Appendices A1 – A9

Table of Contents

Appendix A1: Sacramento River

1.1 Sacramento River

Parties diverting water from the Sacramento River mainstem are proposing a coordinated suite of flow and non-flow measures that are intended to provide a holistic and integrated approach to improve populations of native fish species, especially steelhead and the four runs of Chinook salmon, on the Sacramento River mainstem. These flow and habitat measures build on the regulatory requirements imposed on the parties to the voluntary agreement since 2000, both of which contribute to the implementation of the narrative objective for salmon protection, and the numeric objectives for Delta outflows and Sacramento River inflows.[1]

As a general matter, the measures described in this Project Description are intended to augment flows and implement habitat measures to provide the opportunity for juvenile fish to successfully spawn, shelter, forage, rear, and migrate out of the Sacramento mainstem (as measured at the confluence of the Feather River). By providing additional habitat and working to improve watershed health, these measures are intended to better meed the needs of fish species and thereby help those populations move towards the narrative salmon doubling goal and other metrics of robust and viable populations. Finally, because of the inherent variability within each year, there is a measure to allow, in dry, below normal and above normal years, for at least an additional 100,000 acre-feet of water that may be used for the benefit of fish and wildlife, for instance, (i) as additional flows to augment the natural signals for outmigration conveyed in storm events for Spring and Fall run Chinook salmon, (ii) as additional flows to augment minimum flows or (iii) for any other purpose deemed to be biologically beneficial under the governance and adaptive management plan.

1.1.1 Flow Measures, including interaction with Shasta and CVP Operations

1.1.1.1 Proposed Flow Commitments

The parties to the voluntary agreements on the Sacramento River mainstem are prepared to make a series of additional flow commitments that are intended to augment the existing flow regime during specific seasons of the year, intended to provide additional pulse flows at biologically sensitive periods, and preserve cold-water pool to ensure viability of fish species during the warm summer months. Those additional flow commitments are as follows:

1.1.1.1.1 Fall Flow Stabilization (All Years)

As the irrigation season closes during the late summer and winter-run chinook salmon emerge from redds, releases for, water demand and instream flows move from the peak summer rates to lower winter rates which results in decreased storage releases from Shasta Reservoir. The winter releases are

---

[1] As to flow and habitat measures that have been adopted since 2000, Exhibit 1 hereto ("Sacramento Valley Salmon Recovery Program – Completed Projects – 2000-2017") lists the various Sacramento Valley Salmon Recovery Program projects that were completed during 2000 through 2017. These projects have contributed to the implementation of the narrative objective for salmon protection. These projects form a strong foundation for the additional habitat measures proposed under the voluntary agreements. It is noteworthy that, of the almost 150 projects completed since 2000, almost half of those are on the Sacramento River mainstem.

lower not only because the growing season is completed and downstream diversions decrease accordingly but also so that Reclamation can rebuild storage in Shasta Reservoir during the winter season to create enough cold-water assets needed to protect winter-run salmon in the following spring and summer months. As releases from Shasta and downstream diversions decrease, there is the potential to dewater early spawned fall-run Chinook salmon redds. There is also a need for additional rearing habitat for juvenile salmonids and the need to reduce fluctuations in demands due to rice straw decomposition.

To address these concerns, the parties propose to modify releases from Shasta during October so as to stabilize flows in the Sacramento River mainstem and operate so those flows smoothly transition to the wintertime base flows in the Sacramento River. In coordination with the Bureau of Reclamation, the Sacramento River Settlement Contractors (SRSCs) and other parties diverting water from the Sacramento River mainstem would coordinate their diversions for rice straw decomposition from October 1 through November 30 to lower peak diversion rates and spread the period for rice straw decomposition over a longer time. The target for winter releases would be established based on end of September (EOS) storage in Shasta Reservoir. Such winter base flow releases would be set to improve refill capabilities for Shasta Reservoir to build cold-water pool storage for the following year.

Here are examples of potential Keswick releases based on Shasta Reservoir EOS storage condition. These examples would be refined through modeling efforts under the guidance of the governance structure described below.

1.1.1.1.1.1 If EOS Shasta Reservoir storage is:	**Then, winter base flow releases would be:**
Less than 2.2 MAF	3,250 cfs
2.2 MAF to 2.8 MAF	4,000 cfs
2.8 MAF to 3.2 MAF	4,500 cfs
More than 3.2 MAF	5,000 cfs

Reclamation would determine these winter base flow release rates after the majority of emergence of winter-run Chinook salmon, prior to the majority of fall-run Chinook salmon spawning in any specific year and Shasta EOS storage, in coordination with parties to Voluntary Agreements and consistent with legal and regulatory requirements. The SRSCs, upstream Sacramento Valley CVP contractors and Reclamation propose that they will work together to smooth Sacramento Valley diversions so as to improve the likelihood of reaching winter base flow targets. Nothing in this coordinated effort would limit Reclamation's discretion over all CVP operations and its obligation to operate the CVP to meet regulatory requirements and all contractors' needs (including in the Lower Sacramento River, the Delta and export areas). It is understood that Reclamation will make its operational decisions based on the needs of the CVP as a whole and in accordance with any requirements under then-applicable State Water Resources Control Board decisions, Biological Opinions issued by the National Marine Fisheries Service and/or the U.S. Fish & Wildlife Service, and flood control requirements.

1.1.1.1.2 Actions in Wet Years

In wet years, there may be opportunities for Reclamation to make additional releases that would have the hypothesized benefits of cleaning spawning gravels, creating/restoring/enhancing floodplain habitat, and creating pulse flows that build on natural signals (e.g. storm turbidity). All of these initiatives would require the reoperation of Shasta Reservoir, which is subject to Reclamation approval. All of these initiatives also must be done in a manner that does not create any additional risk to public safety, human health or property damage. These initiatives would only occur in wet years when the action does not result in a water cost to the CVP or the SWP, as determined by Reclamation and DWR, respectively.

The SRSCs propose that, in the event of a wet year, they will collaborate with Reclamation and other parties diverting water from the Sacramento River mainstem to identify the opportunities to engage in activities that will benefit fish and wildlife in the Sacramento River mainstem.

All such activities are subject to the sole and complete discretion of Reclamation, recognizing Reclamation's responsibilities for public safety, the preservation of human health and the prevention of property damage or reductions in the water supplies available to the CVP and/or SWP. Within those constraints, however, the SRSCs will work to coordinate operations with Reclamation to divert additional water into floodplains (including but not limited to the Sutter and Yolo Bypasses) and/or to create other spawning and rearing habitat, depending on the time of year. Particular attention will be paid to the opportunities to enhance outmigration of juvenile salmonids through targeted pulse flows synchronized with natural storm events.

1.1.1.1.3 Actions in Above Normal, Below Normal and Dry Years

The SRSCs propose that during above normal, below normal and dry years, which cumulatively total about 58% of all years according the Sacramento Valley 8-station index, they would make available 100,000 acre-feet through land fallowing/crop shifting (or limited groundwater substitution) within their service areas. This supply would be made available to Reclamation and Reclamation would be responsible for reoperating Shasta Reservoir and passing water through the Delta as outflow, in coordination with DWR. During these years, there is a hypothesized need for additional flows in April and May to enhance spring-run juvenile salmon outmigration survival. There is also a need in these years for additional Delta outflow while also balancing the potential impacts to the cold-water pool storage at Shasta Reservoir. In above normal years and below normal years when there is an adequate cold water pool in Shasta Reservoir to protect winter run salmon, there would be a target base flow during April and May of 8,000 cfs at Wilkins Slough that would be met through the combination of natural side channel flows; releases from Shasta Reservoir for legal and regulatory requirements and other project purpose;, and, to the extent that Shasta releases need to be increased to meet the Wilkins Slough target, those water costs would be charged to the 100,000 acre-feet asset. To the extent that combination of water sources does not support the target base flow throughout the entire two-month period, a shorter period or an alternative flow target will be utilized under the governance and adaptive management plan. In dry years, it is unlikely that there would be enough cold water pool assets in Shasta Reservoir, so no spring flows would be available, but rather the 100,000 acre-foot asset would be available on the delivery pattern of the fallowed land through reoperation of Shasta Reservoir for augmentation of instream flows and Delta outflow, to the extent such reoperation does not create an additional water supply impact, as determined by Reclamation. The water may alternatively be used to augment cold water pool storage in Shasta Reservoir for the benefit of winter-run Chinook salmon.

The SRSCs believe that there will be an enhanced ability for Reclamation to make water available for targeted spring pulse flows if there is a land fallowing/crop shifting program for 100,000 acre-feet in

place at the time that Reclamation makes operational decisions in the spring. If, however, Reclamation is not able to make such spring releases relying on the commitment for the production of 100,000 acre-feet (e.g., based on concerns relating to cold-water pool storage levels during the late summer/early fall period), then Reclamation would retain the discretion to add the 100,000 acre-feet to water releases during the summer or fall for other ecosystem benefits. Reclamation, at all times, retains sole discretion for the operation of the CVP and the release of the 100,000 acre-feet will not be used in a manner that causes changes to water supply allocations and or the timing of such allocations to CVP contractors north or south of the Delta or otherwise adversely affects CVP system-wide operations. The 100,000 acre-feet of water based on land fallowing/crop shifting is included within the water cost dependent on year-type.

While Reclamation retains sole discretion in the manner in which it operates the CVP, Reclamation would participate in the proposed Voluntary Agreement governance structure to solicit input on CVP operations and the manner in which Reclamation can include the provision of this additional 100,000 acre-feet for environmental benefits without adversely affecting CVP contractors or CVP system-wide operations. The proposed governance structure includes collaboration on planning and accountability through reporting on outcomes.

1.1.1.1.4 Actions in Critically Dry Years

In critically dry years, there is limited water to meet limited beneficial uses. During such years, the inflow into Shasta Reservoir is substantially lower than average and the necessary flows at Wilkins Slough are at times equal to Shasta Reservoir inflow, meaning that Reclamation is unable – as a practical matter – to store water in Shasta Reservoir to accumulate a cold-water pool. Finally, there are few significant storms that increase base flows in the Sacramento River mainstem.

Parties diverting water from the Sacramento River mainstem would cooperate with Reclamation provide a single spring pulse flow of 30,000 acre-feet in March, with a focus on last two weeks of the month. The water would be made available from Shasta or Whiskeytown reservoirs at Reclamation's sole discretion. The pulse flow event would be timed to ensure that the water is 100% recoverable by the CVP and SWP through Delta exports (or other mechanisms at the discretion of Reclamation) as addressed through Coordinated Operations Agreement (COA) accounting. The pulse flow event would be coupled with a storm event when possible, likely as an extension of the recession limb of the rainfall runoff hydrograph so as to ensure exportability.

The pulse flow event would not occur under any of the following conditions:

- The action causes any impact to the amount or timing for Reclamation's allocations to any CVP contractors (in any CVP Division, north or south of the Delta).
- The critical year in question immediately follows another critical year or follows a dry year.
- Any new or additional RPMs, RPAs, or other regulatory actions affecting CVP operations occur as a result of this action.

The pulse flow event would also be conditioned on temperature management considerations for the remainder of the year. Thus, if the pulse flow were to be considered for April, Reclamation would need

to consider its projection for EOS storage at Shasta Reservoir, the need for water during the fall to prevent redd stranding and to encourage migration, etc.

In the event that a pulse flow event occurs and then the year type turns from critical to dry, then any water released for the pulse flow event would be credited towards the 100,000 acre-foot requirement described above in future above normal, below normal and dry years.

1.1.1.2 Biological Rationales for Flow Commitments

1.1.1.2.1 Fall Flow Stabilization

The fall flow stabilization will have the effect of smoothing the transition from summer diversion and release patterns to the lower base flow needed to protect fall-run Chinook salmon redd spawning and prevent redd dewatering, and to maintain constant water elevations and temperatures. Such reduced releases are consistent with the need for rice straw decomposition water that benefit avian species and the Pacific Flyway and are further consistent with protecting carryover storage for cold-water pool storage that benefits winter-run Chinook salmon and other species. Finally, such reduced diversions minimize the water cost of these measures.

1.1.1.2.2 Winter Flow Releases

The winter flows regime will maintain side channel tributary inflows from hydrologic events and also maintain bypass and weir operations/inundation. This flow regime would benefit fall-run Chinook salmon by providing constant flows, temperature and velocities to incubating redds and early rearing habitat in the upper Sacramento River system. It would, similarly, provide these same benefits to late fall-run Chinook salmon. It would further continue to provide benefits to avian species using the Pacific Flyway, benefit winter-run Chinook salmon by protecting cold-water pool storage, and protecting consumptive uses of water my minimizing the water cost of these measures.

1.1.1.2.3 Spring Flow Releases

In the spring, Keswick releases are typically steady until flows are needed to support instream demands on the mainstem Sacramento River and Delta requirements. As a standard practice, Reclamation operates Shasta in the spring to have storage in the reservoir high enough (e.g., 3.7 million acre-feet) to use the Shasta temperature control device (TCD) upper gates to maximize the cold water pool potential for winter Chinook egg incubation management.

If this condition is met, releases from Shasta, initially focused on April and May, for the primary purpose of increasing spring-run Chinook outmigration and survival in the lower Sacramento River would be made, incorporating science, monitoring, and decision making and testing the hypothesis of flow and survival.

If Reclamation determines that projected inflows to Shasta Reservoir are likely less than sufficient for summer temperature management pursuant to its ESA obligations, and/or taking the spring action will cause changes to water supply allocations and/or the timing of allocations (to each CVP division north or south of the Delta), or the action impacts other system-wide operations, the water would be added to releases during the summer or fall for other ecosystem benefits, and would serve to augment Delta

outflows at those times. Under certain circumstances, the water may be utilized to augment cold-water pool resources.

1.1.1.2.4 Summer Flow Releases

During the June through September summer period, flows in the Sacramento River mainstem and the releases from Shasta Reservoir would be established so as to meet the temperature and other downstream requirements in the then-current Biological Opinion(s), State Water Resources Control Board decision(s), and to meet CVP contract deliveries. This would primarily benefit winter-run Chinook salmon redds.

If a spring action in not taken or only a portion of the 100,000 acre-foot asset is used to meet the Wilkins Slough target, the water asset could also be using in the summer for delta outflow on the fallowing schedule that the water is made available.

1.1.2 Non-Flow Measures

1.1.2.2 Spawning Habitat (Keswick to Red Bluff Diversion Dam)

Reclamation and the SRSCs propose annually to place 40,000 to 55,000 tons of gravel at the Keswick and/or Salt Creek injection sites. For comparison purposes, over the past 17 years, there has been a total of approximately 90,000 tons of gravel placed at various locations on the Sacramento River mainstem. Within five years, Reclamation and the SRSCs would create at least three site-specific gravel restoration projects upstream of Bonnyview Bridge.

1.1.2.3 Rearing Habitat (Keswick to Red Bluff Diversion Dam)

Reclamation and the SRSCs propose to create a total of 40-60 acres of side channel habitat at no fewer than 10 sites in Shasta and Tehama County.

1.1.2.4 Rearing Habitat (Red Bluff Diversion Dam to Verona)

The SRSCs believe that, at present, they can create 3,225 acres of floodplain habitat in existing areas. The additional spring flows described would inundate another 650 acres of rearing habitat within the current Sacramento River levee system. In-river restoration projects (of the type undertaken by River Garden Farms) would amount to 225 acres of rearing habitat over 15 years. Inundation of the lower portion of the Colusa Basin Drain would yield another 300 acres of floodplain habitat. The inundation of CDFW's Tisdale property would add another 500 acres of floodplain habitat while levee setbacks would add a further 200 acres. Finally, the inundation of the Sutter Bypass would provide 2,000 acres of floodplain habitat. That quantity of habitat is sufficient to support a population of 70,000 to 80,000 fall-run Chinook salmon adults, which is three times more than the current returns.

1.1.2.5 Man-Made Structures (Keswick to Verona)

Finally, the SRSCs propose to undertake a number of projects to modify man-made structures to reduce their impacts on salmonid populations. These projects would include completing the remaining high-priority fish screen projects and reducing lighting on all bridges crossing the Sacramento River within five years.

1.1.3 Funding Commitments and Regulatory Assurances

1.1.3.1 Included in the Planning Agreement

The Sacramento River mainstem element is based on a number of key terms in the Planning Agreement that provide regulatory and management conditions that are essential to the coordinated suite of flow and non-flow measures being proposed by the SRSCs. Those key terms are: (i) governance structure, (ii) the safe harbor/no surprises policy, (iii) compliance with the California Environmental Quality Act, (if) the strategy for the issuance of other necessary permits such as section 404 permit, and (v) a robust science program. Those terms are described in detail in the Planning Agreement.

1.1.3.2 Water Code section 1707 Petition and Related Operations Agreement

The 100,000 acre-feet of water made available by the SRSCs in above normal, below normal and dry years will be dedicated to fish and wildlife beneficial uses for the term of the voluntary agreement pursuant to a Water Code section 1707 petition for change process. Reclamation and CDFW will develop and approve an operations plan/agreement, subject to review and consultation with the SRSCs, to ensure that the 100,000 acre-feet of water made available by the SRSCs shall be used for the WQCP program of implementation to protect fish and wildlife beneficial uses.

1.1.3.3 NRDC v. Zinke

If the *NRDC v. Zinke* litigation results in a reduction in SRS Contract supplies via changes to contracts or constraints on performance, then any additional amounts of water made available for fish and wildlife purposes from such an outcome shall be offset against the 100,000 acre-foot quantity of water to be made available in above normal, below normal or dry years. In the alternative, such an outcome shall serve as an “off-ramp” that would allow any or all of the SRSCs to withdraw from the voluntary agreement.

1.1.3.4 Funding Commitments

The Parties propose to work with state and federal agencies to utilize dedicated funds consisting of: (a) contributions based on deliveries to or diversions by the Parties, and (b) repurposing of existing funding. The Parties believe that these sources, in combination, provide a sustainable and long-term funding stream that will be sufficient to support the projects being conducted under the auspices of the Voluntary Agreement.

- The Parties propose that contributions based on deliveries to or diversions by the Parties of water from the Bay-Delta watershed would be collected annually during the term of the Agreements. Through the contributions, the Parties expect to secure funds totaling

approximately $425 million for the additional flows, and $345 million for the science program, over the term of the Agreements.

Specifically, a fund would initially be established using reprogrammed Proposition 1 funds and subsequently funded through the collection of a surcharge on water diverted within the Bay-Delta watershed for the duration of the fifteen-year term of the Voluntary Agreement. Such a surcharge would not apply to agencies diverting water under their own water rights, provided that those agencies contribute water as part of the Voluntary Agreement.

- The Parties also propose that the State and Federal governments would seek to repurpose or reprogram existing funds and seek new funds in order to support this important effort. The State of California agrees that it will pursue repurposing/reprogramming State bond money and seeking any necessary legislation to provide additional monetary funds. This includes potential directed and competitive funding opportunities from various State sources. Up to approximately $1.3 billion in bond funding is available for instream flows, restoration, multi-benefit flood projects, and other activities

1.1.4 Timing

New water will be made available for environmental purposes primarily during the spring period when juvenile spring-run chinook salmon migrate out from spawning and rearing grounds to the Delta. As described in more detail above, in wet years, there will be collaboration with Reclamation to release water in ways that benefit fish and wildlife. In above normal, below normal and dry years, the parties will make available 100,000 acre-feet of water, most likely for one or more pulse flow events in the April to May period, ideally timed to coincide with the receding leg of the storm hydrograph. That timing would complement and accentuate the instinct of salmonids to outmigrate during periods of high flows and high turbidity, which is thought to contribute to increased survival rates. In summer months if the asset is not used in the Spring, it would be available for summer or fall outflow augmentation. In critically dry years, any water made available would likely be timed so as to be fully recoverable under COA accounting and would likely be made available in the last two weeks of March, which are likely the last period of any substantial precipitation.

1.1.5 Expected Outcomes

The Sacramento River provides spawning, migration, and/or rearing habitat for all runs of Chinook salmon, steelhead, and sturgeon. Improvements in spawning, migration and rearing will occur, as noted above, through improved access to and reactivation of floodplains throughout the Sacramento River basin, along with carefully timed flow management to promote improved conditions along the Sacramento River. CVP and upper Sacramento water users will work to stabilize fall flows to minimize risk of dewatering and stranding. In wet years, and in consideration of cold-water pool management, early initiation of storage management releases for the purposes of spawning gravel cleaning functions, floodplain habitat, general fish migration flows and moderation of flood control-related pulse flows would be implemented. In critical years, a single spring pulse flow in March, with a focus on last two weeks of the month, and coupled with a storm event when possible, will be implemented to aid migration under dry conditions.

1.1.5.1 Rearing habitat

This proposal would substantially improve rearing habitat through the implementation of several landscape level and area-specific improvements in rearing habitat access and conditions. Habitat enhancements to improve rearing and migration conditions for salmonids throughout the Sacramento River basin, including more than 7,000 acres of improved floodplain rearing habitat in Sutter Bypass,

Yolo Bypass, as described above, will provide important ecological functions in combination with ongoing operations. Together, the large increase in landscape-level rearing habitat access will substantially improve rearing conditions. Several other projects address passage, spawning habitat, and predation. These structural habitat improvements will accrue benefits to all runs of Chinook, steelhead, and sturgeon.

1.1.5.2 Migration Conditions

In combination with the rearing habitat improvements expected to occur from November through March throughout the basin, and in consideration of cold-water pool management, real-time migration patterns, and rearing habitat conditions, Sacramento River flows will be pulsed in April and May to support successful migration of spring-run Chinook. Sacramento River flows would be coordinated to provide maximum benefits and to ensure protection of cold-water in Shasta.
Increased in-stream flows using the 100 TAF block of water described above would be provided in above normal, below normal and dry years to augment existing flows and improve overall migration conditions. Working with the regulatory agencies and other parties the interface between these flow changes and structural habitat for rearing benefits would be managed and further explored through the application of testable hypotheses and adjustments to actions. All such actions would be subject to the "safe harbor/no surprises" provisions of the Planning Agreement.

1.1.5.3 Spawning habitat

The substantial gravel placement throughout the Upper Sacramento River described above will provide rearing benefits for spring-run and fall-run Chinook, green sturgeon, and steelhead.

1.1.5.4 Terrestrial habitat

This proposal includes approximately 23,300 acres of land fallowing to generate the water that would be used for in-stream and Delta outflow purposes. It was developed in consideration of minimizing terrestrial species effects, through both the amount of land fallowing that would occur and the ability to provide winter wetland area where possible. The SRSCs expect that federal and state wildlife agencies will permit and not require any mitigation associated with this land fallowing action.

Appendix A10: Illustrative Scope and Magnitude of Non-flow Projects

1.10.1 Sacramento River Habitat Projects

Project	Identified In…	Description	Targeted Habitat	Benefits	Years	Timeline without VSA	Life Stage	Possible Funding Source(s)	Implementation Lead	Contingency	Planning/CEQA Status	Construction/Action Started?	Regulatory Requirement?
Spawning Habitat Keswick to Red Bluff Diversion Dam; Objective – Annually place 40,000 to 55,000 tons of gravel at the Keswick and/or Salt Creek injection site(s). Create at least three site-specific gravel restoration projects upstream of Bonnyview Bridge within 5 years.													
Salt Creek Gravel Injection	Upper Sac AFHRP	Improve substrate conditions for spawning salmonids at key riffles	up to 25,000 CY	Increase existing suitable spawning habitat area	Bi-Annually (1-10 years)	unknown	S	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Market Street	Upper Sac AFHRP	Improve substrate conditions for spawning salmonids at key riffles	up to 12,000 CY	Increase existing suitable spawning habitat area	Tri-Annually	unknown	S	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	N/A	Year by Year	No
Turtle Bay Island Side Channels and Gravel	Upper Sac AFHRP	Improve substrate conditions for spawning salmonids at key riffles and side channel	place and shape 25,000 CY	Increase existing suitable spawning habitat area	Tri-Annually	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Keswick Dam Gravel Injection	Upper Sac AFHRP	Improve substrate conditions for spawning salmonids at key riffles	up to 25,000 CY	Increase existing suitable spawning habitat area	Annually (1-15 years)	Yes currently (but annual funds are not assured)	S	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	N/A	Year by Year	No
Rearing Habitat Keswick to Red Bluff Diversion Dam; Objective – Create a total of 40 to 60 acres of side channel habitat at no fewer than 10 sites in Shasta and Tehama County													
South Shea Levee	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Increase existing suitable spawning habitat area; improve of natural river morphology; increase floodplain habitat, riparian habitat, and instream cover	0-5 years	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Shea Levee	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Increase existing suitable spawning habitat area; improve natural river morphology and connection to historic side channel habitat	0-5 years	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Tobiasson Island - Side Channel/South Bank	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Increase existing suitable spawning habitat area; improve of natural river morphology; increase floodplain habitat, riparian habitat, and instream cover	0-5 years	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Side Channel Habitat - Cypress Ave. Bridge Downstrean	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	0-5 years	Potentially in 2019	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Shea Island Channel/Rearing	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	0-5 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Anderson River Park Channel/Rearing	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	0-5 years	Potentially in 2020 but need permits	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Kutras Lake Project	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	6-10 years	Potentially 2020	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Tobiasson Island Channel/Rearing	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	6-10 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Kapusta Island and River Right Bank Channel/Rearing	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	6-10 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Reading Island Channel/Rearing	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	6-10 years	Potentially in 2020 but need permits	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Rancho Briesgau Channel/Rearing	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
China Gardens Side Channel	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Increase existing suitable spawning habitat area; improve of natural river morphology; increase floodplain habitat, riparian habitat, and instream cover	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Rio Vista	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
East Sand Slough	Upper Sac AFHRP	Creation and improvement of side channel habitat	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No	No
Rearing Habitat Red Bluff Diversion Dam to Verona; Objective – Enhance ~ 2,000 acres of floodplain habitat in the Sutter Bypass within the term of the Voluntary Agreement. Provide fish passage and floodplain habitat at Tisdale Weir within 5 years and Colusa Weir within 10 - 15 years. Inventory historic oxbows and design fish passage and floodplain projects within 5 years and implement projects within 10 years.													
Off-Channel Rearing Habitat Restoration Projects - Side Channel/Oxbow/Floodplain on Lower Battle Creek (below Coleman Hatchery) on Lands Owned by BLM and CDFW	SRS	Study and Determine potential ox bow restoration sites	TBD	Improve natural river morphology, riparian habitat, instream cover, and habita complexity	6-10 years	No	R	Bond, DWR	SRSC, CDFW, BLM, USBR	No	No	No	No
Tisdale Weir and Bypass Multibenefit Project	SRS/SVSRP	Operable Weir	None, weir modification only but required to inundate Sutter bypass	Operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	0-5 years	No	AM, R, M	Bond, DWR	SRS/SVSRP	No	No	No	No
Tisdale Bypass into Sutter Bypass		Improve the bypass property into suitable habitat	500 acres	Property already owned by CDFW and accessible, create habitat for outmigrating salmon	0-7 years	unknown	R, A	Bond, DWR, CDFW	SRSC/DWR/CDFW	No	No	No	No
Lower Colusa Basin Drain Floodplain		Flood lower basin lands through Knights Landing Outfall Gates (KLOG)	300 acres	Operations of KLOG to allow passage of outmigrating salmon onto floodplair	0-5 years	No	R	Bond, DWR	SRSC/SVSRP/DWR	No	No	No	No
Sutter Bypass Area Multibenefit Project	SRS	Increase Suitable Habitat	2000 acres	Increase suitable habitat for out-migrating juveniles to access Sutter Bypass	6-15 years	No	R, M	SRS	SRSC, CDFW, BLM, USBR	No	No	No	No
Setback Levee		Construct setback levee on existing Sac levees with willing landowners	200 acres	Additional rearing habitat connected with Sac River	10-15 years	No	R	Bond, CDFW, DWR	SRSC, DWR, Corp	No	No	No	No
Colusa Weir Multibenefit Improvements		Operable Weir	None, weir modification only but required to inundate Sutter bypass	Operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	6-10 years	No	AM, R, M	Bond, DWR	SRS/SVSRP	No	No	No	No
Sutter Bypass Weir 1 - Rehabilitation of Weir Structure and Fish Ladder. Coupled with New Lower Butte/Sutter Bypass Water Management Plan	SRS	Operable Weir	None, weir modification to benefit migrating juveniles and adults	Operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	0-5 years	No	AM	Bond, DWR	SRS/SVSRP	No	No	No	No

Sutter Bypass Weir 2 Multibenefit Project	SRS/SVSRP	Operable Weir	None, weir modification to benefit migrating juveniles and adults	Operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	0-5 years	No	AM	Bond, DWR	SRS/SVSRP	No	No	No	No
Man Made Structures Keswick-Verona; Objective – Complete remaining high-priority fish screen projects. Reduce lighting to 3 lux or less at fish screens and bridges within 5 years. Incorporate ongoing redd dewatering coordination with Anderson Cottonwood Irrigation District into a Voluntary Agreement. Address fish passage issues at Weir 1 and Weir 2 within 5 years													
Reduced Lighting and Sacramento River Bridges	Upper Sac AFHRP	Perform study on bridges and lighting conditions and work with agencies to reduce lighting	TBD	Increase survival of migrating fish by reducing predation risks	0-5 years	No	M	Upper Sac AFHRP	SRS/SVSRP	No	No	No	No
Screen Meridian Farms Water Company	SRS/SVSRP	Install fish screen	N/A	Fish screen, benefits based on the Sac Valley fish screen program	0-5 years	No	M	AFRP	USBR, SRSC	No	No	No	No
Screen Natomas Mutual Water Company	SRS/SVSRP	Install fish screen	N/A	Fish screen, benefits based on the Sac Valley fish screen program	0-5 years	No	M	AFRP	USBR, SRSC	No	No	No	No
Anderson Cottonwood Irrigation District Dam Operations to Project Salmon Redds	SVSRP	Weir and bypass operations	TBD	Increase existing suitable spawning habitat area	0-5 years	No	I	AFRP	USBR, SRSC	No	No	No	No
Study, Design, and Implement Modifications to Known Redd Dewatering Locations	New	Perform study on redd locations and water elevations based on river stages	TBD	Increase existing suitable spawning habitat area	0-10 years (annual)	No	I	AFRP	USBR, SRSC, CDFW	No	No	No	No
Program for Identification of Predation Hot Spots. Adaptively Manage for the Reduction/Improvement of Predator Contract Points at Man-Made Structures Where Predator Interactions Have Been Observed	New	Perform Study	TBD	Study, currently occurring	0-2 years	Yes	M	AFRP, CDFW, SRSC, NCWA	CDFW	No	No	Yes	No
Study Route-Specific Survival at Key Diversion Facilitie and Implement Appropriate Devices that Reduce Route Selection Into Lower Survival Areas	New	Perform Study	TBD	Study	0-10 years; Annual plan within one year	No	M	AFRP	USBR, SRSC	No	No	No	No

Sacramento Habitat Projects Presented as Part of Voluntary Agreement Framework

(All projects listed may have been identified in multiple lists/documents, this spreadsheet is intended only for illustrative purposes)

Project	Description	Targeted Habitat	Benefits	Years	Timeline without VSA	Life Stage	Possible Funding Source(s)	Implementation Lead	Contingency	Planning/CEQA Status	Construction/Action Started?
Spawning Habitat Keswick to Red Bluff Diversion Dam; Objective – Annually place 40,000 to 55,000 tons of gravel at the Keswick and/or Salt Creek injection site(s). Create at least three site-specific gravel restoration projects upstream of Bonnyview Bridge within 5 years.											
Salt Creek Gravel Injection	Improve substrate conditions for spawning salmonids at key riffles	up to 25,000 CY	increase existing suitable spawning habitat area	Bi-Annually (1-10 years)	unknown	S	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Market Street	Improve substrate conditions for spawning salmonids at key riffles	up to 12,000 CY	increase existing suitable spawning habitat area	Tri-Annually	unknown	S	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	N/A	Year by Year
Turtle Bay Island Side Channels and Gravel	Improve substrate conditions for spawning salmonids at key riffles and side channel	place and shape 25,000 CY	increase existing suitable spawning habitat area	Tri-Annually	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Keswick Dam Gravel Injection	Improve substrate conditions for spawning salmonids at key riffles	up to 25,000 CY	increase existing suitable spawning habitat area	Annually (1-15 years)	Yes currently (but annual funds are not assured)	S	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	N/A	Year by Year
Rearing Habitat Keswick to Red Bluff Diversion Dam; Objective – Create a total of 40 to 60 acres of side channel habitat at no fewer than 10 sites in Shasta and Tehama County											
South Shea Levee	Creation and improvement of side channel habitat	TBD	increase existing suitable spawning habitat area; improve of natural river morphology; increase floodplain habitat, riparian habitat, and instream cover	0-5 years	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Shea Levee	Creation and improvement of side channel habitat	TBD	increase existing suitable spawning habitat area; improve natural river morphology and connection to historic side channel habitat	0-5 years	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Tobiasson Island - Side Channel/South Bank	Creation and improvement of side channel habitat	TBD	increase existing suitable spawning habitat area; improve of natural river morphology; increase floodplain habitat, riparian habitat, and instream cover	0-5 years	unknown	S,R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Side Channel Habitat - Cypress Ave. Bridge Downstream	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	0-5 years	Potentially in 2019	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Shea Island Channel/Rearing	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	0-5 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Anderson River Park Channel/Rearing	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	0-5 years	Potentially in 2020 but need permits	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Kutras Lake Project	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	6-10 years	Potentially 2020	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Tobiasson Island Channel/Rearing	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	6-10 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Kapusta Island and River Right Bank Channel/Rearing	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	6-10 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Reading Island Channel/Rearing	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	6-10 years	Potentially in 2020 but need permits	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Rancho Briesgau Channel/Rearing	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
China Gardens Side Channel	Creation and improvement of side channel habitat	TBD	increase existing suitable spawning habitat area; improve of natural river morphology; increase floodplain habitat, riparian habitat, and instream cover	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Rio Vista	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
East Sand Slough	Creation and improvement of side channel habitat	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	11-15 years	unknown	R	Upper Sac AFHRP, Bond, Science Fund	Potentially USBR, SRSC	No	No	No
Rearing Habitat Red Bluff Diversion Dam to Verona; Objective – Enhance ~ 2,000 acres of floodplain habitat in the Sutter Bypass within the term of the Voluntary Agreement. Provide fish passage and floodplain habitat at Tisdale Weir within 5 years and Colusa Weir within 10 - 15 years. Inventory historic oxbows and design fish passage and floodplain projects within 5 years and implement projects within 10 years.											
Off-Channel Rearing Habitat Restoration Projects - Side Channel/Oxbow/Floodplain on Lower Battle Creek (below Coleman Hatchery) on Lands Owned by BLM and CDFW	Study and Determine potential ox bow restoration sites	TBD	improve natural river morphology, riparian habitat, instream cover, and habitat complexity	6-10 years	No	R	Bond, DWR	SRSC, CDFW, BLM, USBR	No	No	No

Tisdale Weir and Bypass Multibenefit Project	Operable Weir	None, weir modification only but required to inundate Sutter bypass	operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	0-5 years	No	AM, R, M	Bond, DWR	SRS/SVSRP	No	No	No
Tisdale Bypass into Sutter Bypass	Improve the bypass property into suitable habitat	500 acres	property already owned by CDFW and accessible, create habitat for outmigrating salmon	0-7 years	unknown	R, A	Bond, DWR, CDFW	SRSC/DWR/CDFW	No	No	No
Lower Colusa Basin Drain Floodplain	Flood lower basin lands through Knights Landing Outfall Gates (KLOG)	300 acres	operations of KLOG to allow passage of outmigrating salmon onto floodplain	0-5 years	No	R	Bond, DWR	SRSC/SVSRP/DWR	No	No	No
Sutter Bypass Area Multibenefit Project	Increase Suitable Habitat	2000 acres	increase suitable habitat for out-migrating juveniles to access Sutter Bypass	6-15 years	No	R, M	SRS	SRSC, CDFW, BLM, USBR	No	No	No
Setback Levee	Construct setback levee on existing Sac levees with willing landowners	200 acres	additional rearing habitat connected with Sac River	10-15 years	No	R	Bond, CDFW, DWR	SRSC, DWR, Corp	No	No	No
Colusa Weir Multibenefit Improvements	Operable Weir	None, weir modification only but required to inundate Sutter bypass	operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	6-10 years	No	AM, R, M	Bond, DWR	SRS/SVSRP	No	No	No
Sutter Bypass Weir 1 - Rehabilitation of Weir Structure and Fish Ladder. Coupled with New Lower Butte/Sutter Bypass Water Management Plan	Operable Weir	None, weir modification to benefit migrating juveniles and adults	operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	0-5 years	No	AM	Bond, DWR	SRS/SVSRP	No	No	No
Sutter Bypass Weir 2 Multibenefit Project	Operable Weir	None, weir modification to benefit migrating juveniles and adults	operable weir to allow for adult passage for upstream migration, and out-migrating juveniles to access Sutter Bypass	0-5 years	No	AM	Bond, DWR	SRS/SVSRP	No	No	No
Man Made Structures Keswick-Verona; Objective – Complete remaining high-priority fish screen projects. Reduce lighting to 3 lux or less at fish screens and bridges within 5 years. Incorporate ongoing redd dewatering coordination with Anderson Cottonwood Irrigation District into a Voluntary Agreement. Address fish passage issues at Weir 1 and Weir 2 within 5 years											
Reduced Lighting and Sacramento River Bridges	Perform study on bridges and lighting conditions and work with agencies to reduce lighting	TBD	increase survival of migrating fish by reducing predation risks	0-5 years	No	M	Upper Sac AFHRP	SRS/SVSRP	No	No	No
Screen Meridian Farms Water Company	Install fish screen	N/A	fish screen, benefits based on the Sac Valley fish screen program	0-5 years	No	M	AFRP	USBR, SRSC	No	No	No
Screen Natomas Mutual Water Company	Install fish screen	N/A	fish screen, benefits based on the Sac Valley fish screen program	0-5 years	No	M	AFRP	USBR, SRSC	No	No	No
Anderson Cottonwood Irrigation District Dam Operations to Project Salmon Redds	Weir and bypass operations	TBD	increase existing suitable spawning habitat area	0-5 years	No	I	AFRP	USBR, SRSC	No	No	No
Study, Design, and Implement Modifications to Known Redd Dewatering Locations	Perform study on redd locations and water elevations based on river stages	TBD	increase existing suitable spawning habitat area	0-10 years (annual)	No	I	AFRP	USBR, SRSC, CDFW	No	No	No
Program for Identification of Predation Hot Spots. Adaptively Manage for the Reduction/Improvement of Predator Contract Points at Man-Made Structures Where Predator Interactions Have Been Observed	Perform Study	TBD	study only, currently occurring	0-2 years	Yes	M	AFRP, CDFW, SRSC, NCWA	CDFW	No	No	Yes
Study Route-Specific Survival at Key Diversion Facilities and Implement Appropriate Devices that Reduce Route Selection Into Lower Survival Areas	Perform Study	TBD	study only	0-10 years; Annual plan within one year	No	M	AFRP	USBR, SRSC	No	No	No

		Acres Per Depth (in)		
Tons	CY	36	24	18
40,000	28,571	5.9	8.9	11.8
55,000	39,286	8.1	12.2	16.2

Sacramento River Mainstem
Voluntary Agreement Summary

Purpose:

The Mainstem Sacramento actions include habitat restoration designed to work with substantial existing winter and spring flows. The habitat improvements target improved growth, survival, diversity, and abundance of the four runs of Chinook salmon and steelhead on the Sacramento River. Additionally, **100,000 acre-feet of water**, available from **fallowing approximately 24,000 acres**, to increase flows to improve salmonid outmigration survival and increase Sacramento-San Joaquin Delta (Delta) outflow.

Term:
The term of this agreement is 15-years

Commitments:

Flow

- Fall Flow Stabilization (every year type)
  - Less than 2.2 MAF 3,250 cfs
  - 2.2 MAF to 2.8 MAF 4,000 cfs
  - 2.8 MAF to 3.2 MAF 4,500 cfs
  - More than 3.2 MAF 5,000 cfs
- **Additional Water** Provided (Dry, Below Normal, Above Normal Year Types)
  - 100,000 AF in April/May, Shasta Storage >4 MAF
  - 8000 CFS Target at Wilkins Slough (D/S of Delevan)
- Actions in Wet Years (Wet Year Types only)
  - Clean/Move spawning gravel with pre-flood release pulses
  - Modify releases to shoulder weir spills into Sutter Bypass
- Actions in Critical Years (Critical Year Types only)

Habitat

- Spawning Habitat Keswick to Red Bluff Diversion Dam
- Rearing Habitat Keswick to Red Bluff Diversion Dam
- Rearing Habitat Red Bluff Diversion Dam to Verona
- Man Made Structures Keswick-Verona
- Studies Keswick-Verona

Monitoring, Reporting, Adaptive Management:

- Goals
- Collaborative principles
- Governance

Other Commitments for Implementation:

- Early Actions

Funding Commitments:
Both contractor groups agree to commit funding to both the Revolving Fund and the Science Fund.

Revolving Fund

- $5 per acre-foot of Project Water Diverted

Science Fund

- SRSC contribute $1 per acre-foot of all water diverted
- CVP Contractors contribute $2 per acre-foot of all Project Water diverted

Background Slides – Species Discussion with GCID

July 6, 2021

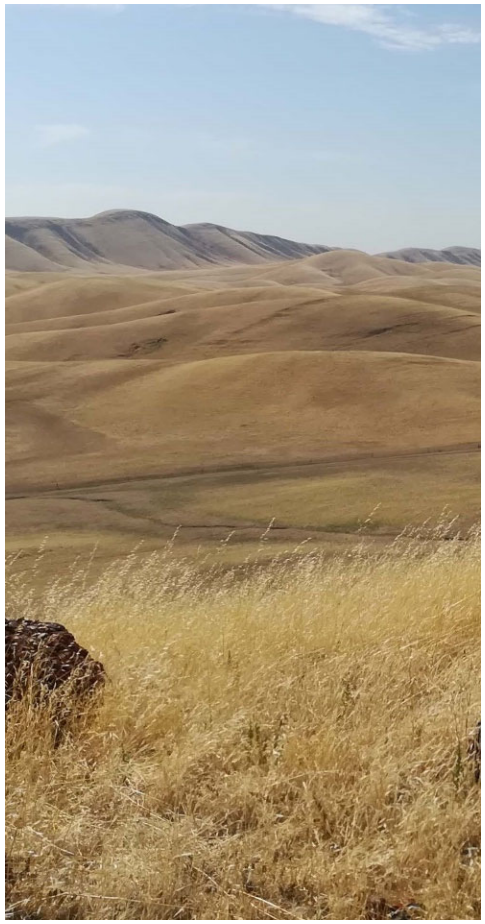
Sites

Land Cover Mapping Resources and Methods

- Previous vegetation and wetland mapping of reservoir and some roads and conveyance routes in 1998-2003 and 2011
- Fall/winter 2020-2021 vegetation and aquatic resource remote mapping of all Project component impact areas plus a 300-foot buffer:
  - Aerial photograph interpretation (Google Earth 1998-2020; National Agriculture Imagery Program 2018; Digital Globe 2019)
  - Additional mapping resources include soils maps, USGS topographic maps, NWI maps, existing delineation mapping from 2000 and 2011
- On-going coordination with U.S. Army Corps of Engineers to obtain available delineation data and consensus on mapping methods, aquatic resources delineation verification approach, and permitting strategy

Species Models

- Species habitat models developed in GIS using:
  - Land cover mapping
  - Species range data, CNDDB records
  - Elevations
  - Soil types
- For listed species, developed in coordination with CDFW and USFWS



Listed Species Considered - Construction

Listed Species	Federally Listed: Minimize and Assure No Jeopardy	State Listed: Minimize and Fully Mitigate
Keck's checker-mallow	Endangered	
Palmate-bracted bird's-beak	Endangered	Endangered
Vernal pool branchiopods	1 Threatened; 2 Endangered	
Valley elderberry longhorn beetle	Threatened	
California red-legged frog	Threatened	
Giant gartersnake	Threatened	Threatened
Tricolored blackbird		Threatened
Swainson's hawk		Threatened
Bald eagle		Endangered
Crotch and western bumble bees*		Candidate (in litigation)

Notes: *Not listed in 2017; Currently in litigation: engaging Sites Legal Team on how to proceed with these two species.

BA/ITP and EIR/S Differences

- EIR/S addresses more species (not just state or federally listed)
- EIR/S states minimum mitigation ratios and notes that ratios may increase through the BA/ITP process with USFWS and CDFW coordination

CEQA Species List

Species Data Resources:

- Non-listed special-status species with potential to occur in study area include 20 wildlife and 12 botanical
- Non-listed special-status species include fully protected and rare wildlife species; animal species of special concern; and California Rare Plant Rank species 1B.1, 1B.2, 1B.3, and 3.2 (no or low potential for other ranked plant species to occur)
- Wildlife surveys of parts of the study area in 1998-2004 and 2010/2011
- Botanical surveys of parts of study area in 1998-1999 and 2000-2003

CA Species of Special Concern - Wildlife (Addressed in EIR/EIS Only)

- Mammals
  - **Pallid bat**
  - **Townsend's big-eared bat**
  - **Western red bat**
  - Long-eared myotis
  - Silver-haired bat
  - Hoary bat
  - **American badger**
- Insects
  - Antioch Dunes anthicid beetle
  - Sacramento anthicid beetle
  - **Monarch butterfly***
- Birds
  - Golden eagle **
  - **Northern harrier**
  - White-tailed kite **
  - **Burrowing owl**
  - **Yellow breasted chat**
  - Yellow warbler
  - **Song sparrow**
  - **Bank swallow**
  - Mountain plover
- Amphibians and Reptiles
  - Western spadefoot
  - **Western pond turtle**

* = Candidate federal

** = Fully Protected Species

California Rare Plant Species (Addressed in EIR/EIS Only)

- Found in previous surveys
  - Bent-flowered fiddleneck – annual grassland
  - Brittlescale – alkali seasonal wetlands
  - Red-flowered bird's-foot trefoil – oak savanna and oak woodland
  - San Joaquin spearscale – alkali seasonal wetland
- Potential habitat for
  - Adobe lily – oak woodland and annual grassland on clay soils
  - Bolander's horkelia – oak woodland and seasonal wetland
  - California alkali grass – alkali seasonal wetland
  - Colusa layia – annual grassland, oak woodland, and chaparral on sandy or serpentine soils
  - Deep-scarred cryptantha – oak woodland on slopes and streambanks
  - Konocti manzanita – oak woodland and chaparral on volcanic soils
  - Shining navarretia – annual grassland and oak woodland on clay soils
  - Tracy's eriastrum – annual grassland and oak woodland on clay soils
  - Vernal pool smallscale – alkali seasonal wetlands

Approach to Analysis

- Current impact acreages based on
  - Species models
  - Aerial imagery
  - No current field species surveys or habitat mapping
- Subsequent refinements needed
  - Project design changes
  - Land cover mapping
  - Species surveys

Approach to Analysis: Next Steps

- How to address lack of property access
  - Impact assessment/mitigation measures in permits based on models and assumptions
  - Ground truthing and surveys when property access is granted
  - Amend permits based on refined mapping and species surveys
- The EIR/S, biological assessment and ITP application will outline this process and frontload it into the permits

Mitigation Measure Approach in the EIR/EIS

- All Species / Habitats Considered in the EIR/EIS
  - Survey to understand quality (habitat), extent and location
  - Avoid if possible
  - Minimize/reduce effects if possible
  - Compensate for remaining effects
- Unique to Certain Species or Activities
  - Remove nesting substrates during the non-nesting season; if not possible, conduct surveys before removal
  - Replacement of bat roosting habitat
  - Design/construct overhead power lines to reduce bird collisions
  - Trap and relocation of some species (e.g., burrowing owl)
  - Add and maintain wildlife crossings for new roadways


Sites

EIR/EIS, BA, ITP Species Briefing for GCID
Agenda

Affordable Water, Sustainably Managed

Our Core Values – Safety, Trust and Integrity, Respect for Local Communities, Environmental Stewardship, Shared Responsibility and Shared Benefits, Accountability and Transparency, Proactive Innovation, Diversity and Inclusivity
Our Commitment – To live up to these values in everything we do

Meeting Information:

Date:	July 6, 2021	**Location:**	Microsoft Teams
Start Time:	8:00 a.m.	**Finish Time:**	10:00 a.m.
Purpose:	Focused discussion on EIR/EIS, BA, and ITP species approach for the Project around GCID facilities.		

Meeting Participants:

Thad Bettner, GCID	Jerry Brown, Sites Authority	John Spranza, Sites Integration
Holly Dawley, GCID	Ali Forsythe, Sites Authority	Laurie Warner Herson, Sites Integration
Ali Stevens, Somach	JP Robinette, Sites Controls	
	Kevin Spesert, Sites Authority	

Agenda:

Discussion Topic	Topic Leader
1. Introductions	Group
2. Land Cover Mapping Around Funks	Ali / Lisa
3. Wetland Mapping Around Funks (Waters of US, Waters of State)	Ali / Lisa / Jelica
4. Species Mapping Around Funks	Ali / ICF Team
5. CEQA / NEPA Vegetation and Wildlife Determinations for Funks Area a. Impacts b. Mitigation Measures	Ali / John / ICF Team
6. BA and ITP Requirements (Jeopardy vs. Fully Mitigate) a. Approach (Mapping, Assume Presence, Survey, Adjust) b. Next Steps in Discussions with Reclamation and CDFW	Ali / Ellen
7. Action Items and Next Steps	Group

GCID – Sites Reservoir Project RDEIR/SDEIS

Preliminary Environmental Effects Related to GCID Facilities

July 9, 2021

Sites

Agenda

- Provide Second Briefing on Preliminary Findings Related to GCID Facilities – Non-Biological Resources
  - General Overview of the RDEIR/SDEIS Contents
  - Discuss Project Description Components Related to GCID Facilities
  - Preliminary Environmental Effects Related to GCID Facilities Other than Biological Resources
  - Other Related Topics
    - Renewable, Carbon-free Power
    - Net Zero Greenhouse Gas Emissions
    - Funks and Stone Corral Creek Releases

RDEIR/SDEIS Contents

- 34 Chapters and 50 Appendices
  - Introductory Chapters
    - Ch. 1 - Introduction
    - Ch. 2 - Project Description and Alternatives
    - Ch. 3 - Approach to Environmental Analysis
    - Ch. 4 - Regulatory and other Approvals
  - Resources Area Chapters
    - Ch. 5 to Ch. 32
  - Closing Chapters
    - Ch. 33 - Consultation and Coordination; List of Preparers
    - Ch. 34 - EIR/EIS Document Distribution

RDEIR/SDEIS Resource Analysis Chapters

Ch. 5 - Surface Water Resources
Ch. 6 - Surface Water Quality
Ch. 7 - Fluvial Geomorphology
Ch. 8 - Groundwater Resources
Ch. 9 - Vegetation and Wetlands
Ch. 10 - Wildlife Resources
Ch. 11- Aquatic Resources
Ch. 12 - Geology and Soils
Ch. 13 - Minerals
Ch. 14 - Land Use
Ch. 15 - Agricultural Resources
Ch. 16 - Recreation
Ch. 17 - Energy
Ch. 18 - Navigation, Transportation and Traffic

RDEIR/SDEIS Resource Analysis Chapters (cont)

Ch. 19 - Noise
Ch. 20 - Air Quality
Ch. 21 - Greenhouse Gases
Ch. 22 - Cultural Resources
Ch. 23 - Tribal Cultural Resources
Ch. 24 - Visual Resources
Ch. 25 - Population and Housing
Ch. 26 - Public Services and Utilities
Ch. 27 - Public Health and Environmental Hazards
Ch. 28 - Climate Change
Ch. 29 - Indian Trust Assets
Ch. 30 - Socioeconomics and Environmental Justice
Ch. 31 - Cumulative Impacts
Ch. 32 - Other Required Analyses (includes Growth Inducement)

Project Description Components Related to GCID Facilities

- Includes the following improvements (page 2-9; Figures 2-7+)
  - New Main Canal headgate structure
  - Replace Walker Creek siphon
  - Replace Willow Creek siphon
  - Union Pacific Railroad siphon improvements (adding an additional barrel)
  - Main Canal improvements between MP 26 to MP 41.3 to increase freeboard
  - Main Canal road improvements from Willow Creek siphon to Funks Creek siphon for all weather road surface
- Recognizes that specific details to follow
- Conservatively assumes upgrades needed

Environmental Effects Related to GCID Facilities

- Biological Effects Previously Discussed
  - Vegetation and Wetlands
  - Wildlife Resources
- Non-Biological Effects Associated with GCID Facilities
  - Surface Water Quality
  - Groundwater Resources
  - Geology and Soils
  - Energy
  - Noise
  - Navigation, Traffic and Transportation
  - Cultural Resources
  - Tribal Cultural Resources
  - Visual Resources
  - Wildfire

Surface Water Quality

- Surface Water Quality – Less than Significant
  - GCID Main Canal improvements would likely occur during the winter (i.e., wet season). The terrain in the areas where this construction would occur is relatively flat, which would reduce the potential for erosion and runoff.
  - In-channel construction would be required for upgrades to the GCID system and canal head gate structure and TRR East and West pipelines; BMPs will minimize water quality impacts.
- Will be targeting release temperatures suitable for rice
- Worked with UC Davis Extension on mercury and arsenic and don't see any concerns for rice
- Variable I/O Tower intake levels will allow flexibility to adjust temperature and avoid water quality issues (HABs, high level of metals, etc)

Groundwater Resources

- Groundwater – Less than Significant
  - Water used for pipeline compression and dust control during construction of conveyance facilities would be supplied from the GCID Main Canal and would not affect groundwater.
  - Some of the GCID Main Canal would be dewatered during siphon improvements. This construction would occur during the regularly scheduled annual maintenance period for the canal and would not adversely affect groundwater flow directions or quality.
  - Construction of TRR East and West, TRR East and West pipelines, and pipelines to convey water during TRR East and West construction may require dewatering but would not result in a violation of water quality standards or waste discharge requirements or otherwise substantial degrade groundwater quality.
  - Reduced infiltration from the TRR East or TRR West would not be considered a significant change when compared the surrounding landscape

Geology and Soils

- Geology and Soils – Less than Significant
  - GCID system upgrades, TRR East PGP and pipelines would not be affected by surface fault rupture because no known active faults are present in the vicinity.
  - Construction of the new GCID head gate and replacement of three GCID Main Canal siphons are located in areas of low to moderate ground shaking; none of these structures would be considered habitable and would not cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction.
  - The TRR West under Alternative 2 would involve a slightly greater risk of landsliding compared to TRR East under Alternatives 1 and 3 because it would require excavation into a hillslope to form a steep cut slope on the north side of the reservoir. Impacts would be minimized through implementation of applicable design criteria.

Geology and Soils (Paleontology)

- Paleontology – Less than significant
  - For the GCID Main Canal improvements, the new head gate would involve excavation and pile driving but would not damage paleontological resources because they would involve shallow disturbance, small areas of disturbance, or geologic units that are generally too young to contain fossils.
- Paleontology – Significant and Unavoidable
  - Construction of the TRR East would require extensive soil amendment using cement deep soil mixing (CDSM) that would damage paleontological resources in those locations where paleontologically sensitive units are present.

Energy

- Energy – Less than Significant
  - The pumps used for the TRR PGP would have a rated pump efficiency of 89%; electrical equipment, including pumping and generation equipment, and electrical equipment in buildings and other facilities would be designed and operated to conform to energy efficiency standards. Construction and operation impacts would be less than significant.

Noise

- Noise – Less than Significant
  - Sensitive receptors are located within 100 feet of the railroad siphon, and a residential area is adjacent to approximately 1 mile of GCID Main Canal system upgrades. BMPs related to noise would be implemented to reduce short term construction noise.
  - Construction noise associated with TRR Reservoir, TRR PGP, and TRR pipelines is unlikely to be noticeable above ambient sound levels by sensitive receptors because they are located more than 1 mile away from the noise-generating activity; for the same reason, operational noise associated with pumping is also unlikely to be noticeable.

Navigation, Traffic and Transportation

- Navigation, Traffic and Transportation – Less Than Significant
  - Anticipated vehicle trips related to construction at the GCID Improvements would be limited to 28 employee and 25 haul truck trips per day.
  - No navigational impacts would occur because construction and operations activities at GCID facilities would not occur within a navigable waterway.

Cultural Resources

- Cultural Resources – Significant and Unavoidable
  - The GCID Main Canal historic property boundary is the structure's footprint, and its period of significance is circa 1887 to 1920, the dates of its original design and construction. The character defining features of the GCID Main Canal property conveying its historical significance under NRHP/CRHR Criteria A/1 are its alignment, its location in a generally rural and agricultural setting, and its continued use as, and ability to function as, a gravitational water conveyance structure serving the GCID market.
  - Portions of the GCID Main Canal historic property are located at the TRR East, along the canal alignment, and at the siphons near Willows. Alternatives 1 and 3 would construct the TRR East adjacent to the GCID Main Canal structure. Alternatives 1 and 3 would also construct a conveyance connection between the TRR East and the GCID Main Canal. This construction would not physically change the canal's location, setting, or ability to convey water but would change the materials, design, and workmanship of the property.
  - Known cultural resources occur in the vicinity of the proposed TRR facilities and could be encountered during constructive associated with all Project facilities.

Tribal Cultural Resources

- Tribal Cultural Resources – Significant and Unavoidable
  - Tribal Cultural Resources are assumed to occur in the vicinity of proposed TRR facilities that could be affected during Project construction. Efforts will be made to avoid and/or minimize effects.

Visual Resources

- Visual Resources – Less than Significant
  - Construction activities associated with GCID system upgrades would be temporary and introduce heavy equipment and associated vehicles, including backhoes, compactors, tractors, and trucks, into the viewsheds of all viewer groups. This equipment is consistent with views of heavy equipment used in adjacent farming operations and during operations and maintenance of existing facilities.
  - Construction of most of the project features would blend with the existing landscape, would not affect sensitive viewers, or would include implementation of BMPs to minimize visual changes.

Wildfire

- Wildfire – Less than Significant
  - Construction and operation of new infrastructure, such as roads, transmission lines, and substations, would not exacerbate fire risk. Incorporation of BMPs in construction and management plans would alert both construction and operation workers to potential ignitable materials and prepare the construction site by implementing required fire suppression procedures and tools.

Other Related Topics – Renewable, Carbon Free Power

- Targets of purchasing Project's operations power needs from renewable, carbon-free sources :
  - At least 60% from the start of operations to 2045
  - Starting in 2045, of 100%
- Does not apply to
  - Any operational power needs attributable to Reclamation's participation, including the conveyance and pumping of Incremental Level 4 Refuge water supply
  - Any non-Project power needs (GCID regular power)

Other Related Topics – Funks and Stone Corral Creek Releases

- Fish and Game Code 5937

  The owner of any dam shall allow sufficient water at all times to pass through a fishway, or in the absence of a fishway, allow sufficient water to pass over, around or through the dam, to keep in good condition any fish that may be planted or exist below the dam. During the minimum flow of water in any river or stream, permission may be granted by the department to the owner of any dam to allow sufficient water to pass through a culvert, waste gate, or over or around the dam, to keep in good condition any fish that may be planted or exist below the dam, when, in the judgment of the department, it is impracticable or detrimental to the owner to pass the water through the fishway.

Other Related Topics – Funks and Stone Corral Creek Releases (cont)

- Funks Creek from Golden Gate Dam to Funks Reservoir
- Not sufficient information on flows, fisheries, habitat to determine releases
- Addressing through:
  - Design currently includes release from 0 to 100 cfs
    - Will be refined in the future based on study below
  - Study effort on fish assemblage, channel capacity, existing habitat to determine future releases
    - Planned for Amendment 3 to refine design ASAP
    - Would prepare Funks and Stone Corral Creeks Ops Plan post study
- Releases made in consideration of Projects flood control benefits and TC Canal operations

GCID Approval for Release of the RDEIR?

- 2.5. GCID and TCCA Operations: The Authority Members anticipate that the Sites Reservoir Project will be within or adjacent to GCID and/or TCCA districts with at least a portion of the conveyance of water into the reservoir to be accomplished by wheeling water through GCID's Main Canal and/or the Tehama-Colusa Canal. The Authority shall not have the power, except with the express written consent of GCID and/or TCCA, depending on which facilities are at issue, to enter into any agreements or otherwise take any action that will, directly or indirectly, decrease, restrict, or in any manner alter, modify or limit water rights, water supplies or contractual entitlements to water of GCID and/or TCCA (and, in the case of TCCA, the water agencies it serves) or the operations of their facilities or any facilities they operate under contract.
- Approval needed? If so, what does this look like?

Questions

Sites


Sites