UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF CALIFORNIA

The Consolidated Salmonid Cases	1:09-cv-1053 OWW DLB FINDINGS OF FACT AND CONCLUSIONS OF LAW RE: PLAINTIFFS' REQUEST FOR PRELIMINARY INJUNCTION (Docs. 161 & 230)

I. INTRODUCTION

Plaintiffs San Luis & Delta Mendota Water Authority (the "Authority") and Westlands Water District ("Westlands") (collectively "San Luis Plaintiffs") seek a Temporary Restraining Order ("TRO")[1] and a Preliminary Injunction ("PI") against the implementation of Reasonable and Prudent Alternative ("RPA") Action IV.2.1 set forth in the National Marine Fisheries Service's ("NMFS") June 4, 2009 Biological Opinion ("2009 Salmonid BiOp"), which addresses the impacts of the coordinated operations of the federal Central Valley Project ("CVP") and State Water Project ("SWP") on the Central Valley winter-run and spring-run Chinook salmon, Central Valley

[1] Plaintiffs' request for a TRO against the imminent implementation of Action IV.2.1, which took effect as of April 1, Doc. 233, was denied for the reasons stated in open court on the record on March 31, 2010. Doc. 306. The denial of a TRO motion is not dispositive of the merits of a related motion for preliminary injunction. *See Office of Personnel Management v. Am. Fed'n of Gov't Employees*, 473 U.S. 1301, 1305 (1985).

steelhead, Southern Distinct Population Segment of Green Sturgeon, and Southern Resident Killer Whales ("Listed Species"). Both motions were filed February 22, 2010. Docs. 230, 233.

Plaintiffs State Water Contractors, Stockton East Water District, Oakdale Irrigation District, and South San Joaquin Irrigation District, and Plaintiff-Intervenor California Department of Water Resources ("DWR") filed statements of non-opposition. Docs. 247, 248 & 251. Federal Defendants and Defendant-Intervenors opposed. Docs. 273 & 274.

Additionally, San Luis Plaintiffs seek a PI against the implementation of Action IV.2.3 in the 2009 Salmonid BiOp. Doc. 164 (filed Jan. 27, 2010). Plaintiffs Kern County Water Agency and Coalition for a Sustainable Delta joined. Doc. 181. DWR filed a partial joinder in and statement of non-opposition to the motion. Doc. 249. Federal Defendants and Defendant-Intervenors opposed. Docs. 273 & 274.

The PI motions came on for evidentiary hearing and argument, in Courtroom 3 of the above-captioned Court from March 30 through April 2, 2010. The parties were represented by counsel, as noted on the record in open court.

After consideration of the testimony of the witnesses, the exhibits received in evidence, the written briefs of the parties, oral arguments, and the parties' proposed findings of fact and conclusions of law, Docs. 316 & 314, and disapprovals thereto, Docs. 320, 321 & 336, the following findings of fact and conclusions of law concerning the motion for interim relief/preliminary injunction are entered.

To the extent any finding of fact may be interpreted as a conclusion of law or any conclusion of law may be interpreted as a finding of fact, it is so intended.

II. BACKGROUND

The 2009 Salmonid BiOp found that planned coordinated Project operations would jeopardize the continued existence of and/or adversely modify the critical habitat of several of the Listed Species.[2] BiOp at 1-2. As required by law, NMFS proposed a Reasonable and Prudent Alternative ("RPA") that imposes a number of operating restrictions and other measures on the Projects. The RPA included numerous elements for each of the various project divisions and associated stressors, which NMFS concluded "must be implemented in its entirety to avoid

[2] Jeopardy was found as to all of the covered species; adverse habitat modification was found as to the designated critical habitat of winter-run, spring-run, steelhead, and green sturgeon. BiOp at 1-2.

jeopardy and adverse modification." *Id.* at 578 (emphasis added). The description of the RPA comprises approximately 90 pages of the 2009 Salmonid BiOp. *See id.* at 581-671.

The RPA includes five principle components, with numerous sub-parts, but Plaintiffs currently seek to restrain only:

- Action IV.2.1, which will limit pumping based on San Joaquin River inflow, measured at Vernalis, from April 1 through May 31; and
- Action IV.2.3, which imposes restrictions on negative flows in Old and Middle Rivers ("OMR") between January 1 and June 15, or until average daily water temps at Mossdale (a location on the San Joaquin River west of Manteca, California) are greater than 72°F, whichever is earlier.

III. SUMMARY OF MOTION

Plaintiffs seek preliminary injunctive relief against implementation of Actions IV.2.1 and IV.2.3 on the grounds that:

1) the district court already found that the United States Bureau of Reclamation ("Reclamation") failed to comply with the National Environmental Policy Act ("NEPA") in implementing the 2009 Salmonid BiOp; and

2) the 2009 Salmonid BiOp is arbitrary, capricious, and contrary to law because:

a) NMFS allegedly conducted an effects analysis that improperly overstates impacts attributable to the coordinated operations of the CVP and SWP;

b) NMFS failed to clearly define or consistently apply a relevant environmental baseline;

c) NMFS failed to distinguish between discretionary and non-discretionary CVP and SWP activities, which overstated the effects of coordinated operations of the Projects; and

d) RPA Actions IV.2.1 and IV.2.3 are arbitrary and capricious, because they are without factual or scientific justification and/or not supported by the best available science.

Plaintiffs further claim that the implementation of Actions IV.2.1 and IV.2.3 will cause them continuing irreparable harm and that the public interest and balance of hardships favor injunctive relief.

IV. STANDARD OF DECISION

Injunctive relief, whether temporary or permanent, is an "extraordinary remedy, never awarded as of right." *Winter v. Natural Resources Defense Council*, 129 S. Ct.

365, 376 (2008); *Weinberger v. Romero-Barcelo*, 456 U.S. 305, 312 (1982). Four factors must be established by a preponderance of the evidence to qualify for temporary injunctive relief:

1. Likelihood of success on the merits;

2. Likelihood the moving party will suffer irreparable harm absent injunctive relief;

3. The balance of equities tips in the moving parties' favor; and

4. An injunction is in the public interest.

Winter, 129 S. Ct. at 374; *Am. Trucking Ass'n v. City of Los Angeles*, 559 F.3d 1046, 1052 (9th Cir. 2009).

V. FINDINGS OF FACT

A. The Agency Action.

1. The agency action is the coordinated operation of the CVP and SWP, pursuant to an Agreement for the Coordinated Operation of the two projects ("COA").

2. According to the Rivers and Harbors Act of 1937, the dams and reservoirs of the CVP "shall be used, first, for river regulation, improvement of navigation and flood control; second, for irrigation and domestic uses; and, third, for power." 50 Stat. 844, 850.

3. The CVP was reauthorized in 1992 through the Central Valley Improvement Act ("CVPIA"), which modified

the 1937 Act and added mitigation, protection, and restoration of fish and wildlife as project purposes. Pub. L. 102-575 § 3402, 106 Stat. 4600, 4706 (1992). One of the stated purposes of the CVPIA is to address impacts of the CVP on fish and wildlife. § 3406(a). The CVPIA made environmental protection and water deliveries co-purposes.

4. This case presents a critical conflict between these dual legislative purposes, providing water service for agricultural, domestic, and industrial use versus enhancing environmental protection for fish species whose habitat is maintained in rivers, estuaries, canals, and other waterways that comprise the Sacramento-San Joaquin Delta.

5. It is of manifest significance to the public interest that DWR, a co-operator and the State contractual partner of Reclamation, disagrees with at least some portions of the RPA and seeks limited injunctive relief against RPA Action IV.2.3.

B. Facts Relevant to NEPA Claims.

6. It is undisputed that neither NMFS nor Reclamation engaged in any NEPA analysis in connection with preparation or implementation of the 2009 Salmonid BiOp.

7. It is undisputed that a March 17, 2010 Order granted San Luis Plaintiffs' motion for summary judgment on their claim that Federal Defendants violated NEPA when they adopted and implemented the 2009 NMFS BiOp RPA without conducting the required NEPA analysis. Doc. 288.

8. NMFS asserts that it did consider a range of alternative RPA actions, including those proposed by Reclamation and DWR, and "carefully avoided prescribing measures that are not necessary to meet section 7 requirements." BiOp at 578, 580 & 720 (NMFS endeavored "through the iterative consultation process to avoid developing RPA actions that would result in high water costs, while still providing for the survival and recovery of listed species."). However, this process did not fully or sufficiently evaluate, explain or analyze the extent and gravity of the harms to humans and the environment visited upon Plaintiffs by Project water service reductions and pumping restrictions.

9. The 2009 Salmonid BiOp phases in some elements of the RPA over time, provides a health and safety exception to ensure a minimum level of water exports, uses monitoring programs and adaptive management to initiate RPA actions when species are present and protections are most needed, and includes specific

scientific studies and engineering programs to refine RPA elements. *Id.* at 579-80, 719-23. In addition, the challenged RPA Actions were modified between the draft and final RPA to lessen water supply impacts, including shortening the duration of Action IV.2.1 from 90 to 60 days. *Id.* at 723; NMFS AR 104419.

10. A legally sufficient NEPA analysis should identify and analyze alternatives that minimize harm to humans and the human environment. Federal Defendants do not claim that they engaged in a systematic consideration of impacts to humans and the human environment and/or the alternatives that would have minimized harm to human and the human environment while still protecting the species.

11. Federal Defendants did not take the hard look required to achieve, to the maximum extent possible, the co-equal Reclamation Law objective of providing water service.

C. Facts Relevant to ESA Challenges.

(1) Current Status of the Species.

a. Sacramento River Winter-Run Chinook Salmon.

12. Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) ("winter-run") are listed as "endangered" under the ESA. 70 Fed. Reg. 37,160 (June 28, 2005). Winter-run critical habitat includes portions

of the Sacramento River and other waters. Historical winter-run population estimates were as high as approximately 100,000 fish in the 1960s, but declined to under 200 fish in the 1990s. Gov't Salmon Ex. 4 (Second Stuart Decl., Doc. 273-3), ¶45. In recent years, population surveys of winter-run estimated a high of 17,344 fish in 2006, followed by a decline in 2007 (2,542 fish) that persisted into 2008 (2,830 fish). *Id.* In 2009, there was a modest increase in adult escapement (4,658 fish). *Id.* Winter-run are "currently not viable." BiOp at 88; *see also* 4/1/10 Tr. 175: 11-12.

13. Winter-run juvenile rearing and migration typically occurs between July and February in the upper Sacramento River, with juvenile emigration downstream through the Delta taking place between November through May or June. BiOp at 81, 94; *Pac. Coast Fed'n of Fishermans' Ass'ns. v. Gutierrez* ("*Gutierrez II*"), 606 F. Supp. 2d 1195, 1216-17 (E.D. Cal. 2008); 4/1/10 Tr. 167:5-19; Gov't Salmon Ex. 1 (First Stuart Decl., Doc. 190-4) at (internal) Exhibit 1a. Historically, the peak emigration period for winter-run occurs during March. Gov't Salmon Ex. 4, ¶47.

14. During the current emigration year (2009-2010), juvenile winter-run began entering the Delta in October

2009. *Id.* at ¶46. On April 1, 2010, Mr. Stuart, an NMFS biologist, testified that "about 1,600 winter-run" juveniles have been salvaged at the pumping facilities for the season. 4/1/10 Tr. 174:11.

15. The estimate of juvenile winter-run production (known as the Juvenile Production Estimate ("JPE")) for 2009 is 1,144,860. Gov't Salmon Ex. 1, at ¶3. The BiOp sets an incidental take limit of two percent of the JPE of winter-run salmon, or 22,897. BiOp at 775; 3/31/10 Tr. 112:16-25 - 113:1.

16. In addition, although winter-run are currently at the "tail end" of their emigration through the Delta (90% moved through the Delta by the end of March), 3/31/10 Tr. 172:3-6, Mr. Stuart opined that the "tail end" of the winter-run migration period is "significant" because it "represents fish that would probably show a different life history than fish that occur during the other parts" and, "protecting the tail end would be important to maintain the diversity of that winter-run population," 4/1/10 Tr. 174:19 - 175:8.

17. The emigration period for winter-run is all but concluded for this water year.

18. Designated critical habitat for winter-run includes the Sacramento River, the Delta, and downstream

bays to the Golden Gate Bridge. *Gutierrez II*, 606 F. Supp. 2d at 1217. Currently, the value of winter-run critical habitat is "degraded." BiOp at 93.

b. Central Valley Spring-Run Chinook Salmon.

19. Central Valley spring-run Chinook salmon (*O. tshawytscha*) ("spring-run") are listed as "threatened" under the ESA. 71 Fed. Reg. 834 (June 5, 2005); 70 Fed. Reg. 37160 (June 28, 2005) (critical habitat designated). Spring-run are not currently viable. 4/1/10 Tr. 179:12-15. Spring-run Chinook have been declining over recent years; this past year was one of the lowest adult escapements ever seen. 3/31/10 Tr. 137:22-138:2.

20. It is estimated that the entire Evolutionarily Significant Unit ("ESU") consists of 3,800 adults. 4/1/10 Tr. 180:9-11; Gov't Salmon Ex. 4 at (internal) Ex. 7 (March 2010 population estimates).

21. The emigration period for spring-run extends from November to May, *see* Gov't Salmon Ex. 4, ¶50, although spring-run may occur in the Delta in low abundance in June, *see* Gov't Salmon Ex. 1 at (internal) Exhibit 1a. Historically, April is the peak period for spring-run salvage at the CVP and SWP. 3/31/10 Tr. 125:14; *see also* Gov't Salmon Ex. 4, ¶52.

22. Emigration for spring-run for 2009-2010 is

substantially complete.

23. During the current emigration year (2009-2010), spring-run began entering the Delta in October 2009. Gov't Salmon Ex. 4, ¶52. Under the 2009 Salmonid BiOp, NMFS uses the release of specially-marked late fall-run Chinook as a surrogate for determining take of spring-run Chinook at the export pumps. BiOp at 776, 782; Gov't Salmon Ex. 4, ¶52; *id.* at (internal) Exhibit 10 (graph showing peak of spring-run salvage in April). For spring-run, the incidental take limit is one percent of the marked fall-run surrogates. 3/31/10 Tr. 113:1-2; *see also* BiOp at 776. Take of the tagged late-fall surrogate releases exceeded the caution level of 0.5% this year, which would have triggered a reduction in negative OMR flows under RPA Action IV.2.3. *See* 3/31/10 Tr. 113:1-4; Gov't Salmon Ex. 4, ¶52; BiOp at 649. However, because Action IV.2.3 was enjoined, NMFS could not implement Action IV.2.3 for several days. *See* Gov't Salmon Ex. 4, ¶52.

24. Designated critical habitat for spring-run includes the Sacramento River, tributaries supporting spring-run, the Delta, and downstream bays to the Golden Gate Bridge. *Gutierrez II*, 606 F. Supp. 2d at 1217. The value of spring-run critical habitat currently is

"degraded." BiOp at 101, 104.

c. Central Valley Steelhead.

25. Central Valley steelhead (*O. mykiss*) ("CV steelhead") are listed as "threatened" under the ESA. 71 Fed. Reg. 834 (Jan. 5, 2006). Wild CV steelhead are confined mostly to the upper Sacramento River and its tributaries. BiOp at 107. Recent surveys also have detected small, self-sustaining populations on the Stanislaus, Mokelumne, and Calaveras rivers, as well as observations of juvenile steelhead on the Tuolumne and Merced rivers. *Id.* These small populations make up the remaining representatives of the Southern Sierra Nevada Diversity Group ("SSNDG") of CV Steelhead. *Id.* at 198.

26. Approximately 90% of historical CV Steelhead range is blocked by dams. 3/31/10 Tr. 99:25-100:2. Mortality rates for CV steelhead, estimated by using fall-run Chinook as surrogates, are approximately 70 to 90%. *Id.* at 102:21-23.

27. While there is limited information on population size, one population estimate in 2005 calculated that there were approximately 3,600 female CV steelhead spawning in the entire Central Valley, compared with 40,000 spawners in the 1960s. BiOp at 106.

28. All available data indicate that the CV

steelhead population continues to decline. *Id.* at 108-09; *see also id.* at 100:8.

29. The SSNDG is one of the population groups of the CV steelhead. 3/31/10 Tr. 98:2-3. Under the Viable Salmonid Population ("VSP") concept and the Lindley (2007) paper applying the VSP concept to Central Valley salmonids, NMFS must maintain all extant populations within the Central Valley, in order to maintain the viability of the Distinct Population Segment ("DPS") as a whole. *Id.* at 98:3-7.

30. The SSNDG is a very small population, represented by very few adult fish moving back into the system and potentially only a few hundred to a few thousand juveniles moving out each year. *Id.* at 98:9-12; 100:12-23. These numbers are an "assumption" because of the limited monitoring data available. *Id.* at 98:12-15.

31. The risk of extirpating the SSNDG is very high because 100% of this very small population must travel through the Delta, where it is exposed to numerous risks. *Id.* at 103:2-11. Mr. Stuart opined that this diversity group has a "very tenuous hold on survival" and that "[i]t wouldn't take much to extirpate it." *Id.* at Tr. 104:11-13. Extirpation of this diversity group would further decrease the viability of the CV steelhead DPS as

a whole. *Id.* at 103:24-104:3.

32. The CV steelhead DPS as a whole is not currently viable. *Id.* at 99:8-11.

33. Juvenile CV steelhead typically emigrate through the Delta from late September through June. Gov't Salmon Ex. 1, at (internal) Exhibit 1a. "Peak entrainment typically occurs between mid-February and mid-March with a prolonged tail into June." Gov't Salmon Ex. 4, ¶57. CV steelhead are currently migrating through the Delta, including the Sacramento and San Joaquin Rivers and their associated tributaries. *See* 3/31/10 Tr. 118:8-10. As of March 15, 2010, approximately 420 wild CV steelhead had been taken at the CVP since October 2009, and 204 wild steelhead had been taken at the SWP. Gov't Salmon Ex. 4, ¶57. The "highest rates of fish collection did overlap with the period in which the TRO [issued in this case against the implementation of Action IV.2.3] allowed increased exports (February 5 through February 10, 2010)." *Id.*

34. The 2009 incidental take for CV steelhead is 3,000 fish based on "fairly old data." 3/31/10 Tr. 135:19-20.

35. CV steelhead critical habitat is severely degraded. 3/31/10 Tr. 67:21-68:8.

36. Despite over five (5) years of active controversy over relevant ESU designation and preservation of CV steelhead, Federal Defendants have no credible population figures, nor a reliable life cycle model for this species.

d. Southern DPS of North American Green Sturgeon.

37. The southern distinct population segment of the North American green sturgeon ("green sturgeon") (*Acipenser medirostris*) is listed as "threatened" under the ESA. 71 Fed. Reg. 17757 (Apr. 7, 2006); 73 Fed. Reg. 52,084 (critical habitat designated).

38. Green sturgeon are anadromous fish that spawn and rear in freshwater rivers and estuaries but spend most of their lives in the ocean. Gov't Salmon Ex. 4, ¶58. Juvenile green sturgeon are present in the Delta year round. *Id.* at ¶59. The green sturgeon "is at substantial risk of future population declines" due to, among other things, "loss of juvenile green sturgeon due to entrainment at the project fish collection facilities in the South Delta...." BiOp at 126.

39. There are no population counts or figures for the Southern DPS green sturgeon. 3/31/10 Tr. 73:1. Mr. Stuart was unable to provide an estimate of the actual population of green sturgeon because relevant data is

sparse. 4/1/10 Tr. 177:7-8, 183:17-18. The BiOp estimates salvage of green sturgeon to be highly variable, with a 10-year historical average of 74 adults and 106 juveniles per year. BiOp at 777. However, Mr. Stuart noted that green sturgeon have not been detected in salvage this year. 4/1/10 Tr. 177:10-11.

40. Green sturgeon are another species for which no reliable population estimates and/or life cycle models have been developed, preventing the formulation of more precise protective measures.

e. Southern Resident Killer Whale.

41. The Southern Resident killer whale DPS ("Sothern Residents") of *Orcinus orca* was listed as an "endangered" species under the ESA on November 18, 2005. 70 Fed. Reg. 69,903 (Nov. 18, 2005).

42. Southern Residents are found throughout the coastal waters off Washington, Oregon, and Vancouver Island and are known to travel as far south as central California and as far north as the Queen Charlotte Islands, British Columbia. BiOp at 159. The Southern Residents were formerly thought to range southward along the coast to about Grays Harbor or the mouth of the Columbia River. However, recent sightings of members of K and L pods in Oregon (in 1999 and 2000) and California (in 2000, 2003,

2005, 2006 and 2008) have extended the southern limit of the Southern Resident range. *Id.* at 160.

43. The Southern Residents have fewer than 90 members and loss of even a single individual, or the decrease in reproductive capacity of a single individual, is likely to reduce the likelihood of survival and recovery of the DPS. BiOp at 573. NMFS concluded that Southern Residents prefer Chinook salmon as prey. *Id.* at 163 (salmon constitute up to 96% of Southern Resident prey, with Chinook salmon constituting 72% of that prey); *id.* at 573. In addition, genetic and chemical evidence indicate that Southern Residents consume Chinook salmon from the Central Valley. *Id.* at 164. Orca sightings off the Coast of California coincide with large runs of Central Valley salmon. *Id.* at 159-62, 573.

44. NMFS concluded that extinction of winter-run and spring-run Chinook salmon, as well as reductions in fall-run Chinook salmon populations[3], "would reduce prey availability and increase the likelihood for local depletions of prey in particular locations and times," which would, in turn increase the risk of extinction of the Southern Residents. *Id.* at 573-74.

45. There is no direct evidence of orca mortality

[3] Fall-run Chinook salmon are not listed as threatened or endangered under the ESA. 3/31/10 Tr. 126:19-21

attributable to the Projects.

(2) Effects of Ocean Conditions on Salmon Declines.

46. Mr. Cramer testified that poor fall-run Chinook adult returns during 2007 and 2008 could be attributed to a change in ocean conditions and very poor survival in the ocean. 3/30/10 Tr. 111:10-112:2; 117:17-118:2.

47. The BiOp cites the Lindley (2009) analysis of this fishery collapse for the proposition that "the rapid and likely temporary deterioration in ocean conditions acted on top of a long-term steady degradation of the freshwater and estuarine environment." BiOp at 149. The BiOp also concludes:

> Because the potential for poor ocean conditions exists in any given year, and there is no way for salmon managers to control these factors, any deleterious effects endured by salmonids in the freshwater environment can only exacerbate the problem of an inhospitable marine environment. Therefore, in order to ensure viable populations, it is important that any impacts that can be avoided prior to the period when salmonids enter the ocean must be carefully considered and reduced to the greatest extent possible.

Id. at 152-53

48. Mr. Cramer clarified that the fish of concern were already at low abundance and that, over the course of decades, there were other factors operating on their population trajectories besides ocean conditions. 3/31/10 Tr. 2:18-3:2. Mr. Stuart testified that the

collapse of fall-run Chinook was not exclusively caused by ocean conditions, but also was brought about by freshwater environmental conditions, including reduced flows, water temperatures, predators, and non-native species. 3/31/10 Tr. 127:22-25; *id.* at 128:1-11.

49. Other causes of freshwater degradation, including, but not limited to, toxics, increased salinity, alien and invasive species, predators, riparian pumping and in-Delta diversions are unaddressed by any alternatives. These other causes have not been systematically addressed by Federal Defendants or any other potentially interested agency or entity.

(3) Action IV.2.1.

a. Operation and Purpose(s) of Action IV.2.1.

50. The stated objectives of Action IV.2.1 are to: (a) reduce vulnerability of emigrating CV Steelhead in the San Joaquin River (i.e., the SSNDG) to conditions in the South Delta and at the pumps; and (b) enhance likelihood of salmonids successfully exiting the Delta by creating more suitable hydraulic conditions in the mainstem of the San Joaquin. BiOp at 641; 3/31/10 Tr. 65:10-18.

51. NMFS's analysis of the scientific basis for Action IV.2.1 is found in Appendix 5 to the BiOP. Gov't

Salmon Ex. 20 ("BiOp App. 5").

52. While spring flow increases and export reductions have been provided as part of the Vernalis Adaptive Management Plan ("VAMP") since 2000, the proposed operation did not carry VAMP forward, as funding for such flows was set to expire in 2009, and the San Joaquin River Agreement, a key to implementing VAMP, expires in 2012. *Id.* at 2. Based on uncertainty that VAMP would continue, NMFS determined it necessary to develop an RPA which ensured the flows necessary for successful juvenile outmigration and maintenance of critical habitat. *Id.* at 3.

53. Action IV.2.1 is in effect from April 1 through May 31 and has two requirements. First, the Action requires a minimum flow, as measured at Vernalis, based on an index of storage at New Melones ("New Melondes Index"). BiOp at 642. Based on this Index, the minimum flow required at Vernalis from April 1, 2010 to May 31, 2010 under Action IV.2.1 is the greater of 3,000 cubic feet per second ("cfs") or the flow needed to meet the requirements of State Water Resources Control Board Decision 1641 ("D-1641"). Gov't Salmon Ex. 5 (Third Milligan Decl.), ¶5. The Vernalis flow requirement is not challenged here.

54. The second requirement of Action IV.2.1 restricts combined CVP and SWP export pumping based on the flows at Vernalis, with the permissible exports rising in relation to increased flows at Vernalis. BiOp at 642. The baseline export rate is set at 1,500 cfs, as this has been deemed an operational minimum required to address health and human safety needs. 3/31/10 Tr. 64:9-11. As of a March 15, 2010 estimate provided by the day-to-day manager of the CVP, Ronald Milligan, Vernalis flows are likely to be less than 6,000 cfs, meaning that Action IV.2.1 likely will limit export pumping to 1,500 cfs. BiOp at 642; Gov't Salmon Ex. 5, ¶5.

55. Action IV.2.1 will not control exports for the entire 60-day period, as VAMP will limit combined exports to 1,500 cfs for 30 days in April and May. Gov't Salmon Ex.5, ¶23. This year, VAMP likely will be initiated April 22, 2010. *Id.*

56. Action IV.2.1 is designed primarily to benefit the SSNDG (i.e. steelhead that originate in the San Joaquin basin from the Stanislaus, Tuolumne, and Merced Rivers). 3/31/10 Tr. 65:10-13. Action IV.2.1 will also benefit those salmonids that emigrate out of the Calaveras and Mokelumne Rivers and those salmonids that come from the Sacramento River basin but enter into the

central and southern Delta through Georgiana Slough or the Delta Cross Channel ("DCC") and the Mokelumne River system when the DCC gates are open. *Id.* at 65:13-18.

57. Increased flows from Action IV.2.1 will also benefit designated critical habitat for the CV steelhead within this region by enhancing riparian habitat, flow, and decreasing ambient temperature, as well as increasing turbidity and juvenile migration time, both of which lessen the risk of predation. 3/31/10 Tr. 67:2-17. However, habitat protection is not one of the rationales for Action IV.2.1 articulated in the BiOp or Appendix 5.

b. Viable Salmonid Population Methodology.

58. There is considerable dispute about whether NMFS went far enough in its use of the Viable Salmonid Population ("VSP") concept to evaluate the effects of Project operations on the Listed Species.

59. It is undisputed that VSP can serve as a "conceptual framework" around which the analysis of a project can be structured. BiOp at 51-53. The BiOp describes VSP as follows:

> The VSP concept provides specific guidance for estimating the viability of populations and larger-scale groups of Pacific salmonids such as ESU or DPS. Four VSP parameters form the key to evaluating population and ESU/DPS viability: (1) abundance; (2) productivity (i.e., population growth rate); (3) population spatial structure; and (4) diversity.

Id.

60. Under the VSP concept, abundance is just one of several criteria that must be met for a population to be considered viable. BiOp at 84. ESU viability also depends on the number of populations and subunits within the ESU, their individual status, their spatial arrangement with respect to each other and sources of catastrophic disturbance, and diversity of the populations and their habitat. *Id.; see also* NMFS AR 00123481 (Lindley (2007)).

61. The BiOp explains that under the VSP framework, viability requires more than attaining a particular level of population abundance. "Rather, for an ESU to persist, populations within the ESU must be able to spread risk and maximize future potential for adaptation." BiOp at 84. Lindley (2007) further found that an important risk facing salmonid ESUs is "that much of the diversity historically present in these ESUs has been lost." NMFS AR 00123489. Lindley (2007) thus recommends that "every extant population" of the listed salmonids "be viewed as necessary for the recovery of the ESU," because all three ESUs "are far short of being viable, and extant populations, even if not presently viable, may be needed for recovery." NMFS AR 00123494. Based on this

recommendation, the BiOp "assumed that if appreciable reductions in any population's viability are expected to result from implementation of the proposed action, then this would be expected to appreciably reduce the likelihood of both the survival and recovery of the diversity group the population belongs to as well as the listed ESU/DPS." BiOp at 50.

62. The BiOp used the VSP concept, extensively discussed it, and addressed the various VSP factors in considering the current status of and the impacts of proposed Project operations on the Listed Species. *See BiOp* at 105 at 43; *see also, id.* at 50-53, 68, 84-88, 93-101, 108-111, 124, 173, 309, 443, 451, 472. However, NMFS used VSP as a qualitative framework.

63. There is a dispute over whether NMFS should have used the VSP as a starting point for a quantitative analysis. Mr. Cramer opines that the VSP concept described in Lindely (2006) ("NMFS Science Center Evaluation of the Peer Reviews of the Long-Term Central Valley Project and State Water Project Operations Section 7 Consultation"), identifies attributes of a population that are useful in determining a population's ability to persist, but is not a quantitative framework. 3/30/10 Tr. 105:5-13.

64. Lindley 2006 states that the VSP framework was designed to be a conceptual framework. SLDMWA Ex. 379 at 5. However, Lindley 2006 also stated: "while VSP would provide a conceptual framework, an analytical framework will still need to be assembled to assess the impacts of specific projects on VSP parameters." *Id.*

65. Mr. Cramer opines that there was data cited in the 2009 Salmonid BiOp that would have permitted quantitative analyses within the VSP framework. 3/30/10 Tr. 123:1-12.

66. However, the NMFS Science Center's 2006 peer evaluation of the previous salmonid biological opinion, for which Lindley was the lead author, disagrees: "While new information or models," beyond the VSP criteria, "may help make the analysis more transparent and rigorous, it is not required and many times is not realistic given the limitations on time and resources." SLDMWA Ex. 379 at 5.

67. Although the analysis in the BiOp could have benefited from the application of quantitative methodologies within the VSP framework, there is a scientific dispute whether the failure to do so represents a breach of accepted scientific practice.

c. <u>Population Modeling/Life Cycle Analysis.</u>

68. Mr. Cramer opines that the BiOp should have

performed population modeling and/or life cycle modeling. *See* 3/30/10 Tr. 94:8 - 96:1. In the context of anadromous salmonids, the application of such a methodology involves evaluation of the life history of the population, from adults spawning in fresh water, to fry emergence from gravel, to downstream migration as smolts rear, and then to the species' salt-water life history. At each stage, population modeling would be used to evaluate the factors that affect survival. *Id.* at 94:8 - 96:1. Mr. Cramer opined that proper use of a life cycle model involves testing of a hypothesis against available data to determine whether predicted outcomes match up with observed values. *Id.* at 97:13 - 98:8.

69. NMFS did not explicitly evaluate the impact of project operations in a life cycle model. This failure has been criticized as not complying with accepted scientific principles for population analysis. Plaintiffs presented no evidence regarding the existence or availability of such a life cycle model for the species in question. Plaintiffs did not present evidence that they, or anyone else developed or made available to NMFS an appropriate life cycle model or the results of an appropriate life cycle analysis prior to the issuance of the BiOp.

70. The primary purpose of Action IV.2.1 is to protect outmigrating juvenile members of the SSNDG of CV steelhead, for which no population indices (whether absolute or relative) exist.

71. Despite years of controversy and litigation over CV steelhead, the absence of reliable population data complicates the analysis.

d. Lack of Statistically Significant Correlation Between Exports and Effects on Salmonid Survival.

72. The crux of Plaintiffs' critique of Action IV.2.1 is that it is unsupported by the various studies and analyses actually relied upon in the BiOp. The rationale for Action IV.2.1, provided in Appendix 5 to the BiOp, relies on a number of sources.

(1) Treatment of VAMP Data in the BiOp.

73. VAMP is a multi-agency collaborative effort designed to test the hypothesis that exports and flow in the San Joaquin River influence survival of smolts emigrating down the San Joaquin River. 3/30/10 Tr. 126:21 - 127:4. Annual reports presenting the results of the VAMP experiment have been produced since 2000. *Id.* at 127:5-7.

74. Analyses of the evidence gathered during VAMP have been equivocal regarding the impact of exports on

survival. The BiOp recognized that "recent papers examining the effects of exports on salmon survival have been unable to prove a statistically significant reduction in survival related to exports (Newman 2008)." BiOp at 426.

75. Newman's 2008 statistical analyses of the VAMP data concludes that environmental variables could obscure any relationship between exports and survival. 3/31/10 Tr. 88:11-14. This caveat was recognized in the BiOp. BiOp at 426.

76. The VAMP experimental design has not been implemented in full, in that not all of the planned relationships have been tested. 3/31/10 Tr. 83:11-15. Over the ten years VAMP data was collected, there have been six replications of conditions at 3,200 cfs Vernalis flow and 1,500 cfs exports. *Id.* at 84:2-4. Newman noted that the small number of variables tested in the existing VAMP data did not provide the ability to discriminate between survival effects. *Id.* at 88:19-22. Plaintiffs' expert, Mr. Cramer, and DWR's expert, Mr. Cavallo, recognize these limitations in the VAMP data. *Id.* at 191:6-12; 4/1/10 Tr. 100:4-11.

77. The BiOp also recognizes these limitations. BiOp at 426. To build a more robust data set, NMFS is implementing a six-year acoustic tag study prescribed by

RPA Action IV.2.2. 3/31/10 Tr. 87:11-15.

78. The BiOp considered the VAMP evidence and its limitations and did not disregard any important conclusions generated from the VAMP data.

(a) Figure 10.

79. Notwithstanding the lack of statistical significance, evidence contained in the VAMP reports demonstrates that, during times when the Head of Old River Barrier ("HORB")[4] was in place, as the ratio between Vernalis flow and exports increased, survival increased. 3/31/10 Tr. 86:6-9; BiOp App. 5 at 20.[5] Figure 10 in Appendix 5 of the BiOp demonstrates a positive relationship between the Vernalis flow/export ratio and survival. BiOp App. 5 at 20. The relationship was not statistically significant, but the BiOp states that this may have been due to the narrow range of export rates tested. *Id.*

80. RPA Action IV.2.1 assumes a physical or non-physical barrier will be installed at the head of Old

[4] HORB is a removable rock barrier that "when installed, directs flows on the San Joaquin River away from the Old River into the Central Delta." Finding of Fact #47 Re: Interim Remedies Re: Delta Smelt ESA Remand and Reconsultation, *NRDC v. Kempthorne*, 2007 WL 4462395 (Dec. 14, 2007).

[5] It is undisputed that when HORB is in place, there is a statistically significant relationship between Vernalis flows and survival. *See* BiOp App. 5 at 20; Tr. 3/30/10 128:3 - 130:11 (Cramer); SLDMWA Ex. 128. This is not equivalent to a statistically significant effect of exports or the Vernalis flow/export ratio on survival.

River in order to prevent the fish from following the flow split at the juncture of the maintstem San Joaquin and Old Rivers. 3/31/10 Tr. 92:4-8. However, because the HORB negatively impacts the Delta smelt, NMFS worked with Reclamation, DWR, and other parties to develop alternative engineering solutions, which resulted in an additional RPA Action to study ways to separate fish from the flow. *Id.* at 95:22-96:3.

81. A non-physical barrier, or "bubble barrier," which uses bubbles, LED strobe lights, and acoustic noise to deter the fish from entering Old River is planned to be installed this year. *Id.* at 96:10-14. Based on a 2009 study, the bubble barrier was 83% successful in blocking fish from moving through the barrier. *Id.* at 96:19-21. NMFS has determined that the bubble barrier will serve as an effective substitute for the physical barrier at the head of Old River required by RPA Action IV.2.1. *Id.* at 96:22-25. As of March 31, the installation of the bubble barrier was scheduled to commence on April 6, 2010. *Id.* at 180:19.

82. Mr. Cramer opined that without HORB in place, studies of survival with HORB in place should not be used. *See id.* at 132:13-24; SLDMWA Ex. 129. Mr. Cramer did not address whether the alternative bubble barrier

will produce conditions similar enough to those present with HORB in place to permit the reliance on survival data from when HORB was in place.

83. The record suggests that an effective barrier will be in place at the head of Old River. It was not unreasonable for NMFS to consider data with HORB in place.

(2) Escapement Data.

84. In Figure 11 of Appendix 5, the BiOp relied on an analysis presented in the 2006 VAMP annual report that showed a positive relationship between the spring Vernalis flow/export ratio and adult escapement (i.e. return from the ocean to freshwater) two and a half years later, based on data from 1951 through 2003. 3/31/10 Tr. 70:12-14, 74:7-20; BiOp App. 5 at 21.

85. The analysis in Figure 11 did not attempt to account for variable ocean conditions or commercial harvest of salmonids. *See* generally 3/31/10 Tr. 142-43 (Cramer). Elsewhere in the BiOp, NMFS acknowledges that escapement survival may be significantly impacted by ocean conditions. *See, e.g.,* BiOp 96, 144-45, 148-53, 166-68, 218. There is a conceptual model in the administrative record that suggests even though ocean conditions and harvest may vary from year to year, the

species' long-term declines may be attributed to other factors affecting survival during the freshwater life stages of the species in question. DI 1002 (Lawson conceptual model).

86. Although Figure 11 did not account for variable ocean conditions and/or commercial harvest, Plaintiffs' expert, Mr. Cramer, testified that a reasonable biologist would use this data. 3/30/10 Tr. 192:21-193:3. This suggests that it was not unreasonable for NMFS to consider the analysis depicted in Figure 11.

e. Delta Action 8 Studies.

87. The BiOp also considered data from the so-called "Delta Action 8 studies," which compared the relative survival rates of coded-wire tagged salmon released at (a) Ryde on the Sacramento River and (b) Georgiana Slough, a channel that splits off of the Sacramento River at Walnut Grove and leads to the interior Delta, joining the South Fork of the Mokelumne River just before it meets the San Joaquin River.

88. Evaluating the data from the Delta Action 8 studies, Newman (2008) first explained that there was a high level of environmental variation in the data. *Id.* at 78:18-23. Dr. Newman performed further analysis to reduce the amount of environmental variation and

subsequently found a 98% probability that a negative relationship between exports and survival is present. *Id.* at 79:5-7. Mr. Stuart stated the significance of Newman's finding is that as exports increased, survival decreases for those salmonid smolts that are moving down into the San Joaquin River, where they would be exposed to the influences of the export pumps. 4/2/10 Tr. 32:8-34:12. For those fish released into Georgiana Slough, survival was better when exports were lower.

89. This study is relevant to assessing the impacts of export pumping on fish migrating through the San Joaquin River, because fish released into Georgiana Slough must exit into the San Joaquin River, where they are subject to the influence of the pumps. 3/31/10 Tr. 76:20-23. The Georgiana Slough fish share a common migratory pathway with fish that exit the San Joaquin River basin. *Id.* at 76:24-77:6. Regardless of their origin, once the fish are in this common migratory pathway, they are subject to the same hydraulic conditions. *Id.* at 78:1-17.

90. Mr. Cavallo stated that his interpretation of the Newman (2008) study is that there is a weak relationship between exports and survival in the interior Delta, but conceded that there was some relationship.

4/1/10 Tr. 98:24-99:4. Mr. Stuart testified that Newman's studies are the best available and the fact that Newman could find a relationship given the considerable amount of "environmental noise" and the very low signal to noise ratio "shows that the relationship is probably very real." *Id.* at 159:6-10. Whether this opinion is entitled to weight is disputed by Plaintiffs.

91. A September 26, 2008 paper prepared by Dr. Newman with Patricia L. Brandes entitled "Hierarchical Modeling of Juvenile Chinook Salmon Survival as A Function of Sacramento-San Joaquin Delta Water Exports" ("Newman and Brandes 2008") examined the Delta Action 8 data concerning the relative survival rates for Ryde and Georgiana Slough releases and declared: what "we cannot conclude is that exports are the cause of this lower relative survival." 4/1/10 Tr. 67:20-23 (emphasis added); DWR Ex. 507 at 22. Newman and Brandes 2008 reached this conclusion because "the evidence for an association between exports and survival is somewhat weak" and because of the study's inability to randomize export levels within a given outmigration season. 4/1/10 Tr. 68:1-12; DWR Ex. 507 at 22-23. A later version of this study, dated 2009, omitted this language from the

conclusion. 4/2/10 Tr. 28:2-13.[6]

92. The Delta Action 8 studies seek to relate to exports survival of juvenile salmonids and steelhead passing through the interior Delta from the San Joaquin River basin. These studies show a negative relationship, although admittedly weak, between export levels and survival for fish passing through this area of the Delta.

f. Limited Amount of Water Available in Storage to Increase Flows at Vernalis.

93. Figure 11 and other studies cited in Appendix 5 suggest that maximizing the difference between Vernalis flows and export levels (or maximizing the Vernalis flow/export ratio) improves survivial. BiOp App. 5 at 8, 20-21.

94. NMFS determined that, because there was a limited amount of water available to increase flows at Vernalis, capping export levels would provide the greatest differential between flows at Vernalis and export levels. 3/31/10 Tr. 71:12-17; 97:14-21.

95. This reason for controlling exports is unrelated to any direct scientific evidence connecting export levels to fish survival, making the reason arbitrary,

[6] Mr. Stuart explained that although the BiOp cited the 2008 version of the Newman and Brandes study, he actually used the 2009 version to prepare the BiOp and the 2009 paper was in his reference list. He does not know why the BiOp used the 2008 citation. 4/2/10 Tr. 28:2-13.

capricious, unsupported by reasonable explanation, and not based on best available science.

g. Justification for Ratios Used in Action IV.2.1.

96. Although not the subject of extensive testimony during the evidentiary hearing, there is little to no justification in the record for the exact flow ratios chosen for RPA Action IV.2.1.

97. NMFS looked at the VAMP data to develop the ratio.

> Current VAMP studies have ratios of flow to exports clustered around 2:1, which have provided low survival indices for upstream releases compared to downstream releases, particularly in recent years. Studies which would have had higher flows (i.e., 7,000 cfs) to export (1,500 cfs) ratios were not conducted, since the necessary environmental conditions to implement this part of the study protocol never occurred. Recent conditions in which high flows did occur in the San Joaquin River basin and which would have given flow to export ratios greater than 3:1 in 2005 and 10:1 in 2006 were confounded by poor ocean conditions during the smolts entry into the marine environment, and returning adult fall-run Chinook salmon escapement numbers from these brood years were very low (brood years 2004, 2005 which returned in 2007 and 2008). From the available data, including the information contained in figures 10[7] and 11[8], flow to export ratios should be at least 2:1 and preferably higher to increase survival and abundance. In light of these

[7] Figure 10 suggests there is a positive relationship between the ratio of Vernalis flow to exports and survival of salmonids in the interior Delta.

[8] Figure 11 relied on an analysis presented in the 2006 VAMP annual report that showed a positive relationship between the spring Vernalis flow/export ratio and adult escapement.

> factors, NMFS initially developed flow to export ratios of 4:1 for wet, above normal, below normal, and dry years, based on the minimum export level of 1,500 cfs and a targeted minimum Vernalis flow of 6,000 cfs. Flows in critically dry years were targeted to be a minimum 3,000 cfs, which gives a flow to export ratio of 2:1 when exports are targeted to be 1,500 cfs.

BiOp App. 5 at 22-23 (emphasis added). The feasibility and water supply implications of implementing such flow versus export ratios were then examined through computer modeling. *Id.* at 24-68. The BiOp reasoned that a 2:1 ratio was insufficient because the VAMP studies demonstrated low survival rates at that ratio, and that higher ratios would be "prefera[ble]" to increase survival and abundance. Yet, without any biological explanation, the BiOp chose to impose a 1,500 cfs limit when flows at Vernalis are lower than 6,000 cfs,[9] and a ratio of 4:1 (as opposed to 2.5:1, or 3:1, or even 5:1 or higher) when Vernalis flows are between 6,000 cfs and 21,750 cfs. *Id.* at 71-72.

98. The absence of explanation and analysis for adoption of these limits uses no science, let alone the best available and is simply indefensible.

[9] This 1,500 cfs limit is the minimum export level that would maintain health and safety criteria. BiOp App. 5 at 22. At flows of 5,000 cfs, for example, the ratio would therefore be 5,000/1,500 or approximately 3.33:1.

h. Will Enjoining Action IV.2.1 Appreciably Diminish The Likelihood Of Survival Or Recovery Of The Listed Species Or Adversely Modify Their Critical Habitat?

99. The evidence supports NMFS's general finding that some form of restriction on the Vernalis flow/export ratio is needed to prevent jeopardy to the SSNDG of CV Steelhead. Enjoining any flow/export ratio restriction will appreciably diminish the likelihood of the SSNDG's survival or recovery and/or adversely modify its critical habitat.

a. Mr. Stuart testified that enjoining Action IV.2.1 would "jeopardize" the SSNDG of CV steelhead, 3/31/10 Tr. 122:9, 121:3-5, which in turn would "further decrease the viability of the Central Valley" steelhead DPS, *id.* at 104:2-3. Plaintiffs' expert, Mr. Cramer, did not provide an opinion on the impact of enjoining Action IV.2.1 on the SSNDG of CV steelhead. *Id.* at 24:23-25:1.

b. For critical habitat, Mr. Stuart opined that Action IV.2.1 provides benefits by enhancing migratory corridors, increasing riparian zones and rearing areas which can be used by migrating juveniles, and shortening migration time and increasing turbidity, both of which can decrease vulnerability to predation. *Id.* at 110:24-111:14. Mr. Stuart testified that enjoining Action IV.2.1 would remove these beneficial effects. *Id.* at

111:1-2, 121:13-19; *see also* Gov't Salmon Ex., ¶4 (enjoining Action IV.2.1 would "negate" the benefits provided by Action IV.2.1). Mr. Cramer did not opine what effect enjoining Action IV.2.1 would have on CV steelhead critical habitat. 3/31/10 Tr. 25:7-11, 110:24-25, 111:1-2 (Stuart testimony that Mr. Cramer "didn't look at the effects of the flow on enhancing critical habitat in migratory corridors in the Delta").

100. The low levels of incidental take of steelhead in this water year do not undermine this conclusion.

a. Mr. Cramer opined that the current estimated take of salmon and steelhead is below the incidental take limits in the BiOp. *See* SLMWA Ex. 122, Doc. 244, Cramer Decl., ¶¶ 41-43.[10]

b. The purpose of the incidental take limit is to identify a point at which reinitiation of consultation should occur. 3/31/10 Tr. 113:20-22. It is not the default level at which the facilities should be operated. If the RPA works as designed, the incidental take limit should never be reached. *Id.* at 113:25-114:7, 133:15-24.

[10] Mr. Cramer also suggests in his declaration that "once fish have entered the south Delta, their best chance for survival is to be salvaged at the fish facilities." SLDMWA Ex. 122, ¶26. However, Mr. Stuart disagreed with this position and pointed out that, in addition to the mortality at the salvage facility, there is a high chance of predation for the fish released back into the western Delta after salvage. 3/31/10 Tr. 132:16-24. The best option is to keep the fish out of Old River. *Id.* at 132:24-133:1. This is a matter of scientific dispute among experts.

Mr. Stuart opines that the take limits alone are not sufficiently protective without implementation of the RPA Actions. *See, e.g., id.* at 148:20-149:1; BiOp 105 at 729 ("If less take occurs from the proposed action than is anticipated, this does not indicate that the actions compromising the RPA are not necessary to avoid jeopardizing listed species.").

b. Take of salmon and steelhead at the pumps is only a "small fraction" of their overall mortality, 3/31/10 Tr. 126:5-7, and does not account for indirect impacts of export pumping. 3/31/10 Tr. 114:10-15. Mr. Cramer, expressed no opinion whether enjoining Action IV.2.1 would increase indirect mortality. 3/31/10 Tr. 36:22-37:25.

101. Action IV.2.1 also helps spring-run Chinook salmon, because "the reduced export rates [caused by Action IV.2.1] create a more positive OMR flow within the southern central Delta," resulting in less fish entrained when entering the San Joaquin River at Mokelumne. 3/31/10 Tr. 124:9-15.

102. However, the record does not support a finding that the specific Vernalis flow to export ratios imposed by Action IV.2.1 (as opposed to lesser or greater ratios) are necessary to avoid jeopardy and/or adverse

modification to any of the Listed Species. The total absence of explanation for the exact flow limits chosen makes Action IV.2.1 arbitrary and capricious.

(4) Action IV.2.3.

103. Action IV.2.3 operates from January 1 through June 15 or until the average daily water temperature at Mossdale is greater than 72° F, and limits OMR flows to no more negative than -2,500 to -5,000 cfs, depending on juvenile entrainment levels. BiOp at 648-52. At the first level of increased juvenile loss, exports must be reduced to achieve an average net flow of -3,500 cfs for a minimum of five days, and at the second level, a more positive OMR average of -2,500 cfs must be achieved for at least five days. *Id.* For each trigger, OMR averages can return to -5,000 cfs only after three consecutive days of not meeting the higher-density juvenile loss trigger. *Id.*

104. Action IV.2.3 is meant to:

> [r]educe the vulnerability of emigrating juvenile winter-run, yearling spring-run, and 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. Enhance the likelihood of salmonids successfully exiting the Delta at Chipps Island by creating more suitable hydraulic conditions in the mainstem of the San Joaquin River for emigrating fish, including greater net downstream flows.

BiOp at 648. RPA Action IV.2.3 is intended to benefit fish coming from both the Sacramento and San Joaquin River basins. 4/1/10 Tr. 101:18-102:2.

105. NMFS utilized several sources of data to determine that export flow limitations would achieve the objectives of RPA Action IV.2.3, including the relationship between OMR flows and salvage, particle tracking model simulations, and other studies evaluating survival of fish within the central and southern Delta. 4/1/10 Tr. 134:5-17.

a. Reliance on Particle Tracking Model Simulations.

106. Plaintiffs' seminal challenge to Action IV.2.3 is that NMFS improperly based its rationale for the Action on outputs from computer model runs utilizing the so-called Particle Tracking Model ("PTM"), which models the flow of inert particles as they move within a flowing body of water.

107. PTM is a hydrodynamic simulation used to assess the fate of particles, as a function of flow, tides, exports, and other factors. 4/1/10 Tr. 18:12-15; *see also id.* at 143:9-25. NMFS used PTM to assess the effects of different OMR flows on the movement of neutrally buoyant particles injected at nine different locations in the Delta. Gov't Salmon Ex. 23 at 2; BiOp

at 364-66. The 2009 Salmonid BiOp states that "NMFS uses the findings of PTM simulations to look at the eventual fate of objects in the river over a defined period of time from a given point of origin in the system." BiOp at 366. According to the BiOp, "PTM data can be useful to indicate the magnitude of the net movement of water through the channel after the junction split (and the route selected by the fish), and thus can be used to infer the probable fate of salmonids that are advected into these channels during their migration." *Id.* at 367.

108. Mr. Cavallo opined that PTM data are not useful to infer the probable fate of salmonids because, in contrast to PTM particles, which have no behavior characteristics, fish have behavior, swim quickly, and have a destination in mind. 4/1/10 Tr. 20:14 - 21:5. Mr. Cramer explained that "[j]uvenile salmonids are strong swimmers whose movements are determined by a wide variety of factors varying with species, size, developmental state, season, time of day, and water temperature, as well as relative hydraulic conditions in a channel. Unlike passive particles, juveniles can and do swim against significant currents." SLDMWA Ex. 120 at ¶6. To illustrate the problems with PTM, Mr. Stuart compared PTM simulations to actual data from mark-

recapture studies of Chinook salmon. This comparison demonstrated that salmon move approximately 3.5 times faster though the water than neutrally buoyant particles and would arrive at Chipps Island in a considerably shorter time frame. 4/1/10 Tr. 37:13 - 38:4.

109. This was a concern expressed in other studies by other experts. For example, the BiOp relied upon Wim J. Kimmerer and Matthew Nobriga's report entitled "Investigating Particle Transport and Fate in the Sacramento-San Joaquin Delta Using a Particle Tracking Model" ("Kimmerer and Nobriga 2008"). BiOp 105 at 380-381; Gov't Salmon Ex. 1 at ¶4; Gov't Salmon Ex. 4 at ¶8. Kimmerer and Nobriga 2008 disclaims: "[w]e do not claim that the specific results presented here represent actual movements of salmon; rather, these results indicate what factors may or may not be important in determining how salmon smolts may move through the Delta." DWR Ex. 501 at 18.

110. DWR expressed similar concerns in an email to NMFS dated April 20, 2009 regarding the draft 2009 Salmonid BiOp, asserting that NMFS improperly applied the PTM results in determining the eventual fate of salmonids. Attachment 1 to DWR's comments is a comparison of the results of an experimental release of

coded wire tagged salmon in the San Joaquin River under known hydrodynamic conditions with a PTM simulation under identical conditions. 4/1/10 Tr. 32:19-33:8. These results indicate that under low flow conditions, the coded wire tag salmon reached the end location of Chipps Island long before the arrival of most of the PTM particles. The PTM results only partially corresponded with the coded wire tag results under high flow conditions. *Id.* at 34:3-35:18; DWR Ex. 502 at AR 00086765, AR 00086767.

111. NMFS recognized the limitations of applying the PTM model simulation to salmonids. 4/1/10 Tr. 144:2-8. There were discussions with DWR concerning this issue during the consultation process. *Id.* at 144:9-11. In discussions between DWR and NMFS, NMFS indicated it was using the PTM to evaluate water movement and the potential vulnerability to particle entrainment from various locations in the Delta. *Id.* at 144:13-19. NMFS was explicit that it was not using PTM to predict exactly how fish were moving within these same channels, but that the information gleaned from PTM about water movement through the Delta could provide information on vulnerability to entrainment. *Id.* at 144:19-25.

112. DWR's expert, Mr. Cavallo, agrees with the BiOp

that PTM data can be useful to indicate the magnitude of the net movement of water through a channel after a junction split. *Id.* at 20:21-23; BiOp at 367.

113. Mr. Cavallo also agrees that PTM results may be informative with regard to salmon movement. 4/1/10 Tr. 28:21-25. Mr. Cavallo stated that under the appropriate conditions, PTM simulations would be an appropriate tool to describe fish movement in discharge-driven portions of the Delta watershed. *Id.* at 86:8-10. Mr. Cavallo stated that the Kimmerer and Nobriga PTM study shows that "flow has a big effect on the path that water takes through the Delta," and that fish in a riverine system will tend to go with the flow. *Id.* at 30:11-15.

114. Mr. Cavallo's time-step critique of the PTM simulations used in the BiOp is unsupported.

a. Mr. Cavallo opines that the correct approach to PTM simulations is be to ensure that the time horizon used in the model was consistent with the time horizon of the fish being studied. *Id.* at 25:6-11. Mr. Cavallo interpreted particular graphs in the biological opinion to indicate that NMFS used a 31-day time horizon in its PTM simulations, *id.* at 26:6-16, and opined that this time horizon was too long and would skew the results of the simulation, *id.* at 27:7-11.

b. The PTM simulations NMFS used were run by DWR. *Id.* at 86:14-15; 146:9-10. These simulations included four model runs for the months of February through June, using both wet year, a dry year, and varied whether HORB was installed during the April/May period. *Id.* at 146:14-24, 147:4-6. Three different OMR flows were examined: -3,000 cfs, -2,500 cfs, and -1,250 cfs. *Id.* at 147:15-18. During that simulation, the particles actually were tracked every five days for the first 30 days. *Id.* at 147:1-4; Gov't Salmon Ex. 23 at 2. Mr. Cavallo was unsure that the particles were tracked every five days, nor did he review Mr. Stuart's memorandum explaining the PTM simulation results. 4/1/10 Tr. 87:11-13.

115. Mr. Cavallo's critique of the choice of injection sites is weakened by his agreement that at least two of the particle injection sites modeled by DWR, at NMFS' request, were useful in evaluating the movement of water particles at channel junctions. *Id.* at 90:17-91:16. NMFS selected the particular injection sites in order to model the vulnerability of particles within the waterways of the south Delta. *Id.* at 147:22-149:13.

116. NMFS' PTM simulation also showed that, as export levels increase, OMR levels became more negative. 4/1/10

Tr. 150:21-21. Mr. Cavallo stated that exports are highly correlated with OMR flows. 4/1/10 Tr. 40:25-41:2.

117. NMFS' PTM simulation showed that, as exports increased, the percentage of particles entrained at the export facilities increased, particularly from the Mossdale and Union Island sites and stations 912, 815, 902, and 915. 4/1/10 Tr. 150:22-25; *see* Gov't Salmon Ex. 18 (map of injection sites). The proximity of the injection point to the export facilities led to a much higher level of particle entrainment. 4/1/10 Tr. 151:1-3. As exports increased, the rate at which the particles arrived at the export facilities increased. *Id.* at 151:3-5; *see also* BiOp at 365-66; 4/1/10 Tr. 151:21-153:9 (explaining graphs in biological opinion).

118. Despite the statement in the Kimmerer and Nobriga study that they could not establish a "zone of influence" of exports, Mr. Stuart testified that the shorter time horizon used in NMFS' PTM simulations distinguished it from the Kimmerer and Nobriga simulations, which utilized a 90-day period. 4/2/10 Tr. 23:21-24:2.

119. Mr. Stuart testified that there is no precisely defined boundary for the influence of the exports, and that the boundary of influence depends on river flow,

tides, and the magnitude of the exports. *Id.* at 29:4-9. If there are extremely low-flow conditions and high exports, the extent of the exports could travel considerably farther downstream, even towards the junction of the Sacramento and San Joaquin Rivers. *Id.* at 29:9-13. Typically, according to Mr. Stuart, the boundary would be close to station 815 at the confluence of Georgiana Slough and the Mokelumne River or slightly farther downstream. *Id.* at 29:13-15. As the BiOp explains:

> The data output for the PTM simulation of particles injected at the confluence of the Mokelumne River and the San Joaquin River (Station 815) indicate that as net OMR flow increases southwards from -2,500 to -3,500 cfs, the risk of particle entrainment nearly doubles from 10 percent to 20 percent, and quadruples to 40 percent at -5,000 cfs. At flows more negative than -5,000 cfs, the risk of entrainment increases at an even greater rate, reaching approximately 90 percent at -7,000 cfs. Even if salmonids do not behave exactly as neutrally buoyant particles, the risk of entrainment escalates considerably with increasing exports, as represented by the net OMR flows. The logical conclusion is that as OMR reverse flows increase, risk of entrainment into the channels of the South Delta is increased. Conversely, the risk of entrainment into the channels of the South delta is reduced when exports are lower and the net flow in the OMR channels is more positive -- that is, in the direction of the natural flow toward the ocean.

BiOp at 652.

120. This is a dispute among scientists. While DWR

criticizes PTM modeling, Stuart and NMFS recognized its limitations and found PTM studies helpful to support its conclusions that: (a) as exports increase, negative OMR flows also increase; and (b) that at Station 815 (the confluence of the Mokelumne River and the San Joaquin River), particle entrainment increases from 10% at -2,500 cfs, to 20% at -3,500 cfs, to 40% at -5,000 cfs, and 90% at -7,000 cfs. NMFS, through Mr. Stuart, took into account inherent differences in the movement of neutrally buoyant particles and their speed and direction of travel. Administrative law requires deference to the Agency. Additional record analysis is necessary to determine the extent of support for NMFS's additional opinion that exports affect salmonid survival.

b. Additional Data Relied Upon by NMFS.

(1) Salvage Data.

121. NMFS also relied on salvage data provided by Plaintiff-Intervenor DWR. 4/1/10 Tr. 134:21; *see* Gov't Salmon Ex. 1 at (internal) Exhibit 3. This data collected monthly average OMR flows for the months of December to April 1995-2007 and the monthly older juvenile loss numbers for both the state and the federal facilities. *Id.* at 135:18-136:8.

122. This data was presented in Figures 6-65 and 6-66

of the BiOp:

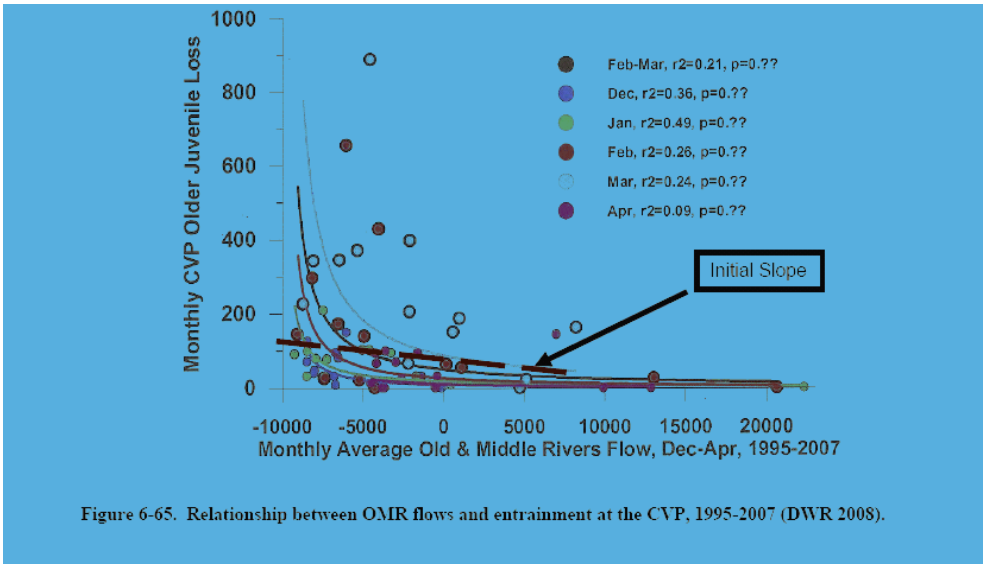

Figure 6-65. Relationship between OMR flows and entrainment at the CVP, 1995-2007 (DWR 2008).

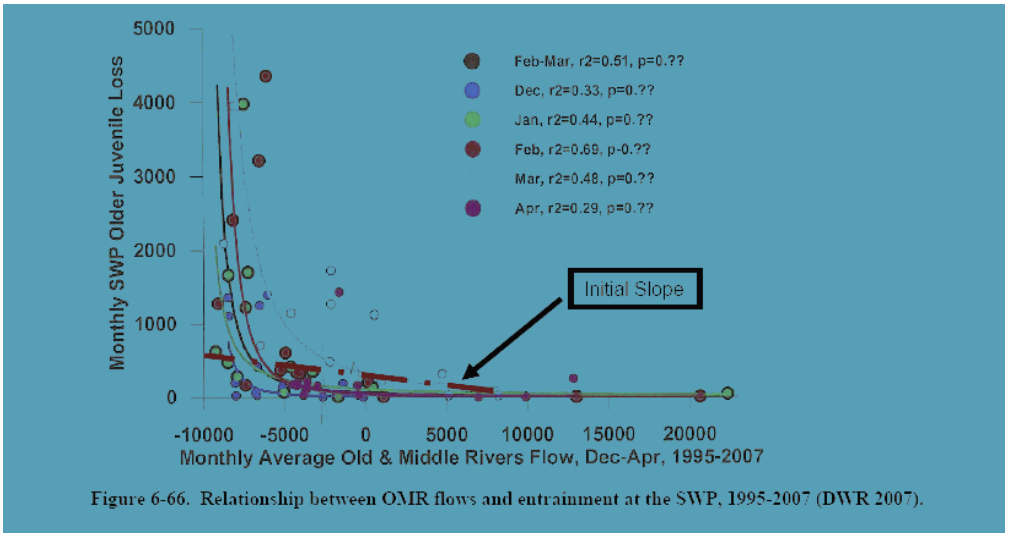

Figure 6-66. Relationship between OMR flows and entrainment at the SWP, 1995-2007 (DWR 2007).

BiOp at 361-62.

123. Based on this data, NMFS determined that there was a threshold level of pumping, as reflected by OMR flows, below which entrainment was low, but above which entrainment at the Project facilities markedly increases. 4/1/10 Tr. 139:11-16. The threshold level identified by NMFS is -5,000 cfs. *Id.* at 139:18-21.

124. There is evidentiary support for the conclusions that: (1) entrainment data show that as exports increase, so does juvenile salvage; and (2) that at flows more negative than -5,000 cfs, OMR salvage increases more rapidly than at lower flow levels.

125. However, The comparisons of salvage to negative OMR flows relied upon in the BiOp utilize raw salvage numbers, rather than scaling salvage to population size. *See* Doc. 179, Declaration of Richard B. Deriso at ¶¶ 3-5. Scaling salvage to population size is standard fisheries science practice and could have been accomplished for several of the Listed Species based on existing population data. *See id.* at ¶¶ 5-6. This failure is a fundamental and inexplicable error. Salvage may have been higher in some years simply because the population was higher, not because of any differences in negative OMR flows. Salvage may have been lower in other years because the population was lower. Dr. Deriso demonstrated the potential significance of this failure by plotting the population adjusted Juvenile Chinook Incidental take rate against OMR flow. Based upon this revised analysis for spring-run and winter-run, Dr. Deriso concluded that there is no statistically significant relationship between the take index and OMR

flows. *Id.* at ¶6.

126. The BiOp's conclusions reached about the spring-run and winter-run Chinook failed to utilize the best available scientific methodology, because population data was available at the time the BiOp was issued that would have permitted NMFS to perform the straightforward population adjustment required to conform to standard, generally accepted practices for fisheries population measurements utilized in their field of expertise. If, in those years when salvage was greatest, population sizes overall were 10 or 100 times larger than other years, the effects might not be jeopardizing. Without adjustment for population size, NMFS's reliance on that figure was arbitrary and capricious.

127. As to the CV steelhead, for which no population numbers are available, it is less clear whether the use of raw salvage numbers is always inappropriate. Figures 6-65 and 6-66 ambiguously reference monthly CVP and SWP "Older Juvenile Loss" on the y axis. Were most of the salvaged fish represented on these charts Chinook salmon? No reason is offered why NMFS did not segregate the steelhead figures from those of Chinook salmon. If the species had been evaluated separately, would it have been reasonable for NMFS to fail to adjust the steelhead

figures for population size? Separate analysis was not done.

(2) Delta Action 8 Studies.

128. NMFS relied upon Newman's 2008 analysis of the Delta Action 8 studies discussed above. *See also* BiOp at 373 (General Discussion of Relationship of Exports to Salvage). These results demonstrate that as exports increase there is decreased survival for salmonids passing through the south and central Delta. Georgianna Slough enters the Delta at Station 815.

129. Newman's and Brandes' (2009) Delta Action 8 studies found that determining the proportion of all Sacramento River smolts volitionally migrating through Georgiana Slough is essential to evaluating the population level or biological significance of any export effects, at least on those populations that spawn in the upper Sacramento basin (e.g., winter-run Chinook salmon). DWR Ex. 507 at 24. NMFS did not address relative population impacts in developing or explaining RPA Action IV.2.3.[11]

130. Even assuming all smolts traveled through Georgiana Slough, Mr. Cavallo testified that under

[11] Although the same failure applies to NMFS's use of the Delta Action 8 data in IV.2.1, that Action was designed to help the SSNDG of CV Steelhead, all of whom must pass through the central Delta on their way to the ocean.

Newman's weak export-mortality relationship, a 2,000 cfs increase (from 4,000 to 6,000 cfs) in exports would increase total mortality by five percent. 4/1/10 Tr. 63:8-25. However, based on his review of available data, Mr. Cavallo estimated that no more than 22% of smolts originating in the Sacramento River would pass through Georgiana Slough, lowering the impact on these populations of a 2,000 cfs increase to one percent. *Id.*

131. NMFS's failure to evaluate the population level impacts of exports is inexplicable. A population level evaluation would shed light on the relative impact of exports on the winter-run, for which no population spawns in the San Joaquin basin. This failure is less critical to the analysis of impacts on spring-run and CV steelhead, as both species have important populations that spawn in tributaries of the San Joaquin and necessarily must pass through the interior Delta on their way to the ocean.

c. Perry & Skalsi.

132. The BiOp utilized the Perry and Skalski (2008) study that concluded survival of fish moving into Georgiana Slough and nearby channels was reduced compared to those in the mainstem of the Sacramento River. 4/1/10 Tr. 161:20-162:1. These fish enter a portion of the San

Joaquin River that NMFS found to be impacted by exports in its PTM simulation. *Id.* at 162:5-17; 4/2/10 Tr. 18:12-20, 19:22-20:11.

133. However, Perry and Skalski 2008 noted that "there is limited understanding of how water management actions in the Delta affect population distribution and route-specific survival of juvenile salmon." SDLMWA Ex. 227 at 3. Mr. Cavallo testified that Perry and Skalski 2008 does not provide scientific support for the view that salmonids are lost due to water project-induced alterations to Delta hydrologic conditions. 4/1/10 Tr. 66:5-9.

134. Mr. Stuart admitted that Perry and Skalski 2008 did not address water project impacts on Delta hydrology, fish behavior, or the indirect mortality of fish in the central and southern channels of the Delta. Mr. Stuart further admitted that he reached his conclusions regarding water project impacts on Delta hydrology, fish behavior, and indirect salmonid mortality based upon his personal extrapolation from the data contained in Perry and Skalski 2008, and not from any conclusions reached by Perry and Skalski. 4/2/10 Tr. 19:2 - 21:24. However, these personal extrapolations are not documented or otherwise explained in the BiOp or elsewhere in the

record.

d. Vogel.

135. The BiOp also relied upon Vogel (2004), which reviewed telemetry-tagging data to investigate fish route selection in the channels leading to the south Delta. *See* BiOp at 380-81. Based on Vogel's work, the BiOp found that when export levels were reduced and San Joaquin River flows were increased, more fish stayed in the main channel of the San Joaquin River, heading downstream toward the San Francisco Bay. *Id.*

136. Mr. Cavallo maintains that Vogel (2004) does not support the conclusion that a reduction in export pumping resulted in the reduction of salmon leaving the mainstem of the San Joaquin River and entering the southern Delta. 4/1/10 Tr. 47:20-24, 49:8-13, 49:25 - 50:4, 50:17-23; DWR Ex. 505. The Vogel (2004) study concluded that the experiments it conducted "could not explain why some fish move off the mainstem of the San Joaquin River into the south Delta channels," noting that "[d]ue to the wide variation in hydrologic conditions" during the course of the experiments, "it was difficult to determine the principal factors affecting fish migration. Based on the limited data from these studies, it may be that a combination of a neap tide, reduced exports, and

increased San Joaquin River flows is beneficial for outmigrating smolts, but more research is necessary." DWR Ex. 505 at 37.

137. When asked about Vogel's inconclusive results, not discussed in the BiOp, Mr. Stuart admitted that the BiOp's failure to disclose the conclusion was "an oversight on my part," for which he had no explanation. 4/2/10 Tr. 15:4-9.

138. It was not rational nor scientifically justified for the BiOp to rely on Vogel (2004) for findings the authors themselves refused to make.

e. Justification for Specific Flow Levels.

139. The only discernable and scientifically justifiable support provided in the BiOp for the negative 5,000 cfs ceiling on OMR flows under Action IV.2.3 is the salvage data, represented in Figures 6-65 and 6-66 of the BiOp. *See* Gov't Salmon Ex. 1 at (internal) Exhibit 3. Based on this data, NMFS concluded that -5,000 cfs represented a "threshold level" of pumping, reflected by OMR flows, below which species entrainment was low, but above which entrainment at the Project facilities markedly increases. 4/1/10 Tr. 139:11-16. The BiOp discusses Figures 6-65 and 6-66:

> Loss of older juveniles at the CVP and SWP fish collection facilities increase sharply at Old

> and Middle River flows of approximately -5,000 cfs and depart from the initial slope at flows below this.

The record does not explain whether NMFS utilized a statistical analysis to choose -5,000 cfs as the break point, or whether that figure was based on a visual inspection of Figures 6-65 and 6-66.

140. NMFS considered setting more positive OMR flow requirements, which would have been more beneficial for the listed salmonids, but would place more restrictions on exports. 4/1/10 Tr. 178:17-22. Mr. Stuart testified that he "tried to find a point that would be equitable" to balance species protection and burdens on the exports. *Id.* at 178:24-179:6 (emphasis added).

141. Mr. Stuart testified that:

> [T]he minus 5,000 was sufficiently [ ] restrictive to protect the fish from entrainment. To go more positive than that would have been better, but I don't think that I would have gained that much. And, you know, I did, you know, consider that to go more positive you'd have to put more restrictions on the exports. And I tried to balance that relationship. You know, more negative would have taken more [ ] fish, which was less protective of our species. To go more positive would have been more protective, but it would have been a very onerous burden on the exports. [¶] So, you know, I tried to find a point that would be equitable. I didn't run a full detailed hydraulic analysis and water analysis on that, but, you know, to balance those two was in my mind as I was looking at the minus 5,000 as the trigger point.

4/1/10 Tr. 178:17 - 179:6. This effort to choose a "balance point," is not supported by any scientific analysis.

142. Mr. Stuart testified that he "looked at ... the level where we saw increasing take and use[d] precautionary ... principles to protect the fish." Yet, nowhere in the BiOp (or any other document in the administrative record cited by the parties) does NMFS disclose its intent to use a "precautionary principle" to design the RPA Actions, nor is that "level" specifically defined or justified.

143. The -5,000 cfs OMR ceiling is based, predominantly on speculation.

144. Moreover, Figures 6-65 and 6-66, do not scale salvage to population size. This further undermines NMFS's extrapolation of the -5,000 cfs "break point," and affects the credibility of Mr. Stuart's testimony.

f. Will Enjoining Action IV.2.3 Appreciably Diminish The Likelihood Of Survival Or Recovery Of The Listed Species Or Adversely Modify Their Critical Habitat?

145. Although the moving papers seek an unlimited injunction of Action IV.2.3, at the evidentiary hearing, Plaintiff-Intervenor DWR clarified that an injunction was sought only against the so-called "calendar-based triggers" of Action IV.2.3, and that it does not oppose

the salvage-based triggers of Action IV.2.3. 4/1/10 Tr. 9:7-10:17. DWR accepts the underlying scientific principle that when significant salvage occurs at project pumps, the projects operations must be altered. *Id.* at 10:11-13. In prior remedial proceedings, some Plaintiffs have acknowledged that at flows more negative than -7,000 cfs, Delta smelt and the continued existence of two Chinook salmon species are jeopardized. *See, e.g., PCFFA v. Gutierrez*, 2008 WL 4657785, *6 (Oct. 21, 2008). The proposed injunction applies only to the "calendar-based triggers" of RPA Action IV.2.3.

146. There are serious questions whether there is support in the record for the general proposition that exports reduce survival of salmonids in the interior Delta.

a. The PTM studies do stand for the proposition that neutrally buoyant particles injected at Station 815 have a higher chance of entrainment as negative OMR flows increase. But, particles are not a reasonably accurate prototype for the behavior of strong-swimming Chinook salmon, steelhead, and sturgeon.

b. The salvage data was not scaled for population size, which any prudent and competent fish biologist and statistician would have done, making NMFS'

reliance on the salvage data scientifically erroneous for those species for which abundance data are available. The effect of this error on NMFS's evaluation of export impacts on CV steelhead is less clear.

c. NMFS's reliance on the Perry & Skalski and Vogel studies is unjustified and unreasonable, given that NMFS relied upon those studies to support conclusions the authors refused to reach without explanation.

d. The Delta Action 8 studies, at the very least, support the proposition that, for those salmonid populations spawning entirely within the San Joaquin basin, increasing exports can negatively impact salmonid smolt survival. This data, coupled with the highly criticized PTM studies, are the questionable foundation underlying NMFS's rationale for Action IV.2.

e. Mr. Stuart testified that if the calendar-based portion of the Action were enjoined, jeopardy to the species would not be avoided because it would "affect a large proportion of the spring-run population, a portion of the steelhead population, and that portion of the green sturgeon population that's currently within the Delta." *Id.* and 186:2-5. (Although, not one sturgeon has been taken as of April 4, 2010.) As further explained in Mr. Stuart's declaration:

> Without the protection of RPA action IV.2.3, OMR flows will increase in relation to the increase in exports, and more fish will be lost to the export actions over current conditions. In addition to the loss [of] salmonids during the salvage process, it is expected that a greater number of listed fish will be exposed to stressors in the delta as they are advected into the channels of the central and southern delta by the altered hydraulic conditions. Loss to predation, as well as other stressors such as contaminants, is expected to occur as a result of this increased exposure.

Gov't Salmon Ex. 4, ¶62. Action IV.2.3 is designed to protect the fish from being pulled south towards the facilities; a purely salvage-based operation is reactionary and reflects the pre-biological opinion status quo, which NMFS determined was not sufficiently protective. 4/1/10 Tr. 170:9-171:7.

147. Plaintiffs' offer to use the species' incidental take limits to avoid jeopardy is not sufficiently protective. The ITL is not meant to be a ceiling on mortality, in part because it "doesn't address all of the different forms of take that can occur throughout the whole Central Valley." 4/1/10 Tr. 172:21-73:1.

148. NMFS's choice of -5,000 cfs as the calendar based ceiling for Action IV.2.1 is not scientifically justified and is not based on best available science.

(5) Indirect Mortality.

149. Indirect mortality is that mortality that does not occur directly as a result of the entrainment process

at the Project pumps. 3/31/10 Tr. 104:22-24. Stated another way, it is the sum of mortality that occurs to fish that are under the influence of the changed hydraulic field within the Delta. *Id.* at 105:1-3.

150. Indirect mortality is observed within the channels and waterways of the northern, central, and southern Dela. *Id.* at 109:23-24.

151. DWR's expert, Mr. Cavallo, does not contend that there is no indirect loss, 4/1/10 Tr. 94:10-12, nor that indirect mortality is not a stressor on fish as they move through the system, *id.* at 94:13-15. Mr. Cavallo agrees that a reasonable biologist addressing the impacts of the Projects should not have ignored indirect mortality. *Id.* at 94:16-19.

152. This belies DWR's present contention that indirect mortality is not related to Project operations, as does information submitted by DWR in the prior litigation estimating indirect mortality attributable to exports. 4/1/10 Tr. 190:7-191:10; *see* D-I Ex. 1003 at (internal) Exhibit 2. NMFS relied on this information in preparation of the current biological opinion. 4/1/10 Tr. 191:13-18; *see* D-I 1011. The information provided by DWR suggests that, based on certain water year types and export to inflow ("E/I") ratios, there could be

substantial export-related mortality in the interior Delta. 4/1/10 Tr. 192:9-14. Such mortality may be substantially greater than direct take at the CVP and SWP. *See id.* at 190:17-190:10; *see also* D-I Ex. 1011.

153. Plaintiffs' expert, Mr. Cramer, did not deny the existence of indirect mortality, but stated that it had not been adequately tested. 3/31/10 Tr. 19:2-15.

154. Acoustic tag studies are beginning to provide estimates of indirect mortality in the Delta. *Id.* at 105:9-10. The Perry and Skalski (2008) paper showed a survival rate of about 30 to 35% for interior Delta waters. *Id.* at 105:15-17, 108:15-18; *see* SLDMWA Ex. 227 (Perry & Skalski (2008)). Perry and Skalski did not attribute any particular portion of this to the projects.

(6) Other Stressors.

155. It is undisputed that there are numerous stressors unrelated to project operations that adversely affect and jeopardize the viability of the Listed Species and the quality of their critical habitat. The BiOp dedicates a lengthy section to "Factors Responsible for the Current Status of Winter-Run, Spring-Run, CV Steelhead, and the Southern DPS of Green Sturgeon." BiOp at 134-157. Among other causes, this section discusses the following factors adverse to survival and habitat

quality:

- Habitat blockage by dams of the CVP SWP and other municipal and private entities;
- Water diversion and storage;
- Anderson-Cottonwood Irrigation District ("ACID") Dam and Red Bluff Diversion Dam ("RBDD");
- Water conveyance and flood control facilities;
- Land use activities throughout the Central Valley;
- Water quality degradation;
- Hatchery operations and practices;
- Over utilization through commercial and/or sport harvest;
- Disease and predation;
- Environmental variation (including natural environmental cycles, ocean productivity, and global climate change); and
- Non-Native Invasive Species.

156. Whether and to what extent these factors are exacerbated by project operations has been the subject of continuing debate in this and the Consolidated Smelt Cases. It was not the subject of briefing in the PI motion in this case.

157. Plaintiffs have argued that Federal Defendants have wrongfully ignored these other causes and have put the burden of remediation wholly on the water supply and Project operations. Plaintiffs contend that the overwhelming causes of jeopardy to the species and their habitats are these other stressors.

158. Federal Defendants have not quantified relative harms, nor has any party suggested what remedies will effectively address these other causes.

D. Irreparable Harm.

159. The evidence has established a variety of adverse impacts to humans and the human environment from reduced CVP and SWP deliveries, including "irretrievable resource losses (permanent crops, fallowed lands, destruction of family and entity farming businesses); social disruption and dislocation; as well as environmental harms caused by, among other things, increased groundwater consumption and overdraft, and possible air quality reduction." Doc. 202, 2/5/10 TRO Decision, at 15:24-24 - 16:1-4.

160. At the same time, the declining health of the salmonid population is harming other interests, including those of commercial fishermen and Native Americans with cultural and spiritual interests in salmon.

(1) Water Supply Impacts.

161. It has previously been recognized that "any lost pumping capacity directly attributable to the 2009 Salmonid BiOp will contribute to and exacerbate the currently catastrophic situation faced by Plaintiffs, whose farms, businesses, water service areas, and

impacted cities and counties, are dependent, some exclusively, upon CVP and/or SWP water deliveries." Doc 202, TRO Decision, at 15:17-24.

162. Every acre-foot of pumping foregone during critical time periods is an acre-foot that does not reach the San Luis Reservoir where it can be stored for future delivery to users during times of peak demand in the water year.

163. It is undisputed that, in the three water years prior to the 2009-2010 water year, California has experienced three consecutive years of drought conditions. Gov't Salmon Exh. 5 at (internal) Exhibit 1 at 18. This influences the amount of run-off forecasted for 2010 and is indicative of why reservoir storages were at a low state entering the 2009-2010 water year. 4/1/10 Tr. 208:7-15. Hydrologic conditions are not within the control of the parties and have materially contributed to water service reductions to contractors.

164. It is also undisputed that other, non-project factors, such as tides, wind events, storm surges, San Joaquin River flows, Contra Costa Water District operations, and diversions by in-Delta water users impose limitations on how Reclamation must operate the project to meet flow targets. *See id.* at 202:12-204:1.

165. The projects are subject to export reductions required to protect species listed under the California Endangered Species Act, including longfin smelt, delta smelt, winter-run Chinook salmon, and spring-run Chinook salmon, which subject the water project operators to controls under state law that are similar, and, in some cases, identical to those contained in the 2009 Salmonid BiOp and the United States Fish and Wildlife Service's ("FWS") December 15, 2008 Biological Opinion ("2008 Delta Smelt BiOp"). *See id.* at Tr. 212:4-213:8; 4//10 Tr. 20:18-21:20. In the absence of the BiOps' RPAs, those protections are argued to have likely limited export pumping to levels below those allowable under D-1641, which also limits Project pumping at certain times of the year. *See, e.g.*, SWC Ex. 938 (DWR's 3/30/10 allocation announcement considered several "SWP operational constraints" including "the incidental take permit for longfin smelt").

166. Plaintiffs' estimates of water losses do not account for or otherwise offset losses attributable to proposed remedies in the consolidated Delta Smelt and Salmon cases. *See* 4/7/10 Tr. 17:10-20:14.

a. Water Supply Impacts of Action IV.2.1.

167. Action IV.2.1 lasts from April 1, 2010 through

May 31, 2010. SLDMWA Ex. 105 at 641-643. The flow requirements in Action IV.2.1 vary depending on the February New Melones Index. SLDMWA Ex. 105 at 642. Based on the February 2010 New Melones Index of 1,779 thousand acre-feet ("TAF") under the 50% exceedance forecast,[12] the minimum flows at Vernalis under Action IV.2.1 will be those required to meet the D-1641 requirements or 3,000 cfs, whichever is greatest. Gov't Salmon Ex. 55 at ¶5. Additionally, flows at Vernalis are anticipated to be less than 6,000 cfs in April and May 2010, which means that combined exports will likely be limited to 1,500 cfs in April and May when Action IV.2.1 controls. Gov't Salmon Ex. 55 at ¶5; SLDMWA Ex. 105 at 642.

168. Action IV.2.1 began affecting pumping and water supply allocations beginning April 1. 4/6/10 Tr. 188:11-14. Terry Erlewine, General Manager of the State Water Contractors, estimated that from April 1 through April 5, 2010 SWP and CVP experienced a loss of exports of approximately 50,000 acre feet. 4/6/10 Tr. 188:18-19. He also estimated that the two Projects would incur

[12] Reclamation only can estimate what will be controlling CVP operations in the future. 4/1/10 Tr. 204:5-7. The degree of certainty in predicting what will control Project operations, particularly in the winter and spring, declines rapidly past two or three days. *Id.* at 204:7-9. Reclamation uses DWR's monthly run-off forecasts to develop monthly 50% and 90% exceedance forecasts of CVP operations. *Id.* at 206:13-207:15.

additional losses of approximately 50,000 acre feet, or more, during the months of April and May 2010, as a result of the 2009 Salmonid and 2008 Delta Smelt BiOps. 4/6/10 Tr. 196:19-21; 199:10-16, 23; SWC Ex. 939.

169. The 2009 Salmonid BiOp estimates that, on average, Action IV.2.1 could reduce monthly exports by 73 percent in April and 67 percent in May. SLDMWA Ex. 105, App. 5 at 44. NMFS has acknowledged that these reductions are in addition to the reductions mandated under the 2008 Delta Smelt BiOp. *Id.* at 60. If Action IV.2.1, Action IV.2.3, or the 2008 Delta Smelt BiOp RPA are enjoined, Reclamation expects to increase CVP water supply allocations in May and June. 4/1/10 Tr. 213:14-20.

b. Water Supply Impacts of Action IV.2.3.

170. Action IV.2.3 began controlling Reclamation's and DWR's operation of the CVP and SWP, respectively, on January 20, 2010. 4/1/10 Tr. 199:8-9; Gov't Salmon Ex. 5 at ¶6. This restriction lasted until January 27, 2010. *Id.* at 199:11-13; Gov't Salmon Ex. 5 at ¶6. From January 27, 2010 through February 5, 2010, Action IV.2.3 required OMR flow reductions which, in turn, required Reclamation to restrict its pumping at the CVP's Jones Pumping Plant to approximately 3,300 cfs. Gov't Salmon Ex. 5 at ¶6.

On February 6, 2010, Reclamation increased pumping at the Jones Pumping Plant to approximately 4,200 cfs in order to comply with the temporary restraining order granted on February 5, 2010. Gov't Salmon Ex. 5 at ¶6. On February 10, 2010, the OMR requirement for the 2008 Smelt BiOp began controlling operation of the pumping facilities. 4/1/10 Tr. 200:6-10.

171. From February 19 through March 15, 2010, NMFS and FWS independently made flow recommendations of -5,000 cfs for OMR flow targets, in order to comply with Action IV.2.3 and the 2008 Delta Smelt BiOp, respectively. 4/1/10 Tr. 200:5-7; Gov't Salmon Ex. 5 at ¶8.

172. San Luis Plaintiffs estimate that for every day that Action IV.2.3 controls under a -5,000 cfs limit, Reclamation's pumping output is reduced by 500 cfs per day. TRO Decision at 14:8-15. Mr. Erlewine estimates that losses to the combined projects between January 20 and January 26, 2010 exceeded 90,000 acre-feet ("AF"), and combined losses from January 27 through February 5, 2010 were approximately another 100,000 AF. TRO Decision at 14:19-22; TR 4/6/10 183:14-15; SWC Ex. 903. It has been reocognized that even if estimates of loss by Thomas Boardman and Erlewine "are so excessive that they double actual loss, the figures are still significant." TRO

Decision at 15:1-4.

c. Other Facts Relevant to Water Supply Impacts.

173. It is undisputed that even in the absence of the RPAs, the quantity of exportable water is still subject to regulation, e.g. under Decision 1641. 4/6/10 Tr. 184-185. However, the quantity of exportable water has been reduced by the implementation of the salmonid and smelt RPAs. *Id.* From January 20 through March 24, 2010, Mr. Erlewine testified that potential and actual exports were diminished by 522,561 acre feet, of which a 433,000 AF loss was attributable to the SWP and a 89,000 AF loss was attributable to the CVP. 4/6/10 Tr. 185:16-19; SWC Demonstrative Ex. 903.

174. DWR made its initial water supply allocation announcement on November 30, 2009, allocating five percent of Table A contracted amounts for SWP water contractors. 4/6/10 Tr. 240:16-22; SWC Ex. 923, Ex. B. As of March 30, 2010, DWR increased the SWP allocation for 2010 to a 20% allocation. 4/6/10 Tr. 189:15-17; SWC Ex. 938; 4/1/10 Tr. 249:22-25.

175. Reclamation announced its initial allocation of CVP water on February 26, 2010. Fed. Salmon Ex. 55 at ¶1. Under the 90% exceedance forecast, Reclamation allocated CVP agricultural users 5% of their contract

amounts, and CVP municipal and industrial ("M&I") contractors 55% of their contract amounts. Fed. Salmon Ex. 55 at ¶12. Under the 50% exceedance forecast, north-of-Delta agricultural and M&I contractors would receive 100% of their contract amounts, while south-of-Delta agricultural contractors would receive 30% and M&I contractors 75%. *Id.*

176. CVP water users faced similar reductions to their individual allocations. Farmers on the west side of the San Joaquin Valley have received reduced CVP water supply allocations in the 2007-2008, 2008-2009, and 2009-2010 water years, and face similar reductions in 2010-2011. SLDMWA Ex. 153 at ¶3; SLDMWA Ex. 154 at ¶4; SLDMWA Ex. 156 at ¶4. In 2007-2008, Reclamation allocated to Westlands 40% of its contract supply. In 2008-2009, that allocation was 10%. SLDMWA Ex. 155 at ¶8. For the 2009-2010 water year, Westlands was advised the initial allocation was zero percent. SLDMWA Ex. 155 at ¶9.

177. On March 16, 2010, Reclamation announced an increase in allocations, raising the allocation for south-of-Delta agricultural users to 25% under a 90% forecast and 30% under a 50% forecast. 4/1/10 Tr. 210:14-22; Gov't Salmon Exh. 13.

178. Judicial notice is taken of the fact that as of

April 1, 2010, CVP water supply allocations to south-of Delta agricultural contractors were increased from 25% to 30%. *See* Doc. 318-2 (U.S. Department of the Interior Press Release). On April 23, 2010, DWR increased its allocation of SWP deliveries to 30%. *See* Doc. 323-2 (DWR Press Release). This does not alter the fact that water deliveries will likely increase if the two RPAs are enjoined. 4/1/10 Tr. 213:14-20 (acknowledging that deliveries would increase by 5% - 10% if the RPAs were enjoined).

179. The quantity of water lost through pumping reductions translates directly into water losses for urban and agricultural water users. In the SWP service area, one acre-foot of water serves about five to seven people for one year. 4/6/10 Tr. 186:25 - 187:1-3. The SWP loss of 433,000 AF, if available to urban users, would have supplied approximately 2.6 million people for one year. 4/6/10 Tr. 187:8-11. Seventy-five to eighty-five percent of SWP supply is provided for urban uses, with the remainder provided to agricultural users. 4/6/10 Tr. 187:15-17. The Metropolitan Water District of Southern California alone serves approximately 20 million urban users.

180. Water loss for agricultural users results in

reduction in the number of acres that may be sustained with actual water supply. Water duty is the amount of water that a crop needs per acre for a growing season. 4/6/10 Tr. 187:21-22. DWR information indicates that for the SWP service area, the water duty is approximately three AF per acre. 4/6/10 Tr. 187:22-25. If the 433,000 AF were withheld from almond crops, for example, almond production would be reduced by approximately 140,000 acres. 4/6/10 Tr. 188:1-4.

181. Reduced CVP and SWP water supply allocations have increased the cost of supplemental water. Farmers have been forced to purchase supplemental water at drastically increased cost. SLDMWA Ex. 154 at ¶7, SLDMWA Ex. 155 at ¶17, SLDMWA Ex. 156 at ¶6. Since 2007, the cost of securing supplemental water has more than tripled. SLDMWA Ex. 156 at ¶6; SLDMWA Ex. 154 at ¶7. As of January 2010, the cost for buying replacement water for transfer in a dry year is at least $300 per acre foot, plus transportation costs. SLDMWA Ex. 157 at ¶12.

182. Increased water allocations may lessen this increased cost, and will mitigate anticipated harms from reduced water allocations. Farmers anticipate that increased water allocations would mitigate anticipated damage to crops in proportion to the amount of water

received and prevent further layoffs of farm employees. SLDMWA Ex. 156 at ¶10.

183. In 2009, the Department of the Interior accounted for actions taken under the Delta smelt biological opinion, including federal export reductions, as (b)(2) actions, pursuant to section 3406(b)(2) of the CVPIA. 4/1/10 Tr. 213:24-214:2. In 2010, the Department of the Interior intends to follow the same accounting allocation for federal export reductions related to both biological opinions, to the extent that (b)(2) assets are available at the time the action is taken. *Id.* at 214:3-7.

(2) Other Resource Impacts Caused or Exacerbated by the 2009 Salmonid BiOp RPA Actions.

184. Plaintiffs attribute a number of other human impacts to reductions in the water supply. There is considerable dispute among the parties regarding the extent to which the 2009 Salmonid BiOp RPA Actions are responsible for a number of other impacts. It is undisputed that these RPA Actions are, at the very least, exacerbating the following impacts.

(1) Permanent Crops.

185. Reductions in the quantity of water supply deliveries have resulted in changes to farming practices,

including an increased reliance on permanent crops. SLDMWA Ex. 154 at ¶6; SLDMWA Ex. 155 at ¶¶ 18, 22; SLDMWA Ex. 157 at ¶11.

186. Permanent crops place farmers at greater risk than row crops, as farmers cannot cut back on the water to permanent crops without destroying them. SLDMWA Ex. 154 at ¶6; SLDMWA Ex. 155 at ¶¶ 18, 22; SLDMWA Ex. 157 at ¶11.

(2) Fallowed Lands.

187. Because of reduced water forecasts and uncertainty regarding future water supply, farmers have fallowed hundreds and thousands of acres of fields. SLDMWA Ex. 155 at ¶10; SLDMWA Ex. 153 at ¶3; SLDMWA Ex. 156 at ¶5.

188. Fallowed lands and reduced water supply has caused the loss of thousands of acres of crops. Todd Allen, a third-generation farmer in Fresno County, was able to salvage and harvest only 40 acres of a wheat crop out of a total arable 616 acres on his farm in 2009. SLDMWA Ex. 153 at ¶3.

189. For every 1,000 AF of water lost by the San Luis Plaintiffs' member agencies, approximately 400 acres of land may remain out of production. SLDMWA Ex. 157 at ¶13.

190. Fallowing fields also negatively impacts the air quality of the San Joaquin Valley by increasing dust and particulate matter. SLDMWA Ex. 155 at ¶20. Reduced air quality in turn impairs major transportation routes through the valley. SLDMWA Ex. 155 at ¶20.

191. The commander of Lemoore Naval Air Station described increased bird-on-aircraft strikes attributable to land fallowing. 4/7/10 Tr. 213:20 - 214:6. Reclamation responded by allocating an emergency water supply to farms adjacent to Lemoore. *See id.* at 213.

(3) Lack of Access to Credit.

192. The more unreliable the water supply, the more difficult it is for farmers to secure necessary financing for their farming operations. SLDMWA Ex. 153 at ¶4; SLDMWA Ex. 154 at ¶13, SLDMWA Ex. 155 at ¶26, SLDMWA Ex. 156 at ¶7, SLDMWA Ex. 157 at ¶15. In some cases, lenders deny loan applications because of a lack of reliable water supply. SLDMWA Ex. 153 at ¶4; SLDMWA Ex. 154 at ¶13, SLDMWA Ex. 155 at ¶26, SLDMWA Ex. 156 at ¶7, SLDMWA Ex. 157 at ¶15. In others, lenders' concerns about availability to lands irrigated by federally-supplied water has required farmers to make a 50 percent down payment to secure any loans. SLDMWA Ex. 156 at ¶7.

(4) Social Disruption and Dislocation.

193. It is undisputed that farm employees and their families have faced devastating losses due to reductions in the available water supply. The impact on the farm economy from the combination of a three-year drought and diversion limitations relating to the delta smelt has already been severe. SLDMWA Ex. 157 at ¶14.

194. Lost water supply has decreased the number of productive agricultural acres, which has resulted in reductions in employee hours, salaries, and positions, devastating farm employees and their families. SLDMWA Ex. 154 at ¶11, SLDMWA Ex. 156 at ¶8.

195. The removal of 250,000 acres from production translates to a loss of approximately 4,200 permanent agricultural worker positions. SLDMWA Ex. 155 at ¶19. Water shortages also cause jobs to be lost in agriculture-related businesses, such as packing sheds, processing plants, and other related services. *Id.* The projected agriculture-related wage loss for the San Joaquin Valley stands at $1.6 billion. *Id.*

196. Dr. Michael, Defendant Intervenors' economist with expertise in regional and environmental economics, counters that "[a]lthough water impacts have affected parts of the west side, there is no evidence that reduced

water deliveries have had a severe effect on farm or non-farm employment in the Central Valley as a whole." D-I Exh. 1006 (Michael Decl.) ¶10. Instead, it is a combination of factors, including the three-year drought, the global economic recession, the foreclosure crisis, and the collapse of the real estate market and construction industry, that are mainly driving crop and job losses, food bank needs, and credit problems in the Central Valley—not RPA Action IV.2.1. *Id.* at ¶¶ 6-10. Dr. Michael estimates that ESA-related pumping restrictions have resulted in the loss of less than 2,000 jobs. *See id.* at ¶4.

197. Unemployment has led to hunger on the west side of the San Joaquin Valley. SLDMWA Ex. 158 at ¶8. The Community Food Bank, serving Fresno, Madera and Kings Counties, estimates 435,000 people in the area it serves do not have a reliable source of food. SLDMWA Ex. 158 at ¶4. The Chief Executive Officer of the Community Food Bank, Dana Wilkie, believes that hunger in the communities served by the Food Bank in the western San Joaquin Valley will continue to increase in 2010 because of ongoing water shortages. SLDMWA Ex. 158 at ¶5. Ms. Wilkie understands that at least 42,000 people served by the Food Bank in October 2009 were employed by farm-

related businesses before losing their jobs. SLDMWA Ex. 158 at ¶8.

(5) Groundwater Consumption and Overdraft.

198. Reductions in the available water supply have caused water users to increase groundwater pumping in attempts to make up the difference between irrigation need and allocated water supplies. SLDMWA Ex. 155 at ¶¶ 4, 7; SLDMWA Ex. 157 at ¶10; 4/6/10 Tr. 216:6-7.

199. However, groundwater pumping is not always available, and cannot be used in all areas or for all crops. SLDMWA Ex. 155 at ¶11. Increased groundwater pumping reduces the quality of water applied to the soil by increasing soil salinity. SLDMWA *Id.* at ¶15. Not all fields and crops can be irrigated with groundwater. *Id.* at ¶¶ 11, 15.

200. Increased reliance on and overuse of groundwater has caused groundwater overdraft, which occurs when pumping exceeds the safe yield of an aquifer. *Id.* at ¶12. Overdraft causes increased land subsidence and potential damage to CVP conveyance facilities, *id.* at ¶¶ 12-13, although it is not clear that any subsidence of CVP facilities has occurred as a result of the implementation of the 2009 Salmonid BiOp RPA Actions, as the only reported incident of subsidence at a SWP

conveyance facility predates current implementation, 4/7/10 Tr. 16:1-13.

201. Increased groundwater pumping also increases demand for energy. SLDMWA Ex. 155 at ¶16. Due to the falling water table, wells require increased amounts of energy. *Id.* Westlands estimates that pumping of groundwater in 2009 required approximately 425,000,000 kWh. *Id.* Adverse environmental impacts are associated with such increased demand for and use of energy. *Id.*

202. Increased groundwater pumping has depleted groundwater reserves. Groundwater reserves that were at 2 million acre feet in the beginning of 2007 are now less than 900,000 AF. 4/6/10 Tr. 216:21-24. Within MWD's service area, storage levels are at 1.3 million AF, about half of normal storage levels. 4/6/10 Tr. 217:4-8.

b. Impacts of Decreased Salmonid Populations.

203. It is undisputed that declines in salmon populations have caused harm to other residents of California, predominantly the salmon fishing industry, although the extent to which the Projects should be assigned the blame for such harms and the extent to which the RPA Actions will alleviate these harms is a matter of considerable dispute.

(1) Impacts on the Commercial and Recreational Salmon Fishing Industries

204. Mr. Zeke Grader, Executive Director of Defendant-Intervenor Pacific Coast Federation of Fishermen's Associations ("PCFFA"), testified that the commercial fishing industry has suffered tremendous losses as a result of the near total collapse of California's salmon fishery, which precipitated a shutdown of the salmon fishing seasons in 2008 and 2009 and threatens another shutdown in the future. D-I Ex. 1007 (Supp. Declaration of William F. "Zeke" Grader) ¶¶ 5, 8. The fall-run (a non-listed species) collapse is believed to have been brought about by a combination of environmental stressors in the Delta, including reduced flows, water temperature, predation, and non-native species, as well as declining ocean conditions. *Id.* at ¶5; *see also* 3/31/10 Tr. 127:22-128:10.

205. The evidence establishes that the costs of these closures are substantial: the 2008-2009 closures cost the states of California, Oregon, and Washington approximately 4,200 jobs and well over $500 million. *See id.* ¶7, Att. 3; *see also* D-I Ex. 1006 at ¶14.

206. According to Mr. Stuart, fall-run Chinook emigrate through the Delta during the same time period as Central Valley steelhead (April and May). 3/31/10 Tr.

128:17-18. The BiOp notes, "[m]any RPA actions intended to avoid jeopardy to listed winter-run and spring-run, or adverse modification of their critical habitat, are also expected to reduce adverse effects of the action on the short- and long-term abundance and the long-term viability of non-listed fall-run and late-fall run." BiOp at 715. RPA Actions IV.2.1 and IV.2.3 are also designed to "reduce exposure of fall-run and late fall-run juveniles to export facilities and increase survival for fall-run leaving the San Joaquin River." *Id.* at 716, 717.

207. Reduced fall-run populations could lead to further closures in future seasons, which, according to Mr. Grader, "would have devastating effects on the commercial fishermen of PCFFA and likely would lead to additional job and income losses. Continued fishery closures threaten the long term viability of the salmon fishery, as the infrastructure and expertise that sustains the fishery is lost." D-I Ex. 1007 (Supp. Grader Decl.) ¶8.

208. Dr. Michael compared the economic impacts to the agricultural and salmon fishing industries and concluded that the "short-run economic impacts of the endangered species pumping restrictions and salmon fishery closure

are of a similar scale." D-I Exh. 1006 at ¶16.

c. Impacts On the Winnemem Wintu Tribe's Cultural Interests in Salmon

209. The Winnemem Wintu, a Native American tribe, also have significant interests in Sacramento River Chinook salmon that could be affected by injunctive relief against Actions IV.2.1 or IV.2.3. *See* D-I Ex. 1008 (Declaration of Gary Hayward Slaughter Mulcahy ("Mulcahy Decl.")) ¶¶ 2-3. The declaration of Gary Mulcahy demonstrates that, for centuries, salmon have sustained the Winnemem Wintu and have formed the foundation of the Tribe's cultural and spiritual ceremonies and beliefs. *Id.* at ¶3. However, like the salmon, the Tribe is "struggling to survive," in part due to the decline of native wild salmon and the dietary and health effects this has had on Tribal members. *Id.* at ¶5. In addition, the loss of native salmon runs has transformed the Winnemem Wintu's way of life, which once involved community celebrations, salmon bakes, and festivals, all centered around the salmon. *Id.* at ¶¶ 3, 6. The Winnemem Tribe's connection to salmon is so strong that they believe "that if the salmon go, the Winnemem Wintu will also disappear." *Id. at* ¶3.

210. To the extent that an injunction of either Action IV.2.1 or Action IV.2.3 would harm Sacramento

River Chinook salmon, as discussed above, it will threaten the significant cultural and spiritual interests of the Winnemem Wintu.

(3) Harm to Species.

211. The potential harms to the species of enjoining Action IV.2.1 and/or IV.2.3 are discussed above.

212. The NMFS's and related fish agencies continuing failure, after more than ten (10) years of disputes, to acquire credible and reliable species population figures, perform impact analyses in light of population levels, and develop appropriate population life-cycle models, with explicit knowledge that such data and modeling are generally accepted scientific methods in the field, is still unexplained, except that it is difficult to accomplish.

VI. CONCLUSIONS OF LAW

A. Jurisdiction.

1. Jurisdiction over claims brought under NEPA exists under 28 U.S.C. § 1331 (Federal Question) and the Administrative Procedure Act ("APA"), 5 U.S.C. § 702 et seq. Jurisdiction over the ESA claims exists under the ESA citizen-suit provision, 16 U.S.C. § 1540(g)(1)(A). Personal jurisdiction over all the parties exists by virtue of their participation in the lawsuit as

Plaintiffs, Defendants, and Intervenors.

B. Likelihood of Success on the Merits: NEPA Claim.

2. Plaintiffs have already succeeded on their NEPA claim. *See* Memorandum Decision Re Cross-Motions for Summary Judgment on NEPA Issues. Doc. 266.

3. NEPA insures that federal agencies "make informed decisions and 'contemplate the environmental impacts of [their] actions.'" *Ocean Mammal Inst. v. Gates*, 546 F. Supp. 2d 960, 971 (D. Hi. 2008) (quoting *Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1149 (9th Cir. 1998).

4. "NEPA emphasizes the importance of coherent and comprehensive up-front environmental analysis to insure informed decision-making to the end that the agency will not act on incomplete information, only to regret its decision after it is too late to correct." *Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1166 (9th Cir. 2003).

5. The agencies' violations of NEPA prevented the required reasonable evaluation, analysis, "hard look at," and disclosure of the harms and damage of implementing the 2009 Salmonid BiOp RPA Actions to human health and safety, the human environment and other environments not inhabited by the Listed Species.

6. Harms that have been caused by RPA water supply reductions include but are not limited to: destruction of permanent crops; fallowed lands; increased groundwater consumption; land subsidence; reduction of air quality; destruction of family and entity farming businesses; and social disruption and dislocation, such as increased property crimes and intra-family crimes of violence, adverse effects on schools, and increased unemployment leading to hunger and homelessness.

7. Where a federal agency takes action in violation of NEPA, "that action will be set aside." *High Sierra Hikers Ass'n v. Blackwell*, 390 F.3d 630, 640 (9th Cir. 2004).

8. However, a court may not issue an injunction under NEPA that would cause a violation of other statutory requirements, such as those found in section 7 of the ESA. *See United States v. Oakland Cannabis Buyers' Coop.*, 532 U.S. 483, 497 (2001) ("A district court cannot, for example, override Congress' policy choice, articulated in a statute, as to what behavior should be prohibited"). Nor should an injunction issue under NEPA when enjoining government action would result in more harm to the environment than denying injunctive relief. *Save Our Ecosystems v. Clarke*, 747 F.2d 1240,

1250 (9th Cir. 1984); *Am. Motorcyclist Ass'n v. Watt*, 714 F.2d 962, 966 (9th Cir. 1983) (holding public interest does not favor granting an injunction where "government action allegedly in violation of NEPA might actually jeopardize natural resources"); *Alpine Lakes Prot. Soc'y v. Schlapfer*, 518 F.2d 1089, 1090 (9th Cir. 1975) (denying injunctive relief in NEPA case where more harm could occur to forest from disease if injunction was granted).

C. Likelihood of Success on ESA Claims.

(1) Legal Standards.

9. The Administrative Procedure Act ("APA") requires Plaintiffs to show that NMFS's action was "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A).

a. Record Review.

10. A court reviews a biological opinion "based upon the evidence contained in the administrative record." *Arizona Cattle Growers' Ass'n v. FWS*, 273 F.3d 1229, 1245 (9th Cir. 2001). Judicial review under the APA must focus on the administrative record already in existence, not some new record made initially in a reviewing court. Parties may not use "post-decision information as a new

rationalization either for sustaining or attacking the agency's decision." *Ass'n of Pac. Fisheries v. EPA*, 615 F.2d 794, 811-12 (9th Cir. 1980).

11. Exceptions to administrative record review for technical information or expert explanation make such evidence admissible only for limited purposes, and those exceptions are narrowly construed and applied. *Lands Council v. Powell*, 395 F.3d 1019, 1030 (9th Cir. 2005).

12. Here, the Court has considered expert testimony only for explanation of technical terms and complex subject matter beyond the Court's knowledge; to understand the agency's explanations, or lack thereof, underlying the RPA Actions; and to determine if any bad faith existed.

b. Deference to Agency Expertise.

13. The Court must defer to the agency on matters within the agency's expertise, unless the agency completely failed to address some factor, consideration of which was essential to making an informed decision. *Nat'l Wildlife Fed'n v. NMFS*, 422 F.3d 782, 798 (9th Cir. 2005). The court "may not substitute its judgment for that of the agency concerning the wisdom or prudence of the agency's action." *River Runners for Wilderness v. Martin*, 539 F.3d 1064, 1070 (9th Cir. 2009).

> In conducting an APA review, the court must determine whether the agency's decision is "founded on a rational connection between the facts found and the choices made ... and whether [the agency] has committed a clear error of judgment." *Ariz. Cattle Growers' Ass'n v. U.S. Fish & Wildlife*, 273 F.3d 1229, 1243 (9th Cir. 2001). "The [agency's] action ... need be only a reasonable, not the best or most reasonable, decision." *Nat'l Wildlife Fed. v. Burford*, 871 F.2d 849, 855 (9th Cir. 1989).

Id.

14. Although deferential, judicial review under the APA "is designed to ensure that the agency considered all of the relevant factors and that its decision contained no clear error of judgment." *Arizona v. Thomas*, 824 F.2d 745, 748 (9th Cir. 1987) (internal citations omitted). "The deference accorded an agency's scientific or technical expertise is not unlimited." *Brower v. Evans*, 257 F.3d 1058, 1067 (9th Cir. 2001) (internal citations omitted). Deference is not owed when "the agency has completely failed to address some factor consideration of which was essential to making an informed decision." *Id.* (internal citations and quotations omitted).

> [An agency's decision is] arbitrary and capricious if it has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.

Motor Vehicle Mfrs. Ass'n of U.S. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983); *see also Citizens*

to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 416 (1971) ("A reviewing court may overturn an agency's action as arbitrary and capricious if the agency failed to consider relevant factors, failed to base its decision on those factors, and/or made a clear error of judgment.").

c. General Obligations Under the ESA.

15. ESA Section 7(a)(2) prohibits agency action that is "likely to jeopardize the continued existence" of any endangered or threatened species or "result in the destruction or adverse modification" of its critical habitat. 16 U.S.C. § 1536(a)(2).

16. To "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02; *see also Nat'l Wildlife Fed'n v. NMFS*, 524 F.3d 917 (9th Cir. 2008) ("*NWF v. NMFS II*") (rejecting agency interpretation of 50 C.F.R. § 402.02 that in effect limited jeopardy analysis to survival and did not realistically evaluate recovery, thereby avoiding an interpretation that reads the provision "and recovery"

entirely out of the text). An action is "jeopardizing" if it keeps recovery "far out of reach," even if the species is able to cling to survival. *Id.* at 931.

17. "[A]n agency may not take action that will tip a species from a state of precarious survival into a state of likely extinction. Likewise, even where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm." *Id.* at 930.

18. To satisfy this obligation, the federal agency undertaking the action (the "action agency") must prepare a "biological assessment" that evaluates the action's potential impacts on species and species' habitat. 16 U.S.C. § 1536(c); 50 C.F.R. § 402.12(a).

19. If the proposed action "is likely to adversely affect" a threatened or endangered species or adversely modify its designated critical habitat, the action agency must engage in "formal consultation" with NMFS to obtain its biological opinion as to the impacts of the proposed action on the Listed Species. 16 U.S.C. § 1536(a)(2), (b)(3); *see also* 50 C.F.R. § 402.14(a), (g). Once the consultation process has been completed, NMFS must give the action agency a written biological opinion "setting forth [NMFS's] opinion, and a summary of the information

on which the opinion is based, detailing how the agency action affects the species or its critical habitat." 16 U.S.C. § 1536(b)(3)(A); *see also* 50 C.F.R. § 402.14(h).

20. If NMFS determines that jeopardy or destruction or adverse modification of critical habitat is likely, NMFS "shall suggest those reasonable and prudent alternatives which [it] believes would not violate subsection (a)(2) of this section and can be taken by the Federal agency or applicant in implementing the agency action." 16 U.S.C. § 1536(b)(3)(A). "Following the issuance of a 'jeopardy' opinion, the agency must either terminate the action, implement the proposed alternative, or seek an exemption from the Cabinet-level Endangered Species Committee pursuant to 16 U.S.C. § 1536(e)." *National Ass'n of Home Builders v. Defenders of Wildlife*, 551 U.S. 644, 652 (2008).

d. Best Available Science.

21. Under the ESA, an agency's actions must be based on "the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(g)(8) ("In formulating its Biological Opinion, any reasonable and prudent alternatives, and any reasonable and prudent measures, the Service will use the best scientific and commercial data available."). "The obvious purpose of

the [best available science requirement] is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise." *Bennett v. Spear*, 520 U.S. 154, 176 (1997). A failure by the agency to utilize the best available science is arbitrary and capricious. *See Gutierrez II*, 606 F. Supp. 2d at 1144.

22. A decision about jeopardy must be made based on the best science available at the time of the decision; the agency cannot wait for or promise future studies. *See Ctr. for Biological Diversity v. Rumsfeld*, 198 F. Supp. 2d 1139, 1156 (D. Ariz. 2002).

23. The "best available science" mandate of the ESA sets a basic standard that "prohibits the [agency] from disregarding available scientific evidence that is in some way better than the evidence [it] relies on." *Am. Wildlands v. Kempthorne*, 530 F.3d 991, 998 (D.C. Cir. 2008) (citation omitted).

24. What constitutes the "best" available science implicates core agency judgment and expertise to which Congress requires the courts to defer; a court should be especially wary of overturning such a determination on review. *Baltimore Gas & Elec. Co. v. Natural Res. Defense Council*, 462 U.S. 87, 103 (1983) (a court must be "at its most deferential" when an agency is "making

predictions within its area of special expertise, at the frontiers of science"). As explained by the en banc panel of the Ninth Circuit in *Lands Council*, 537 F.3d at 993, courts may not "impose on the agency their own notion of which procedures are best or most likely to further some vague, undefined public good." *Id.* In particular, an agency's "scientific methodology is owed substantial deference." *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv.*, 378 F.3d 1059, 1066 (9th Cir. 2004).

25. This deference extends to the use and interpretation of statistical methodologies. As explained by the D.C. Circuit in *Appalachian Power Co. v. EPA*, 135 F.3d 791 (D.C. Cir. 1998), in reviewing a challenge to a decision of the Environmental Protection Agency ("EPA") under the "arbitrary and capricious" standard of review:

> Statistical analysis is perhaps the prime example of those areas of technical wilderness into which judicial expeditions are best limited to ascertaining the lay of the land. Although computer models are "a useful and often essential tool for performing the Herculean labors Congress imposed on EPA in the Clean Air Act," [citation] their scientific nature does not easily lend itself to judicial review. Our consideration of EPA's use of a regression analysis in this case must therefore comport with the deference traditionally given to an agency when reviewing a scientific analysis within its area of expertise without abdicating our duty to ensure that the application of this model was not arbitrary.

Id. at 802.

26. More generally, "[w]hen specialists express conflicting views, an agency must have discretion to rely on the reasonable opinions of its own qualified experts even if, as an original matter, a court might find contrary views more persuasive." *Lands Council*, 537 F.3d at 1000 (quoting *Marsh v. Oregon Natural Res. Council*, 490 U.S. 360, 378 (1989)).

27. Mere uncertainty, or the fact that evidence may be "weak," is not fatal to an agency decision. *Greenpeace Action v. Franklin*, 14 F.3d 1324, 1337 (9th Cir. 1992) (upholding biological opinion, despite uncertainty about the effectiveness of management measures, because decision was based on a reasonable evaluation of all available data); *Nat'l Wildlife Fed'n v. Babbitt*, 128 F. Supp. 2d 1274, 1300 (E.D. Cal. 2000) (holding that the "most reasonable" reading of the best scientific data available standard is that it "permits the [FWS] to take action based on imperfect data, so long as the data is the best available").

28. The deference afforded under the best available science standard is not unlimited. For example, *Tucson Herpetological Society v. Salazar*, 566 F.3d 870, 879 (9th Cir. 2009), held that an agency may not rely on

"ambiguous studies as evidence" to support findings made under the ESA. Because the studies did not lead to the conclusion reached by FWS, the Ninth Circuit held that these studies provided inadequate support in the administrative record for the determination made by FWS. *Id.; see also Rock Creek Alliance v. U.S. Fish & Wildlife Service*, 390 F. Supp. 2d 993 (D. Mont. 2005) (rejecting FWS's reliance on a disputed scientific report, which explicitly stated its analysis was not applicable to the small populations addressed in the challenged opinion); *Greenpeace v. NMFS*, 80 F. Supp. 2d 1137, 1149-50 (W.D. Wash. 2000) (where agency totally failed to develop any projections regarding population viability, it could not use as an excuse the fact that relevant data had not been analyzed).

29. The presumption of agency expertise may be rebutted if the agency's decisions, although based on scientific expertise, are not reasoned. *Greenpeace*, 80 F. Supp. 2d at 1147. Agencies cannot disregard available scientific evidence better than the evidence on which it relies. *Kern County Farm Bureau v. Allen*, 450 F.3d 1072, 1080 (9th Cir. 2006); *S.W. Ctr. for Biological Diversity v. Babbitt*, 215 F.3d 58, 60 (D.C. Cir. 2000).

30. Courts routinely perform substantive reviews of

record evidence to evaluate the agency's treatment of best available science. The judicial review process is not one of blind acceptance. *See, e.g., Kern County*, 450 F.3d 1072 (thoroughly reviewing three post-comment studies and FWS's treatment of those studies to determine whether they "provide[d] the sole, essential support for" or "merely supplemented" the data used to support a listing decision); *Home Builders Ass'n of N. Cal. v. U.S. Fish and Wildlife Serv.*, 529 F. Supp. 2d 1110, 1120 (N.D. Cal. 2007) (examining substance of challenge to FWS's determination that certain data should be disregarded); *Trout Unlimited v. Lohn*, 645 F. Supp. 2d 929 (D. Or. 2007) (finding best available science standard had been violated after thorough examination of rationale for NMFS's decision to withdraw its proposal to list Oregon Coast Coho salmon); *Oceana, Inc. v. Evans*, 384 F. Supp. 2d 203, 217-18 (D.D.C. 2005) (carefully considering scientific underpinnings of challenge to Service's use of a particular model, including post decision evidence presented by an expert, to help the court understand a complex model, applying one of several record review exceptions articulated in *Esch v. Yeutter*, 876 F.2d 976, 991 (D.C. Cir. 1989), which are similar to those articulated by the Ninth Circuit).

31. Courts are not required to defer to an agency conclusion that runs counter to that of other agencies or individuals with specialized expertise in a particular technical area. *See, e.g., Am. Turnboat Ass'n v. Baldrige*, 738 F.2d 1013, 1016-17 (9th Cir. 1984) (NMFS's decision under the Marine Mammal Protection Act was not supported by substantial evidence because agency ignored data that was product of "many years' effort by trained research personnel"); *Sierra Club v. U.S. Army Corps of Eng'rs*, 701 F.2d 1011, 1030 (2d Cir. 1983) ("court may properly be skeptical as to whether an EIS's conclusions have a substantial basis in fact if the responsible agency has apparently ignored the conflicting views of other agencies having pertinent experience[]") (internal citations omitted). Here, DWR has a scientifically-based, contrary view of the science, has considered the economic consequences of the RPA Actions, and has intervened to protect humans and the human environment. A court should "reject conclusory assertions of agency 'expertise' where the agency spurns unrebutted expert opinions without itself offering a credible alternative explanation." *N. Spotted Owl v. Hodel*, 716 F. Supp. 479, 483 (W.D. Wash. 1988) (citing *Am. Turnboat Ass'n*, 738 F.2d at 1016).

32. In *Conner v. Burford*, 848 F.2d 1441, 1453-54 (9th Cir. 1988), the agency attempted to defend its biological opinions by arguing that there was a lack of sufficient information. In rejecting this defense, the court held that "incomplete information about post-leasing activities does not excuse the failure to comply with the statutory requirement of a comprehensive biological opinion using the best information available," and it noted that FWS could have completed more analysis with the information that was available. *Id.* at 1454 (emphasis added). The Ninth Circuit stated:

> In light of the ESA requirement that the agencies use the best scientific and commercial data available ... the FWS cannot ignore available biological info or fail to develop projections of oil and gas activities which may indicate potential conflicts between development and the preservation of protected species. We hold that the FWS violated the ESA by failing to use the best information available to prepare comprehensive biological opinions.

848 F.2d at 1454 (emphasis added).

(2) Environmental Baseline.

33. Plaintiffs argue that the BiOp is flawed because NMFS improperly attributed negative effects to the Project that should have been included in the environmental baseline. Doc. 164 at 10-16.

34. The relevant regulatory definition of the "environmental baseline" is provided within the

definition of the "effects of the action":

> the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process.

50 C.F.R. § 402.02.

35. When determining the "effects of the action," the agency first must evaluate the status of the species or critical habitat, which will involve "consideration of the present environment" in which the species or habitat exists as well as "the environment that will exist when the action is completed, in terms of the totality of factors affecting the species or critical habitat." 51 Fed. Reg. 19,926, 19,932 (June 3, 1986). This evaluation is to serve as the "baseline" for determining the effects of the action on the species or critical habitat. *Id.* However, it is all evaluated together as the "effects of the action."

36. If additional data would provide a better information base from which to formulate a biological opinion, the Director may request an extension of formal

consultation and that the action agency obtain additional data to determine how or to what extent the action may affect listed species or critical habitat. 50 C.F.R. § 402.14(f); U.S. Fish and Wildlife Service and National Marine Fisheries Service, Endangered Species Consultation Handbook (March 1998) at 4-6.[13]

37. The Ninth Circuit directed NMFS to consider the effects of its actions "within the context of other existing human activities that impact the listed species." *NWF v. NMFS II*, 524 F.3d at 930. "[T]he proper baseline analysis is not the proportional share of responsibility the federal agency bears for the decline in the species, but what jeopardy might result from the agency's proposed actions in the present and future human and natural contexts." *Id.* The relevant jeopardy analysis is whether this Project will tip a species into a state of "likely extinction." 524 F.3d at 930.

> Even under the so-called aggregation approach NMFS challenges, then, an agency only "jeopardize[s]" a species if it causes some new jeopardy. An agency may still take action that removes a species from jeopardy entirely, or that lessens the degree of jeopardy. However, an agency may not take action that will tip a species from a state of precarious survival into a state of likely extinction. Likewise, even where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm.

[13] Judicial notice may be taken of this Handbook, which is available at: http://www.fws.gov/endangered/consultations/s7hndbk/s7hndbk.htm.

> Our approach does not require NMFS to include the entire environmental baseline in the "agency action" subject to review. It simply requires that NMFS appropriately consider the effects of its actions "within the context of other existing human activities that impact the listed species." [citation]. This approach is consistent with our instruction (which NMFS does not challenge) that "[t]he proper baseline analysis is not the proportional share of responsibility the federal agency bears for the decline in the species, but what jeopardy might result from the agency's proposed actions in the present and future human and natural contexts." [citation].

Id. (footnote omitted).

38. The agency is not required to quantify and/or parcel out the "proportional share" of harms among the baseline and the proposed action. *See Pacific Coast Fed'n of Fishermen's Ass'ns v. U.S. Bureau of Reclamation*, 426 F.3d 1082, 1093 (9th Cir. 2005); *see also Pacific Coast Fed'n of Fishermen's Ass'ns v. U.S. Bureau of Reclamation*, 226 Fed. Appx. 715, 718 (9th Cir. 2007) (rejecting water users' argument that agency action must be the "historical cause" of the jeopardy to salmon). However, the record must reasonably demonstrate that the agency's proposed actions, when viewed in the present and future human and natural contexts, will cause jeopardy or adverse modification.[14]

[14] Plaintiffs' motion for preliminary injunction specifically addresses the treatment of hatcheries and gravel loss below Whiskeytown Dam. Doc. 164 at 11-12. However, this issue was not presented or discussed at the evidentiary hearing or in Plaintiffs' proposed findings. It appears that these specific arguments have

39. Here, Plaintiffs identify only two potential flaws in the environmental baseline in their Proposed Findings of Fact and Conclusions of Law, namely NMFS's general failure to segregate discretionary from non-discretionary actions, Doc. 316, Pltf's Proposed Findings of Fact ## 65-66, 80, and, more specifically, NMFS's failure to treat certain obligations arising under the Coordinated Operations Agreement ("COA") as "mandatory," *id.* at Proposed Findings of Fact ## 67-80.[15]

a. Treatment of Discretionary v. Non-Discretionary Operations.

40. Plaintiffs complain that the BiOp does not distinguish between discretionary and non-discretionary actions. *Home Builders*, 551 U.S. 644, held that ESA § 7's consultation requirements do not apply to non-discretionary actions. Where an agency is required by law to perform an action, it lacks the power to insure that the action will not jeopardize the species. *Id.* at 667.

41. However, *Home Builders* says nothing about whether, once section 7 consultation is triggered, the jeopardy analysis should segregate discretionary and non-

been abandoned.

[15] It is unclear whether Plaintiffs contend that all other stressors now jeopardizing the San Joaquin and Sacramento Rivers and the Delta are part of the Baseline and must not be considered cumulatively with the effects of coordinated Project operations.

discretionary actions, relegating the non-discretionary actions to the environmental baseline. *Home Builders* fundamentally concerns whether the section 7 consultation obligation attaches to a particular agency action at all. *See Home Builders*, 551 U.S. at 679-80 ("duty does not attach to actions... that an agency is required by statute to undertake....") (emphasis added).

b. Reclamation's Treatment of the Coordinated Operations Agreement.

The same reasoning applies to Plaintiffs' related argument that Federal Defendants acted unlawfully by attributing to the project the effects of "mandatory" compliance with the Coordinated Operations Agreement ("COA"). Even assuming, *arguendo,* that any mandatory obligation exists under the COA, a proposition that is questionable given the open-ended wording of the COA and language in the CVPIA subjecting project operations to the ESA, *Home Builders* does not require the agency to segregate discretionary from non-discretionary activities during an ESA § 7 consultation.[16] Moreover, this argument was not presented in Plaintiffs' opening brief. *See Alaska Ctr. for Envt. v. U.S. Forest Serv.*, 189 F.3d 851, 858 n. 4 (9th Cir. 1999) ("Arguments not raised in

[16] To the extent that Plaintiffs suggest that section 7 does not apply to the projects at all under *Home Builders*, this paradigm-shifting argument has not properly been raised or briefed.

opening brief are waived").

(3) Southern Resident Indirect Effects Analysis.

42. Plaintiffs raise another argument based on an alleged error in the effects analysis pertaining to the impacts of the projects on Southern Resident Killer whales. Doc. 164 at 16-19. While the parties briefed the issue, engaging in considerable debate over both the appropriate standard to be applied to indirect effects analyses and the sufficiency of the evidence cited in the record to support NMFS's conclusions, this issue was not a focus of the evidentiary hearing.

43. It is unnecessary to reach this issue because, even if, *arguendo*, Plaintiffs demonstrated a likelihood of success on this claim, the alleged deficiencies in the BiOp's analysis of impacts to orcas do not justify enjoining either RPA Action IV.2.1 or IV.2.3. An injunction must be "narrowly tailored" to give only the relief to which plaintiffs are entitled. *See Orantes-Hernandez v. Thornburgh*, 919 F.2d 549, 558 (9th Cir. 1990). Here, NMFS adopted Actions IV.2.1 and IV.2.3 primarily for the benefit of salmon, steelhead, and green sturgeon that migrate through the Delta and are harmed by export pumping that interferes with their migrations, not orcas which reside in the ocean. *See* 4/1/10 Tr. 184:4-17

(Action IV.2.3 was not designed with the objective to protect orcas or fall-run Chinook salmon). The indirect effect of alleged reductions of orca prey is not mentioned as a direct justification for either challenged RPA.

(4) Challenges to Action IV.2.1.

a. Viable Salmonid Population Methodology/ Population Modeling/ Life Cycle Analysis.

44. Plaintiffs' argument that NMFS failed to apply the VSP methodology in a sufficiently rigorous manner is unpersuasive. The BiOp did not ignore the VSP methodology. Rather, it chose to use VSP in a qualitative manner as a conceptual framework, as recommended by Lindley (2006). Although the analysis in the BiOp may have benefited from the application of quantitative VSP methodologies, it is disputed whether the failure to do so represents a breach of accepted scientific practice. A court must defer to the agency in such scientific disputes.

45. The agency is not required to generate new studies. For example, in *Southwest Center for Biological Diversity v. Babbitt*, 215 F.3d 58, 60-61 (D.C. Cir. 2000), the district court found the available evidence regarding FWS's decision not to list the Queen Charlotte goshawks "inconclusive" and held that the agency was

obligated to find better data on the species' abundance. The D.C. Circuit reversed, emphasizing that, although "the district court's view has a superficial appeal ... this superficial appeal cannot circumvent the statute's clear wording: The secretary must make his decision as to whether to list a species as threatened or endangered 'solely on the basis of the best scientific and commercial data available to him....' 16 U.S.C. § 1533(b)(1)(A)." *Id.* at 61. Requiring NMFS to adapt the VSP methodology to operate as a quantitative model would be the equivalent of requiring NMFS to generate data. The court has no authority to do so.

46. The same conclusion is required for Plaintiffs' contention that NMFS should have engaged in population modeling and/or life cycle analysis. Although such modeling is scientifically preferred, Plaintiffs presented no evidence that they, or anyone else, presented NMFS with <u>then-existing</u> best available science representing appropriate population or life cycle models for the species of concern prior to the issuance of the BiOp. Moreover, the primary purpose of Action IV.2.1 is to protect outmigrating juvenile members of the SSNDG of CV steelhead, for whom no population indices (whether absolute or relative) are available.

b. Correlation Between Exports and Effects on Salmonid Survival.

47. NFMS relied on a number of circumstances to support its general conclusion that salmonid survival in the interior Delta was adversely affected by export pumping.

a. The VAMP data demonstrated some observable negative impacts, but no statistically significant connection, albeit the lack of statistical significance was likely due to limitations in the data.

b. Figure 10 of Appendix 5 supports the conclusion that, at least when HORB is in place, there is an observable (but not statistically significant) negative relationship between survival and exports. Questions exist whether it is appropriate to rely on data collected when HORB was in place, given that HORB cannot be used under the Smelt BiOp. However, NMFS presented evidence that a workable substitute (the bubble barrier) for HORB will be utilized. Plaintiffs have not suggested the barrier would be inadequate.

c. Highly questionable support for the BiOp's conclusion that exports negatively influence survival derives from a comparison of exports and adult escapement two and a half years later, from 1951 through 2003. *See* BiOp App. 5 at Figure 11. All parties agreed that adult

escapement can be significantly influenced by factors such as ocean conditions and harvest. It is undisputed that Figure 11 did not adjust for these factors. However, NMFS relied on a conceptual model that suggests because ocean conditions and harvest were likely to fluctuate over time, long-term downward trends in population could be caused by declining freshwater conditions.

d. NMFS also relied extensively on Newman's 2008 analysis of the Delta Action 8 studies, which released coded-wire tagged salmon into Georgiana Slough and compared their survival to coded-wire tagged salmon released into the mainstem Sacramento River. Newman found a statistically significant, although weak, negative relationship between exports and salmonid survival.

e. There is no question that the remaining data connecting exports to reduced salmonid survival is not what NMFS represents it to be. Recognizing that "[w]hen specialists express conflicting views, an agency must have discretion to rely on the reasonable opinions of its own qualified experts even if, as an original matter, a court might find contrary views more persuasive," *Lands Council*, 537 F.3d at 1000 (quoting *Marsh*, 490 U.S. 360)

(emphasis added), deference is not required "where the agency offers an explanation for an action that runs counter to the evidence before the agency, *Tuscon Herpetological Society*, 566 F.3d at 878. NMFS did not just rely on "ambiguous studies." Rather, it uncritically examined the body of evidence, sometimes disregarding the express qualifications and reservations of independent studies, to reach the conclusion that the exports negatively impact salmonid survival. This conclusion, although not scientifically unassailable, has marginal support in the record.

48. NMFS's opinion that low Vernalis flow to export ratios threaten to appreciably increase the likelihood that the SSNDG of CV steelhead will become extinct is also based on incomplete and conflicting evidence. Although no absolute or relative population numbers are available for either the SSNDG or the entire ESU, it is undisputed that both are small and imperiled. It is also undisputed that, pursuant to the VSP approach, every extant population of the CV steelhead must be protected. All members of the SSNDG must pass through the interior Delta on their way to the ocean. As exports increase, their chances of survival decrease. On the whole, the record corroborates NMFS's conclusion that planned

project operations will jeopardize the CV steelhead.[17]

49. Other adverse impacts from toxics, invasive species, predators, in-Delta pumping, and other non-operational hazards were not compared with Project operations to determine the extent these other stressors contribute to the jeopardy to the species and their habitat.

c. Did NMFS Adequately Justify the Ratios Imposed?

50. The fundamental flaw in NMFS's justification of Action IV.2.1 is its selection of the specific ratios imposed under the Action. As discussed in the Findings of Fact, the record reveals no biological explanation why NMFS chose to impose a 1,500 cfs limit on exports when flows at Vernalis are lower than 6,000 cfs,[18] and a ratio of 4:1, as opposed to any other ratio, when Vernalis flows are between 6,000 cfs and 21,750 cfs. *Id.* at 71-72.

51. This is a quintessential example of arbitrary action. There is no way to know whether these levels are sufficiently protective, not protective enough, or far

[17] It is not necessary to now examine whether NMFS was justified in concluding that planned project operations during this time period will jeopardize any of the other Listed Species. Action IV.2.1 is designed primarily to aid CV steelhead.

[18] This 1,500 cfs limit is the minimum export level NMFS found necessary to maintain health and safety criteria. BiOp App. 5 at 22. At flows of 5,000 cfs, for example, the ratio would be 5,000/1,500 or approximately 3.33:1.

more protective than necessary.[19] Particularly in light of the enormous human impacts caused by even small changes in the flow regime reducing exports, the agency must provide a reasoned and scientifically justified basis for selecting the specific remedial measures chosen. They have failed to do so.

52. This conclusion is particularly justified in light of the concurrent NEPA violation. Had either NMFS or Reclamation performed a proper NEPA evaluation of the human and environmental impacts of the RPA Actions before implementing them, or if both NMFS and Reclamation had worked together to do so, this would have at least forced the agencies to fully consider and rationally balance the biological need for certain flow levels against the adverse water supply and resulting human impacts those restrictions effectuate.

53. There is insufficient record evidence to conclude what alternative flow/export ratio would be sufficiently protective of the SSNDG of CV steelhead, the population Action IV.2.1 was designed to protect. NMFS's scientifically justified conclusion that a low Vernalis flow to export ratio during the spring threatens to jeopardize CV steelhead makes it inappropriate to

[19] It may be scientifically justifiable to build a margin of error (i.e. to take a precautionary approach) when designing an RPA, but this must be properly justified and disclosed by the record.

completely remove any Vernalis flow to export ratio restriction. Plaintiffs offered no scientifically justifiable alternative except the unjustified argument there is no jeopardy caused by project operations and no evidence of peril to the species.

(5) Challenges to Action IV.2.3.

54. Action IV.2.3 operates from January 1 through June 15 or until the average daily water temperature at Mossdale is greater than 72° F, whichever is earlier. It limits OMR flows to no more negative than -2,500 to -5,000 cfs, depending on juvenile entrainment levels. BiOp at 648-52.

55. Plaintiffs and DWR only seek an injunction against the -5,000 cfs "calendar-based" ceiling.

a. Use of PTM for salmonids.

56. Although the PTM model, a hydrodynamic simulation used to assess the fait of particles as a function of flow, tides, project operations, and other factors, has shortcomings, it is an indicator of directions of river flows that salmonids follow, recognizing their strong swimming ability. NMFS relied on the PTM studies to support its conclusions that: (a) as exports increase, negative OMR flows also increase; and (b) that at Station 815 (the confluence of the

Mokelumne River and the San Joaquin River), particle entrainment increases as negative OMR flows increase. Above -5,000 cfs, 40% of particles injected at that station are entrained, while 90% are entrained at -7,000 cfs.

57. Although particles decidedly do not mirror the behavior of salmonid smolts, which move approximately 3.5 times faster, they provide a very rough approximation of salmonid behavior, one ground supporting NMFS's utilization of the PTM as part of its overall rationale for Action IV.2.1.

b. Salvage Data.

58. NMFS also relied on salvage data, which demonstrated that, as negative OMR flows increases, salvage increases, and that at some point more negative than -5,000 cfs, salvage increases much more rapidly than at lower levels.

59. The data utilized does not scale salvage to population size, an undisputed failure to use the best available scientific methods, at least with respect to the winter-run and spring-run, for which population data is available. Dr. Deriso opined that scaling salvage to population size is standard accepted practice in the field of fisheries science. Even from a lay perspective,

it is obvious that absolute salvage numbers vary depending on the size of the extant population. NMFS's reliance on comparisons of raw salvage numbers to negative OMR flow was clear scientific error and not the best available science.

60. Action IV.2.3 is also designed to protect CV steelhead, for which no population data is available. It is less certain whether NMFS could legitimately apply comparisons of raw salvage data to OMR flows to assess the impact of negative OMR flows on CV steelhead.

c. Delta Action 8 Studies.

61. As with Action IV.2.1, NMFS also relied extensively on Newman's 2008 analysis of the Delta Action 8 studies, which released coded-wire tagged salmon into Georgiana Slough. Newman found a statistically significant, although "weak," negative relationship between exports and salmonid survival.

62. There are additional concerns that, as to upper Sacramento River populations, NMFS failed to consider the relative number of fish that are exposed to conditions in the interior Delta, compared to those that remain in the mainstem of the Sacramento River. This critique is not relevant to NMFS's application of the Delta Action 8 Studies to those populations of CV steelhead and spring-

run that originate in the San Joaquin basin. For those populations, the Delta Action 8 studies support the conclusion that the higher the export levels, the lower the chance a salmonid smolt may survive to reach the ocean.

d. Perry & Skalski and Vogel.

63. Perry and Skalski (2008) concluded that survival of fish moving into Georgiana Slough and nearby channels was reduced compared to those in the mainstem of the Sacramento River. 4/1/10 Tr. 161:20-162:1. However, Perry and Skalski observed that "there is limited understanding of how water management actions in the Delta affect population distribution and route-specific survival of juvenile salmon." SDLMWA Ex. 227 at 3. Mr. Stuart admitted that Perry and Skalski 2008 did not address water project impacts on Delta hydrology, fish behavior, or the indirect mortality of fish in the central and southern channels of the Delta. Mr. Stuart further admitted that he reached his conclusions regarding water project impacts on Delta hydrology, fish behavior, and indirect salmonid mortality based upon his personal extrapolation from the data contained in Perry and Skalski 2008, and not from any conclusions reached by the study. 4/2/10 Tr. 19:2 - 21:24. The BiOp and Stuart

used Perry and Skalski (2008) to support a proposition that Perry and Skalski themselves disclaimed. The BiOp provides no explanation to justify this use of Perry and Skalski for this purpose, which is arbitrary and capricious.

64. A similar problem exists with the BiOp's reliance on the Vogel (2004) review of telemetry-tagging data to investigate fish route selection in the channels leading to the south Delta. *See* BiOp at 380-81. The BiOp used Vogel's work to find that when export levels were reduced and San Joaquin River flows were increased, more fish stayed in the main channel of the San Joaquin River, heading downstream toward the San Francisco Bay. *Id.* However, the Vogel study concluded its experiments "could not explain why some fish move off the mainstem of the San Joaquin River into the south Delta channels," noting that "[d]ue to the wide variation in hydrologic conditions" during the course of the experiments, "it was difficult to determine the principal factors affecting fish migration. Based on the limited data from these studies, it may be that a combination of a neap tide, reduced exports, and increased San Joaquin River flows is beneficial for outmigrating smolts, but more research is necessary." DWR Ex. 505 at 37 (emphasis added).

65. The BiOp's reliance on the Perry and Skalski and Vogel studies presents the same infirmities as in *Tucson Herpetological Society*, 566 F.3d at 879, where the FWS wrongfully "affirmatively relie[d] on ambiguous studies."

e. Does the Record Support NMFS's General Conclusion that Negative OMR Flows Appreciably Reduce Salmonid Smolts' Chances of Survival?

66. There are undeniable problems with NMFS's basis for Action IV.2.3. However, the Delta Action 8 studies support the proposition that, for those populations spawning entirely within the San Joaquin basin, increasing exports negatively impact salmonid smolt survival. The highly disputed PTM studies constitute the other colorable support for Action IV.2.3. In such a scientific dispute, deference is owed unless the Agency is unreasonably wrong.

f. Did NMFS Adequately Justify the Calendar-based -5,000 cfs Ceiling of Action IV.2.3?

67. The -5,000 cfs OMR ceiling is based, in large measure, on speculation. It is also based upon BiOp Figures that do not scale salvage to population size. This is not the best available science and is arbitrary and capricious.

(6) Reclamation's ESA Responsibility.

68. The ESA regulations require the action agency to

"determine whether and in what manner to proceed with the action in light of its section 7 obligations and the Service's biological opinion." 50 C.F.R. § 402.15(a). Prior to accepting and implementing the 2009 Salmonid BiOp RPA, Reclamation had an independent obligation under ESA section 7(a)(2) to ensure that it "use[d] the best scientific and commercial data available."

69. Reclamation, as the federal action agency, "may not rely solely on a FWS biological opinion to establish conclusively its compliance with its substantive obligations under section 7(a)(2)." *Pyramid Lake Paiute Tribe of Indians v. U.S. Dept. of the Navy*, 898 F.2d 1410, 1415 (9th Cir. 1990). "[T]he action agency must not blindly adopt the conclusions of the consultant agency." *City of Tacoma v. Fed. Energy Regulatory Comm'n*, 460 F.3d 53, 76 (D.C. Cir. 2006).

70. Reclamation did not ensure that the RPA utilized the best available science, nor did it independently identify and analyze alternative RPA Actions that minimized jeopardy to humans and the human environment while protecting threatened species.

D. Balancing of the Harms.

(1) Balancing of the Harms in ESA Cases.

71. The Supreme Court held in *TVA v. Hill*, 437 U.S.

153, 194 (1978), that Congress struck the balance in favor of affording endangered species the highest of priorities. In adopting the ESA, Congress intended to "halt and reverse the trend toward species' extinction, whatever the cost." *Id.* at 184 (emphasis added). *TVA v. Hill* continues to be viable. *See Home Builders*, 551 U.S. at 669-71; *see also Oakland Cannabis Buyers' Co-op.*, 532 U.S. 496-97; *Amoco Prod. Co. v. Village of Gambell*, 480 U.S. 531, 543 n.9 (1987).

72. *Winter* does not modify or discuss the *TVA v. Hill* standard.[20] Although *Winter* altered the Ninth Circuit's general preliminary injunctive relief standard by making that standard more rigorous, *Winter* did not address, nor change, the approach to the balancing of economic hardships where endangered species and their critical habitat are jeopardized. *See Biodiversity Legal Found. v. Badgley*, 309 F.3d 1166, 1169 (9th Cir. 2002) (Congress removed the courts' traditional equitable discretion to balance parties' competing interests in ESA injunction proceedings); *Nat'l Wildlife Fed'n v. Burlington N. R.R., Inc.*, 23 F.3d 1508, 1510-11 (9th Cir. 1994)(same).

73. Prior decisions involving the coordinated

[20] Although *Winter* involved ESA-listed species, the *Winter* decision did not address any ESA claims.

projects' operations found that *TVA v. Hill* and related Ninth Circuit authorities foreclose the district court's traditional discretion to balance equities under the ESA. There is no such bar in NEPA injunction proceedings.

74. Plaintiffs have advanced a human health and safety exception and contend that unlike any of the prior cases, this case juxtaposes species' survival against human welfare, requiring a balancing of the BiOp's threats of harm to humans, health, safety and protection of affected communities. No case, including *TVA v. Hill*, which concerned the competing economic interest in the operation of a hydro-electric project, expressly addresses whether the ESA precludes balancing of harms to humans and the human environment under the circumstances presented here.

75. Even if it is permissible to balance harm to humans and the human environment against Congress' stated desire to protect the Listed Species, doing so in practice is complicated by the harm caused to other human communities by the reduced abundance of salmonids, such as to the salmon fishing industry and the Winnemem Wintu Tribe.

76. This case is at the intersection of harm to threatened species and humans and their environment.

Congress has not nor does *TVA v. Hill* elevate species protection over the health and safety of humans.

(2) Balancing the Harms under NEPA.

77. Although it is undisputed that all harms may be considered in evaluating a claim for injunctive relief under NEPA, an injunction should not issue if enjoining such government action would result in more harm to the environment than denying injunctive relief. *Save Our Ecosystems*, 747 F.2d at 1250.

78. Here, it appears that interim relief is justified, if deepening of the species' jeopardy can be avoided.

E. The Public Interest.

79. In adopting the ESA, Congress explicitly found that all threatened and endangered species "are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." 16 U.S.C. § 1531(a)(3). The ESA advances a Congressional policy to "halt and reverse the trend toward species extinction, whatever the cost." *TVA v. Hill*, 437 U.S. at 184 (emphasis added).

80. The public policy underlying NEPA favors protecting the balance between humans and the environment. *See* 42 U.S.C. § 4321 (declaring a national

policy to "encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; [and] to enrich the understanding of the ecological systems and natural resources important to the Nation....").

81. If both these objectives can all be realized by astute management, it is the government's obligation to do so.

82. It is in the public interest that relief be granted to Plaintiffs, who represent a substantial population of water users in California, to enhance the water supply to reduce the adverse harms of destruction of permanent crops; fallowed lands; increased groundwater consumption; land subsidence; reduction of air quality; destruction of family and entity farming businesses; and social disruption and dislocation, such as increased property crimes and intra-family crimes of violence, adverse effects on schools, and increased unemployment leading to hunger and homelessness. This must be done without jeopardizing the species and their critical habitat.

VII. CONCLUSION

1. Plaintiffs have succeeded on the merits of their NEPA claim.

a. NEPA requires that the responsible agency take a hard look at the environmental consequences of its actions, *Robertson v. Methow Valley Citizen's Counsel*, 490 U.S. 332, 350 (1989), obligating federal agencies to prepare an environmental impact statement ("EIS") for all "major federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C).

b. Federal Defendants are required to evaluate the impact of the coordinated operations of the CVP and SWP, which constitutes major federal action. The evidence overwhelmingly establishes significant detrimental effects visited on the quality of the human environment by implementation of the BiOp's RPA Actions, which impose virtually year-round substantial restrictions on the water supply to California to protect the Listed Species.

c. Where required, an EIS discloses environmental affects of a proposed action and considers alternative courses of action. *Id.* Here, Federal Defendants completely abdicated their responsibility to

consider alternative remedies in formulating RPA Actions that would not only protect the species, but would also minimize the adverse impact on humans and the human environment.

d. In considering RPA alternatives, the record shows the burden of other causes is allocated to the water supply, without the required analysis whether alternatives, less harmful to humans and the human environment, exist.

2. Plaintiffs have also shown a likelihood of success on the merits of their ESA claim. Although the premise underlying the RPA Actions -- that the species may be jeopardized by increased negative flows occasioned by export pumping -- has some record support, NMFS has failed to adequately justify by generally recognized scientific principles the precise flow prescriptions imposed by RPA Actions IV.2.1 and IV.2.3. The exact restrictions imposed, which are inflicting material harm to humans and the human environment, are not supported by the record. Rather, they are product of guesstimations and attempts to try to achieve "equity," rendering it impossible to determine whether the RPA Actions are adequately protective, too protective, or not protective enough. Judicial deference is not owed to such

arbitrary, capricious, and scientifically unreasonable agency action.

3. It is highly significant that the co-operator of the Projects, DWR, with access to scientific competence in the fields of fish biology and ecology, and project operations, strongly criticizes some of the science NMFS used to justify RPA Action IV.2.3, seeks to enjoin Action IV.2.3, and does not oppose enjoining Action IV.2.1

4. Under the balance of hardships analysis, Defendants' contention that the ESA, under *TVA v. Hill*, precludes equitable weighing of Plaintiffs' interests is not supported by that case, as evidence of harm to the human environment in the form of social dislocation, unemployment, and other threats to human welfare were not present in *Hill*. They are in this case.

5. Defendants argue that jeopardy to the species cannot be avoided without continuing substantial reduction of pumping, with resultant reduction of water supply to Plaintiffs, representing over 20,000,000 persons, affected communities, and the agricultural industry in Northern, Central, and Southern California. Harm to the species has had equally detrimental effects on the Pacific Coast salmon fishing industry and impairs the interests of Native Americans. These additional

harms are deserving of equal protection.

6. Congress created public expectations in the Amended Reclamation Act by instructing Reclamation to contract for water service to hundreds of public-entity water service providers that supply water to millions of people and thousands of acres of productive agricultural land. The agencies have not fully discharged their responsibility to effectively allocate Project water resources. Federal Defendants have acted arbitrarily and capriciously in formulating RPA Actions to protect threatened species under the ESA that lack factual and scientific justification, while effectively ignoring the irreparable harm those RPA Actions have inflicted on humans and the human environment.

7. The species and their critical habitats are entitled to protection under the ESA. The species have been and will be protected. That is the law. Nonetheless, NMFS and Reclamation, as the consulting and action agencies, must take the hard look under NEPA at the draconian consequences visited upon Plaintiffs, the water supply of California, the agricultural industry, and the residents and communities devastated by the water supply limitations imposed by the RPA Actions. Federal Defendants have failed to comprehensively and competently

evaluate whether RPA alternatives can be prescribed that will be mutually protective of all the statutory purposes of the Projects.

8. This is a case of first impression. The stakes are high, the harms to the affected human communities great, and the injuries unacceptable if they can be mitigated. NMFS and Reclamation have not complied with NEPA. This prevented in-depth analysis of the potential RPA Actions through a properly focused study to identify and select alternative remedial measures that minimize jeopardy to affected humans and their communities, as well as protecting the threatened species. No party has suggested that humans and their environment are less deserving of protection than the species. Until Defendant Agencies have complied with the law, some injunctive relief pending NEPA compliance is appropriate, so long as it will not further jeopardize the species or their habitat.

9. Injunctive relief is also warranted under the ESA, because, although the general premises underlying Actions IV.2.1 and IV.2.3 find marginal support in the record, the precise flow prescriptions imposed on coordinated project operations as part of Action IV.2.1's Vernalis flow/export ratio and Action IV.2.3's -5,000 cfs

"calendar based" ceiling are not supported by the best available science and are not explained as the law requires.

10. Injunctive relief cannot be imposed without up-to-date evidence of the status of the species to assure that altered operations will not deepen jeopardy to the affected species or otherwise violate other laws. The evidence has not sufficiently focused on remedies to provide a confidence level that completely removing the Vernalis flow to export ratio prescriptions of Action IV.2.1 or permitting negative flows in excess of the -5,000 cfs OMR flow ceiling imposed by Action IV.2.3 to increase water supply will not jeopardize the continued existence of the species and/or adversely modify their critical habitats.

11. Legal and equitable grounds for injunctive relief have otherwise been established by a preponderance of the evidence.

12. A hearing to address the proposed injunction and any imminence of harm to species shall be held May 19, 2010 in Courtroom 3 at 10:00 a.m.

SO ORDERED
Dated: May 18, 2010

/s/ Oliver W. Wanger
Oliver W. Wanger
United States District Judge