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UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF CALIFORNIA

The Consolidated Delta Smelt
Cases

1:09-CV-00407 OWW DLB
1:09-cv-00480-OWW-GSA
1:09-cv-00422-OWW-GSA
1:09-cv-00631-OWW-DLB
1:09-cv-00892-OWW-DLB

FINDINGS OF FACT AND
CONCLUSIONS OF LAW RE
PLAINTIFFS' REQUEST FOR
PRELIMINARY INJUNCTION
AGAINST IMPLEMENTATION
OF RPA COMPONENT 2
(a/k/a Action 3) (Doc.
433)

I. INTRODUCTION

Plaintiffs, San Luis & Delta Mendota Water Authority
(the "Authority") and Westlands Water District
("Westlands"), move for a preliminary injunction ("PI")
against the implementation of Reasonable and Prudent
Alternative ("RPA") Component 2 set forth in the United
States Fish and Wildlife Service's ("FWS") December 15,
2008 Biological Opinion, which addresses the impacts of
the coordinated operations of the federal Central Valley
Project ("CVP") and State Water Project ("SWP") on the
threatened delta smelt (*Hypomesus transpacificus*) ("2008

1 Smelt BiOp" or "BiOp"). Doc. 433.

2 Plaintiffs State Water Contractors; Metropolitan
3 Water District of Southern California; Kern County Water
4 Agency and Coalition for a Sustainable; Stewart & Jasper
5 Orchards, et al.; and the Family Farm Alliance join in
6 the motion. Docs. 449, 451 & 453. Plaintiff-Intervenor
7 Department of Water Resources ("DWR"), the operator of
8 the SWP, partially joins. Doc. 452.

9
10 Federal Defendants and Defendant Intervenors opposed.
11 Docs. 469, 473. Plaintiffs replied. Docs. 487, 491,
12 495, 497 & 507. The motion came on for an evidentiary
13 hearing on April 2, 5, 6, and 7, 2010. Docs. 644, 652,
14 653 & 654. The parties were represented by counsel, as
15 noted in the record.
16

17 After consideration of the testimony of the
18 witnesses, the exhibits received in evidence, the written
19 briefs of the parties, oral arguments, and the parties'
20 proposed findings of fact and conclusions of law, the
21 following findings of fact and conclusions of law
22 concerning the motion for interim relief/preliminary
23 injunction are entered.
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25 To the extent any finding of fact may be interpreted
26 as a conclusion of law or any conclusion of law may be
27 interpreted as a finding of fact, it is so intended.
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II. BACKGROUND

The 2008 Smelt BiOp, prepared pursuant to Section 7 of the Endangered Species Act ("ESA"), 16 U.S.C. § 1536(a)(2), concluded that "the coordinated operations of the CVP and SWP, as proposed, are likely to jeopardize the continued existence of the delta smelt" and "adversely modify delta smelt critical habitat." BiOp at 276-78. As required by law, the BiOp includes an RPA designed to allow the projects to continue operating without causing jeopardy to the species or adverse modification to its critical habitat. *Id.* at 279. The RPA includes various operational components designed to reduce entrainment of smelt during critical times of the year by controlling exports out of and water flows into the Delta. *Id.* at 279-85.

Component 1 (Protection of the Adult Delta Smelt Life Stage) consists of two Actions related to Old and Middle River ("OMR") flows.

- Action 1, which is designed to protect upmigrating delta smelt, is triggered during low and high entrainment risk periods based on physical and biological monitoring. Action 1 requires OMR flows to be no more negative than -2,000 cubic feet per second ("cfs") on a 14-day average and no more

1 negative than -2,500 cfs for a 5-day running average.
2 *Id.* at 281, 329.

- 3 • Action 2 of Component 1 is designed to protect adult
4 delta smelt that have migrated upstream and are
5 residing in the Delta prior to spawning. Action 2 is
6 triggered immediately after Action 1 ends or if
7 recommended by the Smelt Working Group ("SWG").
8 Flows under Action 2 can be set within a range from
9 -5,000 to -1,250 cfs, depending on a complex set of
10 biological and environmental parameters. *Id.* at 281-
11 82, 352-56.

12
13 At issue here is Component 2 (Action 3) (Protection
14 of Larval and Juvenile Delta Smelt), which requires OMR
15 flows to remain between -1,250 and -5,000 cfs, beginning
16 when Component 1 is completed, when Delta water
17 temperatures reach 12° Celcius ("C"), or when a spent
18 female smelt is detected in trawls or at salvage
19 facilities. *Id.* at 282, 357-58. Component 2 remains in
20 place until June 30 or when the Clifton Court Forebay
21 water temperature reaches 25° C. *Id.* at 282, 368.

22
23 Component 3 (Improve Habitat for Delta Smelt Growth
24 and Rearing) requires sufficient Delta outflow to
25 maintain average mixing point locations of Delta outflow
26 and estuarine water inflow ("X2") from September to
27
28

1 December, depending on water year type, in accordance
2 with a specifically described "adaptive management
3 process" overseen by FWS. *Id.* at 282-83, 369.

4 Under Component 4 (Habitat Restoration), DWR is to
5 create or restore 8,000 acres of intertidal and subtidal
6 habitat in the Delta and Suisun Marsh within 10 years.
7 *Id.* at 283-84, 379.

8 Under Component 5 (Monitoring and Reporting), the
9 Projects gather and report information to ensure proper
10 implementation of the RPA actions, achievement of
11 physical results, and evaluation of the effectiveness of
12 the actions on the targeted life stages of delta smelt,
13 so that the actions can be refined, if needed. *Id.* at
14 284-85, 328, 375.

17 III. SUMMARY OF MOTION

18 Plaintiffs' request temporary injunctive relief on
19 the following grounds:

20 1) the district court has already found that the
21 United States Bureau of Reclamation ("Reclamation")
22 failed to comply with the National Environmental
23 Policy Act ("NEPA") in implementing the 2008 Smelt
24 BiOp RPA; and.

25 2) the 2008 Smelt BiOp violates the ESA and is
26 arbitrary, capricious, and contrary to law because:
27
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- 1 a) various aspects of the BiOp's baseline and
2 effects analysis are flawed, undermining the
3 overall jeopardy conclusion, causing
4 overstatement of the effects of the proposed
5 action and imposition of overly-broad and
6 overly-restrictive RPA Components;
7
8 b) the severe OMR flow restrictions in RPA
9 Components 1 and 2 are unsupported by the best
10 available science and the data in the 2008 Smelt
11 BiOp; and
12
13 c) Component 3 ("The Fall X2 Action") is
14 arbitrary and capricious, because it is without
15 factual or scientific justification and/or is
16 not supported by the best available science,
17 compelling a finding of likelihood of success on
18 the merits.

19 Plaintiffs further claim that the implementation of
20 RPA Components 1 and 2 will cause them continuing
21 irreparable harm and that the public interest and balance
22 of hardships favor injunctive relief.
23

24 RPA Component 1 has ended for the 2009-2010 water
25 year, mooted any request for injunctive relief against
26 its imposition. Component 3 is not set to begin until
27 September, and Plaintiffs do not presently seek
28

1 injunctive relief against its operation. Barring
2 unforeseen circumstances, the parties' cross-motions for
3 summary judgment will be heard and decided before
4 September. Components 1 and 3 are not addressed in this
5 decision.¹

6
7 Plaintiffs' injunction request has been modified over
8 time. Originally, Plaintiffs sought an injunction
9 against implementation of RPA Component 2 and enforcement
10 of the incidental take limits in the BiOp. See Doc. 435
11 at 2-4.

- 12 • In place of Component 2, Plaintiffs sought to require
13 Federal Defendants and DWR to use a Potential
14 Entrainment Index ("PEI") to estimate cumulative
15 entrainment loss of delta smelt. If the PEI estimate
16 of cumulative loss is less than or equal to 7%, no
17 pumping restrictions should be imposed; if the PEI
18 estimate of cumulative entrainment loss exceeds 7%,
19 FWS shall be responsible for setting OMR flows under
20 the range specified in Component 2 of the BiOp. Doc.
21 435 at 3.
22

23
24 ¹ During the evidentiary hearing, Plaintiffs argued that
25 testimony regarding Component 3 should be heard because it is
26 relevant to their likelihood of success on the merits. But, even if
27 Plaintiffs were likely to succeed on their claim that Component 3 is
28 arbitrary and capricious, such a finding would have no bearing on
the propriety of issuing an injunction against the operation of
Component 2. The factual and legal arguments concerning Component 3
are voluminous. In light of Plaintiffs' request that this motion be
resolved with all deliberate haste, Component 3 is not addressed at
this time.

- 1 • Plaintiffs requested that the Incidental Take
2 Statement ("ITS") be recalculated based on a higher
3 Cumulative Salvage Index ("CSI") of 11.36 for adults.
4 Doc. 435 at 4.
- 5 • In the alternative, if the above remedies are not
6 imposed, DWR requested that that the Court impose the
7 interim remedial operational conditions imposed
8 following summary judgment in *NRDC v. Kempthorne*,
9 1:05-cv-1207. Doc. 452 at 2.

10 Although Plaintiffs never filed a written
11 modification of their request for relief, at the
12 evidentiary hearing Plaintiffs withdrew their request to
13 enjoin enforcement of the ITS and their request to
14 implement the PEI in place of RPA Component 2 of the RPA.
15 4/2/10 Tr. 90:4-12; 4/7/10 Tr. 243:23-244:8. Instead,
16 Plaintiffs now propose that Component 2 be replaced by a
17 flat -5,600 cfs ceiling on negative OMR flows during the
18 remainder of the implementation period for Component 2.
19 *Id.*; see 4/2/10 Tr. 208.

22 23 IV. STANDARD OF DECISION

24 Injunctive relief, whether temporary or permanent, is
25 an "extraordinary remedy, never awarded as of right."
26 *Winter v. Natural Resources Defense Council*, 129 S. Ct.
27 365, 376 (2008); *Weinberger v. Romero-Barcelo*, 456 U.S.
28

1 305, 312 (1982). Four factors must be established by a
2 preponderance of the evidence to qualify for temporary
3 injunctive relief:

- 4 1. Likelihood of success on the merits;
- 5 2. Likelihood the moving party will suffer
6 irreparable harm absent injunctive relief;
- 7 3. The balance of equities tips in the moving
8 parties' favor; and
- 9 4. An injunction is in the public interest.

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

12 V. FINDINGS OF FACT

13 A. The Agency Action.

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

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

22 3. The CVP was reauthorized in 1992 through the
23 Central Valley Improvement Act ("CVPIA"), which modified
24 the 1937 Act and added mitigation, protection, and
25

1 restoration of fish and wildlife as co-equal project
2 purposes. Pub. L. 102-575 § 3402, 106 Stat. 4600, 4706
3 (1992). One of the stated purposes of the CVPIA is to
4 address impacts of the CVP on fish and wildlife. §
5 3406(a). The CVPIA made environmental protection and
6 water deliveries co-purposes.
7

8 4. This case presents a critical conflict between
9 these dual legislative purposes, providing water service
10 for agricultural, domestic, and industrial use, versus
11 enhancing environmental protection for fish species whose
12 habitat is maintained in rivers, estuaries, canals, and
13 other waterways that comprise the Sacramento-San Joaquin
14 Delta.
15

16 5. It is of manifest significance to the public
17 interest that DWR, a co-operator and the State
18 contractual partner of Reclamation, disagrees with at
19 least some portions of the RPA and seeks injunctive
20 relief against the calendar-based ceiling in RPA
21 Component 2.
22

23 B. Facts Relevant to NEPA Claim.

24 6. It is undisputed that neither FWS nor
25 Reclamation engaged in any NEPA analysis in connection
26 with preparation or implementation of the 2008 Smelt
27 BiOp.
28

1 7. It is also undisputed that on November 13, 2009,
2 the Court entered an Order granting San Luis Plaintiffs'
3 motion for summary judgment on their claim that Federal
4 Defendants violated NEPA when they implemented the 2008
5 Smelt BiOp without conducting the required NEPA analysis.
6 Doc. 399.

7
8 8. FWS did not engage in a systematic consideration
9 of impacts to the human environment and/or consideration
10 of alternatives that took into account those impacts,
11 ordinarily performed as part of a NEPA review.

12
13 C. Facts Relevant to ESA Challenges.

14 (1) Status of the Species.

15 9. The delta smelt was listed as a threatened
16 species under the ESA on March 5, 1993. 58 Fed. Reg.
17 12,584 (March 5, 1993). Critical habitat was designated
18 for the delta smelt on December 19, 1994. 59 Fed. Reg.
19 65,256 (Dec. 19, 1994).

20 10. The threatened delta smelt, one of the most
21 abundant species in the Bay-Delta ecosystem as recently
22 as thirty years ago, is in imminent danger of extinction.
23 Doc. 94, Findings of Fact Re Plaintiffs' Motion for
24 Preliminary Injunction, ## 1-2. The experts agree that
25 there is no current population count for delta smelt.
26
27 4/2/10 Tr. 174 (Feyrer); 4/5/10 Tr. 67 (Newman); 4/5/10
28

1 Tr. 231 (Hilborn); 4/6/10 Tr. 95 (Deriso). However, the
2 species' relative abundance from year-to-year is
3 monitored using the Fall Midwater Trawl index ("FMWT")
4 prepared by the California Department of Fish and Game
5 ("CDFG"), as well as other abundance indices. 4/2/10 Tr.
6 174-75. The FMWT shows a continuously and precipitously
7 declining trend in delta smelt abundance in recent years,
8 registering a series of record-breaking lows. 4/2/10 Tr.
9 176-78. That trend has continued in the last two years,
10 with the FMWT declining from 23 in 2008 to 17 in 2009,
11 the lowest value ever recorded. *Id.* The population
12 growth rate for delta smelt has been "quite negative" for
13 the last ten years. 4/5/10 Tr. 232. The stock-
14 recruitment relationship for delta smelt, which shows the
15 relationship between adults (i.e., the "stock" of the
16 population) to juveniles recruited into the population,
17 is "trending toward the origin," the opposite direction
18 from recovery. 4/2/10 Tr. 187-88. "There's no question
19 that [the present abundance levels of delta smelt] are
20 very low." 4/5/10 Tr. 232 (Hilborn).

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24 11. FWS recently determined that delta smelt
25 warranted uplisting from threatened to endangered, but
26 that the action was currently precluded by higher
27 priority listing actions. 4/7/10 Tr. 163; 75 Fed. Reg.
28

1 17,667 (Apr. 7, 2010). The direct mortality of delta
2 smelt by entrainment at the CVP and SWP pumps, as well as
3 the destruction and adverse modification of its habitat
4 caused by water exports, were important factors in this
5 determination. 75 Fed. Reg. at 17,671 ("The operation of
6 State and Federal export facilities constitute a
7 significant and ongoing threat to delta smelt through
8 direct mortality by entrainment"). As a result of the
9 "immediate and high magnitude threats" confronting the
10 species, the delta smelt was assigned a listing priority
11 number of 2.² *Id.* at 17,675.

12
13 12. Evidence submitted during trial indicates that,
14 as of the dates of the March Spring Kodiak Trawl (March
15 8-11, 2010) and 20 mm surveys (March 15-18, 2010), delta
16 smelt were collected in the northern and western portions
17 of the Delta, not in the danger zones of the central or
18 south Delta. SWC Exs. 918 & 919. Through March 28,
19 2010, the SWP had an expanded salvage of 16 delta smelt,
20 and the CVP had an expanded salvage of 28 delta smelt.
21 SWC Ex. 915.

22
23 13. Plaintiffs are correct that during the three
24 years that restrictions on spring exports have been in
25 place, the FMWT index has continued to trend downward.

26
27 ² "Warranted but precluded" species are assigned listing
28 priority numbers from 1 to 12, with 1 being the highest priority.
Id. at 17,674.

1 4/7/10 Tr. 94:8-14. However, Mr. Grimaldo testified that
2 improved conditions may not immediately translate into
3 improved survival and population growth. 4/7/10 Tr.
4 120:9-25.

5
6 (2) Baseline Issues.

7 a. Comparison of CalSim and Dayflow Data.

8 14. CalSim II ("CalSim") is a computer model
9 developed jointly by DWR and Reclamation. The model
10 simulates SWP and CVP operations and is the standard
11 planning tool for evaluating project operations. 4/2/10
12 Tr. 101:24-102:6. The first version of the CalSim model
13 was available in May 2002. It is continuously updated.
14 4/2/10 Tr. 102:7-13.

15
16 15. CalSim simulates SWP and CVP reservoir
17 operations, project exports and water deliveries, flow
18 through the Delta, and salinity requirements in the
19 Delta, including the location of X2. 4/2/10 Tr. 102:14-
20 20; BiOp at 207.

21
22 16. X2 is the location in the Delta where the
23 salinity is two parts per thousand. It is measured as
24 the distance upstream from the Golden Gate. 4/2/10 Tr.
25 102:21-24.

26 17. The CalSim model assumes 82 years of hydrology,
27 4/2/10 Tr. 101:23-102:3, 103:14-18, 161:2-6, provides the
28

1 model with data regarding inflow to reservoirs and other
2 information affecting the water supply, 4/2/10 Tr.
3 103:19-23. The model also assumes a level of
4 development, which reflects water demand resulting from a
5 particular urban population level, agricultural
6 production, and wildlife refuge needs, 4/2/10 Tr. 104:1-
7 7, as well as the existence and effect of environmental
8 regulations and environmental programs, 4/2/10 Tr.
9 103:14-18. The assumptions used in the CalSim studies
10 were developed by representatives from FWS, the National
11 Oceanic and Atmospheric Administration ("NOAA"),
12 Reclamation, CDFG, and DWR. 4/2/10 Tr. 105:8-12.

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14
15 18. The CalSim model assists scientists in making
16 planning decisions by allowing comparisons between
17 studies based on differing assumptions. See 4/2/10 Tr.
18 102:25-103:6. According to Aaron Miller, P.E., an expert
19 qualified to offer opinions on the subject of the
20 formulation and application of CalSim, CalSim is not
21 designed, or intended to be used, to compare CalSim study
22 outputs to actual "historic" data or to outputs from
23 different models, including the Dayflow model. 4/2/10
24 Tr. 95:7-14; DWR Ex. 511 at ¶8.

25
26 19. CalSim study 7.0 was developed as the baseline
27 study for the 2008 OCAP Biological Assessment ("2008 OCAP
28

1 BA" or "BA"). Study 7.0 represents existing conditions,
2 and assumes a 2005 level of development and a full
3 environmental water account ("EWA"). 4/2/10 Tr. 104:8-
4 20; 123:21-24, 146:3-6; BiOp at 207. Study 7.1 is a
5 near-future conditions study. It assumes a 2005 level of
6 development and a limited EWA. 4/2/10 Tr. 104:8-23;
7 123:21-25; BiOp at 207-08. Study 8.0 is a future
8 conditions study. It assumes a 2030 level of development
9 and a limited EWA. 4/2/10 Tr. 104:8-25; 123:21-124:2;
10 BiOp at 208.

12 20. CalSim study 6.0 was designed to look at the
13 differences between the prior CalSim model used in the
14 2004 OCAP BA and the new model used in the 2008 OCAP BA.
15 4/2/10 Tr. 104:8-15, 157:11-18.

17 21. Study 6.1 is similar to 6.0, but did not
18 include the EWA and used an older version of the X2
19 estimate. 4/2/10 Tr. 104:8-17. Study 6.1 was prepared
20 at the request of Reclamation biologists to assess
21 changes in water project operations during the pelagic
22 organism decline ("POD") era. 4/2/10 Tr. 149:18-24,
23 150:16-151:17, 158:8-13. Reclamation biologists compared
24 study 6.1 against the 7.0 and 8.0 studies on pages 13-10
25 though 13-17 of the 2008 OCAP BA. 4/2/10 Tr. 149:12-24;
26 AR 011057-011064.

1 22. Mr. Miller testified that study 6.1 should not
2 have been used for comparison because it was not
3 comparable to the other studies. 4/2/10 Tr. 156:25-
4 157:8. Study 6.1 used the Kimmerer Monismith equation to
5 estimate X2 and it, as well as study 6.0, did not
6 completely reflect the new enhancements in the CalSim
7 model developed after the 2004 OCAP BA. 4/2/10 Tr.
8 157:10-18; SLDMWA Ex. 12 at 205-206.

10 23. The CalSim 9.0 series of studies represents
11 climate change scenarios. Study 9.0 represents a future
12 condition to serve as a basis of comparison of the
13 effects of climate change to sea level rise, without the
14 inclusion of (b) (2) or EWA. Study 9.1 represents a one-
15 foot sea level rise, without the inclusion of (b) (2) and
16 EWA. Studies 9.2 through 9.5 look at predicted changes
17 in precipitation and temperature for the period 2010 to
18 2030, relative to conditions for the period 1971 to 2000.
19 The 9.0 climate change scenarios were not intended to be
20 directly compared to studies 7.0-8.0. 4/2/10 Tr. 105:1-
21 5; BiOp at 208. Such a comparison is not valid because
22 the studies make different assumptions regarding
23 environmental programs. 4/2/10 Tr. 123:10-16.

26 24. In the BiOp, CalSim studies were compared to
27 simulations of historic conditions generated using the
28

1 Dayflow model. 4/2/10 Tr. 107:4-7, 142:6-9. Dayflow is
2 a model that estimates historic outflow based on historic
3 precipitation, inflow, and exports, and estimates of
4 delta island diversions. Dayflow also provides an
5 estimate for the location of X2. 4/2/10 Tr. 107:8-14.
6

7 25. In the BiOp, FWS purports to quantify adult
8 entrainment by comparing OMR flows from CalSim studies to
9 historic OMR flows during 1967-2007. BiOp at 212-13.
10 The BiOp depicts these results in Tables E-5b and E-5c in
11 the BiOp, which are labeled "difference from historic
12 median value to CalSim II model median value" and
13 "difference from historic median salvage to predicted
14 salvage based on ... CalSim II," respectively. *Id.* at
15 214. Tables E-5b and E-5c purport to quantify, as
16 effects of the action, changes in OMR flows and
17 entrainment using the Dayflow-generated historic data as
18 the baseline and comparing that to CalSim study results.
19 Based on these comparisons of CalSim data and Dayflow-
20 generated historic data, the BiOp concludes, "adult
21 entrainment is likely to be higher than it has been in
22 the past under most operating scenarios, resulting in
23 lower potential production of early life history stages
24 in the spring in some years." BiOp at 213.
25
26

27 26. In another analysis in the BiOp, FWS purports to
28

1 quantify the effects of the action on delta smelt habitat
2 by comparing CalSim model projections of the location of
3 X2 under the proposed action to the median location of X2
4 over the historical period 1967-2007, as simulated by
5 Dayflow. BiOp at 235-36. Based on this comparison, the
6 BiOp concludes "[t]he median X2 [locations] across the
7 CalSim II modeled scenarios were 10-15 percent further
8 upstream than actual historic X2 (Figure E-19)." *Id.* at
9 235. In reliance on these percent differences between
10 CalSim-created data and historical data, the BiOp
11 concludes "proposed action operations are likely to
12 negatively affect the abundance of delta smelt." *Id.* at
13 236.

14
15
16 27. In the BiOp, FWS performed similar comparisons
17 of CalSim data to Dayflow-simulated historic baseline
18 data to quantify the effects of the action on larval and
19 juvenile delta smelt. *See, e.g.,* BiOp at 219 (examining
20 effect of action on larval and juvenile entrainment and
21 stating "[t]he analysis is based on comparison of
22 historical (1967-2007) OMR and X2 to the proposed
23 action's predictions of these variables provided in ...
24 [CalSim] studies 7.0, 7.1, 8.0, and 9.0-9.5").

25
26 28. Mr. Miller explained that outputs from a CalSim
27 study should not be compared to outputs from the Dayflow
28

1 model because the assumptions used in the two models are
2 significantly different. 4/2/10 Tr. 107:18-23, 136:10-
3 18.

4 a. The CalSim model assumes a constant level of
5 development. In contrast, the Dayflow model incorporates
6 a continuous change in the level of development because
7 the Dayflow model is using historical information as
8 input. When comparing models to determine the effect of
9 project operations, the best scientific practice is to
10 keep the assumed level of development constant. 4/2/10
11 Tr. 107:15-108:15.

12 b. A CalSim study also assumes a constant
13 regulatory environment, whereas Dayflow uses a regulatory
14 environment that has changed over time. This difference
15 renders any comparison between CalSim and Dayflow outputs
16 unreliable. 4/2/10 Tr. 108:16-109:23.

17 c. CalSim also operates on a monthly time step,
18 whereas Dayflow operates on a daily time step. The two
19 models also operate to different guidelines. The Dayflow
20 model incorporates a conservative operation to avoid
21 violating a regulation. In contrast, the CalSim model
22 operates strictly to that regulation. 4/2/10 Tr. 107:23-
23 108:3, 109:24-110:9. Operating conservatively results in
24 higher modeled outflow. 4/2/10 Tr. 110:10-14.

1 d. The differences in the model assumptions and
2 in the way the models operate, as described above, cannot
3 be quantified to calibrate the models. CalSim does not
4 model or simulate historical conditions, so it cannot be
5 calibrated to history. 4/2/10 Tr. 121:18-122:6, 161:2-6.
6 Calibration would be "very difficult, nearly impossible,
7 to do without [] developing a model designed to simulate
8 historical conditions." 4/2/10 Tr. 110:15-111:1. The
9 CalSim model cannot currently predict X2 for historic
10 years because it would require a new model. 4/2/10 Tr.
11 122:7-16.

13 e. The Dayflow historic time window that FWS
14 reported using in the BiOp was 1967 to 2007. CalSim
15 studies model water years 1992 through 2003. The BiOp's
16 comparison of CalSim-modeled data to Dayflow-modeled data
17 resulted in comparing different sets of water years. Mr.
18 Miller testified that the best scientific practice
19 regarding years of comparison would have been to use
20 consistent time windows. 4/2/10 Tr. 116:18-117:21;
21 142:13-15.

23 f. The artificial neural network ("ANN") and
24 the Kimmerer Monismith equation ("KM equation") are two
25 methods of estimating X2. 4/2/10 Tr. 111:2-16. The
26 CalSim studies used ANN to estimate the position of X2,
27
28

1 because ANN can be adapted to address sea level rise.
2 4/2/10 Tr. 111:19-25. The Dayflow model uses the KM
3 equation to estimate X2. 4/2/10 Tr. 111:2-8; DWR Ex. 510
4 at Fig. 2; DWR Ex. 511 at ¶15. The KM equation was
5 developed using historical data, making the KM equation
6 invalid for a sea level rise study. 4/2/10 Tr. 111:19-
7 25.
8

9 g. At locations less than 75 kilometers ("km")
10 from the Golden Gate, the KM equation results in an X2
11 estimate greater than (or farther upstream than) the ANN
12 estimate. In contrast, at locations greater than 75 km
13 from the Golden Gate, the KM equation provides an
14 estimate less than the ANN estimate. 4/2/10 Tr. 112:1-
15 113:18, DWR Ex. 510 at Fig. 2.
16

17 29. Mr. Miller calculated the magnitude of error
18 introduced into the BiOp by FWS's application of both the
19 KM and the ANN methods of estimating X2. He replicated
20 the 87 km value as the median estimate of X2 from CalSim
21 study 7.0 using the ANN method, and, consistent with the
22 BiOp, calculated the difference between the reported
23 historic median of X2 [79 km] and the study 7.0 median
24 [87 km] to be 10% $[(87 \text{ km} - 79 \text{ km})/79]$. He then
25 calculated the median X2 for the CalSim 7.0 study using
26 the KM equation (instead of using ANN) to be 84 km
27
28

1 (instead of 87 km). Finally, he identified the percent
2 difference between the reported historic median estimate
3 of X2 using the KM equation [79 km] and the CalSim study
4 7.0 median estimate of X2 using the KM equation [84 km]
5 to be 6% $[(84 \text{ km} - 79 \text{ km}) / 79 \text{ km}]$. 4/2/10 Tr. 114:6-25; DWR
6 Ex. 511 at ¶¶ 14-16; BiOp at 235-36.
7

8 30. FWS did not calculate X2 using the KM equation
9 for the CalSim studies, as did Mr. Miller. Instead, it
10 undertook a direct comparison. DWR Ex. 511 at ¶15. The
11 BiOp reported a 10% difference between the reported
12 historic median X2 and the CalSim study 7.0 X2 median.
13 Calculating the percent difference between the historical
14 median X2 and study 7.0 median X2 using the KM equation
15 resulted in only a 6% difference. From this, Mr. Miller
16 concluded that 40% of the difference between X2 as
17 estimated by study 7.0 and the historical X2 baseline
18 reported in the BiOp is error attributed entirely to the
19 use of the KM equation to calculate the historical
20 baseline X2 and the ANN equation to calculate the CalSim
21 study 7.0 baseline. 4/2/10 Tr. 114:6-25; DWR Ex 511 ¶
22 15.
23
24

25 31. Mr. Miller testified that the differences in the
26 KM equation and the ANN method of estimating X2 has an
27 effect on the BiOp's analysis of habitat area, which in
28

1 turn effects the BiOp's prediction of smelt abundance (as
2 measured by the Summer Townet Survey Index). 4/2/10 Tr.
3 113:19-114:5; BiOp at 235-236, 266-269.

4 32. Mr. Miller explained that correcting for the
5 differences between the use of the KM and ANN methods to
6 estimate X2 does not correct for all the biases inherent
7 in comparing CalSim data to "historic" data. It is
8 unknown which portion of the remaining 60% of difference
9 is attributable to the proposed action, and which portion
10 is due to the other identified biases. 4/2/10 Tr. 115:1-
11 8; DWR Ex. 511 at ¶16.

12 33. Mr. Miller testified that when using CalSim
13 study 7.0 -- designed as a current conditions baseline --
14 instead of the "historical" baseline in the BiOp, and
15 comparing study 7.0 to the near-future 7.1 study, X2
16 moved upstream 0.7 km. The percentage change in X2 from
17 current to near-current conditions was 0.8%. Further,
18 when comparing study 7.0 to study 8.0 (a 2030 level of
19 development scenario), X2 moved upstream only 1.1 km,
20 with a resultant percentage change in X2 of 1.2% from
21 current to future conditions. 4/2/10 Tr. 128:18-129:11;
22 DWR Ex. 511 at ¶20; BiOp at 235, 265. The 0.7 km change
23 and the 1.1 km change, respectively, were vastly
24 different from the approximately 8.7 km and 9.1 km
25
26
27
28

1 changes shown in the BiOp (Figure E-19) using historical
2 Dayflow as the baseline. BiOp at 265; DWR Ex. 511 at ¶7.

3 34. Using the equation identified in Figure E-20 in
4 the BiOp, Mr. Miller calculated the reduction in suitable
5 habitat consistent with the change in the position of X2.
6 A comparison of CalSim study 7.0 with study 7.1 yielded a
7 reduction in habitat area of 128 hectares, and a
8 comparison of study 7.0 with study 8.0 yielded a
9 reduction in habitat area of 289 hectares. 4/2/10 Tr.
10 129:12-130:5; DWR Ex. 511 at ¶20; BiOp at 266.

11 35. Plaintiffs assert that, prior to issuance of the
12 BiOp, FWS was put on notice that comparing historical
13 data to CalSim simulated data was an inappropriate and
14 invalid methodology. 4/2/10 Tr. 133:15-134:11, 137:16-
15 138:16, 138:21-139:14; SLDMWA Ex. 351 at 7; SLDMWA Ex.
16 261 at 5; SWC Ex. 933 at 3.

17 a. The 2008 OCAP BA did raise some cautionary
18 notes:

19 CalSim II is intended to be used in a
20 comparative mode. The results from a "proposed
21 operation" scenario are compared to the results
22 of a "base" scenario, to determine the
23 incremental effects. The model should be used
24 with caution to prescribe seasonal or to guide
25 real-time operations, predict flows or water
26 deliveries for any real-time operations. The
27 results from a single simulation may not
28 necessarily represent the exact operations for a
specific month or year, but should reflect long-
term trends.

DWR Ex. 518.

1 b. DWR Deputy Director Jerry Johns, on October
2 24, 2008, submitted comments to FWS on the draft effects
3 analysis, generally cautioning against the comparison of
4 modeled data with actual data:

5 USFWS is using historic data for comparison to
6 CalSim II simulations. Great caution should be
7 taken when comparing actual data to modeled
8 data. CalSim II modeling should be used in a
9 comparative mode. In other words, it should be
10 used to compare one set of model runs to
11 another. For example, it would be appropriate to
12 compare CalSim II modeling of one demand
13 alternative to another to analyze the
14 incremental effects.

15 AR 8671; see also AR 8668 (further explaining
16 unreliability problems comparing historic and modeled
17 data).

18 c. The State Water Contractors also cited a
19 letter that they sent to FWS before the BiOp was
20 completed. However, that letter only critiqued the
21 comparison of simulated data to historical salvage data,
22 and did not dispute with the comparison of CalSim-
23 simulated to Dayflow-simulated historic data. 4/2/10 Tr.
24 133-34.

25 d. Mr. Miller acknowledged that, despite his
26 heavy involvement in the modeling analysis underlying the
27 BiOp, he did not present his current criticism of the use
28 of the data to FWS during preparation of the BiOp.
4/2/10 Tr. 115-16.

1 36. FWS was not on notice of Mr. Miller's critiques
2 regarding comparing simulated CalSim runs to simulated
3 Dayflow runs, and was not put on notice by him that they
4 were improperly using the specialized models. FWS did
5 not have an opportunity to correct its modeling or
6 address Plaintiffs' concerns.
7

8 37. The BiOp explains why FWS looked beyond CalSim.
9 When CalSim was used to identify current Project
10 operations, and these results were then compared to the
11 results of a CalSim modeling run purportedly simulating
12 past operations, the results "were nearly identical"
13 despite significant operational changes in current
14 operations as compared to past. BiOp at 204-05. The
15 BiOp explains that "[t]he inaccuracies in CalSim [led
16 FWS] to use actual data to develop an empirical
17 baseline." *Id.* at 206. FWS "also developed historical
18 time series data for hydrologic variables used in this
19 effects analysis based on the Dayflow database ... and
20 OMR data obtained from USGS." *Id.*
21

22 38. Mr. Miller asserts that best scientific
23 practice would preclude FWS from comparing CalSim output
24 to historic data generated by Dayflow. However, Mr.
25 Miller acknowledged that in the 2008 OCAP BA, DWR and
26 Reclamation compared CalSim output to historic data,
27
28

1 albeit for a different purpose, namely to show that the
2 timing and magnitude of reservoir and export operations
3 were similar to historic operations. 4/2/10 Tr. 119-20.
4 Mr. Miller acknowledged that other modelers involved in
5 preparing the BA expressed concerns about using only
6 CalSim data, and that the BA itself questioned the use of
7 that data alone, as CalSim simulations did not provide
8 "an especially satisfactory representation of pre-POD
9 water project operations." *Id.* at 150-51. The BA,
10 prepared by DWR and Reclamation, states: "While we have
11 not adopted an alternative statistical approach [to the
12 use of CalSim model runs] in this biological assessment,
13 we believe it would be a useful way to further assess
14 changes in water project operations during the POD era
15 and we recommend that [FWS] consider such an analysis as
16 further refinement to this BA." *Id.* Other reputed
17 scientists in the field agree with FWS and the BA that
18 the CalSim-generated modeling studies did not "generate[]
19 baselines with a high degree of reliability." *Id.* at
20 160. Neither Mr. Miller nor DWR offered any alternative
21 to Dayflow to FWS to address that serious shortcoming
22 during preparation of the BiOp. *Id.* at 160-61.

26 39. Mr. Miller acknowledged that, even if the
27 CalSim comparison had been conducted in the manner he
28

1 recommends, it would have confirmed FWS's conclusions
2 that Project operations as proposed in the BA move X2
3 further upstream in the fall, reducing the amount of
4 habitat for delta smelt and modifying the quality of
5 critical habitat by shifting the low salinity zone away
6 from higher-quality habitat and further into the central
7 Delta. *Id.* at 130. Mr. Miller did not suggest that this
8 revision would result in a *de minimis* shift of X2.
9

10 40. Mr. Miller presents substantive criticisms of
11 the BiOp's CalSim runs. These specific concerns were not
12 raised before the agency prior to the BiOp's issuance.
13 Moreover, FWS expressed legitimate concerns, shared with
14 other scientists, about the exclusive reliance on CalSim
15 runs. Mr. Miller concedes that even if his recommended
16 approach had been taken, the same fundamental result
17 would have obtained: project operations shift the
18 position of X2 upstream.³
19

20 41. This highly technical dispute was not raised
21 before the agency, and there were legitimate concerns
22 about comparing Calsim modeling runs to other Calsim
23 runs. This choice of competing methodologies is not
24 sufficiently clear error to justify the court's
25 intervention.
26

27 ³ The magnitude of the shift, not its existence, and what should
28 be done about it may be relevant to the need for and justification
of RPA Component 3.

1 b. Treatment of "Other Stressors."

2 42. Plaintiffs raise a generic concern about how the
3 BiOp treated the many other factors that are undeniably
4 contributing to the decline of delta smelt including: (a)
5 presence of aquatic macrophytes (submerged aquatic
6 vegetation such as *Egeria densa* that may overwhelm delta
7 smelt habitat); (b) predation; (c) introduction and
8 propagation of invasive species, including inland
9 silversides and the overbite clam that compete with the
10 delta smelt; (d) presence of contaminants, such as
11 pesticides and wastewater, in the Delta; and (e) presence
12 of large blooms of blue-green algae toxic to the copepods
13 eaten by delta smelt. BiOp at 182-86; 4/7/10 Tr. 148:17-
14 19, 149:20-25.
15

16 43. Plaintiffs take particular issue with a
17 statement in the very first paragraph of a section of the
18 BiOp entitled "Effects of the Proposed Action."
19

20 The Status of the Species/Environmental Baseline
21 section of this document described the multitude
22 of factors that affect delta smelt population
23 dynamics including predation, contaminants,
24 introduced species, entrainment, habitat
25 suitability, food supply, aquatic macrophytes,
26 and microcystis. The extent to which these
27 factors adversely affect delta smelt is related
28 to hydrodynamic conditions in the Delta, which
in turn are controlled to a large extent by CVP
and SWP operations. Other sources of water
diversion (NBA, CCWD, local agricultural
diversions, power plants) adversely affect delta
smelt largely through entrainment (see following
discussion), but when taken together do not
control hydrodynamic conditions throughout the

1 Delta to any degree that approaches the
2 influence of the Banks and Jones export
3 facilities. So while many of the other stressors
4 that have been identified as adversely affecting
5 delta smelt were not caused by CVP and SWP
6 operations, the likelihood and extent to which
7 they adversely affect delta smelt is highly
8 influenced by how the CVP/SWP are operated in
9 the context of annual and seasonal hydrologic
10 conditions. While research indicates that there
11 is no single primary driver of delta smelt
12 population dynamics, hydrodynamic conditions
13 driven or influenced by CVP/SWP operations in
14 turn influence the dynamics of delta smelt
15 interaction with, these other stressors (Bennett
16 and Moyle 1996).

17 BiOp at 202 (emphasis added).

18 44. The BiOp concludes that "the CVP and SWP have
19 played an indirect role in the delta smelt's decline by
20 creating an altered environment in the Delta that has
21 fostered the establishment of nonindigenous species and
22 that exacerbates these and other stressors that are
23 adversely impacting delta smelt." BiOp at 203; 4/7/10
24 Tr. 152:5-12. Ms. Goude further testified that it is not
25 possible to quantify the level of effects of those other
26 factors. 4/7/10 Tr. 150:1-3.

27 45. When asked by the Court to identify any
28 information in the record that supports the BiOp's
conclusion that project operations exacerbate the effect
of other stressors, Dr. Thomas Quinn, an expert appointed
under Federal Rule of Evidence 706, concluded that "there
does not appear to be evidence in the record
demonstrating that project operations exacerbate the

1 effect/impact of other stressors." Doc. 633, Order
2 Transmitting Responses from 706 Experts, Ex. A, at 20.
3 Ms. Goude testified that she disagreed with this
4 conclusion, but could not identify any evidence from the
5 record to support her assertion. See 4/7/10 Tr. 201:22-
6 203:9.
7

8 46. Dr. Andre Punt, another court-appointed expert,
9 further explained the BiOp's notion that indirect effects
10 of the Projects may contribute to effects such as high
11 water toxicity, suppression of phytoplankton, increase of
12 overbite clams, and increase in encounters with
13 unscreened agricultural diversions in the Delta are
14 plausible hypotheses, but that "there are no direct data
15 available to test them." Doc. 633 at 21.
16

17 47. In contrast to the BiOp's general statements
18 assigning the blame for at least some, unquantified
19 portion of the negative effects cause by these "other
20 stressors" to the projects, elsewhere, the BiOp
21 acknowledges that there is "no single primary driver of
22 delta smelt population dynamics," *id.* at 202, but rather
23 that there are "multiple factors" and that "not all are
24 directly influenced by operations of the CVP/SWP." *Id.*
25 at 328. "Other stressors" are discussed in detail
26 throughout the BiOp. See, e.g., *id.* at 182-88, 198, 201-
27
28

1 2. Specifically, FWS considered the effects of
2 "predation, contaminants, introduced species..., habitat
3 suitability, food supply, aquatic macrophytes, and
4 microcystis." *Id.* at 202, 277. The BiOp expressly
5 recognizes that the long-term decline of the species "was
6 very strongly affected by ecosystem changes caused by
7 non-indigenous species invasions and other factors...."
8 *Id.* at 189.

10 48. Although the BiOp acknowledges that "not all" of
11 the multiple factors negatively impacting the species
12 "are directly influenced" by Project operations, the
13 general assertion in the BiOp that other stressors are
14 the result of (or at least exacerbated by) Project
15 operations is not supported by the record. This error
16 compounds the agency's failure to address alternative
17 approaches to avoiding jeopardy, including whether other
18 stressors can be mitigated or eliminated, which NEPA
19 requires.
20

21
22 (3) Challenges to Component 2 (Action 3).

23 49. Component 2 (Protection of Larval and Juvenile
24 Delta Smelt) requires OMR flows to remain between -1,250
25 and -5,000 cfs beginning when Component 1 is completed,
26 when Delta water temperatures reach 12° Celsius, or when
27 a spent female smelt is detected in trawls or at salvage
28

1 facilities. *Id.* at 282, 357-358. Component 2 remains in
2 place until June 30 or when Clifton Court Forebay water
3 temperature reaches 25° Celsius, whichever first occurs.
4 *Id.* at 282, 368.

5 50. The objective of Component 2 (which corresponds
6 to Action 3 in Attachment B of the BiOp), is to "improve
7 flow conditions in the Central and South Delta so that
8 larval and juvenile delta smelt can successfully rear in
9 the Central Delta and move downstream when appropriate."
10 BiOp 282.

11 51. The most recent smelt working group
12 recommendation for the week of April 12, 2010 recommends
13 OMR flows no more negative than -5,000 cfs because the
14 "risk to larval delta smelt was low, given that no
15 salvage of larvae has occurred so far this year and the
16 latest survey data suggest that the greatest densities of
17 delta smelt are in the Sacramento River and downstream of
18 the confluence, and, therefore, outside the influence of
19 the pumps."⁴

22 //

23 //

24 //

25
26
27 ⁴ Judicial notice is taken of the existence and content of the
28 Smelt Working Group Recommendation, dated April 12, 2010, available
at: http://www.fws.gov/sacramento/es/documents/ds_working_group/4-12-10%20notes.pdf.

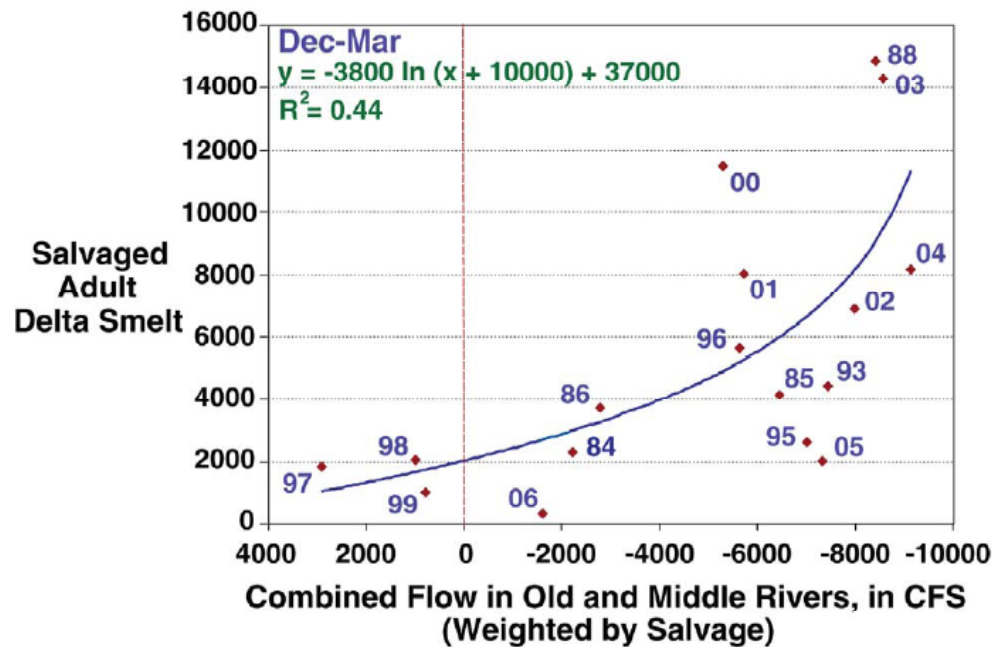
1 a. Use of Raw Salvage to Justify the
2 Quantitative Flow Restrictions.

3 52. The BiOp quantitatively analyzed the effects of
4 pumping at the Banks and Jones pumping plants. 4/6/10
5 Tr. 19:1-3; BiOp at 208-209.

6 53. The results of that quantitative analysis, which
7 compared OMR flows with gross salvage numbers, are
8 described in Figures B-13 and B-14 of the BiOp. BiOp at
9 348, 350. These figures were presented as part of a
10 three and-a-half page section of the BiOp entitled
11 "Justification for Flow Prescriptions in Action 1." BiOp
12 at 347-51. It also appears that this analysis was relied
13 upon to set the calendar-based flow prescription in
14 Component 2 (Action 3), as no other basis for the -5,000
15 cfs ceiling is presented. Because this portion of the
16 BiOp is critical to the present challenge, it is
17 reproduced here in its entirety:
18

19 Justification for Flow Prescriptions in Action 1
20

21 Understanding the relationship between OMR flows and delta smelt salvage allows
22 a determination of what flows will result in salvage. The OMR-Salvage analysis
23 herein was initiated using the relationship between December to March OMR flow
24 and salvage provided by P. Smith and provided as Figure B-13, below. Visual
25 review of the relationship expressed in Figure B-13 indicates what appears to be a
26 "break" in the dataset at approximately -5,000 OMR; however, the curvilinear fit
27 to the data suggest that the break is not real and that the slope of the curve had
28 already begun to increase by the time that OMR flows reached -5,000 cfs.



Note: Data shown are for the period 1984-2007, excluding years 1987, 1989-92, 1994, and 2007 that had low (<12ntu) average water turbidity during Jan-Feb at Clifton Court Forebay.

Figure B-13. OMR-Salvage relationship for adult delta smelt. (source, P. Smith). Data from this figure were the raw data used in the piecewise polynomial regression analysis.

Further, a nonlinear regression was performed on the dataset, and the resulting pseudo- R^2 value was 0.44—suggesting that although the curvilinear fit is a reasonable description of the data, other functional relationships also may be appropriate for describing the data. Fitting a different function to the data could also determine the location where salvage increased, i.e. identify the “break point” in the relationship between salvage and OMR flows. Consequently, an analysis was performed to determine if the apparent break at -5,000 cfs OMR was real. A piecewise polynomial regression, sometimes referred to as a multiphase model, was used to establish the change (break) point in the dataset.

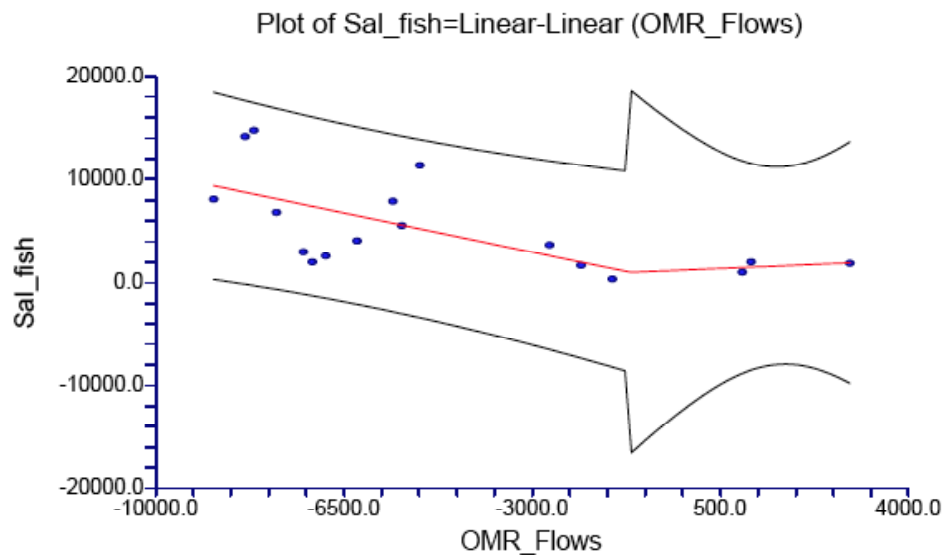
A piecewise polynomial regression analysis with a linear-linear fit was performed using data from 1985 to 2006. The linear-linear fit was selected because it was the analysis that required the fewest parameters to be estimated relative to the amount of variation in the salvage data. Piecewise polynomial regressions were performed using Number Cruncher Statistical Systems (© Hintz, J., NCSS and PASS, Number Cruncher Statistical Systems, Kaysville UT).

The piecewise polynomial regression analysis resulted in a change point of -1162, i.e. at -1162 cfs OMR, the slope changed from 0 to positive (Figure B-14). These results indicate that there is a relatively constant amount of salvage at all flows more positive than -1162 cfs but that at flows more negative than -1162, salvage

1 increases. The pseudo-R² value was 0.42, a value similar to that obtained by P.
2 Smith in the original analysis.

3 To verify that there was no natural break at any other point, the analysis was
4 performed using a linear-linear-linear fit (fitting two change points). The linear-
5 linear-linear fit resulted in two change points, -1,500 cfs OMR and -2,930 cfs
6 OMR. The -1,500 cfs value is again the location in the dataset at which the slope
7 changes from 0 to positive. The pseudo-R² value is 0.42 indicating that this
8 relationship is not a better description of the data. Because of the additional
9 parameters estimated for the model, it was determined that the linear-linear-linear
10 fit was not the best function to fit the data, and it was rejected. No formal AIC
11 analysis was performed because of the obvious outcome.

12 A major assumption of this analysis is that as the population of Delta smelt
13 declined, the number of fish at risk of entrainment remained constant. If the
14 number of fish in the vicinity of the pumps declined, fewer fish would be entrained
15 and more negative OMR flows would result in lower salvage. This situation would
16 result in an overestimate, i.e. the change point would be more positive. In fact, if
17 the residuals are examined for the relationship in Figure B-13 above, the salvage for
18 the POD years 2002, 2004, 2005, and 2006 are all below the line. 2003 is above
19 the line although the line is not extended to the points at the top of the figure, and
20 these data points occur when the curve becomes almost vertical. The negative
21 residuals could be a result of a smaller population size available for entrainment
22 and salvage. This could be verified by normalizing the salvage data by the
23 estimated population size based on the FMWT data.



26 **Figure B-14. Piecewise polynomial regression of OMR flows and salvage. The**
27 **change point is the location at which the two regression lines meet; -1,162 cfs OMR.**

1
2 The original values of OMR and salvage could have been measured with error due
3 to a number of causes, consequently the values used in the original piecewise
4 polynomial analysis could be slightly different than the “true” values of salvage
5 and OMR flow. Consequently, a second analysis was undertaken to examine the
6 effect of adding stochastic variation to the OMR and salvage values in the
7 piecewise polynomial regression analysis. The correlation between OMR and
8 salvage in the original dataset was -0.61 indicating that the more negative the
9 OMR, the greater the salvage. Consequently, it was necessary to maintain the
10 original covariance structure of the data when adding the error terms and
11 performing the regressions. The original covariance structure of the OMR–salvage
12 data was maintained by adding a random error term to both parameters. The
13 random error term was added to OMR and a correlated error term was added to
14 salvage. The expected value of the correlated errors was -0.61.

15
16 The error terms were selected from a normal distribution with a mean of 1.0 and a
17 standard deviation of 0.25 which provided reasonable variability in the original
18 data. Operationally this process generated a normal distribution of OMR and
19 salvage values in which the mean of the distributions were the original data points.
20 Additional analyses were performed with standard deviations of 0.075, 0.025, and
21 0.125. Smaller standard deviations in the error term resulted in estimates of the
22 change point nearer to the original estimate of -1,162 cfs. This is to be expected as
23 the narrower the distribution of error terms, the more likely the randomly selected
24 values would be close to the mean of the distribution. The process was repeated
25 one hundred times, each time a new dataset was generated and a new piecewise
26 polynomial regression was performed. The software package @Risk (© Palisade
27 Decision Tools) was used to perform the Monte Carlo simulations. Latin
28 hypercube sampling was used to insure that the distributions of OMR and salvage
values were sampled from across their full distributions. The parameter of interest
in the simulations was the change point, the value of the OMR flow at which the
amount of salvage began to increase. Incorporating uncertainty into the analysis
moved the change point to -1,800 cfs OMR, indicating that at flows above -1683,
the baseline level of salvage occurred but with flows more negative than -1683,
salvage increased.

BiOp 347-51 (emphasis added) .

**54. The BiOp does not use this information to assert
that entrainment has a statistically significant effect
on the population of delta smelt every year. 4/7/10 Tr.
172. Rather, this information appears to be used to set**

1 "break points" above and below which entrainment rates
2 noticeably change. In turn, these break points were
3 utilized in the formation of the flow restrictions in the
4 RPAs.

5 55. It is undisputed that the use of gross salvage
6 does not account for the size (or relative size) of the
7 smelt population, as estimated by reliable abundance
8 indexes. 4/6/10 Tr. 22:10-11, 23:19. The BiOp admits as
9 much, and concedes that the analysis "assumes that as the
10 population of Delta smelt declined, the number of fish at
11 risk of entrainment remained constant." See emphasized
12 text above.
13

14 56. Considering gross salvage numbers alone provides
15 no means of distinguishing an event in which 10,000 fish
16 are salvaged out of a population of 20,000 from an event
17 in which 10,000 fish are salvaged from a population of 20
18 million. 4/6/10 Tr. 24:19-22.
19

20 57. FWS was aware of the problems with using gross
21 salvage numbers before the completion of the BiOp. The
22 August 26, 2008, draft meeting notes of FWS's Delta Smelt
23 Action Evaluation Team state:
24

25 When analyzing the importance of entrainment to
26 the species population structure or decline, the
27 relevant fact to consider is the percentage of
28 the population being removed via entrainment.
Salvage data, by itself, may not be sufficient
to help one understand the percentage of the
population being removed via entrainment.

1 MWD Ex. 633 at 5.

2
3 58. The Independent Peer Review of FWS's draft
4 Effects Analysis for the BiOp also recommended to FWS
5 that it "normalize[]" salvage to population size:

6 The panel suggests that the use of predicted
7 salvage of adult smelt should be normalized for
8 population size. Total number salvaged is
9 influenced by a variety of factors, particularly
10 the number of fish in the population....
11 Expressing salvage as a normalized index may
12 help remove some of the confounding of the
13 temporal trends during the baseline.

14 MWD Ex. 608 at 8.

15 59. However, notwithstanding the recommendation of
16 the Independent Peer Review and its own internal staff's
17 recognition that salvage data should be normalized, FWS
18 persisted in using raw salvage data and did not normalize
19 or index the salvage data to the population size. BiOp
20 at 348, 350. As a result, salvage numbers relied upon to
21 justify the RPAs do not relate to any information
22 regarding population-level effects. 4/6/10 Tr. 22:10-11,
23 23:19. This was unreasonable, not based on the best
24 available science, arbitrary, and capricious.

25 60. This conclusion was supported by explanatory
26 testimony of the experts. There was agreement among the
27 testifying scientific experts that the use of normalized
28 salvage data rather than gross salvage data is the
standard accepted scientific methodology among

1 professionals in the fields of fisheries
2 biology/management. 4/5/10 Tr. 97:4-10, 143:25-144:1;
3 4/6/10 Tr. 30:15-22; Doc. 633, Ex. A, at 7, 10; 4/6/10
4 Tr. 31:11-16; MWD Ex. 608 at 6; Fed. Gov't Smelt Ex. 17
5 at ¶11.

6
7 a. The Federal Defendants' expert on biological
8 statistics, Dr. Kenneth Newman, stated in his declaration
9 that Federal Defendants should have "scale[ed] salvage by
10 some measure of population abundance" and stated in his
11 oral testimony that without indexing salvage to
12 population there is "nothing to go on." Fed. Gov't Smelt
13 Ex. 17 at ¶11; 4/5/10 Tr. 143:25-144:1.

14
15 b. Dr. Newman went on to state that the
16 relevant factor to consider is the percentage of the
17 smelt population being removed by entrainment and that
18 salvage data by itself is not sufficient. 4/5/10 Tr.
19 97:4-10. Dr. Newman also stated that because Figure B-13
20 relates raw salvage to combined OMR flows, it does not
21 enable the agency to determine the effect on the
22 population of a particular OMR flow. 4/5/10 Tr. 100:11-
23 15.

24
25 c. Dr. Punt found that "it was unreasonable
26 (given that appropriate data and analysis methods were
27 available to account for population size) to have only
28

1 relied on the information in Fig. B-13 and Fig. B-14
2 rather than on an analysis in which salvage is expressed
3 relative to population size." Doc. 633, Ex. A, at 7.
4 Dr. Deriso agreed. 4/6/10 Tr. 30:15-31:2.

5 d. Dr. Thomas Quinn, the other 706 expert,
6 stated: "it is not clear why such an adjustment [of
7 salvage to population size] was not made for the data
8 examined in this report." Doc. 633, Ex. A, at 10. Dr.
9 Deriso agreed. 4/6/10 Tr. 31:11-19.

10
11 61. The BiOp itself recognized the necessity of
12 normalizing raw salvage data:

13 To provide context to determine the magnitude of
14 effect of pre-spawning adult direct mortality
15 through entrainment within any given season (as
16 measured by salvage), it is necessary to
17 consider two important factors.....¶ The second
18 factor to consider when relating salvage to
19 population-level significance is that the total
20 number salvaged at the facilities does not
21 necessarily indicate a negative impact on the
22 overall delta smelt population.

23 BiOp at 338.

24 62. August 26, 2008 meeting notes of the Delta Smelt
25 Action Evaluation Team also indicate that FWS recognized
26 and was aware of the need to analyze the percentage of
27 the population removed by salvage, but neither these
28 notes nor the BiOp explain why this analysis was not
performed. MWD Ex. 633 at 5; 4/5/10 Tr. 96-97:14-10.

63. The BiOp, in fact, used normalized salvage data
for other parts of its analysis, including the Incidental

1 Take Statement, evidencing its ability to do so. BiOp at
2 386; 4/7/10 Tr. 196:18-20; see also 4/7/10 Tr. 199:14-21
3 (Cay Goude testifying that FWS understood the importance
4 of using normalized salvage data and chose to use it in
5 parts of the BiOp).

6
7 64. FWS did not explain its decision in the BiOp to
8 use gross salvage numbers in Figures B-13 and B-14, and
9 did not explain why it selectively used normalized
10 salvage data in some parts of the BiOp but not in others.
11 4/6/10 Tr. 28:5-8, 32:5-9.

12
13 65. FWS presented no credible, scientifically based
14 explanation for the decision to use gross salvage numbers
15 instead of normalized salvage data in Figures B-13 and B-
16 14, either in the BiOp or at the hearing. Other than
17 endeavoring to structure a result, there is no
18 explanation for this departure from best available
19 science. This raises the spectre of bad faith.

20
21 66. For the purposes of (a) demonstrating the
22 difference between the analysis presented in the BiOp and
23 a population-normalized analysis and (b) identifying an
24 appropriate interim remedy, Dr. Deriso analyzed the
25 relationship between normalized salvage and OMR flows.
26 This analysis revealed that there were no detectable
27 trends in the juvenile salvage rate at flows up to -5,600
28

1 cfs, which is the most negative salvage weighted flow
2 rate contained in the data. 4/6/10 Tr. 55:18-24; Fed.
3 Gov't Smelt Ex. 18 at ¶25.

4 67. Federal Defendants criticize Dr. Deriso's
5 alternative analysis in a number of ways:
6

7 a. Dr. Newman explained that Dr. Deriso's
8 analysis is more appropriately characterized as a "first
9 cut" at an analysis that fails to correct for potentially
10 large "observation errors." 4/5/10 Tr. 73, 77-78. Those
11 "errors" include factors and variability that would tend
12 to confound the results if not accounted for, such as
13 temperature variations, geographic distribution,
14 turbidity, or predation, all of which can "distort[,]
15 confuse or confound" the relationship between the factors
16 one is trying to examine. *Id.* at 51 (Dr. Newman's
17 testimony regarding the factors he will be addressing and
18 including in his forthcoming delta smelt life cycle
19 model). He opined that some of these confounding factors
20 are very important and ignoring them could lead one
21 "[e]ither to wrongly assume that there is a relationship
22 or to assume that there is [one] when there isn't." *Id.*
23 at 82. This concern was reiterated by Dr. Rose in his
24 2000 paper, and by Dr. Hilborn. *Id.* at 160-61.
25
26

27 b. Dr. Newman ran his own analysis, applying a
28

1 different standard statistical methodology, on the same
2 cumulative salvage index versus OMR flow data used by Dr.
3 Deriso, and got different results regarding the
4 "inflection point" where OMR flows had an increasing
5 impact on the population-normalized salvage rate. 4/5/10
6 Tr. 63-64. Ultimately, Dr. Newman testified that he
7 would have performed a statistical analysis different
8 from those performed by both Dr. Deriso and in the BiOp.
9 *Id.* at 79-80. Dr. Newman never suggested that an
10 analysis utilizing raw salvage numbers (i.e., not
11 adjusted for relative population size) is scientifically
12 appropriate. This is not just a scientific dispute among
13 experts, particularly in view of FWS's concession in the
14 BiOp.
15
16

17 c. Dr. Deriso admitted that he is not a delta
18 smelt biologist, 4/6/10 Tr. 125, and that his analysis
19 does not account for a number of potentially confounding
20 factors, such as: the large amount of pumping-related
21 mortality that is not measured by salvage, *id.* at 89;
22 116, pumping-related changes to delta smelt habitat, *id.*
23 at 116, 140; pumping-related impacts on food supply, *id.*
24 at 143; pumping-related impacts of spatial confinement of
25 delta smelt to the Sacramento River, *id.* at 144-45;
26 whether the death of some individuals such as fecund
27
28

1 females may have a disproportionate impact on the
2 population (the so-called "big mama" hypothesis) *id.* at
3 116; and whether the relationship between OMR flows and
4 population abundance could change depending on population
5 size, *id.* at 146.

6
7 d. Nor did Dr. Deriso's analysis distinguish
8 between years pre-dating or post-dating the POD, though
9 he acknowledged that there is evidence of drastic changes
10 in the estuary during that period. *Id.* at 123-24, 165.
11 Reputable scientists in the field, including Drs. Peter
12 Moyle and Bill Bennett, have opined that statistical
13 "correlations [in the Delta] seem to be losing some of
14 their former predictive value in recent years for some
15 desirable species (Kimmerer et al. 2009). This, in part,
16 may be due to ... the extremely low abundance of
17 desirable fishes, which may not be tracked as effectively
18 by the traditional monitoring programs." *Id.* at 119-20.

19
20 e. In the absence of reliable population
21 estimates for delta smelt, Dr. Deriso utilized the FMWT
22 index as a proxy for population when conducting his
23 analysis of the population-level effects of salvage on
24 adult delta smelt. However, Dr. Newman noted that there
25 are several biases in the FMWT data, particularly
26 selection bias, such that he would not rely purely on
27
28

1 FMWT data "when it comes to analyzing salvage." 4/5/10
2 Tr. 118.

3 e. In addition, Dr. Deriso's analysis accounts
4 in only a very limited way for spatial distribution (by
5 excluding years with low turbidity from the analysis).
6 Spatial distribution reflects the increased vulnerability
7 of delta smelt to entrainment as they move closer to the
8 pumps. 4/5/10 Tr. 80-82. In contrast, Components 1 and
9 2 of the BiOp account for spatial distribution to a much
10 greater extent by allowing for modification of the level
11 of OMR flows based on the location of delta smelt in the
12 estuary. 4/7/10 Tr. 55-56, 69-71. Dr. Deriso's analysis
13 looks solely at the relationship between population-
14 weighted salvage and OMR flows, excluding all other
15 factors and considerations.
16
17

18 68. Nevertheless, even assuming all of these
19 critiques of Dr. Deriso's opinion are valid, they do
20 nothing to justify the BiOp's election to base its flow
21 prescriptions on an analysis that uses raw salvage
22 numbers. Even if Dr. Deriso's "first cut" needs
23 refinement to address these critiques, the BiOp's
24 analysis in Figure B-13 does not account for any of the
25 issues on which Federal Defendants criticize Dr. Deriso's
26 analysis.
27
28

1 69. Federal Defendants note that Dr. Deriso
2 presented his conclusions and analysis regarding the BiOp
3 to the National Research Council of the National Academy
4 of Sciences panel that peer-reviewed the BiOp. 4/2/10
5 Tr. 193; 4/6/10 Tr. 137. After reviewing the information
6 presented by Dr. Deriso, that panel explicitly disagreed
7 with his conclusion that FWS's analysis in the BiOp was
8 not based on the best available science or one that a
9 "reasonable biologist" would perform. Instead, the NRC
10 Panel confirmed the analysis performed by FWS and its
11 biologists, stating that:
12

13 Although there are scientifically based
14 arguments that raise legitimate questions about
15 this action, the committee concludes that until
16 better monitoring data and comprehensive life
17 cycle models are available, it is scientifically
18 reasonable to conclude that high negative OMR
19 flows in winter probably adversely affect smelt
20 populations. Thus the concept of reducing OMR
21 and negative flows to reduce mortality of smelt
22 at the SWP and CVP facilities is scientifically
23 justified.

24 4/2/10 Tr. 194. The NRC analysis justifies its
25 conclusion by recognizing better monitoring is not
26 available, a comprehensive life cycle model does not
27 exist, and that high negative OMR flows in winter
28 "probably" adversely affect smelt populations.

70. The NRC's equivocal conclusion is in no way
inconsistent with a finding that the BiOp failed to
utilize the best available scientific methods by relying

1 on a quantitative analysis using raw salvage to select
2 the upper ceiling for negative OMR flows under Component
3 2. The Federal Defendants have not told the whole NRC
4 Panel story. The NRC Panel expressly found that "there
5 is substantial uncertainty regarding the amount of flow
6 that should trigger a reduction in exports," (emphasis
7 added) and declined to decide whether alternative RPAs
8 would "provide equal or greater protections for the
9 species while requiring less disruptions of Delta water
10 diversions," concluding that the panel had received
11 insufficient documentation on such alternatives. *Id.* at
12 200-01. Having failed to perform the required NEPA
13 analysis, it is certain that Federal Defendants could not
14 and did not take the requisite hard look at RPA
15 alternatives.
16
17

18 71. Federal Defendants argue that the district court
19 previously heard and rejected similar statistical
20 analysis of fish population dynamics presented by Mr.
21 B.J. Miller during the 2007 interim remedy hearing.
22

23 a. Mr. Miller "concluded that there was no
24 statistical significance in the relationship between
25 Delta smelt abundance and salvage and export operations
26 in the pumps." 4/6/10 Tr. 114. Another of Plaintiffs'
27 witnesses in that proceeding, Dr. Charles Hanson, then
28

1 explained that even if Mr. Miller's statistical analyses
2 were correct and "reflect the low significance of that
3 salvage mortality to the population," it did not suggest
4 that regulatory action to minimize salvage at the pumps
5 was not justified:
6

7 On the other side, Your Honor, the fact that we
8 are salvaging Delta smelt represents a source of
9 mortality to this population. And one of the
10 approaches that's being made, given the low
11 population abundance, is to identify those
12 sources of mortality that we know of and to try
13 and reduce those. My feeling is that we have
14 such a complex estuary with so many interacting
15 variables that change from year to year and
16 within years, that it's difficult to rely solely
17 on statistical analyses. I think we're at a
18 point where we need to say do we have a
19 substantial source of mortality and is there
20 something we can do to help reduce that.

21 4/6/10 Tr. 114-15.

22 b. Plaintiffs' expert, Dr. Hilborn, expressed
23 similar opinions during the most recent evidentiary
24 hearings, acknowledging that, while he criticized the
25 BiOp for lacking "a basis for population level effects of
26 the proposed actions... it's pretty clear that there are
27 viability concerns about Delta smelt." 4/5/10 Tr. 224.
28 Dr. Hilborn also acknowledged "it's very clear that large
negative flows have an impact on the number of fish that
are impinged and entrained." *Id.* at 228. He did not
quantify what he meant by "large negative flows." Dr.
Hilborn agrees that there is no doubt that the population
size of delta smelt is currently at an historic low and

1 that entrainment at project facilities results in direct
2 mortality. *Id.* at 249-50. Dr. Hilborn explained that he
3 does not deny that a long-term relationship between
4 population growth rate and salvage may exist, only that
5 he has not seen "any evidence of that in any of the
6 analysis I've seen so far." *Id.* at 228. Dr. Hilborn
7 acknowledged that he "couldn't exclude the possibility"
8 that a future salvage event could eliminate 100% of the
9 population, even if there was no relationship between the
10 amount of delta smelt salvaged and long-term population
11 dynamics. *Id.* at 229.

12
13 c. Assuming, arguendo, the "possibility" cannot
14 be "exclude[d]" that a future salvage event could
15 eliminate 100% of the population, FWS did not justify its
16 selection of -5,000 cfs on the basis of that ceiling's
17 ability to prevent such a catastrophic salvage event.
18 Faced with express concerns from inside and outside the
19 agency about drawing conclusions from analyses using raw
20 salvage, FWS completely failed to explain why it
21 nonetheless did so. None of the post-hoc
22 rationalizations offered by Federal Defendants, e.g. the
23 "big mama" hypothesis, was mentioned in the BiOp as bases
24 for selecting -5,000 cfs as the ceiling for negative OMR
25 flows.
26
27
28

1 72. FWS's reliance on analyses that utilize raw (as
2 opposed to population-normalized) salvage data is an
3 undeniable failure to use the best available scientific
4 methodology.

5
6 b. Other Data Supporting the General Conclusion
7 that Negative OMR flows Jeopardize the
8 Smelt.

9 73. There is far more dispute over the sufficiency
10 of evidence supporting the BiOp's general conclusion that
11 the negative OMR flows predicted to take place under
12 planned Project operations will jeopardize the smelt
13 (referred to in this subsection as the "jeopardy
14 conclusion").

15 (1) Sporadically Significant Take.

16 74. One of the key rationales for the jeopardy
17 conclusion is the assertion that entrainment has a
18 "sporadically significant" effect on smelt abundance.
19 BiOp at 210. This assertion was based on the estimates
20 of proportional entrainment in Kimmerer 2008. BiOp at
21 210; Fed. Gov't Smelt Ex. 38. Kimmerer 2008 states that:

22 Delta smelt may suffer substantial losses to
23 export pumping both as pre-spawning adults and
24 as larvae and early juveniles. In contrast to
25 the situation for salmon, pre-salvage mortality
26 has been constrained in the calculations for
27 adult Delta smelt, and its effects eliminated
28 from the calculations for larval/juvenile Delta
smelt. Combining the results for both life
stages, losses may be on the order of zero to 40
percent of the population throughout winter and

1 spring.

2 4/7/10 Tr. 42-43; AR 018877.

3 75. Dr. Grimaldo confirmed that the Kimmerer (2008)
4 and Kimmerer and Nobriga (2008) studies represented the
5 "best available science" when the BiOp was prepared.
6 4/7/10 Tr. 63-64. The BiOp cites Kimmerer (2008) (and
7 other peer-reviewed studies) for the propositions that
8 entrainment can affect the abundance of delta smelt in
9 certain years; may prevent recovery when habitat
10 conditions are suitable; and that high entrainment of
11 adults in the winter appears to have played a role in the
12 decline of delta smelt in the POD years. BiOp at 158-59.

13 76. Dr. Deriso questions whether Kimmerer (2008)
14 should be interpreted as standing for the proposition
15 that entrainment mortality can kill a substantial portion
16 of the population in some years. For example, he
17 testified that the Kimmerer (2008) article relied on a
18 number of assumptions to calculate the percentage
19 entrainment figures incorporated into the BiOp, including
20 the assumption that a proportional relationship exists
21 between OMR flow levels and entrainment. 4/6/10 Tr.
22 131:12-16; Fed. Gov't Smelt Ex. 29 at ¶19; Fed. Gov't
23 Smelt Ex. 38 at 018875-018876. Because the Kimmerer
24 (2008) article began with this assumption, Dr. Deriso
25
26
27
28

1 opined that it could not reasonably be used by FWS as
2 evidence that a proportional relationship exists between
3 OMR flow level and smelt entrainment. Fed. Gov't Smelt
4 Ex. 29 at ¶19.

5 77. But, the BiOp did not rely on Kimmerer (2008)
6 for this purpose. Dr. Grimaldo explained that "what the
7 Kimmerer 2008 paper actually showed was that there was a
8 population response [to entrainment] within life stages."
9 4/7/10 Tr. 98.⁵ Dr. Newman explained that this
10 information is "certainly pertinent to understanding
11 what's happening with the population." 4/5/10 Tr. 135-
12 136.

13 78. Dr. Newman, who did not participate in the
14 preparation of the BiOp, agreed that FWS's conclusion in
15 the BiOp that entrainment affects subsequent year
16
17

18
19 ⁵ Kimmerer (2008) acknowledges that "...despite substantial
20 variability in export flow in years since 1982, no effect of export
21 flow on subsequent midwater trawl abundance is evident," but refuses
22 to "dismiss the rather large proportional losses of delta smelt that
23 occur in some years; rather, it suggests that these losses have
24 effects that are episodic and therefore their effects should be
25 calculated rather than inferred from correlation analyses." Fed.
26 Gov't Smelt 38 at 25 (AR 018878). Dr. Quinn opined that "evidence
27 should have been presented in the BiOp to demonstrate such effects,
28 based on some calculation." Doc. 633 at 2. For example, he asks:
"In which years were there large losses that can be directly
attributed to the pumping operations, and what were the effects on
subsequent recruitment? Because the smelt are largely annual fish, a
catastrophe in a single year could put them at great risk of
extinction and two bad years in a row could accomplish it. The risk
inherent in the statistical and ecological uncertainty is borne
heavily by the species but there still should be some evidence in
the record to reveal these effects." *Id.* It is not clear whether
the BiOp relies on Kimmerer 2008 as evidence of these effects or
simply as evidence that these effects may be significant.

1 abundance of Delta smelt even sporadically is supported
2 by generally accepted scientific standards. 4/5/10 Tr.
3 89-90. It is undisputed that very large salvage events
4 can and have occurred at OMR flows of less than -5,000
5 cfs. In May and June of 1999 alone, 58,929 and 73,368
6 delta smelt, respectively, were salvaged at the Project
7 export facilities. 4/6/10 Tr. 111. Average OMR flows
8 during those months were -1,062 cfs and -3,814 cfs,
9 respectively. *Id.* at 112. While Dr. Deriso testified
10 that the significance of such an event depends on the
11 size of the population, he also could not state whether
12 the current population was large enough to survive
13 similar salvage events, or whether such an event would
14 jeopardize the continued existence of the smelt. *Id.*
15 Dr. Hanson, another of Plaintiffs' expert fish biologist
16 witnesses, testified in 2007 that salvage of 1,300-1,400
17 delta smelt would be "a very high level of salvage"
18 "under the current population levels." *Id.* at 113.
19 Delta smelt abundance levels have further declined since
20 Dr. Hanson made that statement. *Id.*

21
22
23
24 79. It was not unreasonable for FWS to conclude that
25 salvage events may be "sporadically significant."

26 //

27 //

28

1 (2) Dr. Bennett's Work.

2 (a) Impact of VAMP on Population
3 Dynamics.

4 80. Dr. Bennett's unpublished research
5 "demonstrated that the number of larvae that survived to
6 the fall is related to when they hatch in the spring....
7 [and] that larvae that hatched during the VAMP ...
8 protective period[] were the ones that survived to the
9 fall in the period that he examined." 4/7/10 Tr. 93.

10 81. The BiOp concluded:

11 Based on Bennett's unpublished analysis,
12 reduced spring exports resulting from VAMP
13 have selectively enhanced the survival of
14 delta smelt larvae spawned in the Central
15 Delta that emerge during VAMP by reducing
16 their entrainment. Initial otolith studies
17 by Bennett's lab suggest that these spring-
18 spawned fish dominate subsequent recruitment
19 to adult life stages. By contrast, delta
20 smelt spawned prior to and after the VAMP
21 have been poorly-represented in the adult
22 stock in recent years. The data suggests
23 that the differential fate of early, middle
24 and late cohorts affects sizes of delta
25 smelt in fall because the later cohorts have
26 a shorter growing season. These findings
27 suggest that direct entrainment of larvae
28 and juvenile delta smelt during the spring
are relevant to population dynamics.

23 BiOp at 170 (emphasis added). Nothing in the record
24 suggests this conclusion was unreasonable.

25 (b) Big Mama Hypothesis.

26 82. Federal Defendants and Defendant Intervenors
27 also suggest that Dr. Bennett's work provided "evidence"
28

1 to support the "big mama" hypothesis that Project
2 operations may affect delta smelt abundance by entraining
3 the most fecund individuals in the population, thereby
4 creating a disproportionate impact on the reproductive
5 potential and growth rate of the population.
6

7 83. However, the BiOp does not suggest Bennett's
8 work provides evidence of this hypothesis; rather, the
9 BiOp consistently indicates that the "big mama"
10 hypothesis is just that -- a hypothesis:

11 Another possible contributing driver of reduced
12 delta smelt survival, health, fecundity, and
13 resilience that occurs during winter is the "Big
14 Mama Hypothesis" (Bill Bennett, UC Davis, pers.
15 comm. and various oral presentations). As a
16 result of his synthesis of a variety of studies,
17 Bennett proposed that the largest delta smelt
18 (whether the fastest growing age-1 fish or fish
19 that manage to spawn at age-2) could have a
20 large influence on population trends. Delta
21 smelt larvae spawned in the South Delta have
22 high risk of entrainment under most hydrologic
23 conditions (Kimmerer 2008), but water
24 temperatures often warm earlier in the South
25 Delta than the Sacramento River (Nobriga and
26 Herbold 2008). Thus, delta smelt spawning often
27 starts and ends earlier in the Central and South
28 Delta than elsewhere. This differential warming
may contribute to the "Big Mama Hypothesis" by
causing the earliest ripening females to spawn
disproportionately in the South Delta, putting
their offspring at high risk of entrainment.
Although water diversion strategies have been
changed to better protect the 'average' larva,
the resilience historically provided by variable
spawn timing may be reduced by water diversions
and other factors that covary with Delta inflows
and outflows.

BiOp at 158 (emphasis added). This hypothesis has not

1 been proved.

2
3 (3) Consideration of Life Stage and
4 Geographic Distribution.

5 84. The BiOp considers the life stage of delta smelt
6 and where the population is located in the estuary, to
7 help assess entrainment risk. Dr. Grimaldo explained:

8 [I]n the fall [and] winter, we have very low
9 entrainment risk. But once the first flush
10 events happen, beginning sometime in mid
11 December, Delta smelt often migrate upstream. So
12 they're vulnerable at this part of the life
13 stage. After they migrate upstream, they stage
14 for a little bit. And they're vulnerable to
15 entrainment during the staging period. And then
16 after the staging period, they spawn. And their
17 progeny are vulnerable to entrainment at this
18 period.

19 So there's vulnerability to different life
20 stages as -- and, in general, as they become
21 distributed closer to the central and south
22 Delta central and south Delta, their entrainment
23 risk goes up.

24 4/7/10 Tr. 50-51. The RPA takes into account these
25 spatial and life stage factors by breaking actions into
26 different components over different periods of time. *Id.*
27 at 64-65.

28 85. Mr. Feyrer and Dr. Grimaldo testified that the
export pumps affect the geographic distribution of delta
smelt, and that preventing the fish from coming near the
pumps reduces the risk of entraining those fish. 4/2/10
Tr. 180; 4/7/10 Tr. 64. Larval and juvenile delta smelt,
in particular, are "neutrally buoyant" and thus follow
the flow in the Delta in a manner similar to particles.

1 4/7/10 Tr. 54-55. Particle-tracking modeling shows that
2 many of the particles are "lost" to the pumps when
3 export-inflow ratios are increased. *Id.* at 59-60.
4 Kimmerer and Nobriga (2008), relied on in the BiOp,
5 asserts that these studies "suggest a direct link between
6 the position of the smelt population as determined by
7 outflow and losses as determined by export flow" and "may
8 be enough to recommend strong protective measures for
9 Delta smelt in spring (March-May) of low outflow years
10 when they are highly vulnerable to export losses." *Id.*
11 at 60-62. Non-export factors influence entrainment too,
12 "such as river inflows, the position of X2 and where the
13 fish are distributed." *Id.* However, as Mr. Feyrer
14 testified, "essentially the closer [the fish] are, the
15 more vulnerable [they] will be" to the effects of
16 entrainment.⁶ *Id.*

21 ⁶ Entrainment includes more than just salvage measured at the
22 pumps. As Mr. Feyrer explained, salvage is a small subset of
23 entrainment: "Salvage is essentially the fish that are observed at
24 the ... salvage facilities. Those are the facilities that are
25 located at both the state and federal export operation facilities.
26 And those facilities are designed to essentially filter the fish out
27 of the water before they are entrained into the pumps. And then
28 they're released back into the estuary. And so those are the fish
that you actually observe in salvage. However, entrainment refers
to the fish that are not observed plus those fish that are
observed." 4/2/10 Tr. 180-81. Fish that are not observed include
those that suffer from pre-screen mortality at Clifton Court
Forebay, *id.* at 182, and those that are not detected due to louver
inefficiency. Pumping pulls fish into the Forebay, increasing their
exposure to these sources of mortality. *Id.* at 183.

1 c. Life Cycle Analysis.

2 86. Studies cited in the BiOp failed to demonstrate
3 that water exports affect the delta smelt population
4 growth rate. Kimmerer (2008), for example, noted a "lack
5 of evidence for population-level effects" of the water
6 projects and stated that "no effect of export flow on
7 subsequent midwater trawl is evident." AR 018878,
8 018855; MWD Ex. 600 at 53; MWD Ex. 600 at 28. Bennett
9 (2005) found that "it is unlikely that losses of young
10 fish to the export facilities consistently reflect a
11 direct impact on recruitment success later in the year."
12 AR 017004; MWD Ex. 607; SLDMWA Ex. 240.

14 87. All experts agree that application of a life-
15 cycle model⁷ is accepted method for evaluating the
16 effects of an action upon a population's growth rate.

17 a. The Delta Smelt Action Evaluation Team
18 recognized that such a model should be developed and
19 utilized. MWD Ex. 633 at 5, 9, 10, 11.

20 b. Dr. Deriso testified that a population
21 growth rate analysis is the method by which fisheries
22 biologists normally evaluate the impact of a stressor on
23 a population. 4/6/10 Tr. 38:11-18.

24 c. Dr. Hilborn similarly testified that life-

25
26
27 ⁷ The experts use the term "population dynamics model," "life
28 history model," and "life cycle model" interchangeably. See, e.g.,
4/2 Tr. 255; 4/6 Tr. 41.

1 cycle models are the accepted method in population
2 dynamics to evaluate anthropogenic effects on the
3 probability of growth or decline of a species. 4/5/10
4 Tr. 154:16-24. Dr. Hilborn testified that development of
5 such a model is "standard operating procedure" for
6 fisheries management agencies to evaluate human impacts
7 on fish species. 4/5/10 Tr. 155:20-25.

9 d. FWS's expert, Dr. Newman, stated in his
10 declaration that he "agreed with the utility of life
11 history models for assessing population level effects of
12 SWP/CVP operations." Fed. Gov't Smelt Ex. 17 at ¶8.

13 e. Dr. Newman said he would have developed a
14 life-cycle model for the BiOp. 4/5/10 Tr. 107:21-108:5.
15 Dr. Newman stated the methodology employed in the BiOp
16 was "quite a different way of doing things" from the
17 statistical analysis he was "familiar with" and
18 "comfortable with." 4/5/10 Tr. 107:21-108:5.

19 f. Federal Defendants' expert, Mr. Feyrer,
20 testified that, once developed, a life-cycle model would
21 be the best available science to evaluate the population-
22 level impacts of the water projects on the delta smelt.
23 4/2/10 Tr. 253:4-10.

24 g. According to Mr. Feyrer, use of a life-cycle
25 modeling methodology in the BiOp would have reduced the
26
27
28

1 uncertainty in the RPAs. 4/2/10 Tr. 258:22-259:8.

2 88. How long it would have taken FWS to develop an
3 appropriate life cycle model is a matter of considerable
4 debate.

5 a. Life-cycle modeling is an analytical
6 technique that has been known and available to scientists
7 for years. 4/5/10 Tr. 109:19-110:3. Numerous textbooks
8 and reference articles explain how to develop a life-
9 cycle model, which are a standard tool used by fisheries
10 scientists to evaluate population-level impacts. 4/2/10
11 Tr. 254:23-255:14. Basic growth rate models such as the
12 Ricker model and the Beverton-Holt model were developed
13 in the 1950s. 4/6/10 Tr. 41:22-42:4; 49:16-22.

14 b. Dr. Deriso testified that sufficient data
15 existed at the time of the creation of the BiOp to enable
16 FWS to perform a quantitative life-cycle modeling
17 analysis. 4/6/10 Tr. 46:16-47:16.

18 c. Dr. Deriso testified that a basic
19 quantitative life-cycle modeling analysis could be
20 performed in less than an hour, while a more complicated
21 modeling effort could be completed in a few weeks.
22 4/6/10 Tr. 43:2-7.

23 d. Mr. Feyrer testified that FWS could have
24 completed a life-cycle modeling analysis within 18
25

1 months. 4/2/10 Tr. 263:15-24.

2 e. In a 2005 research article Dr. Bennett
3 employed a life-cycle model to evaluate a number of
4 impacts on the delta smelt. 4/2/10 Tr. 46:16-47:16.

5 f. Dr. Hilborn testified that a life-cycle
6 modeling effort could have been performed for the delta
7 smelt within a matter of months. 4/5/10 Tr. 175:5-21.
8 He further testified that even an incomplete life-cycle
9 modeling analysis, such as the one found in Bennett
10 (2005), would be superior to simply relying on
11 professional or expert opinion without use of any such
12 model. 4/5/10 Tr. 212:23-213:6. However, Dr. Hilborn
13 admitted that when he and Dr. Maunder actually endeavored
14 to build a quantitative population dynamics model for
15 delta smelt over 18 months ago, they abandoned that
16 particular modeling effort as too complicated and time-
17 consuming. *Id.* at 217-18.

18 g. Dr. Punt stated "[i]t is surprising that a
19 population dynamics model was not developed for delta
20 smelt for the BiOp.... The model developed by Bennett
21 could have been extended to more fully account for the
22 biology of delta smelt and fitted to data to assess the
23 population-level effects of impact of the project."

24 4/6/10 Tr. 44:16-21; Doc. 633, Ex. A, at 3.

1 89. Yet, a quantitative population dynamics model
2 for delta smelt is "not something that you go to the
3 store and just buy [like] a piece of equipment," but
4 rather would consist of a large amount of formulas.
5 4/2/10 Tr. 254; 4/5/10 Tr. 48 (Dr. Newman concurring that
6 "there's not off-the-shelf software to build such
7 models"). Dr. Newman testified that previous efforts to
8 build such models in which he has been involved have
9 taken two to three years, 4/5/10 Tr. 50, and have
10 involved numerous people because you need expertise in
11 biology, statistics, and modeling. *Id.* at 131. Mr.
12 Feyrer stated that "the construction of a full blown high
13 quality life cycle model is no simple task." 4/2/10 Tr.
14 255, 258.

17 90. Mr. Feyrer also pointed out the importance of
18 constructing an appropriate and well-calibrated model:
19 "even for individuals with the amazing skills of [Drs.
20 Maunder, Deriso and Hilborn], it still takes a lot of
21 time to develop those to where you have the confidence in
22 them so that you can actually apply them in a situation
23 where, you know, there's obviously a lot at stake here.
24 You don't want to apply something prematurely without
25 really understanding how well it works." *Id.* at 258.
26 Dr. Deriso, in contrast, applied a generic "textbook"
27
28

1 version of a life history model in the analysis he
2 presented to the Court, without modifying it to apply
3 specifically to delta smelt biology and characteristics.
4 4/6/10 Tr. 42. Significant disagreement exists among
5 competent experts as to what constitutes a reliable
6 quantitative population dynamics model for delta smelt.
7

8 91. Federal Defendants were aware of the value of a
9 life-cycle model. At a March 8, 2007 meeting regarding
10 the OCAP ESA Re-consultation, attended by a number of FWS
11 employees, the importance of using a life cycle model was
12 recognized and the progress to date was inquired into.
13 4/7/10 Tr. 183:9-188:4; SWC Ex. 960. Likewise, during
14 the Delta Smelt Action Evaluation Team meeting on August
15 8, 2008, the Team recognized that population models for
16 delta smelt already had been developed, and that it was
17 possible to use those models as a starting point for
18 quantitative analyses with appropriate assumptions added
19 as bounds to the analysis. 4/7/10 Tr. 188:9-190:22.
20

21 92. Nevertheless, it is undisputed that, despite
22 over three years of controversy regarding the species, no
23 quantitative life cycle model adapted to the delta smelt
24 was available to or used by FWS at the time the BiOp was
25 issued. A quantitative population dynamics model for
26 delta smelt does not currently exist, although there are
27
28

1 several efforts underway to develop one. 4/2/10 Tr. 189;
2 4/5/10 Tr. 44. Researchers from a number of
3 universities, including Drs. Wim Kimmerer, Bill Bennett,
4 Kenny Rose and Steve Monismith, have been working on
5 developing such a model for a number of years. *Id.* at
6 189-90; 4/5/10 Tr. 46. Dr. Mark Maunder has also been
7 working on such a model for delta smelt since at least
8 March 2008, with the assistance of Dr. Hilborn and Dr.
9 Deriso. *Id.* at 258; 4/5/10 Tr. 47. Dr. Newman, who has
10 previously developed three quantitative life history
11 models, is currently working with the National Center for
12 Ecological Analysis and Synthesis ("NCEAS") to develop
13 one for delta smelt, an effort that has been underway
14 since October 2007. 4/5/10 Tr. 44-46.

17 93. No party who participated in the preparation of
18 the BA or commented on the public review drafts of the
19 BiOp submitted a quantitative life cycle model or the
20 results of such an analysis using a life cycle model for
21 delta smelt to FWS during the consultation. 4/5/10 Tr.
22 16-18.

23 94. It is notable that FWS did make use of the
24 relatively simple and limited life-cycle model described
25 by Dr. Bennett in his 2005 paper. 4/2/10 Tr. 256-57. It
26 utilized that existing model by conducting the effects
27
28

1 analysis in the BiOp according to a similar conceptual
2 life-cycle model. *Id.* at 258. The agency then conducted
3 analyses on specific components of those life stages that
4 would be affected by the proposed Project operations.
5 *Id.* Dr. Hilborn asserts that FWS erred by not using the
6 Bennett model to justify the export limitations in the
7 RPA, 4/5/10 Tr. 241, but the Bennett 2005 paper and Dr.
8 Bennett himself cautioned that the life-cycle model it
9 presented is "premature for management purposes." *Id.* at
10 18, 115, 240-41.

12 95. In sum, although all agree that a quantitative
13 life-cycle model would help FWS evaluate impacts on delta
14 smelt, FWS had not developed an appropriate model, and no
15 such model was available for FWS's use (or otherwise
16 presented to FWS) prior to the issuance of the BiOp.

18 d. Incidental Take Statement.

19 96. Plaintiffs included proposed findings of fact
20 concerning FWS's formulation of the Incidental Take
21 Statement ("ITS"). However, at the evidentiary hearing,
22 Plaintiffs abandoned their request to enjoin
23 implementation of the ITS. 4/7/10 Tr. 243-44
24 ("Plaintiffs do not seek modification of the incidental
25 take limit at this time. Even though the current low ITS
26 limits are not supported by the data and application of
27
28

1 quantitative population dynamics analysis, that very
2 conservative limit, Your Honor, plaintiffs believe will
3 serve as a back stop that will provide an additional
4 level of assurance to the Court that during the component
5 two period, which ends in June, the survival of the smelt
6 will not be jeopardized by project operations.").
7

8 e. Critical Habitat.

9 97. Federal Defendants and Defendant Intervenors
10 maintain, in the alternative, that negative OMR flows
11 adversely modify critical habitat and Component 2 can be
12 upheld because it addresses this adverse modification.
13 4/7/10 Tr. 272:8-273:3; 4/6/10 Tr. 93:2-6; 4/5/10 Tr.
14 225:18-226:22.
15

16 98. However, the specific quantitative criteria
17 established for RPA Component 2 are not derived from or
18 justified by any independent analysis of adverse
19 modification of delta smelt critical habitat. BiOp at
20 344-68.
21

22 99. Discussion of habitat in the justifications for
23 RPA Components 2 defines habitat solely in terms of
24 entrainment risk. BiOp at 344-368. The only
25 quantitative analysis of entrainment risk is found in
26 Figures B-13 and B-14 of the BiOp. BiOp at 348, 350.
27
28

1 f. Indirect Harm.

2 100. Federal Defendants claim that Component 2 also
3 protects against indirect harm. However, the
4 quantitative analysis used to derive the flow levels does
5 not mention indirect harm as a basis for the flow
6 restrictions imposed.
7

8 g. The Role of RPA Component 2 in Avoiding
9 Jeopardy to the Species and Adverse
10 Modification of Critical Habitat.

11 101. All of the experts qualified in delta smelt
12 biology concurred that enjoining parts or all of
13 Component 2 would cause jeopardy or adverse impacts to
14 delta smelt and designated critical habitat.

15 102. Dr. Grimaldo explained that entrainment risk is
16 particularly high from March to May because delta smelt
17 larvae and juveniles are most likely to behave like
18 neutrally buoyant particles during this time period.
19 4/7/10 Tr. 68.

20 103. Ms. Goude testified that the Projects exert a
21 direct entrainment effect on delta smelt, as well as
22 indirect impacts upon the species' food supply, risk of
23 predation, and exposure to contaminants and other
24 stressors, and affect critical habitat by changing the
25 amount and location of habitat in winter, spring and
26 fall. *Id.* at 150-51. In her opinion, enjoining Action 3
27
28

1 of the RPA would result in irreparable harm to the delta
2 smelt due to very low abundance levels and the risk of a
3 "huge" entrainment event causing "catastrophic events."
4 *Id.* at 169-70.

5 104. However, none of these experts offered any
6 quantitative or qualitative analysis, apart from that
7 discussed above, which utilized raw salvage data, to
8 specifically justify the imposition of a -5,000 cfs
9 ceiling on negative OMR flows.
10

11
12 h. Alternative Proposal to Limit negative OMR
Flow to -5,600 cfs.

13 105. Plaintiffs suggest imposition of a -5,600
14 ceiling on OMR flows. This is based entirely on Dr.
15 Deriso's analysis of population-indexed salvage rates
16 versus negative OMR flows. Although Dr. Deriso's
17 analysis corrects for the fundamental error of relying on
18 raw salvage figures, given the large number of variables
19 not accounted for in Dr. Deriso's analysis, it is unclear
20 whether the -5,600 break-point he suggests is any more or
21 less appropriate as a ceiling than the -5,000 figure
22 utilized in the BiOp.
23

24 106. Mr. Feyrer opined that operating the Project
25 pumps to meet OMR flows no less negative than -5,600 cfs,
26 the alternative OMR ceiling proposed by Plaintiffs,
27 during the spring would not avoid jeopardy to the delta
28

1 smelt or adverse modification of its critical habitat.
2 4/2/10 Tr. 208.

3 107. Regardless of the appropriate upper limit for
4 negative OMR flows, RPA Component 2 defines a range of
5 OMR flows within which the Projects may operate during
6 designated time periods. This range of flows "provides
7 flexibility in [] water operations [and] the ability to
8 be protective when their conditions are not favorable --
9 or when entrainment risk increases.... So it maximizes
10 protection for the species while providing flexibility
11 for water operations." 4/7/10 Tr. 66-67. According to
12 Dr. Grimaldo, operating to a "unitary" flow, as
13 recommended by Plaintiffs, "removes your flexibility from
14 managing that risk":
15
16

17 So there may be times when the fish become
18 distributed in the south Delta or the central
19 Delta. And perhaps a lot of them, like we saw
20 in April 2002 and April 2003 were large number
21 of the larvae were in the central and south
22 Delta. If you were at a fixed number, that your
23 risk would be high and you would have
24 substantial losses, which were demonstrated in
25 Kimmerer 2008 during that time period.

26 *Id.* at 67.

27 108. Both the BiOp and subsequent peer reviews have
28 acknowledged that the specific OMR flow triggers and the
implementation of the OMR-flow related requirements of
the RPA "need[] to be accompanied by careful monitoring,

1 adaptive management and additional analyses that permit
2 regular review and adjustment of strategies as knowledge
3 improves." 4/2/10 Tr. 195; BiOp at 279 ("[t]he specific
4 flow requirements, action triggers and monitoring
5 stations prescribed in the RPA will be continuously
6 monitored and evaluated consistent with the adaptive
7 process. As new information becomes available, these
8 action triggers may be modified without necessarily
9 requiring re-consultation on the overall proposed
10 action.").

12 109. Although the record shows that FWS's -5,000 OMR
13 ceiling is not based on the best available science, the
14 record does not contain sufficient information to
15 conclude that the imposition of Plaintiff's suggested
16 -5,600 OMR ceiling would be sufficiently protective of
17 the smelt, particularly in light of the fact that
18 Plaintiffs do not propose any flexibility in the
19 management regime that would permit greater restrictions
20 if a large salvage event was approaching or ongoing.

22 110. Providing flexibility to permit adaptive
23 management for delta smelt is justified.

25 D. Irreparable Harm.

26 111. The record evidence has established a variety of
27 adverse impacts to humans and the human environment from
28

1 reduced CVP and SWP deliveries, including irretrievable
2 resource losses (permanent crops, fallowed lands,
3 destruction of family and entity farming businesses);
4 social disruption and dislocation; as well as
5 environmental harms caused by, among other things,
6 increased groundwater consumption and overdraft, and
7 possible air quality reduction.
8

9 (1) Water Supply Impacts.

10 112. Any lost pumping capacity directly attributable
11 to the 2008 Smelt BiOp will contribute to and exacerbate
12 the currently catastrophic situation faced by Plaintiffs,
13 whose farms, businesses, water service areas, and
14 impacted cities and counties, are dependent, some
15 exclusively, upon CVP and/or SWP water deliveries.
16

17 113. Every acre-foot of pumping foregone during
18 critical time periods is an acre-foot that does not reach
19 the San Luis Reservoir where it can be stored for future
20 delivery to users during times of peak demand in the
21 water year.
22

23 114. It is undisputed that, in the three water years
24 prior to the 2009-2010 water year, California has
25 experienced three consecutive years of drought
26 conditions. Gov't Salmon Ex. 5 at (internal) Exhibit 1
27 at 18. This influences the amount of run-off forecasted
28

1 for 2010 and is indicative of why reservoir storages were
2 at a low state entering the 2009-2010 water year. 4/1/10
3 Tr. 208:7-15. Hydrologic conditions are not within the
4 control of the parties and have materially contributed to
5 water service reductions to contractors.

6
7 115. It is also undisputed that other, non-project
8 factors, such as tides, wind events, storm surges, San
9 Joaquin River flows, Contra Costa Water District
10 operations, and diversions by in-Delta water users effect
11 how Reclamation must operate the project to meet flow
12 targets. See *id.* at 202:12-204:1.

13
14 116. The projects are subject to export reductions
15 required to protect species listed under the California
16 Endangered Species Act, including longfin smelt, delta
17 smelt, winter-run Chinook salmon, and spring-run Chinook
18 salmon, which subject the water project operators to
19 controls under state law that are similar, and, in some
20 cases, identical to those contained in the 2008 Smelt
21 BiOp and the National Marine Fisheries Service's ("NFMS")
22 June 4, 2009 Biological Opinion ("2009 Salmonid BiOp")
23 concerning various ESA-listed anadromous and oceanic
24 species. See *id.* at Tr. 212:4-213:8. In the absence of
25 the BiOps' RPAs, those protections are argued to have
26 likely limited export pumping to levels below those
27
28

1 allowable under State Water Resources Control Board
2 Decision 1641 ("D-1641"), which also limits Project
3 pumping at certain times of the year. See, e.g., SWC Ex.
4 938 (DWR's 3/30/10 allocation announcement considered
5 several "SWP operational constraints" including "the
6 incidental take permit for longfin smelt").
7

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

12 118. The quantity of exportable water has been
13 reduced by the implementation of the Salmonid and Smelt
14 BiOp's RPAs. *Id.* From January 20 through March 24,
15 2010, Mr. Erlewine testified that potential and actual
16 exports were diminished by 522,561 acre feet ("AF"), of
17 which a 433,000 AF loss was attributable to the SWP and a
18 89,000 AF loss was attributable to the CVP. 4/6/10 Tr.
19 185:16-19; SWC Demonstrative Ex. 903.
20

21 119. DWR made its initial water supply allocation
22 announcement on November 30, 2009, allocating 5% of Table
23 A contracted amounts for SWP water contractors. 4/6/10
24 Tr. 240:16-22; SWC Ex. 923, Ex. B. As of March 30, 2010,
25 DWR increased the SWP allocation for 2010 to 20%. 4/6/10
26 Tr. 189:15-17; SWC Ex. 938; 4/1/10 Tr. 249:22-25. On
27
28

1 April 23, 2010, DWR again increased its allocation of SWP
2 deliveries to 30%. See Doc. 323-2 (DWR Press Release).

3 120. Reclamation announced its initial allocation of
4 CVP water on February 26, 2010. Fed. Gov't Salmon Ex. 5
5 (Third Milligan Decl.) at ¶11. Under the 90% exceedance
6 forecast, Reclamation allocated CVP agricultural users 5%
7 of their contract amounts, and CVP municipal and
8 industrial ("M&I") contractors 55% of their contract
9 amounts. *Id.* at ¶12. Under the 50% exceedance forecast,
10 north-of-Delta agricultural and M&I contractors were
11 allocated 100% of their contract amounts, while south-of-
12 Delta agricultural contractors were allocated 30% and M&I
13 contractors 75%. *Id.*

14 121. CVP water users faced similar reductions to
15 their individual allocations. Farmers on the west side
16 of the San Joaquin Valley have received reduced CVP water
17 supply allocations in the 2007-2008, 2008-2009, and 2009-
18 2010 water years, and face similar reductions in 2010-
19 2011. SLDMWA Ex. 153 at ¶3; SLDMWA Ex. 154 at ¶4; SLDMWA
20 Ex. 156 at ¶4. In 2007-2008, Reclamation allocated to
21 Westlands 40% of its contract supply. In 2008-2009, that
22 allocation was 10%. SLDMWA Ex. 155 at ¶8. For the 2009-
23 2010 water year, Westlands was advised the initial
24 allocation was zero percent. SLDMWA Ex. 155 at ¶9.

1 122. On March 16, 2010, Reclamation raised the
2 allocation for south-of-Delta agricultural users to 25%
3 under a 90% forecast and 30% under a 50% forecast.
4 4/1/10 Tr. 210:14-22; Fed. Gov't Salmon Exh. 13.

5 123. These incremental increases do not alter the
6 fact that water deliveries will likely increase further
7 if the two RPAs are enjoined. 4/1/10 Tr. 213:14-20
8 (acknowledging that deliveries would increase by 5% - 10%
9 if the RPAs were enjoined).

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

23 125. Water loss for agricultural users results in
24 reduction in the number of acres that may be sustained
25

1 with actual water supply. Water duty is the amount of
2 water that a crop needs per acre for a growing season.
3 4/6/10 Tr. 187:21-22. DWR information indicates that for
4 the SWP service area, the water duty is approximately
5 three AF per acre. 4/6/10 Tr. 187:22-25. If 433,000 AF
6 were withheld from almond crops, for example, almond
7 production would be reduced by approximately 140,000
8 acres. 4/6/10 Tr. 188:1-4.

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

21 127. Increased water allocations may lessen this
22 increased cost, and will mitigate anticipated harms from
23 reduced water allocations. Farmers anticipate that
24 increased water allocations would mitigate anticipated
25 damage to crops in proportion to the amount of water
26 received and prevent further layoffs of farm employees.

1 SLDMWA Ex. 156 at ¶10.

2 128. In 2009, the Federal Defendants accounted for
3 actions taken under the Delta smelt biological opinion as
4 (b) (2) actions, pursuant to section 3406(b) (2) of the
5 CVPIA. 4/1/10 Tr. 213:24-214:2. Federal Defendants have
6 indicated their intent to follow the same accounting
7 procedure for federal export reductions related to both
8 BiOps in 2010, to the extent that (b) (2) assets are
9 available at the time the action is taken. *Id.* at 214:3-
10 7.
11

12
13 (2) Other Resource Impacts Caused or Exacerbated by
14 the 2008 Smelt BiOp RPA Actions.

15 129. Plaintiffs attribute a number of other human
16 impacts to reductions in the water supply. There is
17 considerable dispute among the parties regarding the
18 extent to which the 2008 Smelt BiOp RPA is responsible
19 for these other impacts. It is undisputed that the RPA
20 is, at the very least, exacerbating the following
21 impacts.
22

23 (1) Permanent Crops.

24 130. Reductions in the quantity of water supply
25 deliveries have resulted in changes to farming practices,
26 including an increased reliance on permanent crops.

27 SLDMWA Ex. 154 at ¶6; SLDMWA Ex. 155 at ¶¶ 18, 22; SLDMWA
28

1 Ex. 157 at ¶11.

2 131. Permanent crops place farmers at greater risk
3 than row crops, as farmers cannot cut back on the water
4 to permanent crops without destroying them. SLDMWA Ex.
5 154 at ¶6; SLDMWA Ex. 155 at ¶¶ 18, 22; SLDMWA Ex. 157 at
6 ¶11.
7

8 (2) Fallowed Lands.

9 132. Because of reduced water forecasts and
10 uncertainty regarding future water supply, farmers have
11 fallowed hundreds and thousands of acres of fields.
12 SLDMWA Ex. 155 at ¶10; SLDMWA Ex. 153 at ¶3; SLDMWA Ex.
13 156 at ¶5.
14

15 133. Fallowed lands and reduced water supply have
16 caused the loss of thousands of acres of crops. Todd
17 Allen, a third-generation farmer in Fresno County, was
18 able to salvage and harvest only 40 acres of a wheat crop
19 out of a total arable 616 acres on his farm in 2009.
20 SLDMWA Ex. 153 at ¶3.
21

22 134. For every 1,000 AF of water lost by the San Luis
23 Plaintiffs' member agencies, approximately 400 acres of
24 land may remain out of production. SLDMWA Ex. 157 at
25 ¶13.
26

27 135. Fallowing fields also negatively impacts the air
28 quality of the San Joaquin Valley by increasing dust and

1 particulate matter. SLDMWA Ex. 155 at ¶20. Reduced air
2 quality in turn impairs major transportation routes
3 through the valley. SLDMWA Ex. 155 at ¶20.
4

5 (3) Lack of Access to Credit.

6 136. The more unreliable the water supply, the more
7 difficult it is for farmers to secure necessary financing
8 for their farming operations. SLDMWA Ex. 153 at ¶4;
9 SLDMWA Ex. 154 at ¶13; SLDMWA Ex. 155 at ¶26; SLDMWA Ex.
10 156 at ¶7; SLDMWA Ex. 157 at ¶15. In some cases, lenders
11 deny loan applications because of a lack of reliable
12 water supply. SLDMWA Ex. 153 at ¶4; SLDMWA Ex. 154 at
13 ¶13; SLDMWA Ex. 155 at ¶26; SLDMWA Ex. 156 at ¶7; SLDMWA
14 Ex. 157 at ¶15. In others, lenders' concerns about
15 availability to lands irrigated by federally-supplied
16 water has required farmers to make a 50% down payment to
17 secure any loans. SLDMWA Ex. 156 at ¶7.
18
19

20 (4) Social Disruption and Dislocation.

21 137. It is undisputed that farm employees and their
22 families have faced devastating losses due to reductions
23 in the available water supply. The impact on the farm
24 economy from the combination of a three-year drought and
25 diversion limitations relating to the delta smelt has
26 already been severe. SLDMWA Ex. 157 at ¶14.
27

28 138. Lost water supply has decreased the number of

1 productive agricultural acres, which has resulted in
2 reductions in employee hours, salaries, and positions,
3 devastating farm employees and their families. SLDMWA
4 Ex. 154 at ¶11; SLDMWA Ex. 156 at ¶8.

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

13 140. Dr. Michael, Defendant Intervenors' economist
14 with expertise in regional and environmental economics,
15 counters that "[a]lthough water impacts have affected
16 parts of the west side, there is no evidence that reduced
17 water deliveries have had a severe effect on farm or non-
18 farm employment in the Central Valley as a whole." D-I
19 Exh. 1006 (Michael Decl.) ¶10. Instead, it is a
20 combination of factors, including the three-year drought,
21 the global economic recession, the foreclosure crisis,
22 and the collapse of the real estate market and
23 construction industry, not RPA Component 3, that are
24 mainly driving crop and job losses, food bank needs, and
25
26
27
28

1 credit problems in the Central Valley. *Id.* at ¶¶ 6-10.
2 Dr. Michael estimates that ESA-related pumping
3 restrictions have resulted in the loss of less than 2,000
4 jobs. *See id.* at ¶4.

5 141. Unemployment has led to hunger on the west side
6 of the San Joaquin Valley. SLDMWA Ex. 158 at ¶8. The
7 Community Food Bank, serving Fresno, Madera and Kings
8 Counties, estimates 435,000 people in its service area do
9 not have a reliable source of food. SLDMWA Ex. 158 at
10 ¶4. The Chief Executive Officer of the Community Food
11 Bank, Dana Wilkie, believes that hunger in the
12 communities served by the Food Bank in the western San
13 Joaquin Valley will continue to increase in 2010 because
14 of ongoing water shortages. SLDMWA Ex. 158 at ¶5. Ms.
15 Wilkie understands that at least 42,000 people served by
16 the Food Bank in October 2009 were employed by farm-
17 related businesses before losing their jobs. SLDMWA Ex.
18 158 at ¶8.

19
20
21
22 (5) Groundwater Consumption and Overdraft.

23 142. Reductions in the available water supply have
24 caused water users to increase groundwater pumping in
25 attempts to make up the difference between irrigation
26 need and allocated water supplies. SLDMWA Ex. 155 at ¶¶
27 4, 7; SLDMWA Ex. 157 at ¶10; 4/6/10 Tr. 216:6-7.

1 143. However, groundwater is not always available,
2 and cannot be used in all areas or for all crops. SLDMWA
3 Ex. 155 at ¶11. Increased groundwater pumping reduces
4 the quality of water applied to the soil by increasing
5 soil salinity. SLDMWA *Id.* at ¶15. Not all fields and
6 crops can be irrigated with groundwater. *Id.* at ¶¶ 11,
7 15.
8

9 144. Increased reliance on and overuse of groundwater
10 has caused groundwater overdraft, which occurs when
11 pumping exceeds the safe yield of an aquifer. *Id.* at
12 ¶12. Overdraft causes increased land subsidence and
13 potential damage to CVP conveyance facilities, *id.* at ¶¶
14 12-13, although it is not clear that any subsidence of
15 Project facilities has occurred as a result of the
16 implementation of the 2008 Smelt BiOp RPA Actions, as the
17 only reported incident of subsidence at a SWP conveyance
18 facility predates current implementation, 4/7/10 Tr.
19 16:1-13.
20

21 145. Increased groundwater pumping also increases
22 demand for energy. SLDMWA Ex. 155 at ¶16. Due to the
23 falling water table, wells require increased amounts of
24 energy. *Id.* Westlands estimates that pumping of
25 groundwater in 2009 required approximately 425,000,000
26 kWh. *Id.* Adverse environmental impacts are associated
27
28

1 with such increased demand for and use of energy. *Id.*

2 146. Increased groundwater pumping has depleted
3 groundwater reserves. Groundwater reserves that were at
4 2 million AF in the beginning of 2007 are now less than
5 900,000 AF. 4/6/10 Tr. 216:21-24. Within MWD's service
6 area, storage levels are at 1.3 million AF, about half of
7 normal storage levels. 4/6/10 Tr. 217:4-8.
8

9
10 (6) Related, Recent Impacts on Naval Air
Station Lemoore.

11 147. Captain James Knapp testified as a fact witness
12 on behalf of Naval Air Station Lemoore, which is located
13 approximately 30 miles south of Fresno, eight miles west
14 of the town of Lemoore, California. 4/7/10 Tr. 208:12-
15 14. Its daytime population is approximately 14,000
16 people, including residents, who are sailors and
17 dependent families. *Id.* at 208:15-21.
18

19 148. The air station's location was selected at a
20 time when the Navy was transitioning from propeller-
21 driven aircraft to jet aircraft, the latter being
22 incompatible with urban environments such as the Naval
23 Air Station Alameda in the San Francisco Bay Area. *Id.*
24 at 211:17-212:21. The air station's 18,000 acres of
25 agriculture-compatible land and neighboring land under
26 permanent agricultural easements help to ensure there
27 will be no urban build-out to interfere with the Navy's
28

1 operations. *Id.* at 211:17-212:21, 213:2-19. From its
2 location, the installation supports aircraft carrier
3 activities along the Pacific Coast. *Id.*

4 149. Active agricultural operations on the air
5 station's 18,000 acres and in the surrounding areas also
6 serve "to control bird and animal strike hazards, grass
7 fires, rodent activity, dust, and the release of
8 *Coccidioidomycosis* (Valley Fever) spores carried by
9 dust." SLDMWA Ex. 390 at p. 3. These risks are
10 interrelated; for example, fallowed fields attract
11 rodents and predatory birds. 4/7/10 Tr. at 213:10-25.
12 An increased bird presence increases the chances of bird
13 strikes by naval aircraft. *Id.* at 214:1-6.

14 150. Ongoing agricultural activities are vitally
15 important to the Navy's ability to safely train and
16 support flight operations at Naval Air Station Lemoore.
17 4/7/10 Tr. at 214:7-24; SLDMWA EX. 390 at p. 2.

18 151. Lemoore Naval Air Station's principal source of
19 municipal, industrial, and agricultural water is
20 Westlands Water District. 4/7/10 Tr. 208:24-209:2.

21 152. The past water year began with a zero percent
22 water allocation which increased to a ten percent
23 allocation, resulting in 6,000 acres of fallow fields.
24 SLDMWA Ex. 390 at p. 3. Pilots training at low altitude
25
26
27
28

1 witnessed an increase in bird activity, with one aircraft
2 suffering thousands of dollars in damage as a result of a
3 bird strike. *Id.*

4 43. Captain Knapp testified that Naval Air Station
5 Lemoore had requested and received emergency supplemental
6 water allocations from Reclamation for these properties.
7
8 *Id.* at 210, 217-18; SLDMWA Ex. 391.

9 44. This post-record evidence is received for the
10 limited purpose of showing the action agency's ability to
11 respond to conditions that pose imminent harm to the
12 human environment.

13
14 (3) Harm to Species.

15 45. To the extent such information is in the record,
16 the potential harms to the species of enjoining Component
17 2 (Action 3) are discussed above.

18
19 VI. CONCLUSIONS OF LAW

20 A. Jurisdiction.

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

1 Plaintiffs, Defendants, and Intervenors.

2
3 B. Likelihood of Success on the Merits: NEPA Claims.

4 2. Plaintiffs have already succeeded on their NEPA
5 claim. See Doc. 399.

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

12 4. "NEPA emphasizes the importance of coherent and
13 comprehensive up-front environmental analysis to insure
14 informed decision-making to the end that the agency will
15 not act on incomplete information, only to regret its
16 decision after it is too late to correct." *Ctr. for*
17 *Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157,
18 1166 (9th Cir. 2003).

19 5. Federal Defendants' violations of NEPA prevented
20 the required reasonable evaluation, analysis, "hard look
21 at," and disclosure of the harms of implementing the 2008
22 Smelt BiOp RPA Actions to human health and safety, the
23 human environment, and other environments not inhabited
24 by the delta smelt.

25 6. Harms that have been caused by RPA water supply
26
27
28

1 reductions include but are not limited to: destruction of
2 permanent crops; fallowed lands; increased groundwater
3 consumption; land subsidence; reduction of air quality;
4 destruction of family and entity farming businesses; and
5 social disruption and dislocation, such as increased
6 property crime and intra-family crimes of violence,
7 adverse effects on schools, and increased unemployment
8 leading to hunger and homelessness.
9

10 7. Where a federal agency takes action in violation
11 of NEPA, "that action will be set aside." *High Sierra*
12 *Hikers Ass'n v. Blackwell*, 390 F.3d 630, 640 (9th Cir.
13 2004).

14 8. However, a court may not issue an injunction
15 under NEPA that would cause a violation of other
16 statutory requirements, such as those found in section 7
17 of the ESA. See *United States v. Oakland Cannabis*
18 *Buyers' Coop.*, 532 U.S. 483, 497 (2001) ("A district
19 court cannot, for example, override Congress' policy
20 choice, articulated in a statute, as to what behavior
21 should be prohibited."). Nor should an injunction issue
22 under NEPA when enjoining government action would result
23 in more harm to the environment than denying injunctive
24 relief. See *Save Our Ecosystems v. Clarke*, 747 F.2d 1240,
25 1250 (9th Cir. 1984); *Am. Motorcyclist Ass'n v. Watt*, 714
26
27
28

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

10 C. Likelihood of Success on the Merits: ESA Claims.

11 (1) Legal Standards.

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

17 a. Record Review.

18 10. A court reviews a biological opinion "based upon
19 the evidence contained in the administrative record."
20 *Arizona Cattle Growers' Ass'n v. FWS*, 273 F.3d 1229, 1245
21 (9th Cir. 2001). Judicial review under the APA must
22 focus on the administrative record already in existence,
23 not some new record made initially in a reviewing court.
24 Parties may not use "post-decision information as a new
25 rationalization either for sustaining or attacking the
26 agency's decision." *Ass'n of Pac. Fisheries v. EPA*, 615
27
28

1 F.2d 794, 811-12 (9th Cir. 1980).

2 11. Exceptions to administrative record review for
3 technical information or expert explanation make such
4 evidence admissible only for limited purposes, and those
5 exceptions are narrowly construed and applied. *Lands*
6 *Council v. Powell*, 395 F.3d 1019, 1030 (9th Cir. 2005).
7

8 12. Here, the Court has considered expert testimony
9 only for explanation of technical terms and complex
10 subject matter beyond the Court's knowledge; to
11 understand the agency's explanations, or lack thereof,
12 underlying the RPA; and to determine if any bad faith
13 existed.
14

15 b. Deference to Agency Expertise.

16 13. The Court must defer to the agency on matters
17 within the agency's expertise, unless the agency
18 completely failed to address some factor, consideration
19 of which was essential to making an informed decision.
20 *Nat'l Wildlife Fed'n v. NMFS*, 422 F.3d 782, 798 (9th Cir.
21 2005). The court "may not substitute its judgment for
22 that of the agency concerning the wisdom or prudence of
23 the agency's action." *River Runners for Wilderness v.*
24 *Martin*, 593 F.3d 1064, 1070 (9th Cir. 2009).
25

26 In conducting an APA review, the court must
27 determine whether the agency's decision is
28 "founded on a rational connection between the
facts found and the choices made ... and whether

1 [the agency] has committed a clear error of
2 judgment." *Ariz. Cattle Growers' Ass'n v. U.S.*
3 *Fish & Wildlife*, 273 F.3d 1229, 1243 (9th Cir.
4 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).

5 *Id.*

6 14. Although deferential, judicial review under the
7 APA "is designed to ensure that the agency considered all
8 of the relevant factors and that its decision contained
9 no clear error of judgment." *Arizona v. Thomas*, 824 F.2d
10 745, 748 (9th Cir. 1987) (internal citations omitted).

11 "The deference accorded an agency's scientific or
12 technical expertise is not unlimited." *Brower v. Evans*,
13 257 F.3d 1058, 1067 (9th Cir. 2001) (internal citations
14 omitted). Deference is not owed when "the agency has
15 completely failed to address some factor consideration of
16 which was essential to making an informed decision." *Id.*
17 (internal citations and quotations omitted).
18

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

25 *Motor Vehicle Mfrs. Ass'n of U.S. v. State Farm Mut.*
26 *Auto. Ins. Co.*, 463 U.S. 29, 43 (1983); see also *Citizens*
27 *to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402,
28

1 416 (1971) ("A reviewing court may overturn an agency's
2 action as arbitrary and capricious if the agency failed
3 to consider relevant factors, failed to base its decision
4 on those factors, and/or made a clear error of
5 judgment.").

6
7 c. General Obligations Under the ESA.

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

13
14 16. To "jeopardize the continued existence of" means
15 "to engage in an action that reasonably would be
16 expected, directly or indirectly, to reduce appreciably
17 the likelihood of both the survival and recovery of a
18 listed species in the wild by reducing the reproduction,
19 numbers, or distribution of that species." 50 C.F.R. §
20 402.02; see also *Nat'l Wildlife Fed'n v. NMFS*, 524 F.3d
21 917 (9th Cir. 2008) ("*NWF v. NMFS II*") (rejecting agency
22 interpretation of 50 C.F.R. § 402.02 that in effect
23 limited jeopardy analysis to survival and did not
24 realistically evaluate recovery, thereby avoiding an
25 interpretation that reads the provision "and recovery"
26 entirely out of the text). An action is "jeopardizing"
27
28

1 if it keeps recovery "far out of reach," even if the
2 species is able to cling to survival. *Id.* at 931.

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

9 18. To satisfy this obligation, the federal agency
10 undertaking the action (the "action agency") must prepare
11 a "biological assessment" that evaluates the action's
12 potential impacts on species and species' habitat. 16
13 U.S.C. § 1536(c); 50 C.F.R. § 402.12(a).
14

15 19. If the proposed action "is likely to adversely
16 affect" a threatened or endangered species or adversely
17 modify its designated critical habitat, the action agency
18 must engage in "formal consultation" with FWS to obtain
19 its biological opinion as to the impacts of the proposed
20 action on the listed species. 16 U.S.C. § 1536(a)(2),
21 (b)(3); *see also* 50 C.F.R. § 402.14(a), (g). Once the
22 consultation process has been completed, FWS must give
23 the action agency a written biological opinion "setting
24 forth [FWS's] opinion, and a summary of the information
25 on which the opinion is based, detailing how the agency
26
27
28

1 action affects the species or its critical habitat." 16
2 U.S.C. § 1536(b)(3)(A); see also 50 C.F.R. § 402.14(h).

3 20. If FWS determines that jeopardy or destruction
4 or adverse modification of critical habitat is likely,
5 FWS "shall suggest those reasonable and prudent
6 alternatives which [it] believes would not violate
7 subsection (a)(2) of this section and can be taken by the
8 Federal agency or applicant in implementing the agency
9 action." 16 U.S.C. § 1536(b)(3)(A). "Following the
10 issuance of a 'jeopardy' opinion, the agency must either
11 terminate the action, implement the proposed alternative,
12 or seek an exemption from the Cabinet-level Endangered
13 Species Committee pursuant to 16 U.S.C. § 1536(e)."
14 *National Ass'n of Home Builders v. Defenders of Wildlife*,
15 551 U.S. 644, 652 (2008).

16
17
18 d. Best Available Science.

19 21. Under the ESA, an agency's actions must be based
20 on "the best scientific and commercial data available."
21 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(g)(8) ("In
22 formulating its Biological Opinion, any reasonable and
23 prudent alternatives, and any reasonable and prudent
24 measures, the Service will use the best scientific and
25 commercial data available."). "The obvious purpose of
26 the [best available science requirement] is to ensure
27
28

1 that the ESA not be implemented haphazardly, on the basis
2 of speculation or surmise." *Bennett v. Spear*, 520 U.S.
3 154, 176 (1997). A failure by the agency to utilize the
4 best available science is arbitrary and capricious. See
5 *Gutierrez II*, 606 F. Supp. 2d at 1144.

6
7 22. A decision about jeopardy must be made based on
8 the best science available at the time of the decision;
9 the agency cannot wait for or promise future studies.
10 See *Ctr. for Biological Diversity v. Rumsfeld*, 198 F.
11 Supp. 2d 1139, 1156 (D. Ariz. 2002).

12 23. The "best available science" mandate of the ESA
13 sets a basic standard that "prohibits the [agency] from
14 disregarding available scientific evidence that is in
15 some way better than the evidence [it] relies on." *Am.*
16 *Wildlands v. Kempthorne*, 530 F.3d 991, 998 (D.C. Cir.
17 2008) (citation omitted).

18
19 24. What constitutes the "best" available science
20 implicates core agency judgment and expertise to which
21 Congress requires the courts to defer; a court should be
22 especially wary of overturning such a determination on
23 review. *Baltimore Gas & Elec. Co. v. Natural Res.*
24 *Defense Council*, 462 U.S. 87, 103 (1983) (a court must be
25 "at its most deferential" when an agency is "making
26 predictions within its area of special expertise, at the
27
28

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

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

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

Id. at 802.

1 26. More generally, "[w]hen specialists express
2 conflicting views, an agency must have discretion to rely
3 on the reasonable opinions of its own qualified experts
4 even if, as an original matter, a court might find
5 contrary views more persuasive." *Lands Council*, 537 F.3d
6 at 1000 (quoting *Marsh v. Oregon Natural Res. Council*,
7 490 U.S. 360, 378 (1989)).
8

9 27. Mere uncertainty, or the fact that evidence may
10 be "weak," is not fatal to an agency decision.
11 *Greenpeace Action v. Franklin*, 14 F.3d 1324, 1337 (9th
12 Cir. 1992) (upholding biological opinion, despite
13 uncertainty about the effectiveness of management
14 measures, because decision was based on a reasonable
15 evaluation of all available data); *Nat'l Wildlife Fed'n*
16 *v. Babbitt*, 128 F. Supp. 2d 1274, 1300 (E.D. Cal. 2000)
17 (holding that the "most reasonable" reading of the best
18 scientific data available standard is that it "permits
19 the [FWS] to take action based on imperfect data, so long
20 as the data is the best available").
21

22 28. The deference afforded under the best available
23 science standard is not unlimited. For example, *Tucson*
24 *Herpetological Society v. Salazar*, 566 F.3d 870, 879 (9th
25 Cir. 2009), held that an agency may not rely on
26 "ambiguous studies as evidence" to support findings made
27
28

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

15
16
17 29. The presumption of agency expertise may be
18 rebutted if the agency's decisions, although based on
19 scientific expertise, are not reasoned. *Greenpeace*, 80
20 F. Supp. 2d at 1147. Agencies cannot disregard available
21 scientific evidence better than the evidence on which it
22 relies. *Kern County Farm Bureau v. Allen*, 450 F.3d 1072,
23 1080 (9th Cir. 2006); *S.W. Ctr. for Biological Diversity*
24 *v. Babbitt*, 215 F.3d 58, 60 (D.C. Cir. 2000).

25
26 30. Courts routinely perform substantive reviews of
27 record evidence to evaluate the agency's treatment of
28

1 best available science. The judicial review process is
2 not one of blind acceptance. See, e.g., *Kern County*, 450
3 F.3d 1072 (thoroughly reviewing three post-comment
4 studies and FWS's treatment of those studies to determine
5 whether they "provide[d] the sole, essential support for"
6 or "merely supplemented" the data used to support a
7 listing decision); *Home Builders Ass'n of N. Cal. v. U.S.*
8 *Fish and Wildlife Serv.*, 529 F. Supp. 2d 1110, 1120 (N.D.
9 Cal. 2007) (examining substance of challenge to FWS's
10 determination that certain data should be disregarded);
11 *Trout Unlimited v. Lohn*, 645 F. Supp. 2d 929 (D. Or.
12 2007) (finding best available science standard had been
13 violated after thorough examination of rationale for
14 NMFS's decision to withdraw its proposal to list Oregon
15 Coast Coho salmon); *Oceana, Inc. v. Evans*, 384 F. Supp.
16 2d 203, 217-18 (D.D.C. 2005) (carefully considering
17 scientific underpinnings of challenge to Service's use of
18 a particular model, including post decision evidence
19 presented by an expert, to help the court understand a
20 complex model, applying one of several record review
21 exceptions articulated in *Esch v. Yeutter*, 876 F.2d 976,
22 991 (D.C. Cir. 1989), which are similar to those
23 articulated by the Ninth Circuit).

24
25
26
27 31. Courts are not required to defer to an agency
28

1 conclusion that runs counter to that of other agencies or
2 individuals with specialized expertise in a particular
3 technical area. See, e.g., *Am. Turnboat Ass'n v.*
4 *Baldrige*, 738 F.2d 1013, 1016-17 (9th Cir. 1984) (NMFS's
5 decision under the Marine Mammal Protection Act was not
6 supported by substantial evidence because agency ignored
7 data that was product of "many years' effort by trained
8 research personnel"); *Sierra Club v. U.S. Army Corps of*
9 *Eng'rs*, 701 F.2d 1011, 1030 (2d Cir. 1983) ("court may
10 properly be skeptical as to whether an EIS's conclusions
11 have a substantial basis in fact if the responsible
12 agency has apparently ignored the conflicting views of
13 other agencies having pertinent experience[]") (internal
14 citations omitted). A court should "reject conclusory
15 assertions of agency 'expertise' where the agency spurns
16 un rebutted expert opinions without itself offering a
17 credible alternative explanation." *N. Spotted Owl v.*
18 *Hodel*, 716 F. Supp. 479, 483 (W.D. Wash. 1988) (citing
19 *Am. Turnboat Ass'n*, 738 F.2d at 1016).

22 32. In *Conner v. Burford*, 848 F.2d 1441, 1453-54
23 (9th Cir. 1988), the agency attempted to defend its
24 biological opinions by arguing that there was a lack of
25 sufficient information. In rejecting this defense, the
26 court held that "incomplete information ... does not
27
28

1 excuse the failure to comply with the statutory
2 requirement of a comprehensive biological opinion using
3 the best information available," and it noted that FWS
4 could have completed more analysis with the information
5 that was available. *Id.* at 1454 (emphasis added). The
6 Ninth Circuit stated:
7

8 In light of the ESA requirement that the
9 agencies use the best scientific and commercial
10 data available ... the FWS cannot ignore
11 available biological info or fail to develop
12 projections of ... activities which may indicate
13 potential conflicts between development and the
14 preservation of protected species. We hold that
15 the FWS violated the ESA by failing to use the
16 best information available to prepare
17 comprehensive biological opinions.

18 848 F.2d at 1454 (emphasis added).

19 (2) Environmental Baseline Challenges.

20 33. The relevant regulatory definition of the
21 "environmental baseline" is provided within the
22 definition of the "effects of the action":

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

50 C.F.R. § 402.02.

1 34. When determining the "effects of the action,"
2 the agency first must evaluate the status of the species
3 or critical habitat, which will involve "consideration of
4 the present environment" in which the species or habitat
5 exists as well as "the environment that will exist when
6 the action is completed, in terms of the totality of
7 factors affecting the species or critical habitat." 51
8 Fed. Reg. 19,926, 19,932 (June 3, 1986). This evaluation
9 is to serve as the "baseline" for determining the effects
10 of the action on the species or critical habitat. *Id.*
11 However, all of these elements are to be evaluated
12 together as the "effects of the action."
13

14 35. If additional data would provide a better
15 information base from which to formulate a biological
16 opinion, the consulting agency (FWS or NMFS) may request
17 an extension of formal consultation and that the action
18 agency obtain additional data to determine how or to what
19 extent the action may affect listed species or critical
20 habitat. 50 C.F.R. § 402.14(f); FWS and NMFS, *Endangered*
21 *Species Consultation Handbook* (March 1998) at 4-6.⁸
22

23 36. The Ninth Circuit directs the consulting agency
24 to consider the effects of its actions "within the
25 context of other existing human activities that impact
26

27 ⁸ Judicial notice may be taken of this Handbook, which is
28 available at:
<http://www.fws.gov/endangered/consultations/s7hndbk/s7hndbk.htm>.

1 the listed species." *NWF v. NMFS II*, 524 F.3d at 930.
2 "[T]he proper baseline analysis is not the proportional
3 share of responsibility the federal agency bears for the
4 decline in the species, but what jeopardy might result
5 from the agency's proposed actions in the present and
6 future human and natural contexts." *Id.* The relevant
7 jeopardy analysis is whether this Project will tip a
8 species into a state of "likely extinction." 524 F.3d at
9 930.
10

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

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

26 *Id.* (footnote omitted).

27 37. Plaintiffs' essential critique of the BiOp's
28 baseline analysis is that the BiOp improperly concluded

1 that "CVP and SWP operations exacerbate the effects of
2 other factors, such as food or predation on the delta
3 smelt." See Doc. 667, Pltf's Proposed Conclusions of Law
4 ## 316-18.⁹ Plaintiffs argue "FWS simply determined that
5 these factors are attributable to CVP and SWP operations"
6 and therefore "based the effects analysis of the 2008
7 BiOp upon an unreasoned premise." *Id.* at Proposed
8 Conclusion of Law # 343.

10 38. Plaintiffs are correct that the general
11 assertion that Project operations exacerbate the effects
12 of these other stressors is unsupported by the record.
13 However, the inclusion of this unsupported assertion does
14 not invalidate the BiOp's baseline analysis. BiOp at
15 140-189. FWS does discuss "other stressors" at length in
16 the BiOp. See, e.g., *id.* at 182-88, 198, 201-2.
17 Specifically, FWS considered the effects of "predation,
18 contaminants, introduced species..., habitat suitability,
19 food supply, aquatic macrophytes, and microcystis." *Id.*
20 at 202, 277. The CVP and SWP are not identified as the
21
22

23 ⁹ Plaintiffs' motion for preliminary injunction specifically
24 addresses the treatment of hatcheries and gravel loss below
25 Whiskeytown Dam. Doc. 164 at 11-12. However, this issue was not
26 presented or discussed at the evidentiary hearing or in Plaintiffs'
27 proposed findings. These specific arguments appear to have been
28 abandoned.

26 Plaintiffs also advance an elaborate argument based on the
27 contention that FWS misapplied the "reasonably certain to occur"
28 standard applicable to "indirect effects" analyses. Because
Component 2 is not explicitly justified by any indirect effects
analysis, this argument is not directly relevant to the resolution
of the pending motion for preliminary injunction.

1 sole source of the delta smelt's problems. Rather, FWS
2 expressly recognizes that the long-term decline of the
3 species "was very strongly affected by ecosystem changes
4 caused by non-indigenous species invasions and other
5 factors...." *Id.* at 189. The BiOp repeatedly
6 acknowledges that there is "no single primary driver of
7 delta smelt population dynamics," *id.* at 202, but rather
8 that there are "multiple factors" and that "not all are
9 directly influenced by operations of the CVP/SWP." *Id.*
10 at 328.
11

12 39. It is undisputed that uncertainty surrounding
13 the measurement of the other stressors makes it difficult
14 (if not impossible) to separate those effects from the
15 effects of joint Project operations. Even if it were
16 possible to separate the quantitative effect of the other
17 stressors, which are part of the environmental baseline,
18 the ESA does not require that FWS quantify and/or parcel
19 out the "proportional share" of harms among the baseline
20 and the proposed action. See *Pacific Coast Fed'n of*
21 *Fishermen's Ass'ns v. U.S. Bureau of Reclamation*, 426
22 *F.3d 1082, 1093 (9th Cir. 2005)*; see also *Pacific Coast*
23 *Fed'n of Fishermen's Ass'ns v. U.S. Bureau of*
24 *Reclamation*, 226 *Fed. Appx. 715, 718 (9th Cir. 2007)*
25
26 (rejecting water users' argument that agency action must
27
28

1 be the "historical cause" of the jeopardy to salmon).

2 40. FWS's treatment of the "other stressors" in the
3 BiOp did not violate the ESA's baseline analysis
4 requirements because the ESA does not demand a
5 quantitative separation of project stressors from non-
6 project stressors. See *NWF v. NMFS II*, 524 F.3d at 930.
7 ("[T]he proper baseline analysis is not the proportional
8 share of responsibility the federal agency bears for the
9 decline in the species, but what jeopardy might result
10 from the agency's proposed actions in the present and
11 future human and natural contexts."). FWS was required
12 to and did describe the present and future federal,
13 state, and private actions in the action area, which
14 include the "other stressors". Whether it sufficiently
15 justified whether jeopardy might result from the agency's
16 proposed actions viewed in this context is a separate
17 question.
18
19

20 41. It is inequitable to put the entire burden of
21 the stressors on the water supply. However, this
22 decision goes beyond science to implicate the Executive's
23 (Department of Interior) allocation of resources. A
24 court lacks authority to interfere with such a policy
25 choice by a coordinate branch of government.
26
27
28

1 a. Discretionary v. Non-Discretionary.

2 42. Plaintiffs complain that the BiOp does not
3 distinguish between discretionary and non-discretionary
4 actions. *Home Builders*, 551 U.S. 644, held that ESA §
5 7's consultation requirements do not apply to non-
6 discretionary actions. Where an agency is required by
7 law to perform an action, it lacks the power to insure
8 that the action will not jeopardize the species. *Id.* at
9 667.
10

11 43. However, *Home Builders* says nothing about
12 whether, once section 7 consultation is triggered, the
13 jeopardy analysis should segregate discretionary and non-
14 discretionary actions, relegating the non-discretionary
15 actions to the environmental baseline. *Home Builders*
16 fundamentally concerns whether the section 7 consultation
17 obligation attaches to a particular agency action at all.
18 See *Home Builders*, 551 U.S. at 679-80 ("duty does not
19 attach to actions... that an agency is required by
20 statute to undertake....") (emphasis added).
21
22

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

25 The same reasoning applies to Plaintiffs' related
26 argument that Federal Defendants acted unlawfully by
27 attributing to the project the effects of "mandatory"
28 compliance with the Coordinated Operations Agreement

1 ("COA"). Even assuming, *arguendo*, that any mandatory
2 obligation exists under the COA, a proposition that is
3 questionable given the open-ended wording of the COA and
4 language in the CVPIA subjecting project operations to
5 the ESA, *Home Builders* does not require the agency to
6 segregate discretionary from non-discretionary activities
7 during an ESA § 7 consultation.¹⁰ Moreover, this argument
8 was not presented in Plaintiffs' opening brief. See
9 *Alaska Ctr. for Env't. v. U.S. Forest Serv.*, 189 F.3d 851,
10 858 n. 4 (9th Cir. 1999) (arguments not raised in opening
11 brief are waived).
12

13
14 c. Comparison of CalSim Data against Dayflow
15 Data.

16 44. Plaintiffs also argue that FWS's analysis is
17 flawed because FWS compared CalSim data to Dayflow Data.
18 As discussed in the Findings of Fact, although Mr. Miller
19 presents some substantive criticisms of the way the BiOp
20 utilized CalSim runs and compared those runs to other
21 types of data, these specific concerns were not raised
22 before the agency prior to the issuance of the BiOp. FWS
23 had legitimate concerns, shared by other scientists, with
24 the exclusive reliance on CalSim data. Finally, Mr.
25 Miller concedes that even if the approach he recommends
26

27 ¹⁰ To the extent that Plaintiffs suggest that section 7 does
28 not apply to the projects at all under *Home Builders*, this paradigm-
shifting argument has not properly been raised or briefed.

1 had been taken, the same fundamental result would have
2 obtained: project operations shift the position of X2
3 upstream. The magnitude of this shift is relevant to the
4 justification for and design of Component 3, which takes
5 effect in September, but that need not be resolved at
6 this time.
7

8 (3) Effects Analysis Challenges (Food Web).

9 45. Plaintiffs' original motion attacked the BiOp's
10 analysis regarding *P. forbesi*, a food item for delta
11 smelt during the summer and fall seasons. Doc. 447 at
12 21-26. Plaintiffs appear to have abandoned this
13 argument, as it was not discussed during the evidentiary
14 hearing or in their proposed Findings of Fact or
15 Conclusions of Law.
16

17
18 (4) Challenges to Component 2.

19 a. Use of Raw Salvage Numbers.

20 46. The evidence described in the Findings of Fact
21 establishes that FWS's use of gross salvage numbers to
22 justify the quantitative pumping restrictions in RPA
23 Component 2 did not utilize the best available science.

24 47. There was agreement among all the experts that
25 the best available, scientifically accepted methodology
26 is to use normalized salvage data to analyze the effect
27 of OMR flows on the delta smelt population. Normalized
28

1 salvage data was available to FWS, but FWS failed to
2 incorporate any analysis of normalized salvage data into
3 its quantitative justification for the specific flow
4 prescriptions imposed by RPA Component 2. To exacerbate
5 this failure, FWS did not explain why it did not.
6

7 48. FWS's disregard for an available scientific
8 methodology that was "in some way better than the
9 evidence [the agency] relied on" was a violation of the
10 "best available science" standard of the ESA. *Kern*
11 *County*, 450 F.3d at 1080.

12 49. Additionally, by entirely failing to explain its
13 use of gross salvage numbers despite internal discussions
14 indicating an awareness of the problem and criticism from
15 the Independent Peer Review, FWS "has entirely failed to
16 articulate a satisfactory explanation for its
17 conclusions." *Gutierrez II*, 606 F. Supp. 2d at 1183.

19 50. Plaintiffs have shown a likelihood of success on
20 the merits of their claim that the use of gross salvage
21 numbers in Figures B-13 and B-14 of the BiOp was a
22 violation of the ESA, and was arbitrary, capricious, and
23 an abuse of discretion.
24

25 51. However, Plaintiffs have not demonstrated that
26 Dr. Deriso's alternative -5,600 cfs flow limit is any
27 more valid than the -5,000 cfs limit imposed by RPA
28

1 Component 2. The condition of the delta smelt continues
2 to be non-viable and precarious, with a likely risk of
3 extinction if protections are not afforded. Plaintiffs
4 must produce evidence that shows otherwise to justify a
5 flow restriction that permits negative OMR flows to
6 exceed -5,000 cfs.
7

8 b. Failure to Use a Quantitative Life Cycle
9 Model.

10 52. The agency is not required to generate new
11 studies. For example, in *Southwest Center for Biological*
12 *Diversity v. Babbitt*, 215 F.3d 58, 60-61 (D.C. Cir.
13 2000), the district court found the available evidence
14 regarding FWS's decision not to list the Queen Charlotte
15 goshawk "inconclusive" and held that the agency was
16 obligated to find better data on the species' abundance.
17 The D.C. Circuit reversed, emphasizing that, although
18 "the district court's view has a superficial appeal ...
19 this superficial appeal cannot circumvent the statute's
20 clear wording: The secretary must make his decision as
21 to whether to list a species as threatened or endangered
22 'solely on the basis of the best scientific and
23 commercial data available to him....' 16 U.S.C. §
24 1533(b) (1) (A)." *Id.* at 61.
25
26

27 53. The use of a quantitative life cycle model is
28 the preferred scientific methodology. FWS made a

1 conscious choice not to use expertise available within
2 the agency to develop one, nor did it explain why it did
3 not. However, a completed life-cycle model was not
4 available for FWS's use prior to the issuance of the
5 BiOp, and the Court does not have the authority to
6 require the agency to create one.
7

8 (5) Critical Habitat.

9 54. As required by the ESA, if FWS finds that the
10 proposed agency action will result in "jeopardy or
11 adverse modification [of critical habitat] ... the
12 Secretary shall suggest those reasonable and prudent
13 alternatives which [it] believes would not violate
14 [Section 7(a)(2)] and can be taken by the Federal agency
15 or applicant in implementing the agency action." 16
17 U.S.C. § 1536(b)(3)(A). Avoiding adverse modification of
18 critical habitat is an independent statutory basis for
19 the promulgation of an RPA.
20

21 55. The BiOp sets forth extensive findings regarding
22 the adverse effects of export pumping on the critical
23 habitat of the delta smelt. See BiOp at 190-202, 239-78.
24 For instance, the BiOp found that the export pumps "alter
25 the hydrologic conditions within spawning habitat
26 throughout the spawning period for delta smelt by
27 impacting various abiotic factors including the
28

1 distributions of turbidity, food, and contaminants," and
2 further adversely modify spawning habitat by
3 "contribut[ing] to upstream movement of the LSZ [low
4 salinity zone]," which in turn "reduc[es] the amount and
5 quality of spawning habitat available to delta smelt."
6 *Id.* at 239-40.
7

8 56. In light of such findings, the BiOp concluded
9 that the operations of the CVP and SWP "are likely to
10 adversely modify delta smelt critical habitat" because
11 "[t]he past and present operations of the CVP/SWP have
12 degraded [delta smelt] habitat elements (particularly
13 PCEs 2-4 ["primary constituent elements" - water, water
14 flow, and salinity]) to the extent that their co-
15 occurrence at the appropriate places and times is
16 insufficient to support successful delta smelt
17 recruitment at levels that will provide for the species'
18 conservation." *Id.* at 278.
19

20 57. Plaintiffs have not challenged the BiOp's
21 findings on adverse modification of critical habitat in
22 this motion. Plaintiffs' experts Dr. Deriso and Dr.
23 Hilborn stated that their criticisms of the BiOp's OMR
24 flow restrictions did not apply to critical habitat.
25 4/5/10 Tr. 226; 4/6/10 Tr. 93. Rather, Plaintiffs argue
26 that the only stated rationale for the specific flow
27
28

1 prescriptions imposed by Component 2 is to avoid
2 jeopardy, and that Component 2 does not itself indicate
3 that it is necessary to prevent adverse modification.
4 See Pls.' Reply (Doc. 491) at 1 n.1.

5
6 58. Federal Defendants respond that "[t]his argument
7 elevates form over substance and needlessly
8 compartmentalizes portions of the BiOp that are designed
9 to work together as part of the same document." Doc.
10 666, Proposed Conclusion of Law #187.

11 59. As a general matter, Federal Defendants are
12 correct that the BiOp's critical habitat modification
13 finding operates as an independent justification for
14 imposing flow restrictions on the projects. However, the
15 BiOp justifies the specific flow prescriptions imposed by
16 Component 2 with a quantitative analysis that says
17 nothing whatsoever about critical habitat. Rather, an
18 improper analysis of raw salvage data is utilized to
19 generate a series of "break points," including a -5,000
20 cfs ceiling on negative OMR flows. There is no analysis
21 of critical habitat that independently justifies this
22 specific flow prescription, as opposed to the ceiling of
23 -5,600 proposed by Plaintiffs, or any other level.

24 //

25 //

1 (6) Reclamation's ESA Responsibility.

2 60. The ESA regulations require the action agency to
3 "determine whether and in what manner to proceed with the
4 action in light of its section 7 obligations and the
5 Service's biological opinion." 50 C.F.R. § 402.15(a).
6 Prior to accepting and implementing the 2008 Smelt BiOp
7 RPA, Reclamation had an independent obligation under ESA
8 section 7(a)(2) to ensure that it "use[d] the best
9 scientific and commercial data available."
10

11 61. Reclamation, as the federal action agency, "may
12 not rely solely on a FWS biological opinion to establish
13 conclusively its compliance with its substantive
14 obligations under section 7(a)(2)." *Pyramid Lake Paiute*
15 *Tribe of Indians v. U.S. Dept. of the Navy*, 898 F.2d
16 1410, 1415 (9th Cir. 1990). "[T]he action agency must
17 not blindly adopt the conclusions of the consultant
18 agency." *City of Tacoma v. Fed. Energy Regulatory*
19 *Comm'n*, 460 F.3d 53, 76 (D.C. Cir. 2006).
20

21 62. Reclamation did not ensure that the RPA utilized
22 the best available science. Rather, it uncritically
23 accepted the RPA and did not independently identify and
24 analyze alternative RPA Actions that minimized jeopardy
25 to humans and the human environment while protecting
26 threatened species.
27
28

1 D. Balancing of the Harms.

2 (1) Balancing of the Harms in ESA Cases.

3 63. The Supreme Court held in *TVA v. Hill*, 437 U.S.
4 153, 194 (1978), that Congress struck the balance in
5 favor of affording endangered species the highest of
6 priorities. In adopting the ESA, Congress intended to
7 “halt and reverse the trend toward species’ extinction,
8 whatever the cost.” *Id.* at 184 (emphasis added). *TVA v.*
9 *Hill* continues to be viable. See *Home Builders*, 551 U.S.
10 at 669-71; see also *Oakland Cannabis Buyers’ Co-op.*, 532
11 U.S. 496-97; *Amoco Prod. Co. v. Village of Gambell*, 480
12 U.S. 531, 543 n.9 (1987).

13
14 64. *Winter* does not modify or discuss the *TVA v.*
15 *Hill* standard.¹¹ Although *Winter* altered the Ninth
16 Circuit’s general preliminary injunctive relief standard
17 by making that standard more rigorous, *Winter* did not
18 address, nor change, the approach to the balancing of
19 economic hardships where endangered species and their
20 critical habitat are jeopardized. See *Biodiversity Legal*
21 *Found. v. Badgley*, 309 F.3d 1166, 1169 (9th Cir. 2002)
22 (Congress removed the courts’ traditional equitable
23 discretion to balance parties’ competing interests in ESA
24 injunction proceedings); *Nat’l Wildlife Fed’n v.*

25
26
27
28 ¹¹ Although *Winter* involved ESA-listed species, the *Winter*
decision did not address any ESA claims.

1 *Burlington N. R.R., Inc.*, 23 F.3d 1508, 1510-11 (9th Cir.
2 1994) (same).

3 65. Prior decisions involving the coordinated
4 projects' operations found that *TVA v. Hill* and related
5 Ninth Circuit authorities foreclose the district court's
6 traditional discretion to balance economic equities under
7 the ESA. There is no such bar in NEPA injunction
8 proceedings.
9

10 66. Plaintiffs have advanced a human welfare
11 exception and contend that unlike any of the prior cases,
12 this case juxtaposes species' survival against human
13 welfare, requiring a balancing of the BiOp's threats of
14 harm to humans, health, safety, and protection of
15 affected communities. No case, including *TVA v. Hill*,
16 which concerned the competing economic interest in the
17 operation of a hydro-electric project and prohibited
18 federal courts from balancing the loss of funds spent on
19 that project against the loss of an endangered species,
20 expressly addresses whether the ESA precludes balancing
21 of harms to humans and the human environment under the
22 circumstances presented here.
23
24

25 67. This case involves both harm to threatened
26 species and to humans and their environment. Congress
27 has not nor does *TVA v. Hill* elevate species protection
28

1 over the health and safety of humans.

2
3 (2) Balancing the Harms under NEPA.

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

10
11 E. The Public Interest.

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

20
21 70. The public policy underlying NEPA favors
22 protecting the balance between humans and the
23 environment. See 42 U.S.C. § 4321 (declaring a national
24 policy to "encourage productive and enjoyable harmony
25 between man and his environment; to promote efforts which
26 will prevent or eliminate damage to the environment and
27 biosphere and stimulate the health and welfare of man;
28

1 [and] to enrich the understanding of the ecological
2 systems and natural resources important to the
3 Nation....").

4 71. If both these objectives can be realized by
5 astute management, it is the government's obligation to
6 do so.
7

8 72. It is in the public interest that relief be
9 granted to Plaintiffs, who represent a substantial
10 population of water users in California, to enhance the
11 water supply to reduce the adverse harms of destruction
12 of permanent crops; fallowed lands; increased groundwater
13 consumption; reducing groundwater supplies; land
14 subsidence; reduction of air quality; destruction of
15 family and entity farming businesses; and social
16 disruption and dislocation, such as increased property
17 crimes and intra-family crimes of violence, adverse
18 effects on schools, and increased unemployment leading to
19 hunger and homelessness. This must be done without
20 jeopardizing the species and their critical habitat.
21
22

23 VII. CONCLUSION

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

26 a. NEPA requires that the responsible agency
27 take a hard look at the environmental consequences of its
28

1 actions, *Robertson v. Methow Valley Citizen's Counsel*,
2 490 U.S. 332, 350 (1989), obligating federal agencies to
3 prepare an environmental impact statement ("EIS") for all
4 "major federal actions significantly affecting the
5 quality of the human environment." 42 U.S.C. §
6 4332(2)(C).
7

8 b. Federal Defendants are required to evaluate
9 the impact of the coordinated operations of the CVP and
10 SWP, which constitutes major federal action. The
11 evidence overwhelmingly establishes significant
12 detrimental effects visited on the quality of the human
13 environment by implementation of the BiOp's RPA Actions,
14 which impose substantial restrictions on the water supply
15 to California to protect the delta smelt.
16

17 c. Where required, an EIS discloses
18 environmental effects of a proposed action and considers
19 alternative courses of action. *Id.* Here, Federal
20 Defendants completely abdicated their responsibility to
21 consider alternative remedies in formulating RPA Actions
22 that would not only protect the species, but would also
23 minimize the adverse impact on humans and the human
24 environment.
25

26 d. In considering RPA alternatives, the record
27 shows the burden of other causes is allocated to the
28

1 water supply, without the required analysis whether
2 alternatives, less harmful to humans and the human
3 environment, exist. Although this allocation of
4 resources ultimately is the prerogative of the agency,
5 NEPA nevertheless requires a hard look.

6
7 2. Plaintiffs have also shown a likelihood of
8 success on the merits of their ESA claim. Although the
9 premise underlying Component 2 -- that the species may be
10 jeopardized by increased negative flows occasioned by
11 export pumping -- has record support, FWS has failed to
12 adequately justify by generally recognized scientific
13 principles the precise flow prescriptions imposed by
14 Component 2. The exact restrictions imposed, which are
15 inflicting material harm to humans and the human
16 environment, are not supported by the record, making it
17 impossible to determine whether RPA Component 2 overly
18 protective. Judicial deference is not owed to arbitrary,
19 capricious, and scientifically unreasonable agency
20 action.
21

22
23 3. It is highly significant that the co-operator of
24 the Projects, DWR, with access to scientific competence
25 in the fields of fish biology and ecology, and project
26 operations, does not oppose the motion for a preliminary
27 injunction.
28

1 4. Under the balance of hardships analysis,
2 Defendants' contention that the ESA, under *TVA v. Hill*,
3 precludes equitable weighing of Plaintiffs' interests is
4 not supported by that case, as evidence of harm to the
5 human environment in the form of social dislocation,
6 unemployment, and other threats to human welfare were not
7 present in *Hill*. They are in this case.
8

9 5. Defendants argue that jeopardy to the species
10 cannot be avoided without continuing substantial
11 reduction of pumping, with resultant reduction of water
12 supply to Plaintiffs, representing over 20,000,000
13 persons, affected communities, and the agricultural
14 industry in Northern, Central, and Southern California.
15

16 6. Congress created public expectations in the
17 Amended Reclamation Act by instructing Reclamation to
18 contract for water service to hundreds of public-entity
19 water service providers that supply water to millions of
20 people and thousands of acres of productive agricultural
21 land. The agencies have not fully discharged their
22 responsibility to effectively allocate Project water
23 resources. Federal Defendants have acted arbitrarily and
24 capriciously in formulating Component 2 of the RPA, which
25 lacks factual and scientific justification, while
26 effectively ignoring the irreparable harm that pumping
27
28

1 restrictions have inflicted and will inflict on humans
2 and the human environment.

3 7. The species and its critical habitats are
4 entitled to protection under the ESA. The species has
5 been and will be protected. That is the law.
6 Nonetheless, FWS and Reclamation, as the consulting and
7 action agencies, must take the hard look under NEPA at
8 the severe consequences visited upon Plaintiffs, the
9 water supply of California, the agricultural industry,
10 and the residents and communities impacted by the water
11 supply limitations imposed by the Component 2. Federal
12 Defendants have failed to comprehensively and competently
13 evaluate whether RPA alternatives can be prescribed that
14 will be mutually protective of all the statutory purposes
15 of the Projects.
16
17

18 8. This is a case of first impression. The stakes
19 are high, the harms to the affected human communities
20 great, and the injuries unacceptable if they can be
21 mitigated. FWS and Reclamation have not complied with
22 NEPA. This prevented in-depth analysis of the potential
23 RPA Actions through a properly focused study to identify
24 and select alternative remedial measures that minimize
25 jeopardy to affected humans and their communities, as
26 well as protecting the threatened species. No party has
27
28

1 suggested that humans and their environment are less
2 deserving of protection than the species. Until
3 Defendant Agencies have complied with the law, some
4 injunctive relief pending NEPA compliance may be
5 appropriate, so long as it will not further jeopardize
6 the species or their habitat.
7

8 9. Injunctive relief also may be warranted under the
9 ESA, because, although the general premises underlying
10 Component 2 find some support in the record, the precise
11 flow prescriptions imposed on coordinated project
12 operations are not supported by the best available
13 science and are not explained as the law requires.
14

15 10. Injunctive relief cannot be imposed without
16 current evidence of the status of the species to assure
17 that altered operations will not deepen jeopardy to the
18 affected species or otherwise violate other laws. The
19 evidence has not sufficiently focused on remedies to
20 provide a confidence level that Plaintiffs' proposed
21 remedy of a flat -5,600 cfs ceiling on negative OMR flows
22 will not jeopardize the continued existence of the
23 species and/or adversely modify its critical habitat.
24

25 11. Legal and equitable grounds for injunctive
26 relief have otherwise been established by a preponderance
27 of the evidence.
28

1 12. RPA component 2 suffers from a lack of
2 population scaling in violation of the requirement FWS
3 use the best available science. There is no reliable
4 lifecycle model, which best available science calls for,
5 even if the Court cannot require the agency to develop
6 one. Continuing evidence of the extreme risk to the
7 continued existence of the Delta smelt population has
8 been presented by Defendants. Absent a showing by
9 Plaintiffs that Delta smelt are not within imminent risk
10 of entrainment by Project pumping facilities and/or not
11 within hydraulic influence of the pumps in the danger
12 area of the Central and South Delta, the -5,000 cfs flow
13 restriction cannot be enjoined.
14

15
16 13. A telephonic conference to discuss whether
17 Plaintiffs have evidence that imminence of harm to Delta
18 smelt does not exist to justify injunction of pumping
19 restrictions shall be held May 28, 2010 in Courtroom 3 at
20 10:00 a.m.
21

22 SO ORDERED

23 Dated: May 27, 2010
24

25 /s/ Oliver W. Wanger
26 Oliver W. Wanger
27 United States District Judge
28