UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF CALIFORNIA

Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources, *et al.*, Plaintiffs, v. Carlos M. Gutierrez, in his official capacity as Secretary of Commerce, *et al.*, Defendants, San Luis & Delta-Mendota Water Authority, *et al.*, Defendant-Intervenors.	1:06-CV-00245 OWW GSA FINDINGS OF FACT AND CONCLUSIONS OF LAW RE THE EXISTENCE OF IRREPARABLE HARM DURING THE INTERIM PERIOD AND DENYING PLAINTIFFS' REQUESTS FOR EMERGENCY INTERIM REMEDIES REGARDING FLOWS ON CLEAR CREEK AND GATE OPERATIONS AT RED BLUFF DIVERSION DAM

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I. INTRODUCTION

A memorandum decision and order, issued April 16, 2008 as amended May 20, 2008, granted in part and denied in part Plaintiffs' Endangered Species Act ("ESA") challenges to the 2004 biological opinion ("BiOp") issued by the National Marine Fisheries Service ("NMFS") on the effects of coordinated operation of two of California's largest water projects, the federal Central Valley Project ("CVP") and the State Water Project ("SWP"), on the endangered Sacramento River winter-run Chinook salmon, the threatened Central Valley spring-run Chinook salmon, and the threatened Central Valley steelhead. (*See* Doc. 256.)

Plaintiffs move for injunctive relief. The parties submitted briefs and evidence on whether the species' would be placed in jeopardy or their critical habitat threatened with adverse modification or destruction until such time as the new BiOP is released. (*See* Doc. 233, filed Apr. 29, 2008.) While the proceedings were in progress, Plaintiffs moved for emergency injunctive relief, suggesting the immediate implementation of a number of interim remedies was necessary to prevent jeopardy. Plaintiffs identified four remedies for immediate implementation, and seven additional remedies for implementation pending the March 2009 completion of the new BiOp. (Doc. 280, filed May 27, 2008.) An evidentiary hearing commenced June 6, 2008 and concluded July 3, 2008. The hearing focused on the status of the species, whether Project operations would result in jeopardy before the new BiOp is issued, and on the four "immediate" remedies.

On June 20, 2008, after eight full days of testimony, Plaintiffs requested the court expedite decision on emergency injunctive relief to: (1) increase flows on Clear Creek for the benefit of those spring-run that spawn there; and (2) raise the gates at Red Bluff Diversion Dam ("RBDD") through July 15, 2008.[1] (6/20 Tr. 74:4-77:11.)[2] Plaintiffs were concerned that ongoing adult Chinook migrations, if completed, would diminish the potential value of any relief. The request was granted, and focused, supplemental expert testimony and documentary evidence was received.

Comprehensive testimony on the status of the species and the impacts of Project operations on the three species has been received from three expert fisheries biologists, Bruce Oppenheim, employed by NMFS, Dr. Christina Swanson of the Bay Institute, and Dr. Charles Hanson. Ronald Milligan, the Bureau's Operations Manager of the CVP, and John Leahigh, Chief of the Project Operations Planning Branch for the SWP, both of whom are qualified experts in water project operations testified. Michael Urkov testified for Defendant-Intervenor Tehama Colusa Canal Authority, *et al.*, ("TCCA"), and qualified

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[1] Plaintiffs do not suggest that the gates should necessarily be closed again after July 15, 2008. They have withdrawn their initial request that the gates be opened and closed in alternating weeks in August. (Doc. 280 at 27.) Their latest proposal is to keep the gates open for the later part of the summer, commencing in August, to protect down-migrating juveniles. (6/27 Tr. 104:20-25.)

[2] All transcript references are to rough drafts. Final drafts, which were not available as of the issuance of these findings, may change pagination slightly.

as an expert regarding fish passage and operations at RBDD. After considering the testimony of the witnesses, the exhibits received in evidence, the written briefs of the parties, and oral arguments, the following findings of fact and conclusions of 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. CONCLUSIONS OF LAW

A. Jurisdiction.

1. Jurisdiction exists under 28 U.S.C. § 1331 (Federal Question), as this case arises under the ESA, 16 U.S.C. § 1536 *et seq.*, and the Administrative Procedure Act ("APA"), 5 U.S.C. § 702 *et seq.*

2. Defendant-intervenors San Luis & Delta-Mendota Water Authority, Westlands Water District, State Water Contractors, and Glenn-Colusa Irrigation District, *et al.*, have voluntarily submitted themselves to the district court's jurisdiction by intervening and fully participating in this litigation. Defendant-Intervenors Department of Water Resources ("DWR") and TCCA expressly submitted to the Court's jurisdiction as a condition of their intervention in these interim remedy proceedings. (Docs. 247 & 248, filed May 15, 2008.) TCCA agreed to limit their participation to non-duplicative and non-cumuulative issues that are unique to RBDD and TCCA.

B. Agencies' General Obligations Under the ESA.

3. 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).

4. 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. U.S. Fish & Wildlife Serv.*, 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.

5. "[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.

6. The Supreme Court summarizes the operation of ESA Section 7:

> Section 7 of the ESA prescribes the steps that federal agencies must take to ensure that their actions do not jeopardize endangered wildlife and flora. Section 7(a)(2) provides that "[e]ach Federal agency shall, in consultation with and with the assistance of the Secretary [of Commerce or the Interior], insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an 'agency action') is not likely to jeopardize the

> continued existence of any endangered species or threatened species." 16 U.S.C. § 1536(a)(2).
>
> Once the consultation process contemplated by § 7(a)(2) has been completed, the Secretary is required to give the agency a written biological opinion "setting forth the Secretary'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." § 1536(b)(3)(A); see also 50 CFR § 402.14(h). If the Secretary concludes that the agency action would place the listed species in jeopardy or adversely modify its critical habitat, "the Secretary shall suggest those reasonable and prudent alternatives which he believes would not violate [§ 7(a)(2)] and can be taken by the Federal agency...in implementing the agency action." 16 U.S.C. § 1536(b)(3)(A); see also 50 CFR § 402.14(h)(3). Regulations promulgated jointly by the Secretaries of Commerce and the Interior provide that, in order to qualify as a "reasonable and prudent alternative," an alternative course of action must be able to be implemented in a way "consistent with the scope of the Federal agency's legal authority and jurisdiction." § 402.02. 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).

Nat'l Ass'n of Home Builders v. Defenders of Wildlife, 127 S. Ct. 2518, 2526 (2008).

7. In making determinations under the ESA, agencies must "use the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2).

C. <u>ESA § 7(a) Only Applies to Actions that Fall Within a Federal Agency's Discretion</u>.

8. The Supreme Court recently upheld an NMFS/U.S. Fish and Wildlife Service ("USFWS") regulation interpreting ESA § 7(a)(2) as only applying to actions "in which there is *discretionary* federal involvement or control." *Home Builders*, 127 S. Ct. 2518 (interpreting 50 C.F.R. § 402.03). *Home Builders* addressed EPA's decision to transfer to the State of

Arizona its National Pollutant Discharge Elimination System ("NPDES") permitting power under the Clean Water Act. The *Home Builders* Court held that this decision was non-discretionary:

> While the EPA may exercise some judgment in determining whether a State has demonstrated that it has the authority to carry out § 402(b)'s enumerated statutory criteria, the statute clearly does not grant it the discretion to add another entirely separate prerequisite to that list. Nothing in the text of § 402(b) authorizes the EPA to consider the protection of threatened or endangered species as an end in itself when evaluating a transfer application. And to the extent that some of the § 402(b) criteria may result in environmental benefits to marine species, there is no dispute that Arizona has satisfied each of those statutory criteria.

Id. at 2536; *see also NWF v. NMFS II*, 524 F.3d 917, 927-28 (9th Cir. 2008)(applying *Home Builders*, holding that despite existence of broad, unquantified statutory goals in applicable Reclamation statute, Bureau still retains discretion over Project operations and those operations are still subject to the ESA).

9. Certain aspects of the management of the CVP/SWP are non-discretionary as that term is utilized in *Home Builders*. Most importantly, in this case, federal Reclamation law requires the Bureau to comply with non-conflicting state water law. Reclamation Act of 1902, Pub. L. 57-161, 32 Stat. 288 at § 8 (June 17, 1902); Central Valley Project Improvement Act ("CVPIA") § 3406(b), Pub. L. 102-575, 106 Stat. 4600 (Oct. 30, 1992). Specifically, the Bureau must comply with State Water Resources Control Board ("SWRCB") water rights and water quality decisions. *See* CVPIA § 3406(b)("The Secretary...shall operate the [CVP] to meet all obligations under State and Federal law, including....all decisions of the California State Water

Resources Control Board establishing conditions on applicable licenses and permits for the project....").

10. For example, the Bureau has a mandatory (i.e., non-discretionary) legal obligation to make releases from Shasta Reservoir for delivery to the Sacramento River Settlement Contractors. Under the Sacramento River Settlement Contracts, Settlement Contractors are entitled to 100% of their contractual supply in all years except so-called "Shasta Critical Years." In Shasta Critical Years, Settlement Contractors' priority supply may be reduced by 25 percent. This mandatory obligation derives from the priority of the Settlement Contractors' water rights, which facilitated issuance of state water permits to the Bureau to operate the CVP. The CVP's water rights are subject to the Settlement Contractors' rights. *See e.g.*, SWRCB D-990 (granting water rights to the United States to operate the CVP, while also recognizing and prioritizing the protection of existing rights on the Sacramento River).[3]

11. Non-priority water service contracts for irrigation and municipal and industrial uses by north-of-Delta, in-Delta, and south-of-Delta CVP contractors are, for the purposes of *Home Builders*, "discretionary" and are subject to the ESA. *See NRDC v. Houston*, 146 F.3d 1118, 1126 (9th Cir. 1998); *O'Neill v.*

[3] The Sacramento-San Joaquin Exchange Contractors also hold priority water rights to CVP water. *See generally Westlands Water Dist. v. Firebaugh Canal*, 10 F.3d 667, 669, 675-76 (9th Cir. 1993).

United States, 50 F.3d 677, 686 (9th Cir. 1995).[4]

12. When Congress authorized the CVP in 1937, it stated that Project "dams and reservoirs shall be used, first, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses; and, third, for power." Act of Aug. 26, 1937, ch. 832, 50 Stat. 844, 850; *see also United States. v.* SWRCB, 182 Cal. App. 3d 82, 135 (1986). In 1992, Congress explicitly amended this hierarchy of use by enacting sections 3406(a) and (b) of the CVPIA, which make protection of non-ESA listed fish and wildlife co-equal priorities with irrigation. The CVPIA also expressly reaffirms the Bureau's obligation to comply with the ESA in operating the CVP. *See* CVPIA § 3406(b)("The Secretary...shall operate the [CVP] to meet all obligations under State and Federal law, including....the [ESA]....).

13. As a top priority, the Bureau must "'insure that actions authorized funded or carried out by [it] do not jeopardize the continued existence' of a listed species," even if doing so would require that the Bureau "alter ongoing projects in order to fulfill the goals of the Act." *TVA v. Hill*, 437 U.S. 153, 186 (1978)(quoting 16 U.S.C. § 1536(a)(2)).

D. <u>Remand Without Vacatur</u>.

14. All defendants seek to keep the BiOP in place without vacatur and to retain the BiOp's Incidental Take Permit (and

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[4] Although the ESA does not expressly recognize an exception for human health and safety, Plaintiffs have offered and it is prudent to apply a human health and safety exception in any remedial phase of this interim remedy proceeding.

associated take limits) during reconsultation until the new BiOp is issued.[5]

15. The 2004 BiOp has been found unlawful, arbitrary, and capricious. (Doc. 256 at 146.) The usual remedy under such circumstances is remand to the agency. *See Florida Power & Light v. Lorion*, 470 U.S. 729, 744 (1985). The court has the discretionary authority to impose a deadline for remand proceedings. *Nat'l Org. of Veterans' Advocates v. Sec'y of Veteran's Affairs*, 260 F.3d 1365, 1381 (Fed. Cir. 2001). NMFS shall complete the new BiOp on or before March 2, 2009.

16. If the BiOp and its incidental take statement are vacated, the Bureau and DWR could be compelled to completely stop Project operations if they incidentally take one of the endangered species. Inoperative Projects would not maintain the status quo, but would instead produce catastrophic results to the public and all parties in interest. Plaintiffs,

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[5] Plaintiffs assert that they "do not seek vacatur provided that the Court imposes interim remedies that will insure that Project operations during reconsultation will not cause jeopardy to the three species or destruction or adverse modification of their critical habitats and that it orders the Bureau not to make any irreversible or irretrievable commitment of resources with respect to Project operations that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures to the Bureau's proposed Project operations." (Doc. 341, Pltf's Prop'd Findings, filed June 20, 2008.) Plaintiffs also concede that "vacatur would force the Bureau and DWR to operate the Projects during reconsultation without any take authority at the risk of incurring criminal liability. The 2004 BiOp superseded the 1993 winter-run Chinook biological opinion on Project operations, [] as well as all previous interim and supplemental OCAP biological opinions for the effects of CVP and SWP operations on spring-run Chinook salmon and steelhead." (*Id.*)

responsibly, have not suggested shutting down the Projects.

17. Vacating the BiOp would also remove the beneficial measures, terms, and conditions of the BiOp, such as numerous mitigation and adaptive management measures that to some extent are acknowledged by Plaintiffs as providing protection for the species. The BiOp also imposes other beneficial non-discretionary terms and conditions, including temperature controls on CVP and SWP managed rivers and restrictions on the operation of the Delta Cross Channel gates and RBDD gates. (Pltf's Ex. ("PE") 3 at 212-16.)

18. Due to the disastrous disruptions that vacatur of the BiOp would cause to the vital water supply functions the CVP and SWP serve and the concomitant loss of protective measures for the species included in the BiOp and Incidental Take Statement, it appears most reasonable that the BiOp be remanded without vacatur, once further explanation of the steelhead take limit is provided. Agency decisions may remain in place, pending the completion of remand, even where they have been found "arbitrary and capricious." *See NRDC v. U.S. Dept. of the Interior*, 275 F. Supp. 2d 1136, 1143 (C.D. Cal. 2002); *Nat'l Wildlife Fed'n v. NMFS*, 254 F. Supp. 2d 1196, 1215-16 (D. Or. 2003)(remanding BiOp without vacatur).

19. Nevertheless, the BiOp is subject to ESA Section 7(d) requirements.

E. <u>The Bureau's 7(d) Obligations During Re-Consultation</u>.

20. Here, the Bureau voluntarily re-initiated consultation with NMFS over the 2004 OCAP. ESA section (7)(d) governs the Bureau's actions during consultation and provides in relevant

part:

> After initiation of consultation required under subsection (a)(2), the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section.

16 U.S.C. § 1536(d). "Section 7(d) was enacted to ensure that the status quo would be maintained during the consultation process, to prevent agencies from sinking resources into a project in order to ensure its completion regardless of its impacts on endangered species." *Washington Toxics Coal. v. EPA*, 413 F.3d 1024, 1034-35 (9th Cir. 2005). "The purpose of the consultation process...is to prevent later substantive violations of the ESA." *Id.* at 1034 (*citing Sierra Club v. Marsh*, 816 F.2d 1376, 1389 (9th Cir. 1987)). It is well-settled that a court can enjoin agency action pending completion of section 7(a)(2) requirements. *Id.*

21. During consultation, only "non jeopardizing" actions may continue. *Id.* at 1035.

F. Standard for Issuance of Preliminary Injunctive Relief In ESA Cases.

22. In general, "the test for determining if equitable relief is appropriate is whether an injunction is necessary to effectuate the congressional purpose behind the statute." *Biodiversity Legal Found. v. Badgley*, 309 F.3d 1166, 1177 (9th Cir. 2002).

23. Outside the context of the ESA, the standard for granting a preliminary injunction balances plaintiff's likelihood of success against the relative hardship to the

parties. The Ninth Circuit recognizes two different sets of criteria for preliminary injunctive relief. Under the traditional test, "a plaintiff must show: (1) a strong likelihood of success on the merits, (2) the possibility of irreparable injury to plaintiff if preliminary relief is not granted, (3) a balance of hardships favoring the plaintiff, and (4) advancement of the public interest (in certain cases)." *Taylor v. Westly*, 488 F.3d 1197, 1200 (9th Cir. 2007). An "alternative" test requires that "a plaintiff demonstrate either a combination of probable success on the merits and the possibility of irreparable injury or that serious questions are raised and the balance of hardships tips sharply in his favor." *Id.* "These two formulations represent two points on a sliding scale in which the required degree of irreparable harm increases as the probability of success decreases. They are not separate tests but rather outer reaches of a single continuum." *Id.*

24. In the Ninth Circuit, in ESA cases, the conventional preliminary injunctive relief standard is substantially modified. *Nat'l Wildlife Fed'n v. NMFS*, 422 F.3d 782, 793-94 (9th Cir. 2005) (*NWF v. NMFS I*) ("The traditional preliminary injunction analysis does not apply to injunctions issued pursuant to the ESA.")*.*

> In cases involving the ESA, Congress removed from the courts their traditional equitable discretion in injunction proceedings of balancing the parties' competing interests. As the Supreme Court has noted, "Congress has spoken in the plainest of words, making it abundantly clear that the balance has been struck in favor of affording endangered species the highest of priorities." *TVA v. Hill*, 437 U.S. 153, 194 (1978). Accordingly, courts "may not use equity's scales to strike a different balance." *Sierra Club v. Marsh*, 816 F.2d 1376, 1383 (9th Cir. 1987); *see also Marbled*

> *Murrelet v. Babbitt*, 83 F.3d 1068, 1073 (9th Cir.1996) ("Congress has determined that under the ESA the balance of hardships always tips sharply in favor of endangered or threatened species.").

Id. (citations omitted); *see also TVA*, 437 U.S. at 187-88 (concluding that Congress determined in the ESA that the value of endangered species is "incalculable" and prohibiting the balancing of economic harms against the Congressionally determined public interest in preserving endangered species); *Home Builders*, 127 S. Ct. at 2537 (reaffirming holding from *TVA v. Hill* that economic burden of enforcing the ESA cannot be considered by the courts, concluding that "the ESA's no-jeopardy mandate applies to every discretionary agency action-regardless of the expense or burden its application might impose"); *Nat'l Wildlife Fed'n v. Burlington N. R.R., Inc.*, 23 F.3d 1508, 1510-11 (9th Cir. 1994)("In cases involving the ESA, Congress removed from the courts their traditional equitable discretion in injunction proceedings of balancing the parties' competing interests."); *Sierra Club v. Marsh*, 816 F.2d 1376, 1383 (9th Cir. 1987)(courts "may not use equity's scales to strike a different balance"); *Marbled Murrelet v. Babbitt*, 83 F.3d 1068, 1073 (9th Cir. 1996) ("Congress has determined that under the ESA the balance of hardships always tips sharply in favor of endangered or threatened species.").[6]

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[6] Defendant Intervenors point to several non-ESA cases for the proposition that the district court must consider the "public interest" in determining whether injunctive relief is appropriate. (*See* Doc. 309 at 8 (citing *Weinberger v. Romero-Barcelo*, 456 U.S. 305, 312 (1982)(evaluating request for injunctive relief under the Clean Water Act); *Am. Motorcyclist Ass'n v. Watt*, 714 F.2d 962, 967 (9th Cir. 1983)(applying the

25. Under this modified standard, plaintiffs must nevertheless demonstrate (1) a likelihood of success on the merits, and (2) a "reasonable likelihood" of irreparable harm. *See NWF v. NMFS I*, 422 F.3d at 794; *NWF v. Burlington*, 23 F.3d at 1511 (re-affirming that non-traditional injunctive relief standard applies, but finding that Plaintiffs still need to show likelihood of future injury to members of the endangered species).

(1) Likelihood of Success on the Merits.

26. With respect to likelihood of success, Plaintiffs have already succeeded on the merits of their ESA claims regarding the legality of the 2004 BiOp.

26.1. TCCA suggests that at least with respect to the request for modifications to the operations of RBDD, Plaintiffs

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National Environmental Policy Act ("NEPA"), the Federal Land Policy and Management Act, and related Bureau of Land Management Regulations); *United States v. Oakland Cannabis Buyer's Cooperative*, 532 U.S. 483 (2001)(interpreting the federal Controlled Substances Act)); *see also* Doc. 359 (citing *Lands Council v. U.S. Forest Serv.*, --- F.3d ---, 2008 WL 2640001 (9th Cir. 2008)(holding in a NEPA case that a court "must also consider the public interest")). These cases are not instructive regarding the district court's discretion to consider public interest or other related evidence in the context of the ESA, under which judicial discretion is severely constrained by binding Ninth Circuit precedent.

It appears that the Ninth Circuit is the only circuit to articulate a standard that arguably completely precludes the balancing of relative harms. District courts in other circuits have, in an abundance of caution, applied the traditional approach to injunctive relief, while at the same time recognizing the balancing of the equities and the determination of the public interest already performed by Congress. *See, e.g., Alabama v. U.S. Army Corps of Eng'rs*, 441 F. Supp. 2d 1123, 1131-32 (N.D. Ala. 2006); *Am. Rivers v. U.S. Army Corps of Eng'rs*, 271 F. Supp. 2d 230, 238-49 (D.D.C. 2003).

"cannot establish any likelihood of success on the merits" because the district court ruled in favor of the federal defendants on the issue of sufficiency of the adaptive management plan and mitigation measures for RBDD. TCCA assigns too much significance to the summary judgment ruling on that issue. The summary judgment decision found serious substantive errors throughout the BiOp. For example, NMFS failed to explain contradictory evidence as to the survival and recovery of the species and their habitat; failed to analyze the effect of the Projects on critical habitat; failed to evaluate the impact of the Projects in light of the species' life cycles; failed to properly evaluate the baseline; and failed to evaluate the effects of climate change. (Doc. 256, filed May 20, 2008.)

26.2. With respect to the mitigation measures, Plaintiffs raised essentially the same challenge in this case as in the smelt case, arguing that the mitigation measures are not sufficiently definite and enforceable. Although the salmonid mitigation measures were found sufficiently certain and mandatory to be enforceable, the decision did not validate all mitigation measures as applied or find that the measures fully satisfy NMFS' and the Bureau's Section 7(a)(2) responsibilities with respect to any aspect of ongoing joint Project operations. Such a finding would directly conflict with the holding that NMFS failed to adequately analyze critical factors, like the impact of Project operations, including RBDD operations, on the species' recovery and critical habitat. Rather, the summary judgment decision determined that the mitigation measures identified in the BiOp were sufficiently certain to occur to be

enforceable and implementable, and were distinguishable from the Delta Smelt Risk Assessment Matrix, which required no more than that agency scientists and representatives consult, and, despite ascertained action triggers and catastrophic conditions, the mitigation measures had never been implemented to protect the smelt.

(2) "Reasonable Likelihood" of Irreparable Harm.

(a) Injunctive Relief is Not Automatic.

27. Plaintiffs assert that, in light of Congressional pronouncements regarding the primacy of preserving endangered species, whenever an ESA violation has been conclusively established, as here, the "appropriate remedy" is to enjoin agency action until there has been "substantial compliance with [the ESA's] procedural requirements." *Thomas v. Peterson*, 753 F.2d 754, 764 & n.8 (9th Cir. 1985).

28. This is not the approach the Ninth Circuit took in reviewing a district court's issuance of injunctive relief under the ESA in *NWF v. NMFS I*, 422 F.3d at 793, where the district court invalidated the controlling BiOp, and then heard plaintiffs' request for injunctive relief pending completion of a new BiOp. *Id.* at 796-97. The district court analyzed whether irreparable harm would result from Columbia River Power System operations pending completion of the remand. *Id.* The Ninth Circuit affirmed this approach, holding that "[a]lthough not every statutory violation leads to the 'automatic' issuance of an injunction in the context of the ESA, 'the test for determining whether equitable relief is appropriate is whether an injunction is necessary to effectuate the congressional

purpose behind the statute.'" *Id.* at 795 (quoting *Badgley*, 308 F.3d at 1177)(emphasis added).[7] *Cf. Lands Council v. U.S. Forest Serv.*, --- F.3d ---, 2008 WL 2640001 (9th Cir. 2008)(declining, in a NEPA case, "to adopt a rule that any potential environmental injury automatically merits an injunction....").

29. Plaintiffs correctly assert that in every published ESA case in which likelihood of success was established, an injunction issued. However, Plaintiffs' conclusion that an ESA violation automatically, *a fortiori*, requires injunctive relief is overstated. In each case cited by the parties, including those in which some language suggests injunctive relief must follow an ESA violation,[8] the existence of irreparable harm was evaluated.

30. There is considerable disagreement and confusion about

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[7] Plaintiffs' attempt to distinguish this precedent on the ground that the Ninth Circuit was engaging in "limited appellate review" is not persuasive, particularly given the absence of relevant contrary authority.

[8] Plaintiffs also cite *Pac. Coast Fed'n of Fishermen's Ass'ns v. U.S. Bureau of Reclamation*, 2006 WL 798920, at *1 (N.D. Cal. Mar. 27, 2006)(*aff'd* 226 F. App'x 715 (9th Cir. 2007)), which held that where plaintiffs prevailed on an ESA challenge to the Bureau's planned operation of the Klamath Irrigation Project, "a court's inquiry is largely at an end[, and]...'the remedy must be an injunction of the project pending compliance with the ESA'" (*quoting Thomas*, 753 F.2d at 765). Critically, in that case, despite its broad pronouncements that injunctive relief should be automatic, the district court nevertheless looked for evidence of irreparable harm, *see id.* *6, finding such harm was evidenced by the fact that NMFS had concluded that the proposed operations would jeopardize affected species. Here, there is no such conclusive evidence from the expert agency. In fact, NMFS's official position is that interim operations will not jeopardize the species.

what should be considered "irreparable harm" for purposes of these injunctive relief proceedings. The Ninth Circuit has not articulated a standard or threshold at or above which ESA "harm" is considered "irreparable."[9]

(b) Likely Extirpation Is Not the Standard.

31. Federal Defendants and Defendant Intervenors repeatedly refer to the species' "extirpation" or extinction as the benchmark for determining the necessary irreparable harm to justify interim injunctive relief. A court need not wait until the species is immediately threatened with extirpation to issue injunctive relief. *See Am. Rivers v. U.S. Army Corps of Eng'rs*, 271 F. Supp. 2d 230, 258-59 (D.D.C. 2003) (injunction may issue if the number of individuals likely to be taken as a result of agency action during the time it will take to conclude litigation will cause "significant" harm to the species, even if there is "not the remotest possibility that the planned agency activity...would eradicate the species"); *Swan View Coal., Inc. v. Turner*, 824 F. Supp. 923, 938 (D. Mont. 1992)(threatened extinction not necessary for a finding of harm under the ESA).

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[9] A different approach has been taken in other jurisdictions. For example, irreparable injury justifying preliminary injunctive relief in the D.C. Circuit is injury that is great, certain, and actual, not merely theoretical. *Chaplaincy of Full Gospel Churches v. England*, 454 F.3d 290, 297-98 (D.C. Cir. 2006)*(quoting Wisconsin Gas Co. v. Fed. Energy Regulatory Comm'n*, 758 F.2d 669, 674 (D.C. Cir. 1985))("The injury complained of must be of such imminence that there is a clear and present need for equitable relief to prevent irreparable harm.")).

(c) Reduce Appreciably the Likelihood of Survival or Recovery/Appreciably Diminish the Value of Critical Habitat.

32. The Ninth Circuit test requires that agencies not take actions as to species that will reduce appreciably their likelihood of survival or recovery or appreciably diminish the value of their critical habitat.

32.1. "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 (emphasis added), while prohibited "destruction or adverse modification" is "any direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species." *Id.* (emphasis added).

32.2. Plaintiffs argue that any harm that is "appreciable" justifies equitable intervention. Plaintiffs maintain that under certain circumstances this standard is satisfied by the loss of one female salmon or steelhead capable of reproducing.

32.3. Plaintiffs assert that the term "appreciably" in the jeopardy context means "capable of being perceived or recognized by the senses; perceptible," citing Black's Law Dictionary.[10] Plaintiffs argue that the meaning of "appreciably"

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[10] By contrast, Dictionary.com defines appreciable as: "Sufficient to be readily perceived or estimated; considerable" giving the example of "there is an appreciable difference between

is informed by the Ninth Circuit's recent decision in *NWF v. NMFS II*, 524 F.3d 917, which held that an agency may not "gradually destr[oy]" a listed species or its critical habitat just because "each step on the path to destruction is sufficiently modest." However, Plaintiffs quote *NWF v. NMFS II* out of context. That decision examines whether the agency was required to incorporate degraded biological conditions into the baseline for a jeopardy analysis. The Ninth Circuit reasoned:

> 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 CFR § 402.02; 16 U.S.C. § 1536(a)(2). NMFS argues that, under this definition, it may satisfy the ESA by comparing the effects of proposed [project] operations on listed species to the risk posed by baseline conditions. Only if those effects are "appreciably" worse than baseline conditions must a full jeopardy analysis be made. Under this approach, a listed species could be gradually destroyed, so long as each step on the path to destruction is sufficiently modest. This type of slow slide into oblivion is one of the very ills the ESA seeks to prevent.

Id. at 929-30 (emphasis added). This language does not define the term "appreciably" in the jeopardy inquiry, rather it considers the cumulative effects of incremental actions in light of baseline conditions.

32.4. Plaintiffs' interpretation of "appreciably" to mean any "perceptible" effect would lead to irrational results, making any agency action that had any effects on a listed

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socialism and communism." Available at "http://dictionary.reference.com/browse/appreciable" (last visited July 2, 2008)(emphasis added).

species a "jeopardizing" action. This is not the law, as such an interpretation conflicts with other provisions of the ESA that permit incidental take of a listed species. *See* 16 U.S.C. §§ 1536(b)(4)(describing procedure for issuance of incidental take statements), 1539(1)(B) (permitting incidental take).

32.5. Federal Defendants correctly note that NMFS and USFWS have interpreted the term "appreciably diminish" to mean "considerably reduce." USFWS/NMFS, ESA Section 7 Consultation Handbook (March 1998), at 4-34. The Consultation Handbook states:

> Adverse effects on individuals of a species or constituent elements or segments of critical habitat generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species range, or appreciably diminish the capability of the critical habitat to satisfy essential requirements of the species.

Id. at 4-34 (emphasis added). The following definition for "appreciably diminish" is provided:

> Appreciably diminish the value: to considerably reduce the capability of designated or proposed critical habitat to satisfy requirements essential to both the survival and recovery of a listed species.

Id. (emphasis added).

32.6. While not entitled to *Chevron* deference, the interpretations in the Consultation Handbook "are made in pursuance of official duty, based upon more specialized experience and broader investigations and information than is likely to come to a judge in a particular case," and "constitute a body of experience and informed judgment to which courts and litigants may properly resort for guidance." *Skidmore v. Swift*

& Co., 323 U.S. 134, 139-40 (1944).

32.7. The Consultation Handbook's treatment of the term "appreciably" is NMFS's interpretation of 50 C.F.R. § 402.02, and is "controlling" unless "plainly erroneous or inconsistent with the regulation." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 359 (1989); *see also Webber v. Crabtree*, 158 F.3d 460, 461 (9th Cir. 1998) (agency's interpretation of its own regulation is accorded a "high degree" of deference unless plainly erroneous or inconsistent with regulation). Moreover, the Consultation Handbook was prepared ten years ago and is not a "post hoc rationalization[n]." *Auer v. Robbins*, 519 U.S. 452, 462 (1997). The Court has "no reason to suspect that the interpretation does not reflect the agency's fair and considered judgment on the matter in question." *Id.*

32.8. NMFS's interpretation of the term appreciably is entitled to *Skidmore* deference. Plaintiffs' overly expansive definition of "appreciably" reads the term out of the statute. *See Forest Guardians v. Veneman*, 392 F. Supp. 2d 1082, 1092 (D. Arizona 2005) (refusing to apply dictionary definitions of appreciably and instead deferring to the Consultation Handbook's interpretation of appreciably to mean significant or considerable biological effects).[11]

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[11] DWR advocates the adoption of a different standard from *NWF v. NMFS II*, 524 F.3d at 930, that would prohibit only those actions that would "tip a species from a state of precarious survival into a state of likely extinction." For several reasons, this language is not helpful as a litmus test for the issuance of injunctive relief. First, *NWF v. NMFS II* was not concerned with the issuance of injunctive relief. Rather, the Court reviewed a challenge on the merits to a biological opinion.

33. The Handbook definition of "appreciably" is also consistent with how the concept of irreparable harm has been applied in practice. *In NWF v. NMFS I*, 422 F.3d 782, 795 (9th Cir. 2005), the Ninth Circuit affirmed the issuance of a preliminary injunction where the district court found that the operation of the Columbia and Snake River dams "strongly contribut[ed]" to the endangerment of listed species, citing the government's own data showing "that between 78-92% of juvenile fall chinook salmon that remain in-river for their migration are killed by the operation of the dams even with mitigation measures, with a mean estimated kill of 86% of the salmon migrating in-river."

34. American Rivers v. *U.S. Army Corps of Engineers*, 271 F. Supp. 2d 230 (D.D.C. 2003), defined "irreparable injury" as that which would result in significant take of the species

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Second, DWR takes this language out of context. The entire passage reads:

> [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.

Plaintiffs argue that the second sentence provides the applicable standard, namely, that when baseline conditions already jeopardize a species, the agency cannot take any action that "deepens" that jeopardy in any respect. Neither sentence is controlling in the issuance of injunctive relief, particularly given that they both contravene the approach taken by other courts in deciding the basis for injunctive relief under the ESA as well as the NMFS interpretation of "appreciable" found in the Consultation Handbook.

and/or delays in implementing a recovery plan that would have significant impacts on the species. In *American Rivers*, for a population of plovers numbering approximately 2,000 and a population of terns numbering approximately 7,000, a delay in implementing a recovery program for the birds was found to constitute "irreparable injury" to their recovery and continued existence. *Id.* at 259. *American Rivers* also examined a population of sturgeon that numbered fewer than 2,000 and held that "any potential harm from delaying implementation [of the recovery action] is irreparable and must be avoided." *Id.*; *see also, Water Keeper Alliance v. U.S. Dept. of Defense*, 271 F.3d 21, 34 (1st Cir. 2001)(requiring a "concrete showing of probable deaths during the interim period and how those deaths might impact the species" (emphasis added)).[12]

35. The approach taken in *NWF v. NMFS I* and *American Rivers*, that identifies "irreparable harm" as "significant" vis-

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[12] Other district courts have issued injunctive relief where an agency action would cause harm to a small number of individual species' members, but always under circumstances in which the loss of those individuals would be significant for the species as a whole. For example, in *Humane Society v. Kempthorne*, 481 F. Supp. 2d 53, 69-70 (D.D.C. 2006), the district court enjoined implementation of a program that would have permitted the lethal take of 43 gray wolves, a number that constituted ten percent of the remaining gray wolf population in Wisconsin. *See also Defenders of Wildlife v. Martin*, 454 F. Supp. 2d 1085, 1099 (E.D. Wash. 2006)(activity that would cause "any harm" during consultation to the few animals that remain in an endangered population sufficient to justify injunctive relief); *Marbled Murrelet v. Babbit*, 83 F.3d 1060 (9th Cir. 1996)(showing of imminent threat of future harm sufficient for injunction under the ESA where listed birds were known to breed in area that would be impacted by logging activities, and logging activities would impair ability to breed).

a-vis the overall population, applies here.

36. However, the terms "significant" and "considerable" are imprecise and conclusory. Here, Plaintiffs expert opined that the combined effect of Project operations through the interim period are significant to the three species overall. The Defendants' two experts opined that interim Project operations would not result in extinction during the interim period.

(3) Burden Shifting.

37. *Washington Toxics* placed the burden of demonstrating that an action is non-jeopardizing on the acting agency.

> Placing the burden on the acting agency to prove the action is non-jeopardizing is consistent with the purpose of the ESA and what we have termed its "institutionalized caution mandate[ ]." *Sierra Club v. Marsh*, 816 F.2d at 1389. We said as much in *Thomas v. Peterson*, where the defendant, the U.S. Forest Service, urged the district court to conclude that absent proof by the plaintiffs to the contrary, a proposed project was not likely to affect an endangered or threatened species. 753 F.2d at 765. We held that this was an inappropriate finding for the district court to make. *Id*. "It is not the responsibility of the plaintiffs to prove, nor the function of the courts to judge, the effect of a proposed action on an endangered species when proper procedures have not been followed." *Id*. The district court correctly assigned EPA the burden of proving that its actions were non-jeopardizing.

413 F.3d at 1034-35.[13]

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[13] Defendant Intervenors suggest that the Supreme Court overruled the use of this burden-shifting approach. (*See* Doc. 309 at 4.) However, the Supreme Court case they cite for this proposition does not address burden shifting; rather, it reverses the Ninth Circuit for applying a presumption of "irreparable harm" whenever an agency fails to adequately evaluate environmental impacts under NEPA, not the ESA, calling this "contrary to equitable principles." *Amoco Prod. Co. v. Village of Gambell, Alaska*, 480 U.S. 531, 545 (1987).

38. After *Washington Toxics*, the ESA injunctive relief standard has been modified to place on the federal defendants the burden to demonstrate that their action will be "non-jeopardizing."[14]

39. The jurisprudence on this issue lacks clarity, because of a parallel line of cases that look for proof of "irreparable harm" rather than "no-jeopardy" before an injunction may issue. *See, e.g., NWF v. NMFS I,* 422 F.3d 782 (requiring showing of irreparable harm before enjoining agency conduct during an interim period while consultation was ongoing). Does the burden of showing "non-jeopardy" equate to a burden to show that Project operations will cause no "irreparable harm"? If so, then according to the definition of "irreparable harm" articulated above, Federal Defendants bear the burden of showing that Project operations will not considerably reduce the species' chances of survival or recovery or considerably reduce the value of their critical habitat.

40. In the only published case that specifically recognizes the burden-shifting approach *of Washington Toxics*, *Defenders of Wildlife v. Martin*, 454 F. Supp. 2d 1085, 1097 (E.D. Wash. 2006), the district court acknowledged the burden shifting holding, but then largely ignored it, placing the burden upon Plaintiffs to show irreparable harm. *Id.* at 1098-

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[14] Defendant Intervenors tautologically maintain that there is no such burden of proof where an invalidated BiOp has not been vacated. This ignores that the fact that no decision regarding vacatur or the sufficiency of interim protections had been finalized prior to the commencement of evidentiary proceedings in this case.

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41. No further treatment of the burden-shifting issue is required, because Federal Defendants, despite Defendant Intervenors' contrary contention, accepted the burden of proving their actions are non-jeopardizing. Applying the NMFS/USFWS definition of "appreciable," in order to show that their actions are non jeopardizing, the Federal Defendants must prove that Project operations during the interim period will not significantly or considerably reduce the species' chances of survival and recovery and will not significantly or considerably reduce the value of their critical habitat.

(4) Should Evaluation of "Significance" Occur at the ESU or Population Level?

42. The evidence regarding the significance of impacts to the spring-run has been presented in two ways: (1) relative to the entire evolutionarily significant unit ("ESU") for each species; and (2) relative to those populations of each species that spawn above RBDD and/or within Clear Creek.

43. The parties agreed in open court that jeopardy should be determined at the level of each species' entire ESU. (6/27 Tr. 100:1-101:16.) This is consistent with the interpretation of "jeopardy or adverse modification" set forth in the Consultation Handbook, at p. 4-34:

> The determination of **jeopardy** or **adverse modification** is based on the effects of the action on the continued existence of the **entire** population of the listed species or on a listed population, and/or the effect on critical habitat as designated in a final rulemaking. When multiple units of critical habitat are designated for particular purposes, these units may serve as the basis of the analysis if protection of different facets of the species' life cycle or its distribution is essential to both its survival and

> recovery. Adverse effects on individuals of a species or constituent elements or segments of critical habitat generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the critical habitat to satisfy essential requirements of the species.

(emphasis added).[15]

44. No evidence was offered that separate populations of spring-run or steelhead have been designated by final rulemaking. It is recognized that separate geographical locations for these species provide spatial diversity, which contributes to their survival and recovery. (*See* PE 1.) In contrast, the winter-run are a single geographical population in the mainstem upper Sacramento River. (PE 9 at 5:17-18.)

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[15] At least one case suggests an alternative approach, that focuses on discrete populations within an ESU. In *Humane Society of U.S. v. Kempthorne*, 481 F. Supp. 2d 53 (D.D.C. 2006), after finding likelihood of success on the merits, the district court found irreparable harm where 43 wolves would be exterminated by a Wisconsin program aimed at eliminating depredating wolves. The 43 wolves amounted to ten percent of the total population of wolves in Wisconsin. Although the district court decision did not discuss whether the Wisconsin population represented the entire ESU. A subsequent D.C. Circuit opinion, considering a later appeal in the same case suggests that, at the time the question of injunctive relief was before the district court, the Wisconsin population was only part of a larger ESU. The D.C. Circuit found the pending challenge to the depredation program moot because, subsequent to the issuance of injunctive relief, USFWS designated the "Western Great Lakes" population of gray wolves as a "distinct population segment" ("DPS") and simultaneously de-listed that population. *Humane Soc. of U.S. v. Kempthorne*, 527 F.3d 181 (D.C. Cir. 2008). It can be inferred that prior to the designation of the DPS and the associated delisting of that population, the Wisconsin population of wolves referenced in the 2006 district court opinion was part of a larger gray wolf ESU.

(5) The Impacts of Project Operations Must be Evaluated in the Context of Baseline Conditions.

45. Plaintiffs place great weight on language from *NWF v. NMFS II*: "where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm." 524 F.3d at 930. In *NWF v. NMFS II*, the agency failed to incorporate degraded baseline conditions into its baseline analysis. *Id.* at 929. Plaintiffs are correct that the "[t]he proper baseline analysis is not the proportional share of responsibility the federal agency [action] 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." *Pac. Coast Fed'n of Fishermen's Assoc. v. U.S. Bureau of Reclamation*, 426 F.3d 1082, 1093 (9th Cir. 2005).

46. The jeopardy and habitat destruction determinations cannot be based upon piecemeal evaluations of incremental actions above the baseline. *NWF v. NMFS II*, explains "[u]nder this approach, a listed species could be gradually destroyed, so long as each step on the path to destruction is sufficiently modest. This type of slow slide into oblivion is one of the very ills the ESA seeks to prevent." 524 F.3d at 930; *see also Am. Rivers*, 271 F. Supp. 2d at 258-59 (holding that jeopardy determination must "consider the...proposed action in the context of [agency's] overall management" of the action area and rejecting as invalid USFWS's "'incremental-step approach.'" (*quoting Conner v. Burford*, 848 F.2d 1441, 1457-58 (9th Cir. 1988))).

47. However, Plaintiffs take these holdings too far by suggesting that whenever a listed species is in a state of "jeopardy," an agency is prohibited from taking any action that would cause any further "deterioration in the species' pre-action condition," *NWF v. NMFS II*, 524 F.3d at 930, even if that further deterioration is *de minimus*. The relevant inquiry is whether the "action effects, when added to the underlying baseline conditions," in the present and future human contexts, are cumulatively such that they would cause jeopardy as that term is defined by law and agency regulation. *Id.* The seminal holding of *NWF v. NMFS II* is that baseline conditions must be factored into the jeopardy analysis, cumulatively with the entirety of agency actions.

48. Irreparable harm to justify injunctive relief is shown when the agency action causes appreciable (i.e., considerable or substantial) harm to the species or its critical habitat, as measured by the combined effects of the action and underlying baseline conditions.

(6) Consideration of Recovery.

49. Recovery of the three salmonid species must be considered as part of the jeopardy and adverse modification analyses. *NWF v. NMFS II*, 524 F.3d at 931-32; *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Serv.*, 378 F.3d 1059, 1070 (9th Cir. 2004). Recovery means "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4(a)(1) of the [ESA]." 50 C.F.R. § 402.02.

50. However, "recovery impacts alone will not often prompt

a jeopardy finding." *NWF v. NMFS II*, 524 F.3d at 932. Only in "exceptional circumstances" could injury to recovery prospects result in a jeopardy finding. *Id.* at 931-32.

(7) Economic Harm May Not Be Considered, But Public Safety is Relevant and Injunctive Relief Must Be Narrowly Tailored.

51. The district court is constrained from balancing the competing interests of protecting endangered species against the economic costs of an injunction, because "Congress has decided that under the ESA, the balance of hardships always tips sharply in favor of the endangered or threatened species." *Washington Toxics*, 413 F.3d at 1035; *see also United States v. Glenn-Colusa Irrig'n Dist.*, 788 F. Supp. 1126, 1132 (E.D. Cal. 1992) (declining to consider the "social utility" of ordering defendant to cease operation of a pumping facility that was taking listed salmonids without a take permit).

52. During the *Kempthorne* (Delta smelt) remedies hearing, objections were sustained to evidence of "pure economic harm," but evidence was admitted about risks to human health and safety (including evidence regarding the health and safety effects of secondary adverse impacts like land subsidence, land fallowing leading to air quality impacts, and community dislocations arising from job losses).[16] Further evidence was admitted to

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[16] The *Kempthorne* remedies decision found:

> Although the ESA does not expressly recognize an exception for human health and safety, Plaintiffs have offered it is prudent to apply a human health and safety exception as part of [any] relief granted in this case. Risks that will be created by implementation of the interim remedial actions to be imposed, include, but are not limited to:

show the "water costs" of various remedial actions, as resulting water unavailability related to impacts on endangered species, safety consequences to communities (including to emergency services), and effects upon the structural integrity of Project facilities.

53. No party has presented any legal authority providing that purely economic interests may be balanced in an ESA injunctive relief case.

(8) Judicial Non-Intervention.

54. Concomitant with the requirement for narrow tailoring, the district court is bound by the general rule that a court should not substitute its judgment for that of the administrative agency. *NWF v. NMFS I*, 422 F.3d at 798-99; *see also Lands Council*, --- F.3d ---, 2008 WL 2640001, *9 (holding that when reviewing an agency decision, courts are to be "most deferential" when an agency is "making predictions within its

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a. Adverse impacts affecting [reduced] deliveries of water necessary for water service districts, emergency water supplies, municipal water supplies, and industrial power and related energy sources;

b. Adverse effects on agriculture including, but not limited to, loss of jobs, increased groundwater pumping, fallowed land [and] subsidence.

c. Air pollution [caused by] from heavier reliance on groundwater pumping and decrease in surface irrigation and moisture content in the soil; and

d. Damage to the structural integrity of CVP or SWP facilities including reservoirs or dams, causing, for example, significant damage to the earthen walls of the San Luis Reservoir, if that reservoir is drawn down too rapidly.

area of expertise"). A federal court lacks the expertise and/or background in fish biology, hydrology, hydraulic engineering, water project operations, and related scientific and technical disciplines that are essential to determining how the water projects should be operated on a real time, day-to-day basis. The scientific, engineering, and operational constraints under which the Projects are managed on a day-to-day basis are of mind-boggling complexity and sensitivity, requiring the highest level of skill, competence, and experience. Plaintiffs did not offer an operations expert, nor do they profess to have such compentence.

55. However, judicial deference is not unlimited. In *NWF v. NMFS I*, where NMFS's BiOp had already been invalidataed, the agency nevertheless argued that the district court was required to defer to its expertise. 422 F.3d at 798. The Ninth Circuit disagreed, finding that, because the district court had already invalidated NMFS's BiOp "in large part because it omitted factors essential to the analysis," there was no formal agency findings to which deference was owed. *Id.* at 799. The agency in *NWF v. NMFS I* presented its case through expert affidavits. *Id.* Under such circumstances, the district court properly ordered injunctive relief after finding that planned operations could cause irreparable harm. *Id.*

56. The narrow tailoring requirement means that a court should interfere with complex managerial decisions no more than absolutely necessary.

(9) FERC Jurisdiction: Feather River and Oroville Dam.

57. The Federal Power Act precludes review by district courts of operations regulated by the Federal Energy Regulatory Commission ("FERC"). Title 16 U.S.C., section 8251(b) confers exclusive jurisdiction upon the Courts of Appeals to review and make substantive modifications to FERC licensing orders. Section 8251(b) provides, in relevant part, that "[a]ny party to a proceeding under this chapter aggrieved by an order issued by [FERC] in such proceeding may obtain review of such order in the United States Court of Appeal...Upon the filing of such petition such court shall have jurisdiction, which upon the filing of the record with it shall be exclusive, to affirm, modify, or set aside such order in whole or in part."

58. According to the Supreme Court, in drafting section 8251(b), Congress prescribed the specific, complete, and exclusive mode for judicial review of FERC orders. *City of Tacoma v. Taxpayers of Tacoma*, 357 U.S. 320, 335-336 (1958). "Hence, upon judicial review of the Commission's order, all objections to the order, to the license it directs to be issued, and to the legal competence of the licensee to execute its terms must be made in the Court of Appeals or not at all." *Id.* at 336.

59. This rule applies to cases involving the ESA. It precludes the district court from exercising jurisdiction over ESA-related matters covered by a FERC license. *See Idaho Rivers United v. Foss*, 373 F. Supp. 2d 1158, 1160-1161 (D. Idaho 2005).

60. Here, DWR's operations on the Feather River, through the Oroville/Thermalito Dam Complex, are currently subject to an

annual FERC license. The fifty-year license has expired and a new long-term licence is in the final stages of the renewal process following executed settlement agreements among the parties in interest. Feather River operations covered by the FERC license are not within the jurisdiction of the district court.

III. FINDINGS OF FACT

A. Overview of Salmonid Life History.

1. Winter-run Chinook salmon, spring-run Chinook salmon, and steelhead are anadromous species that spawn in freshwater but rear for a portion of their lives in coastal marine waters. (Def. Int. Ex. ("DI") B at Ex. 2; 6/6 Tr. 89:7-15.)

2. The fecundity (number of eggs produced) is typically 7,000 eggs per female steelhead and spring-run salmon, and approximately 3,000-4,000 eggs per female winter-run salmon. (6/6 Tr. 199:17-22; DI B at ¶6; 6/18 Tr. 180:22-23; 6/19 Tr. 47:16-25.) In general, for the population to remain stable, only two eggs from each spawning female need to survive to reproduce as adults. (DI B at ¶6.)

3. Chinook salmon and steelhead migrate upstream from the ocean, through the Delta, and into Central Valley rivers and creeks during the fall, winter, and spring months, depending on the species. (DI B at ¶7.) The run name for Chinook salmon, such as winter-run, reflects the seasonal timing of adult upstream migration. (*Id.*) The adults of some salmonid species (e.g., fall-run, late fall-run, and steelhead) are sexually mature when they enter freshwater, while the adults of other species (e.g., spring-run and winter-run) are sexually immature

and hold in upstream freshwater for a period of time before spawning. (*Id.*; Doc. 256 at 22:1-3, 22:13-15.)

4. Spawning occurs in the upper reaches of rivers and streams in areas characterized by relatively clean gravel of suitable size, in areas where water temperatures during spawning are cool (preferably less than 57°F). (DI B at ¶7; Doc. 256 at 23:5-9, 23:9-11.) The female digs a shallow depression in the gravel (redd) where the eggs are deposited and fertilized by the male. (DI B at ¶7.) The fertilized eggs are then covered by a shallow layer of gravel. (*Id.*) Water flow through the gravel and water temperatures are two of the factors that affect hatching success. (*Id.*) After hatching, the young salmonids remain in the gravel redd until they have absorbed the yolk-sac and begin to emerge into the surface waters. (*Id.*)

5. For some salmonid species such as fall-run Chinook salmon, juvenile rearing in freshwater is relatively short (a period of months). (DI B at ¶8.) Some juveniles rear in upstream areas and migrate downstream as smolts (meaning that they are physiologically capable of the transition from freshwater to saltwater). (*Id.*) Others in the population migrate downstream shortly after emergence as fry and rear in the lower reaches of the rivers and the Delta until ready to move into saltwater. (*Id.*) In other species, such as winter-run, spring-run, and steelhead, the juveniles rear in upstream river habitat for one or more years before migrating downstream through the Delta into the ocean. (*Id.*)

6. Juvenile salmonids rear in coastal marine waters for a period of typically two to five years, where they feed on marine

macroinvertebrates (e.g., krill, amphipods, squid, etc.) and small fish. (DI B at ¶9.)

(1) Winter-Run Biology, Location and Movement.

7. The Sacramento River winter-run Chinook salmon ESU is listed as "endangered" under the ESA. 70 Fed. Reg. 37,160 (June 28, 2005). Adult winter-run Chinook salmon migrate upstream from the Pacific Ocean through the Bay-Delta estuary during November through March, moving upstream into the Sacramento River near Redding during December through April, with the greatest movement during late February through late March. (6/1 Tr. 51:25 to 52:3; DI B at Ex. 3; Doc. 256 at 22:21-26.) The adults are sexually immature when migrating upstream and hold in the mainstem river for a period of months prior to spawning. (DI B at ¶10.)

8. Spawning typically occurs in the mainstem Sacramento River downstream of Keswick Dam during April through August, with the greatest spawning activity typically taking place during May. Egg incubation occurs between April and late September. (DI B at ¶10; Doc. 256 at 23:11-13.) Juvenile rearing and emigration typically occurs between July and February in the upper Sacramento River, with juvenile migration downstream through the Delta taking place between late November and May. (DI B at ¶10 & Ex. 3.) The geographic distribution of winter-run Chinook salmon spawning is currently limited to the mainstem Sacramento River in the reach from Keswick Dam to Red Bluff. (DI B at ¶10 & Ex. 4; 6/6 Tr. 72:11-19, 73:1-3; PE 9 at 5:17-18.) However, the actual distribution of spawning and egg incubation within the reach varies among years in response to

water temperatures, adult abundance, and other factors. (DI B at ¶10.)

9. Juvenile and adult winter-run Chinook salmon use the entire Sacramento River, the Delta, and downstream bays (e.g., Suisun, San Pablo, and central San Francisco Bays) as juvenile rearing habitat and a migratory corridor. (6/6 Tr. 72:16-19; DI B at ¶10.)

10. Critical habitat for winter-run Chinook salmon has been identified to include the Sacramento River, Delta, and downstream bays to the Golden Gate Bridge. (DI B at ¶10; Doc. 256 at 25:7-15.)

(2) Spring-Run Biology, Location and Movement.

11. Adult spring-run Chinook salmon migrate upstream from the Pacific Ocean through the Bay-Delta estuary during January through mid-May, moving upstream into the Sacramento River near Redding, major tributaries such as Mill, Deer, and Butte Creeks, and the Feather River during late March through September, with the greatest movement during May. (6/10 Tr. 52:7-10; DI B at ¶11 & Ex. 5; 6/19 Tr. 16:5-7.) The adults are sexually immature when migrating upstream and hold in the mainstem river and tributaries for a period of months prior to spawning. (DI B at ¶11; 6/10 Tr. 60:25-61:1, 62:10-16; Doc. 256 at 22:28-23:4; 22:13-15.)

12. Spring-run spawning typically occurs during late-August through September, with the greatest spawning activity during September. (DI B at ¶11; Doc. 256 at 23:15-17; 6/10 Tr. 32:4-7.) Egg incubation occurs between September and January. (DI B at ¶11 & Ex. 5; *see* 6/10 Tr. 34:14-16.) A

portion of the juvenile population may move downstream as fry, while a portion rear within the upper reaches of the rivers and tributaries for one year and then migrate downstream as smolts between approximately September and early May. (DI B at ¶11 & Ex. 5; Doc. No. 256, 23:28-24:3.) Juvenile migration downstream through the Delta typically occurs between late November and August, although the majority of juvenile migration occurs during the late winter and spring. (DI B at ¶11 & Ex. 5.) The geographic distribution of spring-run spawning includes both the mainstem Sacramento River and a number of major tributaries. (DI B at ¶11 & Ex. 6.) During their seasonal period of adult and juvenile migration, the Sacramento River, Delta, and downstream bays serve as juvenile rearing habitat and a migratory corridor for both adult and juvenile spring-run. (DI B at ¶11.)

13. As a result of the seasonal migration through the Bay-Delta system, critical habitat for spring-run has been identified to include the Sacramento River, tributaries supporting spring-run, the Delta, and downstream bays to the Golden Gate Bridge. (DI B at ¶11.)

(3) Central Valley Steelhead Biology, Location and Movement.

14. Adult steelhead migrate upstream from the Pacific Ocean into downstream bays, such as Suisun Bay, during the late summer and early fall, where they forage for a period of time before migrating into upstream rivers during the late fall and winter, when upstream water temperatures are more suitable. (DI B at ¶12 & Ex. 7; Doc. 256 at 36:16-20.) Central Valley

steelhead are broadly distributed within many of the rivers and tributaries of the Central Valley, (6/6 Tr. 164:14-16), including the mainstem Sacramento, many of its upstream tributaries, the Feather, Yuba, American, Mokelumne, and Consumnes Rivers, (DI B at ¶12). There is recent evidence of steelhead occurring on other tributaries to the lower San Joaquin River. (DI B at ¶12 & Ex. 11; Doc. 256 at 35:26-27; 6/6 Tr. 175:9-11, 180:19-181:5.)

15. Spawning typically occurs in the mainstem Sacramento River downstream of Keswick Dam and within a number of tributaries between late November and April, with the greatest spawning activity during the period from January through March. (DI B at ¶12 & Ex. 4; 6/6 Tr. 168:7-10.) Egg incubation occurs between April and late September. (DI B at ¶10 & Ex. 4.) Juvenile rearing and emigration typically occurs between December and April in the upper Sacramento river. Juvenile steelhead rear within the river year-round for a period of typically one to two years before migrating downstream to the ocean. (*Id.* at ¶12; Doc. 256 at 37:11-15.)

16. Juvenile migration downstream through the Delta typically occurs between late September and May. (DI B at ¶12 & Ex. 7.) The seasonal timing of migration, spawning and egg incubation, and juvenile emigration varies somewhat among Central Valley rivers. (DI B at ¶12 & Exs. 8-10.)

B. Current Status of the Species.

(1) Overview.

17. Winter-run Chinook are listed as endangered, 70 Fed. Reg. 37,160 (June 28, 2005), and Spring-run Chinook and Central

Valley steelhead are listed as threatened under the ESA, 71 Fed. Reg. 834 (Jan. 5, 2006). The 2004 BiOp considered the impacts to these three ESA-listed species of the 2004 Operational Criteria and Plan ("2004 OCAP") for combined operations of the CVP and SWP.[17]

18. NMFS evaluates a species' viability based on four criteria: (1) population abundance, (2) productivity, (3) geographic distribution, and (4) genetic diversity. (6/13 Tr. 119:19-120:8; PE 15A at 7:4-6.) As a species' viability increases, its risk of extinction decreases. Mr. Oppenheim, NMFS's biologist, explained a species that is not viable is "almost extinct" or "on the verge of being extirpated." (6/10 Tr. 193:11-12; 6/11 Tr. 172:18-22, 173:1-2.)

19. In a 2007 report commissioned by NMFS (the "Lindley article"), the Central Valley Technical Recovery Team ("CVTRT"), of which Drs. Hanson and Swanson were members, concluded that the three species were not viable and were all in jeopardy of extinction. (6/6 Tr. 15:10-11, 36:11-17; 6/10 Tr. 8:9-11; PE 1.)

20. In the Lindley article, the CVTRT specifically recommended "secur[ing] all extant populations" of the three species "as soon as possible." (6/6 Tr. 40:8-10; PE 1 at 20.) "[E]very extant population [should] be viewed as necessary for recovery" of the three species. (6/6 Tr. 40:18-29, 41:1; 6/10 Tr. 104:6-10; 6/13 Tr. 154:7-8; PE 1 at 20.) Mr. Oppenheim

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[17] Additional background on the 2004 OCAP and the 2004 BiOp is included in the memorandum decision on summary judgment, which is incorporated by this reference. (Doc. 256.)

concurred with the CVTRT's conclusion. (6/10 Tr. 185:15-20, 188:10-16.)

21. These conclusions of the CVTRT expressed in the Lindley article are undisputed, although the Lindley article suggests criteria for judging long-term recovery goals to ultimately delist the species. (PE 1.) The Lindley article is not an official NMFS publication nor is it a recovery plan. The immediate inquiry is what jeopardy is posed to the three species' ESUs over the eight-month interim period.

(2) Winter-Run.

22. The winter-run Chinook ESU has been listed as endangered since 1994. *See* 59. Fed. Reg. 440 (Jan. 1, 1994). The ESU constitutes a single population that spawns and rears in a limited stretch of habitat in reaches of the upper mainstem of the Sacramento River downstream of Keswick Dam. (PE 9 at 5:17-18; PE 15A at 13:22-14:4.)

23. Adult escapement (the number of adult fish that return from the ocean to spawn in freshwater each year) of winter-run was relatively high during the late-1960s and through 1978 and substantially decreased throughout the 1980s and 1990s. (DI C; 6/10 Tr. 75:12-16.) Between approximately 2000 and 2006, adult winter-run returning to spawn in the Sacramento River showed an increasing trend of abundance. (6/6 Tr. 75:17-20, 188:14-16; 6/19 Tr. 34:18-20.) Adult winter-run escapement in 2006 exceeded 17,000 fish, the highest level of escapement in 20 years. (6/19 Tr. 34:21-23.)

24. Adult escapement declined markedly between 2006 and 2007, from over 17,000 fish in 2006 to approximately 2,500 in

2007. (6/10 Tr. 11:16-17, 20-2; 6/11 Tr. 173:10; 6/19 Tr. 34:1-35:3.) This level is far below the goal, established in a NMFS recovery plan, of 26,000 returning adults for thirteen consecutive years. (6/12 Tr. 198:1-15.) Adult returns have not fallen this low since the drought years of the mid-1970s. (PE 15B, Fig. 3.)

25. The cohort replacement rate[18] based on 2007 abundance estimates was less than 1.0 (reflecting a decline in replacement for the first time in recent years). (6/10 Tr. 24:8-10; DI B at ¶18; PE 9 at 5:18-6:2.) This means the winter-run are not recovering.

26. Estimates of juvenile winter-run production (known as the Juvenile Production Estimate ("JPE")) showed a generally increasing trend beginning in the early 1990's, reaching a peak in 2004 of more than 2,000,000 juvenile winter-run produced in the river and entering the Delta. (6/6 Tr. 76:9-20; DI B at ¶19 & Eh. 17.) The JPE for the winter-run was approximately 500,000 in 2005 and 1,300,000 in 2006. (DI B at ¶19.) As of May 15, 2008, the 2008 JPE, representing the offspring of 2007 spawners, was lower than average, at approximately 500,000. (PE 9 6:2-5; 6/6 Tr. 77:14-17.)

27. The results of recent unpublished data from the 2008

[18] The productivity of a species is often measured in terms of its cohort replacement rate, which is the ratio of the number of adult fish that return to spawn in a particular year versus the number of adult fish that produced them several years earlier. (PE 15A at 6:15-19.)

USFWS rotary screw trap sampling[19] at RBDD estimated that the number of juvenile winter-run migrating downstream past RBDD in 2008 is between 1,100,000 and 1,500,000 fish, which is one of the lowest estimates on record. (Tr. Day 1, 77:14-17; PE 9 6:2-5.) Since 2004, this estimate ranged from 3-8 million juveniles per year. (PE 9 6:2-5.)

28. NMFS anticipates that returns in 2008 may be about the same as in 2007, resulting in a second consecutive year of "extremely low" winter-run abundance. (6/12 Tr. 196:7-9, 196:20-197:4.) As of June 25, 2008, 136 winter-run redds have been sighted in the upper Sacramento, all located above Airport Road. (6/25 Tr. 56:6-14.) This is a marked decrease from 2005, when 948 redds had been located by this time that year. (6/25 Tr. 66:3-21.) New carcass[20] surveys indicate that, to date, there have been 218 winter-run salmon carcasses observed by boat surveys. This is a slightly higher number than observed last year at this time. (Tr. 6/25 54:13-18.)

29. The timing of winter-run spawning varies from year-to-year depending upon hydrology and water flow and temperature. Mr. Oppenheim opined that winter-run spawning is occurring later this year than normal but is within past years' range of variation. (6/25 Tr. 56:15-57:14.)

30. Because of the ESU's "extremely reduced [spatial]

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[19] Rotary screw trap estimates do not account for juvenile mortality between RBDD and the Delta. (DI B at ¶ 20.)

[20] After spawning, winter-run and spring-run Chinook salmon die. Therefore, the discovery of carcasses is used as a measure of the spawning population. (DI B at ¶15.) Steelhead do not necessarily die after spawning.

distribution[]," it is "highly vulnerable to some sort of catastrophic event." (6/13 Tr. 120:16-21.) In addition, because of reduced genetic diversity, the winter-run is "more susceptible to disease." (6/13 Tr. 121:10-11.)

31. The number of winter-run salvaged at the CVP and SWP fish salvage facilities as of May 13, 2008 was 1,316 fish, substantially lower than in recent years. (PE 9 6:10-11.) This salvage figure is less than 0.3% percent of the 2008 take limit of 11,798 fish (2% of the JPE).

32. Overall, at present, the winter-run ESU is "clearly not recovering." (6/13 Tr. 130:19-20.) An "important criterion for recovery...would be the establishment of additional independent populations located in different geographic regions." (6/13 Tr. 131:14-18; 6/18 Tr. 207:9-14; PE at 31:3-7.) All scientists conclude the winter-run population is not viable at this time because it is composed of a single population that lacks spatial diversity. (PE 1 at 13.) Nonetheless, the CVTRT concluded that winter-run ESU faces a "low" risk of extinction in the long term. (6/10 Tr. 173:4-5; PE 1 at 10.)

33. The exact causes of the sharp 2007 decline in winter-run abundance are unknown, but declines in other salmon populations that do not spawn in the Central Valley provides strong evidence that poor ocean conditions were a major factor. (PE 13 21:11-22:7.) In addition, the reduced number of juvenile winter-run this year is partially explained by the extremely dry hydrologic conditions.

34. Larger numbers of winter-run should return to spawn in

2009 because both the commercial and recreational salmon fisheries are closed this year.

35. Dr. Swanson opined that if the Bureau does not conserve cold water resources now to protect returning cohorts in 2009, and if current dry hydrology continues, winter-run egg mortality could reach 100% in 2009. (6/13 Tr. 141:1-10.)

36. Given the winter-run's low abundance levels in 2007 and 2008, "loss of the 2009 cohort represents a very, very severe [potential] adverse impact," because it will be the third consecutive cohort (out of three cohorts) to exhibit markedly low returns. (6/13 Tr. 140:11-14.) Dr. Swanson opined, in light of a second year of low winter-run abundance in 2008, we will have "run out of cohorts that are persisting in the ocean." (6/13 Tr. 140:22-141:1.)

(3) Spring-Run.

37. Like the winter-run, the spring-run ESU suffers from loss of historic upstream habitat. (Doc. 256 at 29-30, 33.) The ESU was listed as threatened in 1999. (*Id.* at 29.)

38. The ESU is also limited in its spatial structure. (6/13 Tr. 122:14-22.) There are nine populations of spring-run. Six are "dependent" populations (i.e., their spawning grounds are within the sphere of influence of Project operations) that spawn in the Sacramento River mainstem above RBDD, in tributaries above RBDD, or in the Feather River. Three are "independent" populations (i.e., their spawning grounds are outside the influence of Project operations) that spawn on Butte, Mill, and Deer Creeks, tributaries that join the Sacramento River below RBDD.

38.1. Once the largest spring-run population, totaling 20,000 adults in 1986 (6/10 Tr. 31:6-13), the population that spawns above RBDD on the mainstem Sacramento and upper tributaries "has declined precipitously and [now] persists at very[,] very low numbers," constituting approximately 10% of the ESU as a whole (6/13 Tr. 122:12-14). The 2007 Grand Tab[21] figures indicate that slightly more than 1,300 spring-run returned to spawn on the mainstem or tributaries above Red Bluff Diversion Dam. (DI J.) This population nonetheless constitutes "an important component of the spatial structure" of the ESU. (6/13 Tr. 151:8-11.) One of these populations, on Clear Creek, is the subject of one of Plaintiffs requests for emergency relief. Although that population is not presently viable, its numbers increased in recent years. (PE 9 at 7:13-14; 6/19 Tr. 138:10-13; PE 15A at 16:6-7.) The experts agree that establishing a viable Clear Creek population would benefit the spring-run Chinook ESU's recovery. (6/6 Tr. 65:24-66:6; 6/10 Tr. 30:21-23; 6/13 Tr. 16:4-22.)

38.2. The additional dependent population on the Feather River, comprises 10% to 25% of the entire ESU. (6/6 Tr. 144:13-15, 145:14-15.)

38.3. The "independent" populations on Butte, Mill,

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[21] GranTab is a spreadsheet database maintained by CDFG using data on adult salmonid abundance (based on spawning escapement) to the various Central Valley rivers and creeks, and adult harvest estimates compiled by CDFG, USFWS, and other state and federal resource agencies. (DI B at ¶15, 6/19 Tr. 73:10-74:21.)

and Deer Creeks, comprise 65-90%[22] of the spring-run ESU. It is undisputed that the close geographic proximity of these independent populations reduces the ESU's spatial distribution, increases its vulnerability to catastrophic events such as a large wildfire,[23] and decreases the species ability to cope with global climate change (6/13 Tr. 122:23-123:13), thereby increasing its risk of extinction (6/13 Tr. 150:17-20; 6/10 Tr. 174:22-25, 179:20-180:5; PE 4.26). These latter risks are not directly attributable to the Projects.

39. Overall, for the entire ESU, following a period of low adult escapement between 1991 and 1997, adult spring-run abundance in the Central Valley began to increase in 1998. (DI B at ¶39 & Ex. 37.) Adult abundance generally increased between 1999 and 2005, followed by a moderate reduction in adult escapement in 2006 and 2007. The estimated adult escapement of spring-run in 2007 was approximately 10,500 fish, which was similar to adult escapement in 2006 (approximately 10,600 fish). (DI B at ¶39; PE 9, 7:1-3.) Spring-run adult escapement did not

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[22] Dr. Hanson opined that 90% of the spring run-ESU spawn in Butte, Mill, and Deer Creeks, with the remaining 10% spawning in the upper Sacramento and its tributaries above RBDD. (6/12 Tr. 41:2-7.) However, he also testified that 10%-25% of the ESU spawns on the Feather River. (6/6 Tr. 144:13-15, 145:14-15) Including the 10% on the upper Sacramento, this leaves 65-80% remaining in Butte, Mill, and Deer Creeks.

[23] It is undisputed that a large wildfire is currently burning in the vicinity of Deer, Mill, and Butte Creeks, but the record does not reveal whether these fires will cause harm to the species or serve as the type of "catastrophe" that would measurably increase the spring-run's risk of extinction. This finding is without prejudice to any future information that might change the outlook of the independent populations.

show the magnitude of reduction in 2007 that was observed in either adult winter-run or fall-run escapement. (6/6 Tr. 139:1-3.) This is explained by differences in the size of juveniles, seasonal timing of ocean entry, differences in ocean behavior, diet, and migration patterns. (DI B at ¶39.)

40. For a number of reasons, there is limited information about juvenile production for spring-run. (6/6 Tr. 143:15-22, 144:3-9; DI B at ¶41.) Juvenile salmon monitoring occurs downstream in the Delta at Chipps Island as a part of USFWS's midwater trawl. (6/6 Tr. 78: 6-9; DI B at ¶¶21, 41.) However, it is difficult to differentiate juvenile spring-run from juvenile fall-run Chinook salmon in these samples. (DI B at ¶41.) As a result, estimates of annual abundance from the Chipps Island trawl have been combined by USFWS for both spring-run and fall-run salmon. (*Id.*) These juvenile abundance estimates are characterized by annual variation but do not show a trend of either increasing or decreasing juvenile production. (*Id.* at Ex. 39.)

41. According to Mr. Oppenheim, "any processes that increase spring-run Chinook salmon mortality in the future can have significant impacts on the population demographics and therefore on the risk of extinction." (6/10 Tr. 179:23-180:5; PE 4.26.) Dr. Swanson confirmed that the ESU's ability to achieve viability "depends on having a more diverse spatial structure." (6/13 Tr. 151:3-4; 6/19 Tr. 131:6-22, 132:4-7.) Additional factors that are preventing the ESU from becoming viable include low genetic diversity and introgression with fall-run Chinook. (6/12 Tr. 22:16-23:6.)

42. In general, the ESU has demonstrated a negative cohort replacement rate over the last four years, indicating that the species is not replacing itself. (6/10 Tr. 175:3-6; 6/11 Tr. 88:5-8; PE 9 at 7:3-5.) Trends in spring-run abundance, population, and productivity in recent years indicate that the ESU's status is deteriorating. (6/13 Tr. 122:18-22.)

43. Spring-run are not presently recovering. (6/10 Tr. 30:18-20; 6/13 Tr. 131:12-13.) Recovery goals include increasing the ESU's geographic distribution and establishing additional independent populations: "Spring-run recovery will require establishment of additional populations outside of those present in [M]ill, [D]eer and Butte Creek[s]." (6/13 Tr. 131:21-23; 6/18 Tr. 207:15-19.) For this reason, "all extant populations...should be viewed as essential to the recovery of the species," including the recently re-established Clear Creek population. (6/10 Tr. 30:21-23; PE 9 at 7:13-15.) Nonetheless, the CVTRT concluded that the ESU, based primarily on the independent populations on Butte, Mill & Deer Creeks, is at "low" risk of extinction in the long term. (6/10 Tr. 173:4-5; PE 1 at 10.)

(4) Steelhead.

44. Access to much of the Central Valley steelhead's historic and preferred spawning habitat in Sacramento River tributaries at high elevations has been blocked by dams. (6/6 Tr. 168:20-169:3.) The ESU was listed as threatened in 1998 as a result of several factors, including loss of historic habitat and declining abundance. (Doc. 256 at 35, 38-39.)

45. Recent data on the status of the steelhead is limited.

It is difficult to reliably estimate steelhead abundance due to lack of accurate monitoring information, but the experts agree that the best available information indicates that since 2004, steelhead abundance has continued to decline and that the species is consistently and presently at low abundance. (6/6 Tr. 31:8-9, 160:10-11, 162:14-19; 6/10 Tr. 93:25-94:4; 6/13 Tr. 70:25-71:3, 96:25-97:2, 104:16-18, 132:22-25.) Estimates of juvenile steelhead abundance based on results of the USFWS Chipps Island midwater trawl surveys show a declining trend in juvenile abundance between 1995 and 1997 with consistently low abundance (densities) every year between 1998 and 2007. (6/6 Tr. 163:1-11; DI B at Ex. 45.)

46. A 2005 report released by the Biological Review Team concluded:

> If we make the fairly generous assumptions (in the sense of generating large estimates of spawners) that average fecundity is 5,000 eggs per female, 1 percent of eggs surviving to reach Chipps Island, and 181,000 smolts are produced (the 1998-2000 average), about 3,628 female steelhead spawn naturally in the entire Central Valley. This can be compared with McEwan's (2001) estimate of 1 million to 2 million spawners before 1850, and 40,000 spawners in the 1960s.

(PE 9 at 38:20-39:6 (citing Good *et al*. 2005).)

47. A 2003 study by Nobriga and Cadrett approximated that 100,000 to 300,000 steelhead juveniles are produced naturally each year in the Central Valley. (PE 9 at 39:19-20.)

48. According to Mr. Oppenheim:

> Existing wild steelhead stocks in the Central Velley are mostly confined to the upper Sacramento Rivers and its tributaries, including Antelope, Deer and Mill Creeks[,] and the Yuba River. Populations may exist in Big Chico and Butte Creeks and a few wild steelhead are produced in the American and Feather Rivers (McEwan and Jackson 1996). On January 5, 2006 (71 FR

> 834), NMFS designated Feather River Hatchery steelhead as part of the DPS. The in-river produced Feather River steelhead are limited to a small area within the low flow channel where water temperatures and flow remain constant (600 cfs year round). Recent snorkel surveys (1999 to 2007) indicate that steelhead are present in Clear Creek, however, due to a large resident *O mykiss* population in Clear Creek, steelhead spawner abundance is difficult to determine. Until recently, Central Valley steelhead were thought to be extirpated from the San Joaquin River system. Recent monitoring has detected small self-sustaining populations of steelhead in the Stanislaus, Mokelumne, and Calaveras River, steelhead smolts have been captured in rotary screw traps at Caswell State Park and Oakdale each year since 1995 (S.P. Cramer 2000 to 2007) and adults have been observed moving through the fish weir in recent years (S.P Cramer 2007). Recent studies (Zimmerman *et al.* 2008) have documented Central Valley steelhead in the Stanislaus, Tuolumne[,] and Merced Rivers based on otolith microchemistry.

(PE 9 at 39:19-40:12.)

49. Steelhead populations in Deer, Mill, and Antelope Creeks are stable, but these populations remain suppressed. (PE 9 8:12-14.)

50. Low population numbers heighten the ESU's vulnerability to catastrophic events. (6/13 Tr. 19:11-16.) In light of the declining trends in population, abundance, and spatial distribution, as well as habitat loss, the ESU as a whole is not viable. (6/11 Tr. 174:2-8.) The ESU's becoming viable depends on maintaining the small populations in every stream where steelhead exist. (6/18 Tr. 19:17-21, 20:18-22.) There is no evidence that the ESU is recovering. (6/13 Tr. 132:24-25.)

51. Mr. Oppenheim testified that the steelhead ESU is presently "in jeopardy of extinction" (6/6 Tr. 37:25-38:1), while Dr. Swanson opined that it is at "high risk of extinction"

(6/13 Tr. 70:2-24, 129:21-24). The CVTRT concluded that this ESU is at a moderate to "high" risk of extinction in the long term. (6/10 Tr. 184:6-10; PE 1 at 10.)

C. Impacts from Non-Project Related (Baseline) Conditions.

52. Juvenile salmon rear in coastal waters for several years before returning to freshwater. Typically, sub-adult and adult Chinook salmon are harvested in coastal commercial and recreational fisheries while steelhead (because of their diet) are not vulnerable to ocean harvest. (DI B at ¶9.) Both adult Chinook salmon and steelhead are harvested in relatively low numbers in the inland recreational fisheries within San Francisco, San Pablo, and Suisun bays, Delta, and the Sacramento River and its tributaries. (DI B at ¶9; 6/6 Tr. 94:2-3.)

53. An NMFS BiOp for the ocean harvest of winter-run allows take of 20% of the estimated adult winter-run population annually. (DI B at ¶9.) The salmon harvested by fishermen are primarily three year old fish. (6/6 Tr. 94:8-10; 6/12 Tr. 126:14-15.) When harvest is allowed, it adversely impacts abundance and age structure. (6/18 Tr. 178:17.)

54. The salmon season, both commercial and recreational, has been closed for 2008, due to poor ocean conditions, meaning that there will effectively be no harvest through March 2009. (*See* PE 9 at 11:11-13.) This shutdown of the salmon fishing industry may result in improved survival for those cohorts still out at sea. (6/6 Tr. 135:25-136:5; 6/12 Tr. 24:9-13.)

55. It is undisputed that recent years' ocean conditions have been poor. During 2004 and 2005, standard indices that measure the abundance of salmonid food sources were

substantially lower than in prior years, resulting from a lack of ocean upwelling off the coast. (6/6 Tr. 90:23-25.) Fall-run and winter-run Chinook and Coho salmon escapement numbers exhibited marked declines in 2007, including runs that spawned and reared in coastal tributaries that are completely independent of environmental and Project-induced conditions in the Delta watershed. (6/6 Tr. 90:1-7, 90:25-91:4.) Spring-run did not show declines attributable to ocean conditions, because spring-run exhibit different seasonal timing of ocean entry and different juvenile diet at the time of ocean entry. (DI B at ¶39.)

56. It is undisputed that natural hydrologic (rainfall and climate) conditions affect Central Valley salmonid populations, both negatively (in dry years) and positively (in wet ones). (6/6 Tr. 59:18-60:11.)

57. Dam and flood control structures not related to the Projects caused significant habitat loss. (PE 9 at 17-18.)

58. Other material, non-Project adverse impacts include in-Delta water diverters; toxics and other pollutants in the water; hatchery fish, which can diminish genetic integrity and species strength; disease; predation; and alien invasive species. (PE 9 at 18-24.)

59. No party has provided an estimate of the overall, cumulative effects of non-Project impacts on the species' survival and recovery and loss of critical habitat.

E. Project-Related Impacts.

(1) Overview of Project Operations.

60. This water year, both the Sacramento and San Joaquin

Valleys are hydrologically classified as "critically dry." (7/1 Tr. 11:5-7.) This March, April, and May were the driest on record (in terms of precipitation). (7/1 Tr. 11:12-14.) The level of dryness that occurred this spring occurs in less than one percent of the years of record. (7/1 Tr. 14-18.)

61. Storage in the CVP's upstream reservoirs is very low. (7/1 Tr. 11:24-12:1.) The northern reservoirs are at their lowest levels since the end of 1992, which followed an extended (5 year) period of drought. (7/1 Tr. 12:2-3.) Inflows into the CVP reservoirs have been very low this year, ranging from between 40% and 60% of normal. (7/1 Tr. 12:4-19.)

62. The Governor of California has declared a statewide drought and drought emergencies within certain counties in the Central Valley. (7/1 Tr. 17:25-18:7.)

63. The elements of the CVP and SWP are operated together as an integrated system, in coordination with DWR, NMFS, USFWS, the California Department of Fish and Game ("CDFG"), the Western Area Power Administration, and local entities. (6/27 Tr. 117:22, 121:22-122:2-5.)

64. The Bureau operates the CVP for multiple beneficial uses, with the goal of ensuring that every release of water is used for multiple purposes. (6/27 Tr. 128:5-11.) For example, a release from a reservoir may generate power, help to meet a temperature objective, then meet an inflow standard or objective further downstream, and finally be diverted for use as water supply. (*Id.*)

65. The statutory purposes of the CVP include river regulation, storage and release of water for consistency in

streamflows, prevention of saltwater intrusion, and downstream water quality requirements. Act of Aug. 26, 1937, ch. 832, 50 Stat. 844, 850; *see also United States v. SWRCB*, 182 Cal. App. 3d 82, 135-36 (1986). As discussed above, CVPIA sections 3406(a) and (b) made non-ESA listed fish and wildlife equal priorities with water service for irrigation, and identified the Bureau's duty to operate the CVP in compliance with the ESA.

66. Under the Reclamation Act of 1902, 43 U.S.C. § 383, the Bureau must proceed in conformity with state laws, except where federal laws conflict. SWRCB Decision 1641 ("D-1641") provides that the Bureau must comply with applicable water quality requirements.

67. The Bureau gives the highest priority in its water allocation decisions to prescribed (i.e., mandatory) legal requirements that constrain its operations, including the terms and conditions of applicable BiOps under the ESA, the terms and conditions of water rights permits, settlement agreements with senior water rights holders, and water quality standards (including those imposed by D-1641). (6/27 Tr. 130:15-24.) The second tier in the priority of water allocations includes deliveries to water contractors (both agricultural and municipal and industrial) and "level two" deliveries to wildlife refuges (for restoration purposes). (7/1 Tr. 10-16.) The third tier (lowest) priority of water service needs includes power generation, incidental recreational use, and "level four" deliveries to wildlife refuges (for wildlife enhancement purposes). (7/1 Tr. 4:2.)

68. The Bureau prepares a 12-month forecast to guide its

operation of the CVP, but plans specific management actions, including specific levels of releases from reservoirs only three to four days in advance, to respond to the significant uncertainties that affect operations, including day-to-day weather conditions (including rainfall, air temperatures, and runoff) and the level of depletions or accretions within the river basins. (6/27 Tr. 119:22-23, 120:13-20.)

69. Releases from CVP reservoirs may increase ("accrete") or decrease ("deplete") as they travel to the Delta as a result of the natural migration of water through the soil of the river channels, small creeks that feed into the river systems, and diversions by riparian water rights holders (including in-Delta diverters). (6/27 Tr. 120:23-121:4; 7/1 Tr. 15:4-11.) This year, depletions are especially high -- that is, much less of the water released from the reservoirs actually reaches the Delta -- due to the very dry conditions that the Central Valley has experienced since the beginning of March. (6/27 Tr. 121:12-17.)

70. The Bureau's most recent 12-month forecast was completed at the beginning of June. (PE 12 at Att. 2.) The conditions included in that forecast are based on a 75% probability of occurrence. A 75% year is one in which conditions in the Central Valley would be wetter than the assumed conditions in 75% of years, based on the historic record. (7/1 Tr. 27:5-13.) This is a conservative forecast for conditions during the next water year, and equates to a dry or critically dry year. (7/1 Tr. 27:14-28:9.)

71. Deliveries to CVP and SWP water service contractors

have been substantially reduced in light of very dry conditions in the Central Valley. (7/1 Tr. 13:5-7.) Agricultural service contractors north of the Delta are receiving a 40% allocation this year, adjusted downward from an initial projection of a 45% allocation due to increasingly dry conditions this spring. (7/1 Tr. 13:8-20.) Agricultural service contractors south of the Delta are also receiving a 40% allocation this year, and deliveries during June, July, and August will be further limited to 35% by restrictions on Delta pumping. (7/1 Tr. 13:21-14:8.) Municipal and industrial ("M&I") contractors are receiving a 75% allocation this year. (7/1 Tr. 14:9-13.) Level two refuge needs are receiving 100%. (7/1 Tr. 14:14-19.)

72. Sacramento River Settlement Contractors are receiving 100% allocation because, under the terms of their contracts, these allocations are linked to Shasta inflow criteria that were met this year. (7/1 Tr. 17:3-4.) Similarly, the San Joaquin River Exchange Contractors (priority south-of-Delta Eastside contractors) are receiving 100% allocations because their contracts are also linked to Shasta inflows. (7/1 Tr. at 17:13-20.)

73. Between now and the end of the summer, the Bureau will generally be operating the CVP to meet temperature compliance points on the Sacramento and American Rivers, (7/1 Tr. 28:12-17), and/or to meet requirements in the Delta set by D-1641, (7/1 Tr. 28:12-17).

74. The Bureau expects that its operations will be subject to additional constraints once USFWS issues its new BiOp on the effects of CVP operations on the Delta smelt due September 15,

2008. (7/1 Tr. 29:15-21.)

(2) Shasta Reservoir/Sacramento River Operations.

75. The only remaining population of winter-run spawns and rears in the upper Sacramento River, downstream of Keswick Dam and Shasta Reservoir. (6/6 Tr. 72:16-22.) A relatively small population of spring-run also currently spawns in the upper Sacramento and tributaries above RBDD, as do some steelhead. (6/6 Tr. 144:4-9. 146:17-21; 6/12 Tr. 24:24-25:1; DI B at ¶12.)

(a) Operations.

76. Shasta operations are characterized in part by two parallel management tasks: (1) the control of temperatures on the upper Sacramento River during the summer and fall to keep temperatures sufficiently low to avoid jeopardy to fish populations; and (2) the maintenance of carryover storage ("COS") in Shasta Reservoir at the end of the water year, September 30th, the sufficiency of which affects the Bureau's ability to control water temperatures to protect fish the following summer.

77. The 2004 BiOp calls for the Bureau to maintain a target of 1.9 million acre-feet (MAF) of carryover storage in Shasta. (6/11 Tr. 1:20-2:12.) The 2004 BiOp recognizes, however, that the 1.9 MAF target might not be met in 15% to 19% of the years, the percentage of years predicted to be dry based on historic averages. (PE 3 at 107.) The Bureau currently predicts that end-of-September carryover storage for Shasta will be 1.548 MAF, approximately 350,000 acre-feet less than the target. (PE 3 at 107; PE 12 at Att. 2.) Mr. Milligan opined

that storage should be returned to 1.9 MAF by the end of December 2008. (FD C at Att. 2.) How this will benefit temperature control operations was not explained.

78. The Bureau anticipates additional constraints from the Delta smelt BiOp to be issued September 15, 2008. (7/1 Tr. 29:15-21.)

79. At the same time, the 2004 BiOp requires that the Bureau maintain 56°F or cooler flows at Balls Ferry on the Sacramento River, the so-called temperature compliance point ("TCP"), for the benefit of Chinook eggs and emerging fry, which require temperatures of 56°F or less. (*See* PE 3 at 219; PE 15A 9:27-28.) When it does not appear that the TCP can be maintained at Balls Ferry, the 2004 BiOP requires the Bureau to convene the Sacramento River Temperature Task Group ("SRTTG"). (PE 9 4-5, ¶5.)

80. The SRTTG uses real-time data, including information about Shasta's coldwater pool, throughout the season, to formulate, monitor, and implement a temperature control plan for the Sacramento River. (DI B at Ex. 16.) Members of the SRTTG include representatives of the SWRCB, NMFS, USFWS, and CDFG, among others. (DI B at Ex. 12, n.3; 6/12 Tr. 124:17-25.) Mr. Oppenheim is a member of the SRTTG. (6/10 Tr. 192:9-10.)

81. In mid-May 2008, the SRTTG recommended that the Bureau modify its releases of water from Shasta Dam to blend warmer water with cold water to conserve the coldwater pool in Shasta. (6/6 Tr. 11:1-8; 6/12 Tr. 185:8-11.) That warm water release recommendation was approved after being considered by the Water Operations Management Team ("WOMT"). (6/11 Tr. 25:24-26:12;

6/12 Tr. 26:2-12, 191:2-19.) The Bureau implemented this bypass from June 1 to June 20, 2008. (6/11 Tr. 26:2-12; 191:2-19.)[24]

82. In early June 2008, the SRTTG recommended maintenance of the TCP upstream, at Airport Road, to provide suitable habitat for both winter-run and spring-run spawners. (6/11 Tr. 12:4-6.) Airport Road is located approximately half way between Balls Ferry (at river mile 274.85) and the Clear Creek confluence with the Sacramento (at river mile 289.12). Given that Keswick Dam is located at river mile 300.90, this leaves approximately between 18 to 19 miles of habitat of suitable temperature. (*See* FD D; 6/20 Tr. 202:16-17.)

83. Moving the TCP further downstream might encourage salmon to spawn in a reach of the River where temperature cannot be controlled throughout the entire incubation period, subjecting eggs to increased mortality. (6/11 Tr. 188:19-25, 192:3-9.) According to Mr. Oppenheim, the SRTTG engages in a "balancing act between meeting the downstream requirements [in] the Delta and meeting...the carryover target and the temperature [compliance point] in the upper Sacramento." (6/11 Tr. 195:24-196:3.) Current modeling indicates that the coldwater pool at

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[24] Plaintiffs complain that the delay between the SRTTG's recommendation and the Bureau's implementation of the bypass (15-20 days) and the resulting release of cold instead of warm water was unacceptable. It is unnecessary to determine whether the Bureau unnecessarily delayed the implementation of the bypass because the undisputed evidence indicates that implementing the bypass earlier would not have conserved a significant amount of additional cold water because there was not a significant difference between the temperature of the water that could be accessed using the temperature control device and the water accessible via the bypass. (7/1 Tr. 59:19-60:5.)

Shasta will be sufficient to maintain the TCP at Airport Road through the end of September. (6/11 Tr. 30:7-11; 7/1 Tr. 72:25-73:4.)

84. The stated goal of the SRTTG is to protect 90 percent of the fish 90 percent of the time. (6/11 Tr. 17:4-6.)

85. Between now and the end of the summer, the Bureau will generally be operating the CVP to meet temperature compliance points on the Sacramento and American Rivers, (7/1 Tr. 28:12-17), and/or to meet requirements in the Delta set by D-1641, (7/1 Tr. 28:12-17). Earlier in the summer, the Bureau made some deliveries to maintain adequate flows in the Sacramento River at Wilkins Slough to facilitate diversions by riparian water rights holders. These releases did not affect the coldwater pool because they were made from a warmer part of Shasta Reservoir. (7/1 Tr. 87:15-17, 88:12-16.)

86. In some cases, once water is used to meet mandatory obligations, it can be diverted for use by water service contractors. For example, if water is released to meet Sacramento River temperature requirements, but that water is not needed to meet the in-Delta requirements of D-1641, such water may be available for diversion upstream of the Delta or for export out of the Delta. (6/27 Tr. 128:5-11.)

87. Even though the Bureau believes that releases from July through September will predominantly be allocated either to temperature control requirements or Delta water quality requirements mandated by D-1641, (7/1 Tr. 94:15-20), Mr. Milligan predicts that some water will be released from reservoirs solely for the purpose of facilitating deliveries to

water service contractors of the balance of their 2007-08 water year allocations.

88. Mr. Milligan estimated that the totality of these water service contractor releases through September 30 will be between 100,000-150,000 acre-feet through the end of the water year. He believes that this volume of releases will not significantly alter the temperature compliance point for next year. (7/1 Tr. 103:11-18.)

89. The Bureau has considered the continued delivery to contractors for the balance of the water year. The Bureau has not modeled a scenario that cuts off all non-priority water service contract deliveries for the balance of the water year.

90. In addition to the coldwater pool at Shasta Reservoir, the Bureau also draws on cold water from the Trinity River system to manage water temperatures on the Sacramento River. (7/1 Tr. 42:15-23.) Plaintiffs have requested that the Bureau be ordered to include as much Trinity water as possible in Shasta operations to preserve the Shasta coldwater pool. Mr. Milligan represented that the Bureau is already considering the feasibility of drawing more water from the Trinity River system during July and August of this year to assist with temperature management on the upper Sacramento River. (7/1 Tr. 43:17-22, 46:25-47:5.) However, the Trinity River watershed is also dry this year. (7/1 Tr. 45:22-23.) By the middle of August, the water from the Trinity River will have warmed to more than 56°F, which means that it is not useful in managing Sacramento River water temperatures (and is actually a detriment). (7/2 Tr. 42:18-23, 44:20-45:3, 45:8-11.)

(b) Winter-Run.

91. The SRTTG has limited mortality of winter-run eggs and fry to less than 4% since 2001. (PE 13 at 6:6-8; PE 3 at Ex. 3; 6/10 Tr. 190:23-191:5, 192:4-14.)

92. In setting the temperature control point, the SRTTG uses CDFG aerial redd surveys to estimate the spatial distribution of spawning winter-run salmon. (6/10 Tr. 198:23-119:16.) Although there is some imprecision to aerial surveillance, the information is routinely relied upon by SRTTG and is the best available scientific data to calibrate abundance. (6/10 Tr. 199:14-16, 201:10-25; 6/13 Tr. 78:17-79:8.) To date, all 136 winter-run redds detected in aerial surveys are located above Airport Road. (PE 13 at 5:15-17; 6/13 Tr. 78:6-16; Fed. Def. Ex. ("FD") B.) This is largely consistent with recent spawning patterns; since 2001, more than 95% of observed redds have occurred at or above Airport Road. (PE 13 at Ex. 3.)

93. Plaintiffs cite the 2008 OCAP BA, at Table 5-4, which indicates that more than 5% of winter run historically spawn below Airport Road. (DI F at Table 5-4.) But, the evidence does not establish that significant numbers of winter run have recently spawned below Airport Road. (*See Id.* at Table 5-5 (indicating that less than 1% of winter-run redds were located below Airport Road from 2001-2005).)

94. Because the vast majority of observed and predicted spawning will take place above Airport Road, moving the temperature compliance point to there is not expected to cause

any significant egg/fry mortality. (PE 13 at 6:2-4.)

95. Nevertheless, moving the TCP to Airport Road, eight miles above the 2004 BiOp's target of Balls Ferry, will reduce spawning habitat. Mr. Oppenheim opined that there will be some negative impacts from moving the TCP and suggested that in a "best case scenario" the TCP should be maintained as far downstream as possible to "provide as much habitat for the winter-run to expand into" as possible. (6/11 Tr. 186:5-10.) He also opined that there is adequate spawning habitat available above Airport Road this year to avoid superimposition of winter-run redds. (6/13 Tr. 81:4-12.) He believes there is a sufficient quantity of gravel and sufficient habitat to support a much larger population in that area. (*Id.*)

96. Dr. Hanson opined that, due to the SRTTG's adaptive management, less than 3% of this year's winter-run would be impacted by temperature control operations at Shasta and CVP operations. (6/10 at 190:24-191:5.)

(c) Spring-Run.

97. The record does not reveal specific mortality figures for spring-run salmon in the upper Sacramento. The eggs of spring-run, which spawn in late August and early September, are affected by temperature conditions on the Sacramento during those months. (6/6 Tr. 146:17-147:3.) By late October, although spring-run eggs are still incubating, ambient temperatures tend to be low enough to eliminate much of the threat of temperature stress on the Sacramento River. (6/6 Tr. 147:15-20.)

(d) Steelhead.

98. The record does not contain specific mortality figures for steelhead on the Sacramento River. Steelhead adults and eggs are not affected by Shasta TCP/carryover management because they spawn in the winter. (6/12 Tr. 44:21-45:9.) However, juveniles oversummer in Central Valley rivers and tributaries, including the Sacramento mainstem. (6/6 Tr. 165:2-12.) Because suitable habitat for juvenile steelhead is characterized by water temperatures of between 63°F and 65°F and below, (6/6 Tr. 173:19-21), temperature control management below Shasta will likely be protective of oversummering juvenile steelhead. (6/6 165:2-12; 169:22-170:5.)

(e) Worst Case Scenario.

99. In part because current operational forecasts predict only 1.548 MAF carryover storage in Shasta at the end of this water year, there is concern that if next year is also dry, there may not be enough cold water in Shasta to preserve any habitat for next year's (2009) winter-run spawners. (6/13 141:1-7, 146:16-20.) This could, under a worst case scenario, result in the complete loss of the 2009 winter-run year class. (6/11 Tr. 197:19-20, 198:7-11; 6/13 Tr. 141:5-10, 146:18-22; 6/18 Tr. 25:18-20.) Given the winter-run ESU's current "status and trajectory" toward extinction, the fact that the 2007 and 2008 cohorts are at record low numbers, and the fact that the ESU consists of a single population, the winter-run may be unable to "tolerate," i.e. to recover from, temperature failure in 2009. (6/19 Tr. 25:12-26:24.)

100. Notwithstanding the potential loss to the 2009 year

class, none of the three species will be extirpated even if temperature control was impossible in 2009, because other year classes remain in the ocean, (6/11 Tr. 190:24-199:5), although it is undisputed that the 2007 and 2008 year winter-run classes are diminished.

101. The defendants' experts opine it is preferable to protect this years' population by adaptive management, than to reserve water to to protect next years' cohort. (6/13 Tr. 82:17-23.)

102. The Bureau's discretion to hold water in Shasta is severely constrained by a variety of mandatory legal requirements, primarily temperature control requirements on the upper Sacramento and in-Delta requirements imposed by D-1641. Mr. Milligan estimates the approximately 100,000-150,000 acre-feet of water discretionarily released to water service contractors over the next nine months are minimal, (7/1 Tr. 80:22-81:4), and will not make a significant difference to next years' coldwater pool, nor will further contractor reductions improve ability to manage Sacramento River water temperatures, (7/1 82:5-83:10). As no contrary operational evidence was presented, Mr. Milligan's testimony is accepted as accurate.

(3) Impacts of Red Bluff Diversion Dam Operations.

103. The RBDD traverses the Sacramento River at Red Bluff, between river miles 241 and 242. (6/24 Tr. 5:12-13.) The dam is comprised of eleven gates across the Sacramento River that, when lowered, raise the elevation of the river to allow water to flow by gravity into the Tehama-Colusa and Corning Canals, where water is distributed mainly to agricultural users. (6/24 Tr.

6:9-18.) At peak irrigation demand, which usually occurs in mid July, RBDD diverts as much as 1,200 cfs of Sacramento River flows. (6/24 Tr. 10:4-8, 11:5-10.)

104. Initially, RBDD gates were closed year round, including the period from December through April of each year, when deliveries were made to a fish rearing facility in the Tehama Colusa Canal. (6/24 Tr. 75:2-9.) Later, when that fish rearing facility was abandoned, the gates were opened from December through April. (*Id.*) Early fish studies at RBDD demonstrated that the closure of RBDD's gates created a barrier to fish passage, resulting in delayed migration, disorientation of juveniles, and increased mortality. (DI B at 22 ¶25.) Based on the results of these earlier studies, RBDD gate operations have been modified over time to reduce the seasonal period when the gates are closed. (*Id.*)

105. Current gate operations are based on the 1993 NMFS BiOp for winter-run salmon. Under the 1993 BiOp, the gates at RBDD are required to be opened nine months of the year, from September 15 to May 14 each year for the protection of the species. (6/24 Tr. 74:15-25; PE 3 at 111-113.) This schedule overlaps the peak spring-run upstream migration period of late April through June.

106. RBDD design includes three fish ladders to facilitate fish migration, which "pass[] approximately 700 cfs." (6/20 Tr. 155:6-21.)

107. There is also an experimental pumping plant located near RBDD, which is capable of delivering 465 cfs into the Tehama Colusa Canal. (6/24 Tr. 12:9-15.)

108. There are plans to build a new pumping plant at RBDD that would have greater capacity could permit the gates to remain open year round. (6/24 Tr. 17:7-17.) The plans are currently undergoing environmental review. (*Id.*) The project will take several more years for permitting and construction. (6/24 Tr. 17:23-18:5.)

(a) Impacts to Up-Migrating Adults During Entire Closure Season (Currently May 15 through Sept. 15).

(i) Overview of Impacts to Adult Salmonids During Entire Closure Season.

109. When its gates are closed, RBDD "creat[es] a velocity barrier that prevents upstream migrating adult salmon and steelhead from passing under (or over) the dam." (6/10 Tr. 105:10-14; PE 3 at 111.) The number of salmonids actually prevented from passage is not quantified.

110. During a normal closure season, up to 15% of all winter-run Chinook and 72% of spring-run Chinook that spawn above RBDD encounter closed gates at RBDD and may be blocked or delayed by RBDD. (6/10 Tr. 55:20-25, 191:6-9; PE 20.) No known mortality rates exist.

111. The reproductive success of those winter-run and spring-run Chinook salmon that encounter RBDD is adversely affected in several ways:

111.1. Migration delays at RBDD when the gates are closed deplete adult Chinook's finite energy supplies, which are intended to last throughout their migration, holding, and spawning stages. (6/10 Tr. 108:15-20.) According to the 2004 BiOp, these delays, which can last for weeks, "may leave the

fish in a weakened state before spawning which may subject them to a greater chance of disease, especially if they have to hold over summer in warm water conditions prior to spawning (e.g., spring-run Chinook salmon)." (PE 3 at 112.)

111.2. Blockage or passage delay at RBDD may also result in "changes in spawning distribution, hybridization with fall-run Chinook salmon, increased adult pre-spawning mortality, and decreased egg viability, all of which may result in the reduction in annual recruitment of this species." (6/10 Tr. 108:20-109:7; 6/19 Tr. 96:4-10; PE 3 at 112; 6/13 Tr. 156:6-10.)

111.3. Those fish that are truly blocked by RBDD may consequently spawn below RBDD in the Sacramento River mainstem, "outside the area where tolerable environmental conditions" are maintained, thus causing "unsuccessful reproduction." (6/19 Tr. 102:8-13, 102:23-103:2, 104:22-105:4.)

112. RBDD has three aging fish ladders. These "have proven to be inefficient at certain flow levels to pass anadromous fish to upstream spawning grounds." (6/11 Tr. 69:9-15; 6/10 Tr. 106:2-23; 6/19 Tr. 95:23-96:2.) The BiOp for the planned pumping plant concluded that the ladders are "undersized and are not very successful in passing adult salmonid[s] without delays." (6/20 Tr. 179:21-180:10; PE 6 at 35.) Some, unquantified number fish are never able to pass the dam. (6/10 Tr. 55:10-12; 6/19 Tr. 97:8.) Nevertheless, it is undisputed that some salmon do pass through the ladders each year. (6/20 Tr. 155:21-25.) Fish counts in 2008 show that winter-run and spring-run have been successful at passing RBDD to the upper Sacramento River spawning grounds below Keswick and Shasta Dams.

(6/27 Tr. 55:20-24.)

113. As a result of the above-mentioned impacts, RBDD contributes to increased mortality for all three ESUs at some level that cannot be quantified. (6/20 Tr. 184) It is undisputed that elimination of RBDD gates would have benefits for all three species and their recovery. As to the plan to replace or supplement RBDD with a pumping plant, USFWS, NMFS, and CDFG all "support[] and recommend[]...return[ing] the Sacramento River at Red Bluff to pre-dam condition, the gates-out alternative." (6/11 Tr. 71:1-8; 6/13 Tr. 162:19-163:3.) Returning to year-round gates-out operations "would allow unimpeded access above and below the dam" and "represents...a substantial improvement in fish passage over the 4-month alternatives." (PE 11 at 7, 23.) The proposed pumping plant will not be complete and operative within the next few years, and certainly not within the interim period. (6/25 11:15-22.)

(ii) Impacts of RBDD to Spring-Run Adult Migration During Entire Closure Season.

114. The 2004 BiOp concludes that the impacts of RBDD are particularly detrimental to spring-run because the gate closures overlap with a greater portion of this species' seasonal migration period. (6/10 Tr. 56:6-22, 93:14-21, 109:8-12; 6/11 Tr. 91:16-20; PE 3 at 112.) Approximately 10% of the entire spring-run Chinook ESU (equating to more than 70% of the spring-run Chinook populations that spawn upstream of RBDD) encounter closed gates at RBDD. (6/6 Tr. 149:8-20; 6/11 Tr. 52:4-15.) The bulk of the spring-run upstream migration passes RBDD in May and June, with less significant numbers passing in April and

July. (TC B at ¶11.)

115. Some number of those spring-run that are delayed at RBDD, but do ultimately pass, may not be able to reach their spawning habitat in upstream tributaries before water temperatures effectively "block passage and prevent the fish from ascending the stream to cooler reaches at higher elevations." (6/19 Tr. 118:1-8.)

115.1. This includes delays to fish that might otherwise successfully spawn as part of the spring-run Clear Creek population that has been identified as "essential to the recovery of [the] species." (6/11 Tr. 52:16-20, 89:5-11; 6/13 Tr. 132:10-18; 6/19 Tr. 124:23-125:2.) Migration delays at RBDD also increase the likelihood that spring-run seeking to access the important Cottonwood Creek watershed "may encounter thermal barriers to reaching the mouth of Cottonwood [Creek]. Consequently, they may then be unable to make it to cold water to spawn. This region supports a large population, so a few thermal barriers can have huge impacts." (6/11 Tr. 57:16-58:3;,54:6-16, 59:7-20, 60:2; 6/13 Tr. 157:23-158:58.) Delays at RBDD may also cause spring-run to reach Cottonwood Creek late in the summer, when inadequate instream flows will preclude access for lack of "connectivity" with the Sacramento River mainstem. (6/12 Tr. 160:4-7.) It is not possible to quantify The likelihood of such delays occurring. (6/19 Tr. 117:24-118:18, 127:6-19.)

115.2. At the same time, the highest number of spring-run to spawn in Clear Creek over a ten year period occurred in 2007. (*Id.*) Mr. Oppenheim also explained that even

if a migration delay ultimately limits an individual spring-run from spawning in a tributary upstream of the RBDD, the fish might be able to successfully spawn in the Sacramento River. (6/12 Tr. 28:5-10.)

116. Overall, Mr. Oppenheim agreed that RBDD gate operations adversely affect the spring-run ESU's chances for recovery. (6/11 Tr. 87:21.) According to Dr. Hanson, opening the RBDD gates during June would "improve[] the likelihood of survival and the likelihood of successful reproduction" for the Sacramento River spring-run population. (6/10 Tr. 61:16-62:3.) However, spring-run are capable of, and do, spawn upstream of RBDD, as they do pass the dam. (6/12 Tr. 27:19-22.)

117. Spring-run do not spawn immediately upon reaching their spawning grounds because spring-run are not sexually mature during upstream migration and hold for a period of time before spawning. (6/19 Tr. 122:20-23, 123:7-11.) The effect of a migration delay on spring-run may be less significant than the effect on a sexually mature fish because the spring-run can mature downstream of RBDD. (6/10 Tr. 62:10-16; 117:9-23.)

(iii) Impacts of RBDD to Winter-Run Adult Migration During Entire Closure Season.

118. The Sacramento River is the winter-run Chinook ESU's only spawning habitat. (6/11 Tr. 53:17-25.)

119. The RBDD gates-closed period does not overlap with typical adult winter-run Chinook migration because winter-run move up the Sacramento River during December through April with the greatest movement during late-February through late-March. (DI B at ¶10; PE 15-A at Fig. 2; TC B.) In contrast to spring-

run, only approximately 15% of winter-run Chinook adults encounter RBDD gate closures between May 15 and September 15, 2008. (TC B.) The gates are open the rest of the year.

(iv) Impacts of RBDD to Steelhead Adult Migration During Entire Closure Season.

120. The RBDD gates-closed period does not overlap with typical adult steelhead migration because upstream steelhead migration occurs during late fall and winter. (DI B at ¶12; PE 15-A at 18:23-24; 6/12 Tr. 45:2-3.) The closure of the RBDD gates could delay 17% of those steelhead trying to migrate above RBDD, but that delay is probably not significant because steelhead have a prolonged spawning period and are therefore not as dependent on reaching the tributaries within a defined time period to hold over and spawn as are other salmonids. (6/12 Tr. 46:16-24, 47:10-19; PE 20.)

121. Moreover, only a portion of the entire steelhead ESU spawns above RBDD. (*See* PE 9 at 39-40.)

(b) Emergency Request To Raise Gates Through July 15.

122. Initially, Plaintiffs requested, on an emergency basis, that the RBDD gates be opened immediately from mid-June through July 15 and in August be opened and closed for alternating weeks. Subsequently, Plaintiffs modified their request, and now seek opening of the RBDD gates for the entire month of August.

123. The emergency request that the gates be opened immediately through July 15 was submitted for decision on June 27, 2008, after the district court granted Defendants' and Defendant-Intervenors' request to supplement the record with

additional calculations and analyses of statistical information. An oral statement of decision denied Plaintiffs' request on the following grounds:

124. Mr. Milligan testified that it would take at least three or four days to begin the process of closing the gates at RBDD, and another several days to safely drain the lake behind the dam in an orderly manner. (6/26 Tr. 53:3-23, 56:19-58:12.) Therefore, optimistically, normal "gates-open" flows would not be restored before July 1.

125. In addition, during the period just after the gates are opened, fish passage might be adversely affected for approximately one week, as the fish "fell back" in response to the increased flows. (6/25 Tr. 48:6-8.)

126. Juveniles would not benefit considerably from opening the gates between July 1 and July 15. Although, RBDD increases predation of juvenile winter-run, spring-run, and steelhead, the juveniles of those species are not typically present in significant numbers at the dam during the month of July. TCCA's Exhibit B, indicates that only 1.7% of winter-run juveniles, 0.6% of spring-run, and 3.7% of rainbow trout/steelhead pass RBDD during the entire month of July.

127. Winter-run adults would not benefit considerably from the gates being opened from July 1 through July 15. As of the end of June, most adult winter-run migrating up past RBDD have already passed. (6/11 Tr. 201:1-3.) The greatest proportion of winter-run up-migration past RBDD occurs in March and April. (TC B.) According to historic run timing records, 3.4% of the winter-run encounter the dam during the entire month of July.

(TC B.)[25] Not all of those fish will be prevented from successfully spawning.

128. Similarly, steelhead adults would not benefit considerably from the gates being opened from July 1 through July 15. According to historic run timing records, which measure passage of rainbow trout (of which steelhead is a variant) through the fish ladders at RBDD, only 9.3 percent of those trout that pass RBDD do so during the entire month of July. (TC B.) The majority of steelhead migration occurs during late fall and winter, when the gates are open. (DI B at ¶12; PE 15A at 18:23-24.) Moreover, steelhead life history patterns are such that they are not as impacted by delays in general. (*See* DI B at ¶50.)

129. The magnitude of the impact upon spring-run adults is a matter of considerable scientific dispute between the experts, however, and depends in part on the data set utilized.

129.1. Dr. Hanson analyzed three separate data sets to determine the relative percentages of the species that were impacted by RBDD for the period from June 26 through July 15, 2008. (DI L; 6/27 Tr. 47:24-50:7.) For each data set, he first

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[25] The most recent surveys of fish passage through the ladders at RBDD (the "Killam" reports) indicate that winter-run were still passing the dam during the June 26 through July 15 period (corresponding to Julian weeks 26-28). For example, in 2006, 83 of the 1,144 winter-run calculated to have climbed the ladders in that year did so between June 26 and July 15, or 7% of the ESU. (*See* TC N; 6/27 Tr. 83-8; TC M; TC N.) Mr. Oppenheim explained that there is considerable variation in run timing from year to year. (6/25 70:5-12.) In light of the historic run timing, averaged over many years, the data utilized in the Fish Passage Improvement Project EIS/R is more reliable than any given year's data.

analyzed what percentage of the entire ESU was impacted and then analyzed the proportional effect upon those populations of fish that spawn above RBDD. In order to distinguish between a mere "encounter" with the dam and a true adverse impact, Dr. Hanson made a series of assumptions about the proportion of fish that would be truly "blocked" (i.e., prevented from successfully spawning) by RBDD. Acknowledging that there is no way to know how many fish are truly "blocked" by RBDD, Dr. Hanson provided a range of estimates for each scenario (from 10%-50%), representing a hypothetical percentage of fish that encountered that dam but were effectively prevented from spawning by RBDD. (6/27 Tr. 52:21-53:3.)

129.2. These figures reflect Dr. Hanson's estimates as to the number of fish that would be effectively prevented from successfully spawning by RBDD. Although it is undisputed that no one knows the actual percentage of fish that encounter the dam that are completely blocked, there is support for his assumption that the blockage figure should not be 100%, given that some fish do pass through the ladders to spawn above RBDD. It is also undisputed that there is no data to show mortality of fish encountering RBDD.

129.3. Based upon fish ladder counts performed by Mr. Killam at RBDD in 2005 and 2006, Dr. Hanson estimated that between 0% and 0.1% of the entire spring-run ESU would be blocked by RBDD from June 26 through July 15, 2008. This equates to between 0% and 1.3% of those spring-run that spawn above RBDD. (DI-L.) The presence of spawning salmonids above RBDD confirms that the fish are capable of getting upriver

despite the dam.

129.4. Based upon historic data from Mr. Killam's fish ladder counts from 1974 through 1988, Dr. Hanson calculated that between 1.3% and 6.5% of those Sacramento River spring-run that spawn above RBDD would be blocked by RBDD. (6/27 Tr. 54:9-15, 112:20-28.) This is less than 0.1% - 0.8 percent of the entire spring-run ESU. (DI L.)

129.5. Finally, based on figures Dr. Swanson drew from a variety of sources, between 0.1% and 0.6% of the entire spring-run ESU would be blocked, which equates to 0.9% - 4.7% of those salmon that spawn above RBDD. (DI L; PE 20.)

130. Despite the fact that those populations of spring-run above RBDD are considered essential to the species' recovery, Plaintiffs conceded at oral argument that the proper measure of jeopardy is the impact to the entire ESU. (6/27 Tr. at 21-25.) When ESU-level impacts are considered, the range over all three data sets are all under 1% of the entire ESU. Even if 90% blockage (as opposed to the high end of Dr. Hanson's estimate of 50%) is assumed, the high end of the estimated number of blocked fish would be under 2% of the entire ESU. This is not an appreciable effect on the entire spring-run ESU and is not "considerable" or "significant."

131. On this record, given the lack of appreciable effect on the spring-run ESU; the limited temporal duration of the requested relief; questions about the feasibility of implementation in getting the gates open; and the extent of the experts' dispute over the scientific evidence, the proposed emergency relief at RBDD will not benefit an appreciable

proportion of the ESU, making emergency injunctive relief unwarranted. The ongoing adaptive management measures being implemented by the agencies will also provide some degree of protection to the up-migrating adults that encounter RBDD.

132. The movement of any adult salmonid migrants that might encounter RBDD during this closure season (May 15, 2008 through September 15, 2008) is largely complete for the year, and NMFS's new BiOp is expected to be completed before any of next year's adult migrants will encounter the dam. If, however, the BiOp is not completed according to NMFS's current schedule, the district court retains jurisdiction to address the need to protect up-migrating adults.

(c) Impacts to Juvenile Migration During Entire RBDD Closure Season & Plaintiffs' Request to Open RBDD August 1, 2008.

133. Juveniles of all three species also encounter closed gates at RBDD. The following table, containing data extracted from TCCA's Exhibit C (TC-C), presents the proportion of each species that encounters the dam during the closure season:

Table 1: Excerpts of Data from Exhibit TC C Regarding Juvenile Fish Passage at RBDD.

	May 15-31	June	July	August	Sept. 1-15
Winter-Run	0.0	0.0	1.3	11.8	26.3
Spring-Run	0.6	0.1	0.0	0.0	0.0
Steelhead/ Rainbow Trout	6.2	4.4	3.7	12.3	10.0

134. Gate closures are known to harm those juveniles that do encounter the dam. "The turbulence generated by the [RBDD]

gates...provides a 'feeding station' for predators to prey on downstream migrating fish." (6/11 Tr. 84:9-15; 6/13 Tr. 162:14-17.) As explained in the 2002 Fish Passage Improvement Project DEIS/EIR, "[w]hen the dam gates are lowered, predators congregate below the dam creating difficult conditions for juvenile downstream passage....Most juveniles pass below the gates and in the process are likely disoriented and vulnerable to predation." (PE 11 at 4; 6/25 Tr. 5:19-22.) Predators including striped bass concentrate near the gates when the gates are closed, and when predators are captured they are almost always found to have recently ingested salmon juveniles. (6/11 Tr. 87:3-11; 6/13 Tr. 155:2-14; PE 11 at 23.)

135. There is considerable dispute as to the extent of the predation impact. Predation rates range anywhere from less than 5%, based on unpublished estimates from a NMFS biologist, (6/12 Tr. 32:2-8), to 50%, (PE 20). Those studies which indicate predation levels on the high end of this scale date to a time when the gates are open for a longer period. (6/12 Tr. 31:12-23.)

136. Mr. Urkov testified that, according to the method applied in the Fish Passage Improvement Project DEIS/EIR, predation can only be accurately evaluated by considering when both predators and prey are present. (TC J at ¶24; *see* 6/24 Tr. 113:5-14..) In this case, the relevant potential predators are Sacramento pikeminnow and striped bass. (TC J at ¶24.) Coupling historic records reflecting the abundance of these predators at RBDD with records reflecting abundance of juvenile salmonids at RBDD, the NMFS BiOp for the planned pumping plants

at RBDD indicates that predation mortality is 26.87% in July, 5.46% in August and 13.85% in September.[26] (TC G.) Taking the information from Table 1, and combining it with these predation rates, it is possible to roughly estimate the total loss during the remaining months of gate closures at RBDD, assuming the gates remain closed for the entire, normal closure period.

Table 2: Total Juvenile Loss Due to RBDD, Based on Information Contained In Exhibits TC C and TC G.

	July	August	Sept. 1-15	Total Loss Due to RBDD
Winter-Run	1.3% * 26.87% predation = Loss of 0.34%[27]	11.8% * 5.46% predation = Loss of 0.64%	26.3% * 13.85% predation = Loss of 3.64%	4.62%
Spring-Run	0.0% * 26.87% predation = Loss of 0.0%	0.0% * 5.46% predation = Loss of 0.0%	0.0% * 13.85% predation = Loss of 0.0%	0.0%
Steelhead/ Rainbow Trout	3.7% * 26.87% predation = Loss of 0.99%	12.3% * 5.46% predation = Loss of 0.67%	10.0% * 13.85% predation = Loss of 1.38%	3.04%

137. Federal Defendants propose to schedule an early opening of the RBDD gates when 5% of the winter-run chinook juveniles have passed, as observed in the rotary screw traps,

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[26] The actual figures presented in TC G are "survival rates," the inverse of which are presented here as "predation" or mortality rates.

[27] By way of example, 1.3% of the entire winter-run ESU passes RBDD during July, according to historic records. (TC c) If 26.87% of those fish are killed by predators, that represents a loss of 0.34% (1.3% * .2687) of the entire ESU during the month of July due to predation at RBDD. Summing those total loss figures for July, August, and the first half of September indicates that 4.62% of the entire ESU will be lost to predation at RBDD for the remainder of the interim period, assuming RBDD gates remain closed through September 15, which, as discussed below, is likely not to be the case.

but no earlier than September 2. (PE 9 at 44:1-4; FD-C at Att. 3.) This action is expected to provide unimpeded passage to an additional 10% of the winter-run chinook juveniles and improve juvenile survival. (PE 9 at 44:5-6.) Assuming this year's winter-run juveniles downmigrate according to their historic pattern, opening the gates on September 2 will eliminate a large portion of the 3.4% loss that would otherwise take place in September.

138. Plaintiffs request instead that the gates be opened on August 1, 2008, to provide unimpeded access to juveniles throughout the months of August and September. This would provide only a small incremental benefit to the winter-run, spring-run, and steelhead juveniles, amounting to less than 1% of each species' ESU. The harm caused by leaving the gates closed during August is not sufficient to usurp the operating discretion of the Project managers.

139. In light of substantial scientific dispute over the efficacy of the recommended RBDD gate opening, deference is owed to the experts at the agencies, NMFS and the Bureau. The request to keep RBDD open in August is **DENIED WITHOUT PREJUDICE**. The Bureau shall implement the gate opening plan as of September 2, 2008, upon confirmation that 5% of the winter-run juveniles have passed RBDD.

(4) Predicted Impacts of Operations at Clear Creek.

140. Plaintiffs separately request that the court immediately order the Bureau to maintain at least 150 cfs flows in Clear Creek through the end of July 2008. (6/20 Tr. 77:1-3.) The Bureau's temperature management on Clear Creek will improve

conditions for approximately 190 spring-run, 1.3% of the total spring-run ESU, based on a 10-year average. (PE 13 at 9:4-8.)

141. Clear Creek is a tributary to the Sacramento River that originates on the west side of the upper Sacramento River watershed, eleven miles upstream of Balls Ferry. (6/11 Tr. 12:4-6.) The higher elevation portion of the Creek empties into Wiskeytown Reservoir, while the lower elevation portion of the creek flows downstream from the base of Whiskeytown dam to its confluence with the Sacramento River at Sacramento River mile 289.2 and is controlled by releases from that reservoir. (6/20 Tr. 200:15-202:23, 205:9-13)

142. A small population of less than 200 spring-run spawn on the lower, regulated portion of Clear Creek. (6/20 Tr. 109:8-12; PE-9 at 5-8.)

143. The Clear Creek Technical Team ("CCTT"), made up of representatives from NMFS, the Bureau of Land Management, the local Conservation District (a state entity), USFWS, the National Park Service, and CDFG, makes management recommendations to protect salmon and steelhead in Clear Creek. (6/20 Tr. 100:1-4.) The 2004 BiOp conditioned CVP operations on Clear Creek on the Bureau's cooperation with the CCTT and NMFS in the development and implementation of annual flow release and temperature requirements. (6/12 Tr. 33:16-21.)

144. The CCTT makes recommendations concerning instream flows necessary for adult salmon migration and cold water storage needed to assure adequate temperatures for egg incubation utilizing real-time information about temperature and habitat conditions. (6/6 Tr. 146:17-147:21.) The CCTT also

bases its decisions on the goal of avoiding hybridization of spring-run and fall-run and preventing loss due to superimposition of redds. (6/12 Tr. 35:5-37:6.)

145. Management of Clear Creek is also constrained by a mandatory TCP at the Igo Gage, located 7.3 miles downstream of Whiskeytown. (6/20 Tr. 204:22-205:5) This TCP is set at 60°F during the summer and reduces to 56°F on September 15. Maintenance of the TCP takes precedence over the flow recommendations of the CCTT, which are treated as a baseline. If greater flows are required to maintain the TCP, the Bureau will provide the higher flows to comply with the TCP. (6/20 Tr.96:13-15; 213:15-17.)

146. For the summer of 2008, the CCTT recently affirmed its recommendation to maintain minimum flows of 150 cfs in June and 85 cfs in both July and August. (6/12 Tr. 34:25-35:14; 6/20 Tr. 96:20-24.)

147. The Bureau's current plan of operations for Clear Creek calls for maintenance of 200 cfs through the end of June 2008, followed by 85 cfs starting in July. (6/20 Tr. 211:15-19.) If the CCTT were to change its recommendation, the Bureau sees "no reason not to implement" such changes. (6/20 Tr. 216:19-20.) There is "no operational impediment" to maintaining flows at 150 cfs beyond July 1st. (6/20 221:8.)

148. The stated purposes of the flow regime recommended by the CCTT are several-fold:

148.1. First, the 150 cfs flow is believed to serve as an attraction for spring-run that arrive at the mouth of Clear Creek in June. The higher flows are also used to

encourage spring-run to move "up as high as they can" into Clear Creek's higher reaches, so that managers can better control temperatures. (6/20 Tr. 131:23-132:7.)

148.2. In July and August, the flows are ramped down to 85 cfs in part to preserve the coldwater pool in Whiskeytown. (6/20 Tr. 215:4 (Whiskeytown has a "fairly finite" coldwater pool).) Unlike Shasta Dam, Whiskeytown has no advanced temperature control device, only a less efficient "temperature curtain." (6/20 Tr. 207:12-13.) In addition, flows are reduced to 85 cfs to prevent spring-run from setting up their redds too far downstream. For example, it would be problematic for spring-run to spawn below the Igo Gage TCP, because the Bureau might not be able to maintain safe temperatures downstream of Igo. (6/20 Tr. 101:23-102:11.) In addition, at some time during the later part of the summer, a weir is installed across Clear Creek to prevent the up-migration of fall-run salmon into the area in which spring-run are holding to prevent introgression of the runs. The 85 cfs flow in July and August is believed to help prevent spring-run from spawning below where the weir will be installed. (6/20 Tr. 96:13-24.)

148.3. Mr. Oppenheim testified that he believed maintaining 150 cfs for July would be "harmful" to the spring-run, in that it might encourage spring-run to spawn below the weir or below the temperature compliance point, subjecting them to the risks of introgression and/or high levels of mortality. (6/20 Tr. 103:1-19.)

148.4. Mr. Oppenheim also opined that, based on his review of relevant documents and sources, 85 cfs will not

present a physical barrier to the up-migration of salmonids, (6/20 Tr. 94:19-95:2), and will provide adequate spring-run passage, (6/20 Tr. 94:13-95:9, 96:5-24, 98:21-99:15, 111:1-18).

148.5. In recent years, spring-run have apparently responded positively to management on Clear Creek, showing improved abundance. (6/20 Tr. 99:11-15.) The CCTT also believes its practices have prevented hybridization of the two runs. (6/20 Tr. 114:14-20.)

148.6. There is also concern that constant 150 cfs flows from June through September would exhaust the coldwater pool in the Whiskeytown Reservoir. (6/20 Tr. 102:2-103:7, 213:10-215:12.)

149. The scientific evidence about risks and benefits is in manifest dispute. There are considerable, potentially negative operational tradeoffs that militate against maintaining flows at 150 cfs throughout July and August. In light of the conflicting expert opinions, the evidence is insufficient to justify ignoring the agencies' expert assessment and management measures.

150. The request for emergency injunctive relief as to Clear Creek is **DENIED**.

(5) Feather River and Thermalito/Lake Oroville Complex.

151. The Feather River and the Oroville Dam/Thermalito Complex are operated by DWR under a license from the Federal Energy Regulatory Commission ("FERC"). A district court has no jurisdiction to review or order modifications to Oroville/Thermalito operations, the review of which is committed to the Court of Appeals. 16 U.S.C. § 8251(b). Impacts from

operations on the Feather River will only be considered as contributions to cumulative impacts upon the three species from Project operations.

152. The 2004 BiOp sets a temperature requirement of 65°F at Robinson Riffle on the Feather River for benefit of spring-run chinook and steelhead. (6/12 Tr. 55:1-4.) DWR is expected to maintain the temperature requirements of no greater than 65°F at Robinson's Riffle. (6/11 Tr. 160:9-11.) Flows must be no less than 600 cfs year round. (6/12 Tr. 55:1-4.)

153. Spring-run Chinook and Steelhead use the Feather River for holding, spawning, rearing, and over-summering. (*See* DWR C at ¶14; PE 13 ¶23.) Available habitat on the Feather River for the spring-run Chinook and steelhead populations that use this tributary is limited to a six mile reach of the river between the fish barrier dam and the Thermalito outlet. (6/18 Tr. 17:24-18:4.) The length of habitat below the dam is constrained by physical factors other than flow. (6/11 Tr. 162:19-163:5.) This has and will continue to lead to "superimposition of redds," contributing to egg mortality, and "hybridization of spring-run and fall-run Chinook salmon redds." (6/18 Tr. 18:6-9.)

154. A recent settlement reached with FERC regarding the operation of Oroville will soon require minimum flows of 800 cfs, because such flows improve habitat conditions for both spring-run and steelhead. (6/11 Tr. 165:7-11.) However, the new flow regime called for in the FERC settlement will not be implemented before March 2009. (6/11 Tr. 164:6-17.) At the time the motion for injunctive relief was filed, DWR's

operations manager confirmed it will maintain minimum flows of 600 cfs in the Feather River low flow channel. (6/11 Tr. 162:5-8; 6/18 Tr. 77:22-78:3, 116:1-15.) Plaintiffs seek flow levels maintained at no less than 800 cfs.

155. No expert was able to quantify the potential impacts of Feather River operations on the spring-run and steelhead ESUs.

156. Feather River operations will have some, unquantified effect on the spring-run and steelhead ESUs. Current operations will cause some superimposition and hybridization of spring-run. None are expected, on their own, to be appreciable or to tip any of the species of concern into extinction. (6/10 Tr. 104:7-11.) However, these impacts must be considered as part of the cumulative impacts of Project operations.

(6) Folsom Dam/American River.

157. The 2004 BiOp sets a temperature requirement of 68°F at Watt Avenue Bridge to protect the steelhead population. (6/12 Tr. 48:3-9.) If the temperature exceeds 68°F, temperature-related mortality is possible. (6/12 Tr. 51:22-24.) The lower American River has a steelhead population, along with fall-run Chinook, and other fish species. (DI B at ¶60.)

158. There is a real-time, adaptive management group for the American River, the American River Ops Group ("ARG"), made up of representatives from CDFG, USFWS, and NMFS. (6/12 Tr. 48:23-25.) Mr. Oppenheim serves on this group. (6/12 Tr. 49:5-6.)

159. Initially, Mr. Oppenheim testified that because the coldwater pool behind Folsom Dam is now significantly reduced

from previous years, it is inadequate to provide cold water through the summer for steelhead. (6/12 Tr. 48:18-22.) However, by mid-June, the ARG had not yet finalized their recommendations for this year. (6/12 Tr. 49:9-11.) While the ARG deliberated, the Bureau maintained 68°F at Watt Avenue Bridge. (6/12 Tr. 51: 12-13.)

160. On June 25, 2008, Mr. Oppenheim reported that CDFG, a member of the ARG, evaluated five different water temperature alternatives proposed by the Bureau in May. (6/25 Tr. 57:25-58:3.) CDFG concluded, with NMFS's concurrence, that there are sufficient cold water resources to maintain a 69°F temperature compliance point at Watt Avenue Bridge, four miles below Nimbus Dam. (6/25 Tr. 58:19-22.) This would provide enough habitat so that "some number of steelhead...will be able to survive over the summer within that four miles. So it will not be a complete year class failure for the juvenile steelhead this year," and is the most beneficial alternative for juvenile steelhead (6/25 Tr. 57:22-59:2; FD G.)

161. The Bureau will add 7,000 tons of spawning gravel to the lower American River to benefit steelhead. (DI B ¶104.)

162. Although there will be some effects to steelhead on the American River caused by limited habitat availability, there will not be a complete loss of this year's juveniles. There is no evidence quantifying the amount of loss that will likely take place, but it is not expected that juvenile steelhead or redds will be isolated. Dr. Hanson opines that the Bureau's proposed operations on the American River will benefit juvenile steelhead and reduce potential adverse effects to their habitat. (DI B

¶103.)

163. American River operations over the next eight months will not, standing alone, irreparably injure any of the species, although the unquantified impacts discussed must be considered alongside other impacts.

(7) New Melones Reservoir/Stanislaus River.

164. The Stanislaus River supports a small population of steelhead. (DI B at ¶61.) The 2004 BiOp requires The Bureau to meet a 65°F temperature compliance point at Orange Blossom Road through the summer and fall to protect oversummering juvenile steelhead. (6/12 Tr. 56:5-8.) The Bureau's planned operations between now and March 2009 will meet this temperature requirement. (6/12 Tr. 56:17-18.)

165. There are no temperature requirements on the Stansislaus River for the steelhead spawning period of December to March. (6/12 Tr. 59:19-60:6.) However, winter water temperatures naturally occurring in the Stanislaus River are generally cool enough for steelhead spawning. (6/12 Tr. 60:6-7.) In Mr. Oppenheim's years of experience and opinion, the temperatures from December to February have never risen high enough to be of concern. (6/12 Tr. 60: 9-14.)

166. The Bureau's proposed operations on the Stanislaus River predict flows below 150 cfs in January, February, and March. (6/18 Tr. 22:18-21.) 150 cfs has been identified as the "optimal" flow for juvenile steelhead rearing. (6/11 Tr. 167:5-7.) Flows below this level would result in a loss of rearing habitat that would be "significant" to the small population of steelhead rearing there. (6/11 167:21-168:6; 6/18 Tr.

23:10-16.) As a result of these operations, the Stanislaus River steelhead population is expected to decline. (6/18 Tr. 21:9-12.) Losing this population, which is not predicted to occur in the near future, but could become more likely as a result of interim operations, "would represent a serious adverse impact by not only reducing the overall population abundance for the species, but also by reducing the spatial distribution of the species." (6/18 Tr. 21:13-16.)

167. Dr. Hanson opined the proposed Stanislaus River operations will benefit steelhead and relieve the effects of limited reservoir storage and coldwater pool volume. (DI B ¶105.)

168. Although the temperature compliance goals on the Stanislaus will be met, Dr. Swanson opines that flows below the optimal 150 cfs will reduce steelhead habitat for spawning and rearing, (6/18 Tr. 22:4-23:16.), reducing steelhead abundance in the Stanislaus River. Impacts to this small population could adversely impact their spatial distribution, but the magnitude of any such effects is unknown. The Federal Defendants' evidence proves by a preponderance that even absent the 150cfs flow level in January through March 2009, irreparable injury to steelhead on the Stanislaus is unlikely.

(8) CVP/SWP Export Operations.

169. It is known that juveniles of all three species may be subject to direct and indirect mortality if they are drawn into the central Delta toward the pumps.

170. Although a majority (65%-90%)[28] of the spring-run ESU, and some percentage of the steelhead ESU spawn in areas that are not controlled by Project operations, it is undisputed that the juveniles of all spawners within the three ESUs must nonetheless pass through the Delta on their way out to sea.

171. The winter-run juvenile outmigration runs from December through May with its peak in February. (6/12 Tr. 99:22-25.) Spring-run juvenile migration typically runs from late November through August, beginning with the first pulse of rains or a storm event and peaks in April. (DI B ¶11 & Ex. 5; 6/12 Tr. 37:13-17, 102:9-16.) Steelhead outmigration from the San Joaquin River peaks in the Delta in February; their outmigration can extend through June. (6/12 Tr. 60:20-22, 61:8-12.)

(a) Sources of Juvenile Mortality.

(i) Direct Mortality.

172. Direct mortality of juvenile salmonids results from entrainment at CVP and SWP pumping facilities. (6/11 104:10-12.)

173. Some entrained salmon and steelhead may be salvaged and returned by truck to another part of the Delta, but a "large proportion are lost directly to entrainment." (6/18 Tr. 29:19-22.) Salmonids have a greater ability than some other species of fish, like the Delta smelt, to survive salvage due to their size and swimming ability.

174. The number of fish "taken" at the pumps is calculated

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[28] *See supra*, note 22.

using a "combined loss estimate." That estimate is derived from periodic samples of salvaged fish. Fish screens are in place at the pumping plants with the goal of salvaging fish before they become entrained in the pumps. Periodically during operations, a portion of the salvaged fish are retained and counted. These counts are used to estimate the numbers of fish from each species that are salvaged by the pumps over longer periods of time. (6/6 Tr. 85:18-87:1.) Take is calculated based on these expanded salvage numbers and a number of other figures, including the estimated amount of "pre-screen" mortality -- the number of fish that encounter the screens at the SWP pumps, but die. (6/6 Tr. 86:23-87:1.) Many studies have attempted to quantify the level of pre-screen loss at each of the facilities. The average of these studies indicates that the SWP has an 85% pre-screen loss rate. (6/10 Tr. 76:19-22.) However, agency scientists determined that it is more appropriate to assign a 75% loss rate to SWP facilities. (6/10 Tr. 76:6-9.) Average pre-screen loss at CVP facilities has never been quantified but is estimated at 15%. (6/10 Tr. 76:6-9; 6/11 Tr. 110:9-15.)

175. These estimates of pre-screen mortality may be overly optimistic. For example, the 15% estimate for the CVP is based on studies conducted at the Glen-Colusa Irrigation District facility, which has a more effective fish screen than CVP facilities in the Delta. (6/10 Tr. 76:7-8; 6/11 Tr. 110:10-24.) The 15% loss estimate also fails to account for loss during times when the fish screens are removed for cleaning, which is approximately 10% to 25% of the time. (6/11 Tr. 110:25-111:17.)

176. It is undisputed that, in general, the loss of

juveniles at the pumps increases as the level of exports increases. (PE 13 at 12:10-11.) Studies show that lower export/import ratios are more protective for migrating salmonids. (6/11 Tr. 125:8-11.) Pumping operations are currently restricted to a 35% export/import ("E/I") ratio starting February 1 for the protection of winter-run Chinook migrating through the Delta. (6/11 Tr. 120:23-121:4.)

177. Salvage levels and loss are also affected when inflow is low and export rates are high. (PE 13 11:8-13.)

178. On this basis, NMFS has recommended that the Bureau limit the E/I ratio to 35% in January as well, but the Bureau has rejected this suggestion. (6/11 Tr. 126:13-18.)

179. A recent study by Dr. Wim Kimmerer also indicates that as export rates increase, proportional loss of salmonids may increase at greater than a linear rate. (6/11 Tr. 137:20-25; PE 14B at 19.)

(ii) Indirect Mortality.

180. Delta operations also cause indirect mortality and other sub-lethal impacts by diverting juveniles into the central Delta, where they suffer increased exposure to predators, toxics, temperatures, and other environmental hazards. (6/11 Tr. 104:6-17; 6/18 Tr. 29:13-30:14, 34:21-35:13, 55:23-56:13; 6/13 Tr. 49:7-11, 51:14-20, 53:1-3, 56:4-11.)

181. The evidence does not reliably show the magnitude of indirect mortality.[29] According to the 2004 BiOp, under the

[29] Dr. Hanson examined the relationship between the juvenile winter-run production estimate upstream and subsequent estimates downstream to estimate overall juvenile survival in the

"best case scenario," due to indirect mortality from baseline (i.e. pre 2004-OCAP) pumping rates, losses are estimated at 33% for all three species. (6/18 Tr. 58:7-17; PE 3 at 195.) Only a portion of this 33% loss is actually attributable to Project operations, while a substantial but unquantified proportion of the remaining indirect mortality in the Delta is caused by other, non-Project sources of mortality, that occur with or without Project operations, such as toxics, invasive species, temperatures, instream diverters, and others. (*See* PE 3 at 84, 194.)[30]

182. The BiOp suggests that "the increased mortality associated with the indirect effects of moving water and fish across the interior of the Delta can range from 4 to 40 percent in the baseline for the juvenile population entering the Delta." (PE 3 at 190.) Mr. Oppenheim testified that assuming indirect mortality of 50% was "realistic." (6/13 Tr. 46:11-18.) Dr. Hanson opined that mark-recapture survival studies conducted

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Delta. He opined that there was not a major change in juvenile survival rates in 2004, suggesting something other than Delta mortality was responsible for the low adult escapement in 2007. (DI B at ¶27.) Even assuming this is true, the lack of a relationship between juvenile survival rates and the 2007 escapement does not reveal the extent to which juvenile mortality during the interim period will impact the currently low population of winter run.

[30] Mr. Oppenheim suggested that the portion of this 33% attributable to Project operations may be as low as 1% or as high as 16%. He provided no basis for this assertion. It appears he may have referred to figures from the BiOp's discussion of the increased indirect mortality (1%-16%) that may occur as a result of increased pumping proposed as part of the 2004 OCAP. (PE 3 at 193.)

using juvenile Chinook salmon and steelhead have shown that mortality within the Delta is "typically high," although it is not possible to quantify "either the incremental impacts of individual sources of mortality or the relationship between increases or decreases in SWP and CVP export operations on the vulnerability of juvenile salmon to these sources of mortality." (DI B at ¶31.)

183. The increased pumping rates proposed as part of the 2004 OCAP may enhance indirect mortality losses by a range of 1% to 16%. (PE. 3 at 193; 6/18 Tr. 58:24-59:5.) Mr. Milligan opined it was imprudent to provide any assurances that combined pumping rates would not exceed 7,000 cfs and opined that such a cap would be inconsistent with the Bureau's operational responsibilities. (7/1 Tr. 112:17-113:3.)

184. Monthly pumping at the SWP's Banks pumping plant July through September will be significantly less than normal, with an estimated pumping rate of between 2,000 and 4,000 cfs, compared to a 2007 average of 6,200 cfs and a 2006 average of 7,000 cfs. (DWR Ex. C at ¶¶38-39.) The CVP's Jones pumping plant will operate July through September at capacity (about 4,500 cfs). (FD C at ¶28.)

185. Because of the critically dry hydrologic conditions, SWP exports are expected to average less than 2,500 cfs from the beginning of October through the first substantial rains. (DWR C at ¶48.) From mid-December through mid-March, the Army Corps of Engineers permits a maximum export rate from the SWP's Banks pumping facility of 6,680 cfs plus one third of the San Joaquin River inflow as measured at Vernalis. (*Id.* at ¶50.) Federal

Defendants provided no parallel operational prediction for Jones.

186. Substantial uncertainty about indirect juvenile mortality prevails. The best that can be said from the record is that indirect juvenile mortality, including both baseline and Project effects, may range anywhere from 4%-50%.[31] The conclusory opinions of Dr. Hanson and Mr. Oppenheim that interim Project operations will not tip the species toward extinction do not explain the extent to which indirect mortality levels, taken together with other impacts, will harm the species.

187. Although the agencies are only required to rely on the best available science, they must nevertheless reasonably justify their conclusion that indirect mortality rates will not cause jeopardy. They have not done so.

(b) Protective Measures.

(i) Incidental Take Limits.

188. To address and monitor, at least in part, direct loss due to export operations, the 2004 BiOp contains an incidental take statement for all three species at the pumping facilities. (PE 3 at 205-212.)

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[31] Defendant intervenors correctly point out that this figure, along with the other juvenile mortality rates discussed in these findings, must be viewed in light of the fact that salmonids have evolved to withstand high rates of juvenile mortality. Out of the thousands of eggs produced by any single female, only two need to survive to adulthood to sustain the population. (DI B at ¶6.) The key question is whether Project operations contribute significantly to increasing the mortality rate to levels that result in a population that cannot survive and recover.

188.1. For winter-run, the take limit is two percent[32] of the estimated number of juvenile Sacramento River winter-run Chinook salmon annually entering the Delta. (PE 3 at 218.) This year's incidental take limit is 11,798; through July 3, 2008, only about 1,300 winter-run have been taken at the pumps, which is well within the limit, even assuming underestimation of pre-screen loss. (6/12 Tr. 2:24-3:5, 5:10-15.) No more winter-run are expected to be taken by export operations through September 30. (6/11 Tr. 3:2-5.)

188.2. The spring-run incidental take limit at the pumps is one percent. (6/12 Tr. 38:4-23.) For 2007-2008 water year, the actual take has been less than half of a percent, which is within this limit. (*Id.*)

188.3. The incidental take limit for steelhead at the Project pumps is fixed at 3,000 juveniles per year. (6/12 Tr. 61:3-4.) For the 2007-2008 water year, approximately 970 steelhead have been taken. (6/12 Tr. 61:6-7.)

189. For a number of reasons, Plaintiffs argue that all three incidental take limits are inappropriate and inadequate.

189.1. First, Plaintiffs contend that the take limit

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[32] NMFS concluded that a 1% take limit is appropriate for winter-run Chinook, but set the take limit in the BiOp at 2% based on an assumption that approximately half of salvaged fish identified as winter-run are not actually winter-run. (PE 3 at 218; 6/13 Tr. 56:17-57:1.) Dr. Kimmerer's recent study, based on marked fish, showed that the proportion of entrained fish that are actually winter-run is actually "much higher" than 50%. (6/11 Tr. 136:11-14; 6/18 Tr. At 65:11-15.) However, even if one assumes that the take limit should actually be 1% of JPE, or 5,899 (one half of 11,798), this year's take will still be within the two percent take limit authorized by the 2004 BiOp. (6/12 Tr. 5:10-15.)

for winter-run is flawed because it is based on an uncertain estimate of juvenile abundance, the JPE. The JPE for winter-run is derived from a variety of data, including carcass surveys, water temperature monitoring, estimates of egg hatching success and fry rearing, and expected levels of mortality. (6/6 Tr 83:24-84:16, 198:15-199:4; DI B at ¶16.) The JPE is then adjusted to account for mortality of juveniles before they reach the Delta. (6/6 Tr. 84:16-85:25, 199:1-4.) It is still highly uncertain and has large error bands. (6/6 Tr. 199:5-200:19; 6/10 Tr. 85:1-7; 6/11 Tr. 42:5-7 (Hanson); 6/18 Tr. 33:4-34:20 (Swanson).) Nevertheless, the JPE for winter-run has been validated using independent estimates. (DI B at ¶16.)

189.2. Plaintiffs assert that the method used to estimate spring-run juvenile abundance relies on a different, uncertain estimate, based on a percentage of the number of late fall-run Chinook estimated to enter the Delta. (6/18 Tr. 67:22-68:13.) Plaintiffs suggest that using data from Chipps Island trawl surveys would produce a more realistic estimate of the juvenile population, but provided no convincing evidence as to why this estimate, which has yet to be put to use for a regulatory purpose, (6/13 Tr. 166:10-12), is more reliable for the purposes of estimating juveniles entering the Delta than those currently being used by the agencies. The agencies are using the best available scientific means of estimating juvenile abundance.

190. Plaintiffs next argue that the method used to calculate level of "take" at the pumps is flawed. First, the pre-screen loss assumptions of 75% at the SWP facilities and 15%

at the CVP facilities fail to consider those fish that are lost while fish screens are removed for cleaning, nor do they account for the fact that the screens themselves may only be "50%" efficient. (6/18 Tr. 31:12-32:7, 67:10-17; 6/11 Tr. 108:9-18, 111:12-17; 6/12 Tr. 3:19-21.) Plaintiffs also argue that pre-screen loss assumptions erroneously assume that any fish released back into the Delta after salvage will survive. In reality, predation loss of salvaged fish may be very high. (6/18 Tr. 32:9-19.) This evidence raises questions about the ability of the take calculation to precisely estimate the amount of take at the pumps, but no better methodology or science was presented as available. It is indisputable that salmonid salvage results in some surviving fish.

191. Plaintiffs argue that the take limits are simply unjustified, as they have not been shown to be sustainable for current populations.

191.1. The same argument was raised in cross-motions for summary judgment in the delta smelt case. The Delta smelt decision concluded that the smelt take limits were arbitrary and capricious because they were based on historic take and did not account for current information regarding large declines in population abundance. (*Kempthorne*, Doc. 323 at 86-93.) Here, the take limits were not directly addressed during cross motions for summary judgment and the issue is rased for the first time in these evidentiary proceedings.

191.2. As to the winter-run and spring-run, the take limits do incorporate up-to-date information about population abundance. As a matter of simple logic, 1%-2% of a juvenile

population that can experience huge losses and still replace itself is inherently small. However, these losses must, be considered in light of other, cumulative impacts.

191.3. In contrast, the salvage rate for steelhead, set at 3,000, is not explained in relation to that ESU's abundance. Neither the Administrative Record nor the trial evidence provides an explanation for the 3,000 fish limit. The steelhead population is declining in abundance. (6/6 Tr. 162:15-19.) The 2004 BiOp's 3,000 fish take limit is less protective as the population declines. (6/13 Tr. 58:17-59:9.)

191.4. The current take of steelhead since October 2007 is 970 fish. The 2004 OCAP BiOp indicates that, from 1993 through 2003, the salvage of Central Valley steelhead ranged from 461 to 16,537 fish during the sampling season from October through June, for an average of 3,719. (PE 3 at 210.) The BiOp indicates that "[g]enerally, these fish are returned alive to the Delta waters through collection, trucking and release program at the CVP and SWP pumping facilities." (*Id.*) The BiOp goes on to state:

> The combined cumulative salvage of unmarked juvenile and adult Central Valley steelhead at the CVP and SWP Delta pumping facilities is not expected to exceed one percent of the previous years' estimated juvenile steelhead production based on Chipps Island Trawl data. The juvenile production estimate (JPE) for steelhead will be developed by NOAA Fisheries in consultation with DFG and FWS. For the year 2004-2005, and until a suitable JPE is developed, the combined cumulative salvage at the CVP and SWP pumping facilities is not expected to exceed 3,000 juvenile steelhead.

(PE 3 at 211.) The actual take limit provides:

> Reclamation and DWR will monitor the loss of Central Valley steelhead at the CVP and SWP Delta pumping

> facilities and use that information to determine whether the cumulative estimated level of loss is expected to exceed one percent of the juvenile production estimate (JPE) for steelhead entering the Delta. Until such time as a suitable JPE has been developed, the cumulative take at the CVP and SWP delta pumping facilities shall not exceed 3,000 steelhead (juveniles and adults combined). If the take level anticipated for Central Valley steelhead is exceeded, Reclamation and DWR shall immediately convene the Water Operations Management Team to explore additional measures which can be implemented to reduce the rate of take. If suitable measures to reduce the rate of take can not be implemented, consultation shall be reinitiated immediately.

(PE 3 at 218.)

191.5. The evidence does not measure what percentage of the overall steelhead ESU the 3,000 fish take limit represents. The parties disagree whether there is a "suitable" JPE. If the steelhead take limit is reached, adaptive management measures through the WOMT are required to be implemented, however, by then, appreciable harm to a non-viable, non-recovering species may have occurred.

(ii) Delta Cross Channel Operations.

192. In the past several years, the Delta cross-channel gates have been closed December 1st, which is within the 45 day period between November and February when those gates can be discretionarily closed if there is a large pulse of chinook moving through the Delta. (6/12 Tr. 11:21-12:1.) Closure of the Delta cross channel gates keeps the juvenile salmonids in the mainstem Sacramento River, where survival is higher. (6/12 Tr. 12:9-12, 79:2-8.)

193. After February 1, D-1641 requires closure of the Delta cross-channel gates through the end of May. (6/12 Tr. 12:4-6, 104:4-10.) D-1641 also mandates a 35% E/I ratio from February

through June. (6/12 Tr. 69:2-70:11.) The E/I ratio is a cap on the volume or rate of Project exports. (6/12 Tr. 103:2-4.)

194. There is no evidence that the Delta Cross Channel operations will cause irreparable injury to any of the species.

(iii) Salmon Decision Tree.

195. The Salmon Decision Tree is an adaptive management approach utilized to minimize take by export operations. The updated salmon decision tree, (FD A), superceded the version relied on in the 2004 BiOp, (6/13 Tr. 83:6-8).

196. Under the salmon decision tree, defined triggers, broken down by time periods, compel the fishery managers to recommend particular export reduction rates to the WOMT. (6/12 Tr. 7:23-8:13, 10:22-11:16, 12:22-13:10, 14:19-15:2.) WOMT routinely responds to a fishery recommendation in less than two weeks. (6/13 Tr. 85:9-12.)

197. The recommendations stand even if there are no (b)(2) or EWA assets available. (6/13 Tr. 5:1-5.)

198. Plaintiffs complain that the Salmon Decision Tree is uncertain and unenforceable as was the smelt DSRAM. Mr. Milligan testified that when the Salmon Decision Tree calls for measures that are necessary to protect a listed salmonid, the Bureau considers such actions to be mandatory, provided any conflicts with the interests of other listed species are resolved. (7/1 Tr. 120:16-22.) He testified that such recommended measures have actually been implemented, contrary to the smelt DSRAM under which no action was ever taken.

199. The USFWS BiOp on Delta smelt is due September 15, 2008. By November 2008, NMFS and the Bureau will evaluate any

winter pumping restrictions imposed by that BiOp and determine what additional actions are necessary to protect juvenile winter-run, spring-run and steelhead in that wintertime period. (6/12 Tr. 17:2-13.)

200. The evidence establishes that, to the present, the Salmon Decision Tree has actually worked to effectuate remedial measures to protect listed salmonids from Project operations. This remedial approach is benefitting the species and their habitat. The magnitude of impacts with and without the Decision Tree are unquantified.

(c) Summary of Delta Impacts.

201. Export operations have negative impacts upon the three ESUs. The take limits at the pumps (2% for winter-run; 1% for spring-run; and 3,000 individuals for steelhead) are not close to being exceeded in the 2007-08 water year, nor, according to Defendants' experts will they be through March 2009. Plaintiffs' expert did not opine that any take limit would be exceeded over the next nine months. Other than the opinions of the defendants' biologists that 2007-08 operations will not result in extirpation of any species, tip the three species into extinction, or result in any loss of critical habitat, the effectiveness of the take limits is uncertain. It is undisputed that the flat take limit of 3,000 for steelhead is not based on recent population abundance and no explanation has been given for how it was derived.

202. Tying indirect mortality of juveniles to Project operations remains imprecise, i.e., indirect mortality to juveniles could be anywhere from 4%-50%.

203. Implementation of the Salmon Decision Tree, protections at the Delta Cross Channel, and the Export/Import restrictions imposed by SWRCB decisions benefit juvenile salmonids passing through the delta.

C. Analysis of Overall Irreparable Harm/Jeopardy During Interim Period.

The seminal question is whether, overall, Project operations during the remainder of the interim period (through March 2009) will irreparably harm the species' ESUs. The inquiry focuses on whether interim Project operations appreciably (i.e., significantly or considerably) diminish the species' chances of survival or recovery and/or appreciably (i.e., significantly or considerably) diminish the value of the species' critical habitat.

(1) Critical Habitat Analysis.

204. It is undisputed here that any impacts to critical habitat over the interim period will be temporary in nature. The experts disagree about the extent of impacts that will result. Rather than involving permanent changes to the physical components of the habitat, which are the rivers and tributaries of the delta, any such short term habitat changes will temporarily impact spawning, rearing, and migration conditions, which may in turn impact species' abundance and distribution. The legal question raised by the parties, whether temporary modifications to critical habitat can ever constitute the kind of considerable diminishment of critical habitat that warrants the issuance of injunctive relief, need not be answered. Instead, where potential habitat effects are directly linked to

population impacts, it is reasonable to conclude that any habitat effects caused by interim operations are subsumed in the analysis of the impacts of interim operations upon the species' chances of survival and recovery. Obviously, the critical habitat changes daily based on hydrologic, temperature, and flow conditions. It is further impacted by other effects not related to Project operations.

(2) Will Interim Project Operations Appreciably or Considerably Diminish the Species Chances of Survival and Recovery?

205. The Federal Defendants bear the burden of proof to show non-jeopardy. Specifically, they must establish that Project operations will not considerably reduce the species' chances of survival and recovery or significantly adversely affect its critical habitat.

206. Of the more than 3,000-7,000 eggs produced by any spawning female, depending on the species, only two need to survive and successfully reproduce for the population to remain stable. Even assuming, arguendo, baseline and Project impacts combine to result in 90% mortality, the 10% remaining would, in theory, be sufficient to sustain the population. In practical fact, there is such imprecision in the mortality figures, that it is impracticable to determine with any reasonable degree of certainty what the total mortality (including baseline conditions) is for juveniles of these three species from Project operations. By contrast, in *NWF v. NMFS I*, over 80% of the juvenile salmon population was killed by project operations. Here, after four weeks of evidence, it cannot be determined whether overall juvenile mortality is 5% or 75%.

(a) Conclusions Re: Winter-Run.

207. The CVTRT concluded that the winter-run population is not currently viable. The population is not recovering. Abundance has been particularly low in 2007 and 2008.

208. Nevertheless, the CVTRT concluded that the species was at a low risk of extinction in the long run. Defendants emphasize it is not remotely probable that the population will fall below the failsafe minimum required for species viability of 200 adult fish as a result of the next eight months of Project operations. (PE 13 3:5-7.)

209. Beneficially, there will be no ocean harvest in 2008. This should result in improved escapement for the 2009 cohort.[33] At least two cohorts are in the ocean, which will return in the next two years.

210. There will be fairly low egg and fry mortality due to Shasta operations this year, on the order of less than 4%.

211. Because of low carryover storage in Shasta predicted for the end of this water year, there may be some additional, unquantified risk of mortality to the 2009 winter-run cohort. However, Bureau modeling indicates that even if next year is relatively dry (based on 75% modeling), there will be enough of a coldwater pool to provide the winter run with at least some habitat in which to spawn. Complete loss of a year class or the

[33] Voluntary suspension of the harvest for 2008, at the expense of the fishing industry, lessens the chance that Project operations will drive the species to extinction during the interim period and reduces the justification for judicial intervention during the interim period.

entire species appears unlikely.

212. Winter-run juveniles may experience a very small degree of increased mortality during the months of July and August at RBDD, on the order of 1%. Protective measures will be effectuated by September 2nd if 5% of the winter-run juveniles have passed as of that date.

213. Nonetheless, the potential mortality due to Delta pumping is very uncertain. Direct loss may be as high as 2% if credence is given to Kimmerer's studies that show that far more than 50% of those Chinook counted as winter-run are actually winter-run. The magnitude of indirect loss is totally unclear, and may range from 4-50%. If indirect loss is 50%, regardless of the contribution of the Projects to that figure, cumulative impacts on winter-run juveniles before they reach the ocean will be over 50%, because of the upstream impacts (3-4% mortality due to Shasta temperature control operations and 1-2% mortality due to RBDD operations through September 2). If 500,000 winter-run juveniles are produced this year, approximately 5% will be lost due to upstream impacts (leaving 475,000), and another 50% will be lost due to direct and indirect loss caused by the export facilities, that leaves less than 250,000 to survive the other causes of mortality not related to Project operations.

214. In light of the ESU's currently depressed levels and geographic isolation, and the totally uncertain effects of the Projects' Delta operations, which could result in mortality of more than 50% of downmigrating juveniles notwithstanding other impacts to the ESU, the Federal Defendants have not proved that interim operations will be non-jeopardizing to the survival and

recovery and critical habitat of winter-run. A worsening of the conditions of a non-viable, non-recovering population meets the irreparable harm standard.

(b) Conclusions Re: Spring-Run.

215. Unlike the winter-run, spring-run escapement did not exhibit dramatic declines in recent years. Nonetheless, that population is not viable and is not recovering. However, the CVTRT concluded that the ESU is at low risk of extinction.

216. The portion of the ESU that spawns in the upper Sacramento, above RBDD (approximately 10% of the total ESU), is subject to the same temperature control conditions as the winter-run, although their egg incubation period runs later into the fall, including a period of time during which there is no mandate to maintain a temperature compliance point. The evidence suggests that spring-run are no more affected by temperatures on the Sacramento than are winter-run. It may be inferred that spring-run suffer less than 4% mortality in the upper Sacramento River.

217. Spring-run juveniles should not experience increased mortality during the months of July and August at RBDD, as their downmigration does not overlap with the gates closed period.

218. There are small spring-run populations on tributaries to the Sacramento River above RBDD. One of those populations, on Clear Creek, is being managed to the best of the Bureau's ability to avoid introgression with fall run. The mitigation activities undertaken to accomplish this are somewhat detrimental to individual spring-run spawners, although not to an extent that justifies interference with the Bureau's choice

to prevent introgression.

219. The majority of the ESU (between 65%-80%) spawns in the independent populations at Butte, Mill, and Deer Creeks. (*See* TC L.) These populations, because of their geographic proximity to each other, are vulnerable to catastrophic events, including large wildfires. A large wildfire is currently nearby, but there is no evidence that suggests a significant level of adverse impact will result.

220. As is the case with the winter-run, the potential mortality due to delta pumping is very uncertain. Even assuming direct take is limited to 0.5%, it must be considered with other impacts. The magnitude of indirect loss is unclear, and may range from 4%-50%. The uncertain scientific evidence submitted by Defendants on the extent to which Delta impacts (direct and indirect) will affect the species' ability to survive and recover and the value of their critical habitat does not satisfy the required non-jeopardy showing.

221. All juveniles from the entire ESU, whether reared in streams influenced by Project operations or elsewhere, must pass through the Delta on their way to the ocean.

(c) Conclusions Re: Steelhead.

222. Information regarding steelhead abundance is very sparse.

223. Steelhead populations on the Sacramento, American, Feather, and Stanislaus rivers will be adversely impacted by Project operations to some degree. The magnitude of these impacts is not determinable on the evidence submitted, but it is more than insignificant because every population must be

preserved.

224. A small proportion (approximately 1%) of steelhead juveniles migrating down the Sacramento past RBDD during July and August, will be killed by predators there.

225. The Lindley paper found that populations of steelhead on Battle Creek, and the Feather, American, and Mokelumne Rivers, where hatchery fish are the majority of the spawning run, are at high risk of extinction. (6/19 Tr. 19:2-16.) This is disputed by defendants.

226. In addition, at least some steelhead will be impacted by Project operations in the Delta.

227. Indirect take is unquantified, and may range from 4%-50%.

228. The steelhead incidental take limit is 3,000. As of early July 2008, take since October 2007 was 970 fish. The existing take limit for steelhead at the Delta is not scientifically justified. This, coupled with other impacts steelhead will experience elsewhere within the system, make it impracticable to determine how jeopardizing the overall Project effects on steelhead will be.

229. The Federal Defendants' burden of proof to show the absence of jeopardy requires a showing that Project operations will not significantly adversely impact the species' survival and recovery and its critical habitat. Although Defendants' experts have opined that the steelhead will not be extirpated or tipped into extinction, the evidence does not establish that Project operations will not cause appreciable harm to the steelhead's survival and recovery and the maintenance of its

critical habitat in the next eight months.

IV. CONCLUSION

230. All three testifying experts and the Central Valley Technical Recovery Team, in its 2007 report, conclude that the three salmonid species are not viable and are all in jeopardy of extinction. NMFS' biologist testified that a species that is not viable is "almost extinct or on the verge of being extirpated." Dr. Hansen opined that every extant population must be viewed as necessary for recovery of the three species. All three experts agreed that extinguishing or reducing any single population within any of the three ESUs would diminish the ESU's viability and increase the risk of extinction. Based on two drought years, with critically dry hydrologic conditions in 2008, and the presently unpredictable risk of a third dry year, the three species are unquestionably in jeopardy. The ESA does not permit jeopardy to a listed species to be considerably increased during a BiOp reconsultation. Project operations through March 2009 will appreciably increase jeopardy to the three species.

231. Mr. Oppenheim and Dr. Swanson testified that the winter-run is at high risk of extinction.

232. Mr. Oppenheim opined that "any processes that increase spring-run Chinook mortality in the future can have significant impacts on the population demographics and, therefore, run the risk of extinction." The 2004 BiOp predicts a high probability of extirpation of the spring-run populations in the Sacramento

River mainstem and Feather River. The condition of the species and its critical habitat in 2007 and 2008 have worsened.

233. The steelhead ESU is presently comprised of small populations, vulnerable to catastrophe and possible extirpation. NMFS predicts a steep decline in the steelhead population in the San Joaquin River Basin and "any impacts from loss of rearing habitat is considered significant." There are no presently viable steelhead populations. The three biologists agree that the steelhead ESU is in danger of extinction.

234. It is undisputed that Project operations over the next eight months will increase mortality of eggs, fry, and juveniles of all three species. Each species' spatial distribution, diversity and abundance, will be reduced.

235. Existing hydrology and operational conditions will adversely modify critical habitat to an unquantified degree and reduce the three species' prospects for long term recovery.

236. Federal Defendants have not met their burden of proving that Project operations will not appreciably diminish the three species' present states of non-viability and non-recovery and will not adversely affect the species' remaining critical habitat over the next eight month period.

237. Because irreparable harm will likely result during the interim period, the standard for equitable relief has been met. Whether interim remedies are necessary remains to be addressed. Plaintiffs proposed interim remedies for Clear Creek and RBDD have been rejected because of scientific and evidentiary dispute whether and to what extent they will benefit the three ESUs. Plaintiffs' request that the Bureau model a scenario that

provides for no further contractor deliveries in this water year, to the extent it has not already done so (Mr. Milligan stated no modeling had been done), to determine whether additional contractor delivery curtailments could benefit carryover storage[34] is **DENIED.** The Bureau has established that additional contractor delivery curtailments before September 30, 2008 would not significantly improve carryover storage.

238. Plaintiffs have requested the opportunity to present evidence on additional suggested remedies, including requests to: (1) keep combined Delta export rates below 7,000 cfs when juveniles of any of the three species are migrating through the Delta, until NMFS completes its new BiOp, or the start of VAMP, whichever is first; (2) maintain temperatures below 68°F between Nimbus and Watt Ave Bridge on the American River; (3) limit Folsom releases to 4,000 cfs or less from December 31, 2008 through May 31, 2009, with an exception for flood control; and (4) require temperatures be maintained below 52°F between Goodwin Dam and Orange Blossom Bridge from December 1 through April 30; below 60°F from May 1 through May 31; and below 65°F from June 1 through November 30.[35]

239. The decision about remand without vacatur is deferred

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[34] Plaintiffs initially requested that the Bureau be ordered to maintain the TCP at Balls Ferry and also maintain 1.9 MAF carryover storage in Shasta. The court finds that neither of these are possible given current hydrologic conditions. If Plaintiffs are still requesting these remedies, that request is **DENIED.**

[35] Plaintiffs requests for relief as to Feather River operations are not cognizable in this court.

to conclusion of the decision whether interim remedies are necessary.

240. A status conference will be held July 23, 2008 at 8:30 a.m. to discuss the schedule for the case. Parties may appear telephonically.

SO ORDERED.

DATED: July 18, 2008

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