

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF CALIFORNIA

THE CONSOLIDATED SALMONID CASES	1:09-CV-01053 OWW DLB 1:09-CV-01090 OWW DLB 1:09-CV-01373 OWW DLB
SAN LUIS & DELTA-MENDOTA WATER AUTHORITY; WESTLANDS WATER DISTRICT v. GARY F. LOCKE, as Secretary of the United States Department of Commerce; <i>et al.</i> (1:09-cv-01053-OWW-DLB)	1:09-CV-01520 OWW SMS 1:09-CV-01580 OWW DLB 1:09-CV-01625 OWW SMS
STOCKTON EAST WATER DISTRICT, <i>et al.</i> v. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, <i>et al.</i> (1:09-cv-01090- OWW-DLB)	MEMORANDUM DECISION RE CROSS MOTIONS FOR SUMMARY JUDGMENT (DOCS. 430, 435, 446, 474, 477)
STATE WATER CONTRACTORS v. GARY F. LOCKE, <i>et al.</i> (1:09-cv-01378-OWW-SMS)	
KERN COUNTY WATER AGENCY, <i>et al.</i> v. UNITED STATES DEPARTMENT OF COMMERCE, <i>et al.</i> (1:09-cv-01520-OWW-SMS)	
OAKDALE IRRIGATION DISTRICT, <i>et al.</i> v. UNITED STATES DEPARTMENT OF COMMERCE, <i>et al.</i> (1:09-cv-01580-OWW-DLB)	
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA v. NATIONAL MARINE FISHERIES SERVICE, <i>et al.</i> (1:09-cv- 01625-OWW-SMS)	

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1 I. INTRODUCTION

2 These consolidated cases arise out of continuing efforts to
3 protect several species listed under the Endangered Species Act
4 ("ESA"), namely the endangered Sacramento River winter-run Chinook
5 salmon (*Oncorhynchus tshawytscha*) ("winter-run"), threatened Central
6 Valley spring-run Chinook salmon (*O. tshawytscha*) ("spring-run"),
7 threatened Central Valley steelhead (*O. mykiss*) ("CV steelhead"),
8 threatened Southern Distinct Population Segment ("DPS") of North
9 American green sturgeon (*Acipenser medirostris*), and endangered
10 Southern Resident killer whales (*Orcinus orca*) (collectively, "Listed
11 Species"); and associated impacts to the water supply for more than
12 half the State of California.
13

14 Plaintiffs, San Luis & Delta Mendota Water Authority and
15 Westlands Water District; State Water Contractors ("SWC"); Kern County
16 Water Agency and Coalition for a Sustainable Delta; and Metropolitan
17 Water District of Southern California ("MWD" or "Metropolitan")
18 (collectively "Export Plaintiffs") move for summary judgment on their
19 claims that the United States National Marine Fisheries Service's
20 ("NMFS") June 4, 2009 Biological Opinion, addressing the impacts of
21 the coordinated operations of the federal Central Valley Project
22 ("CVP") and State Water Project ("SWP") (collectively the "Project")
23 on the Listed Species ("2009 Salmonid BiOp" or "BiOp") and its
24 Reasonable and Prudent Alternative ("RPA"), violates the ESA and the
25
26
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1 Administrative Procedure Act ("APA"). Doc. 430.¹ Plaintiffs Stockton
2 East Water District, Oakdale Irrigation District, and South San
3 Joaquin Irrigation District ("Stanislaus River Plaintiffs" or "SR
4 Plaintiffs") filed a separate motion for summary judgment, raising
5 unique challenges to the BiOp. Doc. 435. Plaintiff-in-Intervention,
6 the California Department of Water Resources ("DWR") filed a separate
7 motion for summary judgment on narrower grounds. Doc. 446.

8
9 Federal Defendants, the United States Department of Commerce
10 ("DOC"), the National Oceanic and Atmospheric Administration ("NOAA"),
11 the agency within DOC of which NMFS is a part, NMFS, the United States
12 Department of the Interior ("DOI"), and its sub-agency the United
13 States Bureau of Reclamation ("Reclamation"), oppose and cross move
14 for summary judgment on all remaining claims, Doc. 477, as do
15 Defendant-Intervenors California Trout, Friends Of The River, Natural
16 Resources Defense Council, Northern California Council of the
17 Federation of Fly Fishers, Pacific Coast Federation of Fishermen's
18 Associations/Institute for Fisheries Resources, Sacramento River
19 Preservation Trust, San Francisco Baykeeper, The Bay Institute, and
20 the Winnemem Wintu Tribe, Doc. 474. All parties filed replies. Docs.
21 487, 492, 513, 515. These cross motions, which included over 700
22 pages of briefing and thousands of pages of supporting declarations
23 and exhibits, came on for hearing on December 16 and 17, 2010.

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27 ¹ Export Plaintiffs previously prevailed on their claims that the Bureau of
28 Reclamation violated the National Environmental Policy Act ("NEPA") by failing to
perform any NEPA analysis prior to provisionally adopting and implementing the BiOp
and its RPA. Doc. 288.

II. BACKGROUND

A. The Listed Species.

1. Sacramento River Winter-Run Chinook Salmon.

Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) ("winter-run") is listed as "endangered" under the ESA. 70 Fed. Reg. 37,160 (June 28, 2005). Historical winter-run population estimates were as high as approximately 230,000 fish in the 1960s, BiOp at 82, but declined to under 200 fish in the 1990s. *Id.* at 81. In recent years, population surveys of winter-run estimated a high of 17,344 fish in 2006, followed by a decline in 2007 (2,542 fish) that persisted into 2008 (2,830 fish). *Id.*²

Adult winter-run Chinook salmon migrate upstream from the Pacific Ocean through the Bay-Delta estuary during November through July, moving upstream past Red Bluff Diversion Dam ("RBDD") from mid-December through early August, with peak passage occurring in mid-March. BiOp at 80. 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 and June. *Id.*

Winter-run fry begin to emerge from the gravel beds where eggs are laid in late June and early July, continuing through October. *Id.* Juvenile rearing and emigration typically occurs between July and February in the upper Sacramento River, with juvenile migration

² More recent population figures were presented during hearings on motions for injunctive relief; only data available at the time the BiOp was issued has been considered.

1 downstream past RBDD beginning as early as mid-July, peaking in
2 September, and continuing through March in some years. *Id.* at 80-81.

3 Juvenile winter-run occur in the Delta from November through May.
4 *Id.*; *Pac. Coast Fed'n of Fishermans' Ass'ns. v. Gutierrez* ("*Gutierrez*
5 *II*"), 606 F. Supp. 2d 1195, 1216-17 (E.D. Cal. 2008). Winter-run
6 juveniles typically remain in the Delta until they reach a fork length
7 of approximately 118 millimeters and are from 5 to 10 months of age.
8 BiOp. at 81. Juveniles begin exiting to the ocean as early as
9 November and continue to do so through May. *Id.*

11 Designated critical habitat for winter-run includes the
12 Sacramento River, the Delta, and downstream bays to the Golden Gate
13 Bridge. 58 Fed. Reg. 33,212 (June 16, 1993). *Gutierrez II*, 606 F.
14 Supp. 2d at 1217. The following physical and biological features are
15 identified as essential for the conservation of winter-run:
16

17 (1) access from the Pacific Ocean to appropriate spawning
18 areas in the upper Sacramento River, (2) the availability of
19 clean gravel for spawning substrate, (3) adequate river
20 flows for successful spawning, incubation of eggs, fry
21 development and emergence, and downstream transport of
22 juveniles, (4) water temperatures between 42.5 and 57.5°F
23 for successful spawning, egg incubation, and fry
24 development, (5) habitat areas and adequate prey that are
25 not contaminated, (6) riparian habitat that provides for
26 successful juvenile development and survival, and (7) access
27 downstream so that juveniles can migrate from spawning
28 grounds to San Francisco Bay and the Pacific Ocean.

24 BiOp at 90. Currently, the value of winter-run critical habitat is
25 "degraded," by, among other things, the presence of dams, temperature
26 control issues on the upper Sacramento River, unscreened diversions,
27 and degraded spawning and riparian habitat. *Id.* at 93.

1 2. Spring Run Chinook.

2 Central Valley spring-run Chinook salmon (*O. tshawytscha*)
3 ("spring-run") is listed as "threatened" under the ESA. 71 Fed. Reg.
4 834 (June 5, 2005); 70 Fed. Reg. 37160 (June 28, 2005) (critical
5 habitat designated). There are three "independent" populations of
6 spring-run, located on Butte, Deer and Mill Creeks, several
7 "dependent" populations (which rely on the three independent
8 populations for continued existence), and a population of hatchery
9 fish from the Feather River Hatchery (FRH). BiOp at 93-94.

10 Spring-run Chinook have been declining over recent years. The
11 Central Valley as a whole is estimated to have supported spring runs
12 as large as 600,000 fish between the late 1880s and 1940s. *Id.* at
13 94. The 2007 escapement was 7,819 for all tributary populations (all
14 independent and dependent populations, excluding those fish returning
15 to FRH). *Id.* at 97.

16 Adult spring-run enter freshwater in the spring, beginning in
17 late January, entering the Sacramento River between March and
18 September, primarily in May and June, and entering spawning grounds
19 between mid-April and mid-June. *Id.* at 93. Adults hold over the
20 summer in cool, high elevation streams while they sexually mature, and
21 then spawn in the fall, between September and October, depending on
22 water temperatures. *Id.* at 93.

23 Juveniles typically spend a year or more in freshwater before
24 emigrating to the ocean. *Id.* at 93. The emigration period for
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1 spring-run extends from November to June and is highly variable. *Id.*
2 at 94.

3 Designated critical habitat for spring-run includes the
4 Sacramento River, tributaries supporting spring-run, the Delta, and
5 downstream bays to the Golden Gate Bridge. *Gutierrez II*, 606 F.
6 Supp. 2d at 1217. The value of spring-run critical habitat currently
7 is "degraded." BiOp at 101, 104.
8

9
10 3. Central Valley Steelhead.

11 Central Valley steelhead (*O. mykiss*) ("CV steelhead") is listed
12 as "threatened" under the ESA. 71 Fed. Reg. 834 (Jan. 5, 2006). Wild
13 CV steelhead are confined mostly to the upper Sacramento River and its
14 tributaries. BiOp at 107. Recent surveys also have detected small,
15 self-sustaining populations on the Stanislaus, Mokelumne, and
16 Calaveras Rivers, as well as observations of juvenile steelhead on the
17 Tuolumne and Merced Rivers. *Id.* These small populations make up the
18 remaining representatives of the Southern Sierra Nevada Diversity
19 Group ("SSNDG") of CV Steelhead. *Id.* at 198.
20

21 While there is limited information on population size, NMFS
22 estimates that the current population for the entire distinct
23 population segment ("DPS")³ (including the SSNDG as well as all other
24 populations) in the Central Valley is less than 3,628 spawning
25

26 ³ The term "species" includes "any subspecies of fish or wildlife or plants, and any
27 distinct population segment of any species of vertebrate fish or wildlife which
28 interbreeds when mature." 16 U.S.C. § 1532. NMFS has issued guidance on how to
apply the ESA's DPS concept, see *Modesto Irr. Dist. v. Gutierrez*, 619 F.3d 1024,
1028 (9th Cir. 2010) (citing 56 Fed. Reg. 58,612 (Nov. 20, 1991)), and has
"struggled for two decades over how to apply the term DPS to steelhead," *id.*

1 females, compared with 40,000 spawners in the 1960s. BiOp at 106.
2 The CV Steelhead population has shown a pattern of negative growth
3 since the late 1960s, and there is no indication that the trend has
4 changed. BiOp at 108-09 & Figures 4-4 & 4-5.

5 CV steelhead generally leave the ocean from August through April
6 and spawn from December through April in small streams and tributaries
7 where cool, well-oxygenated water is available year-round. *Id.* at
8 104. Unlike Pacific salmon, steelhead are capable of spawning more
9 than once before death. Although one-time spawners are the great
10 majority, approximately 17.2 percent in California streams are repeat
11 spawners. *Id.* at 103-104.

13 Steelhead eggs hatch approximately 30 days after spawning, and
14 fry emerge from the gravel four to six weeks later into shallow areas
15 where they feed. *Id.* at 105. Steelhead rear during the summer and
16 emigrate "episodically" from their natal streams during fall, winter,
17 and spring high flows. *Id.* at 106. Emigrating CV Steelhead use the
18 lower reaches of the Sacramento River and Delta for rearing and as a
19 migration corridor to the ocean. *Id.* Juvenile CV steelhead
20 typically emigrate through the Delta from late September through June.
21 *Id.* at 105 (Table 4-6).

23 Approximately 80% of historical CV Steelhead range is blocked by
24 dams. *Id.* at 109. CV steelhead critical habitat is degraded. *Id.*
25 at 113.

1 4. Green Sturgeon.

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

6 Green sturgeon are anadromous fish that spawn and rear in
7 freshwater rivers and estuaries but spend most of their lives in the
8 ocean. See BiOp at 114-15. They are a long-lived, slow-growing
9 species. 68 Fed. Reg. 4,433, 4,436 (Jan. 29, 2003). Juvenile green
10 sturgeon are present in the Delta year round. BiOp at 119.

11 There are no definitive population counts or figures for the
12 Southern DPS green sturgeon. Evidence available at the time the BiOp
13 was written suggests that the population in the Delta watershed is
14 "relatively small," ranging from several hundred to a few thousand
15 adults. *Id.* at 124.

16 Critical habitat for the Southern DPS of green sturgeon was
17 proposed on September 8, 2008, 73 Fed. Reg. 52,084, but had not been
18 adopted as of the issuance of the BiOp. Proposed critical habitat
19 included "approximately 325 miles of riverine habitat and 1,058 square
20 miles of estuarine habitat in California, Oregon, and Washington, and
21 11,927 square miles of coastal marine habitat off California, Oregon,
22 and Washington within the geographical area presently occupied by the
23 Southern DPS of green sturgeon." BiOp at 126. In addition,
24 approximately 136 square miles of habitat within the Yolo and Sutter
25
26
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1 bypasses, adjacent to the Sacramento River, are proposed for
2 designation. *Id.* The BiOp concluded that the current condition of
3 proposed critical habitat for the Southern DPS of green sturgeon is
4 "degraded over historical conditions." *Id.* at 134.

5
6 5. Southern Resident Killer Whale.

7 The Southern Resident DPS of killer whale (*Orcinus orca*)
8 ("Southern Residents") was listed as "endangered" under the ESA on
9 November 18, 2005, 70 Fed. Reg. 69,903 (Nov. 18, 2005), and the DPS is
10 designated as "depleted" under the Marine Mammal Protection Act. BiOp
11 at 158-59. Southern Residents are found throughout the coastal waters
12 off Washington, Oregon, and Vancouver Islands and are known to travel
13 as far south as central California. *Id.* at 159.

14
15 The BiOp addresses the impact of Project operations on Southern
16 Residents and concludes that extinction of winter-run and spring-run
17 Chinook salmon, as well as reductions in fall-run⁴ Chinook salmon
18 populations, "would reduce prey availability and increase the
19 likelihood for local depletions of prey in particular locations and
20 times," which would, in turn, increase the risk of extinction of the
21 Southern Residents. BiOp at 573-74.

22
23 B. The 2009 Salmonid BiOp and RPA.

24 The 2009 Salmonid BiOp, prepared pursuant ESA § 7, 16 U.S.C. §
25 1536(a)(2), concluded that "the long-term operations of the CVP and
26 SWP are likely to jeopardize the continued existence" of the Listed
27

28 ⁴ Fall-run Chinook salmon are not listed as threatened or endangered under the ESA.

1 Species and "destroy or adversely modify" critical habitat for winter-
2 run, spring-run, and CV steelhead. BiOp at 575. As required by law,
3 the BiOp includes an RPA designed to allow the projects to continue
4 operating without causing jeopardy to the species or adverse
5 modification to its critical habitat. *Id.* at 575-671. The RPA "is
6 composed of numerous elements for each of the various project
7 divisions and associated stressors," which, according to the BiOp,
8 "must be implemented in its entirety to avoid jeopardy and adverse
9 modification." *Id.* at 578. The BiOp provides a succinct overview of
10 the RPA:
11

12 There are several ways in which water operations adversely
13 affect listed species that are addressed in this RPA. We
14 summarize the most significant here:

15 1) Water operations result in elevated water temperatures
16 that have lethal and sub-lethal effects on egg incubation
17 and juvenile rearing in the upper Sacramento River. The
18 immediate operational cause is lack of sufficient cold water
19 in storage to allow for cold water releases to reduce
20 downstream temperatures at critical times and meet other
21 project demands. This elevated temperature effect is
22 particularly pronounced in the Upper Sacramento for winter-
23 run and mainstem spring-run, and in the American River for
24 steelhead. The RPA includes a new year-round storage and
25 temperature management program for Shasta Reservoir and the
26 Upper Sacramento River, as well as long-term passage
27 prescriptions at Shasta Dam and re-introduction of winter-
28 run into its native habitat in the McCloud and/or Upper
 Sacramento rivers.

24 2) In Clear Creek, recent project operations have led to
25 increased abundance of Clear Creek spring-run, which is an
26 essential population for the short-term and long-term
27 survival of the species. Nonetheless, in the proposed
28 action, continuation of these operations is uncertain. The
 RPA ensures that essential flows and temperatures for
 holding, egg incubation and juvenile survival will be
 maintained.

1 3) Red Bluff Diversion Dam (RBDD) on the Sacramento River
2 impedes both upstream migration of adult fish to spawning
3 habitat and downstream migration of juveniles. Effects are
4 significant for winter-run and spring-run, but are
5 particularly pronounced for green sturgeon and its proposed
6 critical habitat in that a significant portion of the
7 population is blocked from its spawning and holding habitat.
The RPA mandates gate openings at critical times in the
short term while an alternative pumping plant is built, and,
by 2012, opening of the gates all year.

8 4) Both project and non-project effects have led to a
9 significant reduction in necessary juvenile rearing habitat
10 in the Sacramento River Basin and Delta. The project's flood
11 control operations result in adverse effects through reduced
12 frequency and magnitude of inundation of rearing habitat. To
minimize these effects, the RPA contains both short-term and
long-term actions for improving juvenile rearing habitat in
the Lower Sacramento River and northern Delta.

13 5) Another major effect of water operations is diversion of
14 out-migrating juveniles from the north Delta tributaries
15 into the interior Delta through the open DCC gates. Instead
16 of migrating directly to the outer estuary and then to sea,
17 these juveniles are caught in the interior Delta and
18 subjected to pollution, predators, and altered food webs
that cause either direct mortality or impaired growth. The
RPA mandates additional gate closures to minimize these
adverse effects to winter-run, spring-run, and steelhead.

19 6) Similarly, water pumping causes reverse flows, leading to
20 loss of juveniles migrating out from the Sacramento River
21 system in the interior Delta and more juveniles being
22 exposed to the State and Federal pumps, where they are
23 salvaged at the facilities. The RPA prescribes Old and
Middle River flow levels to reduce the number of juveniles
exposed to the export facilities and prescribes additional
measures at the facilities themselves to increase survival
of fish.

24 7) The effects analysis shows that juvenile steelhead
25 migrating out from the San Joaquin River Basin have a
26 particularly high rate of loss due to both project and non-
27 project related stressors. The RPA mandates additional
28 measures to improve survival of San Joaquin steelhead
smolts, including both increased San Joaquin River flows and
export curtailments. Given the uncertainty of the

1 relationship between flow and exports, the RPA also
2 prescribes a significant new study of acoustic tagged fish
3 in the San Joaquin Basin to evaluate the effectiveness of
4 the RPA and refine it over the lifetime of the project.

5 8) On the American River, project-related effects on
6 steelhead are pronounced due to the inability to
7 consistently provide suitable temperatures for various life
8 stages and flow-related effects caused by operations. The
9 RPA prescribes a flow management standard, a temperature
10 management plan, additional technological fixes to
11 temperature control structures, and, in the long term, a
12 passage at Nimbus and Folsom Dams to restore steelhead to
13 native habitat.

14 9) On the Stanislaus River, project operations have led to
15 significant degradation of floodplain and rearing habitat
16 for steelhead. Low flows also distort cues associated with
17 out-migration. The RPA proposes a year-round flow regime
18 necessary to minimize project effects to each life-stage of
19 steelhead, including new spring flows that will support
20 rearing habitat formation and inundation, and will create
21 pulses that cue out-migration.

22 10) Nimbus Fish Hatchery steelhead program contribute to
23 both loss of genetic diversity and mixing of wild and
24 hatchery stocks of steelhead, which reduces the viability of
25 wild stocks. The Nimbus and Trinity River Hatchery programs
26 for non-listed fall-run also contribute to a loss of genetic
27 diversity, and therefore, viability, for fall-run. The RPA
28 requires development of Hatchery Genetics Management Plans
to improve genetic diversity of both steelhead and fall-run,
an essential prey base of Southern Resident.

29 *Id.* at 576-78.

30 III. STANDARD OF DECISION

31 Summary judgment is appropriate when the pleadings and the record
32 demonstrate that "there is no genuine dispute as to any material fact
33 and the movant is entitled to judgment as a matter of law." Fed. R.
34 Civ. P. 56(c). The claims in this case involve NMFS's issuance of a
35 biological opinion, final agency action subject to judicial review

1 under the APA, 5 U.S.C. § 702. *Nat'l Wildlife Fed'n v. Nat'l Marine*
2 *Fisheries Serv.*, 524 F.3d 917, 925 (9th Cir. 2008) ("*NWF v. NMFS*
3 *II*"). A court conducting APA judicial review may not resolve factual
4 questions, but instead determines "whether or not as a matter of law
5 the evidence in the administrative record permitted the agency to make
6 the decision it did." *Sierra Club v. Mainella*, 459 F. Supp. 2d 76,
7 90 (D.D.C. 2006) (quoting *Occidental Eng'g Co. v. INS*, 753 F.2d 766,
8 769 (9th Cir. 1985)). "[I]n a case involving review of a final agency
9 action under the [APA] ... the standard set forth in Rule 56(c) does
10 not apply because of the limited role of a court in reviewing the
11 administrative record." *Id.* at 89. In this context, summary
12 judgment becomes the "mechanism for deciding, as a matter of law,
13 whether the agency action is supported by the administrative record
14 and otherwise consistent with the APA standard of review." *Id.* at
15 90.
16
17

18 IV. BASIC LEGAL FRAMEWORK

19 A. Review under the APA.

20 APA invalidation of a biological opinion requires Plaintiffs to
21 prove that NMFS's action was "arbitrary, capricious, an abuse of
22 discretion, or otherwise not in accordance with law." 5 U.S.C. §
23 706(2) (A).
24

25 1. Record Review.

26 APA review of a biological opinion is "based upon the evidence
27 contained in the administrative record." *Arizona Cattle Growers'*
28

1 *Ass'n v. U.S. Fish and Wildlife Serv.*, 273 F.3d 1229, 1245 (9th Cir.
2 2001). Judicial review under the APA must focus on the administrative
3 record already in existence, not some new record made initially in a
4 reviewing court. Parties may not use "post-decision information as a
5 new rationalization either for sustaining or attacking the agency's
6 decision." *Ass'n of Pac. Fisheries v. EPA*, 615 F.2d 794, 811-12 (9th
7 Cir. 1980). Exceptions to administrative record review for technical
8 information or expert explanation make such evidence admissible only
9 for limited purposes, and those exceptions are narrowly construed and
10 applied. *Lands Council v. Powell*, 395 F.3d 1019, 1030 (9th Cir.
11 2005).

12
13 Here, as evidentiary rulings explained, *see, e.g.*, Docs. 387,
14 392 (10/19/09 Hearing Transcript ("Tr.")), 406, 407, 462, 740 (7/8/10
15 Tr.), 750, expert testimony has been considered solely for explanation
16 of technical terms and complex scientific subject matter beyond the
17 Court's knowledge; and to understand the agency's explanations, or
18 lack thereof, and the parties' arguments.

19
20
21 2. Deference to Agency Expertise.

22 A court must defer to the agency on matters within the agency's
23 expertise, unless the agency completely failed to address some factor,
24 consideration of which was essential to making an informed decision.
25 *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 422 F.3d 782,
26 798 (9th Cir. 2005) ("*NWF v. NMFS I*"). A court "may not substitute
27 its judgment for that of the agency concerning the wisdom or prudence
28

1 of the agency's action." *River Runners for Wilderness v. Martin*, 593
2 F.3d 1064, 1070 (9th Cir. 2009):

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

8 *Id.*

9 Although deferential, judicial review under the APA is designed
10 to "ensure that the agency considered all of the relevant factors and
11 that its decision contained no clear error of judgment." *Arizona v.
12 Thomas*, 824 F.2d 745, 748 (9th Cir. 1987) (internal citation and
13 quotation omitted). "The deference accorded an agency's scientific or
14 technical expertise is not unlimited." *Brower v. Evans*, 257 F.3d
15 1058, 1067 (9th Cir. 2001).

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

21 *Motor Vehicle Mfrs. Ass'n of U.S. v. State Farm Mut. Auto. Ins. Co.*,
22 463 U.S. 29, 43 (1983); see also *Citizens to Preserve Overton Park,
23 Inc. v. Volpe*, 401 U.S. 402, 416 (1971) (reviewing court may overturn
24 an agency's action as arbitrary and capricious if the agency failed to
25 consider relevant factors, failed to base its decision on those
26 factors, and/or made a "clear error of judgment"), *overruled on other*

1 grounds by *Califano v. Sanders*, 430 U.S. 99, 105 (1977)).

2 More generally, "[u]nder the APA 'the agency must examine the
3 relevant data and articulate a satisfactory explanation for its action
4 including a rational connection between the facts found and the choice
5 made.'" *Humane Soc. of U.S. v. Locke*, 626 F.3d 1040, 1048 (9th Cir.
6 2010) (quoting *Motor Vehicle Mfrs. Ass'n*, 463 U.S. at 43). "The
7 reviewing court should not attempt itself to make up for an agency's
8 deficiencies: We may not supply a reasoned basis for the agency's
9 action that the agency itself has not given." *Id.*

11
12 B. General Obligations Under the ESA.

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

17 To "jeopardize the continued existence of" means "to engage in an
18 action that reasonably would be expected, directly or indirectly, to
19 reduce appreciably the likelihood of both the survival and recovery of
20 a listed species in the wild by reducing the reproduction, numbers, or
21 distribution of that species." 50 C.F.R. § 402.02; *see also NWF v.*
22 *NMFS II*, 524 F.3d 917 (rejecting agency interpretation of 50 C.F.R. §
23 402.02 that in effect limited jeopardy analysis to survival and did
24 not realistically evaluate recovery, thereby avoiding an
25 interpretation that reads the provision "and recovery" entirely out of
26 the text). An action is "jeopardizing" if it keeps recovery "far out
27
28

1 of reach," even if the species is able to cling to survival. *NWF v.*
2 *NMFS II*, 524 F.3d at 931. "[A]n agency may not take action that will
3 tip a species from a state of precarious survival into a state of
4 likely extinction. Likewise, even where baseline conditions already
5 jeopardize a species, an agency may not take action that deepens the
6 jeopardy by causing additional harm." *Id.* at 930.

7
8 To satisfy this obligation, the federal agency undertaking the
9 action (the "action agency") must prepare a "biological assessment"
10 that evaluates the action's potential impacts on species and species'
11 habitat. 16 U.S.C. § 1536(c); 50 C.F.R. § 402.12(a). If the proposed
12 action "is likely to adversely affect" a threatened or endangered
13 species or adversely modify its designated critical habitat, the
14 action agency must engage in "formal consultation" with NMFS⁵ to
15 obtain its biological opinion as to the impacts of the proposed action
16 on the listed species. See 16 U.S.C. § 1536(a)(2), (b)(3); see also
17 50 C.F.R. § 402.14(a), (g). Once the consultation process has been
18 completed, NMFS must give the action agency a written biological
19 opinion "setting forth [NMFS's] opinion, and a summary of the
20 information on which the opinion is based, detailing how the agency
21 action affects the species or its critical habitat." 16 U.S.C. §
22 1536(b)(3)(A); see also 50 C.F.R. § 402.14(h).

23
24
25 If NMFS determines that jeopardy or destruction or adverse
26 modification of critical habitat is likely, NMFS "shall suggest those

27 ⁵ Generally, where the listed species in question is marine or anadromous,
28 consultation must involve NMFS. For terrestrial and freshwater species, the United
States Fish and Wildlife Service ("FWS") must be consulted.

1 reasonable and prudent alternatives which [it] believes would not
2 violate subsection (a) (2) of this section and can be taken by the
3 Federal agency or applicant in implementing the agency action." 16
4 U.S.C. § 1536(b) (3) (A). "Following the issuance of a 'jeopardy'
5 opinion, the agency must either terminate the action, implement the
6 proposed alternative, or seek an exemption from the Cabinet-level
7 Endangered Species Committee pursuant to 16 U.S.C. § 1536(e)." *Nat'l*
8 *Ass'n of Home Builders v. Defenders of Wildlife*, 551 U.S. 644, 652
9 (2008).

11
12 1. Best Available Science.

13 Under the ESA, an agency's actions must be based on "the best
14 scientific and commercial data available." 16 U.S.C. § 1536(a) (2); 50
15 C.F.R. § 402.14(g) (8) ("In formulating its Biological Opinion, any
16 reasonable and prudent alternatives, and any reasonable and prudent
17 measures, the Service will use the best scientific and commercial data
18 available...."). A failure by the agency to utilize the best
19 available science is arbitrary and capricious. *See Gutierrez II*, 606
20 F. Supp. 2d at 1144.

21
22 "The obvious purpose of the [best available science requirement]
23 is to ensure that the ESA not be implemented haphazardly, on the basis
24 of speculation or surmise." *Bennett v. Spear*, 520 U.S. 154, 176
25 (1997).

26 While this no doubt serves to advance the ESA's overall goal
27 of species preservation, we think it readily apparent that
28 another objective [of the best available science
requirement] (if not indeed the primary one) is to avoid

1 needless economic dislocation produced by agency officials
2 zealously but unintelligently pursuing their environmental
3 objectives. That economic consequences are an explicit
4 concern of the ESA is evidenced by § 1536(h), which provides
5 exemption from § 1536(a)(2)'s no-jeopardy mandate where
6 there are no reasonable and prudent alternatives to the
7 agency action and the benefits of the agency action clearly
8 outweigh the benefits of any alternatives. We believe the
9 "best scientific and commercial data" provision is similarly
10 intended, at least in part, to prevent uneconomic (because
11 erroneous) jeopardy determinations.

12 *Id.* at 176-77.

13 A decision about jeopardy must be made based on the best science
14 available at the time of the decision; the agency cannot wait for or
15 promise future studies. *See Ctr. for Biological Diversity v.*
16 *Rumsfeld*, 198 F. Supp. 2d 1139, 1156 (D. Ariz. 2002) (the best
17 scientific and commercial data available standard "recognizes that
18 better scientific evidence will most likely always be available in the
19 future"). The "best available science" mandate of the ESA sets a
20 basic standard that "prohibits the [agency] from disregarding
21 available scientific evidence that is in some way better than the
22 evidence [it] relies on." *Am. Wildlands v. Kempthorne*, 530 F.3d 991,
23 998 (D.C. Cir. 2008) (internal quotation omitted).

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

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

9 When specialists express conflicting views, an agency must have
10 discretion to rely on the reasonable opinions of its own qualified
11 experts even if, as an original matter, a court might find contrary
12 views more persuasive." *Lands Council*, 537 F.3d at 1000 (quoting
13 *Marsh v. Oregon Natural Res. Council*, 490 U.S. 360, 378 (1989)).
14 Mere uncertainty, or the fact that evidence may be "weak," is not
15 fatal to an agency decision. *Greenpeace Action v. Franklin*, 14 F.3d
16 1324, 1337 (9th Cir. 1992) (upholding biological opinion, despite
17 uncertainty about the effectiveness of management measures, because
18 decision was based on a reasonable evaluation of all available data);
19 *Nat'l Wildlife Fed'n v. Babbitt*, 128 F. Supp. 2d 1274, 1300 (E.D.
20 Cal. 2000) (holding that the "most reasonable" reading of the best
21 scientific data available standard is that it "permits [NMFS] to take
22 action based on imperfect data, so long as the data is the best
23 available"). NMFS "must utilize the best scientific ... data
24 available, not the best scientific data possible." *Building Indus.*
25 *Ass'n v. Norton*, 247 F.3d 1241, 1246 (D.C. Cir. 2001), cited with
26
27
28

1 approval in *Kern County Farm Bureau v. Allen*, 450 F.3d 1072, 1080-81
2 (9th Cir. 2006) ("Absent superior data occasional imperfections do not
3 violate" the ESA best available data standard); *see also Defenders of*
4 *Wildlife v. Babbitt*, 958 F. Supp. 670, 680 (D.D.C. 1997) (best
5 available science standard does not require "conclusive evidence,"
6 only that agency use best science available and not ignore contrary
7 evidence).

8
9 The deference afforded under the best available science standard
10 is not unlimited. For example, *Tucson Herpetological Society v.*
11 *Salazar*, 566 F.3d 870, 879 (9th Cir. 2009), held that an agency may
12 not rely on "ambiguous studies as evidence" to support findings made
13 under the ESA. There, in the context of an ESA § 4 listing
14 determination, NMFS "affirmatively relie[d] on ambiguous studies as
15 evidence of persistence (i.e., stable and viable populations), and in
16 turn argue[d] that this 'evidence' of persistence ... proves that the
17 lizard's lost range is insignificant for purposes of the ESA." *Id.*
18 The Ninth Circuit found this conclusion to be unreasonable because
19 "[t]he studies do not lead to the conclusion that the [species]
20 persists in a substantial portion of its range, and therefore cannot
21 support [NMFS's] conclusion. *Id.*⁶; *see also Rock Creek Alliance v.*

22
23
24
25 ⁶ Export Plaintiffs repeatedly rely on *Tucson* to argue that NMFS erred by relying on
26 "ambiguous studies" as affirmative proof of scientific fact. Federal Defendants
27 suggest that Export Plaintiffs' reading of this holding is incorrect, and emphasize
28 that the Ninth Circuit re-affirmed the general rule that "when examining decisions
made under conditions of scientific uncertainty 'a reviewing court must be at its
most deferential.'" *Tucson*, 566 F.3d at 879. Federal Defendants suggest that the
holding in *Tucson* resulted from the special circumstances in that case, where FWS
relied on a single study to affirmatively conclude that a species persisted in a

1 *U.S. Fish & Wildlife Service*, 390 F. Supp. 2d 993, 1008 (D. Mont.
2 2005) (rejecting section 7 biological opinion's reliance on a disputed
3 scientific report, which explicitly stated its analysis was not
4 applicable to the small populations addressed in the challenged
5 opinion).

6
7 Alternatively, the presumption of agency expertise may be
8 rebutted if the agency's decisions, although based on scientific
9 expertise, are not reasoned, *Greenpeace v. NMFS*, 80 F. Supp. 2d 1137,
10 1147 (W.D. Wash. 2000), or if the agency disregards available
11 scientific evidence better than the evidence on which it relies, *Kern*
12 *County Farm Bureau*, 450 F.3d at 1080.

13
14 Courts routinely perform substantive reviews of record evidence
15 to evaluate the agency's treatment of best available science. The
16 judicial review process is not one of blind acceptance. *See, e.g.,*
17 *Kern County*, 450 F.3d at 1078-79 (thoroughly reviewing three post-
18 comment studies and FWS's treatment of those studies to determine
19 whether they "provide[d] the sole, essential support for" or "merely
20 supplemented" the data used to support a listing decision); *Home*
21 *Builders Ass'n of N. Cal. v. U.S. Fish and Wildlife Serv.*, 529 F.
22 Supp. 2d 1110, 1120 (N.D. Cal. 2007) (examining substance of challenge
23 to FWS's determination that certain data should be disregarded);
24

25
26 significant portion of its range, even though that one study only addressed two
27 discrete sections of the species' current range. Doc. 484 at 34 (citing *Tuscon*, 66
28 F.3d at 882). This is a distinction without a difference. *Tuscon* stands generally
for the proposition that, while a court must be deferential in areas where there is
scientific uncertainty, such deference is not unlimited. More specifically, an
agency may not rely on an ambiguous study for affirmative proof of something the
study does not establish.

1 *Trout Unlimited v. Lohn*, 645 F. Supp. 2d 929 (D. Or. 2007) (finding
2 best available science standard had been violated after thorough
3 examination of rationale for NMFS's decision to withdraw its proposal
4 to list Oregon Coast Coho salmon); *Oceana, Inc. v. Evans*, 384 F.
5 Supp. 2d 203, 217-18 (D.D.C. 2005) (carefully considering scientific
6 underpinnings of challenge to FWS's use of a particular model,
7 including post decision evidence presented by an expert to help the
8 court understand the complex model, applying one of several record
9 review exceptions articulated in *Esch v. Yeutter*, 876 F.2d 976, 991
10 (D.C. Cir. 1989), which are similar to those articulated by the Ninth
11 Circuit).

12
13 Courts are not required to defer to an agency conclusion that
14 runs counter to that of other agencies or individuals with specialized
15 expertise in a particular technical area. *See, e.g., Am. Turnboat*
16 *Ass'n v. Baldrige*, 738 F.2d 1013, 1016-17 (9th Cir. 1984) (NMFS's
17 decision under the Marine Mammal Protection Act was not supported by
18 substantial evidence because agency ignored data that was product of
19 "many years' effort by trained research personnel"); *Sierra Club v.*
20 *U.S. Army Corps of Eng'rs*, 701 F.2d 1011, 1030 (2d Cir. 1983) ("court
21 may properly be skeptical as to whether [the conclusions of an
22 environmental impact statement prepared under the National
23 Environmental Policy Act] have a substantial basis in fact if the
24 responsible agency has apparently ignored the conflicting views of
25 other agencies having pertinent experience[]"). A court should
26
27
28

1 "reject conclusory assertions of agency 'expertise' where the agency
2 spurns un rebutted expert opinions without itself offering a credible
3 alternative explanation." *N. Spotted Owl v. Hodel*, 716 F. Supp. 479,
4 483 (W.D. Wash. 1988) (citing *Am. Turnboat Ass'n*, 738 F.2d at 1016).

5 In *Conner v. Burford*, 848 F.2d 1441, 1453-54 (9th Cir. 1988),
6 the agency attempted to defend its biological opinions by arguing that
7 there was a lack of sufficient information to perform additional
8 analysis. In rejecting this defense, the Ninth Circuit held that
9 "incomplete information ... does not excuse the failure to comply with
10 the statutory requirement of a comprehensive biological opinion using
11 the best information available," and noted that FWS could have
12 completed more analysis with the information that was available.
13

14 *Id.* at 1454.

15
16 In light of the ESA requirement that the agencies use the
17 best scientific and commercial data available ... the FWS
18 cannot ignore available biological info or fail to develop
19 projections of ... activities which may indicate potential
20 conflicts between development and the preservation of
21 protected species. We hold that the FWS violated the ESA by
22 failing to use the best information available to prepare
23 comprehensive biological opinions.

24 *Id.*

25
26 2. Best Available Science Standards and the Application of
27 Analytical/Statistical Methodologies.

28 These above-described standards apply with equal force to the use
and interpretation of statistical methodologies. As the D.C. Circuit
in *Appalachian Power Co. v. EPA*, 135 F.3d 791 (D.C. Cir. 1998),
explained in reviewing a challenge to a decision of the Environmental
Protection Agency ("EPA") under the "arbitrary and capricious"

1 standard of review:

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

15 *Id.* at 802.

16 The model must fit the available data. *See Nat'l Wildlife Fed'n*
17 *v. EPA*, 286 F.3d 554, 565 (D.C. Cir. 2002) ("*NWF v. EPA*") (a court
18 will only reject the choice of a model "when the model bears no
19 rational relationship to the characteristics of the data to which it
20 was applied"). For example, *Oceana*, 384 F. Supp. 2d at 220, rejected
21 a challenge to NMFS's use of a particular analytical model that used
22 data drawn from existing literature, even though experts "suggested
23 that reliable take limits cannot be established without quantitative
24 data gathered from 'in-water' surveys." Although NMFS conceded "a
25 thorough quantitative analysis based on empirical estimates of
26 population size would be a superior way to analyze the impact [] on
27 [the species]," it was undisputed that "given the paucity of
28 information on sea turtles and the difficulties of using the data that
does exist, [a] different or more complex model [than that used by
NMFS] was not available and could not even be constructed." *Id.*
(internal quotations omitted). Likewise, "the fact that a given model

1 has some imperfections does not prevent it from constituting the 'best
2 scientific information available.'" *Oceana v. Evans*, 2005 WL 555416,
3 *16-*17 (D.D.C. Mar. 9, 2005) (citing 16 U.S.C. § 1851(a)(2))
4 (approving NMFS's use of a model despite known limitations, where it
5 was the only model available and the agency supplemented its analysis
6 with other sources to address areas where the model was unable to make
7 accurate predictions).

9
10 V. EXPORT PLAINTIFFS' & DWR'S CLAIMS.

11 A. Alleged Clear Scientific Errors Pertaining to Delta Operations.

12 A major premise of the BiOp is that pumping "causes reverse
13 flows, leading to loss of juveniles migrating out from the Sacramento
14 River system in the interior Delta and more juveniles being exposed to
15 the State and Federal pumps, where they are salvaged⁷ at the
16 facilities." BiOp at 577. The effects analysis also concluded "that
17 juvenile steelhead migrating out from the San Joaquin River Basin have
18 a particularly high rate of loss due to both project and non-project
19 related stressors." *Id.* at 577-78. To mitigate for these impacts,
20 the RPA "prescribes Old and Middle River flow levels to reduce the
21 number of juveniles exposed to the export facilities and prescribes
22 additional measures at the facilities themselves to increase survival
23 of fish." *Id.* at 577. In addition, "to improve survival of San
24 Joaquin steelhead smolts," the RPA prescribes "both increased San
25
26

27 ⁷ The State and Federal pumping facilities use louvers to divert salmonids entrained
28 by the pumping process into collection tanks where operators attempt to "salvage"
them by returning them to other areas of the Delta. BiOp at 341, 345.

Joaquin River flows and export curtailments." *Id.* at 578.

Plaintiffs strenuously argue that NMFS made certain "clear" scientific errors in reaching the conclusion that exports adversely affect juvenile salmonid survival.

1. Challenged Statistical Methodologies.

a. Use of Raw Salvage in Figures 6-65 and 6-66.

NMFS relied on salvage data provided by Plaintiff-Intervenor, DWR, presented in Figures 6-65 and 6-66 of the BiOp:

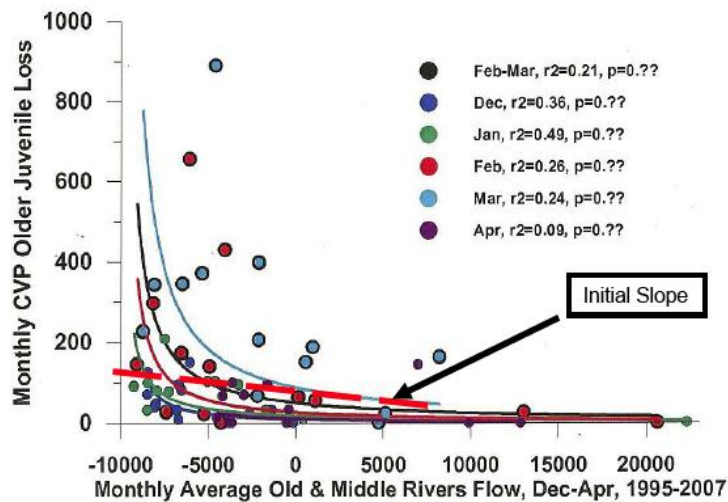


Figure 6-65. Relationship between OMR flows and entrainment at the CVP, 1995-2007 (DWR 2008).

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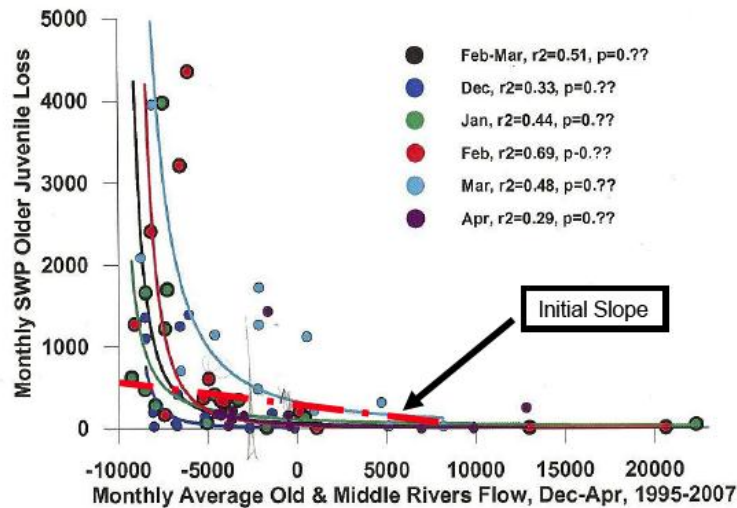


Figure 6-66. Relationship between OMR flows and entrainment at the SWP, 1995-2007 (DWR 2007).

Id. at 361-62. These figures were cited to demonstrate that “[l]oss of older juveniles at the CVP and SWP fish collection facilities increase sharply at [OMR] flows of approximately -5,000 cfs and depart from the initial slope at flows below this.” *Id.* at 361. Federal Defendants’ cross motion explains that NMFS used this data to “help evaluate where along the spectrum of OMR flows any significant change in salvage could be observed.” Doc. 477-1 at 53.

These figures, which are based upon average salvage figures over many years, use “raw” salvage numbers that are not scaled to reflect the size of the population from which the fish were salvaged at the time the particular sample was taken. Previous rulings in this and the related *Consolidated Delta Smelt Cases* have discussed at length why the use of such data is not consistent with standard practice in the fields of fish biology and population dynamics. See *San Luis & Delta-Mendota Water Authority v. Salazar*, 760 F. Supp. 2d, 885-90

1 (E.D. Cal. 2010). The May 18, 2010 Findings of Fact and Conclusions
2 of Law Re Plaintiffs' Request for Preliminary Injunction ("PI
3 Decision") in this case found:

4 125. ...The comparisons of salvage to negative OMR flows
5 relied upon in the BiOp utilize raw salvage numbers, rather
6 than scaling salvage to population size. See Doc. 179,
7 Declaration of Richard B. Deriso at ¶¶ 3-5. Scaling salvage
8 to population size is standard fisheries science practice
9 and could have been accomplished for several of the Listed
10 Species based on existing population data. See *id.* at ¶¶
11 5-6. This failure is a fundamental and inexplicable error.
12 Salvage may have been higher in some years simply because
13 the population was higher, not because of any differences in
14 negative OMR flows. Salvage may have been lower in other
15 years because the population was lower. Dr. Deriso
16 demonstrated the potential significance of this failure by
17 plotting the population adjusted Juvenile Chinook Incidental
18 take rate against OMR flow. Based upon this revised
19 analysis for spring-run and winter-run, Dr. Deriso concluded
20 that there is no statistically significant relationship
21 between the take index and OMR flows. *Id.* at ¶6.

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

23 127. As to the CV steelhead, for which no population numbers
24 are available, it is less clear whether the use of raw
25 salvage numbers is always inappropriate. Figures 6-65 and
26 6-66 ambiguously reference monthly CVP and SWP "Older
27 Juvenile Loss" on the y axis. Were most of the salvaged
28 fish represented on these charts Chinook salmon? No reason
is offered why NMFS did not segregate the steelhead figures
from those of Chinook salmon. If the species had been
evaluated separately, would it have been reasonable for NMFS
to fail to adjust the steelhead figures for population size?

1 Separate analysis was not done.

2 *Consol. Salmonid Cases*, 713 F. Supp. 2d 1116, 1142-43 (E.D. Cal.
3 2010) (emphasiss added).

4 Federal Defendants attempt to explain their use of these figures
5 in two ways. First, Jeffrey Stuart, NMFS Fisheries Biologist and the
6 primary author of the Delta section of the BiOp, opines that "the
7 general trend in fish loss should still be apparent regardless of
8 scaling." Fourth Stuart Decl., Doc. 485 at ¶ 72. He insists that
9 this data "indicates that additional loss of fish occurs with
10 increasing export levels as measured by the OMR flow values." *Id.*
11 This explanation simply defies common sense. When trying to discern
12 trends from data points that range across many years, an obvious
13 "confounding variable" is population size. A trend observed in data
14 that is unscaled for population size may change or completely
15 disappear when scaled for population size. See Deriso Decl., Doc.
16 440 at ¶¶ 13 - 31. Federal Defendants had the information needed to
17 perform such a simple analysis of the available data, but did not do
18 so, and unjustifiably relied on the unscaled data to form a
19 quantitative conclusion that salvage rates increased sharply above -
20 5,000 cfs OMR. This was a clear scientific error.

21 Defendant-Intervenors argue that the agency cannot violate the
22 ESA by failing to take an additional step to scale the salvage data to
23 salmonid population abundance. They maintain that all the ESA
24 requires is that NMFS consider the "available" evidence not that it
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1 create new data or "follow scientific practices defined by Export
2 Plaintiffs experts." Doc. 484 at 51. It is true that the best
3 available science standard does not require NMFS to create new data or
4 apply new models to existing data, *Building Indus. Ass'n*, 247 F.3d at
5 1246. However, here, NMFS put data to a use for which it is not
6 appropriate, as it produces unreliable results. *Cf. NWF v. EPA*, 286
7 F.3d at 565 (a court may reject agency's choice of model when it
8 "bears no rational relationship to the characteristics of the data to
9 which it was applied"). Every biostatistics expert who presented
10 evidence in this and related fish cases has agreed that it is wholly
11 inappropriate and scientifically unreasonable to draw management
12 conclusions from a plot comparing unscaled salvage data to OMR flows
13 collected over a period of years when population varied. The agency
14 is required to apply generally recognized and accepted biostatistical
15 principles, which constitute best available science, in reaching its
16 decisions.
17
18

19
20 b. Was the BiOp's Reliance on Figures 6-65 and 6-66
21 Harmless?

22 Alternatively, Federal Defendants argue that any such error was
23 harmless given the other record evidence that supports the BiOp's
24 conclusions. No party has provided authority that a harmless error
25 rule applies when the agency commits a substantive error under the
26 ESA.⁸ *Arguendo*, Defendants' alternative evidence is considered.
27

28 ⁸ ESA procedural errors are subject to a harmless error analysis. See *Idaho Farm Bureau Fed'n v. Babbitt*, 58 F.3d 1392, 1405 (9th Cir. 1995).

1 (1) Record Citations Provided by Mr. Stuart.

2 Mr. Stuart states: "[a]dditional assessment of the effects of the
3 OMR flow levels on salmon loss was derived from data provided by NMFS
4 staff for the BDCP. NMFS 79238-239; 79240-83808; 90852-98." Fourth
5 Stuart Decl., Doc. 485 at ¶ 73. These are several thousand pages of
6 documents. Mr. Stuart does not explain how the voluminous referenced
7 information was used or analyzed. It is impossible to determine
8 whether these referenced pages provide a sufficient alternative basis
9 for the BiOp's conclusions. NMFS has provided no explanation for an
10 alternative to its scientifically unreliable conclusions. *Humane*
11 *Soc. v. Locke*, 626 F.3d at 1048 (holding NMFS did not offer a
12 satisfactory explanation for its findings); *Am. Turnboat Ass'n*, 738
13 F.2d at 1016 (finding that despite broad discretion afforded NOAA,
14 where record evidence detracts from that relied upon by the agency, a
15 court may find the agency's decision arbitrary and capricious).
16 Citing this information and then failing to explain it is arbitrary
17 and capricious.
18
19

20 (2) Particle Tracking Model Results.

21 The BiOp also relied on outputs from computer model runs
22 utilizing the so-called Particle Tracking Model ("PTM"). Export
23 Plaintiffs' and DWR's 2010 PI Motion challenged the use of PTM,
24 arguing that while PTM is useful to track the fate of neutrally
25 buoyant particles, it does not accurately reflect the behavior of
26 salmonids, which are strong, volitional swimmers. These challenges
27
28

1 were rejected in the May 18, 2010 PI Decision on the grounds that the
2 BiOp acknowledged the limitations of PTM and reasonably relied on PTM
3 studies to support certain conclusions:

4 120. This is a dispute among scientists. While DWR
5 criticizes PTM modeling, Stuart and NMFS recognized its
6 limitations and found PTM studies helpful to support its
7 conclusions that: (a) as exports increase, negative OMR
8 flows also increase; and (b) that at Station 815 (the
9 confluence of the Mokelumne River and the San Joaquin
10 River), particle entrainment increases from 10% at -2,500
11 cfs, to 20% at -3,500 cfs, to 40% at -5,000 cfs, and 90% at
12 -7,000 cfs. NMFS, through Mr. Stuart, took into account
13 inherent differences in the movement of neutrally buoyant
14 particles and their speed and direction of travel.
15 Administrative law requires deference to the Agency.
16 Additional record analysis is necessary to determine the
17 extent of support for NMFS's additional opinion that exports
18 affect salmonid survival.

19 *Cosol. Salmonid Cases*, 713 F. Supp. 2d at 1141. These challenges are
20 discussed in other sections of this decision. Here, it is sufficient
21 to note that the PTM results are not a complete replacement for
22 Figures 6-65 and 6-66, as they only explain how particles, not actual
23 fish, would respond to increased OMR flow. Nor do Federal Defendants
24 point to any other information in the record that delineates "where
25 along the spectrum of OMR flows any significant change in salvage
26 could be observed," the purposes for which Federal Defendants use 6-65
27 and 6-66.

28 The same reasoning applies to acoustic tag studies and other data
the BiOp relies upon. This other data was treated in the May 18, 2010
decision and below in greater detail. It is undisputed that none of
these studies or additional data pinpoint for management purposes at

1 what point negative OMR flows must be controlled. Doc. 347 ¶¶ 128-
2 138.

3 It is not appropriate to speculate how NMFS's analysis and/or
4 conclusions would have changed had the data used in figures 6-65 and
5 6-66 been scaled to population size. This must be done on remand.

6 Whether there is sufficient data to scale CV steelhead salvage
7 information to population size is unclear. Compare BiOp at 107
8 (discussing existing population data and difficulties posed by "lack
9 of monitoring program") with Doc. 431 at 11 (citing Burnham Decl.,
10 Doc. 439 at ¶ 42 ("NMFS has access to the number of hatchery-produced
11 salmon each year), for the proposition that NMFS had "readily
12 available" data regarding how many CV Steelhead were released from
13 hatcheries each year)). That scaling for population size may not be
14 possible for all species may limit NMFS's efforts. If population data
15 is unavailable for certain species, the agency must nevertheless
16 explain how it can make management conclusions without such
17 information. The extent to which any such limitations mitigate NMFS's
18 failure to scale raw salvage data cannot be discerned from the present
19 record.
20
21
22

23 (3) Figures 6-71, 6-72, and 6-73.

24 The BiOp also relies on a series of plots, taken directly from
25 Reclamation's Biological Assessment ("BA" or "OCAP BA"), of monthly
26 juvenile salmonid "loss" against average exports. The first set of
27 plots, Figure 6-71, depicts loss of juvenile Chinook salmon versus
28

average monthly CVP and SWP exports for a period from 1995 through 2007.

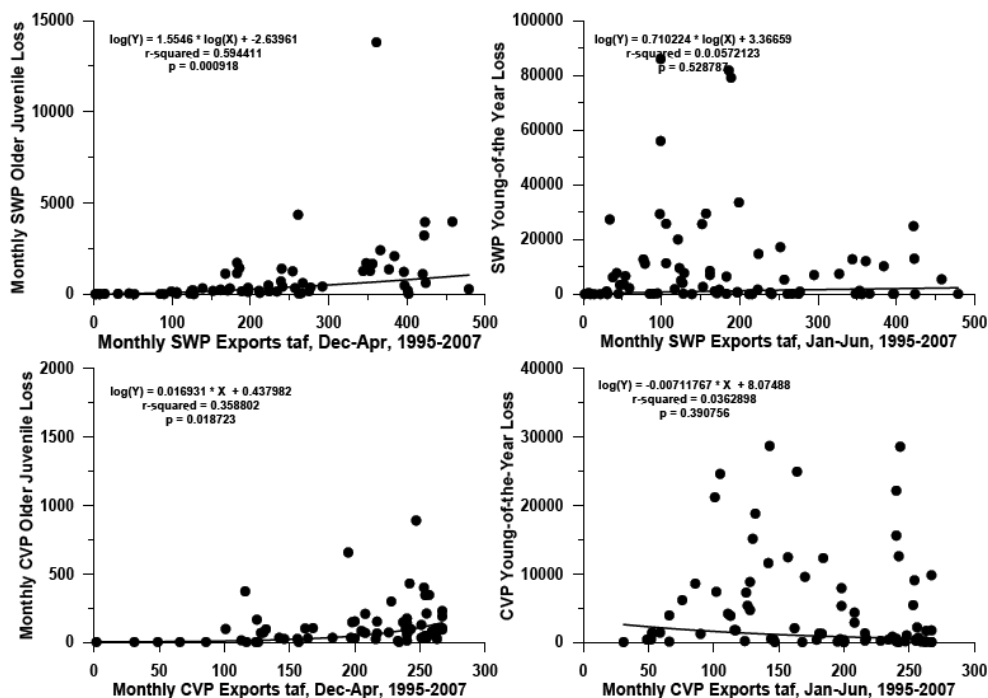


Figure 6-71. Monthly juvenile Chinook salmon loss versus average exports, December through June, 1993 through 2006, at each facility; SWP and CVP (CVP/SWP operations BA figure 13-40).

BiOp at 370. This plot was specifically cited as quantitative evidence of a relationship between exports and loss at the pumps:

The CVP/SWP operations BA presented data that regressed the loss of older juvenile Chinook salmon against exports (figure 6-71) and found that a significant relationship existed. The relationship was stronger for exports at the SWP ($p = 0.000918$) than for exports at the CVP ($p = 0.0187$). The months of December through April resulted in the most informative relationship based on the historical number of older juvenile Chinook salmon salvaged each month and the relationship of each month to salvage and exports. Conversely, regressions performed for monthly salvage of YOY Chinook salmon against exports did not result in a significant relationship at either the SWP or CVP facilities....

Id. at 368-69. In this way, the BiOp used Figure 6-71 as quantitative evidence of a statistically significant connection

1 between loss of older juvenile Chinook salmon and export levels.
2 These plots suffer from the same flaw of mis-using raw salvage data.
3 They must be re-analyzed and explained on remand if they are to be
4 used as scientific justification for the BiOp's conclusions.

5 Figures 6-72 and 6-73 present a more difficult issue, as they
6 concern CV steelhead salvage, for which much less data is available.
7 Figure 6-72 plots monthly CV Steelhead salvage (both clipped/hatchery
8 and unclipped/wild⁹) against exports:

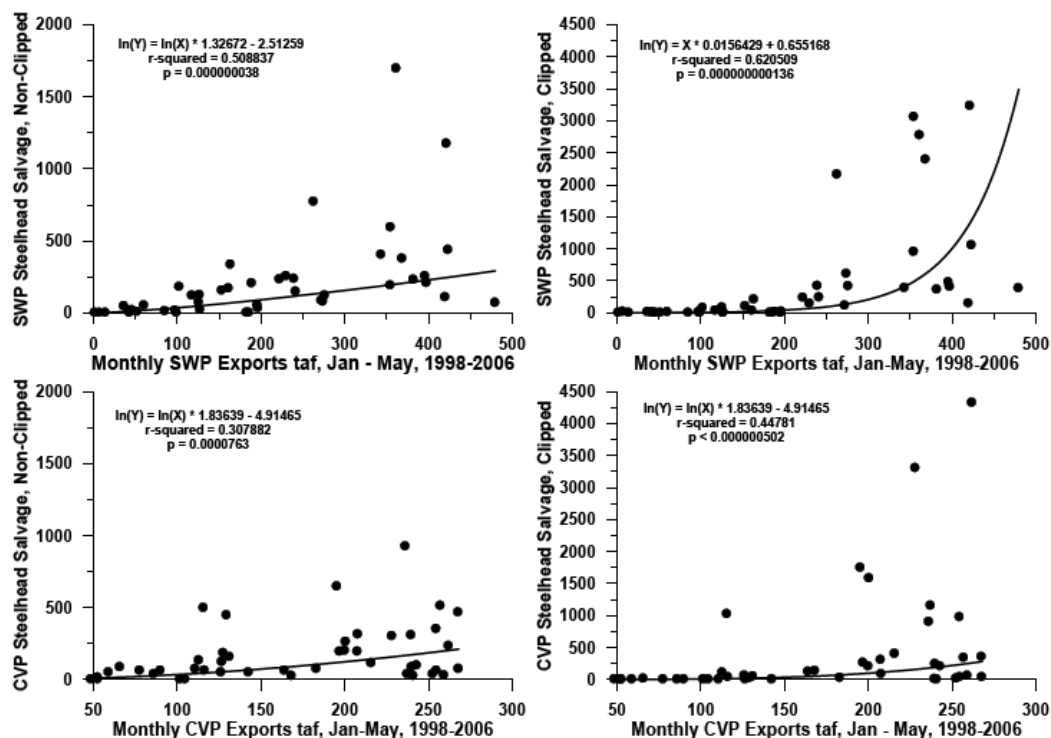


Figure 6-72. Monthly steelhead salvage versus average exports, January through May, 1998 through 2006, at each facility; SWP and CVP (CVP/SWP operations BA figure 13-45).

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25 *Id.* at 371. The BiOp indicates that these "regressions resulted in
26 significant relationships between exports and salvage of steelhead at

27 ⁹ The term "unclipped" refers to wild fish with intact adipose fins, while "clipped"
28 fish have had their adipose fins clipped before release from a hatchery. BiOp at
337

the facilities, more so for the SWP than the CVP." *Id.* at 369.

Figure 6-73 plots monthly CV Steelhead salvage against the monthly average export to inflow ratio, finding significant relationships:

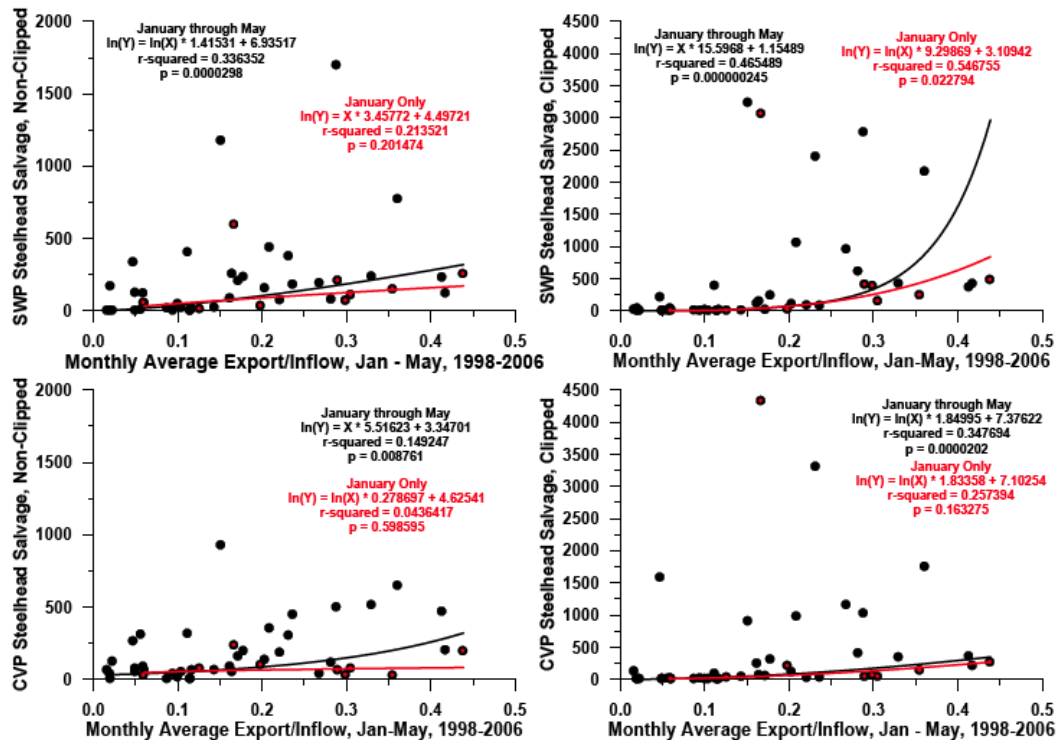


Figure 6-73. Monthly steelhead salvage versus average Export/Inflow ratio in TAF, January through May, and January alone, 1998 through 2006, at each facility; SWP and CVP (CVP/SWP operations BA figure 13-46).

Id. at 370-71. The 2010 PI Decision found that "[a]s to the CV steelhead, for which no population numbers are available, it is less clear whether the use of raw salvage numbers is always inappropriate." *Consol. Salmonid Cases*, 713 F. Supp. 2d at 1143. Export Plaintiffs do not explain how it would be possible to scale to overall population size the wild CV steelhead salvage data, referenced in Figure 6-73 as "unclipped" CV steelhead. However, plaintiffs point out that the exact number of hatchery CV steelhead released each year is known, and therefore argue that NMFS could have scaled the hatchery or "clipped"

1 CV Steelhead data to population size. Doc. 431 at 11. Federal
2 Defendants do not respond to this assertion. There appears to be no
3 reason to distinguish between the clipped CV steelhead analyses and
4 Chinook salmon analyses, for which population scaling is the best
5 available scientific methodology.

6
7 More importantly, Federal Defendants do not explain how these
8 figures, even if valid, serve the same purpose as Figures 6-65 and 6-
9 66, which were cited to demonstrate that "[l]oss of older juveniles at
10 the CVP and SWP fish collection facilities increase sharply at [OMR]
11 flows of approximately -5,000 cfs and depart from the initial slope at
12 flows below this." *Id.* at 361.

13
14 None of the alternative bases offered by Federal Defendants are
15 sufficient to render NMFS's reliance on Figures 6-65 and 6-66
16 "harmless error." The significance of Mr. Stuart's voluminous record
17 citations is unexplained. Neither the PTM Modeling Results, nor
18 Figures 6-71, 6-72, or 6-73 provide alternative bases for NMFS's
19 conclusions regarding the negative OMR flows below which loss of
20 juvenile salmonids "increases sharply." Export Plaintiffs' motion for
21 summary judgment that Federal Defendants acted unlawfully by relying
22 on raw salvage analyses is GRANTED; Federal Defendants' and Defendant-
23 Intervenor's cross motions are DENIED.

24
25 c. Separate Challenges to Statistical Analyses in Figures
26 6-71, 6-72, and 6-73.

27 Export Plaintiffs also maintain that all three sets of graphs
28 misrepresent the statistical significance of the data because "the

1 decision to divide the data by month created an arbitrarily large
2 sample size." Doc. 431 at 10. According to Export Plaintiffs, this
3 "produce[d] facially incredible P-values (the standard statistical
4 measure of significance) that misrepresented the validity of the
5 models that were fit to the data." *Id.* A P-value "represents the
6 probability that the result obtained in a statistical test is due to
7 chance rather than a genuine relationship between the variables."
8 Burnham Decl., Doc. 439 at ¶ 43. Regression analysis is generally
9 considered statistically significant when the P-value is smaller than
10 0.05. *Id.*

12 The upper right graph from Figure 6-72, which plots monthly SWP
13 exports for January through May of 1998 through 2006 against the raw
14 salvage of hatchery steelhead, presents a P-value of 0.00000000136.
15 This is several million times smaller than 0.05. Dr. Burnham opines
16 that while "[s]uch a P-value is not impossible ... it would be
17 surprising and especially so with this graph" because "[t]he scatter
18 of the data points indicates that the regression is not a very good
19 fit." *Id.* at ¶ 44.

21 Dr. Burnham describes the R^2 value of 0.62 as not very strong.
22 The R^2 value is a statistical measure of how well the regression
23 explains the data. "Roughly speaking an R^2 of 0.5 means that the
24 regression accounts for 50% of the variation observed in the data,
25 while the other 50% is explained by other, unknown factors. Generally
26 speaking an R^2 of 0.5 is considered weak, while an R^2 of 0.8 or above
27
28

1 is considered strong." *Id.* at ¶ 36.

2 Dr. Burnham opined that this high level of apparent
3 "significance" is the result of treating each of the monthly export
4 points as an independent data point, which increases the sample size
5 and influences the P-value. *Id.* at ¶ 45. Because the monthly data
6 is "highly correlated with each individual year, due to the unique
7 natural conditions that characterize each year, such as the abundance
8 of the salmon cohort, patterns of flow, changes in temperature, etc."
9 *Id.* at 47. Dr. Burnham offers a helpful explanation of why this is a
10 problem:
11

12 For example, a medical researcher could misrepresent the
13 significance of a drug study by performing [a] test on 10
14 people, and then treating the results for each individual
15 person as if that person was 100 people. If the initial
16 result of the test on 10 people was that 80% had been cured
17 by the drug, nothing would change by acting as if the test
had been performed on 1000 people: 80% would still be cured.
However, the study would appear more significant because of
the claim the results were true for a 1000 people rather
than 10 people.

18 *Id.* at ¶ 46. In the present case, Dr. Burnham opines that NMFS's
19 approach caused the relationship between exports and salvage to
20 "appear more significant than it really is," when in fact "the high
21 salvage levels in [certain] years may have actually been primarily
22 caused by one independent factor, such as a large hatchery release
23 that year." *Id.* at ¶ 49. The results of the "January Only" data
24 depicted in red on Figure 6-73, are different, showing much higher P-
25 values, with only one of the four graphs showing statistical
26 significance. *Id.* at 51.
27

28 Mr. Stuart responds to these critiques in his Fourth Declaration:

1 ... Dr. Burnham critiques the statistical analysis of the
2 data that was presented to NMFS in the biological assessment
3 by DWR. NMFS reported the data presented by DWR in the BA as
4 it was written without altering its content. While the
5 probability of the regressions lines is unusual, having an
6 unusually low "p" value, this is not a reason to completely
7 disregard the data because the general trend of the lines is
8 consistent with trends previously seen in consultations and
9 reports provided to NMFS. This data is also consistent with
10 the results of the radio tagged salmon studies conducted by
11 Vogel in the South Delta in 2000 and 2001 in which tagged
12 fish were drawn to the export facilities in higher numbers
13 when exports were high as compared to lower levels of
14 exports (Vogel 2002 cited in Vogel 2004). NMFS regarded the
15 trends as more explanatory biologically than the accuracy of
16 the statistical analysis being reported.

17 Doc. 485 at ¶ 75. Mr. Stuart now argues that the trend lines have
18 biological significance even if the statistical analyses were
19 incorrectly performed. Yet, the BiOp specifically emphasizes how
20 these graphs demonstrated "significant relationship[s]" between the
21 variables. See, e.g., BiOp at 369.

22 Mr. Stuart also provides a substantive rebuttal to Dr. Burnham's
23 critique of the statistical analyses, premised on Dr. Burnham's
24 argument that it was clear error to use monthly data points in the
25 correlation analysis because they are highly correlated within years.
26 Mr. Stuart opines that this premise is flawed because "[m]onthly
27 exports do not necessarily correlate with each other between months or
28 between years." Fourth Stuart Decl., Doc. 485 at ¶ 76.

29 For example, exports in March do not correlate with exports
30 in April and May from 2000 to 2006, as Dr. Burnham has
31 alleged, since exports are curtailed in April and May for
32 the VAMP experiment during this time period. So regardless
33 of what the March pumping rate is, the exports in April and
34 May will be lower. Likewise, exports in January are allowed
35 to reach a maximum of 65 percent of the inflow to the Delta,

1 while exports from February through June are only allowed to
2 reach a maximum of 35 percent of inflow.

3 *Id.* This provides a partial explanation for the statistical
4 analyses.

5 This is an area of disagreement among experts. The agency is due
6 deference in such circumstances, unless its experts' opinions are
7 unsupported or wrong. *Cactus Corner, LLC v. U.S. Dept. of Agric.*,
8 346 F. Supp. 2d 1075, 1113 (E.D. Cal. 2004).

9 When specialists express conflicting views, an agency must
10 have discretion to rely on the reasonable opinions of its
11 own qualified experts even if, as an original matter, a
court might find contrary views more persuasive.

12 *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 378 (1989)
13 (explaining in the context of an agency's decision not to supplement a
14 NEPA environmental impact statement that "courts should not
15 automatically defer to the agency's express reliance on an interest in
16 finality without carefully reviewing the record and satisfying
17 themselves that the agency has made a reasoned decision based on its
18 evaluation of the significance-or lack of significance-of the new
19 information" and noting that "[a] contrary approach would not simply
20 render judicial review generally meaningless, but would be contrary to
21 the demand that courts ensure that agency decisions are founded on a
22 reasoned evaluation "of the relevant factors").

23
24
25 This is a close call. Dr. Burnham's opinion suggests that it was
26 unreasonable for NMFS to rely on the statistical analyses it
27 performed. Mr. Stuart offers some explanation to counter certain
28

1 aspects Dr. Burnham's critique, but does not satisfactorily explain
2 the anomalous statistical results. Because the BiOp's reliance on
3 these graphs must be remanded for other reasons, the agency must
4 explain the flaws in its approach to the statistical analyses on
5 remand.
6

7 2. Failure to Perform a Population-Level Quantitative Analysis.

8 Plaintiffs maintain that the BiOp violated the best available
9 science requirement because it failed to employ a "population-level
10 quantitative analysis." Doc. 431 at 15. It is undisputed that
11 quantitative population dynamics models, or life cycle models, are the
12 most reliable method to evaluate the impacts of various stressors on a
13 fish population. This has been indisputably established in these
14 related cases. Plaintiffs' expert Dr. Hilborn opined:
15

16 Life cycle modeling for salmonids is widely recognized as an
17 available and necessary scientific tool, and is generally
18 accepted in the scientific community as the best method for
19 identifying the factors affecting fish population abundance
and determining the significance or relative importance of
distinct factors causing salmonid fish population increases
or decreases.

20 Hilborn Decl., Doc. 443 at ¶ 5. The BiOp concedes that "[i]deally, a
21 life cycle approach, in which the effects on individual life stages on
22 the life cycle could be estimated independent of the effects on other
23 stages, would be implemented to assess the relative impacts on
24 abundance...." BiOp at 66.
25

26 However, such models only qualify as "best available science"
27
28

1 where an appropriate model is available.¹⁰ In the *Consolidated Delta*
2 *Smelt Cases*, an appropriate smelt population dynamics was not
3 available at the time the biological opinion in dispute in that case
4 was issued:

5 The ESA does not require FWS[] to generate new studies. In
6 *Southwest Center for Biological Diversity v. Babbitt*, 215
7 F.3d 58 (D.C. Cir. 2000), the district court found
8 "inconclusive" the available evidence regarding FWS's
9 decision not to list the Queen Charlotte goshawk, and held
10 that the agency was obligated to find better data on the
11 species' abundance. The D.C. Circuit reversed, emphasizing
12 that, although "the district court's view has a superficial
13 appeal ... this superficial appeal cannot circumvent the
14 statute's clear wording: The secretary must make his
15 decision as to whether to list a species as threatened or
16 endangered 'solely on the basis of the best scientific and
17 commercial data available to him....' 16 U.S.C. §
18 1533(b)(1)(A)." *Id.* at 61 (emphasis added); *see also*
19 *American Wildlands v. Kempthorne*, 530 F.3d 991, 998 (D.C.
20 Cir. 2008) (the "best available data" standard "requires not
21 only that the data be attainable, but that researchers in
22 fact have conducted the tests").

23 Plaintiffs advocate a narrow reading of both *Southwest*
24 *Center* and *American Wildlands*, arguing these cases only
25 mean that the agency is not required to gather new data in
26 the field regarding a species if such information is not
27 already available. Doc. 697 at 22. Plaintiffs object that
28 "[n]either of these cases supports Defendants' position that
FWS could disregard the smelt abundance data that were
already in its possession and fail to undertake the
necessary statistical analyses to satisfy its statutory
mandate to determine 'whether the action ... is likely to
jeopardize the continued existence of the species.' 50
C.F.R. § 402.14(g)(4)." *Id.*

¹⁰ Plaintiffs also point to several documents in the administrative record where scientific experts recommended that NMFS use a quantitative life cycle model. *See, e.g.,* AR 00108170 (CALFED Science Panel commissioned by NMFS to review a draft version of the BiOp noted that the "lack of quantitative modeling ... and lack of integrative life-cycle modeling for salmon" was "[o]ne of the most important limitations to the analyses used in the draft [BiOp]"). However, these recommendations are not dispositive of whether the models discussed were "available."

1 Plaintiffs cite no authority suggesting that the non-
2 existence of an analytical model should be treated any
3 differently from the non-existence of raw field data. FWS
4 did not have an off-the-shelf form of "statistical analysis"
5 it could apply to determine the effects of Project
6 Operations on the delta smelt population. Although life-
7 cycle modeling is standard practice in the field of
8 fisheries biology, and a life-cycle model is being (and
9 should have been) developed for delta smelt, it is
10 undisputed that an appropriate life cycle model had not been
11 developed at the time the BiOp issued. FWS must apply the
12 best "available" science; not the best science possible.
13 FWS's failure to apply a life cycle model did not per se
14 violate the ESA or the APA.

15 *San Luis v. Salazar*, 760 F. Supp. 2d at 884-85.

16 The 2010 PI Decision in this case found that Plaintiffs' were not
17 likely to succeed on the merits of their life cycle modeling claim
18 because they had not "present[ed] evidence that they, or anyone
19 else[,] developed or made available to NMFS an appropriate life cycle
20 model or the results of an appropriate life cycle analysis prior to
21 the issuance of the BiOp." *Consol. Salmonid Cases*, 713 F. Supp. 2d
22 at 1132. However, the PI Decision is not law of the case. *S. Or.*
23 *Barter Fair v. Jackson County, Or.*, 372 F.3d 1128, 1136 (9th Cir.
24 2004) ("[D]ecisions on preliminary injunctions are just that-
25 preliminary-and must often be made hastily and on less than a full
26 record.") (citing *Univ. of Tex. v. Camenisch*, 451 U.S. 390, 395
27 (1981)).

28 Plaintiffs insist that NMFS did have access to "several fully
29 featured quantitative life-cycle models[,] which had been specifically
30 designed for use in the Delta...." Doc. 431 at 15. Plaintiffs focus
31 on the Interactive Object-Oriented Salmon simulation ("IOS") model,

developed by Bradley Cavallo, and the *Oncorhynchus* Bayesian Analysis ("OBAN") model, which was developed in coordination with NMFS. *Id.* at 19

a. IOS.

The BiOp discussed its decision not to use IOS, which was designed to evaluate the influence of different Central Valley water operations on the life cycle of winter-run using simulated historical flow and water temperature inputs." BiOp at 65.

NMFS did not use the results of the IOS model for our analysis in this Opinion because the intended application of the model in the CVP/SWP operations BA was not useful for estimating, in an overall sense, how winter-run might respond to the proposed action. For example, the CVP/SWP operations BA cautions the use of the IOS model results in making inferences related to how winter-run abundance is affected by the proposed action: "*In evaluating effects of the proposed actions, differences between the three studies rather than absolute trends should be examined*" (Appendix O in CVP/SWP operations BA). Thus, it seems that the IOS model results presented in the CVP/SWP operations BA are not intended to reflect either abundance estimates observed in the past or future abundance with implementation of the proposed Project. Estimates based on observations are much different than estimates based on modeling without observation input. Results of the IOS model presented in the CVP/SWP operations BA show an increasing trend in winter-run escapement throughout the entire simulation period (i.e., from 1923 through 2002), such that by 2002, escapement is above 40,000 fish for all CALSIM II studies examined (figure 11-5 in CVP/SWP operations BA). Those results contrast with observed winter-run escapement estimates, which show a dramatic population crash during this period (see Grandtab at <http://www.delta.dfg.ca.gov/afrp/>), eventually leading to their endangered status under the ESA.

In the Opinion, NMFS must consider how winter-run is expected to respond to implementation of the proposed action. Model results, such as the IOS model results presented in the CVP/SWP operations BA, that are not intended to at least generally approximate past or future

1 conditions, do not inform us in this consideration. If the
2 IOS model results in the CVP/SWP operations BA are intended
3 to be used strictly as an alternatives comparison tool, as
4 the CVP/SWP operations BA indicates, instead of one that
5 produces somewhat meaningful trend information for
6 individual model runs, then the utility of those results for
7 the Opinion is limited, particularly considering that a
8 model alternative representing just baseline conditions does
9 not exist. The CALFED Peer Review Panel stated that, "*The
10 default should be comparing the CALSIM studies of future
11 scenarios (with different scenarios for climate change) to
12 baseline*" (Anderson *et al.* 2009). The context of this
13 statement was that comparisons among alternatives such as
14 those used in the IOS model (e.g., CALSIM studies 6, 7, and
15 8) are inconsistent with the Opinion's analytical approach.
16 As such, NMFS did not use the IOS model results presented in
17 the CVP/SWP operations BA as evidence for analyzing how
18 winter-run will be affected by the proposed action.

12 Another consideration for not using the IOS model in the
13 Opinion is that the model has not yet been published in peer
14 reviewed scientific literature, and NMFS does not understand
15 either the model's limitations or its extent. As described
16 in Paine *et al.* (2000), mathematical models intended to
17 help guide management of natural populations must be used
18 wisely and with understanding of limitations. One potential
19 limitation associated with applying large scale models over
20 the entire life cycle of a species, as is done in the IOS
21 model, is whether enough data are available to reliably
22 estimate model parameters. Paine *et al.* (2000) state: "*When
23 the data are not available for the needed estimates of
24 parameter values, there is a tendency to insert values
25 based on opinion or expert testimony. This practice is
26 dangerous. The idea that opinion and "expert testimony"
27 might substitute for rigorous scientific methodology is
28 anathema to a serious modeler and clearly represents a
29 dangerous trend.*" With these considerations in mind, NMFS
30 did not utilize the IOS model in this Opinion.

23 *Id.* at 65-65 (italics in original). It is ironic that NMFS's
24 reverence for "rigorous scientific methodology" is honored in the
25 breach by the agency's failure to utilize the most rigorous method
26 possible in the disputed BiOp.

28 Garwin Yip, supervisor for the Water Operations and Delta

1 Consultations branch of NMFS's Sacramento Area Office, elaborated on
2 the first explanation provided in the BiOp -- that IOS estimates did
3 not match actual historic winter run population levels -- by pointing
4 out that even Plaintiffs' expert Dr. Burnham stated that: "If the data
5 does generally not match the model, then we know that our assumption
6 is somehow incorrect and needs refinement." Yip Decl., Doc. 481 at ¶
7 9 (citing Burnham Decl., Doc. 439, at ¶ 24). Mr. Yip points out that
8 "[h]ad NMFS based our conclusion for winter-run on the quantitative
9 approach of the IOS life cycle model results contained in the BA, we
10 would have erroneously concluded that the proposed CVP/SWP operations
11 would help a great deal in recovering the species, rather than
12 jeopardizing it." *Id.* at ¶ 10.

13
14
15 Second, Mr. Yip points out that the CalFed Science Panel, in its
16 review of the December 11, 2008, draft BiOp, discussed NMFS's decision
17 not to use IOS in the BiOp and acknowledged that "the IOS model is
18 relatively new and has not been extensively vetted and published, but
19 all of these types of models are flexible and the Panel wonders if,
20 with sufficient time and with some adjustments and modifications,
21 whether a new version of the IOS could be used." *Id.* at ¶ 11 (citing
22 AR¹¹ 00108178 (Anderson, *et al.* 2009)). The CalFed Science Panel did
23 not recommend or encourage the use of IOS in its current state at the
24 time the BiOp was being developed.

25
26 Mr. Yip points out that the NMFS Central Valley Office requested

27 ¹¹ All references to the NMFS administrative record are noted as "AR" references.
28 References to the separate Reclamation administrative record will be noted as "USBR
AR."

1 that NMFS's Southwest Fisheries Science Center ("NMFS-SWFSC") review
2 various models, including IOS, for overall assumptions and
3 limitations. According to Yip, NMFS-SWFSC "did not have the
4 considerable staff resources and time it would take to adequately
5 review and comment on the IOS model, it did have previous experience
6 with similar models developed by Cramer Fish Sciences, and therefore,
7 offered some comments." *Id.* at ¶ 12.

8
9 To adequately review such a model [IOS model] one must
10 thoroughly examine the model's foundation, functional
11 relationships, error structure, and parameter values in
12 order to assess the quality of the model's resulting
13 inferences. The range of elements incorporated in similar
14 models developed by this contractor [Cramer Fish Sciences]
15 is extensive, many of which are hypothetical in nature and
16 remain the focus of active research. For those model
17 elements that are well-founded, many of the parameter values
18 will, given the data poor situation we find ourselves in,
19 have been set using data from other populations, locations,
20 species, or simply by assumption. Adequate review of the
21 appropriateness of the assumed functional relationship and
22 parameter values would require a significant amount of
23 time.... Parenthetically, we note that the use of large and
24 complex models in data-poor situations runs directly counter
25 to the advice given to NMFS by expert scientific review
26 panels concerned with salmon recovery.

27 AR 00101045-6 (emphasis added).

28 NMFS contends that the IOS model was not available in a reliable,
appropriate, and usable form at the time the BiOp was developed, and
denies that IOS could have been adapted in a reasonable amount of time
for use in the BiOp. NMFS knows all experts agree a life cycle model
is the best methodology for measuring population effects. The agency
continues to dodge serious questions the parties are entitled to have
answered by refusing employ existing models. At the same time, NMFS

1 continues to plead poverty by describing this case as a "data-poor
2 situation." If the data is so sparse that a workable model cannot be
3 formulated, when does NMFS's failure to ensure appropriate data
4 collection is taking place constitute bad faith? After more than five
5 years of dispute, future pleas of data poverty will no longer be
6 accepted.
7

8 As to the IOS model, although it is a close call, Federal
9 Defendants' contention that IOS was not available in a reliable form
10 at the time the BiOp issued has not been rebutted. Plaintiffs' motion
11 for summary judgment that NMFS violated the ESA by failing to apply
12 IOS in the BiOp is DENIED; Federal Defendants' and Defendant-
13 Intervenor's cross motions are GRANTED.
14

15 b. OBAN.

16 Plaintiffs further argue that NMFS acted unlawfully by failing to
17 apply the OBAN model in the BiOp. The BiOp mentions OBAN, but does
18 not specifically address it, opting instead to generally explain that
19 because existing life-cycle models only address population abundance,
20 leaving out other aspects of the Viable Salmonid Population ("VSP")
21 framework (e.g., spatial structure and genetic and life history
22 diversity), the BiOp's analysis is superior because it encompasses
23 these other factors:
24

25 An alternative approach recommended by the CALFED Science
26 Review Panel for estimating an ASR for the Central Valley
27 includes the use of computer models. In particular, the IOS
28 model (Cavallo *et al.* 2008) and the Oncorhynchus Bayesian
Analysis (OBAN) model (Hendrix 2008) were referenced as
potentially useful tools. IOS is a detailed mechanistic

1 model that describes the entire life cycle of both winter-
2 run and spring-run in the Sacramento River, while the OBAN
3 model is a Bayesian statistical model for winter-run in the
4 Sacramento River. Although the CALFED Science Review Panel
5 identified these models as potentially viable options either
6 in combination or independently, it acknowledged the
7 necessary refinement and implementation of this type of
8 model by NMFS for the Opinion may not have been practical
9 because of time constraints and the need for additional
10 modeling expertise. Further development of mortality rates
11 at different life stages specific to the Central Valley
12 could be incorporated into the model to reduce the amount of
13 assumptions currently required, and lead to more realistic
14 and informative results. However, as previously mentioned,
15 this type of information will not be available in the near
16 term. Moreover, in order to sufficiently address the issue
17 of fish routing through the Delta, identified as a critical
18 component by the CALFED Science Review Panel, additional
19 data collection and modeling over the long term (i.e.,
20 beyond the timeline allowed for the development of this
21 Opinion) would be required.

22 As discussed above, this Opinion equates a listed species'
23 probability or risk of extinction with the likelihood of both
24 the survival and recovery of the species, and uses "likelihood
25 of viability" as a standard to bridge between the VSP
26 framework (McElhany *et al.* 2000) and the jeopardy standard.
27 Assessing the viability of salmonid populations requires the
28 consideration of other parameters in addition to population
abundance, including productivity (i.e., population growth
rate), spatial structure, and genetic and life-history
diversity (McElhany *et al.* 2000). All four VSP parameters are
deemed important in evaluating a population's ability to
persist, especially when faced with catastrophic disturbances
(Lindley *et al.* 2007). Although the life cycle modeling
approaches discussed above have the potential to provide
information on all VSP parameters at some point in the future,
it would require substantial data collection and model
refinement. Any present attempt to complete such an exercise
would only address one of those parameters (i.e., abundance),
and any results would include making many assumptions.
Therefore, although a method for evaluating impacts during a
specific life stage in terms of the overall loss in numbers of
fish would be useful, there are other potential consequences
resulting from project operations that need to be considered.
For example, are mortalities at different life stages, or the
loss of historical habitats, likely to have effects on the
other VSP parameters? The analyses within this Opinion, in an
attempt to encompass this broader range of effects, focused on

1 determining whether or not appreciable reductions were
2 expected from the proposed action, rather than trying to
3 quantify the absolute magnitude of those reductions.

4 *Id.* at 67-68.

5 NMFS staff from the Seattle office collaborated with Dr. Nobel
6 Hendrix, the author of the OBAN model, during the model's development.
7 AR 00050578. Throughout 2008, NMFS communicated with Dr. Hendrix
8 about the model, AR 00023869-70, and NMFS staff scheduled and attended
9 meetings about the model, *see, e.g.*, AR 00050874. NMFS requested
10 that its own Science Center review the OBAN model. AR 00046767-69.

11 Plaintiffs argue that Dr. Brian Wells, an NMFS fisheries
12 biologist, described the OBAN model as "a great approach," AR
13 00050825, "a superior model design" and "well thought out," a model
14 that "is the best approach laid out yet and deserves full attention,"
15 AR 00103798. Plaintiffs selectively quote Dr. Wells. For example,
16 in a November 13, 2008 letter to Bruce Oppenheim, a NMFS biologist
17 working on the BiOp, Dr. Wells did compliment the OBAN model:
18

19 Statistically, this is a superior model design because it
20 integrates each life-history phase transition appropriately
21 through a string of Beverton-Holt recruitment models
22 [citations]. The approach is well thought out and, with
23 appropriate data, could result in an intriguing model that
24 will allow the user to determine the potential impact of
25 management decisions at any given life-history stage on the
26 ultimate production of the stock...

27 AR 000103798. However, his next paragraph raises a concern about the
28 available data set:

The only criticism I have for this approach is in the
capacity of the dat[a] to address these questions. At each
stage the data is compromised. For instance, Chipp's Island

1 data does not allow for stock-specific allocation of
2 production and ocean data is reliant on notoriously poor
3 effort data which is not stock specific. Such data will
4 undoubtedly reduce the precision of these models to predict
5 the effects of variability at each life-history phase on the
6 cohort and it is possible that the process error could
7 become cumulatively greater as additional life stages are
8 strung together. Having said that, this is the best approach
9 laid out yet and deserves full attention. The author is
10 clearly aware of the data limitations and through his
11 approach has done the best to accommodate.

12 *Id.*

13 The model's own developer agreed with the Science Center's
14 concern that OBAN contains "a lot of factors that are hypothesized to
15 affect winter run relative to the amount of data," and suggested that
16 a "goal of the modeling effort is to identify some of the most
17 important places to collect additional data." AR 00054082 (emphasis
18 added). As of February 2009, NMFS still had not received a clear
19 response about whether appropriate and sufficient data were available
20 to reliably model population dynamics using OBAN. AR 00070672
21 (indicating it "is uncertain as to whether appropriate and sufficient
22 data are available to reliably model the population dynamics of
23 winter-run Chinook salmon and spring-run Chinook salmon. If
24 appropriate data are not available, application of the OBAN and IOS
25 models to inform risk analysis may lead to erroneous management
26 decisions. Before utilizing the OBAN or IOS models, it is necessary
27 for PRD to gain further confidence in the various results each model
28 can produce.").

Plaintiffs also do not address the 2010 PI Decision's finding

1 that the application of population or life cycle models is not
2 feasible for any analyses applicable to the CV steelhead, for which no
3 population indices are available. *Consol. Salmonid Cases*, 713 F.
4 Supp. 2d at 1164.

5 Federal Defendants also remonstrate that even if sufficient data
6 had been available, email communications in late 2008 and early 2009,
7 while the BiOp was being prepared, describe the model as still under
8 development. See AR 00060571 (January 21, 2009 email discussing need
9 to develop temperature metrics). The software needed to run the model
10 was not available until late April 2009. AR 00086362 (April 20, 2009
11 workshop demonstrating new software for OBAN model).

12 Plaintiffs rejoin that "Defendants' principal criticism of the
13 OBAN model ... that the data were incomplete ... suggests a
14 fundamental misunderstanding of life-cycle modeling generally." Doc.
15 48 at 15. Plaintiffs characterize Defendants' position as based on an
16 erroneous premise that a life cycle model can never be used unless and
17 until it is fully and finally perfected, peer reviewed, and populated
18 with perfect data." *Id.* Plaintiffs complain that this is an
19 impossible standard that ignores the reality that perfect data does
20 not exist and that modeling is an iterative process. For example, Dr.
21 Hilborn opines that life cycle models are "always evolving and many
22 times being challenged by models that make alternative assumptions."
23 Hilborn Reply Decl., Doc. 496 at ¶ 26.

24 The standard scientific approach is a process of confronting
25 competing models with data, not having a perfect and

1 unchanging model. To suggest that a model is unavailable
2 for use because it will require some adjustment or
3 refinement ignores this reality.

4 *Id.* Dr. Hilborn pointed out that preliminary results from OBAN
5 indicated that water temperature and harvest were the dominant factors
6 affecting salmonid populations and that water exports was "not one of
7 the most powerful explanatory factors." *Id.* at ¶ 25.

8 The record reflects that NMFS was working in late 2008 to
9 integrate OBAN into the consultation process, *see* AR 00060572-73; AR
10 00052306-07, but that the agency elected not to make use of the model
11 in the final BiOp approximately three months months before the BiOp
12 was issued, AR 0065191-94. Plaintiffs assert that this was
13 unreasonable because OBAN was "fully functional and ready to be
14 integrated into the BiOp." Doc. 487 at 16. Agency experts concluded
15 that there was not enough data to reliably apply OBAN.¹²

16
17 This is more disassembling by NMFS. Having not devoted necessary
18 attention to OBAN, it rationalizes its doubts about the reliability of
19

20 ¹² NMFS also claims it did not have the expertise to make use of such a model.
21 Plaintiffs rejoin that any lack of modeling resources was manufactured by NMFS,
22 "which could easily have made modeling resources available to the BiOp team,"
23 pointing to various individuals within NMFS who could have done the work. Doc. 487
24 at 17-18. This debate raises difficult issues. On the one hand, an agency cannot
25 be permitted to ignore the best available science simply because it refuses to
26 assign to the task personnel with the expertise to understand and apply that
27 science. On the other hand, NMFS has limited resources, and a court cannot
28 instruct an agency how to allocate those assets. While it may be reasonable to
 demand that NMFS assign to the BiOp team individuals who can correctly apply
 readily available statistical methodologies, at some point Plaintiffs' demands that
 NMFS assign specific experts on its staff to fine tune the application of OBAN to
 the purposes of the BiOp becomes a demand that NMFS develop new science. Where the
 line between these two extremes should be drawn is not clear. It is relevant that
 no outside expert (government, academic, or consultant) had applied OBAN in the
 manner Plaintiffs demand prior to the issuance of the BiOp. Plaintiffs were free
 to submit their own studies and results for NMFS's consideration. They did not.

1 application of OBAN in the BiOp as not clearly erroneous. NMFS
2 remains in the position where it can raise doubt about all conflicting
3 science and hide behind the rubric it cannot be compelled to collect
4 data or develop a model. Plaintiffs' motion for summary judgment that
5 NMFS violated the ESA by failing to apply the OBAN model in the BiOp
6 is DENIED and Federal Defendants' and Defendant-Intervenors' cross
7 motions are GRANTED, but this is the last time NMFS will be permitted
8 to avoid studying, analyzing, and applying a life cycle model. NMFS's
9 chronic failure to do so now approaches bad faith in view of the
10 undeniable importance of the information to resolve the perennial
11 dispute over population dynamics. At some point, this diminishes the
12 agency's credibility.
13
14

15 c. Ricker and/or Beverton-Holt Models.

16 Plaintiffs argue that, even if use of the IOS and/or OBAN models
17 was not legally required, NMFS violated the ESA because it did not
18 make use of certain "basic tools of fisheries management," such as the
19 Ricker or Beverton-Holt models, two mathematical models developed in
20 the mid-1900s. See Doc. 431 at 26. According to Plaintiffs' expert
21 Dr. Burnham, these models make use of "simple mathematical
22 expressions, based solely on past observations [that] combine all life
23 history and environmental information into the period between parent
24 spawners and the resultant returning spawners in the next generation."
25 Burnham Decl., Doc. 439 at ¶ 18. According to another of Plaintiffs'
26 experts, Dr. Ray Hilborn, these models are part of a "standard set of
27
28

1 population dynamics models ... that form the core of the body of
2 knowledge" among fisheries biologists. Hilborn Reply Decl., Doc. 493
3 at ¶ 6. Dr. Hilborn concludes:

4 NMFS should have at the very minimum used simple multiple
5 regression with Ricker or Beverton-Holt models (as discussed
6 in the declaration submitted by Dr. Richard B. Deriso (Doc.
7 440-0)) to see if exports or OMR flows and other factors
8 such as ocean harvest rates, ocean upwelling, and (for
9 winter Chinook) water temperatures on the spawning grounds
10 were related to the cohort replacement rates. Such an
11 analysis can be done in a matter of hours, and NMFS has
dozens of scientists at the Science Centers who could have
done this analysis. I find no explanation in the BiOp or the
administrative record why such an analysis was not
performed. It is 1940s science, is available, and could have
and should have been performed at the very outset of the
BiOp.

12 *Id.* at ¶ 30.

13 NMFS's biologist Garwin Yip submitted a detailed response:

14 23. Dr. Hilborn suggests that NMFS should have performed a
15 statistical regression analysis to identify whether or not
16 various environmental factors were related to, for example,
17 the cohort replacement rate. Hilborn Reply Decl. ¶7, ¶30.
18 While it's true that building a multiple regression model
19 can be relatively simple and straightforward using available
programs such as Excel, it is also true that many data are
not suited for analysis with a straightforward multiple
regression model. For example, Newman and Rice (2002, NMFS
127363-73) note that:

20 "The work of Kjelson *et al.* (1989) was closely
21 scrutinized by numerous interested parties, and their
22 methodology was criticized on a number of grounds. The
23 assumptions and methods for estimating the indices, the
24 application of standard linear regression to dependent
25 variables ranging between 0 and 1, and the selection of
26 covariates were major criticisms. In light of these
27 criticisms, the interested parties chose to bring in
28 statisticians previously unaffiliated with this work
(namely, the authors) in an attempt to develop an
alternative approach for modeling the release-recovery
data. This article describes the resulting model.
Although the approach here was quite different from
that of Kjelson *et al.*, some of our conclusions were
quite similar—for example, the sizeable effect of water
temperature."

1 NMFS 127364. Indicative of the sophistication of the Newman
2 and Rice (2002) analysis is the fact that it was published
3 not in a fisheries or ecological journal, but rather in the
4 Journal of the American Statistical Association.

5 24. Further warning of the potential pitfalls of using a
6 "basic procedure" comes from p. 285 of Hilborn and Walters
7 (1992), on the page immediately following the excerpt quoted
8 by Dr. Hilborn, Hilborn Reply Decl. ¶7. After providing
9 general equations for including multiple environmental terms
10 in the Ricker and Beverton-Holt models, Hilborn and Walters
11 (1992) ask "Why is this dangerous?" and proceed to say that
12 "as tempting as it is to add environmental variables to
13 stock-recruitment data, this is a potentially dangerous
14 practice." On the same page, an explicit "warning" message
15 reads "Be very, very cautious in fitting environmental
16 variables, as it is almost impossible to make sure the
17 apparent correlation is not spurious." (see Exhibit 1).

18 25. The devil is in the details, of course. I do not
19 disagree with Dr. Hilborn's view that a basic regression
20 analysis, possibly including an assessment of environmental
21 terms in a standard stock-recruitment relationship, can be
22 useful in many situations. However, in the specific case of
23 evaluating the effects of CVP/SWP operations on cohort
24 replacement rates of ESA-listed fish in California's Central
25 Valley, I note that the "basic procedure" he suggests grows
26 rather quickly either into a more complicated procedure, or
27 into a "basic procedure" that relies on a set of assumptions
28 that make interpretation and application of the analysis
result more complicated. Consider, for example, a simple
regression of cohort replacement rate (CRR) for winter-run
Chinook salmon, against a single environmental factor.
Below, I discuss several issues that would either complicate
the analysis, or require simplifying assumptions: the
interaction of age structure with the environmental variable
of interest, and the selection of specific environmental
measures.

26 26. First, how would the age structure of the spawning
27 population in a given year be handled? One could, as did
28 NMFS in the CRR summary provided in the status section for
winter-run Chinook salmon (BiOp at 83), assume that the
spawning population was composed entirely of three year
olds. Using this assumption, the CRR is calculated as the
spawning population at time t divided by the spawning
population at t-3. While this assumption keeps the life-
history model simple, it introduces an inaccuracy into the
estimate of cohort replacement rate (unless one makes yet
additional assumptions), since the 2- and 4-year olds in the
spawning population at time t have actually been produced by
spawners at time t-2 and t-4, respectively. The assessment
of potential environmental influences on CRR can also be
affected by this assumption of no age structure in the
spawning population, depending on the environmental factor

being considered. For example, an assessment of attraction flows in year t (the year of return) as a factor affecting CRR would still be very appropriate, since all returning fish, regardless of age, would have experienced the flows observed in year t . In contrast, an assessment of OMR flows (or Sacramento River flow, or exports) during the juvenile outmigration period in year $t-3$ (the brood year) as a factor affecting CRR would be less appropriate, since the 2- and 4-year olds would not have experienced those OMR flows (or Sacramento River flow, or exports). Even if 3-year olds do make up the majority of spawners in a given year, 2- and 4-year old fish may well introduce sufficient mismatch into the model as to mask any environmental effect. Adjusting the model to allow appropriate matching of environmental factor with each age class of spawner leads down a yet more complicated analysis path.

27. Second, what measure would one use to assess "simple" effects like exports or OMR? Looking at row 16e of the stressor table for winter-run Chinook salmon (Table 9-1, BiOp at 452-460), one might choose to assess the impacts of OMR flows during the juvenile emigration period on CRR. Row 16e notes that OMR flows are a potential stressor in the Delta for juvenile winter-run Chinook salmon from November through May, so that's one possible averaging period, though clearly winter-run are more prevalent in the Delta in some months within that period than in others. Dr. Deriso, in his basic analysis of winter-run population growth rate against OMR flows, used the average OMR flow from December through March. Mechanistically, the impacts of OMR are likely to occur on the scale of days to weeks - it is not clear how to capture the effects of OMR variability at this temporal resolution in a model that (unless it is made more complex) calls for an environmental time series with a single value per year.

28. As described in the previous paragraph, a single, "simple" effect could be modeled in many ways. If one wants to consider additional effects (e.g., temperature during the spawning period, exports), each of which also can be modeled in various ways (and for factors such as temperatures, may have watershed-specific values), the possible list of environmental time series grows large very quickly. With this abundance of possible environmental effects, one needs to be very cautious about the risks of overfitting the model (which is an increasing risk as one includes more and more environmental factors into a single regression analysis) or the risks of increasing the Type 1 error rate by performing a large number of simple, single-factor comparisons. While there are various stepwise model-fitting procedures and multiple comparison procedures available to address these two issues, respectively, I note yet again that even the seemingly simple analysis proposed by Dr. Hilborn requires a not insignificant set of assumptions.

1 29. NMFS did perform some basic analyses in evaluating
2 effects of the projects, (e.g. for estimating reasonable OMR
3 targets to manage entrainment), and has been roundly
4 criticized by other plaintiffs' experts (e.g., Dr. Burnham,
5 Dr. Deriso) for the statistical imperfections of those
6 analyses. On the whole, NMFS used a mix of quantitative and
7 qualitative analyses, including analyses provided in the BA
8 and selected scientific literature, in order to come up with
9 its assessment of project effects and the suite of actions
10 necessary to avoid jeopardy.

11 Third Yip Decl., Doc. 518. The application of these "simple" models
12 is not as straightforward as Plaintiffs claim. The law relegates
13 their use and application to the discretion of the agency unless
14 clearly erroneous. Plaintiffs have not demonstrated that NMFS's use
15 or non-use of these models is more than scientific dispute, which is
16 resolved in favor of the agency. A court cannot lawfully second-guess
17 the agency, unless clear scientific error or bad faith is so manifest
18 that the agency's judgments can no longer be trusted. Plaintiffs'
19 motion for summary judgment that NMFS acted unlawfully by failing to
20 use the Ricker and Beverton-Holt models is DENIED; Federal Defendants'
21 and Defendant-Intervenors' cross motions are GRANTED.¹³

22 d. Does the Absence of a Quantitative Analysis Render the
23 BiOp's Quantitative Limits Per Se Unjustified?

24 Plaintiffs argue that even if the BiOp's failure to apply

25 ¹³ In their opening brief, Plaintiffs also argued that the conceptual model applied
26 in the BiOp was biologically implausible because it relied on a particular study,
27 Naiman & Turner (2000), for the proposition that it is possible to drive population
28 to extinction by only slight changes in survival at each life history stage. Doc.
431 at 27-31. Plaintiffs complained that NMFS was misusing a "thought experiment"
from that study as though it were scientific fact. *Id.* Federal Defendants respond
that "NMFS did not rely upon the Naiman and Turner conceptual model to conclude
that any one project effect causing small reductions in one life stage would
jeopardize the species. The Naiman and Turner model was used in evaluating how
slight incremental changes in life history stages affect already-diminished
populations, as such changes are difficult to quantify and may take years to
resolve." Doc. 477 at 28. Plaintiffs appear to have abandoned this argument.

1 quantitative life cycle modeling was not per se unlawful, the absence
2 of such analyses "necessarily cripple[s] the specific quantitative
3 limits imposed by the RPAs." Doc. 431 at 31. The Peer Review Panel
4 addressed this issue:

5 The preparation of the RPAs shifts the questions from
6 jeopardy/no-jeopardy to questions like: Will proposed export
7 and other modifications in the Delta provide the expected
8 benefit for targeted species? Will water withdrawals through
9 a new pumping facility at Red Bluff impose new mortality on
10 downstream migrants that largely offsets the reduced
11 mortality from lifting the dam gates at RBDD? Will remedial
12 actions be effective or will they become expensive projects
13 that show little improvement in species status? How will
14 specific RPAs affect other listed species (e.g., delta
15 smelt) and unlisted species (e.g., fall-run Chinook salmon)?

16 Tier 1 comments, especially related to defining baseline and
17 lack of quantitative integrative tools, become even more
18 important in addressing these and similar RPA related
19 questions. The long-term solution to this challenge is
20 targeted research on the critical issues; careful monitoring
21 of responses to implemented actions; and further development
22 of models for generating baseline conditions, downscaling
23 temporally and spatially coarse outputs, and simulating life
24 cycle dynamics. The modeling and monitoring before and after
25 implementation of actions is needed to highlight or test key
26 uncertainties and to increase our understanding of the
27 system in order to facilitate improved management in the
28 future. We believe that lack of quantitative integrative
29 tools will hinder the development of RPAs because NMFS
30 cannot presently quantify the relative contributions of the
31 different project effects to population status nor can NMFS
32 quantitatively determine the potential benefits of specific
33 remedial actions to population recovery. Without this
34 information, it is difficult to rank the many possible
35 remedial actions by their biological effectiveness relative
36 to their fiscal and social costs in order to logically
37 develop an optimal mix of actions.

38 AR 00089620-21 (emphasis added). Although the Peer Review certainly
39 warned of the pitfalls of attempting to formulate RPA's without
40 "quantitative integrative tools," it acknowledged that the "long-term

1 solution" was further development of modeling tools. The Peer Review
2 did not outright advise the abandonment of quantitative RPAs in the
3 short term. It did caution that the benefits cannot be quantified,
4 nor can the fiscal and social costs.

5 For the purposes of this challenge to the BiOp and its RPAs, it
6 is not appropriate or justified to find all the RPA Actions unlawful
7 simply because Plaintiffs were not satisfied with the quantitative
8 analyses performed in the BiOp. Each challenged RPA must be analyzed
9 in light of the record evidence.
10

11
12 B. Baseline Analysis Challenges.

13 1. Failure to Distinguish Between Discretionary and
14 Nondiscretionary Actions.

15 Plaintiffs opening brief advances an elaborate argument based on
16 *National Association of Home Builders v. Defenders of Wildlife*, 551
17 U.S. 644 (2007), which held that the ESA's consultation requirement
18 was not triggered when an agency undertook nondiscretionary actions,
19 because the agency has no choice. Plaintiffs argue that NMFS erred by
20 failing to distinguish between the discretionary and nondiscretionary
21 aspects of CVP and SWP project operations. Doc. 431 at 48-55.

22 Although it is undisputed that Reclamation operates the project to
23 fulfill certain mandatory water delivery obligations, Plaintiffs'
24 argument that *Home Builders* should be extended to require NMFS to
25 segregate discretionary from non-discretionary operations, placing
26 non-discretionary ones in the "baseline" for purposes of evaluating
27 the action's effect on the Listed Species, was rejected in a December
28

1 14, 2010 Memorandum Decision issued in the related *Consolidated Delta*
2 *Smelt Cases*:

3 Plaintiffs complain that the BiOp's Project Effects analysis
4 was "tainted" because it does not distinguish between
5 discretionary and non-discretionary actions. [] *National*
6 *Association of Home Builders v. Defenders of Wildlife*, 551
7 U.S. 644 (2008), held that ESA § 7's consultation
8 requirements do not apply to non-discretionary actions.
9 Where an agency is required by law to perform an action, it
10 lacks the power to insure that the action will not
11 jeopardize the species. *Id.* at 667. Plaintiffs' cite the
12 Coordinated Operations Agreement, the Central Valley Project
13 Improvement Act's ("CVPIA") requirements to deliver water
14 for Central Valley wildlife refuge areas, and D-1641 as
15 examples of mandatory aspects of Project operations that,
16 they claim, should have been segregated from other Project
17 Operations in the Project Effects Analysis.

18 However, *Home Builders* does not address whether, once
19 section 7 consultation is triggered, the jeopardy analysis
20 must separately identify and segregate discretionary from
21 non-discretionary actions, relegating the non-discretionary
22 actions to the environmental baseline. *Home Builders*
23 addressed whether the section 7 consultation obligation
24 attaches to a particular agency action at all. *See Home*
25 *Builders*, 551 U.S. at 669-70 (holding that consultation
26 "duty does not attach to actions... that an agency is
27 required by statute to undertake..." (emphasis added)).
28 Plaintiffs do not suggest that section 7 does not apply to
the coordinated operations of the Projects. Rather,
Plaintiffs contend that the section 7 consultation process
requires distinguishing between discretionary and non-
discretionary Project operations to identify the actions not
subject to Section 7. Neither *Home Builders* nor the
regulation interpreted in *Home Builders*, 50 C.F.R. §
402.03, includes any such requirement. Plaintiffs' motion
for summary judgment that the BiOp unlawfully failed to
distinguish between discretionary and non-discretionary
actions is DENIED. This does not mean non-discretionary
actions required by law must not be considered in the
consultation process. Federal Defendants and Defendant-
Intervenors' cross-motion on identification of non-
discretionary actions is GRANTED.

1 *San Luis v. Salazar*, 760 F. Supp. 2d at 947-48. Any voluntary

1 efforts by NMFS to segregate discretionary from non-discretionary
2 actions in the BiOp does not alter the fact that *Home Builders*
3 imposes no legal obligation to do so.

4 Plaintiffs advance a related argument that even if *Home Builders*
5 does not require segregation of discretionary from non-discretionary
6 project operations in the BiOp, the ESA otherwise requires NMFS to
7 consider only discretionary operations when evaluating the "effects of
8 the action" vis-à-vis the environmental baseline. Doc. 431 at 55-58.
9 This is based in part on the Science Panel's recommendation that NMFS
10 model a baseline that represents a "hypothetical situation in which
11 physical project infrastructure exists, but no project operations are
12 performed except those mandated by prior agreements or those that are
13 not part of the proposed actions." AR 00108175. The Panel offered:

16 For example, the decline of stream habitat because the dams
17 block gravel recruitment from upstream would be part of
18 baseline, as would providing water to fulfill senior water
19 rights agreements. Modeling in the Delta seemed to use
20 recent conditions rather than an estimate of baseline
21 conditions (i.e., recent conditions minus effects of
22 project-related actions). This definition of baseline was
23 described in words (although too succinctly, in the opinion
24 of the Panel) in the draft BO but never quantified with
25 model results. This can be a serious omission because
26 without a proper baseline, one struggles to make
27 straightforward comparisons of scenarios that differ only by
28 whether proposed project operations are included or not.
Much of the draft BO involves comparing results of various
simulations, but we had difficulty interpreting results
without direct comparisons of the correct baseline to the
correct baseline with project operations.... NMFS must
clearly define the baseline used in analyses and explain why
this baseline was used rather than the baseline quoted above
and seemingly required by the ESA.

Id. (emphasis added).

1 NMFS addressed this recommendation in the BiOp:

2 ESA regulations define the environmental baseline as "the
3 past and present impacts of all Federal, State, or private
4 actions and other human activities in the action area, the
5 anticipated impacts of all proposed Federal projects in the
6 action area that have already undergone formal or early
7 section 7 consultation, and the impact of State or private
8 actions which are contemporaneous with the consultation in
9 process" (50 CFR 402.02). The "effects of the action"
10 include the direct and indirect effects of the proposed
11 action and of interrelated or interdependent activities,
12 "that will be added to the environmental baseline" (50 CFR
13 402.02). Implicit in both these definitions is a need to
14 anticipate future effects, including the future component of
15 the environmental baseline. Future effects of Federal
16 projects that have undergone consultation and of
17 contemporaneous State and private actions, as well as future
18 changes due to natural processes, are part of the future
19 baseline, to which effects of the proposed project are
20 added.

21 In consultations on continuing actions such as CVP/SWP
22 operations, it is quite difficult to separate future
23 baseline effects from the anticipated effects of the
24 proposed action. Operations of existing structures, such as
25 dams and gates, for water supply, flood control, and other
26 purposes -- the proposed action -- are integrally related to
27 the existence of the structures themselves, but effects of
28 the mere existence of the structures are not effects of the
proposed action. *See National Wildlife Federation v.*
National Marine Fisheries Service, 524 F.3d 917, 930-31
(9th Cir. 2008). Similarly, some activities that are part of
the proposed project are non-discretionary, and their
effects are also not effects of the proposed action. *See*
id. at 928-29 (citing *National Ass'n of Home Builders v.*
Defenders of Wildlife, 551 U.S. 644 (2007) []).

Consequently, it is not surprising that in its review of
NMFS' December 11, 2008, draft OCAP Opinion, the CALFED
Science Review Panel (Anderson *et al.* 2009) commented that
a clearly defined baseline was lacking. Reclamation (2009)
provided similar comments. NMFS acknowledges that it was not
easy to discern a uniform approach to characterizing the
environmental baseline in the draft Opinion. NMFS believes,
however, that this is due to the nature of the action under
consultation and available information, rather than a flawed
approach to the analysis. NMFS clarifies its approach here

1 and in relevant sections of the Opinion.

2 In *National Wildlife Federation*, a case regarding
3 consultation on the effects of operating hydropower dams on
4 the Columbia River, the 9th Circuit Court of Appeals
5 rejected NMFS' attempt to narrow the "effects of the action"
6 by defining the baseline to include operations that NMFS
7 deemed to be "nondiscretionary." The Court observed that
8 many of the actions NMFS deemed "nondiscretionary" actually
9 were subject to the action agencies' discretion, and it held
10 that it was impermissible to create an imaginary "reference
11 operation" excluding these actions, to which the effects of
12 the action could be compared. Rather, the Court said that
13 the regulatory requirement to consider the effects of the
14 action added to the environmental baseline "simply requires
15 NMFS to consider the effects of [the] actions 'within the
16 context of other existing human activities that impact the
17 listed species.' [citations omitted]" *Id.* at 930. In other
18 words, the effects of a particular Federal action are
19 intended to be evaluated not simply on their own, but as
20 they affect the species in combination with other processes
21 and activities.

22 The question addressed in a consultation is whether the
23 project jeopardizes the species' continued existence. As the
24 court stated in *National Wildlife Federation*, even if the
25 baseline itself causes jeopardy to the species, only if the
26 project causes additional harm can the project be found to
27 jeopardize the species' continued existence. *Id.* This
28 determination requires an evaluation of the project's
effects, separate from the conditions that would exist if
the project were not carried out.

29 NMFS and Reclamation together attempted to isolate the
30 effects of proposed project operations by segregating the
31 activities that are within Reclamation's discretion to
32 change in the future from those that are not. This effort
33 was not fruitful. The CVP/SWP operations BA begins with a
34 summary of legal and statutory authorities, water rights,
35 and other obligations relevant to the action (Chapter 1),
36 all of which are incorporated into the project description
37 (Chapter 2). Neither chapter describes what Reclamation's
38 nondiscretionary operations would be if discretionary
39 aspects of the proposed action were not implemented. In
40 addition, in all of the models and simulations that
41 Reclamation used to prepare the CVP/SWP operations BA, a "no
42 project" scenario was not run. For example, table 2-1 in the
43 CVP/SWP operations BA identifies the major proposed

1 operational actions for consultation, including
2 implementation of the water quality control plan (WQCP), but
3 it is not clear whether implementing the WQCP, or some
4 portion of it, is a non-discretionary action.

5 Consequently, we determined that if NMFS were to propose a
6 "no project operations" scenario to characterize the
7 environmental baseline, it would be speculative and not
8 supported by the model runs. Following the 9th Circuit's
9 reasoning, with limited exceptions, NMFS assumed that all
10 CVP and SWP operations are subject to the discretion of the
11 project agencies and, thus, that all effects of future
12 operations are effects of the proposed action. The only
13 project effects considered to be within the future baseline
14 (and thus not effects of the proposed action) are those
15 caused by activities that are clearly outside the agencies'
16 authority. For example, as in *National Wildlife Federation*,
17 it is not within the agencies' discretion to remove dams, so
18 the effects of their existence are part of the baseline.
19 Figure 2-12 provides a conceptual diagram of how NMFS
20 characterizes the past and future components of the
21 environmental baseline for consultations on an ongoing
22 action.

23 BiOp at 57-60.

24 *NWF v. NMFS II*, 524 F.3d 917, 929, applies to whether the BiOp's
25 baseline rationale is reasonable for the proposed action. There,
26 NMFS's 2004 biological opinion for the Federal Columbia River Power
27 System ("FRCPS") "included in the environmental baseline for the
28 proposed action the existing FCRPS, various supposedly
nondiscretionary dam operations, and all past and present impacts from
discretionary operations." *Id.* at 926. In addition, NMFS "adopted a
novel 'reference operation' approach ... purportedly in order to
account for the existence of the FCRPS dams." *Id.*

The reference operation consisted of the dams and a
hypothetical regime for operating them, which, according to
NMFS, was the most beneficial to listed fishes of any
possible operating regime. NMFS also found, though, that

1 certain aspects of FCRPS operations-such as operations
2 relating to irrigation, flood control, and power generation-
3 were nondiscretionary, given the dams' existence, and that
4 those aspects should not be considered part of the action
5 under ESA review. The BiOp offers little detail on the
6 nature and extent of the purportedly nondiscretionary
7 obligations or NMFS's basis for finding them to be
8 nondiscretionary.

9 *Id.* The Ninth Circuit evaluated this "reference operation" approach:

10 The district court properly held that NMFS may not use a
11 hypothetical "reference operation" in its jeopardy analysis
12 to exclude from the proposed actions' impacts the effects of
13 related operations NMFS deems "nondiscretionary." NMFS
14 admits that it chose the reference operation approach in
15 order to avoid "trying to precisely determine the extent of
16 the Action Agencies' discretionary operation." However,
17 neither the ESA nor *Home Builders* permits agencies to
18 ignore potential jeopardy risks by labeling parts of an
19 action nondiscretionary. We cannot approve NMFS's
20 interpretation of this rule as excluding from the agency
21 action under review discretionary agency actions taken
22 pursuant to a broad congressional mandate.

23 ***

24 ...NMFS's contention that competing mandates for flood
25 control, irrigation, and power production create any
26 immutable obligations that fall outside of agency discretion
27 is not persuasive. Indeed, NMFS's interpretation is neither
28 mandated nor intimated by the Court's holding in *Home*
29 *Builders*. The Court's concern in *Home Builders* was that
30 "[a]n agency cannot simultaneously obey the differing
31 mandates set forth in § 7(a)(2) of the ESA and § 402(b) of
32 the CWA." 127 S.Ct. at 2534. In this context, compliance
33 with the CWA provision is problematic because the provision
34 "affirmatively mandates that [a specific action which
35 conflicts with the ESA] 'shall' be [taken] if the specified
36 criteria are met. The provision operates as a ceiling as
37 well as a floor." *Id.* at 2533. Here, in contrast, Congress
38 has imposed broad mandates which do not direct agencies to
39 perform any specific nondiscretionary actions, but rather,
40 are better characterized as directing the agencies to
41 achieve particular goals.

42 The 2004 BiOp itself recognizes that Congress has not
43 quantified any of those broad goals, or otherwise specified

1 the manner in which the agencies must fulfill them. NMFS
2 found, for instance, that Congress has mandated that dam
3 operations include flood control, though "Congress has not
4 prescribed precisely how the Corps must achieve its flood
5 control responsibilities." 2004 BiOp at 5-5. Similarly,
6 Congress has mandated that the BPA market and transmit "some
7 level of power, although the precise level is not defined."
8 *Id.* Thus, the 2004 BiOp recognizes that Congress has not
9 specified the manner in which the agencies must fulfill
10 their various obligations. In other words, while the goals
11 themselves may be mandatory, the agencies retain
considerable discretion in choosing what specific actions to
take in order to implement them. The agencies are therefore
obligated to satisfy the ESA's requirements. *See Pac. Coast*
Fed'n, 426 F.3d at 1084-85 ("The ESA obligates federal
agencies 'to afford first priority to the declared national
policy of saving endangered species.' ") (quoting *TVA v.*
Hill, 437 U.S. 153, 185 (1978)). [FN8]

12 FN8. Moreover, at least some of the competing statutory
13 mandates clearly acknowledge that implementing agencies
14 must accommodate wildlife needs. *See* Northwest Power
15 Act, 16 U.S.C. § 839 (providing for purposes of 1980
16 Pacific Northwest Electric Power Planning and
17 Conservation Act "to be construed in a manner
18 consistent with applicable environmental laws");
19 *ALCOA*, 175 F.3d at 1163 ("The Northwest Power Act's
20 goal of providing economical power, however, does not
supplant the BPS's obligation to comply with
environmental mandates."); *Confederated Tribes & Bands*
of the Yakima Indian Nation v. FERC, 746 F.2d 466, 473
(9th Cir.1984) (finding Northwest Power Act places
"fish and wildlife concerns on an equal footing with
power production").

21 NMFS may not avoid determining the limits of the action
22 agencies' discretion by using a reference operation to sweep
23 so-called "nondiscretionary" operations into the
24 environmental baseline, thereby excluding them from the
25 requisite ESA jeopardy analysis. And *Home Builders* cannot
26 be read, as the State of Idaho would have us do, to immunize
27 discretionary agency actions simply because they are taken
28 in pursuit of a non-discretionary goal. The concern that an
agency cannot "simultaneously obey" with both the ESA and
the broad mandates relevant to this case is simply not at
issue here.

ESA compliance is not optional. "[A]n agency cannot escape

1 its obligation to comply with the ESA merely because it is
2 bound to comply with another statute that has consistent,
3 complementary objectives." *Washington Toxics Coal. v. EPA*,
4 413 F.3d 1024, 1032 (9th Cir. 2005). As the Court emphasized
5 in *Home Builders*, "ESA's no-jeopardy mandate applies to
6 every discretionary agency action-regardless of the expense
7 or burden its application might impose." 127 S. Ct. at 2537.
8 When an agency, acting in furtherance of a broad
9 Congressional mandate, chooses a course of action which is
not specifically mandated by Congress and which is not
specifically necessitated by the broad mandate, that action
is, by definition, discretionary and is thus subject to
Section 7 consultation. Because NMFS's approach in the 2004
BiOp produces the opposite result, it is inconsistent with
the ESA and its accompanying regulations, and cannot stand.

10 *Id.* at 928-29.

11 *NWF v. NMFS* found it inappropriate for NMFS to treat as "non-
12 discretionary" activities undertaken to achieve "broad mandates which
13 do not direct agencies to perform any specific nondiscretionary
14 actions, but rather, are better characterized as directing the
15 agencies to achieve particular goals." The opinion does not address
16 the converse situation, present here, where it is alleged that NMFS
17 included non-discretionary aspects of Project operations in the
18 effects of the action, rather than in the environmental baseline.

19
20 Whether or not a particular aspect of project operations is "non-
21 discretionary" is a complex legal inquiry that may take years of
22 litigation to resolve. *See, e.g., Natural Resources Defense Council*
23 *v. Kempthorne*, 627 F. Supp. 2d 1212 (E.D. Cal. 2009) (resolving
24 lengthy cross motions for summary judgment on the issue of whether
25 Sacramento River Settlement Contracts constituted non-discretionary
26 water delivery obligation). Practically speaking, in all but the most
27
28

1 obvious of situations or for obligations that have previously been
2 determined to be "mandatory," it is not feasible for the action agency
3 to finely parse the legal determinations required to distinguish
4 discretionary aspects of the action from non-discretionary ones in the
5 preparation of a biological opinion, especially in a system as complex
6 as the joint Project operations. This is reflected in the 2009
7 Salmonid BiOp's explanation that NMFS could not reliably propose a "no
8 project operations" scenario to characterize the environmental
9 baseline.
10

11 Plaintiffs' ultimate argument is that if non-discretionary
12 project operations are backed out of the "effects of the action" and
13 instead are included in the "baseline" the effects of the action will
14 no longer be "appreciable." This identical argument was explicitly
15 rejected by *NWF v. NMFS II's* holding that comparison of the effects
16 of the action against a hypothetical "reference operation" is not
17 appropriate because the jeopardy analysis must focus on "whether the
18 action['s] effects, when added to the underlying baseline conditions,
19 would tip the species into jeopardy." 524 F.3d at 930. The Ninth
20 Circuit reasoned:
21

22 To "jeopardize the continued existence of" means "to engage
23 in an action that reasonably would be expected, directly or
24 indirectly, to reduce appreciably the likelihood of both the
25 survival and recovery of a listed species in the wild by
26 reducing the reproduction, numbers, or distribution of that
27 species." 50 CFR § 402.02; 16 U.S.C. § 1536(a)(2). NMFS
28 argues that, under this definition, it may satisfy the ESA
by comparing the effects of proposed FCRPS operations on
listed species to the risk posed by baseline conditions.
Only if those effects are "appreciably" worse than baseline

1 conditions must a full jeopardy analysis be made. Under this
2 approach, a listed species could be gradually destroyed, so
3 long as each step on the path to destruction is sufficiently
4 modest. This type of slow slide into oblivion is one of the
5 very ills the ESA seeks to prevent.

6 Requiring NMFS to consider the proposed FCRPS operations in
7 their actual context does not, as NMFS argues, effectively
8 expand the "agency action" at issue to include all
9 independent or baseline harms to listed species. Nor does it
10 have the effect of preventing any federal action once
11 background conditions place a species in jeopardy. To
12 "jeopardize"-the action ESA prohibits-means to "expose to
13 loss or injury" or to "imperil." Either of these implies
14 causation, and thus some new risk of harm. Likewise, the
15 suffix "-ize" in "jeopardize" indicates some active change
16 of status: an agency may not "cause [a species] to be or to
17 become" in a state of jeopardy or "subject [a species] to"
18 jeopardy. American Heritage Dictionary of the English
19 Language (4th ed.). Agency action can only "jeopardize" a
20 species' existence if that agency action causes some
21 deterioration in the species' pre-action condition.

22 Even under the so-called aggregation approach NMFS
23 challenges, then, an agency only "jeopardize[s]" a species
24 if it causes some new jeopardy. An agency may still take
25 action that removes a species from jeopardy entirely, or
26 that lessens the degree of jeopardy. However, an agency may
27 not take action that will tip a species from a state of
28 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.

Our approach does not require NMFS to include the entire
environmental baseline in the "agency action" subject to
review.[FN9] It simply requires that NMFS appropriately
consider the effects of its actions "within the context of
other existing human activities that impact the listed
species." ALCOA, 175 F.3d at 1162 n. 6 (citing 50 C.F.R. §
402.02's definition of the environmental baseline). This
approach is consistent with our instruction (which NMFS does
not challenge) that "[t]he proper baseline analysis is not
the proportional share of responsibility the federal agency
bears for the decline in the species, but what jeopardy
might result from the agency's proposed actions in the
present and future human and natural contexts." *Pac. Coast*
Fed'n, 426 F.3d at 1093 (emphasis added).

1 FN9. We note that under NMFS's jeopardy approach, the
2 environmental baseline serves only as a point of
3 reference to determine the net effects of a narrowly-
4 defined action. Thus, whether an action is included in
5 the baseline determines whether its impacts are
6 considered at all in the agency's basic jeopardy
7 analysis.

8 The current existence of the FCRPS dams constitutes an
9 "existing human activity" which is already endangering the
10 fishes' survival and recovery. See *ALCOA*, 175 F.3d at 1162
11 n. 6 (citing 50 C.F.R. § 402.02). Although we acknowledge
12 that the existence of the dams must be included in the
13 environmental baseline, the operation of the dams is within
14 the federal agencies' discretion under both the ESA and the
15 Northwest Power Act, 16 U.S.C. § 839. Any proposed agency
16 action must be evaluated in the contest of this baseline in
17 order to properly determine whether the proposed actions
18 will jeopardize the listed fishes.

19 *Id.* at 929-31 (emphasis added).

20 Nothing in the law requires NMFS to segregate discretionary
21 aspects of coordinated Project operations from non-discretionary ones
22 in the manner Export Plaintiffs demand. If feasible, it could have
23 made sense for NMFS to do this to better document the relationship
24 between the requirements of the species and the action agency's
25 statutory authority to implement the RPA. But, NMFS disclaims the
26 capacity to undertake appropriate modeling and related analysis.
27 Export Plaintiffs have not demonstrated that NMFS's disclaimer is
28 unreasonable.

29 Plaintiffs' motion for summary judgment that NMFS acted
30 unlawfully by failing to segregate discretionary aspects of Project
31 operations from non-discretionary ones is DENIED; Federal Defendants'
32 and Defendant-Intervenors' cross motions are GRANTED.

1 2. Treatment of Available Data on Ocean Harvest and Ocean
2 Conditions.

3 Plaintiffs next argue that NMFS acted unlawfully by failing to
4 quantitatively analyze available data on ocean conditions and ocean
5 harvest. Plaintiffs assert that these failures resulted in an
6 "improper jeopardy finding and invalid RPA." Doc. 431 at 34.

7 a. Consideration of Ocean Conditions Data.

8 Plaintiffs argue that the BiOp should have used available data to
9 quantitatively analyze the impact of ocean conditions on the Listed
10 Species. Doc. 43 at 40-45. Specifically, Plaintiffs assert that NMFS
11 should have performed quantitative analyses using data measuring the
12 Pacific Decadal Oscillation ("PDO"), a recognized index of ocean
13 conditions, so that the "major role ocean conditions play in
14 determining abundance levels of salmonids ... could be compared with
15 other stressors, such as the effects caused by water exports." Deriso
16 Decl., Doc. 440 at ¶ 41. Record evidence suggests ocean conditions
17 play a substantial role in salmon abundance. *See id.* (citing Hare &
18 Mantua (1997), AR 00120076-84); *see also* AR 00084001 (Reclamation
19 arguing to NMFS that "[o]cean conditions likely amount to 99.999% of
20 the cause of the status of Central Valley species" and complaining
21 that NMFS "isn't acknowledging this overwhelming stressor").
22 that NMFS "isn't acknowledging this overwhelming stressor").
23 that NMFS "isn't acknowledging this overwhelming stressor").

24 In a four and a half page section, the BiOp discusses the
25 importance of natural environmental cycles, including those affecting
26 ocean productivity:
27 ocean productivity:

4.2.4.11.1 Natural Environmental Cycles

Natural changes in the freshwater and marine environments play a major role in salmonid abundance. Recent evidence suggests that marine survival among salmonids fluctuates in response to 20- to 30-year cycles of climatic conditions and ocean productivity (Hare *et al.* 1999, Mantua and Hare 2002). This phenomenon has been referred to as the Pacific Decadal Oscillation. In addition, large-scale climatic regime shifts, such as the El Niño condition, appear to change productivity levels over large expanses of the Pacific Ocean. A further confounding effect is the fluctuation between drought and wet conditions in the basins of the American west. During the first part of the 1990s, much of the Pacific Coast was subject to a series of very dry years, which reduced inflows to watersheds up and down the west coast.

"El Niño" is an environmental condition often cited as a cause for the decline of West Coast salmonids (NMFS 1996b). El Niño is an unusual warming of the Pacific Ocean off South America and is caused by atmospheric changes in the tropical Pacific Ocean [El Niño Southern Oscillation (ENSO)] resulting in reductions or reversals of the normal trade wind circulation patterns. El Niño ocean conditions are characterized by anomalous warm sea surface temperatures and changes to coastal currents and upwelling patterns. Principal ecosystem alterations include decreased primary and secondary productivity in affected regions and changes in prey and predator species distributions. Cold-water species are displaced towards higher latitudes or move into deeper, cooler water, and their habitat niches are occupied by species tolerant of warmer water that move upwards from the lower latitudes with the warm water tongue.

A key factor affecting many West Coast stocks has been a general 30-year decline in ocean productivity. The mechanism whereby stocks are affected is not well understood, partially because the pattern of response to these changing ocean conditions has differed among stocks, presumably due to differences in their ocean timing and distribution. It is presumed that survival in the ocean is driven largely by events occurring between ocean entry and recruitment to a sub-adult life stage.

The freshwater life history traits and habitat requirements of juvenile winter-run and fall-run are similar. Therefore, the unusual and poor ocean conditions that caused the

1 drastic decline in returning fall-run populations coast wide
2 in 2007 (Varanasi and Bartoo 2008) are suspected to have
3 also caused the observed decrease in the winter-run spawning
4 population in 2007 (Oppenheim 2008). Lindley *et al.* (2009)
5 reviewed the possible causes for the decline in Sacramento
6 River fall-run in 2007 and 2008 for which reliable data were
7 available. They concluded that a broad body of evidence
8 suggested that anomalous conditions in the coastal ocean in
9 2005 and 2006 resulted in unusually poor survival of the
10 2004 and 2005 broods of fall-run. However, Lindley *et al.*
11 (2009) recognize that the rapid and likely temporary
12 deterioration in ocean conditions acted on top of a long-
13 term, steady degradation of the freshwater and estuarine
14 environment.

15 4.2.4.11.2 Ocean Productivity

16 The time at which juvenile salmonids enter the marine
17 environment marks a critical period in their life history.
18 Studies have shown the greatest rates of growth and energy
19 accumulation for Chinook salmon occur during the first 1 to
20 3 months after they enter the ocean (Francis and Mantua
21 2003, MacFarlane *et al.* 2008)....Therefore, the conditions
22 that juvenile salmonids encounter when they enter the ocean
23 can play an important role in their early marine survival
24 and eventual development into adults.

25 It is widely understood that variations in marine survival
26 of salmon correspond with periods of cold and warm ocean
27 conditions, with cold regimes being generally favorable for
28 salmon survival and warm ones unfavorable....

29 The generally warmer ocean conditions in the California
30 Current that began to prevail in late 2002 have resulted in
31 coastal ocean temperatures remaining 1-2°C above normal
32 through 2005. A review of the previously mentioned
33 indicators for 2005 revealed that almost all ecosystem
34 indices were characteristic of poor ocean conditions and
35 reduced salmon survival....

36 Updated information provided by Peterson *et al.* (2006) on
37 the NWFSC Climate Change and Ocean Productivity website
38 shows the transition to colder ocean conditions, which began
39 in 2007, has persisted throughout 2008. All ocean indicators
40 point toward a highly favorable marine environment for those
41 juvenile salmon that entered the ocean in 2008....
42 Therefore, ocean conditions in the broader California
43 Current appear to have been favorable for salmon survival in

1 2007 and to a greater extent in 2008, which bodes well for
2 Chinook salmon populations returning in 2009 and 2010. These
3 ecosystem indicators can be used to provide an understanding
4 of ocean conditions, and their relative impact on marine
5 survival of juvenile salmon, throughout the broader,
6 northern portion of the California Current. However, they
7 may not provide an accurate assessment of the conditions
8 observed on a more local scale off the California coast.

9 Wells *et al.* (2008a) developed a multivariate environmental
10 index that can be used to assess ocean productivity on a
11 finer scale for the central California region. This index
12 (also referred to as the Wells Ocean Productivity Index) has
13 also tracked the Northern Oscillation Index, which can be
14 used to understand ocean conditions in the North Pacific
15 Ocean in general. The divergence of these two indices in
16 2005 and 2006 provided evidence that ocean conditions were
17 worse off the California coast than they were in the broader
18 North Pacific region. The Wells *et al.* (2008a) index
19 incorporates 13 oceanographic variables and indices and has
20 correlated well with the productivity of zooplankton,
21 juvenile shortbelly rockfish, and common murre production
22 along the California coast (MacFarlane *et al.* 2008). In
23 addition to its use as an indicator of ocean productivity in
24 general, the index may also relate to salmon dynamics due to
25 their heavy reliance on krill and rockfish as prey items
26 during early and later life stages. For instance, not only
27 did the extremely low index values in 2005 and 2006
28 correlate well with the extremely low productivity of salmon
off the central California coast in those years, but the
index also appears to have correlated well with maturation
and mortality rates of adult salmon from 1990-2006 in that
region (Wells and Mohr 2008). Although not all of the data
are currently available to determine the Wells *et al.*
(2008a) index values for 2007 and 2008, there is sufficient
information to provide an indication of the likely ocean
conditions for those 2 years, which can then be compared to
2005 and 2006.

23 A review of the available information suggests ocean
24 conditions in 2007 and 2008 have improved substantially over
25 those observed in 2005 and 2006. For instance, the spring
26 transition, which marks the beginning of the upwelling
27 season and typically occurs between March and June, was
28 earlier in 2007 and 2008 compared to 2005 and 2006. An early
spring transition is often indicative of greater
productivity throughout the spring and summer seasons (Wells
and Mohr 2008, Peterson *et al.* 2006). Coastal upwelling,

1 the process by which cool, nutrient rich waters are brought
2 to the surface (perhaps the most important parameter with
3 respect to plankton productivity), was also above average in
4 2007 and 2008. Moreover, coastal sea surface temperature and
5 sea level height (representative of the strength of the
6 California current and southern transport) values were also
7 characteristic of improved ocean productivity (Wells and
8 Mohr 2008). Thus, contrary to the poor ocean conditions
9 observed in the spring of 2005 and 2006, the Wells *et al.*
10 (2008a) index parameters available at this time indicate
11 spring ocean conditions have been generally favorable for
12 salmon survival off California in 2007 and 2008.

13 In contrast to the relatively "good" ocean conditions that
14 occurred in the spring, the Wells *et al.* (2008a) index
15 values for the summer of 2007 and 2008 were poor in general,
16 and similar to those observed in 2005 and 2006. Summer sea
17 surface temperature followed a similar pattern in both 2007
18 and 2008, starting out cool in June, and then rising to well
19 above average in July before dropping back down to average
20 in August (Wells and Mohr 2008). The strong upwelling values
21 observed in the spring of 2007 and 2008 were not maintained
22 throughout the summer, and instead dropped to either at or
23 below those observed in 2005 and 2006. Finally, sea level
24 height and spring curl values (a mathematical representation
25 of the vertical component of wind shear which represents the
26 rotation of the vector field), which are negatively
27 correlated with ocean productivity, were both poor (Wells
28 and Mohr 2008). Therefore, during the spring of 2007 and
2008, ocean conditions off California were indicative of a
productive marine environment favorable for ocean salmon
survival (and much improved over 2005 and 2006). However,
those conditions did not persist throughout the year, as
Wells *et al.* (2008a) index values observed in the summer of
2007 and 2008 were similar to those experienced in the
summer of 2005 and 2006, 2 years marked by extremely low
productivity of salmon off the central California coast.

29 Evidence exists that suggests early marine survival for
30 juvenile salmon is a critical phase in their survival and
31 development into adults. The correlation between various
32 environmental indices that track ocean conditions and salmon
33 productivity in the Pacific Ocean, both on a broad and local
34 scale, provides an indication of the role they play in
35 salmon survival in the ocean. Moreover, when discussing the
36 potential extinctions of salmon populations, Francis and
37 Mantua (2003) point out that climate patterns would not
38 likely be the sole cause but could certainly increase the

1 risk of extinction when combined with other factors,
2 especially in ecosystems under stress from humans. Thus, the
3 efforts to try and gain a greater understanding of the role
4 ocean conditions play in salmon productivity will continue
5 to provide valuable information that can be incorporated
6 into the management of these species and should continue to
7 be pursued. However, the highly variable nature of these
8 environmental factors makes it very difficult, if not
9 impossible, to accurately predict what they will be like in
10 the future. Because the potential for poor ocean conditions
11 exists in any given year, and there is no way for salmon
12 managers to control these factors, any deleterious effects
13 endured by salmonids in the freshwater environment can only
14 exacerbate the problem of an inhospitable marine
15 environment. Therefore, in order to ensure viable
16 populations, it is important that any impacts that can be
17 avoided prior to the period when salmonids enter the ocean
18 must be carefully considered and reduced to the greatest
19 extent possible.

20 BiOp at 149-53.

21 Plaintiffs do not argue that the BiOp entirely failed to consider
22 ocean conditions and/or the PDO.¹⁴ Rather, they argue that NMFS
23 should have evaluated the impact ocean conditions have on salmon
24 populations quantitatively, so that the effect of ocean conditions can
25 be compared to the effects of project operations. In support of this
26 argument, Plaintiffs quote the Peer Review: "[T]he possibility exists
27 that we may be analyzing effects that occur within the system that
28 ultimately are overshadowed by dynamics and effects in the marine
phase." Doc. 487 at 36 (citing AR 0089603). Plaintiffs' quotation is

¹⁴ The BiOp explains why the PDO is not necessarily the ideal measurement of ocean conditions off the California coast. While general ecosystem indicators, like the PDO, "can be used to provide an understanding of ocean conditions, and their relative impact on marine survival of juvenile salmon, throughout the broader, northern portion of the California Current... they may not provide an accurate assessment of the conditions observed on a more local scale off the California coast." BiOp at 151. Instead, the BiOp examined available data using the Wells index, which does provide specific information about conditions off the California coast. *Id.*

1 incomplete; the whole paragraph provides:

2 The ocean phase remains a major knowledge gap for all of the
3 species. Some information is available for salmon and adult
4 green sturgeon, but little is known for steelhead and sub-
5 adult green sturgeon. Growth and mortality after leaving the
6 system can be affected by a variety of sources including
7 climate patterns and effects on productivity and species
8 community, harvest, trawl by catch, and predation by marine
9 mammals and other predators. The draft BO does not directly
10 address growth and survival during the ocean phase for any
11 of the species. While we understand the logic, and time and
12 knowledge limitations, the possibility exists that we may be
13 analyzing effects that occur within the system that
14 ultimately are overshadowed by dynamics and effects in the
15 marine phase.

16 AR 0089603. Although the Peer Review expressly recognizes a need to
17 consider "the dynamics and effects in the marine phase," as possibly
18 significant to the species, this is not a pronouncement that standard
19 scientific practice demands a quantitative analysis of ocean
20 conditions. Plaintiffs cite no legal requirement that NMFS perform a
21 quantitative analysis to determine the relative impact of ocean
22 conditions on salmon populations. The ESA does not require such an
23 analysis. The caselaw affirmatively decries such a relativistic
24 approach. *See NWF v. NMFS II*, 524 F.3d at 930 ("even where baseline
25 conditions already jeopardize a species, an agency may not take action
26 that deepens the jeopardy by causing additional harm"). The relevant
27 question is whether or not the record supports NMFS's conclusion that
28 Project operations appreciably diminish those species' likelihood of
survival and recovery in light of all pre-existing natural and manmade
conditions. The appropriate focus, under *NWF v. NMFS II*, is not on
the Projects' relative contribution to harm compared to ocean

1 conditions, but rather, whether Project operations cause separate
2 harm, including by making the species more vulnerable to adverse ocean
3 conditions.

4 The BiOp concludes that because the natural cycles that drive
5 ocean conditions are "highly variable," it makes it "very difficult,
6 if not impossible, to accurately predict what they will be like in the
7 future," and because "the potential for poor ocean conditions exists
8 in any given year, and there is no way for salmon managers to control
9 these factors, any deleterious effects endured by salmonids in the
10 freshwater environment can only exacerbate the problem of an
11 inhospitable marine environment." BiOp at 152-53.

13 The BiOp cites Lindley (2009) for the proposition that
14 deterioration in ocean conditions has "acted on top of a long-term,
15 steady degradation of the freshwater and estuarine environment." *Id.*
16 at 149 (citing Lindley (2009), AR 00123514-631). Plaintiffs are
17 correct that Lindley (2009) found that ocean conditions and fishery
18 management played roles in the low escapement of 2007. AR 00123517-
19 18. Plaintiffs quote Lindley (2009)'s conclusion that "unfavorable
20 ocean conditions were the proximate cause" of declines to the 2004 and
21 2005 broods. Doc. 487 at 38. Plaintiffs take these statements out of
22 context. Before discussing impacts to salmon populations caused by
23 human effects on the freshwater environment, Lindley (2009) emphasized
24 the difference between "proximate" and "ultimate" causation:
25
26

27 So far, we have restricted our analysis to the question of
28 whether there were unusual conditions affecting Sacramento

1 River fall-run Chinook from the 2004 and 2005 broods that
2 could explain their poor performance, reaching the
3 conclusion that unfavorable ocean conditions were the
proximate cause. But what about the ultimate causes?

4 AR 00012355. The paper concluded that human manipulation of the
5 freshwater environment likely "played a significant role in making
6 this stock susceptible to collapse during periods of unfavorable ocean
7 conditions." AR 00123551.

8 The law does not require a quantitative, comparative fault type
9 analysis. If the species is in decline and one of the causes is
10 Project operations, the agency has discretion to address and mitigate
11 the resulting harm. The extent to which the record affirmatively
12 demonstrates that Project operations cause separate harm is examined
13 below in connection with Plaintiffs' challenges to the effects
14 analysis.

15 Plaintiffs' motion for summary judgment that NMFS violated the
16 ESA by failing to quantitatively analyze ocean conditions is DENIED;
17 Federal Defendants' and Defendant-Intervenors' cross motions are
18 GRANTED.

19
20
21 b. Consideration of Ocean Harvest Impacts.

22 Plaintiffs also argue that NMFS acted unlawfully by failing to
23 quantify the effect of ocean harvest on the Listed Salmonids. Their
24 argument is that: (1) NMFS has sufficient quantitative data to analyze
25 the effects of ocean harvest on the Listed Salmonids because it
26 manages the ocean harvest; (2) that data, if it had been
27 quantitatively analyzed in the BiOp, would have revealed that the
28

1 losses caused by Project operations are miniscule in comparison to
2 losses caused by ocean harvest. Doc. 431 at 37-40.

3 The ESA requires NMFS to evaluate to what extent the losses are
4 caused by the proposed action, here the operation of the CVP and SWP.
5 The action in question does not include ocean harvest, which in part
6 is the result of separate government activity. NMFS quantitatively
7 evaluated the impacts of ocean harvest on the Listed Species in a
8 separate biological opinion. The Salmonid BiOp acknowledges that
9 ocean harvest is a part of the environmental baseline affecting
10 species viability, see BiOp at 144-46 (discussing ocean commercial
11 and ocean and inland sport harvest as "factors responsible for the
12 current status" of the Listed Species), but does not quantitatively
13 integrate the impact of ocean harvest into the analysis of Project-
14 related impacts on the species.
15
16

17 NMFS's obligation under the ESA is to evaluate how Project
18 operations affect the Listed Species, in light of a depleted
19 population impacted by ocean harvest and other conditions. It is
20 inexplicable that these species are being managed in a piecemeal
21 fashion, without considering all aspects of their life cycle in the
22 same analysis, which would facilitate description of the true effect
23 Project operations have on the species in light of other conditions.
24 What population is available to be affected by Project operations is
25 entirely relevant, as all Defendants have sought to attribute the
26 species' decline to Project operations. Nonetheless, under *NWF v.*
27
28

1 NMFS, the analytical focus is not on the relative contribution of the
2 Projects to the species' condition, but whether the Projects cause
3 additional, independent harm. Plaintiffs' motion for summary judgment
4 that NMFS acted unlawfully by failing to quantitatively analyze ocean
5 harvest impacts to determine whether, relatively speaking, they
6 overwhelm Project impacts is DENIED; Federal Defendants' and
7 Defendant-Intervenors' cross motions are GRANTED.

9 C. Effects Analysis Challenges.

10 1. Use of a 100-Year Timeframe.

11 The BiOp evaluated how the proposed action would impact the
12 species' risk of extinction over a 100-year time period. BiOp at 51.
13 The BiOp explains that the jeopardy standard has been interpreted in
14 the Joint Consultation Regulations as "a requirement that Federal
15 agencies ensure that their actions are not likely to result in
16 appreciable reductions in the likelihood of both the survival and
17 recovery of the species in the wild by reducing its numbers,
18 reproduction, or distribution." *Id.* at 42 (citing 50 C.F.R. §
19 402.02). This means:

21
22 NMFS equates a listed species' probability (or risk) of
23 extinction with the likelihood of both the survival and
24 recovery of the species in the wild for purposes of
25 conducting jeopardy analyses under section 7(a)(2) of the
26 ESA. In the case of listed salmonids, we use the Viable
27 Salmonid Populations (VSP) framework (McElhany *et al.* 2000)
28 as a bridge to the jeopardy standard. A designation of "a
high risk of extinction" or "low likelihood of becoming
viable" indicates that the species faces significant risks
from internal and external processes that can drive it to
extinction. The status assessment considers and diagnoses
both the internal and external processes affecting a

1 species' extinction risk.

2 BiOp at 42. The VSP framework estimates the viability of salmonid
3 populations by defining a viable salmonid population as one that "has
4 a negligible probability of extinction over a 100-year time frame."
5 *Id.* at 51. More specifically, the BiOp sets the threshold for
6 jeopardy as the point at which the effects of the action, in the
7 context of the baseline, result in a risk of extinction of greater
8 than five percent over 100 years. The threshold combines two types of
9 information: a probability of extinction expressed as the percentage
10 likelihood of extinction and a timeframe within which that probability
11 may come to pass, expressed in years. NMFS utilizes a NMFS technical
12 memorandum by McElhany *et al.* (2000), AR 00124576, and a 2007 article
13 by Lindley *et al.*, AR 00123475, as "a bridge to [this] jeopardy
14 standard." BiOp at 42-43, 51-53.

17 The five percent probability of extinction component of the
18 BiOp's standard is derived Lindley (2007), which opines: "We assume a
19 5% risk of extinction in 100 years is an acceptably low extinction
20 risk for populations (Thompson, 1991)." AR 00123477 (emphasis added).
21 Lindley (2007) describes specific criteria for assessing the risk of
22 extinction, and "assume[s] that a 5% risk of extinction in 100 years
23 is [] acceptably low...." AR 00123477. Lindley (2007) characterizes
24 a risk of extinction of less than five percent within 100 years as
25 "low," greater than five percent within 100 years as "moderate," and
26 greater than 20% within 20 years as "high." AR 00123478.

1 The BiOp appears to derive the 100-year timeframe from McElhany
2 (2000). See BiOp at 51. McElhany (2000) describes a viable salmonid
3 population as "an independent population of any Pacific salmonid []
4 that has a negligible risk of extinction due to threats from
5 demographic variation (random or directional), local environmental
6 variation, and genetic diversity changes (random or directional) over
7 a 100-year time frame." AR 00124594. Regarding the selection of the
8 100-year time frame, McElhany (2000) states: "While it is ultimately
9 an arbitrary decision, the 100-year time scale was chosen to represent
10 a 'long' time horizon for evaluating extinction risk." Plaintiffs
11 claim that neither the BiOp nor McElhany provide a reasoned basis for
12 the decision to choose a time frame of 100 years, as opposed to any
13 other, shorter, timeframe. When the McElhany (2000) sentence is read
14 in context, an explanation is provided for the 100-year time scale
15 emerges:
16
17

18 While it is ultimately an arbitrary decision, the 100-year
19 time scale was chosen to represent a "long" time horizon for
20 evaluating extinction risk. It is necessary to evaluate
21 extinction risk at a long time scale for several reasons.
22 First, many recovery actions (such as habitat restoration)
23 are likely to affect population status over the long term.
24 Second, many genetic processes important to population
25 function (such as the loss of genetic diversity or
26 accumulation of deleterious mutations) occur over decades or
27 centuries and current actions can affect these processes for
28 a long time to come. Third, at least some environmental
 cycles occur over decadal (or longer) time scales (e.g.,
 oceanic cycles—Beamish and Bouillon 1993, Mantua *et al.*
 1997, Hare *et al.* 1999). Thus, in order to evaluate a
 population's status it is important to look far enough into
 the future to be able to accommodate large-scale
 environmental oscillations and trends.

1 AR 00124595. Plaintiffs identify no record evidence suggesting that
2 this explanation is irrational.

3 Plaintiffs also argue that the 100-year timeframe is arbitrary in
4 light of the fact that NMFS used a 24-year time frame just a year
5 earlier in the biological opinion for the Federal Columbia River Power
6 System ("FCRPS BiOp"). AR 00130923. The FCRPS BiOp addressed
7 critiques suggesting that it use a 100-year extinction risk period as
8 follows:
9

10 Some suggested that NOAA Fisheries evaluate a 100-year
11 extinction risk time horizon, rather than a 24-year period,
12 or else set standards for both periods. The rationale was
13 that the 24-year extinction risk is lower than the 100-year
14 extinction risk (i.e., it "inflates" survival probability
15 compared to the 100-year time horizon). It has been well-
16 documented that extinction risk increases with longer time
17 horizons, with the probability of extinction "approaching
18 100% for all species if the period is long enough" (NRC
19 1995). For example, Oregon's comments (page 5) include a
20 Figure 2 that shows a low likelihood of extinction over 24
21 and 48 years and a high likelihood of extinction over 100
22 years for Upper John Day spring Chinook. This population is
23 not listed under ESA, and is considered by the state of
24 Oregon to be healthy (ODFW 2006a). While NOAA Fisheries is
25 not familiar with the data or assessment methodology used in
26 Oregon's 100-year extinction risk estimates for this
27 population, their result suggests that even healthy salmon
28 stocks may appear to have a high likelihood of extinction
under this assumption. It has been equally well-documented
that the precision of the risk estimate decreases with
longer time horizons. For example, Fieberg and Ellner (2000)
estimated that reliable estimates of extinction risk may
only be possible when the number of base period observations
is 5-10 times greater than the number of years in the time
horizon.

NOAA Fisheries continues to rely primarily on the 24-year
time horizon for this analysis because the main purpose of
the metric is to inform our judgment regarding the ability
of the species to survive while actions to promote recovery
are implemented under the Prospective Actions and through

1 other processes. The 24-year period is more than twice that
2 of most of the Prospective Actions and is identical to the
3 short-term period considered in the 2000 FCRPS Biological
4 Opinion (NMFS 2000b). However, NOAA Fisheries did calculate
5 extinction risk over the 100-year time horizon to allow
6 comparison of the 24-year extinction risk results with the
7 100-year extinction risk results of interest to some parties
8 in the region. The 100-year extinction risk estimates and
9 associated confidence intervals are reported in the
10 Aggregate Analysis Appendix.

11 AR 00130937.

12 Plaintiffs maintain that these paragraphs from the FRCPS BiOp
13 demonstrate that NMFS adopted a "prior practice" of using a 24-year
14 extinction period and that NMFS failed to supply a reasoned basis for
15 departing from that prior practice. *See River Runners for Wilderness*
16 *v. Martin*, 593 F.3d 1064, 1075-76 (9th Cir. 2010) ("Part of the
17 discretion granted to federal agencies is the freedom to change
18 positions.... [A]n agency's view of what is in the public interest may
19 change, either with or without a change in circumstances. But an
20 agency changing its course must supply a reasoned analysis.")
21 (internal citations and quotations omitted).

22 Plaintiffs suggest there is conflict between these two biological
23 opinions. The FRCPS BiOp utilizes a 24-year timeframe to
24 quantitatively evaluate short-term extinction risk where sufficient
25 data was available to do so. AR 00131546. That was only possible for
26 six of the 13 species covered by that biological opinion. NMFS did
27 not have sufficient data to perform a 24-year analysis for the
28 remaining seven species, so NMFS used a qualitative analysis of the
VSP factors that considers a 100-year timeframe. *See FCRPS BiOp*,

1 Chapter 8.¹⁵ Plaintiffs have not established that the 2009 Salmonid
2 BiOp is a marked departure from prior and/or contemporaneous practice
3 for the risk of extinction assessment. No evidence shows the shorter
4 time span represents the best available science. This is another
5 dispute that ends by default, with NMFS claiming the absence of data
6 to permit it to engage in its preferred analysis. What has not been
7 explained is whether or not a 100-year period introduces bias toward
8 an extinction finding.
9

10 Based on limited precedent, the agency's partial justification,
11 and the lack of any evidence demonstrating the agency's approach was
12 irrational, the law defers to the agency. Plaintiffs' motion for
13 summary judgment that NMFS acted unlawfully by failing employing a
14 100-year timeframe is DENIED; Federal Defendants' and Defendant-
15 Intervenor's cross motions are GRANTED.
16

17 2. Winter-Run Viability Analysis.

18 Plaintiffs contend that the BiOp's determination that winter-run
19 are at a "high risk of extinction" is not based on the best available
20 science because that determination is an unexplained departure from a
21 "nearly contemporaneous classification" to the contrary by Lindley
22 (2007). AR 00123478. In addition, Lindley (2007) incorporates
23 assessments of spatial distribution, as well as genetic and life
24 history diversity. Plaintiffs maintain that Lindley classified the
25 winter-run as "low risk" in 2007 and that the BiOp's reclassifying the
26
27

28 ¹⁵ The AR contains a portion of the FCRPS BiOp. The complete BiOp is available at
<http://www.nwr.noaa.gov/Salmon-Hydropower/Columbia-Snake-Basin/final-BOs.cfm>.

species as being at "high risk" of extinction is unexplained. Doc.
431 at 64-66.

This argument is unconvincing for two reasons. First, Lindley
(2007) did not unequivocally classify the winter-run as "low risk."
Lindley (2007) assesses a population's viability by examining criteria
relating to: (1) population size, (2) population growth rate, (3) the
occurrence of catastrophic declines, and (4) the degree of hatchery
influence. AR 000123478. In Table 1 of Lindley (2007) the thresholds
for finding "high," "moderate," or "low" risk as to each of these four
criteria are defined.

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Table 1. Criteria for assessing the level of risk of extinction for populations of Pacific salmonids. Overall risk is determined by the highest risk score for any category. (Modified from Allendorf et al. 1977)

Criterion	Risk of Extinction		
	High	Moderate	Low
Extinction risk from PVA	> 20% within 20 years – or any ONE of –	> 5% within 100 years – or any ONE of –	< 5% within 100 years – or ALL of –
Population size ^a	$N_e \leq 50$ –or– $N \leq 250$	$50 < N_e \leq 500$ –or– $250 < N \leq 2500$	$N_e > 500$ –or– $N > 2500$
Population decline	Precipitous decline ^b	Chronic decline or depression ^c	No decline apparent or probable
Catastrophe, rate and effect ^d	Order of magnitude decline within one generation	Smaller but significant decline ^e	not apparent
Hatchery influence ^f	High	Moderate	Low

^a Census size N can be used if direct estimates of effective size N_e are not available, assuming $N_e/N = 0.2$.
^b Decline within last two generations to annual run size ≤ 500 spawners, or run size > 500 but declining at $\geq 10\%$ per year. Historically small but stable population not included.
^c Run size has declined to ≤ 500 , but now stable.
^d Catastrophes occurring within the last 10 years.
^e Decline $< 90\%$ but biologically significant.
^f See Figure 1 for assessing hatchery impacts.

AR 00123478.

Lindley (2007) concluded that, at the time the paper was published, winter run "easily satisfie[d] the low-risk criteria for population size, population decline, and catastrophe, but hatchery influence [was] a looming concern." AR 000123486. Lindley (2007) also factors in spatial distribution, as well as genetic and life-

1 history diversity as part of an overall assessment of viability. AR
2 00123481. Applying these additional criteria to winter-run, Lindley
3 (2007) concluded:

4 The Sacramento River winter-run Chinook salmon ESU does not
5 currently satisfy the representation and redundancy rule
6 because it has only one population, and that population
7 spawns outside of the ecoregion where it evolved. For the
8 Sacramento River winter-run Chinook salmon ESU to satisfy
9 the representation and redundancy rule, at least two
populations would need to be re-established in the basalt-
and-porous-lava region. This may require passage past Shasta
and Keswick dams.

10 Obviously, an ESU represented by a single population at
11 moderate risk of extinction is at high risk of extinction
12 over the long run. A single catastrophe could extirpate the
13 entire Sacramento River winter-run Chinook salmon ESU, if
14 its effects persisted for four or more years. The entire
15 stretch of the Sacramento River used by winter run Chinook
16 salmon is within the zone of influence of Mt. Lassen. Some
17 other possible catastrophes include a prolonged drought that
depletes the cold water storage of Lake Shasta or some
related failure to manage cold water storage, a spill of
toxic materials with effects that persist for four years, or
a disease outbreak.

18 AR 00123487.

19 Lindley (2007) advocated that an alternative assessment,
20 population viability analysis ("PVA"), be applied where possible and
21 that the results of the PVA be compared to the "simpler" criteria
22 described in Lindley (2007). The authors opined that, at the time the
23 paper was published, winter run were at a "moderate extinction risk"
24 according to the PVA. AR 00123486.

25 Federal Defendants accurately described the Lindley (2007)
26 findings and identified more recent information, including the 2007
27 population crash, that render Lindley (2007)'s specific conclusions
28

1 outdated. NMFS first focused on the catastrophe criteria:

2 At the time of publication, Lindley *et al.* (2007) indicated
3 that winter-run satisfies the low-risk criteria for
4 population size, population decline, and catastrophe.
5 However, they also acknowledged that the previous
6 precipitous decline to a few hundred spawners per year in
7 the early 1990s would have qualified it as high risk at that
8 time, and the 1976-77 drought would have qualified as a
9 high-risk catastrophe. In consideration of the almost 7-fold
10 decrease in population in 2007, coupled with the dry water
11 year type in 2007, followed by the critically dry water year
12 type in 2008 (which could be qualified as a high-risk
13 catastrophe) and likely a similar forecast for 2009, NMFS
14 concludes that winter-run are at a high risk of extinction
15 based on population size.

16 BiOp at 86.

17 Plaintiffs argue that the BiOp's conclusion that the almost
18 seven-fold decrease in population in 2007, and resulting conclusion
19 that winter run were at "high risk" of extinction based on population
20 size is without support in the record, because, according to Lindley,
21 even the 2007 population decline does not meet the "high risk"
22 criteria (see Table 1 above). The population never fell to or below
23 500 spawners, nor did the 2007 decline meet or exceed the 90% "order
24 of magnitude" decline definition. Cramer Decl., Doc. 448 at ¶¶ 42,
25 44.¹⁶ Federal Defendants do not attempt to refute this criticism, and
26 it appears that the record does not support a high risk finding in
27 light of Lindley (2007)'s definition of a "high risk" designation
28

¹⁶ Plaintiffs invoke Lindley (2009) to argue that the impacts to the species in the freshwater phase during recent years were inconsequential in comparison to the impacts resulting from poor ocean conditions. This argument fails for the reasons discussed above. Lindley recognized that the period of deteriorated ocean conditions, which were a major short-term cause of population decline, acted in conjunction with a long-term steady degradation of the freshwater environment leaving Chinook vulnerable to other stressors. See BiOp at 149; AR 00123517.

1 based on population.¹⁷

2 Plaintiffs also challenge this determination on the ground that
3 Lindley (2000) defines a "catastrophe," as an event occurring within
4 the last 10 years that caused "an order of magnitude decline within
5 one generation," which "is created by a 90% decline in population
6 size" over that generation. AR 00123478. Plaintiffs point out, and
7 Federal Defendants do not dispute, that the 2007 population decline of
8 76% in one generation, while significant, did not meet this standard.
9 Doc. 487 at 46. A 76% decline arguably meets the standard for
10 "moderate" catastrophe, which is described as one that is "smaller"
11 than a high-risk catastrophe, but "still [a] significant decline."
12 NMFS's conclusion that the three subsequent years of drought caused a
13 "high-risk" catastrophe is not supported by the record. It is at most
14 a "moderate-risk" catastrophe.
15

16
17 Federal Defendants point out that in order for a population to be
18 considered viable, it "must meet all the low-risk thresholds." Doc.
19 477-1 (citing BiOp at 84). Whether the drought was a "high" or
20 "moderate" risk catastrophe or whether the population should actually
21 have been classified as "low-risk" based on population size, does not
22 change the fact that the winter-run are "not viable," because a
23

24 ¹⁷ Federal Defendants attempt to defend this analysis by asserting that the winter-
25 run "population trend has been consistently negative for several decades." Doc.
26 477-1 at 50. Plaintiffs point out that Federal Defendants rely on a comparison of
27 2008 figures to 1969 figures to reach this conclusion. Doc. 487 at 47. Lindley
28 (2007) states that "[p]opulation growth (or decline) [] is estimated from the slope
of the natural logarithm of spawners versus time for the most recent 10 years of
spawner count data." AR 00123481. In fact, when Lindley applied this standard to
the most recent 10 years of data available at the time of publication, the
population showed growth not decline. AR 00123486. Defendants do not explain this
inconsistency.

1 classification of "moderate" is justified as to at least one criteria:
2 catastrophe.

3 In addition, the BiOp found that winter-run are at a high-risk of
4 extinction based on spatial structure. BiOp at 86-87. Although
5 "spatial structure" was not one of Lindley (2007)'s primary criteria
6 for population viability, it was considered. AR 00123481, 00123487.
7 Lindley (2007) concluded that the winter-run "does not currently
8 satisfy the representation and redundancy rule because it has only one
9 population and that population spawns outside of the ecoregion where
10 it evolved." AR 00123487. To satisfy this rule at least two
11 populations would need to be re-established. *Id.* Plaintiffs
12 emphasize that this situation is "entirely attributable to baseline
13 conditions (i.e., dams)." Doc. 487 at 48. Lindley acknowledges this,
14 noting that establishment of additional winter-run populations "may
15 require passage past Shasta and Keswick dams." AR 00123487. But,
16 this does not render spatial structure irrelevant to the BiOp's
17 analysis. "[A]n agency may not take action that will tip a species
18 from a state of precarious survival into a state of likely extinction.
19 Likewise, even where baseline conditions already jeopardize a species,
20 an agency may not take action that deepens the jeopardy by causing
21 additional harm." *NWF v. NMFS II*, 524 F.3d at 930.

22 Is there a practical implication in the BiOp of NMFS's
23 unsupported description that the winter-run are at "high-risk," as
24 opposed to the less serious classification of "not viable"?
25
26
27
28

1 Plaintiffs cite Steven Cramer's Reply Declaration to support their
2 argument that the BiOp used the "high-risk" designation to "justify
3 its failure to do a careful, scientific analysis of the RPA because
4 immediate radical action supposedly is necessary." Doc. 487 at 44
5 (citing Cramer Reply Decl., Doc. 487 at ¶¶ "20-17[sic]"). Cramer
6 opines:
7

8 ...Although "high-risk" of extinction is not a necessary
9 criteria for determination of jeopardy, NMFS uses the "high
10 risk" rating that stems from its misapplication of Lindley
11 *et al.* (2007) to indicate that immediate additional
12 constraints on water operations are needed to avoid
13 extinction. In other words, from its initial,
14 scientifically incorrect premise, NMFS implies that
15 substantial new restrictions are necessary because the
16 population is supposedly at high risk of extinction, so any
17 careful analysis of the RPAs is inconsequential compared to
18 a claimed urgent need to take radical action. (See Fed.
19 Def. Br. at 8-9.)

20 *Id.* at ¶ 20. Cramer's accusations are troubling, but are not
21 reflected in the record. Mr. Cramer cites pages 8-9 of Federal
22 Defendants' memorandum in support of their cross motion for summary
23 judgment. Nowhere on those pages do Federal Defendants even mention
24 the "high-risk" rating, let alone rely upon it to justify the RPAs in
25 any way.

26 Plaintiffs have identified areas of NMFS's analysis that are
27 completely unsupported by the record, constituting "clear error." The
28 extent to which they undermine the viability determination is properly
addressed on remand. This aspect of the BiOp must be remanded for
correction.

1 3. Orca Analysis.

2 The BiOp concluded that the Southern Resident population was so
3 diminished that "the loss of a single individual, or the decrease in
4 reproductive capacity of a single individual, is likely to reduce the
5 likelihood of survival and recovery of the DPS." BiOp at 573. The
6 BiOp also concluded that any reduction in the Southern Resident's prey
7 base may have adverse physiological effects on Southern Residents.
8
9 *Id.*

10 Plaintiffs point to yet another separate biological opinion
11 issued May 5, 2009, evaluating the effects of the Pacific Coast Salmon
12 Plan, which governs management of commercial and recreational salmon
13 fishing off the west coast of the United States, on the Southern
14 Residents ("Orca Salmon Harvest BiOp"). See AR 00131721 - 802.
15 According to Plaintiffs, the Orca Salmon Harvest BiOp "produced an
16 extraordinarily detailed quantitative analysis of the effect of
17 decreases in the adult [C]hinook population on Southern Residents ...
18 that incorporated data on factors such as orca abundance, size, and
19 kilocalorie requirements, which NMFS used to project the percent
20 changes in prey availability at different locations in the orcas'
21 range, different times of the year, and different levels of quality in
22 yearly [C]hinook salmon production." Doc. 431 at 35. The Orca Salmon
23 Harvest BiOp concluded that planned ocean harvest of salmon would not
24 jeopardize the Southern Resident Killer Whales. AR 00131781.
25
26

27 The crux of Plaintiffs' complaint is that both the conclusions
28

1 reached and the methodologies used in the 2009 Salmonid BiOp are
2 inconsistent with those of the earlier-issued, more comprehensive and
3 focused Orca Salmon Harvest BiOp. Plaintiffs argue:

4 One would think that the Orca BiOp's analysis—which found
5 that percent reductions in available chinook ranging up to
6 11.8% would not jeopardize the Southern Residents—would
7 represent the best available science, and would provide
8 extensive guidance to NMFS in its analysis of the effect of
9 the projects' take of juvenile salmonids. And yet, NMFS
10 relied instead on an earlier quantitative analysis, produced
11 February 4, 2009, which it never updated or revised to
12 reflect the new state of the agency's own science
13 represented by the Orca BiOp. (BiOp, App. 3, AR 00107119-
14 136.) The earlier study contained in Appendix 3 did not
15 include any of the analysis of Southern Resident metabolic
16 needs, location, or seasonal migration—all of which were
17 described as "necessary" in the NMFS Orca BiOp study issued
18 a full month before the final publication of the Salmonid
19 BiOp. In fact, Appendix 3 of the BiOp does not even mention
20 the Orca BiOp, despite its obvious relevance and its status
21 as the best available science on the effect of the take of
22 adult salmon on Southern Residents. This, on its own, was a
23 failure to use the best available science in violation of
24 the ESA.

25 What Appendix 3 did instead was to quantitatively analyze
26 the effect of the projects on adult salmon abundance under
27 the various Reclamation Study scenarios. It compared these
28 analyses with a scenario representing salmon production
without the water projects ("No Project"), which it defined
as the highest salmon production year on record. (BiOp, App.
3 at 1, AR 00107119.).... What does this study show? It
shows that in the worst case scenario—which is a comparison
of the best possible outcome and the worst possible outcome—
the reduction in total number of adults would be 13.9% (see
highlighted figures above).

29 It is useful to look at this very worst case scenario in
30 terms of numbers: the total projected population reduction
31 caused by that 13.9% reduction is 120,945 adult salmon. To
32 put that in perspective, that hypothetical worst case
33 scenario is smaller than the actual reported total loss in
34 the lowest ocean harvest on record (161,845 adult salmon).
35 RJN, Ex. 2, Ocean Harvest BiOp at 31. Looking at the average
36 projected reduction in Study 7.1 and Study 8.0 (the

1 column labeled "Mean") compared with the "No Project"
2 scenario, the result of the projects is a much more modest
3 take of about 20,150 fish, which is eight times less than
4 the lowest salmon ocean harvest ever recorded.

5 Doc. 431 at 35-36.

6 Federal Defendants maintain that the two biological opinions are
7 not inconsistent because they address impacts over different time
8 frames and from different actions. The Orca Salmon Harvest BiOp
9 describes short-term impacts to prey availability in specific months
10 during high abundance Chinook years. The 2009 Salmonid BiOp
11 considered impacts to Southern Residents caused by long-term increase
12 in the risk of extinction for winter-run and spring-run Chinook, in
13 addition to long-term impacts to fall-run. BiOp at 573. The Orca
14 Salmon Harvest BiOp concluded the long-term impact of ocean harvest is
15 not likely to appreciably reduce the survival and recovery of the
16 listed Chinook and other salmon affected by harvest, in part because
17 the fishery is managed to adjust harvest levels annually according to
18 the actual salmon population available for harvest, thereby avoiding
19 harm to the species. AR 00131776-81. The 2009 Salmonid BiOp
20 concluded that Project operations would increase the risk of
21 extinction of winter-run and spring-run, which "increases the risk of
22 a permanent reduction in prey available to Southern Residents, and
23 increases the likelihood for local depletions of prey in particular
24 locations and times." *Id.* at 574.

25 Although these biological opinions facially consider different
26 time frames and different actions, it is undeniable that they are
27
28

1 temporally and factually interrelated. The Salmonid BiOp specifically
2 concludes that Project operations will reduce the abundance of
3 naturally produced CV fall run Chinook salmon, a source of prey to the
4 Southern Residents. BiOp at 574. As a result, the Salmonid BiOp
5 concludes "Southern Residents would likely experience nutritional,
6 reproductive, or other health effects from reduced prey as a result of
7 the proposed action." *Id.* In contrast, the Orca Salmon Harvest BiOp
8 concludes that, even in the long run, implementation of the Pacific
9 Coast Salmon Plan will not have long-term deleterious effects on
10 Chinook salmon. AR 00131776-77. It is true that the Pacific Coast
11 Salmon Plan is designed to manage commercial and recreational salmon
12 harvest to meet salmon recovery goals and requires conservation
13 measures, including suspension of all harvest if necessary, when
14 Chinook stocks are doing poorly. AR 00131777. This amounts to a "do
15 no harm" approach to managing the fishery. However, under such a
16 management approach, it is plausible that any impact to fall-run
17 Chinook, and any related impact to orca, caused by Project operations
18 could be automatically mitigated by reduced harvest in the ocean. How
19 these two sets of human actions (Project operations and harvest
20 restrictions) interplay, and how this interplay might impact the
21 likelihood that Project operations would harm the Southern Residents,
22 is not discussed in the Salmonid BiOp, which post-dates the Orca
23 Salmon Harvest BiOp, albeit by only one month. NMFS's own findings in
24 the Orca Salmon Harvest BiOp are certainly "relevant factors" NMFS
25
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1 should have taken into consideration before issuing the Salmonid BiOp.
2 Federal Defendants, through counsel, provide a partial, but
3 insufficient, post hoc explanation.

4 Plaintiffs' motion for summary judgment that the Orca jeopardy
5 analysis is unlawful is GRANTED; Federal Defendants' and Defendant-
6 Intervenor's cross motions are DENIED. On remand, NMFS must explain
7 how the findings of these two biological opinions can be reconciled.
8

9
10 4. Interior Delta Mortality as an Indirect Effect.

11 Plaintiffs assert that the BiOp unlawfully classifies mortality
12 from predators, pollution, and other adverse conditions in the
13 interior delta, as "indirect effects" caused by Project operations.
14 Doc. 431 at 66-72.

15
16 a. Applicable Legal Standard.

17 The Joint Consultation Regulations promulgated by FWS and NMFS
18 explain that "effects of the action" refers to "the direct and
19 indirect effects of an action on the species or critical habitat...
20 that will be added to the environmental baseline...." 50 C.F.R.
21 § 402.02. "Indirect effects are those that are caused by the proposed
22 action and are later in time, but still are reasonably certain to
23 occur." *Id.* (emphasis added). The ESA's definition differs from
24 NEPA's definition of indirect effects of an action: "[i]ndirect
25 effects, which are caused by the action and are later in time or
26 farther removed in distance, but are still reasonably foreseeable."
27 40 C.F.R. § 1508.8(b) (emphasis added). In the preamble of the Final
28

1 Rule adopting the ESA regulations, NMFS and FWS explained that it
2 intended a narrower regulatory definition of indirect effects under
3 the ESA than applied in the NEPA context (i.e., compare "reasonably
4 certain to occur" with "reasonably foreseeable"). 51 Fed. Reg. 19,926
5 (June 3, 1986). NMFS and FWS distinguished the ESA from NEPA and
6 expressly explained the intent and rationale for adopting the more
7 narrow "reasonably certain to occur" standard for indirect and
8 cumulative effects under the ESA:
9

10 If the jeopardy standard is exceeded, the proposed Federal
11 action cannot proceed without an exemption. This is a
12 substantive prohibition that applies to the Federal action
13 involved in consultation. In contrast, NEPA is procedural
14 in nature, rather than substantive, which would warrant a
15 more expanded review of cumulative effects. Otherwise, in a
16 particular situation, the jeopardy prohibition could operate
17 to block "nonjeopardy" actions because future, speculative
18 effects occurring after the Federal action is over might, on
19 a cumulative basis, jeopardize a listed species. Congress
20 did not intend that Federal actions be precluded by such
21 speculative actions.

22 51 Fed. Reg. at 19,933.

23 Shortly after adoption of the ESA regulations, the Ninth Circuit
24 confirmed "[t]he reasonably certain to occur" standard applies to
25 'indirect effects ... caused by the proposed action.' *Sierra Club v.*
26 *Marsh*, 816 F.2d 1376, 1388 (9th Cir. 1987); *Ctr. for Biological*
27 *Diversity v. U.S. Dept. of Hous. & Urban Dev.*, 541 F. Supp. 2d 1091,
28 1100-01 (D. Ariz. 2008) (dismissing a suit alleging federal agencies
had violated the ESA by failing to analyze the indirect effects of
providing federal funding to local development projects, concluding
that the link between such financial assistance and groundwater

1 depletion that could harm listed species was "too attenuated" to meet
2 the standards of 50 C.F.R. § 402.02).

3 The December 14, 2010 summary judgment Decision in the
4 *Consolidated Delta Smelt Cases* found that the "reasonably certain to
5 occur" standard controlled the asserted causes of indirect mortality
6 to the smelt in the interior Delta. *San Luis v. Salazar*, 760 F.
7 Supp. At 146-47. Here, NMFS resists such a finding, arguing that
8 Plaintiffs (and by implication the December 14, 2010 MSJ Decision in
9 the *Consolidated Delta Smelt Cases*) confuse the BiOp's discussion of
10 "indirect mortality" with the regulatory term "indirect effect." Doc.
11 477-1 at 55. Federal Defendants argue that the "reasonably certain to
12 occur" standard does not refer to the certainty of the effect on the
13 species, but rather to the certainty of whether a future activity
14 (i.e. the activity that may have an effect on the species) will occur.
15 The federal register notice promulgating the relevant regulations
16 explains that NMFS considers "effects to listed species from such
17 future activities that are reasonably certain to occur under the
18 analysis of 'indirect effects.'" 51 Fed. Reg. 19,926, 19,932 (June 3,
19 1986) (emphasis added). Indirect effects are further defined as "those
20 that are caused by the action and are later in time but are still
21 reasonably certain to occur." *Id.* (emphasis added). Federal
22 Defendants point out that the kinds of "indirect mortality" discussed
23 in the BiOp are not "future activities." Rather, they are a category
24 of effects that are purportedly occurring all the time.
25
26
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1 Plaintiffs rejoin by citing a single sentence from the Final ESA
2 Section 7 Consultation Handbook, jointly prepared by FWS and NMFS,
3 which explains that "[i]ndirect effects may include other Federal
4 actions that have not undergone section 7 consultation but will result
5 from the action under consideration." AR 00217743 ("Consultation
6 Handbook") at 4-29 (emphasis added).¹⁸ Plaintiffs argue that the use
7 of the word "include" suggests "that NMFS considers effects from
8 future activities to be only a subset of possible indirect effects,
9 and that indirect effects are not limited to future activities." Doc.
10 487 at 57. Plaintiffs do not mention the very next sentence of the
11 Consultation Handbook. The entire paragraph reads:
12

13 Indirect effects may include other Federal actions that have
14 not undergone section 7 consultation but will result from
15 the action under consideration. In order to treat these
16 actions as indirect effects in the biological opinion, they
17 must be reasonably certain to occur, as evidenced by
18 appropriations, work plans, permits issued, or budgeting;
they follow a pattern of activity undertaken by the agency
in the action area; or they are a logical extension of the
proposed action.

19 *Id.* (emphasis added). Here, the indirect mortality findings
20 challenged by Plaintiffs do not constitute "indirect effects." The
21 indirect mortality discussed in the BiOp is caused by the action
22 subject to consultation, not by some other action that is the subject
23 of work plans, permits, or budgeting. The emphasized language
24 specifies actions "reasonably certain to occur," not those that have
25 occurred. This suggests but does not explicitly reference actions
26

27 ¹⁸ NMFS's and FWS's joint Consultation Handbook "provides internal guidance and
28 establishes national policy for conducting consultation and conferences pursuant to
Section 7 of the Endangered Species Act of 1973, as amended." AR 00217635.

1 other than the action under consultation.

2 The "reasonably certain to occur" standard does not apply to the
3 indirect mortality analysis in the BiOp.¹⁹ However, this does not
4 immunize the indirect mortality findings from review. "Jeopardize"
5 means to "engage in an action that reasonably would be expected,
6 directly or indirectly, to reduce appreciably the likelihood of both
7 the survival and recovery of a listed species in the wild but reducing
8 the reproduction, numbers and distribution of that species." 50
9 C.F.R. § 402.02. The BiOp finds project operations cause indirect
10 mortality. Whether such findings are reasonable must be addressed.²⁰
11

12
13 a. Does the Record Support a Finding that Project
14 Operations Can Reasonably Be Expected to Cause More
15 Salmonids to Enter the Interior Delta?

16 Plaintiffs concede that the mortality rate of migrating salmonids
17 is generally higher for fish traveling through the interior Delta than
18 for fish that remain in the mainstem Sacramento River. Doc. 431 at

19 ¹⁹ This finding applies with equal force to the analysis of the causes of indirect
20 mortality discussed in the *Consolidated Delta Smelt Cases*' December 14, 2010
21 Summary Judgment Decision, namely the negative influence of Project operations on
22 delta smelt food supply and the exacerbation of the impacts of pollution and
23 contaminants by Project operations. Although the reasonably certain to occur
24 standard was applied in that case, the link between Project operations and these
25 purported sources of indirect mortality were not clearly articulated in the BiOp or
26 justified by record evidence, so the application of the incorrect standard did not
27 make a material difference.

28 ²⁰ Plaintiffs also argue that NMFS must affirmatively acknowledge its own regulatory
standard in the BiOp, presumably by making direct reference to the relevant
regulatory language. Doc. 431 at 67. Although a court "cannot infer an agency's
reasoning from mere silence," *PCFFA v. U.S. Bureau of Reclamation*, 426 F.3d 1082,
1091 (9th Cir. 2005), so long as the record, as evidenced by the agency's reasoning
in the BiOp, supports a finding that Project operations reasonably would be
expected to cause indirect mortality, the ESA does not require NMFS to use "magic
words" in a biological opinion. An agency's rationale must be upheld if it can
"reasonably be discerned." See *Modesto Irr. Dist. v. Gutierrez*, 619 F.3d 1024,
1035 (9th Cir. 2010).

1 68. Plaintiffs argue, however, that the record does not support the
2 BiOp's conclusion that project operations cause more salmonids to take
3 the more dangerous routes through the interior Delta. *Id.* at 67-70.
4 Plaintiffs fault the BiOp for not providing any "analysis or
5 articulation whatsoever of [what] additional fraction of emigrating
6 salmonids -- above the baseline number that will enter the Delta
7 irrespective of the projects -- will be induced to enter the interior
8 Delta solely as a result of proposed project operations." Doc. 431 at
9 68. Plaintiffs incorporate by reference the arguments made by DWR in
10 its challenge to Action IV.2.1. *Id.* at 69-70. As Plaintiffs'
11 challenge turns on the merits of DWR's challenge, which is thoroughly
12 discussed below in the context of Action IV.2.1, there is no need to
13 separately discuss them here.
14
15

16 b. Does the Record Support a Finding that Project
17 Operations Can Reasonably Be Expected to Cause Indirect
18 Mortality from Exotic Species, Pollution, and/or Food
19 Limitations in the Interior Delta?

20 Plaintiffs also contend that there is no record evidence to
21 support the BiOp's implied conclusion that project operations cause
22 indirect mortality from exotic species, pollution, and other adverse
23 environmental conditions in the interior Delta. Doc. 431 at 70-71.

24 (1) Exotic Species.

25 Among other things, the BiOp concludes that Project operations
26 create conditions that favor exotic over native species:

27 In addition to the "direct" effects of the CVP and SWP
28 operations manifested by flows and exports, the modification
of the Delta hydraulics for the conveyance of water has

1 altered the suitability of the Delta for native species of
2 fish, such as Chinook salmon, steelhead, and green sturgeon.
3 Since the inception of the CVP and later the SWP, the
4 natural variability in the hydrology of the Delta has been
5 altered. As previously explained, the amount and timing of
6 runoff from the Sacramento and San Joaquin Rivers has been
7 altered and shifted to accommodate human needs. When large-
8 scale exports of water were initiated in the South Delta, it
9 became necessary to "freshen up" the Delta to guarantee high
10 quality fresh water was available to export from the
11 facilities on a reliable basis (e.g., construction of the
12 DCC). This necessitated an increase in the stability of the
13 Delta's hydrology and the formation of a large freshwater
14 "lake" for the reliable conveyance of water from the river
15 sources to the export facilities. The enhanced stability of
16 the freshwater pool in the Delta enabled non-native species,
17 such as centrarchids and catfish, as well as invasive
18 plants, such as *Egeria densa* and water hyacinth, to thrive
19 in this "new" Delta hydrology (Brown and Michniuk 2007). In
20 addition, the altered ecological characteristics of the
21 Delta have been proposed as a contributing factor in the
22 recent Pelagic Organism Decline (POD) observed in the Delta.
23 The combination of these exotic species and altered
24 ecological characteristics of the Delta interact to decrease
25 the suitability of the Delta for native species of fish and
26 have increased the potential for predation and loss (see
27 2008 CVP/SWP operations BA, Delta smelt sections for a more
28 detailed explanation).

BiOp at 382 (emphasis added). Elsewhere, the BiOp concludes:

As described earlier in the Delta effects analysis, many of
the sources of loss associated with moving fish through the
Delta, such as predator populations and the increased
prevalence of non-native aquatic weeds such as *Egeria
densa*, have their own interconnections with the operations
of the CVP and SWP, and their continued presence is linked
to maintaining an artificially stable Delta environment
conducive to moving freshwater towards the pumps.

Id. at 433.

Plaintiffs do not directly contest the conclusion that the
altered hydrologic conditions are favorable for invasive species. Nor
do Plaintiffs challenge the BiOp's conclusion that CVP and SWP
operations contribute to this ecosystem alteration. Rather, they
argue that the operators of the CVP and SWP did not release the exotic

1 predators or introduce the exotic weeds, nor can the operators of the
2 projects control these alien species. Doc. 431 at 71.

3 This is not disputed. The BiOp does not assert, as it cannot,
4 that the Projects were the original cause of these problems. The BiOp
5 concludes that the hydrologic conditions created by the projects favor
6 the continued presence of these exotics and that proposed project
7 operations are likely to make this situation worse. See BiOp at 382
8 ("Continued operations of the CVP and SWP are unlikely to benefit the
9 health of the Delta, and increases of the facility operations are
10 likely to degrade the system beyond their current conditions, rather
11 than return the Delta to a more natural condition, with more
12 functional hydraulics conducive to a healthy ecosystem."). The BiOp
13 cites recent studies, including Brown and Michniuk (2007), see BiOp
14 at 382, to support its conclusion that this "new" Delta hydrology
15 favors exotic species over native ones. Plaintiffs do not challenge
16 the BiOp's reliance on these studies.

17 However, assuming the BiOp properly found a Project-exotics
18 connection, NMFS failed to adequately consider this factor in its
19 jeopardy analysis. What effect do these exotics have on the Listed
20 Species? To what extent does the contribution of the Projects to the
21 continued presence of these exotics contribute to the jeopardy
22 finding? Could altered project operations reduce the presence of
23 exotics? NMFS's logic taken to the extreme means the Projects cannot
24 operate, as no analysis has been done to evaluate the impact on the
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26
27
28

1 Listed Species from this indirect effect at varying pumping levels.
2 It may be that there is insufficient information to answer these
3 questions, but this is pure speculation, as the sufficiency of
4 information is not discussed. This is another example of the need for
5 a realistic analysis of relative effect from Project operations on
6 conditions that are not related to pumping.
7

8 The BiOp's analysis of the influence of Project operations on the
9 continued presence of exotic species, and how this relates to indirect
10 mortality to the Listed Species, must be explained. Plaintiffs'
11 motion for summary judgment on this issue is GRANTED. Federal
12 Defendants' and Defendant-Intervenors' cross motions are DENIED.
13

14 (2) Pollution and Food Limitation.

15 Plaintiffs also argue that the BiOp unlawfully "blames the
16 project for pollution and food limitation by labeling them effects of
17 the action." Doc. 431 at 72. This is the logical inference drawn
18 from the focus on predators and contaminants, which are mentioned
19 throughout the BiOp. The agency does not explain how the projects
20 influence contaminants or cause food limitations. Plaintiffs point to
21 a statement in the biological assessment that "there is no direct
22 evidence of food limitation for salmon in the delta or lower estuary,"
23 AR 00143672. It is not clear that the BiOp actually asserts that
24 there is a food limitation in the lower estuary. This imprecision
25 contributes to the inadequacy of the BiOp. There is no way to
26 understand the BiOp's attribution of adverse indirect effects to the
27
28

1 Projects.

2 Plaintiffs' motion for summary judgment that the record does not
3 support the BiOp's conclusions about the connection between Project
4 operations and pollution and food limitation, causing indirect
5 mortality to the Listed Species is GRANTED. Federal Defendants' and
6 Defendant-Intervenors' cross motions are DENIED.
7

8 D. Critical Habitat Analysis.

9 1. There Is No Requirement that NMFS Identify a Numerical
10 Threshold for Adverse Modification.

11 Destruction or adverse modification is defined by regulation to
12 mean "a direct or indirect alteration that appreciably diminishes the
13 value of critical habitat for both the survival and recovery of a
14 listed species." 50 C.F.R. § 402.02. Previous rulings in related
15 cases have held "that NMFS and FWS have interpreted the term
16 'appreciably diminish' to mean 'considerably reduce.'" Findings of
17 Fact and Conclusions of Law Re the Existence of Irreparable Harm,
18 *PCFFA v. Gutierrez*, 1:06-cv-245 OWW GSA, Doc. 367 at 24:6-9 (citing
19 Consultation Handbook at 4-34).
20

21 Plaintiffs demand that NMFS set a threshold for adverse
22 modification and directly analyze whether the action "appreciably
23 diminishes" the capability of habitat to support survival or recovery
24 vis-à-vis this threshold. *Id.* at 75. This demand was rejected in
25 the December 14, 2010 MSJ Decision in the *Consolidated Delta Smelt*
26 *Cases*:
27
28

1 Plaintiffs cite *Gifford Pinchot*, 378 F.3d at 1074, and *NWF*
2 *v. NMFS II*, 524 F.3d at 932 & n.10, for the principle that
3 FWS must identify a threshold for adverse modification and
4 assess and explain whether the magnitude and extent of any
5 claimed effects to critical habitat reach that threshold.
6 These cases do not support Plaintiff's argument. *Gifford*
7 *Pinchot* rejected FWS's interpretation of "adverse
8 modification" in a manner that only triggered an adverse
9 modification finding where there is "an appreciable
10 diminishment of the value of critical habitat for both
11 survival and recovery." *Id.* at 1069. After rejecting
12 FWS's rationale for applying the regulation, the Ninth
13 Circuit reasoned that the various biological opinions at
14 issue could nevertheless be found valid if they actually
15 evaluated the impact to recovery. The *Gifford Pinchot*
16 plaintiffs raised concerns about FWS's complete failure to
17 address the issue of recovery in that biological opinion's
18 critical habitat analysis. The Appeals Court specifically
19 found that FWS detailed the percentage loss of critical
20 habitat but did not discuss the specific impact of that loss
21 on recovery, rendering the BiOp insufficient. 378 F.3d at
22 1074.

23 Following *Gifford Pinchot*, *NWF v. NMFS II* held that NMFS
24 acted arbitrarily and capriciously by failing to analyze the
25 impacts of dam operations on the recovery value of critical
26 habitat. 524 F.3d at 932. NMFS' argument "that it
27 'implicitly' analyzed recovery in its survival analysis" was
28 rejected as a "post hoc justification," because a court
cannot consider "an analysis that is not shown in the
record." *Id.* at 932 n.10 (internal citations and
quotations omitted). Plaintiffs do not directly challenge
the BiOp's recovery analysis; rather, they argue that the
BiOp should have set a "threshold" for adverse modification.
Nothing in *Gifford Pinchot* or *NWF v. NMFS II* requires FWS
to set a "threshold" for adverse modification.

29 *Butte Environmental Council v. U.S. Army Corps of*
30 *Engineers*, 607 F.3d 570, 582-83 (9th Cir. 2010), suggests
31 exactly the opposite. *Butte* upheld FWS's determination
32 that destruction of a very small percentage (less than 1%)
33 of designated critical habitat would not adversely modify
34 the species' critical habitat. Relevant here is the Ninth
35 Circuit's rejection of a demand that FWS address the rate of
36 loss of critical habitat, finding that nothing in the
37 statute or regulations requires FWS to perform such a
38 calculation. *Id.*

1 *San Luis v. Salazar*, 760 F. Supp. 2d at 945. NMFS is not required to
2 set a numeric threshold for adverse modification.

3
4 2. Significance of Impacts to Critical Habitat.

5 Plaintiffs argue that the adverse modification findings are
6 unlawful because the BiOp explicitly declines to apply the regulatory
7 definition of adverse modification found in 50 C.F.R. 402.02. Doc.
8 431 at 75. The BiOp states:

9 For critical habitat, NMFS did not rely on the regulatory
10 definition of "destruction or adverse modification" of
11 critical habitat at 50 CFR 402.02. Instead, we have relied
12 upon the statutory provisions of the ESA to complete the
13 analysis with respect to critical habitat. NMFS will
14 evaluate "destruction or adverse modification" of critical
15 habitat by determining if the action reduces the value of
16 critical habitat for the conservation of the species.

17 BiOp at 43. Plaintiffs maintain that this reads the word
18 "appreciably" out of the regulatory definition of adverse
19 modification. Doc. 431 at 75-76. The record provides a reasoned
20 basis for this statement in the BiOp and demonstrates that NMFS has
21 not read the term "appreciably diminish" out of the definition.

22 In 2005, after *Gifford Pinchot* invalidated FWS's application of
23 the regulatory definition in 50 C.F.R. § 402.02 because FWS had not
24 evaluated whether the amount of habitat anticipated to be lost would
25 impact recovery, NMFS issued a guidance memo on how to conduct
26 "destruction or adverse modification" determination. See AR
27 00005204-209. That memo explicitly directs NMFS to identify the
28

1 current condition of the Primary Constituent Elements ("PCE")²¹ of
2 each critical habitat designation before examining how the proposed
3 action will affect the function and conservation role of each PCE.
4 *Id.* Federal Defendants do not assert that this guidance has
5 invalidated the "appreciably diminishes" aspect of the critical
6 habitat regulation. Doc. 515 at 29. Rather, the guidance memo, which
7 instructs NMFS to "discuss the significance of anticipated effects to
8 critical habitat," is sufficient to implement an "appreciably
9 diminish" standard. AR 00005208²² (emphasis added). The guidance
10 memo's requirement of "significant" impacts to critical habitat is
11 consistent with the regulatory definition of adverse modification to
12 include only those alterations that "appreciably diminish[] the value
13 of critical habitat."

14
15 Because an agency's rationale must be upheld if it can
16 "reasonably be discerned," *see Modesto Irr. Dist. v. Gutierrez*, 619
17 F.3d 1024, 1035 (9th Cir. 2010), there is no requirement that the
18 agency use "magic words" in its analysis. The key question is whether
19 the record supports the adverse modification findings in the BiOp. In
20 other words, does the record demonstrate that Project operations will
21 have a significant (i.e., appreciable or considerable) impact on the
22
23

24 ²¹ PCEs are those elements of a critical habitat designation deemed essential for
25 the conservation of the listed species and are described as the sites and habitat
26 components that support one or more life stages or requirements of the species.
27 PCEs are made up of essential features, which are needed to support that specific
28 life-stage requirement. An example is the PCE of spawning habitat, which includes
such essential features as clean spawning gravel, clean water, and appropriate
water temperatures. See BiOp at 56.

²² The pages in this document appear to be out of order in the AR. What appears to
be page 3, AR 00005208, is before what appears to be page 2, AR 00005209.

critical habitat of each of the listed species for which adverse modification was found.

The BiOp examines impacts to critical habitat at length. For each species, the BiOp describes the PCEs of that species' critical habitat, examines the current status of the critical habitat and describes factors responsible for the current status, evaluates the impacts of current and future non-project (i.e., baseline) impacts, and describes the anticipated impacts of proposed project operations on that habitat.

a. Winter-Run Habitat Analysis.

The evaluation of winter-run critical habitat provides a representative example. There are seven PCEs of Chinook critical habitat: (1) access from the Pacific Ocean to appropriate spawning areas in the Upper Sacramento River; (2) clean gravel for spawning; (3) adequate river flows for spawning, egg incubation, fry emergency, and juvenile downstream migration; (4) appropriate water temperatures for spawning, egg incubation, and fry development; (5) uncontaminated habitat and food sources; (6) riparian habitat for juvenile development and survival; and (7) downstream migration access to the Pacific Ocean. BiOp at 90. The BiOp evaluates the current status of each of these PCEs. *Id.* at 90-92. In addition, the BiOp contains a lengthy section describing the factors responsible for the current status of the species, many of which also affect the species' habitat. *See id.* at 134-142. The BiOp concludes that the current condition of

critical habitat is degraded and has low value for the conservation of the species. *Id.* at 93.

Critical habitat for winter-run is composed of physical and biological features that are essential for the conservation of winter-run, including up and downstream access, and the availability of certain habitat conditions necessary to meet the biological requirements of the species. Currently, many of these physical and biological features are impaired, and provide limited conservation value. For example, when the gates are in, RBDD reduces the value of the migratory corridor for upstream and downstream migration. Unscreened diversions throughout the mainstem Sacramento River, and the DCC when the gates are open during winter-run outmigration, do not provide a safe migratory corridor to San Francisco Bay and the Pacific Ocean.

In addition, the annual change in TCP has degraded the conservation value of spawning habitat (based on water temperature). The current condition of riparian habitat for winter-run rearing is degraded by the channelized, leveed, and riprapped river reaches and sloughs that are common in the Sacramento River system. However, some complex, productive habitats with floodplains remain in the system (e.g., Sacramento River reaches with setback levees (i.e., primarily located upstream of the City of Colusa) and flood bypasses (i.e., Yolo and Sutter bypasses).

Based on the impediments caused by RBDD when the gates are in, unscreened diversions, annual changes to the TCP, the time when the DCC gates are open during the winter-run outmigration period, and the degraded condition of spawning habitat and riparian habitat, the current condition of winter-run critical habitat is degraded, and has low value for the conservation of the species.

Id. (emphasis added).

In the environmental baseline analysis, NMFS concluded climate change will negatively affect all of the Central Valley critical habitat designations at issue. *Id.* at 173. With respect to upstream habitat, NMFS evaluated the current and future environmental baseline of winter-run Chinook critical habitat in the Shasta and Sacramento Divisions of the CVP, and concluded that the current baseline is "degraded, and has low value for the conservation of the species," and

1 future baseline habitat impacts will "affect the fitness... of the
2 critical habitat...." *Id.* at 181-83, 187-91. For the Delta
3 Division, NMFS concluded that the migratory function of this critical
4 habitat is degraded, *id.* at 203-05, and that the future environmental
5 baseline included continued "ongoing habitat modifications" and
6 adverse habitat impacts from levees, predation, non-native species,
7 contaminants, entrainment, dredging, recreational boating, and
8 temporary irrigation barriers, *id.* at 215-16.

10
11 (1) Project Impacts to Winter-Run Spawning Habitat.

12 In addition to these past, current, and future non-project
13 adversities, NMFS found that proposed project operations in the
14 Sacramento River constrain spawning habitat by providing relatively
15 less cool water temperatures below Keswick Dam and by stranding or
16 dewatering redds and juveniles. *See id.* at 273. The BiOp's section
17 on the "Effects of the Action on Critical Habitat in the Sacramento
18 River" in particular on "Spawning Habitat" provides:

19 For winter-run and spring-run, potential spawning habitat is
20 constrained by temperature control to smaller and smaller
21 areas below Keswick Dam. The impacts of operations on cold
22 water have already been described above. However, the
23 changes to the habitat downstream are far more widespread
24 and difficult to detect. The volume of water stored in
25 Shasta reservoir tends to dampen the seasonal variation in
26 water temperatures. This moderation of water temperatures,
27 combined with a loss in spawning habitat above Shasta and
28 Keswick dams, may have profound effects on life history
patterns. Warmer water temperatures during the spring-run
and CV steelhead egg incubation have resulted in earlier
emergence time. Spawning habitat, which is now located 60 to
240 miles downstream from historical sites above Shasta Dam,
truncates the juvenile emigration timing by 2-3 months.
Therefore, juveniles leave the spawning area at much smaller
size and are less likely to survive downstream. For
steelhead the cold summer-time flow regime favors residency

1 over anadromy, which reduces the variability in life history
2 that distinguished runs. In addition, with more spatial and
3 temporal overlap between the listed anadromous salmonid
species, competition for space reduces the value of the
spawning habitat for the conservation of any one species.

4 The value of spawning habitat for the conservation of the
5 species is also reduced by flow fluctuations twice a year
6 every year to install and remove the ACID diversion dam.
7 These sudden drops in flow strand and/or isolate juveniles
8 rearing along 5 miles of habitat above the diversion dam,
and likely for miles downstream. Flow fluctuations can also
9 dewater winter-run and fall-run redds. Since the majority of
winter-run have shifted to spawning above the ACID diversion
dam (e.g., 62 percent in 2006), flow fluctuations are likely
to have greater impacts in future years.

10 Climate change, as a modeled future baseline stressor, is
11 likely to reduce the conservation value of the spawning
12 habitat PCE of critical habitat by increasing water
13 temperatures, which will reduce the availability of suitable
14 spawning habitat. Cold water in Shasta Reservoir will run
out sooner in the summer, impacting winter-run and spring-
run spawning habitat. This reduction in an essential feature
of the spawning habitat PCE will reduce the spatial
structure, abundance, and productivity of salmonids.

15 *Id.* at 273. Spawning habitat has been impacted by baseline
16 conditions (such as the presence of Shasta and Keswick Dams) and
17 climate change. The BiOp provides explanation for its conclusion that
18 additional Project operations will add to those baseline impacts. As
19 to winter-run spawning habitat, the section references an earlier
20 discussion of "the impacts of operations on cold water;" addressing
21 CALSIM II modeling runs, comparing temperature conditions (and
22 resulting egg mortality) between baseline operations and operations
23 under the proposed action. Figure 6-14, which depicts winter-run egg
24 mortality by water year type, permits comparison of the baseline
25 (Study 7.0), near future project operations (Study 7.1) and future
26 project operations (Study 8.0).
27
28

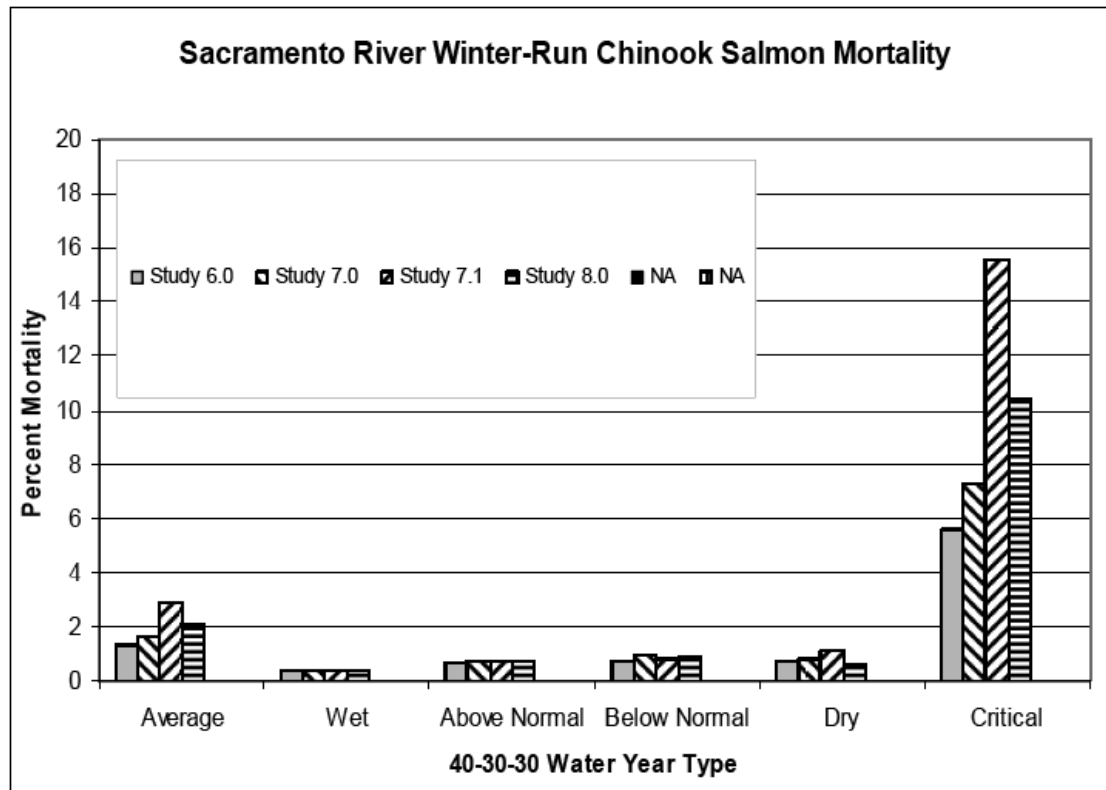


Figure 6-14. 2008 Winter run average egg mortality by water year type at Balls Ferry. Study 6.0 represents 2004 operations, study 7.0 represents current operations, 7.1 represents near future operations, and 8.0 represents future operations (CVP/SWP operations BA figure 11-39).

Id. at 259. These results show that in critical years, which are 15 percent (15%) of the years modeled, egg mortality more than doubles between Study 7.0 and Study 7.1, and increases by 50 percent between Study 7.0 and Study 8.0, under past and future operations. (No explanation is given for why study 7.1 shows higher mortality than Study 8.0.) Because egg mortality is a direct result of temperature conditions in winter-run spawning habitat, this demonstrates that Project operations will significantly reduce spawning habitat in critical years.

(2) Project Impacts to Rearing and Migratory Habitat.

Information to support NMFS's finding of significance for winter-

run rearing and migratory habitat is less apparent. In Section 6.3.8 ("Effects of the Action on Critical Habitat in the Sacramento River"), the BiOp reviews impacts to rearing and migratory habitat very generically:

6.3.8.2 Rearing Habitat

Stream flows within the Sacramento River have been altered by the operations of Shasta and Keswick dams. Generally, the changes have increased flows during the summer and fall, and decreased flows in the winter and spring compared to historical conditions (figure 5-13). The result of the change in historical flow patterns has been a decrease in the hydrologic variability and a loss of complexity in the freshwater aquatic habitat. Specific areas of rearing habitat loss due to changes in the flow pattern include fewer oxbows, side channels, braided channels, less LWD, and less shaded aquatic riparian habitat. The Nature Conservancy (2007) model shows that these are necessary for proper functions of riverine ecosystems. A more natural flow regime with higher spring flows and lower summer flows would support riverine functions like the creation of oxbows, side channels and more varied riparian communities. In turn, this would increase cottonwood regeneration, shaded aquatic habitat, food supply, rearing areas, and LWD recruitment, all important components that are being degraded under continued project operations.

The decrease in the biological value of the rearing habitat is due to the simplification of the processes that create these important areas. The CVP and SWP have for years used the river as a conveyance system, neglecting the natural processes that are necessary to support river dependent species. This altered stream flow pattern has indirectly led to an increase in bank stabilization, levees, riprap, and armoring to keep the river in place. The reduction in rearing habitat quality has decreased the survival of juvenile salmonids and favored the proliferation of introduced non-native species that prey or compete with juvenile salmonids. Due to the stream flow changes, introduced warm water predators are much more numerous today than historically. Therefore, the conservation value of rearing habitat along the entire 300 miles has been degraded by project operations.

1 Rearing habitat for CV steelhead has been modified in the
2 Sacramento River to cooler summer time releases for winter-
3 run spawning. This change in summer temperature regime has
4 increased the resident rainbow trout population. The change
5 in summer temperatures may reduce the number of steelhead
6 that choose to migrate to the ocean because conditions are
7 too favorable. If the resident trout population is as large
8 as the trout population above Shasta dam (i.e., estimated at
9 10,300 trout per mile), then competition for food and space
10 could reduce the value of the rearing habitat PCE.

11 Climate change, as modeled future baseline stressor, is
12 likely to reduce availability of rearing habitat, and in
13 turn, the value of the rearing habitat PCE of critical
14 habitat, by increasing water temperatures. As the juveniles
15 migrate downstream, they will emigrate earlier, encounter
16 thermal barriers sooner, and be subjected to predators for
17 longer periods of time. This reduction in the essential
18 elements of critical habitat will reduce the spatial
19 structure, abundance, and productivity of salmonids.
20 Juveniles would be expected to concentrate in areas of cold
21 water refugia, like in the few miles below Keswick Dam,
22 where competition for food, space, and cover would be
23 intense. Those individuals that stayed to over summer would
24 be forced into one life history pattern consistent with
25 project operations (i.e., yearling life history and
26 emigration during the following spring). Those juveniles
27 that did emigrate early would be exposed to greater stress
28 regimes as they encounter higher water temperatures and
greater concentrations of predators downstream.

6.3.8.3 Migratory Corridors

29 The conservation value of the migratory corridor along the
30 mainstem Sacramento River for all 4 listed species is
31 degraded by the presence of barriers to upstream and
32 downstream migrations.

33 An essential feature of the migratory corridor PCE is
34 unobstructed passage of emigrating fish through the upper
35 Sacramento River to the spawning areas. This characteristic
36 of the PCE will continue to be degraded by the continued
37 operation of the RBDD and ACID diversion dam. Adult
38 salmonids are blocked and/or delayed in passing these
obstructions. Juveniles are subjected to higher
concentrations of predators at these locations. Entrainment
losses will continue into the future from operation of fish
screens at these diversions.

1 RBDD backs up water on the Sacramento River to form Lake Red
2 Bluff during the summer months, when juvenile winter-run are
3 migrating downstream. This action reduces the conservation
4 value of the critical habitat within the 6-mile lake (or 15
5 miles of shoreline) for winter-run, spring-run and CV
6 steelhead (TCCA 2008). The inundation of the Sacramento
7 River slows down flows, covers riparian areas, warm water
8 predators become more numerous, and the value of the habitat
9 is reduced. Juvenile salmon and steelhead are disoriented
10 and confused as they migrate downstream through the lake,
11 similar to what happens on the Columbia River above its
12 dams. Stranding and isolation occur in sloughs adjacent to
13 the lake when the gates come out in September (USFWS 1998).
14 The rising waters in the spring kill any vegetation along
15 the sides by submerging it underwater and covering it with
16 silt. Water temperatures increase in the lake as flows are
17 slowed and surface water is heated by the sun. Large shade
18 trees and riparian areas are prevented from becoming
19 established leaving the near shore areas devoid of
20 vegetation. Food supply, shelter and cover are reduced by
21 this action and will continue to be reduced under future
22 operations until a new pumping plant is built and
23 operational.

24 Approximately, 8 miles of river habitat is modified (or 13.3
25 percent of the available habitat above RBDD) to less
26 suitable lake habitat for 4 to 6 months of every year when
27 the diversions are in place (i.e., 6 miles above RBDD, and 2
28 miles above ACID). This seasonal loss of habitat reduces
food availability, shelter, and cover, and causes permanent
changes that reduce the value of that habitat for the rest
of the year (i.e., from sedimentation, loss of shaded
aquatic habitat, loss of riffle areas that produce food).
The loss of habitat value leads to a reduction in the
abundance of juvenile winter-run and spring-run that enter
the Delta. Productivity and growth are also reduced from
modified habitat and reduced complexity. Juvenile salmonids
reach the Delta sooner and at a smaller size, making them
more vulnerable to predation. Larger fish are more likely to
survive the stressful transition into the marine environment
than smaller fish, which have less energy reserves stored in
their bodies. Therefore, salmonids with life history stages
(representing a year in freshwater) like spring-run
yearlings and CV steelhead smolts are less likely to be
affected by these habitat changes in the migratory corridor,
since they move through mainstem quickly prior to entering
the ocean.

BiOp at 273-74.

The BiOp's "Synthesis of Effects" provides the following additional discussion of rearing habitat:

9.2.2 Project Effects on Sacramento River Winter-Run Chinook Salmon Critical Habitat

Critical habitat for winter-run is comprised of physical and biological features that are essential for the conservation of winter-run, including freshwater spawning sites, rearing sites, and migration corridors to support one or more life stages of winter-run. As summarized below, the conservation value of critical habitat throughout the Sacramento River from Keswick Dam to the Delta (302 miles) will be degraded by the proposed action.

9.2.2.2 Rearing Habitat

The value of rearing habitat will continue to be degraded as hydrologic conditions resulting from operations favor the proliferation of introduced non-native warm water predators of juvenile salmonids.

Reclamation will continue to operate RBDD (modification of 6 miles of free-flowing riverine habitat to lake-like habitat) and the ACID diversion dam (modification of 3 miles of free-flowing riverine habitat to lake-like habitat) for 4 to 6 months of every year. Food supply, shelter, and cover will continue to be reduced during the 4 months that the gates are in. In the future full build out scenario, the value of rearing habitat will improve when the gates are out for up to 10 months of each year. However, stranding and isolation in sloughs adjacent to the lake would still occur, and riparian habitat will not likely establish.

9.2.2.3 Migratory Corridors

The value of upstream and downstream migratory corridors will continue to be degraded as a result of the continued operation of RBDD and the ACID diversion dam, which preclude unobstructed passage. The creation of Lake Red Bluff results in the reduction in value of rearing habitat and degradation of 15 miles of shoreline that slows down flows, inundates riparian areas, and increases habitat for warm water predators. The value of the migratory corridor will also continue to be degraded when the RBDD gates come out in September and cause stranding and isolation in sloughs adjacent to the lake. In the future full build out scenario (2030, which we assume the effects will be realized starting

1 in year 2019), the 10-month gates out and 2-month (which is
2 really 2½ months) gates in scenario will improve the value
of the migratory corridor by providing unobstructed passage.

3 During outmigration, the DCC, when the gates are open,
4 continues to degrade the value of the mainstem Sacramento
River as a migratory corridor by entraining a portion of the
5 outmigrating juveniles into the Central Delta, where
survival and successful outmigration to the Pacific Ocean is
6 lower than if the juveniles remained in the main migratory
corridor of the Sacramento River. The proposed action
7 exacerbates this problem by altering water movement through
the Sacramento River and Delta such that water in the north
8 part of the Delta (e.g., immediately upstream of the DCC) is
pulled southward towards the Federal and State pumping
9 plants through the DCC and/or Georgiana Slough.

10 *Id.* at 469-70. The next sub-section assesses risk to winter-run
11 critical habitat.

12 9.2.3 Assess Risk to the Winter-Run Chinook Salmon Critical Habitat

13 Many of the physical and biological features that are
14 essential for the conservation of winter-run are currently
degraded. As a result of implementing the proposed action,
15 some of those physical and biological features will likely
remain the same, which will keep their conservation value
16 low. However, the conservation value of many of the physical
and biological features will likely be further degraded. For
17 example, the proposed action will further degrade the value
of spawning, rearing, and migratory habitat. Reoperation of
18 RBDD in the future full build out scenario, so that the
gates are down for 2½ months instead of the 4-month near-
19 future (i.e., 2009-2019) scenario, will slightly improve the
value of rearing and migratory habitat. However, the
20 conservation value of these habitats will remain degraded by
other stressors related to both the proposed action and the
21 baseline (see figure 9-4).

22 The effects of the proposed action under climate change
scenarios would likely further degrade the value of spawning
23 and rearing habitat by increasing water temperatures. Cold
water in Shasta Reservoir will run out sooner in the summer,
24 degrading winter-run spawning habitat, and the value of
rearing habitat would likely be further degraded by
25 juveniles emigrating earlier, encountering thermal barriers
sooner, and be subjected to predators for longer periods of
26 time. Juveniles that do not emigrate earlier will likely
congregate in areas of cold water refugia, like in the few
27 miles below dams where competition for food, space, and
cover would be intense.

1 Based on the analysis of available evidence, NMFS concludes
2 that the proposed action is likely to reduce the
3 conservation value of the critical habitat, as designated,
4 for the conservation of Sacramento River winter-run Chinook
5 salmon (table 9-3).

6 *Id.* at 470.

7 All of these discussions of impacts to rearing and migratory
8 habitat on the Sacramento River focus on the operation of Red Bluff
9 Diversion Dam ("RBDD") and Anderson Cottonwood Irrigation District
10 ("ACID") diversion dam, which obstruct passage and alter large areas
11 of habitat. For example:

12 Reclamation will continue to operate RBDD (modification of 6
13 miles of free-flowing riverine habitat to lake-like habitat)
14 and the ACID diversion dam (modification of 3 miles of free-
15 flowing riverine habitat to lake-like habitat) for 4 to 6
16 months of every year. Food supply, shelter, and cover will
17 continue to be reduced during the 4 months that the gates
18 are in. In the future full build out scenario, the value of
19 rearing habitat will improve when the gates are out for up
20 to 10 months of each year. However, stranding and isolation
21 in sloughs adjacent to the lake would still occur, and
22 riparian habitat will not likely establish.

23 *Id.* at 469. Although the BiOp does not offer a numerical analysis of
24 what percentage of the designated rearing and/or migratory habitat is
25 disturbed by these operations, at least for those fish that must pass
26 these structures (the entire winter and spring-run populations) the
27 significance of such barriers is obvious.

28 Similar evidence of significant impacts for other aspects of
critical habitat exists for each of the species. *E.g., id.* at 260
(demonstrating significant impacts to the spring-run spawning
habitat); *id.* at 501-503, 504 (summarizing project impacts to spring-
run habitat), *id.* at 549-53 (same as to steelhead); *id.* at 570-71

1 (same as to green sturgeon proposed critical habitat, noting that
2 "[w]hen the gates are down, RBDD precludes access to 53 miles of
3 spawning habitat for 35-40 percent of the spawning population of green
4 sturgeon").

5 Plaintiffs' argument is simply that Federal Defendants acted
6 unlawfully by failing to directly articulate that project operations
7 have "appreciable" or "significant" impacts on critical habitat. The
8 test is that the agency's reasoning should reasonably be discerned
9 from the BiOp. A number of evident causes are identified, which
10 adversely impact the Listed Species. NMFS provided no quantification
11 other than year-to-year population fluctuations. Data for CV
12 Steelhead and green sturgeon are sparse. The record reflects a number
13 of adverse modifications of the species' critical habitat. Although
14 the BiOp does not show what proportion of the population will be
15 affected, this is not required. The explanation of the adverse
16 effects on habitat and how these changes have the ability to effect
17 harm to the species is sufficient.

18 Plaintiffs' motion for summary judgment that the critical habitat
19 analysis is unlawful because NMFS did not apply the proper standard
20 for adverse modification is DENIED; Federal Defendants' and Defendant-
21 Intervenor's cross motions are GRANTED.

22 E. Use of Surrogates.

23 In the effects analysis, the BiOp utilized fall-run Chinook
24 salmon as a surrogate for steelhead, and hatchery Chinook salmon as a
25

1 surrogate for wild Chinook salmon. Plaintiffs argue that NMFS
2 violated the best available science standard by failing to "validate"
3 its use of surrogate species. Doc. 431 at 81.

4 Plaintiffs' expert Kenneth Cummins opines that there is a
5 consensus in the scientific community that, whenever possible the use
6 of surrogates should be avoided. Cummins Decl., Doc. 445 at ¶ 8.
7 Surrogates should be a "tool of last resort." *Id.* This is
8 undisputed.
9

10 Dr. Cummins further opines that "for a surrogate to be
11 appropriate, it should share the same key ecological or behavioral
12 traits that make the target ... sensitive to environmental disturbance
13 and the relationship between population vital rates (for example,
14 survival) and level of disturbance should match that of the target."
15 *Id.* at ¶ 11 (citing Caro *et al.* (2005)). Dr. Cummins maintains that
16 because "all species are different to some degree in regards to their
17 life history strategies, ecological relationships with other species,
18 and selection and use of habitat, substituting data from one species
19 to draw inferences about another for purposes of conservation planning
20 without validating that decision a priori is not justified." *Id.* at
21 ¶ 14. He continues: "since no two co-occurring species are
22 biologically identical, that would seem to rule out management
23 planning for one species that is informed using biological information
24 that is available for another unless use of a surrogate species for
25 the target species is validated." *Id.* Dr. Cummins cites a study by
26
27
28

1 Favreau, *et al.* (2006), which found that "in less than 2 percent of
2 the cases examined did a surrogate represent the target species better
3 than a random selection of potential surrogates. Further, in less
4 than 4 percent of the cases could the surrogate be considered as
5 effective in representing the target species." *Id.* From this, Dr.
6 Cummins concludes:
7

8 This makes it clear that without detailed data supporting
9 very similar responses of juvenile Chinook salmon and
10 juvenile steelhead to specific stressors, such as a given
11 set of flow conditions, there is no scientific justification
12 to choose Chinook as a surrogate over any other co-occurring
13 species.

14 *Id.* Dr. Cummins describes "various approaches to validation that
15 scientists may employ before relying on surrogate data."

16 One approach to validation sets forth three criteria that
17 must be met in order to use a surrogate confidently: (1)
18 establish the relationship between levels of environmental
19 disturbance and demographic vital rates for the surrogate
20 species; (2) identify the key traits that affect demographic
21 viability in both the surrogate and target species with
22 regard to the environmental disturbance; and (3) establish
23 the relationship between the key trait and the disturbance
24 threshold Caro *et al.* (2005). Under this approach NMFS
25 should have identified the key traits for both Chinook and
26 steelhead that affect their survival as they migrate through
27 the Delta. NMFS failed to do this.

28 *Id.* at ¶ 15. The problem with Plaintiffs validation argument, and
Dr. Cummins' related opinions, is that they require that NMFS conduct
new experiments to justify reliance on existing experimental data.
For this reason, those portions of Dr. Cummins' declarations that
opine NMFS should have conducted validation experiments were stricken
from the record. See Doc. 536 at ¶ 15; see also *S.W. Ctr. for
Biological Diversity v. Babbitt*, 215 F.3d 58, 60 (D.C. Cir. 2000)
(best available science standard does not impose an obligation to

1 conduct independent studies). The record does not support Plaintiffs'
2 validation requirement argument.²³

3 To the extent Plaintiffs advance a more generic challenge to
4 NMFS's use of surrogates, NMFS explained its use of surrogates and
5 addressed the limitations of surrogate data:

6
7 NMFS understands that the use of surrogates in the form of
8 hatchery releases (e.g., late fall-run to determine spring-
9 run behavior), different species (e.g., Chinook salmon to
10 determine steelhead behavior; Atlantic or shovelnose
11 sturgeon to determine effects of contaminant exposures on
12 green sturgeon), and even the same run and species (e.g.,
13 hatchery fish and laboratory studies to determine
14 wild/natural fish behavior) may not accurately predict or
15 emulate the exact behavior of the species under analysis in
16 its natural environment in order to determine exact fish
routing, timing, duration of migration, and export pumping
entrainment patterns. However, when direct evidence or
similar evaluations are not available for the species under
analysis, NMFS has utilized data and results from the use of
surrogates that exhibit strong similarities in physiological
needs, in life history stages, and in general behaviors. In
the absence of data on salmonids and green sturgeon in the
wild, NMFS considers these studies one of the best available
sources of information used to determine the potential
effects of CVP/SWP operations.

17 BiOp at 62. NMFS maintains that the use of surrogates "minimizes the
18 amount and extent of take associated with tagging or capturing listed
19 species to monitor take." *Id.* at 62-63. Appendix 3 of the BiOp
20 contains a comparison of delta survival rates between hatchery and
21 wild Chinook. BiOp App. 3, at 10-11.

23 One of the draft BiOp peer reviewers considering the BiOp's
24 analyses of winter- and spring-run Chinook noted: "where information
25

26 ²³ It is unclear whether Dr. Cummins is correct to assert that validation is
27 standard practice in the field. Garwin Yip opines that his review of tagging
28 studies in the Pacific Northwest reveals that the surrogate validation process is
not typically used due to increased time and funding required to complete the
validation process. Third Yip Decl., Doc. 518 at ¶ 16.

1 was lacking, reasonable surrogates are used." AR 00061498.
2 Plaintiffs' own experts, e.g., Mr. Cramer, Dr. Hanson, and Mr.
3 Cavallo, used data from experiments utilizing surrogates without
4 independently validating the surrogates. See Second Yip Decl., Doc.
5 481 at ¶ 33; Third Yip Decl., Doc. 518 at ¶ 16. It is undisputed that
6 in many circumstances unverified surrogate data was the only data
7 available for use by NMFS to evaluate the impact of project operations
8 on the Listed Species. Eliminating the surrogate data would have
9 "considerably limit[ed] the utility of any biological analyses
10 undertaken" in the BiOp. *Id.* at ¶ 14.
11

12 Plaintiffs' motion for summary judgment that the BiOp's use of
13 surrogates violated the ESA's best available science standard is
14 DENIED; Federal Defendants' and Defendant-Intervenors' cross motions
15 are GRANTED. The agency recognized there were shortcomings in using
16 surrogates. This is a dispute among scientists.
17

18 F. Challenges to the Reasonable and Prudent Alternative.
19

20 1. RPA Action IV.2.1.

21 Action IV.2.1 limits export pumping from April 1 through May 31
22 and has two requirements. First, the Action requires a minimum flow,
23 as measured at Vernalis, based on an index of storage at New Melones
24 Reservoir ("New Melones Index"). BiOp at 642; BiOp App. 5 at 71.
25 The Vernalis flow requirement is not challenged.

26 The second requirement of Action IV.2.1 restricts combined CVP
27 and SWP export pumping based on the flows at Vernalis, with the
28

permissible level of exports rising in relation to increased flows at Vernalis. BiOp at 642; BiOp App. at 71-72. The action is phased. Phase I governs operations during 2010 and 2011, when combined CVP and SWP exports were restricted as follows:

Flows at Vernalis (cfs)	Combined CVP and SWP Export
0-6000	1,500 cfs
6,000-21,750	4:1 (Vernalis flow:export ratio)
21,750 or greater	Unrestricted until flood recedes below 21,750

BiOp at 642. Under Phase I, the baseline export rate is set at 1,500 cfs, deemed an operational minimum required to address health and human safety needs. *Id.* at 74. Flood warning stage at Vernalis is 21,750 cfs. *Id.* at 71 n.2.

During Phase II, which operates from 2012 on, combined exports are governed by the following table from April 1 through May 31:

San Joaquin Valley Classification	Vernalis flow (cfs): CVP/SWP combined export ratio
Critically dry	1:1
Dry	2:1
Below normal	3:1
Above normal	4:1
Wet	4:1
Vernalis flow equal to or greater than 21,750 cfs	Unrestricted exports until flood recedes below 21,750.

Id. at 643-44. Action IV.2.1 includes an exception for multiple dry years and a health and safety exception. *Id.* at 644.

Action IV.2.1 is designed primarily to "reduce the vulnerability of emigrating CV steelhead within the lower San Joaquin River to entrainment into the channels of the South Delta and at the pumps caused by the diversion of water by the export facilities in the South

1 Delta, by increasing the inflow to export ratio." BiOp at 641. A
2 secondary purpose of Action IV.2.1 is to more generally "enhance the
3 likelihood of salmonids successfully exiting the Delta at Chipps
4 Island by creating more suitable hydraulic conditions in the main stem
5 of the San Joaquin River for emigrating fish, including greater net
6 downstream flows." *Id.*

7
8 Both the Export Plaintiffs and DWR have twice previously sought
9 injunctive relief against the imposition of Action IV.2.1. On May 18,
10 2010, Action IV.2.1 was addressed in Findings of Fact and Conclusions
11 of Law, granting in part and denying in part Plaintiffs' motion for
12 preliminary injunction:

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

19 a. Mr. Stuart testified that enjoining Action IV.2.1
20 would "jeopardize" the SSNDG of CV steelhead, 3/31/10
21 Tr. 122:9, 121:3-5, which in turn would "further
22 decrease the viability of the Central Valley" steelhead
23 DPS, *id.* at 104:2-3. Plaintiffs' expert, Mr. Cramer,
24 did not provide an opinion on the impact of enjoining
25 Action IV.2.1 on the SSNDG of CV steelhead. *Id.* at
26 24:23-25:1.

27 b. For critical habitat, Mr. Stuart opined that
28 Action IV.2.1 provides benefits by enhancing migratory
corridors, increasing riparian zones and rearing areas
which can be used by migrating juveniles, and
shortening migration time and increasing turbidity,
both of which can decrease vulnerability to predation.
Id. at 110:24-111:14. Mr. Stuart testified that
enjoining Action IV.2.1 would remove these beneficial
effects. *Id.* at 111:1-2, 121:13-19; *see also* Gov't
Salmon Ex., ¶4 (enjoining Action IV.2.1 would "negate"

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

8 ***

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

14 However, the record does not support a finding that the
15 specific Vernalis flow to export ratios imposed by Action
16 IV.2.1 (as opposed to lesser or greater ratios) are
17 necessary to avoid jeopardy and/or adverse modification to
18 any of the Listed Species. The total absence of explanation
19 for the exact flow limits chosen makes Action IV.2.1
20 arbitrary and capricious.

21 Doc. 347 ¶¶ 99-102 (internal paragraph numbers omitted from quotation
22 to avoid confusion). The injunction decision found likely success on
23 the merits, but requested additional information on the status of the
24 species before ordering injunctive relief:

25 Injunctive relief is also warranted under the ESA, because,
26 although the general premises underlying Actions IV.2.1 ...
27 find marginal support in the record, the precise flow
28 prescriptions imposed on coordinated project operations as
part of Action IV.2.1's Vernalis flow/export ratio ... are
not supported by the best available science and are not
explained as the law requires.

Injunctive relief cannot be imposed without up-to-date
evidence of the status of the species to assure that altered
operations will not deepen jeopardy to the affected species
or otherwise violate other laws. The evidence has not
sufficiently focused on remedies to provide a confidence
level that completely removing the Vernalis flow to export
ratio prescriptions of Action IV.2.1 ... to increase water
supply will not jeopardize the continued existence of the

1 species and/or adversely modify their critical habitats.

2 *Id.* at 133-34.

3 After receiving additional evidence about the status of the
4 species, Action IV.2.1 was enjoined for a limited period of time (from
5 May 26 through May 31, 2010), in part because only a small percentage
6 of the population of concern, the SSNDG of CV Steelhead, remained in
7 the area that would be impacted by the injunction. Doc. 380.

8
9 A second motion for injunctive relief was filed against Action
10 IV.2.1 in February 2011, Doc. 538, and then withdrawn in light of wet
11 hydrologic conditions that obviated the need to implement the
12 challenged aspects of the Action in this water year. Doc. 625, filed
13 March 30, 2011.

14
15 Export Plaintiffs and DWR again challenge the scientific basis
16 for Action IV.2.1. Export Plaintiffs' and DWR's briefs on the issue
17 substantially overlap.

18
19 a. Does the Record Support NMFS's Imposition of an
20 Flow:Export Ratio Requirement?

21
22 (1) Studies Cited by DWR.

23 DWR's principle argument is that the last twenty years of San
24 Joaquin River fisheries studies have not produced any statistically
25 significant evidence of a negative relationship between salmonid
26 survival and project pumping. Doc. 446-1 at 11. DWR's expert,
27 Bradley Cavallo, refers to various statistical analyses of San Joaquin
28 River salmonid experiments that reveal either no statistically
significant relationship, or a positive one. His citation to a study

1 by Kjelson, Loudermilk, Hood, and Brandes, "The Influence of San
2 Joaquin River Inflow, Central Valley and State Water Project Exports
3 and Migration Route on Fall-Run Chinook Smolt Survival in the Southern
4 Delta During the Spring of 1989," published in 1990, is representative
5 of these critiques. Kjelson, *et al.* (1990) concluded:

6
7 Survival of tagged smolts released under low export
8 conditions was not greater than for those released under
9 high export conditions (Table 4). This was an unexpected
10 result as we believed conditions for survival should have
11 improved when exports were lowered, since direct losses at
12 the Project facilities were decreased, flow in the mainstem
13 San Joaquin was increased and reverse flows in the Delta
14 were eliminated.

15 AR 00122358-59 (cited in Cavallo Decl., Doc. 452 at ¶8a).

16 Mr. Stuart, the lead author of the Delta section of the BiOp,
17 asserts that Mr. Cavallo has selectively quoted from the relevant
18 studies. For example, as to the Kjelson, *et al.* study:

19 ...Mr. Cavallo selectively cites a paragraph from the
20 Kjelson *et al.* (1990) study without including the
21 discussion concerning the results of the study. Kjelson *et*
22 *al.* reached a different conclusion as to the potential role
23 of exports than would be arrived at by reading Mr. Cavallo's
24 excerpt from his declaration. Starting on page 11 of the
25 Kjelson *et al.* study, the authors discuss the potential
26 reasons for the lower survival during lower export levels.
27 NMFS 122357. These included: (1) the duration of the low
28 export period in May 1989 under the low San Joaquin River
flow conditions was too short, thereby not allowing the
tagged smolts sufficient time to successfully exit the Delta
before high export conditions were resumed, (2) a short
curtailment period may be sufficient if San Joaquin River
flows are high compared to the export rates at the time of
smolt migration, (3) the relatively low number of tagged
fish released under each export period that would make
recovery at Chipps Island difficult if survival was low, and
(4) elevated temperatures and poor trucking survival for the
Stanislaus River releases that potentially lowered initial
survival rates, thus biasing the export relationship.
Kjelson *et al.* finishes with recommendations for future

1 studies, including: (1) a wider range of inflow to export
2 ratios assessed, particularly between 1 and 5 when river
3 flows are above 5,000 cfs in the San Joaquin River, and (2)
4 document the proportion of fish that enter upper Old River
5 under various flow, export, and tidal conditions. The fact
6 that Mr. Cavallo did not offer these additional points in
7 his declaration limits the utility of his opinion.

8 Fourth Stuart Decl., Doc. 485 at ¶ 13. The BiOp specifically
9 discussed Kjelson, *et al.* (1990)'s conclusions in Appendix 5:

10 In a study assessing the influence of San Joaquin River
11 inflows, state and federal exports and migration routes,
12 Kjelson *et al.* (1990) released experimental fish (coded
13 wire tagged hatchery Chinook salmon) during the spring of
14 1989 at Dos Reis on the San Joaquin River below the head of
15 Old River, and in Old River itself downstream of the head
16 under conditions with low San Joaquin River flow ($\approx$ 2,000
17 cfs) and high/low export conditions (10,000 cfs and 1,800
18 cfs). The results of the study were unexpected as the rate
19 of survival was not greater for the low export conditions
20 compared to the higher export conditions. Upon further
21 examination of the data, Kjelson *et al.* found that survival
22 was comparatively lower for all upstream release groups that
23 year compared to other studies conducted in previous years.
24 In addition, Kjelson *et al.* surmised that the short period
25 of reduced exports (7 days) was not long enough to allow
26 fish to exit the system and move beyond the influence of the
27 exports when higher pumping resumed. Based on the times to
28 recovery at Chipps Island, it was concluded that a sizeable
proportion of the released fish were still in the Delta when
the higher export levels resumed. This conclusion is further
reinforced by the salvage of fish released at Jersey Point,
indicating that fish were drawn upstream into the interior
of the Delta and towards the pumps. The study, although
having several significant flaws, did conclude that survival
was higher in the main stem San Joaquin River compared to
Old River and that survival in the Delta interior was lower
compared to the western Delta (i.e., Jersey Point releases).
The authors cautioned about drawing conclusions about export
rates and survival from the data due to its obvious flaws.

BiOp App. 5 at 5-6.

DWR correctly rejoins that Mr. Stuart does not contest that
Kjelson, *et al.* (1990) concluded that survival was lower during low

1 exports than high exports. DWR is also correct that Mr. Stuart does
2 not explain how the study "affirmatively supports the United States'
3 claim that a relationship exists between project exports and smolt
4 survival sufficient to justify the Inflow/Export ratio." Doc. 495 at
5 16. Mr. Stuart never opined that Kjelson's study provides such
6 affirmative support. The BiOp considered the study, its caveats, and
7 acknowledged the study's "surprising" conclusion that survival was not
8 higher during low export conditions.
9

10 Mr. Cavallo quotes from five more studies, Cavallo Decl., Doc.
11 Doc. 452 at ¶ 8:

- 12
- 13 • Brandes and McLain, "Juvenile Chinook Salmon Abundance,
14 Distribution, and Survival in the San Sacramento-San Joaquin
Estuary," Fish Bulletin 179, Vol. 2 (2001):

15 To determine if exports influenced the survival of smolts in
16 the San Joaquin Delta, experiments were conducted in 1989,
17 1990 and 1991 at medium/high and low export levels. Results
18 were mixed showing in 1989 and 1990 that survival estimates
19 between Dos Reis and Jersey Point were higher with higher
20 exports whereas in 1991 between Stockton and the mouth of
21 the Mokelumne River (Tables 11 and 12) survival was shown to
22 be lower (0.008 compared to 0.15) when exports were
23 higher.... In addition, results in 1989 and 1990 also showed
24 that survival indices of the upper Old River groups relative
25 to the Jersey Point groups were also higher during the
26 higher export period, but overall still about half that of
27 the survival of smolts released at Dos Reis (Table 11).

28 AR 00109602-604.

- San Joaquin River Group Authority, "2005 Annual Technical
Report":

Regression of exports to smolt survival without the HORB
were weakly or not statistically significant (Figure 5-17)
using both the Chipps Island and Antioch and ocean
recoveries, but both relationships indicated survival
increased as exports increased."

AR 00134289-90.

- California Department of Fish and Game, "Final Draft 11-28-05 San Joaquin River Fallrun Chinook Salmon Population Model"

There is no correlation between exports and adult salmon escapement in the Tuolumne River two and one-half years later (Figure 24).

AR 00212424, 00212477.

- Mesick, McLain, Marston and Heyne, "Draft Limiting Factor Analyses & Recommended Studies for Fall-run Chinook Salmon and Rainbow Trout in the Tuolumne River" (February 27, 2007)

[P]reliminary correlation analyses suggest that the combined State and Federal export rates during the smolt outmigration period (April 1 to June 15) have relatively little effect on the production of adult recruits in the Tuolumne River compared to the effect of winter and spring flows.

Furthermore, reducing export rates from an average of 264% of Vernalis flows between 1980 and 1995 to an average of 43% of Vernalis flows and installing the head of Old River Barrier between 1996 and 2002 during the mid-April to mid-May VAMP period did not result in an increase in Tuolumne River adult recruitment (Figures 3 and 17).

AR 00125522.

- Ken B. Newman, "An Evaluation of Four Sacramento-San Joaquin River Delta Juvenile Salmon Survival Studies" (March 31, 2008) (AR 00127144.)

The Bayesian hierarchical model analyzed the multiple release and recovery data, including Antioch, Chipps Island, and ocean recoveries, simultaneously.... There was little evidence for any association between exports and survival, and what evidence there was pointed towards a somewhat surprising positive association with exports.

AR 00127219-00127220.

Mr. Stuart now submits alternative explanations to support his opinion why each of these studies does not definitively rule out a relationship between exports and survival:

- Brandes and Maclain (2001) elsewhere concludes that direct

1 mortality at the pumps is higher when exports are higher. Fourth
2 Stuart Decl., Doc. 485 at ¶ 14 (citing AR 000109605-07).

- 3 • While the San Joaquin River Group Authority ("SJRG") 2005 VAMP
4 Technical Report did not find a statistically significant
5 relationship between exports and smolt survival without HORB in
6 place, the report does explain that there are apparent
7 relationships between survival and the flow to export ratio.
8 See AR 00134293 (suggesting survival through the Delta can be
9 improved with increased flow/export ratios when HORB is not
10 installed).
- 11 • The Mesick study concerned only the Tuolumne River, which Mr.
12 Stuart admits is "extremely flow limited" making it unlikely that
13 non-flow factors would affect escapement into that watershed.
14 See Stuart Decl., Doc. 485 at ¶ 11.
- 15 • Mr. Stuart does not dispute that Newman (2008)'s analysis of VAMP
16 data concluded "[t]here was little evidence for any association
17 between exports and survival, and what evidence there was pointed
18 toward a somewhat surprising positive association with exports."
19 AR 00127220. This statement has been extensively discussed. Mr.
20 Stuart argues out that Newman (2008) also explained that these
21 analyses "are not the ultimate definitive explanations for what
22 affects juvenile salmon survival through the Delta, particularly
23 for outmigrants from the San Joaquin River," citing data
24 limitations, low re-capture probabilities, high environmental
25
26
27
28

1 variation, and "lack of balance" in the release strategy as
2 affecting the accuracy of estimates of effects on survival. AR
3 00127148.

4 The best that can be said from all these studies is that they do
5 not affirmatively support the purported relationship between exports
6 and survival NMFS uses to justify Action IV.2.1's flow:export ratio.
7 However, without more, DWR has not established that these studies were
8 not properly evaluated. NMFS relies on additional record evidence to
9 support imposition of Action IV.2.1's flow:export ratio limitation.
10

11
12 (2) Studies Cited by NMFS in Support of a Flow:Export
13 Ratio.

14 (a) VAMP Data.

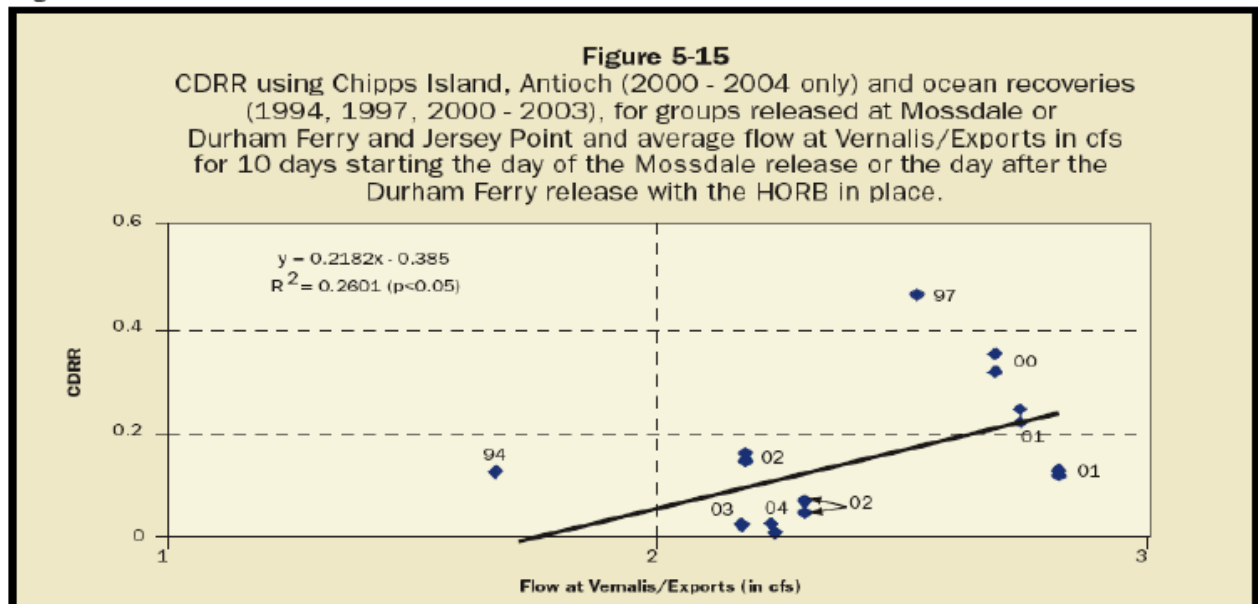
15 The BiOp concedes that analyses of the evidence gathered during
16 the Vernalis Adaptive Management Program ("VAMP")²⁴ are equivocal
17 regarding the impact of exports on survival. BiOp at 373. The BiOp
18 also recognizes that the VAMP experiments may have resulted "in weak
19 to negligible" associations because of the "correlation between flow
20 and export rates during VAMP." *Id.* Mr. Stuart explains the VAMP
21 experimental design was not implemented in full, in that not all of
22 the planned relationships have been tested, with overrepresentation at
23

24 ²⁴ VAMP is a multi-agency collaborative effort that is part of the San Joaquin River
25 Agreement ("SJRA"). "SJRA is a negotiated settlement agreement between SJR water
26 suppliers, water purveyors, and both State and Federal Fishery Agencies that calls
27 for specific spring South Delta (e.g. SJR at Vernalis) river flows and Delta export
28 pumping rates. The San Joaquin River Group Authority provides the flows necessary
to attain the Vernalis flow objectives. State and Federal agencies ensure that
Delta exports rates are met. [VAMP] is a scientific study that evaluates the
effects of Delta inflow, and outflow, upon fall-run Chinook salmon smolt survival."
AR 00212419.

certain combinations of flow and exports. Fifth Stuart Decl., Doc. 516 at ¶ 6. Mr. Stuart opined: "Newman (2008) concluded that the testing of the extremes of combinations is necessary to increase the precision of the experiments and allow discrimination of differences between the parameters." *Id.* at ¶ 50. The 2010 PI Decision found that the BiOp considered the VAMP evidence and its limitations and did not disregard any important conclusions generated from the VAMP data. *Consol. Salmonid Cases*, 713 F. Supp. 2d at 1132-34.

Notwithstanding the lack of statistical significance, the BiOp relied on the following Figure copied from the 2006 VAMP Technical Report to demonstrate that, during times when the Head of Old River Barrier ("HORB") was in place, as the ratio between Vernalis flow and exports increased, survival increased. BiOp App. 5 at 20.

Figure 10:



Copied from the 2006 Annual Technical Report, Vernalis Adaptive Management Plan

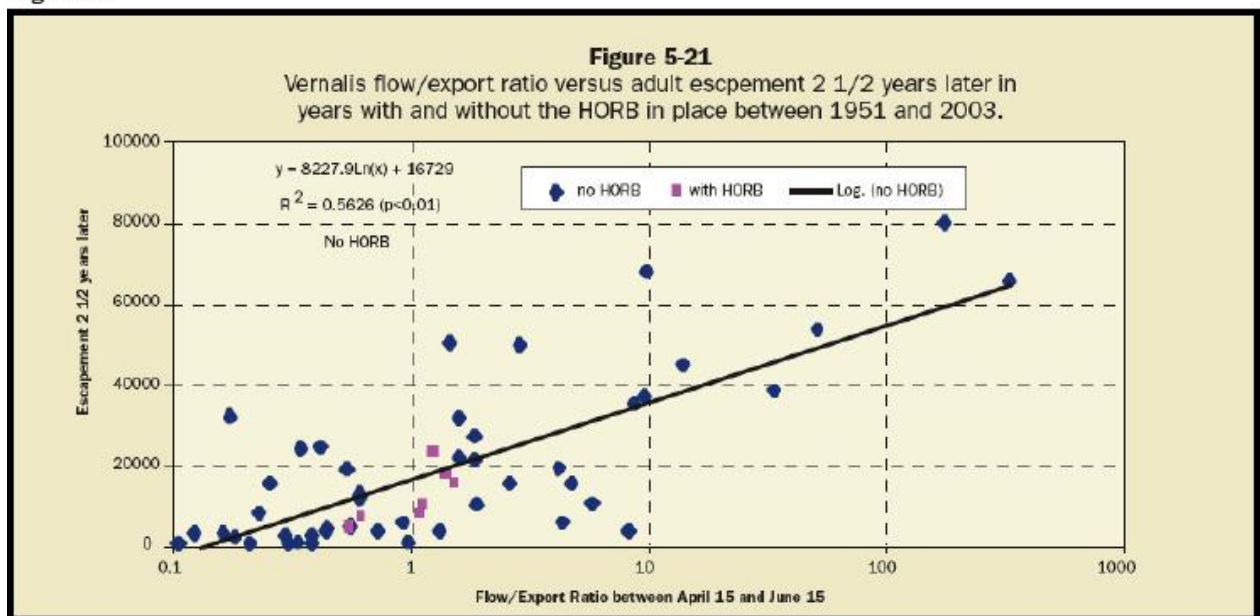
BiOp App. 5 at 20. The relationship was not statistically significant, but the BiOp states that this may have been due to the

1 narrow range of export rates tested. *Id.* The 2010 PI Decision found
2 NMFS's reliance on this data was not arbitrary. *Consol. Salmonid*
3 *Cases*, 713 F. Supp. 2d at 1133-34.

4
5 (b) Escapement Data.

6 NMFS includes the following chart from the 2006 VAMP annual
7 report that showed a positive relationship between the spring Vernalis
8 flow/export ratio and adult escapement (i.e. return from the ocean to
9 freshwater) two and a half years later, based on data from 1951
10 through 2003. BiOp App. 5 at 21.

11 Figure 11



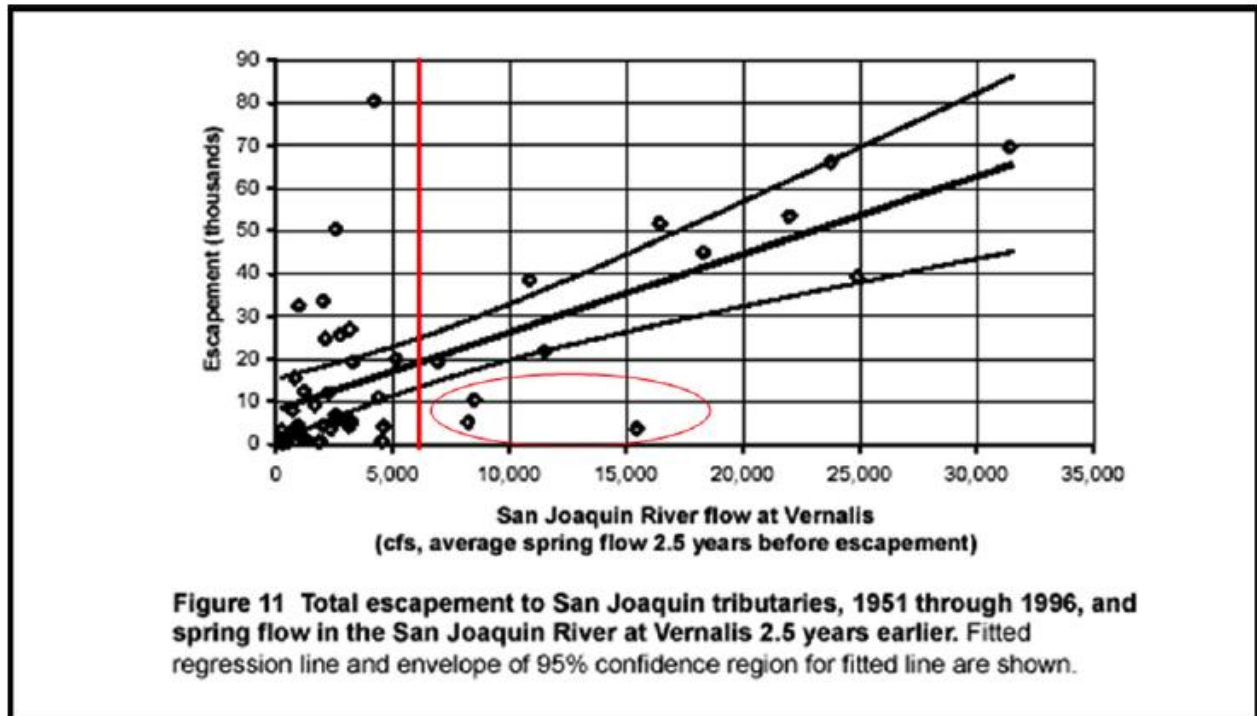
22 Copied from the 2006 Annual Technical Report, Vernalis Adaptive Management Plan

23 The 2010 PI Decision found it not unreasonable for NMFS to consider
24 the analysis depicted in Figure 11. *Consol. Salmonid Cases*, 713 F.
25 Supp. 2d at 1134.

26 DWR argues that NMFS's reliance on Figures 10 and 11 to support
27 the conclusion that there is a correlation between exports and
28

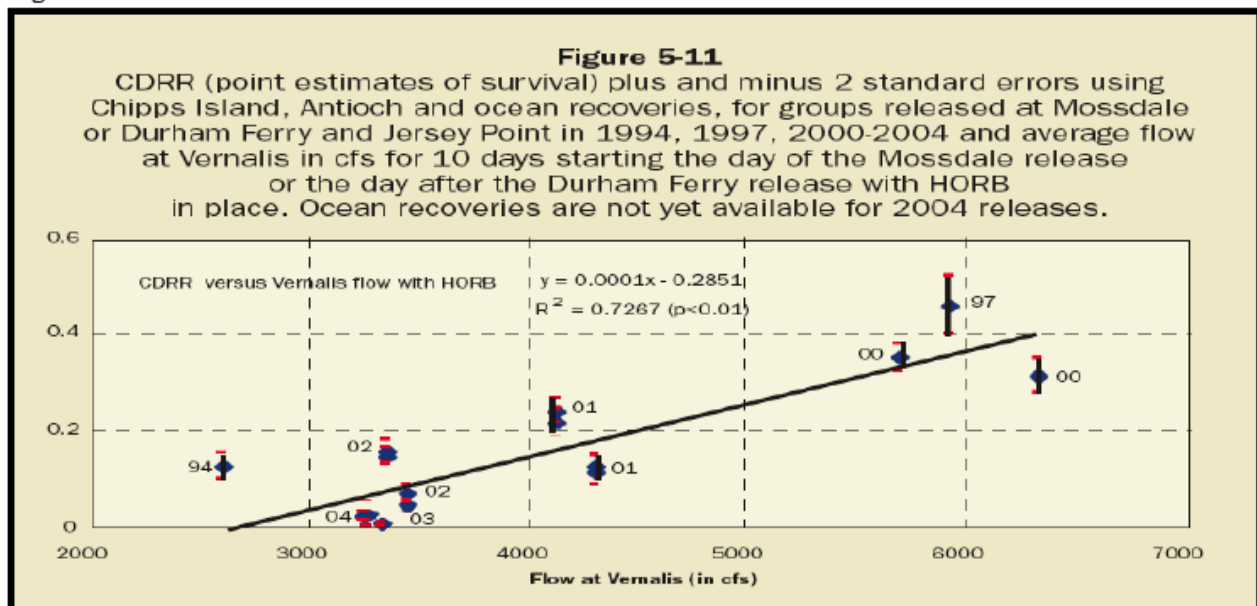
survival is unfounded. Doc. 446-1 at 14. DWR's expert, Bradley Cavallo, compares Figures 10 and 11 to Figures 8 and 9, which plot the impact of San Joaquin River ("SJR") flow against exports:

Figure 8:



Copied from Baker and Morhardt 2001.

Figure 9:



Copied from the 2006 Annual Technical Report, Vernalis Adaptive Management Plan

1 BiOp App. 5 at 19. Mr. Cavallo opines that "inspection of the degree
2 of scatter in [Figures 10 and 11] relative to [Figures 8 and 9]
3 suggests SJR inflow to export ratio provides a poorer fit to observed
4 data than does SJR inflow alone." Cavallo Decl., Doc. 452 at ¶ 12.
5 For example, "the model describing smolt survival in relation to SJR
6 flows alone (Exhibit 1, bottom) has an r^2 value of 0.73 while the
7 comparable model with the ratio of SJR flows to exports has an r^2
8 value of only 0.26 (Exhibit 2, bottom). [¶] An r^2 value closer to 1
9 signifies that salmon survival is better explained by SJR flows ($r^2 =$
10 0.73) than by the ratio of SJR flows to exports ($r^2 = 0.26$)." *Id.* at
11 ¶¶ 12-13. Although SJR flows better explain salmon survival than the
12 ratio of SJR flows to exports, Mr. Cavallo does not opine that there
13 is no relationship between salmon survival and the ratio of SJR flows
14 to exports depicted in Figures 10 and 11. Although NMFS overstates
15 and over-relies on questioned data, this is a scientific dispute among
16 experts that does not involve error of the magnitude that rises to
17 unlawfulness.

18
19
20
21 (c) CDFG (2005).

22 DWR also criticizes NMFS's treatment of a 2005 Department of Fish
23 and Game ("CDFG") study, which provides a "description of the process
24 [CDFG] used to develop, and apply, its Model in the formulation of
25 spring Vernalis flow objectives that were submitted to the [State
26 Water Resources Control Board]." AR 00212414. Mr. Stuart opined that
27 the report "clearly shows that while flows are the primary driver,
28

1 exports play a role, albeit less than that attributable to flows."
2 Fourth Stuart Decl., Doc. 485 at 14. DWR responds that NMFS
3 "misrepresents the [report's] flow and export conclusions." DWR
4 focuses on several statements from the report, including the
5 conclusion that "Delta export level, relative to Delta inflow level,
6 does not influence juvenile salmon survival on a regular, normal, or
7 repetitive pattern." AR 000212423. CDFG determined that non-flow
8 parameters, such as exports, ocean conditions, "have little, or no,
9 relationship to fall-run Chinook salmon population abundance in the
10 SJR and that spring flow magnitude, duration, and frequency all had
11 significant influence upon SJR fall-run Chinook salmon abundance in
12 the SJR." AR 00212413. CDFG excluded consideration of project
13 exports, ocean conditions, and/or density dependence from its model
14 because of "the lack of substantial cause and effect relationships"
15 between these non-flow factors and abundance. AR 00212426.

16
17
18 DWR's contextual approach requires examination of the entire
19 section:

20 Delta Exports

21 It has long been surmised, due to salvage of many juvenile
22 salmon at both the State and Federal Delta export facilities
23 in the spring months, that entrainment of juvenile salmon at
24 the export facilities in the spring months has impacted
25 fall-run Chinook salmon populations in the SJR. A
26 statistically significant regression correlation
27 relationship exists between the ratio of Delta exports and
28 Delta inflow, from the SJR in April-June, and in-river
escapement of fall-run salmon two and one-half years later
(Figure 17). If the measurement metric of production cohort
is used, instead of escapement 2.5 years later, the
curvilinear regression correlation relationship improves (r-

1 square value rises from 0.44 to 0.58) (Figure 18). This
2 seems to suggest that both flow and exports are influencing
3 salmon production in the SJR basin. However, in every
4 instance where salmon production was high, Vernalis flows
5 are in excess of 10,000 cfs. Conversely when salmon
6 production was low, Vernalis flow levels are less than 2,000
7 cfs (Figure 18). The question becomes is it the flow, or the
8 exports?

9 In an attempt to answer this question, the Department took a
10 closer look at smolt survival data that has been collected
11 in recent years (data from P. Brandes USFWS). Smolt survival
12 data collected during VAMP shows that juvenile survival
13 increases as exports increase (Figure 19). In addition smolt
14 survival as a function of the export to Vernalis flow ratio
15 has a low correlation (Figure 20), indicating that Delta
16 export level, relative to Delta inflow level, does not
17 influence juvenile salmon survival on a regular, normal, or
18 repetitive pattern. When exports are combined with Vernalis
19 flow in a multiple regression against juvenile survival
20 (both with the Head of Old River Barrier in or out), a
21 strong positive regression occurs (as both exports and
22 Vernalis flow increase, juvenile salmon survival increases
23 (Figures 21 and 22)). For both cases, with either the HORB
24 in or out, export level has a slightly stronger positive
25 influence upon survival than does inflow level. What is
26 surprising about this occurrence is not that export level
27 influences survival, but that there is a positive, rather
28 than a negative, response in juvenile survival as export
29 level increases. It is noted that due to VAMP, when exports
30 are up, Vernalis flows are increased with export level tied
31 to Vernalis Flow level. This is a noteworthy Delta system
32 operational change, as prior to VAMP there was no
33 correlation between South Delta spring inflow level (e.g.
34 Vernalis flow) and spring Delta export level (unpublished
35 data). Here again, the variable that seems to be controlling
36 salmon production (e.g. survival) is spring Delta inflow not
37 spring Delta export.

38 When Delta exports are subtracted from Vernalis flow levels
39 (Figure 23) and escapement is regressed against this
40 difference, a statistically significant regression
41 correlation results. There is no correlation between exports
42 and adult salmon escapement in the Tuolumne River two and
43 one-half years later (Figure 24). When spring Vernalis flow
44 and spring Delta exports are regressed against salmon
45 escapement two and one-half years later, no improvement in
46 the flow to salmon escapement correlation occurs (VAMP

2005), suggesting that spring flow level, not exports, is the variable limiting salmon production in the South Delta.

To summarize the relationship between exports, flow, and SJR salmon production the primary relationship suggesting that exports influence SJR salmon production is that when the ratio of exports to Vernalis flow decreases both escapement and cohort production increases. The relationships that suggest that flow, not export, is the primary factor influencing SJR salmon production are: 1) when the ratio of spring exports to spring Vernalis flow decreases, Vernalis flow greatly increases and SJR salmon production greatly increases; 2) when the ratio of spring exports to spring Vernalis flow increases, Vernalis flow greatly decreases and SJR salmon production substantially decreases; 3) juvenile salmon survival increases when spring Vernalis flow increases; 4) spring export to spring Vernalis flow ratio has little influence upon juvenile salmon survival; and 5) as the difference between spring Vernalis flow level and spring export flow level increases, escapement increases.

In conclusion, while the influence of Delta export upon SJR salmon production is not totally clear, overall it appears that Delta exports are not having the negative influence upon SJR salmon production they were once thought to have. Rather it appears that Delta inflow (e.g. Vernalis flow level) is the variable influencing SJR salmon production, and that increasing flow level into the Delta during the spring months results in substantially increased salmon production.

AR 00212423-24 (footnotes omitted) (emphasis added).²⁵ Although the

²⁵ Contrary to Export Plaintiffs' assertion that ocean conditions are the primary driver of salmonid abundance, the CDFG report concludes ocean conditions are far less influential than spring flows:

Ocean Harvest

It has also long been postulated that ocean harvest is a controlling influence upon long-term in-river salmon escapement population trends in the SJR. However, comparing the Central Valley Harvest Index to Sacramento and San Joaquin River salmon escapements (Figures 25) suggests that ocean harvest is not a variable influencing the long-term trend in SJR salmon escapement. Unlike in the Sacramento River basin, no noticeable increase in SJR salmon escapement occurred when substantial changes in ocean sport and commercial fish regulations restricted ocean harvest in recent years. Additionally, regressing the Central Valley Harvest Index against annual SJR escapement produces a weak, but statistically significant, regression correlation (Figure 26). The relationships depicted in Figure 25 and 26 suggest that

1 CDFG report supports Mr. Cavallo's assessment that flows are the
2 primary driver of salmon abundance in the SJR, the report acknowledges
3 that as the export:flow ratio "decreases" (i.e., as the flow:export
4 ratio increases) escapement and cohort production increases. This
5 supports NMFS's use of a flow:export ratio. NMFS's minimization of
6 the CDFG study was scientifically undesirable, but the law does not
7 prevent it, by extending discretion to be mistaken. A candid
8 appraisal of the true effect of flows, without masking the lack of
9 significance in a flow:export ratio, would be welcome.
10

11
12 (d) Delta Action 8 Studies.

13 The BiOp considered data from the so-called "Delta Action 8
14 studies," which compared the relative survival rates of coded-wire
15 tagged salmon released at (a) Ryde on the Sacramento River and (b)
16 Georgiana Slough, a channel that splits off of the Sacramento River at
17 Walnut Grove and leads to the interior Delta, joining the South Fork
18 of the Mokelumne River just before it meets the San Joaquin River.
19 The 2010 PI Decision discussed NMFS's treatment and critiques of these
20 studies in detail:
21

22 Evaluating the data from the Delta Action 8 studies, Newman
23 (2008) first explained that there was a high level of
24 environmental variation in the data. [3/30/10 Tr.] at
25 78:18-23. Dr. Newman performed further analysis to reduce

26 factors other than ocean harvest, such as in-Delta or in-river conditions,
27 are controlling the long-term SJR salmon escapement trend. With Delta
28 condition influence upon long term SJR escapement trend being determined by
Delta inflow, which in turn is largely controlled by east-side SJR tributary
flow21, the focus shifts to in-river, specifically in east-side SJR
tributary, conditions.

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

11 This study is relevant to assessing the impacts of export
12 pumping on fish migrating through the San Joaquin River,
13 because fish released into Georgiana Slough must exit into
14 the San Joaquin River, where they are subject to the
15 influence of the pumps. 3/31/10 Tr. 76:20-23. The
16 Georgiana Slough fish share a common migratory pathway with
17 fish that exit the San Joaquin River basin. *Id.* at 76:24-
18 77:6. Regardless of their origin, once the fish are in this
19 common migratory pathway, they are subject to the same
20 hydraulic conditions. *Id.* at 78:1-17.

21 Mr. Cavallo stated that his interpretation of the Newman
22 (2008) study is that there is a weak relationship between
23 exports and survival in the interior Delta, but conceded
24 that there was some relationship. 4/1/10 Tr. 98:24-99:4.
25 Mr. Stuart testified that Newman's studies are the best
26 available and the fact that Newman could find a relationship
27 given the considerable amount of "environmental noise" and
28 the very low signal to noise ratio "shows that the
relationship is probably very real." *Id.* at 159:6-10.
Whether this opinion is entitled to weight is disputed by
Plaintiffs.

1 A September 26, 2008 paper prepared by Dr. Newman with
2 Patricia L. Brandes entitled "Hierarchical Modeling of
3 Juvenile Chinook Salmon Survival as A Function of
4 Sacramento-San Joaquin Delta Water Exports" ("Newman and
5 Brandes 2008") examined the Delta Action 8 data concerning
6 the relative survival rates for Ryde and Georgiana Slough
7 releases and declared: what "we cannot conclude is that
8 exports are the cause of this lower relative survival."
9 4/1/10 Tr. 67:20-23 (emphasis added); DWR Ex. 507 at 22.
10 Newman and Brandes 2008 reached this conclusion because "the
11 evidence for an association between exports and survival is
12 somewhat weak" and because of the study's inability to
13 randomize export levels within a given outmigration season.
14 4/1/10 Tr. 68:1-12; DWR Ex. 507 at 22-23. A later version

1 of this study, dated 2009, omitted this language from the
2 conclusion. 4/2/10 Tr. 28:2-13.[FN 6]

3 [FN6] Mr. Stuart explained that although the BiOp cited
4 the 2008 version of the Newman and Brandes study, he
5 actually used the 2009 version to prepare the BiOp and
6 the 2009 paper was in his reference list. He does not
7 know why the BiOp used the 2008 citation. 4/2/10 Tr.
8 28:2-13

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

15 *Consol. Salmonid Cases*, 713 F. Supp. 2d at 1134-35 (emphasis added).

16 DWR again challenges NMFS's reliance on Newman's review of the
17 Delta Action 8 studies to demonstrate that increasing exports will
18 negatively affect salmonids migrating to the ocean through the San
19 Joaquin River and its tributaries. Mr. Cavallo opines that it is
20 inappropriate to rely on the Delta Action 8 studies to reach
21 conclusions about San Joaquin basin salmonids. Cavallo Decl., Doc.
22 452 at ¶¶ 19-25. He also opines that the overall effect even on
23 migrating salmon smolts in the Sacramento River is relatively small.
24 *Id.* at ¶ 23. NMFS acknowledged the limitations of these studies in
25 the BiOp, yet relies on them to support Action IV.2.1.

26 The Delta Action 8 studies marginally support Action IV.2.1.
27 Newman's analysis of the Delta Action 8 studies revealed that for
28 those fish passing through Georgiana slough and the interior Delta,
survival was negatively impacted by exports. Those fish share a
common migratory pathway with all of the fish exiting the San Joaquin

1 Basin. Fourth Stuart Decl., Doc. 485 at ¶¶ 28-29. It continues to be
2 marginal logic to apply the admittedly weak correlative results of
3 Newman's analysis to San Joaquin salmonids. Mr. Cavallo's criticism
4 that Georgiana Slough, which is not a tidally influenced watercourse
5 and which never experiences reverse flows, is distinct from the SJR,
6 which is tidally influenced and regularly experiences reverse flows,
7 Cavallo Reply Decl., Doc. 497 at ¶ 55, does not abrogate the use of
8 Delta 8 studies. Once fish exit Georgiana Slough, they must travel
9 into the Mokelumne River system and the lower SJR, where they are
10 influenced by tidal movements and exports. Fourth Stuart Decl., Doc.
11 485 at ¶ 28. Mr. Cavallo's criticisms represent another dispute among
12 experts, to which the agency is due deference, even recognizing that
13 DWR and Mr. Cavallo have no apparent incentive to reach objective
14 opinions contrary to NMFS, while Mr. Stuart makes every call in favor
15 of the species, no matter how questionable the basis.

16
17
18 (3) Treatment of Data Related to the Use of Bubble
19 Curtains at HORB.

20 Export Plaintiffs argue that NMFS ignored record evidence
21 demonstrating the effectiveness of non-physical barriers, such as
22 bubble curtains, which use sound, lights, and air bubbles, to guide
23 fish. Doc. 431 at 91. A May 18, 2009 transmittal of "preliminary
24 data" from Reclamation Biologist Dr. Mark Bowen showed that a bubble
25 curtain kept a substantial percentage of fish in the San Joaquin
26 River, rather than allowing them to move into the Old River toward the
27 pumps. AR 00093348. Export Plaintiffs' contention that NMFS did not

1 consider this data in developing Action IV.2.1 is incorrect. NMFS
2 considered Dr. Bowen's preliminary data, Fourth Stuart Decl., Doc. 485
3 at ¶ 91, and recognized Dr. Bowen's warning that the results were
4 preliminary and was "NOT to be cited!" AR 00093348 (emphasis and
5 punctuation in original). Export Plaintiffs' objection on this ground
6 is not valid.
7

8 b. Does the Record Support the Specific Flow/Export Ratios
9 Imposed?

10 The 2010 PI Decision discussed NMFS's rationale for the 4:1
11 Ratio:

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

13 Current VAMP studies have ratios of flow to exports
14 clustered around 2:1, which have provided low survival
15 indices for upstream releases compared to downstream
16 releases, particularly in recent years. Studies which
17 would have had higher flows (i.e., 7,000 cfs) to export
18 (1,500 cfs) ratios were not conducted, since the
19 necessary environmental conditions to implement this
20 part of the study protocol never occurred. Recent
21 conditions in which high flows did occur in the San
22 Joaquin River basin and which would have given flow to
23 export ratios greater than 3:1 in 2005 and 10:1 in 2006
24 were confounded by poor ocean conditions during the
25 smolts entry into the marine environment, and returning
26 adult fall-run Chinook salmon escapement numbers from
27 these brood years were very low (brood years 2004, 2005
28 which returned in 2007 and 2008). From the available
data, including the information contained in figures 10
and 11, flow to export ratios should be at least 2:1
and preferably higher to increase survival and
abundance. In light of these factors, NMFS initially
developed flow to export ratios of 4:1 for wet, above
normal, below normal, and dry years, based on the
minimum export level of 1,500 cfs and a targeted
minimum Vernalis flow of 6,000 cfs. Flows in critically
dry years were targeted to be a minimum 3,000 cfs,
which gives a flow to export ratio of 2:1 when exports
are targeted to be 1,500 cfs.

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

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

Consol. Salmonid Cases, 713 F. Supp. 2d at 1135-36 (emphasis added) (footnote omitted).

The PI Decision addressed the Phase I flow:export ratio, which operated through May 31, 2011. Phase II, which will control operations starting next spring (from April 1 through May 31), imposes the following flow:export ratios:

San Joaquin Valley Classification	Vernalis flow (cfs): CVP/SWP combined export ratio
Critically dry	1:1
Dry	2:1
Below normal	3:1
Above normal	4:1
Wet	4:1
Vernalis flow equal to or greater than 21,750 cfs	Unrestricted exports until flood recedes below 21,750.

BiOp at 643-44.

Defendant-Intervenors offer the following record-based justification for these ratios:

NMFS explained the rationale for the 2:1 flow/export ratio in dry years as follows:

1 Studies identify increased flows as a factor that
2 increases survival of tagged Chinook salmon smolts. To
3 date, most VAMP experiments have utilized San Joaquin
4 River flows to export pumping ratios of approximately
5 2:1. Survival to Chipps Island of smolts released
6 upstream has been relatively low under these
7 conditions. Historical data indicates that high San
8 Joaquin River flows in the spring result in higher
9 survival of outmigrating Chinook salmon smolts and
greater adult returns 2.5 year later (Kjelson *et al.*
1981, Kjelson and Brandes 1989, USFWS 1995) and that
when the ratio between spring flows and exports
increase, Chinook salmon production increases (CDFG
2005, SJRGA 2007).

10 NMFS 00106725 (BO at 645) (emphasis added); *see also* NMFS
11 00107220-21 (BO, App. 5, at 74-75). Figure 11 in Appendix 5 of
12 the BiOp depicts data of flow/export ratios over a 50 year
13 period (1951 to 2003) and reveals that increasing the
14 flow/export ratio was positively correlated with increased
escapement of fall-run Chinook salmon 2 1/2 years later. *See*
NMFS 00107166-67 (BO, App. 5, at 21-22).

15 The BiOp's rationale for the 4:1 flow/export ratio is
16 likewise clearly set forth and logical:

17 The data from the ongoing VAMP experiments provided
18 useful information in developing the ratio. Current
19 VAMP studies have ratios of flow to exports clustered
20 around 2:1, which have provided low survival indices
21 for upstream releases compared to downstream releases,
22 particularly in recent years. Studies which would have
23 had higher flow (i.e., 7,000 cfs) to export (1,500 cfs)
24 ratios were not conducted, since the necessary
25 environmental conditions to implement this part of the
26 study protocol never occurred.

27 NMFS 00107168 (BO, App. 5, at 22). NMFS went on to explain
28 that:

29 From the available data, ... flow to export ratios
30 should be at least 2:1 and preferably higher to
31 increase survival and abundance. In light of these
32 factors, NMFS initially developed flow to export ratios
33 of 4:1 for wet, above normal, below normal, and dry
34 years, based on the minimum export level of 1,500 cfs
35 and a targeted minimum Vernalis flow of 6,000 cfs.
36 Flows in critically dry years were targeted to be a

1 minimum 3,000 cfs which gives a flow to export ratio of
2 2:1 when exports are targeted to be 1,500 cfs.

3 *Id.* (emphasis added). These flow and export levels were
4 then assessed through computer modeling. *Id.* See NMFS
00107169-00107214 (BO, App. 5, at 23-68).

5 NMFS acknowledged and responded to DWR's objections to
6 Action IV.2.1: "Both the Bureau of Reclamation and DWR have
7 strong initial opposition to the proposed RPA. DWR has
8 indicated that the RPA is unfeasible as it [is] currently
9 written. They have proposed alternative actions that NMFS
10 has investigated." NMFS 00107214 (App. 5 at 68). Among the
alternative proposals made by DWR was "real time monitoring
at Mossdale utilizing additional Kodiak trawling." NMFS
responded, reasonably, by stating that:

11 [R]ecoveries of steelhead in the Mossdale trawl are a
12 rare event and in many years only a handful of fish are
13 recovered. Given these rare recoveries of fish, an
14 appropriate trigger to initiate flow increase or export
15 reductions in a timely manner to protect outmigrating
fish would be difficult to determine.... Therefore,
16 what parameters would DWR suggest to indicate when the
pulse of steelhead is exiting the system?

17 NMFS 00107214 (BO, App. 5, at 68).

18 The analysis discussed above amply demonstrates that, rather
19 than base Action IV.2.1 solely on feasibility concerns, as
20 Export Plaintiffs incorrectly argue, see Export Br. at 94-
21 96, NMFS used the VAMP fish experiments as a starting point
22 for the agency's analysis of a flow/export ratio. See NMFS
23 00107168 (BO, App. 5, at 22). The results of those VAMP
24 studies established that a 2:1 ratio (involving a 1,500 cfs
25 export limit) resulted in "low survival indices," and that a
26 larger ratio was preferable when possible to "increase
27 survival" and adequately protect the species. *Id.* After
28 modeling results showed that it would be difficult to
increase this ratio in dry years, NMFS reasonably set the
Phase II ratios at 1:1 for critically dry years and 2:1 for
dry years. NMFS 00107219 (BO, App. 5, at 73). In below
normal and above normal years, however, NMFS reasonably
concluded that more water would be available to meet the
more protective ratios, thus allowing a 3:1 ratio in below
normal years and a 4:1 ratio in above normal years. *Id.*

In its PI ruling, this Court questioned whether Action

1 IV.2.1 was "protective enough" or whether a "5:1 or higher"
2 ratio was necessary. PI Findings, CoL ¶ 51; id. FoF ¶ 97. As
3 NMFS explained in Appendix 5 of the BiOp, there are no
4 conclusive studies of flow/export ratios greater than 2:1,
5 but the best available data supports a minimum feasible flow
6 of 6,000 cfs in most years, along with a ratio somewhat
7 higher than the historically tested 2:1 ratio, which had
8 proved insufficiently protective as discussed above. See
9 NMFS 00107164-68 (BO, App. 5, at 18-22). Specifically, the
10 6,000 cfs target minimum flow was determined based on (1)
11 water reasonably available based on historical flow patterns
12 since 1922; and (2) flow-to-escapement relationships
13 indicating that flows over 5,000 to 6,000 cfs "were required
14 to move into the linear phase of increasing fish
15 escapement." NMFS 00107167-68 (BO, App. 5, at 21-22). Unless
16 NMFS reduced exports to even less than 1,500 cfs - the
17 minimum believed necessary to protect human health and
18 safety - simple math reveals that it would be impossible to
19 achieve a 5:1 or higher ratio, assuming 6,000 cfs as the
20 target minimum flow.

21 As to whether a less restrictive ratio (e.g., 3:1) was
22 biologically appropriate, NMFS did adopt a 3:1 ratio for
23 below normal years. Only in "above normal" or "wet" years is
24 a 4:1 ratio required. Given the parameters for a flow/export
25 ratio that could feasibly be implemented using a 6,000 cfs
26 target for flows - somewhere between 2:1 and 4:1 - and the
27 lack of data on any of the ratios in between, NMFS
28 reasonably adopted a sliding scale that allows the absolute
minimum ratio during drought conditions but increases
protections for species when it is feasible to do so, as
determined by hydrological conditions.

Of course, NMFS cannot prove with absolute certainty that
the 4:1 ratio is protective enough for the species. The
existing data simply does allow it. But, given the record
evidence of harm to salmon and the need to modify the
flow/export ratio, the best available science standard does
not require that NMFS stand by and do nothing, paralyzed by
a lack of perfect data. To the contrary, NMFS had to act and
reasonably exercised its expertise by adopting a flow/export
ratio that is both feasible and more protective of the
species than the status quo. *See Greenpeace Action*, 14 F.3d
at 1337 (upholding biological opinion even though FWS
admitted that it was "uncertain about the effectiveness of
its management measures" because it "premised these measures
on a reasonable evaluation of available data, not on pure
speculation").

1 Thus, rather than base its decision on "no evidence," as was
2 the case in Pacific Coast I, here NMFS's conclusions are
3 explicitly based on scientific evidence, although some of
4 that data may be "less than conclusive." 426 F.3d at 1094.
5 As acknowledged in Pacific Coast I, this is reasonable and
6 consistent with the ESA. Accordingly, Defendant-Intervenors
7 respectfully urge the Court to reconsider and reverse its
8 preliminary finding that NMFS failed to articulate a
9 reasonable basis for RPA Action IV.2.1. See PI Findings,
10 FoF ¶¶ 97, 98; CoL ¶¶ 50, 51.

11 Doc. 484 at 68-71.

12 This explanation for the basis for the ratios imposed by Action
13 IV.2.1 is supported by record references, which now explain in part
14 NMFS's choice of ratios, aided by hindsight and judicial review. This
15 is another close call. DWR opposes the flow ratings as infeasible and
16 arguably unnecessary. NMFS uses VAMP flow data to corroborate its
17 position that a 2:1 ratio is insufficiently protective. It justifies
18 the use of a 3:1 ratio when possible (e.g., in below normal years) as
19 necessarily more protective than a 2:1 ratio. The consequences of
20 imposing a 4:1 ratio in above normal and wet years demand a clearer
21 explanation of NMFS's rationale for imposing a 4:1 ratio, rather than
22 a 3:1 ratio in above normal and wet years. The ESA Handbook requires
23 "a thorough explanation of how each component of the [RPA] is
24 essential to avoid jeopardy and/or adverse modification." ESA
25 Handbook at 4-43 (emphasis added).²⁶ This is not to be done by

26 ²⁶ Plaintiffs repeatedly assert that NMFS was required to articulate in the BiOp how
27 and provide supporting evidence demonstrating that each RPA action "will avoid
28 jeopardy to the continued existence of a listed species." Doc. 431 at 92, 101.
This suggests a requirement that each individual RPA action must be designed to
avoid jeopardy. The requirement is more subtle. The Handbook requires each aspect
be an "essential" component of an overall RPA designed to avoid jeopardy and

1 attorneys, post hoc, in litigation. The importance of this
2 requirement is heightened in light of the weak (arguably equivocal)
3 evidence supporting the imposition of any ratios at all.²⁷
4

5 Plaintiffs' and DWR's challenge to Action IV.2.1 is valid and
6 their MSJ is GRANTED IN PART AND DENIED IN PART, as are Federal
7 Defendants' and Defendant-Intervenors' cross motions. Although there
8 is marginal record support for the imposition of some form of
9 flow:export ratio, the Action must be remanded for further explanation
10 of the necessity of a 4:1 ratios in above normal and wet years.
11

12 adverse modification. Although each element need not achieve avoidance on its own,
13 Federal Defendants incorrectly assert that "the Court's task here is not to dissect
14 and reanalyze this RPA bit by bit, but analyze the overall management scheme
15 proposed by the RPA and determine whether NMFS acted arbitrarily and capriciously
16 in concluding that the RPA, in its entirety, was necessary to avoid the likelihood
17 of jeopardizing the continued existence of the multiple species at issue." Doc.
18 477-1 at 71. In fact, the Handbook requires an action-by-action analysis. NMFS
19 must thoroughly explain how "each" component of the RPA is "essential." While the
20 Handbook is not deserving of Chevron deference, *N. Cal. River Watch v. Wilcox*, 633
21 F.3d 766, 778-79 (9th Cir. 2011), as its purpose is to provide "information and
22 guidance," its text is routinely cited as NMFS's and FWS's interpretation of the
23 ESA, entitled to at least *Skidmore* deference, *Az. Cattle Growers Ass'n v. Salazar*,
24 606 F.3d 1160, 1165 (9th Cir. 2010). In at least one case, the Secretary of the
25 Interior argued that the Handbook was not binding on the consulting agencies.
26 *Nat'l Wildlife Fed'n v. Babbitt*, 128 F. Supp. 2d 1274, 1292 (E.D. Cal. 2000). But
27 no such suggestion has been made here, nor is the agency's alternative
28 interpretation that it may omit specific justification of each RPA action
reasonable. "Although interpretations contained in agency manuals and comments are
not entitled to the highest level of deference, a court may nevertheless defer to
an agency's interpretation of its own regulation, depending upon 'the thoroughness
evident in its consideration, the validity of its reasoning, its consistency with
earlier and later pronouncements, and all those factors which give it power to
persuade, if lacking power to control.'" *Medina County Envt'l Action Ass'n v.*
Surface Transp. Bd., 602 F.3d 687, 700-701 (5th Cir. 2010) (quoting *United States*
v. Mead Corp., 533 U.S. 218, 227-30 (2001)). Applying this standard, the Fifth
Circuit concluded that an interpretation contained in the Handbook was entitled to
deference. *Id.* at 701.

²⁷ NMFS is entitled to deference in its interpretation and application of the body
of relevant science, most of which is equivocal on the issue, and had some basis to
reach the conclusion that some form of flow:export ratio limitation should be
imposed. It is as apparent that the record contains no strong evidence that a
flow:export ratio limitation will improve salmonid survival.

1 2. RPA Action IV.2.3.

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

12 Action IV.2.3 is meant to:

13 [r]educe the vulnerability of emigrating juvenile winter-
14 run, yearling spring-run, and CV steelhead within the lower
15 Sacramento and San Joaquin rivers to entrainment into the
16 channels of the South Delta and at the pumps due to the
17 diversion of water by the export facilities in the South
18 Delta. Enhance the likelihood of salmonids successfully
19 exiting the Delta at Chipps Island by creating more suitable
hydraulic conditions in the mainstem of the San Joaquin
River for emigrating fish, including greater net downstream
flows.

20 *Id.* at 648.

21 NMFS utilized several sources of data to determine that export
22 flow limitations would achieve the objectives of RPA Action IV.2.3,
23 including the relationship between OMR flows and salvage, particle
24 tracking model simulations, and other studies evaluating survival of
25 fish within the central and southern Delta. Export Plaintiffs and DWR
26 challenge the scientific basis for NMFS's determination that an export
27 limitation should be part of the RPA. Export Plaintiffs' general
28

arguments largely overlap with and incorporate the specific arguments presented in DWR's briefs, this discussion focuses on DWR's briefs.

a. Challenge to the Use of the Particle Tracking Method.

DWR argues that the record does not support NMFS's use of the Particle Tracking Model ("PTM"). A similar argument was addressed in the 2010 PI Decision, which provides the starting point:

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

PTM is a hydrodynamic simulation used to assess the fate of particles, as a function of flow, tides, exports, and other factors. 4/1/10 Tr. 18:12-15; *see also id.* at 143:9-25. NMFS used PTM to assess the effects of different OMR flows on the movement of neutrally buoyant particles injected at nine different locations in the Delta. Gov't Salmon Ex. 23 at 2; BiOp at 364-66. The 2009 Salmonid BiOp states that "NMFS uses the findings of PTM simulations to look at the eventual fate of objects in the river over a defined period of time from a given point of origin in the system." BiOp at 366. According to the BiOp, "PTM data can be useful to indicate the magnitude of the net movement of water through the channel after the junction split (and the route selected by the fish), and thus can be used to infer the probable fate of salmonids that are advected into these channels during their migration." *Id.* at 367.

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

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

5 This was a concern expressed in other studies by other
6 experts. For example, the BiOp relied upon Wim J. Kimmerer
7 and Matthew Nobriga's report entitled "Investigating
8 Particle Transport and Fate in the Sacramento-San Joaquin
9 Delta Using a Particle Tracking Model" ("Kimmerer and
10 Nobriga 2008"). BiOp 105 at 380-381; Gov't Salmon Ex. 1 at
11 ¶4; Gov't Salmon Ex. 4 at ¶8. Kimmerer and Nobriga 2008
disclaims: "[w]e do not claim that the specific results
presented here represent actual movements of salmon; rather,
these results indicate what factors may or may not be
important in determining how salmon smolts may move through
the Delta." DWR Ex. 501 at 18.

12 DWR expressed similar concerns in an email to NMFS dated
13 April 20, 2009 regarding the draft 2009 Salmonid BiOp,
14 asserting that NMFS improperly applied the PTM results in
15 determining the eventual fate of salmonids. Attachment 1 to
16 DWR's comments is a comparison of the results of an
17 experimental release of coded wire tagged salmon in the San
18 Joaquin River under known hydrodynamic conditions with a PTM
19 simulation under identical conditions. 4/1/10 Tr. 32:19-
20 33:8. These results indicate that under low flow
conditions, the coded wire tag salmon reached the end
location of Chipps Island long before the arrival of most of
the PTM particles. The PTM results only partially
corresponded with the coded wire tag results under high flow
conditions. *Id.* at 34:3-35:18; DWR Ex. 502 at AR 00086765,
AR 00086767.

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

1 DWR's expert, Mr. Cavallo, agrees with the BiOp that PTM
2 data can be useful to indicate the magnitude of the net
3 movement of water through a channel after a junction split.
4 *Id.* at 20:21-23; BiOp at 367.

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

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

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

26 The PTM simulations NMFS used were run by DWR. *Id.* at
27 86:14-15; 146:9-10. These simulations included four model
28 runs for the months of February through June, using both [a]
wet year [and] a dry year, and varied whether HORB was
installed during the April/May period. *Id.* at 146:14-24,
147:4-6. Three different OMR flows were examined: -3,000
cfs, -2,500 cfs, and -1,250 cfs. *Id.* at 147:15-18. During
that simulation, the particles actually were tracked every
five days for the first 30 days. *Id.* at 147:1-4; Gov't
Salmon Ex. 23 at 2. Mr. Cavallo was unsure that the
particles were tracked every five days, nor did he review
Mr. Stuart's memorandum explaining the PTM simulation
results. 4/1/10 Tr. 87:11-13.

Mr. Cavallo's critique of the choice of injection sites is
weakened by his agreement that at least two of the particle
injection sites modeled by DWR, at NMFS' request, were
useful in evaluating the movement of water particles at

1 channel junctions. *Id.* at 90:17-91:16. NMFS selected the
2 particular injection sites in order to model the
3 vulnerability of particles within the waterways of the south
Delta. *Id.* at 147:22-149:13.

4 NMFS' PTM simulation also showed that, as export levels
5 increase, OMR levels became more negative. 4/1/10 Tr.
6 150:21-21. Mr. Cavallo stated that exports are highly
correlated with OMR flows. 4/1/10 Tr. 40:25-41:2.

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

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

21 Mr. Stuart testified that there is no precisely defined
22 boundary for the influence of the exports, and that the
23 boundary of influence depends on river flow, tides, and the
24 magnitude of the exports. *Id.* at 29:4-9. If there are
25 extremely low-flow conditions and high exports, the extent
26 of the exports could travel considerably farther downstream,
27 even towards the junction of the Sacramento and San Joaquin
28 Rivers. *Id.* at 29:9-13. Typically, according to Mr.
Stuart, the boundary would be close to station 815 at the
confluence of Georgiana Slough and the Mokelumne River or
slightly farther downstream. *Id.* at 29:13-15. As the BiOp
explains:

The data output for the PTM simulation of particles
injected at the confluence of the Mokelumne River and
the San Joaquin River (Station 815) indicate that as
net OMR flow increases southwards from -2,500 to -3,500
cfs, the risk of particle entrainment nearly doubles
from 10 percent to 20 percent, and quadruples to 40

1 percent at -5,000 cfs. At flows more negative than -
2 5,000 cfs, the risk of entrainment increases at an even
3 greater rate, reaching approximately 90 percent at -
4 7,000 cfs. Even if salmonids do not behave exactly as
5 neutrally buoyant particles, the risk of entrainment
6 escalates considerably with increasing exports, as
7 represented by the net OMR flows. The logical
8 conclusion is that as OMR reverse flows increase, risk
9 of entrainment into the channels of the South Delta is
10 increased. Conversely, the risk of entrainment into the
11 channels of the South delta is reduced when exports are
12 lower and the net flow in the OMR channels is more
13 positive -- that is, in the direction of the natural
14 flow toward the ocean.

15 BiOp at 652.

16 This is a dispute among scientists. While DWR criticizes
17 PTM modeling, Stuart and NMFS recognized its limitations and
18 found PTM studies helpful to support its conclusions that:
19 (a) as exports increase, negative OMR flows also increase;
20 and (b) that at Station 815 (the confluence of the Mokelumne
21 River and the San Joaquin River), particle entrainment
22 increases from 10% at -2,500 cfs, to 20% at -3,500 cfs, to
23 40% at -5,000 cfs, and 90% at -7,000 cfs. NMFS, through Mr.
24 Stuart, took into account inherent differences in the
25 movement of neutrally buoyant particles and their speed and
26 direction of travel. Administrative law requires deference
27 to the Agency. Additional record analysis is necessary to
28 determine the extent of support for NMFS's additional
opinion that exports affect salmonid survival.

19 *Consol. Salmonid Cases*, 713 F. Supp. 2d at, 1138-41. DWR raises
20 several additional arguments regarding the use of PTM.

21
22 (1) DWR's Argument that NMFS Failed to Address PTM
23 Limitations Described by Kimmerer and Nobriga.

24 DWR argues that NMFS did not adequately address PTM limitations
25 described in Kimmerer and Nobriga's 2008 article "Investigating
26 Particle Transport and Fate in the Sacramento San Joaquin Delta using
27 a Particle Tracking Model." AR 00122246-71.

28 First, Kimmerer and Nobriga cautioned that PTM "was a useful

1 predictor of entrainment probability if the model were allowed to run
2 long enough to resolve particles' ultimate fate" and that "model
3 accuracy varies depending on the length of the simulation." AR
4 00112246, 00122250. DWR argues that NMFS disregarded these "words of
5 caution." Doc. 446-1 at 20. This is inaccurate. NMFS convened a
6 group of State and federal scientists to discuss PTM simulations,
7 including DWR representatives, who raised some of the same criticisms
8 asserted here. AR 00106021-25 (June 3, 2009 Memo Re: PTM "results for
9 [OMR] flow manipulation" ("PTM Memo")). NMFS considered the length of
10 simulation at multiple meetings, AR 00106021-22 (PTM Memo discussing
11 meetings from January through March 2009 and durations of PTM
12 tracking); AR 00061290-91 (communication between Jeffrey Stuart and
13 Tracy Hinojosa at DWR regarding PTM simulations), AR 00060023-24
14 (agenda items for discussion at "Modeling work group), and addressed
15 concerns raised in the PTM Memo, see AR 00105025-27.

16
17
18 Second, DWR highlights that Kimmerer and Nobriga (2008) notes
19 that the PTM model "has not been calibrated." AR 00122262. DWR
20 argues that NMFS should not have used an un-calibrated model. Doc.
21 446-1 at 20. This ignores the fact that DWR and others have in fact
22 performed validation and calibration on the PTM to ensure that it
23 accurately depicts hydrodynamics. Fourth Stuart Decl., Doc. 485 at ¶
24 47.

25
26 Finally DWR argues that NMFS's reliance on this study to
27 "analyz[e] the potential 'zone of effects' for entraining emigrating
28

1 juvenile and smolting salmonids," BiOp at 361, conflicts with the
2 recommendations of Kimmerer and Nobriga, Doc. 446-1 at 21.
3 Specifically, Kimmerer and Nobriga stated: "[w]e are ... not inclined
4 to define a 'zone of influence' of the pumps on the basis of our
5 results." AR 00122263. The entire paragraph goes on:

6
7 A consequence of this is that simple questions (e.g., what
8 proportion of particles are entrained under a given set of
9 conditions) have no clear answer. Instead, the answer
10 depends on the time horizon, which in turn depends on the
11 overall flow conditions and the site of the release. We are,
12 furthermore, not inclined to define a "zone of influence" of
the pumps on the basis of our results, since the probability
of entrainment depends on time horizon which, in many cases,
is too long to be useful for analyzing the movements of
larval fish. By the end of the modeled time period, the fish
would already have metamorphosed, and their behavior would
have become more complex.

13 AR 00122263. Kimmerer and Nobriga (2008) addresses both larval delta
14 smelt and juvenile salmonids. Their reluctance to define a "zone of
15 influence" is focused on the difficulties posed by modeling larval
16 delta smelt, which may metamorphose to a more complex state within the
17 time horizon of the PTM simulation. This apologetic does not suggest
18 there are not problems with using PTM to define a of zone of
19 influence, it is simply a statement that endeavors to explain
20 uncertainty. Although NMFS's interpretation and use of Kimmerer and
21 Nobriga (2008) was not accurate, again it is the agency's spin on the
22 science. It is not unlawfully erroneous.
23
24

25 (2) DWR's Argument that NMFS Failed to Address
26 Evidence in the Record Critical of the Use of PTM
to Explain Salmonid Behavior.

27 DWR revisits the issue of whether NMFS gave adequate
28

1 consideration to record evidence critical of the use of PTM to explain
2 salmonid behavior. DWR specifically cites a 2001 article by Baker and
3 Morhardt, AR 00108384-403, and an analysis conducted by DWR included
4 in DWR's April 24, 2009 comments on the draft BiOp. See Doc. 446-1
5 at 22-23. Baker and Morhardt (2001) demonstrated that the fate of
6 particles in the PTM was different from actual salmon behavior. AR
7 00108394 ("for the hydraulic simulations available to us ... 77 % of
8 the tracer [PTM] particles ended up at the export pumps, while only
9 13% of the smolts arrived there"). Likewise, the DWR (2009) analysis
10 concluded there "is no correlation" between coded wire tagged ("CWT")
11 Chinook recoveries and PTM particle behavior. AR 00105430.

12
13 These additional studies do not undermine the reasoning of the
14 2010 PI Decision:
15

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

24 *Consol. Salmonid Cases*, 713 F. Supp. 2d at 1139. DWR has
25 acknowledged that this is a permissible PTM use. It has cast doubt on
26 the efficacy of NMFS's reliance on the PTM, even for this narrow
27 purpose, but has not shown it to be substantially unreasonable.
28

1 There is more to DWR's critique. To validly rely on the PTM
2 results to impose management measures designed to aid salmonid
3 survival, the movement of water described by the PTM must be
4 reasonably related to the movement of salmonids. Citing the Baker and
5 Morhardt (2001) study and DWR (2009) comments, Mr. Cavallo opines that
6 this "has been shown to be incorrect." Cavallo Decl., Doc. 452 at ¶
7 54.
8

9 NMFS justifies reliance on PTM simulations as a proxy for
10 salmonid behavior:

11 NMFS uses the findings of the PTM simulations to look at the
12 eventual fate of objects in the river over a defined period
13 of time from a given point of origin in the system. While
14 salmonids and green sturgeon are not "neutrally buoyant
15 particles", they can be represented to some degree by the
16 PTM modeling results. The fish occupy a given body of water
17 in the river and that body of water has eventual fates in
18 the system, as represented by the dispersion of the injected
19 particles. The salmonids have volitional movement within
20 that body of water and react to environmental cues such as
21 tides, water velocity vectors, and net water flow movement
22 within the channel. The eventual fate of that body of water
23 signifies the potential vulnerabilities of fish within that
24 body of water to external physical factors such as export
25 pumping or river inflows. For example, if exports increase,
26 and the eventual fate of the water body indicates that it
27 has a higher probability of entrainment compared to other
28 conditions (i.e., lower export pumping), then NMFS believes
that salmonids within that same body of water will also
experience a higher probability of entrainment by the export
pumping. Conversely, under conditions where the eventual
fate of injected particles indicate a high probability of
successfully exiting the Delta at Chipps Island, NMFS
believes salmonids traveling in the same body of water will
have a higher probability of exiting the Delta successfully.
Furthermore, conditions which delay movement of particles
out of the Delta yet don't result in increased entrainment
at the export facilities would indicate conditions that
might delay migration through the Delta, which would
increase vulnerabilities to predation or contaminant

1 exposure. Finally, flow conditions at river channel splits
2 indicate situations where migrating fish must make a
3 "decision" as to which channel to follow. If water is
4 flowing into a given channel, then fish closer to that
5 channel bifurcation are more likely to be influenced by the
6 flow conditions adjacent to the channel opening than fish
7 located farther away from the channel mouth. Burau *et al.*
8 (2007) describes the complexity of these temporal and
9 spatial conditions and their potential influence on salmonid
10 movement. PTM simulations currently do not give the
11 necessary fine scale resolution both temporally (minutes to
12 fractions of hours) and spatially (three dimensional on the
13 scale of meters) to give clear results at these channel
14 splits. Burau states that spatial distribution of fish
15 across the river channel occurs upstream of the channel
16 splits and is dependent "upon the interaction between local
17 hydrodynamic processes (e.g., secondary currents) and subtle
18 behaviors that play out in a Lagrangian reference frame.
19 These spatial structures evolve over fractions of hours to
20 hours. Junction interactions, on the other hand, happen very
21 rapidly, typically within minutes. Thus, route selection may
22 only minimally depend on behavioral responses that occur in
23 the junction, depending to a greater degree on spatial
24 distributions that are created by subtle behavioral
25 responses/interactions to geometry-mediated current
26 structures that occur up-current of a given junction." This
27 description illustrates the complexity of route selection.
28 Based on Burau's explanation, fish upstream of the split are
dispersed by the environmental conditions present in the
channel into discrete locations across the channel's cross
section. The proximity of these locations to the channel
mouth is predictive of the risk of diversion into the
channel itself. PTM data can be useful to indicate the
magnitude of the net movement of water through the channel
after the junction split (and the route selected by the
fish), and thus can be used to infer the probable fate of
salmonids that are advected into these channels during their
migrations.

23 BiOp 366-67. The BiOp does not explain the basis for NMFS's "belief"
24 that salmonids within a body of water with a higher probability of
25 particle entrainment will themselves "also experience a higher
26 probability of entrainment by the export pumping"; its "belief" that
27 salmonids within a body of water "where the eventual fate of injected
28

1 particles indicate a high probability of successfully exiting the
2 Delta at Chipps Island" will themselves have a "higher probability of
3 exiting the Delta successfully"; nor its conclusion that conditions
4 which delay movement of particles out of the Delta yet don't result in
5 increased entrainment at the export facilities suggest conditions that
6 might delay migration through the Delta. What support for these
7 conclusions does the record contain?
8

9
10 (3) Salvage Data.

11 The BiOp relies in part on the plots of juvenile loss versus
12 monthly OMR flows in Figures 6-65 and 6-66 discussed above to link the
13 PTM results to salmonid behavior.

14 Based on particle tracking modeling, the Delta smelt work
15 group concluded that net river flows greater than $-2000 \pm$
16 500 cfs in the Old River and Middle River complex reduced
17 the zone of entrainment so that particles injected into the
18 central Delta at Potato Slough would not be entrained
19 towards the pumps (Kimmerer and Nobriga 2008 op cit. CVP/SWP
20 operations BA). NMFS considers this information useful in
21 analyzing the potential "zone of effects" for entraining
22 emigrating juvenile and smolting salmonids. A similar
23 pattern is observed in material (figures 6-65 and 6-66)
24 provided to NMFS by DWR (Greene 2009). Loss of older
25 juveniles at the CVP and SWP fish collection facilities
26 increase sharply at Old and Middle River flows of
27 approximately -5,000 cfs and depart from the initial slope
28 at flows below this. Given the data derived from the CVP/SWP
operations BA Appendix E, flows in Old and Middle River are
consistently in excess of the -2000 ± 500 cfs threshold for
entrainment (i.e., more upstream flow). Assuming that in the
normal (natural) flow patterns in the Delta, juvenile and
smolting Chinook salmon and steelhead will use flow as a cue
in their movements and will orient to the ambient flow
conditions prevailing in the Delta waterways, then upstream
flows will carry fish towards the pumps during current
operations. General tendencies of the modeling results
indicate that Old River and Middle River net flows trend
towards greater upstream flow in the near future and future

1 conditions, resulting in even more fish carried towards the
2 pumps.

3 BiOp at 361. The BiOp's reliance on figures 6-65 and 6-66 has been
4 found unlawful. Without scaling for population size, the trends seen
5 in Figures 6-65 and 6-66 are meaningless, because data points
6 indicating greater salvage may simply be the result of a greater
7 absolute number of individuals present in the entire Delta. The
8 number of individuals lost to salvage could go up simply because the
9 volume of water pumped through the salvage facility increases, not
10 because increasing exports causes a greater percentage of the
11 population to make its way toward the salvage facilities than would
12 otherwise be present there.
13

14
15 (4) Other Studies.

16 In addition to Figures 6-65 and 6-66, NMFS relied on other
17 studies, namely Vogel (2004), Perry & Skalski (2008), Newman (2008),
18 and Newman and Brandes (2009), to conclude that as exports increase,
19 greater numbers of salmonids are drawn into the interior Delta.
20

21 (a) Vogel (2004).

22 The 2010 PI Decision addressed the BiOp's reliance on Vogel
23 (2004):

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

1 Mr. Cavallo maintains that Vogel (2004) does not support the
2 conclusion that a reduction in export pumping resulted in
3 the reduction of salmon leaving the mainstem of the San
4 Joaquin River and entering the southern Delta. 4/1/10 Tr.
5 47:20-24, 49:8-13, 49:25 - 50:4, 50:17-23; DWR Ex. 505. The
6 Vogel (2004) study concluded that the experiments it
7 conducted "could not explain why some fish move off the
8 mainstem of the San Joaquin River into the south Delta
9 channels," noting that "[d]ue to the wide variation in
10 hydrologic conditions" during the course of the experiments,
11 "it was difficult to determine the principal factors
12 affecting fish migration. Based on the limited data from
13 these studies, it may be that a combination of a neap tide,
14 reduced exports, and increased San Joaquin River flows is
15 beneficial for outmigrating smolts, but more research is
16 necessary."
17 DWR Ex. 505 at 37.

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

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

25 *Consol. Salmonid Cases*, 713 F. Supp. 2d at 1144. Defendant-

26 Intervenor attempt to justify NMFS's reliance on Vogel (2004):

27 [T]he paragraph from page 380 of the BiOp (NMFS 00106460)
28 that DWR quotes and claims misstates Vogel (2004) is based
not only on the 2004 Vogel study, but also the subsequent
VAMP experiments. Vogel did conclude, as DWR states, that:
"These [radio-tagged] experiments could not explain why some
fish moved off the mainstem San Joaquin River into south
Delta channels." NMFS 00217996 (Vogel 2004 at 37). But Vogel
also went on to observe that "[b]ased on limited data from
these studies, it may be that [a] combination of a neap tide,
reduced exports, and increased San Joaquin River flows is
beneficial for outmigrating smolts, but more research is
necessary." *Id.* (emphasis added). According to Vogel,
"[m]ore detailed analyses of fish movements in relation to
quantitative measures of Delta hydrodynamics such as tidal
excursion, net flow over a complete tide cycle, and flow
structure at specific channel flow splits ... may provide
more definitive conclusions on fish migration behavior."
Id. Such further studies, according to Vogel, should
include "water particle tracking model results in comparison
to radio-tagged fish migration data," *id.* (emphasis added),

1 as well as acoustic tagged salmon releases. *Id.* Thus,
2 NMFS's conclusions are based not only on Vogel (2004), but
3 the subsequent PTM and VAMP studies, discussed above, that
4 Vogel and others recommended. And, NMFS has required the
acoustic tag studies recommended by Vogel and others in
Action IV.2.2.

5 Doc. 484 at 48-49. Vogel's call for further experiments or statement
6 that he believes reduced exports, in conjunction with other factors,
7 "may be" beneficial to migrating salmonids, does not change the fact
8 that Vogel's own 2004 work does not explain why the fish studied moved
9 off the mainstem San Joaquin. Reliance on this study to demonstrate
10 that that Action IV.2.3's negative OMR flow limitations will reduce
11 the vulnerability of juvenile salmonids to entrainment in the Delta is
12 unreasonable.
13

14
15 (b) Perry and Skalski (2008).

16 The BiOp also relied upon a 2008 study by Perry and Skalski,
17 which was previously addressed in the 2010 PI Decision:

18 The BiOp utilized the Perry and Skalski (2008) study that
19 concluded survival of fish moving into Georgiana Slough and
20 nearby channels was reduced compared to those in the
21 mainstem of the Sacramento River. 4/1/10 Tr. 161:20-162:1.
22 These fish enter a portion of the San Joaquin River that
23 NMFS found to be impacted by exports in its PTM simulation.
24 *Id.* at 162:5-17; 4/2/10 Tr. 18:12-20, 19:22-20:11.

25 However, Perry and Skalski 2008 noted that "there is limited
26 understanding of how water management actions in the Delta
27 affect population distribution and route-specific survival
28 of juvenile salmon." SDLMWA Ex. 227 at 3. Mr. Cavallo
testified that Perry and Skalski 2008 does not provide
scientific support for the view that salmonids are lost due
to water project-induced alterations to Delta hydrologic
conditions. 4/1/10 Tr. 66:5-9.134.

Mr. Stuart admitted that Perry and Skalski 2008 did not
address water project impacts on Delta hydrology, fish

1 behavior, or the indirect mortality of fish in the central
2 and southern channels of the Delta. Mr. Stuart further
3 admitted that he reached his conclusions regarding water
4 project impacts on Delta hydrology, fish behavior, and
5 indirect salmonid mortality based upon his personal
6 extrapolation from the data contained in Perry and Skalski
7 2008, and not from any conclusions reached by Perry and
8 Skalski. 4/2/10 Tr. 19:2 - 21:24. However, these personal
9 extrapolations are not documented or otherwise explained in
10 the BiOp or elsewhere in the record.

11 *Consol. Salmonid Cases*, 713 F. Supp. 2d at 1143-44.

12 Mr. Stuart's Fifth Declaration clarifies that the BiOp cited
13 Perry and Skalski (2008) in reference to "the risk that individual
14 salmon smolts face to entrainment into either the channel of the Delta
15 Cross Channel (when it is open) or into the channel of Georgiana
16 Slough as they migrate downstream in the Sacramento River and not to
17 the probability of ending up at the export facilities." Fifth Stuart
18 Decl., Doc. 519 at ¶ 19. The BiOp did not rely on Perry and Skalski
19 to justify its conclusion that the PTM is a valid proxy for salmonids
20 or to demonstrate that exports cause salmonids to move toward the
21 export facilities. Perry and Skalski does not support PTM as a proxy
22 and should not have been cited.

23 (c) Newman (2008).

24 Newman (2008), which concluded that salmonids passing through
25 Georgiana slough into the interior delta had slightly reduced survival
26 when exports were higher relative to times when exports were lower,
27 has been discussed. This lends marginal support to NMFSS conclusion
28 that increasing exports negatively impacts salmonids moving through
the interior delta.

1 (d) Newman and Brandes (2009).

2 DWR cites a 2008 draft of a study by Newman and Brandes analyzing
3 the Delta Action 8 studies, "Hierarchical Modeling of Juvenile Chinook
4 Salmon Survival as a Function of Sacramento-San Joaquin Delta Water
5 Exports." In that draft, discussing the lower rate of survival of
6 smolts traveling through Georgiana slough and the interior delta under
7 high export conditions relative to low export conditions, the authors
8 opined: "what we cannot conclude is that exports are the cause of this
9 lower relative survival." NMFS 00127347. However, that sentence and
10 several following paragraphs were eliminated by Newman and Brandes
11 from the final, published version of the study. See AR 00089883.
12 Like Newman (2008), Newman and Brandes (2009) found negative
13 relationships between exports and survival. Fifth Stuart Decl., Doc.
14 519 at ¶ 33 (citing AR 00089884).

15 (e) Brandes & McLain (2001).

16 DWR also cites Brandes and McLain, "Juvenile Chinook Salmon
17 Abundance, Distribution, and Survival in the Sacramento-San Joaquin
18 Estuary" (2001). This study found "mixed results":
19

20 Results were mixed showing in 1989 and 1990 that survival
21 estimates between Dos Reis and Jersey Point were higher with
22 higher exports whereas in 1991 between Stockton and the
23 mouth of the Mokelumne River (Tables 11 and 12) survival was
24 shown to be lower (0.008 compared to 0.15) when exports were
25 higher. One potential bias in the 1989 and 1990 data is that
26 as mentioned earlier, smolts released at Dos Reis in 1989
27 were from the Merced River Fish Facility while those
28 released at Jersey Point were from Feather River hatchery.
Using different stocks to estimate smolt survival between
two locations may introduce bias. In addition, results in
1989 and 1990 also showed that survival indices of the upper

1 Old River groups relative to the Jersey Point groups were
2 also higher during the higher export period, but overall
3 still about half that of the survival of smolts released at
4 Dos Reis (Table 11).

5 AR 00109602. That the study's authors question the validity of the
6 results from the years showing a positive relationship between exports
7 and survival and do not critique the results from the year showing a
8 negative relationship, lends minimal support to NMFS's conclusion that
9 exports influence salmonid survival.

10 (f) Kimmerer 2008.

11 Defendant-Intervenors point to a Kimmerer 2008 that unequivocally
12 found that "[t]he estimated proportion of migrating fish salvaged at
13 the export facilities increased with increasing export flow." AR
14 00122236. DWR and Export Plaintiffs do not contest this conclusion.

15 (g) SJRGA 2007

16 Finally, Defendant-Intervenors point to the San Joaquin River
17 Group Authority ("SJRGA") 2007 review of VAMP data, which found
18 evidence of a negative relationship between exports and survival.
19 See AR 00134423 ("The CDRRs [combined differential recovery rates]
20 measured for the first group released in 2006, under low exports,
21 appeared higher than those obtained in 2003-2005 and for the 2006
22 group released under higher exports and higher temperature.").

23
24
25
26 This entire record shows that the science is conflicting and
27 often equivocal. Most of the evidence does not show a negative
28

1 relationship between levels of exports and salmon survival. It is
2 impossible to discern the effect of exports on salmon behavior from
3 the record. Despite these numerous criticisms, NMFS chose to use PTM
4 as a modeling tool for salmonid behavior. DWR's own staff biologist,
5 Sheila Greene, testified in a related case by declaration that "Given
6 the insufficiency of behavioral data, particle tracking is the best
7 available science to estimate the proportions of juvenile Chinook
8 salmon that emigrate through the Delta." AR 00118803. DWR is bound
9 by this statement. Whether to use PTM modeling then becomes a matter
10 of agency discretion.
11

12
13 b. Justification for the Specific Flow Prescriptions in
14 Action IV.2.3.

15 Existence of record support for NMFS's reliance on the PTM does
16 not end the inquiry. The BiOp applied the PTM to generate flow
17 prescriptions using the following approach:

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

1 BiOp at 652. Even if the PTM is the best available mechanism for
2 modeling salmonid behavior, NMFS has failed to justify this leap of
3 logic, which in essence assumes that salmonids will be drawn toward
4 the export facilities to the same extent as neutrally buoyant
5 particles. In light of undisputed record evidence discussed above
6 demonstrating the many deficiencies in the PTM and that it is far from
7 a perfect proxy for salmon behavior, NMFS has not provided "a thorough
8 explanation of how each component of the [RPA] is essential to avoid
9 jeopardy and/or adverse modification." ESA Handbook at 4-43 (emphasis
10 added). Conclusory explanations of the value of RPA actions are
11 insufficient. *PCFFA v. U.S. Bureau of Reclamation*, 426 F.3d 1082,
12 1093 (9th Cir. 2005).
13
14

15
16 Plaintiffs' and DWR's motion challenges to Action IV.2.3 is
17 GRANTED IN PART AND DENIED IN PART, as are Federal Defendants' and
18 Defendant-Intervenors' cross motions. There is nominal record support
19 for the imposition of some form of OMR flow restriction, but the
20 Action must be remanded for further explanation of the necessity the
21 specific flow prescriptions imposed, which are derived primarily from
22 PTM simulations, a method that is undisputedly an imperfect predictor
23 of salmon behavior.
24

25 3. Action IV.3.

26 From November 1 through December 31, Action IV.3 restricts
27 combined CVP and SWP exports to 6,000 cfs or 4,000 cfs when certain
28

1 salvage thresholds are met. BiOp at 653. The 6,000 cfs export limit
2 is triggered when daily SWP and CVP older juvenile loss density is
3 greater than 8 fish per thousand acre feet ("TAF"), daily loss is
4 greater than 95 fish per day, or the Coleman National Fish Hatchery
5 coded wire tagged late fall-run Chinook salmon ("Coleman CWT fish") or
6 Livingstone Stone National Hatchery coded wire tagged winter-run ("L-S
7 CWT fish") cumulative loss is greater than 0.5%. *Id.* The more
8 restrictive 4,000 cfs export limit is triggered when the daily older
9 juvenile loss density is greater than 15 fish per TAF, daily loss is
10 greater than 120 fish per day, or the Coleman CWT or L-S CTW fish
11 cumulative loss is greater than 0.5%. Either export restriction
12 remains in place for three days, or until daily older juvenile loss
13 density is less than 8 fish per TAF. *Id.* Action IV.3 also
14 establishes an "alert," which signals that export restrictions may
15 need to be altered when either the Knights Landing or Sacramento catch
16 index is greater than 10 fish captured per day from November 1 to
17 February 28, or greater than 15 fish captured per day from March 1 to
18 April 30. *Id.* at 652.

21 The objective of Action IV.3 is to "[r]educe losses of winter-
22 run, spring-run, CV steelhead, and Southern DPS of green sturgeon by
23 reducing exports when large numbers of juvenile Chinook salmon are
24 migrating into the upper Delta region, at risk of entrainment into the
25 central and south Delta and then to the export pumps in the following
26 weeks." *Id.*

1 DWR does not challenge this RPA Action. Export Plaintiffs,
2 however, raise several objections. First, Export Plaintiffs challenge
3 NMFS's underlying assumption for Action IV.3 that "[e]xport pumping
4 changes flow patterns and increases residence time of ... diverted
5 fish in the central Delta, which increases the risk of mortality from
6 [other factors], as well as the likelihood of entrainment at the
7 pumps." *Id.* at 653. They argue that this assumption is not
8 supported by the best available science, reiterating the argument that
9 the studies relied upon by NMFS do not "connect mortality in the
10 interior delta to export levels," and that NMFS's use of PTM studies
11 to show "potential vulnerabilities of fish" is not appropriate. Doc.
12 431 at 106-108. Although the evidence supporting a survival effect of
13 increased exports weak and disputed, NMFS's conclusion that export
14 pumping negatively impacts salmonid survival has marginal support in
15 the record and is not unlawfully erroneous. The BiOp's related use of
16 PTM as a modeling tool for salmonids is a highly disputed scientific
17 choice, described by DWR as the best available science in at least one
18 application.

21 Export Plaintiffs also challenge the specific triggers used in
22 Action IV.3, on the grounds that: (1) as was the case with the plots
23 of raw salvage used to justify other Actions, the triggers do not
24 account for the relative size of the various salmonid populations; and
25 (2) "NMFS nowhere explains how it arrived at these thresholds. Doc.
26 431 at 108-09.

1 Federal Defendants respond that Plaintiffs' concern that Action
2 IV.3 fails to scale the loss triggers against the population size is
3 "a red herring" because "NMFS did not conclude that Action IV.3 alone
4 is avoiding jeopardy. Rather, the measure simply reflects NMFS's
5 conclusion that it is important to have increased protections when you
6 have more fish at the salvage facilities." Doc. 477-1. This is a
7 total abdication from NMFS's self-imposed requirement that the RPA
8 provide "a thorough explanation of how each component of the [RPA] is
9 essential to avoid jeopardy and/or adverse modification." ESA
10 Handbook at 4-43 (emphasis added). Federal Defendants cannot impose a
11 complex and burdensome RPA, damaging of other interests, without
12 specifically justifying each of its components. Adoption of Federal
13 Defendants' "trust me" approach would mean that the more complex an
14 RPA, the more obscured it is from judicial review. Each component
15 need not eliminate jeopardy on its own, but that does not excuse NMFS
16 from separately justifying individual Actions.

17 While there is record explanation for an action designed to
18 prevent large numbers of fish from being killed or harmed at the
19 export pumping facilities, Export Plaintiffs raise serious questions
20 related to the need to scale the triggers to the overall size of the
21 salmonid populations they aim to protect. Given previous findings
22 about the use of raw salvage figures, the best available science calls
23 for an index related to population size, rather than a fixed number.
24 More importantly, even if this were not a problem, Federal Defendants
25
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28

1 have entirely failed to provide any record explanation for why the
2 specific triggers were chosen. NMFS must address and correct this
3 failure on remand. Plaintiffs' motion is GRANTED on this issue;
4 Federal Defendants' and Defendant-Intervenors' cross motion is DENIED.
5

6 G. Compliance with 50 C.F.R. § 402.02.

7 ESA section 7(b)(3)(A) provides that, "[i]f jeopardy or adverse
8 modification is found, the Secretary shall suggest those reasonable
9 and prudent alternatives which he believes would not violate
10 subsection (a)(2) of [Section 7] and can be taken by the Federal
11 agency ... in implementing the agency action." *Id.* "Reasonable and
12 prudent alternatives refer to alternative actions identified during
13 formal consultation [1] that can be implemented in a manner consistent
14 with the intended purpose of the action, [2] that can be implemented
15 consistent with the scope of the Federal agency's legal authority and
16 jurisdiction, [3] that is economically and technologically feasible,
17 and [4] that the Director believes would avoid the likelihood of
18 jeopardizing the continued existence of listed species or resulting in
19 the destruction or adverse modification of critical habitat." 50
20 C.F.R. § 402.02 (the "four RPA requirements").
21
22

23 NMFS and FWS's joint Consultation Handbook explains that during
24 the formal consultation period, NMFS should "meet or communicate with
25 the action agency ... to gather any additional information necessary
26 to conduct the consultation." Consultation Handbook at 4-6. Among
27 other things, the formal consultation period should be used to
28

1 "develop reasonable and prudent alternatives to an action likely to
2 result in jeopardy or adverse modification...." *Id.*

3 Consultation "should be undertaken cooperatively with the action
4 agency and any applicant, thus allowing the Services to develop a
5 better understanding of direct and indirect effects of a proposed
6 action and any cumulative effects in the action area. Action agencies
7 also have the project expertise necessary to help identify reasonable
8 and prudent alternatives, and reasonable and prudent measures. Other
9 interested parties (including the applicant, and affected State and
10 tribal governments) should also be involved in these discussions....
11 These cooperative efforts should be documented for the administrative
12 record." *Id.*

13
14 The Handbook contains a section on RPAs, which provides as
15 follows:
16

17 Reasonable and prudent alternatives

18 This section lays out reasonable and prudent alternative
19 actions, if any, that the Services believe the agency or the
20 applicant may take to avoid the likelihood of jeopardy to
21 the species or destruction or adverse modification of
22 designated critical habitat (50 CFR § 402.14(h)(3)). When a
23 reasonable and prudent alternative consists of multiple
24 activities, it is imperative that the opinion contain a
25 thorough explanation of how each component of the
26 alternative is essential to avoid jeopardy and/or adverse
27 modification. The action agency and the applicant (if any)
28 should be given every opportunity to assist in developing
the reasonable and prudent alternatives. Often they are the
only ones who can determine if an alternative is within
their legal authority and jurisdiction, and if it is
economically and technologically feasible.

If adopted by the action agency, the reasonable and prudent
alternatives do not undergo subsequent consultation to meet

1 the requirements of section 7(a)(2). The action agency's
2 acceptance in writing of the Services' reasonable and
3 prudent alternative concludes the consultation process.

4 Section 7 regulations (50 CFR §402.02) limit reasonable and
5 prudent alternatives to:

- 6 • alternatives the Services believe will avoid the
7 likelihood of jeopardy or adverse modification,
- 8 • alternatives that can be implemented in a manner
9 consistent with the intended purpose of the action,
- 10 • alternatives that can be implemented consistent with
11 the scope of the action agency's legal authority and
12 jurisdiction, and
- 13 • alternatives that are economically and technologically
14 feasible.

15 If the Services conclude that certain alternatives are
16 available that would avoid jeopardy and adverse
17 modification, but such alternatives fail to meet one of the
18 other three elements in the definition of "reasonable and
19 prudent alternative," the Services should document the
20 alternative in the biological opinion to show it was
21 considered during the formal consultation process. This
22 information could prove important during any subsequent
23 proceeding before the Endangered Species Committee
24 (established under section 7(e) of the Act), which reviews
25 requests for exemptions from the requirements of section
26 7(a)(2).

27 Although a strong effort should always be made to identify
28 reasonable and prudent alternatives, in some cases, no
alternatives are available to avoid jeopardy or adverse
modification.

Examples include cases in which the corrective action relies
on:

- an alternative not under consideration (e.g., locating
a project in uplands instead of requiring a Corps
permit to fill a wetland);
- actions of a third party not involved in the proposed
action (e.g., only the County, which is not a party to

1 the consultation, has the authority to regulate speed
2 limits);

- 3 • actions on lands over which the action agency has no
4 jurisdiction or no residual authority to enforce
5 compliance; and
- 6 • data not available on which to base an alternative.

7 In these cases, a statement is included that no reasonable
8 and prudent alternatives are available, along with an
9 explanation. When data are not available to support an
10 alternative, the explanation is that according to the best
11 available scientific and commercial data, there are no
12 reasonable and prudent alternatives to the action undergoing
13 consultation. The Services are committed to working closely
14 with action agencies and applicants in developing reasonable
15 and prudent alternatives. The Services will, in most cases,
16 defer to the action agency's expertise and judgment as to
17 the feasibility of an alternative. When the agency maintains
18 that the alternative is not reasonable or not prudent, the
19 reasoning for its position is to be provided in writing for
20 the administrative record. The Services retain the final
21 decision on which reasonable and prudent alternatives are
22 included in the biological opinion. When necessary, the
23 Services may question the agency's view of the scope of its
24 authorities to implement reasonable and prudent
25 alternatives.

26 Consultation Handbook, 4-41 - 4-42.

27 *San Luis & Delta-Mendota Water Authority v. Salazar*
28 (*Consolidated Delta Smelt Cases*), 666 F. Supp. 2d 1137 (E.D. Cal.
2009), discussed section 402.02 in considering a facial challenge to a
related biological opinion, filed before the administrative record was
completed. Plaintiffs argued that FWS acted unlawfully by failing to
discuss the four § 402.02 factors on the face of the biological
opinion. The decision found that FWS was only required to make
explicit findings in the biological opinion on the fourth factor,
namely whether the RPA will avoid the likelihood of jeopardy or

1 adverse modification. "[W]hether FWS properly promulgated the RPA
2 [consistent with the requirements of § 402.02] must be decided on the
3 basis of the entire record." *Id.* at 1158-59.

4 Export Plaintiffs now bring a record-based challenge to NMFS's
5 alleged non-compliance with § 402.02, asserting that entire RPA is
6 invalid because the record does not support a finding that NMFS
7 complied with the four § 402.02 factors. Doc. 431 at 109-118. DWR
8 joins this aspect of Export Plaintiffs' motion. Doc. 446-1 at 27.

9 There is scant authority to aid interpretation of § 402.02. The
10 text of the Federal Register Notice promulgating § 402.02 provides
11 limited guidance:
12

13 "Reasonable and prudent alternatives" is defined in the
14 final rule. Section 7(b) of the Act requires the Service to
15 include reasonable and prudent alternatives, if any, in a
16 "jeopardy" biological opinion. An alternative is considered
17 reasonable and prudent only if it can be implemented by the
18 Federal agency and any applicant in a manner consistent with
19 the intended purpose of the action, and if the Director
20 believes it would avoid the likelihood of jeopardizing the
21 continued existence of listed species or resulting in the
22 destruction or adverse modification of critical habitat of
23 such species. Further, the Service should be mindful of the
24 limits of a Federal agency's jurisdiction and authority when
25 prescribing a reasonable and prudent alternative. An
26 alternative, to be reasonable and prudent, should be
27 formulated in such a way that it can be implemented by a
28 Federal agency consistent with the scope of its legal
authority and jurisdiction. However, the Service notes that
a Federal agency's responsibility under section 7(a)(2)
permeates the full range of discretionary authority held by
that agency; i.e., the Service can specify a reasonable and
prudent alternative that involves the maximum exercise of
Federal agency authority when to do so is necessary, in the
opinion of the Service, to avoid jeopardy. The Service
recognizes that economic and technological feasibility are
factors to be used in developing reasonable and prudent
alternatives, as requested by one commenter. The definition

1 of "reasonable and prudent alternatives" has been amended to
2 reflect these considerations. If there are no alternatives
3 that meet the definition of "reasonable and prudent
4 alternatives," the Service will issue a "jeopardy"
5 biological opinion without alternatives.

6 Two commenters stated that reasonable and prudent
7 alternatives should include mitigation measures designed to
8 reduce adverse effects, i.e., conservation recommendations.
9 One of those commenters urged the Service to limit the scope
10 of recommended alternatives to those "consistent with the
11 scope, magnitude, and duration of the project as well as the
12 extent of its adverse effects." First, because there is a
13 distinction between "reasonable and prudent alternatives"
14 (that satisfy section 7(a)(2)) and "conservation
15 recommendations" (that are authorized by section 7(a)(1)),
16 the Service declines to include conservation measures within
17 the scope of the definition. Second, the Service agrees that
18 reasonable and prudent alternatives should be consistent
19 with the intended purpose of the action and should therefore
20 be economically and technologically feasible, but the
21 Service cannot limit its range of choices to the criteria
22 suggested by the commenter. Reasonable and prudent
23 alternatives must cover the full gamut of design changes
24 that are economically and technologically feasible for an
25 action, independent of who is sponsoring the action.

26 51 Fed. Reg. 19,926, 19,937 (June 3, 1986).

27 1. Consistency with Purposes of the Action.

28 The BiOp reasons that because the operational changes demanded by
the RPA do not preclude continued operation of the CVP and SWP, the
RPA is consistent with the purpose of the action:

[T]his RPA is consistent with the intended purpose of the
action. According to the BA, "[t]he proposed action is the
continued operation of the CVP and SWP." (CVP and SWP
operations BA, P. 2-1) Specifically, Reclamation and DWR
"propose to operate the Central Valley Project (CVP) and
State Water Project (SWP) to divert, store, and convey CVP
and SWP (Project) water consistent with applicable law and
contractual obligations." (CVP and SWP operations BA, p.1-1)
Changes in operation of the projects to avoid jeopardizing
listed species or adversely modifying their critical
habitats require that additional sources of water for the
projects be obtained, or that water delivery be made in a

1 different way than in the past (e.g., elimination of RBDD),
2 or that amounts of water that are withdrawn and exported
3 from the Delta during some periods in some years be reduced.
These operational changes do not, however, preclude
operation of the Projects.

4 BiOp at 724. The BiOp also discussed the various purposes of the CVP:

5The Rivers and Harbors Act of 1937, which established
6 the purposes of the CVP, provided that the dams and
reservoirs of the CVP " 'shall be used, first, for river
7 regulation, improvement of navigation and flood control;
second, for irrigation and domestic uses; and, third, for
8 power.'" (CVP and SWP operations BA, p. 1-2). The CVP was
reauthorized in 1992 through the CVPIA, which modified the
9 1937 Act and added mitigation, protection, and restoration
of fish and wildlife as project purposes. The CVPIA provided
10 that the dams and reservoirs of the CVP should be used
" 'first, for river regulation, improvement of navigation,
11 and flood control; second, for irrigation and domestic uses
and fish and wildlife mitigation, protection and restoration
12 purposes; and, third, for power and fish and wildlife
enhancement.'" (CVP and SWP operations BA p. 1-3) One of the
13 stated purposes of the CVPIA is to address impacts of the
CVP on fish and wildlife. CVPIA, Sec. 3406(a). The CVPIA
14 gives Reclamation broad authority to mitigate for the
adverse effects of the projects on fish and wildlife, and
15 nothing in the Rivers and Harbors Act of 1937 requires any
set amount of water delivery.

16 In addition to adding protection of fish and wildlife as
17 second tier purposes of the CVP, the CVPIA set a goal of
doubling the natural production of anadromous fish in
18 Central Valley rivers and streams on a long-term sustainable
basis, by 2002. Sec. 3406(b)(1). This goal has not been met.
19 Instead, as detailed in this Opinion, natural production of
anadromous fish has declined precipitously....

20 *Id.* at 724-25.

21 Export Plaintiffs challenge NMFS's finding that the RPA is
22 consistent with the multiple purposes of the Projects. First, Export
23 Plaintiffs argue that NMFS ignored warnings about the water costs of
24 the RPA. For example, DWR commented that "the average combined water
25 supply impact to the SWP and the CVP of the NFMS proposed RPA is
26 roughly 900 [thousand acre feet ("taf")] to 1.1 [million acre feet
27 ("Maf")] (or about 16% to 19%)." AR 00086760. DWR's estimate
28

continues:

By taking an alternative approach and layering the NMFS proposed RPA on top of the terms of the USFWS 2008 [Smelt] BiOp RPA that have been provisionally accepted by Reclamation, the average combined water supply impact of the NMFS draft RPA to the SWP and CVP is roughly 150 taf to 750 taf, or about 3% to 15% above the impact of the USFWS 2008 [Smelt] BiOp RPA depending on the range of adaptive actions implemented by the USFWS under the terms of the [Smelt] BiOp. When compared to OCAP Study 7.0, the average combined water supply impact of the collective USFWS [Smelt] RPA and NMFS draft RPA to the SWP and CVP is roughly 1.3 Maf to 1.6 Maf (or about 23% to 29%).

[I]t should be noted that these estimated impacts are incomplete, and we would expect them to be greater because they do not include reoperation of CVP reservoirs as specified in the draft NMFS RPA. In addition, these studies do not include any assessment of the USFWS Fall X2 measure which has not been accepted by Reclamation as reasonable or prudent.

Id. Plaintiffs also point to Reclamation's comments on the RPA, which express general concerns over water supply impacts. AR 00210461-69, 00210473-76, 00105273.

That there are water supply impacts does not necessarily render the RPA inconsistent with the purposes of the action. However, NMFS is absolutely obligated do more than simply check to ensure that the proposed operational changes do not "preclude operation of the Projects." See BiOp at 724. Assumedly, if the Projects delivered ten AF of water in a water year, the Projects would be "operating." An RPA that effectively eliminates Project water deliveries to parts of the CVP's service area is inconsistent with one of the co-equal purposes of that project.²⁸ What is the ultimate impact of the

²⁸ Federal Defendants cite *Kandra v. United States*, 145 F. Supp. 2d 1195, 1207 (D. Or. 2001), which briefly discusses consistency with the project purposes, for the proposition that so long as wildlife protection is a legitimate purpose of a

1 salmonid BiOp RPA? The BiOp does not provide explicit answers to
2 these questions. The BiOp predicted a lower estimate of water supply
3 costs than DWR:

4 NMFS estimates the water costs associated with the RPA to be
5 5-7% of average annual combined exports: 5% for CVP, or 130
6 TAF/year, and 7% for SWP, or 200 TAF/year. The combined
7 estimated annual average export curtailment is 330 TAF/year.
8 These estimates are over and above export curtailments
9 associated with the USFWS' Smelt Opinion. The OMR
10 restrictions in both Opinions tend to result in export
11 curtailments of similar quantities at similar times of year.
12 Therefore, in general, these 330 TAF export curtailments are
13 associated with the NMFS San Joaquin River Ratio actions in
14 the RPA.

15 NMFS also considered that there may be additional localized
16 water costs not associated with South Delta exports. These
17 may include, in some years, localized water shortages
18 necessitating groundwater use, water conservation measures,
19 or other infrastructure improvements in the New Melones
20 service area, and localized impacts in the North of Delta in
21 some years, associated with curtailments of fall deliveries
22 used for rice decomposition. NMFS considered whether it was

23 project, an RPA designed to protect a species is consistent with the purposes of
24 that. In *Kandra*, water user plaintiffs sought to enjoin Reclamation from
25 implementing a 2001 Annual Operations Plan for the Klamath Reclamation Project,
26 which included RPAs that would modify flows to support listed species, resulting in
27 complete curtailment of water deliveries to the majority of land within the Klamath
28 Project. *Id.* at 1195-96. Plaintiffs argued that the purpose of the Klamath
Project, pursuant to the Reclamation Act, is irrigation, and that the RPAs adopted
by Reclamation benefit fish to the detriment of irrigation was inconsistent with
the Project's purpose. *Id.* at 1207. The district court found this argument
unpersuasive:

29 True, an RPA is defined as an alternative action[,] which is "consistent with
30 the purposes of the action...." 50 C.F.R. § 402.02. ...[A]gency actions
31 taken pursuant to the Reclamation Act must comply with the requirements of
32 the ESA. See *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 185 (1978)
33 (ESA obligations take "priority over the 'primary' missions" of federal
34 agencies). Further, agency actions are subject to the government's duty to
35 protect tribal resources. Reclamation's legal duty to operate the Project
36 consistent with its ESA and tribal trust obligations does not render the RPAs
37 inconsistent with the Project's purpose. [*Klamath Water Users Protective*
38 *Ass'n v.*] *Patterson*, 204 F.3d [1206,] 1213-14 [(9th Cir. 1999)].

39 *Id.* at 1207. This non-binding decision is decidedly unpersuasive, as it ignores
40 the competing, Congressionally mandated irrigation purpose. Even if the logic of
41 *Kandra* is accepted, *arguendo*, the Agency has a duty to closely examine the adverse
42 effects to prevent emasculation of the co-equal purpose of irrigation.

feasible to model and estimate any water costs associated with the Shasta or American River RPA actions, and discussed this issue with Reclamation. In general, it was decided that modeling tools were not available to assess these costs and/or that costs would be highly variable depending on adaptive management actions, and therefore, not meaningful to model.

BiOp at 720-21 (footnote omitted).

The agency abandoned its legal duties and said in effect: "we can't model, we won't do it." However, much of the Defendants' support for the BiOp and its RPA actions is based upon the same highly variable and questionable modeling of species populations and effects from exports. As this agency practices, what is "science" for the "goose" is clearly not "for the gander."

Export Plaintiffs argue that NMFS has failed to explain why its estimate is more reliable than the 900,000 - 1,100,000 AF water cost estimate (16%-19% of the Projects' combined water supply) provided by DWR, one of the Project co-operators. Doc. 431 at 113-14. In particular, Export Plaintiffs challenge the BiOp's consideration of only the impacts of export curtailments "associated with the NMFS San Joaquin River Ratio actions in the RPA," presumably a reference to Action IV.2.1. The BiOp explains that many of the OMR restrictions in both the Salmon and Smelt BiOps "tend to result in export curtailments of similar quantities at similar times of year," but does not explain why it is appropriate to entirely ignore the effects of those curtailments that may overlap with those mandated by the Smelt BiOp. This requires further clarification and revision in light of competent

1 and meaningful impact studies.²⁹

2 Even assuming, *arguendo*, the BiOp's water cost prediction is
3 correct, is such a reduction "consistent" with the irrigation purpose
4 of the CVP? How should the RPA analyze the extent of water supply
5 reductions that are consistent with the co-equal legislative
6 irrigation purpose? The ESA provides no guidance, nor do the joint
7 ESA regulations or any other authority identified by any party. It
8 cannot simply be said that if an ESA-listed species' protection is at
9 stake, the "no balancing of hardships" principle excludes such
10 consideration. This would impermissibly rewrite Reclamation law to
11 eliminate the regulatory requirement that NMFS consider the RPA's
12 effect on the co-equal statutory purpose of irrigation. Federal
13 Defendants' examination of this factor is insufficient. Export
14 Plaintiffs' motion for summary judgment on this issue is GRANTED;
15 Federal Defendants' and Defendant-Intervenors' cross motions are
16 DENIED.

17
18
19
20 2. Consistency with the Action Agency's Legal Authority and
21 Jurisdiction.

22 Export Plaintiffs dispute the BiOp's conclusion that the RPA can
23 be implemented in a manner consistent with the legal authority and
24 jurisdiction of Reclamation and DWR. The BiOp reasons that "[t]he

25 ²⁹ Export Plaintiffs also challenge the BiOp's related conclusion that the 330,000
26 AF of export curtailments "can be offset by application of (b) (2) water resources,
27 water conservation, groundwater use, water recycling and other processes currently
28 underway." BiOp at 580. This is not an essential element of the BiOp's reasoning,
as NMFS later concedes that "NMFS could not be reasonably certain b(2) water would
be available" and indicates that the BiOp's analysis of the RPA actions does not
depend on the availability of (b) (2) water. *Id.* at 722.

1 CVPIA gives Reclamation broad authority to mitigate for the adverse
2 effects of the projects on fish and wildlife, and nothing in the
3 Rivers and Harbors Act of 1937 requires any set amount of water
4 delivery." BiOp at 724-25. The BiOp also recognizes that the CVPIA
5 contains a goal of doubling the natural production of anadromous fish
6 in Central Valley rivers and streams, and that this goal has not yet
7 been met. *Id.* at 725. As Federal Defendants well know, the CVPIA
8 dedicates a finite 800,000 AF of annual CVP yield to the fish-doubling
9 objective.
10

11 The BiOp reasons that Reclamation has broad powers to restore
12 anadromous fish populations:

13 A 2008 report on the CVPIA anadromous fish program by
14 independent reviewers (Cummins *et al.* 2008), recommended by
15 the Office of Management and Budget and requested by
Reclamation and the USFWS, stated that

16 "it is far from clear that the agencies have done what
17 is possible and necessary to improve freshwater
18 conditions to help these species weather environmental
19 variability, halt their decline and begin rebuilding in
20 a sustainable way. A number of the most serious
impediments to survival and recovery are not being
effectively addressed, especially in terms of the
overall design and operation of the [CVP] system."

21 One of the review panel's specific recommendations was that
the agencies

22 "should develop a more expansive view of the
23 authorities at their disposal to address the problems,
24 especially with regard to water management and project
25 operations. The agencies have followed a more
restrictive view of their authorities than appears
legally necessary or appropriate to the seriousness of
the mission. "

26 The report notes that the CVPIA contains a "long list of
27 operational changes, actions, tools, and authorities - some
quite specific and discrete, some general and on-going -
28 that Interior is to use to help achieve the anadromous fish
restoration purposes of the CVPIA" (Cummins *et al.*

1 2008 at 5) The report then describes development of a Final
2 Restoration Plan that would utilize these authorities, but
3 concludes that "[t]he agencies implement the CVPIA . . . in
4 a way that bears little resemblance to the integrated,
5 coordinated, holistic vision of the Final Restoration Plan."
6 (Cummins *et al.* 2008 at 9)

7 Most relevant to this consultation, the review panel
8 observed that

9 "[i]t would seem that CVPIA activities and personnel
10 should be central to the OCAP plan, the Section 7
11 consultation, and the agencies' efforts to satisfy the
12 requirements of the ESA (that is, after all, one of the
13 directives of the CVPIA). The panel received no
14 information or presentations on the involvement of the
15 CVPIA program or personnel in the ESA consultation
16 effort . . . and in the determination of what actions the
17 agencies should be taking to meet the ESA."

18 (Cummins *et al.* 2008 at 11)

19 *Id.* The CVPIA contains prescriptives; it does not elevate the ESA
20 over all other statutory purposes for use of Project water. Although
21 specific provisions of the law may authorize finite increase in fish
22 protection water appropriation, there is no indefinite, unlimited
23 power for NMFS to take whatever Project water it deems essential for
24 the species.

25 The BiOp also finds that "state law gives DWR authority to
26 provide for needs of fish and wildlife independent of the connection
27 of the two water projects."

28 According to the [Biological Assessment], DWR

"is required to plan for recreational and fish and
wildlife uses of water in connection with State-
constructed water projects and can acquire land for
such uses (Wat. Code Sec. 233, 345, 346, 12582). The
Davis-Dolwig Act (Wat. Code Sec. 11900-11925)
establishes the policy that preservation of fish and
wildlife is part of State costs to be paid by water
supply contractors, and recreation and enhancement of
fish and wildlife are to be provided by appropriations
from the General Fund."

(CVP/SWP operations BA, page 1-4) DWR, like Reclamation, has broad authority to preserve and enhance fish and wildlife.

Id. at 726.

Although § 402.02's RPA requirements demand that NMFS engage in an evaluation of its legal authority to implement the RPA Actions, NMFS's interpretations of these laws set forth in the BiOp are not entitled to deference, as they were neither promulgated through notice and comment rulemaking procedures, *see Chevron v. NRDC*, 467 U.S. 837 (1984), nor contained within an agency policy statement, manual, enforcement guideline, or other document entitled to limited deference, *see Skidmore v. Swift & Co.*, 323 U.S. 134 (1944); *Christensen v. Harris County*, 529 U.S. 576, 587 (2000).

State and federal law impose upon Reclamation and DWR a nondiscretionary duty to comply with state water rights law. *See* 43 U.S.C. § 383; *California v. United States*, 483 U.S. 645, 675 (1978). Export Plaintiffs point to the "obligation imposed upon both Reclamation and DWR by D-1641 to comply with the reasonable and beneficial use requirements and prohibition against waste [of water] set forth in Article X, section 2 of the California Constitution, in their respective operations of the CVP and SWP." Doc. 431 at 117. The argument continues:

Because there is no indication in the record that NMFS undertook any analysis of whether DWR and Reclamation have jurisdiction and authority under the reasonable and beneficial use requirements of California law to annually reallocate hundreds of thousands of acre feet of project water, particularly where the benefits to listed salmonid species have not been demonstrated, the requirements of

1 Section 402.02 and the ESA have been violated.

2 *Id.*

3 It is undisputed that California law identifies the preservation
4 of fish and wildlife as a beneficial use of water. Cal. Water Code §
5 1243. In addition to requiring compliance with California's
6 reasonable and beneficial use standard, D-1641 imposes a condition
7 upon both Reclamation's and DWR's water rights requiring both to
8 "meet[] all requirements of the applicable Endangered Species Act for
9 the project authorized under [their respective] permit[s]/license[s]." D-1641
10 at 148. When jeopardy is found, the ESA requires
11 implementation of a RPA. D-1641 authorizes Reclamation's
12 implementation of lawful RPAs.³⁰

13
14 However, several of the specific RPA prescriptions have failed to
15 demonstrate compliance with the Handbook's requirement that every RPA
16 be "essential to avoid jeopardy and/or adverse modification."
17 Obviously, to the extent that any RPA Action has been found unlawful,
18 Federal Defendants cannot establish that implementation of that RPA is
19 consistent with Reclamation's legal authority.
20

21 Export Plaintiffs' motion for summary judgment that NMFS failed
22 to demonstrate the RPA's consistency with Reclamation and DWR's legal
23 authority is GRANTED IN PART AND DENIED IN PART, as are Federal
24 Defendants' and Defendant-Intervenors' cross motions. To the extent
25

26
27 ³⁰ In light of D-1641's requirement that DWR and the Bureau comply with the ESA,
28 Export Plaintiffs have not pointed to any substantive statute or jurisdictional
limitation that precludes the Reclamation or DWR from implementing a lawful ESA RPA.
The SR Plaintiffs have made such an argument. That argument is addressed below.

1 individual RPA Actions are otherwise lawful, Export Plaintiffs'
2 argument that Federal Defendants' failed to demonstrate Reclamation's
3 authority to implement those Actions is belied by D-1641, which
4 expressly requires implementation of lawful RPA Actions.
5 Correlatively, to the extent individual RPA Actions are unlawful,
6 Federal Defendants cannot find authority for their implementation.
7

8 3. Economic and Technical Feasibility.

9 The BiOp contains a lengthy discussion of economic and technical
10 feasibility. Export Plaintiffs attack the discussion as insufficient
11 in several respects. First, Export Plaintiffs argue that NMFS ignored
12 objections and evidence submitted by Reclamation and DWR suggesting
13 that the RPA was not technologically or economically feasible. A
14 March 23, 2009 letter from Reclamation to NMFS details a number of
15 concerns with the proposed RPA. See AR 00105277-84. A March 20,
16 2009 letter from DWR to NMFS describes some specific feasibility
17 concerns and a general objection that several of the RPA actions were
18 not economically feasible. See AR 00105285-99.
19

20 Export Plaintiffs object generally that NMFS failed to articulate
21 a reasoned response to DWR and Reclamation's objections. Doc. 431 at
22 114. The BiOp explained that the relevant state and federal agencies
23 engaged in a back-and-forth exchange of information regarding
24 feasibility of the RPA and adjustments were made:
25

26 Some of the more complex RPA actions, including Shasta
27 Storage, Habitat Rearing Actions, Passage Program,
28 Stanislaus Flows and the San Joaquin River Inflow Export
Ratio, went through many iterations of review, re-drafting,

1 and refinement, involving interagency staff and management
2 expertise, including biology, ecology, hydrology, and
3 operations, in order to ensure that the actions were based
4 on best available science, would be effective in avoiding
5 jeopardy, and would be feasible to implement. NMFS also
6 secured outside contractual services to provide additional
7 modeling expertise in evaluating draft RPA actions.

8 Examples of Feasibility Concerns in RPA Actions

9 As a result of this iterative consultation process, NMFS
10 considered economic and technological feasibility in several
11 ways when developing the CVP/SWP operations RPA. Examples
12 include:

13 1) Providing reasonable time to develop technologically
14 feasible alternatives where none are "ready to go" -
15 e.g., the Delta engineering action (Action IV.1.3), and
16 lower Sacramento River rearing habitat action (Action
17 I.6.1);

18 2) Calling for a stepped approach to fish passage at
19 dams, including studies and pilot projects, prior to a
20 significant commitment of resources to build a ladder
21 or invest in a permanent trap and haul program. A
22 reinitiation trigger is built into this action in the
23 event passage is not deemed feasible, prior to
24 construction of permanent infrastructure;

25 3) Considering limitations of the overall capacity of
26 CVP/SWP systems of reservoirs in determining
27 feasibility of flow actions below reservoirs, and
28 considering the hydrologic record and CALSIM modeling
results (Shasta/Sacramento River, Folsom/American
River, New Melones/Stansislaus River).

4) Tiering actions to water year type and/or storage in
order to conserve storage at reservoirs and not unduly
impact water supplies during drought (e.g., see
appendix 5);

5) Providing health and safety exceptions for export
curtailments;

6) Using monitoring for species presence to initiate
actions when biologically supported and most needed, in
order to limit the duration of export curtailments;

7) Incorporating scientific uncertainty into the design
of the action, when appropriate, in order to refine the
action over time (e.g., 6-year acoustic tag study for
San Joaquin steelhead).

8) Incorporating performance goals into more complex
actions (for example, Shasta storage, rearing habitat

1 and San Joaquin acoustic tag study). A performance goal
2 approach will allow for adaptation of the action over
3 time to incorporate the most up-to-date thinking on
4 cost-effective technologies or operations.

5 9) Allowing for interim, further constrained, water
6 deliveries to TCCA through modified RBDD operations for
7 3 years, while an alternative pumping plant is being
8 built.

9 *Id.* at 719-20.

10 NMFS viewed adaptive management as another tool to address
11 feasibility issues:

12 The RPA includes collaborative research to enhance
13 scientific understanding of the species and ecosystem, and
14 to adapt actions to new scientific knowledge. This adaptive
15 structure is important, given the long-term nature of the
16 consultation and the scientific uncertainty inherent in a
17 highly variable system. Monitoring and adaptive management
18 are both built into many of the individual actions and are
19 the subject of an annual program review. This annual program
20 review will provide for additional opportunities to address
21 any unforeseen concerns about RPA feasibility that may
22 arise.

23 *Id.* at 720.

24 Export Plaintiffs do not identify any specific technological
25 feasibility objection that was not addressed by NMFS's adjustments to
26 the draft RPA. Export Plaintiffs do argue that NMFS ignored
27 "extensive evidence" submitted by DWR about economic feasibility. DWR
28 informed NMFS of its opinion as to the economic impact of the RPA:

For the 2004 scenario, the NMFS draft RPA would have a net
economic impact of about \$320 million to \$390 million per
year while the combined costs of both the USFWS and NMFS
opinions would be about \$500 million to \$670 million per
year. For the 2030 scenario, the NMFS draft RPA in the Delta
would have a net economic impact of about \$320 million to
\$390 million per year while the combined costs of both the
USFWS and NMFS opinions would be about \$480 million to \$620
million per year.

1 AR 00113831-32. Export Plaintiffs argue that according to DWR's
2 figures, the net cost of the NMFS RPA over a 20-year implementation
3 period could exceed \$8 billion dollars. Doc. 431 at 115. Based on
4 its own figures, DWR urged NMFS to find that the RPA did not meet the
5 standard for economic feasibility. AR 00113831-32.
6

7 Does section 402.02 contemplate consideration of economic costs
8 to third parties or just to the action agencies? Without any analysis
9 or legal authority, the district court in *Kandra* concluded: "Read in
10 context ... the RPAs must be economically and technically feasible for
11 the government to implement." *Id.* at 1207 (emphasis added). The
12 regulation itself does not specify whether feasibility should be
13 limited to the economic impact on the action agencies or on others
14 affected by the agency action. Defendants contend the regulation must
15 be interpreted in a manner that does not violate *TVA v. Hill*, 437
16 U.S. 153, 184 (1978), which concluded that Congress enacted the ESA to
17 "halt and reverse the trend toward species extinction, whatever the
18 cost." (Emphasis added.) This language directs the conclusion that
19 the economic feasibility requirement refers only to the costs to the
20 action agency, requiring analysis of whether the corrective measures
21 required by an RPA can be implemented from a purely budgetary
22 perspective.
23
24

25 NMFS engaged in such an analysis. Starting with its 330,000 AF
26 water supply impact projection, which has been remanded for other
27 reasons, NMFS examined the impact of water supply reductions on
28

1 Reclamation and DWRs costs:

2 In evaluating economic feasibility, NMFS examined the direct
3 costs of the modified operations to the Federal action
4 agency, Reclamation. According to the [California State
5 Legislative Analyst's Office ("LAO")], 85% of Reclamation's
6 costs are reimbursed by water users, and 95% of DWR's SWP
7 costs are reimbursed:

8 Irrigation water users pay about 55 percent of CVP
9 reimbursable costs (\$1.6 billion), while municipal and
10 industrial water users are responsible for the
11 remaining 45 percent (or about \$1.3 billion). These
12 reimbursements are paid through long-term contracts
13 with water agencies. The total capital cost to
14 construct the CVP as of September 30, 2006, is about
15 \$3.4 billion. The federal Bureau of Reclamation
16 calculates how much of the capital construction cost is
17 reimbursable from water users. Currently, users pay
18 about 85 percent of total costs. In contrast, more than
19 95 percent of SWP's costs are reimbursable from water
20 users. The costs assigned to such CVP purposes as flood
21 control, navigation, and fish and wildlife needs are
22 not reimbursable and are paid by the federal
23 government.

24 (LAO, 2008) Through this arrangement, costs to the action
25 agency itself are minimized.

26 BiOp at 723. NMFS also evaluated direct Project Costs.

27 In addition to water costs, Reclamation and DWR will incur
28 project costs associated with certain RPA actions (e.g., the
fish passage program). The State of California has
authorized \$19.6 billion in water-related general obligation
bonds since 2000, and these bonds often contain provisions
for environmental conservation related purposes (LAO, 2008).
Over \$3 billion has been spent through the Calfed Bay-Delta
Program. The CALFED ROD contains a commitment to fund
projects through the Ecosystem Restoration Program.
Similarly, the CVPIA AFRP funds eligible restoration
projects, using federal authorities. Some of the projects in
the RPA may qualify for those sources of funds.

29 *Id.* at 723-24.

30 Even assuming DWR's higher water costs figures (approximately
31 three times NMFS's estimate), no party suggests that the costs to the
32 agency would be prohibitive, given the reimbursement structure.

33 Export Plaintiffs' motion for summary judgment that NMFS failed to

1 demonstrate economic and technological feasibility is DENIED. Federal
2 Defendants' and Defendant-Intervenors' cross motions are GRANTED.
3 DWR's specific challenge to the feasibility of Action IV.4.2 is
4 addressed separately below.
5

6 4. Avoidance Jeopardy and/or Adverse Modification.

7 Export Plaintiffs incorporate by reference their substantive
8 challenges to the RPA, arguing that for all those reasons, NMFS failed
9 to comply with the fourth requirement of section 402.02. Consistent
10 with and incorporating the rulings on the merits of the challenges to
11 RPA Actions IV.2.1, IV.2.3 and IV.3, Export Plaintiffs' motion
12 regarding the fourth section 402.02 requirement is GRANTED IN PART AND
13 DENIED IN PART and Federal Defendants' and Defendant-Intervenors'
14 cross motions are GRANTED IN PART AND DENIED IN PART. While there is
15 some record support for the general approaches used in these RPA
16 Actions, the specific prescriptions imposed are not sufficiently
17 justified. As a result, NMFS did not reasonably conclude that Actions
18 IV.2.1, IV.2.3 and IV.3 were essential to avoid jeopardy to the
19 continued existence of the Listed Species and/or destruction or
20 adverse modification of the species' critical habitat.
21
22

23 5. DWR's Feasibility Challenges to Action IV.4.2.

24 The stated objective of Action IV.4.2, entitled "Skinner Fish
25 Collection Facility Improvements to Reduce Pre-Screen Loss and Improve
26 Screening Efficiency," is to "[i]mplement specific measures to reduce
27 pre-screen loss and improve screening efficiency at state facilities."
28

1 BiOp at 655. The Action requires DWR to undertake the following
2 actions at the Skinner Fish Collection Facility:

3 1) By December 31, 2012, operate the whole Skinner Fish
4 Protection Facility to achieve a minimum 75 percent salvage
5 efficiency for CV salmon, steelhead, and Southern DPS of
6 green sturgeon after fish enter the primary channels in
7 front of the louvers.

8 2) Immediately commence studies to develop predator control
9 methods for Clifton Court Forebay that will reduce salmon
10 and steelhead pre-screen loss in Clifton Court Forebay to no
11 more than 40 percent.

12 a) On or before March 31, 2011, improved predator
13 control methods. Full compliance shall be achieved by
14 March 31, 2014. Failure to meet this timeline shall
15 result in the cessation of incidental take exemption at
16 SWP facilities unless NMFS agrees to an extended
17 timeline.

18 b) DWR may petition the Fish and Game Commission to
19 increase bag limits on striped bass caught in Clifton
20 Court Forebay.

21 3) Remove predators in the secondary channel at least once
22 per week.

23 *Id.* at 655-56.

24 a. Is Action IV.4.2 Inconsistent with Action IV.4.

25 DWR argues that Action IV.4.2 is arbitrary and capricious because
26 it is inconsistent with Action IV.4 ("Modifications of the Operations
27 and Infrastructure of the CVP and SWP Fish Collection Facilities"),
28 which provides:

Objective: Achieve 75 percent performance goal for whole
facility salvage at both state and Federal facilities.
Increase the efficiency of the Tracy and Skinner Fish
Collection Facilities to improve the overall salvage
survival of winter-run, spring-run, CV steelhead, and green
sturgeon.

Action: Reclamation and DWR shall each achieve a whole
facility salvage efficiency of 75 percent at their

1 respective fish collection facilities. Reclamation and DWR
2 shall implement the following actions to reduce losses
3 associated with the salvage process, including: (1) conduct
4 studies to evaluate current operations and salvage criteria
5 to reduce take associated with salvage, (2) develop new
6 procedures and modifications to improve the current
7 operations, and (3) implement changes to the physical
8 infrastructure of the facilities where information indicates
9 such changes need to be made. Reclamation shall continue to
10 fund and implement the CVPIA Tracy Fish Facility Program. In
11 addition, Reclamation and DWR shall fund quality control and
12 quality assurance programs, genetic analysis, louver
13 cleaning loss studies, release site studies and predation
14 studies. Funding shall also include new studies to estimate
15 green sturgeon screening efficiency at both facilities and
16 survival through the trucking and handling process.

17 By January 31 of each year, Reclamation and DWR shall submit
18 to NMFS an annual progress report summarizing progress of
19 the studies, recommendations made and/or implemented, and
20 whole facility salvage efficiency. These reports shall be
21 considered in the Annual Program Review.

22 *Id.* at 653-54. DWR suggests that Action IV.4 defines 75% salvage
23 efficiency as a "performance goal," rather than a requirement, and
24 therefore that Action IV.4.2's "requirement" of 75% efficiency is
25 inconsistent with Action IV.4. Action IV.4 does not relegate the 75%
26 target to the status of a "performance goal." The action sets a
27 requirement for the Bureau and DWR "shall each achieve a whole
28 facility salvage efficiency of 75 percent." *Id.* at 653. There is
nothing equivocal about this language and no inconsistency between
Actions IV.4 and IV.4.2.

DWR's motion for summary judgment that Action IV.4.2 is unlawful
because it is inconsistent with IV.4 is DENIED; Federal Defendants'
and Defendant-Intervenors' cross motions are GRANTED.

//

//

b. DWR's Argument that the Record Does not Support the Conclusion that Action IV.4.2 (Subpart(1)) is Economically and Technologically Feasible.

DWR next complains that the record does not support the conclusion that the first subpart of Action IV.4.2, which requires 75% salvage efficiency at the Skinner Fish Facility for Chinook salmon, CV steelhead, and Southern DPS of green sturgeon by December 31, 2012, is technologically or economically feasible. DWR maintains that NMFS arbitrarily took the "goal" of Action IV.4, namely achieving a 75% salvage efficiency for the Skinner Fish Facility, turned it into an "action," and "slapped a date for compliance on the goal." Doc. 446-1. DWR's first premise -- that the 75% efficiency target in Action IV.4.2 is a "goal" - is mistaken. Nor is it inherently illogical for NMFS to impose a compliance deadline for the 75% target. DWR has been studying salvage efficiency and ways to improve the salvage process for many years, *see, e.g.*, AR 00109712-31, and NMFS was warned by a Reclamation biologist with experience working with individuals at the facility that without a deadline, improvements might never take place, AR 00105052. The deadline of December 31, 2012 provided DWR with approximately three and a half years from the adoption of the BiOp in June 2009. DWR has not demonstrated that imposing this deadline was irrational or arbitrary.

DWR next argues that the record does not support the conclusion that the standard of 75% efficiency at the Skinner Fish Facility is technologically or economically feasible. DWR points to its assertion in a March 20, 2009 letter to NMFS that it might not be possible to

1 meet the December 31, 2012 deadline.

2 Part 1 of this action is infeasible because it requires DWR
3 to operate Skinner Fish Protection Facility to achieve a
4 minimum 75% salvage efficiency for salmonids and green
5 sturgeon by December 31, 2012. While DWR can strive to
6 achieve this rate of success by that date, there is
7 uncertainty that it can occur within that timeframe. To
8 incrementally improve the salvage efficiency within Skinner
9 Fish Protection Facility will require the efficiency of each
10 component to be determined and a strategy developed to
11 identify the most effective improvements to be made. Testing
12 within a hydraulic lab may be required to evaluate the
13 improvements of potential structural changes within the
14 facility. In addition, making the actual modifications will
15 take time. It is quite likely that these efforts will extend
16 past the required implementation date. We recommend that a
17 process involving the annual progress reports required by
18 January 31 st be incorporated into this action. The process
19 would involve the review of the annual status report by DWR
20 and NMFS to determine if satisfactory progress is being made
21 toward meeting the salvage requirement and, if it is
22 determined that satisfactory progress is being made but the
23 deadline of December 31, 2012 will not be met, NMFS will
24 adjust the deadline accordingly.

25 AR 00078204. That DWR's expressed "uncertainty" to NMFS that it could
26 not meet the higher target by the end of 2010 does not mean the action
27 is "infeasible." One and one-half years remain to perform.

28 DWR also maintains that NMFS had information indicating that DWR
could not even complete the necessary studies on the current
facilities' efficiency by the deadline. Steelhead studies had been
ongoing since 2005, AR 00003660, 3642, 4105, 4128-29. DWR maintains
that "[t]here are no similar studies as to sturgeon and salmon and
"[f]rom the steelhead facility study, NMFS was aware that a study on
facility efficiency would take at least three years to perform."
However, DWR provides no record citation to support this three-year
timeframe. To the contrary, the methods described in a 2008 technical
study plan for the Tracy Fish Facility suggest that the actual

1 experiments would be run over a period of only several months. AR
2 00078557, 00078563 (explaining that efficiency experiments for fiscal
3 year 2009 will be "completed during the months of March-June," with
4 results available by August 2010).

5 DWR next argues "the standard for efficiency imposed by NMFS
6 seems to have changed from 90%, to 80%, to 75%" without explanation as
7 to whether one or any of the standards was economically or
8 technologically feasible. Doc. 446-1 at 6. Federal Defendants
9 emphasize that a study cited by DWR found that the Skinner Fish
10 Collection Facility is already operating at an estimated 74%
11 efficiency for steelhead. AR 00113798 (cited in BiOp at 346).
12 Federal Defendants further explain the reasoning behind the 75%
13 efficiency standard:
14
15

16 ... NMFS's decision to require this efficiency rate was
17 based on numerous studies and NMFS's own technical
18 experience working with both the state and federal
19 facilities over the last 20 years. In choosing the 75%
20 salvage efficiency at the Skinner Fish Facility, NMFS
21 considered, among other things: (i) the fish facilities'
22 original design, which was 90-95% efficiency based on
23 juvenile striped bass similar in size to Chinook salmon
24 smolts; (ii) historical efficiency testing performed by the
25 California Department of Fish and Game; (iii) and current
26 efficiency estimates performed by DWR, which is 74% $\pm$ 7%.
27 NMFS 00113798.

28 NMFS considered whether the original 90-95% design
efficiency could be met at the facilities. However, over the
years the efficiency of both the State and the Federal
facility has varied due a variety of problems in the
southern Delta, including, among other things, surface water
levels, aquatic weeds, corrosion, introduced species like
the mitten crab, and infrastructure age. NMFS 50871-73; NMFS
112963 (DWR noting similar "challenges"). Thus, given these
changes in Delta conditions, NMFS concluded it would be

unreasonable to assume the original 90-95% design efficiency could be met.

To determine a reasonable efficiency rate, NMFS also reviewed the history of the facilities and consulted with the Denver Technical Center. Contrary to DWR's claim that "facility efficiency is currently unknown," DWR Br. at 6, there have been a number of studies to determine the what that efficiency rate is in order to mitigate for the loss of striped bass and Chinook salmon (i.e., mitigation requirements established in the 1986 4-Pumps Agreement between DFG and DWR). A study conducted by DFG and DWR in 1994 based on 13 years of data established methods and a process for DWR to use to calculate the facility efficiency at each one of its four bays. NMFS 109712-731 (Brown *et al.* 1996). A review of the salmon losses related to the CVP and SWP export pumping in that study found that facility efficiency ranged from 70 - 85% at the primary louvers, and 70 - 95% at the secondary louvers for the Skinner Fish Facility. NMFS 109712-731 (Brown *et al.* 1996). NMFS's 75% criteria is within the established range and conservatively lower than the average efficiency as stated in previous studies. Similarly, the first biological opinion on winter-run Chinook salmon assumed 75% salvage efficiency in calculating the loss at Skinner Fish Facility. NMFS 127399-454 (NMFS 1992).

Moreover, the current Skinner Fish Facility efficiency, which is calculated on a daily basis by DFG in order to estimate the loss at facility, uses a efficiency rate for the louvers is 0.630 for fish < 101 mm and 0.568 for fish 100 mm, plus the primary channel flow divided by the primary channel volume. Overall, calculated louver efficiencies are typically in the range of 70-80% for most salmon that enter the facility. See e.g., NMFS 109725-26 (estimating "70 and 85 percent" at primary louvers and "70 to 95 percent" at secondary louvers, and noting CDFG "combined the data to obtain an overall ... screen efficiency ... calculated as 0.630 for fish < 101 mm, and 0.568 for fish 100 mm, divided by an approach velocity"). Critically, DWR's own brief states that the Skinner Fish Facility efficiency "was estimated to be 74% +/- 7%" in a 2008 DWR study, DWR Br. at 6, which meets the criteria set forth in the BiOp. NMFS 113798. Thus, it is possible that no further action may be necessary, except to initiate a study to determine efficiency for green sturgeon through the facility.

1 DWR argues that Brown, *et al.* (1996) is based upon obsolete data
2 collected at the louvers approximately 40 years ago, in 1970 and 1971.
3 AR 00109725. The Brown study recognized that changes to the Skinner
4 Fish Facility had been made between the time the data was collected
5 and the article's publication. AR 00109728. Therefore, DWR argues
6 that the data relied upon in Brown, *et al.* (1996) does not reflect
7 the current or potential efficiency at the Skinner Fish Facility.
8 Doc. 495 at 10. Nor does the data reflect the entire process by which
9 DWR protects fish at Skinner, which involves handling, trucking, and
10 releasing entrained fish. The focus of Action 4.2.1(1) is the overall
11 efficiency of the Skinner Facility, not just the louver facility.
12
13 *Id.*

14
15 Federal Defendants do not respond to these critiques of the
16 obviously outdated Brown (1996) study, but instead focus on the fact
17 that DWR's own 2007 study predicted that efficiency at the entire
18 Skinner Facility was estimated to be "74 ± 5% (mean ±95% Confidence
19 Interval) for the 2007 study period. AR 00113798. DWR objects that
20 "even this data does not support Federal Defendants' conclusion that
21 an improvement of 1% to 75% overall efficiency standard for operating
22 the Skinner Fish Facility as to Chinook salmon, steelhead trout, and
23 green sturgeon, is economically and technologically feasible by the
24 date imposed under the BiOp." Doc. 495 at 10-11. Based on the
25 information before NMFS, was it unreasonable to conclude that a 1%
26 improvement was technologically or economically feasible? NMFS
27
28

1 justifies its conclusion on the ground that DWR "did not say it could
2 not possibly reach a one percent higher efficiency target by 2012."
3 Doc. 477-1 at 107 (emphasis added). Rather, DWR's comment letter
4 stated that DWR had "uncertainty" as to whether the efficiency
5 improvements were feasible.
6

7 To uphold an agency's decision, its rationale must "reasonably be
8 discerned," from the record. *See Modesto Irr. Dist.*, 619 F.3d at
9 1035. Here, NMFS has failed to cite any record evidence indicating
10 that the efficiency improvement, albeit a minor one, is economically
11 or technologically feasible. DWR's own 2007 study indicates the
12 efficiency is close to the target, from which it could be inferred
13 that the technological changes may be possible, but the record lacks
14 affirmative support for a finding of feasibility.
15

16 DWR's motion for summary judgment that the record lacks support
17 for a finding that Action IV.4.2(1) is feasible is GRANTED; Federal
18 Defendants' and Defendant-Intervenors' cross motions are DENIED.
19

20 c. DWR's Argument that the Record Does not Support the
21 Conclusion that Action IV.4.2 (Subpart(2)) is
Economically and Technologically Feasible

22 DWR maintains that the record does not support NMFS's economic
23 and feasibility determination as to subpart 2 of Action IV.4.2, which
24 requires reduction of predation at Clifton Court Forebay to 40% by
25 March 31, 2014.

26 There is undisputed record evidence that at DWR's facility, most
27 loss of fish occurs in the Clifton Court Forebay. AR 00117410-441
28

1 (Gingras 1997). DWR concedes that pre-screen loss at the Forebay is
2 estimated at between 63 and 99% for juvenile Chinook salmon. Doc.
3 446-1 at 7 (citing BiOp at 348 and AR 00106736).

4 It is also undisputed that reducing predation would improve
5 survival across the Forebay. See AR 00113817 (DWR (2008)). However,
6 DWR argues that the record does not support Action IV.4.2(2)'s
7 imposition of the specific requirement that DWR reduce "predation" in
8 the Forebay to 40%. In support of Action IV.4.2(d), NMFS cites a 2008
9 DWR study that in turn cites a 1952 study by Ricker. Doc. 477-1
10 (citing AR 113817). Ricker concluded that when survival rates are
11 below 25%, a reduction of predator numbers to below 50% can double the
12 survival rate of the prey. But, DWR points out that Ricker's finding
13 that predator numbers should be reduced to below 50% is distinct from
14 whether predation should be reduced to below 50%.³¹ In response,
15 Federal Defendants disclaim reliance on Ricker, asserting that NMFS
16 considered DWR (2008) as support for the proposition that predator
17 removal is a method of reducing pre-screen loss. Doc. 515 at 44.
18 Rather than rely directly on Ricker's work, NMFS "reasoned by simple
19 math that if predation was reduced by half to no more than 40%, giving
20
21
22

23 ³¹ DWR points out that, in response to DWR's motion to admit expert testimony,
24 Federal Defendants made a judicial admission that they would not rely on Ricker's
25 1952 study or the statement that when survival is below 25%, a reduction of
26 predator numbers to below 50% can double survival. See Doc. No. 464; Draft Tr.
27 7/19/10 at 61-67. Relying on that admission, the Court concluded expert testimony
28 was not needed to explain application of the Ricker study. Doc. 464 at 1-2. DWR
now asserts that it is prejudiced by Federal Defendants reliance on a passage that
discusses Ricker because DWR "does not have an expert to explain DWR (2008) and the
Ricker equation. However, DWR successfully explains the Ricker study and NMFS's
use of it. See Doc. 495 at 4-5. Expert clarification is unnecessary.
Nonetheless, Federal Defendants are precluded from using the 1952 Ricker study
after they said they would not.

1 60% survival rather than 20-25% survival, overall survival through the
2 Skinner Facility would reach approximately 39%, roughly equivalent to
3 the current CVP survival efficiency." *Id.* Federal Defendants
4 provide no record citation related to this imprecise guestimate.
5

6 Even if the 40% target is scientifically justified, whether
7 predation in the Forebay is a problem and/or whether a reduction to
8 40% is a reasonable goal is an entirely different inquiry from whether
9 reducing predation to 40% is feasible. NMFS mentions numerous
10 examples of methods of reducing predators on juvenile salmon and
11 steelhead, but nothing in the record indicates whether the 40% target
12 can be met, or whether it could be met by the deadline imposed by the
13 BiOp.³² It cannot be determined from the existing record whether
14 NMFS's feasibility determinations are supportable. There is no
15 explanation.
16

17 DWR's motion for summary judgment that the record lacks support
18 for a finding that Action IV.4.2(2) is feasible is GRANTED; Federal
19 Defendants' and Defendant-Intervenors' cross motions are DENIED.
20

21 d. DWR's Argument that Action IV.4.2 is Arbitrary and
22 Capricious Because it Fails to Explain How the Action
Will Avoid Jeopardy and/or Adverse Modification.

23 DWR also argues that the record does not support NMFS's finding
24 that Action IV.4.2 is essential to avoid jeopardy and/or adverse
25 modification. There is record evidence to support NMFS's findings
26 that pre-screen loss and loss due to salvage are significant and that
27

28 ³² While Action IV.4.2(2) provides that NMFS may agree to an extended timeline, the
Action provides no basis for determination of whether an extension should be given.

1 reducing these sources of loss will improve survival. However, the
2 record does not explain why increasing the existing salvage efficiency
3 by 1% and/or reducing predation to 40% "is essential to avoid jeopardy
4 and/or adverse modification." ESA Handbook at 4-43 (requiring a
5 "thorough explanation of how each component of the [RPA] is essential
6 to avoid jeopardy and/or adverse modification"). The RPA is not
7 lawful without the required through explanation, which shall be
8 provided on remand.
9

10 VI. STANISLAUS RIVER PLAINTIFFS' CLAIMS.

11 A. Relevant Factual Background.

12 1. The New Melones Project.

13 The New Melones Project was approved as the last unit of the CVP
14 in 1962. Pub. L. No. 87-874, 76 Stat. 1173, 1191-92 (1962). The New
15 Melones Project includes a dam and 2.4 million acre-foot reservoir on
16 the Stanislaus River. USBR AR 007570. The New Melones Reservoir is
17 "operated primarily for purposes of water supply, flood control, power
18 generation, fishery enhancement, and water quality improvements in the
19 lower San Joaquin River. The reservoir and river also provide
20 recreation benefits." *Id.* The United States holds appropriative
21 water rights issued by the SWRCB for the New Melones Project,
22 conditioned by Water Rights Decisions 1422, 1616 and Revised Decision
23 1641 ("D-1641"). *See generally* USBR AR 007571-73.
24
25

26 //

27 //

1 2. The Stanislaus River Plaintiffs.

2 Plaintiffs Oakdale Irrigation District ("OID"), and South San
3 Joaquin Irrigation District ("SSJID") hold pre-1914 water rights to
4 Stanislaus River water. OID and SSJD receive water from New Melones
5 under a 1988 Agreement with the United States designed to fulfill
6 their prior rights. USBR AR 007571-72; USBR AR 011751. That
7 agreement requires Reclamation to provide to OID and SSJID:
8

- 9 • The inflow into New Melones plus the amount derived by the
10 formula of (600,000 minus inflow) divided by 3, not to exceed
11 600,000 AF per year, USBR AR 011751; and
12 • The right to conserve up to 200,000 AF in New Melones, USBR AR
13 011752.
14

15 Plaintiff Stockton East Water District ("SEWD") is one of only
16 two "Eastside Contractors" that receive a CVP supply from New Melones
17 pursuant to Reclamation water service contracts. SWED's contract
18 provides for up to 75,000 AF of water annually. See USBR AR 011728-
19 29. (Collectively, these three plaintiffs are referred to as the
20 "Stanislaus River Plaintiffs" or "SR Plaintiffs.")
21

22 3. The Status of Steelhead in the Stanislaus River.

23 The OCAP BA summarizes the history and status of Steelhead in the
24 Stanislaus River:

25 Historically, steelhead distribution extended into the
26 headwaters of the Stanislaus River (Yoshiyama *et al.* 1996).
27 Dam construction and water diversion for mining and
28 irrigation purposes began during and after the Gold rush.
 Goodwin Dam, constructed in 1913, was probably the first
 permanent barrier to significantly affect Chinook salmon

1 access to upstream habitat. Goodwin Dam had a fishway, but
2 Chinook could seldom pass it. Steelhead may have been
3 similarly affected. The original Melones Dam, completed in
4 1926, permanently prevented access to upstream areas for all
5 salmonids. Currently, steelhead can ascend over 58 miles up
6 the Stanislaus River to the base of Goodwin Dam. Although
7 steelhead spawning locations are unknown in the Stanislaus,
8 most are thought to occur upstream of the City of Oakdale
9 where gradients are slightly higher and more riffle habitat
10 is available.

11 The Fishery Foundation of California (Kennedy and Cannon
12 2002) has monitored habitat use by juvenile
13 steelhead/rainbow since 2000 by snorkeling seven sites from
14 Oakdale to Goodwin Dam every other week. Steelhead fry begin
15 to show up in late March and April at upstream sites, with
16 densities increasing into June and distribution becoming
17 more even between upstream and downstream sites through
18 July. Beginning in August and continuing through the winter
19 months, densities appeared highest at upstream sites
20 (Goodwin to Knights Ferry). Age 1-plus fish were observed
21 throughout the year with densities generally higher at
22 upstream sites (Goodwin to Knights Ferry). Low densities
23 were observed from late December until April. It is unknown
24 whether fish left the system in December or if, with the
25 cooler winter water temperatures, they were less active and
26 more concealed during the day.

27 Since 1993, catches of juvenile steelhead/rainbow in rotary
28 screw traps (RSTs) indicate a small portion of the
Stanislaus River steelhead/rainbow population displays
downstream migratory characteristics at a time that is
typical of steelhead migrants elsewhere. The capture of
these fish in downstream migrant traps and the advanced
smolting characteristics exhibited by many of the fish
indicate that some steelhead/rainbow juveniles might migrate
to the ocean in spring. However, it is not known whether the
parents of these fish were anadromous or fluvial (they
migrate within freshwater). Resident populations of
steelhead/rainbow in large streams are typically fluvial and
migratory juveniles look much like smolts. Further work is
needed to determine the parental life histories that are
producing migratory juveniles. The Stanislaus River Weir has
been installed annually since 2003 at RM 31.4. The primary
purpose of the weir[] is to monitor escapement of fall-run
Chinook salmon, so it is installed from September through
June each year. Fish passing the weir are monitored using a
Vaki infrared RiverWatcher Fish Counter. From 2003 through
2007, O. mykiss have been observed passing the weir a total
of 16 times. Scale analysis of one individual indicated that
it was a steelhead.

Smolts have been captured each year since 1995 in RSTs at
Caswell State Park and at Oakdale (Demko *et al.* 2000).
Captures occurred throughout the time the traps were run,

generally January through June. Most fish were between 175 and 300 mm at the Caswell site, with only six fish in seven years less than 100 mm. Larger numbers of fry were captured upstream at Oakdale. During 2001, 33 smolts were captured at Caswell and 55 were captured at Oakdale, the highest catch of all years. Although improved traps were used, the higher catch in 2001, was likely due to more fish present and not due to better trap efficiencies (Doug Demko, personal communication, 2001). RSTs are generally not considered efficient at catching fish as large as steelhead smolts and the number captured is too small to estimate capture efficiency so no steelhead smolt outmigration population estimated has been calculated.

USBR AR 007670-71.

The BiOp describes the impacts of proposed operation of New Melones on survival of CV steelhead and its critical habitat, BiOp at 296-313, and imposes a number of RPAs that affect the New Melones Unit.

- Action III.1. - Establishes a real-time operational decision-making team, the Stanislaus Operations Group ("SOG"), to "provide direction and oversight to ensure that the East Side Division actions are implemented, monitored for effectiveness and evaluated." *Id.* at 620.
- Action III.1.2 - Requires Reclamation to make releases from New Melones to achieve specified water temperatures at two locations downstream of Goodwin Dam. Temperature compliance is to be measured on a seven-day average daily maximum temperature. *Id.* at 620-22.
- Action II.1.3 - Requires Reclamation to release water pursuant to a year-round minimum flow schedule, dependent on hydrologic year time, to "optimize CV steelhead habitat for all life history

1 stages and to incorporate habitat maintaining geomorphic flows in
2 a flow pattern that will provide migratory cues to smolts and
3 facilitate out-migrant smolt movement on [the] declining limb of
4 [the] pulse." *Id.* at 622; BiOp App. 2-E.

- 5
6 • Action III.2.1 - Calls for the addition of 50,000 cubic yards of
7 gravel to improve spawning habitat by 2014, and 8,000 cubic yards
8 per year for the duration of the Project Actions. BiOp at 626-
9 27.
- 10 • Action III.2.2 - Requires Reclamation, with advice from SOG, to
11 develop an operational strategy to achieve floodplain inundation
12 flows that inundate CV steelhead juvenile rearing habitat on a
13 one- to three-year return schedule. A proposed plan shall be
14 submitted by June 2011. If NMFS approves the plan, Reclamation
15 will begin to implement it in 2012. *Id.* at 627.
- 16
17 • Action III.2.3 - Requires Reclamation, in cooperation with SOG,
18 to develop a list of projects to improve the habitat values of
19 freshwater migratory habitat in the Stanislaus River. *Id.* at
20 627-28.
- 21
22 • Action III.2.4 - Requires an evaluation of options to enable
23 steelhead to pass New Melones, Goodwin, and Tulloch dams in order
24 to access their historic habitat. A report detailing options is
25 to be prepared by December 13, 2016. *Id.* at 628.
- 26
27 • Action IV.2.1 - This Delta action, a part of which is discussed
28 above, requires Reclamation to release water from New Melones, in

1 addition to the minimum flow schedule set forth in Appendix 2-E,
2 to meet certain flow requirements at Vernalis. This requirement
3 is valid through 2011. At that time, it is anticipated that the
4 SWRCB will establish minimum flows for the San Joaquin River.
5 BiOp at 642-43. There is no information about such minimum flows
6 or whether they have been established.
7

8 SR Plaintiffs raise a number of challenges to the treatment of
9 New Melones in the BiOp, its effects analysis, and RPAs related to New
10 Melones.³³
11

12 B. Inclusion of the New Melones Unit in the Proposed Action Subject
13 to Consultation.

14 SR Plaintiffs challenge NMFS's decision to include the New
15 Melones Unit in the action subject to consultation. The ESA's
16 consultation requirement applies to "agency actions." See 16 U.S.C.
17 1536(a)(2). The ESA implementing regulations define "action" to mean
18 "all activities or programs of any kind authorized, funded, or carried
19 out, in whole or in part, by Federal agencies in the United States or
20 upon the high seas." 50 C.F.R. § 402.02. No regulation defines the
21 scope of the action to be considered. The question is whether NMFS's
22 definition of the scope of the action is reasonable in light of the
23 record. See *PCFFA*, 426 F.3d at 1090 ("Even when an agency explains
24 its decision with less than ideal clarity, a reviewing court will not
25

26
27 ³³ SR Plaintiffs' motion suffers from a lack of internal organization, repeatedly
28 shifting back and forth between challenges to the effects analysis and challenges
to the RPA, making evaluation of the merits of their arguments unnecessarily time
consuming and difficult.

1 upset the decision on that account if the agency's path may reasonably
2 be discerned.") .

3 SR Plaintiffs make two attacks on NMFS's decision to include New
4 Melones in the Project Description. They first argue that the
5 touchstone of inclusion in the action appears to be "coordination" of
6 the Unit in question with Project operations. For example, the SWP is
7 included in the action because its operations are closely coordinated
8 with those of the CVP through the Coordinated Operating Agreement.
9 BiOp at 31; USBR AR 007495 (BA 1-4) ("SWP operations are coordinated
10 with CVP operations and, as such, are consulted on as part of the
11 proposed action described in the BA."). In contrast, the Friant Unit
12 was deliberately excluded from the action because it operates
13 separately from the rest of the CVP and is not integrated into the CVP
14 OCAP." BiOp App. 1 at 79. SR Plaintiffs argue that while "New
15 Melones is an element of the CVP, it is also clear that operation of
16 New Melones is not coordinated with the operation of the rest of the
17 CVP and/or SWP." Doc. 454 at 37. This assertion is belied by the
18 record. Stanislaus Plaintiffs admit that New Melones is one of the
19 major reservoirs in the CVP system and releases from it are needed to
20 meet non-consumptive downstream purposes, such as water quality and
21 the preservation and enhancement of fish and wildlife in both the
22 Stanislaus and San Joaquin rivers. *Id.* at 37-38; *see also* Sixth
23 Milligan Decl., Doc. 517 at ¶ 10 (explaining that "[r]eleases from New
24 Melones down the Stanislaus River affect Reclamation's ability to
25
26
27
28

1 comply with Vernalis flow and water quality requirements.").

2 SR Plaintiffs also argue that inclusion of New Melones in the
3 action subject to consultation will lead to "absurd results" because
4 the Incidental Take Statement provides that the RPAs must be
5 implemented as a whole and if Reclamation and/or DWR fail to comply
6 with the terms of the ITS, they may no longer comply with the ESA.
7 See BiOp at 728. SR Plaintiffs maintain that this is "absurd given
8 the lack of coordination" between New Melones and other operations of
9 the CVP and SWP. Doc. 454 at 38. "Simply put, what happens on the
10 Sacramento River as a result of actions taken by the CVP and/or SWP
11 has nothing to do with the listed species contained in the Stanislaus
12 River, and vice-versa." *Id.* This statement is incorrect. Mr.
13 Milligan opines: "during balanced conditions, releases from New
14 Melones down the Stanislaus River affect overall Delta conditions,
15 which potentially play a role in determining how Reclamation operates
16 the rest of the CVP.... Therefore [Reclamation] typically
17 coordinate[s] operations of the various Delta facilities and CVP
18 reservoirs, including New Melones Reservoir ... with DWR in its
19 operation of the SWP, on a daily basis." Sixth Milligan Decl., Doc.
20 517 at ¶ 10. SR Plaintiffs have presented no contrary evidence.

21 SR Plaintiffs' motion for summary judgment that Federal
22 Defendants erred by including New Melones in its coordinated Project
23 description is DENIED. Federal Defendants' and Defendant-Intervenors'
24 cross motions are GRANTED.

1 C. Effects Analysis Challenges.

2 1. New Melones Operations v. Baseline Effects.

3 SR Plaintiffs argue that the BiOp is unlawful because NMFS
4 improperly identified as "effects of the action," effects caused by
5 the existence of New Melones Dam. Doc. 454 at 18-21. Specifically,
6 SR Plaintiffs point to the BiOp's conclusions that the action (1)
7 altered flows, which impact habitat conditions and survival at various
8 life history stages, and (2) modified the hydrograph to dampen peak
9 flood flows, mute flow variability, and reduce or eliminate channel
10 forming flows. *Id.* at 19. SR Plaintiffs maintain that "[t]hese are
11 effects associated with the fact that the dam exists, rather than
12 effects associated with the operational plan." *Id.* at 20. SR
13 Plaintiffs' seminal argument is that NMFS has "failed to identify with
14 any clarity how continued operations, as opposed to the basic
15 existence of the dam itself, cause any additional incremental harm to
16 steelhead, deepen their jeopardy, or otherwise 'tip' them into
17 extinction." Doc. 454 at 20.

18
19
20 The record does explain how continued operations will cause
21 additional incremental harm. The BiOp compares effects of the action
22 both to pre-dam "unimpeded" conditions and to the "future baseline"
23 which includes the existence of the dams:

24
25 The future baseline of the existing dams prevents access to
26 historical habitat, but the proposed operations of the dams
27 control the quality and quantity of available alternative
28 habitat below Goodwin Dam and the suitability of the
physical conditions to support CV steelhead at various life
history stages. Survival of CV steelhead may be affected by
operations of the East Side Division in the following ways:

- Operational releases control extent of cool water habitat available below Goodwin Dam.
- Operational release levels control the quantity and functionality of instream habitat for spawning, egg incubation, juvenile rearing and smoltification.
- Operational releases are typically lower than unimpaired flows, requiring smolting juveniles to expend more energy to outmigrate and lower stream velocities increase the exposure of juveniles and smolts to predation.

The proposed New Melones operations will create an altered hydrograph as compared to the unimpaired flows and as compared to the future baseline. The dampening of flood events and freshets eliminates the geomorphic processes that are important to CV steelhead to replenish and rejuvenate spawning riffles and to inundate floodplain terraces to provide nutrients and rearing habitat for juvenile salmonids. The Corps has limited controlled flood releases from New Melones Dam to 8,000 cfs. The dampening of flood events also eliminates or reduces the intensity and duration of freshets and storm flows that would otherwise convey smolting CV steelhead to the ocean and create a clear signature for the river. A more moderated hydrograph has eliminated periodic channel forming flows. The dams (a future baseline condition) capture sediment that would otherwise be transported downstream for geomorphic processes. Operations of the dams result in channel incision that further reduces the chance of inundated floodplain habitat and degrades spawning habitat quality. Releases from New Melones can affect downstream temperatures at critical times to affect adult migration, spawning, egg incubation success, juvenile survival and anadromy. Predicted increases in temperature as a result of climate change will affect instream water temperatures directly, and will affect New Melones operations as more precipitation will fall as rain, rather than snow, and as storm event intensity is expected to increase. Climate change may affect the types and cover rates of vegetation upslope of the river, potentially increasing the rate of fine sediment transport to the river and to spawning areas. Future baseline stressors that are exacerbated by the proposed East Side Division operations include increased vulnerability to non-native fish predators

1 owing to flow velocities and downstream temperatures
2 conducive to these species and competition from resident O.
3 mykiss, which may be more abundant as a result of less
 variability in instream conditions.

4 BiOp at 300-301 (emphasis added). The subsequent pages provide more
5 specific support for these conclusions. *Id.* at 302-309.

6 SR Plaintiffs specifically challenge only one aspect of this
7 analysis; NMFS's reliance on a 2001 Kondolf, *et al.* study to support
8 the assertion that available steelhead spawning gravel habitat
9 decreased 40% since 1994. BiOp at 308. Kondolf, *et al.* (2001)
10 concluded that spawning gravel habitat decreased 40% between 1972 and
11 1993, and thereafter decreased by a smaller percentage, within the
12 study's margin of error, between 1993 and 2000, excluding gravel
13 augmentation efforts. The significance of this minor error to SR
14 Plaintiffs' argument is unclear. The BiOp does not specifically
15 attribute this 40% loss to Project operations. Rather, later in the
16 same paragraph, NMFS explains with specificity the ongoing impact of
17 dam operations:
18 dam operations:
19

20 Operational criteria have resulted in channel incision of 1-
21 3 feet since the construction and operation of New Melones
22 Reservoir (Kondolf *et al.* 2001). This downcutting, combined
23 with operational criteria, have effectively cut off overbank
24 flows which would have inundated floodplain rearing habitat,
25 as well as providing areas for fine sediment deposition,
26 rather than within spawning gravels, as occurs now.
27 Additionally, the flow reductions in late spring and early
28 summer are too rapid to allow recruitment of large riparian
 trees such as Fremont cottonwoods. Consequently, within 10
 to 20 years as existing trees senesce and fall, there will
 be no younger riparian trees to replace them, resulting in
 less riparian shading, higher instream temperatures, less
 food production from allochthonous sources, and less LWD for
 nutrients and channel complexity[.]

1 BiOp at 308.

2
3 SR Plaintiffs do not dispute the science underlying this
4 conclusion, nor do they suggest that the impacts of operations, per
5 se, are *de minimis*. Rather, they argue that the real issue is
6 whether the amount of New Melones water within Reclamation's
7 discretion is significant enough to cause appreciable harm to CV
8 Steelhead and/or appreciable diminishment of its critical habitat.
9 See Doc. 492 at 4-6. The median historical unimpaired runoff in the
10 Stanislaus River Basin is 1.1 million acre feet per year ("MAFY").
11 BiOp App. 1 at 69. OID and SSJID are legally entitled to the first
12 600,000 AF. USBR AR 011751-53. In addition, Reclamation must release
13 between 98,300 and 302,000 AF for fish pursuant to its agreement with
14 CDFG. BiOp App. 1 at 71. Additional releases may be required to meet
15 dissolved oxygen criteria and D-1641. BiOp App. 1 at 72-73, 76-77.³⁴

16
17 Federal Defendants concede that these mandatory delivery
18 requirements do exist, but emphasize that Reclamation nonetheless
19 possesses discretion over how those releases are made. See Doc. 515
20 at 49. For example, while OID and SSJID have an entitlement to
21 600,000 AF, past water use data demonstrates that this full amount is
22 not always requested, which in turn changes the amount of water
23
24

25 ³⁴ SR Plaintiffs mention further legal constraints on the Bureau's use of water set
26 forth in the September 30, 2009 Federal Circuit Ruling, *Stockton E. Water Dist. v.*
27 *United States*, 583 F.3d 1344 (Fed. Cir. 2009), which post-dates the June 4, 2009
28 issuance of the BiOp by several months. See Doc. 492 at 6 (discussing holding that
Reclamation does not have discretion to breach SEWD CVP contract to comply with the
ESA). Those subsequent constraints and their future effects do not apply to the
reasonableness of the BiOp when issued.

1 available for other beneficial uses. See Hilts Decl., Doc. 480, Ex.
2 1 (showing that during the 1987-1992 drought, OID and SSJID never
3 requested full allocation). In addition, Reclamation has the ability
4 to request temporary exemptions from SWRCB conditions such as for
5 dissolved oxygen and Vernalis flow objectives when warranted, and
6 assumptions to reflect this option were inserted into the CalSim II
7 modeling for the Stanislaus River. Fifth Milligan Decl., Doc. 479 at
8 ¶¶ 7-8; Hilts Decl., Doc. 480 at ¶ 12. Defendants do not suggest
9 these are not *Home Buidlers* non-discretionary obligations on
10 Reclamation.
11

12 SR Plaintiffs argue that NMFS must independently demonstrate that
13 discretionary operations alone satisfy the jeopardy/adverse
14 modification standard. This contention was rejected above. The ESA
15 does not require the agency to segregate discretionary from non-
16 discretionary impacts for the purposes of the effects analysis.
17 (Whether an agency can implement an RPA within its legal authority if
18 an insufficient amount of discretionary water is available is a
19 different question.) Given that there is some discretionary water in
20 the New Melones system and that Reclamation authority over how make
21 discretionary deliveries, is there enough discretionary project water
22 to cause appreciable harm to the species?
23
24

25 The BiOp identifies several negative impacts caused by Project
26 operations, including increasing the likelihood that CV Steelhead will
27 be exposed to unfavorable temperatures at various life stages and, by
28

1 lowering instream flows, the amount of energy juveniles and smolts
2 must expend to avoid predation is increased. BiOp at 301. SR
3 Plaintiffs do not challenge these underlying findings. The BiOp does
4 not have to demonstrate that these negative effects, alone, satisfy
5 the jeopardy standard by "reduc[ing] appreciably the likelihood of
6 both the survival and recovery of [the] listed species in the wild by
7 reducing the reproduction, numbers, or distribution of that species."
8 Rather, the jeopardy analysis must determine the overall impact on the
9 species of the entire project, not just the New Melones unit. See 50
10 C.F.R. § 402.14 (NMFS's obligation during formal consultation is to
11 determine "whether the action, taken together with cumulative effects,
12 is likely to jeopardize the continued existence of the listed species
13 or result in the destruction or adverse modification of critical
14 habitat").
15
16

17 SR Plaintiffs' motion for summary judgment that the BiOp's
18 effects analysis is unlawful because it does not properly distinguish
19 between baseline effects and effects of the action is DENIED; Federal
20 Defendants' and Defendant-Intervenors' cross motions are GRANTED on
21 this issue.
22

23 2. Challenge to Critical Habitat Adverse Modification Finding.

24 SR Plaintiffs complain that NMFS has not specifically identified
25 how the proposed action will cause "adverse modification" to the
26 steelhead's critical habitat. Doc. 492 at 7-9.³⁵
27

28 ³⁵ Defendant-Intervenors and Federal Defendants suggest that SR Plaintiffs' opening
228

1 a. Spawnable Area.

2 SR Plaintiffs first challenge aspects of the BiOp's treatment of
3 the "spawnable area" aspect of CV Steelhead critical habitat. Doc.
4 492 at 8. The BiOp found that steelhead spawning habitat would be
5 "maximized" if instream flows were maintained at 200 cfs. However,
6 operations for the protection of fall-run Chinook require higher flow
7 rates may "conflict" with the needs of steelhead. BiOp at 311. SR
8 Plaintiffs argue that habitat "maximization" is not a requirement of
9 the ESA and is not relevant to the effects analysis. Doc. 492 at 8.
10 NMFS does not explain why it set the benchmark for evaluating project
11 impacts at the spawning habitat "maximum." To ascertain whether
12 project operations will impact the likelihood of CV steelhead survival
13 and recovery, the more appropriate benchmark is that amount of habitat
14 that is "essential" for survival and recovery. The BiOp does not
15 identify the extent of this "essential" habitat or how it relates to
16 the "maximum" habitat. The use of the "maximum" habitat benchmark
17 necessarily resulted in a finding of adverse modification to this
18 aspect of CV habitat. That finding is not justified.

19 SR Plaintiffs motion for summary judgment that the record does
20 not support NMFS's findings regarding spawnable area is GRANTED;
21
22 Federal Defendants' and Defendant-Intervenors' cross motions are

23
24
25 brief failed to challenge NMFS's determination that the actin would adversely
26 modify CV steelhead critical habitat. Doc. 484 at 88 & Doc. 515 at 53. However,
27 although the critical habitat analysis was not a direct subject of discussion in SR
28 Plaintiffs' opening brief, that brief did directly challenge the effects analysis
regarding the Stanislaus River, which includes both effects on the species and
critical habitat. Defendant-Intervenors' discussion of critical habitat as an
alternative justification for the RPAs, Doc. 484 at 82-85, invites SR Plaintiffs'
discussing critical habitat in reply.

1 DENIED.

2
3 b. Spawning Gravel Quality and Quantity.

4 SR Plaintiffs dispute the BiOp's findings related to "Spawning
5 Gravel Quality and Quantity." The entire section on this topic
6 provides:

7 Pebble counts and sediment size analysis of spawning areas
8 has shown an increase in sand and fine material in spawning
9 beds since construction of New Melones Dam (Kondolf *et al.*
2001, Mesick 2001). Most non-enhanced riffles had sufficient
fine material to impair egg incubation and survival.

10 Gravel replenishment actions below Goodwin Dam add suitably-
11 sized gravel for CV steelhead spawning, but it is rapidly
mobilized at flows as low as 280 cfs (Kondolf *et al.* 2001).
12 CVPIA spawning gravel additions have targeted 3,000 cubic
yards per year. This is not of sufficient volume to offset
13 the deficits created by the loss of recruitment from
upstream sources (over 1 million cubic yards, Kondolf *et*
14 *al.* 2001). At best, these additions may strategically
maintain the quality of few spawning riffles. The project
15 description does not specify a level of spawning gravel
addition to be performed on the Stanislaus River.

16 BiOp at 311. SR Plaintiffs contest the BiOp's reliance on the 2001
17 Kondolf, *et al.* study to find that an increase in fine material in
18 spawning beds since the construction of New Melones impairs egg
19 incubation and survival. *Id.* at 311. Federal Defendants acknowledge
20 that the loss of gravel recruitment from upstream sources is not the
21 result of the proposed action. See Doc. 515 at 51. However, Federal
22 Defendants argue that "continuing discretionary flow releases
23 eliminates the variability which replenishes spawning riffles," *id.*,
24 citing page 301 of the BiOp, which discusses how "[t]he dampening of
25 flood events and freshets eliminates the geomorphic processes that are
26 important to CV steelhead to replenish and rejuvenate spawning riffles
27
28

1 and to inundate floodplain terraces to provide nutrients and rearing
2 habitat for juvenile salmonids." Page 301 includes this finding, but
3 the section of the BiOp challenged by SR Plaintiffs, at page 311,
4 specifically discusses gravel recruitment (i.e. the volumes of gravel
5 present), not "riffle rejuvenation." There is no record evidence that
6 loss of gravel recruitment is an effect of the action. This effect is
7 completely without support and the purported impact of any changed
8 analysis on the overall critical habitat discussion must be addressed
9 by NFMS on remand.
10

11 SR Plaintiffs motion for summary judgment that the record does
12 not support NMFS's finding that New Melones operations effect gravel
13 recruitment is GRANTED; Federal Defendants' and Defendant-Intervenors'
14 cross motions are DENIED on this issue.
15

16 c. Challenge to Temperature Requirements for Spawning
17 Habitat.

18 SR Plaintiffs also purport to challenge the BiOp's finding
19 regarding "degradation of rearing habitat conditions," but actually
20 advance arguments about temperature requirements for spawning habitat.
21 See Doc. 492 at 9. The BiOp explains that "[b]ecause CV steelhead
22 are unable to reach their historical spawning areas above Goodwin Dam,
23 they are dependent on East Side Division operations maintaining
24 temperatures suitable for spawning below the dam..." and concludes
25 that appropriate temperature conditions likely cannot be met for April
26 and May for future operations. BiOp at 310. SR Plaintiffs argue
27 "NMFS fails to explain whether or not these 'temperature conditions'
28

1 will be met with the proposed operations or whether there is any
2 evidence that temperatures, as the result of existing operations, have
3 been detrimental to steelhead." Doc. 492 at 9. This argument
4 entirely ignores the four-and-a-quarter page discussion of temperature
5 at BiOp pages 302 through 306, discussing results of computer modeling
6 showing that project operations will result in temperature exceedances
7 that will have detrimental effects on certain life stages of CV
8 steelhead in the Stanislaus. This challenge is without merit.

9
10 SR Plaintiffs motion for summary judgment that the record does
11 not support NMFS's findings regarding New Melones operations' impacts
12 on temperature conditions in spawning habitat is DENIED; Federal
13 Defendants' and Defendant-Intervenors' cross motions are GRANTED on
14 this issue.

15
16 d. Freshwater Migration Corridors.

17 SR Plaintiffs challenge the BiOp's finding that proposed
18 operations will negatively affect upstream and downstream migration
19 corridors. The relevant section of the BiOp provides:

20
21 Under proposed operations the freshwater migration corridors
22 on the Stanislaus River will continue to require juvenile CV
23 steelhead to pass through predator-rich abandoned mining
24 pits, incised channels that limit channel complexity and
25 water temperatures that may be physiologically lethal or
26 sublethal. The spring pulse flows defined in VAMP are
27 generally less than the spring pulse flows measured in 1989,
28 a critically dry year (Kondolf *et al.* 2001), hence the
operational assistance provided to assist CV steelhead
outmigrants is only representative of the lowest migratory
volumes historically experienced by CV steelhead.

Channel incision resulting from post New Melones operations
has produced overhanging large wood and river edge aquatic
vegetation but the lack of scouring and channel forming

1 flows has effectively channelized and simplified the
2 corridor. The variety of habitats that allow them to avoid
3 high flows, avoid predators, successfully compete, begin the
4 behavioral and physiological changes needed for life in the
5 ocean, and reach the ocean in a timely manner has been
6 limited by operational conditions. Obstruction of access to
7 historic spawning and rearing habitat requires CV steelhead
8 to utilize these freshwater migration corridors at times
9 that may not be optimal with respect to temperature, forage
10 availability and exposure to predators.

11 Adult CV steelhead migrating upstream frequently are delayed
12 entering the river owing to poor water quality conditions in
13 the Delta. Fall attraction flows released for Fall Run
14 typically improve conditions for steelhead migration also,
15 hence steelhead tend to be observed on the Stanislaus River
16 earlier in the year than in other Central Valley streams.

17 BiOp at 312-13. SR Plaintiffs argue "there is nothing in the AR that
18 indicates that existing operations have negatively affected upstream
19 or downstream migration to begin with, let alone that future
20 operations will 'continue' to do so." Doc. 492 at 9. SR Plaintiffs'
21 argument continues:

22 ...[T]he AR reveals that as to fall attraction, existing
23 pulse flows for fall-run salmon appear to also attract
24 steelhead (BO at 625). Nonetheless, NMFS imposes additional
25 fall pulse-flows to attract steelhead. (BO at 624). For out-
26 migration, the BO explains that steelhead are larger than
27 fall-run smolts and may be less dependent on pulse flows to
28 convey them out of the Stanislaus River (Id.). Without any
evidence that the existing population of steelhead in the
Stanislaus River that has been unable to outmigrate due to
impaired flows, the BO states that the late spring flows in
Action III.1.3 are needed to "allow more smolted fish to
migrate out of the system."

Doc. 492 at 9. The pages cited by SR Plaintiffs are from the section
of the BiOp discussing the need for the RPA Actions. SR Plaintiffs do
not challenge the clearly explained conclusions of the effects
section. Project operations reduce spring pulse flows to levels that
are below normal migratory flows, and the flow regime implemented by
Reclamation under the action results in channel incision, which

1 reduces connection to floodplain areas necessary for steelhead to rear
2 to large enough size to begin the smolting process. BiOp at 312-13.

3 SR Plaintiffs motion for summary judgment that the record does
4 not support NMFS's finding that New Melones operations effect
5 downstream migration corridors is DENIED; Federal Defendants' and
6 Defendant-Intervenors' cross motions are GRANTED.
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8 D. Stanislaus River RPA Challenges.

9 1. Challenge to the Assumptions Used to Model New Melones
10 Project Operations.

11 SR Plaintiffs' claim that NMFS used a flawed project description
12 for New Melones and that this "fundamental error renders the entire
13 consultation for the New Melones unit erroneous." Doc. 454 at 17.
14 This objection concerns the assumptions used to represent New Melones
15 operations in computer modeling.

16 In 1997, Reclamation and FWS adopted an Interim Plan of
17 Operations to guide the annual operations for New Melones ("NMIPO").
18 Although the NMIPO was only a two-year plan, it is still used today as
19 an operational guide. USBR AR 0007573-74. Reclamation has deviated
20 from NMIPO in recent years to provide more water to meet State Water
21 Resources Control Board ("SWRCB") conditions and fulfill CVP
22 Contracts, USBR AR 0007575. The 2008 OCAP BA described the modified
23 operating plan that was the subject of consultation as a "Transitional
24 Operating Plan" ("TOP"). See USBR AR 0007513. The TOP differs from
25 the NMIPO in several ways, which are described in Table 2-11 of the
26 BA. USBR AR 0007576. SR Plaintiffs note that under the NMIPO,
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1 allocations to CVP contractors are capped at 90,000 af, while under
2 the TPO Reclamation provides for the full 155,000 AF allocation in
3 "high allocation years." *Id.*

4 It is undisputed that NMFS used the TOP as the basis for its
5 effects analysis. *See* Doc. 477-1 at 119; Doc. 492 at 4. SR
6 Plaintiffs object instead to NMFS's decision to use the NMIPO
7 assumptions to model RPA options. NMFS elected to use the NMIPO
8 assumptions after it concluded that the TPO would not provide
9 sufficient water for fishery needs in 59% of years. BiOp at 306. The
10 BiOp explained that a 1993 study by Aceituno applied the so-called
11 "instream flow incremental methodology" to the Stanislaus River
12 between Riverbank and Goodwin dam and "determined that 155 TAF was
13 needed to maximize weighted usable habitat area for salmon, not
14 including outmigration flows or fall attraction flows." *Id.* The
15 BiOp then determined that the proposed allocation strategy for the
16 East Side Division under the TPO only commits to providing this level
17 of water for fisheries in 41 percent of years (meaning insufficient
18 supplies would be present in 59% percent of years). *Id.*

19 SR Plaintiffs assert in a footnote that this conclusion is
20 "bogus" because NMFS did not explain to "[w]hich fisheries" it was
21 referring, nor how much water is "sufficient." Doc. 492 at 4 n. 4.
22 More importantly, the BiOp nowhere explains why it is "essential" to
23 achieve flows designed to "maximize" steelhead habitat area. Is the
24 status of the species so dire that improvement to 60, 70, 80, or 90%

1 of the "maximum" would be insufficient, even if that marginal
2 difference from the maximum saved large amounts of water? The record
3 provides no explanation of the decision to aim for "maximum" habitat
4 in a system of limited resources. This must be specifically addressed
5 and explained on remand.

6
7 NMFS admits that the modeling used to support the RPA builds upon
8 this unexplained decision to set a "maximum habitat" goal. Doc. 477-1
9 at 119. The agency's own internal guidance requires an explanation
10 why operating to this goal is "essential." None is provided. It is
11 impossible to determine how a change in this goal impacts the overall
12 rationale for the RPA. This too must be addressed on remand.

13 SR Plaintiffs' motion for summary judgment that Federal
14 Defendants erred by modeling RPA actions based on inappropriate
15 assumptions is GRANTED. Federal Defendants' and Defendant-
16 Intervenor's cross motions are DENIED.

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19 2. Do Actions III.1.2, III.1.3, and IV.1.2 Improperly Require
20 Reclamation to Infringe Upon OID and SSJID's Prior Right to
21 Stanislaus River Water in violation of 50 C.F.R. § 402.02?

22 "Reasonable and prudent alternatives refer to alternative
23 actions identified during formal consultation [1] that can be
24 implemented in a manner consistent with the intended purpose of the
25 action, [2] that can be implemented consistent with the scope of the
26 Federal agency's legal authority and jurisdiction, [3] that [are]
27 economically and technologically feasible, and [4] that the Director
28 believes would avoid the likelihood of jeopardizing the continued

1 existence of listed species or resulting in the destruction or adverse
2 modification of critical habitat." 50 C.F.R. § 402.02 (the "four RPA
3 requirements").

4 SR Plaintiffs claim that Actions III.1.2, III.1.3, and IV.1.2
5 exceed Reclamation's legal authority because they require Reclamation
6 to infringe upon OID and SSJID's prior (superior) water rights in the
7 Stanislaus River. It is undisputed that OID and SSJID hold perfected
8 water rights to Stanislaus River water that are senior to
9 Reclamation's rights to divert from the Stanislaus. OID and SSJD
10 receive water from New Melones under a 1988 Agreement with the United
11 States designed to fulfill their prior rights. USBR AR 0007571-72;
12 USBR AR 0011751. That agreement requires Reclamation to provide to
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- The inflow into New Melones plus the amount derived by the formula of (600,000 minus inflow) divided by 3, not to exceed 600,000 AF per year, USBR AR 011751; and
- The right to conserve up to 200,000 AF in New Melones, USBR AR 011752.

SR Plaintiffs point to studies in the record that they claim indicate the RPAs will require Reclamation to short OID and SSJID 13,000 AF on average. AR 00219154. They maintain that this is actually an under-estimate of the amounts they will be shorted under the Stanislaus River RPA Actions because of certain of NMFS's modeling assumptions. Specifically, the modeling assumed:

- (1) OID and SSJID's senior water rights would be shorted;
- (2) non-compliance with a Court order to limit non-flood flows to no more than 1500 cfs
- (3) relaxation of dissolved oxygen ("DO") requirement that is a condition of Reclamation's water right for New Melones;
- (4) a successful petition to the SWRCB to relax D-1641 salinity requirements at Vernalis; and
- (5) a successful petition to the SWRCB to relax D-1641 flow requirements at Vernalis.

Doc. 492 at 13.

Neither the underlying study purportedly demonstrating that water rights will be shorted, nor the inclusion of the listed modeling assumptions require Reclamation to short senior water rights or demonstrated that it is likely they will be unable to comply with the RPA without doing so. The study cited by SR Plaintiffs was restricted to modeling two years, 2010-2011, when the Phase I requirements of Action IV.2.1 were in place. AR 00219154. Reclamation complied with the RPA during this period and there is no indication that Reclamation shorted senior water rights. More to the point, neither NMFS nor the Bureau has discretion to violate these water rights. It is inappropriate to speculate they will break the law.

As for the modeling assumptions, each is justified based on past practice and experience and has long been included in the CALSIM II modeling process. The Calsim II model inputs do not assume that OID and SSJID's rights will be shorted. They cannot be. Rather, the RPAs assume that demand from these districts will be reduced under certain circumstances, based upon land use projections developed by the

1 California Department of Planning and Local Assistance. Hilts Decl.,
2 Doc. 480 at ¶ 6 ("hydrology-land-use-demand input [data] set ... was
3 best available... [and] suggest that OID and SSJID will not use their
4 full entitlement in most years"); Fifth Milligan Decl., Doc. 479 at ¶
5 5 (SR Plaintiffs' expert Mr. Steiner participated in 2005 update of
6 land use demand assumptions, which were used in the BA and relied upon
7 in the BiOp). In addition to the land-use based assumptions, the
8 relevant modeling included assumptions designed to reasonably reflect
9 water usage by the Stanislaus basin stakeholders during sustained dry
10 periods. Hilts Decl., Doc. 480 at ¶ 10.

12 SR Plaintiffs cite a number of cases in which mitigation measures
13 were deemed unsatisfactory to satisfy an agency's burden to insure
14 against jeopardy because those measures were not "reasonably specific,
15 certain to occur, [] capable of implementation, [and] subject to
16 deadlines or otherwise-enforceable obligations...." *Ctr. for*
17 *Biological Diversity v. Rumsfeld*, 198 F. Supp. 2d 1139, 1152-54 (D.
18 Ariz. 2002). But, the cases cited are distinguishable, and it is
19 unclear whether the "reasonably certain to occur" language should be
20 applied to RPAs. *Rumsfeld* concerned a biological opinion's "no
21 jeopardy" finding that relied upon the action agency to mitigate
22 groundwater impacts of its activities through participation in a
23 regional plan to protect groundwater resources, despite the fact that
24 the action agency had no authority to ensure the regional plan was
25 implemented. Nor did the biological opinion set any goals or
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1 deadlines regarding groundwater protection. *Rumsfeld* reasoned that
2 necessary mitigation measures designed to prevent adverse impacts to
3 groundwater must be identified and included either in the proposed
4 action or as RPAs. *Id.* at 1154. Without these adjustments there was
5 no rational basis for the "no jeopardy conclusion." *Id.* *Rumsfeld*
6 address the requirements for mitigation measures, not RPAs. *See also*
7 *NWF v. NMFS*, 254 F. Supp. 2d 1196, 1213-14 (D. Or. 2003) (requiring
8 reasonable certainty when NMFS relied upon off-site federal actions to
9 conclude that jeopardy will not occur).

11 *Rumsfeld* relied upon *Sierra Club v. Marsh*, 816 F.2d 1376 (9th
12 Cir. 1987), which addressed whether an agency was required to
13 reinitiate formal consultation after failing to acquire certain
14 mitigation lands. Those lands were considered a "vital" RPA by FWS in
15 its biological opinion concerning the agency's action. *Id.* at 1378.
16 *Marsh* explained that the "reasonably certain to occur" standard
17 applies to "[i]ndirect effects ... caused by the proposed action," not
18 to RPA actions. *See id.* at 1388 (citing 50 C.F.R. § 402.02).
19 Rather, *Marsh* applied the regulatory criteria from 50 C.F.R § 402.16
20 to determine whether the action agency unlawfully failed to reinitiate
21 consultation. *Id.* at 1388-89.

24 Even if reasonable certainty is the benchmark, it is satisfied
25 here. The RPAs in question here require Reclamation to use its own
26 water resources for particular purposes. Reclamation has reasonably
27 examined past patterns of Project water use by third parties and
28

1 concluded that water will be available to implement the RPAs. See
2 *S.W. Ctr. for Biological Diversity v. U.S. Bureau of Reclamation*, 143
3 F.3d 515, 518-19 (9th Cir. 1988) (upholding generalized RPA requiring
4 agency to protect 1,400 acres without identifying the particular
5 location or timeframe). SR Plaintiffs have not demonstrated that
6 reliance on past practice is unreasonable. If, however, Reclamation's
7 predictions prove incorrect and make the RPAs' implementation
8 infeasible, the burden cannot be imposed on senior water rights
9 holders. Rather, Reclamation must then re-initiate consultation.

11 Federal Defendants have reasonably explained the remaining
12 modeling assumptions about acquisition of waivers from the SWRCB
13 regarding dissolved oxygen and D-1641 flow and salinity requirements.
14 Fifth Milligan Decl., Doc. 497 at ¶ 7-8; Hilts Decl., Doc. 48 at ¶ 12
15 (explaining it is "reasonable to assume the SWRCB will take a holistic
16 approach and grant such petitions" under relevant conditions). This
17 is speculation and may be mistaken, however the law does not require
18 more. If no Petitions are granted, absent available existing water,
19 NMFS must reinitiate consultation. SR Plaintiffs have not
20 demonstrated that these assumptions were clearly erroneous.

22 SR Plaintiffs' final challenge to the modeling assumptions is
23 based on a March 10, 1982 injunction imposed in *United States v.*
24 *California*, purportedly requiring Reclamation to limit non-flood
25 flows to no more than 1,500 cfs. It is undisputed that Action III.1.3
26 calls for spring pulse flow releases as high as 5,000 cfs, BiOp at
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1 623, Fig. 11-1, and Action IV.1.2 requires releases from New Melones
2 to meet higher Vernalis flow rates, BiOp at 642.

3 The Ninth Circuit's March 10, 1982 injunction "pending
4 determination of appeal," required the United States to provide the
5 State of California with a plan to protect downstream property from
6 damage caused by inundation or seepage. SR Plaintiffs' Request for
7 Judicial Notice ("SRJN"), Doc. 453-7, Ex. 7 at 2. That plan, set
8 forth in a February 1982 memo drafted by the Bureau, indicated that
9 flows above 1,500 cfs would "create water tables high enough to have
10 the potential to damage the almond and walnut orchards adjacent to the
11 [Stanislaus] river." *Id.*, Ex. 8, at 1.³⁶ But, the injunction, by its
12 own terms, was limited to the time period pending appeal. The appeal
13 was decided nine months later on December 20, 1982. 694 F.2d 1171
14 (9th Cir. 1982). The Ninth Circuit's remanded with instructions that
15 "[t]he injunction previously issued by the court may be modified or
16 amended by the district court as it deems necessary and appropriate in
17 view of this opinion and the present circumstances of the dam and its
18 storage facility," *id.*, but there is no evidence in the record that
19 the district court ever imposed a similar 1,500 cfs ceiling on non-
20 flood flows. NMFS reasonably concluded that the limitation no longer
21 applies and could be omitted from Stanislaus River modeling.³⁷ This
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26 ³⁶ Both SRJN Exhibit 7 and 8 are public records subject to judicial notice for their
27 content. *San Luis Unit Food Producers v. United States*, 77 F. Supp. 2d 1210, 1216
28 n.1 (E.D. Cal. 2011).

³⁷ SR Plaintiffs cite a May 2009 Memo authored by NMFS's Rhonda Reed, which
discussed the purported 1,500 non flood flow limit:

1 is not the appropriate forum for SR Plaintiffs to attempt to enforce a
2 nineteen-year-old injunction, which has no continuing validity.

3 SR Plaintiffs' motion for summary judgment that the RPA
4 improperly requires Reclamation to infringe on OID and SSJID's prior
5 rights to Stanislaus River water is DENIED; Federal Defendants' and
6 Defendant-Intervenors' cross motions are GRANTED.
7

8 3. Use of the San Joaquin River Temperature Model.

9 Federal agencies must use "the best scientific and commercial
10 data available" in developing reasonable and prudent alternatives. 16
11 U.S.C. § 1536(a)(2); 50 C.F.R. §402.14(g)(8). SR Plaintiffs assert
12 that Federal Defendants did not use the best available science in
13 formulating the Stanislaus River RPAs because they did not model the
14 feasibility of the RPAs using the San Joaquin River Water Temperature
15 Model ("SJRWTM").
16

17 There is no dispute that temperature modeling is critical to the
18 management of the Stanislaus River and to implementation of the
19 Stanislaus River RPAs. NMFS relied on Reclamation's "USBR Temperature
20 Model," to run an operational scenario involving a draft RPA for new
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23 Issues raised were his understanding that Reclamation couldn't exceed 1500
24 cfs because of seepage. Roger Guinee pointed out that the 1500 cfs cap
25 related to a ruling in a judgment that applied only to the period that New
26 Melones reservoir was filling, and no longer applies (per Jim Monroe, FWS).
27 Kaylee Allen (Reclamation) said she was researching the issue and wasn't sure
28 of outcome. I asked how long it takes for high flows to cause seepage
problems. Ron was not definite, but implied about ten days.

AR 105885. SR Plaintiffs erroneously assert that this paragraph indicates that an
NMFS scientist, Roger Guinee, offered a "legal opinion" that the injunction no
longer applied. In fact, the paragraph states that the legal opinion came from Jim
Monroe, a federal government attorney.

1 minimum flow releases on the Stanislaus. AR 00105890.

2 SR Plaintiffs' expert, Avery Dotan, opines that no reasonably
3 prudent modeler would choose to use the USBR Temperature Model, which
4 can only simulate the mean monthly vertical temperatures, to assess
5 the feasibility of meeting a seven-day average daily maximum
6 temperature requirement, such as Action III.1.2. See Dotan Decl.,
7 Doc. 442 at ¶¶ 53-58

8
9 The agencies had numerous discussions throughout 2009 regarding
10 temperature modeling, including some specific requests to look into
11 the use of the SJRWTM. See, e.g., AR 00065939 (Feb. 6, 2009 email
12 regarding modeling), 00070965, 00074969 (requesting use of a different
13 model), 00077217 (Feb. 18, 2009 email asking questions about "Derek's
14 model run"), 00077613 (Mar. 20, 2009 inquiry regarding application of
15 the SJRWTM), 00078887 (Mar. 29, 2009 email containing information
16 about SJRWTM), 00079052 (Mar. 27, 2009 email containing information
17 about SJRWTM), 00085078 (Apr. 10, 2009 email asking for assistance
18 from "Don Smith and Avry Dotan" as the "SJR-Basin wide temperature
19 modelers"). CalFed's Science Program held a special workshop on
20 temperature modeling for the BO in April 2008 and advised the agencies
21 to utilize the "latest technology" in temperature modeling, including
22 adopting models with "smaller time-steps to better assess biological
23 effects." AR 00038723. The CalFed Science Review Panel, in reviewing
24 the draft BiOp, specifically recommended that Federal Defendants
25 utilize the SJRWTM, a sub-daily temperature model developed for the
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1 Stanislaus River by Avry Dotan and Resources Management Associates.
2 See AR 00219651. Several federal agencies, including NMFS, FWS, and
3 Reclamation, participated in its development. Dotan Decl., Doc. 442
4 at ¶¶ 6, 23-34. The model was funded by CalFed and peer reviewed by
5 CalFed scientists. *Id.* at ¶¶ 24, 21, 26.

6
7 The SJRWTM could have modeled temperatures on a seven-day average
8 daily maximum basis, a more appropriate time scale according to Mr.
9 Dotan. *Id.* at ¶¶ 53, 80. SR Plaintiffs assert that the SJRWTM was
10 the best available science and should have been used to evaluate the
11 feasibility of the RPA actions.

12 The model runs in the AR using the USBR Temperature Model predict
13 that the new flow requirements in Action III.1.3 will occasionally
14 cause temperatures to exceed the objectives set forth in Action
15 III.1.2. Dotan Decl., Doc. 442 at ¶¶ 73-77. Mr. Dotan opines that
16 these results are unreliable because the model could only predict
17 monthly mean temperatures and was not capable of determining when the
18 seven-day average daily maximum temperature was or was not met. *Id.*
19 at ¶¶ 52-72. To demonstrate that this error is material, Mr. Dotan
20 repeated the analysis using the SJRWTM. The results of this analysis
21 are depicted in Figure 7 to his Declaration, which shows that in
22 February, March, April, May, June, July, August, and September the
23 Bureau's model estimates fewer exceedances than does the SJRWTM.
24 Doc. 441-15. (Mr. Dotan does not discuss the fact that this figure
25 also shows that in October and November, the SJRWTM indicates fewer
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1 exceedances than the Bureau's model. *Id.*)

2 The SJRWTM model also predicts that the water cost associated
3 with meeting Action III.1.2 vary between 22,000 - 190,000 AF per year
4 with an average cost of 84,000 AF, Dotan Decl., Doc. 442 at ¶ 87; that
5 operating for temperature control will deplete the volume of water in
6 New Melones by as much as 717,000 AF during 1987-1995, *id.* at ¶¶ 86;
7 and that this successive operation for temperature control will
8 eventually cease to be effective as New Melones' pool of cold water is
9 depleted, *id.* at ¶¶ 89.

11 Federal Defendants do not dispute the superiority of the SJRWTM.
12 Rather, they strenuously object that contemporaneous documents in NMFS
13 administrative record demonstrate that the model was not "available"
14 to the agencies during the consultation. Doc. 477-1 at 131. Although
15 employees of the Federal Defendants were trained to use the model
16 between 2001 and 2009, Dotan Decl., Doc. 442 at ¶¶ 35-42, and Mr.
17 Dotan answered specific questions posed by NMFS and Reclamation
18 regarding the use of model, *see, e.g.*, NAR 00093319 & 00094138, there
19 were concerns that documentation of the complex model was insufficient
20 to allow others to run it, AR 00089101 (May 1, 2009 email indicating
21 "NMFS has the model" but discussing problems with the contract for
22 technical support); AR 00089027 (model in public domain but difficult
23 to run unassisted). The BiOp explains why it did not use the SJRWTM:

26 When evaluating the effect on salmonids of an operational
27 strategy on the Stanislaus River, [USBR] would normally take
28 the CalSim modeled results and conduct post-processing to
determine temperature effects. When we met in early March to

1 discuss the March 3 version of the RPA with the action
2 agencies, we requested help from [USBR] to do temperature
3 modeling on these flows using their tools. In subsequent
4 discussion with USFWS and CDFG, the need to perform
5 temperature modeling on these flows was also identified, but
6 NMFS and USFWS lacked internal expertise to perform the
7 modeling. CDFG was unable to assist with running the San
8 Joaquin River Basin temperature model because of funding
9 freezes. Tetra Tech was hired by NMFS to assist with such
10 activities...[but] [i]nsufficient time was available to them
11 to learn and apply the specifics of the operating model.

12 AR 00105884.

13 Record evidence demonstrates that the model was not self-
14 explanatory, even for staff with background in a related model used as
15 the basis for the SJRWTM: HEC-5Q. NMFS had to seek outside help to
16 use the model, and encountered implementation issues. See AR
17 00077320 (NMFS discussing hiring Tetra Tech to help run SJRWTM),
18 00092267 (NMFS seeking assistance from Bureau engineer with model),
19 00093101 (NMFS obtaining promise of documentation from FWS), 00093319
20 (Dotan answering NMFS's questions about application of model),
21 00093538 (discussing "numerous issues (above and beyond downscaling)
22 with bringing CalSim data into the SJ temp model"), 00094138 (Dotan
23 answering NMFS's questions about application of model). Once NMFS
24 engaged a consultant to run the modeling, the model's other co-
25 developer, Don Smith, resisted providing the assistance necessary to
26 run the model. See AR 00089096. In addition, the material provided
27 with the then-available version of the SJRWTM did not allow the model
28 to be correctly utilized. Reed Decl., Doc. 482 at ¶¶ 10-13.

SR Plaintiffs concede that Federal Defendants are only required

1 to use the best science available, and not the best science possible.
2 See Doc. 492 at 17 (citing *S.W. Ctr. for Biological Diversity v.*
3 *Babbitt*, 215 F.3d 58, 60-61 (D.C. Cir. 2000)). However, SR
4 Plaintiffs assert it "stretches credulity" to accept that the
5 Government was unable to run this model because:

6 [its] development began in 1999 with the assistance and
7 participation of Reclamation and FWS (Dotan Decl., ¶ 6),
8 [it] is based upon the HEC-5Q platform that has been around
9 since the 1980s and which is the platform of the USBR's
10 Upper Sacramento River Water Temperature Model used in this
11 consultation (Id., ¶ 8; BA, App. H, p. H-5), [it] was
12 completed for the Stanislaus River only in 2001 (Dotan
Decl., ¶ 19), and [it] has been used by Reclamation for its
Friant Restoration Project and Delta-Mendota Canal
Recirculation Project. (Dotan Decl. ¶ 33).

13 *Id.* This argument continues:

14 All of this, coupled with the fact that representatives from
15 NMFS, FWS and Reclamation sit on the TAC and Super TAC
16 committees overseeing the development and use of the SJRWTM,
17 and that employees from these agencies have received
18 specific training on how to run the model (Dotan Decl., ¶¶
19 36-43), shows that the Government's defense is, at best, one
of willful ignorance that should not be tolerated. Moreover,
the Government was told repeatedly to use a temperature
model with a smaller time-step, and specifically the
Stanislaus River portion of the SJRWTM, well before the BO
was due, yet the Government failed to do so at every turn.

20 In April 2008, the CALFED Science Program told the
21 Government that it needed to use the latest technology in
22 temperature modeling by utilizing models with smaller time-
23 steps (NMFS AR at 00038723), but the Government chose not to
24 take this advice in regards to the Stanislaus River. In
25 January 2009, a mere six months before the final BO was due
26 and eight months after the Science Program recommended using
27 models with shorter time-steps, a draft of the BO was
28 reviewed by the CALFED Science Review Panel. The Panel again
noted the paucity of relevant temperature data for the
Stanislaus River and specifically recommended that the
Government incorporate into the BO the "considerable
temperature work" that had been done on the Stanislaus River
with the Stanislaus River portion of the sub-daily SJRWTM.
(NMFS AR at 00219651). Again, the Government did nothing. In
fact, only in March 2009 - almost a full year after being
told to use a model with shorter timesteps and only three

1 months before the final BO was due - did the Government
2 finally have internal discussions with its modeler TetraTech
3 about its ability to conduct water temperature modeling for
4 the Stanislaus River. (Reed Decl., ¶ 15). Any inability to
run the SJRWTM has more to do with the Government's delay in
responding to the advice of the CALFED review teams than
with the Government's lack of knowledge or resources.

5 *Id.* at 17-18.

6 Ms. Reed, an NMFS employee with significant involvement in the
7 development of the BiOp disagrees with Plaintiffs' assessment of the
8 circumstances. She declares that the SJRWTM was not functionally
9 available during the consultation:
10

11 8. ... NMFS was aware of the development of the SJRWTM and
12 participated in some of the advisory group meetings, but
NMFS's attempts to use this model in developing the BiOp
were not successful.

13 9. NMFS disagrees with Mr. Dotan's assertion that the
14 November 2008 version of the SJRWTM was sufficiently
complete to utilize. Mr. Dotan states that the final version
15 of the SJRWTM was submitted to CALFED October 2009, months
after the June 4, 2009 completion date of the BiOp. Dotan
16 Decl. ¶ 43. He goes on to state that this version "was
almost identical" to the November 19, 2008 pre-release
17 version that he made available to stakeholders including
NMFS. Dotan Decl. ¶ 42. However, the flaws in the November
18 2008 version and supporting documentation made it so that
NMFS was unable to run the model.

19 10. On December 10, 2008, Mr. Craig Anderson,
20 hydrologist/modeler for NMFS, attended a Super TAC meeting.
Dotan Decl. Exhibit C. This was his first introduction to
21 the model and its availability. He subsequently downloaded a
version of the SJRWTM and documentation from the ftp site,
22 as directed by Mr. Dotan. Mr. Anderson forwarded this model
and associated information to Mustafa Faizullahoy at Tetra
23 Tech who was under contract with NMFS to conduct temperature
and other modeling related to the biological opinion
24 development. NMFS 85074-7. Mr. Faizullahoy has extensive
experience with developing, implementing, and evaluating
25 water quality and flow models for environmental analyses
including applications of the BASINS, QUAL2E, EFDC, and CE-
26 QUAL-W2 models amongst others. However, Mr. Faizullahoy had
substantial difficulty running the model based only on the
27 information provided at the ftp site and sought advice from
Mr. Dotan and Mr. Don Smith, Mr. Dotan's partner in
28 developing the model. NMFS 85074-77, 86560-1, 87111-3,

92267-8, 93310-18, 93319-20, and 94185.

11. The communication between NMFS, Mr. Faizullahoy, and the model developers reflects that the material was not self-explanatory, and that it was still in development mode. See e.g. NMFS 93319-20. For example, the Tetra Tech modeler had difficulty running the model because the documentation he received had an old version of a table necessary to run the model, which Mr. Dotan admitted "reflects our early work on the Stanislaus model." NMFS 93320. In any case, the model files made available on the FTP site did not include the source code necessary to fully evaluate model numerical schemes and mechanics and important pre-and post processing algorithms. Essentially, the pre-release modeling package contained compiled source code that limits an outside user's ability to effectively alter the model in any substantial way.

12. Mr. Dotan also asserts that he provided training to NMFS and Reclamation staff so that they should have known how to run the model as a result of this participation. Dotan Decl. ¶¶ 37, 39, 40, 41. NMFS disagrees with this contention. While staff participated in the coordination meetings during the development of the SJRWTM, Mr. Dotan's implication that attendees were all fully trained to run the model is incorrect. For example, in response to a request to run the SJRWTM to evaluate early versions of the RPA Actions, Mr. Dean Marston of the California Department of Fish and Game responded that DFG had no resources to run the model, despite the fact that Mr. Marston attended almost all the meetings. NMFS 77613-5; Dotan Decl. Exhibit C. Based on personal communication with other attendees of these trainings, I understand that these sessions were more like demonstrations of the model's features, rather than a training course intended to prepare the participant to be able to run the model (Pers. comm. Mr. Craig Anderson, now USFWS, and Mr. Russ Yaworsky, Reclamation).

13. In order to apply the SJRWTM to the RPA or to Reclamation's proposed action, the CalSim II results that govern allocations would have to be disaggregated from a monthly time step for use with the SJRWTM, which operates on a 6-hour time step. The manner in which the disaggregation is done is important, as indicated in Mr. Milligan's declaration. Milligan Decl. ¶9. The November 2008 documentation available for running the SJRWTM stated the following regarding using CalSim II data in the model:

"2.8 Using Addition Tools

The Dss file viewer, HecDssVue, is provided as a tool within the application for viewing and editing dss file data. It can be accessed through the Tool menu in the main HWMS application window. Downscale CalSim will also be included. This tool is used to modify the

CalSim output files for use in the HEC5Q model."

HWMS-HEC5Q User Interface at 8, Exhibit 1. This is the only reference to how to use CalSim II inputs to the model and it indicates that while a tool to downscale CalSim II information will be included in a future version of the model, it was not included in the version available in November 2008. In the absence of that data, there was no explanation which would have allowed NMFS staff to perform the disaggregation process on their own.

14. Mr. Dotan states that the SJRWTM has already been used in several proceedings, including the Stanislaus River studies, Friant Restoration Project, presentations for the SWRCB [303(d)/305(b)] workshop, and the USBR Delta Mendota Recirculation Project. However, Mr. Dotan does not disclose that the operation of this model was usually performed by Mr. Dotan or his partners who worked with him in the development of the code. Dotan Decl. ¶¶ 21, 25 and 33, SJRGA 2007 at 52, Exhibit 2. Their intimate and proprietary knowledge of the model made use of the model possible in those proceedings.

15. In November 2008, NMFS advertised a contract solicitation to contract for outside modeling expertise. This contract was announced on <http://www.gsa.gov/portal/content/103541>, a public website for advertising Federal contract opportunities. Mr. Dotan did not submit a bid as a direct contractor or subcontractor. NMFS could only have contracted for Mr. Dotan's services through this sort of public, competitive solicitation given that this model is based on public domain code and is intended to be nonproprietary. It would have been inappropriate for NMFS to attempt to justify contracting Mr. Dotan's services as a sole-source contractor. In December 2009, the contract was awarded to Tetra Tech Inc. Early efforts by Tetra Tech were focused on modeling the Shasta Reservoir carryover storage RPA actions. Initial, internal discussions regarding Stanislaus River water temperature modeling by Tetra Tech occurred in late March 2009 (see NMFS 77320-1), and an official response from Tetra Tech re: their ability to conduct said water temperature modeling occurred on April 16, 2009. NMFS 86560-1. As discussed above, Tetra Tech staff (primarily Mr. Faizullahoy) subsequently transmitted five emails to Mr. Anderson (NMFS 87111-3, 88597-602, 93310-18, 00093319-20, and 94185) containing model specific technical questions through the remainder of April 2009 into May 2009, with the final email transmission occurring on May 22, 2009 (NMFS 94185). Where appropriate, Mr. Anderson sought the assistance and technical advice of SJRWTM experienced practitioners, including Mr. Dotan. Despite these efforts neither NMFS nor their contractor was able to conduct runs with the SJRWTM for the BiOp analysis.

1 16. In summary, NMFS disputes that the model was
2 sufficiently available for use in the preparation of our
3 BiOp, without the direct and extensive intervention of the
4 developer, Mr. Dotan or his consulting firm, and he did not
5 choose to make his services available to NMFS through a
6 legal contracting process.

7 Reed Decl., Doc. 482.

8 NMFS claims it did not have the expertise and could not get Dotan
9 to respond. This is a factual dispute over whether NMFS could use the
10 model. There is no dispute using the shorter time step was the best
11 science. The Supreme Court has "repeated time and again, an agency
12 has broad discretion to choose how best to marshal its limited
13 resources and personnel to carry out its delegated responsibilities."
14 *Massachusetts v. EPA*, 549 U.S. 497, 527 (2007). Although the record
15 suggest that the resources required to run this model properly would
16 be modest, that the model results would be preferable to those
17 presented in the BiOp, and that NMFS had knowledge of the model for
18 over 8 years, a court does not have the authority to order the agency
19 how to direct and allocate its resources. Congress has chosen to
20 partially immunize such agency "mis-performance." SR Plaintiffs'
21 motion for summary judgment that Federal Defendants acted unlawfully
22 by failing to utilize the SRJWMTM is DENIED; Federal Defendants' and
23 Defendant-Intervenors' cross motions are GRANTED.

24 4. Exceptions Built into Action III.1.2.

25 Even if, *arguendo*, Federal Defendants' failure to employ the
26 SJRWMTM was unlawful, Federal Defendants alternatively argue that that
27 exceptions built into Action III.1.2 render any dispute over the model
28

1 used irrelevant. Action III.1.2 was developed to address the impacts
2 of adverse temperatures on the species. The temperature compliance
3 schedule is purportedly based on the species' biological and
4 physiological needs. Reed Decl., Doc. 482 at ¶¶ 3-4. Because the
5 modeling indicated that these temperatures could not always be
6 achieved, the RPA action has a built-in exception, which can be
7 exercised any time the temperature requirements of Action III.1.2 will
8 be exceeded on a three-day average daily maximum temperature. BiOp at
9 621. Operational adjustments to address such exceptions will be
10 coordinated through the SOG and WOMT. *Id.* NMFS concluded:
11

12 Because every year is a bit different, we determined that
13 matching temperature requirements to the appropriate life
14 cycle timing and providing for exceptions was an appropriate
15 way to provide necessary protections for listed species
16 while allowing for occasional off-ramps when meeting
17 temperatures was not feasible. That is, an approach using
18 feasibility-based exceptions to biologically-based
19 temperature criteria was deemed more protective.

20 Reed Decl., Doc. 482 at ¶ 29. Because the exception provision "has no
21 limitations," Federal Defendants argue it is immaterial whether the
22 SJRWTM would have shown more instances of exceeding the RPA Action's
23 seven-day average daily maximum temperatures. Doc. 477-1 at 133.

24 This argument presents a conflict between the adaptive management
25 scheme and the ESA Regulations' explicit demand that Federal
26 Defendants demonstrate the necessity and feasibility of implementing
27 every RPA Action. Flexibility is the essence of adaptive management,
28 a tool that is indisputably beneficial both to the species and
impacted stakeholders. But, Federal Defendants describe an exception

1 that "has no limitations."³⁸ How often can the exception be triggered
2 without rendering the Action ineffectual? This is not examined.
3 Without such an analysis, the extent to which this RPA is "essential"
4 to avoiding jeopardy cannot be evaluated. This makes the RPA unlawful
5 and it must be addressed on remand.
6

7 5. Does the Record Support the Finding that Action III.1.3 Will
8 Avoid Jeopardy to or Adverse Modification of CV Steelhead or
9 Critical Habitat?

10 The objective of Action III.1.3 is to operate the East Side
11 Division³⁹ dams to "optimize CV steelhead habitat for all life history
12 stages and to incorporate habitat maintaining geomorphic flows in a
13 flow pattern that will provide migratory cues to smolts and facilitate
14 out-migrant smolt movement on [the] declining limb of pulse." BiOp at
15 622. Specifically, the Action requires the Bureau to achieve a
16 minimum flow schedule prescribed in Appendix 2-E and generally
17 described in Figure 11-1, copied below:

18 //

19 //

20 //

21 //

22 //

23 //

24 ³⁸ Federal Defendants later clarify that Reclamation must support an invocation of
25 the exception with iterative modeling that demonstrates varying allocations and
26 delivery schedules do not let them meet the required temperatures." BiOp at 621.
27 But, this does not place a limit on the number of times the exception may be
28 invoked, nor does it demonstrate the extent to which repeated invocation of the
exception will undermine the purpose of the Action.

³⁹ New Melones Dam operates in conjunction with Tulloch Reservoir and Goodwin Dam on
the Stanislaus River to form the East Side Division. See BiOp at 197.

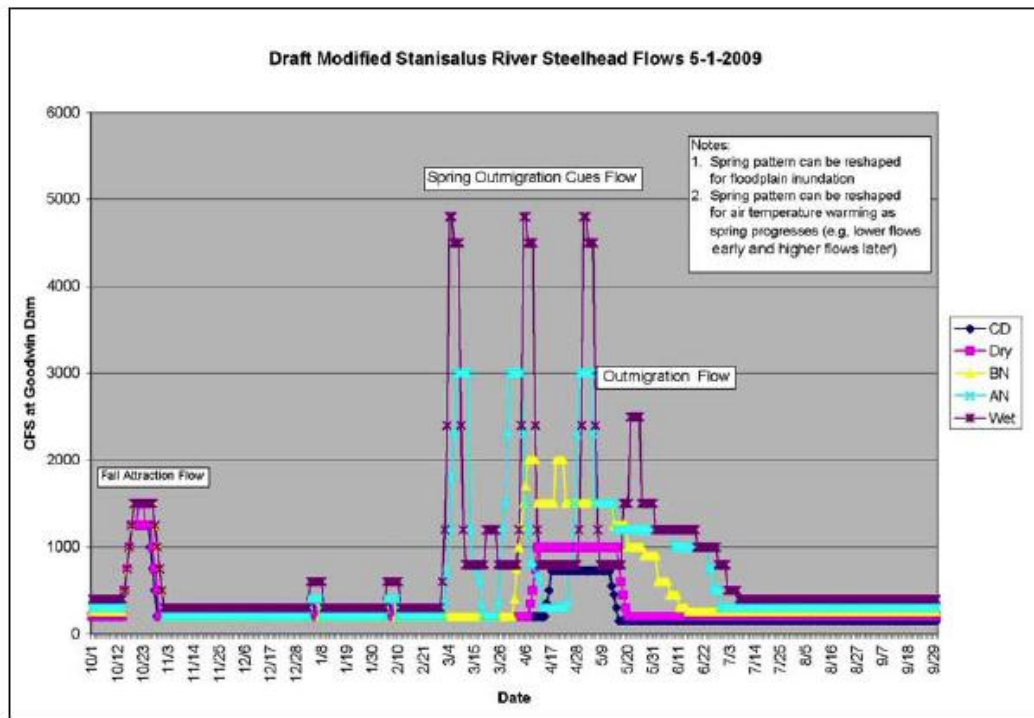


Figure 11-1. Minimum Stanislaus River in-stream flow schedule for CV steelhead as measured at Goodwin Dam

Id. at 623. SR Plaintiffs take issue with the requirement of releases as high as 5,000 cfs in the spring of wet years, which represents a drastic change from the prior flow regime and such high flows are unjustified.

NMFS explains in a May 31, 2009 memo from Rhonda Reed to Maria Rea that the flow requirements of Action III.1.3 are based on a 1993 study by Aceituno, which uses "In-stream Flow Incremental Methodology" ("IFIM"). AR 00105879. NMFS then conferred with CDFG and FWS biologists regarding CV Steelhead's need for pulse flows. AR 00105881-82. These consultations revealed that a fall attraction pulse was needed. This is included in Action III.1.3 and is not challenged by SR Plaintiffs.

NMFS also assessed whether CV steelhead needed a spring pulse

1 flow:

2 Do steelhead need spring pulse flows, or can they just swim
3 out on their own? CV steelhead are captured at the RSTs
4 before the pulse flows, so early smolts may not need a
5 spring pulse. However, the spring pulse does improve
6 downstream water quality conditions for smolts that are
7 leaving later, and this may be more important than for
8 swimming assistance.

9 AR 00105882. SR Plaintiffs object that this language is equivocal and
10 that a life stage of the species "may" need a particular pulse flow is
11 not sufficient justification for requiring one.

12 Although this passage from the Reed Memo does admit that "early
13 smolts may not need a spring pulse," AR 00105882, Defendants point to
14 other record evidence supporting the imposition of a spring pulse flow
15 requirement. Spring pulse flows cue more smolts to migrate,
16 protecting the anadromous form. BiOp at 306-307; AR 00105882
17 (variability in flow triggers important to anadromy), AR 00105883
18 (flow variability important to anadromy).

19 SR Plaintiffs do not directly challenge this rationale. Rather,
20 they argue that even if some form of spring pulse is justified,
21 nothing in the BiOp justifies a 5,000 cfs pulse flow. SR Plaintiffs
22 point out that Aceituno's 1993 IFIM study called for flows ranging
23 from between 50-500 cfs. Aceituno's study focused on instream needs,
24 and did not include an assessment of water needed for spring pulse
25 flows to convey steelhead to delta. BiOp at 307 ("IFIM analysis did
26 not include an assessment of the volume of water needed for a spring
27 pulse flow to convey CV steelhead or fall run from the Stanislaus
28 River into the Delta"); AR 00107828 (Aceituno (1993) explicitly

1 acknowledging that "[t]his study did not directly provide information
2 on flows needed for smolt emigration in the spring").

3 CDFG's initial draft recommendation for the RPA Action called for
4 a spring pulse flow of 3,500 cfs. AR 00105882. CDFG's highest
5 recommendation was for a pulse of 4,000 cfs. AR 00061652. NMFS
6 raised the pulse to 5,000, reasoning that this would provide "minimum
7 channel forming flows." AR 00105887. In support of providing such
8 "channel forming flows," NMFS cites Kondolf (2001), which provides an
9 analysis of pre- and post-New Melones flood frequency rates at Knights
10 Ferry on the Stanislaus River. Kondolf (2001) concludes: "flows in
11 excess of 5,000 to 8,000 cfs are needed to mobilize the bed and
12 thereby maintain channel form and gravel quality." AR 00122645. Such
13 flows are "important to rejuvenate spawning beds and floodplain
14 rearing habitat and to recruit allochthonous nutrients and large wood
15 into the river." BiOp at 308.

16 According to Kondolf (2001), channel-forming flows occurred every
17 1.4-1.8 years prior to the construction of New Melones, but only once
18 every 5 to 20 years since construction of New Melones. *Id.* Kondolf
19 further explains:

20 The frequent floods, those with return intervals of one to
21 five years, and the flows that move the most sediment over
22 time in many natural alluvial channels (commonly considered
23 the "channel forming" flows) (Kondolf *et al.* 1999; Leopold
24 *et al.* 1964), are three to four times smaller since the
25 construction of New Melones Dam. For example, the Q1.s
26 (i.e., the flow equaled or exceeded once per 1.5 years),
27 considered the bankfull flow in many rivers, has been
28 reduced from 5,340 cfs to 1,840 cfs. The Q10 and Q20 were
reduced by six to eight times after construction of New

1 Melones Dam.

2 AR 00122626. Kondolf (2001) then evaluated the post-dam flood
3 frequency, and concluded that the two-year return flow is 3,070 cfs,
4 meaning that such a flow returns every two years. AR 00122714. A
5 5,000 cfs flow has a return rate of just over three years. *Id.*
6 Kondolf (2001) supports a regime that would provide for high pulse
7 flows to maintain gravel quality. In general, this is what Action
8 III.1.3 attempts to achieve.
9

10 However, in light of Kondolf (2001)'s conclusion that "flows in
11 excess of 5,000 to 8,000 cfs are needed to mobilize the bed and
12 thereby maintain channel form and gravel quality," SR Plaintiffs
13 challenge whether RPA Action III.1.3, which calls for peak flows of
14 3,000 cfs in above normal years and 5,000 in wet years, would maintain
15 channel form and gravel quality. Kondolf (2001) provides the only
16 record support for flows above the 3,000 suggested by CDFG, yet Action
17 III.1.3 does not actually implement the flow regime suggested by
18 Kondolf (2001). The record provides no support for the conclusion
19 that the regime imposed by Action III.1.3 is sufficient to maintain
20 gravel quality. Particularly in light of the potentially high water
21 costs of these pulse flows, the rationale for Action III.1.3 must be
22 lawfully explained and justified on remand.
23
24

25 SR Plaintiffs' motion for summary judgment that the record does
26 not support the imposition of Action III.1.3's 5000 cfs spring pulse
27 flow is GRANTED; Federal Defendants' and Defendant-Intervenors' cross
28

1 motions are DENIED.

2
3 6. DFG Salmon Population Model

4 a. Use of the Model to Set Out-Migration Flows.

5 In calculating the flows CV Steelhead need for outmigration, NMFS
6 relied upon the "SJR salmon model (V.1.0) (output for doubling salmon
7 and calculating the Stanislaus flow contribution....)" AR 00105883.
8 It is undisputed that this is a reference to a CDFG model used to
9 determine flows needed to double salmon in the San Joaquin River. SR
10 Plaintiffs complain that NMFS's use of the model was inappropriate
11 because: (1) steelhead are not salmon; and (2) the "doubling" goal is
12 distinct from the goal of "avoiding jeopardy." Doc. 454 at 29.

13
14 The former argument is identical to the surrogate challenges
15 raised by Plaintiffs and rejected above. Salmon are the best
16 available surrogates for CV steelhead, for which the available data is
17 inadequate for modeling purposes.

18 Nothing in the record explains why it is appropriate to use a
19 model designed to double the existing salmon population to set numeric
20 flow targets to avoid jeopardy to the CV steelhead. The BiOp must
21 explain why each aspect of the RPA is essential to avoid jeopardy or
22 adverse modification. The facial disconnect between the goal of the
23 salmon-doubling model and the goal of ESA section 7 consultation
24 requires explanation on remand.

25
26 SR Plaintiffs' motion for summary judgment that the BiOp
27 unlawfully utilized the CDFG salmon doubling model is GRANTED IN PART
28

1 AND DENIED IN PART; and Federal Defendants' and Defendant-Intervenors'
2 cross motions are GRANTED IN PART AND DENIED IN PART. That the model
3 used salmon as a surrogate for CV Steelhead was not inappropriate, but
4 the record does not support the use of a model designed to double
5 salmon to set flow targets to avoid jeopardy.
6

7 b. NMFS's Reliance on Draft Model Runs from Outdated
8 Version 1.

9 The record further suggests that NMFS relied on runs from an
10 outdated version of the CDFG Salmon Model. When it produced the data
11 to NMFS, CDFG explained that the results were preliminary and based
12 upon version 1.0, AR 00061644, which was subsequently subject to peer
13 review and further clarification, AR 00103255-58. CDFG specifically
14 warned NMFS that the results would need to be confirmed through the
15 performance of several checks. AR 00061644. The record reveals no
16 evidence that such corrections were made. The need for confirmation
17 must be addressed on remand.
18

19 SR Plaintiffs' motion for summary judgment that the BiOp
20 unlawfully and unreasonably relied upon an outdated version of the
21 CDFG salmon model is GRANTED; Federal Defendants' and Defendant-
22 Intervenors' cross motions are DENIED.
23

24 7. SR Plaintiffs' "Impermissible Major Changes" Argument.

25 SR Plaintiffs originally advanced the argument that the
26 Stanislaus River RPAs were unlawful because they constituted
27 "impermissible major changes" to the New Melones Project. This
28

1 argument was based on SR Plaintiffs citation to 50 C.F.R. §
2 402.14(i)(2) which provides that "[r]easonable and prudent measures,
3 along with the terms and conditions that implement them, cannot alter
4 the basic design, location, scope, duration, or timing of the action
5 and may involve only minor changes." However, reasonable and prudent
6 measures ("RPMs") are those measures "necessary or appropriate to
7 minimize [the] impact" of incidental take. 50 C.F.R. § 402.02. No
8 RPMs are imposed upon Stanislaus River operations. There is no
9 "impermissible major changes" language associated with the imposition
10 of RPAs. SR Plaintiffs' motion for summary judgment on this ground is
11 DENIED; Federal Defendants' and Defendant-Intervenors' cross motions
12 are GRANTED.⁴⁰

13
14
15 8. Challenges to the BiOp's Feasibility Analyses?

16 SR Plaintiffs argue that it is impossible to determine from the
17 record whether certain of the Stanislaus River RPA Actions are
18 feasible.

19
20 a. General Objection that Feasibility Modeling Employed
21 Erroneous Assumptions.

22 First, SR Plaintiffs argue that the feasibility modeling employed
23 erroneous assumptions, such as assumptions that constrain allocations

24 ⁴⁰ SR Plaintiffs' alternatively argue that the RPA definition impliedly
25 incorporates the "impermissible major changes" prohibition contained in the RPM
26 definition. SR Plaintiffs offer no support for this argument, which is
27 contradicted by the general rule that the plain language of a statute governs,
28 absent "some indication of [] regulatory intent that overcomes plain language ...
referenced in the published notices that accompanied the rulemaking process." See
Webb v. Smart Document Solutions, 499 F.3d 1078, 1084 (9th Cir. 2007).

1 to OID and SSJID below their entitlements. Doc. 492 at 12-13. This
2 objection has been rejected, as the modeling captures the actual
3 operation of these districts with reasonable accuracy.

4 SR Plaintiffs' motion for summary judgment that the BiOp's
5 feasibility modeling employed erroneous assumptions is DENIED; Federal
6 Defendants' and Defendant-Intervenors' cross motions are GRANTED.
7

8 b. Objection that Action III.1.2's Exception Procedure
9 Renders the BiOp's Feasibility Analysis of that Action
10 Arbitrary and Capricious.

11 Second, SR Plaintiffs argue that the RPA's exception procedures
12 render any feasibility analysis irrational. *Id.* at 13. SR
13 Plaintiffs do not specifically identify which Action, III.1.2, III.1.3
14 or IV.2.1, they assert is rendered infeasible by its exception
15 procedures; but they must be referring to Action III.1.2, which
16 contains the broad exception procedure discussed above, *see* BiOp at
17 621. Action III.1.3 contains no exception procedure, BiOp at 622-26,
18 and Action IV.2.1's exception procedure is narrowly limited, BiOp at
19 644. SR Plaintiffs succeeded on their argument that Action III.1.2's
20 exception procedure is so broad that it has the potential, without
21 further refinement, to render the RPAs ineffectual. Relatedly, an
22 exception procedure without any guarantees as to whether the exception
23 may be successfully invoked when necessary renders any feasibility
24 analysis impossible. Although Federal Defendants' feasibility
25 analysis need not be perfect, it must be rational. Federal Defendants
26 must reconsider their approach to the feasibility analysis in light of
27
28

1 the numerous problems with the exception process identified above.

2 SR Plaintiffs' motion for summary judgment that the BiOp's
3 feasibility analysis for III.1.2 is arbitrary and capricious is
4 GRANTED; Federal Defendants' and Defendant-Intervenors' cross motions
5 are DENIED.
6

7 c. Feasibility of Action III.2.2.

8 SR Plaintiffs also challenge the feasibility of Action III.2.2,
9 which calls for Reclamation to confer with the SOG to develop an
10 operational strategy to meet the purpose of achieving floodplain
11 inundation flows on a one to three year schedule.⁴¹ See Doc. 454 at
12 32. As this RPA defines no action per se, it is impossible to perform
13 a feasibility analysis of it. Federal Defendants cannot escape the
14 requirement of a feasibility analysis simply because they delay the
15 design of this RPA. Before implementation, Federal Defendants must
16 ensure that any action implemented under RPA Action III.2.2 complies
17 with the requirements of law.
18

19 SR Plaintiffs' challenge to this feasibility analysis is correct
20 to the extent there is no validly formulated RPA Action.
21

22 ⁴¹ Action III.2.2 specifically requires:
23

24 Reclamation shall seek advice from SOG to develop an operational strategy to
25 achieve floodplain inundation flows that inundate CV steelhead juvenile
26 rearing habitat on a one- to three-year return schedule. Reclamation shall
27 submit a proposed plan of operations to achieve this flow regime by June
28 2011. This plan shall include the minimum flow schedule identified in Action
III.1.2, or shall provide justification for any proposed modification of the
minimum flow schedule. NMFS will review and, if satisfactory, approve the
operational strategy. Reclamation will implement strategy starting in 2012.

9. Are Actions III.1.3, III.2.2 Consistent with the Purposes of the Project?

SR Plaintiffs also argue that implementation of Actions III.1.3 and III.2.2 conflict with one of the express project purposes of New Melones, namely flood control, in violation of 50 C.F.R. § 402.02's requirement that an RPA be "consistent with the intended purpose of the action." See Doc. 454 at 32. As to Action III.2.2, which calls for a plan to provide flows large enough to "inundate floodplains" in the winter or spring, no action has yet been defined. SR Plaintiffs' challenge to this feasibility analysis is valid to the extent there is not yet a validly formulated RPA Action.

Action III.1.3 imposes certain pulse flows to benefit CV Steelhead, including the 5,000 cfs pulse flows in wet years discussed above. SR Plaintiffs suggest that these pulse flows, designed to be "channel forming," will conflict with New Melones' flood control purpose. Doc. 454 at 32. However, the BiOp specifically explains that Action III.1.3 is to be implemented for ten days or less in order to limit seepage impacts to nearby landowners. BiOp at 624. SR Plaintiffs fail to acknowledge the short duration of the pulse flows, nor do they otherwise explain how flows of this magnitude and limited duration conflict with the flood control purpose of New Melones.

SR Plaintiffs' motion for summary judgment that RPA Action III.1.3 conflicts with the flood control purpose of the New Melones Dam is DENIED; Federal Defendants' and Defendant-Intervenors' cross motions are GRANTED.

1 10. Waste and Unreasonable Use of Water (California Constitution
2 Article X, Section 2) .

3 Finally, the SR Plaintiffs argue that implementation of the
4 Stanislaus River RPAs would require water waste and unreasonable use
5 in violation of Article X, Section 2 of the California Constitution.
6 The Bureau must comply with non-conflicting state water law.
7 Reclamation Act of 1902, Pub. L. No. 57-161, 32 Stat. 288, at § 8
8 (June 17, 1902); *California v. United States*, 438 U.S. 645, 675
9 (1978) .

10 The California Constitution states that the right to water is
11 limited to reasonable use, and does not extend to waste or
12 unreasonable use:
13

14 The right to water or to the use or flow of water in or from
15 any natural stream or water course in this State is and
16 shall be limited to such water as shall be reasonably
17 required for the beneficial use to be served, and such right
18 does not and shall not extend to the waste or unreasonable
19 use or unreasonable method of use or unreasonable method of
20 diversion of water.

21 Cal. Const. art. X, § 2.

22 SR Plaintiffs concede that release of water for fish is a
23 beneficial use of water in California. However, they argue that the
24 spirit of Article X, Section 2 dictate that any releases must be
25 carefully tailored to "just what is needed to avoid jeopardy so that
26 the remaining water can be reserved for other equally important
27 beneficial uses." Doc. 454 at 35. SR Plaintiffs then argue that
28 Actions III.1.2, III.1.3, III.2.2 and IV.2.1 violate Article X,
29 Section 2 "absent record evidence to support a finding that these RPAs
30 use only as much water as is reasonable and necessary to avoid

1 jeopardy." *Id.* SR Plaintiffs underestimate the complexity of the
2 waste and unreasonable use standard and the process by which they must
3 establish waste and unreasonable use is occurring.

4 SR Plaintiffs cite no caselaw to support their assertion that the
5 California Constitution's reasonable use doctrine demands that an RPA
6 "be carefully tailored to just what is necessary to avoid jeopardy."
7 To the contrary, the reasonable use doctrine protects a broad range of
8 interests, including fish protection interests that go far beyond
9 prevention of jeopardy. *See, e.g., Nat'l Audubon Soc'y v. Superior*
10 *Court*, 33 Cal. 3d 419, 443 (1983) (use of water to maintain scenic
11 and recreational values consistent with the reasonable use doctrine).
12

13 Nor do Federal Defendants bear any burden to affirmatively
14 demonstrate that the RPA's comply with the California Constitution.
15 The ESA's implementing regulations specifically enumerate in 50 C.F.R.
16 § 402.02 the analyses NMFS and the Bureau must undertake when
17 promulgating an RPA. It is Plaintiffs who bear the burden in a
18 challenge based upon Article X. *State Water Resources Control Board*
19 *Cases*, 136 Cal. App. 4th 674, 762 (2006) (rejecting allegation that
20 releases of water pursuant to D-1641 constituted waste and
21 unreasonable use because the plaintiffs failed to demonstrate that the
22 releases "necessarily result[] in an unreasonable use of water.").
23 The reasonableness of a use of water is a question of fact that
24 depends on the particular circumstances of each case. *Id.* Any such
25 claim arises under state law, not the APA, and is not limited to the
26
27
28

1 administrative record. The briefing in this case has not addressed in
2 any analytic respect the unreasonable use issue.

3 SR Plaintiffs motion for summary judgment that the Stanislaus
4 River RPA Actions violate Article X, Section 2 of the California
5 Constitution is DENIED WITHOUT PREJUDICE; Federal Defendants' and
6 Defendant-Intervenors' cross motions are PREMATURE.
7

8 VII. RECLAMATION'S LIABILITY UNDER THE ESA.

9 All Plaintiffs move for summary judgment that Reclamation
10 violated the ESA by adopting and implementing the BiOp. Following the
11 issuance of a biological opinion, the ESA regulations require the
12 action agency, here, Reclamation, to "determine whether and in what
13 manner to proceed with the action in light of its section 7
14 obligations and the Service's biological opinion." 50 C.F.R.
15 § 402.15(a). In making that determination, a federal action agency
16 "may not rely solely on a [] biological opinion to establish
17 conclusively its compliance with its substantive obligations under
18 section 7(a)(2)." *Pyramid Lake Paiute Tribe of Indians v. U.S. Dept.*
19 *of Navy*, 898 F.2d 1410, 1415 (9th Cir. 1990). In *City of Tacoma v.*
20 *Fed. Energy Regulatory Comm'n*, 460 F.3d 53, 76 (D.C. Cir. 2006), the
21 D.C. Circuit summarized the caselaw culminating in *Pyramid Lake*:
22
23

24 [The] interagency consultation process reflects Congress's
25 awareness that expert agencies (such as the [NMFS] and
26 [FWS]) are far more knowledgeable than other federal
27 agencies about the precise conditions that pose a threat to
28 listed species, and that those expert agencies are in the
best position to make discretionary factual determinations
about whether a proposed agency action will create a problem
for a listed species and what measures might be appropriate

1 to protect the species. Congress's recognition of this
2 expertise suggests that Congress intended the action agency
3 to defer, at least to some extent, to the determinations of
4 the consultant agency, a point the Supreme Court recognized
5 in *Bennett v. Spear*, 520 U.S. 154, 169-170 (1997). In
6 *Bennett*, the Court stated that an action agency disregards
7 a jeopardy finding in a BiOp "at its own peril" and bears
8 the burden of articulating the reasons for reaching its
9 contrary conclusion. *Id.*

10 Accordingly, when we are reviewing the decision of an action
11 agency to rely on a BiOp, the focus of our review is quite
12 different than when we are reviewing a BiOp directly. In the
13 former case, the critical question is whether the action
14 agency's reliance was arbitrary and capricious, not whether
15 the BiOp itself is somehow flawed. *Aluminum Co. of Am. v.*
16 *Adm'r, Bonneville Power Admin.*, 175 F.3d 1156, 1160 (9th
17 Cir.1999); *Pyramid Lake Paiute Tribe v. U.S. Dep't of Navy*,
18 898 F.2d 1410, 1415 (9th Cir.1990); *Stop H-3 Ass'n v. Dole*,
19 740 F.2d 1442, 1460 (9th Cir.1984); cf. *Nat'l Wildlife*
20 *Fed'n v. Nat'l Marine Fisheries Serv.*, 422 F.3d 782, 790
21 (9th Cir. 2005) (direct review of a BiOp). Of course, the
22 two inquiries overlap to some extent, because reliance on a
23 facially flawed BiOp would likely be arbitrary and
24 capricious, but the action agency "need not undertake a
25 separate, independent analysis" of the issues addressed in
26 the BiOp. *Aluminum Co.*, 175 F.3d at 1161. In fact, if the
27 law required the action agency to undertake an independent
28 analysis, then the expertise of the consultant agency would
be seriously undermined. Yet the action agency must not
blindly adopt the conclusions of the consultant agency,
citing that agency's expertise. *Id.* Rather, the ultimate
responsibility for compliance with the ESA falls on the
action agency. 16 U.S.C. § 1536(a) (1)-(2). In *Pyramid*
Lake, the Ninth Circuit balanced these two somewhat
inconsistent principles and articulated the following rule:

[E]ven when the [consultant agency's] opinion is based
on "admittedly weak" information, another agency's
reliance on that opinion will satisfy its obligations
under the Act if a challenging party can point to no
"new" information- i.e., information the [consultant
agency] did not take into account-which challenges the
opinion's conclusions.

898 F.2d at 1415; see also *Defenders of Wildlife v. U.S.*
EPA, 420 F.3d 946, 959, 976 (9th Cir. 2005); *Stop H-3*
Ass'n, 740 F.2d at 1459-60.

1 *City of Tacoma*, 460 F.3d at 75-76. The D.C. Circuit rejected the
2
3 City of Tacoma's claim that the consultant agency in that case, FERC,
4 was liable under the ESA because the City had not "presented FERC with
5 new information that was unavailable to [NMFS] or [FWS] and that would
6 give FERC a basis for doubting the expert conclusions in the BiOps
7 those agencies prepared." *Id.* at 76.

8 Reclamation clearly disagreed with NMFS's approach to many
9 important elements of the BiOp's analysis. See Doc. 431 at 119
10 (Plaintiffs' opening brief citing pages in the record containing
11 Reclamation's critiques of the BiOp). This is not alone the litmus
12 test for Reclamation's liability. In the context of ESA consultation,
13 Reclamation is the regulated party and will not necessarily agree with
14 every aspect of NMFS's opinion on the impacts of Reclamation's project
15 on Listed Species. Under *City of Tacoma*, Plaintiffs must
16 demonstrate that, at the time it adopted the BiOp's RPA, Reclamation
17 was in possession of any "new information" not considered by NMFS that
18 provided Reclamation a basis for questioning the BiOp's expert
19 conclusions. They have not. Absent such a showing, even though the
20 BiOp is flawed in many ways, Reclamation could rely upon it without
21 incurring ESA liability.
22
23

24 All Plaintiffs motions for summary judgment that Reclamation
25 violated the ESA and/or the APA are DENIED; Federal Defendant and
26 Defendant-Intervenors' cross motions are GRANTED.
27
28

1 VIII. CONCLUSION

2 For all the reasons set forth above:

3 (A) Plaintiffs' and DWR's motions for summary judgment that the
4 BiOp violates the ESA and the APA are GRANTED IN PART AND DENIED IN
5 PART; and Federal Defendants' and Defendant-Intervenors' cross motions
6 are GRANTED IN PART AND DENIED IN PART based on the following
7 findings:
8

9 (1) It was clear error and inconsistent with standard
10 practice in the field of fisheries biology for Federal Defendants to
11 rely upon the raw salvage analyses set forth in Figures 6-65 and 6-66
12 to reach conclusions about the effect of specific levels of negative
13 OMR flows on the Listed Species. None of the alternative record
14 citations or analyses cited by Defendants, including the PTM Modeling
15 Results, or Figures 6-71, 6-72, or 6-73, provide sufficient
16 alternative bases for NMFS's conclusions regarding the negative OMR
17 flows below which loss of juvenile salmonids "increases sharply."
18

19 (2) Federal Defendants' reliance on Figure 6-71 also suffers
20 from the same unjustified use of raw salvage data. Federal Defendants
21 must clarify on remand whether it is possible to scale the CV
22 steelhead data used in Figures 6-72 and 6-73 to population size and,
23 if not, why unscaled analyses are nevertheless useful. Federal
24 Defendants must also further explain and/or refine the statistical
25 methodologies used to develop these figures.
26

27 (3) Federal Defendants' did not act unlawfully in failing to
28

1 apply either of the two suggested life-cycle models (IOS and/or OBAN)
2 or other mathematical models, such as the Ricker or Beverton-Holt
3 models, to evaluate project impacts on the Listed Species. However,
4 NMFS's chronic and unsatisfactorily explained failure to avoid
5 studying, analyzing, and applying a life cycle model approaches bad
6 faith in light of all experts' opinions it can be done in far less
7 than the five years the agency has been pleading lack of ability and
8 resources, and in view of the undeniable importance of the information
9 to resolve the perennial dispute over population dynamics.
10

11 (4) NMFS did not act unlawfully by failing to segregate
12 discretionary from non-discretionary actions in evaluating the
13 environmental baseline. Although such a delineation could better
14 document the relationship between the requirements of the species and
15 the action agency's statutory authority to implement the RPA, NMFS
16 disclaims the capacity to undertake appropriate modeling and related
17 analysis and Plaintiffs have failed to demonstrate that NMFS's claim
18 is unreasonable or false.
19

20 (5) Although it is inexplicable that these species are being
21 managed in a piecemeal fashion, without considering all aspects of
22 their life cycles, including impacts to abundance from ocean
23 conditions and ocean harvest, the ESA does not require a quantitative,
24 causative analysis of the relative importance of these non-Project
25 impacts vis-à-vis Project effects.
26

27 (6) NMFS did not act unlawfully by employing a 100-year
28

1 timeframe for its analysis of extinction risk.

2 (7) Certain aspects of NMFS's winter-run viability analysis
3 are clearly erroneous as identified above and must be corrected on
4 remand.

5 (8) In view of the inconsistency, the 2009 Salmonid BiOp
6 must explain on remand how its conclusions are consistent with the
7 Orca Salmon Harvest BiOp.
8

9 (9) Although the BiOp contains some (uncontested) support
10 for a connection between Project operations and the presence of exotic
11 species, the BiOp is remanded for further explanation of how this
12 relates to indirect mortality of the Listed Species.
13

14 (10) The record does not support the BiOp's conclusions
15 about the connection between Project operations on the one hand and
16 pollution and/or food limitations on the other. This is not the best
17 available science.

18 (11) NMFS is not required to set a numeric threshold for
19 adverse modification of critical habitat. The record supports the
20 BiOp's conclusion that Project operations will have appreciable
21 negative effects on the Listed Species' critical habitat.
22

23 (12) NMFS's use of surrogates was not unlawful.

24 (13) The record provides some, albeit equivocal, evidence to
25 support the imposition of some form of flow:export ratio as part of
26 Action IV.2.1. In a world of sound science, a questionable judgment
27 that has significant adverse consequences for the water supply would
28

1 not drive the formulation of an RPA. However, this is a scientific
2 dispute between the State and water users' scientists on the one side
3 and federal scientists on the other. Administrative law permits the
4 agency to make mistakes, and the ESA requires such disputes be
5 resolved in the species' favor. This is Congress' choice.

6
7 (14) However, the BiOp does not clearly explain the
8 rationale for imposing a 4:1 ratio in above normal and wet years.
9 Particularly in light of the potential adverse consequences of
10 imposing such a ratio, this is unlawful. Full explanation on remand
11 is required.

12 (15) Likewise, although there is marginal record support for
13 the imposition of some form of OMR flow restriction, Action IV.2.3
14 must be remanded for further explanation of the necessity for the
15 specific flow prescriptions imposed, which are derived primarily from
16 PTM simulations, a method that is undisputedly an imperfect, if not
17 incompetent, predictor of salmon behavior.

18
19 (16) Action IV.3 suffers from a similar defect. Although
20 there is record support for some form of action designed to prevent
21 large numbers of fish from being killed or harmed at the export
22 facilities, lawful explanation is required to justify the specific
23 triggers imposed by Action IV.3.

24
25 (17) As to Export Plaintiffs' and DWR's argument that the
26 RPA fails to satisfy the four requirements of 50 C.F.R. § 402.02:

27 (a) Federal Defendants failed to sufficiently explain
28

1 whether the RPA can be implemented consistent with the co-equal, non-
2 environmental statutory purposes of the action.

3 (b) Although the CVPIA does not grant NMFS unlimited
4 power to take whatever Project water it deems essential for the
5 species, under D-1641, lawful RPA's can (and must) be implemented in a
6 manner consistent with the legal authority and jurisdiction of
7 Reclamation and DWR.
8

9 (c) The BiOp reasonably concluded that the RPA is
10 economically feasible for the action agency to implement. Only the
11 costs to the action agency are relevant; economic burdens upon third
12 parties cannot be considered under *TVA v. Hill*.
13

14 (d) The fourth § 402.02 requirement demands that an RPA
15 avoid jeopardy and/or adverse modification. Consistent with and
16 incorporating the rulings on the merits of the challenges to RPA
17 Actions IV.2.1, IV.2.3 and IV.3, while there is anecdotal evidence for
18 some of the general approaches used in these RPA Actions, the specific
19 prescriptions imposed are not sufficiently justified or explained.
20 NMFS acted arbitrarily and capriciously in concluding that Actions
21 IV.2.1, IV.2.3 and IV.3 are essential to avoid jeopardy and/or adverse
22 modification.
23

24 (18) Regarding DWR's related challenges to Action IV.4.2:

25 (a) Action IV.4.2 is not inconsistent with Action IV.4,
26 and is not unlawful in that respect.

27 (b) The record lacks affirmative support for findings
28

1 that either Action IV.4.2(1) or Action IV.4.2(2) are feasible.

2 (c) The record fails to explain why the measures
3 imposed by Action IV.4.2 are essential to avoid jeopardy and/or
4 adverse modification.

5 (B) Stanislaus River Plaintiffs' motion for summary judgment that
6 the BiOp violates the ESA and the APA is GRANTED IN PART AND DENIED IN
7 PART; and Federal Defendants' and Defendant-Intervenors' cross motions
8 are GRANTED IN PART AND DENIED IN PART based on the following
9 findings:
10

11 (1) It was not unlawful for NMFS to include the New Melones
12 unit in the action under consideration.

13 (2) NMFS did not act unlawfully by failing to distinguish
14 between baseline effects and effects of the action.

15 (3) As to SR Plaintiffs' challenges to the adverse
16 modification findings related to New Melones:
17

18 (a) The BiOp's use of a "maximization" benchmark in
19 connection with its analysis of spawnable area is without support in
20 the record.

21 (b) The BiOp's finding that New Melones operations
22 affect gravel recruitment is without support in the record.

23 (c) The record adequately supports the BiOp's findings
24 regarding New Melones' effects on temperature conditions in spawning
25 habitat and on downstream migration corridors.

26 (4) As to SR Plaintiffs' challenges to the New Melones RPA
27
28

1 Actions:

2 (a) The BiOp does not reasonably or sufficiently
3 explain its decision to set a "maximum habitat goal," which underlies
4 its decision to use certain assumptions to model RPA actions.

5 (b) The Stanislaus River RPA Actions do not improperly
6 require Reclamation to infringe on OID and SSJID's prior rights to
7 Stanislaus River water.

8 (c) Federal Defendants did not act unlawfully by
9 failing to utilize the San Joaquin River Water Temperature Model.

10 (d) The limitations of the exceptions built into Action
11 III.1.2 must be defined on remand to explain how often the exception
12 can be triggered without rendering the Action ineffectual.

13 (e) The record and best available science do not
14 support Action II.1.3's 5,000 cfs spring pulse flow.

15 (f) In calculating the flows CV Steelhead need for
16 outmigration, NMFS relied on a CDFG model used to determine flows
17 needed to double salmon in the San Joaquin River. While it was not
18 inappropriate for NMFS to use a model employing salmon as a surrogate
19 for CV Steelhead, nothing in the record explains why it is appropriate
20 to use a model designed to double the existing salmon population to
21 set numeric flow targets to avoid jeopardy to the CV steelhead. This
22 is arbitrary and capricious and must be fully explained on remand. In
23 addition, NMFS must address the fact that the BiOp unreasonably relied
24 upon runs from an outdated version of the model.

1 (g) SR Plaintiffs' argument that the Stanislaus River
2 RPAs were unlawful because they constituted "impermissible major
3 changes" to the New Melones Project is without merit, as this
4 requirement applies to "reasonable and prudent measures," none of
5 which were applied to the Stanislaus River.
6

7 (h) As to SR Plaintiffs' challenges to the BiOp's
8 feasibility analyses of the Stanislaus River RPA Actions:

9 (1) The feasibility modeling did not employ
10 erroneous assumptions.

11 (2) Action III.1.2's exception procedure is so
12 broad that it renders any feasibility analysis wholly unreliable and
13 arbitrary. It is unlawful as formulated.
14

15 (3) The feasibility of Action III.2.2 cannot be
16 evaluated because the RPA has yet to be defined. This is not a valid
17 RPA. Federal Defendants must ensure that any Action defined in the
18 future complies with the requirements of law. SR Plaintiffs'
19 challenge to this feasibility analysis is correct to the extent there
20 is not a validly formulated RPA Action.
21

22 (i) SR Plaintiffs' challenge to Action III.2.2 as
23 inconsistent with the flood control purposes of the New Melones
24 Project is valid, as that Action has yet to be defined and is not yet
25 a valid RPA.

26 (j) SR Plaintiffs' have not demonstrated that the
27 pulse flows called for in Action III.1.3, designed to be of short
28

1 duration to limit seepage impacts to nearby landowners, conflict with
2 the flood control purpose of the New Melones Project.

3 (k) SR Plaintiffs' have failed to meet their burden to
4 demonstrate that the Stanislaus River RPAs violate Article X, Section
5 2 of the California Constitution.
6

7 (C) All Plaintiffs' motions for summary judgment that Reclamation
8 violated the ESA and/or the APA are DENIED; Federal Defendant and
9 Defendant-Intervenors' cross motions are GRANTED.

10 It is undisputed that the law entitles the winter-run and spring-
11 run Chinook, CV steelhead, Southern DPS of green sturgeon, and
12 Southern Resident killer whales to ESA protection. Plaintiffs have
13 succeeded on some of their challenges to the BiOp's justifications and
14 analyses of Delta and Stanislaus River operations. The BiOp discusses
15 and prescribes RPAs to address many other sources of harm, including
16 adverse temperature conditions and blockages caused by dams on the
17 Sacramento River. The BiOp's jeopardy conclusion is lawful. Project
18 operations negatively impact the Listed Species and adversely modify
19 their critical habitat in various ways that remain incompletely
20 described and quantified.
21

22 Some of NMFS's analyses rely upon equivocal or bad science to
23 impose RPA Actions without clearly explaining or otherwise
24 demonstrating why the specific measures imposed are essential to avoid
25 jeopardy and/or adverse modification. Given the potential serious
26 impacts of these measures, the agency must do more to comply with the
27
28

1 law.

2 The 2009 Salmonid BiOp and its RPA are ARBITRARY, CAPRICIOUS, and
3 UNLAWFUL, and are REMANDED to NMFS for further consideration in
4 accordance with this decision and the requirements of law.

5 Plaintiffs shall submit a form of order consistent with this
6 memorandum decision within five (5) days of electronic service.
7

8 Within five (5) days of service of this decision, Federal
9 Defendants shall provide a proposed date by which they shall file the
10 new BiOp and any RPA.

11
12 SO ORDERED

Dated: September 20, 2011

13
14 /s/ Oliver W. Wanger
United States District Judge
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