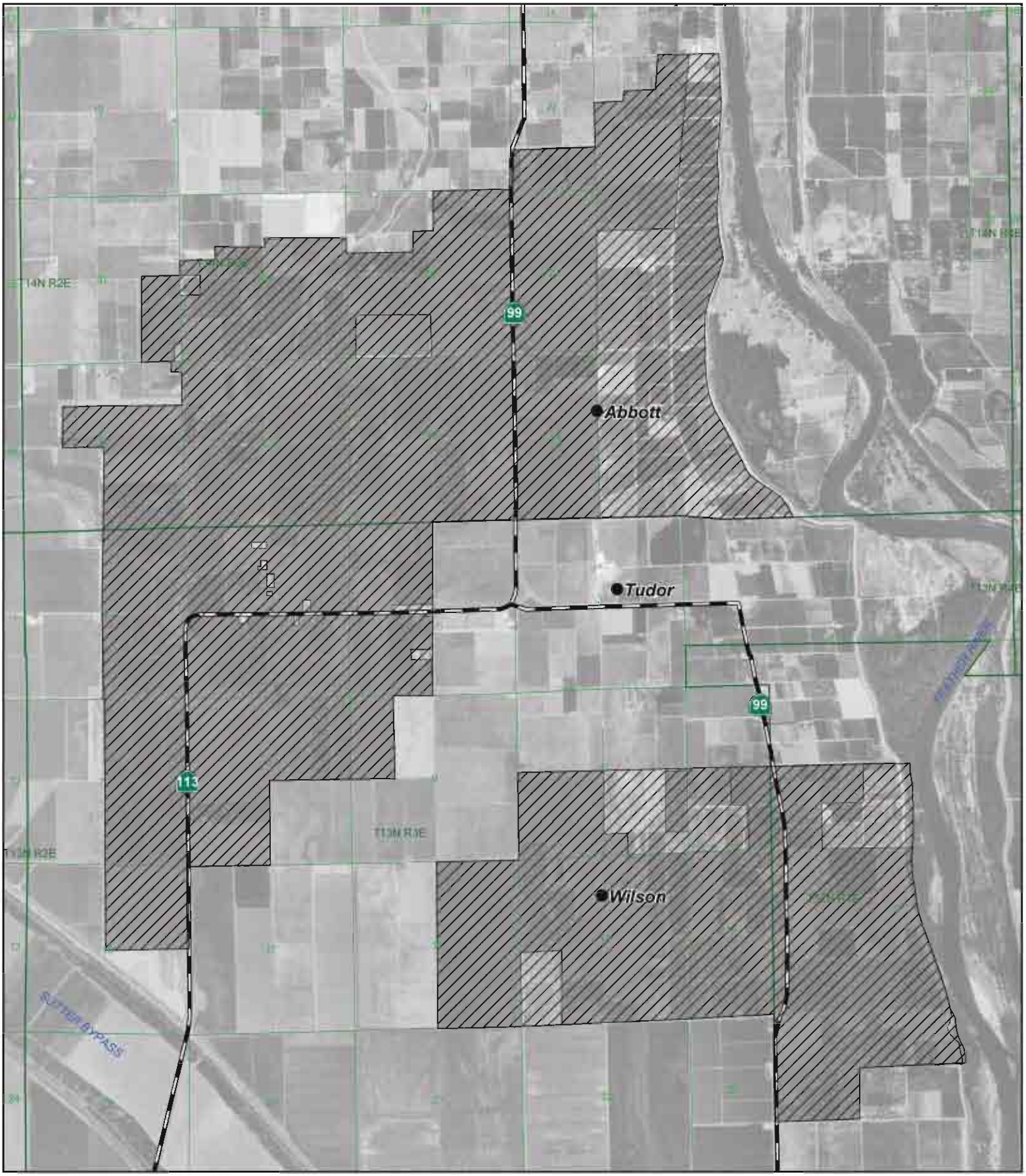
Attest:

By: _____
Secretary of the Board of Directors

(H:\public\Willows Final LTRC's\2005-01-31 Feather WD LTRC Final Contract Draft.doc))

Exhibit A

(Contractor's Map)



Feather Water District

Contractor's Service Area

District Boundary

Contract No. 14-06-200-171A-LTR1
Exhibit A

Date: November 18, 2004
File Name: N:\districts\contracts\feather\feather.mxd

0 0.5 1 Miles

602-202-20

EXHIBIT B
Rates and Charges
FEATHER WATER DISTRICT
2005 Water Rates and Charges

	Irrigation	Other
COST OF SERVICE RATES:		
Capital Rates	$ 3.71	1/
O&M Rates:		
Water Marketing	6.61	
Storage	5.93	
Deficit Rates:		
Interest Bearing	0.00	
CFO/PFR Adjustment Rate 2/	$ 1.61	
TOTAL	$17.86	1/
FULL-COST RATES:		
Section 202(3) Rate is applicable to a Qualified Recipient or to a Limited Recipient receiving irrigation water on or before October 1, 1981.	$23.61	
Section 205(a)(3) Rate is applicable to a Limited Recipient that did not receive irrigation water on or before October 1, 1981.	$26.19	
TIERED PRICING COMPONENTS:		
Tiered Pricing Component >80% <=90% of Contract Total [Full Cost Rate – COS Rate / 2]	$ 2.88	1/
Tiered Pricing Component >90% of Contract Total [Full Cost Rate – COS Rate]	$ 5.75	1/
CHARGES UNDER P.L. 102-575 TO THE RESTORATION FUND 2/		
Restoration Payments (3407(d)(2)(A))	$ 7.93	1/

1/ To be provided as needed.

2/ Chief Financial Officer (CFO) adjustment and Provision for Replacement (PFR) expense is being distributed over a 5-year period beginning in FY 2003 for those contractors that requested those costs be deferred.

3/ Restoration fund charges are payments in addition to the water rates and were determined pursuant to Title XXXIV of Public Law 102-575. Restoration fund charges are on a fiscal year basis (10/1 - 9/30).

APPENDIX G
FINAL NOAA FISHERIES BIOLOGICAL OPINION

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

In response refer to:
151422SWR2005SA5686:HLB

JUL 28 2005

AUG -2

Michael J. Ryan
Area Manager
United States Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825

CF 341,340 8/2/05 100A 300 340

Dear Mr. Ryan:

This document transmits NOAA's National Marine Fisheries Service's (NMFS) final biological and conference opinion (Enclosure) based on our review of the proposed Feather River Water District (FWD) Long-term Central Valley Project (CVP) Water Service Contract Renewal, in Sutter County, California, and its effects on federally-listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (CV spring-run Chinook salmon; *O. tshawytscha*), threatened Central Valley steelhead (CV steelhead; *O. mykiss*), and proposed critical habitat for CV spring-run Chinook salmon and CV steelhead, in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your request for formal consultation was received on April 29, 2004. Formal consultation was initiated on October 22, 2004.

CF 340 8/2/05 JW

On May 16, 2005, NMFS issued a draft biological and conference opinion for the FWD Long-term CVP Water Service Contract Renewal. On June 23, 2005, The Bureau of Reclamation (Reclamation) requested NMFS to finalize the biological and conference opinion and modify the terms and conditions to incorporate language changes that were discussed following the issuance of the draft. This final biological and conference opinion includes four major changes: (1) the *Project Description* was modified to include language from the water contract that clarifies the use of project water during the months of May and October, (2) the *Status of the Species and Critical habitat* section was updated to incorporate the final listing determinations for Central Valley Evolutionarily Significant Units (70 FR 37160), (3) the *Incidental Take Statement* was modified by changing the language of term and condition 1a to improve consistency between the intent of the requirement and the jurisdictional authority of Reclamation, and (4) a conservation recommendation was added suggesting that Reclamation develop and implement coordinated monitoring programs to adaptively manage water and fishery resources in the Feather River.

This biological and conference opinion is based on information provided in the April 2004 biological assessment, the August 2004 Revised Draft Environmental Assessment, and the draft Finding of No Significant Impact, for the proposed project. A complete administrative record of this consultation is on file at the NMFS Sacramento Area Office.

END-7.00 CVP 5001744 JW 5444

Based on the best available scientific and commercial information, the biological and conference opinion concludes that this project is not likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead, or adversely modify their designated or proposed critical habitat. NMFS also has included an incidental take statement with reasonable and prudent measures and non-discretionary terms and conditions that are necessary and appropriate to minimize incidental take associated with the FWD Long-term CVP Water Service Contract Renewal.

The biological and conference opinion finds the proposed action will not result in any adverse effects to designated or proposed critical habitat. Because of this conclusion, NMFS also believes that the project is not likely to adversely affect the Essential Fish Habitat of Pacific salmon identified by the Magnuson-Stevens Fishery Conservation Act (MSA) as amended (U.S.C 180 *et seq.*).

If you have any questions regarding this correspondence please contact Mr. Howard Brown in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814. Mr. Brown may be reached by telephone at (916) 930-3608 or by Fax at (916) 930-3629.

Sincerely,

for Rodney R. McInnis
Regional Administrator

Enclosure

Enclosure

BIOLOGICAL AND CONFERENCE OPINION

ACTION AGENCY:	United States Bureau of Reclamation Mid-Pacific Region
ACTIVITY:	Feather River Water District Long-term Central Valley Project Water Service Contract Renewal
CONSULTATION CONDUCTED BY:	Southwest Region, National Marine Fisheries Service
FILE NUMBER:	151422SWR2001SA5686
DATE ISSUED:	JUL 28 2005

I. CONSULTATION HISTORY

In August 2003, the U.S. Bureau of Reclamation (Reclamation) provided NOAA's National Marine Fisheries Service (NMFS) a biological assessment (BA) for the Feather River Water District (FWD) Long-term Central Valley Project (CVP) Water Service Contract Renewal.

Reclamation subsequently revised the BA and requested formal consultation with NMFS for the FWD Long-term CVP Water Service Contract Renewal on April 29, 2004. The BA included a request to review a draft of the biological and conference opinion.

In August 2004, Reclamation provided NMFS with a Revised Draft Environmental Assessment (EA) and the draft Finding of No Significant Impact (FONSI).

On October 22, 2004, NMFS issued a biological opinion on the Long-Term Operations, Criteria, and Plan (OCAP) for the coordinated operations of the CVP and the California State Water Project (SWP). At Reclamation's request, initiation of the FWD Long-term CVP Water Service Contract Renewal section 7 consultation was delayed until completion of the OCAP consultation. The reason for this request was that Reclamation believed that all aquatic concerns would be addressed in the OCAP consultation and, therefore, it was a necessary precursor to completing this contract specific consultation.

Following review of the OCAP biological opinion, we find that the only some of the effects of the FWD Long-term CVP Water Service Contract Renewal on federally-listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (CV spring-run Chinook salmon; *O. tshawytscha*), and threatened Central Valley steelhead (CV steelhead; *O. mykiss*), and the designated critical habitat of winter-run Chinook salmon, were previously analyzed and are included in the incidental take

statement of the OCAP biological opinion as appropriate. The effects that were analyzed in the OCAP biological opinion are system-wide effects that are related to CVP and SWP operations. Impacts to the proposed critical habitat of Central Valley steelhead and Central Valley spring-run Chinook salmon from the contracts, and certain contract-specific issues, such as river flow conditions downstream from the FWD diversion point, juvenile entrainment at pumping stations, and return flows of contaminated agricultural runoff were not analyzed in the OCAP consultation and will be addressed in this biological and conference opinion.

On May 16, 2005, NMFS provided Reclamation with a draft biological and conference opinion for the FWD Long-term CVP Water Service Contract Renewal. The draft biological and conference opinion concluded that this project is not likely to jeopardize the CV spring-run Chinook salmon and CV steelhead, or adversely modify their proposed critical habitat. NMFS also included a draft incidental take statement with reasonable and prudent measures and non-discretionary terms and conditions that are necessary and appropriate to minimize incidental take associated with the FWD Long-term CVP Water Service Contract Renewal.

Between May 16, and June 6, 2005, NMFS and Reclamation discussed the findings of the draft biological and conference opinion and discussed the reasonable and prudent measures and the terms and conditions. Reclamation believed that term and condition 1a was not within their jurisdictional authority because they could not directly require the FWD to minimize pumping. NMFS agreed to revise term and condition 1a to bring consistency between the intent of the term and condition and the jurisdictional scope of Reclamation. NMFS modified the project description to include additional information related to the type of water over which Reclamation has jurisdiction. These discussions also resulted in NMFS developing an additional conservation recommendation that Reclamation should develop and implement coordinated monitoring programs to adaptively manage water and fishery resources in the Feather River.

On June 24, 2005, Reclamation requested NMFS to finalize the draft biological and conference opinion for the FWD Long-term CVP Water Service Contract Renewal. This request included a summary of the reasonable and prudent measures, the terms and conditions, and the conservation recommendations that were discussed between NMFS and Reclamation.

This biological and conference opinion is based on information provided in the April 2004 BA, the August 2004 Revised Draft EA and FONSI, the October 24, 2004, OCAP biological opinion, and discussions held between NMFS and Reclamation. A complete administrative record of this consultation is on file at the NMFS Sacramento Area Office.

II. DESCRIPTION OF THE PROPOSED ACTION

Reclamation proposes to renew the FWD's long-term CVP water service contract for a period of 25 years, from March 1, 2005, to February 28, 2029. The proposed action will execute the long-term contract to provide a maximum of 20 thousand acre feet (TAF) of replacement water per year to the Sacramento River, at the confluence with the Feather River to allow the FWD to pump an equal amount of water from the Feather River, and to provide a concurrent exchange of water to supply the prior rights of the Sacramento River and Sacramento-San Joaquin Delta

users. The proposed action does not include construction, installation, or modification of any new facilities or structures.

A. Project Activities

The FWD typically diverts water from May to October with most of the water diverted from June to September. The water service contract specifies that during the months of June, July, August, and September of each year, all water diverted by the FWD is considered replacement water, except when the California Water Resources Control Board (State Board) determines that insufficient water is available under State Board Permit 12094 during other months, in which case all diversions made by the FWD are considered replacement water. During these months, water that is diverted by the FWD is replaced with CVP water that is delivered in the Sacramento River at the confluence with the Feather River. Table 1 provides a statement of monthly deliveries for the year 2003 which represent typical diversion rates.

Table 1. Feather River Water District monthly water deliveries for 2003.

	May	June	July	August	September	October
Acre Feet Used	269	2,308	3,854	732	1,108	197
Percent of Delivery	3%	27%	46%	9%	9%	2%

Water is delivered to the FWD from Oroville Dam, into the Feather River, and then flows into channels where the water is lifted by a northern pump station east of the Garden Highway, near Messick Road, and a southern pump station at the end of Wilkie Avenue in Sutter County. The northern pump station is approximately 17 miles upstream from the confluence of the Feather and Sacramento Rivers, near Verona, California. The southern pump station is approximately 12.5 miles upstream from the confluence. Both pump stations are at the end of channels that are perpendicular to the Feather River. The channel to the northern pump station is approximately 480 feet long, 320 feet wide, and five feet deep. At the end of the channel is a side-channel that is 96 feet wide and holds four 60-horsepower (hp) pumps, each with an unscreened, 10-inch diameter intake. The channel to the southern pump station is approximately 200 feet long, 50 feet wide, and 5 feet deep. This pump station also contains four 60-hp pumps, and each has an unscreened, 18-inch intake.

The typical pumping rate at the northern intake is approximately 20,000 gallons per minute (gpm), or 45 cubic feet per second (cfs). The typical pumping rate at the southern intake is approximately 12,000 gpm, or 27 cfs. Water velocity in the diversion channels during pumping is estimated to be approximately 0.3 feet per second (fps), depending on river elevations.

All water delivered to the FWD will be measured and recorded with equipment furnished, installed, operated, and maintained by the United States, the FWD, or other appropriate entity, as designated by Reclamation at the established points of delivery. Annual CVP contract water delivery to the FWD will not exceed the historical maximum of 20 TAF. Actual water delivery may vary based on Reclamation's annual allocation. Annual water delivery over a 10-year

period from 1989 to 1998 ranged from approximately 5 to 21 TAF, and averaged 10.7 TAF. Return flows are recycled, with any surplus draining into Gilsetzer Slough.

B. Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). The action area, for the purposes of this biological and conference opinion, is located on the Feather River between river mile (RM) 17 and RM 0. This includes all water bodies accessible to anadromous salmonids that are influenced by water diversions. This area was selected because it comprises the reach of the Feather River between the most upstream diversion point and the mouth, below which flows will be restored as described above. The Sacramento River and the designated critical habitat of Sacramento River winter-run Chinook salmon are not included in the action area because Reclamation will restore flows diverted by the FWD with releases from Shasta Reservoir.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

This biological and conference opinion analyzes the effects of the FWD Long-term Water Service Contract Renewal on the following threatened and endangered species and proposed critical habitat:

Sacramento River winter-run Chinook salmon - endangered
Central Valley spring-run Chinook salmon - threatened
Central Valley spring-run Chinook salmon - proposed critical habitat
Central Valley steelhead - threatened
Central Valley steelhead - proposed critical habitat

A. Species Life History, Population Dynamics, and Likelihood of Survival and Recovery

1. Sacramento River winter-run Chinook salmon

Sacramento River winter-run Chinook salmon were originally listed as threatened in November, 1990 (55 FR 46515). Their status was reclassified as endangered in January 1994 (59 FR 440) due to continued decline and increased variability of run sizes since their listing as a threatened species, expected weak returns as a result of two small year classes in 1991 and 1993, and continued threats to the population. In the proposed rule to reclassify the winter-run Chinook salmon as endangered, NMFS recognized that the population had dropped nearly 99 percent between 1966 and 1991, and despite conservation measures to improve habitat conditions, the population continued to decline (57 FR 27416). In June 2004 NOAA Fishery proposed to reclassify Sacramento River winter-run Chinook salmon as threatened (69 FR 33102). This determination was based on three main points: (1) harvest and habitat conservation efforts have increased the abundance and productivity of the Evolutionarily Significant Unit (ESU) over the past decade; (2) artificial propagation programs that are part of the ESU (*i.e.*, the Captive Broodstock Programs at Livingston Stone National Fish Hatchery (LSNFH) and at the

University of California Bodega Marine Laboratory) contribute to the ESU's viability; and (3) California Bay-Delta Authority (CALFED) ecosystem restoration plans underway in Battle Creek should provide the opportunity to establish a second winter-run Chinook salmon population. However, on June 28, 2005, after reviewing the best available scientific and commercial information, NMFS issued its final decision to retain the status of Sacramento River winter-run Chinook salmon as endangered (70 FR 37160). This decision was based on the continued threats to Sacramento River winter-run Chinook salmon and the continued likelihood of this ESU becoming extinct throughout all or a significant portion of its range. A draft recovery plan was published in August 1997 (NMFS 1997).

Winter-run Chinook salmon historically spawned in the headwaters of the McCloud, Pit, and Little Sacramento Rivers and Hat and Battle Creeks. Construction of Shasta Dam in 1943 and Keswick Dam in 1950 blocked access to all of these waters except Battle Creek, which has been severely impacted by hydroelectric facilities and the Coleman National Fish Hatchery (Moyle *et al.* 1989, NMFS 1997a). Until 1984, the upper Calaveras River also contained a run of several dozen to several hundred fish that spawned below New Hogan Dam. According to the California Department of Fish and Game (CDFG), low river flows in the Calaveras during the 1987-1992 drought are believed to have eliminated this population (CDFG 1998). Most of the current winter-run Chinook salmon spawning and rearing habitat exists on the mainstem Sacramento River between Keswick Dam and Red Bluff Diversion Dam (RBDD). Although a small, unknown, number of winter-run Chinook salmon are thought to spawn in Battle Creek, the ESU is widely considered to be reduced to a single naturally spawning population in the mainstem Sacramento River below Keswick Dam. Following the construction of Shasta Dam, the number of winter-run Chinook salmon initially declined but recovered during the 1960s. This initial recovery was followed by a steady decline from 1969 through the late 1980s (U.S. Fish and Wildlife Service (FWS) 1999).

Adult winter-run Chinook salmon enter San Francisco Bay from November through June (Hallock and Fisher 1985) and migrate past RBDD from mid-December through early August (NMFS 1997a). The majority of the run passes RBDD from January through May, and peaks in mid-March (Hallock and Fisher 1985). Generally, winter-run Chinook salmon spawn from near Keswick Dam, downstream to Red Bluff. Spawning occurs from late-April through mid-August with peak activity between May and June. Eggs and pre-emergent fry require water temperatures at or below 56 °F for maximum survival during the spawning and incubation period (FWS 1999). Fry emerge from mid-June through mid-October and move to river margins and tributary streams to rear. Emigration past RBDD may begin in mid-July and typically peaks in September and can continue through March in dry years (NMFS 1997a, Vogel and Marine 1991). From 1995 to 1999, all winter-run Chinook salmon outmigrating as fry passed RBDD by October, and all outmigrating pre-smolts and smolts passed RBDD by March (Martin *et al.* 2001).

Construction of RBDD in 1966 enabled improved accuracy of population estimates as salmon passed through fish ladders. From 1967 to 2000, winter-run Chinook salmon estimates were extrapolated from adult counts at RBDD ladders. Recent operational changes at RBDD have allowed a majority of the winter-run Chinook salmon population to bypass the ladders and counting facilities, and have increased the error associated with extrapolating the population

estimate. Beginning in 2001, carcass counts replaced the ladder count to reduce the error associated with the estimate.

Since 1967, the estimated adult winter-run Chinook salmon population ranged from 186 in 1994 to 117,808 in 1969 (CDFG 2002). The estimate declined from an average of 86,000 adults in 1967-1969 to only 2,000 by 1987-1989, and continued downward to an average 830 fish in 1994-1996. Since then, estimates have increased to an average of 3,136 fish for the period of 1998-2001. Winter-run abundance estimates and cohort replacement rates since 1986 are shown in Table 2. Although the population estimates display broad fluctuation since 1986 (186 in 1994 to 9,757 in 2003), there is an increasing trend in the five-year moving average over the last five year period (491 from 1990-1994 to 5,818 from 1999-2003), and a generally stable trend in the five-year moving average of cohort replacement rates. The 2003 run was the highest since the listing, with an estimate of 9,757 adult fish.

Table 2. Winter-run Chinook salmon population estimates from RBDD ladder counts, and corresponding cohort replacement rates for years since 1986. Population estimates include both adult and grilse.

Year	Population Estimate	5-Year Moving Average of Population Estimate	Cohort Replacement Rate	5-Year Moving Average of Cohort Replacement Rate
1986	2,596	-	-	-
1987	2,186	-	-	-
1988	2,886	-	-	-
1989	697	-	0.3	-
1990	431	1,759	0.2	-
1991	211	1,282	0.1	-
1992	1,241	1,093	1.8	-
1993	387	593	0.9	0.6
1994	186	491	0.9	0.8
1995	1,297	664	1.1	0.9
1996	1,337	890	3.5	1.6
1997	880	817	4.7	2.2
1998	3,002	1,340	2.3	2.5
1999	3,288	1,961	2.5	2.8
2000	1,352	1,972	1.5	2.9
2001	5,521	2,809	1.8	2.6
2002	9,172	4,467	2.3	2.2
2003	9,757	5,818	7.2	3.2

2. Central Valley Spring-Run Chinook Salmon

NMFS listed the CV spring-run Chinook salmon evolutionarily significant unit (ESU) as threatened on September 16, 1999 (64 FR 50394). In June 2004 NMFS proposed that CV spring-run Chinook salmon remain listed as threatened (69 FR 33102). This proposal was based

on the recognition that although CV spring-run Chinook salmon productivity trends are positive, the ESU continues to face risks from having a limited number of remaining metapopulations (*i.e.*, three existing populations from an estimated 17 historical populations), a limited geographic distribution, and potential hybridization with Feather River Hatchery spring-run Chinook salmon which are not in the ESU and display genetic similarities to fall-run Chinook salmon. On June 28, 2005, after reviewing the best available scientific and commercial information, NMFS issued its final decision to retain the status of CV spring-run Chinook salmon as threatened (70 FR 37160). This decision also included the Feather River Hatchery (FRH) spring-run Chinook salmon population included as part of the Central Valley spring-run Chinook salmon ESU.

Adult spring-run Chinook salmon enter the Sacramento-San Joaquin Delta (Delta) from the Pacific Ocean beginning in January and enter natal streams from March to July. In Mill Creek, Van Woert (1964) noted that of 18,290 spring-run Chinook salmon observed from 1953 to 1963, 93.5 percent were counted between April 1 and July 14, and 89.3 percent were counted between April 29 and June 30.

During their upstream migration, adult Chinook salmon require streamflows sufficient to provide olfactory and other orientation cues used to locate their natal streams. Adequate streamflows also are necessary to allow adult passage to upstream holding habitat. The preferred temperature range for upstream migration is 38 to 56°F (Bell 1991, CDFG 1998).

Upon entering fresh water, spring-run Chinook salmon are sexually immature and must hold in cold water for several months to mature. Typically, spring-run Chinook salmon utilize mid-to high-elevation streams that provide appropriate temperatures and sufficient flow, cover, and pool depth to allow over-summering. Spring-run Chinook salmon also may utilize tailwaters below dams if cold water releases provide suitable habitat conditions. Spawning occurs between September and October and, depending on water temperature, emergence occurs between November and February.

Spring-run Chinook salmon emigration is highly variable (CDFG 1998). Some may begin outmigrating soon after emergence, whereas others oversummer and emigrate as yearlings with the onset of increased fall storms (CDFG 1998). The emigration period for spring-run Chinook salmon extends from November to early May, with up to 69 percent of young-of-the-year outmigrants passing through the lower Sacramento River between mid-November and early January (Snider and Titus 2000). Outmigrants also are known to rear in non-natal tributaries to the Sacramento River and the Delta (CDFG 1998).

Chinook salmon spend between one and four years in the ocean before returning to their natal streams to spawn (Myers *et al.* 1998). Fisher (1994) reported that 87 percent of Chinook trapped and examined at RBDD between 1985 and 1991 were three-year-olds.

Spring-run Chinook salmon were once the most abundant run of salmon in the Central Valley (Campbell and Moyle 1992) and were found in both the Sacramento and San Joaquin drainages. More than 500,000 spring-run Chinook salmon were caught in the Sacramento-San Joaquin commercial fishery in 1883 alone (Yoshiyama *et al.* 1998). The San Joaquin populations were

essentially extirpated by the 1940s, with only small remnants of the run that persisted through the 1950s in the Merced River (Hallock and Van Woert 1959, Yoshiyama *et al.* 1998). Populations in the upper Sacramento, Feather, and Yuba Rivers were eliminated with the construction of major dams during the1950s and 1960s. Naturally spawning populations of spring-run Chinook salmon are currently restricted to accessible reaches of the upper Sacramento River, Antelope Creek, Battle Creek, Beegum Creek, Big Chico Creek, Butte Creek, Clear Creek, Deer Creek, Mill Creek, Feather River, and the Yuba River (CDFG 1998).

Since 1969, the spring-run Chinook salmon ESU has displayed broad fluctuations in abundance, ranging from 1,403 in 1993 to 25,890 in 1982 (CDFG 2003). The average abundance for the ESU was 12,590 for the period of 1969 to 1979, 13,334 for the period of 1980 to 1990, and 6,554 from 1991 to 2001. Evaluating the abundance of the ESU as a whole, however, complicates trend detection. For example, although the mainstem Sacramento River population appears to have undergone a significant decline, the data are not necessarily comparable because coded wire tag information gathered from fall-run Chinook salmon returns since the early 1990s has resulted in adjustments to ladder counts at RBDD that have reduced the overall number of fish that are categorized as spring-run Chinook salmon (Colleen Harvey-Arrison, CDFG, pers. comm., 2003).

Sacramento River tributary populations in Mill, Deer, and Butte Creeks are probably the best trend indicators for the CV spring-run Chinook ESU as a whole. These streams have shown positive escapement trends since 1991. Recent escapements to Butte Creek, including 20,259 in 1998, 9,605 in 2001 and 8,785 in 2002 (CDFG 2002, CDFG 2003), represent the greatest proportion of the ESU's abundance. Although recent trends are positive, annual abundance estimates display a high level of fluctuation, and the overall number of CV spring-run Chinook salmon remains well below estimates of historic abundance. Additionally, in 2003, high water temperatures, high fish densities, and an outbreak of Columnaris Disease (*Flexibacter columnaris*) and Ichthyophthiriasis (*Ichthyophthirius multifiliis*) contributed to the pre-spawning mortality of an estimated 11,231 adult spring-run Chinook salmon in Butte Creek. Because the CV spring-run Chinook salmon ESU is confined to relatively few remaining streams, continues to display broad fluctuations in abundance, and a large proportion of the population (*i.e.*, in Butte Creek) faces the risk of high mortality rates, the population is at a moderate to high risk of extinction.

3. Central Valley Steelhead

NMFS listed the CV steelhead ESU as threatened on March 19, 1998 (63 FR 13347). The ESU includes all naturally-produced CV steelhead in the Sacramento-San Joaquin River Basin. NMFS published a final 4(d) rule for steelhead on July 10, 2000 (65 FR 42422). The 4(d) rule applies the section 9 take prohibitions to threatened species except in cases where the take is associated with State and local programs that are approved by NMFS. In June 2004 NMFS proposed that CV steelhead remain listed as threatened (69 FR 33102). This proposal is based on the recognition that although the NMFS Biological Review Team (BRT) (NMFS 2003) found the ESU "in danger of extinction," ongoing protective efforts for this ESU, and the likely implementation of an ESU-wide monitoring program effectively counter this finding. NMFS also is proposing changes involving steelhead hatchery populations (69 FR 31354). The Coleman National Fish Hatchery and Feather River Fish Hatchery steelhead populations are

proposed for inclusion in the listed population of steelhead. These populations previously were included in the ESU but were not deemed essential for conservation and thus not part of the listed steelhead population. Finally, NMFS has proposed to include resident *Oncorhynchus mykiss*, present below natural or long-standing artificial barriers, in all steelhead ESUs (69 FR 33102) The final decisions on these steelhead proposals have been deferred for six months for further scientific review (70 FR 37160).

All steelhead stocks in the Central Valley are winter-run steelhead (McEwan and Jackson 1996). Steelhead are similar to Pacific salmon in their life history requirements. They are born in fresh water, emigrate to the ocean, and return to freshwater to spawn. Unlike other Pacific salmon, steelhead are capable of spawning more than once before they die.

The majority of the CV steelhead spawning migration occurs from October through February and spawning occurs from December to April in streams with cool, well oxygenated water that is available year round. Van Woert (1964) and Harvey (1995) observed that in Mill Creek, the CV steelhead migration is continuous, and although there are two peak periods, sixty percent of the run is passed by December 30. Similar bimodal run patterns have also been observed in the Feather River (Brad Cavallo, California Department of Water Resources (DWR), pers. comm., 2002), and the American River (John Hannon, Bureau of Reclamation, pers. comm., 2002).

Incubation time is dependent upon water temperature. Eggs incubate for one and a half to four months before emerging. Eggs held between 50 and 59 °F hatch within three to four weeks (Moyle 1976). Fry emerge from redds within in about four to six weeks depending on redd depth, gravel size, siltation, and temperature (Shapovalov and Taft 1954). Newly emerged fry move to shallow stream margins to escape high water velocities and predation (Barnhart 1986). As fry grow larger they move into riffles and pools and establish feeding locations. Juveniles rear in freshwater for one to four years (Meehan and Bjornn 1991) emigrating episodically from natal springs during fall, winter and spring high flows (Colleen Harvey Arrison, CDFG, pers. comm. 1999). Steelhead typically spend two years in fresh water. Adults spend one to four years at sea before returning to freshwater to spawn as four or five year olds (Moyle 1976).

Steelhead historically were well-distributed throughout the Sacramento and San Joaquin Rivers (Busby *et al.* 1996). Steelhead were found from the upper Sacramento and Pit River systems south to the Kings and possible the Kern River systems and in both east- and west-side Sacramento River tributaries (Yoshiyama *et al.* 1996). The present distribution has been greatly reduced (McEwan and Jackson 1996). The California Advisory Committee on Salmon and Steelhead (1988) reported a reduction of steelhead habitat from 6,000 miles historically to 300 miles. The California Fish and Wildlife Plan (CDFG 1965) estimated there were 40,000 steelhead in the early 1950s. Hallock *et al.* (1961) estimated an average of 20,540 adult steelhead through the 1960s in the Sacramento River, upstream of the Feather River.

Nobriga and Cadrett (2003) compared coded-wire tagged (CWT) and untagged (wild) steelhead smolt catch ratios at Chipps Island trawl from 1998-2001 to estimate that about 100,000 to 300,000 steelhead juveniles are produced naturally each year in the Central Valley. In the draft *Updated Status Review of West Coast Salmon and Steelhead* (NMFS 2003), the BRT made the following conclusion based on the Chipps Island data:

> "If we make the fairly generous assumptions (in the sense of generating large estimates of spawners) that average fecundity is 5,000 eggs per female, 1 percent of eggs survive to reach Chipps Island, and 181,000 smolts are produced (the 1998-2000 average), about 3,628 female steelhead spawn naturally in the entire Central Valley. This can be compared with McEwan's (2001) estimate of 1 million to 2 million spawners before 1850, and 40,000 spawners in the 1960s".

The only consistent data available on steelhead numbers in the San Joaquin River basin come from CDFG mid-water trawling samples collected on the lower San Joaquin River at Mossdale. These data indicate a decline in steelhead numbers in the early 1990s, which have remained low through 2002 (CDFG 2003). In 2003, a total of only 12 steelhead smolts were collected at Mossdale (CDFG, unpublished data).

Existing wild steelhead stocks in the Central Valley mostly are confined to upper Sacramento River and its tributaries, including Antelope, Deer, and Mill Creeks and the Yuba River. Populations may exist in Big Chico and Butte Creeks and a few wild steelhead are produced in the American and Feather Rivers (McEwan and Jackson 1996). Until recently, CV steelhead were thought to be extirpated from the San Joaquin River system. Recent monitoring has detected populations of steelhead in the Stanislaus, Mokelumne, and Calaveras Rivers, and other streams previously thought to be void of steelhead (McEwan 2001). Naturally spawning populations may exist in many other streams but are undetected due to lack of monitoring programs (Interagency Ecological Program Steelhead Project Work Team (SPWT) 1999).

Reliable estimates of CV steelhead abundance for different basins are not available (McEwan 2001), however, McEwan and Jackson (1996) estimate the total annual run size for the entire Sacramento-San Joaquin system, based on RBDD counts, to be no more than 10,000 adults. Steelhead counts at the RBDD have declined from an average of 11,187 for the period of 1967 to 1977, to an average of approximately 2,000 through the 1990s (McEwan and Jackson 1996, McEwan 2001). The future of CV steelhead is uncertain because of the lack of status and trend data.

B. Habitat Condition and Function for Species' Conservation

Designated critical habitat for Sacramento River winter-run Chinook salmon does not occur in the action area. NMFS proposed to designate critical habitat for CV spring-run Chinook salmon and CV steelhead in December 2004 (69 FR 71880). Proposed critical habitat includes stream channels within certain occupied stream reaches and includes a lateral extent as defined by the ordinary high water mark (33 CFR 329.11) or the bankfull elevation. Critical habitat in estuarine reaches is defined by the perimeter of the water body or the elevation of the extreme high water mark, whichever is greater. The reach of the Feather River that contains the action area currently is proposed.

The freshwater habitat of salmon and steelhead in the Central Valley varies in function depending on location. Spawning areas are located in accessible, upstream reaches of the Sacramento or San Joaquin Rivers and their watersheds where viable spawning gravels and

water conditions are found. Spawning habitat condition is strongly affected by water flow and quality, especially temperature, dissolved oxygen, and silt load, all of which can greatly affect the survival of eggs and larvae.

Migratory corridors are downstream of the spawning area and include the Sacramento-San Joaquin Delta. These corridors allow the upstream passage of adults, and the downstream emigration of outmigrant juveniles. Migratory habitat condition is strongly affected by the presence of barriers, which can include dams, unscreened or poorly-screened diversions, and degraded water quality.

Both spawning areas and migratory corridors comprise rearing habitat for juveniles, which feed and grow before and during their outmigration. Non-natal, intermittent tributaries also may be used for juvenile rearing. Rearing habitat condition is strongly affected by habitat complexity, food supply, and presence of predators of juvenile salmonids. Some complex, productive habitats with floodplains remain in the system (*e.g.*, the lower Cosumnes and Sacramento River reaches with setback levees [*i.e.*, primarily located upstream of the City of Colusa]). However, the channelized, leveed, and rip-rapped river reaches and sloughs that are common in the Sacramento-San Joaquin system typically have low habitat complexity, low abundance of food organisms, and offer little protection from either fish or avian predators.

C. Factors Affecting the Species and Habitat

A number of documents have addressed the history of human activities, present environmental conditions, and factors contributing to the decline of salmon and steelhead species in the Central Valley. For example, NMFS prepared range-wide status reviews for west coast Chinook salmon (Myers *et al.* 1998) and steelhead (Busby *et al.* 1996). Also, the NOAA BRT published a draft updated status review for west coast Chinook salmon and steelhead in November 2003 (NMFS 2003). Information also is available in Federal Register notices announcing ESA listing proposals and determinations for some of these species and their critical habitat (*e.g.*, 58 FR 33212, 59 FR 440, 62 FR 24588, 62 FR 43937, 63 FR 13347, 64 FR 24049, 64 FR 50394, 65 FR 7764). The Final Programmatic Environmental Impact Statement/Report (EIS/EIR) for the CALFED Bay-Delta Program (CALFED 1999) and the Final Programmatic EIS for the Central Valley Project (CVPIA) (Department of Interior (DOI) 1999) provide a summary of historical and recent environmental conditions for salmon and steelhead in the Central Valley. The following general description of the factors affecting the viability of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, CV steelhead is based on a summarization of these documents.

In general, the human activities that have affected the listed anadromous salmonids and their habitats addressed in this opinion consist of: (1) dam construction that blocks previously accessible habitat; (2) water development and management activities that affect water quantity, flow timing, and quality; (3) land use activities such as agriculture, flood control, urban development, mining, road construction, and logging that degrade aquatic and riparian habitat; (4) hatchery operation and practices; (5) harvest activities; (6) predation; and (7) ecosystem restoration actions.

1. Habitat Blockage

Hydropower, flood control, and water supply dams of the CVP, SWP, and other municipal and private entities have permanently blocked or hindered salmonid access to historical spawning and rearing grounds. Clark (1929) estimated that originally there were 6,000 miles of salmon habitat in the Central Valley system and that 80 percent of this habitat had been lost by 1928. Yoshiyama *et al.* (1996) calculated that roughly 2,000 miles of salmon habitat was actually available before dam construction and mining, and concluded that 82 percent is not accessible today.

In general, large dams on every major tributary to the Sacramento River, San Joaquin River, and Sacramento-San Joaquin Delta block salmon and steelhead access to the upper portions of the respective watersheds. On the Sacramento River, Keswick Dam blocks passage to historic spawning and rearing habitat in the upper Sacramento, McCloud, and Pit Rivers. Whiskeytown Dam blocks access to the upper watershed of Clear Creek. Oroville Dam and associated facilities block passage to the upper Feather River watershed. Nimbus Dam blocks access to most of the American River basin. Friant Dam construction in the mid-1940s has been associated with the elimination of spring-run Chinook salmon in the San Joaquin River upstream of the Merced River (DOI 1999). On the Stanislaus River, construction of New Melones Dam and Goodwin Dam blocked both spring and fall-run Chinook salmon (CDFG 2001).

As a result of the dams, Sacramento River winter-run Chinook salmon, CV Chinook salmon, and CV steelhead populations on these rivers have been confined to lower elevation mainstems that historically only were used for migration. Population abundances have declined in these streams due to decreased quantity and quality of spawning and rearing habitat. Higher temperatures at these lower elevations during late-summer and fall are a major stressor to adults and juvenile salmonids.

The Suisun Marsh Salinity Control Gates (SMSCG), located on Montezuma Slough, were installed in 1988, and are operated with gates and flashboards to decrease the salinity levels of managed wetlands in Suisun Marsh. The SMSCG have delayed or blocked passage of adult Chinook salmon migrating upstream (Edwards *et al.* 1996, Tillman *et al.* 1996, DWR 2002).

2. Water Development

The diversion and storage of natural flows by dams and diversion structures on Central Valley waterways have depleted stream flows and altered the natural cycles by which juvenile and adult salmonids base their migrations. Depleted flows have contributed to higher temperatures, lower dissolved oxygen levels, and decreased recruitment of gravel and large woody debris. Furthermore, more uniform flows year round have resulted in diminished natural channel formation, altered food web processes, and slower regeneration of riparian vegetation. These stable flow patterns have reduced bedload movement (Ayers 2001) and caused spawning gravels to become embedded, and reduced channel width, which has decreased the available spawning and rearing habitat below dams.

Water diversions for irrigated agriculture, municipal and industrial use, and managed wetlands are found throughout the Central Valley. Hundreds of small and medium-size water diversions exist along the Sacramento River, San Joaquin River, and their tributaries. Although efforts have been made in recent years to screen some of these diversions, many remain unscreened. Depending on the size, location, and season of operation, these unscreened intakes entrain and kill many life stages of aquatic species, including juvenile salmonids. For example, as of 1997, 98.5 percent of the 3,356 diversions included in a Central Valley database were either unscreened or screened insufficiently to prevent fish entrainment (Herren and Kawasaki 2001). Most of the 370 water diversions operating in Suisun Marsh are unscreened (FWS 2003).

Outmigrant juvenile salmonids in the Delta have been subjected to adverse environmental conditions created by water export operations at the CVP/SWP. Specifically, juvenile salmonid survival has been reduced from (1) water diversion from the mainstem Sacramento River into the Central Delta via the Delta Cross Channel; (2) upstream or reverse flows of water in the lower San Joaquin River and southern Delta waterways; (3) entrainment at the CVP/SWP export facilities and associated problems at Clifton Court Forebay; and (4) increased exposure to introduced, non-native predators such as striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), and American shad (*Alosa sapidissima*).

The OCAP consultation was completed with the issuance of a biological opinion by NOAA Fisheries on October 22, 2004. The OCAP biological opinion found that CVP and SWP actions are likely to adversely affect federally-listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, and the critical habitat of winter-run Chinook salmon, due to reservoir releases, Sacramento River flows, water temperatures, and physical facility operations that reduce habitat availability and suitability. These effects are expected to impact and result in the take of individual fish by delaying or blocking adult migration into suitable spawning habitat and decreasing spawning success, killing vulnerable life stages such as eggs, larvae, and juveniles due to stranding or elevated water temperatures, or increasing the likelihood of disease or juvenile vulnerability to predation due to temperature stress. NMFS determined that these effects are not likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, or Central Valley steelhead, and is not likely to destroy or adversely modify the designated critical habitat Sacramento River winter-run Chinook salmon.

3. Land Use Activities

Land use activities continue to have large impacts on salmonid habitat in the Central Valley. Until about 150 years ago, the Sacramento River was bordered by up to 500,000 acres of riparian forest, with bands of vegetation extending outward for four or five miles (California Resources Agency 1989). By 1979, riparian habitat along the Sacramento River had diminished to 11,000 to 12,000 acres, or about 2 percent of historic levels (McGill 1987). The degradation and fragmentation of riparian habitat had resulted mainly from flood control and bank protection projects, together with the conversion of riparian land to agriculture (Jones and Stokes Associates, Incorporated 1993).

Increased sedimentation resulting from agricultural and urban practices within the Central Valley is a primary cause of salmonid habitat degradation (NMFS 1996). Sedimentation can adversely affect salmonids during all freshwater life stages by clogging or abrading gill surfaces, adhering to eggs, or impeding fry emergence (Phillips and Campbell 1961); burying eggs or alevins, scouring and filling in pools and riffles, or reducing primary productivity and photosynthesis activity (Cordone and Kelley 1961); and affecting intergravel permeability and dissolved oxygen levels. Excessive sedimentation over time can cause substrates to become embedded, which reduces successful salmonid spawning, and egg and fry survival (Hartmann *et al.* 1987).

Land use activities associated with road construction, urban development, logging, mining, agriculture, and recreation have significantly altered fish habitat quantity and quality through alteration of streambank and channel morphology, alteration of ambient water temperatures, degradation of water quality, elimination of spawning and rearing habitat, fragmentation of available habitats, elimination of downstream recruitment of LWD, and removal of riparian vegetation resulting in increased streambank erosion (Meehan and Bjornn 1991). Agricultural practices in the Central Valley have eliminated large trees and logs and other woody debris that would otherwise be recruited into the stream channel (NMFS 1998). LWD influences stream morphology by affecting channel pattern, position, and geometry, as well as pool formation (Keller and Swanson 1979, Bilby 1984, Robison and Beschta 1990).

Since the 1850s, wetlands reclamation for urban and agricultural development has caused the cumulative loss of 79 and 94 percent of the tidal marsh habitat in the Sacramento-San Joaquin Delta downstream and upstream of Chipps Island, respectively (Monroe and Kelly 1992, Goals Project 1999). In Suisun Marsh, salt water intrusion and land subsidence gradually has led to the decline of agricultural production. Presently, Suisun Marsh consists largely of tidal sloughs and managed wetlands for duck clubs.

Juvenile salmonids are exposed to increased water temperatures in the Delta during the late spring and summer due to the loss of riparian shading, and by thermal inputs from municipal, industrial, and agricultural discharges. Studies by the California Department of Water Resources (DWR) on water quality in the Delta over the last 30 years show a steady decline in the food sources available for juvenile salmonids and an increase in the clarity of the water. These conditions have contributed to increased mortality of juvenile Chinook salmon and steelhead as they move through the Delta.

4. Hatchery Operations and Practices

Five hatcheries currently produce Chinook salmon in the Central Valley and four of these also produce steelhead. Releasing large numbers of hatchery fish can pose a threat to wild Chinook salmon and steelhead stocks through genetic impacts, competition for food and other resources between hatchery and wild fish, predation of hatchery fish on wild fish, and increased fishing pressure on wild stocks as a result of hatchery production (Waples 1991). The genetic impacts of artificial propagation programs in the Central Valley primarily are caused by straying of hatchery fish and the subsequent interbreeding of hatchery fish with wild fish. In the Central Valley, practices such as transferring eggs between hatcheries and trucking smolts to distant sites for release contribute to elevated straying levels (DOI 1999). For example, Nimbus Hatchery on

the American River rears Eel River steelhead stock and releases these fish in the Sacramento River.

Hatchery practices as well as spatial and temporal overlaps of habitat use and spawning activity between spring- and fall-run fish have led to the hybridization and homogenization of some subpopulations (CDFG 1998). As early as the 1960s, Slater (1963) observed that early fall- and spring-run Chinook salmon were competing for spawning sites in the Sacramento River below Keswick Dam, and speculated that the two runs may have hybridized. Feather River Hatchery (FRH) spring-run Chinook salmon have been documented as straying throughout the Central Valley for many years (CDFG 1998), and in many cases have been recovered from the spawning grounds of fall-run Chinook salmon (Colleen Harvey-Arrison and Paul Ward, CDFG, pers. comm., 2002), an indication that FRH spring-run Chinook salmon may exhibit fall-run life history characteristics. Although the degree of hybridization has not been comprehensively determined, it is clear that the populations of spring-run Chinook salmon spawning in the Feather River and counted at RBDD contain hybridized fish.

The management of hatcheries, such as Nimbus Hatchery and FRH, can directly impact CV spring-run Chinook salmon and CV steelhead populations by overproducing the natural capacity of the limited habitat available below dams. In the case of the Feather River, significant redd superimposition occurs in-river due to hatchery overproduction and the inability to physically separate CV spring-run and fall-run Chinook salmon adults. This concurrent spawning has led to hybridization between the spring- and fall-run Chinook salmon in the Feather River. At Nimbus Hatchery, operating Folsom Dam to meet temperature requirements for returning hatchery fall-run Chinook salmon often limits the amount if water available for steelhead spawning and rearing the rest of the year.

The increase in Central Valley hatchery production has reversed the composition of the steelhead population, from 88 percent naturally-produced fish in the 1950s (McEwan 2001) to an estimated 23 to 37 percent naturally-produced fish currently (Nobriga and Cadrett 2001). The increase in hatchery steelhead production proportionate to the wild population has reduced the viability of the wild steelhead populations, increased the use of out-of-basin stocks for hatchery production, and increased straying (NMFS 2001). Thus, the ability of natural populations to successfully reproduce has likely been diminished.

The relatively low number of spawners needed to sustain a hatchery population can result in high harvest-to-escapements ratios in waters where regulations are set according to hatchery population. This can lead to over-exploitation and reduction in size of wild populations coexisting in the same system (McEwan 2001).

Hatcheries also can have some positive effects on salmonid populations. Artificial propagation has been shown effective in bolstering the numbers of naturally spawning fish in the short term under certain conditions, and in conserving genetic resources and guarding against catastrophic loss of naturally spawned populations at critically low abundance levels, such as Sacramento River winter-run Chinook salmon. However, relative abundance is only one component of a viable salmonid population.

5. Ocean and Sport Harvest

Extensive ocean recreational and commercial troll fisheries for Chinook salmon exist along the Central California coast, and an inland recreational fishery exists in the Central Valley for Chinook salmon and steelhead. Ocean harvest of Central Valley Chinook salmon is estimated using an abundance index, called the Central Valley Index (CVI). The CVI is the ratio of Chinook salmon harvested south of Point Arena (where 85 percent of Central Valley Chinook salmon are caught) to escapement. CWT returns indicate that Sacramento River salmon congregate off the coast between Point Arena and Morro Bay.

Historically in California, almost half of the river sportfishing effort was in the Sacramento-San Joaquin River system, particularly upstream from the city of Sacramento (Emmett *et al.* 1991). Since 1987, the Fish and Game Commission has adopted increasingly stringent regulations to reduce and virtually eliminate the in-river sport fishery for winter-run Chinook salmon. Present regulations include a year-round closure to Chinook salmon fishing between Keswick Dam and the Deschutes Road Bridge and a rolling closure to Chinook salmon fishing on the Sacramento River between the Deschutes River Bridge and the Carquinez Bridge. The rolling closure spans the months that migrating adult winter-run Chinook salmon are ascending the Sacramento River to their spawning grounds. These closures have virtually eliminated impacts on winter-run Chinook salmon caused by recreational angling in freshwater. In 1992, the California Fish and Game Commission adopted gear restrictions (all hooks must be barbless and a maximum of 5.7 cm in length) to minimize hooking injury and mortality of winter-run Chinook salmon caused by trout anglers.

In-river recreational fisheries historically have taken CV spring-run Chinook salmon throughout the species' range. During the summer, holding adult CV spring-run Chinook salmon are easily targeted by angler's when they congregate in large pools. Poaching also occurs at fish ladders, and other areas where adults congregate; however, the significance of poaching on the adult population is unknown. Specific regulations for the protection of CV spring-run Chinook salmon in Mill, Deer, Butte and Big Chico Creeks were added to the existing CDFG regulations in 1994. The current regulations, including those developed for winter-run Chinook salmon, provide some level of protection for CV spring-run Chinook salmon (CDFG 1998).

There is little information on steelhead harvest rates in California. Hallock *et al.* (1961) estimated that harvest rates for Sacramento River steelhead from the 1953-54 through 1958-59 seasons ranged from 25.1 percent to 45.6 percent assuming a 20 percent non-return rate of tags. Staley (1975) estimated the harvest rate in the American River during the 1971-1972 and 1973-74 seasons to be 27 percent. The average annual harvest rate of adult steelhead above Red Bluff Diversion Dam for the three year period from 1991-92 through 1993-94 was 16 percent (McEwan and Jackson 1996). Since 1998, all hatchery steelhead have been marked with an adipose fin clip allowing anglers to distinguish hatchery and wild steelhead. Current regulations restrict anglers from keeping unmarked steelhead in Central Valley streams (CDFG 2004). Overall, this regulation has greatly increased protection of naturally produced adult CV steelhead.

6. Predation

Accelerated predation also may be a factor in the decline of winter-run Chinook salmon and CV spring-run Chinook salmon, and to a lesser degree CV steelhead. Additionally, human-induced habitat changes such alteration of natural flow regimes and installation of bank revetment and structures such as dams, bridges, water diversions, piers, and wharves often provide conditions that both disorient juvenile salmonids and attract predators (Stevens 1961, Vogel *et al.* 1988, Garcia 1989, Decato 1978).

On the mainstem Sacramento River, high rates of predation are known to occur at RBDD, Anderson Cottonwood Irrigation District (ACID), Glenn Colusa Irrigation District (GCID), areas where rock revetment has replaced natural river bank vegetation, and at south Delta water diversion structures (*e.g.*, Clifton Court Forebay; CDFG 1998). Predation at RBDD on juvenile winter-run Chinook salmon is believed to be higher than normal due to factors such as water quality and flow dynamics associated with the operation of this structure. Due to their small size, early emigrating winter-run Chinook salmon may be very susceptible to predation in Lake Red Bluff when the RBDD gates remain closed in summer and early fall (Vogel *et al.* 1988). In passing the dam, juveniles are subject to conditions which greatly disorient them, making them highly susceptible to predation by fish or birds. Sacramento pikeminnow (*Ptychocheilus grandis*) and striped bass congregate below the dam and prey on juvenile salmon.

FWS found that more predatory fish were found at rock revetment bank protection sites between Chico Landing and Red Bluff than at sites with naturally eroding banks (Michny and Hampton 1984). From October 1976 to November 1993, CDFG conducted ten mark/recapture experiments at the SWP's Clifton Court Forebay to estimate pre-screen losses using hatchery-reared juvenile Chinook salmon. Pre-screen losses ranged from 69 percent to 99 percent. Predation from striped bass is thought to be the primary cause of the loss (Gingras 1997).

Other locations in the Central Valley where predation is of concern include flood bypasses, release sites for salmonids salvaged at the State and Federal fish facilities, and the Suisun Marsh Salinity Control Structure (SMSCS). Predation on salmon by striped bass and pikeminnow at salvage release sites in the Delta and lower Sacramento River has been documented (Orsi 1967, Pickard *et al.* 1982). Predation rates at these sites are difficult to determine. CDFG conducted predation studies from 1987-1993 at the SMSCS to determine if the structure attracts and concentrates predators. The dominant predator species at the structure was striped bass, and juvenile Chinook salmon were identified in their stomach contents (NMFS 1997).

7. Ecosystem Restoration

a. *CALFED*

Two programs under CALFED, the Ecosystem Restoration Program (ERP) and the Environmental Water Account (EWA), were created to improve conditions for fish, including listed salmonids, in the Central Valley. Restoration actions implemented by the ERP include the installation of fish screens, modification of barriers to improve fish passage, habitat acquisition, and instream habitat restoration. The majority of these recent actions address key factors

affecting listed salmonids, and emphasis has been placed in tributary drainages with high potential for CV steelhead and CV spring-run Chinook salmon production. Additional ongoing actions include new efforts to enhance fisheries monitoring and directly support salmonid production through hatchery releases. Recent habitat restoration initiatives sponsored and funded primarily by the CALFED-ERP Program have resulted in plans to restore ecological function to 9,543 acres of shallow-water tidal and marsh habitats within the Delta. Restoration of these areas primarily involves flooding lands previously used for agriculture, thereby creating additional rearing habitat for juvenile salmonids. Similar habitat restoration is imminent adjacent to Suisun Marsh (*i.e.*, at the confluence of Montezuma Slough and the Sacramento River) as part of the Montezuma Wetlands project, which is intended to provide for commercial disposal of material dredged from San Francisco Bay in conjunction with tidal wetland restoration.

A sub-program of the ERP called the Environmental Water Program (EWP) has been established to support ERP projects through enhancement of instream flows that are biologically and ecologically significant. This program is in the development stage and the benefits to listed salmonids are not yet clear. Clear Creek is one of five watersheds in the Central Valley that has been targeted for action during Phase I of this program.

The EWA is geared to providing water at critical times to meet ESA requirements and incidental take limits without water supply impacts to other users. In early 2001, EWA released 290,000 acre-feet of water at key times to offset reductions in south Delta pumping to protect winter-run Chinook salmon, delta smelt (*Hypomesus transpacificus*), and splittail *(Pogonichthys macrolepidotus*). The actual number of fish saved was very small. The anticipated benefits to fisheries from EWA were much higher than what has actually occurred.

b *Central Valley Project Improvement Act*

The Central Valley Project Improvement Act implemented in 1992 requires that fish and wildlife get equal consideration with water allocations from the Central Valley Project. From this act arose two programs that have benefited listed salmonids: the Anadromous Fish Restoration Program (AFRP) and the Water Acquisition Program (WAP). The AFRP has engaged in monitoring, education, and restoration projects geared toward recovery of all anadromous fish species residing in the Central Valley. Restoration projects funded through the AFRP include fish passage, fish screening, riparian easement and land acquisition, development of watershed planning groups, instream and riparian habitat improvement, and gravel replenishment. The goal of the WAP is to acquire water supplies to meet the habitat restoration and enhancement goals of the CVPIA and to improve the Department of the Interior's ability to meet regulatory water quality requirements. Water has been used successfully to improve fish habitat for CV spring-run Chinook salmon and CV steelhead by maintaining or increasing instream flows in Butte and Mill Creeks and the San Joaquin River at critical times.

c. *Iron Mountain Mine Remediation*

The Environmental Protection Agency's (EPA) Iron Mountain Mine remediation involves the removal of toxic metals in acidic mine drainage from the Spring Creek Watershed with a state-

of-the-art lime neutralization plant. Contaminant loading into the Sacramento River from Iron Mountain Mine has shown measurable reductions since the early 1990s. Decreasing the heavy metal contaminants that enter the Sacramento River should increase the survival of salmonid eggs and juveniles. However, during periods of heavy rainfall upstream of the Iron Mountain Mine, Reclamation substantially increases Sacramento River flows in order to dilute heavy metal contaminants being spilled from Spring Creek debris dam. This rapid change in flows can cause juvenile salmonids to become stranded or isolated in side channels below Keswick Dam.

d. *SWP Delta Pumping Plant Fish Protection Agreement (Four-Pumps Agreement)*

The Four Pumps Agreement Program has approved about $49 million for projects that benefit salmon and steelhead production in the Sacramento-San Joaquin basins and Delta since the agreement inception in 1986. Four Pumps projects that benefit CV spring-run Chinook salmon and CV steelhead include water exchange programs on Mill and Deer Creeks, enhanced law enforcement efforts from San Francisco Bay upstream to the Sacramento and San Joaquin Rivers and their tributaries, design and construction of fish screens and ladders on Butte Creek, and screening of diversions in Suisun Marsh and San Joaquin tributaries. Predator habitat isolation and removal, and spawning habitat enhancement projects on the San Joaquin tributaries benefit CV steelhead.

The Spring-run Salmon Increased Protection project provides overtime wages for CDFG wardens to focus on reducing illegal take and illegal water diversions on upper Sacramento River tributaries and adult holding areas, where the fish are vulnerable to poaching. This project covers Mill, Deer, Antelope, Butte, Big Chico, Cottonwood, and Battle Creeks, and has been in effect since 1996. Through the Delta-Bay Enhanced Enforcement Program (DBEEP), initiated in 1994, a team of ten wardens focus their enforcement efforts on salmon, steelhead, and other species of concern from the San Francisco Bay Estuary upstream into the Sacramento and San Joaquin River basins. These two enhanced enforcement programs, in combination with additional concern and attention from local landowners and watershed groups on the Sacramento River tributaries which support CV spring-run Chinook salmon summer holding habitat, have been shown to reduce the amount of poaching in these upstream areas.

The provisions of funds to cover over-budget costs for the Durham Mutual/Parrot Phelan Screen and Ladders project expedited completion of the construction phase of this project which was completed during 1996. The project continues to benefit salmon and steelhead by facilitating upstream passage of adult spawners and downstream passage of juveniles.

The Mill and Deer Creek Water Exchange projects are designed to provide new wells that enable diverters to bank groundwater in place of stream flow, thus leaving water in the stream during critical migration periods. On Mill Creek several agreements between Los Molinos Mutual Water Company (LMMWC), Orange Cove Irrigation District (OCID), CDFG, and DWR allows DWR to pump groundwater from two wells into the LMMWC canals to pay back LMMWC water rights for surface water released downstream for fish. Although the Mill Creek Water Exchange project was initiated in 1990 and the agreement for a well capacity of 25 cfs, only 12 cfs has been developed to date (Reclamation and OCID 1999). In addition, it has been determined that a base flow of greater than 25 cfs is needed during the April through June period

for upstream passage of adult CV spring-run Chinook salmon in Mill Creek (Reclamation and OCID 1999). In some years, water diversions from the creek are curtailed by amounts sufficient to provide for passage of upstream migrating adult CV spring-run Chinook salmon and downstream migrating juvenile CV steelhead and CV spring-run Chinook salmon. However, the current arrangement does not ensure adequate flow conditions will be maintained in all years. DWR, CDFG, and FWS have developed the Mill Creek Adaptive Management Enhancement Plan to address the instream flow issues. A pilot project using one of the ten pumps originally proposed for Deer Creek was tested in summer 2003. Future testing is planned with implementation to follow.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the status of the species within the action area. The environmental baseline "includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area (*i.e.*, lower Feather River), the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process" (50 CFR §402.02).

A. Status of the Species and Habitat in the Action Area

1. Status of the Species within the Action Area

The action area contains populations of CV spring-run Chinook salmon and CV steelhead from the Feather River. The action area is a migratory corridor for adult CV spring-run Chinook salmon and CV steelhead, and provides migration and rearing habitat for juveniles of these species. Juvenile Sacramento River winter-run Chinook salmon may migrate upstream into the Feather River during some months. Following is a status summary of these species and their habitat within the action area.

a. *Sacramento River Winter-run Chinook Salmon*

There are no records of winter-run Chinook salmon in the Feather River. Moore (1997) and Maslin *et al.* (1996, 1997) found that juvenile winter-run Chinook salmon rear in non-natal tributaries to the Sacramento River during winter and early spring months. Due to the proximity of the action area to the Sacramento River, it is possible that adult strays, or non-natal juveniles may occur between December and February in some years.

b. *Central Valley Spring-run Chinook Salmon*

The action area contains Feather River populations of CV spring-run Chinook salmon. Adults and juveniles migrate through the action area. Adults hold and spawn approximately 45 miles upstream, in the uppermost three miles of accessible habitat below the Feather River Fish Hatchery (DWR 2001). The number of naturally-spawning spring-run Chinook salmon in the

Feather River has been estimated only periodically since the 1960s, with estimates ranging from 2 fish in 1978 to 2,908 in 1964. Adult spring-run Chinook salmon that return to the Feather River Fish Hatchery have been counted each year since 1963, and their numbers have ranged from 146 in 1967 to 8,662 in 2003 (CDFG 2004).

Based on run-time observations of spring-run Chinook salmon in the Feather River, adults are likely to be present in the action area during the upstream migration period between February and July where they hold in deep coldwater pools until spawning begins in mid- to late August. Results from Feather River Chinook salmon emigration studies indicate virtually all spring-run Chinook salmon juveniles in the Feather River exit as sub-yearlings (DWR 1999a, b ,c). Emigration of young-of-year salmon begins immediately following emergence in late November, peaks in January or February, and continues through June (DWR 1999a, b, c). Rearing and migrating juveniles are likely to be present in the action area from January through June, with the greatest abundance of individuals in January and February.

c. *Central Valley Steelhead*

Limited information exists regarding the abundance, location, and timing of steelhead spawning within the Feather River. The only available information on natural steelhead production in the action area comes from DWR redd surveys on the Feather River (DWR 2003). Based on these surveys, DWR estimated that a minimum of 163 steelhead spawned in the Feather River in 2003. Nearly half (*i.e.*, 48 percent) of all redds were located in the uppermost mile of existing anadromous habitat below the Feather River Fish Barrier Dam. The Feather River Fish Hatchery maintains records of the number of steelhead that have entered the hatchery annually since 1967. Feather River Fish Hatchery counts since 1969 ranged from a low of 78 in 1972 to a high of 2,587 in 1989, with an average of 904 adults per year (DWR 2001).

Steelhead adults migrate upstream in the Sacramento River during the period between December and March to spawn and are likely to enter into the Feather River during the same period. Observations to date suggest that the low-flow channel is the primary reach for steelhead spawning, with up to 75 percent of the spawning occurring in the side channel adjacent to the Feather River Fish Hatchery (DWR 2003).

Chinook salmon emigration studies in the Feather River from 1995 through 1998 have incidentally captured steelhead young-of-year and yearlings. Young-of-year were captured from March through June, while yearlings were captured January through June. Steelhead were not captured during the early migration period, from October and December, but DWR researchers speculated that this may have occurred because the sampling gear may not be able to detect their presence during this time (DWR 1999a, b, c). Based on these results and steelhead emigration patterns in the Sacramento River, steelhead juveniles and smolts are expected to use the action area from December through June, with peak use from January through March.

2. Status of Habitat within the Action Area

The action area (*i.e.*, lower Feather River) provides migration and rearing habitat for Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead. The action area is proposed critical habitat for CV spring-run Chinook salmon and CV steelhead. Habitat requirements for these species are similar. The essential features of freshwater salmonid habitat within the action include adequate substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions.

Water temperatures in the action area generally are most favorable for anadromous fish during the winter and spring months and may be warmer than desired conditions from late spring through early fall. High temperatures primarily are caused by ambient air temperatures, but also are affected by the lack of riparian shading, and by thermal inputs from agricultural outfall water.

Habitat within the action area primarily is used as juvenile rearing habitat and as a migration corridor by adults and juveniles. The condition and function of this habitat has been severely impaired through several factors discussed in the *Status of the Species and Habitat* section of this biological and conference opinion. The result has been the reduction in quantity and quality of several essential elements of rearing habitat required by juveniles to grow, and survive. In spite of the degraded condition of this habitat, the conservation value of the action area is high because it is used by a large number of naturally-produced anadromous fish from the Feather River.

B. Factors Affecting the Species and Habitat in the Action Area

The magnitude and duration of peak flows in the Feather River during the winter and spring are reduced by water impoundment in upstream reservoirs. Instream flows during the summer and early fall months have increased over historic levels for deliveries of municipal and agricultural water supplies. Overall, water management now reduces natural variability by creating more uniform flows year-round. Current flood control practices require peak flood discharges to be held back and released over a period of weeks. Consequently, flow in the Feather River often remains too low during the winter to provide quality rearing habitat.

High water temperatures limit habitat availability for listed salmonids in the lower Feather River (Boles *et al.* 1988). High summer water temperatures in the lower Feather River and Sutter Bypass can exceed 72°F. Such temperatures can create a thermal barrier to the migration of adult and juvenile salmonids (Rich 1997, Kjelson *et al.* 1982). Water diversions, for agricultural and municipal purposes are found throughout the action area and entrain and kill juvenile and salmon and steelhead during emigration periods during fall, winter, and spring months.

C. Importance of the action area to species survival and recovery

The action area of the FWD Long-term CVP Water Contract Renewal is located within a reach of the Feather River that is utilized as migration and rearing habitat by all listed anadromous fish populations within the Feather River Basin. Because of the location of the action area near the

confluence with the Sacramento River, out-of-basin juvenile Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead also may use habitats within the action area for non-natal rearing and growth. The use of the action area by such a large number of anadromous fish makes it an important node of habitat for the survival and recovery of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead, and it is likely that these fish will continue to utilize the action area as a migratory corridor and for rearing.

V. EFFECTS OF THE ACTION

This section discusses the direct and indirect effects of the FWD Long-term CVP Water Contract Renewal on Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead that are expected to result from the proposed action. Cumulative effects (*i.e.*, effects of future State, local, or private actions on endangered and threatened species or critical habitat) are discussed separately.

A. Approach to the Assessment

Pursuant to section 7(a)(2) of the ESA (16 U.S.C. §1536), Federal agencies are directed to ensure that their activities are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. This biological and conference opinion assesses the effects of the implementation of the FWD Long-term CVP Water Service Contract on endangered Sacramento River winter-run Chinook salmon, threatened CV spring-run Chinook salmon, threatened CV steelhead, and the proposed critical habitat of CV spring-run Chinook salmon and CV steelhead.

In the *Description of the Proposed Action* section of this biological and conference opinion, NMFS provided an overview of the action. In the *Status of the Species* and *Environmental Baseline* sections of this biological and conference opinion, NMFS provided an overview of the threatened and endangered species and critical habitat that are likely to be adversely affected by the activity under consultation.

Regulations that implement section 7(b)(2) of the ESA require biological opinions to evaluate the direct and indirect effects of Federal actions and actions that are interrelated with or interdependent to the Federal action to determine if it would be reasonable to expect them to appreciably reduce listed species' likelihood of surviving and recovering in the wild by reducing their reproduction, numbers, or distribution (16 U.S.C. §1536; 50 CFR 402.02). Section 7 of the ESA and its implementing regulations also require biological opinions to determine if Federal actions would destroy or adversely modify the conservation value of critical habitat (16 U.S.C. §1536).

NMFS generally approaches "jeopardy" analyses in a series of steps. First, we evaluate the available evidence to identify the direct and indirect physical, chemical, and biotic effects of proposed actions on individual members of listed species or aspects of the species' environment (these effects include direct, physical harm or injury to individual members of a species;

modifications to something in the species' environment - such as reducing a species' prey base, enhancing populations of predators, altering its spawning substrate, altering its ambient temperature regimes; or adding something novel to a species' environment - such as introducing exotic competitors or a sound). Once we have identified the effects of an action, we evaluate the available evidence to identify a species' probable response (including behavioral responses) to those effects to determine if those effects could reasonably be expected to reduce a species' reproduction, numbers, or distribution (for example, by changing birth, death, immigration, or emigration rates; increasing the age at which individuals reach sexual maturity; decreasing the age at which individuals stop reproducing; among others). We then use the evidence available to determine if these reductions, if there are any, could reasonably be expected to appreciably reduce a species' likelihood of surviving and recovering in the wild.

To evaluate the effects of the FWD Long-term CVP Water Contract Renewal, NMFS examined the diversion periods specified in the contract with the seasonal periods that anadromous salmonids are expected to be present within the action area. If an overlap was detected between water conveyance, water withdrawals, and water use, we examined the degree of overlap to identify likely impacts to listed anadromous salmonids within the action area based on the best available information.

The primary information used in this assessment includes fishery information previously described in the *Status of the Species* and *Environmental Baseline* sections of this biological and conference opinion; studies and accounts of the impacts of water diversions on anadromous species; and documents prepared in support of the proposed action, including the April 2004 BA and the Revised Draft EA.

B. Assessment

The assessment will consider the nature, duration, and extent of the proposed action relative to the migration timing, behavior, and habitat requirements of federally-listed anadromous fish that are expected to be within the action area during the diversion period. This assessment will consider water delivery and water use impacts CV spring-run Chinook salmon and CV steelhead and their proposed critical habitat. Sacramento River winter-run Chinook salmon will not be within the action area during the irrigation season and are not expected to be adversely affected by the action.

The proposed action could affect CV spring-run Chinook salmon and CV steelhead when water is being diverted at FWD pump stations for irrigation. Water delivery and water use may affect salmonids through changes in the flow of the Feather River, by diverting fish into diversion channels, and by entraining fish at diversion points. Agricultural runoff is captured by the FWD and re-used. Runoff may percolate into Gilseizer Slough, but does not re-enter anadromous habitat as surface flow. Because return flows percolate into agricultural soils and do not reach anadromous habitat as surface flows, potential impacts are not measurable, and are considered discountable and unlikely to occur.

a. *Flow Changes*

Water delivery and diversion could decrease water levels in the lower 17 mile reach of the Feather River between the northern pump station channel inlet and the confluence with the Sacramento River (*i.e.*, between RM 17 and RM 0), which may impede the successful migration of juvenile and adult salmonids. The FWD's typical diversion rate is 45 cfs at the northern pump, near RM 17, and 27 cfs at the southern pump, near RM 12. During the diversion period, Feather River flows typically range from 5,000 to 10,000 cfs. The combined diversion rate (*i.e.*, 72 cfs) is low relative to typical river flow. Areas on the lower Feather River that have been identified as potential fish passage impediments during low flows are Shanghai Bend, the Sunrise Pump Diversion, and Steep Riffle. All of these sites are located upstream of the action area, and will not be affected by the action. Other than the presence of numerous unscreened diversion points, NMFS is not aware of any additional fish passage concerns in the action area Therefore, NMFS does not suspect that a continued flow reduction of 72 cfs will adversely affect the upstream migration of adult salmon and steelhead, or the downstream migration of juveniles. Water delivery impacts to Sacramento River flows will be avoided with additional flow to the Sacramento River provided through releases from Shasta Reservoir. Therefore, Sacramento River flows will not be reduced as a result of the action.

b. *Entrainment*

Juvenile CV spring-run Chinook salmon and CV steelhead are at risk of being diverted into diversion channels and entrained into diversion pumps because migration periods partially overlap with the irrigation season. CV spring-run Chinook salmon and CV steelhead from the Feather River are the most likely populations to enter project canals because both of these populations must migrate through the action area.

During typical pumping operations, the water velocity in the diversion channels is estimated to be approximately 0.3 fps (BOR 2004a). At the pump intake, velocities are likely to be higher because flow is moved into a narrower cross-sectional area to enter the diversion intake pipes. Because the volume of water moving into the pumps is a constant, as the cross sectional area decreases, the velocity increases. Velocities below 0.33 fps can be negotiated and avoided by very small Chinook salmon and steelhead fry (Nordlund 1986, NMFS 1997b, CDFG 2000). Because diversion channel velocities are low enough to be negotiated by small fish, it is unlikely that salmon and steelhead will be involuntarily diverted from the course of their normal migration. However, fish may voluntarily enter diversion channels for temporary rearing, or to avoid high flows in the Feather River. Juveniles that enter the diversion channels and swim in front of water pump intakes while they are in operation are likely to be entrained because velocities at the pump intakes are expected to exceed 0.33 fps. Entrained fish are not expected to survive because they will be mutilated by pumps or deposited into irrigation fields that lack suitable rearing and migration components such as flow and connectivity to normal rearing corridors.

Adult Chinook salmon and steelhead are strong swimmers capable of sustained swimming speeds up to 4.6 fps, and burst speeds up to 26 fps (Powers and Orsborn 1984). Because of their

large size and superior swimming abilities adult salmon and steelhead may enter project canals but are not expected to be entrained into pump intakes.

Entrainment risk is influenced by the relative abundance of migrating juveniles during the irrigation diversion season, when pumps are in operation. Juvenile Chinook salmon in the Feather River emigrate from late November through early June, with a peak from January through March. Steelhead juveniles are expected to emigrate from the Feather River from December through June, with a peak in March and April. The irrigation season extends from May through October, with the greatest water diversion from June through September. Thus, there is a potential for juvenile fish to be entrained during May and June.

May and June are at the end of the emigration season and juvenile Chinook salmon and steelhead abundance in the action area is probably low. A review of juvenile Chinook salmon emigration patterns in the lower Feather River (DWR 2002) supports this assumption. From 1998 to 2000, 0.4 percent of Feather River Chinook salmon emigrated in May, and 0.004 percent emigrated in June (DWR 2002). The relative abundance of juvenile steelhead during the irrigation period is more difficult to discern because steelhead are less abundant, larger, and better swimmers, making them more difficult to capture and monitor than Chinook salmon. A review of steelhead emigration data (DWR 1999a, b) indicates that steelhead abundance in May and June also is low. Steelhead captures in May and June of the 1997 through 1998 trapping season, represent 16 percent and 1 percent, respectively, of the overall capture. The rate was slightly different in 1996 (*i.e.*, 11 percent and 9 percent, respectively), but sampling did not begin until March and it is likely that much of the run was not represented. Based on the low proportion of emigrants during the diversion period, we expect that the number of fish that may be entrained also will be low. We also expect that the proportion of entrained will be low relative to the overall abundance of the species. Winter-run Chinook salmon will not be in the action area during the diversion period and are not expected to be adversely affected by diversion activities.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological and conference opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Ongoing agricultural activities likely will continue to cause entrainment into diversions, and adversely affect water quality. Levee maintenance and bank stabilization will continue to fragment habitat availability. These actions and conditions may injure or kill salmonids by affecting food availability, growth rate, susceptibility to disease, or other physiological processes necessary for survival.

VII. INTEGRATION AND SYNTHESIS

A. Impacts of the Proposed Action on Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead, and their Habitat

NMFS finds that the proposed action will affect juvenile CV spring-run Chinook salmon and CV steelhead by causing death of individuals through entrainment at the northern and southern diversion pumps for the next 25 years.

Juvenile entrainment is most likely in May and June when the end of the juvenile emigration period coincides with the beginning of the irrigation season. Entrainment rates relative to overall population abundance are expected to be small because the irrigation season avoids peak migration periods, and because diversion rates during the beginning of the irrigation season typically are low.

B. Impacts of the Proposed Action on ESU Survival and Recovery

The adverse effects to CV spring-run Chinook salmon and CV steelhead within the action area are not expected to affect the overall survival and recovery of the ESUs. This is largely due to the fact that diversion and irrigation activities do not coincide with peak migration periods. Some juvenile CV spring-run Chinook salmon and CV steelhead will be migrating through the action area during the beginning and the end of the water use period and some will be entrained and killed each year for the next 25 years. However, the action is only expected to affect a small number of juveniles each year, and the relative number of entrained juveniles will be small compared to the overall juvenile population size. Therefore, adverse population-level impacts that may affect survival and recovery are not anticipated. Sacramento River winter-run Chinook salmon will not be within the action area during the irrigation season and are not expected to be adversely affected by the action.

C. Impacts of the Proposed Action on Proposed Critical Habitat

Habitat changes related to water deliveries and diversions are not expected to modify the migration, rearing, holding, or spawning success of CV spring-run Chinook salmon and CV steelhead. Most measurable changes to flow will occur during summer months when federally-listed anadromous fish are not present. Therefore, the proposed action is not expected to adversely modify the conservation value of proposed critical habitat.

VIII. CONCLUSION

After reviewing the best available scientific and commercial information; the current status of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, CV steelhead, and the designated critical habitat of Sacramento River winter-run Chinook salmon; the environmental baseline for the action area; the effects of the proposed action; and the cumulative effects, it is NMFS' biological opinion that the FWD Long-term CVP Water Contract Renewal,

as proposed, is not likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, or CV steelhead, and is not likely to destroy or adversely modify the designated critical habitat Sacramento River winter-run Chinook salmon.

After reviewing the best available scientific and commercial information, the current status of proposed CV spring-run Chinook salmon and CV steelhead critical habitat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' conference opinion that the FWD Long-term CVP Water Contract Renewal, as proposed, is not likely to destroy or adversely modify the proposed critical habitat CV spring-run Chinook salmon and CV steelhead.

IX. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS as an act which kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by Reclamation so that they become binding conditions of any grant or permit, as appropriate, for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation: (1) fails to assume and implement the terms and conditions or (2) fails to require the contractors to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Reclamation must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement [50 CFR §402.14(I)(3)].

A. Amount or Extent of Take

NMFS anticipates incidental take of CV spring-run Chinook salmon and CV steelhead from death due to entrainment at the northern and southern diversion pumps, and by causing injury and death from exposure to contaminated agricultural discharge and increased water turbidity and water temperature. Incidental take of Sacramento River winter-run Chinook salmon is not expected.

NMFS cannot, using the best available information, quantify the anticipated incidental take of individual CV spring-run Chinook salmon and CV steelhead because of the variability and uncertainty associated with the population size of each species, annual variations in the timing of migration, and uncertainties regarding individual habitat use of the project area. However, it is possible to describe the conditions that will lead to the take. Although the exact percentage of each ESU that will be affected cannot be determined, because of the size of the project, and the brief exposure time that fish will face, a small percentage of each population (*i.e.*, less than 1 percent) is expected be injured or killed. Accordingly, NMFS is quantifying take of CV spring-run Chinook salmon and CV steelhead incidental to the FWD Long-term CVP Water Contract Renewal in terms associated with the extent and duration of water diversion and water use activities.

NMFS anticipates that, during the contract water use period (*i.e.*, through 2029), take in the form of injury and death to juvenile CV spring-run Chinook salmon and juvenile CV steelhead will occur from entrainment from the use of up to 20 TAF of contract water. Specifically, take is expected from a total of 2.57 TAF during May and June when pumps are operating at a combined diversion rate of up to 72 cfs.

B. Effect of the Take

NMFS has determined that the above level of take is not likely to jeopardize Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, or CV steelhead. The effect of this action will consist of fish behavior modification, loss of habitat value, and potential death or injury of juvenile CV spring-run Chinook salmon and CV steelhead. Sacramento River winter-run Chinook salmon will not be within the action area during the irrigation season and are not expected to be adversely affected by the action.

C. Reasonable and Prudent Measures

NMFS has determined that the following reasonable and prudent measure is necessary and appropriate to minimize the incidental take of listed anadromous salmonids.

1. Measures shall be taken to minimize salmonid injury and mortality during the contract period.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Measures shall be taken to minimize salmonid injury and mortality during the contract period to the maximum extent practicable.

    a. Reclamation shall coordinate with FWD and NMFS, to minimize pumping of CVP replaced water from the Feather River, to the maximum extent

practicable, during the months of May and June to minimize entrainment of juvenile salmonids, until the diversion pumps are screened in accordance with NMFS fish screen criteria.

b. Reclamation shall utilize programs within their authority to screen FWD's northern and southern water pumping facilities with state-of-the-art fish screens that meet NMFS and CDFG fish screen criteria.

c. Reclamation shall provide a project summary and compliance report to NMFS within 12 months of the issuance of this biological and conference opinion. Annual compliance reports shall be submitted until the diversions are screened to NMFS and CDFG fish screen criteria. These reports shall describe implementation of the terms and conditions of the biological and conference opinion.

Reports and notifications required by these terms and conditions shall be submitted to:

Sacramento Area Office Supervisor
National Marine Fisheries Service
650 Capitol Mall, Suite 8-300
Sacramento California 95814-4706
FAX: (916) 930-3629
Phone: (916) 930-3600

X. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. These conservation recommendations include discretionary measures that Reclamation can implement to avoid or minimize adverse effects of a proposed action on a listed species or critical habitat or regarding the development of information. NMFS provides the following conservation recommendations that would avoid or reduce adverse impacts to listed salmonids:

1. Reclamation should expand CV spring-run Chinook salmon and CV steelhead monitoring programs throughout the lower Feather River to improve understanding of the life history of these listed species and improve the ability to coordinate water management and fisheries protection.

2. Reclamation should coordinate with FWD, NMFS and CDFG to conduct fish entrainment monitoring at their pumping stations.

3. Reclamation should utilize programs within their authority, to develop and implement water use efficiency projects with FWD and other Central Valley

water contractors to minimize water demand and the amount of water withdrawn from anadromous fish habitat.

4. Reclamation should develop and implement a real-time juvenile salmonid monitoring program in the lower Feather River in cooperation and with assistance from CDWR, CDFG, and NMFS, in order to adaptively manage water deliveries and diversions with the objective of minimizing entrainment of juvenile salmonids at the pump facilities.

To be kept informed of actions minimizing or avoiding adverse effects, or benefiting listed and proposed species or their habitats, NMFS requests notification of the implementation of any conservation recommendations.

XI. REINITIATION OF CONSULTATION

This concludes formal consultation on the proposed FWD Long-term CVP Water Contract Renewal. Reinitiation of formal consultation is required if: (1) the amount or extent of taking specified in any incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological and conference opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

You may request NMFS to confirm the conference opinion as a biological opinion if the proposed critical habitat designations become final. The request must be in writing. If NMFS reviews the proposed action and finds that there have been no significant changes to the action or in the information used during the conference, NMFS will confirm the conference opinion as the biological opinion on the project, and no further section 7 consultation will be necessary.

XII. LITERATURE CITED

Ayers and Associates. 2001. Two-dimensional modeling and analysis of spawning bed mobilization, Lower American River. Prepared for U.S. Army Corps of Engineers, Sacramento District Office.

Barnhart, R.A. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific southwest), steelhead. U.S. Fish and Wildlife Service Biological Report 82(11.60).

Beamer, E.M., and R.A. Henderson. 1998. Juvenile salmonid use of natural and hydromodified stream bank habitat in the mainstem Skagit River, northwest Washington. Skagit System Cooperative, LaConner, WA.

Bell, M.C. 1991. Fisheries handbook of engineering requirements and biological criteria (third edition). U.S. Army Corps of Engineers, Portland, OR.

Bilby R.E. 1984. Removal of woody debris may affect stream channel stability. Journal of Forestry 82:609-613.

Boles, G.L., S.M. Turek, C.C. Maxwell, and D.M. McGill. 1988. Water temperature effects on Chinook salmon (*Oncorhynchus tshawytscha*) with emphasis on the Sacramento River: a literature review. California Department of Water Resources.

Bureau of Reclamation. 2004a. Biological assessment for the long-term renewal of the water service contract in the Feather Water District of the Sacramento River Division, Central Valley Project, California. Shasta Lake, CA.

Bureau of Reclamation. 2004b. Long-term Central Valley Project and State Water Project Operating Criteria and Plan, Biological Assessment. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Sacramento, CA.

Bureau of Reclamation and Orange Cove Irrigation District. 1999. Draft Environmental Assessment/Initial Study for Mill Creek anadromous fish adaptive management enhancement plan. August 1999.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L. Lierheimer, R.S. Waples, F.W. Waknitz and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon and California. U.S. Department of Commerce. NOAA Technical Memo. NMFS-NWFSC-27.

California Advisory Committee on Salmon and Steelhead. 1988. Restoring the balance. California Department of Fish and Game, Sacramento.

California Bay-Delta Program. 1999. Ecosystem Restoration Program Plan, Volume II. Technical Appendix to draft PEIS/EIR. June 1999.

California Department of Fish and Game. 1965. California Fish and Wildlife Plan.

California Department of Fish and Game. 1998. A report to the Fish and Game Commission: a status review of the spring-run Chinook (*Oncorhynchus tshawytscha*) in the Sacramento River drainage. Candidate Species Status Report 98-01. June 1998.

California Department of Fish and Game. 2000. Fish screening criteria. Habitat Conservation Division, Sacramento.

California Department of Fish and Game. 2002. Sacramento River winter-run Chinook salmon biennial report, 2000-2001. Prepared for the Fish and Game Commission. Habitat Conservation Division, Native Anadromous Fish and Watershed Branch, Sacramento.

California Department of Fish and Game. 2003. Preliminary unpublished data, Grand Tab: Adult Chinook salmon populations in the Sacramento/San Joaquin River systems. Native Anadromous Fish and Watershed Branch, Sacramento.

California Department of Fish and Game. 2004. Freshwater sport fishing regulations 2004-2006. California Fish Commission and Department of Fish and Game, Sacramento.

California Department of Water Resources. 1999a. Feather River Study, Chinook salmon emigration survey, March - June 1996. Draft report. June 1999.

California Department of Water Resources. 1999b. Feather River Study, Chinook salmon emigration survey, October - December 1996. Draft report. June 1999.

California Department of Water Resources. 1999c. Feather River Study, Chinook salmon emigration survey, December 1997 - June 1998. Draft report. June 1999.

California Department of Water Resources. 2001. Initial information package for the relicensing of the Oroville Facilities, FERC No. 2100.

California Department of Water Resources. 2002. Suisun Marsh salinity control gates salmon passage evaluation report. Ecological Services Office, Sacramento.

California Department of Water Resources. 2003. Lower Feather River steelhead (*Oncorhynchus mykiss*) redd survey. SP F-10 Task 2B Report. Oroville facilities relicensing, FERC No. 2100.

California Resources Agency. 1989. Upper Sacramento River fisheries and riparian management plan. Prepared by an Advisory Council established by SB1086, authored by State Senator Jim Nielson.

Campbell, E.A., and P.B. Moyle. 1992. Effects of temperature, flow, and disturbance on adult spring-run Chinook salmon. University of California Water Resources Center. Technical Completion Report.

Clark, G.H 1929. Sacramento-San Joaquin salmon (*Oncorhynchus tshawytscha*) fishery of California. California Department of Fish and Game, Fish Bulletin 17:73.

Cramer, S.P., and D.B. Demko. 1997. The status of late fall and spring Chinook salmon in the Sacramento River Basin regarding the Endangered Species Act. S.P. Cramer and Associates. Sacramento, CA.

Cordone, A.J., and D.W. Kelley. 1961. The influences of inorganic sediment on the aquatic life of streams. California Fish and Game 47:189-228.

Decato, R.J. 1978. Evaluation of the Glenn-Colusa Irrigation District Fish Screen. California Department of Fish and Game, Anadromous Fish Branch Administrative Report No. 78-20.

Edwards, G.W., K.A.F. Urquhart, and T.L. Tillman. 1996. Adult salmon migration monitoring, Suisun Marsh Salinity Control Gates, September-November 1994. Interagency Ecological Program Technical Report No. 50.

Emmett, R.L., S.L. Stone, S.A. Hinton, and M.E. Monaco. 1991. Distribution and abundance of fishes and invertebrates in West coast estuaries, Volume II: species life history summaries. ELMR Report No. 8. NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD.

Fisher, F.W. 1994. Past and present status of Central Valley Chinook salmon. Conservation Biology 8:870-873.

Garcia, A. 1989. The impacts of squawfish predation on juvenile Chinook salmon at Red Bluff Diversion Dam and other locations in the Sacramento River. U.S. Fish and Wildlife Service, Report No. AFF/FAO

Gingras, M. 1997. Mark/recapture experiments at Clifton Court Forebay to estimate pre-screen loss of juvenile fishes: 1976-1993. Interagency Ecological Program Technical Report No. 55.

Goals Project. 1999. Baylands ecosystem habitat goals: a report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. EPA, San Francisco, and San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

Hallock, R.J., and W.F. Van Woert. October 1959. A Survey of Anadromous Fish Losses in Irrigation Diversions from the Sacramento and San Joaquin Rivers. California Fish and Game 45:227-266.

Hallock, R.J., W.F. Van Woert, and L. Shapovalov. 1961. An evaluation of stocking hatchery reared steelhead rainbow (*Salmo gairdneri gairdneri*) in the Sacramento River system. California Department of Fish and Game, Fish Bulletin 114.

Hallock, R.J., and F. Fisher. 1985. Status of winter-run Chinook salmon, *Oncorhynchus tshawytscha*, in the Sacramento River. California Department of Fish and Game, Anadromous Fisheries Branch Office Report, January 25, 1985.

Hartman, G., J.C. Scrivener, L.B. Holtby, and L. Powell. 1987. Some effects of different streamside treatments on physical conditions and fish population processes in Carnation Creek, a coastal rainforest stream in British Columbia. Pages 330-372 *in* Salo and Cundy, editors.

Harvey, C.D. 1995. Adult steelhead counts in Mill and Deer Creeks, Tehama County, October 1993 - June 1994. California Department of Fish and Game, Inland Fisheries Administrative Report No. 95-3.

Herren, J.R. and S.S. Kawasaki. 2001. Inventory of water diversions in four geographic areas in California's Central Valley. Pages 343-355 *in* R.L. Brown, editor. Contributions to the biology of Central Valley salmonids, Volume 2. California Department of Fish and Game, Fish Bulletin 179.

Interagency Ecological Program Steelhead Project Work Team. 1999. Monitoring, Assessment, and Research on Central Valley Steelhead: Status of Knowledge, Review Existing Programs, and Assessment Needs. In Comprehensive Monitoring, Assessment, and Research Program Plan, Technical Appendix VII-11.

Jones and Stokes Associates, Inc. 1993. Strategies, potential sites, and site evaluation criteria for restoration of Sacramento River fish and wildlife habitats, Red Bluff to the Feather River. Prepared for the U.S. Army Corps of Engineers, Sacramento, CA.

Keller, E.A., and F.J. Swanson. 1979. Effects of large organic material on channel form and fluvial processes. Earth Surface Processes 4:361-380.

Kjelson, M.A., P.F. Raquel, and F.W. Fisher. 1982. Life history of fall-run juvenile Chinook salmon, *Oncorhynchus tshawytscha*, in the Sacramento-San Joaquin estuary, California. Pages 93-411 *in*: V.S. Kennedy (editor). Estuarine comparisons. Academic Press, New York, NY.

Martin, C.D., P.D. Gaines, and R.R. Johnson. 2001. Estimating the abundance of Sacramento River juvenile winter Chinook salmon with comparisons to adult escapement. Red Bluff Research Pumping Plant Report Series, Volume 5. U.S. Fish and Wildlife Service, Red Bluff, CA.

Maslin, P.E., W.R. McKinney, and T.L. Moore. 1996a. Intermittent streams as rearing habitat for Sacramento River chinook salmon. Department of Biology, California State University, Chico. Available: http://www.csuchico.edu/~pmaslin/rsrch/Salmon/Abstrct.html

Maslin, P.E., W.R. McKinney, and T.L. Moore. 1997. Intermittent streams as rearing habitat for Sacramento River chinook salmon. Department of Biology, California State University, Chico. Available: http://www.csuchico.edu/~pmaslin/rsrch/Salmon/Abstrct.html

McEwan, D.R., and T. Jackson. 1996. Steelhead restoration and management plan for California. California Department of Fish and Game, February 1996.

McEwan, D.R. 2001. Central valley steelhead. Pages 1-44 *in* R.L. Brown, editor. Contributions to the biology of Central Valley salmonids, Volume 1. California Department of Fish and Game, Fish Bulletin 179.

McGill, R.R., Jr. 1987. Land use changes in the Sacramento River riparian zone, Redding to Colusa. A third update: 1982-1987. Department of Water Resources, Northern District.

McKinley, R.S., and P.H. Patrick. 1986. Use of behavioral stimuli to divert sockeye salmon smolts at the Seton Hydro-electric station, British Columbia. *In*: W.C. Micheletti, editor. Proceedings of the Electric Power Research Institute at steam and hydro plants, 1987. San Francisco, CA.

Meehan W.R., and T.C. Bjornn. 1991. Salmonid distribution and life histories. American Fisheries Society Special Publication 19: 47-82.

Michny, F., and M. Hampton. 1984. Sacramento River Chico Landing to Red Bluff project, 1984 juvenile salmon study. U.S. Fish and Wildlife Service, Division of Ecological Services, Sacramento, CA.

Monroe, M., J. Kelly, and N. Lisowski. 1992. State of the estuary, a report of the conditions and problems in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. June 1992.

Moore, T.L. 1997. Condition and feeding of juvenile chinook salmon in selected intermittent tributaries of the upper Sacramento River. M.S. Thesis, California State University, Chico.

Moyle, P.B. 1976. Inland fishes of California. University of California Press, Berkeley.

Moyle, P.B., J.E. Williams, and E.D. Wikramanayake. 1989. Fish species of special concern of California. Wildlife and Fisheries Biology Department, University of California, Davis. Prepared for The Resources Agency, California Department of Fish and Game, Rancho Cordova.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of Chinook salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Technical Memo NMFS-NWFSC-35, 443 pages.

National Marine Fisheries Service. 1996. Factors for steelhead decline: a supplement to the notice of determination for west coast steelhead under the Endangered Species Act. NMFS Protected Species Branch, Portland, OR, and Protected Species Management Division, Long Beach, CA.

National Marine Fisheries Service. 1997a. NMFS proposed recovery plan for the Sacramento River winter-run Chinook salmon. Southwest Region, Long Beach, CA. August 1997.

National Marine Fisheries Service. 1997. Fish screen criteria for anadromous salmonids. Southwest Region, Santa Rosa, CA. January 1997.

National Marine Fisheries Service. 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Technical Memo NMFS-NWFSC.

National Marine Fisheries Service. 2003. Updated status of listed ESUs of West Coast salmon and steelhead. West Coast Salmon Biological Review Team. U.S. Department of Commerce, NOAA Tech Memo NMFS-NWFSC. June 2003.

Nobriga, M., and P. Cadrett. 2003. Differences among hatchery and wild steelhead: evidence from Delta fish monitoring programs. Interagency Ecological Program for the San Francisco Estuary Newsletter 14:3:30-38.

Nordland, B. 1996. Designing fish screens for fish protection at water diversions. National Marine Fisheries Service. Portland, OR.

Orsi, J. 1967. Predation study report, 1966-1967. California Department of Fish and Game.

Phillips, R.W., and H.J. Campbell. 1961. The embryonic survival of coho salmon and steelhead trout as influenced by some environmental conditions in gravel beds. Annual Report to Pacific Marine Fisheries Commission 14:60-73.

Pickard, A., A. Grover, and F. Hall. 1982. An evaluation of predator composition at three locations on the Sacramento River. Interagency Ecological Program Technical Report No. 2.

Powers, D., and J.F. Orsborn. 1985. Analysis of barriers to upstream fish migration: an investigation of the physical and biological conditions affecting fish passage at culverts and waterfalls. Bonneville Power Administration Project No. 82-84. Portland, OR.

Reynolds, F.L., T.J. Mills, R. Benthin, and A. Low. 1993. Restoring Central Valley streams: a plan for action. California Department of Fish and Game, Inland Fisheries Division, Sacramento.

Rich, A.A. 1997. Testimony of Alice A, Rich Ph.D. regarding water rights applications for the Delta Wetlands Project, proposed by Delta Wetlands Properties for Water Storage on Webb Tract, Bacon Island, Bouldin Island, and Holland Tract in Contra Costa and San Joaquin Counties. July 1997. California Department of Fish and Game Exhibit DFG-7. Submitted to State Water Resources Control Board.

Robison, G.E., and Beschta, R.L. 1990. Identifying trees in riparian areas that can provide coarse woody debris to streams. U.S. Forest Service 36:790-801.

Shapovalov, L., and A.C. Taft. 1954. The life histories of the steelhead rainbow trout (*Salmo gairdneri gairdneri*) and silver salmon (*Oncorhynchus kisutch*) with special reference to Waddell Creek, California, and recommendations regarding their management. California Department of Fish and Game, Fish Bulletin 98.

Slater, D.W. 1963. Winter-run Chinook salmon in the Sacramento River, California with notes on water temperature requirements at spawning. Special Science Report No. 461.

Snider, B., and R.G. Titus. 2000. Timing, composition, and abundance of juvenile anadromous salmonid emigration in the Sacramento River near Knights Landing, October 1996-September 1997. California Department of Fish and Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 00-04.

Stevens, D.E. 1961. Food habits of striped bass, *Roccus saxatilis* (Walbaum), in the Rio Vista area of the Sacramento River. M.S. Thesis, University of California, Berkeley.

Tillman, T.L., G.W. Edwards, and K.A.F. Urquhart. 1996. Adult salmon migration during the various operational phases of Suisun Marsh Salinity Control Gates in Montezuma Slough: August-October 1993. Agreement to Department of Water Resources, Ecological Services Office by California Department of Fish and Game, Bay-Delta and Special Water Projects Division.

U.S. Department of Interior. 1999. Final Programmatic Environmental Impact Statement for the Central Valley Project Improvement Act. October 1999. Technical Appendix, 10 volumes.

U.S. Fish and Wildlife Service. 1999. Effects of temperature on early-life survival of Sacramento River fall- and winter-run Chinook salmon. U.S. Fish and Wildlife Service Final Report, January 1999.

U.S. Fish and Wildlife Service. 2000. Impacts of riprapping to ecosystem functioning, lower Sacramento River, California. U.S. Fish and Wildlife Service, Sacramento Field Office. Prepared for US Army Corps of Engineers, Sacramento District.

U.S. Fish and Wildlife Service. 2003. Abundance and survival of juvenile Chinook salmon in the Sacramento-San Joaquin Estuary: 1999 annual progress report on the Sacramento-San Joaquin Estuary.

Van Woert, W. 1964. Mill Creek counting station. Office memorandum to Eldon Hughes, May 25, 1964. California Department of Fish and Game, Water Projects Branch, Contract Services Section.

Vogel, D.A., K.R. Marine, and J.G. Smith. 1988. Fish passage action program for Red Bluff Diversion Dam. Final Report, U.S. Fish and Wildlife Service. Report No. FR1-FAO-88-19.

Vogel, D.A., and K.R. Marine. 1991. Guide to upper Sacramento River Chinook salmon life history. Prepared for the U.S. Bureau of Reclamation, Central Valley Project.

Waples, R.S. 1991. Pacific salmon, *Oncorhynchus* spp., and the definition of "species" under the Endangered Species Act. Marine Fisheries Review 53:11-21.

Yoshiyama, R.M., E.R. Gerstung, F.W. Fisher, and P.B Moyle. 1996. Historical and present distribution of Chinook salmon in the Central Valley drainage of California. *In*: Sierra Nevada Ecosystem Project, final report to Congress, Volume III. Assessments, commissioned reports, and background information. Centers for Water and Wildland Resources, University of California, Davis.

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. North American Journal of Fisheries Management 18:487-521.