Protest of Request to Modify Temporary Urgency Change Order to Allow Reduced Delta Outflow and Export Pumping in Excess of Applicable Limits

FACTS SUPPORTING PROTEST

The Natural Resources Defense Council, Pacific Coast Federation of Fishermen's Associations and the Institute for Fisheries Resources, Golden Gate Salmon Association, Defenders of Wildlife, and The Bay Institute ("NRDC et al.") protest the March 14, 2014 request by the U.S. Bureau of Reclamation and California Department of Water Resources ("USBR/DWR") to modify the January 31, 2014 Temporary Urgency Change Order, last revised on February 28, 2014, on the basis that the applicants have failed to demonstrate (i) that the proposed change will not result in an unreasonable effect on fish, wildlife, or other instream resources; (ii) that the proposed change is in the public interest; or (iii) that the proposed change will not cause injury to any lawful water user.

I. Background

The State Water Resources Control Board ("SWRCB") has previously issued a Temporary Urgency Change Order in late January (modified twice since then) ("TUC Order") allowing temporary waiver from certain D-1641 requirements for the purpose of allowing USBR/DWR to "preserve water in storage to protect future cold water pool needs for listed species, future water supply, and maintain in-Delta water quality." TUC Order at 5. It is our understanding that pursuant to the TUC Order, USBR/DWR have pumped additional water from the Delta than what would be permitted by D-1641 on approximately 15 days. The TUC Order also states that, while the waiver is in place, the maximum Export Limits contained in D-1641 Table 3 are limited to "1,500 cfs of combined SWP/CVP exports … to provide minimum health and safety flows to municipal and industrial diverters who rely solely on supplies from the Delta or the canal between the export pumps and San Luis Reservoir." TUC Order at 5. As the Board recognized, while the waiver of applicable Delta outflow and Delta Cross Channel gate requirements were deemed necessary due to the extraordinary drought conditions, the waiver would cause irreversible harm to imperiled native fish populations, especially migrating salmon, as Delta outflow and DCC requirements are designed to protect fish and wildlife beneficial uses, as well as municipal and agricultural uses.[1]

[1] *See* TUC Order at 2 ("The Delta Outflow objective is intended to protect estuarine habitat for anadromous fish and other estuarine dependent species. Delta outflows affect migration patterns of both estuarine and anadromous species and the availability of habitat. Freshwater flow is an important cue for upstream migration of adult salmon and is a factor in the survival of smolts moving downstream through the Delta. The populations of several estuarine-dependent species of fish and shrimp vary positively with flow as do other measures of the health of the estuarine ecosystem"); *id.*at 3 ("Opening the DCC gates during winter and spring months can negatively affect juvenile Chinook salmon survival by causing straying into the interior and then southern Delta where survival is much lower than for fish that stay in the mainstem of the Sacramento River.").

NRDC et al. did not object to the Board's issuance of the prior TUC Order and revisions in recognition that the drought justified extraordinary actions and because the orders reflected a careful balancing of the multiple uses and users impacted by the SWP and CVP, in compliance with Water Code section 1435. However, USBR/DWR now seek a modification of the terms of the TUC Order to waive existing outflow requirements, without contributing to the preservation of upstream storage. In addition, USBR and DWR are seeking to violate the terms of the existing biological opinion to protect endangered winter-run chinook salmon, threatened spring-run chinook salmon, threatened Central Valley steelhead, and threatened North American green sturgeon, by permitting Delta exports in excess of the Old and Middle River reverse flow requirements under the 2009 National Marine Fisheries Service's biological opinion, dated June 4, 2009.[2] *See* Letter from Sue Fry, USBR, to Maria Rea, NMFS (March 14, 2014). USBR/DWR's current modification request does not satisfy the requirements of Water Code section 1435 or the terms of the existing TUC Order, nor does it satisfy the purpose for which these agencies originally requested (and were granted) a TUC order.[3]

II. The Request Does Not Meet the Requirements of Water Code Section 1435

Water Code section 1435(b) requires that the Board make the following findings prior to issuing any temporary urgency change:

(1) The permittee or licensee has an urgent need to make the proposed change.

(2) The proposed change may be made without injury to any other lawful user of water.

(3) The proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses.

(4) The proposed change is in the public interest, including findings to support change order conditions imposed to ensure that the change is in the public interest, and may be made without injury to any other lawful user of the water, and without unreasonable effect upon fish, wildlife, and other instream beneficial uses.

The requested modification from USBR/DWR fails to meet these requirements.

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[2] The Biological Opinion is available at http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/nmfs_biological_and_conference_opinion_on_the_long-term_operations_of_the_cvp_and_swp.pdf Action IV.2.3 of the Reasonable and Prudent Alternative, describing Old and Middle River pumping limits, is described beginning on page 648.

[3] To our knowledge, USBR/DWR have not disclosed the end use of the increased exports, nor have they explained whether the water that they currently seek to export could be preserved in upstream storage for later use. If the benefit of recent rains could be captured and stored in upstream reservoirs, it could serve multiple uses and provide multiple benefits later in the year, including, for example, improving deliveries to refuges and helping with salinity control in the Delta, which would benefit Delta farmers and the recipients of exported water.

A. The Proposed Change Will Result in an Unreasonable Effect on Fish and Wildlife

The currently requested change by USBR/DWR does not benefit upstream storage for later use or otherwise benefit fish and wildlife, but would worsen impacts to fish, in violation of Water Code section 1435 (b)(3).[4]

The existing TUC Order recognizes that by failing to comply with otherwise applicable Delta outflow and DCC gate closure requirements since late January, 2014, USBR and DWR have already harmed imperiled fish species. *See, e.g.*, TUC Order at 10 ("With the DCC gates open, there is potential for decreased survival of Sacramento River-origin species as they move through the central Delta. Potential hazards include increased entrainment, predation, and salvage."). However, the Order permits the change (and NRDC et al. did not object to the change) in recognition of the need to weigh the "short-term impact to fish and wildlife … against the long-term impact to all beneficial uses of water, including fish and wildlife, if the changes are not approved." TUC Order at 9. "[W]ithout the changes, the Projects' limited water supplies would be released for short term benefits to fish and wildlife at the expense of storage and flows later in the season, which would likely have severe effects on fish and wildlife and other instream beneficial uses of water." TUC Order at 10.

But the pending request does not provide the benefit of improving storage, and worsens impacts on fish. First, the requested change would substantially reduce Delta outflow, causing harm to multiple fish species and the biological health of the Bay-Delta estuary. As the Board concluded in its prior TUC Order,

> Providing year round Delta inflows and outflows is critically important to the survival of numerous fish and wildlife species in the Delta and upstream areas…. Delta outflows and inflows are also needed throughout the year for the anadromous species listed above as well as various ESA listed pelagic species including long-fin smelt and Delta smelt.

TUC Order at 11. Numerous scientific studies, including reports of the SWRCB, have demonstrated that winter/spring Delta outflow protects estuarine habitat in the Delta and strongly

[4] The SWRCB has already permitted DWR/USBR to exceed the otherwise applicable 35% I/E ratio, calculated on a 14-day average, allowing additional exports beyond that which would be permitted by the objectives in Table 3 of D-1641. *See* Attachment 1 (approving use of a 3-day average, rather than the 14-day average, which has increased water exports from the Delta); *see also* http://www.water.ca.gov/swp/operationscontrol/docs/delta/DeltaHydrology.pdf. Neither this change to the I:E ratio in D-1641 nor the current proposed temporary urgency change petition contributes to storage nor prevents the depletion of storage in reservoirs upstream of the Delta, that could be tapped later for multiple benefits, including salinity control, temperature control, to maintain flow requirements or to meet minimal refuge water supply requirements.

affects the abundance of native fish species in the Bay-Delta. *See, e.g.*, SWRCB, 2009 Staff Report for Periodic Review of the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; SWRCB, 2010 Public Trust Flow Report.[5] Reducing Delta outflow below 11,400 cfs is likely to substantially harm the health of the Bay-Delta estuary and numerous fish species, including endangered species.

Without the TUC Order, DWR/USBR would be obligated to provide Net Delta Outflow (NDOI) of 11,400 cfs for the relevant period, given current hydrologic conditions under D-1641. *See* http://www.water.ca.gov/swp/operationscontrol/docs/delta/DeltaWQ.pdf (page 1). The requested modification would waive this standard, seeking to relax it to 7,100 cfs, even though the Projects could comply with the applicable standard and still pump in excess of public health and safety requirements, or could utilize the provisions of the existing TUP Order to pump 1,500 cfs for health and safety purposes without meeting the Delta outflow requirement of D-1641. This reduction will harm migrating fish.

Winter-run and spring-run chinook salmon juveniles are currently migrating through the Delta, and are likely to migrate far more successfully with increased outflow to expedite their passage through the Delta and past the Project pumps. The existing TUC Order permits reduced Delta outflow on condition that:

> [A] higher pulse flow [will] be scheduled to benefit fish species. The magnitude, timing, and duration of this pulse flow will be determined by the Real-Time Drought Operations Management Team. Further changes to Delta Outflows for the remainder of the season may be requested. At that time, State Water Board staff will evaluate current circumstances and information and determine what if any changes should be made to Delta Outflow requirements for the remainder of the year to reasonably protect fish and wildlife and other instream uses and meet the other requirements of the Water Code.

TUC Order at 11. Implementing a higher pulse flow right now could significantly benefit out-migrating fish. Instead, USBR/DWR seek to reduce outflow. Moreover, to NRDC et al.'s knowledge, USBR/DWR rejected the request of the fishery agencies to release a pulse flow in recent weeks.

Second, the current proposal is related to DWR/USBR's request to allow pumping at the Project pumps to exceed pumping limits in state and federal Endangered Species Act permits – limits which were established because harm to salmon and other native fish substantially increase when

[5] In addition to the citations above, NRDC et al. have submitted voluminous scientific information as part of the SWRCB's consideration of changes to the Delta outflow objectives in the Water Quality Control Plan, which are available online at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt081712/jonathan_rosenfield.pdf and at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt091412/jonathan_rosenfield.pdf. Those submissions are incorporated by reference.

pumping results in reverse flows in Old and Middle River in excess of -5,000 cfs. The proposed change to the Delta outflow standard in the current petition would facilitate increased project exports that will unreasonably harm winter run Chinook salmon and other native fish. In considering the requested change, the Board must analyze the impact of this interconnected change to CVP/SWP operations on fish and wildlife, and not focus solely on the requested reduction in Delta outflow, particularly since changes in Delta outflow will directly affect the duration and extent of increased Delta exports above -5,000 cfs OMR. In addition, NRDC et al. note that the USBR/DWR petition claims that, "Project diversions from Old River for periods when Delta outflow is at or above 7,100 will continue to conform to existing Biological Opinions and the D-1641 Export to Inflow Ratio." Letter from Sue Fry, USBR, to Maria Rea, NMFS (March 14, 2014), at 2. That statement is false; USBR/DWR are seeking approval by NMFS and USFWS to ***violate*** the express terms of the existing Biological Opinions.

In 2008, following weeks of testimony, a federal district court determined that CVP and SWP operations, without limits on export pumping, "will appreciably increase jeopardy to the three species [winter-run chinook, spring-run chinook, Central Valley steelhead]" and adversely modify those species' critical habitat. *Pacific Coast Fed'n of Fishermens' Assns. v. Gutierrez,* 606 F. Supp. 2d 1195, 1253 (E.D. Cal. 2008). NMFS's 2009 biological opinion on the effects of the Projects on listed salmon, steelhead, sturgeon and other species, sets that limit at a ceiling of -5,000 cfs Old and Middle River flows during spring migration, explaining that "*the risk of entrainment escalates considerably with increasing exports, as represented by the net OMR flows."* NMFS 2009 BiOp at 652 (emphasis added); *see also* Kimmerer (2008) (the "estimated proportion of migrating fish salvaged at the export facilities increased with increasing export flow").[6] The rate of escalation – and harm – increases significantly as OMR flows exceed -5,000 cfs as depicted in figure 6-65 from NMFS's biological opinion, reproduced below:

[6] The Department of Fish and Wildlife, the state agency responsible for ensuring the protection of species listed under the California Endangered Species Act ("CESA"), Fish & Game Code, § 2050, *et seq*., has imposed the same -5,000 cfs OMR flow limit under CESA as necessary to protect listed fish from jeopardizing operations by the Projects.

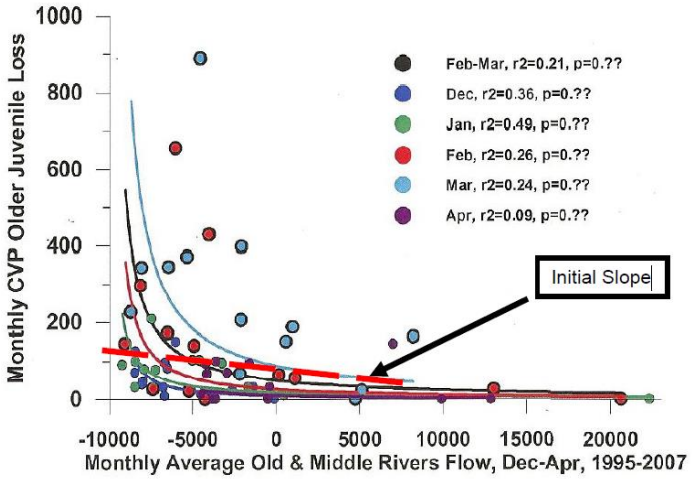


Figure 6-65. Relationship between OMR flows and entrainment at the CVP, 1995-2007 (DWR 2008).

And the harm is not limited to the period of excessive pumping, nor is it significantly mitigated by maintaining a loss-density trigger or salvage limits at the pumps. By the time those triggers are reached, the damage is done. This is because higher pumping pulls migrating salmon off of their migratory pathway into the Delta, where survival plummets due to a variety of factors, of which mortality at the pumps is only one. *See* Attachment 2 (Declaration of Jeffrey Stuart ISO Fed'l Defs.' Opp. to Pls.' Mot. for TRO, dated Feb. 1, 2010, Doc. 190-4). For example, as explained in the draft Bay Delta Conservation Plan EIS/EIR:

> Before fish reach the CVP and SWP facilities, there are other ways mortality occurs. Pre-screen mortality can occur in Old River when emigrating smolts from the San Joaquin River become diverted and drawn into the south Delta export facilities (Larry Walker Associates 2010). For example, between 1979 and 1993 up to 435,000 juvenile Chinook salmon and 56,000 delta smelt were salvaged annually at the SWP south Delta fish facility (Brown et al. 1996). *The actual entrainment losses were likely an order of magnitude greater than measured salvage*, due to predation in Clifton Court Forebay and the relatively low diversion efficiency of the louver fish exclusion system (the percentage of fish that are successfully directed to holding tanks and counted) (Brown et al. 1996; Castillo et al. 2012, Castillo et al. in review).

Draft BDCP EIS/EIR, at 11-126 (emphasis added). By the time pumping is ramped down, salmon have already been entrained into the central Delta by the hydraulic influence of the pumps.

Right now, juvenile endangered winter-run chinook and threatened spring-run chinook are traversing the Delta on their out-migration to the ocean, and last week NMFS estimated that nearly 75% of the winter run population is in the Delta and is vulnerable to changes in projects exports and outflow. *See* Attachment 3 (Barbara Byrne, NMFS, email to DAT (March 13, 2014)

("*Young-of-year Winter-run & yearling spring-run*: DOSS believes it likely that at least 75% of the winter-run Chinook young-of-year and spring-run Chinook yearling populations will have entered the delta by the end of this week. DOSS believes it likely that approximately 10% of the winter-run Chinook young-of-year and spring-run Chinook yearling populations will have exited the delta at Chipps Island by the end of this week.")). During this migratory period, it is critical that an OMR ceiling of -5,000 cfs be maintained to avoid increasing salvage at the pumps and the lethal indirect effects of entraining migrating salmonids into the central Delta, where they suffer significant mortality. *See, e.g.*, http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Appendix_3G_-_Proposed_Interim_Delta_Salmonid_Survival_Objectives.sflb.ashx (estimating through-Delta mortality of migrating salmonids). The populations of these species are already exceedingly depleted and further harm could jeopardize their continued existence. As NMFS's biologists have previously testified, exceeding the -5,000 cfs OMR limit would "deepen" harm to listed salmon and steelhead and their critical habitat. *See* Attachment 2 at ¶ 19; *see also* Attachment 4 (Declaration of Garwin Yip ¶ 11 (Doc. 217-4) (as a result of injunction of Action IV.2.3, NMFS could "no longer state with confidence that the CVP and SWP are not increasing the risk of extinction of listed species")). NMFS's biologists have also testified that exceeding the pumping limit of -5,000 cfs OMR flow would not avoid jeopardizing the continued existence of spring-run chinook and Central Valley steelhead. *See Consol. Salmon Cases*, 713 F. Supp. 2d 1116, 1146 (E.D. Ca, 2010). As exports and negative OMR has increased over the past week, the Project pumps are currently salvaging substantial numbers of winter-run sized chinook salmon, nearing the triggers for reducing pumping based on the density of salmon lost at the pumps. *See* ftp://ftp.dfg.ca.gov/salvage/DOSS_Salvage_Tables/Salmon_Salvage_Table_2014.xls

Third, USBR/DWR have failed entirely to address the cumulative effects of prior, current and proposed future Project management in 2014 on critically imperiled fish species –like winter run chinook salmon. Those impacts include, at minimum, the harm caused by the failure to meet DCC and Delta outflow objectives for approximately 15 days since issuance of the order, harm from expected salinity barriers that will likely create migration hurdles and increase loss of salmon and other native species, harm from low streamflows and warm water temperatures, harm from reduced carryover storage and inadequate cold water pools to meet temperature needs for spawning and rearing salmonids, and the harm from increased entrainment and salvage at Project pumps due to the current proposal. These cumulative impacts could tip certain species into an irreversible trajectory towards extinction; an impact that would clearly be unreasonable. In short, the requested change does not "balance the short-term and long-term habitat needs of fish and wildlife and other instream uses of water *during the entirety of water year 2014*." TUC Order at 11 (emphasis added).

Finally, even USBR/DWR have admitted that the proposed change will harm salmon and other native fish species, including endangered and threatened species: "Cumulatively, the proposed

change in outflow and Old and Middle River flows will reduce through Delta survival of juvenile listed salmonids, steelhead and green sturgeon, and may modify their critical habitat." USBR Letter to NMFS at 14; Id. at 12 ("The current distribution of Winter-run and Spring-run Chinook salmon and steelhead in the Delta and at the facilities suggest that export levels that create OMR flows more negative than -5,000 may increase the likelihood of exceeding Action IV.2.3's biological triggers associated with loss density and/or daily loss sooner."); *Id*. at 13 ("Old and Middle River flows more negative than -5,000 cfs are likely to increase the susceptibility of salmonids and green sturgeon in the Interior Delta and Lower San Joaquin River regions to entrainment in the South Delta….this region is a low survival zone for migrating and rearing salmonids.").

Unlike the prior TUC Order, this petition cannot be justified on the basis of providing additional benefits to fish and wildlife later in the year. In sum, the requested change will cause unreasonable impacts to fish and wildlife under Water Code section 1435 and should be rejected.

B. The Proposed Change Is Not In the Public Interest

The existing TUC Order found that temporary changes in Delta outflow, DCC gate closures and export limits were in the public interest because "[t]he proposed temporary change will help conserve stored water so that it can be released throughout 2014 to maintain instream flows for the benefit and protection of North of Delta, in-Delta, and South-of-Delta uses, including public trust uses." TUC Order at 12. The current proposal does not provide those benefits, and would worsen impacts on public trust uses. It is not in the public interest.

Furthermore, USBR/DWR have failed to comply with the existing terms of TUC Order, which also impairs the public interest. First, the Order requires that "DWR and Reclamation shall refine what export amounts and deliveries are required to maintain health and safety and shall provide documentation to the State Water Board to support that determination by February 14." TUC Order at paragraph 1.b. While DWR/USBR filed an initial response to define "health and safety," their filing makes clear that they continue to refine this definition. Second, the Order requires that "DWR and Reclamation shall calculate and maintain a record of the amount of water conserved through the changes authorized by this Order." TUC Order at paragraph 4. To our knowledge, that information has not been formally transmitted to the SWRCB, and it has not been shared with the public. Third, the Order requires that "DWR and Reclamation shall develop monthly water balance estimates indicating actual and proposed operations through the end of the water year. Specifically, actual and projected inflows, north of Delta contract deliveries, other channel depletions, exports, and Delta outflows shall be identified." TUC Order at para. 5. To NRDC et al.'s knowledge, USBR/DWR have not formally submitted that monthly water balance to the SWRCB, and have not shared such information with the public. Without providing this critical information, USBR/DWR cannot establish that increased pumping that would harm public trust resources is justified.

In addition, the March 3, 2014 transmittal email from the SWRCB specifies that the Executive Director will further amend the TUC Order on or about March 12, 2014 to clarify allowable uses of water under the TUC Order, to record the amount of water that is conserved pursuant to the TUC Order, and to impose a requirement to maintain a minimum amount of carryover storage in upstream reservoirs to meet health and safety needs in the event of a continuing drought next year. The SWRCB should not approve the current DWR/USBR temporary urgency change petition before fulfilling its obligations under the existing order, as modified by the March 3, 2014 transmittal email.

C. USBR/DWR Have Not Established that the Proposed Change Will Not Injure Lawful Water Users

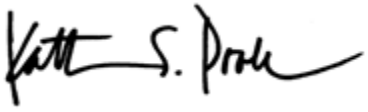
The existing TUC Order states that "the proposed changes will not injure any other lawful user of water because the changes will not result in a decrease in natural flows." TUC Order at 9. Reduced Delta outflow and increased exports have the potential to worsen salinity conditions for agricultural users in the Delta, and the proponents have not established that this will not harm other water rights holders.

III. CONCLUSION

The applicants have failed to demonstrate that the requested urgency change complies with Water Code section 1435. The State Board should deny the request.

March 17, 2014

Respectfully submitted,



Katherine S. Poole
Senior Attorney, NRDC

On behalf of: Natural Resources Defense Council, Pacific Coast Federation of Fishermen's Associations and Institute for Fisheries Resources, Golden Gate Salmon Association, Defenders of Wildlife, and The Bay Institute

Attachment 1

From: Wilson, Craig@Waterboards [Craig.Wilson@waterboards.ca.gov]
Sent: Tuesday, March 11, 2014 3:52 PM
To: Obegi, Doug
Subject: E/I Ratio

See the email string below.
Craig

From: Howard, Tom
Sent: Wednesday, March 05, 2014 4:33 PM
To: RMILLIGAN@usbr.gov
Cc: Howard, Tom; Stein, Russell@DWR; Grober, Les@Waterboards; Rea, Maria@NOAA; Reece, Kevin@DWR; pfujitani@usbr.gov; Moon, Laura K.@DWR; Wilcox, Carl@Wildlife; PABLO ARROYAVE; Helliker, Paul@DWR; Cowin, Mark@DWR; Jeff McClain; Murillo, D@USBR; Castleberry, Dan@fws; Ren_Lohoefener@fws.gov; Garwin.Yip@noaa.gov; dan.keeton@noaa.gov; Riddle, Diane@Waterboards; Aufdemberge, Amy; Leahigh, John@DWR; Fry, Susan@USBR; kaylee.allen@sol.doi.gov; Idlof, Patti@usbr.gov; William W. Stelle; Bonham, Chuck@Wildlife; Croyle, William@DWR; Mizell, James@DWR; Holderman, Mark@DWR; Garcia, Cindy A.@DWR; Friend, Janiene@DWR; Gonzales, Laura@DWR; Wilson, Craig@Waterboards; Burns, Gordon@EPA; WB-EXEC-BoardMembers
Subject: Re: Wednesday RTDOT

Thank you. I have no objection.

Sent from my iPhone

On Mar 5, 2014, at 4:26 PM, "MILLIGAN, RONALD" <rmilligan@usbr.gov> wrote:

Tom,
Consistent with the above email chain, please accept this notice from the Project agencies.
Thanks,
Ron

Notice to Executive Director, State Water Resources Control Board

Through the RTDOT process, the Project agencies have reached consensus with US Fish and Wildlife Service, National Marine Fishery Service and the California Department of Fish and Wildlife to flex the Delta Export/Inflow Ratio (E/I ratio). Effective to today, and continuing through the month of March, the Projects will be working with a 35% E/I Ratio using an averaging period of three days. This action is pursuant to the following:

Flex E/I Ratio: Footnote 21 to the 2006 Water Quality Control Plan and footnote 20 to Decision-1641 allow the percent Delta inflow diverted to vary either up or down. Variations may be authorized if agreed to by the US Fish and Wildlife Service, the National Marine Fisheries Service and the Department of Fish and Wildlife. Any variations will be effective immediately upon notice to the Executive Director of the SWRCB. If the Executive Director of the SWRCB does not object to the variations within 10 days, the variations will remain in effect. (2006 WQCP, p. 17; D-1641, p. 187.)

On Wed, Mar 5, 2014 at 2:44 PM, Wilson, Craig@Waterboards <Craig.Wilson@waterboards.ca.gov> wrote:
All,
Spoke to Tom Howard. Since all fishery agencies have now concurred in the E/I Ratio averaging change per the D-1641 process, Tom will not object to the change.

Craig M. Wilson
Delta Watermaster
916-445-5962
cwilson@waterboards.ca.gov

From: MILLIGAN, RONALD [mailto:rmilligan@usbr.gov]
Sent: Wednesday, March 05, 2014 9:35 AM
To: Stein, Russell@DWR
Cc: Grober, Les@Waterboards; Rea, Maria@NOAA; Reece, Kevin@DWR; pfujitani@usbr.gov; Moon, Laura K.@DWR; Wilcox, Carl@Wildlife; PABLO ARROYAVE; Helliker, Paul@DWR; Wilson, Craig@Waterboards; Cowin, Mark@DWR; Jeff McClain; Murillo, D@USBR; Castleberry, Dan@fws; Ren_Lohoefener@fws.gov; Garwin.Yip@noaa.gov; dan.keeton@noaa.gov; Riddle, Diane@Waterboards; Aufdemberge, Amy; Leahigh, John@DWR; Fry, Susan@USBR; kaylee.allen@sol.doi.gov; Idlof, Patti@usbr.gov; William W. Stelle; Bonham, Chuck@Wildlife; Croyle, William@DWR; Mizell, James@DWR; Holderman, Mark@DWR; Garcia, Cindy A.@DWR; Friend, Janiene@DWR; Gonzales, Laura@DWR
Subject: Re: Wednesday RTDOT

Note to RTDOT:

At our 3 MAR meeting we discussed, and reached general agreement on, modifications to the Delta Export/Inflow ratio (E/I Ratio) objective contained in D-1641 as a means to better deal with Delta operations given the current hydrologic conditions and rapidly changing nature of Sacramento River flows we have experienced over the last month. At out meeting, the Projects proposed maintaining the current 35% E/I Ratio while adjusting the averaging period to a value less than the current 14 days.

The Project Operations staffs have recommended a 3-day averaging period as a workable interval for scheduling and real-time operations this late winter and spring. We noted at the meeting that D-1641 allows for a modification of this objective with the consensus of all three fishery agencies and notification to the Board's Executive Director. Because this modification is an integral part of D-1641, this proposal is integral to the project description, and consistent with the modeling results, that were analyzed for the 2008/2009 Biological Opinions.

To help document the decisions made through our RTDOT process, the Project agencies would like to confirm (via e-mail) our collective agreement to use of the 3-day averaging period for the E/I Ratio are the remainder of March 2014.

Thank You.
Ron Milligan

Attachment 2

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JEAN E. WILLIAMS, Section Chief
SETH M. BARSKY, Assistant Section Chief
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Attorneys for the Federal Defendants

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF CALIFORNIA
FRESNO DIVISION

	)
	) Case No. 1:09-cv-407 OWW
	)
	)
CONSOLIDATED SALMON CASES	) **Declaration of Jeffrey Stuart In**
	) **Support of Federal Defendants'**
	) **Opposition to Plaintiffs' Motion for**
	) **Temporary Restraining Order**
	)
	)
	)
	)
_____	)

I, JEFFREY STUART, declare as follows:

1. My name is Jeffrey Stuart, and I am employed by NOAA's National Marine Fisheries Service ("NMFS") as a Fisheries Biologist in the Sacramento Office of the NMFS Southwest

Region. I have been employed in that position since 2001, and my duties include conducting section 7 consultations under the Endangered Species Act (ESA), including significant involvement in the development and issuance of NMFS' June 4, 2009, Biological and Conference Opinion on the Long Term Operations of the Central Valley Project and State Water Project ("CVP/SWP Opinion").

2. I have reviewed Plaintiffs San Luis & Delta-Mendota Water Authority and Westlands Water District's Memorandum of Points and Authorities in Support of Motion for Temporary Restraining Order and motion for Preliminary Injunction (Case 1:09-cv-01053-OWW-DLB, Document 164), filed on January 27, 2010, and the supporting declarations by Steven P. Cramer, Thomas A. Boardman, Joe del Bosque, Russ Freeman, Chris Hurd, Daniel G. Nelson, Dana Wilkie, Jonathan R. Marz, and Todd Allen. I have also reviewed Metropolitan Water District's Joinder, State Water Contractors' Joinder, and the declaration of Terry Erlewine. For the purposes of this declaration, I will focus on the scientific arguments presented in San Luis & Delta-Mendota Water Authority and Westlands Water District's Memorandum of Points and Authorities, the declaration by Steven P. Cramer, and Metropolitan Water District's joinder, as they relate to the CVP/SWP Opinion Reasonable and Prudent Alternative Action IV.2.3, Old and Middle River Flow Management ("Action IV.2.3"). In addition, this declaration is limited to the time period ending on March 5, 2010.

Fish Presence in the Delta

3. The estimate for the 2009 returning adult escapement of winter-run Chinook salmon is 4,416 fish (including 416 hatchery fish), up from an adult escapement estimate of 2,850 fish in 2008. The preliminary juvenile production estimate ("JPE") for winter-run is 1,144,860 fish (the preliminary JPE is based on the fecundity and sex ratio from the 2008 cohort, therefore, this

estimate may change as these parameters are updated). This preliminary JPE estimate establishes the 2% incidental take limit at 22,897 juvenile winter-run Chinook. There are no population estimates for spring-run juveniles or steelhead smolts that are routinely used that would be comparable to the JPE estimate.

4. The periodicity table provided in Exhibit 1a shows the temporal distribution of anadromous fish species within the Delta. For the time period up to March 5, 2010, I expect to see a high level of Sacramento River winter-run Chinook salmon ("winter-run"), a moderate level of Central Valley ("CV") spring-run Chinook salmon ("spring-run"), and a moderate level of CV steelhead migrating into and through the Delta. Averaged monthly data for the period between January and the end of March (years of records 1999-2009), obtained from the Central Valley Operations ("CVO") website (http://www.usbr.gov/mp/cvo/) indicate that approximately 40% of the annual winter-run salvage will occur between January and the end of February, and 90% by the end of March, as measured by loss estimates at the salvage facilities during the period of record (14% in January, 26% in February, 50% in March). I expect that less than 1 % will of the spring-run Chinook salmon will have moved through the Delta by the end of February as measured by the loss counts at the salvage facilities but that this will rise to approximately 17 percent of the spring-run population by the end of March (0.1% in January, 0.2% in February, and 17% in March). I expect that approximately 58% of the CV steelhead population will have moved through the Delta by the end of February as measured by the loss counts at the facilities, but that this will rise to approximately 90% by the end of March (21% in January, 37% in February, and 31% in March) (Exhibit 1b). Salvage and loss prior to the recent precipitation event has been very low.

5. In addition, the Southern Distinct Population Segment ("DPS") of North American green sturgeon ("Southern DPS of green sturgeon") are present within Delta waterways throughout the year. Based on historical salvage data at the Federal and State fish collection facilities, a total of approximately 16 percent of the annual salvage of green sturgeon will occur between January and the end of March (2% in January, 6% in February, and 8% in March). Salvage is typically higher at the SWP during this period (Exhibit 1c).

6. As shown in Exhibits 1 and 2 from the declaration by Jonathan R. Marz, there was very little salvage and loss of winter-run and CV steelhead (identified by the column "Season Combined," with the season beginning on October 1) at the Federal and State fish facilities until the recent storm events. This indicates that the recent storms triggered the downstream migration of winter-run and CV steelhead into the Central and South Delta waterways.

7. I anticipate that the fish currently in the Delta and those that will be entering the Delta through March 5, 2010, will be vulnerable to increases in salvage and loss as a result of the potential increases in export rates and reduced screening efficiency at the CVP facilities. In particular, winter-run juveniles enter the Delta during the December through March period (approximately 63% through the end of February, > 99% by the end of March; [Exhibit 1d]), but do not migrate past Chipps Island in large numbers until March. Based on the 10 years of data from the CVO web site, approximately 50% of winter run entrainment has typically occurred by the end of February, and almost all winter-run entrainment has typically occurred by the end of March [Exhibit 1b].

<u>Rationale for the Use of the Particle Tracking Model ("PTM") and Old and Middle River ("OMR") Flows</u>

8. Plaintiffs' characterization of NMFS' use of the PTM simulations is inaccurate. It is the subjective opinion of the plaintiff's witness that NMFS solely used neutrally buoyant particles as a surrogate to represent salmonids and their behavior. The CVP/SWP Opinion (pages 366-367) clearly states that this was not so. The analysis of flows and entrainment risk used the output of the PTM simulations, combined with evidence from the salvage data and mark and recapture studies, to develop a relationship between these two factors. The CVP/SWP Opinion (pages 380-381) states, "While the correlation of the survival rates of fish released in the Delta Action 8 and the Interior Delta CWT [coded wire tag] studies with the percentages of particles reaching Chipps Island is poor under most of the runs, Kimmerer and Nobriga (2008) offer potential causes for these differences. They opine that the lack of correlation may be merely due to the differences in the behavior between salmon and neutrally buoyant particles, or, on the other hand, that artifacts of the experiments such as the survival potential of fish traveling through the different waterways (*i.e.*, predation on the CWT fish) or the lack of efficiency in the trawl recapture rates for Chipps Island biases the results of the CWT studies and results in lower numbers of fish reaching the terminal endpoints than suggested by the PTM results. They conclude that 'despite all these differences, the PTM results suggests that river flow may be an important variable in determining which way the salmon go and their probability of survival, and should be included in the design and analysis of future studies' (Kimmerer and Nobriga 2008 page 19)."

9. NMFS used several PTM simulations, executed by the California Department of Water Resources (DWR) at NMFS' request, to assess the relationship between OMR flows and particle fate, including entrainment at the export facilities in the south Delta. Simulations were run using two different water years: 2005, a "wet" year with high San Joaquin River flows; and

2008, a "dry" year with low San Joaquin River flows. These represented two bookends for hydrologic conditions. NMFS included the "dry" year of 2008 as it represented conditions used by the U.S. Fish and Wildlife Service ("FWS") in their analysis for Delta smelt, and thus, FWS could compare runs done for NMFS with their own data set. Injection points within the Delta overlapped with injection sites utilized by FWS studies to make data directly comparable at these points, but also included points in the eastern Delta and south Delta relevant to NMFS' species.

10. The PTM simulations for NMFS examined particle fates injected at OMR flows of -3,500 cubic feet per second ("cfs"), -2,500 cfs, and -1,250 cfs. The particles were tracked for 90 days through the Delta with the first 30 days sampled at intervals of 5 days, thereafter particle fate was determined at 60 and 90 days. Injections were made starting at the beginning of each month beginning with February and ending with June. Due to time limitations, DWR staff could not run additional simulations at higher flow levels and more months, despite requests from NMFS.

11. PTM simulation output was used to assess the magnitude of particle entrainment from each of the injection points over the 90-day time course under a given OMR flow regime, water year type, and month of injection (February through June). Data from the injection site location and initial sampling rate provided additional information concerning the rate of entrainment and the spatial dispersion of the export effects. The synthesis of this information allowed NMFS to develop a conceptual "footprint" of the entrainment vulnerability of particles injected at each injection site, as related to OMR flow values.

12. The conceptual footprint indicates that as exports increase, as represented by more negative OMR flows, the level of particle entrainment at a given injection site will increase to a certain level, and then plateau. The level of the plateau and the speed at which the plateau is

reached indicates the relative vulnerability to entrainment at that injection site. Assessment of the simulation data also indicated that proximity to the export pumps plays a role in the entrainment vulnerability. Injection sites located in closer proximity to the export pumps or along a direct path were more vulnerable than locations located at a greater distance or along an indirect path. Entrainment rates also were higher for sites located closer to the export facilities than those located at a farther distance (*i.e.*, entrainment effects were seen in a shorter amount of time).

Relationship of Exports to Fish Entrainment

13. Newman (2008) found a significant effect of exports on the survival of CWT Chinook salmon released into Georgiana Slough: there is a 98% probability that as exports increase, survival decreases for Georgiana Slough releases (Delta Action 8 studies) compared to fish released in the Sacramento River (Ryde). The Interior Studies also indicated that fish which had moved into Georgiana Slough were 16 times more likely to be salvaged at the export facilities than fish remaining in the Sacramento River. This indicates that fish moving southwards to the San Joaquin River via Georgiana Slough and the Mokelumne River, were vulnerable to entrainment by the export facilities upon entering the Central Delta. These fish also had a lower rate of survival than fish which remained in the Sacramento River (ratio of 0.44). Thus, moving into the central and southern Delta (Delta interior) results in lower survival overall, a higher susceptibility to entrainment at the export facilities, and a lower rate of survival as exports increased compared to the Sacramento River. The location of the junction between the lower Mokelumne River and the lower section of the San Joaquin River where fish enter the San Joaquin River system is approximately Station 815 of the injection sites (Exhibit 2). In addition, Newman's (2008) analysis of the Vernalis Adaptive Management Plan ("VAMP")

experiments indicated that survival was lower for fish moving through the Old River system to Chipps Island, than for fish which remained in the main stem of the San Joaquin River.

14. Information provided by DWR (Exhibit 3) indicate that as OMR levels increase (*i.e.*, more negative), salvage and loss of older juveniles (winter-run and yearling spring-run) increase, typically in a non-linear fashion. In the material provided by DWR, entrainment is relatively low at an OMR flow of up to approximately -5,000 cfs. As OMR flows increase (*i.e.*, more negative) beyond -5,000 cfs, entrainment rates are considerably higher. Data from other sources had variable results. In some months, strong relationships between OMR and salvage existed (Exhibits 3 and 4), while in other months, weaker relationships existed (Exhibit 5), indicating that fish (steelhead) may be coming from multiple basins. Modeling performed for the consultation indicated that predicted OMR flows would be consistently more negative than -5,000 cfs in the months of December through April for wet, above normal, below normal and dry water year types. Critical years had OMR flows that were modeled to range between approximately -2,500 cfs and -6,300 cfs during the period between December and June (Exhibit 7).

15. Taking all of these pieces of information together, the older juvenile (winter-run and yearling spring-run) loss to OMR flow information indicate that under the current and projected future conditions, as modeled in the CALSIM II simulations, loss at the facilities will be in the region of the greater, more vertical slope, not in the region of the flatter slope (Exhibit 3). Loss is substantially reduced when OMR flows are more positive than -5,000 cfs. The particle tracking models indicate that at OMR flows more negative than -5,000 cfs, the vulnerability of particles to entrainment extends out to the lower San Joaquin River (>50 percent at the locations along the lower San Joaquin River between the confluence of the Mokelumne River and

Stockton). When OMR flows are reduced to -3,500 and -2,500 cfs, particle entrainment at points along the San Joaquin River drop substantially. At these flow levels, the export footprint has been reduced in size and fish moving along the San Joaquin River main channel experience less export influence the farther west they move from Stockton towards Jersey Point. Newman (2008) indicates that fish moving through the Georgiana Slough pathway into the lower San Joaquin River section experience more loss, and presumably more movement deeper into the south Delta, under the influence of increasing exports. The increased potential to be salvaged at the exports for fish moving through the Georgiana Slough pathway compared to the Sacramento River route parallels the lower entrainment risk at Rio Vista in the PTM simulations compared to Station 815 at the confluence of the Mokelumne River and San Joaquin River.

16. The plaintiffs have stated that there is no statistically significant relationship between OMR and salmonid mortality. However, the plaintiffs have unfairly represented the reality of the conditions under which the data are collected which makes achieving statistical significance difficult without numerous replications to reduce the standard error. This is particularly true when examining retrospective observational data in which the variables are not well replicated and environmental noise is prevalent. The Delta system is full of multiple factors that can influence the statistical results of the relationship. High levels of environmental noise will mask all but the most robust effects, *i.e.*, a low signal to noise ratio. Newman's (2008) analysis of the four studies involving the Delta Cross Channel, Delta interior, Delta Action 8 and VAMP described this problem. Dr. Newman indicated that the excessive environmental noise swamps the signal from the exports, making the detection of statistically significant differences very hard to find. His analysis in the paper points out the problem in reducing the standard error sufficiently to see the difference in the sample means (pages 68-73 of Newman 2008 report) for

the different mark/recapture studies in the Delta. It would require substantially greater numbers of replications of the experiments to reduce the magnitude of the standard errors to detect significant differences. Plaintiffs also fail to mention that Dr. Newman did find a statistically significant relationship (98% probability) between lowered survival and increased exports in the Delta Action 8 studies. OMR is a function of export levels and, thus, it is likely that a statistically significant relationship would also be found for OMR and salmon survival provided the correct experimental and statistical designs are employed which minimizes extraneous environmental noise. Furthermore, plaintiffs have failed to explain that salvage, whether raw or "indexed," is but a small fraction of the total number of fish affected by exports and is at best a fairly crude assessment due to its inherent assumptions and expansion factors. Most fish drawn into the southern Delta by export-related hydraulic effects fail to ever make it to the actual fish collecting facilities; therefore the values generated for salvage or loss underestimates the impacts created by the export actions. Previous mark/ recapture methods were too crude and insensitive to adequately capture this and this area of project impacts remains contentious. Future studies utilizing acoustic tags, which have better discrimination and sensitivity of fish movement both temporally and spatially, are anticipated to give the resolution needed to detect these relationships.

Impacts of Plaintiffs' Proposed Injunction

17. During the period between February 1 and March 5, salvage and loss records indicate that winter-run, CV steelhead, and green sturgeon will be increasingly present in the salvage collections at the CVP and SWP (Exhibits 1b,c, 8, 9, and10). The cumulative salvage data for green sturgeon shows that approximately 6 percent of the annual salvage for Southern DPS green sturgeon occurs in February. Salvage of Southern DPS green sturgeon doubles in March

compared to February at the State facility (Exhibit 1c). Therefore, I expect increased salvage of Southern DPS of green sturgeon through March 5, 2010. As a result, the Plaintiffs' proposed preliminary injunction of Action IV.2.3 from the beginning of February through early March will result in increased salvage and loss of winter-run, CV steelhead, and Southern DPS of green sturgeon at the Federal and State facilities (see paragraphs 3 and 4, above). I also expect spring-run (as represented by hatchery releases of tagged surrogate late fall-run and fish within the spring-run size criteria) to start showing up at the Federal and State facilities, as approximately 53 percent of the annual population has migrated into the Delta by March (Exhibit 1d) and approximately 17 percent of the annual loss has occurred by the end of March (Exhibit 1b). I expect considerably more fish will be lost prior to encountering the salvage facilities based on the high rates of loss seen in the waterways of the Delta interior in both the central and southern waterways. Survival of fish in these waterways may be no more than 10 to 30 percent based on survival estimates in recent acoustic tag studies (Perry and Skalski 2008, 2009; Holbrook *et al*. 2009).

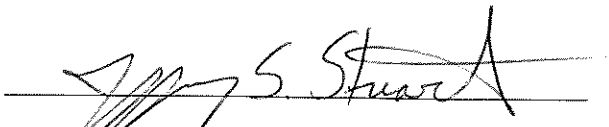
18. The CVP and SWP water projects alter flow patterns in the Delta due to export pumping and create entrainment issues in the Delta at the pumping and fish facilities. In addition to reducing the loss and salvage of the anadromous salmonid species, Action IV.2.3 improves the function of primary constituent element of migratory corridor for CV steelhead and the Southern DPS of green sturgeon. Migratory habitat condition is strongly affected by the presence of barriers, including behavioral impediments to migration. For successful survival and recruitment of salmonids, freshwater migration corridors must function sufficiently to provide adequate passage. In the absence of Action IV.2.3, the primary constituent element of migratory corridor

for CV steelhead and the Southern DPS of green sturgeon, and thus, the conservation value of their critical habitat, will be modified and degraded.

19. The reasonable and prudent alternative (RPA) contained in the CVP/SWP Opinion is comprised of over 50 actions, which must be implemented in its entirety for the projects not to violate the statutory and regulatory requirements of section 7(a)(2) of the ESA. If the protective measures afforded by any of the actions, and in this case, specifically Action IV.2.3, are not implemented, then the CVP and SWP will likely deepen the harm to the listed anadromous fish species and their critical habitat, and the RPA as a whole may not avoid jeopardy to Sacramento River winter-run Chinook salmon, Central Valley steelhead, and Southern DPS of North American green sturgeon, and may not avoid adverse modification to the designated critical habitat of Central Valley steelhead and Southern DPS of North American green sturgeon.

20. I declare under penalty of perjury under the laws of the State of California and the United States that the foregoing is true and correct.

Dated this 1 day of February, 2010



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Biologist, Sacramento Office, Southwest Region
National Marine Fisheries Service

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Perry, R.W. and J.R. Skalski. 2009. Migration and survival of juvenile Chinook salmon through the Sacramento-San Joaquin River Delta during the winter of 2007-2008. University of Washington. 54 pages.

EXHIBIT 1

Exhibit 1a. Temporal distribution of anadromous fish species within the Delta (KL = Knights Landing, FW = Fremont Weir). Reproduced from the NMFS CVP/SWP Opinion (Table 6-27 on page 335).

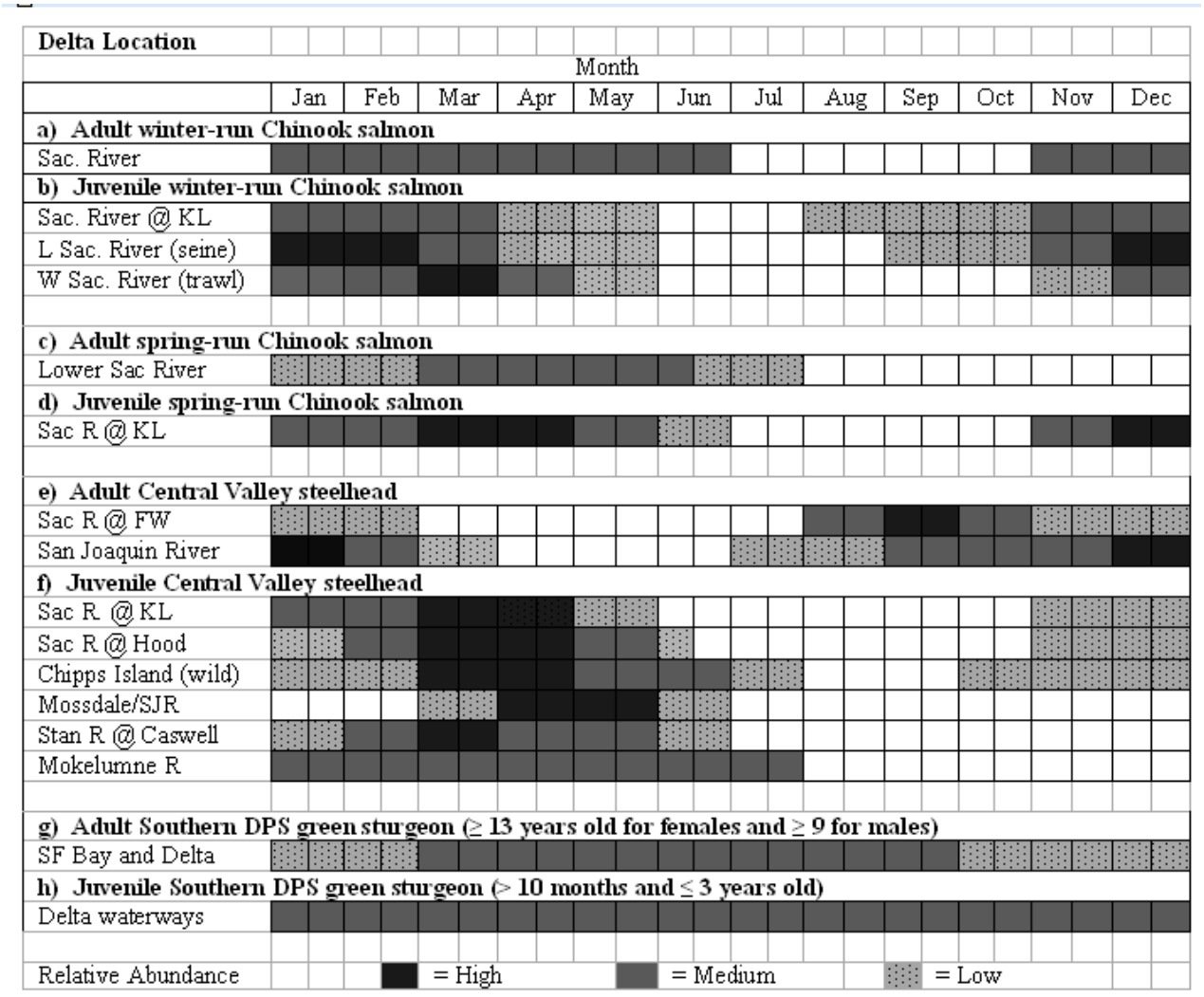


Exhibit 1b: Summary table of monthly Winter-run and Spring-run Chinook salmon loss and Combined total salvage and loss of Central Valley steelhead at the CVP and SWP fish collection facilities from water year 1999-2000 to water year 2008-2009. Data from CVO web site: (http://www.usbr.gov/mp/cvo/)

Fish Facility Salvage Records (Loss)

Winter Run (loss)

Year	October	November	Dec	Jan	Feb	March	April	May	June	July	August	September	Sum
2008-2009	0	0	8	55	210	1654	21	0	0	NA	NA	NA	1948
2007-2008	0	0	0	164	484	628	40	0	0	NA	NA	NA	1316
2006-2007	0	0	87	514	1678	2730	330	0	0	NA	NA	NA	5339
2005-2006	0	0	649	362	1016	1558	249	27	208	NA	NA	NA	4069
2004-2005	0	0	228	3097	1188	644	123	0	0	NA	NA	NA	5280
2003-2004	0	0	84	640	2812	4865	39	30	0	NA	NA	NA	8470
2002-2003	0	0	1261	1614	1464	2789	241	24	8	NA	NA	NA	7401
2001-2002	0	0	1326	478	222	1167	301	0	0	NA	NA	NA	3494
2000-2001	0	0	384	1302	6014	15379	259	0	0	NA	NA	NA	23338
1999-2000	0	0				1592	250	0	0	NA	NA	NA	1842
Sum	0	0	4027	8226	15088	33006	1853	81	216	0	0	0	62497
Avg	0	0	447	914	1676	3301	185	8	22	0	0	0	6553
%Wr/yr	0.000	0.000	6.828	13.947	25.581	50.364	2.828	0.124	0.330	0.000	0.000	0.000	

Spring-Run (loss)

Year	October	November	Dec	Jan	Feb	March	April	May	June	July	August	September	Sum
2008-2009	0	0	0	0	0	333	5912	2604	4	NA	NA	NA	8853
2007-2008	0	0	0	0	15	315	6918	4673	87	NA	NA	NA	12008
2006-2007	0	0	0	0	7	190	4700	365	0	NA	NA	NA	5262
2005-2006	0	0	0	0	104	1034	8315	3521	668	NA	NA	NA	13642
2004-2005	0	0	0	0	0	1856	10007	1761	639	NA	NA	NA	14263
2003-2004	0	0	0	25	50	4646	5901	960	0	NA	NA	NA	11582
2002-2003	0	0	0	46	57	11400	27977	2577	0	NA	NA	NA	42057
2001-2002	0	0	0	21	8	1245	10832	2465	19	NA	NA	NA	14590
2000-2001	0	0								NA	NA	NA	0
1999-2000										NA	NA	NA	0
Sum	0	0	0	92	241	21019	80562	18926	1417	0	0	0	122257
Avg	0	0	0	12	30	2627	10070	2366	177	0	0	0	15282
% SR/yr	0.000	0.000	0.000	0.075	0.197	17.192	65.896	15.481	1.159	0.000	0.000	0.000	

Steelhead (combined salvage and loss, clipped and non-clipped)

Year	October	November	Dec	Jan	Feb	March	April	May	June	July	August	September	Sum
2008-2009	0	0	0	40	571	1358	210	68	13	7	NA	NA	2267
2007-2008	0	0	0	624	4639	717	300	106	24	15	NA	NA	6425
2006-2007	0	0	10	81	1643	4784	2689	113	20	NA	NA	NA	9340
2005-2006	0	0	0	129	867	3942	337	324	619	NA	NA	NA	6218
2004-2005	0	20	70	120	1212	777	687	159	116	NA	NA	NA	3161
2003-2004	0	12	40	613	10598	4671	207	110	0	NA	NA	NA	16251
2002-2003	0	0	413	13627	3818	2357	823	203	61	NA	NA	NA	21302
2001-2002	0	0	3	1169	1559	2400	583	37	42	NA	NA	NA	5793
2000-2001	0	0	89	543	5332	5925	720	69	12	NA	NA	NA	12690
1999-2000	3	60				1243	426	87	48	NA	NA	NA	1867
Sum	3	92	625	16946	30239	28174	6982	1276	955	22	0	0	85314
Avg	0	9	69	1883	3360	2817	698	128	96	11	0	0	9071
SH %/yr	0.0	0.1	0.8	20.8	37.0	31.1	7.7	1.4	1.1	0.1	0.0	0.0	

Exhibit 1c: Total sum of monthly salvage rates for North American green sturgeon at the CVP and SWP Fish Collection Facilities 1981 to 2006.

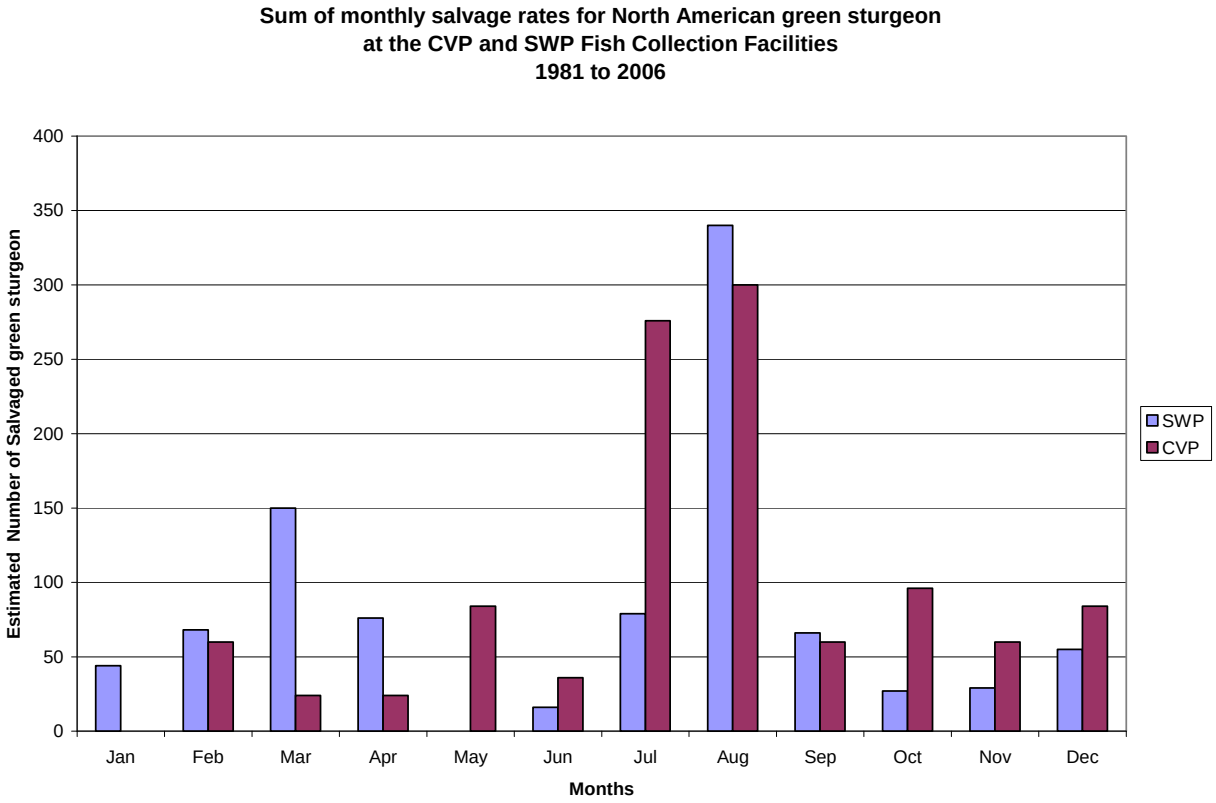


Exhibit 1d: The proportion of juvenile Chinook salmon and steelhead production entering the Delta from the Sacramento River by month.

Month	Sacramento River Total[1,2]	Fall-Run[3]	Spring-Run[3]	Winter-run[3]	Sacramento Steelhead[4]
January	12	14	3	17	5
February	9	13	0	19	32
March	26	23	53	37	60
April	9	6	43	1	0
May	12	26	1	0	0
June	0	0	0	0	0
July	0	0	0	0	0
August	4	1	0	0	0
September	4	0	0	0	1
October	6	9	0	0	0
November	9	8	0	03	1
December	11	0	0	24	1
Total	100	100	100	100	100

Notes:
[1] Mid Water trawl data
[2] All runs combined
[3] Runs from Sacramento River basin only
[4] Rotary screw trap data from Knights Landing
Source: SDIP Draft EIR/EIS 2005 Tables J-23 and J-24, Appendix J.

EXHIBIT 2

Exhibit 2: Location of Injection Sites in the Sacramento –San Joaquin Delta for Particle Tracking Model.

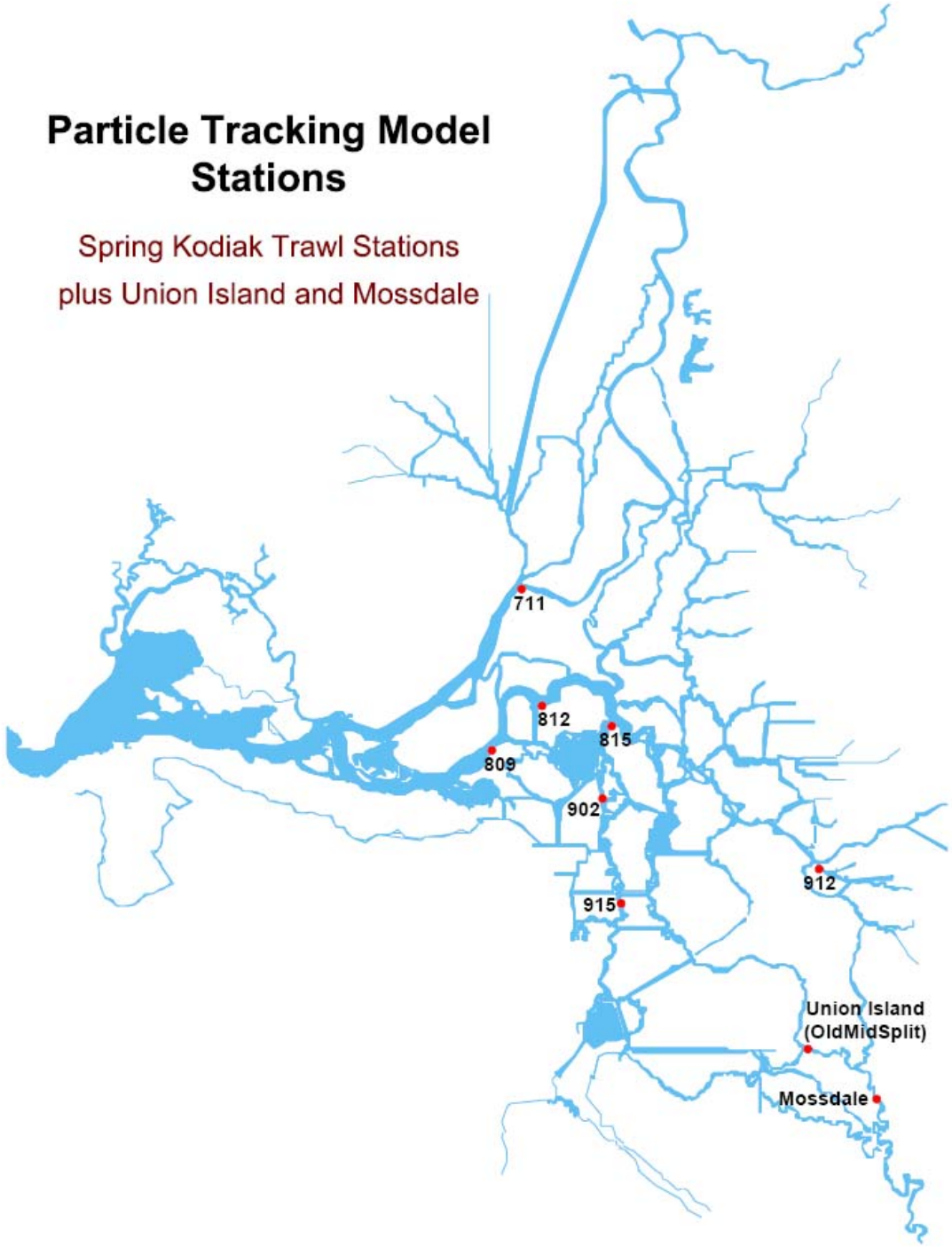


EXHIBIT 3

Exhibit 3: Monthly loss of Older juvenile Chinook salmon versus average monthly Old and Middle River Flows at the CVP and SWP fish collection facilities 1995-2007

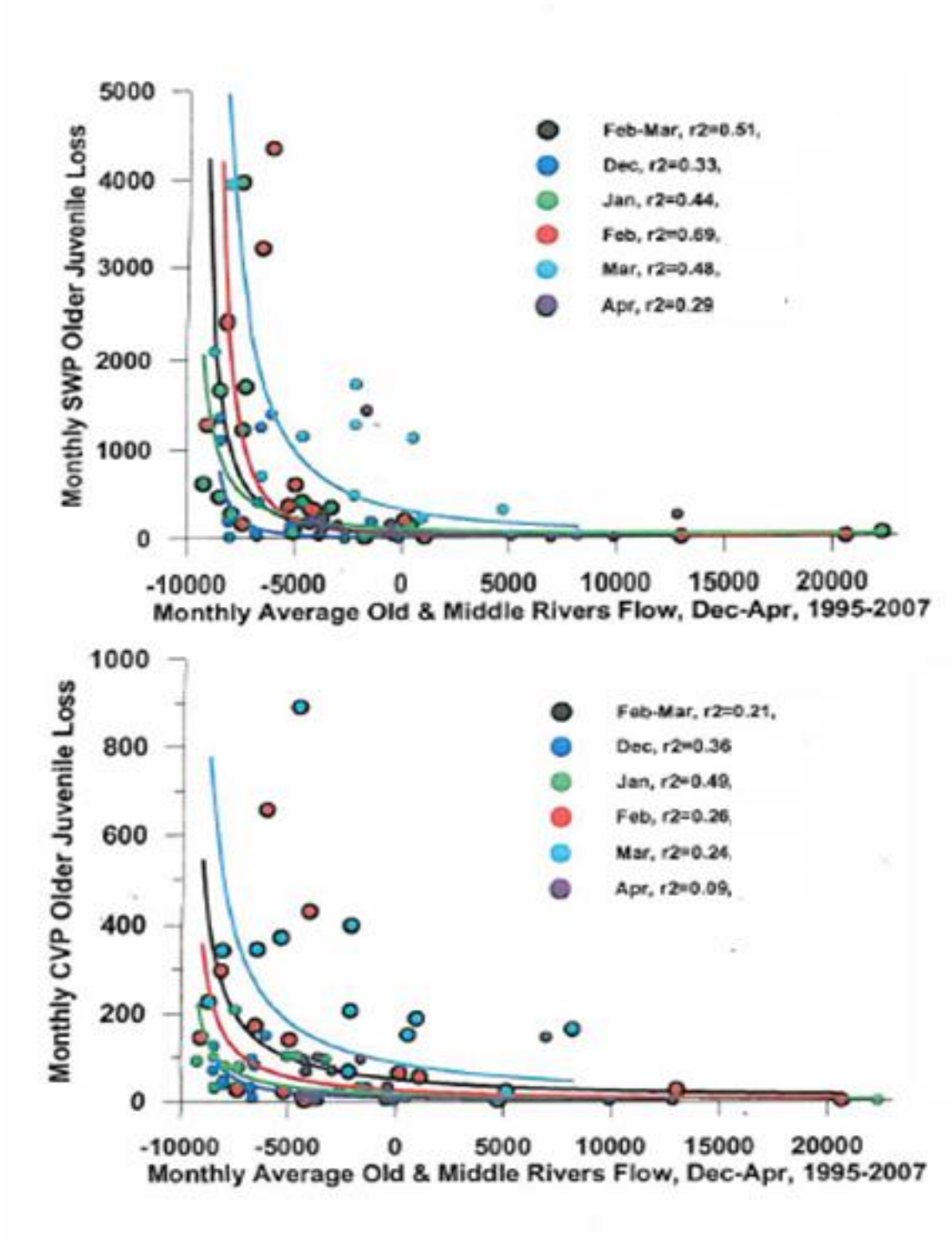


EXHIBIT 4

Exhibit 4: Winter-run Chinook salmon Expanded Salvage, January 1995-2007

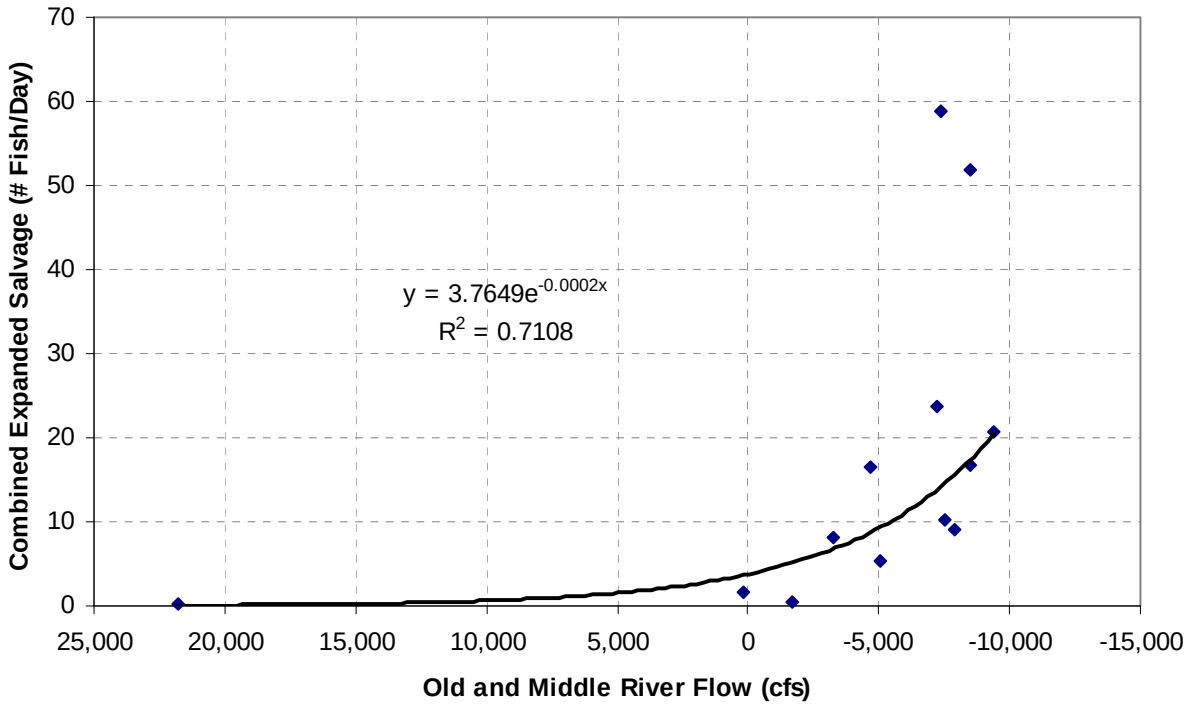


EXHIBIT 5

Exhibit 5: Central Valley steelhead expanded salvage, March 1995-2007

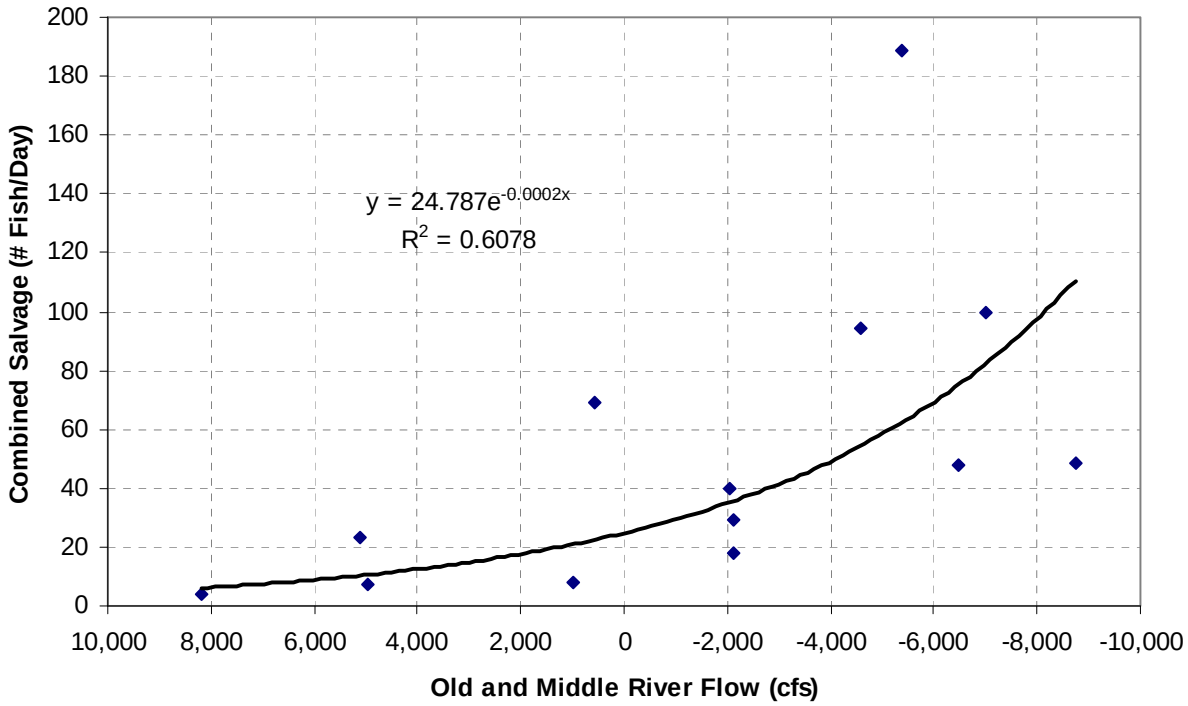


Exhibit 6

Exhibit 6: Central Valley steelhead expanded salvage, April 1995-2007

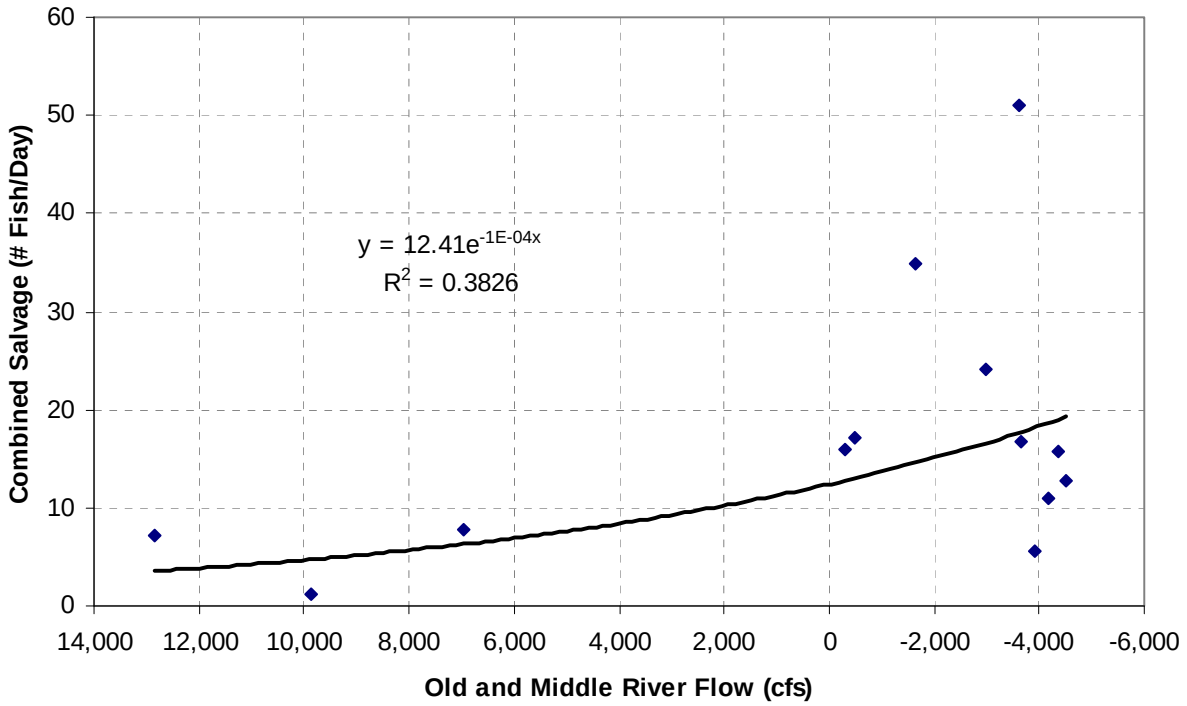


Exhibit 7

Exhibit 7: **Projected Average Old and Middle River Flows in cfs (CVP/SWP operations BA Appendix E CALSIM Output).**

Wet and Above Normal Water Year Types

Study	December	January	February	March	Average
Study 7.0	-8350	-6391	-7322	-6858	-7230
Study 7.1	-8083	-6511	-7377	-7956	-7482
Study 8.0	-8230	-6276	-7203	-7890	-7400

Study	April	May	June	July	Average
Study 7.0	-5847	-4381	-4118	-643	-3747
Study 7.1	-6561	-4652	-3450	-1146	-3952
Study 8.0	-6611	-4941	-3792	-1193	-4134

Below Normal and Dry Water Year Types

Study	December	January	February	March	Average
Study 7.0	-7668	-6125	-6767	-7117	-6919
Study 7.1	-6687	-6098	-6504	-8063	-6838
Study 8.0	-6946	-6030	6435	-8004	-6854

Study	April	May	June	July	Average
Study 7.0	-6889	-6052	-5573	-1064	-4895
Study 7.1	-7889	-5897	-5440	-1442	-5167
Study 8.0	-8038	-5989	-5407	-1428	-5215

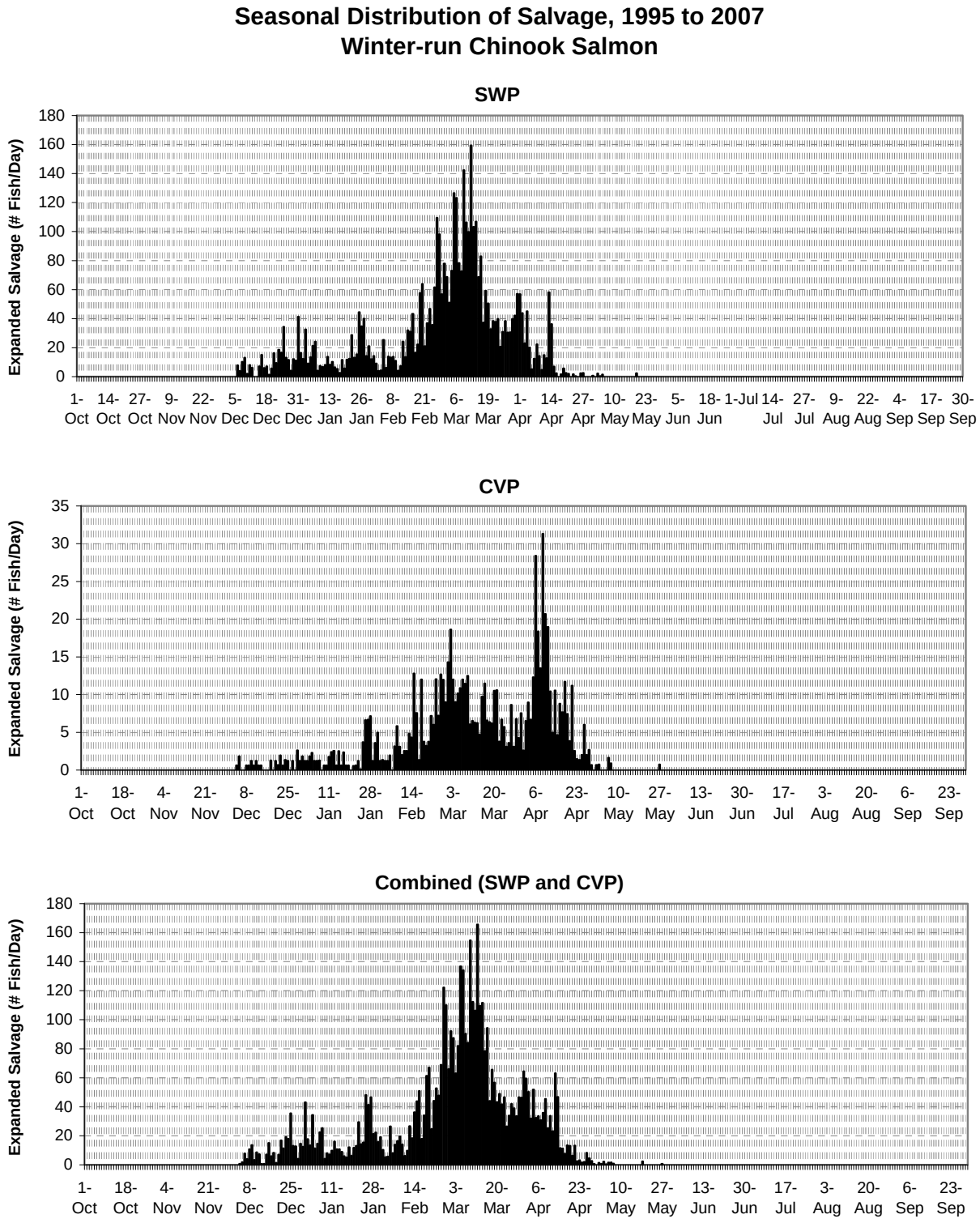
Critical Water Year Type

Study	December	January	February	March	Average
Study 7.0	-4576	-5633	-5293	-6158	-5415
Study 7.1	-3375	-5399	-4892	-6389	-5014
Study 8.0	-3312	-5317	-4333	-6315	-4819

Study	April	May	June	July	Average
Study 7.0	-5368	-4250	-2514	-797	-3232
Study 7.1	-5903	-4744	-2824	-842	-3578
Study 8.0	-5618	-4865	-3024	-870	-3594

EXHIBIT 8

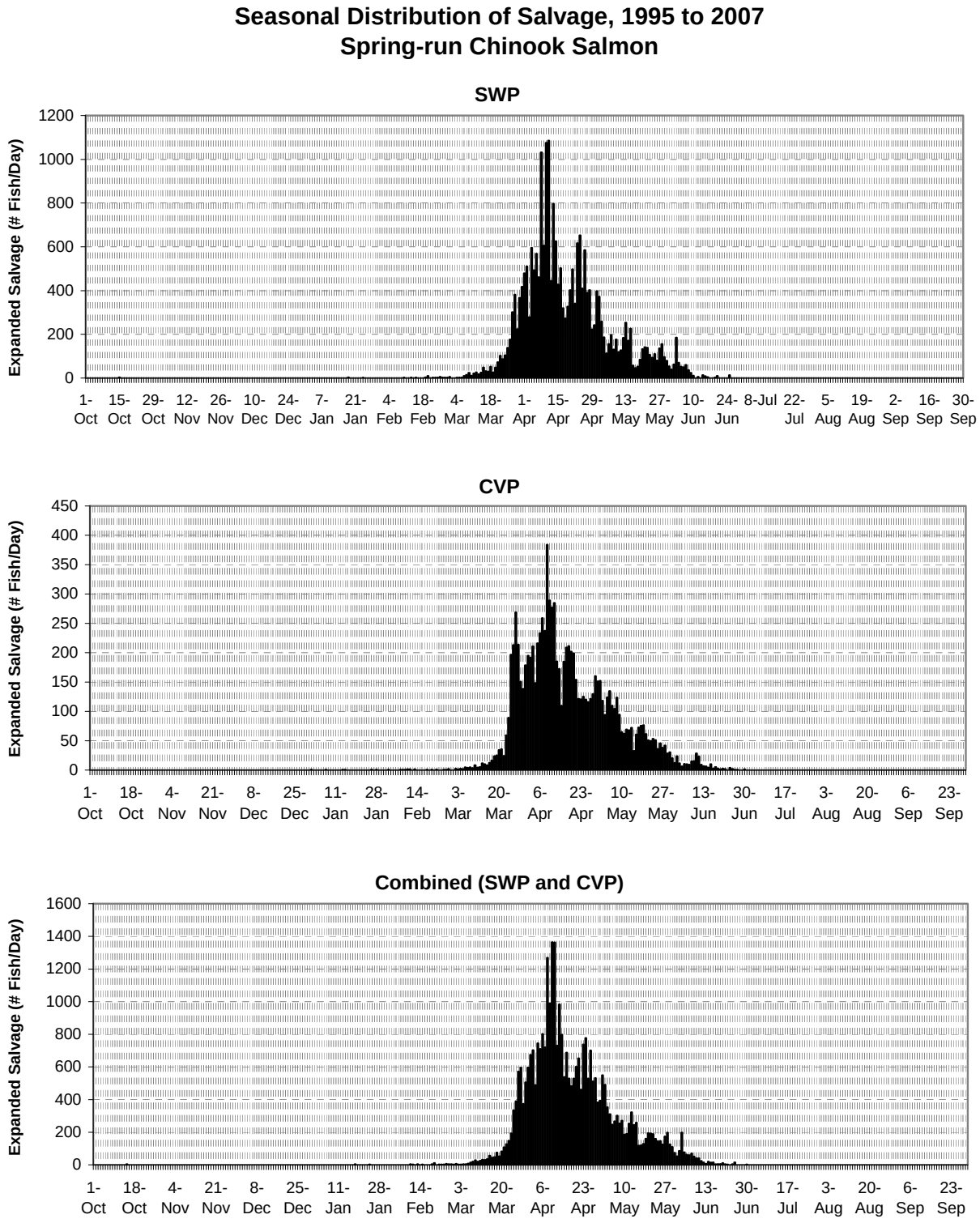
Exhibit 8: Temporal distributions of winter-run Chinook salmon salvage



Source: California Department of Fish and Game (ftp://ftp.delta.dfg.ca.gov/salvage), non-clipped only.

EXHIBIT 9

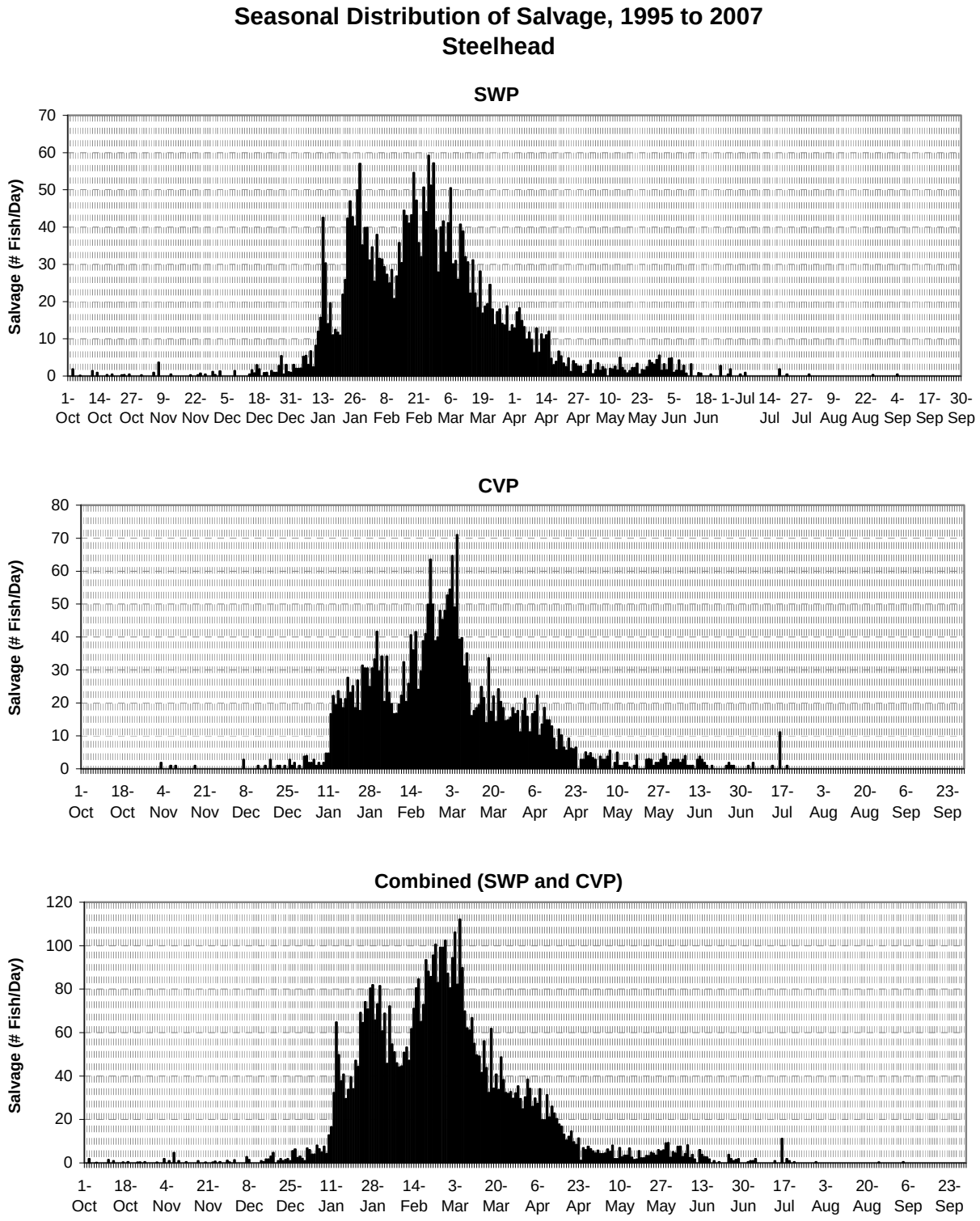
Exhibit 9: Temporal distributions of spring-run Chinook salmon salvage



Source: California Department of Fish and Game (ftp://ftp.delta.dfg.ca.gov/salvage), non-clipped only.

EXHIBIT 10

Exhibit 10: Temporal distributions of steelhead salvage



Source: California Department of Fish and Game (ftp://ftp.delta.dfg.ca.gov/salvage), clipped and non-clipped.

Attachment 3

From: Barbara Byrne - NOAA Federal [barbara.byrne@noaa.gov]
Sent: Thursday, March 13, 2014 9:02 AM
To: Islam, Farida@DWR
Cc: DWR Data Assessment Team (DAT)
Subject: Re: DAT call reminder and Agenda for 3/13/2014 meeting

Hi DAT -- I cannot make today's DAT call, so am providing my DOSS update below. If you have any questions, feel free to contact me: barbara.byrne@noaa.gov or 916-930-5612.

3/11/2014, 9am, DOSS call:

DOSS met on Tuesday, 3/11/14, reviewed the available monitoring and operations data, and provided no advice to NMFS or WOMT. A few discussion highlights are provided below.

RPA Implementation:

- IV.1.2 (DCC gate operations): DCC gates are closed.

- IV.2.3 (OMR flow management): The current requirement is that OMR be no more negative than -5,000 cfs.

Salvage at export facilities

Wilde winter-run-size Chinook salmon and steelhead were salvaged at the CVP & SWP facilities over the past week, but the observed loss densities did not trigger any more restrictive OMR requirements.

Other updates to DOSS

DOSS was updated on recent RTDOMT discussions regarding a potential amendment to the TUC Petition re: outflow, but details were not yet finalized and DOSS did not provide any specific feedback.

Distribution of fish:

DOSS's assessment of fish distribution did not change from last week:

1. *Young-of-year Winter-run & yearling spring-run*: DOSS believes it likely that at least 75% of the winter-run Chinook young-of-year and spring-run Chinook yearling populations will have entered the delta by the end of this week. DOSS believes it likely that approximately 10% of the winter-run Chinook young-of-year and spring-run Chinook yearling populations will have exited the delta at Chipps Island by the end of this week.

2. *Young-of-year spring-run*: DOSS believes it likely that approximately 25% of the spring-run Chinook young-of-year population will have entered the delta by the end of this week. DOSS believes it likely

that <5% of the spring-run Chinook young-of-year population will have exited the delta at Chipps Island by the end of this week.

On Wed, Mar 12, 2014 at 12:50 PM, Islam, Farida@DWR <Farida.Islam@water.ca.gov> wrote:

Good Afternoon DAT members:

We will have a conference call on Thursday, 3/13/14 at 11:00 am. Agency representatives, who cannot make the call, please send me your updates prior to the DAT call. The call-in number is **916-574-2556** and the tentative agenda is below:

1) Fish Monitoring Updates

    a) Sacramento River Fish Monitoring
    b) Delta Fish Monitoring
    c) Salvage Monitoring
    d) Smelt Monitoring

2) Work Group Updates
    a) SWG
    b) DOSS

3) Current Operations

4) Schedule Next Conference Call

Attached please find the draft notes from our last conference call. Let me know if you have any question or comments.

Farida Y. Islam

Senior Environmental Scientist (Specialist)

Department of Water Resources - DES

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Attachment 4

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Attorneys for the Federal Defendants

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF CALIFORNIA
FRESNO DIVISION

THE CONSOLIDATED SALMON CASES	LEAD CASE NO. 1:09-CV-1053-OWW-DLB Consolidated Cases: 1:09-CV-1090-OWW-DLB 1:09-CV-1378-OWW-DLB 1:09-CV-1520-OWW-SMS 1:09-CV-1580-OWW-DLB 1:09-CV-1625-OWW-SMS Judge: Hon. Oliver W. Wanger

DECLARATION OF GARWIN YIP

Date: February 10, 2010
Time: 12:00 P.M.
Location: Courtroom 3

I, GARWIN YIP, declare as follows:

1. I am the supervisor for the Water Operations and Delta Consultations branch of the Sacramento Area Office of NOAA's National Marine Fisheries Service (NMFS), Southwest Region, a position that I have held since July 2009. Prior to my current position, in the beginning of 2008, I joined the Sacramento Area Office of NMFS as the project manager for the Endangered Species Act (ESA) section 7 consultation on the long-term operations of the Central Valley Project (CVP) and State Water Project (SWP). In addition to coordinating all aspects of the biological opinion (Opinion), I was the lead technical editor for the December 11, 2008, and June 4, 2009, CVP/SWP Opinion. I have over 18 years of Federal and State service in environment and natural resources. From 1994-2007, I was a fisheries biologist in the NMFS offices in Portland, Oregon, and Arcata, California. I have over 15 years of experience conducting informal and formal section 7 consultations with many different Federal action agencies on a variety of land management and infrastructure actions. I have experience in Federal Energy Regulatory Commission relicensing projects, and also engaged in a multi-year effort of providing technical assistance towards the development of a Habitat Conservation Plan and Incidental Take Permit pursuant to section 10 of the ESA. My academic training includes a Master's of Science degree in Fisheries from Humboldt State University, Arcata, California and a Bachelor of Science degree in Wildlife and Fisheries Biology from the University of California at Davis.

2. This declaration is provided in support of the Federal Defendant's partial joinder in defendant-intervenors' notice of motion for reconsideration and immediate stay of temporary restraining order. This declaration also clarifies some misperceptions provided in the Court's

memorandum decision and order RE: plaintiffs' motion for temporary restraining order, filed on February 5, 2010.

3. The Court (Doc 202 at 19) stated that Southern Resident (SR) killer whale preferred prey are Fraser River salmon. The court apparently based this finding on statements made by counsel for plaintiffs purporting to characterize a biological opinion issued by NMFS which addresses the effects of the ocean salmon fishery on SR killer whales. Plaintiffs mischaracterized that biological opinion, which stated that killer whales eat predominantly Fraser River salmon stocks *while in inland waters* (the CVP/SWP Opinion at page 159 clarified that inland waterways refers to the Strait of Georgia, Strait of Juan de Fuca, and Puget Sound of Washington State and British Columbia) largely because stocks from other rivers are severely depressed. Both that Opinion and the CVP/SWP Opinion at issue in this case clearly state the findings that fecal analysis and prey analysis show that SR killer whales depend in part on salmon from the Central Valley (CVP/SWP Opinion at page 164). Furthermore, the CVP/SWP Opinion (page 160) documents sightings of SR killer whales feeding on fish in California coastal waters and the fact that Chinook salmon is their preferred prey.

Rationale for Action IV.2.3

4. The Court appeared to support Plaintiffs' contention "that the Listed Species are not now present in the vicinity of the pumps in any significant numbers" (Doc 202 at page 16). To reach this conclusion, the Court performed a simple calculation of the current salvage numbers and extrapolated it to determine the salvage number for the remainder of the year, and concluded that the salvage would be well below the Take Limit for Sacramento River winter-run Chinook salmon ("winter-run"; Doc. 202 at 18). Contrary to the above statements, however, one reason there are currently low numbers of salvage at the Federal and State fish facilities is that

the Old and Middle River Flow (OMR) limit of -5,000 cubic feet per second (cfs) provided in NMFS' CVP/SWP Opinion, Action IV.2.3, is actually working, as intended. Specifically, one of the objectives of Action IV.2.3 is to "Reduce the **vulnerability** [emphasis added] of emigrating juvenile winter-run, yearling Central Valley spring-run Chinook salmon ("spring-run"), and Central Valley ("CV") steelhead within the lower Sacramento and San Joaquin rivers to entrainment into the channels of the South Delta and at the pumps due to the diversion of water by the export facilities in the South Delta." (CVP/SWP Opinion at page 648). Once an increased density of listed salmonids is sampled at the Federal and State fish facilities, the OMR would be reduced (*i.e.*, required to be less negative) to reduce the influence of the Federal and State pumps.

5. Another reason there are currently low numbers of salvage at the Federal and State fish facilities is because there are more numbers of fish lost than there are salvaged. As provided in Table 6-28 of the CVP/SWP Opinion (Exhibit 1), approximately one in three fish survive through the Federal fish facility, and one in six fish survive through the State fish facility. As provided in the footnotes to the table in Exhibit 1, the survival rates tend to be overestimated at the Federal fish facilities because the following are not included into the calculations: (1) Approximately 45 percent of the operational time, the louvers are in noncompliance with the screening criteria; and (2) overall efficiencies during low flow periods could be less than 35 percent, and that value does not include periods when the louvers are being cleaned, where overall efficiency drops towards zero. Therefore, each fish salvaged at the Federal and State facilities represents many fish that die from direct and indirect effects in the Delta resulting from the operations of the CVP and SWP.

6. Furthermore, the court significantly under-estimated immediate harm to the significant populations of juvenile salmonids in the Delta now by focusing on the salvage at the facilities, and incorrectly assuming that the ITS for winter-run was the only quota that could be operated to and still avoid jeopardy of the species and adverse modification of critical habitat. The CVP/SWP Opinion (see Figure 9-3 on page 463) summarizes the relative magnitude and location of juvenile survival throughout the Delta. The CVP/SWP Opinion summarizes studies on sources of indirect mortality (both project and non-project related) within the Delta (pages 374 through 385), effects for winter-run (page 458), and integration and synthesis for winter-run (page 467), stating that "mortality of winter-run juveniles that enter the Delta interior is expected to range from 35-90%, resulting in a loss of approximately 5-20 percent of the entire ESU." The rationale for the OMR Action IV.2.3 (pages 648-652) clearly explains the rationale in changing hydrologic conditions in Old and Middle Rivers as a mechanism to reduce the vulnerability of juvenile salmonids to sources of indirect mortality in the Interior Delta by reducing the likelihood that they will be advected into the Delta and experience the mortality rates discussed above.

7. Another objective of Action IV.2.3 is to preserve the run timing of each of the salmonid and sturgeon species throughout the duration of their emigration. While abundance is an important component to determine the viability of a population, genotypic and phenotypic diversity are also critically important in that they allow species to use a wide array of environments, respond to short-term changes in the environment, and adapt to long-term environmental change (CVP/SWP Opinion at page 53). Therefore, NMFS' analysis of the effects of the action in the Delta does not merely quantify the numbers of fish salvaged at the Federal and State fish facilities. Increasingly negative OMR, which is a result of increased

exports (Exhibits 2A and 2B), results in increased salvage and loss of salmonids and sturgeon (Exhibits 3A and 3B). Doing so at the beginning (and end) of an emigration season (see Stuart Decl. at ¶ 4 and Exhibit 1b) effectively truncates the early (or late) tail of the run and results in a disproportionate amount of loss at the tail ends of the run that are particularly important for preserving the full range in the diversity of run-timing within the species, an essential component of avoiding jeopardy to the species. Exhibits 5A and 5B show that the distributions of the Chinook salmon species are distributed in uneven patterns across the various months in the winter and spring, and maintaining these emigration patterns is important to maintain run timing diversity. A gap in protection in February risks reducing this important component of diversity.

2009/2010 Status of Spring-run

8. Exhibit 4 shows the estimated abundance for Central Valley spring-run Chinook salmon from 10 individual populations. Of particular concern to NMFS are the very low counts of the entire species observed this past summer/fall; counts that were reported after issuance of our June 4, 2009, CVP/SWP Opinion. These low counts in 2009 continue a decreasing trend in spring-run abundance that started in about the mid 2000s. This decreasing trend has occurred in what are typically the healthiest wild populations (*e.g.*, Butte, Mill, and Deer creeks) and in the Feather River hatchery population. While NMFS does not have a method for calculating a juvenile production estimate (JPE), the young-of-year spring-run in the Delta now are particularly important for sustaining the long-term viability of the population. As provided in Exhibit 5B, over 60 percent of spring-run had emigrated into the Delta past Knights landing in 2007-2008, a dry water year type, similar to the current water year type. Exhibit 5A shows significant presence of juvenile spring-run in the Delta this year. Therefore, Action IV.2.3 is important to allow appropriate hydrologic conditions for this cohort.

Fish Presence in the Delta

9. Exhibits 5A, 5B, and 5C provide run timing of juvenile winter-run Chinook, spring-run Chinook, and fall-run migration into the Delta for different water years. The fall-run analysis is included as it relates to the reduction in Southern Resident killer whale prey. Exhibit 5A provides real time data for the water year beginning October 2009. Exhibit 5B provides emigration timing for the dry water year type of 2007-2008. The JPE for that year was 500,000 winter-run (versus this year's preliminary JPE of 1,144,860 fish). Exhibit 5C provides emigration timing for the above normal water year type of 2002-2003. The JPE for that year was 2,100,000 winter-run. As shown in Exhibits 5A-5C, all three runs have entered the Delta through Knights Landing in large numbers at this point in time.

10. Observed Chinook salmon salvage at the Federal and State fish facilities from 1995 through 2007 (Exhibit 6) shows that fish identified as winter-run at the fish facilities have a high rate of being correctly identified, as shown by the DNA analyses showing winter-run fall within size length criteria. This composite graph shows winter-run are salvaged and lost in the month of February. The graph shows a similar pattern for fall-run salvage, although its salvage pattern is more drawn out through the salvage season. (*i.e.*, the fall-run salvage distribution has longer, fatter, tails). Spring-run, especially those originating from the Mill and Deer creek watersheds, appear in the Federal and State fish facilities throughout February, while spring-run from the Butte Creek watershed appear in the Federal and State fish facilities later, in March. Finally, as provided in the Stuart Decl. at ¶ 4 and Exhibit 1b, approximately 58 percent of the CV steelhead population will have moved through the Delta by the end of February, as measured by the loss counts at the facilities, but will rise to approximately 90 percent by the end of March (21 percent in January, 37 percent in February, and 31 percent in March.

Conclusion

11. The Court stated that "The threat of jeopardy to any of the Listed Species by enjoining the operation of Action IV.2.3 appears minimal under the now-existing conditions" (Doc. 202 at page 19), and "...enjoining implementation of a measure, RPA Action IV.2.3, that is causing irreparable harm to the human environment served by the Plaintiff water agencies is justified, so long as jeopardy to species and their critical habitat and/or adverse modification does not occur." Based on the above arguments, and those provided in the Stuart Decl., Action IV.2.3 has been effective [until the February 5, 2010 temporary restraining order (TRO)] at keeping the salmonid species away from the influence of the Federal and State pumps, and therefore, has also been effective in ensuring that each species emigration timing is preserved. Not granting a stay of the TRO would effectively increase salvage and loss of all of the salmonid and sturgeon species and result in the truncation of their emigration timing, thereby compromising their diversity. The RPA was designed as an integrated whole necessary to avoid jeopardy to listed species from operation of the projects. Reduction of the harms caused by excessively negative OMR flows is an essential part of that action. If Action IV.2.3 is restrained and the flows in Old and Middle Rivers become more negative than -5000 cfs, NMFS can no longer state with confidence that the CVP and SWP are not increasing the risk of extinction of listed species, and our conclusion that the projects are not jeopardizing listed species or adversely modifying designated critical habitat may no longer be valid.

12. I declare under penalty of perjury under the laws of the State of California and the United States of America that the foregoing is true and correct to the best of my current knowledge.

Dated this 9th day of February, 2010

Garwin M. Yip
Water Operations and Delta Consultations
Branch Supervisor
Sacramento Office, Southwest Region
National Marine Fisheries Service

Exhibit 1

Exhibit 1. Overall survival of fish entrained by the export pumping facilities at the Tracy Fish Collection Facilities and the John E. Skinner Fish Protection Facilities (from CVP/SWP Opinion Table 6-28).

Estimate of Survival for Screening Process at the SWP and CVP[1]		
SWP	Percent survival	Running Percent
Pre-screen Survival[2]	25 percent[3] (75 percent loss)	25
Louver Efficiency	75 percent (25 percent loss)	18.75
CHTR Survival	98 percent (2 percent loss)	18.375
Post Release Survival (predation only)	90 percent (10 percent loss)[4]	16.54
CVP[5]	Percent survival	Running Percent
Pre-screen Survival[6]	85 percent (15 percent loss)	85
Louver Efficiency[7]	46.8 (53.2 percent loss)	39.78
CHTR Survival	98 percent (2 percent loss)	38.98
Post Release Survival (predation only)	90 percent (10 percent loss)	35.08

[1]These survival rates are those associated with the direct loss of fish at the State and Federal fish salvage facilities. Please see the text for a more thorough description.

[2]Prescreen loss for the SWP is considered to be those fish that enter Clifton Court Forebay that are lost due to predation or other sources between entering the gates and reaching the primary louvers at the Skinner Fish Protection Facility.

[3]Estimates have ranged from 63 to 99 percent (Gingras 1997). Recent steelhead studies indicate a loss rate of approximately 78 to 82 percent (DWR 2008).

[4]Predation following release of salvage fish ranges from less than 10 percent to 30 percent according to DWR (2009). NMFS uses the lower estimate to give a conservative estimate of loss. Actual loss may be greater, particularly in the winter when the density of salvage fish released is low, and predators can consume a greater fraction of the released fish (DWR 2009).

[5]These values do not incorporate the 45 percent of the operational time that the louvers are in noncompliance with the screening criteria. The actual values of the lover efficiency during this time are not available to NMFS. These values would determine the percentage of survival through the facility under real time circumstances.

[6]Prescreen survival in front of the trashracks and primary louvers at the TFCF have not been verified, but are assumed to be 15 percent.

[7]Overall efficiencies of the louver arrays at the TFCF have been shown to be 46.8 percent (59.3 percent primary, 80 percent secondary). Recent studies indicate overall efficiencies during low flow periods could be less than 35 percent (Reclamation 2008). This value does not include periods when the louvers are being cleaned, where overall efficiency drops towards zero.

Exhibit 2A-2B

Exhibit 2A. Total OMR flows versus total exports from the CVP and SWP, from 1995-2007. Each point is a day; points in red are values from the February 5th to March 5th time period.

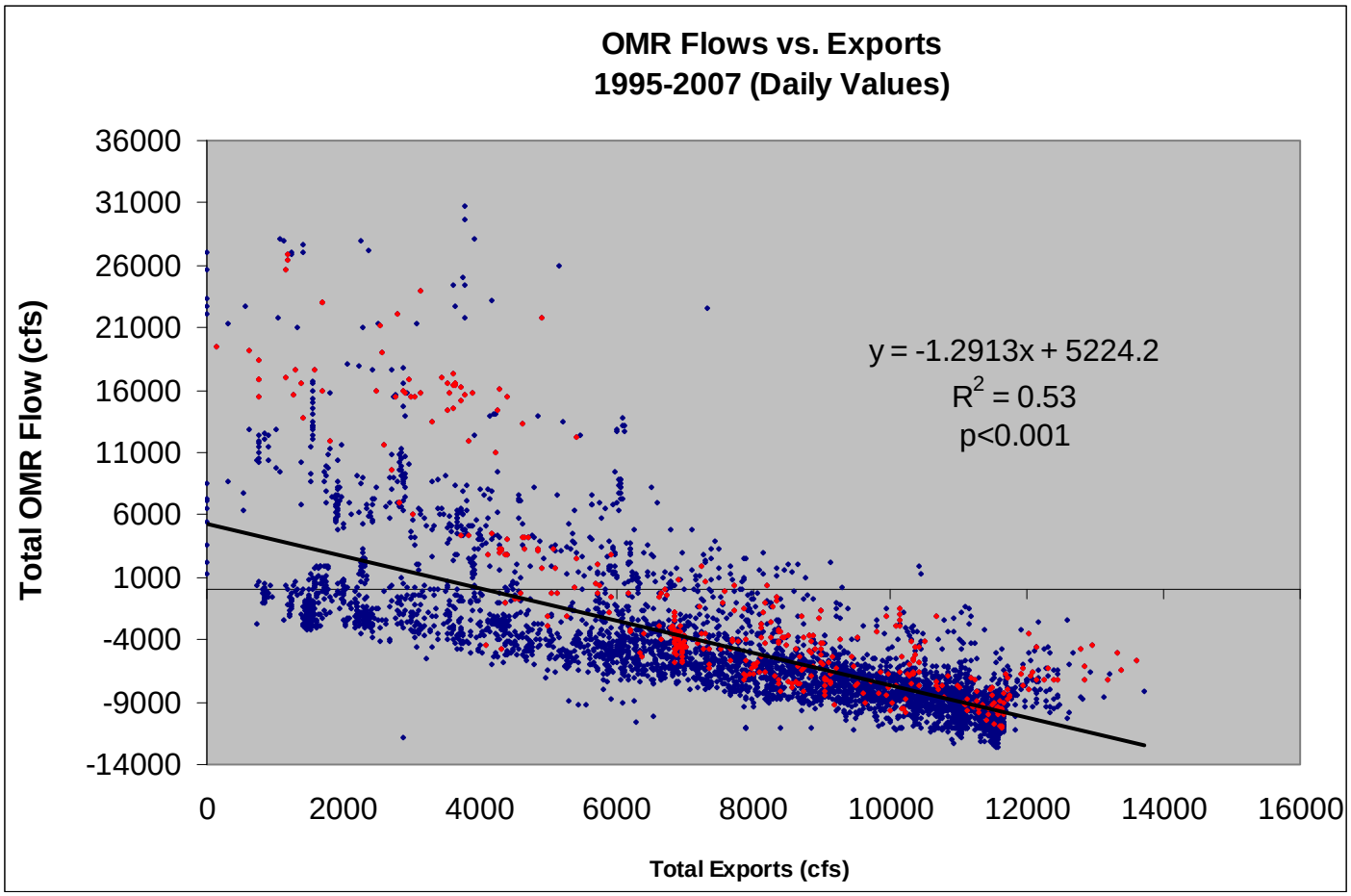


Exhibit 2B. Total OMR flows versus total exports from the CVP and SWP, from 1995-2007, only days from the February 5th to March 5th time period.

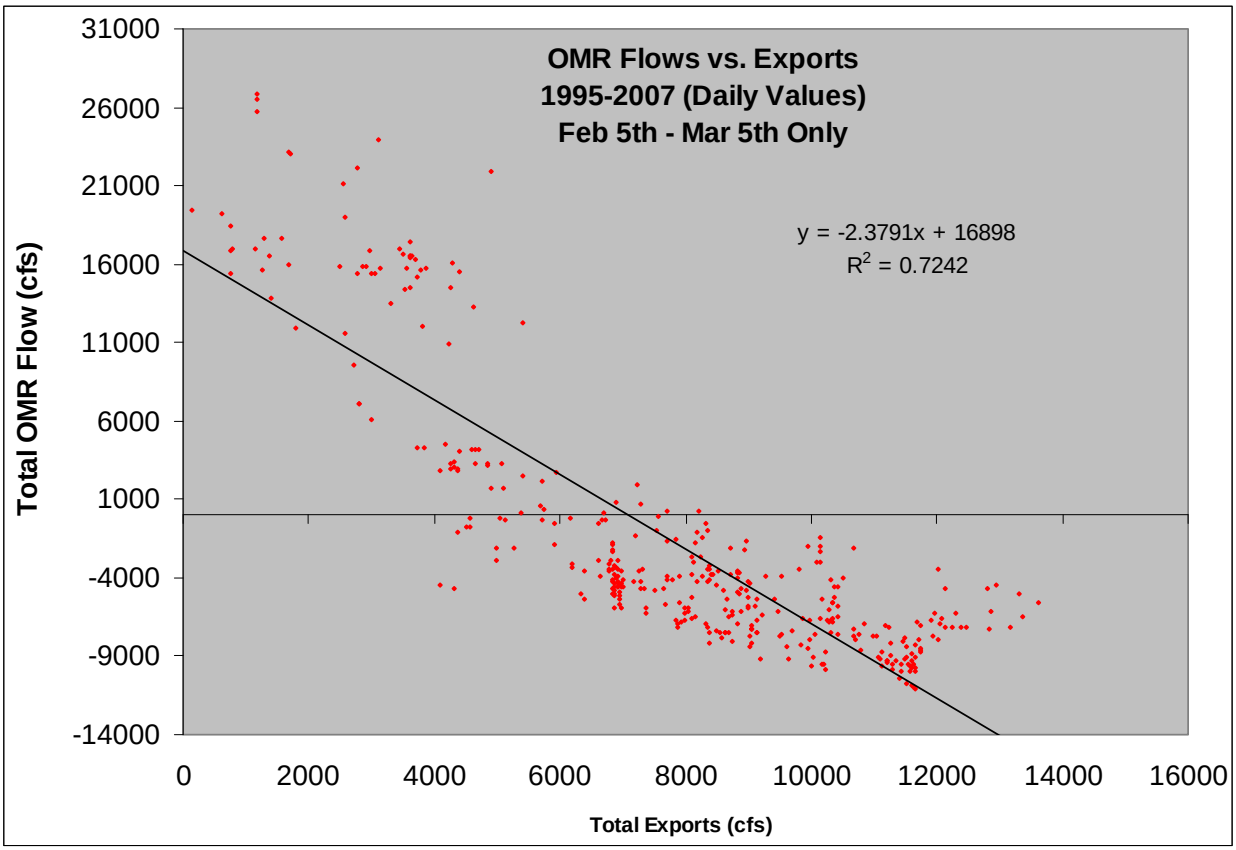


Exhibit 3A-3B

Exhibit 3A. Total number of winter-run Chinook salmon salvaged during the Feb 5th to March 5th time period, from the years 1995-2007.

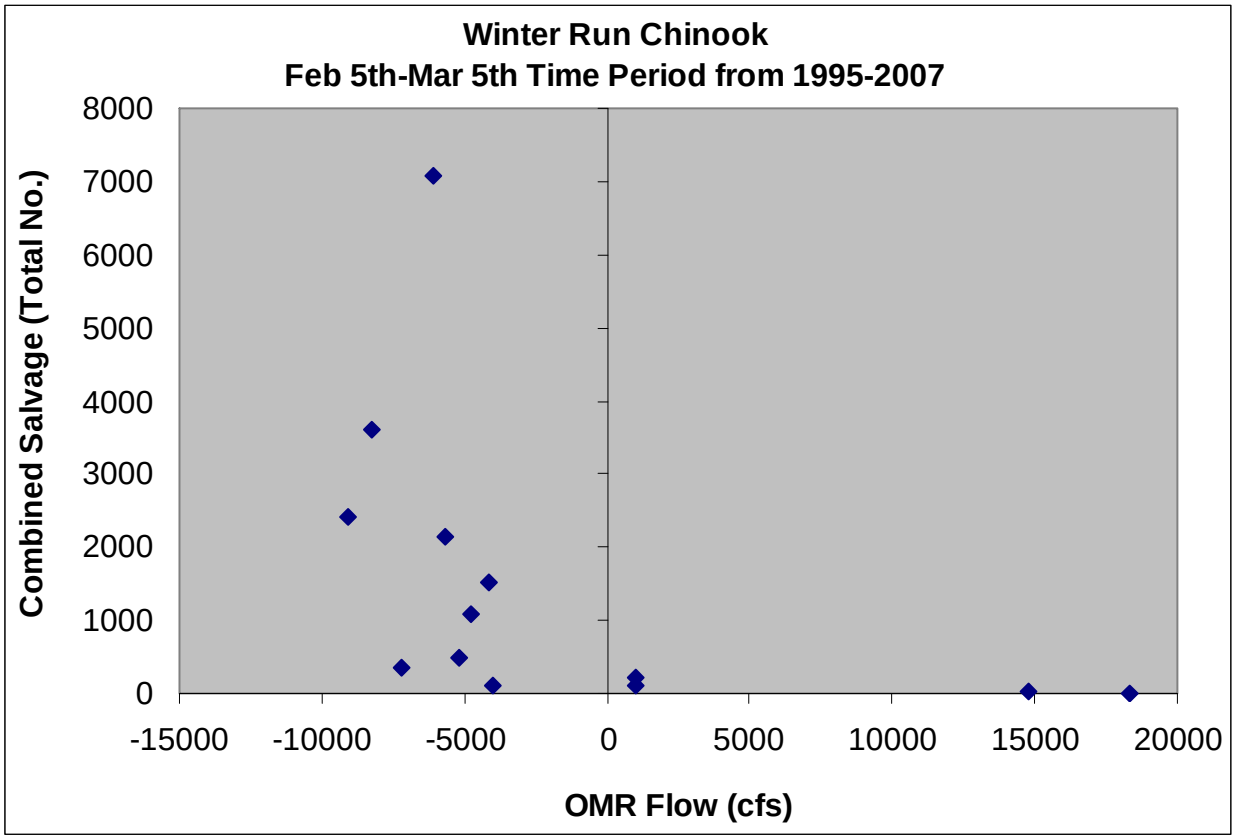


Exhibit 3B. Mean daily number of steelhead salvaged during March, over the years 1995-2007, as a function of OMR flows.

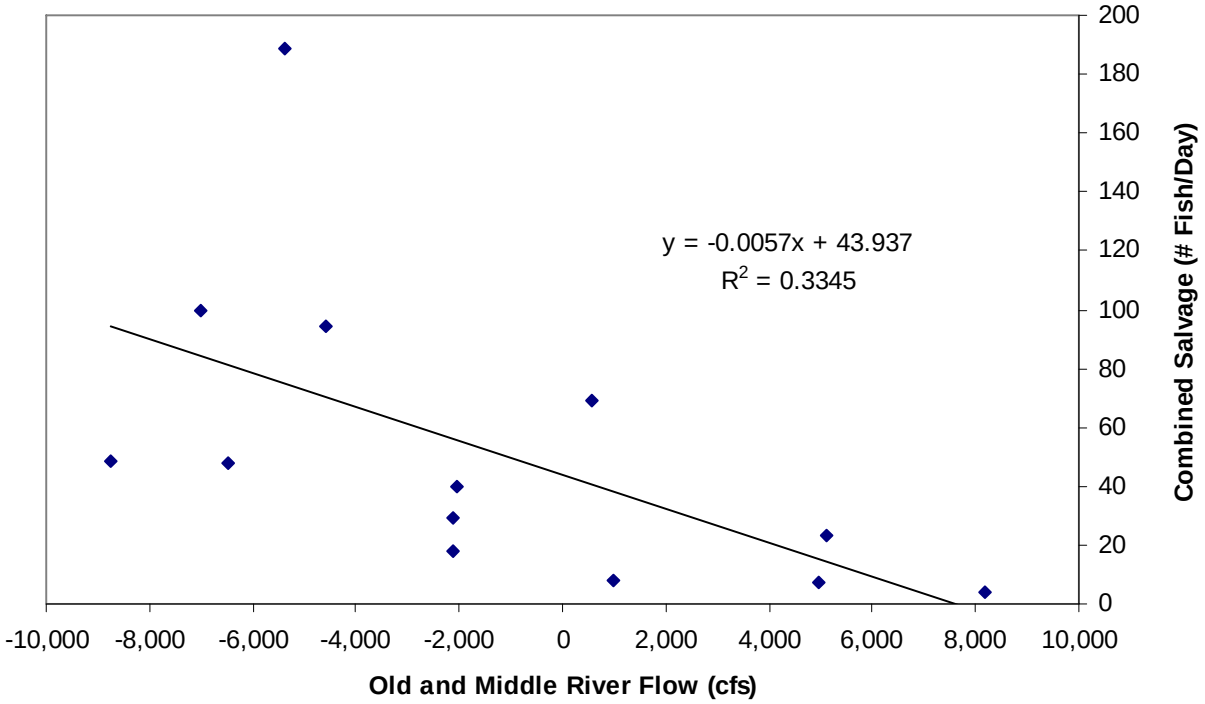


Exhibit 4

Exhibit 4. Spring-run Chinook Salmon Adult Abundance. Data from 1995 through 2008 were obtained from California Department of Fish and Game's GrandTab database, available at http://www.fws.gov/stockton/afrp/. Data for 2009 are preliminary and were obtained from Salmonid Escapement Project Work Team notes from a meeting held on January 27, 2010.

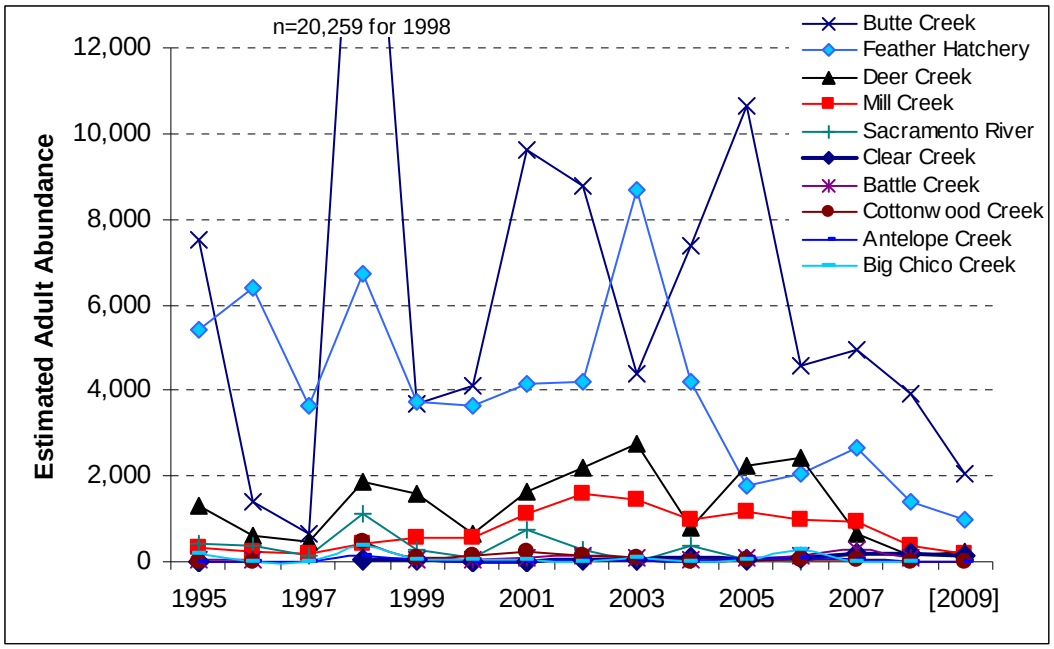
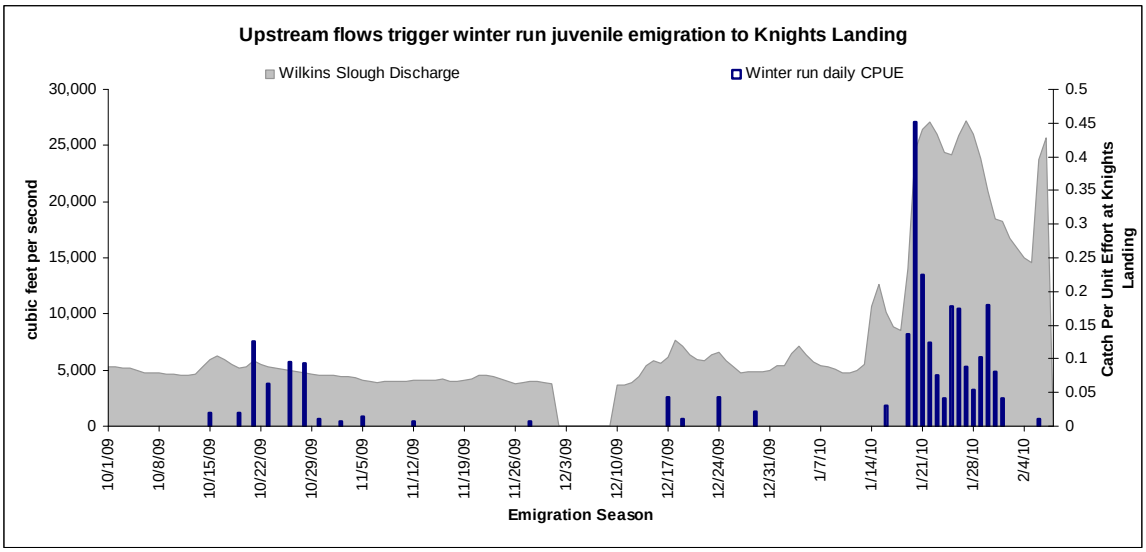
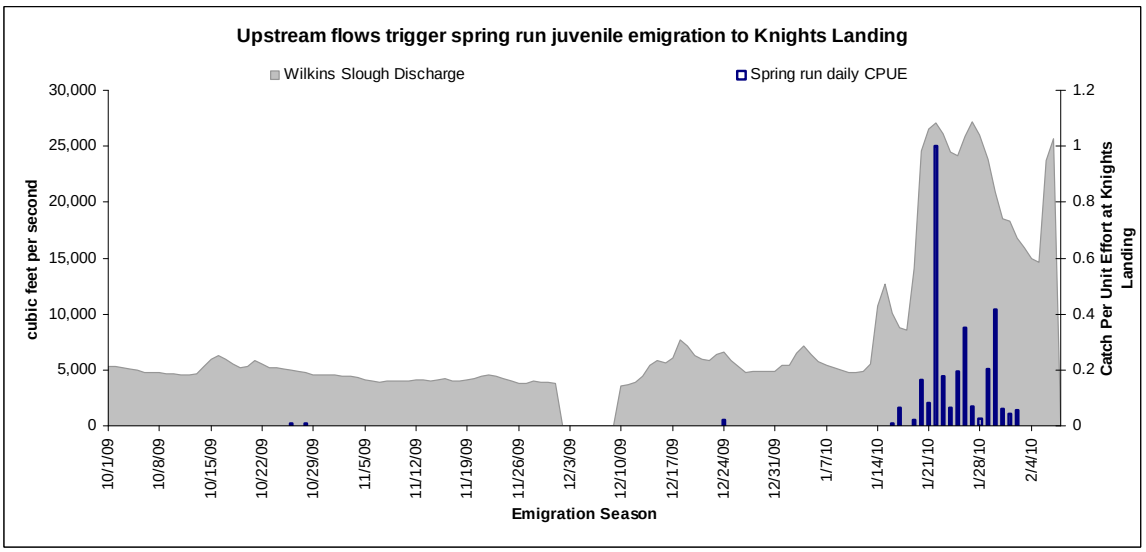


Exhibit 5A-5C

Exhibit 5A. Current presence of Chinook salmon in the Delta.





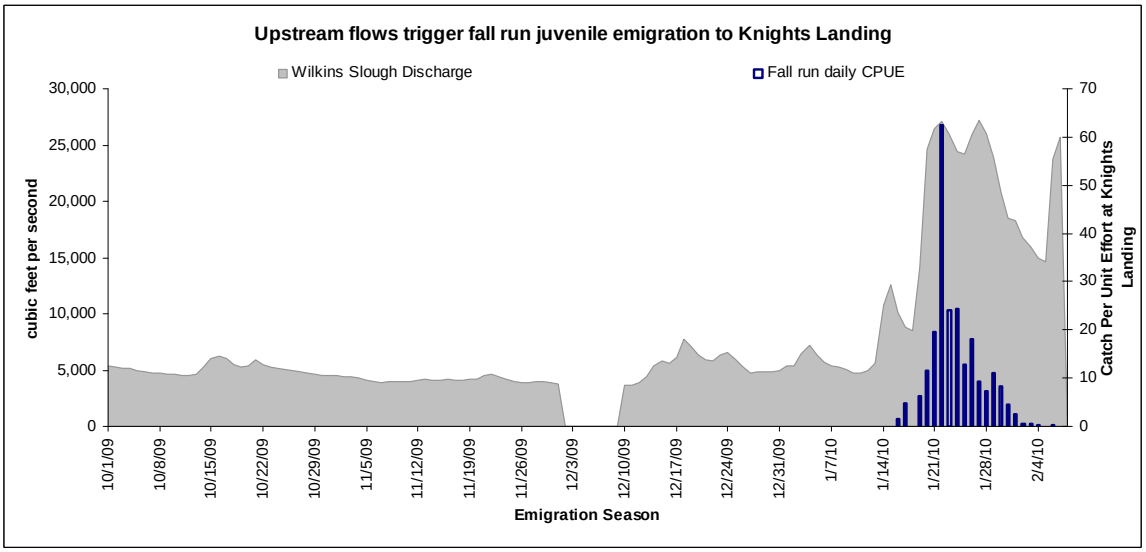
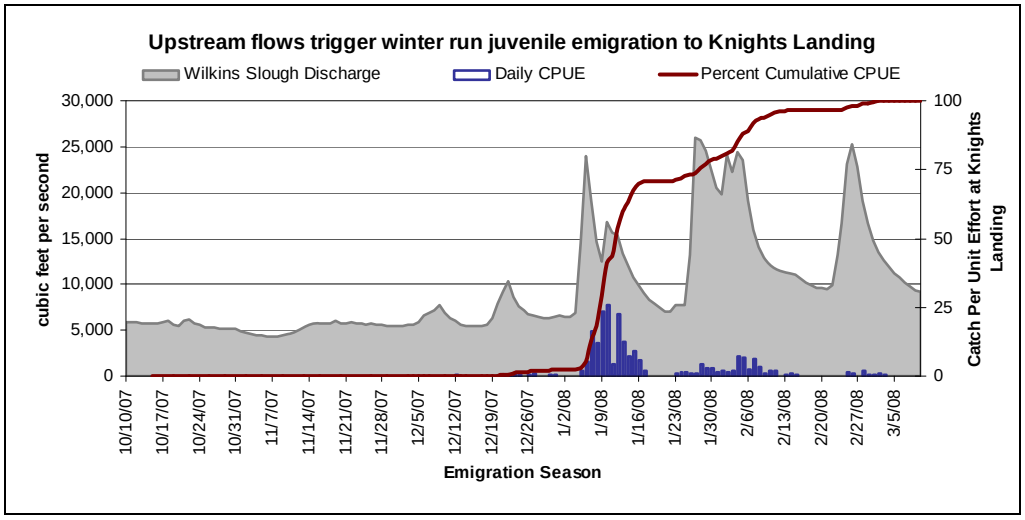
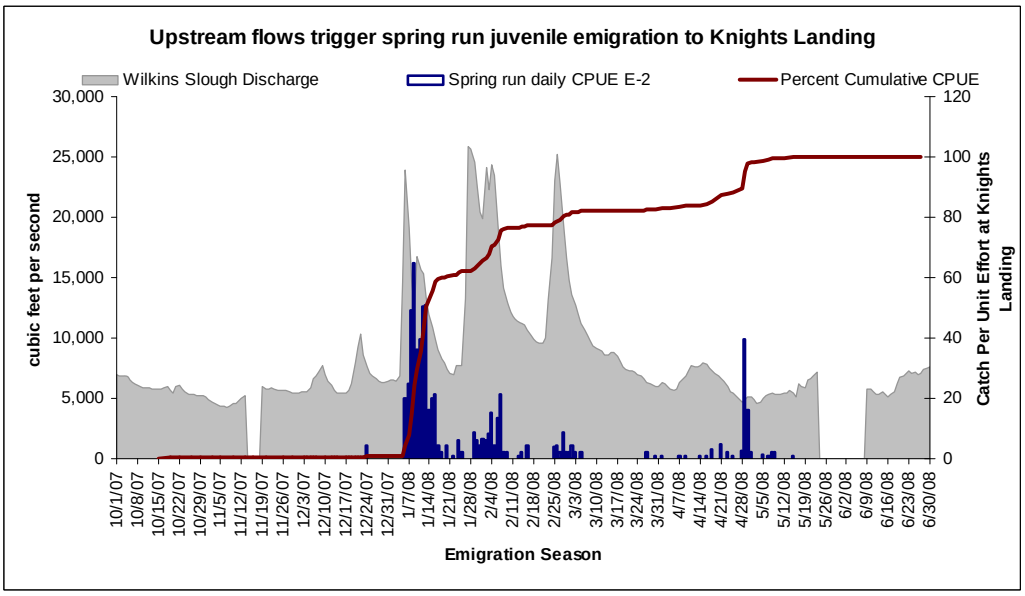


Exhibit 5B. 2007-2008, dry water year type. These graphs show juvenile emigration timing into the Delta.





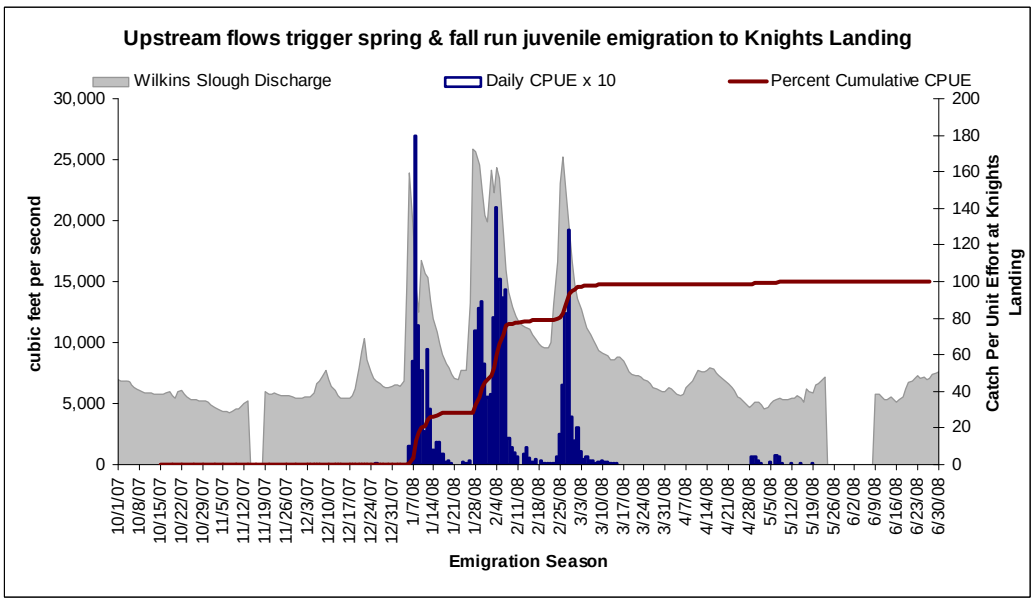
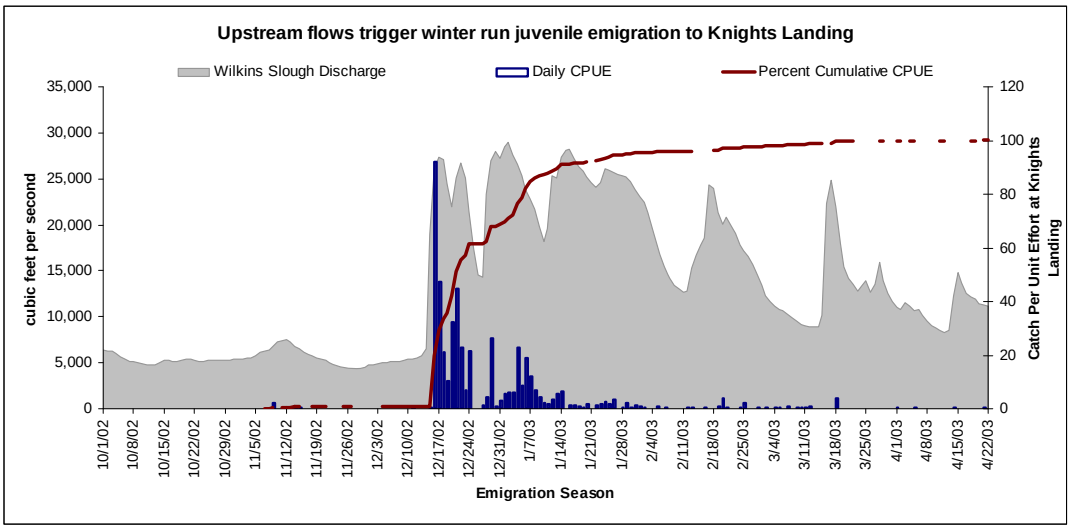
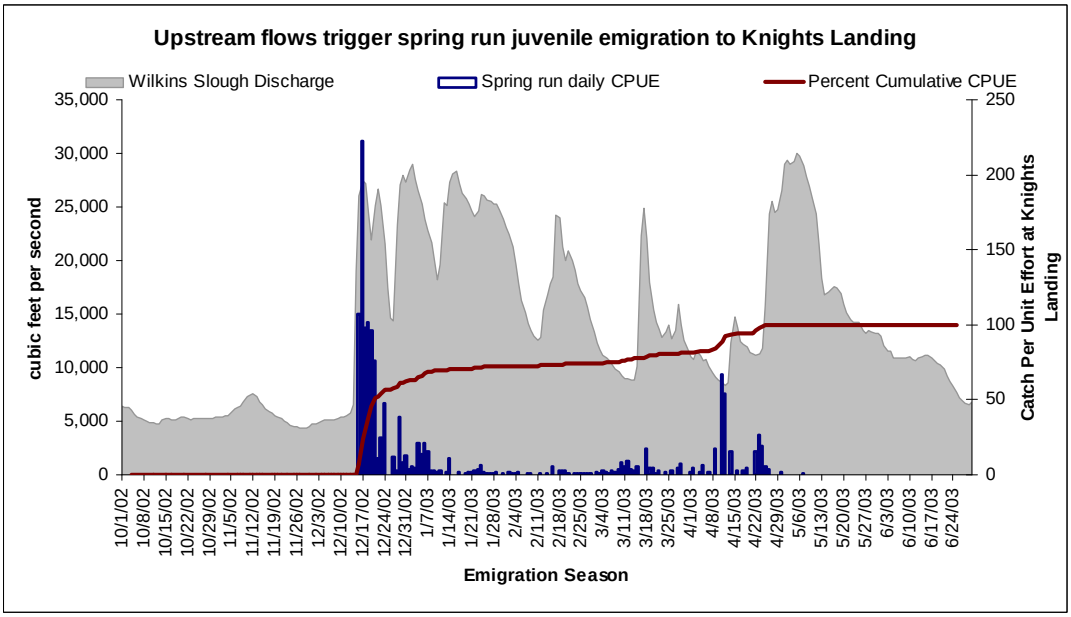


Exhibit 5C. 2002-2003. Above normal water year type. These graphs show juvenile emigration timing into the Delta.





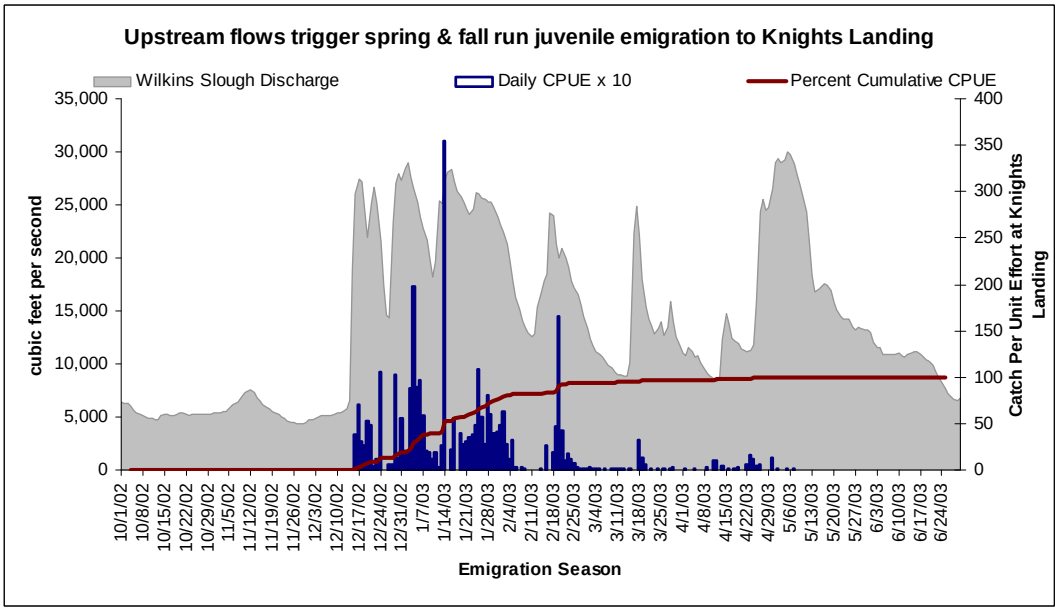
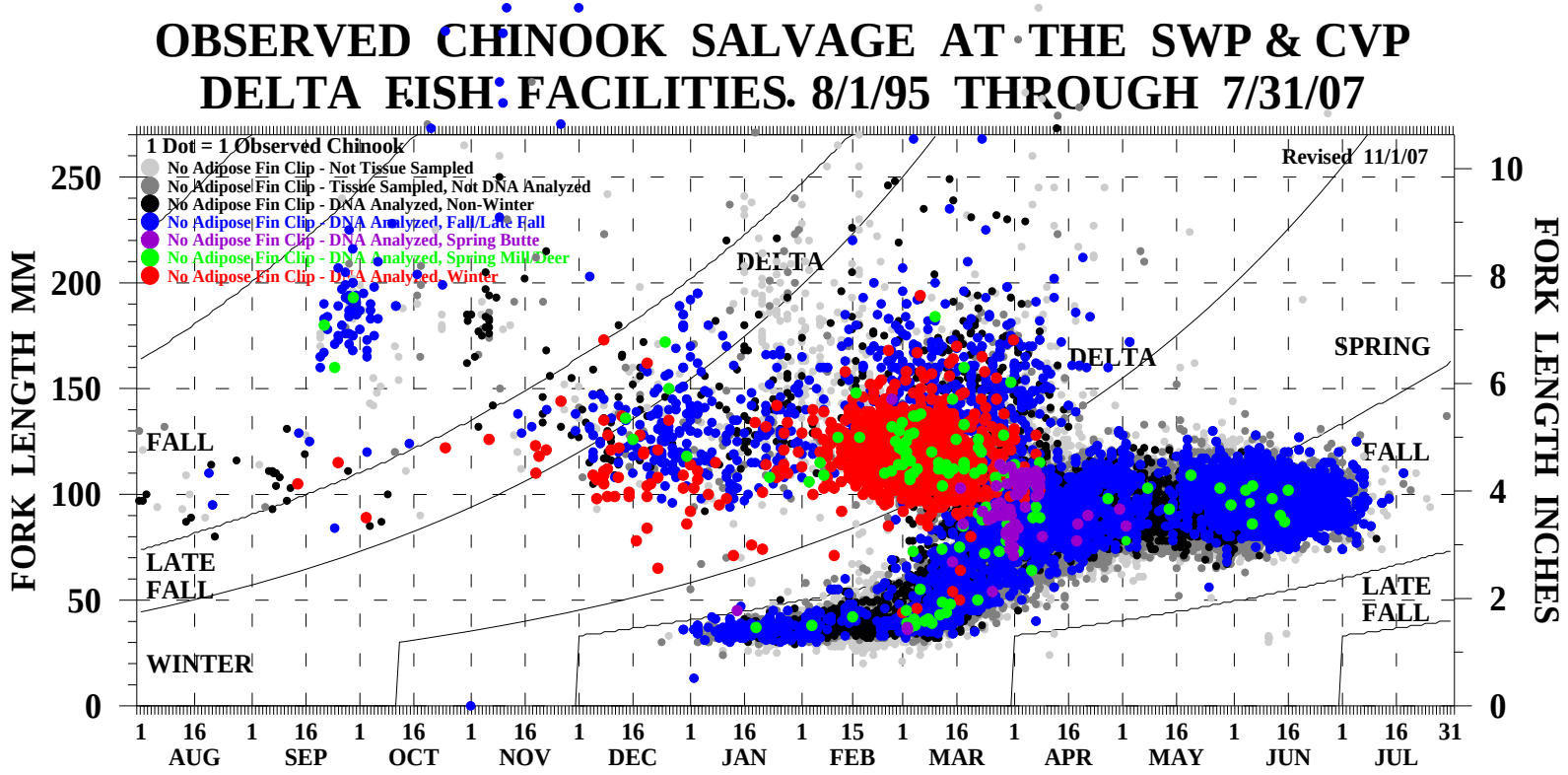


Exhibit 6



Preliminary, Subject to Revision
Sheila Greene, DWR 11/1/2007

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Region
Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

IN REPLY REFER TO:

BDO-100
ENV-7.00

MAR 14 2014

Ms. Maria Rea
Assistant Regional Administrator
California Central Valley Area Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Subject: Interim Contingency Plan for March Pursuant to Reasonable and Prudent Alternative (RPA) Action I.2.3.C of the 2009 Coordinated Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) Biological Opinion (2009 BiOp)

Dear Ms. ~~Rea~~ Maria:

The Bureau of Reclamation and the Department of Water Resources (DWR) prepared a Temporary Urgency Change (TUC) Petition which served as a drought contingency plan for the months of February and March, consistent with the drought exception procedures outlined in the 2009 BiOp reasonable and prudent alternative (RPA) Action I.2.3.C. Reclamation and DWR propose to adjust the drought contingency plan through the end of March. Additionally, Reclamation and DWR propose to modify the implementation of RPA Action IV.2.3 in the 2009 BiOp, necessary as a result of the current drought. Reclamation is seeking concurrence from the National Marine Fisheries Service (NMFS) that these drought response actions proposed by Reclamation and DWR for the remainder of March are within the limits of the Incidental Take Statement (ITS) of the 2009 BiOp. Additionally, because these actions are in compliance with the drought exception procedures described in the 2009 BiOp, these actions do not jeopardize species or adversely modify or destroy designated critical habitats addressed in the 2009 BiOp.

The water situation in California continues to be dire. As a result of this continued aridity, CVP and SWP reservoir levels are forecast to be significantly below historic conditions. In response to this water shortage crisis, Reclamation and DWR have, since January, been coordinating closely with your office, the U.S. Fish and Wildlife Service (Service), and the State Water Resources Control Board (State Board). This coordination has resulted in a TUC Order from the State Board dated January 29, 2014, with subsequent modifications on both February 7, 2014, and February 28, 2014. Additionally, this coordination resulted in correspondence between Reclamation and NMFS, and Reclamation and the Service, acknowledging compliance with section 7 of the Endangered Species Act.

The TUC Order currently allows Reclamation and DWR to conserve additional water in the Project reservoirs for protection of aquatic species, water quality, and water deliveries by modifying Table 3 of D-1641 such that Delta Outflow may be no less than 3,000 cubic feet per second (cfs). In addition to the above modification to Table 3, Reclamation and DWR are requesting that the State Board further modify its Order to also allow for the following:

For the remainder of March 2014, Table 3 of D-1641 will be further modified to allow for compliance with the Delta Outflow objective through a 7,100 cfs outflow on a 3-day average and/or X2 position at Collinsville. Project diversions from Old River for periods when Delta Outflow is at or above 7,100 will continue to conform to existing Biological Opinions and the D-1641 Export to Inflow Ratio. The Delta Cross Channel (DCC) Gates will remain closed when outflow is at or above 7,100. For lower outflows, the current DCC opening protocol recommended by the fishery agencies will be followed.

In addition to the above changes in outflow, and in an attempt to capture additional natural flow in the Delta available because of recent storm events, Reclamation and DWR are proposing to adjust implementation of RPA Action IV.2.3 in the salmonid BiOp for the next 7 days. This RPA action provides Old and Middle River (OMR) flow limits of no more negative than -5,000 cfs using a 14-day running average under current conditions. The action similarly provides that a 5-day running average flow shall be calculated and be no more than 25 percent more negative than the targeted requirement flow for the 14-day average flow. Reclamation and DWR propose to operate in a manner to capture additional natural flow available in the Delta that is anticipated to result in up to 7 days of OMR flows between -5,000 cfs, and -6,000 cfs. Reclamation and DWR would be operating to OMRs more positive than -5,000 cfs for 10 days to the end of the month. The first and second stage salvage-based triggers prescribed by the NMFS 2009 BiOp RPA Action IV.2.3 remain in effect.

The exigency of the extended drought, and the lack of anticipated precipitation in the forecast, necessitates the prudent decision to take advantage of the rise in natural flow over the next several days. Prior to recommending this action, however, Reclamation and DWR completed a biological review (attached) that examines the effects of these two drought actions (D1641 compliance point modification and OMR negative flow adjustment) to winter-run and spring-run Chinook salmon, steelhead, and green sturgeon. While our analysis found that these measures are likely to result in additional adverse effects to the species, however unquantifiable, any effects will be minimized through the projected operations starting March 20 – March 31 that are expected to result in less negative OMRs than -5,000 cfs and the continued implementation of first and second stage density triggers included in RPA Action IV.2.3.

The enclosed biological review supports the conclusion that modifications to the existing State Board TUC Order and additional drought response actions proposed by Reclamation and DWR for the remainder of March, are consistent with the drought exception procedures of the 2009 BiOp. The analysis further shows that any incidental take resulting from these changes are within the limits of the existing incidental take limits in the 2009 BiOp. Because these actions are in compliance with the drought exception procedures described in the 2009 BiOp, they do not jeopardize species or adversely modify or destroy designated critical habitat addressed in the

2009 BiOp. In the Order dated April 9, 2013, the District Court indicated that "any 'modifications' to the RPAs must be made consistent with procedures required by law." (See *Consolidated Salmonid Cases* 1:09-cv-01053 LJO BAM). These adjustments and the process we have followed to document and analyze the adjustments are consistent with the court's directive. As such, these adjustments and the process we have followed to document and analyze the adjustments are consistent with law.

Reclamation and DWR will continue close coordination on current and projected operations on a weekly basis through existing meetings (Delta Operations for Salmonids and Sturgeon, Delta Conditions Team, Water Operations Management Team, etc.). Additionally, DWR and Reclamation will continue to host the Real-Time Drought Operations Management Team as provided in the last order.

We look forward to working with you and your staff as we navigate through this extremely challenging water year and appreciate your willingness to work with us on this time sensitive matter.

Sincerely,

Susan M. Fry
Area Manager, Bay-Delta Office

Enclosures – 1

cc: See next page.

cc: Mr. Chuck Bonham
Director
California Department of Fish and Wildlife
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Sacramento, CA 95814

Mr. Mark Cowin
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2800 Cottage Way
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(w/encl to each)

Status of Species

The status of species during the fall and early winter of water year 2014 was described in supplemental information attached to the February Temporary Urgency Change (TUC) Petition's Endangered Species Act compliance materials (Reclamation 2014). Changes to the status of the species are updated again to identify potential exposure in the Sacramento River and Delta experienced by salmonids and green sturgeon under the proposed drought operational changes during the remainder of March.

Winter-run Chinook salmon

During weekly DOSS calls, the topic of the position of Winter-run Chinook salmon has been discussed. There has been agreement that at least 75% of the 2013 brood-year juvenile population of Winter-run Chinook have entered the Delta as of March 10. This is supported by monitoring at Red Bluff Diversion Dam (RBDD) and Glen-Colusa Irrigation District (GCID) intake canal on the upper Sacramento River, which suggests most of the 2013 brood year has migrated past these locations (Figure 1-2), monitoring at Tisdale Weir, on the Middle Sacramento River, and Knights Landing, in the Lower Sacramento River, where more juvenile Winter-run Chinook have been observed in February and early March than in the prior four months of water year 2014 (Figure 3-4), and recovery of juvenile Winter-run Chinook salmon in the lower Sacramento River and Delta beach seine and trawl fish monitoring surveys. At these lower Sacramento and Delta fish monitoring locations, the vast majority of the cumulative catch reported in Table 1 for WY 2014 occurred in February and March 2014.

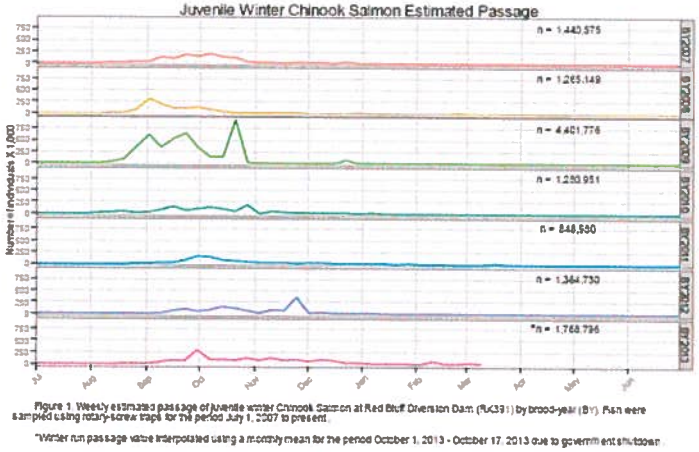


Figure 1. Weekly estimated passage of juvenile winter Chinook Salmon at Red Bluff Diversion Dam (RKM 391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period July 1, 2007 to present.

*Winter run passage value interpolated using a monthly mean for the period October 1, 2013 - October 17, 2013 due to government shutdown

Figure 1. Red Bluff Diversion Dam Rotary Screw Trap older juvenile Chinook salmon catch data and associated environmental data.[1]

[1] Figure supplied by DWR to DOSS on March 12 2014.

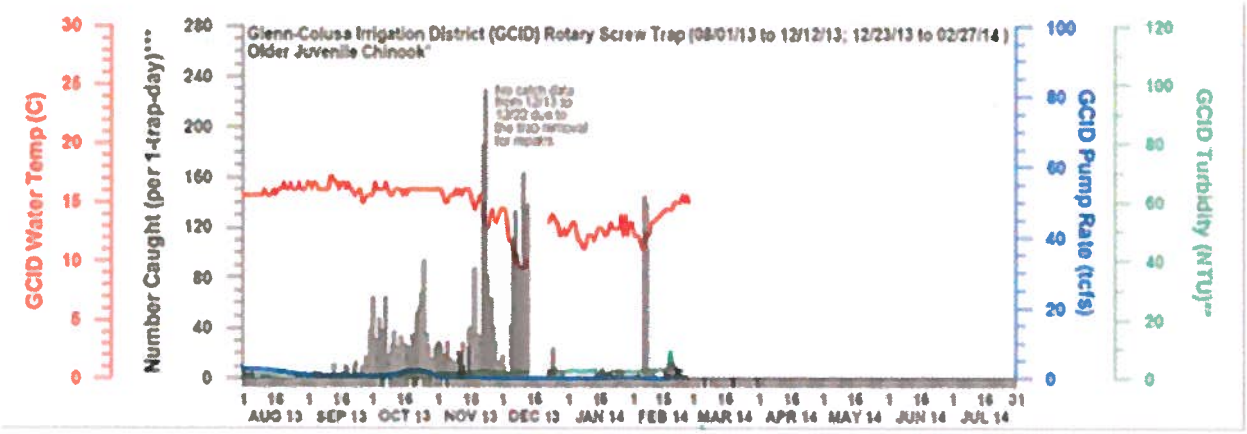


Figure 2. Glen-Colusa Irrigation District Rotary Screw Trap older juvenile Chinook salmon catch data and associated environmental data.[2]

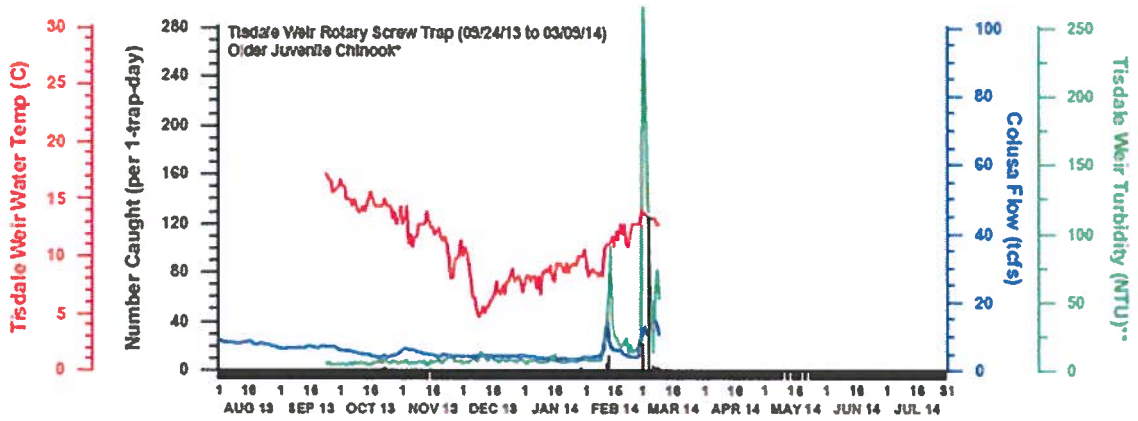
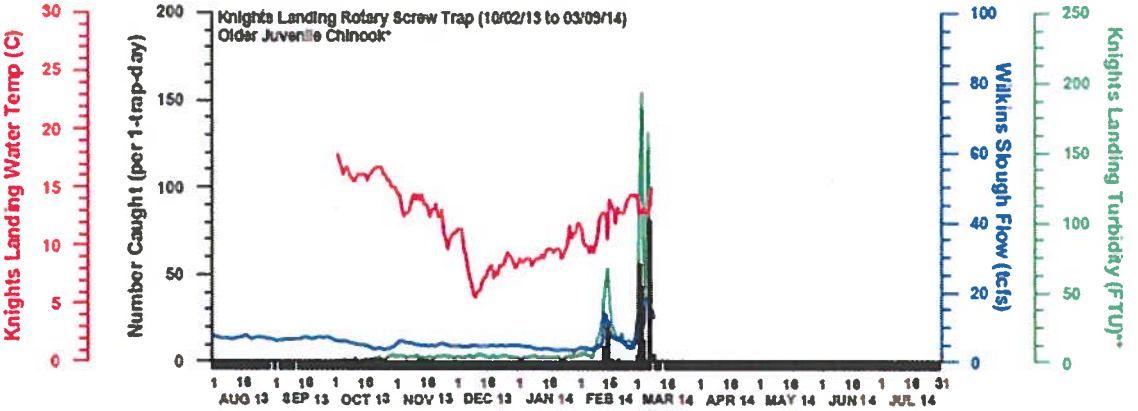


Figure 3. Tisdale Weir older juvenile Chinook salmon catch data, which include Winter-run Chinook and yearling Spring-run Chinook salmon, and associated environmental data.[3]



[2] Figure supplied by DWR to DOSS on March 12 2014.

[3] Figure supplied by DWR to DOSS on March 12 2014.

Figure 4. Knights Landing older juvenile Chinook salmon catch data, which include Winter-run Chinook and yearling Spring-run Chinook salmon, and associated environmental data.[4]

Typically, fry and parr that cannot sustain territories in river flows out migrate past Knights Landing and into the Lower Sacramento River when late fall/early winter Sacramento Valley rainstorms increase flows to greater than 7,500 cfs at Wilkins Slough. Flows associated with the storms during February and March exceeded this level and subsequently exceeded the 14,125 cfs, which exceeded flow volumes identified to initiate juvenile Winter-run migration past Knights Landing (Del Rosario et al 2013; Figure 5). During WY 2014, an expanded salvage of 46.5 natural origin Winter-run sized Chinook salmon have been estimated at the federal fish collection facility at the South Delta CVP export pumps and 26 natural origin juvenile Winter-run sized juvenile Chinook were estimated at the state fish collection facility at the South Delta SWP export pumps through March 11. All of these fish were recovered over the past eight days (since March 3rd). One hatchery Winter-run sized juvenile Chinook has been salvage, but in fact was from the second Late-Fall production release group, and was not a hatchery origin Winter-run.

On the weekly DOSS calls, the topic of the proportion of the population of Winter-run Chinook salmon that has exited the Delta has also been discussed. There has been agreement that less than 10% of the juvenile Winter-run Chinook salmon have passed Chipps Island and exited the Delta region. Twenty-two Winter-run sized, and one hatchery origin Chinook salmon have been observed in the Chipps Island trawl, which is considered the exit point for the Delta (Figure 6). This evidence suggests that a majority of the 2013 brood-year juvenile population of Winter-run Chinook are currently residing in the Delta as of March 10, with a small proportion remaining in the middle Sacramento River and a small proportion having exited the Delta.

During March, adult Winter-run Chinook salmon will continue entering the Sacramento River and migrating to the upper reaches of the Sacramento River in preparation for spawning during

[4] Figure supplied by DWR to DOSS on March 12 2014.

the summer of 2014.

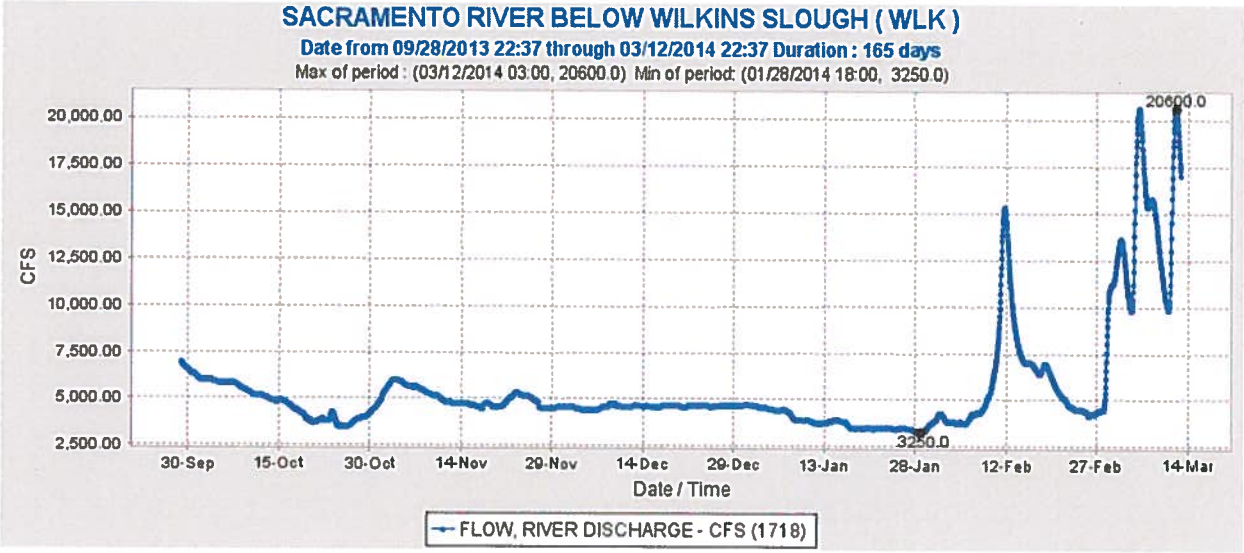


Figure 5. Sacramento River discharge (cubic feet per second) measured at Wilkins Slough during water year 2014.[5]

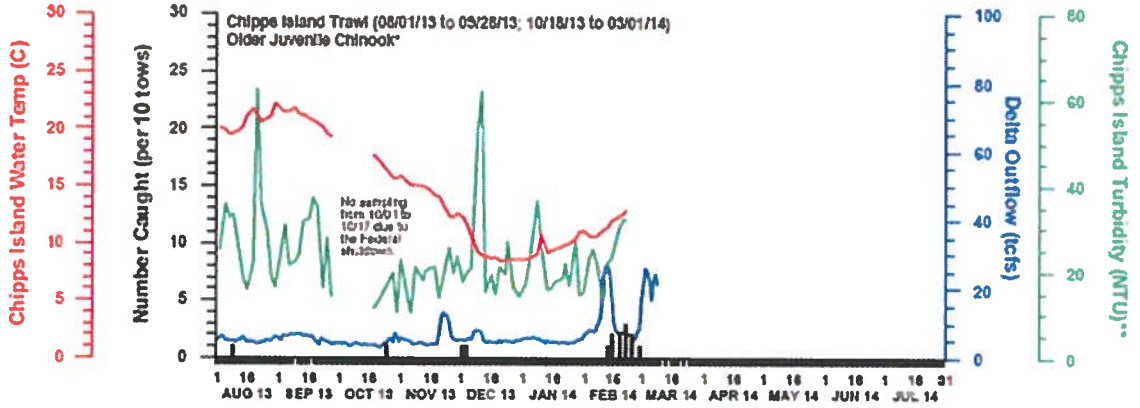


Figure 6.Chipps Island Trawl older juvenile Chinook salmon catch data, which include Winter- run Chinook and yearling Spring-run Chinook salmon, and associated environmental data.[6]

[5] Downloaded from CDEC on March 12, 2014

[6] Figure supplied by DWR to DOSS on March 12 2014.

	Wild juveniles					Ad clipped		
Seine region	**Fall**	**Late Fall**	**Spring**	**Winter**	**Steelhead**	**Steelhead**	**Chinook**	**Region Tot**
Bay East	0	0	0	0		0	0	0
Bay West	0	0	0	0	0	0	0	0
Central Delta	195	0	1	0	1	1	0	198
Lower Sac	466	0	5	0	0	0	0	471
North Delta	1550	1	3	3		0	2	1559
***Sacramento**	27,144	0	86	67	0	40	4	27341
South Delta	0	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	0	0	0
Trawl								0
Chipps	0	5	3	31	3	42	38	122
Sacramento	21089	0	102	60	5	261	33	21550
Species Total	50444	6	200	161	9	344	77	
*Includes lower Sac & Sacramento, and N.Delta & Sac. Sites from FWS metadata.								

Table 1. Lower Sacramento River and Delta beach seine recoveries of salmonids during WY 2014.[7]

[7] Trawl and beach seine data updated through March 10, 2014. Provided by USFWS Delta Juvenile Fish Monitoring Program.

Spring-run Chinook salmon

Similar to February, thousands of Spring-run Chinook salmon juveniles continue to be observed weekly in fish monitoring at Red Bluff Diversion Dam (Figure 7). Also in February, a pulse of juvenile Spring-run Chinook was observed during the month's early storm event. From February 1 through February 27, 310 young-of-year Spring-run Chinook salmon were observed in the rotary screw trap sampling station at the GCID intake canal, and trapping ended there on February 27th. This level of recovery is equal to the number of young-of-year Spring-run Chinook salmon observed at GCID over the previous four months of water year 2014. At the Tisdale Weir and Knights Landing fish monitoring stations, greater catches of older juvenile Chinook salmon, which would include yearling Spring-run Chinook salmon, were observed during the February and March storms than had been observed prior to the storms (Figure 3-4). Similar to February, Spring-run Chinook salmon from Butte Creek, and the Feather and Yuba rivers are outmigrating into the Delta during March. During February, Spring-run Chinook salmon have been observed in the lower Sacramento and Delta beach seine and trawl fish monitoring surveys in addition to being observed exiting at Chipps Island (Table 1), but not at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps. On the weekly DOSS calls, the topic of the proportion of the population of Spring-run Chinook salmon that have entered the Delta has been discussed. DOSS participants agreed at least 75% of the yearling Spring-run Chinook salmon have entered the Delta and approximately 10% have exited the Delta past Chipps Island. This is similar to Winter-run Chinook salmon. Regarding young-of-year Spring-run Chinook salmon, DOSS participants agreed approximately 25% have entered the Delta with less than 5% having exited the Delta past Chipps Island.

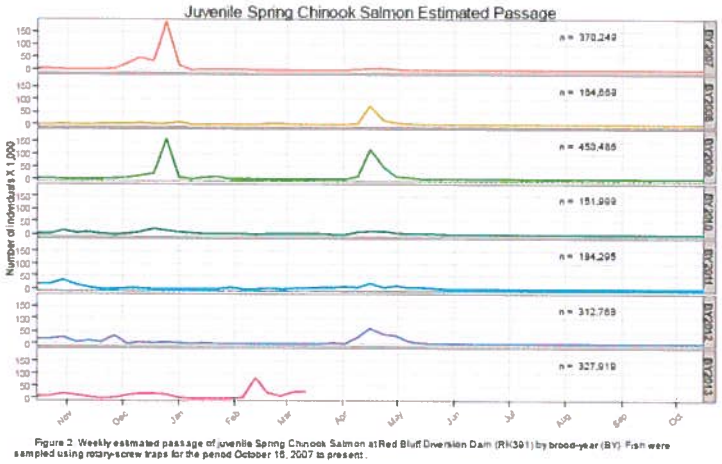


Figure 7. Weekly Estimated Passage of Juvenile Spring-Run Chinook salmon at Red Bluff Diversion Dam (RK 391) by Brood-Year (BY).[8]

[8] Fish were sampled using rotary-screw traps for the period July 1, 2007 to present. Figure supplied by USFWS (March 12, 2014).

Steelhead

Steelhead smolts are seldom recovered in Sacramento River and Delta fish monitoring due to sampling biases related to their larger fish size and their enhanced swimming ability. During February, five wild steelhead were observed in GCID fish monitoring before trapping efforts ended there on February 27th. In combination with the eight steelhead captured at GCID in October, one in December, and two in January; the total recovery of wild steelhead at GCID in WY 2014 is 16 individuals. At the Tisdale Weir and Knights Landing monitoring stations, no steelhead were observed prior to the February storm, but 144 hatchery and 25 wild steelhead smolts have been observed since then. Between 1998 and 2011, temporal observations of wild steelhead juveniles (n=2137) collected in these monitoring efforts in the Delta occurs less than 10% of the time in January, >30% of the time during February, >30% of the time during February, and >20% of the time during March. Prior to February, one steelhead was observed in the Sacramento Trawl (one 210mm fish on 01/31/14) and one steelhead was observed in the Chipps Island Trawl (one 300mm fish on 12/11/13). As of March 10, 9 wild steelhead (5 in Sacramento trawl, 3 in Chipps trawl) and 303 adipose-clipped steelhead (261 in Sacramento trawl, 42 in Chipps trawl) have been recovered. As of March 12, an expanded salvage of 55 natural origin and 97.5 clipped steelhead have been counted at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps. As of March 10, 1 outmigrating steelhead has been observed in the Mossdale trawl this water year.

Green sturgeon

Information on green sturgeon is extremely limited and their recovery in monitoring is limited due to their low vulnerability to monitoring techniques. Adult green sturgeon are expected to start their 2014 spawning migration during March. On February 9, one juvenile green sturgeon (212mm TL) was recovered in Red Bluff Diversion Dam fish monitoring. As of March 10, no green sturgeon were observed in lower Sacramento and Delta fish monitoring surveys or at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps. It is expected that brood year 2013 juvenile green sturgeon have migrated downstream from their natal spawning areas and are overwintering in the Lower Sacramento River and Delta (Israel and Klimley 2009).

Proposed Action

Forecasted March North Delta Outflow and Old and Middle River Indices

Under the proposed action, the Net Delta Outflow Index (NDOI) would be estimated based on a 3-day average period instead of a calculation method in the current TUC Order. The change would result in the outflow index being less than the 3-day average of 7,100 cfs approximately two days earlier than under the existing D-1641 daily outflow objective of 11,400 cfs. The proposed action will cause OMR flows to range between approximately -5,000 and -6,250 cfs for approximately seven days (Table 2), which is an adjustment from the Action IV.2.3 objective of

the 14-day average not exceeding -5,000 cfs, and thus the NDOI drops below 7,100 cfs sooner. Following deviation of OMR flow management objectives, the proposed action is anticipated to include more positive OMR flows during the remainder of the month. The proposed action's monthly average daily OMR flow is projected not to be more negative than -4,000 cfs. Under the proposed action, the 14-day average flows are projected to range from -5836 and -1944 cfs. These effects to outflow and Old and Middle River flows is based on the forecasted remainder-of-March operations and may not hold if operations deviate from these projections.

	Projected Without Proposed Action					Projected With Proposed Action				
			Old and Middle River Flow					Old and Middle River Flow		
Date	Combined pumping	NDOI	Daily Index	14-d Average	QWEST	Combined pumping	NDOI	Daily Index	14-d Average	QWEST
24-Feb-14	1494	6614	-1250	-3526	635	43188	6614	-1250	-3526	635
25-Feb-14	1494	6366	-1258	-3372	526	43189	6366	-1258	-3372	526
26-Feb-14	1498	5885	-1249	-3174	498	43194	5885	-1249	-3174	498
27-Feb-14	1498	6374	-1251	-2921	1855	43195	6374	-1251	-2921	1855
28-Feb-14	1518	7127	-1250	-2669	1965	43216	7127	-1250	-2669	1965
1-Mar-14	1505	10964	-1150	-2408	7386	43204	10964	-1150	-2408	7386
2-Mar-14	3954	15494	-3240	-2295	6179	45654	15494	-3240	-2295	6179
3-Mar-14	4283	21430	-3594	-2205	5994	45984	21430	-3594	-2205	5994
4-Mar-14	4642	24056	-3973	-2175	4769	46344	24056	-3973	-2175	4769
5-Mar-14	5663	24455	-4919	-2275	3896	47366	24455	-4919	-2275	3896
6-Mar-14	5805	21436	-5045	-2424	-5	47509	21436	-5045	-2424	-5
7-Mar-14	6785	20768	-5981	-2686	497	48490	20768	-5981	-2686	497
8-Mar-14	6788	21369	-6016	-2950	520	48494	21369	-6016	-2950	520
9-Mar-14	6546	22835	-5791	-3283	-413	48253	22835	-5791	-3283	-413
10-Mar-14	6822	21137	-6020	-3624	-1318	48530	21137	-6020	-3624	-1318
11-Mar-14	6772	17677	-5963	-3960	-2335	48481	17677	-5963	-3960	-2335
12-Mar-14	6300	14571	-5550	-4267	-2325	48010	14571	-5550	-4267	-2325
13-Mar-14	5800	13914	-5094	-4542	-1459	47511	13414	-6461	-4640	-2959
14-Mar-14	5200	15564	-4559	-4778	-683	46912	14397	-6381	-5006	-2683
15-Mar-14	3900	16940	-3375	-4937	91	45613	14773	-6108	-5360	-2939
16-Mar-14	3900	15900	-3386	-4948	-401	45614	13234	-6119	-5566	-3401
17-Mar-14	3900	13052	-3397	-4934	-745	45615	10052	-6130	-5747	-3745
18-Mar-14	3900	10470	-2395	-4821	-1011	45616	7804	-5219	-5836	-3011
19-Mar-14	3000	8623	-2407	-4641	-409	44717	6957	-2589	-5670	-409
20-Mar-14	2800	7573	-2407	-4453	-236	44518	6907	-2407	-5481	-236
21-Mar-14	2800	7107	-2418	-4198	-295	44519	7107	-2418	-5227	-295
22-Mar-14	2300	7107	-1974	-3910	146	44020	7107	-1974	-4938	146
23-Mar-14	2000	7140	-1701	-3618	419	43721	7140	-1701	-4646	419
24-Mar-14	2000	7173	-1712	-3310	360	43722	7173	-1712	-4338	360
25-Mar-14	1800	7123	-1530	-2993	534	43523	7123	-1530	-4021	534
26-Mar-14	1500	7057	-1268	-2687	775	43224	7057	-1268	-3715	775
27-Mar-14	1500	7007	-1268	-2414	748	43225	7007	-1268	-3345	748
28-Mar-14	1500	6873	-1279	-2180	689	43226	6873	-1279	-2980	689
29-Mar-14	1500	6657	-1279	-2030	662	43227	6657	-1279	-2635	662
30-Mar-14	1500	6440	-1279	-1880	636	43228	6440	-1279	-2290	636
31-Mar-14	1500	6223	-1291	-1729	577	43229	6223	-1291	-1944	577

Table 2. Observed (through March 11) and projected combined exports, Net Delta Outflow Index, Daily and 14-day Old and Middle River Old and Middle River flows, and QWEST. The NDOI is calculated as either a 7-day or 3-day running average.

Effects Analysis

Delta Habitat Effects Regarding Salmonids and Green Sturgeon

Outflow Action

Juvenile and adult salmonids would experience reduced outflows of approximately 3,000cfs daily under the proposed action in the next week (until March 20) compared to the existing D-1641 11,400 cfs outflow objective (Table 2). During the remainder of March, outflow conditions under this proposed action are similar to outflow conditions regardless of export operations, since CVP/SWP reservoir releases are not supplementing outflow in accordance with the February TUC Order. The change in the outflow objective will lead to a more eastwardly daily X2 position. These changes would influence hydrodynamics along the Sacramento River salmonid migration corridors through the north Delta, western Delta, and Lower Sacramento River regions. Under the proposed lower outflow objective for the remainder of March, the proportion of positive daily flow velocities will decrease in Miner Slough and on the mainstem Sacramento River south of approximately Rio Vista (Figure 8). The increase in flow reversals will expose migrating salmonids and green sturgeon to greater entrainment into Georgiana Slough. There is a low level of uncertainty in this conclusion.

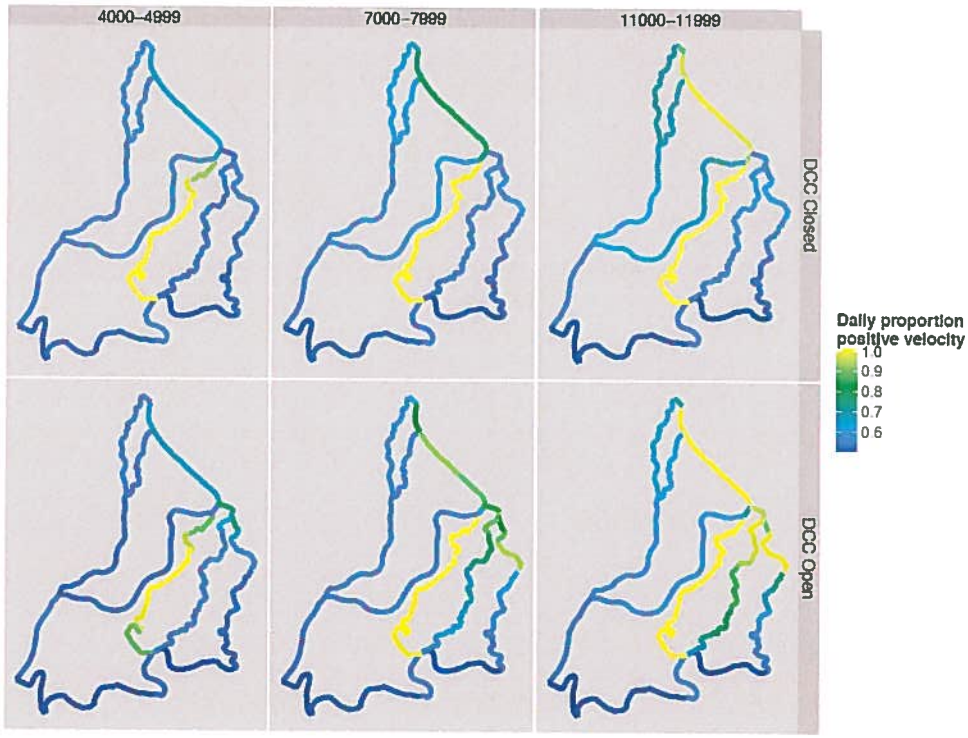


Figure 8. Maps of the North, Interior, and western Delta regions with the channels color coded for daily proportion positive velocity. Figure provided by CFS, March 12, 2014.

Additionally, daily mean velocity is reduced in the North Delta's sloughs and mainstem Sacramento River upstream of Cache Slough (Figure 9) due to reduced outflow. Increased

reverse flows and slower mean velocities result in longer travel times for migrating fish, which has been shown to reduce outmigration survival (Singer et al 2013, Perry 2010, Romine et al 2013). There is a low level of uncertainty in this conclusion. Decreased daily mean velocities may result in increased residence time of Winter-run and Spring-run Chinook salmon, which is hypothesized to result in an increased size at ocean entry. There is a high level of uncertainty in this conclusion.

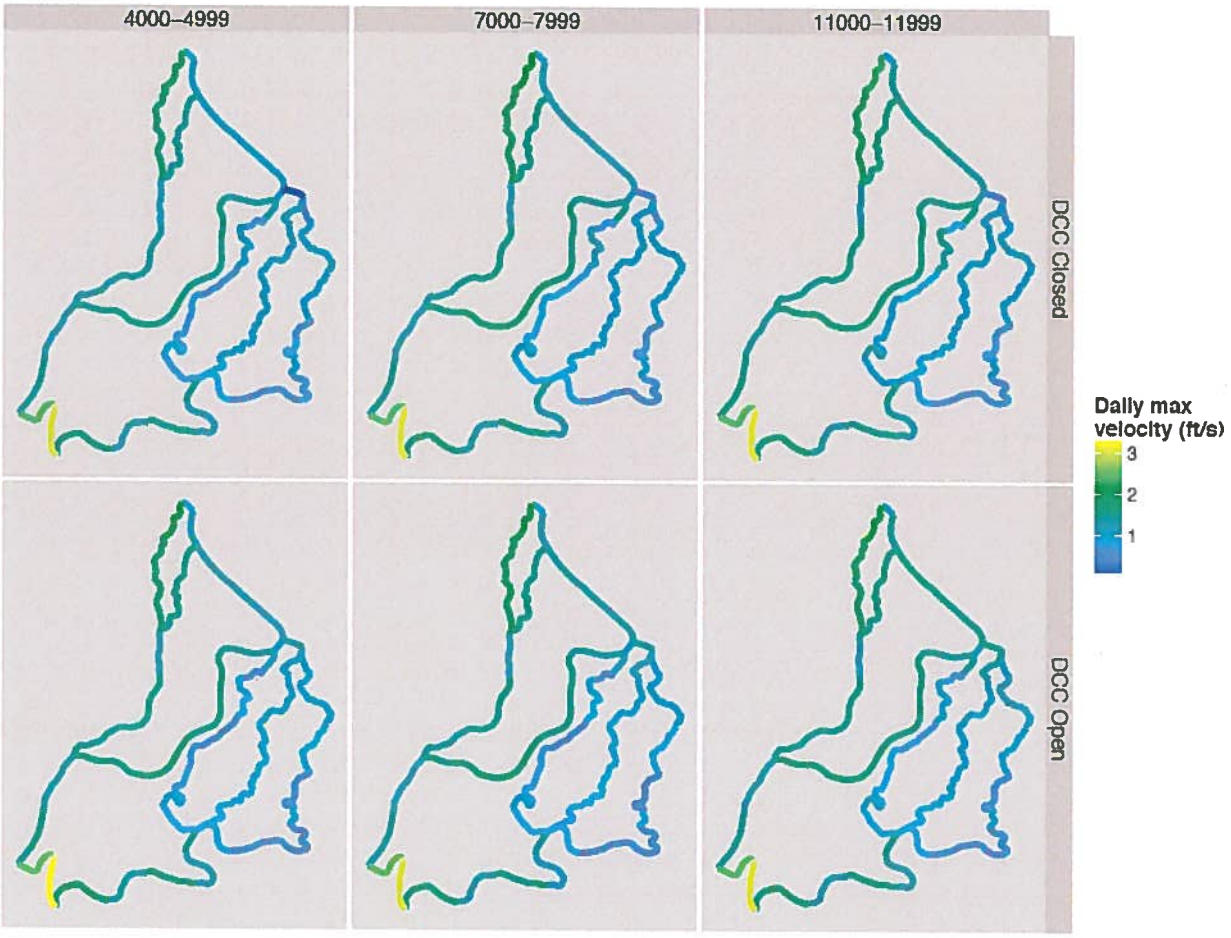


Figure 9. Maps of the North, Interior, and western Delta regions with the channels color coded for daily maximum velocity. Figure provided by CFS, March 12, 2014.

Differences between the frequency of 15-minute velocities under flow ranges similar to D-1641 outflow objective (>11400 cfs) and the proposed outflow objective (>7100 cfs) are immeasurable in the western Delta downstream of Freeport, the Lower San Joaquin, and Three Mile Slough (Figure 10-12). In these western and central regions of the Delta, hydrodynamic effects are dominated by tidal conditions and thus fish in these regions will not experience a measurable change in outflow. During March, green sturgeon adults may experience similar outflow conditions as described above for adult Winter-run Chinook salmon here. There is a low level of uncertainty in these conclusions.

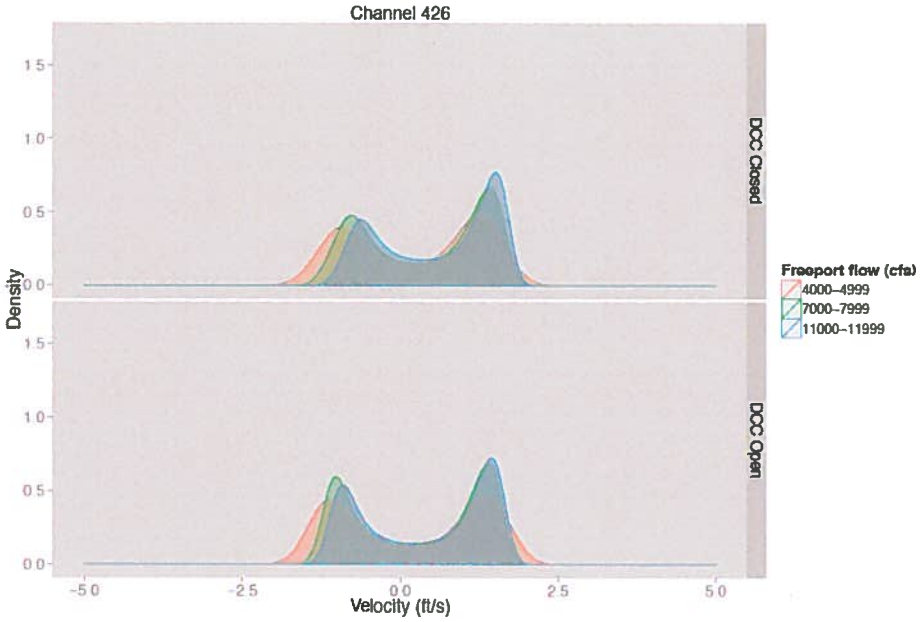


Figure 10. Density plot of velocity (ft/s) observed at DSM2 node 426 (approximately Rio Vista) for three outflow ranges.

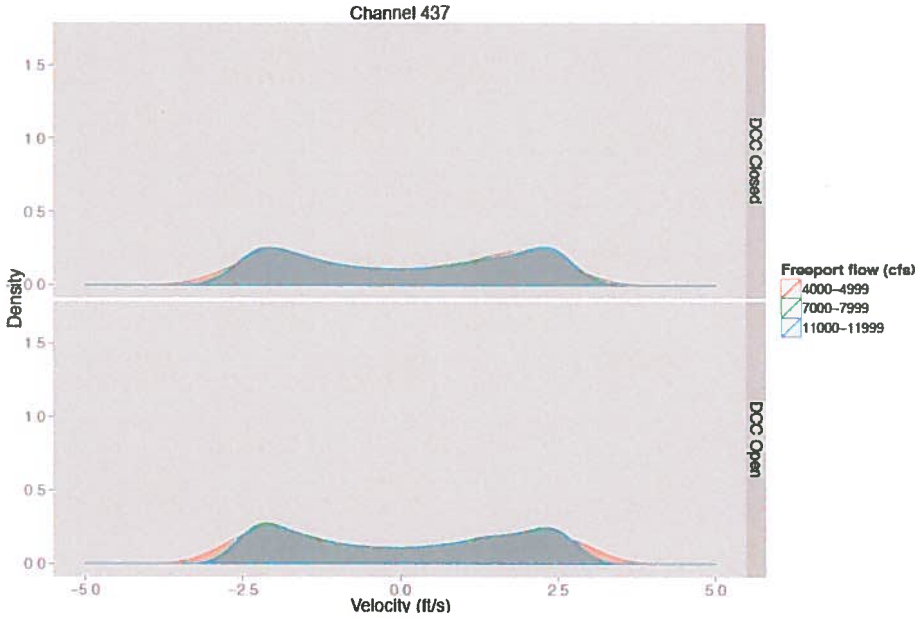


Figure 11. Density plot of velocity (ft/s) observed at DSM2 node 437 (approximately Chipps Island) for three outflow ranges.

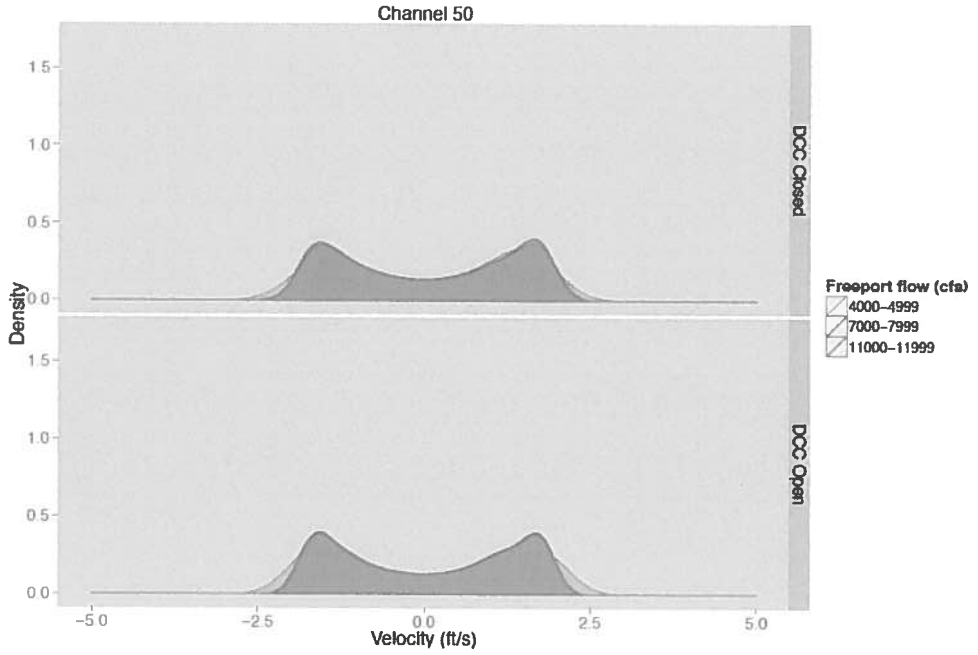


Figure 12. Density plot of velocity (ft/s) observed at DSM2 node 50 (approximately West False River) for three outflow ranges.

Old and Middle River Action

The proposed action would attain similar Old and Middle River conditions for the majority of the remainder of March, except during the next week (until approximately March 20) at which time outflow is projected to be less than 7,100 cfs and pumping would revert to Health and Safety levels. Thus, the proposed change to increase export pumping above Health and Safety levels until the 3-day average outflow at Collinsville is less than 7,100 cfs will create adjusted Old and Middle River flow measurements from the NMFS BiOp (2009) Action IV.2.3 Old and Middle River flow management objective of 14-day average OMR flows no more negative than -5,000 cfs for approximately 7 days (Table 2). The 14-day average flows in Old and Middle River ranged from, -1004 to -2210 cfs in January 2014, -246 to -3203 cfs during February 2014, and -1978 to -3224 cfs thus far in March (Figure 13). Under the proposed action the 14-day average flows are projected to range from -5836 and -1944 cfs.,

The current distribution of Winter-run and Spring-run Chinook salmon and steelhead in the Delta and at the facilities suggest that export levels that create OMR flows more negative than -5,000 may increase the likelihood of exceeding Action IV.2.3's biological triggers associated with loss density and/or daily loss sooner. Old and Middle River flows more negative than -5000 cfs are likely to increase loss of out-migrating salmonids and green sturgeon that are in the South Delta region. During the period when daily and 14-day running average OMR flows are more negative than -5000 cfs, NMFS Biop Action IV.2.3 will continue to use fish loss density, daily loss, and loss of specific Coleman National Fish Hatchery (CNFH) releases of Late Fall and Winter-run Chinook salmon as triggers to reduce the vulnerability of emigrating ESA-listed salmon,

steelhead, and green sturgeon to entrainment into South Delta channels and at the pumps between January 1 and June 15. Depending on what level of fish trigger is exceeded, combined exports are managed to a level so that the 5-day net average OMR flow is not more negative than -3,500 or -2,500 cfs OMR until fish densities return below levels of concern.

Old and Middle River flows more negative than -5,000 cfs are likely to increase the susceptibility of salmonids and green sturgeon in the Interior Delta and Lower San Joaquin River regions to entrainment into the South Delta. Increased duration of OMR flows more negative than -5,000 cfs are likely to affect listed salmonids entering the Delta from the Sacramento River corridor and hypothesized to affect San Joaquin River steelhead migrating through the San Joaquin River migration to an even greater degree. Although the proposed action includes a period with less negative OMR flow, which is hypothesized to reorient fish entrained in the south Delta, this region is a low survival zone for migrating and rearing salmonids (SJRGA 2013, DWR 2014), and subsequently these fish will incur lower survival rates. There is a low to moderate level of uncertainty in these conclusions.

In March, impacts to juvenile and sub adult life stages of green sturgeon are anticipated to remain minimal. Age 1 to 3 green sturgeons are expected to be rearing in the Delta, and are typically exposed to a broad spectrum of flows over the course of the year during this rearing phase and freely move throughout the Delta to find suitable conditions for their needs and the proposed action is hypothesized not to effect any life stage of green sturgeon in the Delta. There is a low level of uncertainty in this conclusion

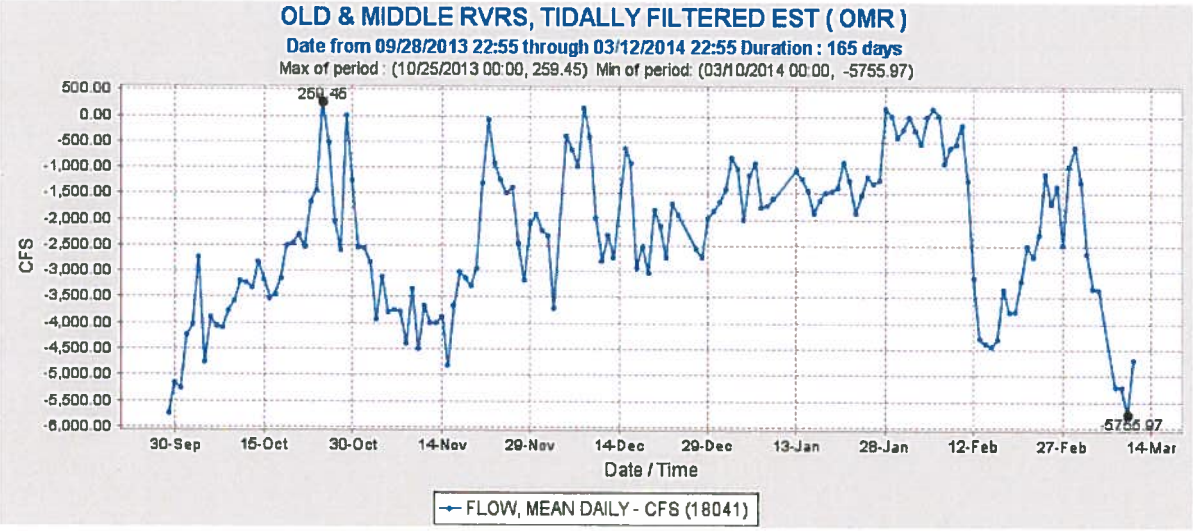


Figure 13. Old and Middle River tidally-filtered daily flows for WY 2014.[9]

[9] Downloaded from CDEC on March 10, 2014.

Cumulative Effects of Action

Cumulatively, the proposed change in outflow and Old and Middle River flows will reduce through Delta survival of juvenile listed salmonids, steelhead and green sturgeon, and may modify their designated critical habitat. The action proposes to: 1) reduce the Delta outflow standard for March from a monthly average of 11,400 cfs at Chipps Island to a three-day average outflow of 7,100 cfs at Collinsville, and 2) operate at daily OMR flows more negative than -5,000 cfs. The action will likely cause unquantifiable reductions in survival in multiple rearing regions and migration corridors through the Delta. The modification of juvenile Winter-run and Spring-run Chinook salmon and steelhead survival due to changes in hydrodynamics would occur primarily through the North Delta downstream of the Head of Sutter Slough and upstream of the confluence of Cache Slough and the mainstem Sacramento and San Joaquin rivers for the remainder of March, and South Delta for approximately seven days, while OMR flows towards the facilities are more negative than -5,000 cfs. The proposed action will increase risks to Winter-run and Spring-run Chinook, steelhead, and green sturgeon associated with CVP/SWP entrainment loss. Similar to the existing biological opinion, exports will conform to existing BiOps when NMFS BiOp Action IV.2.3's fish triggers are exceeded. While the proposed action may increase the likelihood of exceeding these triggers, it does not pose any additional risk to exceeding the annual take limit of Winter- run or Spring-run Chinook salmon.

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