RECLAMATION

Managing Water in the West

Environmental Assessment

Golden Gate Salmon Association Project B.11 – Sacramento River Stranding

EA-13-15-MP

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Regional Office
Sacramento, CA

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Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

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.

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List of Acronyms and Abbreviations

AF	acre-feet
afy	acre-feet/year
CFR	Code of Federal Regulations
cfs	cubic feet per second
COA	Coordinated Operations Agreement
CV	Central Valley
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
Delta	Sacramento-San Joaquin River Delta
DWR	California Department of Water Resources
EA	Environmental Assessment
Fisheries Agencies	National Marine Fisheries Service, U.S. Fish & Wildlife Service, and California Department of Fish & Wildlife
GGSA	Golden Gate Salmon Association
GCID	Glenn-Colusa Irrigation District
ITA	Indian Trust Assets
Keswick	Keswick Dam
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
Project	Project B.11 – Sacramento River Stranding
RBDD	Red Bluff Diversion Dam
RD108	Reclamation District 108
Reclamation	Bureau of Reclamation
Refuges	National Wildlife Refuges
Settlement Contracts	Sacramento River Settlement Contracts
Settlement Contractors	Sacramento River Settlement Contractors
Service	U.S. Fish and Wildlife Service
SWP	California State Water Project
SWRCB	State Water Resources Control Board

Section 1 Introduction

This Environmental Assessment (EA) has been prepared by the Bureau of Reclamation (Reclamation) to examine the potential direct, indirect, and cumulative impacts to the affected environment associated with Reclamation's proposal in pilot Project B.11 – Sacramento River Stranding (Project).

Background

Fall-run Chinook salmon (*Oncorhynchus tshawytscha*) generally spawn in the Upper Sacramento River from Keswick Dam (Keswick) to Red Bluff during the months of October through December, with a large portion of spawning in mid to late October. As the adults of one run enter this area, Sacramento River winter-run Chinook (*O. tshawytscha*) fry have mostly emerged from the redds created the previous summer and are rearing for approximately four months prior to migration down the river. Also in October, rice farmers rely upon increased diversions from the Sacramento River to flood their fields for optimal rice straw decomposition. Rice straw decomposition is a process where water is added to fields to assist in the decomposition of the stubble that exists after rice is harvested. Additionally, public and private wetland managers are flooding managed wetlands to provide habitat for increasing numbers of migrating and wintering waterfowl and other migratory birds. Typically, about one acre-foot (AF)/acre is used in early October to flood post-harvest rice fields. Six inches of the one AF/acre/month is used for rice decomposition and the additional six inches is added to the field to provide for wintering waterfowl. In order to provide fresh water to these wildlife habitat lands and counterbalance evaporation, approximately 30,000 AF/month is flowed-through at the rate of one AF/acre/month, comprising a total of up to about 60,000 AF of water diverted by Settlement Contractors for rice decomposition and wildlife habitat lands in October (Bettner 2013). The diversions can result in higher October Keswick releases to meet the demand. As a result, some shallow riffles and the streamside edges of the mainstem Sacramento River become attractive spawning sites for salmon. At the end of October, the water demand for rice farming, wildlife habitat (both rice fields and wetlands), and National Wildlife Refuges (Refuges) typically decreases and the Keswick flows are normally reduced, potentially resulting in a drying of the edges and shallow riffles of the river and dewatering, or "stranding", active salmon redds where eggs have been deposited in the river gravels. In addition, fluctuating flows can also have a negative effect, if developing eggs are either exposed to air or do not have sufficient water for oxygen exchanged through hyporheic flow. USFWS (2006) describes the relationships between habitat, temperature, and flow for anadromous salmonids in this period of their reproductive cycle. This description of existing conditions includes the flows from Keswick, 184 river miles along the Sacramento River down to Wilkins Slough (the downstream extent of potential flow changes).

Project Background

The Golden Gate Salmon Association (GGSA), in coordination with Glenn-Colusa Irrigation District (GCID) and Reclamation District 108 (RD108) has proposed a Project to reduce the potential for Chinook salmon redd dewatering in the Sacramento River below Keswick as part of the GGSA Salmon Plan (see Figure 1). GGSA has been developing a list of potential projects to support salmon production in the Central Valley (CV) and coordinating with the Federal and

State agencies responsible for fisheries and water management. On March 29th, 2013, GGSA met with the Federal and State agencies and proposed this Project as Project B.11 within their eight priority projects for implementation in 2013 and 2014. This Project is a part of the larger integrated Central Valley Project Improvement Act (CVPIA), federal resource, and state resource efforts to monitor, protect, and restore anadromous fisheries. To accomplish the Project, GGSA proposed modifications by the State Water Resources Control Board (SWRCB) to water rights Term 91, and of diversions under the Sacramento River Settlement Contracts. Term 91 states that no diversion is authorized when satisfaction of inbasin entitlements requires release of supplemental water by the Central Valley Project (CVP) or the California State Water Project (SWP). The agencies discussed the projects and decided to initiate Project specific teams for further implementation. Reclamation evaluated the proposed Project and believes that an agreement between Reclamation and GCID and RD108, and potentially other Sacramento River Settlement Contractors (Settlement Contractors), would accomplish the objectives without requiring action by the SWRCB.

This Project may address part of a larger need to maintain fall-run Chinook eggs throughout the incubation period, while also providing habitat and suitable conditions for other anadromous species that may also be present during the time period, including winter-run Chinook fry, steelhead young-of-the-year that have not yet migrated downstream, and spring-run Chinook fry that enter the Sacramento River from the tributaries (e.g. Clear Creek). For the mainstem Sacramento River, fall-run Chinook eggs and pre-emergent fry are in the redds from October until about mid-March.

Figure 1 – Flow Gage Locations, Diversions, and Partner Water Districts in the Project Area

1.1 Need for the Proposal

The need for the pilot Project is to stabilize releases from Keswick over the month of October to reduce salmon spawning and juvenile rearing/holding in areas subject to dewatering in November and December.

The Settlement Contractors divert water in accordance with agreed upon limits under their Settlement Contracts during the contract period of April 1st through October 31st each year. After October 31st, diversions by the Settlement Contractors are pursuant to a state-issued water rights permit or licenses which are governed by SWRCB's Standard Permit Term 91. Term 91 limits the exercise of the right containing this term when the CVP and SWP are making releases from storage for in-basin, export and other needs including Delta water quality. The Settlement Contractors and their water users typically manage for this limitation by diverting larger volumes of water before October 31st, which is also subject to harvest dates. The proposed agreement would avoid this larger diversion of water before October 31st and allow for more stable flows from Keswick from the beginning of October through December. During years when Term 91 is invoked, this could result in a longer period of time over which the Settlement Contractors could divert for rice decomposition. Also, the Settlement Contractors would take no more total volume of Base Supply, but they could spread it over a longer period of time.

The potential benefits to this Project are in the decreased risk of fall-run Chinook salmon redd dewatering and therefore potential increased success of eggs within these redds reaching emergence, as more stable flows help to avoid habitat reduction. These improvements would contribute towards the wild salmon doubling requirement of the CVPIA, for which Reclamation and the U.S. Fish and Wildlife Service (Service) have the primary obligation to accomplish. Another Project benefit would be increased Shasta cold water pool storage by delaying Shasta releases that may have otherwise been used to deliver Base Supply to the Settlement Contractors in October. Allowing rainfall and runoff in November-December to meet diversion demands rather than October releases from storage in Shasta Reservoir would also potentially provide water supply benefits. Additionally, the Proposed Action would increase the flexibility in managing diversions for rice farmers and Settlement Contractors' other users as diversion times may be expanded to include November and December.

1.2 Resources Analyzed in Detail

This EA assesses whether the reduction in flow from Keswick in October and the potential increase in flow from Keswick in November and/or December might cause potentially adverse environmental effects. This EA will analyze the affected environment of the Proposed Action and No Action Alternative in order to determine the potential impacts and cumulative effects to the following environmental resources:

- Water Resources
- Biological Resources
- Cumulative Impacts

Impacts to the following resources were considered and found to be minor and/or absent. Brief explanations for their elimination from further consideration are provided below:

- Power and Energy Resources: No significant changes in power and energy resources would result from the Proposed Action, other than the delay in hydropower generation during October. This delay in power generation is not likely to have negative impacts as the demand for hydroelectricity is fairly low from October through December.

- Land Use and Agriculture: The Proposed Action will neither produce ground disturbances, nor result in construction of new facilities. Rice fields will still be flooded with the same total amount of water, and the only change would be the timing of distribution. Rice farmers would neither plow nor disc their fields when October flood-up water is delayed. The Proposed Action does not have the potential to affect land use and agriculture.

- Cultural Resources: The Proposed Action will not produce ground disturbances, will not result in the construction of new facilities or the modification of existing facilities, and will not result in any changes in land use. Under either the No Action or Proposed Action alternative, the Proposed Action does not have the potential to cause effects to historic properties, should such historic properties be present, pursuant to the National Historic Preservation Act (NHPA) Section 106 regulations codified at 35 CFR Part 800.3(a)(1) (see Appendix A for Section 106 concurrence).

- Indian Sacred Sites: Reclamation has determined that there would be no impacts to Indian sacred sites as a result of the Proposed Action Alternative because the project is not on federal land and it would not limit access to or ceremonial use of Indian sacred sites.

- Indian Trust Assets (ITA): The Proposed Action does not have the potential to impact Indian Trust Assets. No Indian lands, public domain allotments, or other resources that could be considered Indian Trust Assets, are affected by the Proposed Action Alternative (see Appendix B for ITA concurrence).

- Environmental Justice: No significant changes in agricultural communities or practices would result from the Proposed Action, other than the timing of when the total amount of rice decomposition water is diverted. These changes are not likely to have affects to any individuals or populations within the action area. Accordingly, the Proposed Action would not have disproportionately negative impacts to low-income or minority individuals or populations.

Section 2 Proposed Action and Alternatives

1.3 No Action Alternative

The No Action Alternative would consist of Reclamation not entering into an agreement with Settlement Contractors to reduce the potential for redd dewatering by providing flexibility in

managing diversions during the months of October through December. Reclamation would continue to release Base Supply from Keswick maintaining the current release patterns in October, November and/or December.

1.4 Proposed Action

As an experimental effort, Reclamation proposes to operate Shasta and Keswick Dams in a manner that would provide lower flows in October and higher flows in November and/or December than would otherwise occur. To facilitate these flow changes, and over the span of three years, Reclamation proposes to enter into one-year agreements as necessary with GCID and RD108, with the potential for additional Settlement Contractors to participate in subsequent years of this pilot Project, so long as the total volume of water does not exceed the quantities described in Table 2. As part of the Proposed Action, the participating Settlement Contractors would agree to exchange a portion of Base Supply in October under the Settlement Contracts, at a rate of up to 1,000 cfs per day to Reclamation for a like volume of CVP water to be diverted in November and/or December of the same calendar year, irrespective of Term 91. Implementation would include and depend upon the following steps:

1. Projected Keswick Reservoir Release: Reclamation would prepare its 90 percent exceedance monthly forecast of CVP operations and provide the Fisheries Agencies (National Marine Fisheries Service, the Service, and the California Department of Fish and Wildlife) with the potential Keswick release rates and Wilkins Slough flow rates from October through December. Based on 2-dimensional hydraulic modeling for habitat (USFWS 2006), for fall-run Chinook spawning and embryo incubation, the Fisheries Agencies have indicated they would generally like to achieve an optimum constant Keswick release of approximately 5,000 cfs in October with flexibility depending on the anticipated hydrology and weather conditions for the year. In some years, considerations for Chinook salmon may result in a fishery flow objective higher or lower than 5,000 cfs. Implementation of the action could be delayed or suspended in years when Winter-run Chinook spawn later than usual, and there is the potential to dewater or strand winter-run redds by reducing Keswick releases in October.

2. Proposed Settlement Contractor Schedule: Participating Settlement Contractors would develop a schedule of diversions to assist in meeting the Keswick fishery flow objective.

3. Conditional Schedule Approval: Reclamation, in coordination with the Settlement Contractors and Fisheries Agencies, will approve a schedule based on forecasted conditions and subject to real-time conditions.

4. Conditional Operations: Reclamation will operate the CVP and notify the Settlement Contractors when conditions no longer allow for delaying releases under the Proposed Action from Keswick to satisfy base supply as described in section 3.1.2 under "Avoidance Measures and Conditions". The volume of water for rice decomposition not diverted prior to the notification will remain available for potential diversion in November and/or December. Once conditions no longer allow for delayed releases in a year, operations will revert to historical release rates for the remainder of the year.

5. Delivery: Reclamation will make CVP water available through December 31st up to the volume not diverted for the rice decomposition in October.

6. The specific delivery schedule will depend upon real time flow conditions and will be coordinated as necessary.

Section 3 Affected Environment and Environmental Resources

1.5 Water Resources

1.5.1 Affected Environment

The Upper Sacramento, McCloud, and Pit Rivers make up the Sacramento River Basin's source waters as they converge in Shasta Reservoir behind Shasta Dam. From Shasta Dam the Sacramento River winds approximately 30 miles south through the foothills between Redding and Red Bluff. Many small and moderate-sized tributaries between Keswick and the Bend Bridge gage join the river from both east and west, including Clear, Cottonwood, Cow, and Battle Creeks (see Figure 1) (Sacramento River Basin 2013). The Sacramento River continues to meander south, where it is joined by Antelope, Mill, Deer, Stony, and Big Chico Creeks. Butte Creek merges with the Sacramento River near Colusa and the Sutter Buttes, a group of isolated volcanic hills in the middle of the Sacramento Valley. The Sacramento River is joined by its largest tributary, the Feather River, at Verona. About 10 miles downstream, the Sacramento River flows through the City of Sacramento and receives the American River, its second largest tributary (Sacramento River Basin 2013). From here, the river meanders southwest until it reaches the estuary of the Delta near Rio Vista (Sacramento River Basin 2013).

The downstream extent of potential flow changes of the Project on the Sacramento River is at Wilkins Slough; located near RD108 approximately 20 miles south of Colusa (see Figure 1). RD108's first and primary pumping plant was constructed at Wilkins Slough in 1918, and delivers flood control and irrigation water (Surface Water no date [n.d.]). Any change in water reaching Wilkins Slough may impact RD108's irrigation water deliveries and flood control water moving downstream towards the Delta.

Historical Flow Patterns

Diversion for post-harvest rice stubble decomposition began in 2000 in the GCID (Bettner 2013) as a result of the limitations the State of California placed on the burning of rice straw. Additionally, GCID, in cooperation with Reclamation, completed improvements to its conveyance system for other uses, such as to deliver water to the Refuges in the Colusa Basin. These improvements also allowed for serving other lands year round, including for fall/winter rice decomposition. The resulting amount and quality of wetlands and post-harvest flooded rice fields have provided a significant amount of habitat for waterfowl and other migratory

waterbirds in the CV, which has lost 90-95 percent of its original wetlands (Central Valley Joint Venture 2006). Figure 2 shows fall flows as measured by USGS gage 11370500, Sacramento River at Keswick CA, from 1999 through 2012.

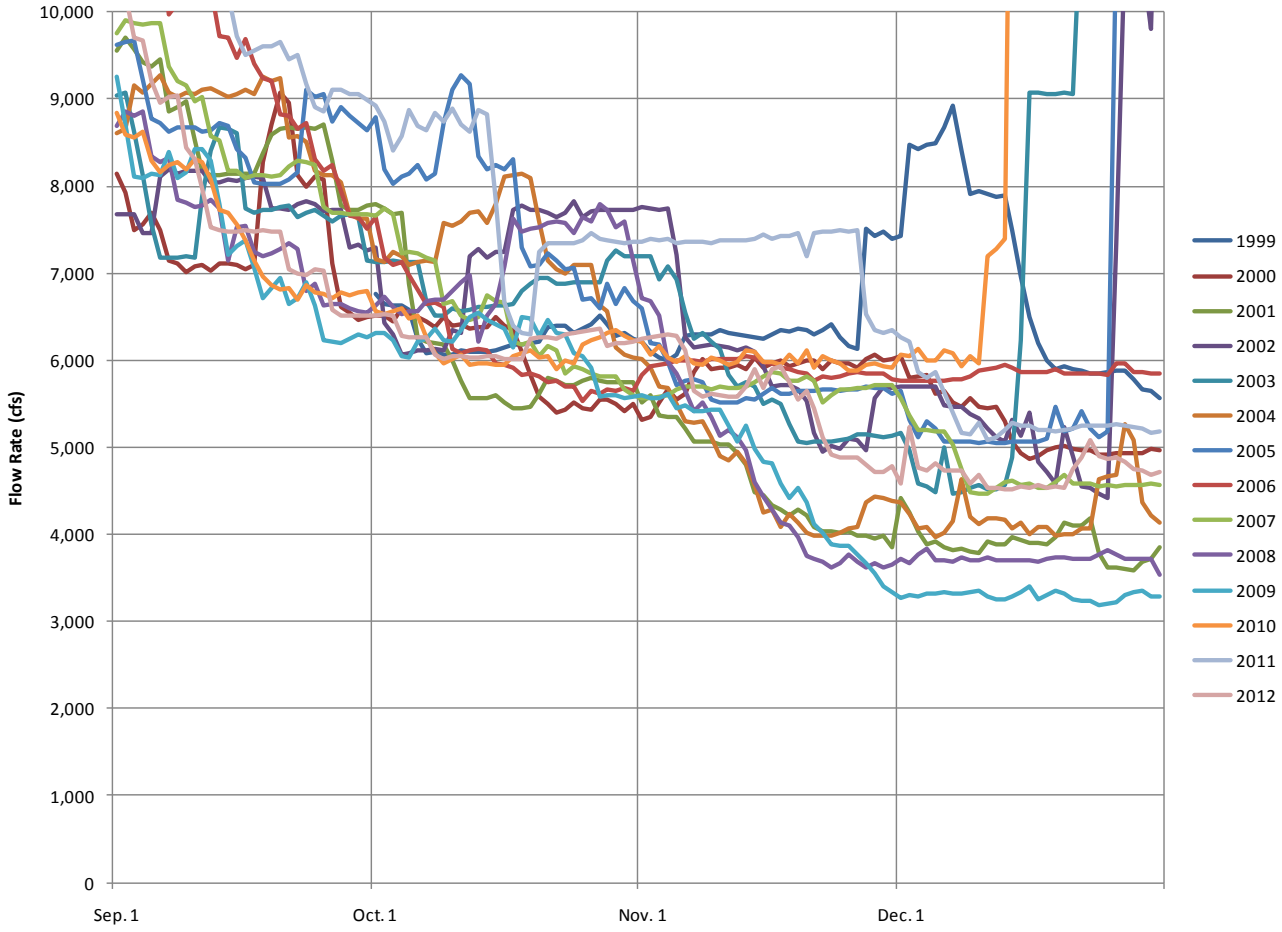


Figure 2 – October through December flows, Sacramento River at Keswick, CA USGS 11370500

Figure 2 generally indicates a pattern of higher flows in October as compared to November. Tributaries do not contribute substantial quantities of water for maintaining redds, because significant inflows do not occur until the confluence of Clear, Cottonwood, and Battle Creeks. Tributary contributions to the Upper Sacramento River may help meet the water supply need of the Settlement Contractors when they occur during the time of diversion from October through December.

GCID diverts water at its Hamilton City Pumping Plant, located approximately 40 miles south of Red Bluff. Figures 3 and 4 show the change in flows from Keswick to the Vina Bridge gage (20 river miles south of Hamilton City Pumping Plant)and Keswick to the Bend Bridge gage (59 river miles south of Hamilton City Pumping Plant), respectively (CDEC identification: VIN).

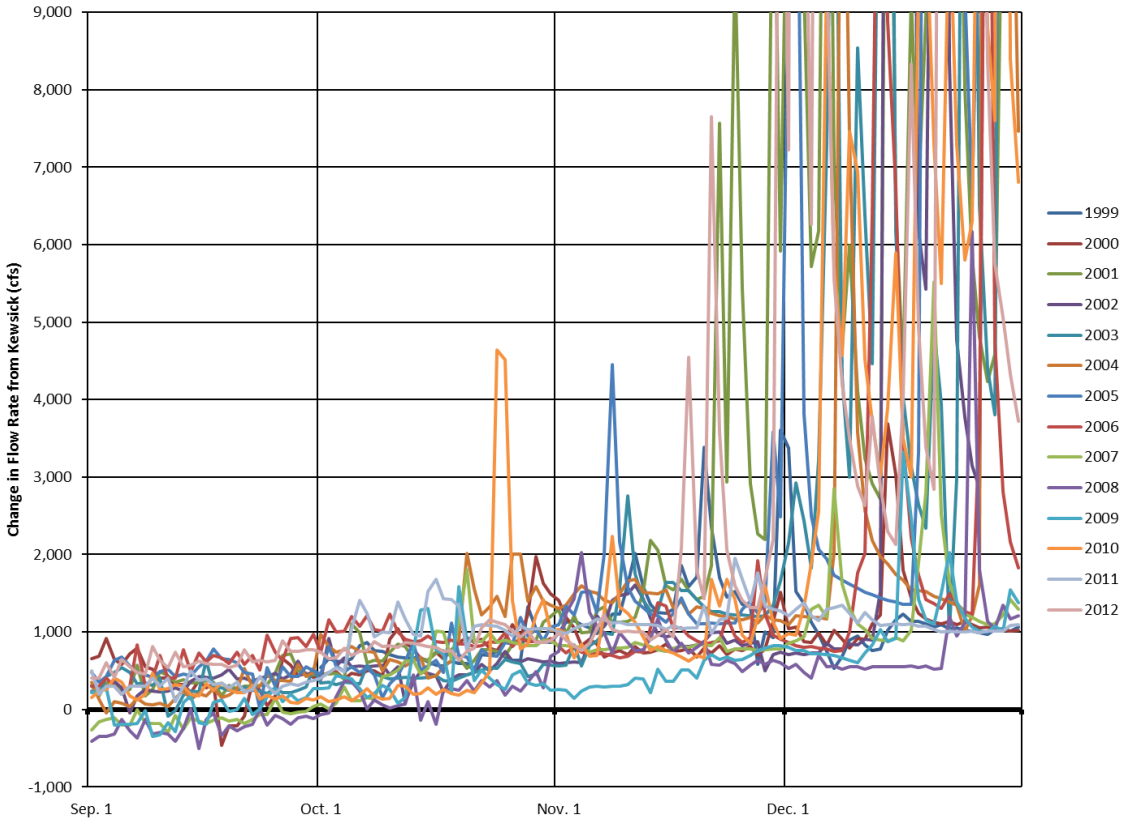


Figure 3 – Change in Flow from Keswick to Vina Bridge (Upstream of GCID Diversion) (positive indicates gains in flow)

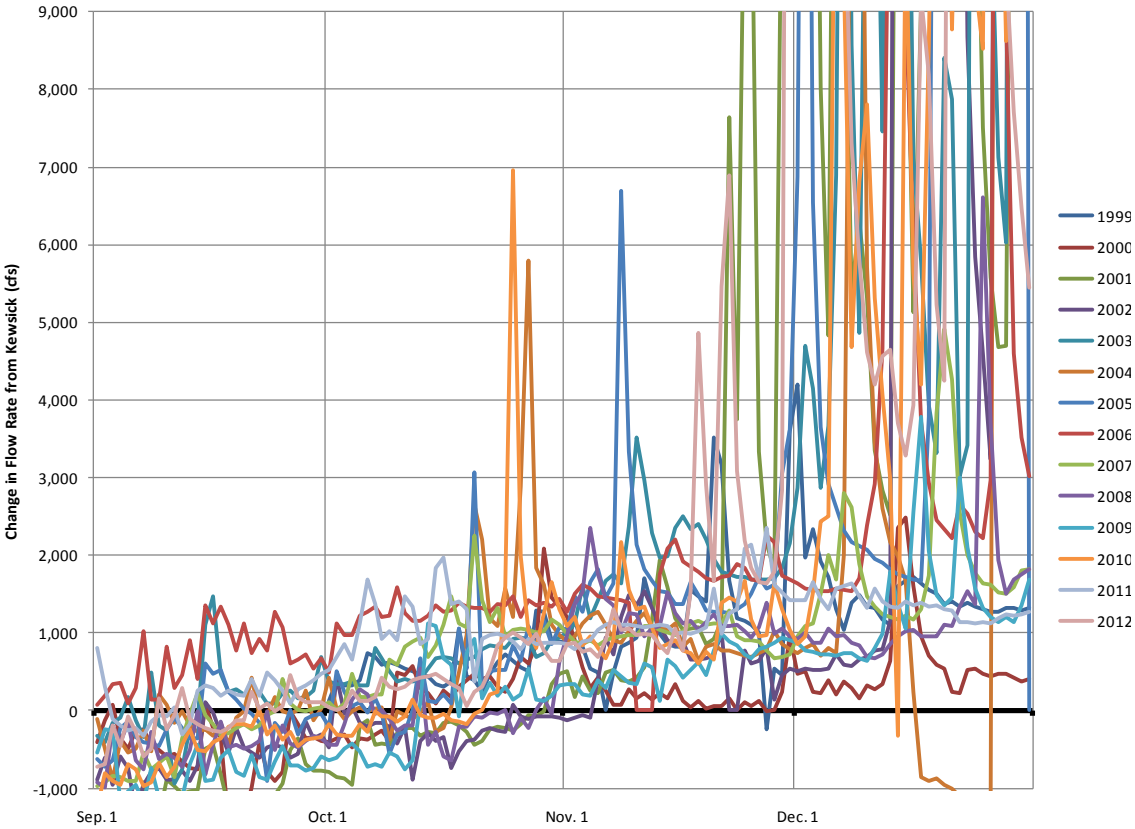


Figure 4 – Change in Flow from Keswick to Bend Bridge (Upstream of Vina Bridge and GCID Diversion)

The pattern generally indicates increasing accretions through October, which generally correlates with reductions in releases from Keswick.

Historical Controls on Keswick Releases

Key factors governing releases from Shasta and Keswick reservoirs during October, November, and December include: minimum flows for fishery resources; a navigation requirement at Wilkins Slough; flood control; water conservation measures; temperature operations; Sacramento – San Joaquin River Delta (Delta) criteria (demands, balanced conditions under the Coordinated Operations Agreement [COA] with the State Water Project: and balanced conditions with COA suspended, and excess conditions). Table 1 shows historical controls that would have precluded flow reductions at Keswick and storage at Shasta Reservoir in October, November, and December for the period of analysis 2003 through 2010.

Table 1 – Selected factors affecting Keswick release reduction and Shasta Reservoir storage October through December, 2003-2010

Year	Factor	Dates
2003	Flood Control	Dec. 15+
2004	Delta Excess Conditions	Oct. 26 – Nov. 16
2005	Delta Excess Conditions	Oct. 1 – 21
2005	Temperature	Oct. 9-24
2005	Flood Control	Dec. 26+
2006	Delta Excess Conditions	Oct. 1 – 20
2006	Temperature	Dec. 6-14
2007	Reduced Demands/Delta	Oct. 4 – Nov. 30
2007	Water Conservation	Dec. 1 – 9
2007	Delta Excess Conditions	Dec. 28 +
2008	Wilkins Slough Consideration	Oct. 16 – 30
2008	Reduced Demands/Delta	Oct. 31 – Nov. 3
2008	Water Conservation	Nov. 4 +
2009	Temperature	Nov. 11-13

Settlement Contractor Diversion Practices

The total amount of water under both Settlement Contracts is approximately 2.2 million AF, which serves farms and cities between Redding and Sacramento (Settlement Contracts 2012). Table 2 shows the October Base Supply for six Settlement Contractors having the greatest volume of Base Supply in October and the conversion of the monthly quantity into average diversion rate if distributed over the entire month. Considering the average Base Supply allocations only, and notwithstanding the ability to move Base Supply into other months as provided for in the Settlement Contracts, on average, these six Settlement Contractors may influence Sacramento flows by up to approximately 1,000 cfs per day over the month of October.

Table 2 – Base Supply for the Top Six Sacramento River Settlement Contractors

Settlement Contractor	October Base Supply (AF)	Avg. October Diversion Rate (cfs)
Glenn-Colusa Irrigation District	45,000	732
Maxwell Irrigation District	3,100	50
Princeton-Codora-Glenn Irrigation District	1,400	23
Provident Irrigation District	2,570	42
Reclamation District #108	1,500	24
Sutter Mutual Water Company	5,500	89
Total	59,070	**960**

Settlement Contractors may divert water on a pattern throughout the month of October for a daily influence larger than indicated by the average rate. The October volumes show monthly allocations, but do not consider water historically moved from other months into October. Figure 5 shows measured actual diversions, including both Base Supply and CVP water during the September through October period; and water diverted pursuant to a State-issued water right during the November through December period through GCID and RD108 facilities, based on data provided by the Districts (GCID, 2013 and RD108, 2013).

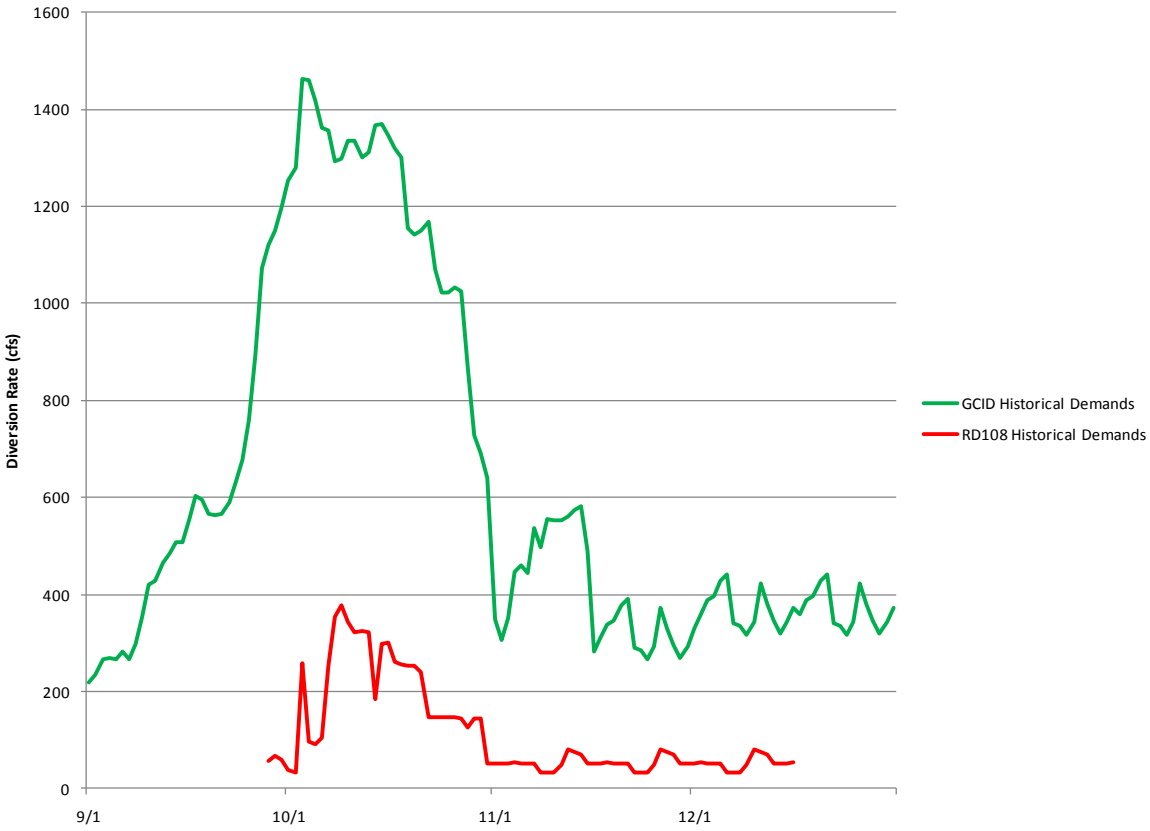


Figure 5 – Average September through December Diversions by GCID and RD108

Figure 6 shows the change in flows on the Sacramento River between Keswick and Wilkins Slough as measured at USGS gage 11390500, Sacramento River below Wilkins Slough near Grimes, CA. Wilkins Slough is located near the downstream end of the area potentially affected by the Proposed Action.

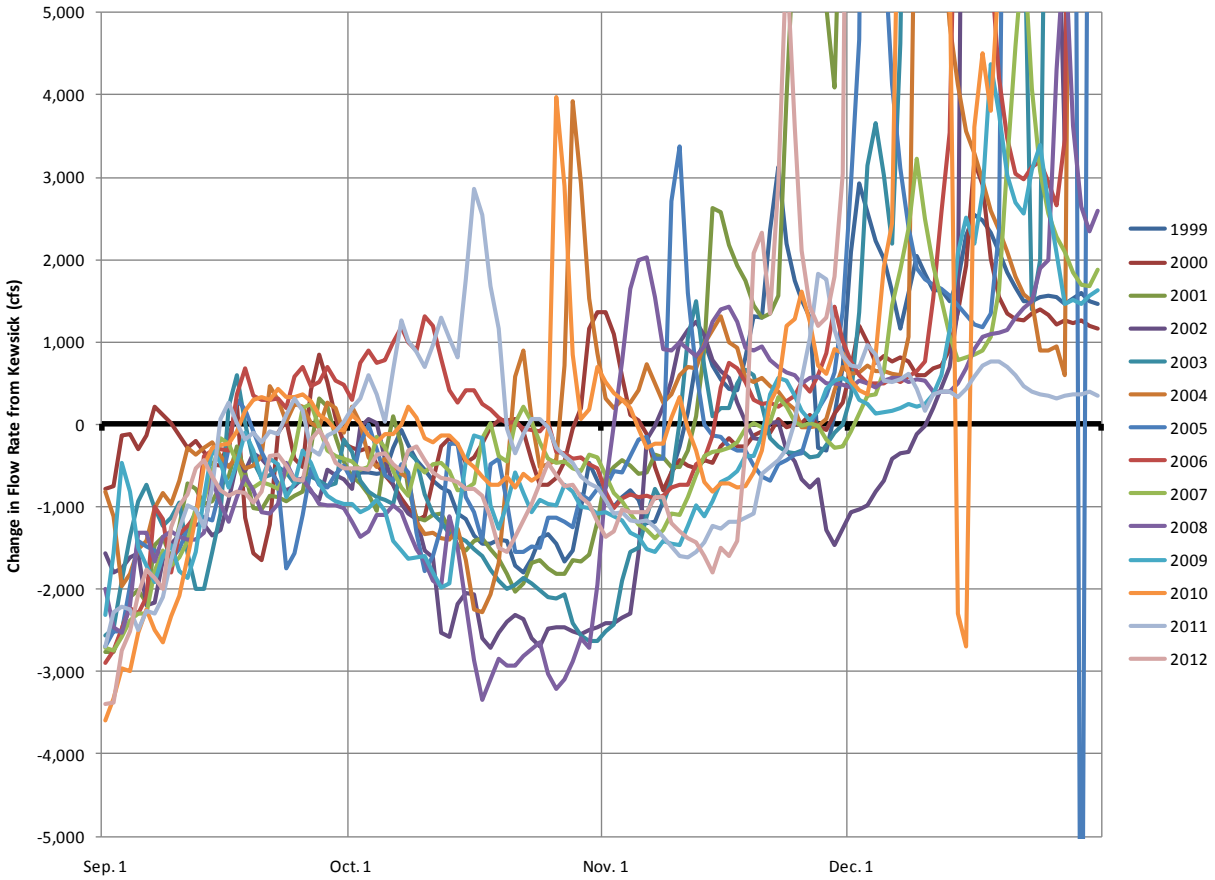


Figure 6 – Change in Flow from Keswick to Wilkins Slough (positive indicates a gain in flow)

October flows at Wilkins Slough are generally less than the Keswick release. Although some infiltration and other losses likely occur, the majority of the loss in flows is likely attributable to diversions made by Settlement Contractors.

1.5.2 Environmental Consequences

No Action

Under the No Action Alternative, no changes would occur to the existing water release operations from Keswick Dam or pumping operations on the Sacramento River south of Wilkins Slough from October through December. Also, up to 1,000 cfs would continue to be released from Keswick in October to meet GCID and RD108's needs, and 500 cfs of that 1,000 could return to the Sacramento River past Wilkins Slough as maintenance water to compensate for evaporation and avoid disease, in the absence of additional diversions in the Colusa Basin Drain.

Proposed Action

Reclamation proposes to exchange a portion of the Settlement Contractors' Base Supply diversions in October, at a rate of up to 1,000 cfs per day, which converts to a total of

approximately 60,000 AF to Reclamation, for CVP water delivered to the Settlement Contractors in November and/or December of the same calendar year. The total volume of Base Supply released and diverted will remain unchanged, and the Project would not anticipate a significant change in the flows reaching the Delta. Considering the average Base Supply allocations only, and notwithstanding the ability to move allocations into other months, on average, the Settlement Contractors listed in Table 2 may influence Sacramento River flows by up to approximately 1,000 cfs over the month of October.

The Fisheries Agencies would like to achieve an optimum Keswick release of 5,000 cfs in October, and Reclamation would coordinate with them to identify a target non-fluctuating Sacramento River flow. Three scenarios bracket the range of potential releases from Keswick in November and December that could result from implementing the project.

1. November Schedule: October reduced by, and November increased by, up to 1,000 cfs;
2. December Schedule: October reduced by, and December increased by, up to 1,000 cfs; and
3. November through December Schedule: October reduced by up to 1,000 cfs, and November and December both increased by up to 500 cfs.

Figure 7 shows the average potential monthly increase in flows under the different scenarios. The analysis subtracts 1,000 cfs from the historical record and adds the flow rate to the respective scenario.

The analysis brackets the range of potential changes, but actual conditions will likely see a need for continued diversions in October (smaller flow reductions) and consequently smaller increases in November and December.

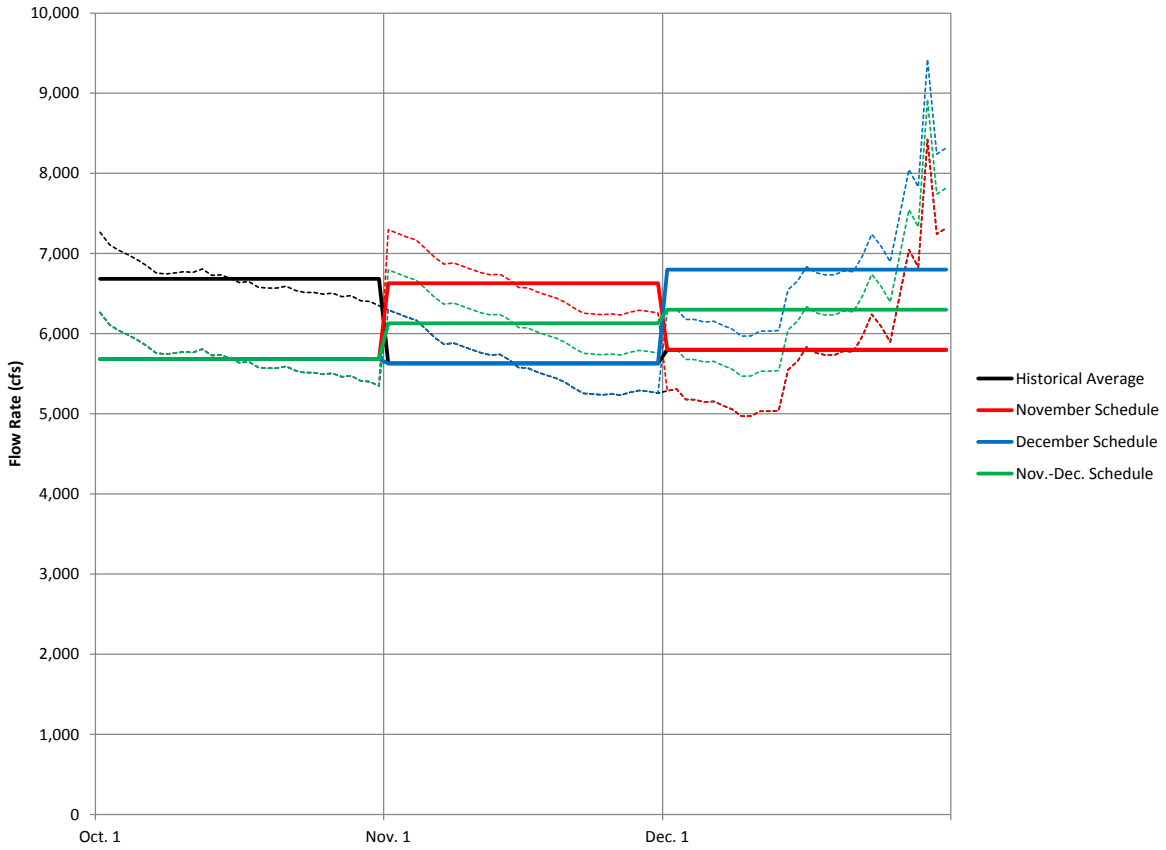


Figure 7 – Average Monthly Change in Sacramento Flows under Scheduling Scenarios

Under the Proposed Action, Settlement Contractors are neither diverting nor returning flows to the Sacramento River in October, so approximately 60,000 AF would be held behind Shasta Dam until November and/or December, including the 30,000 AF that, under current operations, would have typically been returned from the rice fields to the Sacramento River downstream of Wilkins Slough. This reduction in flows to the Delta has the potential to reduce pumping operations to maintain Balanced Conditions in the Delta. However, the water held behind Shasta Dam provides the ability to make additional allocations in the future. Settlement Contractors also could pump additional return flow in November and December unless pumps are at capacity during those months, by which additional supplies to the Sacramento River where the Delta is in excess conditions would not be provided. Although there is the potential that a reduction in flow below Wilkins Slough could reduce pumping operations, it is highly unlikely that the 500 cfs or 30,000 AF held behind Shasta Dam would be completely irretrievable.

Additional potential impacts to water resources that may result from the Proposed Action include:

1. Excess Conditions in the Delta: releases could exceed exports and Delta outflow requirements;
2. Temperature Control Releases: delayed and additional releases could prevent achieving temperature objectives;

3. Flood Control Releases and Ramping Criteria: additional releases could interfere with the required preservation of flood conservation space and/or the ability to reduce the change in flow rate when necessary; or
4. Pumping Operations below Wilkins Slough: delayed releases could reduce flows returning to the Sacramento River from the Colusa Basin Drain or further downstream; therefore, reducing pumping operations.

Avoidance Measures and Conditions

Reclamation and the Settlement Contractors would determine whether a reduction in diversions could occur, the specific quantities, and the schedule in real time. Evaluation of potential Project impacts depends upon the specific conditions assessed in real time and Reclamation will act accordingly. In order to avoid the above potential impacts, Reclamation will follow the avoidance measures and conditions listed below (identified in coordination with the Settlement Contractors) that allow for the reduction in Keswick releases and delivery of rice decomposition water not diverted in October. Avoidance measures and conditions that Reclamation would implement to allow the Project to proceed include:

1. Balanced Conditions in the Delta: Additional releases match exports and Delta outflow requirements;
2. Balanced Conditions in the Delta under the COA: The proposed Project could proceed if all other conditions are met;
3. Temperature Control Releases: Delayed and additional releases may not prohibit Reclamation from meeting temperature objectives, and an off ramp operation would avoid this potential impact;
4. Flood Control Releases from Shasta Dam and Ramping Criteria: Reclamation cannot reduce flood management releases and must be able to operate to flood control criteria and ramping criteria; therefore, the Project would not proceed for the period of time under the influence of flood releases, where storing water would cause the potential for flood releases, or where additional releases would interfere with reducing the change in flow rate when required;
5. Operations to Conserve Water: A delay in diversions would not impact actions to conserve water, but may allow for larger changes in releases. The proposed Project may proceed as long as flows would not be reduced below the minimum of 3,250 cfs per the criteria in the Final Restoration Plan for the Anadromous Fish Restoration Program (USFWS 2001b); and
6. Operations to Preserve Cold Water Pool: When end-of-September storage is less than or equal to 1.9 million-AF, Reclamation minimizes releases in the fall and winter in order to conserve the cold water pool in Shasta Reservoir for the protection of winter-run Chinook salmon spawning and embryo incubation during the subsequent summer (see action I.2.2.C on page 595 of 2009 National Marine Fisheries Service biological opinion [NMFS 2009]). Reclamation and the Settlement Contractors would consider whether the project should proceed given this need to conserve Shasta Reservoir storage in real time. The proposed Project would not result in additional impacts compared to existing conditions, but the ability to proceed with the proposed Project requires clarification before agreeing to the exchange of Base Supply in October where there is a potential for impacts to cold water pool operations.

Water not diverted by December 31st will no longer be available for delivery under the proposed Project and would revert back to the CVP. Also, under excess conditions and flood conditions, existing water may meet release and diversion requirements resulting in no need for delivery of the exchanged water. Diversion rights and operations agreements other than the proposed Project may meet the requirements for rice decomposition.

Considering the stated avoidance measures and conditions that would be implemented, Reclamation has determined that the Proposed Action would have no identifiable impacts to CVP operations, the Sacramento River, or the Delta as a result of the operational agreement. If Reclamation finds that it may run into constraints with any of these potential impacts to water resources during the implementation of the Proposed Action, Reclamation would suspend the Proposed Action to avoid any impacts.

1.6 Biological Resources

1.6.1 Affected Environment

Wildlife Habitat Lands

For the purpose of this Project, wildlife habitat lands refer to the rice field habitats created for wintering waterfowl and other migratory birds as well as surrounding Refuge wetlands in the greater Sacramento Valley Basins (Colusa, American, Butte, Sutter, Yolo, and Suisun Basins) within the CV. Rice farmers primarily flood their fields in the fall for optimal rice straw decomposition, and, as a secondary benefit, provide habitat for increasing numbers of wintering waterfowl and other migratory birds, which could provide the farmer with an opportunity to lease hunting rights. About another six inches of water is diverted to the flooded rice fields in order to provide wildlife habitat lands. The CV of California is the most important waterfowl wintering area in the Pacific Flyway, supporting up to 60 percent of the total Flyway population in some years. The Proposed Action takes place in the Colusa Basin, but could affect surrounding wintering waterfowl habitat in the greater Sacramento Valley Basins. The greater Sacramento Valley Basins within the CV are included in the analysis for potential impacts to biological resources in the action area. The acreage of flooded rice field varies year-to-year as the acreage of planted rice varies. There are approximately 325,500 – 463,000 total acres of flooded wintering waterfowl habitat in the greater Sacramento Valley Basin, comprised of about 108,000 acres of Refuge wetlands (Central Valley Joint Venture 2006) and 217,500 – 354,000 acres of winter flooded rice (Miller *et. al* 2010). Food availability is a key factor limiting waterfowl populations during migration and winter (Miller 1986, Conroy et al. 1989, Reinecke et al. 1989), and habitat conditions on the wintering grounds may influence reproductive success (Heitmeyer and Fredrickson 1981, Kaminski and Gluesing 1987, Raveling and Heitmeyer 1989). Adequate foraging habitat will ensure that survival outside of the breeding season does not limit population growth (Central Valley Joint Venture 2006). Additional water for winter flooding is diverted by Settlement Contractors to provide suitable habitat and increase waterfowl access to agricultural food resources. In addition to waterfowl, these habitats also support substantial proportions of migrating and wintering shorebirds and waterbirds (herons, egrets, white-faced ibis, rails, etc.) in the Pacific Flyway.

Rice fields begin the decomposition process after they have been flooded with six inches of water, and an additional six inches creates suitable wildlife habitat with the total flood-up target

of one AF/acre. Once all 30,000 acres of rice fields are flooded with a foot of water in October, another 30,000 AF of Base Supply is used for maintenance flows to compensate for evaporation and avoid disease.

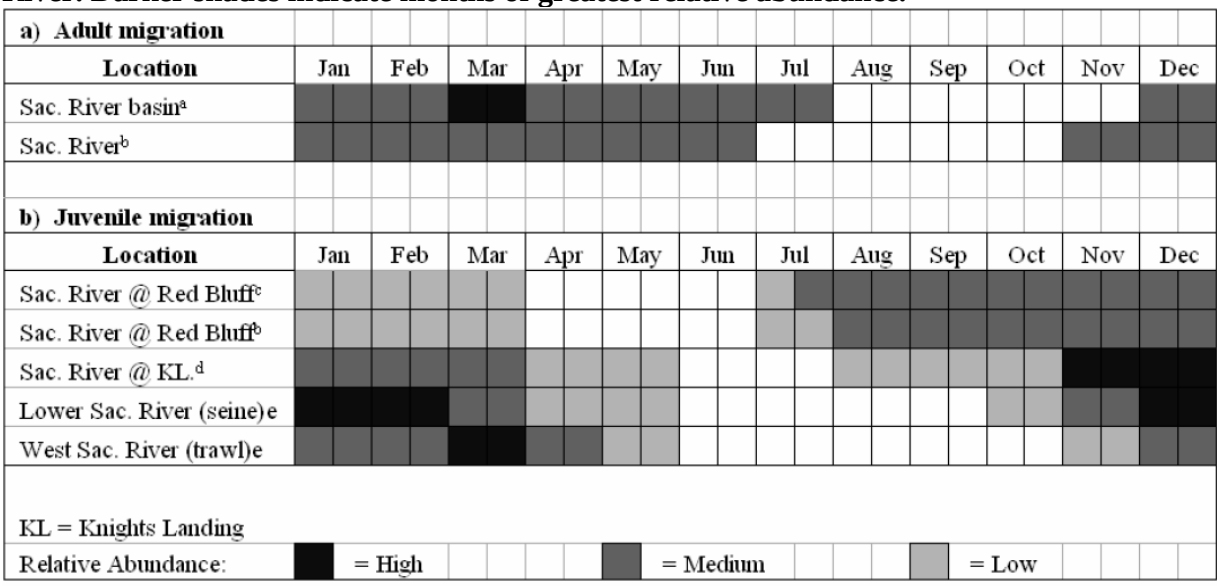
Federally-Listed Fish Species

The following sub-sections describe the life histories for Endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Threatened CV spring-run Chinook salmon (*O. tshawytscha*), Threatened CV steelhead (*O. mykiss*), Threatened Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*), and CV fall-run Chinook salmon (*O. tshawytscha*). These life histories have been adapted from the Biological Opinion for the Long-Term Operations of the Central Valley Project and State Water Project (NMFS 2009). These descriptions are limited to the portions pertaining to the Sacramento River in the Project area.

General Life History of Sacramento River Winter-Run Chinook Salmon

The distribution of winter-run spawning and rearing historically is limited to the upper Sacramento River and its tributaries, where spring-fed streams provide cold water throughout the summer, allowing for spawning, egg incubation, and rearing during the mid-summer period (Slater 1963, Yoshiyama *et al.* 1998). The primary reaches for winter-run Chinook spawning occur between Keswick and Red Bluff Diversion Dam (RBDD) (approximately 15 miles downstream of the Bend Bridge flow gage). Adult winter-run enter the Sacramento River basin between December and July, the peak occurring in March (Table 3; Yoshiyama *et al.* 1998, Moyle 2002), and migrate past the RBDD from mid-December through early August (NMFS 1997). Winter-run fry begin to emerge from the gravel in late June to early July and continue through October (Fisher 1994). Emigration of juvenile winter-run past RBDD may begin as early as mid-July, typically peaking in September, and can continue through March in dry years (Vogel and Marine 1991, NMFS 1997). From 1995 to 1999, all winter-run outmigrating as fry passed RBDD by October, and all outmigrating pre-smolts and smolts passed RBDD by March (Martin *et al.* 2001). The majority of winter-run in recent years (i.e., > 50 percent since 2007) spawn in the area from Keswick Dam downstream to the Anderson-Cottonwood Irrigation District Dam (approximately 5 miles). Table 3 displays the temporal occurrence of adult and juvenile winter-run Chinook in the Sacramento River.

Table 3: The temporal occurrence of (a) adult and (b) juvenile winter-run in the Sacramento River. Darker shades indicate months of greatest relative abundance.



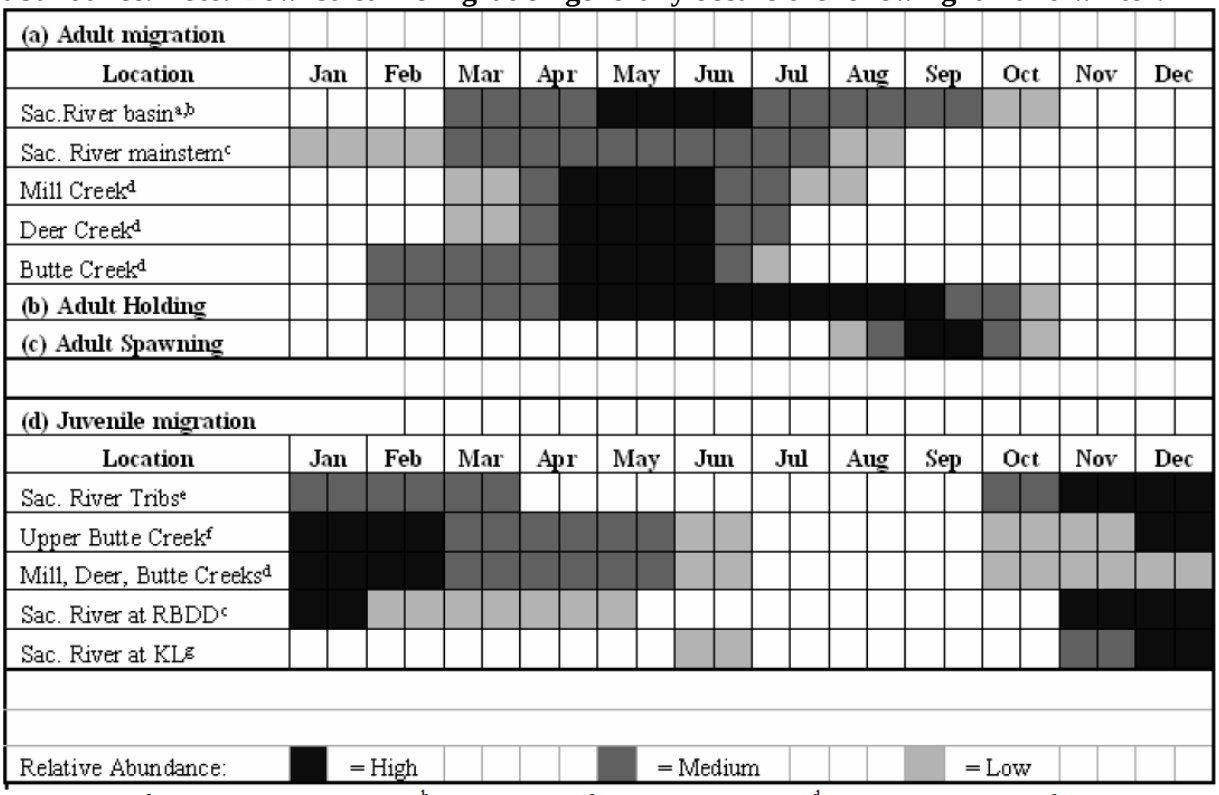
Sources: [a]Yoshiyama *et al*. (1998); Moyle (2002); [b]Myers *et al*. (1998); Vogel and Marine (1991) ; [c]Martin *et al.* (2001); [d]Snider and Titus (2000); [e]USFWS (2001, 2001a)

General Life History of CV Spring-Run Chinook Salmon

Spring-run exhibit a stream-type life history. Adults enter freshwater in the spring, hold over the summer, spawn in the fall, and the juveniles typically spend a year or more in freshwater before emigrating. Adult spring-run enter the Sacramento River between March and September, primarily in May and June (Table 4; Yoshiyama et al. 1998, Moyle 2002). Lindley *et al.* (2007) indicate that adult spring-run migrate from the Sacramento River into spawning tributaries primarily between mid-April and mid-June. Typically, spring-run utilize mid- to high-elevation streams that provide appropriate temperatures and sufficient flow, cover, and pool depth to allow over-summering while conserving energy and allowing their gonadal tissue to mature (Yoshiyama *et al.* 1998). Reclamation reports that spring-run holding in upper watershed locations prefer water temperatures below 60ºF, although salmon can tolerate temperatures up to 65ºF before they experience an increased susceptibility to disease. Spring-run spawning occurs between September and October depending on water temperatures. Between 56 and 87 percent of adult spring-run that enter the Sacramento River basin to spawn are three years old (Calkins et al. 1940, Fisher 1994). Spring-run fry emerge from the gravel from November to March (Moyle 2002) and the emigration timing is highly variable, as they may migrate downstream as young-of-the-year or as juveniles or yearlings. The modal size of fry migrants at approximately 40 mm between December and April in Mill, Butte, and Deer Creeks reflects a prolonged emergence of fry from the gravel (Lindley et al. 2007). Studies in Butte Creek (Ward et al. 2002, 2003; McReynolds et al. 2005) found the majority of spring-run migrants to be fry occurring primarily from December through February, and that these movements appeared to be influenced by flow. Small numbers of spring-run remained in Butte Creek to rear and migrated as yearlings later in the year, typically the next fall. The emigration period for spring-run extends from November to early May, with up to 69 percent of the young-of-the-year fish outmigrating through the lower Sacramento River and Delta during this period (CDFG 1998). Spring-run juveniles have been observed rearing in the lower reaches of non-natal tributaries and intermittent streams in the

Sacramento Valley during the winter months (Maslin et al. 1997, Snider 2001). Peak movement of juvenile (yearling) spring-run in the Sacramento River at Knights Landing occurs in December, and again in March and April for young-of-the-year juveniles. However, juveniles also are observed between November and the end of May (Snider and Titus 2000). Based on the available information, the emigration timing of spring-run appears highly variable (CDFG 1998). Some fish may begin emigrating soon after emergence from the gravel, whereas others over summer and emigrate as yearlings with the onset of intense fall storms (CDFG 1998). Table 4 displays the temporal occurrence of adult and juvenile CV spring-run Chinook salmon in the Sacramento River.

Table 4: The temporal occurrence of adult (a-c) and juvenile (d) CV spring-run Chinook salmon in the Sacramento River. Darker shades indicate months of greatest relative abundance. Note: Downstream emigration generally occurs the following fall and winter.



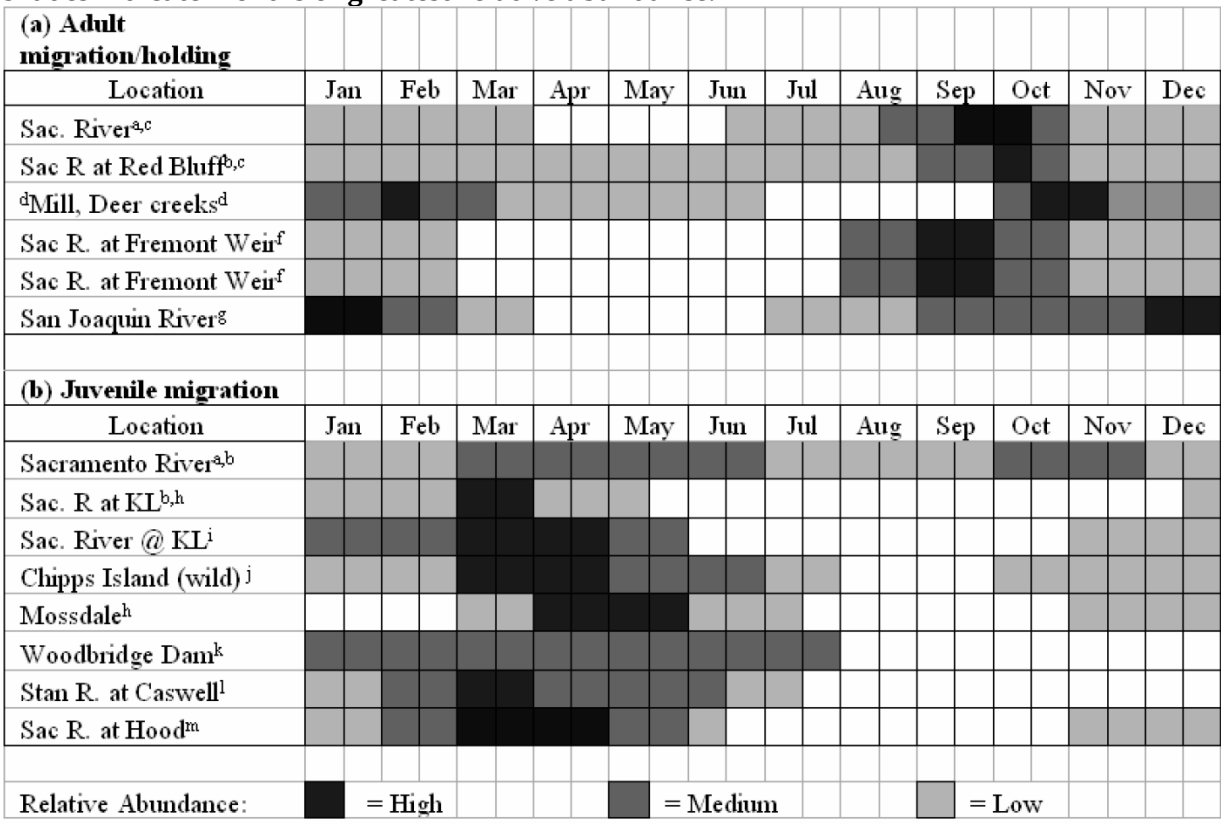
Sources: [a]Yoshiyama *et al*. (1998); [b]Moyle (2002); [c]Myers *et al*. (1998); [d]Lindley *et al*. (2007); [e]CDFG (1998); [f]McReynolds *et al*. (2005); Ward *et al*. (2002, 2003); [g]Snider and Titus (2000)

General Life History of CV Steelhead

Steelhead can be divided into two life history types, summer-run steelhead and winter-run steelhead, based on their state of sexual maturity at the time of river entry and the duration of their spawning migration, stream-maturing and ocean-maturing. Only winter-run steelhead are currently found in CV rivers and streams (McEwan and Jackson 1996). CV steelhead generally spawn from December through April, with peaks from January through March, in small streams and tributaries where cool, well oxygenated water is available year-round (Table 5; Hallock et al. 1961, McEwan and Jackson 1996). Spawning occurs during winter and spring months. The length of time it takes for eggs to hatch depends mostly on water temperature. Hatching of steelhead eggs in hatcheries takes about 30 days at 51°F. Fry emerge from the gravel usually

about 4 to 6 weeks after hatching, but factors such as redd depth, gravel size, siltation, and temperature can affect emergence timing (Shapovalov and Taft 1954). Newly emerged fry move to the shallow, protected areas associated with the stream margin (McEwan and Jackson 1996) and they soon move to other areas of the stream and establish feeding locations, which they defend (Shapovalov and Taft 1954). Productive steelhead habitat is characterized by complexity, primarily in the form of large and small woody debris. Cover is an important habitat component for juvenile steelhead both as velocity refugia and as a means of avoiding predation (Meehan and Bjornn 1991). Juvenile steelhead emigrate episodically from natal streams during fall, winter, and spring high flows. Emigrating CV steelhead use the lower reaches of the Sacramento River and the Delta for rearing and as a migration corridor to the ocean. Table 5 displays the temporal occurrence of adult and juvenile CV steelhead in the CV.

Table 5: The temporal occurrence of (a) adult and (b) juvenile CV steelhead in the CV. Darker shades indicate months of greatest relative abundance.



Sources: [a]Hallock *et al*. (1961); [b]McEwan (2001); [c]USFWS (unpublished data); [d]CDFG (1995); [e]Hallock *et al.* (1957); [f]Bailey (1954); [g]CDFG Steelhead Report Card Data; [h]CDFG (unpublished data); [i]Snider and Titus (2000); [j]Nobriga and Cadrett (2003); [k]Jones & Stokes Associates, Inc. (2002); [l]S.P. Cramer and Associates, Inc. (2000, 2001); [m]Schaffter (1980, 1997)

General Life History of Southern DPS of North American Green Sturgeon

The Southern DPS of green sturgeon includes all green sturgeon populations south of the Eel River, with the only known spawning population being in the Sacramento River. Green sturgeon life history can be broken down into four main stages: eggs and larvae, juveniles, sub-adults, and sexually mature adults. They are believed to spawn every 2 to 5 years (Beamesderfer *et al.* 2007). Upon maturation of their gonadal tissue, but prior to ovulation or spermiation, the adult

fish enter freshwater and migrate upriver to their spawning grounds. Recent acoustical tagging studies on the Rogue River (Erickson *et al*. 2002) have shown that adult green sturgeon will hold for as much as 6 months in deep (> 5m), low gradient reaches or off channel sloughs or coves of the river during summer months when water temperatures were between 59°F and 73°F. Adult green sturgeon migrate upstream as far as the mouth of Cow Creek, near Bend Bridge, in May. Adults prefer deep holes at the mouths of tributary streams, where they spawn and rest on the bottom. After spawning, the adults hold over in the upper Sacramento River between RBDD and GCID's Hamilton City Pumping Plant until November (Klimley 2007). Heublin (2006, 2009) and Vogel (2008) have documented the presence of adults in the Sacramento River during the spring and through the fall into the early winter months. These fish hold in upstream locations prior to their emigration from the system later in the year. Like the Rogue and Klamath river systems, downstream migration appears to be triggered by increased flows, decreasing water temperatures (< 50°F), and occurs rapidly once initiated. During the spring and summer, the main processes influencing green sturgeon are in the freshwater environment. Currently, spawning appears to occur primarily above RBDD, based on the recovery of eggs and larvae at the dam in monitoring studies (Gaines and Martin 2002, Brown 2007). Green sturgeon larvae hatch from fertilized eggs after approximately 169 hours at a water temperature of 59°F (Van Eenennaam *et al.* 2001, Deng *et al.* 2002). Van Eenennaam *et al.* (2005) indicated that an optimum range of water temperature for egg development ranged between 57.2°F and 62.6°F. Temperatures over 73.4°F resulted in 100 percent mortality of fertilized eggs before hatching. Table 6 displays the temporal occurrence of adult, larval, juvenile, and subadult Southern DPS of green sturgeon in the CV.

Table 6: The temporal occurrence of (a) adult, (b) larval (c) juvenile and (d) subadult coastal migrant Southern DPS of green sturgeon in the CV. Darker shades indicate months of greatest relative abundance.

(a) Adult-sexually mature (≥145 – 205 cm TL for females and ≥ 120 – 185 cm TL old for males)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Upper Sac. River[a,b,c,i]												
SF Bay Estuary[d,h,i]												

(b) Larval and juvenile (≤10 months old)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
RBDD, Sac River[e]												
GCID, Sac River[e]												

(c) Older Juvenile (> 10 months old and ≤3 years old)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
South Delta*[f]												
Sac-SJ Delta[f]												
Sac-SJ Delta[e]												
Suisun Bay[e]												

(d) Sub-Adult/non-sexually mature (approx. 75 cm to 145 cm for females and 75 to 120 cm for males)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pacific Coast[c,g]												

Relative Abundance: = High = Medium = Low

* Fish Facility salvage operations

Sources: [a]USFWS (2002); [b]Moyle *et al*. (1992); [c]Adams *et al*. (2002) and NMFS (2005); [d]Kelly *et al*. (2007); [e]CDFG (2002); [f]IEP Relational Database, fall midwater trawl green sturgeon captures from 1969 to 2003; [g]Nakamoto *et al*. (1995); [h]Heublein (2006); [i]CDFG Draft Sturgeon Report Card (2007)

1.6.2 Environmental Consequences

No Action

Under the No Action Alternative, biological resources in agricultural wildlife habitat lands and the Upper Sacramento River would not change from their current conditions. The potential for salmon redds being dewatered in November and December would remain if the Proposed Action is not taken.

Proposed Action

Wildlife Habitat Lands

The Proposed Action would delay the flooding of up to 30,000 acres of waterfowl habitat in the greater Sacramento Valley Basin from October into November. This reduces the available habitat in October from approximately 217,500 – 354,000 acres of flooded rice habitat to approximately 187,500 – 324,000 acres with the remaining habitat being flooded between 10 days and two weeks soon thereafter through November and December. The amount of rice fields that would see a delay in winter flooding due to the Proposed Action comprises approximately 8 – 14 percent of the total rice field habitats in the greater Sacramento Valley Basins currently receiving winter flooding, and approximately 6 – 9 percent of the total greater Sacramento Valley Basins flooded wintering waterfowl habitat. The delayed flows would leave approximately 295,500 – 433,000 acres of the total greater Sacramento Valley Basins flooded wintering waterfowl habitat receiving flood water on time. Delays in flooding 6 – 9 percent of the available habitat in the greater Sacramento Valley Basins for migratory waterfowl at the onset of the migratory season should not appreciably reduce the amount of available wintering waterfowl habitat.

Federally-Listed Fish Species

Sacramento River Winter-Run Chinook Salmon

Winter-run Chinook life stages present in the Upper Sacramento River from October through December are the embryo, juvenile, and adult stages (see Table 3). A stressor for embryo incubation (primarily upstream of RBDD) is exposure to water temperature greater than approximately 62ºF, which may lead to egg mortality. Embryo incubation of concern to the Proposed Action occurs through October and the reduced Keswick releases could potentially raise water temperature above 62ºF. However, Reclamation will comply with the flow releases required in Water Rights Order 90-05, under which it is required to maintain the temperature in the reach of the Sacramento River between Keswick and RBDD at 56 ºF when (1) higher temperatures will be detrimental to the fishery and (2) maintenance of 56 ºF in that reach is within Reclamation's reasonable control. If Reclamation finds that it cannot maintain a daily average water temperature of 56ºFduring the Proposed Action, Reclamation would forego the Proposed Action.

Juvenile and adult winter-run Chinook are present in the Upper Sacramento River from October through December. A stressor for juveniles and adults is low fall flows, which could result in delayed yearling emigration and spawning, higher predation, and reduced smolt survival to the Delta. Fall flow levels would be lower in October, but would remain above levels that would lead to these negative impacts as provided in the 2009 NMFS Biological Opinion and Conference Opinion of the Long-Term Operations of the Central Valley Project and State Water Project (2009 NMFS BO), avoiding threats to juvenile and adult winter-run Chinook. Also, the

reduced October flows would be counterbalanced with increased releases from November to December, providing a more stabilized flow across those three months.

CV Spring-Run Chinook Salmon

Spring-run Chinook life stages present from October through December are the embryo, juvenile rearing and smolt emigration stages. A stressor for embryo incubation is exposure to water temperature greater than 58ºF, which could lead to egg mortality or structural asymmetry. Reduced Keswick releases could potentially raise water temperature above 58ºF. However, Reclamation will comply with the flow releases required in Water Rights Order 90-05, under which it is required to maintain the temperature in the reach of the Sacramento River between Keswick and RBDD at 56 ºF when (1) higher temperatures will be detrimental to the fishery and (2) maintenance of 56 ºF in that reach is within Reclamation's reasonable control. If Reclamation finds that it cannot maintain a daily average water temperature of 56ºF, Reclamation would forego the Proposed Action.

A stressor for juveniles and smolts present between Colusa and Sacramento in November and December is low fall flows, which could result in delayed yearling emigration, higher predation, and reduced smolt survival to the Delta. There's a relatively low abundance of adults migrating in October, but low fall flows could be a stressor as well. Fall flow levels would be lower in October, but would remain above levels that would lead to these negative impacts as described in the 2009 NMFS BO, avoiding threats to juvenile and smolt spring-run Chinook. Also, the reduced October flows would be counterbalanced with increased releases from November to December, providing a more stabilized flow across those three months.

CV Steelhead

CV Steelhead life stages present from October through December are the embryo, juvenile rearing and adult spawning stages (see Table 5). The incubation period for steelhead embryos is from December to May, and they hatch after 30 days in water temperature of 51ºF. Winter water temperature is capable of dropping below 51ºF and the Proposed Action would have slightly larger Keswick releases during December reducing the risk of harmful water temperature levels. A stressor for juveniles that are present in the Upper Sacramento River from October through November is exposure to water temperatures greater than 65ºF during the rearing period. This could result in truncated emigration timing and reduced survival and juvenile production and growth. Reduced Keswick releases in October could potentially raise water temperature above 65ºF. A stressor for adult spawning occurring in October, then gradually decreasing through December, is exposure to water temperature greater than 56ºF, which could result in loss of eggs and sac-fry, reduced juvenile survival, and reduced reproductive success. However, Reclamation will comply with the flow releases required in Water Rights Order 90-05, under which it is required to maintain the temperature in the reach of the Sacramento River between Keswick and RBDD at 56 ºF when (1) higher temperatures will be detrimental to the fishery and (2) maintenance of 56 ºF in that reach is within Reclamation's reasonable control. If Reclamation finds that it cannot maintain a daily average water temperature of 56ºFduring the Proposed Action, Reclamation would forego the Proposed Action.

Southern DPS of North American Green Sturgeon

Southern DPS of North American green sturgeon life stages present from October through December are the larval and juvenile, and adult holding stages (see Table 6). Larvae and

juveniles are of relatively low abundance in the Sacramento River at GCID's Hamilton City Pumping Plant and between RBDD and Colusa in October. A stressor for larvae and juveniles is low fall flows, which could result in delayed emigration, higher predation, reduced juvenile survival to the Delta, loss of rearing and riparian habitat, and increased holding in areas of poor water quality. Dam-controlled releases reduce the first pulse flow in the fall that may trigger adults to move out, so they stay longer in upstream areas. Fall flow levels would be lowered in October, but would remain above levels that would lead to these negative impacts, avoiding threats to larval, juvenile and adult green sturgeon. Also, the reduced October flows would be counterbalanced with increased releases from November to December, which would provide a more stabilized flow across those three months. A stressor for juveniles rearing to Hamilton City from October through November is exposure to water temperature greater than its life history stage requirements of 58ºF, which could result in juveniles moving downstream immediately after hatching and encountering sub-optimum temperatures below Hamilton City due to truncated spawning distribution, reduced growth and feeding, delayed emigration, and increased predation from warm water species. Adult green sturgeons are of relatively low abundance in the Upper Sacramento River from October through December. Stressors for adult holding are low flows and exposure to water temperature greater than 59-73ºF, which could result in some adults holding for up to 6 months in the Upper Sacramento River post-spawn waiting for an increase in flows to move downstream. Reclamation will comply with the flow releases required in Water Rights Order 90-05, under which it is required to maintain the temperature in the reach of the Sacramento River between Keswick and RBDD at 56 ºF when (1) higher temperatures will be detrimental to the fishery and (2) maintenance of 56 ºF in that reach is within Reclamation's reasonable control.

CV Fall-Run Chinook Salmon

CV fall-run Chinook salmon are not a federally-listed species. However, the purpose of this proposed Project is to reduce salmon spawning and juvenile rearing/holding in areas subject to dewatering in November and December. The primary reaches for fall-run Chinook spawning occur between Keswick and RBDD (approximately 15 miles downstream of the Bend Bridge flow gage). The result of this proposed Project would be increased success of redds reaching emergence, improved conditions for salmonid rearing, and improving the survival of late fall-run Chinook young-of-the-year. During a dry year, flows could be reduced further in January, potentially adding stress to fall-run juveniles, however, absent the action there could be potentially greater decreases as October flows would have been higher.

1.7 Cumulative Impacts

There are no other known past, present, and reasonably foreseeable future actions in the vicinity of the Proposed Action area that would cumulatively result in significant impacts to the human environment when taking into consideration the actions analyzed within this EA.

Section 4 Consultation and Coordination

2.1 Public Review Period

Reclamation intends to sign a Finding of No Significant Impact for this Project, and will make the EA available for a two week period beginning September 13, 2013. All comments will be addressed in the FONSI. Additional analysis will be prepared if substantive comments identify impacts that were not previously analyzed or considered.

2.2 Endangered Species Act (16 USC § 1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

Reclamation has determined that additional consultation is not necessary for the Project as there would be no additional effects beyond those previously included in the 2009 NMFS BO.

2.3 National Historic Preservation Act (16 USC § 470 et seq.)

The NHPA of 1966, as amended (16 USC 470 et seq.), requires that federal agencies give the Advisory Council on Historic Preservation an opportunity to comment on the effects of an undertaking on historic properties, and properties that are eligible for inclusion in the National Register of Historic Places. The 36 CFR Part 800 regulations implement Section 106 of the NHPA. Section 106 of the NHPA requires federal agencies to consider the effects of federal undertakings on historic properties, and properties determined eligible for inclusion in the National Register of Historic Places.

Reclamation determined that the proposed Project does not have the potential to effect historic properties and concluded the Section 106 process on August 7, 2013.

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Appendix A: Section 106 Concurrence

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY
REFER TO:
MP-153
ENV-3.00

VIA ELECTRONIC MAIL ONLY

August 07, 2013
MEMORANDUM

To: Alexandra Aviles
Natural Resource Specialist, Division of Environmental Affairs

From: William E. Soule
Archaeologist, Division of Environmental Affairs

Subject: 13-MPRO-246: Three-year Program to Stabilize Flows from Keswick Dam into the Sacramento River during October to December to Improve Salmon Habitat

This proposed undertaking by Reclamation is to enter into at 3-year operational agreement with Sacramento River Settlement Contractors (SRSC) to reduce the potential for dewatering of portions of the Sacramento River below Keswick Dam by providing flexibility in managing releases from Keswick Dam during the October through December period. This is the type of undertaking that does not have the potential to cause effects to historic properties, should such historic properties be present, pursuant to the National Historic Preservation Act (NHPA) Section 106 regulations codified at 36 CFR Part 800.3(a)(1).

Under this proposed action the SRSC will would agree to exchange a portion of their October diversions, at a rate of up to 1,000 cfs per day, to Reclamation for Central Valley Project water delivered to the SRSC in November through December of the same calendar year. This will stabilize flows on the upper Sacramento River benefiting fall run Chinook Salmon and will additionally increase cold water storage in Shasta Lake. This proposed Action will not produce any ground disturbances, it will not result in the construction of new facilities or the modification of existing facilities, and it will not result in any changes in land use.

I concur with a statement in the cultural resources section of the Environmental Assessment (EA) for this project that neither the Proposed Action nor the No Action Alternative have the potential to cause effects to historic properties, assuming such historic properties were present, pursuant to 36 CFR § 800.3(a)(1). With this determination, Reclamation has no further NHPA Section 106 obligations. This memorandum is intended to convey the completion of the NHPA Section 106 process for this undertaking. Please retain a copy in the administrative record for this action. Should changes be made to this action, additional NHPA Section 106 review, possibly including consultation with the State Historic Preservation Officer, may be necessary. Thank you for providing the opportunity to comment.

CC: Cultural Resources Branch (MP-153), Anastasia Leigh – Regional Environmental Officer (MP-150)

Appendix B: ITA Concurrence

RIVERA, PATRICIA <privera@usbr.gov> Tue, Aug 13, 2013 at 7:49 PM
To: "Seabrook, Kristi" <kseabrook@usbr.gov>, Alexandra Aviles <aaviles@usbr.gov>

Alex,

I reviewed the proposed action to approve GGSA and Glen-Colusa Irrigation District's (GCID) proposal to allow the flows from Keswick Dam be coordinated to be smoothed over October, November and December by reducing Reclamation's October releases and increasing November and December releases. This would be done by modifying the demand patterns of rice farmers in GCID without altering the total volume of water diverted or affecting downstream conditions. As an experimental effort, Reclamation proposes to enter into a three-year operational agreement with Sacramento River Settlement Contractors to reduce the potential for redd dewatering by providing flexibility in managing diversions without changing the total volume of water released and diverted. The Settlement Contractors would agree to exchange a portion of the October diversions, at a rate of up to 1,000 cfs per day, to Reclamation for CVP water delivered to the Settlement Contractors in November through December of the same calendar year.

The proposed action does not have a potential to impact Indian Trust Assets.

Patricia Rivera