Name	Address	Telephone #	E-mail Address	Affiliation
Ron Davis	P.O. BOX 6137 Oroville CA. 95966	530-532-0434	☺	

Comment:

Under NEPA the agencys must consider alternatives to their proposed action! One good alternative is to first have a river (with water). The salmon will colonize it just fine.

The stocks targeted for transfer have pathogens that kill dogs that eat of them. Your handouts mention when fish are to be caught for transfer, not [if].

It appears that the minds are made up. 1

If you want a good salmon run on the San Joaquin River [IF it is ever rehabilitated] you will need a permanant hatchery.

If the Dept. of Commerce wants the U.S.A. to be strong in international trade. (#) they will support hatcheries. If you continue playing pie in the sky games; Red China will be your master and they dont believe in genetic fairy tales (i.e. Feather River Spring Run Chinook)

they are all extinct

Name	Address	Telephone #	E-mail Address	Affiliation

Comment: The smolts from the needed San Joaquin River Salmon Hatchery must be trucked to the Bay Area for release — or the pumps will take them.

Your project will likely harm Northern California salmon populations.

(3)

1091aPC02

Name	Address	Telephone #	E-mail Address	Affiliation
Doug Latimer	617 Veterans Blvd. Suite 213 Redwood City, CA 94063	(650) 743-3408	doug@explorepublishing.com	Mill Creek Conservancy

Comment:

Mill Creek Spring Run Fish are totally unsuited genetically for the ~~[illegible]~~ San Joaquin River project. Over thousands of years they have adapted to enter their natal stream in spring, under cold water conditions, and quickly migrate to high elevations (2,500 to 5,400 feet) where cold water prevails through the summer and fall. They then spawn in the fall. (I own 1,630 acres on Mill Creek, from 1,000 to 1,400 feet in stream elevation. In over 40 years I have never seen even one Spring Run redd on my property.)

The San Joaquin environment would be totally alien to Mill Creek Spring Run fish. Spawning would only be possible to a maximum elevation of 500 feet, which would require Mill Creek fish to undo thousands of years of genetic adaptation in a single year. This is not possible, and will simply result in dead fish and failure.

Feather River hatchery ~~[illegible]~~ fish fit the genetic profile needed for the San Joaquin project, and are the obvious solution.

P.S. Mill & Deer Creek are <u>not</u> a "complex" and should not be listed as such!

10a1aPC03

Name	Address	Telephone #	E-mail Address	Affiliation
DENNIS FOX	918 Blossom BKSFLD 93306	6613664093		COHA.

Comment:

1 I would suggest immediately raising Friant:
- Land flooded is already owned,
- This increase could be salmon dedicated

2 Regarding Temperance Flat dam it should be determined where the planned Temperance Flat campground is to be sited,

3 Planning for the management of arundo donax (a weed, not a restaurant chef of Greek cuisine) will be vital.

R. JUDD HANNA
CIRCLE Ⓢ RANCH

RECEIVED
FEB 15 2011
EFS
NAT'L MARINE FISHERIES SVS.
SACRAMENTO, CA
00081

Feb 9, 2011

NOAA
SJRSpring.Salmon@NOAA.gov

Elif Fehm-Sullivan
Protected Resources Division
National Marine Fisheries Service
650 Capitol Mall # 5-100
Sacramento, CA 95814-4706

RE: Enhancement of Species Permit for the Reintroduction of Spring-run Chinook Salmon to the San Joaquin River

Thank you for coming to Chico; I'm sorry your arrival was not met with hospitality and warmth. Five days notice and the wrong meeting day on the notice were factors. However, the subject matter – restocking a dead river with a Federal and State listed Threatened species of salmon from Mill Creek - was really to blame. I usually have a great deal of respect for governmental organizations like DFG, NOAA, USFWS, NPS, NMFS, BOR, etc because you do honest and good works. Not so in this case. You lost a lawsuit and now you are padding your jobs with a horribly expensive experiment. Government has run amuck!

As I said last Thursday, I live in a zip code with eight permanent residents; we usually have about that number of spawning Spring Run Salmon in the entire zip code and you want to come up here and suck up their redds with a vacuum! My family's ranch constitutes the upper most stretch of salmon spawning habitat on the creek – the last three miles before Lassen Volcanic National Park – all above 5000 feet elevation. Over the last 25 years we have had counts in the entire spawning stretch - above 2500 feet elevation - as low as 61 and 89.

1. You have it backwards – prove that you can fix the habitat and then reintroduce the fish. Your mandate calls for fish in 2012 and water flows to support them in 2014.

2. The one person who is an authority on Mill and Deer Creek's Spring Run was never consulted by your "interagency team of experts": Colleen Harvey of DFG. I can't speak for her – but I'll bet she would call your scheme less than well thought out.

3. These fish are at risk of extinction; your scheme will guarantee it. Is this a legitimate taking?

(530) 595-4493 • Fax (530) 595-4490
40652 Hwy. 36E • Mill Creek, CA 96061
juddhanna@aol.com

4. Rhonda Reed of NOAA/NMFS stands by her public comment: "above all, there is a clear mandate that work to reintroduce salmon in the San Joaquin cannot harm existing populations elsewhere". I will hold her and her agency to that standard.

5. 15% of Mill Creek spawners is a big number and will certainly harm the population.

6. How do you address the Delta survival of these fish?

7. How do you guarantee the separation of spring run and fall run in such a confined area at 800 feet elevation below the Friant Dam or is your scheme content with hybridization?

While I applaud the restoration of the San Joaquin River, I am beginning to understand the Tea Party's mentality: get your government off my freedoms; bring back some common sense; we have too many lawyers and too many government employees. The tax payers are saying "enough"! The evidence suggests that they just may be correct.

Needless to say, I am in opposition to your permit. Use fish from other sources (hatchery) until you can prove the viability of San Joaquin River. Until Spring Run Chinook populations are healthy and delisted, I will oppose your permit and your project.

Respectfully,

R. Judd Hanna

CC: Burt Bundy, President, Mill Creek Conservancy
Monty Schmitt, NRDC
Neil Manji, DFG
Dr. Mark Hanna, PhD, PE
Rhonda Reed, NOAA, NMFS
Stephanie Rickabaugh, USFWS

R. JUDD HANNA
CIRCLE Ⓢ RANCH

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Elif Fehm-Sullivan
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R. Judd Hanna

CC: Burt Bundy, President, Mill Creek Conservancy
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Mill Creek Conservancy
40652 Highway 36 E
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Elif Fehm-Sullivan
Protected Resources Division
National Marine Fisheries Service
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SJR Spring.Salmon@noaa.gov

February 14, 2011

Subject: Mill Creek Conservancy opposition and concerns of any use of Mill Creek wild Spring-run Chinook Salmon for the San Joaquin River Settlement Agreement Project

Dear Ms. Fehm-Sullivan,

Mill Creek Conservancy organization and position

The Mill Creek Conservancy is a 501-c3 organization dedicated to the continued preservation of the Mill Creek Watershed Ecosystem. Our non-profit organization is a group of landowners, members of the local community and others committed to the protection of the Mill Creek watershed for future generations. In our nearly 20 year history we have devoted thousands of volunteer hours to the goal of understanding the dynamics of resource planning and management and working for long term improvement and protection of this unique and important watershed. Our diverse group of landowners, neighbors, and various agencies have worked together over these past numerous years to benefit the distinct natural and cultural values that are contained within our treasured watershed, including very specific efforts for the survival of the wild Mill Creek Spring-run Chinook salmon, steelhead and other wildlife.

Some of our successful actions to protect and enhance our wild spring-run Chinook Salmon include:

- Initiated AB 1413 to protect Mill and Deer Creek from additional dams or water impoundments
- Initiated, completed and have continued to implement the Mill Creek Watershed Management Strategy with the help of the community, numerous public agencies and other resource protection groups
- Partnered with local landowners, The Nature Conservancy and Los Molinos Unified School District on several riparian vegetation restoration and enhancement projects
- Coordinated with local Department of Fish and Game wardens on a Spring-Run Salmon Protection Program specifically for Mill Creek

- Secured funding for feral cow removal in sensitive spring-run Chinook Salmon holding, spawning and rearing areas on Mill Creek
- Supported Water Exchange Agreements for fish passage flows in lower Mill Creek
- Secured Federal Bureau of Reclamation grant for Lower Mill Creek Restoration Flow Management Agreement, completing a CalPoly Water Use Efficiency Study, a Department of Water Resources groundwater conjunctive use study and a Department of Fish and Game Surface Flow Criteria for Salmon Passage Study
- Pursuing the purchasing of water rights to be used for the benefit of Chinook flows in Mill Creek
- Supporting Conservation Easements on Mill Creek that limit development and activities that could be harmful to the habitat quality
- Assisted with Dr. Matthew Kondolf with Fluvial Geomorphic study of Mill Creek
- Support Department of Fish and Game Spring-Run Chinook monitoring activities and funding for Mill Creek

These actions are proving beneficial to ensuring survival and productivity of our salmon resource in the Mill Creek Watershed. We therefore oppose any efforts by any individual, group or agency that could compromise wild Mill Creek Spring-run Chinook Salmon.

We have reviewed the numerous documents that have been provided regarding this issue. It is very disturbing that a lawsuit and settlement regarding a specific environmental issue that is hundreds of miles from Mill Creek and completely unrelated to it, proposes solving a portion of San Joaquin watershed problem by extracting a protected endangered species from our watershed.

The Mill Creek Conservancy has been partners with the California Department of Fish and Game, U. S. Bureau of Land Management, Lassen National Forest, Department of Water Resources, Lassen Volcanic National Park, California Department of Forestry, The Nature Conservancy, The Tehama County Natural Resource Conservation Service, Pacific Coast Federation of Fishermen's Association, Los Molinos Mutual Water Company, Los Molinos Unified School District, U. S. Bureau of Reclamation, Spring-Run Work Group, Sierra Pacific Industries and many other organizations. We have worked directly with the U. S. Fish and Wildlife Service on several projects to improve Mill Creek Spring-run Chinook Salmon and steelhead habitat. We are deeply concerned that our precious and imperiled population of wild salmon are proposed to be utilized in a manner that could threaten their survival in their natal habitat, Mill Creek.

No scientific documentation or potential mitigation measures provided in these documents that offers any comfort to the Mill Creek Conservancy. All our efforts over the years could be for naught if this misguided long-distance raid on our natural heritage is carried out. With all due respect for the attempt to improve the situation in the San Joaquin River, depleting Mill Creek's run of wild Spring-run Chinook Salmon is a monumentally wrong-headed solution to your predicament. Numerous public agencies, studies, grants and earnest enterprise by countless individuals have been committed to the preservation of the wild Mill Creek Spring-run Chinook Salmon. How can a responsible public agency suggest a proposal that is so contrary to the stated goals of the U. S. Fish and Wildlife Service Anadromous Fish Doubling program, which has sought to increase the wild Mill Creek Spring-run Chinook Salmon population but as yet has not come close to meeting that laudable aim?

The Mill Creek Conservancy Board of Directors has met regarding this issue and several Board members made presentations at the Public Workshop held on February 3, 2011 in Chico, California. Our voice is loud and clear. You must seek and secure alternatives to your proposal of utilizing wild Mill Creek Spring Run Chinook Salmon. The proposed San Joaquin River habitat will not sustain Mill Creek Spring Run Chinook Salmon that primarily spawn in protected habitat from 2,700 – 5,200 feet in elevation. The project documents are woefully deficient on numerous topics discussed further in this letter that would also impact the survival of any relocated Mill Creek fish. Therefore your agencies should not be allowed to take any eggs, smolts or adult fish from Mill Creek endangered stocks.

Settlement

NOAA, FWS, BOR, DFG, the attorneys for the San Joaquin settlement, or another appropriate party should have coordinated with the Mill Creek Conservancy and other "donor" watersheds before designing a terminally flawed solution dependent upon a source that is at risk of extinction in it's natal habitat. In fact it is very disturbing that neither the Mill Creek Conservancy nor other "donor" creek representatives were invited or present at the April 28, 2010 meeting regarding this project.

The Mill Creek Conservancy is opposed to the wild Mill Creek Spring-run Chinook Salmon being utilized as an "experimental population." We have worked hard for decades to ensure that wild Mill Creek Spring-run Chinook Salmon remain genetically pure, unmolested by humans and given the best opportunity to thrive in their native watershed. The San Joaquin's long, convoluted lawsuit and eventual settlement should not include a remedy from a totally unrelated party, namely our wild Mill Creek Spring-run Chinook Salmon.

On page 6, section 7, line 17 – 19 of the Notice of Lodgment of Stipulation of Settlement it states that "The Parties neither intend or believe that the implementation of this Settlement will have a material adverse effect on any third parties or other streams or rivers tributary to the San Joaquin River." However the Settlement did not consider the potential material adverse effect to the donor fish population. The Mill Creek Conservancy believes that this proposed implementation of the Settlement could have a materially adverse effect on our wild Mill Creek Spring-run Chinook Salmon and therefore would not be considered for use in this project.

CEQA / NEPA, "Reintroduction Strategies" document

Why are there no CEQA or NEPA documents with the "Enhancement of Species Permit Application? You need to address appropriate alternatives and not just the stated plan that would take fish before the necessary habitat conditions are secure and determined adequate for wild Spring-run Chinook Salmon survival. ***How can you have a Permit Application prior to the preparation of a NEPA document?***

It is also disturbing that the "Reintroduction Strategies" has only a draft outline and is not available for public review at this time. These documents should be included in your permit process. Calling your project an "Enhancement of Species" does not encompass the potential adverse and devastating impacts to the donors continued existence in their native habitat.

Enhancement of Species Permit Application

This Enhancement of Species Permit Application will have an adverse impact to an endangered species, namely the wild Mill Creek Spring-run Chinook Salmon. That is of paramount concern to the Mill Creek Conservancy. You need to secure an experimental salmon population for the purposes of reintroduction that does not involve using threatened wild Mill Creek Spring-run Chinook Salmon populations and putting them at further risk of extinction.

Our current fish population is well below any level that could even conceivably justify any "donation or taking" of our wild Mill Creek Spring-run Chinook Salmon. Page 77 of the permit application clearly indicates that the wild Mill Creek Spring-run Chinook Salmon has never met the AFRP production target in 17 years of monitoring, and that in fact there has been a 40% reduction in the average population in the noted time period. It should be abundantly clear from this that wild Mill Creek Spring-run Chinook Salmon are not currently or in the foreseeable future a candidate donor to the San Joaquin project.

As figure 10 on page 78 indicates, the natural production of the wild Mill Creek Spring-run Chinook Salmon is at its lowest point in 16 years. The target AFRP population is 4,500 fish, but only 362 were counted in 2008 and 220 in 2009 (page 98). Therefore we should not be included in this program that will threaten our precarious fish population. How can you even suggest that wild Mill Creek Spring-run Chinook Salmon be used since we have never come close to meeting the USFWS population target since fish have been counted?

Also, our fish should not be grouped with Deer Creek stock as mentioned on page 96 of the permit application. Numerous sources indicate that wild Mill Creek Spring-run Chinook Salmon are distinct both genetically and phenotypically, from other Spring-run Chinook stocks in the Central Valley. Mill Creek is generated from the southern slopes of a 10,500 foot volcano with an annual snowpack, natural springs and undisturbed, protected habitat that other spring-run Chinook streams don't have and can not replicate. Mill Creek's wild Chinook evolved to maximize survival in these unique habitat attributes of our watershed. This difference should be protected from dilution and distress.

Draft Stock Selection Strategy

The Draft Stock Selection Strategy, Draft 2010 should also be completed prior to any decision is made regarding this important topic. The risks and uncertainties for the entire program are huge and do not warrant the use of any life stage of wild Mill Creek Spring-run Chinook Salmon. Table 6-4 on page 6-9 is inaccurate in the depiction of the status of wild Mill Creek Spring-run Chinook Salmon. It is over simplified and is in direct conflict with other agencies' determinations regarding the risk of extinction. As stated in this same report on page 7-2, lines 29 – 30: "**For the past two years the Deer and Mill Creek adult escapement estimates have been below the 250 threshold that puts them at high risk of extinction**." Please heed these facts and their serious warning. Do not use wild Mill Creek Spring-run Chinook Salmon for your donor stocks. This would be an irresponsibly dangerous squandering of a precious natural resource that we have worked very hard to protect.

Separation of Runs

What measures are in place to ensure genetic isolation of introduced spring-run Chinook with other Chinook runs? Specifically, how will late arriving Spring Run Chinook salmon be separated from early arriving Fall Run? Will these measures be implemented prior to fish introduction and full settlement flows releases?

Hybridization issues

How will any of the donor stocks be protected from hybridization?

Hatchery concerns

Since there is no hatchery on Mill Creek for salmon, steelhead or trout we are very concerned about impacts to our native, wild fish from Mill Creek. There are no planted fish on Mill Creek either. There is a concern that some hatchery fish may return to Mill Creek and have the potential to contaminate our native, wild fish in Mill Creek.

Delta Survival

What measures are being proposed to ensure that the reintroduced San Joaquin salmon will survive in the Delta? Are these fish being raised just to meet a court order but will have no chance of survival in the Delta, ocean or in the lower San Joaquin River designated (not actually proven) spawning area?

Required water flows and temperatures

It seems prudent to study the San Joaquin watershed's condition once the legally required flows are secured and maintained for several life cycles of the Spring-run Chinook Salmon. Perhaps 20 years of the additional flows could provide an indication if the water temperatures would be sufficient to support Spring Run Chinook salmon. The Mill Creek Spring Run Chinook Salmon have very specific water temperature requirements from the Mill Creek watershed and Lassen Volcanic National Park. How can the San Joaquin River provide an appropriate water climate for the wild Mill Creek Spring Run Chinook Salmon. The wild Mill Creek Spring Run Chinook Salmon habitat includes a very distinct water chemistry that orientates directly from Lassen Volcanic National Park that the fish utilize to navigate back to their natal stream. How can the Reintroduction project utilize the wild Mill Creek Spring Run Chinook Salmon given their specific habitat and water requirements. Have any studies been performed to determine the potential impacts from climate change on this proposal?

Habitat restoration

When will habitat restoration of proposed spring Chinook habitat be completed? Has a survey been completed to ascertain if adequate spawning gravel exists in the riverbed? Has funding been secured for continual gravel supplementation, even after full restoration has been completed? How much shaded riparian habitat is being proposed? How will interfacing with humans be minimized when the proposed spawning area is in a flat exposed area?

Different Options, Approaches and Concerns

The risks are entirely too great at this time given the lack of protection for any Mill Creek Spring run Chinook salmon to be utilized in this endeavor. The wild Mill Creek Spring-run Chinook Salmon are celebrated as holding and spawning at the highest elevation (5,000') in California, if not North America. The Mill Creek watershed is protected by public land ownership over 50% of the land area, numerous volunteer conservation easements on private land and the majority of the watershed is very remote without road access. Our watershed and creek are distinctly different from the San Joaquin river system. There is no analysis regarding this difference and how it would impact the chance of survival of wild Mill Creek Spring-run Chinook Salmon in the "hot, flat and crowded " environs of the San Joaquin River. It is hard to imagine the **geo-shock** that would occur to any species relocated to such a seemingly hostile environment given the current condition of the Mill Creek watershed. There is no justification of using wild Mill Creek Spring-run Chinook Salmon in the San Joaquin River project due to the mountain of risk to our endangered species that is currently at very low numbers.

The Mill Creek Conservancy recommends that you:

- Secure and complete the legally required flow restoration
- Reintroduce water to the San Joaquin River
- Reestablish riparian vegetation and complete habitat restoration
- Study and monitor water temperatures, flows, chemistry
- Study and monitor riparian vegetation
- Study and monitor any salmon that return to the restoration area over several salmon life cycles

Then, and only if the conditions warrant fish survival, consider utilizing nearby hatchery fish.

The Mill Creek Conservancy hopes that these valid concerns and questions are heard by your agencies and that additional efforts are made to seek a more prudent course of action to promote fish in the yet to be restored San Joaquin River.

Respectfully yours,

Burt Bundy

Burt Bundy, President
Mill Creek Conservancy

Monty Schmitt, NRDC
Neil Manji, DFG
Dr. Mark Hanna, PhD, PE
Rhonda Reed, NOAA, NMFS
Stephanie Rickabaugh, USFWS

February 18, 2011

Elif Fehm-Sullivan
Protected Resources Division
National Marine Fisheries Service
650 Capitol Mall #5-100
Sacramento, CA 95814-4706

Re: Enhancement of Species Permit for the Reintroduction of Spring Run Chinook Salmon to the San Joaquin River

As a Mill Creek Conservancy board member I enthusiastically support the effort to reintroduce salmon to the San Joaquin River. However, I strongly oppose any removal of Spring Run Chinook Salmon from Mill Creek for that purpose.

I'd like to preface my specific comments with a simple story from my youth. I first encountered fish and fishing at age nine, living in rural New Jersey. Stony Brook, the nearest trout stream, was about ten miles away, and I would often hitchhike to it (then safe to do), proudly bringing home any trout I caught for Mom to cook for dinner.

Near my house was a patch of woods, on the other side of which was a factory that made shiny little metal gears that were pretty to look at. My friends and I would comb through their reject piles, bringing home the shiniest pieces as "treasure."

A tiny brook wove from the factory site and then through the woods before vanishing into a culvert under the street. Knowing that the trout I caught in Stony Brook were hatchery fish, I decided to stock "my own" little stream in the woods. After making weirs to seal off a small section, I took a pail along on my next visit to Stony Brook.

My trip was successful. I brought back a nice healthy trout, placed it carefully in my little stream and went home for dinner. The next morning I raced eagerly back to check my fish, only to find it—to my consternation—floating belly up. I was surprised it had died, but eventually learned that trout need cold, clean water to survive. Not only was the water in my brook too warm, but also contaminated by oil and acids from the factory. Despite my good intentions, putting a trout into that environment was a death sentence.

Transplanting Mill Creek's wild Spring Run fish to the San Joaquin River, without access to the cool, shaded, high elevation holding and spawning pools they require, will be no different. They will simply die.

Sincerely,

Douglas H. Latimer

Date: 2/18/11

To: Elif Fehm-Sullivan, National Marine Fisheries Service

From: Douglas H. Latimer, Mill Creek Conservancy

Subject: Opposition to Use of Threatened Mill Creek Chinook Salmon for San Joaquin River Salmon Reintroduction Project

As a long-time landowner on Mill Creek and member of the Board of Directors of the Mill Creek Conservancy, I am committed to protecting the pristine quality of our watershed and the integrity of its wildlife. Commendable as it may be to attempt reintroducing salmon to the San Joaquin River, there are irrefutably compelling reasons against depleting Mill Creek's fragile wild Spring Run Salmon population to achieve that end. No further consideration should be given to doing so.

1. Imperiled Species: Mill Creek's Spring Run Chinook Salmon population has declined from historic runs above 2,500 to such low levels that even 400 fish are now deemed a "good" year. But putting "good" in context, geneticists would quickly define a spawning population of such small size as one in imminent danger of extinction. Consequently the taking of even 1% of Mill Creek's fish for the San Joaquin experiment would be highly irresponsible—much less the potential taking of up to 15% as stipulated in the current plan.

2. Premature Introduction: The current San Joaquin plan mandates reintroducing salmon prior to reestablishing appropriate water flows and other conditions critical for salmon survival. Any fish introduced under these circumstances will inevitably experience extremely high mortality rates. It would be totally unacceptable to expose Mill Creek's already threatened stock to this risk.

3. Genetic Unsuitability: Mill Creek's wild Spring Run Salmon have adapted over the millennia to entering Mill Creek in the spring, passing immediately through the low elevation valley floor and climbing to their spawning grounds at altitudes ranging from 2,500 feet to 5,400 feet. The yearlong cold, spring-fed water, abetted by protective canyon walls and forest-shaded watershed, enables the fish to hold throughout the summer, spawning in the fall. The fact that virtually the entire spawning area is within the roadless Ishi Wilderness area also protects from poaching and/or other human disturbances.

Mill Creek's fish are genetically unsuited for survival in the San Joaquin's diametrically opposite environment, where the fish will be unable to climb higher than 800 feet in search of cold water, where there will be few if any shaded pools in which to hold over the summer, and where road access will expose them to poaching and other human/suburban hazards.

4. Hybridization: Existing conditions in the lower San Joaquin watershed will lead to swift hybridization of Spring and Fall Run Chinook due to overlapping spawning grounds. On Mill Creek, thermal conditions create an impenetrable natural barrier between Spring and Fall Run fish. Fall Run fish spawn immediately upon entering Mill Creek, at elevations below 800 feet. Mill Creek's Spring Run fish spawn only at altitudes above 1,200 feet, and mainly above 2,500 feet. This guarantees lack of interaction between the two species.

   The situation in the San Joaquin will be totally different, with Spring Run fish (if any manage to survive) and Fall Run fish spawning randomly within the same geographically circumscribed area—from the river mouth to 800 feet in elevation. This unavoidable fact will lead to hybridization between the two species, and loss of the distinctive Spring Run genetics. Indeed, the unique genetic traits of Spring Run salmon directly militate against their survival in the San Joaquin, further increasing the risk of rapid hybridization. (Note: Mill Creek's Spring Run fish tend to spawn a few weeks earlier than Fall Run, with only a slight overlap in time. However the San Joaquin's different altitude, water temperature and other environmental conditions will influence the Spring Run spawning cycle in unpredictable ways. It is quite possible that Spring and Fall Run spawning could occur simultaneously, with wholesale interbreeding the result.)

   On a personal note, my property spans five-miles of Mill Creek running from a streambed elevation of 800 feet to 1,100 feet at the upper end. In 40 years I have seen no live Fall Run fish reach my property and only one carcass at the extreme lower end. I have seen only two live Spring Run fish, both of them sickly, near the upper end of my property. I have never seen a spawning redd of either species. This is pretty solid "boots on the ground" evidence that Mill Creek's thermal barrier keeps the two species at least five miles apart.

The best way to restock the San Joaquin with salmon, to steal a line from the film, *Field of Dreams*, would be "build it and they will come." Restore the flows, restore the habitat, and there's no question that salmon will soon begin returning on their own. Over time, assuming the many problems in the Delta impacting salmon mortality can be solved, the San Joaquin will again have a healthy run of wild fish.

Unfortunately this proposal is at odds with the timing mandated by the San Joaquin legal settlement. The next best alternative—the most effective and only responsible one—is to restock the San Joaquin with hatchery fish. They are best suited genetically to the task, and if they should fail then Mill Creek's fish would certainly have met the same fate—but not at the cost of losing an irreplaceable resource.

Thank you for your consideration. I'm confident that intelligence, facts and logic will ultimately lead to the correct decision.

Sincerely,

Douglas H. Latimer

Mark Hanna, PhD, PE
760 Loma Drive
Hermosa Beach

Elif Fehm-Sullivan
Protected Resources Division
National Marine Fisheries Service
650 Capitol Mall # 5-100
Sacramento, CA 95814-4706
SJRSpring.Salmon@noaa.gov

February 24, 2011

Subject: Specific concerns of any use of Mill Creek wild Spring-run Chinook Salmon for the San Joaquin River Settlement Agreement Project

Dear Ms. Fehm-Sullivan,

As a landowner in the Mill Creek watershed, a fifth-generation Californian, and an environmental scientist, I am opposed to the use of wild Mill Creek Spring-run Chinook Salmon as an "experimental population" in the San Joaquin River. The reasons for this are:

1. There no CEQA or NEPA documents with the Enhancement of Species Permit Application;
2. The granting of an Enhancement of Species Permit Application for this project will have an adverse impact to an endangered species;
3. The "Reintroduction Strategies" contains only a draft outline and is not available for public review at this time;
4. The 2010 Draft Stock Selection Strategy should be completed prior to any final decision being made regarding this topic;
5. There are no protections for the donor stocks regarding hybridization;
6. There are no protections to ensure that the reintroduced San Joaquin salmon will survive in the Delta;
7. There are no studies of which I am aware that demonstrate if adequate spawning gravel or shaded riparian habitat exists;
8. No documents that I have seen give me a level of comfort of when Spring-run Chinook Salmon habitat restoration will be complete; and

9. I am aware of no studies that compare and contrast the differences in the physical, biological, and chemical make ups of these two, very different, systems regarding habitat for the Spring-run Chinook Salmon.

I hope that these issues are heard by your agencies.

Thank you for your consideration,

Mark Hanna, PhD, PE

Cc: Monty Schmitt, NRDC
Neil Manji, DFG
Rhonda Reed, NOAA, NMFS
Stephanie Rickabaugh, USFWS
Burt Bundy, MCC
Judd Hanna, MCC
Kerry Burke Hanna, MCC
Joss Hanna

R

NICKEL FAMILY LLC

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Sacramento, CA
SA00127

March 8, 2011

Protected Resources Division
National Marine Fisheries Service
650 Capital Mall, Suite 5-100
Sacramento CA 95814

RE: Comments of San Luis Canal Company to the U.S. Fish and Wildlife Service's 10(a)(1)(A) Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River dated September 29, 2010 and the Hatchery and Genetic Management Plan dated December 17, 2010

Dear Sir/Madam:

Nickel Family LLC has participated in your public forum, and reviewed the documentation on the above referenced project. As one of the third parties that are part of the implementing legislation for the San Joaquin River Restoration Program it is vital that we are engaged in the process.

We would like to reference and be on the public record as incorporating our comments in the above noted letter made on our behalf as members of both the San Joaquin River Exchange Contractors Water Authority and the S.J. River Resource Management Coalition. The letter is dated March 7, 2011 and signed by Tom Berliner of Duane Morris.

Thank you for the opportunity to comment and please call with any questions.

Sincerely,

James L. Nickel,
CEO/President

JLN/rrd

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DANIEL J. O'HANLON
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March 7, 2011

SENT VIA EMAIL AND U.S. MAIL

Rhonda Reed, Program Director
National Marine Fisheries Service
Protected Resources Division
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814-4708
SJRSpring.Salmon@noaa.gov

Re: Comments on the United States Fish and Wildlife Service's September 29, 2010, *10(a)(1)(A), Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River*

Dear Ms. Reed:

We submit these comments on behalf of Westlands Water District ("Westlands") and the San Luis & Delta-Mendota Water Authority ("Authority"), regarding the *10(a)(1)(A), Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River* ("Permit Application").

The Permit Application describes the processes that the U.S. Fish and Wildlife Service ("FWS") will follow during implementation of the proposed reintroduction of Central Valley spring-run Chinook salmon into the San Joaquin River. Specifically, the Permit Application describes how FWS will collect spring-run Chinook from existing populations (donor stock), raise a conservation stock (cultured fish), and reintroduce an "experimental stock" population to the San Joaquin River. Apparently, only those activities described in the Permit Application would receive incidental take authorization. The comments presented by the Authority in this letter are intended to assist the National Marine Fisheries Service ("NMFS") as it evaluates the Permit Application.

The Authority is a joint powers authority formed in 1992 and consists of 29 public agencies, 27 of which contract with the United States Department of the Interior, Bureau of Reclamation ("Reclamation"), for water from the Central Valley Project ("CVP"). The Authority's members, including Westlands, hold contracts with Reclamation for the delivery of approximately 3.3 million acre-feet of CVP water annually. Of that amount, approximately 2.1

million acre-feet are contracted for delivery to water service contractors, approximately 840,000 acre-feet for exchange contractors, and approximately 300,000-350,000 acre-feet to publicly and privately managed wetlands situated in the Pacific Flyway. The CVP water supplies are used within areas of San Joaquin, Stanislaus, Merced, Fresno, Kings, San Benito, and Santa Clara Counties, California. In addition, the Authority is responsible for operating Delta Division facilities of the Central Valley Project pursuant to a transfer agreement between the Authority and the United States. The Authority has participated in several public workshops addressing the reintroduction of spring-run Chinook to the San Joaquin River, part of the San Joaquin River Restoration Program ("SJRRP").

In its present form, the Permit Application is inadequate. Section 10004 of Title X of the Omnibus Public Land Management Act of 2009 states: "implementation of the Settlement and the reintroduction of California Central Valley Spring Run Chinook salmon pursuant to the Settlement and section 10011, *shall not result in the involuntary reduction in contract water allocations to Central Valley Project long-term contractors*, other than Friant Division long-term contractors." (Omnibus Public Land Management Act of 2009 ("Omnibus Act"), Title X, § 10004(f) [emphasis added].) Under this provision, FWS and NMFS must ensure that the reintroduction of spring-run Chinook does not cause a reduction in contract water allocations to the Authority's member agencies. The Permit Application, however, does not address how FWS and NMFS will provide that assurance. In particular, the section 10(a)(1)(A) permit contemplated by the Permit Application apparently would not authorize incidental take of reintroduced fish at CVP facilities used to appropriate water for the benefit of the Authority's member agencies.

In addition, section 10011(c)(2) of Title X of the Omnibus Act requires NMFS to issue a rule under section 4(d) of the federal Endangered Species Act, to govern "the incidental take of reintroduced California Central Valley Spring Run Chinook salmon." The 4(d) Rule must provide that "the reintroduction will not impose more than de minimus water supply reductions, additional storage releases, or bypass flows on unwilling third parties due to such reintroduction." (Omnibus Act, Title X, § 10011(c)(3).) As is described further below, however, NMFS has suggested that the 4(d) Rule will not authorize take of reintroduced fish once they leave the San Joaquin River and move into the Delta.

The Omnibus Act is clear – the reintroduction of spring-run Chinook can neither cause a reduction in CVP contract water allocations to Authority member agencies, nor more than a de minimus reduction in water supply or other measures on third parties. Hence, any implementation of the SJRRP must, but currently fails to, include as an essential element the protections for water supply afforded to the Authority's member agencies. Without provisions to protect water supplies, any program for reintroduction of Central Valley spring-run Chinook salmon is unlawfully incomplete.

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1. The Permit Application Fails To Include A Provision That Ensures The Reintroduction Of Spring-Run Chinook Salmon To The San Joaquin River Will Have No Adverse Impacts To CVP Contract Allocations

The Project Description in the Permit Application does not address, let alone include as an essential element, the requirement that the reintroduction not adversely impact allocation of CVP water to the Authority's member agencies. The Project Description discusses only the collection of donor stock, rearing of conservation stock, and the release of these spring-run Chinook to the San Joaquin River. It refers to the fish released as the "experimental population." The Permit Application does not address incidental take of the experimental population. A provision to ensure the reintroduction of spring-run Chinook does not result in adverse impacts to water allocations to the Authority's member agencies must be added to the Project Description.

The Permit Application acknowledges that "[t]he proposed action [reintroduction of spring-run Chinook] would result in both direct and incidental take to the donor stock populations and losses to the conservation stock." (Permit Application, p. 79.) However, it does not address incidental take of fish after they have been released, the so-called experimental population. The Permit Application should include analysis and a request for authorization of incidental take of the experimental population where necessary to protect water allocations to the Authority's member agencies. If take occurs in the Sacramento-San Joaquin River Delta that is not anticipated or accounted for in the Permit Application, that take might be used to justify the imposition of water export and flow restrictions. The take of experimental stock thus has the potential to result in water supply impacts to the Authority's member agencies. This type of take must be considered and included in the Permit Application, to ensure that it is authorized in a manner that results in no adverse impacts to water allocations to the Authority's member agencies.

Another component of the reintroduction process, the development of a 4(d) Rule, is supposed to address incidental take of the experimental stock, but so far, NMFS has taken the position that the 4(d) Rule will not address take of the reintroduced salmon once they enter the Delta. During the February 8, 2011 workshop on Permitting for the Reintroduction of Spring-Run Salmon to the San Joaquin River, co-presented by FWS and NMFS, the NMFS Program Manager stated that 4(d) Rule now being developed would apply to the reintroduced fish only while they are within the "geographic scope" of the San Joaquin River, and possibly, three tributaries of the San Joaquin River. The Program Manager expressly stated that take authorization of the planned 4(d) Rule would *not* apply to the reintroduced fish once they have migrated into the Delta. However, the mandate that the reintroduced species shall be designated an experimental population is not limited in its geographic scope. Congress did not say that the population would be experimental only while in the San Joaquin River. Rather, Congress said the population shall be reintroduced pursuant to ESA section 10(j), which provides for

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experimental populations. Therefore, whether in the San Joaquin River, the Delta, or the ocean, the reintroduced fish should be designated an experimental population. Otherwise, as currently planned, the 4(d) Rule would not authorize take of these reintroduced fish at the CVP pumping facilities located within the Delta.

In summary, the Permit Application must include, as an essential element of the project description and plan for implementation, a provision to ensure that the reintroduction of spring-run Chinook to the San Joaquin River does not result in adverse impacts to water allocations to the Authority's member agencies. That essential element is missing.

2. FWS And NMFS Must Ensure That The SJRRP's Impact On Donor Populations Will Not Result In Adverse Impacts To CVP Operations

The Permit Application must ensure that impacts of the program on donor stock populations will not affect CVP operations in a way that reduces contact allocations for Authority members. The Permit Application outlines criteria for take of donor stock ("the individuals actually collected from their native (or currently resident) stream source" (*id.*, p. 79)) that permits up to 15 percent of the run to be collected, if certain criteria are met. (*Id.*, p. 99.) Currently, the Permit Application limits collection of donor stock to Butte Creek, based on those criteria. (*Id.*, p. 100.) We are concerned that declines in Butte Creek and other spring-run donor stock populations caused by collections might be used to justify the imposition of further CVP water export and other flow restrictions. Under the Omnibus Act, impacts to the spring-run donor stock populations *cannot* lawfully increase the burden on the water supply of the Authority's member agencies.

Furthermore, in considering the impacts on the spring-run donor stock, FWS and NMFS must be consistent in their evaluation of the impacts among various projects. The Authority's members have felt impacts from inconsistent analyses of project impacts first-hand. In NMFS's evaluation of CVP and SWP project operations on salmonids in the 2009 Salmon biological opinion, for example, NMFS determined that a maximum of two percent take of winter-run Chinook salmon and one percent incidental take of spring-run Chinook could be permitted. NMFS has imposed significant restrictions on CVP operations to avoid and limit such take. Yet, in the 2010 Ocean Harvest biological opinion, NMFS found that an annual take of 7.5 percent to 20 percent of the adult population of winter-run Chinook would not cause jeopardy to the species. In the Permit Application, FWS apparently likewise determines that an impact to the donor stock population of up to 15 percent could occur without jeopardizing spring-run Chinook. In light of these more recent determinations, reconsideration of the conclusions in the 2009 Salmon biological opinion regarding CVP and SWP operations appears overdue.

Conclusion

Westlands and the Authority appreciate the time and effort expended by NMFS and FWS during this process. We hope that the comments presented in this letter reiterate the importance of approving a 10(a)(1)(A) Permit Application that will ensure the reintroduction of spring-run Chinook salmon into the San Joaquin River does not result in the reduction in contract water allocations to the Authority's member agencies. We and our clients would welcome the opportunity to discuss this with you.

Sincerely,

KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD
A Professional Corporation

Daniel J. O'Hanlon
Attorneys for WESTLANDS WATER DISTRICT and
SAN LUIS & DELTA-MENDOTA WATER
AUTHORITY

964993.2 10355.034

SAN LUIS CANAL COMPANY

March 7, 2011

BY E-MAIL: SJRSPRING.SALMON@NOAA.GOV

Protected Resources Division
National Marine Fisheries Service
650 Capital Mall, Suite 5-100
Sacramento, CA 95814

Re: Comments of San Luis Canal Company to the U.S. Fish and Wildlife Service's 10(a)(1)(A) Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River dated September 29, 2010 and the Hatchery and Genetic Management Plan dated December 17, 2010.

Dear Sir/Madam:

San Luis Canal Company (SLCC) has participated in your public forum, and reviewed the documentation on the above referenced project. As one of the third parties that are part of the implementing legislation for the San Joaquin River Restoration Program, it is vital that SLCC is engaged in the process.

SLCC would like to reference and be on the public record as incorporating our comments in the attached letter made on our behalf as members of both the San Joaquin River Exchange Contractors Water Authority and the S.J. River Resource Management Coalition. The letter is dated March 7, 2011 and signed by Tom Berliner of Duane Morris.

Thanks for the opportunity to comment and please call with any questions.

Sincerely,

Chase Hurley
General Manager

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March 7, 2011

BY E-MAIL: SJRSPRING.SALMON@NOAA.GOV

Protected Resources Division
National Marine Fisheries Service
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Sacramento, CA 95814

Re: **Comments of the San Joaquin River Exchange Contractors Water Authority and the San Joaquin River Resource Management Coalition to the U.S. Fish and Wildlife Service's 10(a)(1)(A) Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River dated September 29, 2010 and the Hatchery and Genetic Management Plan dated December 17, 2010.**

Dear Sir/Madam:

Thank you for providing the opportunity to comment on the U.S. Fish and Wildlife Service's ("USFWS") 10(a)(1)(A) Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River dated September 29, 2010 ("Permit Application") and the Hatchery and Genetic Management Plan dated December 17, 2010 ("HGMP") to the San Joaquin River Exchange Contractors Water Authority ("Exchange Contractors")[1] and the San Joaquin River Resource Management Coalition ("RMC"). The Exchange Contractors and the RMC understand that the Permit Application is one step in the process of the reintroduction effort for spring-run Chinook salmon on the San Joaquin River under the San Joaquin River Restoration Program ("SJRRP") as

[1] The San Joaquin River Exchange Contractors Water Authority is a public entity made up of four separate California water districts: Central California Irrigation District; San Luis Canal Company; Firebaugh Canal Water District; and the Columbia Canal Company.

mandated by the stipulated settlement in *NRDC v. Rodgers*,[2] and approved by Congress through the San Joaquin River Restoration Settlement Act, P.L. 111-11 ("SJRRS Act" or "Act").

Under the Act, Central Valley spring-run Chinook ("SRC") salmon are to be reintroduced to the San Joaquin River as an experimental population pursuant to section 10(j) of the Endangered Species Act ("ESA"), provided that the Secretary of Commerce ("Secretary") finds that an ESA section 10(a)(1)(A) permit may be issued allowing the USFWS to collect SRC salmon for the reintroduction program.[3] The Act requires that the Secretary issue a final rule under ESA section 4(d) governing the incidental take of the reintroduced SRC salmon which shall not impose more than de minimus water supply reductions, additional storage releases, or bypass flows on unwilling third parties.[4] The Act also requires that any adverse impacts to third parties be mitigated[5] and that no costs be imposed involuntarily on third parties.[6] Under the terms of the stipulated settlement, salmon are to be reintroduced by December 31, 2012.[7] As third parties who own or control facilities or property affected by the reintroduction program, the Exchange Contractors and RMC expect to actively participate in the development of the final 4(d) Rule.[8]

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[2] Stipulation of Settlement dated September 13, 2006 in *NRDC v. Rodgers*, Case No. CIV. S-88-1658-LKK/GGH, United States District Court, Eastern District of California ("stipulated settlement").

[3] Pub. Law111-11, § 10011(b)

[4] *Id*., § 10011(c)

[5] *Id*. § 10004(d)

[6] *Id.* § 10009(a)(3)

[7] Stipulated Settlement, ¶ 14.

[8] Paragraph 19(b) of the settlement provides that "The Secretary, with cooperation of the other parties, shall provide appropriate opportunities for input from third parties who have an interest in measures to be undertaken pursuant this Settlement, and for coordination with third parties who own or control facilities or property affected by implementation of such measures. Further, the Secretary, with the cooperation of the other Parties, shall provide appropriate opportunities for public participation regarding implementation of this Settlement." From the juxtaposition of these two sentences, it is clear that that the settlement requires the Secretary to engage with the Exchange Contractors and RMC in a more in-depth manner than through the public process required by regulation and the last sentence.

I. OVERALL COMMENTS

A number of overarching concerns that call into question the successful implementation of the SJRRP have come to light since the stipulated settlement in 2006 and the passage of the SJRRS Act in 2009. As more technical and program documents become finalized and released, there likely will be additional concerns. The Exchange Contractors and RMC believe that these concerns compel the implementing or permitting agencies, such as NMFS, to reevaluate the feasibility of implementing the river restoration program on the schedule and in the manner contemplated in the stipulated settlement given the current realities of delays in the completion of necessary channel and structural improvements, mitigation efforts to address the impacts of the interim flows, adequate environmental review of the program and inadequate funding. Such concerns are directly pertinent to NMFS' review of the USFWS' 10(a)(1)(A) Permit Application, because NMFS regulations, regarding the issuance of such permits, require a consideration of, among other things, "whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application."[9]

1. **Inadequate Habitat:** Currently, the program is not being implemented in the sequence or on the schedule[10] that was foreseen in 2006 when the stipulated settlement was crafted. At the time, it was believed that the necessary infrastructure would be in place to reintroduce fish and release full restoration flows down the San Joaquin River by 2014, a schedule as discussed below that is no longer achievable. As a result, the issuance of the 10(a)(1)(A) Permit for the salmon reintroduction program with the goal of SRC salmon reintroduced to the San Joaquin River by December 31, 2012, is far in advance of (a) the establishment of restoration flows and (b) necessary structural and channel improvements, both of which are ***critical*** to providing habitat conditions and the full restoration flow hydrographs essential for the successful reintroduction of SRC salmon to the San Joaquin River.

Further, USFWS guidelines on the formulation of special rules for experimental populations, which we understand NMFS intends to follow, require consultation "with appropriate State fish and wildlife agencies, local governmental entities, affected Federal agencies, and affected private landowners in developing and implementing experimental population rules. When appropriate, a public meeting will be conducted with interested members of the public. Any regulation promulgated pursuant to this section shall, to the maximum extent practicable, represent an agreement between the Fish and Wildlife Service, the affected State and Federal agencies and persons holding any interest in land which may be affected by the establishment of an experimental population." 50 CFR § 17.81(d) (emphasis added).

[9] 50 C.F.R. § 222.308(c)(11).

[10] Permit Application, pp. 43-46.

a. Currently, the Bureau of Reclamation ("Reclamation") is conducting the interim flow program described in paragraph 15 of the stipulated settlement, the purpose of which is to collect data regarding flows, temperatures, fish needs, seepage losses, and recirculation, recapture and reuse of water in advance of full restoration flows. Restoration flows are scheduled to commence no later than January 1, 2014.[11] However, the scheduled restoration flows ***will not be achievable*** in the time period contemplated for salmon reintroduction due to the requirements on Reclamation to first mitigate adverse impacts on third parties, including damage from levee and groundwater seepage, complete necessary channel capacity improvements, or install screens and other fish protection measures – none of which have occurred or are likely to timely occur due to a lack of funding.

i. Pursuant to both the stipulated settlement and the Act, restoration of the San Joaquin River must not have a material adverse impact on any third parties. Specifically with regards to interim flows, the Secretary is required to mitigate impacts on adjacent and downstream water users and landowners under section 10004(d)(2) of the Act and to reduce interim flows to the extent necessary to address impacts to third parties caused by seepage under section 10004(h)(3). Growers within the service area of the Exchange Contractors experienced serious damage to crops and the levee system from seepage that resulted from the first year's interim flows, even though the interim flow was limited to only 10 to 25% of the full flow ultimately planned. Such damage has neither been addressed adequately nor mitigated by Reclamation. Before continuing with the interim flows, Reclamation must complete plans and work needed to mitigate against this type of damages from the flow program.

ii. Moreover, under section 10004(h)(2)(B) of the Act, the Secretary is prohibited from releasing flows that exceed existing downstream channel capacities. For example, existing channel capacity is zero in Reach 4B. Current channel capacity in Reach 4A, without causing seepage impacts, is only 50 cfs. All necessary channel modifications to address capacity identified as Phase 1 improvements in paragraph 11(a) of the stipulated settlement and contemplated to be completed by December 31, 2013 are

[11] Stipulated Settlement, ¶ 13(i)

significantly behind schedule. All are in the planning/permitting stage with no established planning and construction timelines.[12]

b. Successful reintroduction of SRC salmon to the San Joaquin River cannot be achieved if the reintroduction occurs years in advance of necessary in-river, near-river, and facilities/infrastructural improvements to provide quality fish habitat, a concern also raised by the USFWS in the Permit Application at page 43. Habitat conditions in reaches of the San Joaquin River are severely degraded. To achieve the restoration goal, a combination of channel and structural improvements, described in paragraph 11 of the stipulated settlement, along the San Joaquin River below Friant Dam are required. "Phase 1" improvements, listed in paragraph 11(a), are to be completed no later than December 31, 2013 and "Phase 2" improvements, listed in paragraph 11(b), are to be completed no later than December 31, 2016. On page 43, the Permit Application acknowledges that these projects have been delayed beyond that which was anticipated within the context of the Settlement. The just released Reintroduction Strategy for Spring Run Chinook Salmon dated February 2011 also raises this significant concern stating that the Phase 1 projects scheduled for completion by December 31, 2013 are still in the planning/permitting stages and are considered ***significantly behind schedule*** with no established planning and construction timelines.[13] The reintroduction of SRC salmon in advance of necessary restoration projects on the San Joaquin River calls into question whether the restoration goal of the SJRRP, as described in the Permit Application can be successfully accomplished.

c. Reintroduction of SRC salmon to the existing system would be deadly to the fish. In addition to the poor habitat conditions described above, due to the existing flow limitations and flow paths relative to the Mendota Pool, these fish will become entrained in the diversions in the Mendota Pool. When spring interim pulse fish flushing flows occur starting in May, existing flow limitations come into play. With current capacity limitations, interim flows are limited to about 1300 cfs into the Mendota Pool and only about 50 cfs out of the Mendota Pool and into river Reach 4A. To the extent that out migrating juvenile salmon follow the flow, then at least 96% of these fish will be entrained in the 3000 cfs of total irrigation diversions drawing from the Mendota Pool. Internal flow issues in the Mendota Pool will cause the take percentage to be higher. The settlement envisioned

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[12] Reintroduction Strategy for Spring Run Chinook Salmon, dated February 2011, pp. 29-30, made available in the last few days at http://www.restoresjr.net/program_library/02-Program_Docs/ReintroductionStrategyFinal20110228.pdf

[13] *Id.*

construction of the Mendota Pool Bypass, the Reach 2B improvements, and the Arroyo Canal Fish Screens projects to solve and mitigate this specific issue at a cost estimated at $225 million by Reclamation. The Exchange Contractors estimates indicate the costs will be significantly more than the Reclamation estimate.

2. **Inadequate Funding:** Most significantly, the current lack of assured and adequate funding for the SJRRP will prevent the achievement of the program's goals. When the SJRRS Act was enacted in 2009, four sources of funds were identified to provide some of the monies needed to carry out the Restoration Program[14] amounting to hundreds of millions of dollars for the necessary channel and structural improvements; to operate the salmon reintroduction program; to prevent damage (via flooding and seepage) to downstream lands and infrastructure (such as those owned by the Exchange Contractors); and to accomplish the goal of "reducing or avoiding an adverse water supply impact" to Friant water users. However, absent additional appropriations, only $88 million is currently available until October 1, 2019 from the federal government (due to "PayGo" rules). In light of President Obama's announced freeze on discretionary spending for the next five years, the funding issue appears to be highly problematic. Moreover, it is believed that some $40 million has already been spent by the Federal implementing agencies. The remaining funds, over the next 8 years, are ***grossly inadequate*** to carry out the fishery and restoration program that was envisioned at the time of the enactment of the Act.[15]

3. **Inadequate Environmental Review:** *Ad hoc* environmental review that improperly "piecemeals" or "segments" review of individual programs without a consideration of the larger SJRRP will result in unnecessary planning delays, uninformed decision-making and deprives the public and stakeholders of the opportunity to meaningful comment on the SJRRP. The Settlement and the Act specifically state that the Secretary must comply with NEPA and other laws and the Settlement provides in paragraph 28 that the Secretary is to "expeditiously complete applicable environmental documentation and consultations as may be necessary to effectuate the purposes of this Settlement." To date, no

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[14] (1) The annual funds already being paid by Friant dam users to the CVPIA fund – approximately $10 million each year ($200 million over 20 years);
(2) Funds from the early repayment by Friant users of the capital costs of Friant Dam – approximately $220 million;
(3) State of California bond initiatives – approximately $200 million (according to 2008 estimates); and
(4) Federal appropriations capped at $250 million with a 50% non-federal cost share.

[15] There is no certainty that additional money will be more available in 2019.

programmatic environmental impact statement ("PEIS") has been issued to review the SJRRP initiated by the stipulated settlement. From the outset, Reclamation has claimed that it would prepare a PEIS prior to project specific EISs, as is proper under NEPA. A large-scale program such as the SJRRP, which is composed of many individual but interconnected programs that have a significant cumulative impact on each other and the program as a whole, compels programmatic review prior to project specific review.[16]

With the interim flows, Reclamation has released Environmental Assessments ("EA") with a Finding of No Significant Impact ("FONSI") for each of the first two years of the interim flow program. However, each year's interim flows represent an integral and necessary part of the overall restoration flow program and the water management program of the SJRRP and are not separable or of utility in and of themselves, despite Reclamation's contentions to the contrary. Such segmenting of annual interim flows is inappropriate and improper under NEPA. Moreover, the EA/FONSI's done to date for the annual interim flows willfully ignore the fact that a PEIS is being prepared by Reclamation for the entirety of the SJRRP and fail to address and provide mitigation measures for current and future damage to land and levees from seepage. Similarly, a project-specific environmental assessment of the reintroduction of SRC salmon to the San Joaquin River is expected to be released by NMFS. It remains to be seen to what degree the environmental review performed by NMFS is coordinated with the PEIS in preparation by Reclamation. However, it is not proper to contend that the permitting for the SRC salmon is an action independent of the SJRRP or that it has "independent utility." We expect a unified approach to the entire restoration program.

Finalization of the PEIS/PEIR is essential so that the public and interested parties will have an opportunity to comment on the overall restoration program and the alternatives to restoring flows to the San Joaquin River. By failing to develop an integrated and comprehensive approach to restoration, the public and stakeholders are being deprived of the opportunity to consider and comment on the proposed SJJRP.

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[16] CEQ regulations note that agencies are to prepare EISs on "broad actions" so that they are "timed to coincide with meaningful points in agency planning and decisionmaking"; that when preparing statements on such broad actions, agencies may find it useful to evaluate the proposal(s) geographically, generically, or by stage of technological development; and that, as appropriate, agencies shall employ "scoping", "tiering", and other methods "to relate broad and narrow actions and to avoid duplication and delay." 40 C.F.R. §§ 1502.4 (b)-(d). CEQ regulations provide that a "programmatic EIS" should be prepared when federal actions are connected, cumulative, or similar, such that their environmental effects are best considered in a single impact statement. 40 C.F.R. § 1508.25.

4. **Due Process Concerns:** The public participation procedures utilized by NMFS for the review of the USFWS 10(a)(1)(A) Permit Application potentially raise due process concerns. Paragraph 14(a) of the stipulated settlement required the USFWS to submit the Permit Application by September 30, 2010. However, at the time the 10(a)(1)(A) Permit Application was finalized on September 29, 2010, the three foundational documents that comprise the initial technical framework for the Permit Application's project description (the Stock Selection Strategy, the Hatchery and Genetic Management Plan and the Reintroduction Strategies document) were ***all*** in draft form.[17] Indeed, the Permit Application acknowledged that "some discrepancies may exist between draft documents and our application."[18] Subsequently, the Stock Selection Strategy document was finalized in November 2010 and the Hatchery and Genetic Management Plan was finalized on December 17, 2010. However, the Reintroduction Strategies document remained in draft form for all but a few days of the comment period making a complete and informed assessment of the technical underpinning of the 10(a)(1)(A) Permit Application difficult. A final Reintroduction Strategies document dated February 2011 was placed on the restoresjr.net website, but not the NMFS website, sometime between March 2 and 4, 2011, a few days before the comment period deadline of March 7, 2011. The URL for the document seems to indicate that it was finalized on February 28, 2011.[19] To enable thorough and well-informed comments from the public on the Permit Application, NMFS should have postponed review and comments on the Permit Application pending finalization and release of all foundational technical documents.[20] Moreover, NMFS issued the "Notice of receipt for application for a new scientific research and enhancement permit, notice of public meetings, and request for comment" regarding USFWS 10(a)(1)(A) Permit Application on February 4, 2011 (Federal Register vol. 76, no. 24). Due to the short review period for such a comprehensive and technical program encompassing numerous background documents and citations to scientific studies, there was insufficient time to thoroughly review the Permit Application in detail. As a result of these concerns, the Exchange Contractors and RMC reserve the right to make additional comments to the SJRRP, in particular to the reintroduction of SRC salmon to the San Joaquin River, as more information from the implementing agencies becomes available and the SJRRP progresses.

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[17] Permit Application, p. 3.

[18] *Id*.

[19] http://www.restoresjr.net/program_library/02-Program_Docs/ReintroductionStrategyFinal20110228.pdf

[20] On March 1, 2011, counsel for the Exchange Contractor's and RMC spoke with Elif Fehm-Sullivan and Rhonda Reed of NMFS and were told no extension would be granted.

5. **Adaptive Management:** The donor fish collection efforts as well as the reintroduction program are proposed to be guided by an adaptive management approach. While necessary to a degree, it is no substitute for a well thought out initial strategy. An undertaking as large as the SJRRP should not be rushed by arbitrary deadlines. The product of such a rushed effort is the sacrifice of science to the avoidance of confronting an unrealistic schedule. This approach could lead to a never ending cycle of studies and costly enhancement attempts while realistically it may never be possible to establish a self sustaining population of SRC salmon in the San Joaquin River. The long list of uncertainties identified throughout all of the documents and the known extreme variability affecting survival (see page 5-12 of Fisheries Management Plan) attest to this concern. We believe that the use of a quantitative life cycle model rather than only a qualitative model as now proposed would allow the question of biological feasibility of the program to be assessed and periodically updated. Additionally, we recommend the establishment of an independent scientific review process whereby objective scientific assessment can be made of some of the tough issues that the vested parties may be reluctant to address. A similar process has been very effective on the Columbia River system. This is a particularly strong need in this effort where the program was dictated by secret negotiations that compel a course of action without the benefit of scientific peer review, environmental analysis, feasibility studies or public participation.

II. SPECIFIC COMMENTS TO THE USFWS 10(a)(1)(A) PERMIT APPLICATION AND FOUNDATIONAL TECHNICAL DOCUMENTS

As part of the terms of paragraph 14(a) of the stipulated settlement in *NRDC v. Rodgers*, the USFWS submitted to NMFS its 10(a)(1)(A) Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River dated September 29, 2010. The mandated deadline for the permit application was September 30, 2010. In the Permit Application, USFWS is requesting a 7-year permit to collect SRC salmon for the reintroduction program. The overall objective is to develop a naturally-reproducing, self-sustaining population of SRC salmon in the San Joaquin River. The goal is a minimum annual return of 500 salmon by 2019. NMFS guidelines for the issuance of 10(a)(1)(A) permits for scientific purposes or for the enhancement of the propagation or survival of the affected endangered or threatened species can be found at 50 C.F.R. §§ 222-223. Specifically, regulation 50 CFR § 222.308(c)(1)-(12) provides twelve criteria under which NMFS considers 10(a)(1)(A) permit applications including the following:

- Whether the application was applied for in good faith; (50 CFR § 222.308(c)(1))

- Whether permit, if granted and exercised, will not operate to the disadvantage of the endangered species; (50 CFR § 222.308(c)(2))

- Whether the permit would be consistent with the purposes and policy set forth in section 2 of the Act; (50 CFR § 222.308(c)(3))

- Whether the permit would further a bona fide and necessary or desirable scientific purpose or enhance the propagation or survival of the endangered species, taking into account the benefits anticipated to be derived on behalf of the endangered species; (50 CFR § 222.308(c)(4))

- The status of the population of the requested species and the effect of the proposed action on the population, both direct and indirect; (50 CFR § 222.308(c)(5))

- Whether alternative non-endangered species or population stocks can and should be used; (50 CFR § 222.308(c)(7))

- Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application; and (50 CFR § 222.308(c)(11))

- Opinions or views of scientists or other persons or organizations knowledgeable about the species which is the subject of the application or of other matters germane to the application. (50 CFR § 222.308(c)(12))

If a permit is issued under section 222.308, NMFS must specifically find that the permit: (1) was applied for in good faith; (2) will not operate to the disadvantage of such endangered species; and (3) will be consistent with the purposes and policy set forth in section 2 of the Act. 50 C.F.R. 222.303(f).

1. As noted above as a general overall comment concerning due process concerns, the short review period provided for such a comprehensive and technical program encompassing numerous background documents and citations to scientific studies provided insufficient time to thoroughly review the Permit Application in detail. In addition, the finalization of foundational technical documents after the 10(a)(1)(A) Permit Application itself was finalized, most recently the Reintroduction Strategies document, made a complete and informed assessment of the technical underpinning of the 10(a)(1)(A) Permit Application difficult. Again, review and comments on the Permit Application should have been postponed pending finalization and release of all foundational technical documents in order to provide a meaningful opportunity to consider the program as a whole.

2. As discussed above as an overall comment, the issuance of the 10(a)(1)(A) Permit for the salmon reintroduction program with the goal of SRC salmon to be reintroduced to the San Joaquin River by December 31, 2012, is far in advance of (a) the establishment of restoration flows and (b) necessary structural and channel improvements, both of which

are ***critical*** to providing habitat conditions essential for the successful reintroduction of SRC salmon to the San Joaquin River. The Fisheries Management Plan (FMP) identifies biological targets such as fry/juvenile/adult salmon survival, minimum juvenile growth rates, and minimum annual production. Whether these targets can be successfully met will in large part depend on the implementation of appropriate habitat improvements, structural modifications, and restoration measures in the San Joaquin River to support salmon survival and growth before reintroduction of SRC salmon, as discussed on pages 63-65 of the Permit Application. Such a serious disregard for the habitat necessary to sustain the experimental population within the San Joaquin calls into question the objectives concerning the SJRRP as described in the Permit Application, as well as whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application, and each of the other issues raised in the regulations highlighted in the bullets above.

The Exchange Contractors recommend that the reintroduction of SRC salmon be coordinated with priority mitigation, habitat and structural improvement work that has to be completed. We recognize that there could be value in collecting a smaller number of fish for study purposes in the San Joaquin River, for example to estimate downstream migration behavior and survival, but to go beyond that at this time would be an unwarranted taking of individuals from a listed population that is already at high risk of extinction.

3. The Permit Application and HGMP discuss a range of initial in-stream conditions that may limit growth potential and survival rates of introduced eggs and juveniles such as contaminant levels, temperature levels and food availability in the early years of the reintroduction program. However, the Permit Application does not provide details concerning actions to address these issues other than to say that intense restoration work several years after the introductions begin will include establishment of floodplain habitat, creation of in-stream cover, providing shaded streamside riparian habitat and minimizing the limiting reaches.

4. The Permit Application does not acknowledge and sufficiently address the potentially significant impact of predation on juvenile SRC salmon survival, in particular predation by bass and other nonnative piscivorous species, in both the lower and upper stretches of the San Joaquin River. It also does not address the actions of the SJRRP interim flows in establishing the presence of bass near the Hills Ferry Barrier. There are reports of a substantially increased population in the area of the Hills Ferry Barrier and no measures have been identified to address this predation. Further, bass will migrate to the upper San Joaquin River with similar impacts. Again, the Permit Application and supporting documents fail to address this significant problem.

5. On pages 46 through 47 and 65 through 66, the Permit Application discusses the possibility of using a trap and haul program to move reintroduced SRC salmon around passage impediments still in place in the restoration area in the early years of the program, but does not address the impact of implementing the trap and haul program on projected or assumed SRC salmon survival rates.

6. Although we have not had time to adequately assess the current status (extinction risk) of the donor stock, we are aware that returns of adult SRC salmon to the Sacramento River system have declined in recent years. Taking additional fish from these at-risk stocks and placing them into the San Joaquin River system, where they assuredly would suffer extremely high mortality, makes little sense under these conditions. If the donor stocks were in healthier condition and the San Joaquin River system habitat considerably improved, it might make sense to initiate the reintroduction effort, but that is not the current situation.

   The very fact that the Sacramento SRC salmon returns have been so variable over the last couple of decades highlights two additional concerns. First, the Sacramento River Basin stocks have not recovered enough to allow fish to be removed on a yearly basis. This is important because the reintroduction program would likely fail in the long term to establish a self-sustaining run if donor fish were not available every year for the next couple of decades. Second, the fact that the Sacramento SRC salmon do not appear to be recovering very fast raises the question of why one would expect the same fish to do any better in the much more highly degraded San Joaquin River.

7. Donor stock from which the experimental SRC salmon for the San Joaquin River will be sourced from drainage systems including Feather River, Butte Creek and Deer/Mill Creek (preferred alternative chosen by the Genetics Subcommittee of the SJRRP). Out of these, the Feather River SRC salmon population appears to be significantly hybridized with fall-run Chinook (FRC), as evidenced by the high level of introgression with FRC genes, and acknowledged in the HGMP. It is also unclear whether the practices recently adopted by the Feather River Hatchery (FRH) to reduce hybridization between spring-run and fall-run Chinook salmon are having any measurable benefits. Recent genetic analyses (Garza et al. 2008) suggest that Feather River SRC salmon are heavily introgressed with FRC genes and essentially are not genotypically distinguishable as spring-run fish in the way that Butte and Mill/Deer Creek salmon are. Furthermore, the Feather River spring-run stock consists of both hatchery-spawned and naturally-spawned salmon. In contrast, the Butte Creek and Deer/Mill Creek populations show little evidence of introgression and apparently no hatchery influence.

   As noted in the Stock Selection Strategy document dated November 2010, the genetic risks posed by the Feather River fish due to hatchery fish influence and hybridization of FRC with SRC, prompted the Technical Advisory Committee (TAC) of the San Joaquin

River Restoration Program (SJRRP) to recommend against the use of the Feather River Hatchery stock or any other hatchery origin stock for use in reintroduction (Meade 2007). However, the SJRRP still included the Feather River stock in the preferred alternative (along with Butte and Mill/Deer Creek stocks). The rationale that the Genetics Subcommittee provided for using Feather River SRC salmon as part of the donor stock includes the fact that this stock appears to retain remnants of the phenotype and ancestry of the Feather River spring-run, and that through careful management of the broodstock, it may be possible to preserve some component of the ancestral Central Valley spring-run genomic variation. However, the Genetics Subcommittee acknowledges in the HGMP that there is no reasonable way to predict the outcome in terms of genetic variation and diversity.

Overall, given the substantial degree of uncertainty and risk involved with hybridization and hatchery influence in Feather River fish, we recommend that the HGMP further consider the pros and cons of excluding this population from the donor stock. This may include conducting more studies on broodstock selection before reintroducing SRC salmon in the San Joaquin River. Further, the Permit Application and underlying foundational documents do not adequately address the impacts on the assumptions and targets of the reintroduction program of a scenario in which the FRH is the only or primary source of donor stock.

8. As identified in Permit Application, the Conservation Program’s target for the experimental population of SRC salmon is a minimum annual return of 500 adults by 2019. Although the basis for this target is not identified in the Permit Application, support for the numbers is presented in the Recommendations on Restoring Spring-run Chinook Salmon to the Upper San Joaquin River (“Recommendations Report”) prepared by the San Joaquin River Restoration Program Technical Advisory Committee (Meade 2007).

   Discussion presented in the Recommendation Report indicates that the Technical Advisory Committee is aware that an annual run size of greater than 500 adults, perhaps at least 2,500 adults, may be necessary for a viable self-sustaining population. Our reading of the Recommendation Report is that the minimum population size is based on work related to identifying extinction risk of existing salmonid populations and may not be directly related to the minimum population size necessary to provide a viable (self-sustaining) salmonid population for a restoration (i.e., reintroduction) project. We agree with this general concern and further suggest that the 2012-2019 reintroduction period target of 500 adult spawners annually based on one or more of the criteria used to assess the risk of extinction is likely to be too low to provide for a viable salmon population for the following reasons:

a. Total population size per generation (N) is not the annual run size, but is approximated by multiplying the annual run size by the generation length, which for Chinook salmon is assumed to be 3 (Allendorf et al. 1997). Using this calculation, the annual run size to satisfy the 2,500 total population criterion should be approximately 830 (2,500 divided by 3).

b. Conversely, calculating the total population size per generation based on a target annual run size of 500 yields an estimated total population size (N) of 1,500 (500 times 3). Using this single criterion would suggest that the population would be at a very high risk of extinction.

c. Similarly, using the calculated total population size per generation (N) based on the 500 fish target (N = 1,500) and the assumed Ne/N ratio of 0.2 would provide an estimate of the effective population size per generation (Ne) of 300 (1,500 times 0.2). Using this single criterion would suggest that a population with an effective population size of 300 would be at a very high risk of extinction.

In summary, the 2012-2019 Reintroduction Period target of 500 adult Chinook salmon annually seems to be based on criteria used to estimate extinction risk (using genetic concerns) that may not be entirely applicable to a reintroduction project. Even if the assumptions underlying the criteria used to identify the target value are valid, the actual target itself may be too low to provide a truly viable population of spring-run Chinook salmon in the San Joaquin River. We recommend that NMFS, USFWS and the Technical Advisory Committee reconsider these assumptions and means for arriving at the target number of adults.

9. Of the various anadromous salmonid races, spring-run Chinook salmon are probably the most sensitive to environmental modification. They have the most demanding requirements for cool water for all of their life history stages from adult migration, extended pre-spawn holding, spawning, egg incubation, rearing, and outmigration. This is why they historically were confined to higher elevation reaches above about 1500 ft (NMFS 1998). So, the notion of trying to reintroduce the most environmentally sensitive salmon to the highly altered San Joaquin River appears far-fetched. In general, it would seem highly unlikely to expect a transplanted out-of-basin spring-run Chinook salmon stock to develop into a viable population in the much-altered San Joaquin River even assuming that many of the poor habitat conditions could be improved.

For the reintroduction program to be successful, it must lead to the establishment of a viable self-sustaining population over the long term. Self-sustainability clearly is the goal of the reintroduction program as identified in the stipulated settlement and other program documents. And yet we have not seen in any of the documents a real assessment of the biological feasibility of establishing a sustainable population of SRC salmon in the San Joaquin River. The numerous documents highlight uncertainties and challenges associated with the program but only treat them as things to study and address in the future under the "adaptive management" umbrella.

In searching for some notion of whether the reintroduction program would be successful, none of the reports directly address the question of whether the program would be biologically feasible (i.e. sustainable runs). There is much mention of how reintroduction would not be successful now under existing conditions (of course that's why the fish became extirpated), and some optimistic views that it might work if all the major problems were corrected, but does not indicate any prognosis for conditions with the new "restoration flows" plus the various structural and channel modifications projects prescribed in the settlement and NMFS recovery plan. Absent a rational strategy, we have an experimental program that will likely cost in excess of $1 billion with little guarantee that it will be successful.

In order to produce a viable population, regardless of the population size, the total survival rate from egg to returning adult spawner must exceed that necessary to replace the parent population in the long term. All of the documents seem to avoid this topic. The discussion of likely survival rates is only briefly discussed on pages 12-13 in the Permit Application. These rates are extremely optimistic and likely unrealistic. Even using the indicated rates, the total survival rate from egg to returned adult (0.0004) is not enough to achieve sustainability (1:1 return ratio). Our comments on the specific life stage survival estimates cited in the Application are presented below.

a. Egg-to-fry: The report cites 40% as the estimated survival rate from deposited egg to emergent fry. Yet on page 60 of the Permit Application, it is cited that "survival rates under natural conditions usually do not exceed 40%." So the average expected survival rate would have to be something less than 40%. There is little discussion to support this estimate except to note that it was obtained from studies done on the Tuolumne River under optimal water temperature conditions. There is no discussion of how conditions might differ in the expected spawning area of the San Joaquin River. However, a brief review of existing maximum daily water temperatures recorded 1.5 miles below Friant Dam reveal that temperatures are often suboptimal and sometimes critical for both Chinook spawning and incubation life stages. Implementation of the Restoration Flow schedule may improve conditions somewhat, but still would leave frequent periods of suboptimal conditions. Therefore, the 40% egg-to-fry survival rate cited in the Permit Application is likely an overestimate for application to the San Joaquin River. Furthermore, this estimate does not include any consideration of the anticipated warmer conditions associated with climate change, which would make temperature conditions even worse. Although climate warming impacts are discussed generally in several of the program documents (e.g. Lindley et al.

2007), the expected consequences specific to the success or failure of the reintroduction of SRC salmon to the San Joaquin River is not revealed. An accounting of the anticipated warming conditions should be included in the modeling efforts used to project future population growth in the restored spring Chinook runs to the San Joaquin River.

b. Fry-to-smolt: A 5% rate is quoted for fry to migratory smolt. It is difficult to assess this rate because the definition of what is a migratory smolt versus a dispersing parr is necessarily vague. Nevertheless, while the rate seems to be supported with references, the applicability to the San Joaquin River is questionable given that migratory conditions in the San Joaquin River are likely much worse than those in the stream(s) from which the rate estimate was derived. Although there are plans to study and address many of the rearing and migratory problems (e.g. predation) in the lower San Joaquin River, there certainly will be realistic limits of what can be done in such an altered environment. The likelihood of extremely high predation rates from the known populations of nonnative fish species (e.g. striped, largemouth, and smallmouth bass) occurring in the lower San Joaquin River is especially of concern. Effectively controlling populations of such predatory fish has always been a challenge for fish management agencies.

c. Smolt-to-adult: The cited 2.5% rate for smolt-to-adult survival is simply unrealistically high for subyearling Chinook smolts even for a river system in good shape. The Permit Application contains no source citation for this rate other than a personal communication, so it was not possible to check the actual data. Although we did not have time to assemble and present alternative data in this comment submittal, our previous reviews of smolt-to-adult survival data for ocean-type Chinook suggest rates that rarely exceed 1.0% and usually average about 0.5%. The Permit Application, in apparent support of their 2.5% rate, cites a reference for the Snake River that indicates a range of 1-5%. However, these rates were taken out of context and are clearly not applicable to the San Joaquin River. Snake River spring Chinook smolts are yearlings, which are much larger than the subyearling smolts that typify Central Valley spring Chinook smolts. Smaller smolts naturally have lower survival rates.

Applying the life cycle survival rates (0.4 x 0.05 x 0.025 = 0.0004) presented in the Application to the stated (elsewhere) fecundity of 5000 eggs/female curiously results in exactly a 1:1 adult return ratio. This raises suspicion that the survival rates were not derived from a sound review of the scientific data but rather arbitrarily selected to give the desire answer. We note too that the fecundity assumption of 5000 eggs/female was not supported by references and that a more realistic number is closer to 4000 eggs/female (DWR 2003).

Another factor that was not considered regarding the feasibility of both the reintroduction program and the brood stock collection program is the widely varying natural survival occurring from year-to-year on all Chinook life stages. Some of these variability factors are described on page 5.12 of the draft FMP. These include (1) up to a 40-fold variability in smolt production from the river systems; (2) a 25-fold range in smolt survival as they pass through the Delta; and (3) a 2.4-fold range in marine survival. In addition, the factors that cause these high rates of variability, such as ocean conditions and droughts, are widely cyclical. Attesting to the cumulative effect of this cyclical variability is the history of run sizes and escapements of Chinook salmon in Central Valley river systems observed since the 1960s. The cyclical nature of these runs is depicted graphically in Figures 2, 3, and 5 in the San Joaquin River Technical Advisory Committee's 2007 report on Recommended Goals, Stocks, and Reintroduction Strategies. Differences in the peaks and valleys are approximately 20-fold for fall-run Chinook, 40-fold for winter-run Chinook, and 20-fold for spring-run Chinook salmon. The important message seen in these cyclical patterns is that they will have a tremendous influence in determining the success or failure of the San Joaquin River SRC salmon reintroduction effort. The program to date has not appropriately taken this into account. In the Recommendation Report cited above, Figure 1 shows a potential population growth trajectory with fluctuations for the reintroduced SRC salmon out to and beyond year 2040. The graph indicates very minimal variability and basically an increasing trend line. While this may represent a hopeful outcome of the reintroduction program, it certainly is not very realistic in light of the natural cyclical variability that undoubted will continue to affect all Chinook salmon stocks in the Central Valley. Consideration of such wide variability provides yet another question mark to the biological feasibility of the reintroduction program. Accounting for this variability can and should be incorporated into a stochastic quantitative life cycle model that would provide a more realistic projection of fish population growth in future years.

In light of the above concerns we suggest that the program authors provide a more thorough and accurate account of expected life stage survival rates for SRC salmon reintroduced into the San Joaquin River. Furthermore, we recommend that the reintroduction program develop a quantitative life cycle model using realistic life stage survival estimates to address the biological feasibility question. This should provide a good means upon which to measure program success and progress. It could be used in conjunction with the Ecosystem Diagnostic and Treatment (EDT) model that is currently being used to help identify limiting factors and prioritize future actions.

10. The Conservation Facility (i.e., fish hatcheries, both interim and final) will operate under a National Pollution Discharge Elimination System (NPDES) permit. Conservation Facility effluent will be micro-screened and returned to the San Joaquin River. The NPDES permitting process and analyses required by the Regional Water Quality Control

Board (RWQCB) during the application processing phase must be protective of San Joaquin River water quality and quantity.

11. Finally, NMFS regulation 50 C.F.R. § 222.308(b) provides a list of the information required in a 10(a)(1)(A) permit, some of which appear to be missing from the USFWS Permit Application.

- 50 C.F.R. § 222.308(b)(5)(iii) requires as part of a description of the proposed acts, a copy of the formal research proposal or contract if one has been prepared. A finalized Reintroduction Strategies document, which “details the elements of reintroduction and the management of fish and their progeny in the mainstem of the” San Joaquin River, should have been released prior to putting the 10(a)(1)(A) Permit Application out for public comment.

- The Permit Application does not provide the names, qualifications and information concerning the persons or entity which will capture or otherwise take the animals or who will supervise such actions as required by 50 C.F.R. § 222.308(b)(6)(vi)-(vii).

- The Permit Application does not provide all the information required concerning the qualifications and experience of the staff at facilities at which the fish will be maintained; does not provide a written certification from a licensed veterinarian or expert regarding the adequacy of the transport and maintenance of the fish; and does not provide information concerning the availability in the future of such an expert as required by 50 C.F.R. § 222.308(b)(8)(v-vi).

- The Permit Application does not provide the information required in 50 C.F.R. § 222.308(b)(11) regarding the past experience and practices of the applicant concerning endangered species and/or the species affected by the application.

- Finally, the Permit Application appears to be lacking the applicant certification required by 50 C.F.R. § 222.308(b)(12).

III. ADDITIONAL SPECIFIC COMMENTS TO THE HATCHERY AND GENETIC MANAGEMENT PLAN

The HGMP, a foundational document for the 10(a)(1)(A) Permit Application, is a technical document that provides guidance on the management and operation of the Conservation Facility that will be used to propagate SRC salmon as part of the reintroduction effort on the San Joaquin River. The basis for establishing the Conservation Facility and thus the HGMP, is the recognition that natural re-colonization alone is not sufficient to achieve the goal of establishing a self-sustaining population of SRC salmon in the San Joaquin River. NMFS evaluates Hatchery and Genetic Management Plans for threatened anadromous fish under the criteria provided in 50 C.F.R. § 223.203(b)(5).

1. The HGMP and decisions made under this plan will be guided by the adaptive management strategy described in the Fisheries Management Plan (FMP), which recognizes and plans for the myriad sources of uncertainty associated with a project as large and complex as the SJRRP. As such, the HGMP recognizes that all plans for the development and operation of the Conservation Facility would be subject to revision based on this adaptive management approach. Paragraph 19(b) of the stipulated settlement requires the Secretary to engage with the Exchange Contractors and RMC in a more in-depth manner than through the public process required by regulation. As such, the Exchange Contractors and RMC must be notified in the event of any substantial revisions to the HGMP and must be provided the opportunity to review such revised plans as they become available so that we may better understand how proposed changes to the HGMP may affect water system operations, water supply and land use on the San Joaquin River.

2. The HGMP Program timeline (Figure ES.1. page viii) has several milestones, commencing with submission of permit applications in September 2010, and ending in 2025 with the planned phase-out of the Conservation Facility pending establishment of self-sustaining SRC salmon populations in the San Joaquin River. NMFS must set forth a plan that addresses delays in meeting these milestones and disclose the effect the delays would have on the Program's ability to meet its specific goals, especially within the proposed timeline. For example, what measures are specifically built into the Program's timeline to accommodate for any delays in getting the appropriate permits, in procuring funding or the unavailability of the required level of funding for the conservation facilities, and various uncertainties associated with the salmon broodstock collection, rearing and reintroduction components (mentioned within the body of the HGMP) that could potentially delay the overall Program's timeline?

3. NMFS must also clarify what are the ramifications of any delays in the Program's proposed timeline on water system operations on the San Joaquin River. For example, the HGMP states that if the return target of 500 "wild" SRC salmon is not met in 2019 or any year thereafter, the monitoring data will be reviewed and restoration strategies assessed to recommend refinements in management actions to improve returns. What types of revisions and refinements in proposed management actions could be prescribed that would potentially affect water system operations and water supply and land use on the San Joaquin River?

4. A breakdown of the long-term operational and monitoring costs and sources of funding for the full-scale Conservation Facility are provided. What is the approximate capital cost of this facility? What are the sources of funding? Further, what are the prospects for

successfully procuring this funding in a timely manner, so that the full-scale Conservation Facility may begin its operations as proposed in the summer of 2014?

5. It appears that the operational and monitoring (O&M) funds currently available to the State are insufficient to support the full-scale Conservation Facility, and that cost sharing is being explored between California Department of Fish and Game ("CDFG") and others to procure the appropriate level of funding. Has CDFG identified alternate strategies for procuring O&M funds in case the cost sharing measure proves to be unsuccessful for any reason?

6. In the discussion on pages 73-74 regarding the total number of broodstock to be collected from each source population, it was stated that collection goals are based on the number of fish necessary to capture the genetic diversity of the source stocks. Further, it was stated that all three populations (Feather River, Butte Creek, Deer/Mill Creek populations) should be used in roughly equal proportion, as using one population at a much higher level than the other would overwhelm the genetic diversity in the other smaller populations. The HGMP fails to properly consider the consequences if the Feather River populations is the only one available for sourcing broodstock at the time of collection? As previously discussed, the Feather River spring-run population has significant levels of hybridization with fall-run Chinook and also likely consists of both hatchery-spawned and naturally-spawned fish which could prove problematic for adhering to the goal of maintaining the genetic integrity of SRC salmon stock and inclusion of non-hatchery fish in the broodstock, especially if the Feather River population is the only one from which the broodstock could be sourced.

7. The Conservation Facility program has planned several studies to fill data gaps that will help better inform the program on salmon conservation, reintroduction strategies. Some of these planned studies will be conducted in off-site laboratories, and others in-situ in the San Joaquin River. Four out of these ten listed studies will be conducted in the San Joaquin River (Acoustic Telemetry, Juvenile Predation, Egg Survival, and Juvenile Migration Survival). What are the implications of these in-situ studies on the water system operations, water supply and land use in the San Joaquin River during the course of these studies?

The Exchange Contractors and RMC appreciate this opportunity to comment on the 10(a)(1)(A) Permit Application and the HGMP.[21] We look forward to working with NMFS and USFWS to develop a program that meets the goals of the legislation in a manner that does not cause adverse impacts to our customers and landowners.

Sincerely yours,

Thomas M. Berliner

Thomas M. Berliner

TMB:br

cc: Exchange Contractors, Boards of Directors
RMC, Board of Directors

References

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[21] The comments submitted by the San Joaquin River Group are incorporated herein.

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March 7, 2011

Elif Fehm-Sullivan
650 Capitol Mall, Suite 5-100
Sacramento, CA 95811

Dear Ms. Fehm-Sullivan

The Deer Creek Watershed Conservancy (DCWC) attended your public workshop on February 3, 2011 and met with Kim Webb with the USFWS on March 2, 2011 to discuss Deer Creek as a potential donor stream. We are aware that the San Joaquin River Restoration Project (SJRRP) is the result of a settlement and is activities are court directed. While we are generally supportive of restoration efforts, we have the following concerns that should be addressed:

- That the wellbeing of "donor stocks" be placed above that of the experimental populations in the San Joaquin River. Deer Creek is home to the last pure strains of wild spring-run Chinook salmon and contains confirmed functional spring-run habitat that has not been used to capacity for some time. The salmon's stability should not be jeopardized to establish an experimental population in experimental habitat. We recommend that fish from hatchery systems be used until the system is functionally supporting all life stages of spring run salmon and then only when Deer Creek stocks can sustain the loss of donor fish should these fish be introduced into the program.

- That life stages and methods of collection/transportation be best fitted to each system with practical elements such as access, weather, and timing be given full consideration before any recommendation is made. Deer Creek is largely a rugged and remote watershed and needs to be considered on an individual basis. Previous attempts at collection and transportation of fish from out watershed should be referenced when making decisions.

- That local landowners, agencies, and conservation groups be included in the decision making process that affects their watershed and be kept apprised of the proceedings throughout the duration of the project. These groups are by far the most familiar with the Deer Creek watershed and have strong working relationships. It is critical to the success of this project and to any other projects in the watershed that you utilize this local knowledge and expertise.

- While it appears that Mill and Deer Creek fish are effectively treated as one population for donor requirements, it is unclear whether or not they will be evaluated for having stocks stable enough to sustain donor losses on an individual or group basis. For example, if the minimum population is determined to be 500 fish for a number of years to be considered eligible to donate fish, these minimums need to be met for each creek rather than for both combined.

- That collection and distribution of donor fish be done in such a way that it minimizes or eliminates the waste of fish and funds. That donor fish and/or there offspring be released into a system that has adequate flows and habitat to facilitate their migration, spawning, and the rearing of juveniles. Until the system has met these requirements, wild stocks should not be used.

Again, we understand that this project is part of a court mandated action but we are disheartened that funds are being poured into an experimental system before they are dedicated to improving existing systems that currently support spring-run. We would like to emphasize the importance of establishing criteria to protect donor stock that will be clear to current and future resource managers and decision makers. Local involvement is key to effective and successful collection of donor stock. We would also like to point out that the time spent with Kim Webb was far more beneficial and informative than the public workshop we attended in February. We have participated in many of these processes and understand that public workshops are necessary and mandatory but we would like to see more personal outreach efforts in the future and would like to credit and thank Kim for her efforts.

DCWC would like to be included in an applicable workgroup, both to facilitate our keeping relevant parties apprised of the proceedings of the project and to lend our local knowledge to ensure that the above concerns are addressed. We support the practical and efficient success of this project, and look forward to working with you to reach mutually beneficial results.

Thank you for considering our input. Please contact Holly Savage at 530/781-2220 with any questions and/or comments.

Sincerely,

Bill Berens
President

DEER CREEK WATERSHED CONSERVANCY
PO Box 307 - Vina, CA 96092
deercreekwatershed@gmail.com

Cc: Kim Webb, USFWS

O'Laughlin & Paris LLP

Attorneys at Law

SENT VIA ELECTRONIC TRANSMISSION – SJRSpring.Salmon@noaa.gov

National Marine Fisheries Services
650 Capitol Mall, Suite 5-100
Sacramento, California 95814

Re: *Endangered and Threatened Species; Take of Anadromous Fish*

Protected Resources Division:

Attached to this cover letter are the comments of the San Joaquin Tributary Association.[1] We have also reviewed and incorporate herein the comments of the San Joaquin River Exchange Contractors Water Authority and the San Joaquin River Resource Management Coalition.

We will not reiterate all of the comments in this cover letter. We do want to comment on three procedural issues. The USBR is supposed to do, and has stated that they are doing, a PEIS for the San Joaquin River Restoration Program. To date, Reclamation has failed to deliver on its promise. The PEIS/PEIR needs to be done first so the public knows the environmental baseline, and what the environment will look like under various project alternatives in which these fish will be reintroduced. Lacking such basic scientific information makes it almost impossible to discuss intelligently the conditions these fish will face in reintroduction.

The second process issue reinforces the problem raised in the previous paragraph. When USFWS submitted the application, the three foundational documents that are the basis of the application were in draft. They only recently became finalized. The public has not seen an amended application based upon the final documents, even though "some discrepancies may exist between draft documents and our application." As our comments point out, there are significant discrepancies, both in the program and the scientific factual basis to support the reintroduction.

Quite frankly, while the legislation calls for public involvement, it is clear that neither NMFS nor USFWS wants or needs the public involved. The federal register notice gave the public thirty days to respond to the application and the three supporting, but incomplete, draft documents. No time extension was granted. The whole process screams out that no matter what, NMFS and USFWS will railroad this project through.

[1] Oakdale Irrigation District, South San Joaquin Irrigation District, Modesto Irrigation District, Turlock Irrigation District, and Merced Irrigation District.

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Finally, if the PEIS/PEIR work had been done and if the application was incomplete, then the information necessary to determine if the reintroduction can or could be successful would be present—it isn't. Even the most basic data regarding water temperature, velocities, substrate, dissolved oxygen, gravels, and food sources are absent from the document.

What the application and federal register notice really say is, "trust us." Well, we don't. The settlement in this matter was reached behind closed doors without any input from these entities. We have said it previously, and will say it again: This settlement will not be borne on the backs of the tributary agencies.

We would request that the application be denied until, at a minimum, the following occur:

1. A final application is submitted, based on final reports;
2. A PEIS/PEIR is completed by Reclamation; and
3. The initial fieldwork is done based upon the experimental flows to provide the basic scientific information to support the reintroduction rather than relying on the agencies' assumptions.

Very truly yours,

O'LAUGHLIN & PARIS LLP

TIM O'LAUGHLIN

TO/tb

FISHBIO ENVIRONMENTAL, LLC
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MEMORANDUM

Comments on the United States Fish and Wildlife Service's September 29, 2010, *10(a)1(A), Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River*

TO: Tim O'Laughlin

FROM: Sunny Snider, Shaara Ainsley, Michele Palmer, and Andrea Fuller

DATE: February 28, 2011

This memorandum presents our comments on the *10(a)1(A), Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River* (Permit 14868) prepared by the United States Fish and Wildlife Service (USFWS) in cooperation with the National Marine Fisheries Service (NMFS), U.S. Bureau of Reclamation (Reclamation), and California Department of Fish and Game (DFG) (U.S. Fish and Wildlife Service 2010). The USFWS submitted the permit application to NMFS, along with a Hatchery and Genetic Management Plan (San Joaquin River Restoration Program 2010h), with a request for a 7-year permit (2012-2019) to collect Central Valley spring-run Chinook salmon for the purposes of reintroduction into the San Joaquin River. On February 4, 2011, NMFS issued a notice of receipt for this permit application and included a request for public comments (76 FR 6400).

Summary

The effects of taking fish and eggs from donor streams, the problems with reintroducing spring-run and hatchery fish into poor existing conditions in the SJR, and the potential

effects on existing salmon and steelhead populations in the greater SJR basin, will compromise the integrity of the last remaining Central Valley spring-run populations and add stressors to already declining fall-run and steelhead populations in donor streams and the SJR basin. We describe many issues in our comments that follow, but key points include:

- Proposed quota criteria and collection methods are not protective enough of the donor stock since two of the primary proposed donor spring-run populations (Butte Creek and Mill/Deer Creek Complex) are within a federally Threatened ESU and, along with the third primary donor population (Feather River Hatchery), have recently declined to high risk of extinction.
- Existing conditions in the San Joaquin River Restoration Area and areas downstream will not support the experimental population, and, until restoration is completed, even the proposed transport, culture, and release methods will not compensate for inadequate existing conditions.
- Non-native predators, extant in the SJR, will predate juveniles from the experimental population and their progeny—the SJRRP should consider identifying/quantifying predators and implementing predator control strategies before introducing eggs and juvenile spring-run fish.
- Predation on juvenile salmonids, including the experimental population and their progeny, can be exacerbated by poor existing conditions in the SJR.
- If not predated prior to exiting the Restoration Area, juveniles from the experimental population and their progeny will be susceptible to high rates of predation in the lower SJR and Delta.
- Expected egg mortality rates are grossly underestimated, and water temperatures in the spawning reach will not support spring-run spawning or egg incubation.
- The possibility that high water temperatures, in combination with other factors such as poor survival through the Delta and in the ocean, may entirely preclude establishing a viable salmon population has not been adequately addressed.
- Climate change models have predicted scenarios of increased water temperatures in Central Valley rivers over the next 10 years; the reintroduction plan does not sufficiently consider the implications of these climate change scenarios on the experimental population or its progeny.
- It has been proposed that salmon will adapt over time, but existing populations in the Stanislaus, Tuolumne, and Merced Rivers have had the opportunity to adapt over successive generations and are still struggling to persist.
- Fall-run populations in the lower San Joaquin River are already experiencing declines for multiple reasons—and fish from these populations are not exposed to the additional challenges that spring-run will experience. Spring-run survival is expected to be even lower than fall-run and would be unsustainable under the proposed reintroduction methods.
- Survival estimates used to predict potential returns are too high for every life-stage considered, and lack confidence intervals, and therefore the numbers being stocked

are will not produce the desired conservation goal.

- Proposers are aiming for an eventual spring-run population of 500 fish in the SJR, but a population consisting of 500 fish still represents a moderate extinction risk. .
- The extent and exact nature of much of the existing conditions in the SJR have not been quantified, and restoration is planned for after re-introductions have occurred. There are 37 studies planned to address unknown conditions in the SJR. We suggest that these studies, and adequate restoration actions to address needs identified in these studies, be conducted before introducing spring-run salmon.
- Reintroduction of spring-run Chinook salmon to the San Joaquin River, as well as SJRRP restoration flows, may negatively affect fall-run Chinook salmon (FRCS) Essential Fish Habitat (EFH) in nearby tributaries, FRCS populations in the SJR and its tributaries, and federally Threatened Central Valley steelhead in the SJR or in proposed donor streams.
- Feather River hatchery (FRH) introgression has been found to be a major threat to the genetic integrity of wild stocks, yet the SJRRP still included these stocks as an option for reintroduction.
- There is no consideration given to the potential for broodstock (mixed from various populations) to stray and spawn with natural populations (Butte, Mill, Deer creeks) resulting in hybridization of the last remaining spring-run populations in the Central Valley.

To protect the donor and experimental populations, reintroduction should not be allowed until all San Joaquin Restoration Actions are completed, a predator suppression program is implemented, and studies demonstrate that reintroduced fish can be supported under restored conditions. To protect the donor population, collection of individuals from donor stock should not be allowed until it has been demonstrated that there is a surplus of individuals in donor populations. To protect the experimental population, release methods that are more effective than those proposed in the Permit Application should be implemented. Further, measures to protect Threatened steelhead and Species of Concern fall-run Chinook in the San Joaquin Basin need to be integrated. We also recommend that prior to the reintroduction of spring-run salmon to the SJR, (1) studies be conducted addressing the substantial number of unknowns in this system, and (2) successful restoration occur. We also recommend that metrics for assessing and monitoring the effectiveness of the project be included as part of the Permit Application, including triggers that would result in grounds for discontinuing the reintroduction efforts.

Comments pertaining to the United States Fish and Wildlife Service's September 29, 2010, *10(a)1(A), Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River*

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INTRODUCTION

On February 4, 2011, the National Marine Fisheries Service (NMFS) issued a “Notice of receipt of application for a new scientific research and enhancement permit, notice of public meetings, and request for comment” regarding the U.S. Fish and Wildlife Service (USFWS) 10(a)(1)(A) Permit Application (permit 14868) to collect Central Valley spring-run Chinook salmon from 2012 through 2019 for the purpose of reintroduction into the San Joaquin River (76 FR 6400). As part of the permit application, the USFWS identifies targets and objectives for the program, identifies potential effects of collecting and reintroducing individuals to the source (i.e., donor) populations and experimental population, and subsequently proposes conservation measures to minimize adverse impacts. The target for the reintroduced experimental population of spring-run Chinook salmon is a minimum annual return of 500 adults by 2019. The Permit Application states that

> the overall objective is to collect and reintroduce multiple life stages of spring-run Chinook salmon to develop a naturally-reproducing, self-sustaining population of spring-run Chinook salmon in the [San Joaquin River] SJR… Another clear objective … is that these collections not have an adverse impact on the population viability of the [Evolutionarily Significant Unit] ESU and/or the populations within each potential source stream. Finally, the reintroduction and management activities in the restored SJR should not adversely affect the experimental population and their progeny within the mainstem SJR. (Page 5)

Although the USFWS concludes that their proposed conservations measures will achieve the targets and objectives, we disagree with their conclusions and provide evidence to the contrary.

Due to the short review period, we did not have sufficient time to thoroughly review all elements identified in the United States Fish and Wildlife Service’s September 29, 2010, *10(a)1(A), Enhancement of Species Permit Application for the Reintroduction of Central Valley Spring-Run Chinook Salmon into the San Joaquin River* (U.S. Fish and Wildlife Service 2010), hereafter referred to as the ‘Permit Application’. Instead, we focused our review primarily on the project target and objectives, effects analysis, and proposed conservation measures. Our comments are organized into three main sections: Main Comments, Additional Considerations, and Proposed Conservation Measures. Main Comments contain issue statements regarding key points that were not adequately addressed, or not considered, within the Permit Application. Supporting information follows each issue statement, but is not all-inclusive due to time constraints. Additional Considerations identify a number of other issues that need to be addressed in further detail. The final section, Proposed Conservation Measures, contains recommendations for more protective measures deemed necessary to prevent adverse effects to the donor populations, experimental population, and other species not considered.

Main Comment topic areas include the following:

(1) Collection Effects on Donor Spring-Run Population

(2) Reintroduction Effects on the Experimental Population

(3) Reintroduction Effects on Fall-run Chinook Salmon Essential Fish Habitat

(4) Reintroduction Effects on Fall-run Chinook

(5) Reintroduction Effects on Central Valley Steelhead

(6) Reintroduction/Hatchery Effects on Genetic Diversity

(7) Ocean Harvest of Donor and Experimental Populations

Furthermore, the Permit Application was submitted to meet a mandated deadline. It is not complete and is not easy to review because all three of the "foundational documents that comprise the initial technical framework for the current project description within [the] application…(i.e., Stock Selection Strategy; the Hatchery and Genetics Management Plan [HGMP] for the SJR; and the Reintroduction Strategies document) are in draft form and "attached in their most current state" (U.S. Fish and Wildlife Service 2010).

MAIN COMMENTS

Collection Effects on Donor Spring-Run Population

The quantitative decision matrix for choosing the number of stock taken and from which populations stock will be taken has not been developed. The Permit Application states (page 97) that the "complete details of this decision matrix are not currently available" but did put forward a "placeholder within this decision matrix, until such time the updated viability benchmarks are made available to the FMWG" [Fisheries Management Work Group] and proposed an approach for "following criterion [based on Lindley et al. 2007] for planning within the DSC [Donor Stock Collection] process." Several criteria must be met for the donor population to be at a low (<5%) risk of extinction including (1) a census population size of at least 2,500 individuals, (2) evidence that the population is not declining, (3) no catastrophic events during the previous 10 years, and (4) evidence that there is little hatchery influence. Donor populations do not meet these criteria now, and are not expected to return to a low risk state in upcoming years.

Proposed quota criteria and collection methods are not protective enough of the donor stock since two of the primary proposed donor spring-run populations (Butte Creek and Mill/Deer Creek Complex) are within a federally Threatened ESU and, along with the third primary donor population (Feather River Hatchery) have

recently declined to high risk of extinction according to Lindley et al. (2007).

In 1998, a status review was conducted of west coast salmon populations and a majority of the Biological Review Team (BRT) originally concluded that the Central Valley spring-run Chinook salmon ESU was in danger of extinction (Myers et al. 1998). However, the BRT ultimately decided, and has maintained the view, that this ESU was not in danger of extinction, but was likely to become endangered in the foreseeable future (Good et al. 2005). A primary reason for this revised view has been that there was a large run of naturally produced spring-run Chinook salmon observed in Butte Creek in 1998, and increases in abundance of the Mill, Deer, and Butte creek populations through the last status review (up to 2001) probably due to "the combined effects of habitat restoration, reduced fishing effort in the ocean, and favorable climatic conditions" (Good et al. 2005). Concerns were raised regarding the potential influence of the Feather River Hatchery spring-run Chinook salmon population on natural populations, and the small number and locations of extant spring-run Chinook salmon populations. There are only three streams that support self-sustaining runs of spring-run Chinook salmon, these streams are all located in close proximity to each other, and all three streams originate in the southern Cascade Mountains—these factors increase the vulnerability of these populations to catastrophe.

During the settlement agreement, all indications were that spring-run populations were increasing in existing tributaries: total annual escapement estimates for the Central Valley increased from 7,683 to 16,126 between years 1990 and 2005 (

Table 1). However, populations have declined severely in the last few years, and the preliminary escapement estimate for 2010 was 3,792 total Central Valley spring-run. An upcoming five-year status review by the BRT is scheduled for 2011, but will only examine abundance updates through 2007, so the findings will not reflect the most recent, and most serious, declines in the population that have occurred during the last three years (2008-2010). If the three most recent escapements are considered (2008-2010;

Table 1), Butte, Mill, and Deer Creek populations are at high risk of extinction and Feather River populations are at moderate/high risk based on Lindley et al. (2007) viability criteria. As such, the ESU would be expected to be in danger of extinction resulting in a potential change of the ESU to endangered status.

Due to the current, high-risk extinction status of these populations, it is not advisable to consider removing individuals from the population to be placed in conditions off-site that will not support them. Although the reintroduction was planned as a way to reduce the potential for loss of the ESU in the event of a regional catastrophe, the current, un-restored conditions in the SJR will not support individuals placed into it, and restoration actions will not be completed for many years. In order to achieve the goal of protecting the existing populations within the ESU from extinction, it would be more prudent to spend the time and money dedicated to the SJRRP for implementing a captive broodstock program within the Sacramento River basin (like the winter-run Chinook salmon Livingston Stone/Moss Landing program) to ensure survival of existing populations.

Any individuals removed for use in the SJRRP program would preclude use of those fish for in-stream captive broodstock programs that may become necessary. Fish used for the latter would be released into areas known to have conditions that can support them (e.g., Mill, Deer, and Butte Creeks), as opposed to fish released into the SJR where their chance of survival is low, particularly in the absence of restoration actions.

Although we do not necessarily agree with the AFRP doubling goals, they are currently the only measures identified for restoration and the USFWS is responsible for implementing actions to achieve these doubling goals. Until the existing populations have at a minimum reached these doubling goals for at least three generations, these populations cannot afford to have individuals removed for offsite reintroductions as evidenced by the recent declines. Therefore, a very conservative metric should be used for determining when it is acceptable to remove fish from existing populations for reintroduction into the SJR. For example, populations should achieve AFRP doubling targets (Table 3) for a minimum of three consecutive years before individuals can be considered for removal for SJRRP reintroduction purposes.

Justification for the reintroduction of spring-run populations to the SJR includes that it will make the spring-run ESU more viable by increasing the number and geographic spacing of spring-run populations—but that increase in viability would be negated if the last remaining spring-run populations were extirpated as a result.

The Public Draft Recovery Plan (National Marine Fisheries Service 2009) states "viability of the ESU is also more likely if: (1) populations are geographically widespread but some are close enough together to facilitate connectivity; (2) populations do not all share common catastrophic risks; and (3) populations display diverse life-histories and phenotypes (McElhany et al. 2000)." It also states that "[t]he current distribution of viable populations makes the Central Valley spring-run Chinook salmon ESU vulnerable to catastrophic disturbance." (National Marine Fisheries Service 2009, p. 61). Thus, as justification for the reintroduction experiment on the San Joaquin River, the

Hatchery and Genetic Management Plan asserts that “an additional population [of spring run (i.e. on the San Joaquin River)] decreases the demographic and environmental risks inherent in an ESU consisting of one or a few small populations.” Taking endangered fish and eggs from the existing, and declining, populations and introducing them to poor conditions in the SJR for an experiment that may only produce a conservation-reliant population puts the existing populations at risk.

Table 1. Escapement abundance and extinction risk status of proposed primary donor populations since 1990 (California Department of Fish and Game 2011).

Year	Mill Creek	Deer Creek	Butte Creek	Feather Hatchery
1990	844	496	250	1,893
1991	319[a]	479[a]	-[a]	4,303
1992	237[a]	209[a]	730	1,497
1993	61[a]	259	650	4,672
1994	723	485	474[a]	3,641
1995	320[a]	1,295	7,500	5,414
1996	253[a]	614[b]	1,413	6,381
1997	202[a]	466[a]	635	3,653
1998	424	1,879	20,259	6,746
1999	560	1,591	3,679	3,731
2000	544	637	4,118	3,657
2001	1,104	1,622	9,605	4,135
2002	1,594	2,195	8,785	4,189
2003	1,426	2,759	4,398	8,662
2004	998[b]	804	7,390	4,212
2005	1,150	2,239	10,625	1,774
2006	1,002	2,432	4,579	2,181
2007	920	644	4,943	2,674
2008	362[a]	140 [a]	3,935 [b]	1,624 [e]
2009	220 [a]	213 [a]	2,059 [c]	989[e]
2010	482 [a]	262 [a]	1,160 [d]	1661

[a] High risk of extinction as indicated by "decline within last two generations to annual run size ≤ 500 spawners" (Lindley et al. 2007)
[b-d] High risk of extinction as indicated by "run size > 500 but declining at ≥ 10% per year" (Lindley et al. 2007): [b] = 20%; [c] = 48%; [d]= 44%; [e] = 39%

Table 3. Anadromous Fish Restoration Program (AFRP) Doubling Goals for spring-run and fall-run Chinook salmon in the Central Valley (Anadromous Fish Restoration Program 1995).

River/Creek	Restoration Goal	
	AFRP Doubling (1995)	SJRRP
Spring-run Chinook		
Mill	4,400	-
Deer	6,500	-
Butte	2,000	-
San Joaquin	-	30,000
Fall-run Chinook		
Stanislaus	22,000	-
Tuolumne	38,100	-
Merced	18,000	-

Collection methods, as summarized in the Permit Application on pages 14-15, are varied and have the potential to disturb already depressed spring-run donor populations.

Eggs will be collected “through redd excavation and/or redd pumping in Butte, Deer and Mill creeks,” or by capturing ripe adults in remote locations in these rivers. Juveniles will be collected using seines, electrofishing surveys, minnow traps, fyke nets, and RSTs. Adults from Butte, Deer and Mill Creeks may be seined or captured in tangle nets before spawning and delivered to the SJR. The spring-run populations that exist in Butte, Deer, and Mill Creeks are already suffering (

Table 1). These collection methods will not simply remove important contributions to these populations, but will also (1) disturb sediments, substrates, and food resources, (2) cause unnecessary stress to adults and juveniles that remain in their home streams and to individuals transferred elsewhere, possibly compromising the success of spawning activities, and (3) disturb redds, possibly compromising the integrity of redds and reducing egg survival. Many of these potential impacts to existing spring-run populations are discussed in the Permit Application.

Reintroduction Effects on Experimental Population

The Permit Application states that the "reintroduction and management activities in the restored SJR should not adversely affect the experimental population and their progeny within the mainstem SJR." However, the habitat conditions in the San Joaquin Restoration Area are highly degraded and reintroducing fish and/or eggs prior to restoring habitat will not meet this objective.

Existing conditions in the San Joaquin River Restoration Area and areas downstream will not support the experimental population, and, until restoration is completed, even the proposed transport, culture, and release methods will not compensate for inadequate existing conditions.

According to the Permit Application (page 63), "before restoration is completed, the in-stream conditions may limit the growth potential and the survival rates of the introduced eggs and juveniles". This view is corroborated by the NMFS (National Marine Fisheries Service 2009), which states that the population is

> likely to be conservation-reliant, particularly in the near-term (five to ten generations)[, because] it seems highly unlikely that enough habitat can be restored, particularly in the near-term, such that the spring-run Chinook salmon ESU could be expected to persist without appropriate conservation management. (Page 120)

There are notable differences in habitat between the donor creeks, where spring run currently exist in low numbers, and the Restoration Area, demonstrating that existing habitat in the Restoration Area is unsuitable.

The Mill/Deer Creek Complex has generally been described as undisturbed and relatively pristine:

> The upper watershed [of Mill Creek] is relatively inaccessible, it is undisturbed, pristine, salmonid spawning habitat (CH2M Hill 1998). (Chappell 2009)

> There is no evidence that degradation of riparian habitat [in Deer Creek], due to cattle grazing and farm practices in spawning areas, has adversely affected spring-run abundance in recent years. The terrain (i.e., bedrock

> cliffs, canyons, and steep gradient boulder cascades) is not conducive for live stock grazing. (California Department of Fish and Game 1998)
>
> Deer Creek has excellent instream habitat conditions for spring-run Chinook holding, spawning, and rearing (Armentrout and other 1998). . . The upper watershed is inaccessible for most of its length due to the steep canyon walls, except where Highway 32 parallels the creek, limiting human use. (Chappell 2009)

Butte Creek produces the largest runs of spring-run in the Central Valley, however, some reaches of the creek have been degraded in comparison with historical conditions. Upper Butte Creek is relatively remote, with a deeply incised canyon and deep spring-fed pools (Figure 1 Figure 2). The reach between Centerville Head Dam and Centerville Powerhouse is considered the best spring-run oversummering habitat. Although the reach from the Powerhouse to the PPDD (Parrott-Phelan Diversion Dam) has the highest quantity and quality of spawning gravel (San Joaquin River Restoration Program 2010f) (Figure 4), it has experienced considerable residential development and channel modifications (California Department of Fish and Game 1998). The reach from Quartz Pool down to Centerville Covered Bridge (Figure 5), approximately 11 river miles, is the best holding and spawning habitat (Ward et al. 2004; as cited in San Joaquin River Restoration Program 2010f).

In contrast, the Restoration Area is highly degraded. Reach 1, the oversummering and spawning reach from Friant Dam to Gravelly Ford (approximately 37 miles) is an incised, gravel-bedded channel with a moderate slope, confined by periodic bluffs and terraces. The reach is divided into two subreaches: Reach 1A, Friant Dam to State Route 99, has the most gravel, and generally has continuous riparian vegetation (except locations disrupted by gravel mining or development; Figure 6). Reach 1B from SR 99 to Gravelly Ford is narrowly confined by levees, with woody riparian species occurring mainly in narrow strips right next to the river channel (San Joaquin River Restoration Program 2010c). Clark (1943, as cited by San Joaquin River Restoration Program 2010d) documented spring-run Chinook salmon holding in two large pools directly downstream from Friant Dam (Figure 7). Spawning habitat is in the 10-mile reach between the dam and Lanes Bridge (State Route 41; Figure 8).

The elevation of salmonid habitat is considerably higher for Mill and Deer creeks than for Butte Creek or the San Joaquin River Restoration Area (Figure 9). Mill and Deer creeks are also some of the few remaining tributaries with access to historical headwaters (Chappell 2009). Furthermore, in the 1940s a fish ladder was constructed around a natural barrier on Deer Creek allowing access to Upper Deer Creek Falls; “approximately 20% of the spawning now takes place in the six mile extension.” (California Department of Fish and Game 1998).

Predation

Non-native predators, extant in the SJR, will predate juveniles from the experimental population and their progeny—the SJRRP should consider identifying/quantifying predators and implementing predator control strategies before introducing eggs and juvenile spring-run fish.

Non-native predators present in or moving into the Restoration Area include largemouth bass, smallmouth bass, green sunfish, warmouth, black crappie, and striped bass (McBain and Trush Inc. 2002). In addition to species specific evidence summarized below, the Fishing Report in the Fresno Bee Newspaper (http://www.fresnobee.com/sports/outdoors/fishing/index.html) documents non-native game fishes resident in the Restoration Area.

Largemouth bass

Largemouth bass are known to be a 'keystone predator' due to their flexible foraging strategies, size and gape, 'voracious' appetite, and tolerance for a wide variety of environmental conditions (Moyle 2002). During Fish and Game electrofishing surveys of the Restoration Area, largemouth were common in the lower reaches and found upstream as far as Reach 1B (San Joaquin River Restoration Program 2010d). Although largemouth bass predation on salmonids in the Sacramento- San Joaquin Delta is rare (Nobriga and Feyrer 2007, Baxter et al. 2010), there is evidence for predation in the tributaries. Deep pits created during gravel mining (which are present in Reach 1 of the Restoration Area) provide ideal habitat, with low water velocities, warm water, and aquatic vegetation (McBain and Trush Inc. 2002). On the Tuolumne River a diet study of largemouth bass found in mining pit habitats revealed that they do predate upon outmigrating juvenile Chinook salmon, especially hatchery fish (EA Engineering Science and Technology 1992b; as cited inMcBain and Trush Inc. 2002).

Smallmouth bass

Smallmouth bass feed on insects, crustaceans amphibians and other fishes; they may compete with native species (e.g., hardheads) for food resources such as crayfish (Moyle 2002). In the Tuolumne River, they were also found to prey on outmigrating Chinook salmon in the pool habitat created by gravel mining (EA Engineering Science and Technology 1992b; as cited inMcBain and Trush Inc. 2002). Smallmouth bass are present in the Restoration Area, and as a more stream-oriented fish that prefers cooler waters than most other non-natives species (Brown 2000), they may be more common in Reach 1 with the summer restoration flows.

Striped bass

Since the 1960s various studies have showed that striped bass in the Sacramento-San Joaquin Delta and tributary rivers eat salmon (Stevens 1966, Thomas 1967, Pickard et al. 1982, Edwards 1997, Tucker et al. 1998, Merz 2003, Nobriga and Feyrer 2007). Additional evidence suggests that predation in the tributaries may reduce the number of outmigrating juvenile salmon before they even make it to the Delta (Jager et al. 1997, Demko et al. 1998), because the narrow and relatively shallow channels concentrate the fish (Hanson 2009). At an abundance of roughly 1 million adult striped bass, there is an estimated 9% chance of an individual juvenile Chinook salmon being predated upon in the Sacramento River (Lindley and Mohr 2003). Predation on salmonids appears to be patchy—both seasonally and spatially, with higher levels of predation documented in the spring—in areas of anthropogenic influence, such as near water diversion structures and dams (Gingras 1997, Tucker et al. 1998, Merz 2003, Clark et al. 2009). Striped bass are highly mobile and are often recorded in the spring passing upstream of fish counting weirs on SJR tributaries (FISHBIO unpublished data). In recent years it has become clear that predation by striped bass may significantly limit salmon recovery efforts. The NMFS draft recovery plan (2009) for Chinook and Central Valley steelhead stated that "predation on juveniles from all populations rearing and migrating through the Sacramento River and Delta" is one of the most important stressors.

Other bass species
In recent years, both spotted bass and redeye bass have invaded the Delta. Spotted bass were common in the lower reaches of the Restoration Area according to Fish and Game electrofishing surveys (San Joaquin River Restoration Program 2010d). Redeye bass populations, which may also be present in the Restoration Area, now dominate the fish fauna of the Cosumnes River basin, where it has had a substantial effect on shaping the current species assemblage (Moyle et al. 2003). McBain and Trush (2002) caution that the "[c]reation of holding pools or other types of spring and fall Chinook salmon habitat may improve habitat conditions for redeye bass. . . Redeye bass, if established in the San Joaquin River, could become important predators of native fishes."

Predation on juvenile salmonids, including the experimental population and their progeny, can be exacerbated by poor existing conditions in the SJR.

As part of the development of the fish management plan, a proof-of concept Ecosystem Diagnosis and Treatment (EDT) model was used to perform a preliminary diagnosis on the condition of the ecosystem (San Joaquin River Restoration Program 2010g). The model results indicated that the three primary factors limiting spring-run Chinook salmon recovery in the Restoration Area were: 1) maximum temperature, 2) quantity of key habitat, and 3) predation. These factors are not independent – an increase in temperature may stress juvenile salmonids making them more susceptible to predation, and may increase the metabolic rate of predators, increasing predation rates. Lack of rearing habitat may also increase the likelihood of predation. When a similar analysis was conducted for the spawning reach (Reach A1 Friant Dam to Highway 41 bridge), results indicated that predation is considered an "extreme" negative change from historic conditions in terms of a decrease in productivity for several life stages (spawning, pre-spawning holding, fry colonizing, 1-age transient rearing and Age-1 migrants).

Because of the small size of the experimental populations, proposers need to also be wary of native predation, especially on eggs, that may be exacerbated if other prey items are not available in the Restoration Area.

Before anthropogenic changes altered the ecosystem, potential predators of juvenile salmonids were Sacramento perch, rainbow trout and Sacramento pikeminnow. Also, sculpin may have fed on both salmon eggs and fry (McBain and Trush Inc. 2002).

Though not their primary prey, resident rainbow trout and juvenile steelhead may predate juvenile salmonids (San Joaquin River Restoration Program 2010d). The Sacramento perch no longer exists in their native range in the SJR, but other native predators do. **Most importantly, native predators such as pikeminnow and sculpins have been implicated as important predators in the case of re-introductions and hatchery releases as reported below.**

Sacramento pikeminnow

Sacramento pikeminnow were historically the main predator in the Sacramento-San Joaquin system. They are opportunists that feed on aquatic insects, crayfish and fishes (Moyle 2002). **Although pikeminnow predate salmon in the region, in rivers they "do not appear to be significant predators of salmon and trout except under highly localized seasonal, or unusual circumstances that are often related either to the design of dams and diversions or to poorly planned releases of hatchery smolts"** (Brown and Moyle 1981). Sacramento pikeminnow are known to predate juvenile salmon below Redd Bluff Diversion Dam, primarily during the "gates-in" period when fish passing over the dam are disoriented (Tucker et al. 1998). None of the electrofishing studies conducted in the Tuolumne and Stanislaus Rivers identified pikeminnow as predators of juvenile Chinook salmon (San Joaquin River Restoration Program 2010d). Since adult pikeminnows are smaller than adult striped bass they may consume fewer salmon per capita (Hanson 2009). Additionally, large pikeminnows have a low metabolic rate and feed infrequently (Vondracek 1987), possibly reducing their ability to negatively impact juvenile salmonid populations (Moyle 2002).

Sculpin

Prickly and riffle sculpins are native species currently and historically present in the Restoration Area. These species are part of the "rainbow trout assemblage" occupying swift waters in cooler, high gradient habitats. Sculpins are benthic predators and may occasionally consume salmon or trout eggs, although there is controversy regarding the extent to which they can limit salmonid populations (Moyle 1977, McBain and Trush Inc. 2002, Moyle 2002). The susceptibility of salmonid eggs to predation depends on many factors, including the size of the sculpins, the size of the spawning gravel and the environmental characteristics of the spawning habitat (Moyle 1977, Palm et al. 2009). A recent study of the predation rate of European sculpin on Atlantic salmon eggs in northern Sweden found that predation rate was dependent on substrate size (Palm et al. 2009), with higher predation (83%) in the large substrate (62mm/2.4in) and low predation (2-3%) in the smaller substrates (13mm/0.5in to 37mm/1.5in). In some systems, such as lakes in Alaska, where the natural gravel is large and there are few fines, sculpin can place significant predation pressure on salmonid eggs. Foote and Brown (1998) estimate that 16% of the sockeye eggs laid during a spawning event in Iliamna Lake, Alaska may have been consumed by sculpins.

It has been suggested that salmonid eggs in natural gravels of the San Joaquin Basin are protected from sculpin predation "because the interstitial spaces in the gravel are too small for predators to reach the egg pockets. Sculpin and crayfish are capable of penetrating deeply into streambeds to feed on salmon eggs and alevins, but only where the gravel is coarse and free of fine sediments (McLarney 1964, Phillips and Claire 1966, Vyverberg 2004, pers. comm.)" (San Joaquin River Restoration Program 2010d). Notably, a comparison of the diet of prickly sculpin and juvenile Chinook on the Mokelumne River (Jan-Jun in 1998 and 1999) did not find any Chinook eggs in sculpin stomachs, but sculpin eggs were encountered infrequently in Chinook stomachs (Merz 2002). However, it is important to note that no sampling took place during the majority of the Chinook spawning period (fall). Additionally, eggs consumed by sculpin may be those that were not properly buried during spawning or dug up during redd construction (Moyle 1977). Given the continuing debate over sculpin predation on salmonid eggs, if spawning gravel will be added as part of the restoration effort, consideration should be given to potential predation and the substrate size limits for native sculpin (Palm et al. 2009).

Sculpin may occasionally consume salmonid fry (Moyle 1977, Tabor et al. 1998) however results of studies on fry predation can be affected by the methods used to collect the fish (Moyle 1977, Tomaro 2006). Relevant to the current situation on the SJR, Ward et al. (2008) examined the impacts of native fishes on the reintroduction of Atlantic salmon to streams in the Northeastern United States. Sculpin were found to consume hatchery Atlantic salmon fry, and may have consumed up to 20% of the stocked fry within hours of stocking. Additionally, the density of young-of-the-year salmon survivors was negatively correlated with sculpin density. The authors, in agreement with Moyle (1977), concluded that **"[t]he effects of sculpins on salmonids are probably most severe for population reintroductions or for populations already suppressed by other factors, as sculpins regularly coexist with healthy salmonid populations"** [emphasis added]**.** This is an important consideration for the re-introduction of spring-run Chinook salmon to the Restoration Area.

O. mykiss

Resident rainbow trout and juvenile steelhead primarily feed on terrestrial and aquatic invertebrates (Moyle 2002), but may predate juvenile salmonids (San Joaquin River Restoration Program 2010d). The Draft Restoration Strategies for the SJR (Stillwater Sciences 2003a) suggested that restoration of a steelhead population to the lower river should only occur once Chinook populations are "well-established and can tolerate the additional predation pressures." Whether or not they predate upon Chinook, the presence of large trout or steelhead may affect the habitat selection of Chinook fry and smolts.

If not predated prior to exiting the Restoration Area, juveniles from the experimental population and their progeny will be susceptible to high rates of predation in the lower SJR and Delta.

High predation losses at the State Water Project (SWP) are particularly detrimental to SJR salmon populations because over 50% of juvenile salmon from the San Joaquin travel through Old River on their way to the ocean, exposing them to predation at Clifton Court Forebay (CCF) and causing substantially reduced survival. Predation rates in CCF are as high as 66-99% of salmon smolts (Gingras 1997, Kimmerer and Brown 2006). Striped bass are generally associated with the bulk of predation in CCF since their estimated populations have ranged between 30,000 and 905,000 (Healey 1997, Cohen and Moyle 2004); however, studies indicate that six additional invasive predators occur in the CCF (i.e., white catfish, black crappie, largemouth bass, smallmouth bass, spotted bass, redeye bass) with white catfish being the most numerous, having estimated populations of 67,000 to 246,000 (Kano 1990). Yoshiyama et al. (1998) noted that "[S]uch heavy predation, if it extends over large portions of the Delta and lower rivers, may call into question current plans to restore striped bass to the levels of previous decades, particularly if the numerical restoration goal for striped bass (2.5 to 3 million adults; USFWS 1995; CALFED 1997) is more than double the number of all naturally produced Central Valley Chinook salmon (990,000 adults, all runs combined; USFWS 1995)." In 2005, Hanson conducted a pilot investigation of predation on acoustically tagged steelhead ranging from 221-275mm, and estimated that 22 of 30 (73%) were predated (Kimmerer and Brown 2006).

Temperature

Expected egg mortality rates are grossly underestimated, and water temperatures in the spawning reach will not support spring-run spawning or egg incubation.

The SJRRP FMP, Exhibit A (San Joaquin River Restoration Program 2010d) assessment of water temperatures for spawning and incubation indicates that egg mortality rates are expected to be about 50%. It states that:

> Target incubation temperatures for Chinook salmon are daily maximums of less than 55°F (13°C) (EPA 2003). Water released from Friant Dam should be less than 58°F (14°C) throughout the spawning period as long as the cold water pool in Millerton Lake is not exhausted. The HEC 5Q water temperature model developed for the Restoration Area (Deas and Smith 2008) suggests that implementing the Restoration Flow Schedule could result in maximum temperatures of the Friant release flows of under 62°F (16.7°C) [which is lethal according to Myrick and Cech 2001], in October or November (Figure 4-1). Using hydrologic and climatic conditions from 1980 to 2005, the temperature of the release flows would exceed 60°F during 20 years of the 26-year period (Figure 4-1). It is possible that these temperatures could result in Chinook salmon egg mortality rates of about 50 percent.

This assessment is flawed in terms of lifestage timing and the location where temperature is measured, which results in overestimation of egg survival. As described in the USFWS permit application on page 19, spring-run spawn August through October with peak spawning occurring in September. Maximum daily water temperatures recorded approximately 1.5 miles downstream of Friant Dam (CDEC station SJF) during the 2004-2010 spawning and incubation period demonstrate that, according to the criteria established by the SJRRP FMP (San Joaquin River Restoration Program 2010d, Table 3-1), maximum daily water temperatures in September were critical (58-60°F) to lethal (>60°F) at least 58% of the time. These temperatures represent the coolest conditions near the top of the spawning reach, which extends another 8.5 miles downstream, and water temperatures increase with distance below the dam due to the influence of ambient air temperatures.

Based on observed reservoir release temperatures and temperatures approximately 10 miles below the dams on the Stanislaus, Tuolumne, and Merced Rivers, warming of 2-10°F may be expected to occur within the 10 mile spawning reach of the San Joaquin River below Friant Dam during September and October. Using the most conservative estimate of warming in the spawning reach (2°F), maximum daily water temperatures between the gauging station and the bottom of the spawning reach in September may be critical (58-60°F) to lethal (>60°F) at least 83% of the time.

Table 4. Observed frequency of occurrence of SJRRP designated optimal, sub-optimal, critical, and lethal maximum daily water temperature conditions for Chinook salmon spawning and egg incubation in the San Joaquin River below Friant Dam, 2004-2010.

	Frequency of Maximum Daily Water Temperature by Month				
SJRRP Criteria	August	September	October	November	December
Optimal (≤55 F)	2%	9%	24%	33%	82%
Sub-optimal (>55 F to ≤ 58 F)	49%	33%	46%	56%	18%
Critical (>58 F to ≤ 60 F)	22%	51%	30%	11%	0%
Lethal (>60 F)	28%	7%	0%	0%	0%

Table 5. Estimated frequency of occurrence of SJRRP designated optimal, sub-optimal, critical, and lethal maximum daily water temperature conditions for Chinook salmon spawning and egg incubation in the San Joaquin River assuming warming of 2°F between the SJF temperature gauge and the bottom of the spawning reach.

	Frequency of Maximum Daily Water Temperature by Month				
SJRRP Criteria	August	September	October	November	December
Optimal (≤55 F)	0%	2%	14%	17%	46%
Sub-optimal (>55 F to ≤ 58 F)	4%	15%	17%	33%	46%
Critical (>58 F to ≤ 60 F)	47%	25%	38%	39%	8%
Lethal (>60 F)	49%	58%	30%	11%	0%

Under optimal water temperature conditions on the Stanislaus and Tuolumne Rivers, estimated egg to fry mortality rates have ranged from 25%-75% (Stillwater Sciences 2007, Carl Mesick Consultants and KDH Biological Consultants 2009). Given these observations, it is impossible to think that egg to fry survival in the Restoration Reach could be 50%, when at best, optimal water temperatures may be achieved 9% of the time during the peak spawning period. If eggs do survive to develop at high temperatures, the fry produced are at greater risk for deformities (Myrick and Cech 2001), and may be smaller and more susceptible to predation and displacement (Pettersson et al. 1996, Cutts et al. 1998; as cited in Myrick and Cech 2001), further reducing the likelihood of surviving to contribute to adult escapement.

The possibility that high water temperatures, in combination with other factors such as poor survival through the Delta and in the ocean, may entirely preclude establishing a viable salmon population has not been adequately addressed.

Assessment of the limitations associated with water temperature has been cursory, at best, despite the fact that the FMP describes projected temperatures as unsuitable for all lifestages of spring-run salmon based on criteria selected by the SJRRP. The criteria selected by the SJRRP are similar to the USEPA water temperature guidelines that were recently used as the basis to place the San Joaquin River below the Merced River confluence, and its tributaries, on the USEPA 303d list for temperature impairment (U.S. Environmental Protection Agency 2010). Temperatures in the spawning and rearing segments of the Restoration Area are expected to be warmer than in comparable reaches of the Stanislaus, Tuolumne, and Merced Rivers. Friant restoration flows will also reduce the ability to meet USEPA temperature criteria in the 303d listed segment of the San Joaquin River downstream of the Merced River confluence (San Joaquin River Group Authority 2007b). These high water temperatures may affect the survival of both the existing populations of fall-run Chinook salmon and spring-run that may be introduced.

Analysis of the impacts of expected temperatures on salmon productivity is limited to highly preliminary results from the proof-of-concept EDT model, which indicated that "maximum temperature, key habitat quantity, and predation were the primary factors limiting spring-run Chinook salmon habitat within the study area." It appears from the FMP that temperature has largely been viewed as a condition, which can be manipulated through flow and reservoir storage to achieve adequate survival of all lifestages to support a viable population. In reality, temperature may be one of the most difficult conditions to manage as it is highly influenced by factors over which we have little to no control including high ambient air temperatures, which are expected to rise 5°C by 2100 (Dettinger 2005), and reservoir release temperatures.

Note that in this document we do not endorse any particular criteria, but instead are providing examples of how and why the criteria established for this program will not be met.

Climate Change

Climate change models have predicted scenarios that of increased water temperatures in Central Valley rivers over the next 10 years; the reintroduction plan does not sufficiently consider the implications of these climate change scenarios on the experimental population or its progeny.

Global warming is a serious concern that should not be ignored, especially in the case of introducing fish to an already temperature impaired system. Dettinger (2005) determined that the most likely projection of annual average warming over Northern California is about 5°C by 2100, together with a decrease in precipitation. Under the prediction that air temperatures will increase by about 5°C by 2100, the Draft Recovery Plan estimates that the only habitat remaining would be "primarily in the Feather and Yuba rivers, and remnants of habitat [would be] in the upper Sacramento and McCloud rivers, Battle and Mill creeks, and the Stanislaus River" (National Marine Fisheries Service 2009). Lindley et al. (2007) estimates that even if summer air temperatures rise by a more conservative 2°C by 2100, the 25°C isotherm, delineating areas of "high summer temperatures" on the upper San Joaquin River and Butte Creek, "might just rise to the upper limit of the historical distribution of spring-run Chinook salmon."

Given existing temperatures in the SJR and climate change predictions, we strongly suggest that the SJRRP not introduce an experimental population until quantifying existing temperatures in the SJR, future temperatures in the SJR based on climate models, and thermal tolerance of spring-run fish—without a full understanding of these issues there is no way to ensure the immediate or long-term survival of an experimental or self-sustaining population.

Williams (2006) asserts that warming is already affecting Central Valley Chinook populations. Increased water temperatures caused substantial mortality of Butte Creek salmon populations during spring-run over summering. The predicted increase in temperature suggests that Central Valley salmon may not be able to survive over the long term, so that efforts to protect these populations are wasted resources that should be applied elsewhere (Williams 2006). There are several temperature monitoring and modeling studies planned for the existing conditions within the SJR in the San Joaquin River Restoration Program Final 2011 Agency Plan (San Joaquin River Restoration Program 2010b), but thermal tolerance studies are the only studies planned that addressed the impacts of climate change:

> Thermal tolerance is well-studied in Chinook salmon and an important variable for fitness at various life stages. It is therefore a key factor to consider in a successful reintroduction program. This is particularly critical for the reintroduction of Chinook salmon to the San Joaquin River system, the southernmost limit of the species' native range; great potential exists for climate change impacts to be felt early and severely in this portion of the range. Higher temperatures are known to directly affect salmonid growth and mortality, and to indirectly affect other variables such as susceptibility to disease or fish behavior (e.g., habitat selection, swimming performance, relationship to prey-predator community structure), all of which likely have some degree of genetic basis and heritability. Obtaining a gene expression profile of fall-run Chinook under variable thermal regimes will lend to our understanding of the genetic basis of thermal tolerance in this run and possibly in other genetically similar runs such as spring-run Chinook salmon. (Page A-101)

It has been proposed that salmon will adapt over time, but existing populations in the Stanislaus, Tuolumne, and Merced Rivers have had the opportunity to adapt over successive generations and are still struggling to persist.

Moyle (2005a) stated in an Expert Repot that "a restored flow regime does not need to track exactly the historic flow regime of the San Joaquin River because the behavior of both fall and spring-run Chinook can be manipulated through selection to fit a regime that is practical using available water." Salmon may adapt if a sufficient number from each generation can survive to contribute to subsequent generations. However, salmon have had the ongoing opportunity to adapt to conditions in the Stanislaus, Tuolumne, and Merced Rivers, yet these populations are struggling to persist due to factors such as poor ocean conditions and low survival through the Delta attributed to high predation in recent years. The chances that a self-sustaining population will be established through introduction and adaptation are extremely low given that any salmon attempting to colonize the San Joaquin River will experience more unfavorable conditions than existing populations in the tributaries.

Survival

Fall-run populations in the lower San Joaquin River are already experiencing declines for multiple reasons—and fish from these populations are not exposed to the additional challenges that spring-run will experience. Spring-run survival is expected to be even lower than fall-run and would be unsustainable under the proposed reintroduction methods.

In the Permit Application, proposers established conservation goals for a self-sustaining population of spring-run Chinook. The conservation goals will not be met because goals were based on survival estimates that are too high and because the targeted population size is too small. Further, the survival estimates were based on fall-run populations that vary with respect to the conditions they experience during migrations. This section will address these four statements in further detail:

> **(1) Survival estimates used to predict potential returns are too high for every life-stage considered, and therefore the numbers being stocked are not likely to produce the desired conservation goal.**
>
> **(2) There are no confidence intervals provided with survival estimates and therefore no method for determining how confident proposers are that the conservation goal will be achieved or the range of potential outcomes.**
>
> **(3) There is limited explanation of how survival estimates were calculated and very little rationale for how survival estimates were chosen when evidence suggests, instead, a wide range of potential estimates.**
>
> **(4) A population consisting of 500 fish represents a moderate extinction risk. An effective population size (N_e) of 500 might be considered low risk of extinction, but this would require census population size of at least 2,500 individuals.**

Egg to fry survival:

The egg to fry survival rate estimate is too high, does not include any estimation of standard errors, and was estimated at river temperatures lower than those expected in the SJR.

The permit application cites egg to fry survival rates from a study conducted in 1992 on the Tuolumne River (EA Engineering Science and Technology 1992), but two other studies on San Joaquin Basin rivers have since then reported lower egg to fry survivorship rates.

> The survival rates of eggs to the fry stage for fall-run in the lower Tuolumne River have been estimated at 40 percent (EA 1992) when water temperatures are suitable for adult migration (<18ºC) and egg incubation (<13ºC). (Pages 12-13)

According to this study these estimates are also based on specific water temperatures of less than 13ºC. If egg incubation temperatures are higher in the SJR, the estimated 40% found in the Tuolumne may not be comparable. In Dr. Moyle's Rebuttal Testimony in the OCAP BO (Moyle 2005b), he states that temperatures in the SJR will be "suboptimal" for egg incubation:

> . . . the maximum temperatures of water released from the dam under our proposed release schedule would be between 58 and 59º F (ca. 15ºC), well within the optimal range for most life stages if salmon[, but] . . . ***could result in some mortality of eggs incubating in the gravel (these temperatures are in the suboptimal range for incubation)*** (emphasis added)(Page 17)

The optimal range for salmon egg incubation and alevin development has been reported as 4° to 12°C (39.2° to 53.6°F) (Myrick and Cech 2001) —below the range of temperatures that will be released from the dam into the SJR.

There are no confidence intervals associated with the estimates in the Permit Application and therefore no acknowledgement of the range of possible outcomes. For example, a 2007 study by Stillwater Sciences examined the effects of gravel permeability on egg to fry survival. There was a positive relationship between permeability and egg to fry survival and, most importantly, survival ranged from 0% to 40% (Stillwater Sciences 2007). A study conducted in SJR riffles predicted a similar range of egg to fry survival rates based on varying gravel permeability (Stillwater Sciences 2003b). **Although it is expected that gravel restoration in the SJR would strive for gravel permeability that provides the highest egg to fry survival rates, the restoration *will not occur prior to the reintroduction*, therefore given the analyses presented above, an egg to fry survival of 40% is an overestimate.**

<u>Fry to parr-smolt survival:</u>

The fry to parr-smolt survival estimates used in the Permit Application appear to be

based on estimates of smolt survival though the Stanislaus River—survival through the Stanislaus River, i.e., as measured from an upstream RST to a downstream RST, is not a reasonable estimate of survival rates from the fry to the parr-smolt life stage.

> The survival rates for fry to the parr-smolt stage and parr-smolt stage to adult stage were calculated using USFWS AFRP data reports (USFWS AFRP 1996-2009) and analyzed by Alan Hubbard (UC Berkeley, Division of Biostatistics) and Carl Mesick (USFWS). The estimated mean percentage of fry that survive to the parr-smolt stage (>56 mm FL) and migrate is about 5 percent, as suggested from rotary screw trap (RST) data on the Stanislaus River during dry and normal year spring flow releases (not flood control releases). (Page 12)

Juveniles migrating through the Stanislaus River that are >56 mm FL are already considered parr or smolts. The survival estimate used in this case is simply an estimate of survival of parr or smolts through a section of the Stanislaus River. It is not an estimate of survival from the fry life stage to the parr-smolt life stage as it is being used in the permit application.

Finally, there is no documentation of how these survival rates were calculated, nor is there a quantitative or qualitative rationale for the chosen range:

> However, the estimate of 5 percent does not factor in the mortality of fry that may occur before the upstream RST, thus a range of 3-5 percent for the survival rate of fry to parr-smolt stage may be more suitable (C. Mesick, pers. comm. USFWS. 9/15/2010). (Page 13)

<u>Parr-smolt to spawner survival:</u>

The parr-smolt to spawner survival rate estimates used in the Permit Application are substantially higher than those measured from Stanislaus River CWT releases, and the Permit Application does not indicate how these estimates were calculated.

The permit application cites that Carl Mesick and Alan Hubbard calculated parr-smolt to adult survival rates from USFWS AFRP report data from 1996-2009. Since the permit application is not transparent with respect to how these estimates were determined, it is difficult to assess their utility. However, when compared with Stanislaus River CWT releases, the Permit Application's estimates for this life-stage are markedly higher.

> Of these parr-smolt stage fish (>56 mm FL) that migrated from the Stanislaus River and returned to spawn, it has been estimated that escapement values are around 3.6 percent. However, the true estimate could be as low as 2.5 percent because of uncertainty in the estimated number of natural spawners (versus strays) in the Stanislaus River, thus a range of 2.5-3.6 percent would be appropriate (C. Mesick, pers. comm.

USFWS. 9/15/2010). (Page 13)

Table 6. Adult inland recoveries from Stanislaus River CWT releases.

Year	Release location	No. of smolts released	No. inland adult recoveries	Estimated adult return*	Estimated smolt to adult return rate (i.e., smolt to adult survival)	Average estimated smolt to adult survival rate
1986	Knight's Ferry	108273	44	440	0.41%	0.105%
1988		71765	10	100	0.14%	
1989		103951	9	90	0.09%	
2000		77437	2	20	0.03%	
2001		48498	0	0	0.00%	
2002		47981	2	20	0.04%	
2003		77961	3	30	0.04%	
1986	Mouth of Stanislaus	106099	94	940	0.89%	0.212%
1988		68788	13	130	0.19%	
1989		74220	10	100	0.13%	
2000		50547	7	70	0.14%	
2001		25634	1	10	0.04%	
2002		24646	2	20	0.08%	
2003		52733	1	10	0.02%	

Notes: *Assumes that only 10% of tagged inland returns were identified during carcass surveys on the Stanislaus River. This is based on the lowest carcass survey recovery rates observed, and therefore yields the highest possible survival estimate for observed carcass survey recovery rates. Carcass survey recovery rates have frequently exceeded 24% and range as high as 53%.

Source: Annual reports from Turlock ID and Modesto ID to FERC, 1999, 2006, 2007 (year covered by report, not year submitted)

The range of smolt to spawner survival estimates from Stanislaus River CWT data is from 0% to 0.89% (Table 6), much lower than the Stanislaus River survival estimates presented in the Permit application. More inland recovery data is available for other rivers in the SJR complex; these data are provided as an example. We also note that these survival estimates are based on fall-run populations, and spring-run smolt to spawner survival estimates could be even lower given harsh over-summering conditions or other differences in conditions experienced relative to fall-run.

Furthermore, the survival estimates proposed in the Permit Application are also too high because the effects of using hatchery fish and the potential for straying have not been considered in the estimates. Hatchery fish have lower survival rates than non-hatchery fish because they are less acclimated to the natural stream. Hatchery and wild salmon stocks may show behavioral, morphological and physiological differences due to differences in genetic background and rearing environment (Weber and Fausch 2003). For example, early life mortality is lower for hatchery fish released as smolts, therefore, traits that may be selected against in the wild are not in the hatchery. If introduced individuals survive but then stray to another stream, and there is evidence of straying by hatchery fish in the SJR complex, there will be a lower percentage of returns to the SJR. Some estimate of straying should be accounted for in the smolt to adult survival estimates. Evidence of straying rates for Merced River Hatchery Fish were summarized in the Final Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement (ICF Jones & Stokes 2010):

> Most Merced River Hatchery fall-run Chinook released on site returned to the Merced River (approximately 93% of the tags recovered), with smaller proportions recovered in the Tuolumne River (5%), the Feather River (1%), and several other locations (<1%). About 25% of the tags recovered in the Merced River were recovered at the hatchery. Once again, however, stray indices were considerably higher for off-site releases. Less than half (48%) of the tagged Merced River Fish Facility fall-run Chinook released into the San Joaquin River were recovered in the Merced River, with sizeable recoveries occurring in the Tuolumne River (22%), the Stanislaus River (10%), the American River (8%), the Feather River (8%), the Sacramento River (2%), the Mokelumne River (2%), and Butte Creek (1%). As with on-site releases, about 25% of Merced River recoveries of fish released in the San Joaquin River were at the hatchery. (Page 4-186)

Also, there have been major, anthropogenic changes to the Delta ecosystem resulting in a regime shift in about 2000-2001, and to some degree, these changes are irreversible(Bennett and Moyle 2010). South Delta survival has been low since 2003, and even flood flows of approximately 10,000 cfs and 25,000 cfs at Vernalis during outmigration in two years (2005 and 2006) did not increase survival to anywhere near levels when flows were moderately high (5,700 cfs) in 2000. It is unclear why smolt survival between 2003 and 2006 has been so low (San Joaquin River Group Authority 2007a), but these unexpectedly low smolt survival observations during 2003-2006 were far lower than historical data. Any estimates of survival based on observations made prior to these ecosystem wide changes are misleading.

The Permit Application does offer a single peer reviewed estimate of smolt to spawner survival on the Snake River:

> Although falling slightly beyond this range, Petrosky et al. (2001) calculated 1-5 percent for the transition from smolt to adult on the Snake River. However, the estimates for the Stanislaus River are probably more similar to the conditions and survival rates anticipated in the SJR. (Page 13)

One of the objectives of Petrosky et al. (2001) was to compare survival estimates before and after construction of dams on the Snake River (note, Petrosky et al. 2001 was incorrectly referenced in the Permit Application). The range of estimates presented in the Permit Application spanned both pre-dam and post-dam construction, the upper end of the range occurring pre-dam construction. In addition to the challenges of comparing survival in two very different river systems with different conditions, the results of the

Snake River study are taken out of context and are not applicable given the different objectives of this study.

We also noted that Petrosky et al. (Petrosky et al. 2001) make the following remarks:

> These examples demonstrate the importance of identifying the factor that is limiting the population for management decisions regarding the recovery of an endangered species. For some stocks, improvements to habitat would likely improve survival in the spawning and rearing stage. However, the expected improvements in survival in that life stage are unlikely to offset the impacts of the hydrosystem and increase survival overall to a level that ensures the recovery of Snake River spring and summer chinook. (Page 1205)

Without a life-cycle model, and without knowledge of which life-stage is limiting survival, the ability to make evidence-based management decisions or to predict the number of returns, is limited. The Permit Application, while choosing some seemingly arbitrary survival estimates for predicting the number of stock needed to meet conservation goals, does not provide a life-cycle model analysis method for determining which life-stage is limiting survival, or quantitative analysis of the amount of variance in survival estimates.

<u>Minimum population size</u>

Proposers are aiming for an eventual spring-run population of 500 fish in the SJR, but a population consisting of 500 fish still represents a moderate extinction risk. An effective population size (N_e) of 500 might be considered low risk of extinction, but **this would require a census population size of at least 2,500 individuals (Lindley et al. 2007).**

However, the Permit Application established a conservation goal of a minimum population size of 500 by 2019:

> The Conservation Program's target for the experimental population of spring-run Chinook salmon is a minimum annual return of 500 naturally-reproducing and self-sustaining adults by 2019. (Page 11)

Historically, the general rule in managing populations with appropriate genetic variation has been a ''50/500'' rule for N_e (Franklin 1980, Soulé 1980; as cited in Lindley et al. 2007). An N_e of less than 50 is subject to immediate effects of inbreeding depression, while N_e of 500 or more has been considered the minimum number needed to prevent loss of genetic variation over longer time periods. However the results of Franklin (1980) and Soulé (1980) indicating significant genetic drift at $N_e < 500$ are based on several assumptions, which may not be met (Lindley et al. 2007). More recent work has suggested that N_e should be much higher—Lande (1995) suggested an N_e of 5,000 to maintain genetic variation over time.

Most importantly, we have been discussing effective population size, N_e, and not 'census' population size (N). According to Lindley et al. (2007), N_e "is smaller than the population census size N due to variation in reproductive success among individuals," and can be estimated based on detailed demographic or genetic data. Since a ratio of N_e/N for Chinook salmon ranges from 0.06 to 0.29 (Waples et al. 2004; as cited in Lindley et al. 2007), "N can be used if direct estimates of effective size N_e are not available, assuming $N_e/N = 0.2$" (Lindley et al. 2007). Lindley et al. (2007) estimated the average run size ($\hat{S}_t$) as the mean of up to the three most recent generations, and the mean population size (N) as the product of the mean run size and the average generation time (assumed to be 3 years for California salmon). The PVA results for the three donor populations are listed in Table 7. Importantly, the authors note: "the criteria for low risk really are criteria for minimal viability. Recovery planners may want to aim somewhat higher for at least some populations as a precautionary measure." **Thus, a self-sustaining population not subject to the immediate effects of reduced genetic variation would require a higher census population goal.**

Table 7. Population Viability Analysis (PVA) for the donor Spring-run populations (Lindley et al. 2007). Spawning escapement data was obtained from California Department of Fish and Game's 2005 GrandTab database. Census population size, N; the average run size $\hat{S}_t$; and standard deviation, std.

Creek	PVA	N	std	Pop. Growth (% per year)	std	$\hat{S}$	std
Butte	Low	22,630	7,400	11.4	12.6	6,860	2,240
Mill	Moderate	3,360	1,300	17.9	5.95	1020	394
Deer	Low	6,320	1,920	7.63	7.58	1920	1010

The Permit application considers effective population size when determining guidelines for taking donor stock from existing spring-run populations, but has not applied the same rigor to its conservation goal:

> Our approach is based on the specific work within Lindley et al. (2007). This analysis concluded that an effective population size (Ne) of greater than 500 individuals (Ne/N = 0.2) or a total population size per generation (N) greater than or equal to 2,500 individuals (N = the mean run size x average generation time) is at low risk of extinction (Lindley et al., 2007). N is derived from the population count from available census methods; for example, the escapement numbers given by GrandTab (2009) (Page 97)
>
> The criteria used by Lindley et al. (2007) are modified from Allendorf et al. (1997) and correspond to risks of extinction within the specified time horizon. The low risk category in Lindley et al. (2007) is defined by various criteria, including <5% extinction risk from population viability analysis (PVA) within 100 years; but includes, 1) the population size parameters previously described (N ≥ 2,500), along with 2) no apparent or

> probable population decline, 3) no apparent catastrophes occurring within the last 10 years, and 4) low hatchery influence. Lindley et al. (2007) provides quantitative metrics that may be calculated from observed returns to determine these risk levels in any given year. (Page 98)

Given that a minimum goal of only 500 fish falls at the lower end of the moderate risk of extinction category (250 < N < 2,500; Lindley et al. 2007), and that the low risk population values are really minimal criteria for viability, we do not have confidence that this goal will meet the objective of a self-sustaining population.

Data Deficiencies

The extent and exact nature of much of the existing conditions in the SHR have not been quantified, and restoration is planned for after re-introductions have occurred.

Potential stressors, not discussed above, in the SJR Restoration Area include low dissolved oxygen levels, lack of habitat in terms of quantity and quality (e.g., gravel, gravel size, vegetation), and low food resources. Due to the uncertainty regarding many of these stressors and the fact that restoration has not yet occurred, the SJRRP has planned a series of studies to begin in 2011, as outlined in Appendix A of the San Joaquin River Restoration Program Final 2011 Agency Plan (San Joaquin River Restoration Program 2010b). The SJRRP clearly states that

> Chinook salmon are scheduled for reintroduction in 2012, which will likely occur prior to completion of the larger site specific physical habitat restoration activities, and will expose the reintroduced fish to less than optimal habitat conditions. (Page A-65)

There are 37 studies planned to address unknown conditions in the SJR. We suggest that these studies, and adequate restoration actions to address needs identified in these studies, be conducted before introducing spring-run salmon.

Here we cite information from the "Statement of Need" and "Background" sections of the planned studies (San Joaquin River Restoration Program 2010b) as examples of evidence that existing conditions will not support the experimental population.

> Reach 1 is expected to provide all spawning habitat, however, we do not know the suitability of existing gravel or the maintenance and adequate distribution of suitable gravel in this segment of the SJR (FMWG, 2009b). The SJRRP has identified gravel availability as a limiting factor for Chinook salmon in the Restoration Area by the Fisheries Management Work Group (FMWG) (FMWG 2009a, 2009b). Therefore, it is necessary to determine if spawning habitat quality and quantity is sufficient to meet long-term population goals. (Page A-55)

> The construction of Friant Dam blocked gravel recruitment and could have

reduced the quantity and quality of gravel that can be used for Chinook salmon spawning in Reach 1. Incubating salmon eggs requires appropriate conditions (water temperature, spawning gravel size distribution, spawning gravel availability, and water quality, including dissolved oxygen (DO) and pH) to survive and hatch successfully. Field studies indicate there may be significant amount sand and other fine sediments in the areas perceived to be adequate spawning habitats. Infiltration of these materials into the redd, in addition to poor water quality conditions in the hyporheic environment may result in decreased survival of eggs and prevent the SJRRP from meeting the targets identified in the FMP (FMWG, 2009a). (Page A-55)

Another example of studies yet to be conducted documenting problems and unknowns in the SJR:

> Incubating salmon eggs and hatching fry require adequate dissolved oxygen (DO) delivery into the redd's egg pocket and, therefore, adequate hydraulic conductivity to allow its delivery (Cooper 1965). During the redd building phase, bed material is mobilized by spawning salmon. This process removes a portion of the fine sediment from the local mix as it is transported further downstream, thereby increasing the vacant pore space within the lag material that remains to form the redd feature. This increased porosity induces greater hydraulic conductivity and increased delivery of DO from the surface flow (Kondolf, et al. 1993). After spawning is complete the eggs remain buried while incubating and benefit from this relatively higher hydraulic conductivity environment. During this time, fine sediment transported by the flowing water can deposit over or within the subsurface (Beschta and Jackson 1979). Fine sediment depositing into the interstices of the redd or forming a seal at the surface is deemed one of the most detrimental factors to the survival of incubating eggs by reducing hydraulic conductivity and thereby reducing DO delivery and metabolic waste removal to and from the egg pocket, respectively (Shirazi and Seim 1981, Chapman 1988, Sear 1993, Lapointe, et al. 2003).
>
> Field observations indicate that there is a significant volume of sand and fine sediment stored in the channel in Reach 1. There is, therefore, potential for infiltration and accumulation of sand and finer material into the redds' gravel framework, which can significantly affect the quality of the spawning habitat (Kondolf 2000). However, flow conditions that would have access to fine sediment supplies, have the ability transport fine sediment, and allow for it to accumulate on the bed and infiltrate the bed material are not known.
>
> In addition, the bed surface will undergo changes through scour and later deposition as a result of sediment transport processes. These processes are

> known to present a risk to incubating embryos more typically found within bar and riffle subsurfaces. When scour occurs to the egg pocket depth, the eggs lose their protection from the effects of bed material transport. Additionally, subsequent deposition alters the texture of the material overlying the remaining egg pocket (Haschenburger 1999, Lapointe, et al. 2000, May, et al. 2009). Understanding how redds will be transformed by the Restoration flows is necessary to assess the altered flow regime's impact on adult and juvenile salmon habitat. (Pages A-59-A-60)

Floodplain habitat availability has also been limited in the SJR and the exact amount available is unknown:

> The Restoration Goal of achieving a self-sustaining population of Chinook salmon will not be possible without the availability of adequate rearing habitat. This is particularly true for spring-run Chinook salmon whose offspring may spend a significantly greater amount of time rearing in the SJR and migrate as yearlings. Inundated floodplain habitats have been reduced in the San Joaquin because of water management, yet they provide near-optimal rearing conditions for juvenile salmonids (Jeffres, et al. 2008). The direct and indirect benefits of floodplains to salmon are significant and include higher growth rates (warmer water temperatures, greater prey abundance) and increased survivorship (Sommer, et al. 2001).
>
> Several factors can lower the value of floodplains for salmon such as water temperature and depth, and timing, duration, and magnitude of inundation. The amount of area and the number of juvenile salmon that can benefit from the habitat will therefore vary as a function of discharge. Monitoring of current floodplains and those associated with project Restoration areas is necessary to determine the extent to which they are providing quality rearing habitat. (Page A-67)

The planned studies also include monitoring water quality for stressors on upstream migrating adult Chinook, including low dissolved oxygen (DO):

> When DO levels are below 5.0 milligrams per liter (mg/L), an oxygen barrier, also known as "oxygen block", could impede upstream migration of adult Chinook salmon. Levels as low as 1.5 mg/L DO have been recorded in the lower SJR, and levels as low as 0 mg/L have been recorded in the Stockton Deep Water Ship Channel (SJRRP 2009). DO levels could be monitored in real-time at the same locations as water temperature: two locations in Reach 1, two locations in Reach 2, one location in Reach 3, two locations in Reach 4, and two locations in Reach 5. Additional sampling sites for DO may be added, if needed (SJRRP, 2009). (Page A-72)

Reintroduction Effects on Fall-Run Chinook Salmon

The Permit Application states that reintroduction and collection activities should not "have an adverse impact on the population viability of the ESU and/or the populations within each potential source stream" or "adversely affect the experimental population and their progeny within the mainstem SJR;" however, no consideration was given regarding potential effects of the project on fall-run Chinook salmon (FRCS). In the Central Valley, FRCS are designated a 'Species of Concern' by the National Marine Fisheries Service and a 'Species of Special Concern' by the California Department of Fish and Game (California Natural Diversity Database 2011). 'Species of Concern' (69 FR 19976) are designated by NMFS whenever insufficient information is available to indicate a need to list the species, but there are some concerns regarding the status and threats to the species. Although there are no applicable protective regulations regarding this designated status, NMFS wants to "draw proactive attention and conservation action to these species" and support "voluntary conservation efforts designed to conserve anadromous species before listing becomes necessary" (http://www.nmfs.noaa.gov/pr/species/concern/).

Many conservation actions have already been taken to improve habitat conditions for FRCS in the Central Valley, particularly through the CALFED and Anadromous Fish Restoration Programs. Nonetheless, FRCS have experienced declines in recent years. Therefore, actions should not be taken that could potentially exacerbate these recent declines, particularly declines within the San Joaquin basin, which may result in the need to list FRCS as threatened or endangered under the ESA.

Reintroduction of spring-run Chinook salmon to the San Joaquin River may negatively affect fall-run Chinook salmon Essential Fish Habitat (EFH) in nearby tributaries.

The Permit Application indicates that the proposed project "would not have adverse effects on any Chinook salmon EFH [Essential Fish Habitat]"; however, there are potential impacts that need to be considered to fall-run EFH in the lower San Joaquin River and tributaries.

The Draft Recovery Plan (National Marine Fisheries Service 2009) describes EFH as:

> Those waters and substrate necessary for fish spawning, incubation, breeding, feeding, or growth to maturity.
>
> - "waters": aquatic areas and associated physical, chemical, and biological properties used by fish.
> - "substrate": includes sediment, hard bottom, structures underlying the waters, and associated biological communities.
> - "necessary": habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem.
> - "spawning, breeding, feeding or growth to maturity": covers a species' full life cycle.

According to NMFS (National Marine Fisheries Service 1998),

> The EFH regulations define an *adverse effect* as "any impact which reduces quality and/or quantity of EFH...[and] may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions.

Potential effects of the project on FRCS and FRCS EFH are discussed in further detail below, including:

- Habitat - adult straying into non-natal tributaries (superimposition and/or hybridization potential); rearing in non-natal tributaries; water quality in lower SJR when the upper SJR is connected
- Water temperature - restoration flows may increase water temperatures in the San Joaquin River below the Merced River confluence
- Food – competition for resources in the lower SJR and in non-natal tributaries

Habitat

Returning re-introduced spring-run salmon are likely to stray into the San Joaquin River tributaries, where they may spawn in what is presently fall-run spawning habitat, leading to superimposition and further exacerbating the recent decline in the SJR fall-run population.

Given the current, and considerable, rates of straying in the San Joaquin River basin (discussed below), it is expected that returning spring-run salmon will likely stray into the tributaries. The spring-run may spawn in what is presently fall-run spawning habitat, leading to superimposition of redds and further exacerbating the recent decline in the SJR fall-run population. This spatial overlap has been documented for spring-run on the main stem Sacramento River (California Department of Fish and Game 1998):

> Some spring-run chinook salmon may persist between RBDD and Keswick Dam in the Sacramento River, although there is evidence that a portion of the spring run estimated to have passed upstream of RBDD are hybrids of spring run and fall run. . . Even though there is physical habitat available to spring run, spring run depend on spatial isolation to prevent competition and hybridization with fall run. . . since fall run use the same spawning riffles as spring run, later spawners may be displacing the redds of earlier spawners during nest construction. (Section V., Page 16)

The potential for introduced spring-run to hybridize with current populations of fall-run Chinook in the basin is a significant concern, since this may compromise the remaining genetic integrity of the already depressed natural populations of San Joaquin River fall-run Chinook. Studies suggest that loss of rearing and spawning habitat already may limit juvenile Chinook salmon production in the lower Stanislaus River (Stanislaus River Fish

Group 2004) and restoration of instream and riparian habitat are priority actions on this tributary (Anadromous Fish Restoration Program 2001). Thus, any competition and hybridization with spring-run may have severe consequences for the fall-run salmon in the SJR tributaries. The potential for hybridization is discussed in further detail below in the section titled “Reintroduction/Hatchery Effects on Genetic Integrity.”

Spring-run Chinook in the Central Valley are know to rear in non-natal tributaries and may overlap in rearing habitat with FRCS that currently rear in the lower Stanislaus and Tuolumne rivers.

Spring-run Chinook salmon in the Sacramento River have been documented to rear upstream in nearby non-natal tributaries (Maslin et al. 1997). Notably, the researchers found that “spring-run and winter run were disproportionately abundant considering their scarcity in the Sacramento River system”. Since habitat restoration on the San Joaquin River will occur after the re-introduction of spring-run, sufficient quantities of suitable rearing habitat will not be available in the Restoration Area and juvenile spring-run Chinook may rear in the tributaries. Since spring-run may migrate to the ocean as yearlings, and the FMP (San Joaquin River Restoration Program 2010d) indicates that this strategy will be promoted in the re-introduction, then the spring-run will overlap with fall-run juveniles in these rearing habitats:

> The Butte Creek population consists of fry migrants that primarily disperse downstream from mid-December through February, subyearling smolts that primarily migrate between late-March and mid-June, and yearlings that migrate from September through March (Hill and Webber 1999, Ward and McReynolds 2001, Ward et al. 2002). Juvenile emigration patterns in Mill and Deer creeks are very similar to patterns observed in Butte Creek, with the exception that Mill Creek and Deer Creek juveniles typically exhibit a later young-of-the-year migration and an earlier yearling migration (Lindley et al. 2004). (Page 3-2)
>
> Given the uncertainties with stock selection and adaptation to the San Joaquin River environment, we intend to manage and restore habitats to promote expression of several life-history variations exhibited in other spring-run populations. (Page 3-4)

Water Temperature

According to the USEPA and CDFG, the lower SJR downstream of the Merced River confluence is temperature impaired, and therefore a limiting factor, for FRCS smoltification and migration (USEPA 2010); the SJRRP restoration flows may lead to increased temperatures below the confluence, negatively impacting EFH in the SJR tributaries.

Water temperature modeling conducted by AD Consultants (San Joaquin River Group Authority 2007b) indicates that although the SJRRP flows will add more water in this reach, the travel time is such that when the new water reaches the Merced River confluence, it approaches equilibrium with ambient temperature. Even though it is anticipated that the water temperature at the confluence of the Merced and San Joaquin Rivers will be the same with and without the anticipated SJRRP flows, the SJRRP flows themselves are of such a large volume that it will take a greater volume of water from the Merced River to reduce temperatures at the confluence. Given the storage capacity of Lake McClure, the releases necessary to reduce temperatures at the confluence can only be made for limited duration before exhausting the available water supply. Actions should not be taken that could potentially exacerbate recent declines of FRCS, particularly declines within the San Joaquin basin, which may result in the need to list FRCS as threatened or endangered under the ESA.

Because SJRRP restoration flows may lead to increased temperatures below the confluence, there may be negative effects on FRCS populations that were not considered in the Permit Application.

According to the USEPA and CDFG, the lower SJR downstream of the Merced River confluence is temperature impaired, and therefore a limiting factor, for FRCS smoltification and migration (USEPA 2010). According to water temperature modeling conducted by AD Consultants (San Joaquin River Group Authority 2007b, although the SJRRP flows will add more water in this reach, the travel time is such that when the new water reaches the Merced River confluence, it approaches equilibrium with ambient temperature. Even though it is anticipated that the water temperature at the confluence of the Merced and San Joaquin Rivers will be the same with and without the anticipated SJRRP flows, the SJRRP flows themselves are of such a large volume that it will take a greater volume of water from the Merced River to reduce temperatures at the confluence. Given the storage capacity of Lake McClure, the releases necessary to reduce temperatures at the confluence can only be made for limited duration before exhausting the available water supply. Actions should not be taken that could potentially exacerbate recent declines of FRCS, particularly declines within the San Joaquin basin, which may result in the need to list FRCS as threatened or endangered under the ESA.

Food

Since both spring and fall-run Chinook in the San Joaquin River and tributaries may occupy similar habitats during rearing and outmigration, there may be competition for limited food resources.

According to the SJRRP Fisheries Management Plan (San Joaquin River Restoration Program 2010d):

> Food resources in the Restoration Area may be adversely affected by a combination of factors:
>
> - Reduced flows or dikes that substantially reduce the contribution of organic matter and prey-sized invertebrates from inundated floodplains

- Sedimentation and gravel extraction that affects the production of in-river, prey-sized invertebrates
- Lack of nutrients provided by low numbers of adult Chinook salmon carcasses
- Reduced native riparian and wetland vegetation that is the primary basis of the aquatic food web
- Lack of organic matter and prey-sized invertebrates from upstream reservoirs
- Pesticides and other contaminants that reduce the abundance of food organisms
- Competition for food with native and introduced species (Page 4-6)

Given the likelihood for insufficient food resources in the Restoration Area, there is a greater potential for spring-run Chinook salmon to move into lower tributaries, where food resources may be available, consequently competing with the fall-run juveniles.

Reintroduction Effects on Central Valley Steelhead

The Permit Application did not consider effects of the reintroduction of spring-run salmon and SJRRP flows on federally Threatened Central Valley steelhead in the SJR or in proposed donor streams.

The reintroduction activities—from collection procedures in donor streams to trap and haul activities in the SJR—could impact threatened Central Valley steelhead. Fish habitat in the SJR is already severely limited and the amount and quality of food resources unknown. The addition of experimental population juveniles may compete with *O. mykiss* for habitat and other resources. Activities such as in-stream collections, injecting eggs, installing cages for juvenile releases, trapping, etc. disturb substrate and resources.

SJRRP flows may also impact threatened Central Valley steelhead. The USEPA and CDFG consider the lower San Joaquin River downstream of the Merced River confluence to be temperature impaired for steelhead smoltification and migration, and restoration flows will make it more difficult to achieve the temperatures recommended by the USEPA and CDFG.

There are also no attempts to consider steelhead in the San Joaquin River Restoration Program Final 2011 Agency Plan Appendix A (San Joaquin River Restoration Program 2010a). We suggest that the Permit Application consider effects on Central Valley Steelhead before reintroduction occurs.

Reintroduction/Hatchery Impacts on Genetic Diversity

The Permit Application states that the "overall objective is to collect and reintroduce multiple life stages of spring-run Chinook salmon to develop a naturally-reproducing, self-sustaining population of spring-run Chinook salmon in the SJR." The intent is to capture “varied genetic/phenotypic characteristics,” and “therefore increase the likelihood that reintroduction will be successful.”

Feather River hatchery (FRH) introgression has been found to be a major threat to the genetic integrity of wild stocks.

The NMFS Biological Review Team (BRT) has previously concluded that “genetic threats from the Feather River Hatchery spring-run Chinook salmon program” is one of the three most important threats to spring-run populations, and that FRH stocks pose a “major threat to the genetic integrity of the remaining wild, spring-run Chinook salmon populations” (Good et al. 2005). According to the Hatchery and Genetic Management Plan (San Joaquin River Restoration Program 2010h), FRH spring-run fish show some genotypic and phenotypic characteristics of fall-run fish:

> The Feather River spring-run are difficult to characterize as an entity. First, the Feather River spring-run stock consists of both hatchery-spawned and naturally spawned salmon, and there is a general lack of data on the naturally spawned portion of the population. Second, it is not a historical entity, in that the population of spring-running Feather River fish only began spawning below the dam as a single population after construction of the Thermalito Dam in 1968 (Lindley et al. 2004). Third, the Feather River spring-run has significant historical and ongoing hybridization with fall-run Chinook, although the Feather River Hatchery (FRH) is taking steps to create a more genetically isolated spring-run. Genetic analysis suggests that the remaining spring-run fish are heavily introgressed with fall-run genes (Garza et al. 2008), to the point that it is called a genetically fall-run fish (Id.). Given that the Feather River spring-run Chinook salmon are not genotypically distinguishable as a spring-run fish in the same way that Butte and Mill/Deer salmon are, it may more accurately be described as a spring-running fish, not necessarily a spring-run Chinook salmon. (Pages 34-35)

The Technical Advisory Committee to the SJRRP also advised against using FRH fish, yet the SJRRP still included these stocks as a viable option for reintroduction.

The Permit Application states that “these factors [i.e., hybridization of fall and spring-run in the Feather River; mistaken run-timing where some spring-run Chinook salmon express the fall-run Chinook salmon phenotype and visa versa] have prompted the Technical Advisory Committee of the [San Joaquin River Restoration Program] to recommend against the use of the Feather River Hatchery stock or any other hatchery origin stock for use in reintroduction (Meade 2007).” The Permit Application then indicates that these negative aspects “should also be weighed alongside the potential benefits of (1) possibly recovering a phenotypically spring-run Chinook salmon-type fish from Feather River Hatchery, (2) the potential for distinct run timings to emerge when discrete spawning habitats are available, and (3) the potential to minimize impacts to natural spring-run Chinook salmon broodstock source populations.”

Although the above arguments are made in support of FRH fish, it appears that the reintroduction would not be feasible without using FRH fish because of the status of the other two donor stock streams.

A minimum number of fish must be stocked given low survival rates (discussed above) and dependent on the number of expected returns needed for maintaining the genetic integrity of the reintroduced population. The authors of the Permit Application recognize the challenges of getting enough returns to maintain even low levels of genetic diversity as described in the HGMP (San Joaquin River Restoration Program 2010h):

> Recommendations on the ideal number of fish to use for broodstock vary. Frankel and Soule (1981), Miller and Kapuscinski (2003), and Moyer et al. 2008 recommended 50 individual fish from each source population as the bare minimum. Kincaid (1983) recommended 50 breeding pairs, and Allendorf and Ryman (1987) recommended a minimum of 100 breeding pairs from each source population. These recommendations for the minimum number of fish all produce significantly less diversity in the broodstock than is found in the source population (Table 6.2) (Page 75).

Including FRH fish is not advised, but taking enough fish from the already depressed Deer/Mill Creek and Butte Creek populations will likely not be possible. Thus taking from all three sources is deemed the "preferred alternative," even though proposers admit that there is no way to predict the outcome in terms of genetic diversity. We suggest that these unknowns be addressed before the reintroduction occurs. This uncertainty is described in the HGMP (San Joaquin River Restoration Program 2010h):

> After extensive consideration, the Genetic Subgroup members concurred that it would be nearly impossible to accurately predict the relative fitness of fish from the three potential springrun source populations in the San Joaquin River Reintroduction Area. Even with additional data, unknown factors such as the restored conditions of the San Joaquin, the straying rate of reintroduced fish, and the populations' ability to adapt to new conditions would prevent a confident selection of the best stock for reintroduction. (Page 84)

There is also no consideration given to the potential for broodstock (mixed from various populations) to stray and spawn with natural populations (Butte, Mill, Deer creeks) resulting in hybridization of the last remaining spring-run populations in the Central Valley.

There is potential for straying of genetically mixed stock back into donor streams. If naturally produced individuals (unmarked) strayed into donor streams, any remaining genetic integrity of the already depressed natural populations could be compromised. Unmarked fish will not be identifiable, and therefore it will be impossible to manage for strays. We do not recommend that any natural in-stream production occur if multiple source broodstocks are used for the reintroduction. If marked hatchery fish stray, they can be identified.

Based on the winter-run Chinook salmon restoration program, potential straying rates for juveniles released directly into the SJR are high. For example, when winter-run Chinook reared at the Coleman National Fish Hatchery were released into the Sacramento to allow imprinting on the Sacramento River, adults still returned to Battle Creek (USFWS, http://www.fws.gov/stockton/afrp/documents/Genetics.pdf). High rates of straying of ad-clipped fish (likely hatchery origin) were also observed in 2010 at the Stanislaus River weir (25.0% of adult in-river returns as of 2/7/11) and the Tuolumne River weir (32.7% of adult in-river as of 11/30/10) (FISHBIO unpublished). The observed numbers of ad-clipped fish suggest substantial straying. In San Pablo Bay, straying from other locations into the Bay has been estimated to be as high as 70% (California Department of Fish and Game and National Marine Fisheries Service 2001).

Since including FRH fish increases the risk of introgression with fall-run populations, it also increases the costs associated with the reintroduction as the SJRRP plans to increase efforts to prevent hybridization.

The HGMP (San Joaquin River Restoration Program 2010h) described the additional measures needed in the case of using FRH fish stock:

> Further, use of the Feather River stock increases the risk of introgression with the fall-run fish, due to past introgression in the FRH. As noted above, a portion of the Feather River spring-run progeny will return in the fall, which, left unchecked, could lead to increased mixing of the fall and spring-run populations in the San Joaquin River. The Feather River hatchery has adopted new practices to reduce hybridization between spring- and fall-running fish, and the San Joaquin River restoration will require similar interventions to help preserve the spring-run phenotype. If the preferred alternative is selected as the final strategy, measures to reduce hybridization between the fall and spring-run fish should be a priority, and should consider the effectiveness of both use of an effective fish weir and adoption of long-term hatchery practices that identify and exclude fall-run fish from spring-run matings. (Page 85)

Given the substantial amount of uncertainty and risks surrounding the use of hatchery fish, we recommend that the SJRRP complete more studies before re-introducing spring-run salmon including a cost-benefits analysis.

Ocean Harvest of Donor and Experimental Populations

In the ocean Central Valley spring-run Chinook salmon have a more northerly distribution than winter-run Chinook salmon, and Butte Creek spring-run have been caught off the coasts of Oregon and Northern California (Klamath area and Fort Bragg), although the majority are recovered south of Point Arena (Good et al. 2005).

Spring-run Chinook salmon may experience different harvest rates depending on the maturation rate and timing of re-entry into freshwater.

No reliable estimates of harvest rates are available for Central Valley spring-run Chinook and the management plan established by PFMC does not provide specific protection for spring-run (National Marine Fisheries Service 2000). It is assumed that restrictions set by the PFMC to protect the Sacramento River Fall-run Chinook (SRFC), will protect the spring-run Chinook as well. For Sacramento Basin Spring-run, the salmon plan states: "Present level of ocean fishery impacts limited by measures constraining harvest on Sacramento River winter and Klamath River fall chinook. . . Ocean fishery impacts primarily incidental to harvest of Sacramento River fall chinook and may be lower due to differences in run timing." NMFS (2000) presents CWT recovery data for Feather River Hatchery (FRH) Chinook indicating that only “25% of the fall chinook recoveries occur prior to May 1 whereas 44% of the spring chinook recoveries occurred during the same period.” Similarly, CDFG (1998) found that “[a]pproximately 59% of the annual [sport fishery] harvests of age-4 FRH spring run occurred during February through April compared to 27% for fall run for the same 20-year period.” Thus, the PFMC and NMFS presume that spring-run Chinook will experience lower harvest rates compared with the fall-run Chinook, which are the basis for the management plan (National Marine Fisheries Service 2000). The vulnerability of the experimental population to commercial harvest should be examined, as this assumption may not be true for all populations of spring-run.

In addition to the timing of re-entry into freshwater relative to the fishing season, different degrees of fishing pressure may be placed on Chinook salmon populations depending on their maturation rates,. For example, “maturing age-3 fish are only vulnerable to the early portion of the recreational and commercial season (when many of the age-3 fish are sub-legal in the commercial fishery), while immature age-3 fish are exposed to the remainder of the fishing season” (National Marine Fisheries Service 2000). There is very little data regarding Central Valley spring-run Chinook salmon age at maturity. If spring-run mature at 3 years, as indicated by NMFS (2000), then the commercial harvest periods are beneficial to the spring-run since their freshwater entry peaks in May and is complete by July, therefore they would only be affected by the first part of the harvest, beginning on May 1. However, if the individuals mature at 4 yrs, as indicated by Cramer and Demko (1996), then they would be susceptible to the entire harvest season (throughout summer) until they return to freshwater the following winter.

Given the uncertainties regarding the impact of ocean harvest on re-introduced spring-run Chinook salmon, and substantial effort and expense in restoring spring-run in the San Joaquin River, commercial and recreational fishing on threatened/endangered species should be greatly restricted.

As mentioned previously, the Central Valley spring-run Chinook are managed under the SRFC, and in 2010 the SRFC escapement increased to 152,831, within the annual FMP conservation objective of 122,000-180,000 (Pacific Fisheries Management Council

2011). However, the Council specified that for 2010, the spawning escapement objective was 180,000, based on recommendations from NMFS that management measures for 2010 should, “at a minimum, target a spawner escapement around the upper end of the FMP conservation objective in response to the stock falling below the lower end of the conservation objective for three consecutive years” (Pacific Fisheries Management Council 2010). Therefore, SRFC 2010 escapement was below the Council’s objectives for the fourth consecutive year. Failure to meet the Conservation Objective for three consecutive years, absent an exception, is sufficient to trigger an Overfishing Concern. According to the Pacific Coast Salmon Plan (Pacific Fisheries Management Council 2003), three or more consecutive years of failing to meet the Conservation Objective could “signal the beginning of a critical downward trend (e.g., Oregon Coastal Coho) which may result in fishing that jeopardizes the capacity of the stock to produce MSY over the long term if appropriate actions are not taken to ensure the automatic rebuilding feature of the conservation objectives is achieved.” It is therefore important to consider the long-term impacts of the ocean harvest of Central Valley fall and spring-run Chinook on the re-establishment of spring-run Chinook in the San Joaquin River.

ADDITIONAL CONSIDERATIONS

This section contains a series of questions intended to highlight additional considerations.

- It is unclear why the SJRRP is planning to spend half a billion dollars ($1 million per fish) on a project that anticipates a population of only 500 fish, even after 20 years, that is “likely to be conservation-reliant, particularly in the near-term (five to ten generations)[, because] it seems highly unlikely that enough habitat can be restored, particularly in the near-term, such that the spring-run Chinook salmon ESU could be expected to persist without appropriate conservation management[?]” (National Marine Fisheries Service 2009).

- Why place a high priority on the 19 actions identified for spring-run reintroduction into the San Joaquin River (National Marine Fisheries Service 2009; page 117-120), when the money could instead be used to support the already existing spring-run Chinook populations that are at risk of extinction (e.g., Antelope Creek, Deer Creek, Mill Creek) on projects that have a higher likelihood of success, are in areas where habitat is expected to remain despite climate change, and are far less costly?

- The SJRRP Stock Selection Strategy states that: “If it is determined that the risks to the source stock(s) is too high, it is likely the SJRRP will limit the source stock to the use of two stocks, or in the worst case scenario, one stock, since spring-run Chinook salmon must be reintroduced by December 31, 2012” (San Joaquin River Restoration Program 2010i). Regarding concerns over donor stock selection, the Permit Application states: “In addition, we need to be sure about donor stock disposition with respect to hatchery operational status and/or habitat conditions in the mainstem SJR for reintroduced individuals. We recognize that conditions change, the hatchery is not completed, and the restoration has not begun.” This statement recognizes the uncertainties involved with re-introducing spring-run individuals prior to the completion of the hatchery and the restoration. If the risks are found to be *too high* because the remaining spring-run populations are at extremely low abundance levels, is it reasonable to introduce only one stock in less than ideal habitat conditions just to meet a deadline?

- Why not re-consider a more economical alternative, such as natural re-colonization? The Permit Application indicates that several options were considered for restoring a spring-run population in the San Joaquin River including the first option, "to allow natural re-colonization following the time course of habitat restoration" (U.S. Fish and Wildlife Service 2010). Although re-colonization was considered, it was not chosen because "re-colonization of the SJR is problematic for spring-run Chinook salmon, given the lack of geographically proximal populations". However, phenotypic spring-run Chinook salmon (i.e., exhibiting adult migration timing of spring-run) have been observed in several of the SJR tributaries; therefore, natural re-colonization is possible.

- Reintroduction measures were considered and then decided against for Stony Creek because:

> 1) the [Stony Creek] system does not currently support populations of spring-run Chinook salmon and steelhead; (2) water diversions limit instream flows; (3) the watershed is at a relatively low elevation (Lindley et al. 2004), and thus, instream flow inputs are in the form of rainfall, not snowmelt; and (4) water temperatures under the current climate may already be beyond the thermal requirements of coldwater species such as spring-run Chinook salmon and steelhead, and climate change is expected to increase water temperatures in the Central Valley (Lindley et al. 2007)." (National Marine Fisheries Service 2009; pages 104-105)

  And reintroduction measures were also considered and then decided against for the Pit River because:

> "The Pit River has a low potential to support spring-run Chinook salmon populations due to the extensive presence of hydroelectric facilities that inundate or substantially affect historic habitat." (National Marine Fisheries Service 2009; page 104)

  Why will half a billion dollars be spent to establish a population on the San Joaquin River under conditions nearly identical to those on Stony Creek and the Pit River, which have already been determined to have a low potential to support viable populations of spring-run Chinook salmon?

- How can SJRRP justify taking endangered fish/eggs each year from source populations that have themselves declined in recent years for this reintroduction experiment, yet at the same time increase enforcement of the severe civil and criminal penalties for anyone who even harasses a listed fish, as under recovery action number 1.2.4 (National Marine Fisheries Service 2009) where additional funding is to be provided for increased law enforcement to reduce illegal take of these threatened fish?

PROPOSED CONSERVATION MEASURES

1) To protect the donor and experimental populations, reintroduction should not be allowed until <u>all</u> San Joaquin Restoration Actions are completed, a predator suppression program is implemented, and studies demonstrate that reintroduced fish can be supported under restored conditions.

Restoration actions are not scheduled for full completion until 2016 and will likely be delayed. In absence of these restoration actions, “unrestored instream conditions (limited prey base, instream refugia, shaded streamside habitat, consistent water temperatures below 21ºC, floodplain foraging, and adequate dissolved oxygen levels) [and predation] will limit the growth potential and survival rates of introduced eggs and juveniles” (USFWS 2010).” Also, the ability of existing habitat conditions to support spring-run is unknown and multiple studies are planned to address these unknown conditions in the SJR (San Joaquin River Restoration Program 2010b).

Therefore, collection of declining, threatened stocks is not advisable due to their expected low survival upon reintroduction into existing, non-restored SJR conditions, and the uncertainty of ability to support reintroduced fish under future restored conditions. As such, reintroduction efforts should not be allowed until all the following are met:

(1) all San Joaquin Restoration Actions are fully completed
(2) a predator suppression program is implemented in the San Joaquin Restoration Area and in the lower San Joaquin/South Delta; and
(3) studies demonstrate that reintroduced spring-run fish can be supported under restored conditions according to the following SJRRP FMP (San Joaquin River Restoration Program 2010g, d, e) habitat objectives:
   a. A minimum of 30,000 square meters (m^2) of high-quality spring-run Chinook salmon holding pool habitat.
   b. A minimum of 78,000 m^2 of quality functioning spawning gravel in the first 5 miles of Reach 1 should be present for spring-run Chinook salmon.
   c. A minimum of 7,784 acres ($3.15x10^7$ m^2) of floodplain rearing habitat for spring-run Chinook salmon subyearling rearing/migrating juveniles and 2,595 acres (1.05 $x10^7$ m^2) of floodplain rearing habitat for fall-run subyearling rearing/migrating juveniles.
   d. Passage conditions that allow 90 percent of migrating adult and 70 percent of migrating juvenile Chinook salmon to successfully pass to suitable upstream and downstream habitat respectively, during all base flow schedule component periods

and water year types of the Settlement, except the Critical-Low water year type.

e. Water temperatures for spring-run Chinook salmon adult migrants should be less than 68°F (20°C) in Reaches 3, 4, and 5 during March and April, and less than 64°F (18°C) in Reaches 1 and 2 during May and June (Exhibit A).
f. Water temperatures for spring-run Chinook salmon adult holding should be less than 59°F (15°C) in holding areas between April and September (Exhibit A).
g. Water temperatures for spring-run Chinook salmon spawners should be less than 57°F (14°C) in spawning areas during August, September, and October (Exhibit A).
h. Water temperatures for spring-run Chinook salmon incubation and emergence should be less than 55°F (13°C) in spawning areas between August and December (Exhibit A).
i. Water temperatures for spring-run Chinook salmon juveniles should be less than 64°F (18°C) in the Restoration Area when juveniles are present (Exhibit A).
j. Selenium levels should not exceed 0.020 milligrams per liter (mg/L) or a 4-day average of 0.005 mg/L in the Restoration Area (Exhibit B).
k. DO concentrations should not be less than 6.0 mg/L when Chinook salmon are present (Exhibit B).
l. Total ammonia nitrogen should not exceed 30-day average of 2.43 milligrams nitrogen per liter (mg N/L) when juvenile Chinook salmon are present or exceed a 1-hour average of 5.62 mg N/L when Chinook salmon are present (Exhibit B).
m. Over 50 percent of the total target river length should be estimated to be in good condition (benthic index of biotic integrity (B-IBI) = 61-80) or very good condition (B-IBI=81-100). In addition, none of the study sites should be in “very poor condition” (B-IBI=0-20).

2) To protect the donor population, collection of individuals from donor stock should not be allowed until it has been demonstrated that there is a surplus of individuals in donor population.

The proposed approach based on Lindley et al. (2007) criteria indicates that individuals will be removed from donor stocks whenever the donor population number is at low risk of extinction. Low risk of extinction does not imply surplus; particularly since there is uncertainty regarding the population estimates reflecting actual population numbers. This approach is also incongruent with the USFWS AFRP doubling goals (Anadromous Fish Restoration Program 1995) because it does not require that the donor populations meet or exceed their doubling goals before fish can be removed.

Population estimates are imprecise and the magnitude of the difference compared with the true population is unknown and there are no confidence intervals.

As such, reintroduction efforts should not be allowed until all the following are met:

a. Population estimates should include confidence intervals.

b. AFRP doubling goal for a donor stock must be met for three consecutive years prior to collection. The lower confidence interval (CI) of estimated abundance must be used to satisfy the amount defined as necessary for the doubling goal.

c. If doubling goal is met according to “b” above in a third consecutive year, then must satisfy the Lindley et al. (2007) criteria.

    i. Population estimate based on survey conducted no earlier than August to account for potential mortality during holding periods (Butte Cr. fish kill 2003; July rescue 2008, 2009, 2010).

d. Collection cannot occur in any years when these criteria are not met.

3) To protect an experimental population, effective methods of release should be implemented.

Translocation (Direct Release into San Joaquin River)

a. Adult and egg translocation only. No juveniles may be translocated since evidence from the winter-run supplementation program suggests that imprinting of juveniles will be inadequate resulting in high stray rates (USFWS, http://www.fws.gov/stockton/afrp/documents/Genetics.pdf). The potential for high stray rates is corroborated by stray indices for off-site releases of Merced River Hatchery salmon into the San Joaquin River where recoveries where “sizeable recoveries [have occurred] in the Tuolumne River (22%), the Stanislaus River (10%), the American River (8%), the Feather River (8%), the Sacramento River (2%), the Mokelumne River (2%), and Butte Creek (1%)” (ICF Jones & Stokes 2010; page 4-186).
b. Translocation of adults to holding areas only if receiving water temperatures are suitable (<59°F; 15°C).
c. Translocation of eggs to holding areas only if receiving water temperatures are suitable (<55°F; 13°C).

4) To protect Threatened steelhead and Species of Concern fall-run Chinook in the San Joaquin Basin, several measures should be implemented.

Adult and juvenile spring-run Chinook from the experimental population may stray into the east side tributaries and affect steelhead and fall-run Chinook salmon populations. Adult spring-run may spawn with fall-run Chinook resulting in hybridzation and associated loss of genetic fitness. Juvenile spring-run may utilize the tributaries for non-natal rearing and compete with both steelhead and fall-run Chinook for limited food and space.

a. To prevent hybridization of the experimental population with fall-run Chinook salmon in the east side tributaries (Stanislaus, Tuolumne, Merced, and Mokelumne), weirs must be installed downstream of the spawning reach in each tributary to collect any spring-running individual adults and move them to either the Conservation Facility or pools downstream of Friant Dam.
b. Instream monitoring should be conducted to determine whether and to what extent marked juveniles from the experimental population use the tributaries and an analyses be performed regarding the impact to existing steelhead and fall-run Chinook populations.

5) To protect EFH, results of temperature studies should be used to determine fish management measures.

If temperature monitoring indicates that temperature increases will occur downstream of Merced due to flow connectivity, then Friant releases should be managed so that there is no flow connection with the lower river (i.e., downstream of Merced confluence). In this event, a trap and haul program for both adults and juveniles will need to be implemented according to protective measures as described in the Permit Application for collection, transportation, and release procedures.

6) Effectiveness Monitoring

The Permit Application states that:

> Monitoring of the effectiveness of artificial propagation and management actions on the demographics of the natural re-establishing populations is essential for adaptive management. This population will require monitoring during all periods of the restoration program to ensure that the planned level of segregation/integration of hatchery fish is occurring. (Page 45)

On page 39, the Permit Application also states that the adaptive management process is discussed in the ‘2010 Draft Fisheries Management Plan’.

The 2010 Draft Fisheries Management Plan referenced in the Permit could not be found, but a November 2010 FMP (San Joaquin River Restoration Program 2010c) document was found that contains some discussions pertaining to Decision Tree Routing and Potential Triggers and Adaptive Responses. These metrics should be included as part of the Permit Application, and triggers that would result in grounds for discontinuing the reintroduction efforts should also be identified and clearly stated.

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FIGURES

Figure 1. The canyon reach of Butte Creek.


Figure 2. The canyon reach of Butte Creek.

Figure 4. Photo of Butte Creek taken from Cable Bridge Rd., which is below Centerville Covered Bridge and above the Parrott-Phelan Diversion Dam.

Figure 5. Photo taken near the Centerville Covered Bridge on Butte Creek. The best spawning habitat on the Creek is between the Centerville Covered Bridge and Quartz Pool (approximately 11 river miles).


Figure 6. Old gravel mining pits in Reach 1 of the San Joaquin River Restoration Area.


Figure 7. The pools below Friant Dam in the San Joaquin River Restoration Area.

Figure 8. The view from the Highway 41 bridge in Reach 1 of the San Joaquin River Restoration Area.

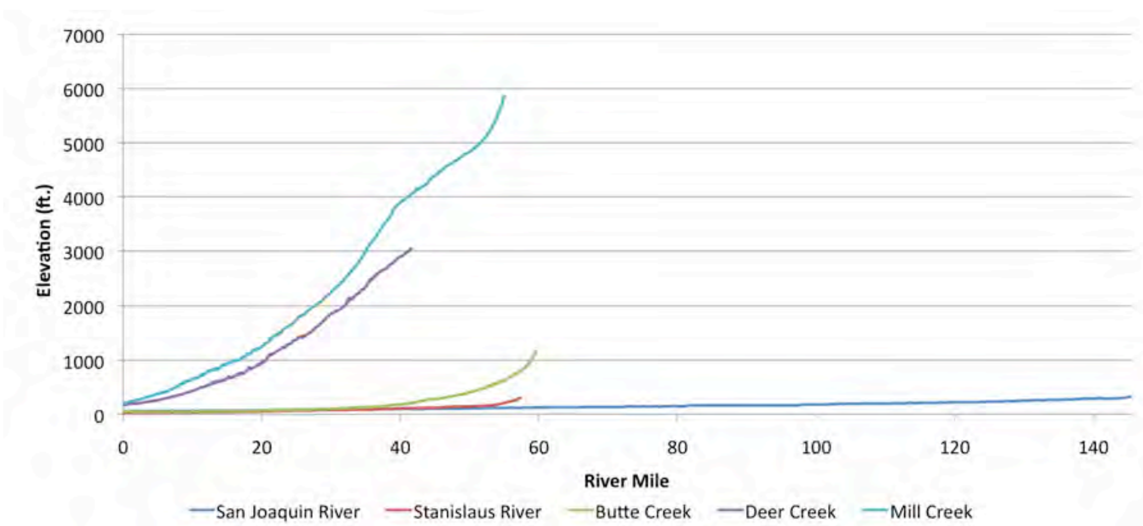

Figure 9. A comparison of elevation of salmonid habitat on the San Joaquin and Stanislaus rivers, and Butte, Deer and Mill creeks.