**Temperature**:

At page 3-12, the Framework states:

> It is assumed stream temperatures in all or a portion of the Restoration Area will support all Chinook salmon freshwater life stages and that total habitat will be sufficient to achieve adult and juvenile abundance targets.
>
> There is some uncertainty surrounding the attainment of temperature and habitat needs because factors such as final stream channel width and depths, channel configuration, and amount of floodplain and riparian habitat to be developed are still a work in progress.

Temperature uncertainties due to possible climate change are not addressed or even mentioned in the Framework. It is our understanding that the temperature models used by the SJRRP have not been modified to address climate change, even though in 2014 Reclamation stated that "*A number of ongoing restoration programs have begun to incorporate climate change modeling results into their restoration planning (e.g., San Juan River Fish Recovery Program and the San Joaquin River Restoration Program).*"[1] FWA-1

In Reclamation's Climate Change Adaptation Strategy: 2016 Progress Report, it states that "*Changes in Water Supply and Demand Climate assessments project that the manageable water supply, in general, will decline in much of the West. A decrease of up to 8 percent in average annual stream flow is projected in several river basins, including the Colorado, the Rio Grande, and the San Joaquin river basins.*"[2] It would seem that such a decline would impact water temperatures; however, the Framework does not address it.

In the report "Literature Synthesis on Climate Change Implications for Water and Environmental Resources – Third Edition,"[3] Reclamation states the Hydroclimate Metric change from 1990s on the San Joaquin River at Friant Dam indicates increases of the mean annual temperature (°F) of 1.4 degrees in the 2020s, 3.3 degrees in the 2050s, and 4.5 degrees in the 2070s. Again, changes of these magnitudes should be addressed in this Framework.

**Other comments**:

Section 4 is referenced in many places in the Framework. For example, at page ES-2 it states, "The Program's implementation plan is described in Section 4." But Section 4 is "References." It appears that Section 4 references should be changed to Section 3. FWA-2

Comment on Appendix F (San Joaquin River Habitat and Flow Changes with SJRRP Implementation Memo – January 31, 2017):

> Appendix F states "This memorandum documents the projected increases in flows and habitat over time, and decreases in temperature due to increasing flows, that will occur as the San Joaquin River Restoration Program implements projects as described in the Framework for Implementation."[4] However, temperature is never again mentioned in the Appendix.

FWA-3

[1] See https://www.usbr.gov/climate/docs/ClimateChangeAdaptationStrategy.pdf (at page 9).
[2] See https://www.usbr.gov/climate/docs/2016ClimateStrategy.pdf (at page 3).
[3] See https://www.usbr.gov/climate/docs/ClimateChangeLiteratureSynthesis3.pdf (at page 36).
[4] See http://www.restoresjr.net/wp-content/uploads/Appendix-F-Habitat-Implementation_2017_BOR.pdf (at page 1).

BISON CONNECT

**Portz, Donald <dportz@usbr.gov>**

# Fwd: San Joaquin River Restoration - Raise the River in low flow times.

**Newcom, Samuel (Joshua)** <snewcom@usbr.gov> Fri, Aug 4, 2017 at 3:27 PM
To: Donald Portz <dportz@usbr.gov>

--- Forwarded message ---
From: **Joseph_Rizzi** <Joseph_Rizzi@sbcglobal.net>
Date: Mon, Jul 17, 2017 at 2:36 PM
Subject: San Joaquin River Restoration - Raise the River in low flow times.
To: snewcom@usbr.gov

Raise the River without increasing flows! Yes, it can be done now and it will make the river colder. JR-1

Look at fish ladder, see the large containers below. This concept has been around for years, working for fish, it just has to be applied to rivers.

A series of river risers to bring up the river water higher on the banks in the summer time, actually is like having ponds or lakes all throughout the river. Deeper water stays colder longer. During the water runoff times the river risers can be deflated, made to not hold back any water, so that no flooding occurs and the rivers can flow normally as they do today. JR-3

I **hope USBR will consider this option and try it out.**

Joseph **Rizzi** -- Cel: 707-208-4508 -- Email: Joseph_Rizzi@sbcglobal.net

Josh Newcom

public affairs specialist

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Web Site: https://www.acwa.com/news/san-joaquin-river-restoration-program-requests-comment-on-draft-fisheries framework

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AND SRI LANKA

August 2, 2017

VIA E-MAIL & U.S. MAIL

Donald Portz
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dportz@usbr.gov

**Re: Comments of the Merced Irrigation District to the Draft Fisheries Framework: Spring-run and Fall-run Chinook**

Dear Mr. Portz:

The following comments to the San Joaquin River Restoration Program's ("SJRRP") Draft Fisheries Framework: Spring-run and Fall-run Chinook ("Draft Fisheries Framework" or "DFF") dated June 2017 are submitted on behalf of the Merced Irrigation District ("MID"). MID appreciates the opportunity to provide comments to the Draft Fisheries Framework. While the Merced River, a tributary of the San Joaquin River, and MID's facilities are not within the Restoration Area, MID is concerned about impacts of SJRRP fisheries management actions with the potential to impact the health of Merced River fish populations and MID operations.

**Comments**

***Reintroduction of Feather River Fish Hatchery-Sourced Spring-run Chinook Salmon May Jeopardize Merced River Fall-run Chinook Salmon***

MID-1

The reintroduction of spring-run Chinook salmon to the San Joaquin River by the SJRRP relies on Feather River Fish Hatchery ("FRFH") fish as its source broodstock. (DFF, p. 3-19.) Feather River spring-run Chinook salmon are virtually identical genetically to Feather River fall-run Chinook salmon. Hatchery operations at the FRFH have mixed fish of different run timings for decades causing hybridization of the two runs of Chinook salmon. (NMFS 2016[1].) The 2016 NMFS 5-year status review of the ESU (p. 14), which controversially includes FRFH spring-run Chinook salmon, notes that NMFS anticipates that, reintroduced spring-run Chinook salmon are likely to stray into the San Joaquin tributaries at some level. As the Draft Fisheries Framework acknowledges, “a major issue with juvenile trap and haul is that returning adults may stray to spawning areas outside their basin of origin due to decreased homing ability” noting that a literature review of salmon and steelhead straying concluded that transported fish had higher stray rates than non-transported fish. (DFF, Appendix G, p. 6.)

While the Draft Fisheries Framework assumes that adult stray rates of spring-run Chinook should not exceed those exhibited by natural populations and expects its fish to exhibit “high honing ability,” no actual adult returns have yet occurred. (DFF, Appendix G, pp. 6-7.) The implementation of an extensive juvenile trap and haul program with spring-run Chinook salmon sourced from a known population hybridized with fall-run Chinook salmon raises concerns about straying into San Joaquin tributaries such as the Merced River where there are extent fall-run Chinook populations. Introgression of reintroduced FRFH-sourced, spring-run Chinook salmon with fall-run Chinook salmon within the Merced River could jeopardize the viability of the Merced River population.

MID-1

***Plans to Release Steelhead at the Confluence of the Merced is an Unauthorized Reintroduction Effort That Has Not Undergone Environmental Review***

The SJRRP anticipates that the restoration of flows and, eventually, the improvement of habitat will attract other fish to the Restoration Area, including listed species such as Central Valley Steelhead. (See DFF, p. 2-13 and Appendix C, pp. 6-7.) Currently, the intent is to translocate steelhead out of the Restoration Area until “protection and/or construction activities are in place/completed.” (DFF, p. 7.) Under the Bureau of Reclamation’s 2017 application to the National Marine Fisheries Service for a renewed permit (16608-2R) for the Steelhead Monitoring Program, the planned release site for captured Steelhead is the confluence with the Merced River.

There is no verifiable evidence that steelhead occur on the Merced River. The reintroduction of fish to the Merced River, whether Central Valley steelhead or spring-run Chinook salmon, is beyond the scope of the SJRRP. Moreover, there is no environmental analysis of the impacts of relocating live steelhead to the confluence of the Merced River, with the stated (as in the renewed permit application) or un-stated intention that such steelhead would

MID-2

[1] NMFS. 2016. “California Central Valley Recovery Domain 5-Year Review: Summary and Evaluation of Central Valley Spring-run Chinook Salmon Evolutionarily Significant Unit.” 41pp. Web: http://www.westcoast.fisheries.noaa.gov/publications/status_reviews/salmon_steelhead/2016/2016_cv-spring-run-chinook.pdf.

migrate into the Merced River system, *where no steelhead are known to occur.* Further, there has been no environmental review under the National Environmental Policy Act of the impacts that establishing a steelhead , or spring run Chinook salmon populatio n, would have on water resources or other environmental values in the Merced River basin. Given these circumstances, Central Valley Steelhead should not be relocated from the Restoration Area and released at the confluence of the Merced River with the effect or intention of reintroducing steel head to the Merced River. MID-2

Thank you for the opportunity to comment. MID looks forward to continuing to work with Reclamation and others to ensure that the SJRRP is developed and implemented in a manner that meets feasible objectives and the needs of stakeholders.

Very truly yours,

Jolie-Anne S. Ansley

JSA

cc: Thomas Berli ner, Duane Morris LLP John Sweigard, Merced Irrigation District
Phil McMurray, Merced Irrigation District

Wonderful orchards

August 2, 2017

SENT VIA FIRST CLASS MAIL AND E-MAIL

Donald Portz
Bureau of Reclamation
2800 Cottage Way, MP-170
Sacramento, CA 95825
dportz@usbr.gov

Re: Comments on the Draft Fisheries Framework: Spring-run and Fall-run Chinook

Dear Mr. Portz:

Wonderful Orchards (formerly Paramount Farming Company), on behalf of Wonderful Nut Orchards who owns New Columbia Ranch ("Wonderful"), appreciates the opportunity to provide comments on the San Joaquin River Restoration Program's ("SJRRP") Draft Fisheries Framework: Spring-run and Fall-run Chinook ("Draft Fisheries Framework" or "DFF") dated June 2017. New Columbia Ranch is located on the east side of Reach 2B of the San Joaquin River, upstream of the Mendota Pool between River Miles 205 and 216. Wonderful holds and exercises rights to divert the water of the San Joaquin River and its sloughs for the irrigation of its almond orchards, and will be directly affected by the implementation of the proposed actions in conjunction with changes to the groundwater seepage threshold for almonds. Wonderful submits the below general comments.

**General Comments**

*The Reintroduction Program Remains Inconsistent with the Settlement and Restoration Act.*

Reintroduction of fish prior to construction and implementation of projects is inconsistent with the SJRRP Restoration Goal of maintaining fish populations in "good condition." The Draft Fisheries Framework dated June 2017 confirms the SJRRP's intent to construct a habitable environment *prior* to the reintroduction of fish. Table 2 on page 1-6 in "Action(s) Remaining-Design, construct and operate projects in a way that works to achieve the Restoration Goal." Figure 11, "Conceptual Model linking actions to Program goals for spring-run and fall-run Chinook salmon," lists the first step in the model as completing physical projects and actions. Wonderful is concerned that Reclamation has proceeded with the reintroduction of spring-run and fall-run Chinook salmon without first ensuring that the Restoration Goal of maintaining fish

WO-1

6801 East Lerdo Highway, Shafter, California 93263 · 661.399.4456 · 661.399.1735

populations in "good condition," including "naturally-producing and self-sustaining populations" can be accomplished efficiently and without impermissible impacts on third parties. WO-1

*SJRRP Remains Grossly Underfunded for Successful Implementation.*

In addition to reintroducing spring-run and fall-run Chinook salmon prior to the completion of any projects that would enable their survival, funding has not been provided at a level to allow successful implementation of mandated improvements, again raising the concern that the reintroduced fish are being set up forfailure. WO-2

*Viability of Spring-Run Chinook has Been Insufficiently Analyzed.*

SJRRP states the desire to restore salmon populations that are: 1) locally adapted; 2) productive and abundant; 3) genetically and phenotypically diverse; and 4) show no significant signs of hybridizing with each other or with non-target hatchery stocks. The foundation of a productive and abundant population is successful spawning. However, according to the DFF, " A preliminary assessment of existing Chinook salmon spawning habitat in the Restoration Area is under development and is expected to be complete in 2017." It is counterintuitive and irresponsible to reintroduce fish populations to an environment with the expectation that populations will a) survive and b) be "productive and abundant" without first assessing spawning habitats. WO-3

*Juvenile Survival Estimates Are Not Supported by Evidence.*

The DFF has identified the survival of both adult and juvenile salmon as " ...a limiting factor in establishing and sustaining Chinook salmon populations within the system." (Page 3-16). Juvenile and adult passage is identified as compromised prior to the completion of physical projects. This again suggests the Settlement is failing to be properly executed and begs the question: Why are fish being released prior to completion of projects when the DFF is very clear that survival (and passage) is predicated and heavily dependent upon the creation of a survivable habitat. Table 11, "Suitable juvenile rearing habitat (acres) under existing conditions, for each water year type, compared to that needed to achieve juvenile abundance objectives," provides an approximate deficit of346-419 acres of suitable habitat to meet population targets. This represents approximately a 34%deficit. WO-4

*Juvenile Trap and Haul Program not shown to be Technically Feasible.*

The juvenile trap and haul program developed as a solution to impassable channels during dry years is recognized as less certain than the parallel program for adult Chinook. The DFF states that evaluation and development of the juvenile trap and haul program is incomplete and ongoing. The Draft also reports that " ... trapping efficiencies were not high enough to successfully support a population level benefit" during the trap and haul pilot program. Such information suggests that the juvenile trap and haul program may not be technically feasible. WO-5

*Achievement of the Restoration Goal Must Address Basin Wide Stressors.*

The DFF states that goals and objectives of the SJRRP are to reduce physical, biological and ecological stressors, also referred to as limiting factors, that limit the development of healthy fish populations (DFF Page ES-1). WO-6

A Substantially Altered Delta and Central Valley

The San Joaquin River has undergone drastic physical changes that, in conjunction with natural environmental changes, ultimately rendered it uninhabitable to Chinook salmon. In order to create a habitable environment for Chinook to thrive, the SJRRP will have to do more than just increase river flows. Reclamation must prioritize the completion of the physical projects to create a suitable habitat for Chinook salmon.

Unsuitable Water Temperatures

According to section 3.5, River Temperature, water temperatures in the lower river are likely to remain above Chinook salmon temperature thresholds after April or if flows are, "lower," meaning Chinook cannot survive during these periods. With El Nino Southern Oscillation (ENSO) cycles occurring every 3 to 6 years on average, and the variable nature of rainfall in the State of California, periods of below-average rainfall that would result in lower flows are inevitable.[1] This would also mean that periods when water temperatures are likely to remain above survivable temperatures for Chinook are highly likely resulting in a continual cycle of attempting to reestablish fish populations under the SJRRP. WO-7

Thank you for considering the above comments. Should you have questions, please contact me at anytime.

S -

Kimberly M. Brown

Vice President, Company Resources

[1] National Oceanic and Atmospheric Administration (NOAA). 2003. "The ' El Nino' FAQ." http://www.aoml.noaa.gov/general/enso fag/

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August 1, 2017

VIA E-MAIL & U.S. MAIL

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**Re: Comments of the San Joaquin River Exchange Contractors Water Authority and San Joaquin River Management Coalition to the Draft Fisheries Framework: Spring-run and Fall-run Chinook**

Dear Mr. Portz:

The following comments are submitted on behalf of the San Joaquin River Exchange Contractors and the San Joaquin River Resource Management Coalition (collectively "Exchange Contractors") to the San Joaquin River Restoration Program's ("SJRRP") Draft Fisheries Framework: Spring-run and Fall-run Chinook ("Draft Fisheries Framework" or "DFF") dated June 2017. As an active participant in the SJRRP process since before its inception, the Exchange Contractors have submitted extensive comments in the past to program documents pertaining to fish reintroduction and appreciate the opportunity to provide further comments to the Draft Fisheries Framework here. These comments have been prepared with the technical assistance of the experts at FISHBIO.

As an over-arching theme, the comments call into question the feasibility of fish reintroduction pursuant to the goals and objectives laid out in the draft Fisheries Framework. As noted in the Draft Fisheries Framework (p. 3-10), even with the construction of the mandated improvement projects mandated by the Stipulation of Settlement in *NRDC, et al. v. Rodgers, et al.* (Settlement), Program biologists themselves have called into question the overall feasibility of the reintroduction. The Draft Fisheries Framework states that "even with the completion of major actions and projects, Program biologists believe that high water temperatures during adult and juvenile migration, juvenile survival through the Delta and juvenile predation stressors will continue to have large impacts on Chinook salmon survival and total adult production. If the magnitude of these impacts is large, the assumptions about life stage survival and fish production used in the Conceptual Models may not be achieved."

**General Comments**

*The Reintroduction Program Remains Inconsistent with the Settlement and Restoration Act.*

The Draft Fisheries Framework's stated purpose is to establish a "realistic" schedule for implementation of the fisheries management actions in the SJRRP in order to implement the fisheries components of the Settlement and the San Joaquin River Restoration Settlement Act, Public Law 111-11 ("Restoration Act"). (DFF, p. ES-1.) However, the Draft Fisheries Framework, and current SJRRP framework, remain inconsistent with the negotiations that led to the Restoration Act and to the terms of the Act itself, which expressly directs the Secretary to implement the Settlement. (See Restoration Act, Section 10004(a).) The SJRRP, and in particular reintroduction of spring-run Chinook salmon, is being developed and implemented backwards; putting fish in the San Joaquin River before constructing any channel and structural improvements to the San Joaquin River is contrary to logic, resource needs, the Settlement and the Restoration Act.

The Settlement, approved by the Court, established a carefully negotiated framework for the Restoration Goal of the SJRRP that included the completion of Paragraph 11, Phase 1 and Phase 2 projects for necessary channel and structural enhancements to the San Joaquin River that the Parties expressly acknowledged were <u>necessary</u> to achieve the Restoration Goal. (See Settlement, ¶¶ 4-5, 9 and 11.) Paragraph 14 of the Settlement regarding reintroduction of spring-run and fall-run Chinook salmon cannot be interpreted and implemented in isolation from this framework, which mandated a series of deadlines for the completion of necessary channel and structural improvements to the San Joaquin River that ensured that such habitat improvements would occur during a time-frame compatible and largely contemporaneous with fish reintroduction. (See Settlement, ¶¶ 11(a), 11(b) and 14.) All parties acknowledge that such court-ordered deadlines have not been achieved by the SJRRP, however, the Bureau of Reclamation ("Reclamation") not only has adopted new deadlines, but has also altered the framework of Reintroduction actions negotiated by the Settling Parties (see DFF, p. 1-2 [Tables 1a and 1b]).[1] In other words, the river was supposed to be ready to receive the fish during the time frame the fish were put into the river.

ECRMC-1

[1] Reclamation has not sought court approval for either the establishment of deadlines different from those in the Stipulated Settlement or its new "Framework", including this framework for fisheries management actions.

Instead of the reintroduction program framework approved in the Settlement, and directed by the Restoration Act, Reclamation has proceeded with the reintroduction of spring-run Chinook salmon, beginning in 2014 (DFF, p. 1-7 [Table 2].), but has yet to complete a single mandated channel or structural improvement project 3 years later (and long past the Settlement deadlines) and now unrealistically estimates that such projects will be completed within 5 to 15 years of reintroduction, which in all likelihood will turn into a much longer timeframe for many projects. The result is reintroduction of a listed species, spring-run Chinook salmon, into a river with unsuitable habitat for multiple lifestages of spring-run Chinook salmon that may not be able to achieve the short or long-term targets of the SJRRP. In fact, biologists from NMFS have acknowledged that the river is so inhospitable that reintroduction might not be achievable at all.[2] Instead of perpetuating the current SJRRP framework through the Draft Fisheries Framework, at the very least, Reclamation should pause salmon reintroduction efforts and establish a framework that coordinates fish reintroduction with the achievement of habitat improvements in the San Joaquin River necessary to maintain spring-run Chinook lifestages. ECRMC-1

*SJRRP Remains Grossly Underfunded for Successful Implementation*

In addition to lack of progress on mandated improvements, the SJRRP remains underfunded and current development and funding plans fail to address a shortfall that could range as high as $700 to $800 million, if not more, depending on the availability of new federal appropriations and whether the State of California would be willing to spend over $300 million on levee stability projects. As such, the funding to construct all of the projects listed in Table 1a of the Draft Fisheries Framework (p. 1-2), on which the Draft Fisheries Framework's biological objectives rely, is highly uncertain or even improbable. This funding deficiency raises the specter of a half-built (or less) program with ESA listed species in a river with little hope of survival and associated "take" issues. Worse, the Draft Fisheries Framework acknowledges that there are projects whose projected costs are higher than originally anticipated, such as with seepage management and land acquisitions, as well as projects not included in the SJRRP. Yet, the Draft Fisheries Framework continues to fail to address the obvious problem of lack of funding and seeks to advance an unaffordable and unrealistic program. ECRMC-2

[2] Indeed, Reclamation's application for a 10(a)(1)(A) permit for the SJRRP steelhead monitoring plan sought permission to trap and relocate any Central Valley steelhead that enter the Restoration Area on the grounds that the elevated stranding and entrainment risk along with potentially high water temperatures would compromise steelhead survival within the Restoration Area until passage and entrainment issues are alleviated. (Application 16608-2R for renewal of the 10(a)(1)(A) permit for the SJRRP Steelhead Monitoring Program, p. 3.) The same conditions, passage barriers, entrainment risks and lethal temperatures, are present for fall-run and spring-run Chinook salmon within the Restoration Area and will not be addressed for many years on an assumption that all of the Settlement Section 11 projects are built.

For example, the Draft Fisheries Framework projects a cost of $20 to $33 million for a juvenile trap and haul effort project to achieve the juvenile production targets during low flow years (Critical-Low, Critical-High and Dry), which does not include the costs estimates for a full scale juvenile sorting and marking facility, which would increase costs from $3 to $5 million. (See DFF, Appendix G, p. 58.) There would also be ongoing monthly O&M costs related to juvenile trap and haul ranging from an estimated $63,000 to $203,000 depending on the design chosen. (See DFF, Appendix G, pp. 52, 58.) In another example, in Appendix B, the Draft Fisheries Framework discusses estimated egg survival well below the set biological objective of 50% and a spawning gravel study that indicated a lack of gravel mobility. (DFF, Appendix B, pp. 12-13.) The Program's Framework for Implementation, however, does not identify specific projects to improve spawning substrate quality if such a project should prove necessary. (Id.) Without adequate funds to make the necessary structural and channel improvements and to run the fisheries reintroduction program, Reclamation should step back and reassess what type of scaled-back program it can successfully implement with the funding relatively certain to be available. ECRMC-2

Just to be clear, the Exchange Contractors are not suggesting that someday, under different financial conditions, the SJRRP cannot be fully implemented. However, due to funding constraints, the full program cannot be implemented now. Rather, this program should be scaled to the amount of money available and if more money becomes available the SJRRP may scale up to the extent, consistent with funds. Facing this reality is entirely within the expectation of the settling parties when they agreed to include paragraph 36 of the Settlement, which provides that if Congress fails to fund aspect of the program, that does not constitute a breach of the Settlement. Hence, a program that is scaled consistent with the money actually available is consistent with the Settlement as was anticipated by the parties.

*Introgression and Hatchery Operations Call into Question the Reintroduction of Spring-Run Chinook*

The SJRRP relies upon artificial propagation (i.e., hatcheries) to reintroduce spring-run Chinook salmon to the river. The majority of these fish will be produced at a custom built hatchery (Salmon Conservation and Research Facility [SCARF]) located below Friant Dam. Since natural populations of spring-run fish are extirpated from the San Joaquin Basin, the SCARF is currently reliant upon broodstock from other spring-run populations in the state. While the Technical Advisory Committee recommended use of Butte Creek stock, agencies (e.g., NMFS, CDFW) determined that initially only spring-run Chinook salmon from the Feather River Fish Hatchery (FRFH) could be used as donor stock due to the high risk of extinction of naturally spawning populations and concerns about habitat availability and suitability in the San Joaquin River (Garza and Clemento 2014). The program anticipates introducing fish from other extant stocks (e.g., Butte Creek) in the future in order to develop a genetically diverse broodstock. (See DFF, pp. 2-2 –2-3.) Once operational, Reclamation plans that the SCARF will be capable of producing one million juveniles per year that are representative of the genetic and ECRMC-3 phenotypic diversity of the donor stock. It is assumed that these fish will become locally adapted over multiple generations and ultimately self-sustaining.

There are several concerns about the reliance upon FRFH fish as a source population. Feather River spring-run Chinook salmon are virtually identical genetically to Feather River fall-run Chinook salmon (Williams 2006, Garza et al. 2008). Hatchery operations at the FRFH have mixed fish of different run timings for decades causing hybridization of the two runs of Chinook salmon (NMFS 2016). Feather River spring-run Chinook salmon are more closely related genetically to Feather River fall-run Chinook salmon than they are to other extant spring-run populations from Butte, Deer, or Mill creeks (Garza et al. 2008). Due to these concerns, Feather River spring-run Chinook salmon were included somewhat controversially into the Central Valley spring-run Chinook Evolutionary Significant Unit (ESU), although there are concerns about the introgression of FRFH spring-run Chinook salmon with other wild spring-run populations (NMFS 2016). The NMFS 5-year status review of the ESU notes that FRFH spring-run Chinook salmon stray rates of less than one percent can increase extinction risk after only four generations (Lindley et al. 2007, NMFS 2016). Straying of FRFH spring-run Chinook salmon has led to fear of increased extinction risk for several tributaries in the Sacramento valley including Battle Creek, Clear Creek and the Yuba River, where FRFH spring-run Chinook salmon have made up approximately 20 percent of the total annual run in recent years (USACE 2012). It is also of note that pursuant to a proposed new license from the Federal Energy Regulatory Commission (FERC), a hatchery and genetics management plan will be developed to help with reduction of introgression between spring run and fall run Chinook salmon in the Feather River. However, that plan has not yet been developed because the new license has not yet been issued.[3]

In addition, introgression with fall-run Chinook salmon in the Restoration Area was covered extensively in the Draft Fisheries Framework because of concerns that it could "reduce the survival and performance of spring-run Chinook salmon." (DFF, p. 3-22.) The Program has acknowledged that total "prevention" of introgression may not be possible but set a target of < 2 percent introgression between runs. (Id.) The Draft Fisheries Framework suggested several methods that may be deployed in order to reach this goal, however, none of these methods are guaranteed to be effective and it was concluded that "annual strategies will be adjusted by program managers," and a "revised segregation protocol will be developed." (DFF, pp. 3-24 – 3-25.) For a program that is 10+ years in the making and has spent significant portions of the budget to address this issue, it would be prudent to develop a strategy to ensure the integrity of the fish stocks ***before*** reintroduction of fish to the system. Furthermore, the reliance on a donor stock of spring-run Chinook salmon that are known to be nearly genetically identical to fall-run

[3] See Appendix A, Article A.107, A107.3 of the Settlement Agreement for Licensing of the Oroville Facilities at http://www.water.ca.gov/orovillerelicensing/docs/settlement_agreement/Settlement%20Agreement.pdf.

Chinook salmon prompts a number of questions about the rationality and feasibility of preventing introgression, in particular at the level set, between runs in the Restoration Area.

Finally, the use of FRFH broodstock for the SJRRP raises the fundamental question of whether the Program wants to truly restore spring-run Chinook salmon to the San Joaquin River or a spring-running population that reflects the underlying genetic makeup of the donor stock. The Program has stated a desire to restore salmon populations that are: 1) locally adapted; 2) productive and abundant; 3) genetically and phenotypically diverse; and 4) show no significant signs of hybridizing with each other or with non-target hatchery stocks. (DFF, p. 2-5.) However, all available evidence, described above, points to the fact that meeting this objective is not possible with FRFH broodstock. The 5-year status review of the spring-run Chinook salmon ESU showed that straying of FRFH fish to other watersheds and introgression with natural populations is already reducing the resiliency of the Central Valley spring-run population. (NMFS 2016.) The Program is expanding the range of this compromised stock to the San Joaquin basin and relying upon broodstock with no local adaptation, reduced fitness and viability, lesser diversity, and confirmed evidence of hybridization with fall-run Chinook to restore a population of spring-run Chinook salmon in 'good condition' (defined in Table 5 of the Fisheries Framework) to the San Joaquin River. All of these concerns call into question whether the reintroduction of spring-run Chinook salmon sourced primarily from FRFH spring-run Chinook salmon is feasible and furthers the goal of Chinook salmon protection and restoration in the State. ECRMC-3

*Habitat Availability and Spawning Conditions in the Restoration Area Render Population Targets Unfeasible*

The Program has a long-term target of restoring a naturally-produced population of 30,000 spring-run Chinook salmon and 10,000 fall-run Chinook salmon to the Restoration Area. (DFF, p. 2-26.) The upper range of the long-term target of fish production is 45,000 spring-run salmon spawners and 15,000 fall-run spawners. (Id.) The habitat available for all life stages and both runs of Chinook is currently inadequate in the Restoration Area and is hampered by a multitude of stressors including flow (i.e., channel connectivity, depth/velocity), temperature, dissolved oxygen, substrate, and predation. (See DFF, pp. 2-15 – 2-18.) The Draft Fisheries Framework's biological objectives or targets depend on the alleviation of some of these stressors through the construction of necessary channel and structural improvement projects but even with the construction of such projects severe stressors will remain, calling into question the assumptions about life stage survival and fish production objectives.[4] (See DFF, p. 3-10.)

[4] Regarding its evaluation and ranking of stressors, the Draft Fisheries Framework notes that "not surprisingly the highest scoring stressor are directly addressed by the project defined in the Settlement" underscoring that if implementation of these projects is not feasible then the Restoration Goal is not feasible.

Among the most significant stressors is the severely limited amount of spawning habitat available, especially for spring-run Chinook salmon. (Castle et al. 2016a, Castle et al. 2016b, SJRRP 2012b, SJRRP 2012c.) The Draft Fisheries Framework notes that temperature conditions during the spawning period (i.e., September – December) are only suitable for the first 5-7 miles below Friant Dam (i.e., Reach 1), where there is currently enough habitat to support only about 7,500 female spawners (or a total population of 15,000 fish assuming a 1:1 sex ratio). (DFF, p. 2-27.) The suitable spawning habitat objective, based upon studies conducted in the Restoration Area, is a total of 270,000 $m^2$ (~67 acres) for spring-run Chinook and 90,000 $m^2$ (~22 acres) for fall-run Chinook. This objective will be impossible to meet in the spawning area of Reach 1. Currently there are 26 acres of potential spawning habitat in this reach, and based on existing flows only about 13 of the 26 acres will have sufficient conditions to function as suitable spawning habitat (Meyers 2016). To reach the spring-run Chinook spawning habitat target, approximately 10,800 m (6.7 miles) of *suitable* spawning habitat would be needed (assuming that the river is 25 meters wide, on average). This amount of *suitable* spawning habitat is not available in a 5-7 mile stretch of the River.

The Fisheries Framework acknowledges the dearth of suitable habitat by stating that "additional spawning habitat may need to be created within the appropriate temperature range in Reach 1." [5] (DFF, p. 2-27). Numerous studies have been conducted to examine the extent and quality of available habitat (Castle et al. 2016a, Castle et al. 2016b, SJRRP 2012c, Bray 2016, Shriver 2016), yet it is not clear how sufficient suitable habitat targets will be accomplished given current and projected conditions. Nearly all of these studies have noted the poor conditions of the spawning habitat currently available including excessive sedimentation, gravel embeddedness, and high water temperatures. (Castle et al. 2016a, Castle et al. 2016b, SJRRP 2012c, Bray 2016, Meyers 2016, Shriver 2016; see also DFF, Appendix B, pp. 12-13.) Monitoring of fall-run Chinook spawning success in Reach 1 during 2015 revealed that 1,300 fry, on average, were produced per redd, which is well below the Program target of 2,100 fry per redd (i.e., 50 percent emergence) that was cited as necessary to maintain a viable population. (Kirsch 2016; SJRRP 2017.) Several studies focused on the high amount of fine sediments in the spawning reach and their effects on limiting hyporheic flows. (Bray 2016, Shriver 2016.) Shriver (2016) assessed spawning gravel quality over three sampling years and found that the low survival to emergence could be primarily attributed to an abundance of fine sediment in the redds. ECRMC-4

Trends in water temperature also appear to be an issue for maintaining suitable conditions for expected populations of returning adult spring-run Chinook. While adult spring-run Chinook have yet to return to the Restoration Area, observed water temperatures were above thresholds for suitable holding (18° C) or spawning habitat (13° C). (USEPA 2003.) Monitoring in 2015

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[5] In the SJRRP Science Symposium held on June 11-12, 2015, Reclamation and fisheries scientists presented information that either Restoration Flows need to be increased above those agree to with Friant or a temperature control system needs to be installed at Friant Dam.

showed that the coldwater pool in Millerton Lake was depleted by the fall spawning season after fulfilling summertime water deliveries. (Kirsch 2016.) Water temperatures in the spawning reach were actually warmer below the dam when compared to locations further downstream and leading some researchers to hypothesize that it was high water temperatures in the spawning reach that likely led to the poor survival to emergence observed with fall-run spawners. (Id.) Additionally, high water temperatures may push spawning fish into lower reaches that are primarily dominated by finer sediment. The presenters of this study concluded, "the quality of extant salmon spawning habitat within the Restoration Area […] may be inadequate for achieving the Chinook salmon reproduction targets." (Id.) Spawning habitat and distribution studies to assess these trends remain ongoing and a preliminary assessment of existing Chinook spawning habitat is still under development. However, the findings to date suggest that biological objectives may be unfeasible due to habitat availability and spawning conditions in the Restoration Area.

*Juvenile Survival Estimates Are Not Supported by Evidence*

Survival of both adult and juvenile salmon has been identified by the Program as "a limiting factor in establishing and sustaining Chinook salmon populations within the system." (DFF, p. 3-16.) The program has set survival targets of > 70 percent for juveniles migrating through the restoration area and > 90 percent for adults. (DFF, pp. 3-6 – 3-9.) Additionally, the Program assumes that the smolt-to-adult survival rates ("SARs") for spring-run and fall-run Chinook salmon born in the Restoration Area will be between 2-4 percent. (Id.) While the adult survival targets are feasible (as shown by ongoing monitoring; Kirsch 2016), there are serious concerns about the likelihood of meeting the juvenile survival and SARs targets.

The Draft Fisheries Framework notes that SARs from elsewhere in the Central Valley are highly variable and generally much lower than the Program targets, and two examples are cited from the Central Valley that show SARs that are much lower than the Program targets. (DFF, p. 3-11.) Smolt-to-adult survival rates of spring-run and fall-run Chinook salmon (spring-run and fall-run Chinook salmon) released from hatcheries are generally less than 0.5 percent. (Id. citing Kormos et al. 2012, Palmer-Zwahlen and Kormos 2013.) Naturally spawning spring-run from Butte Creek exhibit even lower levels of survival, averaging about 0.15 percent over a four-year period. (DFF, p. 3-11.) The Draft Fisheries Framework, however, states that additional information is needed to "diagnose where in the system survival rates need to be improved" in order to reach the targets. (Id.) The Draft Fisheries Framework noted that through-delta survival is low and will "impact the ability of the Program to achieve adult abundance objectives." (Id.) They estimate that that survival rates through the Delta are currently estimated at 7 and 5 percent, respectively, for spring-run and fall-run Chinook salmon, which is accurate according to current literature. However, the Draft Fisheries Framework states that through-Delta survival is expected to increase to 38 percent and 31 percent, respectively, over a 40-year period. It is entirely unclear how these targets are expected to be met since overall trends in survival of juvenile salmon in the Delta have been steadily decreasing for years (Brandes 2016). ECRMC-5

Juvenile survival estimates from elsewhere in the Central Valley highlight the difficulty (and unlikelihood) of achieving > 70 percent survival through the Restoration Area. Pat Brandes, speaking at the 2016 SJRRP Science Meeting, explained that since 1994, survival in the San Joaquin River from Mossdale to Jersey Point (approximately 90 km), has been below 20 percent for most releases of acoustically tagged fish, with the exception of a few high flow years (1995, 1997 – 1999) and medium flow years with the HORB installed (2000 and 2001). (Brandes 2016.) However, survival has been even lower since 2002, with most years having less than 10 percent survival. (Brandes 2016.) Buchanan et al. (2013) estimated that total survival through the entire Delta was 5 percent in 2010 and was higher through the Old River migration route because higher survival was exhibited by salmon that were salvaged from the federal water export facility and trucked through the Delta. (Buchanan et al., 2013.) The same study found that survival in the upstream Delta and San Joaquin River was 6 percent in 2009 and 56 percent in 2010, although the higher survival estimates in 2010 were largely a result of fish migrating through the Old River route. (Buchanan et al., 2013.)

On the Sacramento River, survival rates are not any higher and are worse in some years despite a more naturalized river system and in general, a more natural flow regime. Michel et al. (2015) found that overall survival of late fall-run Chinook salmon (fish length > 140 millimeters [mm]) through the entire migration corridor (rkm 518 to rkm 2) ranged from 3 percent to 16 percent over a five-year period, with 2011 (a 'Wet' water year type) having the highest survival. (Michel et al. 2015.) Natural origin spring-run Chinook salmon tagged in Mill Creek showed even lower survival through the Sacramento River system. A total of 330 spring-run Chinook salmon (all fish > 80 mm) were tagged in Mill Creek over a 4-year period. Of those, only six fish made it to the Delta and one made it to the Golden Gate Bridge. Overall survival was approximately 80 percent for every 10 river kilometers (Notch 2016). For comparison, average survival would need to be greater than 90 percent per 10 km to reach survival levels of even 40 percent through the Delta. ECRMC-5

In addition to the exceedingly high survival estimates, the Draft Fisheries Framework also assumes that the majority of spring-run Chinook salmon emigrating from the Restoration Area will be greater than 70 mm. (DFF, p. 3-11.) No juvenile survival estimates are established for fish less than 70 mm, "due to difficulty in separating rearing mortality from passage mortality." (DFF, p. 3-28). However, in other systems, spring-run Chinook salmon are known to migrate at all times of the year and at many different life stages. In the Feather River, the bulk of juvenile emigration occurs during November and December and, in Butte Creek, most juveniles migrate downstream as fry by the end of February. (McReynolds et al. 2007.) Lindley et al. (2004) showed that outmigrating juveniles from Mill, Butte, and Deer creeks average approximately 40 mm in length between December and April, and reflected a prominent and prolonged emergence of fry. It has been hypothesized that emigration at smaller sizes is driven by warmer water temperatures, which are prevalent in the Restoration Area (NMFS 2016, SJRRP 2017). Fry-sized fish are known to have much lower survival than smolt-sized fish, and therefore, it will be difficult to achieve the target survival rates if a majority of juveniles are migrating from the Restoration Area at sizes less than 70 mm.

*Juvenile Trap and Haul Program not shown to be Technically Feasible*

Even with restored environmental flows in the San Joaquin River, diversions, dry or critically-dry water year types, and channel morphology can reduce the connectivity to the Delta. River conditions are generally impassable downstream and are not conducive to juvenile salmon survival (i.e., near-term volitional juvenile passage survival is expected to be zero [DFF, p. 3-17]). To overcome these challenges, the SJRRP trap and haul program was developed as a pilot study, with the main objective to study the feasibility of various locations, methods, and gear types in order to maximize capture efficiency of juvenile fall- and spring-run Chinook salmon.

The Program tested a variety of trapping methods including, screw traps, incline plane traps and V-screen temporary fence weirs. (See DFF, Appendix G.) All of the trapping methods performed poorly but it was determined that a weir type system was the most effective. (Id.) Weirs were installed at a series of trapping locations, from Highway 41 to downstream of Highway 145 Bridge, located near the downstream end of Reach 1. (SJRRP 2016). The temporary fence weirs were constructed nearly bank to bank and consisted of wire mesh panels supported by t-posts. (Id.) Fish would then enter a collection box by way of a V-shaped passageway that prevents fish from exiting. The collection box was checked daily and any fish species other than Chinook salmon would be released immediately downstream of the weir. Chinook salmon would then be transported by truck to the release site at the downstream end of the Restoration Area (i.e., the confluence of the San Joaquin and Merced rivers). (Id.)

During the three years since reintroduction commenced, 1,188 wild juvenile Chinook salmon were captured in 2014; 625 were captured in 2015; and 2,010 were captured in 2016. Capture rates during individual releases were estimated to range from about 30 to 40 percent using PIT tagged fish (70 mm in length). (Portz 2016, SJRRP 2016.) However, the overall capture efficiency (survival from emergence and capture at the trap) of the trapping program was extremely low. For example, during the fall of 2015, a total of 202 fall-run Chinook salmon redds were counted and subsequent juvenile production was estimated to be approximately 111,000 fry (based upon egg to emergence survival studies). (Castle et al. 2016b.) When considering the number captured and transported during 2015 (n=625), this results in a 0.5 percent capture efficiency. Overall capture efficiency during 2014 was slightly higher, with 1.5 percent of the total estimated juvenile population captured and transported downstream (Castle et al. 2016a). Furthermore, the majority of fish captured at the weir during 2014 and 2015 were non-salmonids, 22,872 and 35,101 respectively. Non-salmonid species were composed of several species of sunfish (bluegill, redear, and green sunfish), black bass, crappie, and Pacific lamprey with only one of those species (Pacific lamprey) being native to the basin. Of those non-salmonid species collected, black bass dominated the catch and gut content samples showed that salmon were a targeted food source. Analysis of stomach contents showed that 38 percent of fish consumed by sampled bass in Reach 1 were salmon, although salmon only represented approximately 5 percent of the catch at the nearby weir. It is unclear if ‘in-trap’ predation is a major factor inhibiting juvenile salmon survival, although directors of the pilot program noted

ECRMC-6

that low capture efficiencies suggested that "improvements could be made by determining methods to better retain salmon once captured." (Portz 2016.)

A review of the literature on other trap and haul programs shows that while such programs can produce equal or better survival rates compared to in-river migration, capture efficiencies are notoriously low. In a review of a trap and haul program on the Willamette River, Keefer et al. (2012) noted that capture efficiencies using rotary screw traps ranged from 0.8 to 7.6 percent, on average, depending on location and were sometimes as low as 0.0 percent. A study conducted by Ebel et al. (1973) on the Columbia River, where the largest juvenile salmon trap and haul program is operated, showed capture efficiencies ranging between 2.5 and 5.7 percent. In addition to being technically challenging, trap and haul programs require a substantial amount of time and resources, and the effectiveness of the program can be influenced by many outside factors that are difficult to control (i.e., time of year, river discharge, temperature, fish condition, and/or predation). Several inherent problems with trap and haul programs were highlighted in Appendix G of the Fisheries Framework: 1) adults transported as juveniles have higher stray rates than fish that migrated in river; 2) there may be delayed mortality associated with transported fish; 3) riverine conditions have a large effect on the success of the transportation program; and 4) the act of transportation may be placing selective pressures on the species that are not well understood. (DFF, Appendix G.)

The Draft Fisheries Framework notes that trapping efficiencies observed in the pilot program from 2014 to 2016 "were not high enough to successfully support a population level benefit." (DFF, p. 3-19). The low number of Chinook captured could be the result of low production and survival, low capture efficiency, or a combination of the two. Some potential issues leading to lower capture efficiencies is the fact that the weirs were not always constructed to reach from bank to bank and the mesh size (i.e., 0.5 inches) used for the fence is large enough to allow salmon fry to pass through. (Portz 2016.) The mesh size was selected to limit the amount of debris build up on the weir, but essentially neglects an entire life-stage of juvenile salmon that may make up a large proportion of outmigrants in the San Joaquin River. (Lindley et al. 2004, McReynolds et al. 2007.) Furthermore, several studies note that the abundance and size of predator species at both the capture and release site may substantially reduce the number of Chinook captured and their survival post release. (Dawley et al. 1992, Buell 2003, Zamon et al. 2013.)

As noted in Appendix G of the Fisheries Framework, a properly designed juvenile fish collection facility should be equipped with sorting facilities to remove larger predatory fish from the system. Additionally, if collection facilities concentrate predators or increase their habitat, then control measures should be implemented as needed. Don Portz, one of the directors of the trap and haul program, noted at the 2016 SJRRP Science Meeting that predation was a major concern but was not currently being addressed. Available information regarding trap and haul programs in general and for the Restoration Area in particular indicate that such programs, which are costly, demonstrate that juvenile trap and haul for the Restoration Area may not be technically feasible.

*Achievement of the Restoration Goal Cannot Be Accomplished Without Addressing Basin Wide Stressors*

Stressors, as defined by the Draft Fisheries Framework, are physical biological or ecological conditions that "limit or inhibit the attainment, existence, maintenance, or potential for desired conditions…" (DFF, p. 2-15). Program biologists identified and ranked a total of 31 potential stressors that may serve as limiting factors in self-sustaining runs of fall-run and spring-run Chinook salmon in the Restoration Area. (See DFF, Appendix B.) The stressors were assigned to several categories including adult migration, adult holding, spawning, egg survival and emergence, juvenile rearing - migration, and ocean phase. Ultimately, the Program identified a handful of focal stressors within these categories and concluded that, "removing passage barriers, protecting juveniles from entrainment, creating floodplain habitat and providing flow to the river will go a long way toward creating conditions suitable for both spring-run and fall-run Chinook salmon." (DFF, p. 2-17). Following the year 2019, the Draft Fisheries Framework anticipates that the only 'critical' stressors remaining will be high water temperatures and predation, primarily due to the assumption that certain channel and structural improvement projects identified in the Settlement will be implemented which eliminate passage barriers and protect juveniles from entrainment. (See DFF, pp. 2-7 – 2-18.)

While it is certainly important to identify and attempt to ameliorate these stressors within the Restoration Area, the SJRRP does not currently address or does not fully appreciate that these stressors are limiting factors throughout the entire San Joaquin River downstream of the Merced confluence and in the Sacramento-San Joaquin Delta. In other words, any Chinook salmon that do make it out of the Restoration Area (whether volitionally or by trucking) will still face all of these issues, and potentially, to a greater degree than they do in the Restoration Area. Given the challenges that extant salmon populations currently face in the Lower San Joaquin River, the Delta, and the ocean, these overarching issues should receive more attention from the SJRRP to achieve the Restoration Goal. It is recognized that the SJRRP itself does not have responsibility or capacity to resolve any of the large-scale stressors outside the Restoration Area. However, it is important to incorporate the current and accurate knowledge of those stressors into the planning process of the SJRRP.

For this reason, we focus on a handful of large-scale stressors to spring-run and fall-run Chinook salmon outside the Restoration Area that may severely limit the attainment of reintroduction objectives. It should be noted that this list is not exhaustive, but focuses on stressors that are currently highlighted in the Draft Fisheries Framework itself (i.e., largely focused on the Restoration Area) or ones that have received significant attention in terms of research or regulation in the last decade. For each large-scale stressor, we describe relevant research and findings, how those findings may impact SJRRP goals, and how the SJRRP could adequately address each, if possible.

A Substantially Altered Delta and Central Valley

The San Joaquin River basin and Delta have undergone considerable changes over the past 150 years. (Simenstad and Bollens 2002, Cowin and Bardini 2012, Null and Viers 2012.) The river has become more channelized due to levees and impoundment infrastructure, which has subsequently affected natural processes within the basin including floodplain inundation, flow variability, turbidity, sedimentation, and water quality. (McEvoy 1986, Yoshiyama et al. 1998, Kondolf et al. 2001, Yoshiyama et al. 2001.) Floodplain habitat is nearly nonexistent in the Delta and lower San Joaquin River and there is an overall lack of quality rearing habitat for native species such as Chinook salmon. (Williams 2006.) Creation of more quality rearing habitats cannot be created with increased flows alone and would require that levees are set back, which is cost prohibitive and not feasible on a large scale. (Cowin and Bardini 2012, Eisennstein and Mozingo 2013.) Furthermore, the floodplains that are available generally lack the warmer temperatures, shallow depths, and open sunlit areas that make floodplains productive, and as a result, the benefits of floodplain restoration for fish are very limited. (Zeug 2016.) In addition, the vast amount of levee, water conveyance, and storage infrastructure prohibit functions such as channel mobilizing flows, food web stimulation, riparian habitat, and creation of other habitat beneficial to native fish species. (Williams 2006; Junk et al. 1989; McEvoy 1986.) As a result, the lower San Joaquin River and Delta is home to a highly altered fish community, which can exert substantial pressure on native species, including salmon. (Williams 2006.) ECRMC-7

Unsuitable Water Temperatures

The Draft Fisheries Framework includes high water temperatures as one of the primary stressors for both the juvenile and adult life stage for both runs of Chinook salmon. (See DFF, p. 2-18.) Temperatures in the Restoration Area as well as elsewhere in the lower San Joaquin River and Delta are currently (and are projected to remain) higher than EPA standards. The Draft Fisheries Framework states that temperature objectives are "theorized to be met upon completion of all habitat projects and full implementation of Restoration Flows." (DFF, p. 3-14.) However, temperature modeling conducted by the Program shows that "after April, […] water temperatures in the lower river are likely remain above Chinook salmon temperature thresholds" (Id.) Additional flow is not likely to substantially reduce water temperatures for fish outside of the Restoration Area because water temperatures in the basin are primarily driven by ambient air temperatures and are not largely impacted by flow releases. (Monismith et al. 2009, Wagner et al. 2011, Nelson et al. 2012.) Water temperatures in the lower San Joaquin River are currently being exceeded during the tail end of the juvenile salmon migration (i.e., May-June), although they generally decrease as river flow increases up to approximately 2,500 cfs. (SRFG 2004.) However, increasing river flows above approximately 2,500 cfs during these months provides no additional benefit in terms of reducing water temperatures at Vernalis or at locations further downstream in the San Joaquin River and Delta. Furthermore, potential issues in relation to increased water temperatures are expected to arise in the future due to climate change. (Cayan et al. 2008.)

Interacting Factors Cause Poor Survival

While it simple and convenient to blame nonnative fish (e.g., namely striped bass) as the major cause of juvenile Chinook mortality, poor survival of migrating juvenile salmonids results not just from one species or poor environmental condition, but a host of interacting factors. These factors interact to mask the 'symptoms' and the 'underlying causes' of poor survival. Fully understanding all of the intricacies of these relationships would be an impossible task, but recent survival studies and predation studies in the San Joaquin River and Delta in the last decade provide some basic information to better understand this particular problem.

Using a bioenergetics approach, Lobschefsky et al. (2012) estimated that striped bass consume 25,000,000 kg of fish per year in the Delta. Using simple calculations, it can be inferred that if every juvenile Chinook salmon in California (both hatchery and wild) from a single brood year were consumed by striped bass that would still only make up 1% of the striped bass dietary needs. Recent research in the San Joaquin River has utilized a variety of methods to understand the predation dynamics of four common and abundant species: striped bass, largemouth bass, white catfish, and channel catfish. (Smith 2016.) Over two years of surveys, the researchers removed and relocated a total of 2,872 predators. Based on densities estimated from that study, and using simple expansions of the study area, it was estimated that there was a population of approximately 10,000-37,500 striped bass and 5,000-15,000 largemouth bass in the 25 km study area downstream of Mossdale. The researchers estimated that in roughly 2 days, the population of striped bass consumed approximately 25-100 smolts per km and the population of largemouth bass consumed approximately 5-10 smolts per km. (Michel 2016.) Extrapolating these consumption estimates out to the entire study area translates to a consumption rate of approximately 781 smolts eaten per day by striped bass and 94 smolts eaten per day by largemouth bass over the entire 25 km reach. Over a longer time scale, the estimated number of smolts consumed by striped bass alone in a period of 90 days is 70,313. It should be noted that the distance from Mossdale to Chipps Island (at the western edge of the Delta) is over three times this length. Approximately similar levels of predation have been observed elsewhere in Delta tributaries. (FISHBIO 2013, Sabal et al. 2016.)

Predation is a demonstrated 'limiting factor' in the basin, and the Draft Fisheries Framework predicted it was one of only two stressors (along with temperature) that would remain a critical issue after 2019. (DFF, p. 2-18.) However, the Program has not made any plans for a predator removal program in the Restoration Area and even if such a program were to be implemented, juvenile Chinook salmon would still face severe predation pressure in the lower San Joaquin River and delta. The Draft Fisheries Framework estimates that through-delta survival will increase from the current 5-7 percent to 31-38 percent in the next 40 years (DFF, p. 2-13), and to some degree, the Draft Fisheries Framework is reliant on these highly optimistic survival scenarios to ensure success. However, the Fisheries Framework acknowledges that these survival estimates are "highly influenced by factors outside of the Restoration Area over which the Program has little or no control." (Id.) With low survival already demonstrated in and through the Restoration Area *and* low survival outside of the Restoration Area, there is a very low likelihood of meeting certain Program goals.

*The Draft Fisheries Framework Lacks an Approach to Unmanageable, Unforeseen, or Uncontrollable Issues within and outside the Restoration Area*

It also needs to be stated that the Draft Fisheries Framework does not currently discuss contingency plans or decision-making processes in the event of potential catastrophic events (e.g., major disease outbreak, fish kills, etc.) or unforeseen issues such as those previously discussed that limit abundance or productivity. In most of the planning process, it has been assumed that abundance and productivity will continually improve and 'ratchet' upwards. However, it does not appear that the planning has incorporated discussions about 'what if' scenarios, and in particular, for the situation of low abundance of adults or for periods of declining productivity. For example, how will adult Chinook salmon be spawned in the SCARF if very few return – what measures will be taken to maintain genetic diversity within the population? A discussion on what measures will be taken, how long they would be carried out (e.g., 1 year, 5 years, 10 years?), and how those decisions will be made would be a valuable addition to the Draft Fisheries Framework. ECRMC-10

**<u>Specific Comments</u>**

Executive Summary

ES-1. The third paragraph discusses direction on reintroduction provided by Settlement Paragraph 15 and states that the Settlement "does not establish a process for achieving natural reproducing and self-sustaining populations, nor does it establish specific, sequential objectives that lead toward this goal, such as biological and habitat objectives, necessary to achieve a naturally reproducing and self-sustaining population." The correct paragraph is Paragraph 14 of the Settlement and it is disingenuous to state that the Settlement does not establish or mandate specific, sequential objectives towards habitat objectives necessary to achieve reintroduction. While the Settlement may not provide biological objectives in the detail provided by the Draft Fisheries Framework, the Settlement does provide an overarching framework negotiated by the settling parties that establishes necessary channel and structural improvements to provide essential habitat and lays out a schedule of deadlines project completion and fish reintroduction that the parties deemed critical towards achieving the Restoration Goal. ECRMC-11

1. Introduction

1-2. Table 1a provides a schedule of key construction actions during each 5-year "Vision Period" and is a replicate of Table 1-1 in the Revised Framework for the SJRRP date May 2015. Being now in the middle of the first five-year period, the Draft Fisheries Framework should provide an update on whether the schedule laid out in Table 1a continues to be on track such that Reclamation foresees meeting the 2015-2019 deadlines. ECRMC-12

2. Program Fisheries and Habitat Goals and Objectives

2-1. Language in the first paragraph is identical to the language addressed in the comment above to ES-1.

2-3. Table 4 should be updated to include known numbers of juveniles released in 2014, 2015, 2016 and 2017. Footnote 2 indicates that the numbers in the table for these years are targets. Further, Table 4 indicates that there is still a presumption that broodstock may be sourced, as early as 2018, from Butte Creek and thereafter from Butte Creek, Deer Creek and Mill Creek, subject to approved permits. However, there is no indication that conditions that prevented broodstock originally from being sourced from these other populations have changed, particularly after recent years of severe drought. ECRMC-13

2-13. Section 2.1.3 briefly discusses goals for other fish species. The Draft Fisheries Framework states that an express goal of the SJRRP is to provide a functional system that supports other native fishes. Reclamation has acknowledged that the release of Restoration Flows and habitat improvements could attract and reintroduce other ESA-listed species to the Restoration Area such as Central Valley steelhead. Under the SJRRP, however, there are only 4(d) protections for water users in relation to reintroduced spring-run Chinook salmon. Reclamation's action to restore flows while failing to simultaneously improve in-river habit, in particular eliminating passage barriers and entrainment risks, exposes water users within the Restoration Area to increased possibilities of incidental take in a system not prepared for either intentional (Chinook salmon) reintroductions or unintentional reintroductions of other species. ECRMC-14

2-17. As noted above, the Draft Fisheries Framework expressly acknowledges that the highest priority stressors, on the reintroduction of Chinook salmon to the San Joaquin River, are directly addressed by the projects defined the Settlement. Failure to implement necessary improvements to the habitat of the San Joaquin River in a time-frame roughly contemporaneous with fish reintroduction is critical to achieving the Restoration Goal of the Settlement. As detailed in the General Comment above, the SJRRP has reordered this negotiated sequence to implement reintroduction of fish to the San Joaquin River long before establishing suitable habitat conditions. No Phase I or II improvement projects have been completed, and due to funding issues it is unlikely that the schedule presented in Table 1a will be met. The Draft Fisheries Framework should be revised to ensure that habitat conditions are suitable, meaning critical channel and structural improvements are completed, prior to forging ahead with fish releases. ECRMC-15

3. Program Implementation

3-27. Section 2.10.1.1.1 discusses the management measures that may be taken if an introgression rate of less than 2% cannot be maintained. One suggested action is to abandon the criteria and allow fish to develop the run-timing best adapted to the Restoration Area. On its own, without the implementation of other measures, this measure would allow an already compromised source population, FRFH spring-run Chinook salmon to further hybridize with ECRMC-16 fall-run Chinook salmon further jeopardizing the recovery of a distinct listed species and potentially threatening the vitality of native fall-run Chinook salmon populations as well. ECRMC-16

3-28. Section 3.10.1.3 discusses the management of spring-run Chinook salmon juveniles. It states that all hatchery origin juveniles will be ad-clipped and coded wire tagged allowing for easy identification of spring-run Chinook salmon at the Delta facilities. The section goes on to note that genetic sampling ***may be conducted*** on naturally spawning adults and juvenile offspring captured at these locations. Currently, rapid genetic testing is the only method being tested and implemented at the Delta facilities to identify spring-run Chinook. No other method has been developed and tested that could be implemented in the short term. Since natural reproduction in the Restoration Area commenced, on a limited scale, last year, Reclamation must have an established method and committed annual funding in place to continue genetic testing at the Delta Facilities in order to meet its obligations under the Settlement Act to cause no more than a de minimis impact to water users. Aside from the minimal discussion on page 3-28, there is no detailed discussion of identification of naturally-reproduced spring-run Chinook salmon as a component of the fisheries management actions guiding the reintroduction efforts. (See e.g., Appendix C, p. 7, discussing only the marking and identification of hatchery fish.) ECRMC-17

Thank you for the opportunity to comment. The Exchange Contractors look forward to continuing to work with Reclamation and others to ensure that the SJRRP is developed and implemented in a manner that meets feasible objectives and the needs of stakeholders.

Very truly yo urs,

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