BUREAU OF RECLAMATION

Annual Report on the Long-Term Operation of the Central Valley Project and State Water Project for Water Year 2020

Central Valley Project, California
California-Great Basin Region

U.S. Department of the Interior **December 2020**

Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Annual Report on the Long-Term Operation of the Central Valley Project and State Water Project for Water Year 2020

Central Valley Project, California
California-Great Basin Region

prepared by

Bureau of Reclamation
Bay-Delta Office
801 "I" Street, Suite 140
Sacramento, CA 95814

Bureau of Reclamation
Central Valley Operations Office
3310 El Camino Avenue, Suite 300
Sacramento CA 95821

in coordination with

California Department of Water Resources, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife

Cover Photo: Shasta Dam (Photo credit: Reclamation)

Contents

Appendices

Figures

Introduction

This Annual Report for Water Year (WY) 2020 fulfills the annual reporting for the Long-Term Operation (LTO) of the Central Valley Project (CVP) and State Water Project (SWP) implemented through Reclamation's Record of Decision (ROD), dated February 19, 2020. The ROD implements Alternative 1 (Preferred Alternative) as described in the Final Environmental Impact Statement (EIS). Alternative 1 was the Proposed Action consulted upon and analyzed in the Biological Opinions issued in October 2019 by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). The Proposed Action included significant commitments to improved coordinated operations with DWR to meet Endangered Species Act (ESA) requirements for Delta Smelt, Southern distinct population segment (sDPS) of North American green sturgeon, California Central Valley (CCV) steelhead, Central Valley spring-run Chinook salmon and Sacramento River winter-run Chinook salmon and their habitats (collectively, "listed species"), as well as other fish and wildlife species in the project area.

While the WY starts October 1 and ends September 30, the ROD was signed in February 2020. Therefore, this first Annual Report reports on operations since February 2020. As such, some seasonal operations have not completed a full season of operation. This Annual Report includes conclusion sections that identify relevant clarifications that were necessary and, when applicable, recommendations to improve implementation of the Proposed Action. Individual operational components of the Proposed Action that require substantial real-time are described in "seasonal reports" that are referenced within this document.

Background

The Proposed Action included operations, monitoring, habitat and facility improvements, intervention, and special studies. Some of these actions were proposed at a site-specific or a programmatic level. Reclamation included conservation measures in the Proposed Action, that were adopted in the ROD, to avoid and minimize or compensate for CVP and SWP project effects, including take, on listed species as well as contribute to the recovery and enhancement of species and their habitats. These measures may also improve production, growth, and survival of listed species. Conservation measures and their status are described in the applicable sections below.

In the Proposed Action, Reclamation committed to review by an independent panel to ensure that performance occurs as expected. The panel will review and recommend alternative steps if the objectives, such as exceedance of a single-year threshold or 50 percent of the cumulative loss threshold, are not being met. An independent panel may also be convened if determined by the hindcast analyses.

Reclamation also committed in the Proposed Action to review the implementation of the proposed action at four year intervals (i.e., 2024 and 2028) through an independent panel of experts to review the Upper Sacramento River Performance Metrics; Old and Middle Rivers management and measures to improve survival through the south Delta and Delta Smelt Summer-Fall Habitat Actions.

In 2020, Reclamation, NMFS, USFWS, CDFW, and DWR worked together on the development of flow guidance documents for assisting agency staff in implementing flow provisions that require collaboration and charters for assisting agency staff in implementing non-flow projects. These documents are "living" documents subject to change, as necessary, in coordination with the multi-agency implementation teams.

The latest flow guidance documents are included as attachments to seasonal reports that describe specific components of the Proposed Action.

This Annual Report describes compliance with the Incidental Take Statements (ITS) and the Reasonable and Prudent Measures (RPMs) of the 2019 NMFS and USFWS Biological Opinions. The RPMs, and associated Terms and Conditions, were included in the 2019 NMFS and USFWS Biological Opinions to minimize incidental take of listed species.

Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are suggestions from NMFS and USFWS regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

Reclamation and DWR worked extensively with NMFS and USFWS to incorporate actions within our discretion and known capability. The Proposed Action included a description of "Collaborative Planning" to govern the implementation of certain programmatic conservation measures within Reclamation's authority, appropriations, and state cost share capabilities, and relies on a science-based framework and structured decision making to prioritize actions for fish rather than a list of specific projects in varying stages of development and unknown performance. Terrestrial species are supported through a combination of competitive grant programs not described in the Proposed Action. The conservation recommendations in the 2019 NMFS and USFWS Biological Opinions were not developed during the consultation for incorporation into the Proposed Action. However, they may be considered under Collaborative Planning and/or competitive grant programs. Conservation recommendations are not further described in this Annual Report unless selected for implementation at a later date.

Upper Sacramento River

The Upper Sacramento River, from Keswick Dam to Red Bluff Diversion Dam (Figure 1) includes winter-run Chinook salmon, spring-run Chinook salmon, and CCV steelhead and their critical habitats.

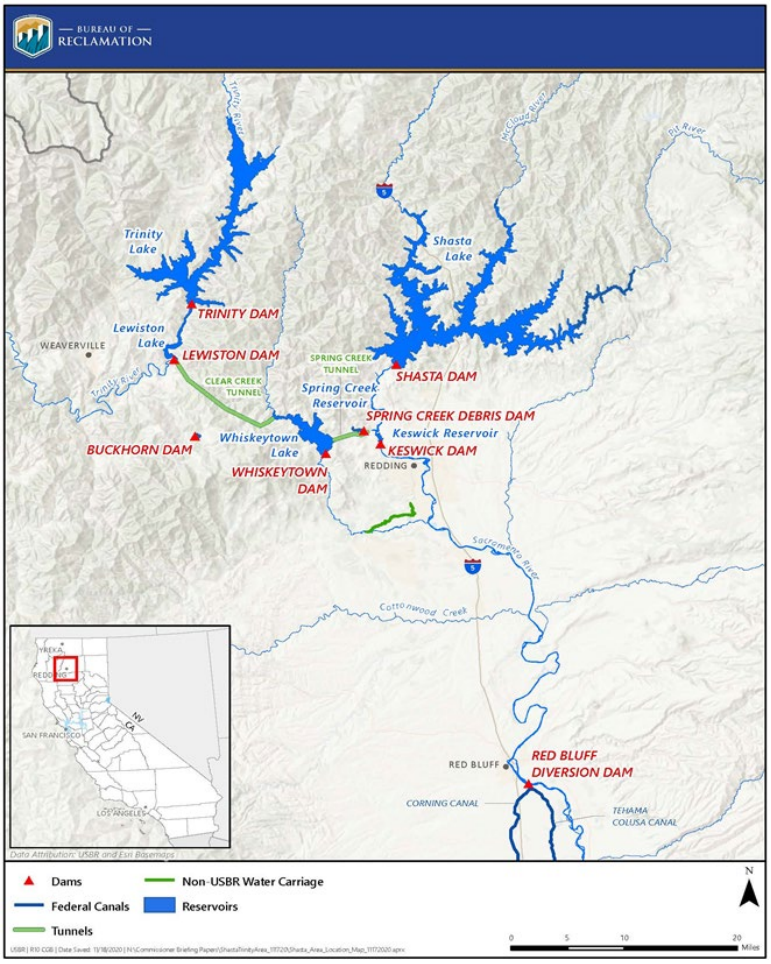

Figure 1. Upper Sacramento River System.

Key components of the LTO include actions to rebuild storage for the upcoming water temperature management season, spring pulse flows for juvenile spring-run Chinook salmon migration, and cold water pool management for winter-run Chinook salmon incubation and emergence. Some seasonal operations have not completed a full season (e.g. actions to rebuild storage).

A Charter for the Sacramento River Science Partnership (SRSP) was signed in 2020 by Reclamation, NMFS, USFWS, CDFW, the Southwest Fisheries Science Center, and Sacramento River Settlement Contractors. In 2020, two workshops were held and included technical presentations related to proposed action activities, including the spring pulse flow scheduling, water temperature management plan, and habitat restoration.

Fall and Winter Refill and Redd Maintenance

Operation for the fall and winter periods of water year 2020 occurred prior to the February ROD; therefore, no annual reporting is provided. Future annual reports would address actions and results under the Proposed Action.

Spring Pulse Flows

The Proposed Action provides spring pulse flows up to 150 thousand acre-feet (TAF) if projected May 1 Shasta Reservoir storage is greater than 4 million acre-feet (MAF). A guidance document regarding planning and implementation of the pulse flow was developed in Spring 2020 and will be included in the Spring Pulse Flow Study Plan, currently under development through the Upper Sacramento Scheduling Team for use in 2021 pulse flow scheduling. The Spring Pulse Flow action was considered in WY 2020, but because May storage thresholds were not reached, the action did not occur.

NMFS included a limitation on spring pulse flows in RPM 1.b.

> *Reclamation shall not implement the Spring Pulse Flow if the release would cause Reclamation to drop into a lower Tier of the Shasta summer temperature managemen*t.

No spring pulse occurred in WY 2020; therefore, Reclamation was in compliance with its Proposed Action and the NMFS Biological Opinion.

Cold Water Pool Management

Reclamation operates a Temperature Control Device (TCD) on Shasta Reservoir in coordination with releases from Shasta Dam and imports from the Trinity River Basin to manage water temperatures downstream of Keswick Dam, primarily for winter-run Chinook salmon egg incubation and emergence. The Shasta Cold Water Pool Management LTO Implementation Guidance Document was completed on March 19, 2020 to provide the deliverables, schedule, and processes of different teams to implement operations for Cold Water Pool (CWP) Management. The Shasta Cold Water Pool Management Seasonal Report is attached as Appendix A and includes the Guidance Document. The Shasta Cold Water Pool Management Seasonal Report strives to provide an integrated view of the system and the factors affecting the coordinated operation of the CVP and SWP and focuses on actions taken specifically by Reclamation for Shasta Reservoir's cold water pool management. Key commitments from the Proposed Action, the measured incidental take, and relevant RPMs are identified below.

The NMFS ITS identified the incidental take anticipated from water temperature effects and from flow management of the operation of the Upper Sacramento River (Shasta and Sacramento Division; NMFS Biological Opinion, page 800). The ITS recognizes the role of hydrology and meteorology in determining egg-to-fry survival. NMFS estimated incidental take due to water temperature dependent mortality based on an average plus one standard deviation of modeled temperature dependent mortality. NMFS further recognizes the role of drought and include as part of incidental take, two consecutive years of egg-to-fry survival of less than 15 percent followed by a third year of less than 21 percent based on fry production at Red Bluff Diversion Dam. These levels of incidental take were not exceeded.

February Projection of Water Operations

The majority of precipitation falls in February and March; however, the first information on the potential water year is provided at the end of January. Reclamation included in the Proposed Action and NMFS included RPM 1.e.:

> *In February of each year, Reclamation shall create and post a projection of water operations, as described in [Appendix C] of the biological assessment.*

Reclamation provided a projection of water operations to NMFS as part of the Sacramento River Temperature Task Group meeting on February 27, 2020.

Commitment to Cold Water Management Tiers

The Proposed Action developed a strategy for managing scarce cold water resources. A Tier 1 year has sufficient cold water to meet temperature targets for the duration of the temperature management season. For the warmer tiers (Tiers 2-4), the Proposed Action describes how to conserve cold water in order to target water temperatures that maximize winter-run Chinook salmon redd survival while reducing the risk of insufficient cold water at the end of the season.

The closer Shasta Reservoir is to full by the end of May, the greater the likelihood of being able to meet water temperature targets throughout the entire water temperature control season. Reclamation uses the information developed in May for a temperature management plan, but material water deliveries under Reclamation's water service and repayment contracts start to occur before the plan in complete. To accommodate the mismatch in timing, the Proposed Action provides for the Tier to be determined based on May 1 storage and that, "Once the initial tier is selected by May 15th, Reclamation will not cause a shift into a warmer tier during real-time implementation of the Shasta Cold Water Management Plan except in the event of responding to emergency and/or unforeseen conditions."

Tier 3 conditions were identified in the Sacramento River Temperature Management Plan, which is provided as part of the Shasta Cold Water Pool Management Seasonal Report (Appendix A). Reclamation did not cause a shift into a warmer tier during real-time implementation. Reclamation operated consistent with the Proposed Action.

Sacramento River Temperature Management Plan

To obtain technical assistance on the management of the Cold Water Pool in Shasta Reservoir, Reclamation included collaborative development of a Temperature Management Plan in the Proposed Action, and NMFS included RPM 1.a:

> a. *In coordination with NMFS and the Sacramento River Temperature Task Group, Reclamation shall consider technical assistance from NMFS regarding the development of annual temperature management plans, regardless of Shasta storage or tiered temperature management stratum. Reclamation shall submit the final temperature management plan to NMFS by May 20 of each year.*

Reclamation coordinated with NMFS through the Sacramento River Temperature Task Group and completed the Sacramento River Temperature Management Plan on May 20, 2020. It is provided as part of Appendix A.

Upper Sacramento Performance Metrics

The Proposed Action includes Upper Sacramento Performance Metrics. The objective of these performance metrics is to ensure that the conditions are protective of listed species. The Upper Sacramento Performance Metrics are included in the Shasta Cold Water Pool Management Guidance Document in Appendix A. The performance metrics also include a Hindcast Analysis of Survival (Biological Assessment page 4-37). The objective of the annual and multi-year hindcast evaluations is to:

- Meet performance metrics objectives and expectations. Identify if results reflect the modeled and analyzed results and show a tendency towards performing as least as well as modeled;

- Evaluate whether either the total egg to fry survival or the temperature dependent mortality exceeded the Tier objective; and
- Contribute to determining whether an independent review of the year is required.

NMFS required as RPM 1.d.:

> *By February of each year, Reclamation shall provide a hindcast report of temperature-dependent mortality for winter-run Chinook salmon based on realized temperature management.*

For WY 2020, the hindcast evaluation and performance metrics are included in the Shasta Cold Water Pool Management Seasonal Report (Appendix A).

Conservation Measures

The Proposed Action included conservation measures to avoid and minimize or compensate for CVP and SWP project effects, including take, on listed species as well as contribute to the recovery and enhancement of species and their habitats. These measures may also improve production, growth, and survival of listed species.

- **Rice Decomposition Smoothing:** The Rice Decomposition Smoothing LTO Implementation Guidance Document completed on May 21, 2020, describes operation scenarios to coordinate implementation of fall and winter operations. Reclamation entered into agreements with Princeton Codora-Glenn Irrigation District, Sutter Mutual Water Company, Reclamation District 108, Provident Irrigation District, Natomas Central Mutual Water Company, and Glenn-Colusa Irrigation District to smooth diversions for rice decomposition. Flows were coordinated through the Upper Sacramento Scheduling Team, which developed flow schedules related to the fall and winter flow refill and redd maintenance and rice decomposition smoothing activities and considered the estimated number of redds dewatered associated with the flow schedules. A modified flow schedule was selected to minimize winter-run Chinook salmon redd dewatering, while balancing stabilizing flows for fall-run Chinook salmon redds, and support other requirements. Operations for rice decomposition smoothing are forthcoming in WY 2021.
- **Spring Management of Spawning Locations:** Reclamation will coordinate with NMFS to establish experiments on water temperatures and the timing of spawning. With the new ROD, the spring management of spawning locations action was not taken in 2020. A guidance document is being developed for 2021.
- **Temperature Modeling Platform:** The Proposed Action included: a collaborative model development effort to develop a new temperature model for the Upper Sacramento River (Shasta and Keswick reservoirs).

  NMFS included as RPM 1.c.:

  > *...Reclamation shall develop a stratification model for Shasta Reservoir and evaluate this model for implementation as part of the development of annual temperature management plans. The initial stratification model shall be available for pilot application and evaluation no later than January 1, 2022, unless NMFS and Reclamation agree to extend the date. At the end of the three-year period starting once the stratification model is available, Reclamation and NMFS shall submit the model to*

the Four-Year Review Panel for advice on the model's accuracy and utility as a forecasting tool, and Reclamation will decide whether implementation is appropriate.

The Temperature Model Platform for the CVP charter was completed in June 2020. The charter established the goals, objectives, purpose and scope of work to be performed. Reclamation awarded a 3-year contract to Watercourse Engineering Inc. in October 2020. Reclamation is developing a workplan for a two-phased effort.

- **Shasta Temperature Control Device Performance Evaluation:** Reclamation will coordinate with NMFS to study whether there are problems or limitations with the function of the Temperature Control Device under low storage conditions, and, if necessary, identify potential actions and/or modifications for improving the operational efficiency of the Temperature Control Device. The draft charter is currently being developed and is expected to be completed in 2021.
- **Lower Intakes near Wilkins Slough:** This action will lower irrigation pump intakes to insure they remain screened and operational at Sacramento River flows of roughly below 5,000 cfs. The Lower Intakes near Wilkins Slough charter was finalized October 8, 2020.
- **Spawning & Rearing Habitat Restoration:** During 2019, Reclamation partnered with the U.S. Fish and Wildlife Service, Chico State University, Sacramento River Forum, Settlement contractors, Yurok Tribe, River Partners, and California Department of Fish and Wildlife to complete three habitat projects along the upper Sacramento River.

  Reclamation and partners constructed the Anderson River Park Side Channel Phase I project. This added 1,500 meters of salmonid rearing and spawning habitat in a restored side channel. The project seeks to provide more juvenile rearing habitat, particularly during lower flow periods in the fall through winter, when this type of habitat is limited in the upper river.

  Reclamation and partners constructed Phase II of the Rancheria Island Side Channel. This project excavated 3,500 meters of side channel habitat. The restored side channel incorporates pools, riffles and woody material to provide ideal juvenile Chinook salmon and steelhead habitat. The project provides perennial flow through more than two miles of channel which was previously a backwater of the Sacramento River comprised of non-native vegetation and fish.

  Reclamation and partners constructed the Rio Vista Side Channel near Red Bluff. This created 500 meters of juvenile rearing habitat in a new perennially flowing side. The project incorporated woody material and added excavated material into the main Sacramento River channel as a source of coarse sediment to maintain spawning and rearing habitats.

  These spawning and rearing habitat restoration projects have their own ESA compliance.

- **Small Screen Program:** Under the Small Screen Program, Reclamation and DWR work together within existing authorities to screen small diversions throughout the Central Valley, CVP/SWP streams, and the Delta. A Small Screen Program Project Charter is currently being developed and is expected to be completed by the end of December 2020.
- **Tier 4 Intervention Measures:** Tier 4 did not occur in 2020 operations, and therefore, Adult

Rescues, Juvenile Trap and Haul, and a Directors Meeting were not necessary. However, the Livingston Stone National Fish Hatchery (LSNFH) Production intervention measure occurred in 2020. Due to concerns of a Tier 4 year during the winter of 2020, the state and federal fishery agencies evaluated LSNFH production intervention options. In 2020, the hatchery increased the female broodstock winter-run Chinook salmon production resulting in approximately 100,000 additional fry at LSNFH, derived from these concerns. Refer to the Shasta Cold Water Pool Management Seasonal Report (Appendix A) for more information.

- **Battle Creek Salmon and Steelhead Restoration Project and Battle Creek Reintroduction Plan:** The Proposed Action included a collaborative effort among several federal and state agencies and Pacific Gas & Electric Company to reestablish approximately 42 miles of prime salmon and steelhead habitat on Battle Creek, and an additional six miles on its tributaries. The partnership provides a framework for expanding Winter-run Chinook salmon spawning to cold water habitat in Battle Creek.

  NMFS required as RPM 1.f.:

  > *Reclamation shall work with NMFS, USFWS, and CDFW to complete a Battle Creek Acceleration Plan by December 31, 2020. The plan shall address the Battle Creek Salmon and Steelhead Restoration Program and the Battle Creek Winter-run Chinook Salmon Reintroduction Plan, and work with USFWS to identify Livingston Stone National Fish Hatchery facility improvements necessary to support the Battle Creek Winter-run Chinook Salmon Reintroduction Plan.*

  A Battle Creek Reintroduction and Restoration charter was completed in July 2020. In November 2020, PG&E is expected to complete a draft new Phase 2 FERC license amendment application for removal work only. A new Phase 2 license amendment application triggers the need for a new Phase 2 Water Quality Certification and a new Phase 2 Biological Opinion. The Phase 2 contract to remove South Diversion Dam, South Canal, Soap Creek Feeder Diversion Dam and Lower Ripley Creek Feeder Diversion Dam is planned to be awarded in November 2022.

  Reclamation accelerated the Battle Creek Salmon and Steelhead Restoration Project with an additional $1 million in funding in fiscal year (FY) 2020. The Battle Creek Salmon and Steelhead Restoration Project November 2020 update is included as (Appendix B).

- **Winter-Run Chinook Salmon Conservation Hatchery Production:** In WY 2020, LSNFH produced winter-run Chinook salmon for both CVP mitigation and the Battle Creek "Jumpstart" reintroduction program. For CVP mitigation, LSNFH produced 320,138 fry from 171 adult fish (96 males and 75 females spawned) collected at the Keswick Fish Trap. For Battle Creek reintroduction, LSNFH produced 145,579 fry from 83 adult fish (52 males and 31 females spawned) collected at the Keswick Fish Trap (these fry were transferred to Coleman National Fish Hatchery). LSNFH also produced 107,183 eyed eggs from 212 captive broodstock adults (76 males and 136 females spawned), which were transferred to Mt Lassen Trout Farm, as part of the "Jumpstart" program. Refer to the Shasta Cold Water Pool Management Seasonal Report (Appendix A) for more information.
- **Non-Flow Projects for Salmonids**: During consultation, Reclamation agreed to include specific non-flow projects:
    - Deer Creek Irrigation District Dam (DCID) Fish Passage: This action is complete.

- Knights Landing Outfall Gates: Knights Landing Outfall Gates is a positive fish barrier to prevent migrating salmon from entering into and getting trapped in the Colusa Basin Drain. In 2016, an operational failure at the Knights Landing Outfall Gates led to the collapse of the fish barrier. Funding has been provided for 2021 construction to reconstruct the fish barrier hoist system and electric controls.

Conclusion

This report and the seasonal reports, guidance documents, and other documentation indicate that Reclamation and DWR are in compliance with the 2019 NMFS and USFWS biological opinions and the 2020 Reclamation ROD. The first year of implementation of the 2019 NMFS and USFWS biological opinions and 2020 ROD, levels of incidental take were not exceeded for the Sacramento River. Reinitiation of consultation was not necessary for WY 2020.

The 2020 Temperature Management Plan detailed a Tier 3 performance category and specified both temperature targets and compliance locations at Clear Creek and Balls Ferry. Reclamation's hindcast temperature dependent mortality estimates ranged from 3.0% to 7.2% in WY 2020; these results indicate that the Tier 3 Upper Sacramento River Performance Metric for temperature dependent mortality were met. Additionally, the Tier 2 performance metric for temperature dependent mortality was also met. As performance metrics were met and levels of incidental take were not exceeded there was no need for an independent panel review for WY 2020. The hindcast analyses in Appendix A also did not identify the need for an independent panel.

The conclusions may identify clarifications that were necessary and provides recommendations to improve the Proposed Action and Incidental Take Statements. Following WY 2020, there were no clarifications that were necessary, or any recommendations for the Sacramento River at this time.

Clear Creek

Clear Creek, from Whiskeytown Reservoir to its confluence with the Sacramento River, includes CV Spring-run Chinook salmon and CCV steelhead and their critical habitats.

Figure 2. Newly constructed channel as part of Phase 3C. (Photo credit: Derek Rupert, Reclamation)

Appendix C provides the Clear Creek Technical Team Summary of Activities for WY 2020. This document includes background and description of management actions in WY 2020, including, minimum base flows, spring attraction flows, channel maintenance flows, fish habitat restoration and management (augmentation of 6,407 tons of coarse sediment ("gravel"), 8 boulders, and 14 pieces of large wood), water temperature management, construction of the Clear Creek Phase 3C Restoration Project, and fisheries monitoring.

Reclamation's operation of Whiskeytown Dam in the Trinity Division in Clear Creek will create stressors of water temperature and flow changes that is reasonably expected to result in take of CV spring-run Chinook salmon and CCV steelhead (NMFS Biological Opinion, page 803).

Water Temperatures

The extent of take is measured by the appropriate life stage habitat between Whiskeytown Dam and the Igo gauge exposed to water temperatures that exceed the proposed temperature management target (2019 NMFS Biological Opinion, page 804).

In WY 2020, mean daily water temperatures at Igo remained below the water temperature criterion 60° F at the Igo temperature gauge for 100% of the 107-day adult holding period (June 1 – September 15). During the spawning/incubation criteria period (September 16 - October 31), mean daily water temperatures at the Igo temperature gauge were maintained below 56° F for 34 of 46 days (74%). The daily temperature exceedances were relatively minor, with mean water temperatures within 1 F° of the 56° F criterion.

WY 2020 was a "dry" year coupled with hot and dry environmental conditions, making water temperature management difficult. Considering these difficulties, water temperatures during the temperature management season (June 1-October 31) were below or near the criterion, with overall conditions generally suitable when compared to past years. The level of incidental take anticipated from water temperature effects described in the 2019 NMFS Biological Opinion was not exceeded in WY 2020.

NMFS included as RPM 2:

a. *To minimize incidental take under 60° F daily average water temperature criteria for adult CV spring-run Chinook salmon holding, and 56° F daily average water temperature criteria for CV spring-run Chinook salmon egg incubation, Reclamation shall, consistent with the proposed action and in consideration of Shasta Cold Pool Management:*

    i. *Continue maintenance of temperature control curtains (Oak Bottom and Spring Creek) in Whiskeytown Reservoir.*

    ii. *Through coordination with the Clear Creek Technical Team, consider real-time species information when making decisions regarding operational adjustments.*

    iii. *In critical years, Reclamation shall coordinate with NMFS through Clear Creek Technical Team and/or the Sacramento River Temperature Task Group on the timing, frequency, duration and magnitude of flows below 150 cfs.*

The Oak Bottom and Spring Creek Temperature Control Curtains remained in place and operational during WY 2020. The curtains are relatively new and there were no observations of the curtains being damaged. Further monitoring did not occur due to challenges with the COVID-19 and staffing. The Spring Creek Curtain is in place to provide cooler water to Keswick Reservoir, via the Spring Creek tunnels. The Oak Bottom curtain discourages the mixing of cold water coming from the Carr Tunnels with the warm epilimnion of the Whiskeytown reservoir, helping to extend the cold water pool resource through the summer months.

Coordination occurred between the Clear Creek Technical Team (CCTT) and Reclamation's Central Valley Operations office (CVO) during the WY 2020 water temperature management period and pulse flow development. The USFWS, CDFW, and Reclamation provided real-time fish data (e.g. weir passage, spawning sightings) to evaluate options when making operational adjustments at Whiskeytown Dam.

WY 2020 was not a critical year.

Flow Changes

The anticipated level of take associated with spring attraction and channel maintenance pulse flows would be exceeded in non-critical years if flows in Clear Creek, as measured at Igo, are lower than 200 cfs between October 1 and May 31 and 150 cfs from June 1 to September 30 (2019 NMFS Biological Opinion, page 804).

In WY 2020, Clear Creek's minimum base flows were met or exceeded throughout the year. The level of incidental take relative to take anticipated from flow management described in the 2019 NMFS Biological Opinion was not exceeded in WY 2020.

NMFS included as RPM 2.d.:

a. *To minimize the adverse effects of flow fluctuations associated with CVP-controlled water operations on all life stages of listed anadromous fish species in Clear Creek, Reclamation shall:*

    i. *Coordinate flow release schedules with NMFS, USFWS, and CDFW via Clear Creek Technical Team or a comparable inter-agency fish monitoring group.*

Flow scheduling in WY 2020 was coordinated with the CCTT. These coordinated flow management actions included Minimum Base Flows, Water Temperature Management, and Spring Pulse Flows. Channel Maintenance Flows were discussed but not implemented, as it was a dry year.

Segregation Weir

NMFS additionally required as RPM 2.c.:

> *Reclamation shall continue implementation of a weir annually to separate CV spring-run Chinook salmon and fall-run Chinook salmon during spawning to minimize the effects of redd superimposition and hybridization.*

The segregation weir was successfully installed and operated between August 21 and November 1 of this year to separate CV spring-run Chinook salmon and fall-run Chinook salmon during spawning.

Temperature Modeling Platform

NMFS additionally required as RPM 2.b.:

> *Reclamation shall ensure that the proposed temperature modeling platform for the Sacramento River will consider Clear Creek system, including Whiskeytown Reservoir, to enable better temperature forecasting and planning in Clear Creek. Reclamation shall undertake a study to collect and analyze temperature data in Whiskeytown Reservoir and Clear Creek to determine the magnitude and potential impact on temperatures from power peaking and flat loading of hydropower production. The data collected shall be analyzed and shared with NMFS and considered for implementation in the temperature model.*

The Temperature Model Platform for the CVP is discussed above under Conservation Measures in the Proposed Action.

Conclusion

This report is the first under the 2019 NMFS and USFWS Biological Opinions and 2020 Reclamation ROD. This report and the seasonal reports, guidance documents, and other documentation indicate that Reclamation and DWR are in compliance with the 2019 NMFS and USFWS Biological Opinions and the

2020 Reclamation ROD. Neither reinitiation of consultation nor independent panel review were necessary for WY 2020.

WY 2020 was a "dry" year coupled with hot and dry environmental conditions making water temperature management difficult. Considering these difficulties, water temperatures during the temperature management season (June 1-October 31) were below or near the criterion, with overall conditions generally suitable when compared to past years. The level of incidental take relative to take anticipated from water temperature effects described in the 2019 NMFS Biological Opinion was not exceeded in WY 2020.

Two spring attraction pulse flows were provided from Whiskeytown Dam. Channel maintenance flows were not applicable in WY 2020, as it was a "dry" year. Fish habitat restoration actions continued with the construction of the Phase 3C restoration project. For WY 2020, there were no clarifications that were necessary, or any recommendations identified to improve implementation of the Biological Opinions and ROD in the Clear Creek watershed.

Feather River

The Oroville Complex (Oroville Dam and related facilities, including the Feather River Fish Hatchery) is part of the SWP. DWR has been operating the Oroville Complex under a Federal Energy Regulatory Commission (FERC) license and is currently undergoing a relicensing process (FERC Project No. 2100-134). USFWS and NMFS completed section 7 consultations and issued biological opinions to FERC regarding the effects of relicensing the Oroville Complex for 50 years on April 9, 2007 and December 5, 2016, respectively. Because the effects of operation of the Oroville Complex were considered in these consultations with FERC, the Relicensing the Oroville Facilities Hydroelectric Project Biological Opinions are incorporated here by reference to satisfy the ESA section 7(a)(2) responsibility as a component of ongoing operations of the CVP.

American River

The American River, from Lake Natoma downstream to its confluence with the Sacramento River, includes Folsom Reservoir, Lake Natoma, and the American River. It includes CCV steelhead and its critical habitat.

Figure 3. Sailor Bar on the lower American River during 2019-20 steelhead redd survey. (Photo credit: Jamie Sweeney, Cramer Fish Sciences)

Folsom and Nimbus reservoirs seasonal operations follow a set of objectives. During winter, Reclamation operates for flood control and building storage, considering both the channel capacity within the lower American River and Folsom Reservoir flood conservation space. During spring, Folsom Reservoir continues to build additional storage until flows are needed to support instream demands on the lower American River, Delta requirements and other CVP needs. Summer operations are focused around water temperature control, instream demands, Delta outflows and exports. Fall operations are guided by water temperature control, instream demands and fish spawning habitat. The American River Group (ARG) Annual Summary of Activities report is pending as Appendix D.

Water Temperature Management

The ARG Annual Summary of Activities describes water temperature management for the WY 2020 (pending Appendix D). Reclamation developed a draft water temperature management plan (Lower American River Temperature Plan) in April 2020 based on forecasted conditions for the summer through fall water temperature management season. The temperature plan was provided to the ARG for review and comment. In May 2020, Reclamation finalized the temperature plan. Reclamation reviews and updates the Lower American River Temperature Plan, typically monthly based on current hydrology. These updated plans are reviewed and commented on by ARG. Updated monthly operations forecasts, in conjunction with an iterative water temperature modeling approach, are used as decision-support tools to demonstrate what water temperatures could be attained in the lower American River. As conditions changed operations were adjusted to improve conditions in the American River.

Conservation Measures

Reclamation included conservation measures in the Proposed Action, that were adopted in the ROD, to avoid and minimize or compensate for CVP and SWP project effects, including take, on listed species. These measures may also improve production, growth, and survival of listed species.

Spawning and Rearing Habitat Restoration

There was no construction for spawning and rearing habitat restoration projects in the American River in WY 2020.

Nimbus Fish Hatchery

Reclamation executed a five-year financial assistance agreement with CDFW in September 2020 for continued operation and maintenance activities at Nimbus Fish Hatchery. A Nimbus Fish Hatchery – Hatchery and Genetics Management Plan (HGMP) charter document was completed in August 2020. The charter establishes the goals and objectives for upcoming development of Chinook salmon and steelhead HGMPs. Construction of the Nimbus Fish Ladder Project is expected to be completed in early 2021.

Drought Temperature Management

WY 2020 was classified as Dry, as defined by the Sacramento Valley 40-30-30 index WY hydrologic classification (SWRCB D-1641). Because there have not been recent multiple years of Dry/Critical year types or drought conditions nor has a drought emergency been declared by the Governor of California, Reclamation and DWR did not implement Drought Temperature Management actions in WY 2020.

Incidental Take Statement

Reclamation's proposed action in the American River Division will create circumstances of water temperature and flow that are reasonably expected to result in take of CCV steelhead (NMFS Biological Opinion, page 805).

- Water Temperature:

Suboptimal water temperatures in the American River are expected to result in reduced survival during egg-to-fry life stage and reduced growth for the juvenile rearing and smolt emigration life stages for CCV steelhead. The extent of take associated with suboptimal water temperatures is all redds exposed to

temperatures above 54° F in the vicinity of Watt Avenue December 1 through May 31. The anticipated level of take of CCV steelhead during the egg-to-fry life stage during these months is expected to be minimal because of the small proportion of eggs or alevins still incubating in the month of May. The level of take of CCV steelhead juvenile life stage will be exceeded if temperatures at Watt Avenue exceed 68° F from May 15 to October 31 for more than seven consecutive days unless it is a critical year based on the Sacramento Valley index or a year following one or more critical years. In critical years, and years immediately after a critical year, anticipated level of take is exceeded if temperature exceeds 68° F at Hazel Avenue (NMFS Biological Opinion, page 805).

The extent of take is measured by the appropriate life stage habitat between Nimbus Dam and the Watt Avenue exposed to water temperatures that exceed the proposed water temperature management target. The ecological surrogate to define the amount or extent of take in the American River is both the magnitude and frequency of suboptimal water temperature in the reach from Nimbus Dam to Watt Avenue. (2019 NMFS Biological Opinion, page 805).

In WY 2020, water temperature criteria were met at Watt Avenue. WY 2020 was a "dry" year coupled with hot and dry environmental conditions making temperature management difficult. Considering these difficulties, water temperatures during the water temperature management season (June 1-October 31) were below or near the thresholds, with overall conditions generally suitable when compared to past years. The level of incidental take relative to take anticipated from water temperature effects described in the 2019 NMFS Biological Opinion was not exceeded in WY 2020.

- Flow Changes:

The anticipated level of take associated with flow changes will be exceeded if flow decreases occur at a rate greater than the ramping rates described in the proposed action, with the exception of flood control or emergency conditions. Take will be exceeded if flows are higher than 50,000 cfs in the American River during January to May with the exception of flood control or emergency conditions (NMFS Biological Opinion page 806).

In WY 2020, the planned minimum flows of the Proposed Action Flow Management Standard were met or exceeded throughout the year. The level of incidental take relative to take anticipated from flow management described in the 2019 NMFS Biological Opinion was not exceeded in WY 2020.

Reasonable and Prudent Measures

This section of the 2020 Annual Report describes compliance with the RPMs of the 2019 NMFS Biological Opinion. The 2019 USFWS Biological Opinion did not include RPMs for the American River. The 2019 NMFS Biological Opinion included the following RPM (and associated Terms and Conditions) to minimize impacts of incidental take of the listed fish species in the American River:

RPM 3: Reclamation shall minimize the impact of the amount or extent of incidental take of listed species during operations of the American Division.

a. Seasonal operational decisions that affect water temperature and river flows shall be coordinated through the American River Group.

Operational decisions made by Reclamation concerning lower American River temperature management, flow schedule development and implementation and pulse flow development were communicated and coordinated with the ARG throughout this reporting period. NMFS, CDFW,

Reclamation and other ARG stakeholders provided real-time fish data to evaluate options when making operational adjustments at Folsom Dam.

Spring Pulse Flow:

Fisheries agencies proposed a water and power neutral mini-pulse flow event in April 2020 which was approved and implemented in an effort to introduce hydraulic variability on the lower American River and help fall-run Chinook salmon outmigrate from the lower American River. The initial pulse called for a reduction down to 1000 cfs but was modified to 1200 cfs due to potential stranding caused by the reduction. Reduction to 1200 cfs was held for five days to ensure total mini pulse action remained water neutral. There was a consensus by the ARG not to implement a second water/power neutral mini-pulse in May 2020 because of the likely limited benefits to fall-run Chinook salmon versus the risk of additional stranding. No spring pulse flow, as defined in the Proposed Action and adopted in the ROD, was required during WY 2020 because of the dry hydrology.

Water Temperature Management:

In May 2020, Reclamation developed a Lower American River Temperature Management Plan with feedback from the ARG. This plan was updated monthly based on current hydrology and with feedback from the ARG. During the water temperature management season, short exceedances occurred above the summer temperature objective of 68° F at the Watt Avenue compliance point in August and September due to unexpected elevated ambient air temperatures and extended lag time for Folsom Dam operational changes (release of additional cold water) to impact lower American River compliance points. When water temperature exceedances were identified, steps were taken to bring the temperatures in the lower American River under 68° F. The summer of 2020 was unusually hot, and as a result, Reclamation made multiple adjustments to in-river temperature operations throughout these exceedance periods to reduce water temperatures to the 68° F objective. The extent of incidental take was minimized in accordance with RPM 3.

Monthly ARG Meeting:

Monthly ARG meetings typically take place on the 3rd Thursday of each month and the ARG is a venue for various stakeholders to provide input on hydrologic, operational, biological, and water temperature management, as well as provide fisheries monitoring information. Reclamation takes this input into consideration when making operational decisions. Monthly ARG meeting notes are taken and posted to the ARG webpage.

https://www.usbr.gov/mp/bdo/american-river-group.html

Fisheries Management Discussions:

Periodic discussions took place outside of ARG monthly meetings between Reclamation, the fisheries agencies and other ARG stakeholders. The purpose of these meetings was to discuss lower American River fisheries management concerns and constraints with an emphasis on improving interagency communication and cooperation. Discussions took place on February 21, August 28, and September 18, 2020. Reclamation presented discussion summaries from these discussions to ARG.

Conclusion

This report is the first under the 2019 NMFS and USFWS Biological Opinions and 2020 Reclamation ROD. This report and the seasonal reports, guidance documents, and other documentation indicate that Reclamation and DWR are in compliance with the 2019 NMFS and USFWS Biological Opinions and the 2020 Reclamation ROD. Neither reinitiation of consultation nor independent panel review were necessary for WY 2020. The level of incidental take relative to take anticipated from flow management described in the 2019 NMFS Biological Opinion was not exceeded in WY 2020.

For WY 2020, there were no clarifications that were necessary, or recommendations identified to improve implementation of the Biological Opinions and ROD in the American River watershed.

Delta

The Delta includes Delta Smelt, winter-run Chinook salmon, spring-run Chinook salmon, Central Valley steelhead, and sDPS North American green sturgeon. Operations involve the Delta Cross Channel (DCC) gates, Suisun Marsh Salinity Control Gates (SMSCG), diversion facilities (Jones Pumping Plant and Banks Pumping Plant, Barker Slough, North Bay Aqueduct, Contra Costa CVP facilities), and construction of agricultural barriers (Figure 4).

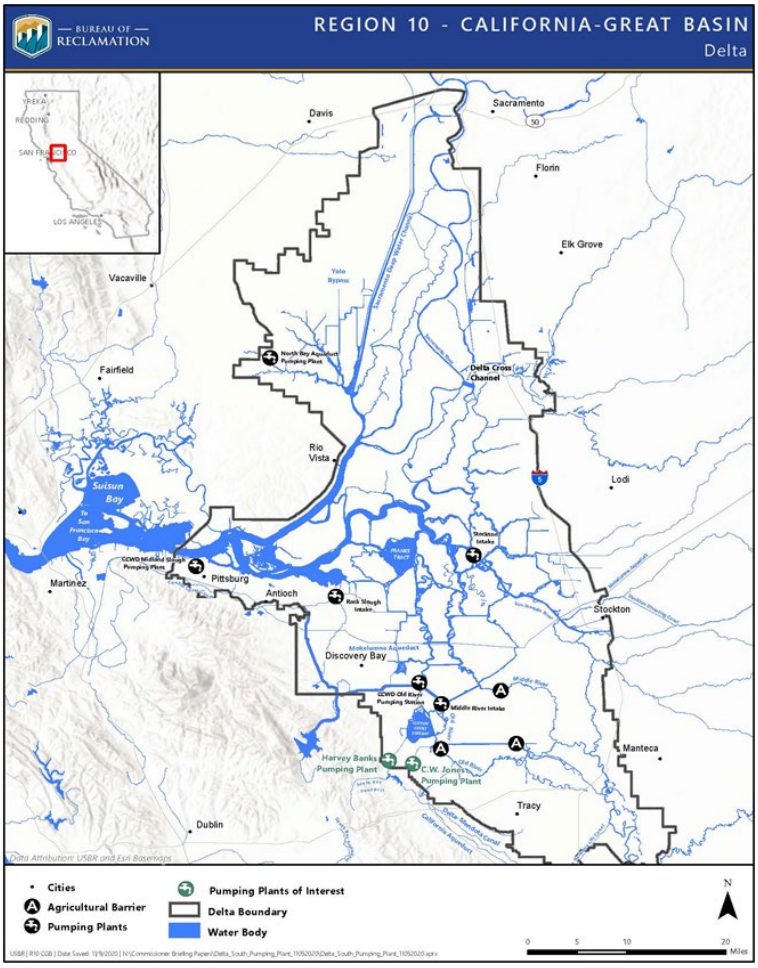

Figure 4. Map of the Delta with CVP and SWP Infrastructure.

Key operational components of the Proposed Action include closure of the DCC gates, export reductions to manage of Old and Middle River (OMR) reverse flows, and the Delta Smelt Summer and Fall Habitat Action.

Delta Cross Channel

Reclamation closes the DCC gates to prevent the entrainment of fish from the Sacramento River though the DCC and into the Central Delta. Survival in the Central Delta is poor, and fish are at greater risk of entrainment into the poor habitat conditions of the South Delta. The DCC Guidance Document describes the implementation guidance on DCC gate operation in coordination with NMFS, USFWS, and CDFW. The OMR Flow Management Seasonal Report (Appendix E) describes DCC Operations during WY 2020 and includes the guidance document. The Proposed Action described closures by calendar date and action triggers from the Knights Landing Catch Index and the Sacramento Catch Index. The anticipated level of take will be exceeded if the number or duration of openings exceed those described in the Proposed Action (NMFS Biological Opinion, page 809).

Reclamation included in the Proposed Action and NMFS required as RPM 5.d.:

i. *Action Triggers – Water quality criteria per D-1641 are met and either the Knights Landing Catch Index or Sacramento Catch Index is greater than five fish per day. Action Responses – Within 48 hours, close the Delta Cross Channel gates and keep closed until the catch index is less than three fish per day at both the Knights Landing and Sacramento monitoring sites (NMFS Biological Opinion, page 417).*

The DCC gate operations followed the schedule described in the Proposed Action, including the D-1641 operations requirement and for WY 2020, Reclamation was in compliance.

Old and Middle Rivers

Net flow in the OMR provides a surrogate indicator for how export pumping at Banks and Jones Pumping Plants influence hydrodynamics in the south Delta. The management of OMR, in combination with other environmental variables, can minimize or avoid the entrainment of fish in the south Delta and at CVP. The OMR Guidance Document describes the implementation guidance in coordination with NMFS, USFWS, and CDFW. The WY 2020 OMR Flow Management Seasonal Report (Appendix E) describes operations during WY 2020 and includes the guidance document. The Incidental Take Report is included as Appendix H.

Salmonid entrainment levels did not trigger OMR reverse flow reductions and losses did not exceed thresholds.

On June 5, 2020, DWR released a memo detailing a change in how turbidity measurement units are reported in the California Data Exchange Center (CDEC) as part of Appendix E. The units for turbidity were updated from NTU (Nephelometric Turbidity Unit) to FNU (Formazin Nephelometric Units) to reflect actual field measurements. Reclamation and DWR have adopted FNU measurements, as appropriate.

NMFS required as RPM 9: *Reclamation and DWR shall implement a program to accelerate steelhead research and monitoring to develop juvenile population abundance estimates and consider using these estimates to develop revised incidental take levels and scale juvenile steelhead salvage and loss to a population abundance estimate.*

a. *Phase 1 (Beginning October 2020):*

   i. *Consistent with the proposed action, implement steelhead research and monitoring actions to develop a juvenile production estimate for steelhead-producing tributaries with CVP or SWP facilities.*

   ii. *Reclamation and DWR will coordinate with NMFS, CDFW, USFWS, CSAMP, and others as necessary, regarding juvenile production estimates on non-project tributaries.*

   iii. *Develop an initial report for consideration of the four-year panel review (2024).*

   iv. *Prepare summary report of population abundance estimates by September 2025.*

See section on "Steelhead Lifecycle Monitoring Program" and "San Joaquin Basin Steelhead Collaborative" below.

NMFS required as RPM 10*: Within 5 years, Reclamation and DWR shall assess a potential Delta Performance Objective for young-of-year CV spring-run Chinook salmon*

a. *Reclamation and DWR shall conduct a set of CWT-tagged juvenile Chinook salmon releases during winter and*

spring to provide increased information on presence and loss of Sacramento basin natural and hatchery spring run Chinook salmon through recovery in fishery and fish collection facility monitoring surveys.

b. *Develop an initial report for consideration of the four-year panel review (2024).*

c. *Prepare summary report of findings by September 2025.*

d. *Consider and revise incidental take estimate, based on new information.*

Reclamation in collaboration with DWR, NMFS, CDFW, and USFWS are preparing a charter document (Spring-Run Chinook Salmon Population Assessment and Delta Performance Measure Development Charter) to develop the most suitable measure, or set of measures, to assess Delta spring-run Chinook salmon populations consistent with the requirements of the NMFS Biological Opinion (RPM 10). The project will support development of Delta Performance Objective for young of the year spring-run Chinook salmon. The established project will track progress towards implementation of RPM 10 through technical teams.

OMR flows did not exceed those described in the Proposed Action and addressed in the ITS in the 2019 USFWS Biological Opinion. Single-year and cumulative loss thresholds were not exceeded. As flows and levels of incidental take were not exceeded,there was no need identified for an independent panel review for WY 2020.

USFWS required under RPM 1.3:

3. If it is determined that an independent panel is necessary to determine the efficacy of the proposed OMR Management actions, Reclamation shall seek technical assistance from the Service on development of the charter for that panel.

Exceedance of a single-year threshold or 50 percent of the cumulative loss threshold did not occur and the need for an Independent Review panel for WY 2020 was not identified.

USFWS required under RPM 1.4:

4. If Reclamation or DWR determine that a Turbidity Bridge Avoidance action is not necessary because the event is not believed to be related to an actual turbidity bridge, they will provide the supporting information, including the reason why the action is not warranted, within 24 hours, and the Service will respond within 24 hours. The action will be initiated until Reclamation, DWR, and the Service are in agreement that an action is not necessary.

The CVP and SWP export facilities operated to the Turbidity Bridge Avoidance action from February 18, 2020 through April 1, 2020. Incidental take under the ROD was not exceeded for WY 2020. For more information, see the OMR Flow Management Seasonal Report (Appendix E). Daily turbidity levels in Old River at Bacon Island did not exceed the 12 NTU threshold (read as FNU) during the action period in WY 2020.

USFWS required under RPM 1.5.:

Reclamation and DWR shall monitor OMR flow and turbidity levels (the surrogate

parameter identified in the Amount or Extent of Anticipated Take section) at locations identified in the PA on a real-time basis. Reclamation and DWR shall ensure monitoring stations have appropriate redundancy to reduce the likelihood of data collection failure due to malfunction. This information shall be made available to the Service on a real-time basis to document the management of the system. This can be done through Bay Delta Live or a similar system. If the Service determines that conditions have led to the exceedance of anticipated take, reinitiation would be required.

The required monitoring was in place for WY 2020, so Reclamation and DWR were in compliance.

USFWS required under RPM 1.6.:

> *Reclamation and DWR shall use Service life cycle models or other Service-approved models when available for the purposes of estimating proportion of the population affected by entrainment.*

Reclamation's operations were based on the Delta Smelt Life Cycle Entrainment Module (CGB-1000 2.2.4.21 dated March 13, 2020) in WY 2020 for the first time. Reclamation and DWR were therefore in compliance.

USFWS required under RPM 1.7.:

> *Reclamation shall seek technical assistance from the Service on the development of the charter for the independent panel for the proposed Four-Year Review of the "OMR management and measures to improve survival through the south Delta".*

An independent panel was not needed, as described above, and a Four-Year Review was not applicable for WY 2020. Development of the Independent Panel charter will include USFWS technical assistance; Reclamation is in compliance.

Tracy Fish Collection Facility and John E. Skinner Delta Fish Protective Facility

Reclamation screens fish from the Jones Pumping Plant with the Tracy Fish Collection Facility (TFCF).

NMFS required RPM 5.b.

i. *Reclamation and DWR shall monitor and calculate salvage and loss for winter-run Chinook salmon, CV spring-run Chinook salmon, CV fall-run Chinook salmon, CV late fall-run Chinook salmon, CCV steelhead, and salvage of sDPS green sturgeon at the Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility.*

    a. *Reclamation and DWR shall prepare and submit to NMFS daily reports from October 1 through June 30 of each water year (or provide data online) regarding the observations of both salmonids and sDPS green sturgeon in the fish salvage facilities. Daily salvage sheets and the operational information needed to calculate salvage and loss shall be provided to NMFS (to a list of recipients updated each water year) or made available online. If, during the period from July 1 to September 30, salmonids and/or sDPS green sturgeon are observed in salvage, Reclamation and/or DWR shall notify NMFS through electronic mail and include the daily salvage sheets and operational information, or direct NMFS to where this information is available online.*

b. During the October through June period of each water year, DWR and Reclamation shall prepare and submit to NMFS, Delta operations for salmonids and sturgeon and other relevant technical teams weekly reports summarizing salvage and loss over the previous week and for the water year to date (or provide data online).

c. No later than December 31, Reclamation and DWR shall submit to NMFS an annual report summarizing salvage and loss over the previous water year (October 1 to September 30).

ii. Reclamation and DWR shall undertake tissue sampling programs from natural origin salmonids, and coded wire tag samples from adipose fin-clipped juvenile winter-run Chinook salmon, CV spring-run Chinook salmon, and CCV steelhead and CV late-fall run Chinook salmon at the Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility, for genetic analysis or tag removal/reading pursuant to appropriate sampling protocols and statistical power analyses.

a. Reclamation and DWR shall submit incidental take reports from Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility by December 31 of each year, to include the genetic results of the tissue samples.

b. Reclamation and DWR shall develop and submit for review and concurrence by NMFS a plan for tissue and whole fish or head processing and storage by December 31, 2020.

The Standard Operating Procedures (SOP) for Fish Handling Related to the Collection, Sampling, Transport, and Release of Salvaged Fish at the CVP's TFCF was developed and submitted to NMFS and USFWS October 23, 2020 (Appendix F). The SOP describes protocols per RPM 5.c and tissue processing per RPM 5.b.ii.b. Reclamation is awaiting review and concurrence from NMFS on the portion of the SOP regarding RPM 5.b.ii.b.

The SOP for the Skinner Delta Fish Protective Facility was developed and submitted to NMFS and USFWS on May 8, 2020 (Appendix G)

NMFS additionally required RPM 5.c.

Reclamation and DWR shall minimize incidental take through the application of best management practices at the fish salvage facilities by developing coordinated protocols within 18 months of the effective date of this Opinion for the following three topics. Be the effective date of the Opinion, Reclamation and DWR shall provide the protocols currently being used.

i. Protocols for fish sampling and handling (from salvage through release), including a description of training procedures and the process for quality assurance and quality control of data.

ii. Protocols for daily estimation of salvage or loss for each ESA-listed anadromous fish that include relevant calculations and identify the data and information sources necessary to perform the relevant calculations used to estimate fish salvage or loss. Each facility shall include in their protocol a process to provide to NMFS, FWS, CDFW, DWR, and Reclamation staff the relevant data and information necessary to calculate fish salvage or loss. The protocol should specify whether and how pumping will be restricted during any salvage disruption, and whether and how salvage disruptions will be reflected in the estimation of salvage or loss. The protocol should include procedures used to implement the single year and cumulative loss thresholds for Delta operations.

iii. Procedures for reporting salvage and loss for each ESA-listed anadromous fish (or relevant surrogate), including a description of the general content, frequency, and distribution of reports. Salvage and loss shall be reported daily (excepting weekends and holidays) from October 1 through

June 30 and DWR and Reclamation shall submit to NMFS an annual report summarizing salvage and loss over the previous water year no later than December 31 of each year.

The SOP for CVP's TFCF is described above and in Appendix F. The SOP for the Skinner Delta Fish Protective Facility is Appendix G.

The Proposed Action included and USFWS required as RPM 1.1

Reclamation and DWR shall ensure the frequency of sampling for the south Delta export facilities (Banks and Jones) will be at least 25% of the time the export facilities are in operation. If this cannot be achieved, the Service shall be notified on a real-time basis.

USFWS required as RPM 1.2

2. Reclamation and DWR shall update and provide fish salvage protocols for Skinner Fish Facility and the Tracy Fish Collection Facility to the Service within 1 year of the issuance of this biological opinion. Annual reports of salvage activities will be submitted to the Service documenting the operation and monitoring activities of the fish salvage facilities.

Results are reported in the Incidental Take Report (Appendix H). Data were provided on CDFW's FTP site, to the Salmon Monitoring Team, and SacPAS: http://www.cbr.washington.edu/sacramento/.

Sampling is documented through the Salmon Monitoring Team here:
https://www.usbr.gov/mp/bdo/water-year-2020-rivertask.html

The Standard Operating Procedures (SOP) for Fish Handling Related to the Collection, Sampling, Transport, and Release of Salvaged Fish at the CVP's TFCF was provided to NMFS and USFWS October 23, 2020 (Appendix F).

The SOP for the Skinner Delta Fish Protective Facility was provided to NMFS and USFWS on May 8, 2020 (Appendix G).

A charter for the Skinner Delta Fish Protective Facility Operations is being developed and it is expected to be completed by the end of December 2020.

In WY 2020, Reclamation and DWR were in compliance.

Delta Smelt Summer-Fall Habitat

The Delta Smelt Summer-Fall Habitat Action is intended to improve Delta Smelt food supply and habitat, thereby contributing to the recruitment, growth, and survival of Delta Smelt. Reclamation and DWR formed the Delta Coordination Group (DCG) in coordination with CDFW, NMFS, and USFWS. WY 2020 was classified as Dry, as defined by the Sacramento Valley 40-30-30 index WY hydrologic classification (SWRCB D-1641). Since it was a Dry Year, Reclamation and DWR did not implement the Delta Smelt Summer-Fall Habitat Action. However, Reclamation, DWR, USFWS, NMFS, and CDFW developed the WY 2020 Delta Smelt Summer Fall Habitat Seasonal Report (Appendix I) that provides habitat and monitoring information on this non-action year. These data will provide a valuable comparison to future action years. As part of the core actions of the Proposed Action, Reclamation and DWR are working together to develop the Delta Smelt Summer-Fall Habitat action plan in coordination

with the Delta Coordination Group and will be available April 30, 2021 and will be used to support future actions.

NMFS additionally required RPM 5.i.:

> *Reclamation and DWR shall coordinate with NMFS through the Sacramento River Temperature Task Group temperature planning processes and the coordination group for the Delta Smelt Summer-Fall Habitat action regarding approaches to for using storage releases for the Delta Smelt Summer-Fall Habitat action.*

No Summer-Fall habitat action occurred in WY 2020.

USFWS included as RPM 2. *Minimize the adverse effects of habitat degradation in summer and fall by studying the effectiveness of the Summer-Fall Habitat Action implementation. As appropriate, representatives from Reclamation, DWR, CDFW, NMFS and the Service will participate in the Delta Coordination Group as part of this planning process.*

> 1. *Reclamation and DWR, in coordination with the Service and Delta Coordination Group, will define specific parameters for implementation of the Summer-Fall Habitat Action. Additionally, mutually agreeable methods for determining parameters for successful recruitment of delta smelt will be developed. These parameters shall include habitat acreages and population trends. This method shall be in place prior to implementation of the Summer-Fall Habitat Action.*
>
> *2. Reclamation and DWR shall provide annual reports documenting the planning, implementation, and monitoring of the Summer-Fall Habitat Action. In years that an action will be implemented, Reclamation shall provide a draft of the implementation plan to the Service by May 1 and a final report of the action by May 1 of the following year.*
>
> *3. Reclamation and DWR shall develop a monitoring plan to assess the efficacy of implementing the Summer-Fall Habitat Action. The plan shall be vetted by the Delta Coordination Group and included in the annual implementation plan. A full report of results shall be provided within one year of the completion of the action.*
>
> *4. Reclamation shall seek technical assistance from the Service on the development of the charter for the independent panel for the proposed Four-Year Review of "Delta Smelt Summer and Fall Habitat Actions".*
>
> *5. Reclamation and DWR will comply with all monitoring and reporting requirements as identified in the Reporting Requirements section.*

Reclamation and DWR, with review by the Delta Coordination Group, developed the Delta Smelt Summer-Fall Habitat Action Monitoring and Science Plan.

Details are provided in the WY 2020 Delta Smelt Summer Fall Habitat Seasonal Report (Appendix I). See above for more information the Delta Smelt Summer-Fall Habitat action. Reclamation will work with the USFWS on the charter for the independent panel Four Year Review of Delta Smelt Summer and Fall Habitat Actions, which will be documented in the appropriate annual report. For WY 2020, Reclamation and DWR were in compliance.

Suisun Marsh Preservation Agreement and Salinity Control Gates

Reclamation and DWR continued to implement the Suisun Marsh Preservation Agreement in WY 2020 to meet water quality standards in accordance with D-1641. WY 2020 was classified as Dry, as defined by the Sacramento Valley 40-30-30 index WY hydrologic classification (SWRCB D-1641). Thus, DWR operated the SMSCG to meet Table 3 salinity standards of SWRCB D-1641 for Suisun Marsh in a Dry Year. Also, since it was a Dry Year, Reclamation and DWR did not implement increased SMSCG operations, included in the Delta Smelt Summer-Fall Habitat Action. The SMSCG operations were operated in a manner consistent with the Proposed Action and the ROD; therefore, the anticipated level of take of listed salmonids and sDPS green sturgeon was not exceeded.

The Roaring River Distribution System (RRDS) and the Morrow Island Distribution System (MIDS) are used to deliver fresh water flowing into Montezuma and Suisun sloughs to adjacent wetlands and to drain water off of these wetlands. The use of these distribution systems entrains fish. The entrainment of delta smelt is based on the ecological conditions (i.e., fish screen approach velocities). The approach velocities at the RRDS fish screen are calculated using the stage information behind and in front of the fish screens. The flows are calculated automatically by the program controls, and the RRDS operators move the gates based on the calculated velocities. The approach velocity at the fish screens did not exceed the proposed maximum approach velocity of 0.2 ft/second and 0.7 ft/second during mid- September – mid October fall flood up operations. Since those conditions described were maintained, the amount or extent of the anticipated level in the 2019 USFWS Biological Opinion is not considered to be exceeded. For WY 2020, Reclamation and DWR were in compliance.

Agricultural Barriers

DWR installs agricultural barriers to increase water levels in the South Delta to support local non-project diversions. NMFS required RPM 5.h.

i. *DWR shall send notice of intent to construct the barriers to NMFS at least 14 days prior to start of construction. This information shall include anticipated start dates and completion dates for each of the barriers. In the fall, DWR shall provide NMFS with the anticipated schedule for removal of the barriers, and notification when the removal has been completed.*

ii. *DWR shall provide documentation to NMFS indicating the anticipated schedule for culvert operations, including potential early closures and water elevation conditions, by the completion of barrier installation each season. Updates to barrier operations shall be provided to NMFS on a weekly basis until mid-June.*

Starting on June 15, 2020 all three agricultural barriers (Middle River, Old River near Tracy and Grant Line Canal) were fully operational with all flap gates operating tidally. To provide passage for adult salmon, the Middle River and Old River Tracy Barriers were notched on September 14, 2020. Flashboards at the Grant Line Canal structure were also removed/adjusted on September 15, 2020.

Operation of the South Delta Temporary Barriers continued through November 1, 2020. DWR operated the Temporary Barriers Project in compliance with all applicable federal and state permits, for barrier removals in November, including the Temporary Barriers Program Biological Opinions and as described in the Biological Assessment Appendix A, Section A.5-2 Temporary Agricultural Barriers. Specific dates for implementation of the South Delta Temporary Barriers are described in the Biological Assessment Appendix A Table A.5-3 (page A-96). For WY 2020, Reclamation and DWR were in compliance.

Water Transfers

WY 2020 was a dry year following a wet year; therefore, the Proposed Action provided for up to 360 TAF of water transfers through CVP and SWP facilities from July 1 through November 30. The CVP and SWP supported 73.25 TAF of water transfers. Appendix J provides a table indicating which tributaries where transfers originated, the types of transfer, the estimated volume and the window of when the water became available. For WY 2020, Reclamation and DWR are in compliance.

Contra Costa Water District Operations – Rock Slough Intake Infrastructure and Operations

Reclamation included all diversions at the Rock Slough Intake (350 cfs capacity for the maximum annual diversion of 195 TAF) as part of the Proposed Action. Contra Costa Water District's (CCWD) operations in the Proposed Action are consistent with the separate biological opinions and remain unchanged from the current operations scenario. Due to high salinity under dry conditions, from February 1 to September 30, 2020, the maximum pumping from the Rock Slough Intake was 74 cfs, below the 350 cfs pumping limit permitted by the 2019 NMFS and USFWS Biological Opinions; the total diversions from Rock Slough Intake were 18.2 TAF, below the 195 TAF diversion limit permitted by the 2019 NMFS and USFWS Biological Opinions. For WY 2020, Reclamation was in compliance.

North Bay Aqueduct and Barker Slough Pumping Plant

The North Bay Aqueduct (NBA) serves communities in Napa County, Vallejo, Benicia, and Travis Air Force Base. NBA diversions are through Barker Slough Pumping Plant (BSPP). The Proposed Action described an annual maximum diversion of 125 TAF. WY 2020 annual diversions were 49.5 TAF. NMFS incidental take uses an ecological surrogate of the maximum diversion rate of 175 cfs (NMFS Biological Opinion, page 811) and the maximum diversion for WY 2020 was 92 cfs. USFWS incidental take used an environmental surrogate of 30 TAF for the months of March, April, and May (USFWS Biological Opinion, page 397). WY 2020 diversions for March through May was 10.1 TAF. Table 1 shows the monthly average diversions.

Table 1. BSPP monthly average diversions during WY 2020.

Month	Monthly average (cfs)	Monthly Volume (TAF)
October 2019	82	5,042
November 2019	92	5,474
December 2019	48	2,951
January 2020	32	1,968
February 2020	69	3,969
March 2020	8	492

April 2020	67	3,987
May 2020	91	5,595
June 2020	80	4,760
July 2020	78	4,796
August 2020	83	5,103
September 2020	90	5,355

For Sediment and Weed Control, NMFS additionally required RPM 5.e.

i. *Cleaning of sediment from in front of the fish screens shall occur during the summer in-water work window of July 1 through October 31 or if ambient water temperature is greater than 77° F.*

ii. *Observers shall be present during sediment cleaning to look for entrained fish in the dredge material discharge as it is pumped into the dredge spoils pit. Any observed fish shall be collected and identified to species. If the species is a salmonid, total body length shall be measured and assigned to race by length at date using the Delta model. Tissue samples shall be collected all natural origin salmonids, and coded-wire tag (CWT) samples from adipose fin-clipped juvenile winter-run Chinook salmon, CV spring-run Chinook salmon, and CCV steelhead, for genetic analysis or tag removal/reading pursuant to appropriate sampling protocols.. All observed sDPS green sturgeon shall be collected. Any living specimens shall be resuscitated if possible, and released away from the Barker Slough Pumping Plant facilities. All dead specimens shall be retained, frozen, and NMFS notified for final disposition.*

iii. *Cleaning of aquatic weeds from in front of the fish screens shall occur during the in-water work window of July 1 through October 31 or when ambient water temperatures are greater than 25oC.*

iv. *Observers shall look for any salmonids or sDPS green sturgeon entangled in the weed mass as it is placed in the trucks and as it is dumped in the disposal site area. Any observed fish shall be collected and identified to species. If it is a salmonid, total body length shall be measured and assigned to race by length at date using the Delta model. All observed sDPS green sturgeon shall be collected. Any living specimens shall be resuscitated if possible, and released away from the Barker Slough Pumping Plant facilities. All dead specimens shall be retained and NMFS notified for final disposition.*

v. *An annual report shall be sent to NMFS-California Central Valley Office by December 31 of each year for the previous water year's operations. The report shall contain information regarding the dates of sediment removal or vegetation cleaning, the number of observed fish, including the number of salmonids and sDPS green sturgeon, if any, and the final disposition of the fish. If salmonids are observed, the report shall include the body lengths and run assignments for each fish.*

Sub-paragraph iii. limits cleaning of aquatic weeds to the in-water work window of July 1 – October 31; however, the communities require water year-round. In 2020, significant aquatic weed infestations required a temporary modification granting cleaning operations to continue beyond October 31 while NMFS considers a permanent change.

Aquatic weeds were removed from the BSPP fish screens. All work occurred immediately in front of the fish screens and on top of the concrete apron that extents out into the Clifton Court Forebay. No weed

removal activities occurred outside of the embayment created by the floating booms. On September 9, DWR notified NMFS that weeds had been removed from the fish screens prior to the start of the permitted work window of July 1 through October 31 and without a biological monitor. Weed removal activities were temporarily suspended and resumed on September 11 with a biological monitor present. In September, a biological monitor thoroughly examined all of the removed aquatic weeds for any fish that may have become entangled in the aquatic weeds upon removal. No fish were present in the removed vegetation. DWR is now in compliance.

USFWS included as RPM 4.1. Minimize the adverse effects of the operation of the North Bay Aqueduct.

> *DWR shall ensure that regular fish screen maintenance is performed at the North Bay Aqueduct. This maintenance is necessary to avoid incidental take of juvenile and adult delta smelt and to avoid exceeding the incidental take of larvae. DWR shall annually report to the Service with details on fish screen maintenance at these facilities.*

No sediment removal activities occurred during the reporting period. On December 22, 2020, DWR provided USFWS maintenance and inspection reports for the fish screens at the NBA during WY 2020. The reports include maintenance and inspection logs, fish screen cleaning logs, and an underwater inspection of the intake at BSPP.

Clifton Court Aquatic Weed and Algal Bloom Management

DWR controls aquatic weeds and algal blooms in Clifton Court Forebay to avoid degrading drinking water quality through production of taste and odor compounds of algal toxins, prevent pump cavitation at Banks Pumping Plant, and reduce the mortality of ESA listed fish species. The Proposed Action limited the timing and magnitude of application. Beyond the commitments incorporated into the Proposed Action, NMFS additionally required RPM 5.g.:

i. *DWR shall provide notification of intent to conduct aquatic weed removal activities to NMFS at least two weeks prior to starting, including the types of herbicides intended to be used for that application and the areas that will be treated.*
ii. *DWR shall send copies of the water quality monitoring results for the concentration of herbicides in the Clifton Court Forebay following treatment to NMFS within 10 business days of DWR's receipt of the results.*
iii. *DWR shall report to NMFS any fish observed exhibiting unusual behavior or found dead or moribund following herbicide treatment within 10 business days of the incident. All dead specimens shall be retained and NMFS notified for final disposition.*

The Clifton Court Aquatic Weed and Algal Bloom Management action followed the time window described in the Proposed Action and adopted in the ROD and DWR is in compliance.

DWR, through Reclamation, notified and conferred with USFWS and NMFS on herbicide application in CCF scheduled for November 3, 2020.

Additional Conservation Measures

Reclamation included additional conservation measures in the Proposed Action, that were adopted in the ROD, to avoid and minimize or compensate for CVP and SWP project effects on listed species as well as

contribute to the recovery and enhancement of species and their habitats. These measures may also improve production, growth, and survival of listed species.

- **San Joaquin Basin Steelhead Telemetry Study:** During WY 2020, a team consisting of representatives from NMFS, University of California Santa Cruz (UCSC), University of Washington, U.S. Geological Survey, USFWS, and Reclamation met throughout the fall and early spring to refine the study design to implement the 2020 San Joaquin Basin Steelhead Telemetry Study. The study was cancelled during 2020 due to safety concerns related to COVID-19. As of November 20, 2020, an agreement is in place with UCSC to implement this study. New agreements with UCSC, USFWS, and University of Washington are being developed to continue this study. Acoustic telemetry data from this study will be available on the CalFish Track: Central Valley Enhanced Acoustic Tagging Project at: https://calfishtrack.github.io/real-time/index.html

- **Steelhead Lifecycle Monitoring Program:** Implementation of Stanislaus River steelhead life-cycle monitoring started in September 2020. Early implementation phases included development of research and monitoring plans for target life stages and acquisition of state and federal biological permits to support field monitoring. Juvenile steelhead life-cycle monitoring is scheduled to begin as early as February 2021 and will include installation and operation of stationary Passive Integrated Transponder (PIT) tag antennas, biological sample collection (i.e. fin tissue and scales), and implementation of genetic-based mark-recapture field study. Adult monitoring and egg-to-fry survival studies are scheduled to start August 2021.

  Discussion focused on the location of the Sacramento River tributary for the second life-cycle monitoring program is scheduled for spring 2021. State and federal partners identified in the non-flow action steelhead charter will be participating in this discussion. Candidate tributaries will include CVP watersheds and tributaries with existing monitoring infrastructure.

- **San Joaquin Basin Steelhead Collaborative:** Reclamation worked with the Delta Stewardship Council to assemble a steelhead collaborative workshop steering committee composed of state, federal, and stakeholder partners. The committee held biweekly meetings starting September 24, 2020 to plan the workshop format, dates, priority topics, presenters, and deliverables. The steelhead collaborative workshop is planned to be held virtually on February 17-19, 2021, and registration opened November 23, 2020. Information produced and presented during the workshop will be used to draft a plan to monitor steelhead populations within the San Joaquin Basin and/or the San Joaquin River downstream of the confluence of the Stanislaus River, including steelhead and rainbow trout on non-project San Joaquin tributaries.

- **San Joaquin River Scour Hole Predation Reduction:** This project will implement measures to reduce the predation intensity on juvenile salmonids and sturgeon, entering the Delta from the San Joaquin River at the Head of Old River Scour Hole, through modifications to the channel geometry and associated habitats. An interagency charter for the San Joaquin River Scour Hole Predation Reduction (Head of Old River Scour Hole) was finalized in April 2020. A contract for the project is anticipated in 2021.

- **Tidal Habitat Restoration:** The Dutch Slough Tidal Habitat Restoration was constructed in 2018. Revegetation planting occurred in 2020. A levee breach planned for 2021 will complete the project. Sherman Island Belly Wetland began construction in 2020. The Lower Yolo Ranch Project was completed late 2019. Construction on Wings Landing tidal marsh and channel habitat was completed in October 2020. The Lookout Slough Project is scheduled to begin construction in 2021. More details on tidal habitat restoration projects are provided in Appendix I.

- **Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project:** Reclamation and DWR are currently working on design and permitting to construct the gated notch structure at Fremont Weir in 2022. Funding for construction was provided in FY 2019. In August 2020, Reclamation conducted a Value Engineering Study on the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project. Reclamation and DWR currently hold monthly agency coordination meetings, including NMFS, USFWS, CDFW, USACE, Central Valley Flood Protection Board, and State Water Resources Control Board.

  NMFS included as RPM 1.g.:

  > *In order to minimize project related impacts to fish growth and survival on the lower Sacramento River, Reclamation shall complete construction of the Fremont Weir component of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project by 2022.*

  Neither Reclamation nor DWR sought to reinitiate the site-specific consultation on the Yolo Bypass as part of the LTO.

- **Predator Hot Spot Removal:** Reclamation would coordinate with water users to minimize lighting at fish screen and bridges and possible remove abandoned structures. NMFS required as RPM 5.a.

  > *Develop and implement a predator management experiment to reduce the mortality of emigrating juvenile salmonids at "hot spots" in the Bay-Delta.*

  A charter is currently being drafted. The purpose of this effort is to develop a process working toward implementation of Delta Predator Hot Spot Removal activities as consistent with the Proposed Action and adopted in the ROD.

- **Delta Cross-Channel Gate Improvements:** Reclamation is currently working on evaluating improvements to automating and streamlining operation of the DCC gates. Reclamation's goal is to modernize DCC's gate materials and mechanics to include adding industrial control systems, increasing additional staff time, and improve physical and biological monitoring associated with the DCC daily and/or tidal operations as necessary to maximize water supply deliveries. Reclamation has identified technical team membership, previous studies/efforts that may be leveraged in the alternative development process and completed the initial investigations of the gate mechanics.

- **Tracy Fish Collection Facility Improvements:** A report on the Tracy Fish Collection Facility (TFCF) Operations Improvement is in progress and the first review is scheduled for January 2021.

A report describing operational and structural changes to the TFCF is posted to:

https://www.usbr.gov/mp/TFFIP/docs/1a-tr93-history-of-the-tfcf-final508.pdf

As part of the Tracy Fish Facility Improvement Program (TFFIP), the proposal package for Fiscal Year (FY) 2021 is posted on Reclamation's website here:

https://www.usbr.gov/mp/TFFIP/docs/study-plan/3-tffip-fy21proposalpackage-final508.pdf

The Tracy Technical Advisory Team (TTAT) has developed a process and deadlines for research proposals, including scientific and technical review and selection for FY 2022.

- **Clifton Court Forebay Mortality Reduction:** The Predator Electrofishing Study will be conducted as part of the Enhanced Predatory Fish Removal and Relocation Study, planned to begin in January of 2021. As such, no work has been done yet in relation to the Predator Electrofishing Study.

  NMFS included as RPM 5.f.:

  > *The initial "run" of Chinook salmon shall be determined based on length at date criteria if the fish is actually captured and handled prior to release.*

The Clifton Court Forebay (CCF) Predatory Fish Relocation Study (PFRS) was two years in duration. The 2019 field season (February 28 to June 4, 2019) tested the effectiveness of five commercial-type fishing gears and acquired data and other information to advise any gear modifications and method refinements to improve catch effectiveness. The 2020 field season (October 8, 2019 to March 12, 2020) incorporated knowledge gained from the 2019 field season to modify and refine the gears and their methodologies to maximize predatory fish capture.

There were 4 steelhead and one Chinook salmon individual captured (Appendix K). Listed individuals were caught in four of the five gears. No listed fish were captured in hoop traps. Only the seine caught more than one individual. All five fish were of hatchery origin, as noted by their clipped adipose fin. There were no mortalities of any listed individuals and all were released back into CCF.

Among the three gear types used during the 2020 PFRS field season, there were 13 steelhead, 10 fall-run Chinook salmon and one winter-run Chinook salmon captured (Appendix K). Two individuals were caught in fyke traps, 22 individuals were caught in beach seines, and no individuals were caught in hoop traps. Most individuals were adults (n = 18 fish). Two individuals were not checked for adipose fins. Of the 22 fish checked, 11 were of hatchery origin, as noted by their clipped adipose fin. There were no mortalities of any listed individuals and all were released back into CCF immediately after they recovered.

- **Salvage Release Sites:** In September 2020, Reclamation finalized the Antioch Fish Release Site Replacement Physical Hydraulic Model (Hydraulic Laboratory Report HL-2020-03). The report is posted on the TFFIP website here:

  https://www.usbr.gov/mp/TFFIP/docs/hl-2020-03-antiochfishreleasesite-hydraulicmodel-final508.pdf

The model determined that the proposed operating procedure adequately cleared debris from the release pipe for all debris except for large amounts of small floating debris. In these cases, small floating debris was difficult to pass.

- **Small Screen Program:** Under the Small Screen Program, Reclamation and DWR work together within existing authorities to screen small diversions throughout the Central Valley, CVP/SWP streams, and the Delta. A Small Screen Program Charter is currently being developed.
- **Supplementation Efforts for Delta Smelt:** USFWS finalized and delivered a Delta Smelt Supplementation Strategy on October 21, 2020 completing the first phase proposed by Reclamation as steps toward supplementation of Delta Smelt. In addition, Reclamation, USFWS, CDFW and DWR formed a steering committee, Culture and Supplementation of Smelt (CASS), to facilitate research and progress on cultured Delta. This effort is intended as a resource to help guide the supplementation program. The FCCL has received funds and begun increasing production of Delta Smelt to reach maximum production capacity in two more years as part of phase 2. As called for by the Supplementation Strategy, increases in production methods are being refined to reflect best practices in both genetic management of Delta Smelt and increasing production. As a related activity, DWR and partners conducted cage studies using cultured Delta Smelt, an important first step in evaluating the response of hatchery fish to natural conditions in the Bay-Delta.

  USFWS included as RPM 3.1.

  > *Reclamation shall ensure development of a supplementation strategy for the FCCL supplementation program as described in the PA. This strategy will be in place one year from the issuance of the Biological Opinion.*

  The FCCL has received funds and begun increasing production of Delta Smelt to reach maximum production capacity in two more years as part of Phase 2. As called for by the supplementation strategy, increases in production methods are being refined to reflect best practices in both genetic management of Delta Smelt and increasing production.
- **Delta Fish Species Conservation Hatchery:** The need for expanded production capacity is closely tied to the successful delta smelt supplementation by both USFWS and CDFW. Discussions between Reclamation, DWR, USFWS, and CDFW are ongoing in regard to production goals and necessary research to support supplementation decisions.
- **Sediment Supplementation Feasibility Study**: There is no update on the status of the Sediment Supplementation Feasibility Study for WY 2020.

Conclusion

This report, for WY 2020, is the first under the 2019 NMFS and USFWS Biological Opinions and 2020 Reclamation ROD. As such, some seasonal operations have not completed a full season of operation.

This report and the seasonal reports, guidance documents, and other documentation indicate that for WY 2020, Reclamation and DWR were in compliance with the 2019 NMFS and USFWS Biological Opinions and the 2020 Reclamation ROD.

The operational dates in the 2019 NMFS and USFWS Biological Opinions and 2020 Reclamation ROD for the agricultural barriers should be consistent with the dates in the Temporary Barriers Program Biological Opinions and as described in the Biological Assessment Appendix A, Section A.5-2 Temporary Agricultural Barriers (Biological Assessment Appendix A Table A.5-3 (page A-96)).

Since 2020 was a Dry WY, Reclamation and DWR did not implement increased SMSCG operations or X2 management associated with the Delta Smelt Summer-Fall Habitat Action. As described in the seasonal report, Delta Smelt habitat in WY 2020 was limited due to salinity conditions in late summer and fall.

In 2020, significant aquatic weed infestations required a temporary modification granting cleaning operations to continue beyond October 31 while NMFS considers a permanent change.

The CVP and SWP did not exceed the amount of take specified in the incidental take statement of listed fish species described in the 2019 NMFS and USFWS Biological Opinions. Exports at the CVP and SWP export facilities and operations of the DCC gates were consistent with the ROD and within the effects anticipated by the 2019 NMFS and USFWS Biological Opinions. As detailed above, salmonid losses did not exceed thresholds and did not trigger OMR reverse flow reductions. Many other factors controlled the operation and reductions in exports and were not necessarily due to OMR flow management. OMR flows did not exceed those in the Proposed Action or prescribed by the ITS in the 2019 USFWS Biological Opinion.

OMR flows did not exceed those described in the Proposed Action and addressed in the ITS in the 2019 USFWS Biological Opinion. Exceedance of a single-year threshold or 50 percent of the cumulative loss threshold did not occur. As flows and levels of incidental take were not exceeded,there was no need identified for an independent panel review for WY 2020.

Improvement recommendations to the guidance documents that were considered include:

- OMR conditions described in Reclamation's Memorandum on the Delta Smelt life cycle model
- DCC gate closure protocol test run at the beginning of the OMR flow management season
- Include the offramp criteria based on larval smelt sampling at the CVP and SWP fish salvage facilities.
- For the weekly assessments from the monitoring teams, include a section for issues that were recommended for discussion at WOMT/Director Elevation.

Stanislaus River

The Stanislaus River, from New Melones Reservoir to its confluence with the San Joaquin River, includes the New Melones Reservoir.

Figure 5. Salmonid spawning gravel injection project at the Goodwin Dam Recreation Area on the Stanislaus River. (Photo credit: Elissa Buttermore, Reclamation)

New Melones Reservoir seasonal operations follow a set of objectives. During winter, Reclamation operates for flood control and building storage, considering both the channel capacity within the Stanislaus River and New Melones Reservoir flood conservation space. During spring, New Melones Reservoir continues to build additional storage until flows are needed to support instream demands. Summer operations are focused around water temperature control, instream demands. During the summer, Reclamation also maintains applicable dissolved oxygen standards on the lower Stanislaus River for species protection. Fall operations are guided by water temperature control, instream demands and fish spawning habitat. Reclamation operates New Melones Reservoir (as measured at Goodwin Dam) in accordance with a stepped release plan (SRP) that varies by hydrologic condition and WY type. The New Melones SRP is implemented with a default daily hydrograph and the ability to shape monthly and seasonal flow volumes to meet specific biological objectives. In WY 2020, with feedback from the Stanislaus Watershed Team (SWT), Reclamation implemented a reshaped spring pulse flow, a component of the SRP daily flow schedule. The Stanislaus River Summary of Activities for WY 2020 report is included pending as Appendix L.

Conservation Measures

Reclamation included conservation measures in the Proposed Action that were adopted in the ROD, to avoid and minimize or compensate for CVP project effects in the Stanislaus River, including take, on listed species. These measures may also improve production, growth, and survival of listed species.

- **Spawning and Rearing Habitat Restoration:** Reclamation implemented the steelhead and Chinook salmon spawning injection project implementation in the Goodwin Dam Recreation Area on the Stanislaus River in September 2020 (Figure 5). 3,000 tons were placed in the Float Tube Pool site and 12,000 tons were placed at the Cable Crossing site. Side channel habitat about a quarter of an acre was restored in this area. The Stanislaus River Summary of Activities for Water Year 2020 is pending as Appendix L and will include more information about Stanislaus River habitat restoration projects. A charter will be developed with a multi-agency team to document information related spawning and rearing habitat restoration on the Stanislaus River. These spawning and rearing habitat restoration projects have their own ESA compliance.
- **Water Temperature Management Study:** Reclamation, through a collaborative approach, will plan and implement measures in developing a collection of data and a set of physically based tools within a modeling framework capable of providing suggestions for short and long-term monitoring to assist resource managers of major Central Valley Project reservoirs with balancing water resources for downstream and temperature needs. Specifically, Reclamation is undertaking an effort for a new temperature model platform for the CVP system that includes the northern California (Shasta/Trinity) River system, the American River system, and the Stanislaus River system that will entail robust and reliable seasonal and planning modeling tools for each system, that are germane, defendable, and trusted by the technical community. Each river system entails numerous data challenges and the Stanislaus River system challenges will include addressing New Melones inflow temperatures, New Melones Reservoir profiles, Tulloch Reservoir profiles, and local meteorology.

Incidental Take Statement

The 2019 NMFS Biological Opinion found the action is reasonably expected to create the stressors of water temperature and flow conditions resulting in take of CCV steelhead in the Stanislaus River. The extent of take is all redds exposed to temperatures above 54° F in the vicinity of Orange Blossom Bridge (OBB) December 1 through May 31. Water temperatures at OBB exceeded 54° F during 71 days in the period between March - May 2020. However, few steelhead eggs were expected to be incubating during the times when the 54° F water temperatures were exceeded. Every year operations have exceeded water temperatures of 54° F (2001-2019; Figure 6). Temperature management capabilities are limited on the Stanislaus River. New Melones Dam does not have a temperature control device.

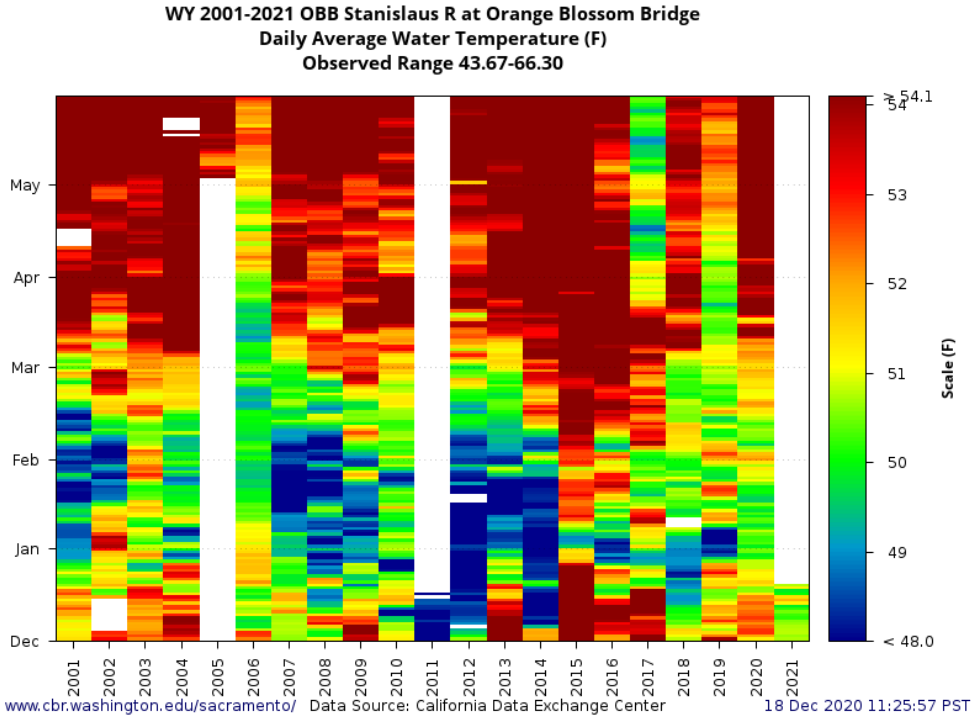

Figure 6. Water temperatures at OBB from 2001 to 2021 during the December 1 through May 31 time period.

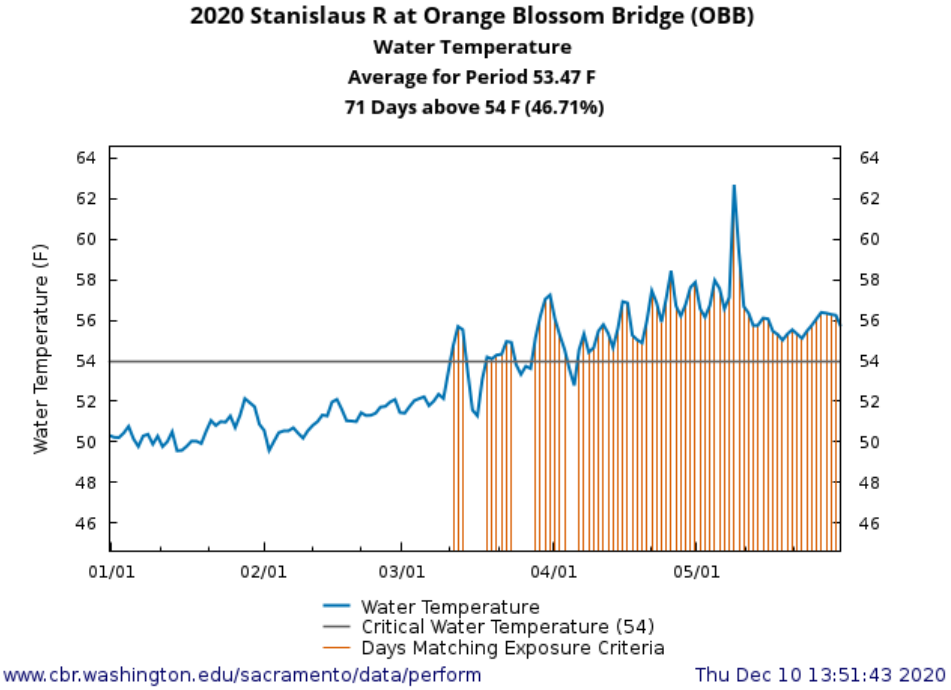

Figure 7. Water temperatures at OBB during WY 2020 and daily water temperatures that exceeded 54° F (in orange).

The anticipated level of take will be exceeded if temperatures at Orange Blossom Bridge exceed 68° F between May 15 to October 31 for more than seven consecutive days unless Reclamation and NMFS agree that it is an acceptable exceedance given the hydrologic and meteorological conditions for that year. From May 15 to October 31, daily average temperatures at Orange Blossom Bridge did not exceed 68° F for more than seven consecutive days. The level of incidental take relative to take anticipated from water temperature effects was not exceeded in WY 2020 for juvenile steelhead.

As described in the NMFS Biological Opinion (page 807), the ecological surrogate to define the amount or extent of take of all Central Valley steelhead life stages in the Stanislaus River is flow. Take will be exceeded if flow releases to the Stanislaus River measured at Goodwin Dam decrease to levels lower than the SRP, or those scheduled by the SWT. In WY 2020, flow releases were consistent with flows described in the SRP or those scheduled by the SWT. For more information, see pending Appendix L.

Reasonable and Prudent Measures

This section of the WY 2020 Annual Report describes compliance with the RPMs of the 2019 NMFS Biological Opinion. The 2019 USFWS Biological Opinion did not include RPMs for the Stanislaus River. The 2019 NMFS Biological Opinion included the following RPM (and associated Terms and Conditions) to minimize impacts of incidental take of the listed fish species in the Stanislaus River:

RPM 4: Reclamation shall minimize the impact of the amount or extent of incidental take of listed species during operations of the Eastside Division.

a. *The shift in compliance location for dissolved oxygen from Ripon to Orange Blossom Bridge from June 1 to September 30 shall not go into effect until NMFS confirms that Reclamation has satisfied both of the following conditions:*

   i. *Provide confirmation that a dissolved oxygen gauge has been installed, and*

   ii. *Consistently providing accurate dissolved oxygen data at Orange Blossom Bridge.*

b. *Reclamation shall complete the Final Temperature Management Study by December 31, 2025.*

The Temperature Model Platform for the CVP is discussed above under Conservation Measures in the Proposed Action. The Temperature Model Platform for the CVP Project Charter was completed in June 2020. The charter established the goals, objectives, purpose and scope of work to be performed.

c. Reclamation shall provide to NMFS an annual water temperature data set and will provide summary statistics.

See above under the Stanislaus River ITS section.

d. Reclamation shall provide to NMFS an annual report of incidental take associated with monthly temperatures and provide an assessment of temperature conditions over the year including monthly average data at Orange Blossom Bridge.

See above under the Stanislaus River ITS section.

Conclusion

This report for WY 2020, is the first under the 2019 NMFS and USFWS Biological Opinions and 2020 Reclamation ROD. As such, some seasonal operations have not completed a full season of operation.

This report and the seasonal reports, guidance documents, and other documentation indicate that for WY 2020, Reclamation and DWR were in compliance with the 2019 NMFS and USFWS Biological Opinions and the 2020 Reclamation ROD. Neither reinitiation of consultation nor independent panel review were necessary for WY 2020.

For WY 2020, there were no clarifications that were necessary, or any recommendations identified to improve implementation of the Biological Opinions in the Stanislaus River watershed.

San Joaquin River

The San Joaquin River, from the confluence of the Stanislaus River downstream to and including the Sacramento–San Joaquin Delta

Figure 8. San Joaquin River (Photo credit: USFWS)

Conservation Measures

Reclamation included conservation measures in the Proposed Action to avoid and minimize or compensate for CVP and SWP project effects, including take, on listed species. These measures may also improve production, growth, and survival of listed species.

- **Lower San Joaquin River Rearing Habitat:** The Central Valley Project Improvement Act (CVPIA) is implementing this effort as an outcome of the CVPIA structured decision-making process. The CVPIA Science Integration Team (SIT) Near-Term Restoration Strategy (NTRS) prioritizes juvenile salmonid habitat restoration in the Stanislaus River downstream through the San Joaquin River to Vernalis. The USFWS is currently managing four on-going rearing habitat projects in this reach. These spawning and rearing habitat restoration projects have their own ESA compliance.

Additional Actions and RPMs

The Proposed Action and Incidental Take Statements include programmatic CVP-wide measures that do not fall within the watersheds.

Collaborative Planning

The Proposed Action identified that Reclamation will pursue and implement certain actions through collaborative planning with the goal of continuing to identify and undertake actions that benefit listed species. Collaborative planning will make use of the Collaborative Science and Adaptive Management Program, Central Valley Project Improvement Act, Interagency Ecological Program, and Delta Plan Interagency Implementation Committee, successors to the forums, or complementary forums, e.g. Voluntary Agreement forums.

NMFS included as RPM 8.a.:

> *Reclamation and DWR shall convene an annual Director's meeting through CSAMP to review the past year's collaborative planning actions and coordinate on future year priorities.*

A Directors' meeting is being coordinated through CSAMP. CSAMP, SRSP, and SIT are comparing science priorities between the organizations to avoid duplication of science-based monitoring and studies and focus resources on mutual science priorities. Habitat and facility improvements are summarized under the CVPIA.

Reporting on Incidental Take

NMFS required RPM 7: Reclamation and DWR shall monitor and report the amount and extent of incidental take described in Section 2.1 as necessary to implement this Opinion.

a. *Reclamation and DWR shall monitor the amount and extent of incidental take through the continued use of programs and processes described in [Appendix C]. Reclamation and DWR also shall annually maintain and update [Appendix C] as appropriate to describe the intended monitoring programs and how they will be used to monitor the amount and extent of take, how they will be applied to CVP and SWP water operation decision making and how they will be used for validation and effectiveness monitoring of Collaborative Planning actions.*

USFWS required RPM 1.8.:

> *8. Reclamation and DWR will comply with all monitoring and reporting requirements as*

identified in the Reporting Requirements section.

Through the development of Seasonal and this Annual Report for WY 2020, Reclamation and DWR have satisfied reporting requirements in WY 2020.

Accommodation of Research

NMFS required RPM 7: Reclamation and DWR shall monitor and report the amount and extent of incidental take described in Section 2.1 as necessary to implement this Opinion.

> *b. Reclamation and DWR shall coordinate with the Interagency Ecological Program Biotelemetry Project Work Team to accommodate research that requires special handling of salvaged fish, release of adipose fin-clipped sutured fish; checking for acoustic tags which furthers minimizes take of listed fish, unless not practicable.*

Reclamation and DWR accommodated research as necessary for WY 2020.

Western Yellow-billed Cuckoo

Reclamation and USFWS have been coordinating to improve baseline survey data of Western Yellow-billed Cuckoo (YBCU) in the project area to further the understanding of potential areas of impact to YBCU. This effort may also provide baseline survey data to other related projects. Ultimately this information may be useful in the conservation of the species, including a potential ecological surrogate model. Reclamation and USFWS have developed a YBCU Surveys LTO Implementation Charter. Efforts to date include developing protocols, estimating costs, and creating options for implementation.

Southern Resident Killer Whale

NMFS anticipated the proposed action would result in incidental take in the form of harm to SRKW individuals in the K and L pods by reducing prey availability and impairing feeding behavior when SRKWs forage for longer periods without success, migrate to alternate locations to seek prey, and experience nutritional stress and related health effects (NMFS Biological Opinion, page 813).

The 2019 NMFS Biological Opinion relied on surrogates in the form of effects to Chinook salmon populations and the measures of surrogates used for the DCC Gates and for CVP and SWP Pumping Facilities. Therefore, actions that result in adverse effects or protections for steelhead would result in adverse effects or protections for spring-run Chinook salmon and fall-run Chinook salmon. Exceedance of take related to these surrogates would be viewed as an exceedance of the anticipated take of SRKW as well.

Reclamation and DWR did not exceed take related to steelhead or Chinook salmon populations related to the DCC Gates and for CVP and SWP Pumping Facilities. Therefore, actions did not result in the exceedance of the anticipated take of SRKW.

NMFS included RPM 6: *Reclamation shall minimize the impact of the amount or extent of incidental take of Southern Resident killer whales during operations.*

a. *Reclamation shall continue to support the USFWS' study of alternative release sites for Coleman National Fish Hatchery produced fall-run Chinook salmon for the next two years to determine if trucking to an alternative release site can increase juvenile survival to the ocean and adult returns to the Sacramento River.*

In 2020, USFWS did not implement alternative release sites due to Spring COVID-19 restrictions. USFWS is planning these efforts for 2021. Reclamation funded CDFW, USFWS, and Pacific States Marine Fisheries Commission to tag fish and compile data.