

1 SOMACH, SIMMONS & DUNN
A Professional Corporation
2 Jennifer T. Buckman, Esq. (SBN 179143)
Stuart L. Somach, Esq. (SBN 90959)
3 Andrew M. Hitchings, Esq. (SBN 154554)
Daniel Kelly, Esq. (SBN 215051)
4 500 Capitol Mall, 10th Fl.
Sacramento, CA 95814
5 Telephone: (916) 446-7979
Facsimile: (916) 446-8199

6 Attorneys for Glenn Colusa Irrigation District, *et al.*
7 (all clients listed on attached signature page)

8 [Other attorneys listed on attached signature page]

9

10

11

STATE OF CALIFORNIA

12

STATE WATER RESOURCES CONTROL BOARD

13

14

In the matter of:

**SACRAMENTO VALLEY
WATER USERS' CLOSING
COMMENTS**

15

Informational Proceeding to Develop Flow
Criteria for the Delta Ecosystem

16

17

18

Following the March 22 – 24, 2010, proceedings, the SWRCB requested that the parties submit their recommendations for the "volume, quality, and timing of water . . . necessary to protect public trust resources in the Delta under current conditions" and also requested that the parties "include a table or tables with numerical flow criteria." The SWRCB has also solicited comments from the parties regarding "adaptive management, variable flows, flow measures that can and should be developed and implemented immediately, and possibilities for future scientific collaboration on flow-related measures." Consistent with these requests, the Sacramento Valley Water Users ("SVWU")¹ submit the following comments:

19

20

21

22

23

24

25

26

27

28

¹ As noted above, the entities and individuals comprising the SVWU are identified on the attached signature page.

1 • The SVWU agree with the conclusion of Dr. Bennett and his colleagues in the UC-
2 Davis "Delta Environmental Flows Group" that the most appropriate outcome of these
3 proceedings would be for the SWRCB to adopt a framework for approaching the problems in the
4 Delta.² (See DVD 1, 3/22/10, at 1:58:05 – 1:58:40³ and DVD 1, 3/23/10, Title 2, at 14:45-15:20
5 for discussion of the framework proposal advanced by the Delta Environmental Flows Group.) In
6 this regard, the SVWU urge the SWRCB to adopt the framework narrative criteria the SVWU
7 proposed in the written Summary that the SVWU submitted February 16, 2010. The principles
8 the SVWU advanced as a part of the framework included the following:

- 9 ○ Delta outflow requirements must be based on reliable, peer-reviewed scientific
10 evidence.
- 11 ○ Consistent with the "natural" hydrograph, Delta outflow requirements should vary
12 by hydrologic year type.
- 13 ○ Delta outflow criteria should identify: (1) what flows are needed to support each
14 particular public trust resource, at which locations and at what times of year, for
15 each type of hydrologic condition, and (2) what water quality parameters (e.g.,
16 temperature, pH, salinity) are needed to support the public trust resources in the
17 relevant portion of the watershed at the relevant times, under each type of
18 hydrologic condition.

19 • The new Delta smelt and salmonid OCAP Biological Opinions effectively have
20 established new flow criteria for the Delta. The Biological Opinions require greater Delta
21 outflows than those set by the SWRCB in D-1641 and its related Water Quality Control Plan –
22 and greater outflows than those considered by the Delta Environmental Flows Group.⁴ The

23 ² Similarly, the Department of Interior's written submittal provided information to help describe a
24 methodology to make flow prescriptions, rather than establish numeric flow recommendations.
25 (See United States Department of the Interior's Comments Regarding the California State Water
26 Resources Control Board's Notice of Public Informational Proceeding to Develop Delta Flow
27 Criteria for the Delta Ecosystem Necessary to Protect Public Trust Resources, dated February 12,
28 2010, at p. 13.)

³ The references to "DVD" refer to the DVDs of the proceedings produced by the SWRCB.

⁴ While the Delta Environmental Flows Group opined that "recent Delta flows have not been
sufficient to support native Delta fishes for today's habitats," panelist Bill Fleenor disclosed that

1 Biological Opinions carefully strike a reasonable balance between the downstream needs of the
2 Delta smelt (and, by extension, other pelagic organisms in the Delta) and the upstream needs of
3 salmonids.

4 • The regulatory requirements imposed under the new federal Biological Opinions
5 have not yet been fully implemented, tested, or evaluated. As the panel of expert scientists
6 convened by the National Academies of Science explained regarding the Biological Opinions,
7 "Even the best-targeted methods of reversing the fish declines will need time to take effect amid
8 changing environmental conditions such as multi-year droughts and continued pressures on the
9 system from other human-caused stresses." (National Research Council's Committee on
10 Sustainable Water and Environmental Management in the California Bay-Delta, A Scientific
11 Assessment of Alternatives for Reducing Water Management Effects on Threatened and
12 Endangered Fishes in California's Bay Delta," Pre-Publication Copy (ISBN: 0-309-12803-X)
13 (2010), at p. 3.) The Delta Environmental Flows Group, through Dr. Herbold and Dr. Bennett,
14 concurred that the Biological Opinions have not been implemented for long enough to see
15 whether the fish are responding to those new regulatory requirements. (DVD 1, 3/23/10, Title 2,
16 at 16:00 – 17:32.)

17 • The scientific experts seem to agree that the species that should be considered in
18 the management of the Delta ecosystem are Delta smelt and salmon. As Dr. Bennett stated
19 during the Pelagic Fish Panel, if the Board selected these species as the target species, that would
20 probably "cover[] a lot of bases" because these are the species that "probably conflict the most in
21 certain areas" in terms of their needs. (DVD 1, 3/23/10, Title 2, at 1:28:16 – 1:28:24.)

22 • The witnesses' statements during the proceedings confirmed that the causal
23 relationships – if any – between Delta outflow and fisheries decline or abundance are not well
24 understood. When Board Member Baggett asked the Pelagic Fish Panel to estimate the increase
25 in fish abundance that would result from the parties' proposed increases in flows, none of the
26 scientists on the panel was willing even to offer an estimate. (DVD 1, 3/23/10, Title 2, 51:52 –

27
28 the data they considered in reaching this conclusion ended in 2005 – before development or
implementation of the now-controlling Biological Opinions. (DVD 1, 3/22/10, at 40:40-41:03.)

1 55:23, 1:46:12 – 1:51:04.) As noted by Jonathan Rosenfield, representing The Bay Institute, in
2 his testimony on the Pelagic Fish Panel, there are almost certainly "multiple mechanisms at work"
3 in the Bay-Delta estuarine system, including habitat volume, food web stimulation, transport to
4 allow upstream and downstream migration at different life stages, turbidity and toxics.⁵ (DVD 1,
5 3/23/10, Title 1, at 39:03 – 39:58.) Increased flow alone might not result in any demonstrable
6 increase in fish abundance.

7 • Given the substantial scientific uncertainty that exists regarding the causes of the
8 decline of the Delta fisheries, the new and untested regulatory requirements of the Biological
9 Opinions, and the current inability to demonstrate a relationship between outflow and fish
10 abundance, the existing numeric outflow requirements (as set forth in D-1641 and the Biological
11 Opinions) are a reasonable starting point for the numerical Delta outflow criteria. A chart
12 showing these current numeric Delta outflow requirements is set forth in Attachment A.

13 • The Delta is just one part of California's integrated water system, and increases to
14 Delta outflows to try to benefit fish in the Delta would require tradeoffs that may adversely affect
15 fish in other parts of the system (as well as numerous other public trust resources). For example,
16 increased Delta outflow may create more habitat in the Delta for pelagic organisms at the expense
17 of the upstream coldwater pools needed for salmonid spawning and incubation. Many of the
18 proposals submitted by the parties would favor Delta smelt and the rest of the pelagic fishery at
19 the expense of the needs of salmonids. (See Attachment B for exhibits containing an analysis of
20 how some of the parties' proposals would deplete the cold water pool in Shasta reservoir and
21 comparisons of the proposals with unimpaired flows (SVWU 61, 62, and 63) and an explanation
22 of the assumptions underlying this modeling work.)⁶ Yet the scientists on the Anadromous Fish

23 ⁵ Along these lines, the NRC report warned that "reversing or even slowing the declines of the
24 listed species cannot be accomplished immediately." (NRC Pre-Publication Copy, at p. 3.) The
25 NRC report also noted, "Especially for fishes whose populations are very low already, the effects
26 of any actions will be difficult to detect at first, and detecting them will be made more difficult by
the effects of other environmental changes and uncertainties inherent in sampling small
populations." (NRC Pre-Publication Copy, at p. 3.)

27 ⁶ MBK Engineers did not have, and therefore could not analyze, most of the parties' proposals
28 before the deadline for filing exhibits and testimony for this proceeding. However, as the NRC
noted, the existing hydrological and hydrodynamic models are "invaluable for understanding and
managing the system." (NRC Pre-Publication Copy, at p. 7.) Because it is critically important

1 Panel unanimously agreed that it is, as Rosalie del Rosario testified on behalf of NOAA Fisheries,
2 "very important to preserve cold water temperature requirements upstream." (See also written
3 submission by California Department of Fish & Game, dated February 16, 2010, at p. 6.)

4 Similarly, the NRC report concluded that the RPAs imposed under the Delta smelt and salmonid
5 Biological Opinions "must be carefully coordinated to reduce or eliminate the potential for
6 conflicting effects on the species." (NRC Pre-Publication Copy, at p. 7.) As Dr. Wim Kimmerer
7 testified, there will be trade-offs between the species. (DVD 1, 3/22/10, at 3:20:17 – 3:21:25.)

8 The NRC also concluded that "an additional overall, systematic, coordinated
9 analysis of the effect of all actions taken together and a process for implementing the optimized,
10 combined set of actions" is needed to manage the Delta. (NRC Pre-Publication Copy, at p. 6.)

11 The NRC found that the current regulatory scheme (under the RPAs for the Biological Opinions):

12 lack[s] an integrated quantitative analytical framework that ties the various actions
13 together within species, between smelt and salmonid species, and across the
14 watershed. This type of systematic, formalized analysis, although likely beyond
15 the two agencies' legal obligations when rendering two separate biological
16 opinions, is necessary to provide an objective determination of the net effect of all
17 their actions on the listed species and on water users.

18 (NRC Pre-Publication Copy, at p. 6.) While the NRC made these comments in the context of
19 integrating the requirements of the new Biological Opinions, the same logic applies with even
20 greater force in the context of integrating *all* of the numerous regulatory actions that combine to
21 create the Delta management regime. (NRC Pre-Publication Copy, at p. 7.) "The lack of a
22 systematic, well-framed overall analysis is a serious scientific deficiency. . . ." (NRC Pre-
23 Publication Copy, at p. 7.)

24 The SVWU concur with Dr. Kimmerer's and the NRC's conclusions on the need
25 for looking at the system holistically and urge the SWRCB not to set new flow criteria at levels
26 that would negatively impact upstream salmonid habitat. As shown in Attachment B, Delta

27 for the SWRCB to know the hydrological impacts and potential feasibility of the various parties'
28 proposals, the SVWU are submitting Attachment B now. The SVWU ask the SWRCB to
seriously consider this attachment as the SWRCB develops its report.

1 outflows that are much higher than those specified in the Biological Opinions would, through
2 reductions in reservoir carryover storage levels, have potentially disastrous effects on upstream
3 salmonid habitat. The SWRCB's new Delta outflow criteria should aim at minimizing these
4 impacts by maintaining Delta outflows at levels close to those specified in the Biological
5 Opinions. This will also ensure that Delta outflows do not unintentionally render the system
6 unable to comply with the salmon Biological Opinion's flow and temperature requirements on the
7 Sacramento River and its tributaries, thereby causing violations of the federal Endangered Species
8 Act. Similarly, to facilitate the SWRCB's role in managing the integrated California water
9 system, the SWRCB's new Delta outflow criteria should be accompanied by calculations of the
10 associated water costs.

11 • The SWRCB's report to the Legislature should explicitly recognize that the
12 SWRCB has not yet undertaken public trust balancing or consideration of the public interest, and
13 both of these factors may significantly impact the amount of water that should be required for
14 Delta outflow. While this proceeding may be a first step toward addressing the protection of
15 public trust resources in the Delta, the report should recognize that the SWRCB has not
16 discharged its public trust obligations by means of these proceedings. In any future proceedings
17 to address the protection of public trust resources in the Delta, the SWRCB (or the courts) must
18 undertake the comprehensive public trust balancing and consideration of the public interest
19 required by *National Audubon Soc'y v. Superior Court*, 33 Cal. 3d 419, 434 (1983). The
20 SWRCB's report should note that, in any such future proceedings, at least three additional steps
21 must be undertaken to discharge the State's public trust obligations: (1) determine whether there
22 is any conflict between the flows needed to support the public trust resource of fisheries in the
23 Delta and the needs of other public trust uses, both in the Delta and upstream, (2) if so, determine
24 the appropriate balance between Delta outflows for fisheries and other public trust needs, and (3)
25 determine how to balance the public interest in providing water for public trust resources and the
26 public interest in existing beneficial uses of water and the economic and social effects of those
27 uses, giving due consideration to the constitutional mandate that the water resources of the State
28 be put to the fullest use of which they are capable.

1 • In developing its report, the SWRCB should also acknowledge that its process to
2 develop Delta outflow criteria is linked to other processes. Specifically, these new Delta outflow
3 criteria will inform the Delta Plan and the Bay-Delta Conservation Plan and any order changing
4 the CVP or SWP points of diversion, as described in Water Code section 85086, subd. (c). If the
5 CVP and the SWP file a petition to change their points of diversion from the Delta, as
6 contemplated by these provisions, then the SWRCB will have an important obligation under the
7 "no-injury rule" to protect existing water rights holders, including the SVWU, in any order on that
8 petition, and the SWRCB may not shift or impose any burden to meet the Delta outflow criteria to
9 upstream water users. The SWRCB's obligation to protect existing legal water rights (including,
10 without limitation, the protections due to areas where water originates) was re-confirmed in
11 various ways in Water Code sections 85031 and 85032 as part of the legislative package.

12 • The proceedings revealed several general concepts on which most of the scientists
13 seemed to agree, e.g., that there could be biological benefits associated with extending the
14 inundation period of the Yolo Bypass. It will take significant amounts of work to translate these
15 types of concepts into potentially feasible proposals for pilot projects.⁷ The SVWU are willing to
16 participate in discussions of such projects, particularly those that potentially could affect their
17 members or their facilities, and related possibilities for future scientific collaboration on such
18 concepts.

19
20 \\\

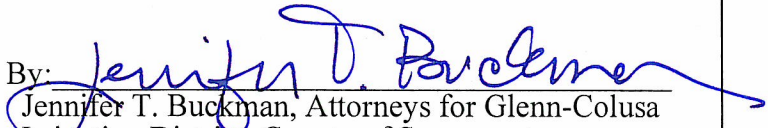
21 _____
22 ⁷ For example, one of the items evaluated by the NRC was a Reasonable and Prudent Alternative
23 included in the salmon Biological Opinion which relates to improving the migratory passage of
24 salmon and sturgeon through the Yolo Bypass and creating additional floodplain lands to provide
25 additional rearing habitat for juvenile salmon; the latter of these two concepts was discussed at
26 length in the SWRCB's proceedings. The NRC's panel of experts concluded that this action is
27 "scientifically justified, but the implications for the system as a whole of routing additional flows
28 through the Yolo Bypass for the system were not clearly analyzed. In particular, the
consequences of the action for Sacramento River flows and for the potential mobilization of
mercury were not clearly described." (NRC Pre-Publication Copy, at pp. 5-6.) Thus, not only
would the operational feasibility of these concepts require further evaluation, but, as the NRC
noted, the potential environmental impacts of such actions would also need to be analyzed. Those
impacts likely extend far beyond the potential mobilization of mercury and may include, among
other things, significant impacts to flood protection facilities, farmland, and existing wildlife
habitat.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

The SVWU thank the SWRCB for its consideration of these closing comments.

DATED: April 14, 2010

SOMACH SIMMONS & DUNN, A
PROFESSIONAL CORPORATION

By: 
Jennifer T. Buckman, Attorneys for Glenn-Colusa
Irrigation District, County of Sacramento,
Sacramento County Water Agency and County of
Yolo

BARTKIEWICZ, KRONICK & SHANAHAN, P.C.
By:
Alan B. Lilly, Attorneys for Browns Valley Irrigation
District, City of Folsom, City of Roseville, San Juan
Water District and Yuba County Water Agency

DOWNEY BRAND LLP
By:
Kevin M. O'Brien, Attorneys for Reclamation
District 108, Calaveras County Water District,
Howald Farms, Inc., Meridian Farms Water
Company, Natomas Central Mutual Water Company,
North Delta Water Agency, Oji Brothers Farm, Inc.
and Oji Family Partnership, Pelger Mutual Water
Company, Pleasant Grove-Verona Mutual Water
Company, Sacramento Municipal Utility District,
Reclamation District 2060, Reclamation District
2068, Richter Brothers, River Garden Farms
Company, South Sutter Water District, Sutter
Extension Water District, Sutter Mutual Water
Company, Tisdale Irrigation and Drainage Company,
and Windswept Land and Livestock Company

ATTACHMENT A

X2 OBJECTIVES AND DELTA OUTFLOW STANDARDS

Document Source(s)	X2 Objective	Minimum Delta Outflows
<p>2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary</p> <p>1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary</p> <p>SWRCB Water Right Decision 1641 (Dec. 29, 1999, revised Mar. 15, 2000) (“D-1641”)</p>	<p>Chipps Island and Port Chicago for a specified number of days each month between February and June based on the previous months Eight River Index, a 14-day running average of 2.64mmhos/cm or 3-day running average of net Delta outflows of 11,400 cfs and 29,200 cfs, respectively. (See attached “Table 4. Number of Days When Maximum Daily Average Electrical Conductivity of 2.54 mmhos/cm Must Be Maintained at Specific Location.”)¹</p> <p>Chipps Island is 75 km upstream of the GG Bridge. Port Chicago is 64 km upstream of the GG Bridge. (See attached annotated CCWD photograph.)</p>	<p><u>Net Delta Outflow Requirement for Fish & Wildlife Beneficial Uses</u></p> <p>January: 4,500 cfs (All Years);² 6,000 cfs if the Eight River Index for December is greater than 800 TAF³</p> <p>February-June: Minimum daily of net outflow of 7,100 cfs (All Years) based on 3-day running average; or 14-day running average of EC at Collinsville Gauge is less than or equal to 2.64 mmhos/cm.</p> <p>If Eight River Index for January is more than 900 TAF, then daily average or 14-day running average EC at station C2 shall be less than or equivalent to 2.64 mmhos/cm at least one day between February 1 and February 14.</p> <p>If Eight River Index for January is 650 TAF-900 TAF, Exec Dir. of SWRCB delegated to decide whether requirement applies.</p> <p>If Eight River Index for February is less than 500 TAF, then standard may be relaxed in March upon recommendation from operations group, with any disputes resolved by CALFED policy group. (Note: In D-1641, this stated that DWR and USBR could request that the March standard be relaxed, subject to the approval of the SWRCB Executive Director.)</p> <p>The standard does not apply in May and June if May estimate of Sacramento River Index is less than 8.1 MAF at the 90% exceedence level. Under this circumstance a minimum 14-day running average flow of 4,000 cfs is required in May and June.</p>

¹ This table appears in the 2006 and 1995 Water Quality Control Plans for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and D-1641. The information in this table in each document is exactly the same.

² Water year-type is based on the Sacramento Valley 40-30-30 Index. This index equation is $0.4*X + 0.3*Y + 0.3*Z$, where X is the current year's April-July Sacramento Valley unimpaired runoff, Y is the current October-March Sacramento Valley unimpaired runoff, and Z is the previous year's index (which has a cap of 10.0 MAF). Sacramento Valley unimpaired runoff for the current water year

X2 OBJECTIVES AND DELTA OUTFLOW STANDARDS

Document Source(s)	X2 Objective	Minimum Delta Outflows		
		<p><u>July:</u> Wet & Above Normal: 8,000 cfs Below Normal: 6,500 cfs Dry: 5,000 cfs Critical: 4,000 cfs</p> <p><u>October:</u> Wet-Dry – 4,000 cfs Critical – 3,000 cfs</p>	<p><u>August:</u> Wet-Below Normal: 4,000 cfs Dry: 3,500 cfs Critical – 3,000 cfs</p> <p><u>Nov-Dec.:</u> Wet-Dry – 4,500 cfs Critical – 3,500 cfs (See p.15, t.3.)</p>	<p><u>September:</u> All Years: 3,000 cfs</p>

Document Source(s)	X2 Objective	Minimum Delta Outflows		
<p>U.S. Fish & Wildlife Service Smelt Biological Opinion (2008)</p>	<p><u>September and October:</u> Wet – X2 no greater than 74 km from GG Bridge Above Normal – X2 no greater than 81 km from GG Bridge⁴</p> <p><u>November:</u> Wet – X2 no greater than 74 km Above Normal – X2 no greater than 81 km from GG Bridge</p> <p><u>December:</u> Any increase in storage during November shall be released to augment outflow requirements in D-1641 (See pp. 282-283.)</p>	<p><u>September and October:</u> Wet – approx. 13,000 cfs required Above Normal – approx. 8,000 cfs required</p> <p><u>November:</u> Wet – approx. 13,000 cfs required Above Normal – approx. 8,000 cfs required (See pp. 373-375.)</p>		

is a forecast of the sum of the following locations: (1) Sacramento River above Bend Bridge, near Red Bluff; (2) Feather River, total inflow to Oroville Reservoir; (3) Yuba River at Smartville; (4) American River, total inflow at Folsom Reservoir. (See 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, p. 23.)

³ The Eight-River Index refers to the sum of the unimpaired runoff from: the Sacramento River at Bend Bridge near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir; Stanislaus River, total inflow to New Melones Reservoir; Tuolumne River, total inflow to Don Pedro Reservoir; Merced River, total inflow to Exchequer Reservoir; and San Joaquin River total inflow to Millerton Lake.

⁴ Water year type is calculated based on the Sacramento Basin 40-30-30 Index. (See Smelt BO at p. 283.)

ATTACHMENT B

Analysis of Delta Outflow Recommendations

Pursuant to the request of the SVWU, MBK Engineers evaluated on the ability of California's water delivery system to meet the requirements of Water Right Decision No. 1641 ("D-1641"), the more recent Biological Opinions on delta smelt and salmonid species (the "BO's"), and several flow recommendations that were submitted to the SWRCB for its March 22-24, 2010 Delta Outflow Proceeding. This document contains a brief summary of analytical results for the follow flow recommendations; assumptions used to model recommendations are described below:

- American Rivers Recommendation to SWRCB, Feb. 16, 2010 (Exh. AR-1)
- UCD Spring Delta Outflow (Exh. SVWU-60) (already analyzed in Bourez testimony, exh. SCWU-1)
- Bay Institute Proposal (Exh. SVWU-59) (already analyzed in Bourez testimony, exh. SVWU-1)
- PCFFA Recommendation to SWRCB Feb. 16, 2010 (Exh. PCFFA-2)
- UCD Yolo Bypass - Sacramento River (Exh. SVWU-60) (already analyzed in Bourez testimony, exh. SVWU-1)
- CSPA X2 Recommendation to SWRCB Feb. 16, 2010 (Exh. CSPA-1)
- Bay Institute Recommendation to SWRCB Feb. 16, 2010 (Exh. TBI-4, TBI-2)
- CSPA Outflow Recommendation to SWRCB Feb. 16, 2010 (Exh. CSPA-1)

The same analytical methods that are described in my testimony (exh. SVWU-1) were used to analyze the new recommendations listed above, with the exception of the CSPA Outflow Recommendation as described below.

Exhibit SVWU-61 (copy attached) shows the changes in average Delta outflows under the BO's as compared to D-1641 and with the various recommendations submitted to the SWRCB. The upper bar chart in Exhibit SVWU-61 shows that implementation of most of these proposals would require average annual Delta outflows that would be 2 million acre-feet or more greater than average Delta outflows required under D-1641, and 1 million acre-feet or more greater than average Delta outflows required under the BO's. (The bar graph in the top half of Exhibit SVWU-61 is in the same format as the previously submitted Exhibits SVWU-7, 21, 33 and 46.)

The Shasta Carryover Storage graph at the bottom of Exhibit SVWU 61 shows the effects of these proposed recommendations on carryover storage at Shasta Reservoir. Plots of Oroville and Folsom Reservoir carryover storage illustrate effects similar to those at Shasta. The salmon BO's indicates it is necessary to carry over 2.4 million acre-feet in order to have sufficient cold water to preserve water temperatures in the Sacramento River. This graph shows most of the proposals presented to the SWRCB would substantially reduce the percentage of time that Shasta carryover storage would meet the Salmon BO target. (The flow-exceedance curves in the bottom half of Exhibit SVWU-61 are in the same format as the previously submitted Exhibits SVWU-9, 23, 35 and 48.)

Exhibit SVWU-62 (copy attached) considers the effects of flow criteria recommended by the Pacific Coast Federation of Fishermen's Associations ("PCFFA") for spring flows in the Sacramento River and for spring Delta outflows. This exhibit compares unimpaired flows for April, May and June with the PCFFA recommended flows for these months. This exhibit shows that the PCFFA recommended flows would exceed: (a) the entire unimpaired flow of the Sacramento River during many Aprils; (b) unimpaired Delta outflows in May of most dry and critical years; (c) entire unimpaired flow in the Sacramento River in June of almost all above normal, below normal, dry and critical years; and (d) unimpaired Delta outflows in about half of all years. Although there are times when the PCFFA recommended flows would be less than the

unimpaired flows, implementing these proposed flows still would require significant reservoir releases and thereby would diminish the cold water pools in these reservoirs.

Exhibit SVWU-63 (copy attached) considers the effect of the Bay Institute's X2 recommendations during fall months. This exhibit shows that the Bay Institute's X2 proposal would require more water than unimpaired Delta outflows in almost all Septembers and in about half of all Octobers and Novembers. Although the Bay Institute's January – June recommended flows are less than the unimpaired flows during these months, implementation of these recommended flows still would cause significant impacts to upstream reservoir storage. These impacts to upstream storage and cold water pools can not be avoided if the Bay Institute's January-June flow targets were met.

ANALYTICAL ASSUMPTIONS

Pacific Coast Federation of Fishermen's Associations (PCFFA)

The PCFFA recommendations for Sacramento River flow and Delta outflows are the same for all year types and are as follows:

	April	May	June
Sacramento at Hood	25,000	25,000	25,000
Sacramento at Rio Vista	25,000	25,000	25,000
Delta Outflow	25,000	25,000	25,000

American Rivers

American Rivers recommended Yolo Bypass inundation and suggest that the following Sacramento River flows at Verona are needed to generate flow in the Yolo Bypass:

	January	February	March	April
Wet	35,000	35,000	35,000	35,000
Above Normal		32,500	32,500	32,500
Below Normal		30,000	30,000	
Dry			27,500	
Critical				

Year type based on SWRCB Sacramento River 40-30-30 index

The Bay Institute

The Bay Institute recommended several Delta standards:

- January – June Delta outflow volume
- September – November X2 targets
- Old and Middle River (OMR) flows
- San Joaquin River at Vernalis flow to export ratio
- Export to Delta inflow ratio

January to June recommended outflow volume:

January – March		March-May		June		January-June	
Flow Volume (MAF)	Percent of years	Flow Volume (MAF)	Percent of years	Flow Volume (MAF)	Percent of years	Flow Volume (MAF)	Percent of years
10	40%	10	25%	1.2	25%	20	33%
6.3	60%	6.3	50%	508	50%	13.5	50%
2.5	95%	2.5	12.50%	250	75%	6.3	80%
						3.2	95%

The September through November X2 targets were applied as follows:

	X2 position (km)	Percent of years
Wet	71	20%
Above Normal	74	40%
Below Normal	77	60%
Dry	80	80%
Critical	83	100%

OMR recommendation was implemented as shown in the table below. Year types are base on the SWRCB 60-20-20 San Joaquin River index.

Assumed OMR Flow Criteria based on Bay Institute Recommendations									
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Wet	-2000	-2000	-1500	-1500	-1500	0	0	0	-1500
AN	-2000	-2000	-1500	-1500	-1500	0	0	0	-1500
BN	-2000	-2000	-1500	-1500	-1500	0	0	0	-1500
Dry	-2000	-2000	-1500	-1500	-1500	0	0	0	-1500
Critical	-2000	-2000	-1500	-1500	-1500	-1500	-1500	-1500	-1500

The Vernalis flow-to-export ratio constraint was applied March through April as follows: 4 in wet and above normal years, 3 in below normal years 2 in dry years, and 1 in critical years based on the SWRCB 60-20-20 San Joaquin River index.

The Bay Institute export-to-inflow ratio of 10% was applied from December to June of Above Normal, Below Normal, Dry and Critical years based on the SWRCB Sacramento River 40-30-30 index.

California Sportfishing Protection Alliance (CSPA)

Two of the CSPA recommendations were analyzed individually in the following studies. CSPA Study 1 analyzed CSPA's recommended Delta outflows. Although this recommendation could not be modeled due to the extremely high recommended outflows, a calculation was performed to estimate the monthly increases in outflow that would occur with implementation of this recommendation.

CSPA Study 1

The following table summarizes the CSPA Delta outflow recommendation:

CSPA Recommended Delta Outflow					
	Wet	AN	BN	Dry	Critical
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
FEB-MAR	91,800	90,800	41,000	23,500	9,100
APR-JUL	43,000	23,000	14,400	10,800	6,700
AUG-JAN	29,000	14,600	12,100	9,200	4,100

Year type based on SWRCB Sacramento River 40-30-30 index

CSPA Study 2

To simulate the recommendations in CalSim, the midpoint of each CSPA recommended X2 range was assumed. It was also assumed that if large Delta outflows early in the season pushed X2 downstream of the target, that the target would be relaxed later in the season such that it would be met on a seasonal average.

X2 Target Based on CSPA Recommendations					
	Wet	AN	BN	Dry	Critical
	(km)	(km)	(km)	(km)	(km)
FEB-MAR	52	52	61	69	78
APR-JUL	64	64	74	77	82
AUG-JAN	67	76	76	79	87

EXHIBIT SVWU-61

Analytical Results Summary

Delta Outflow Recommendations to SWRCB

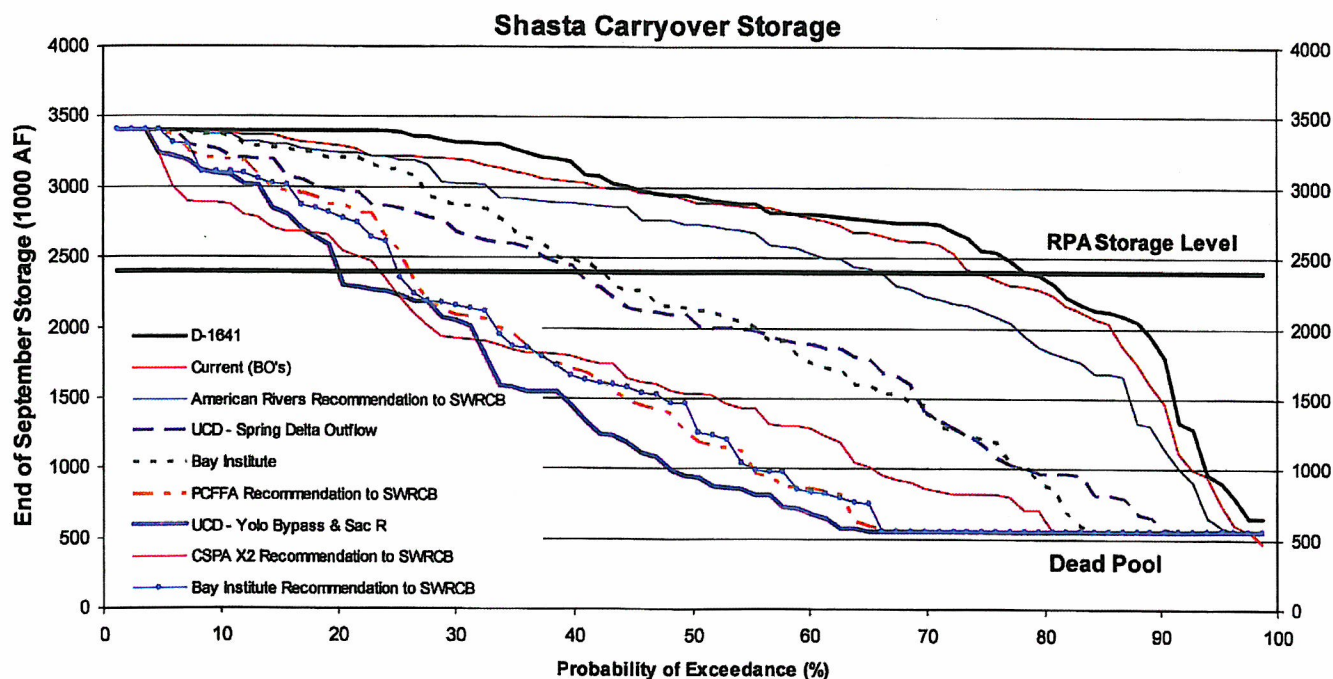
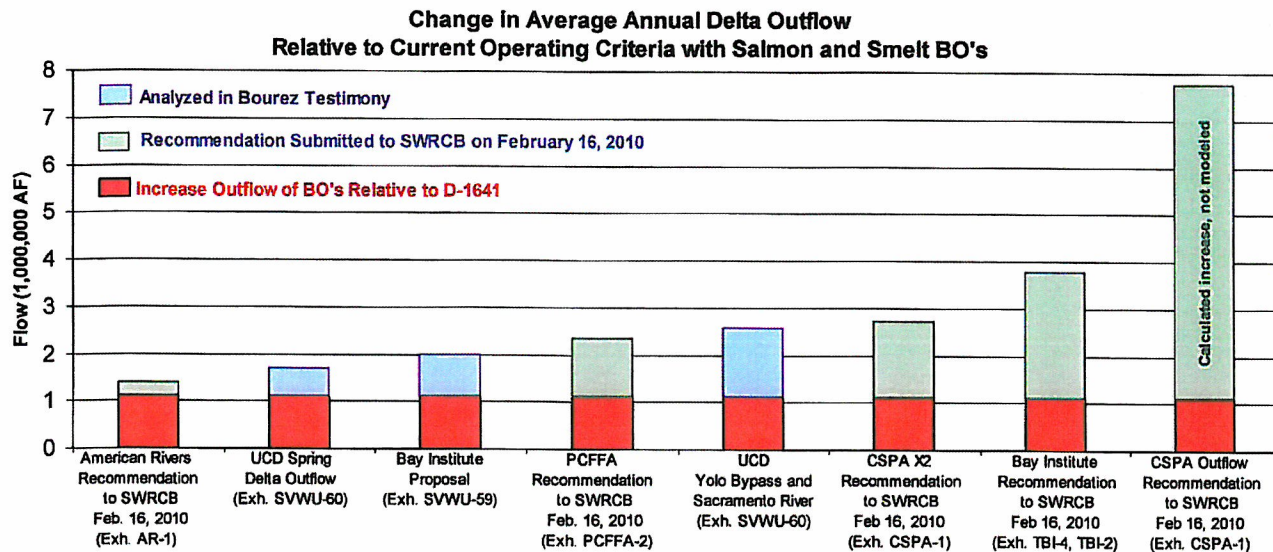
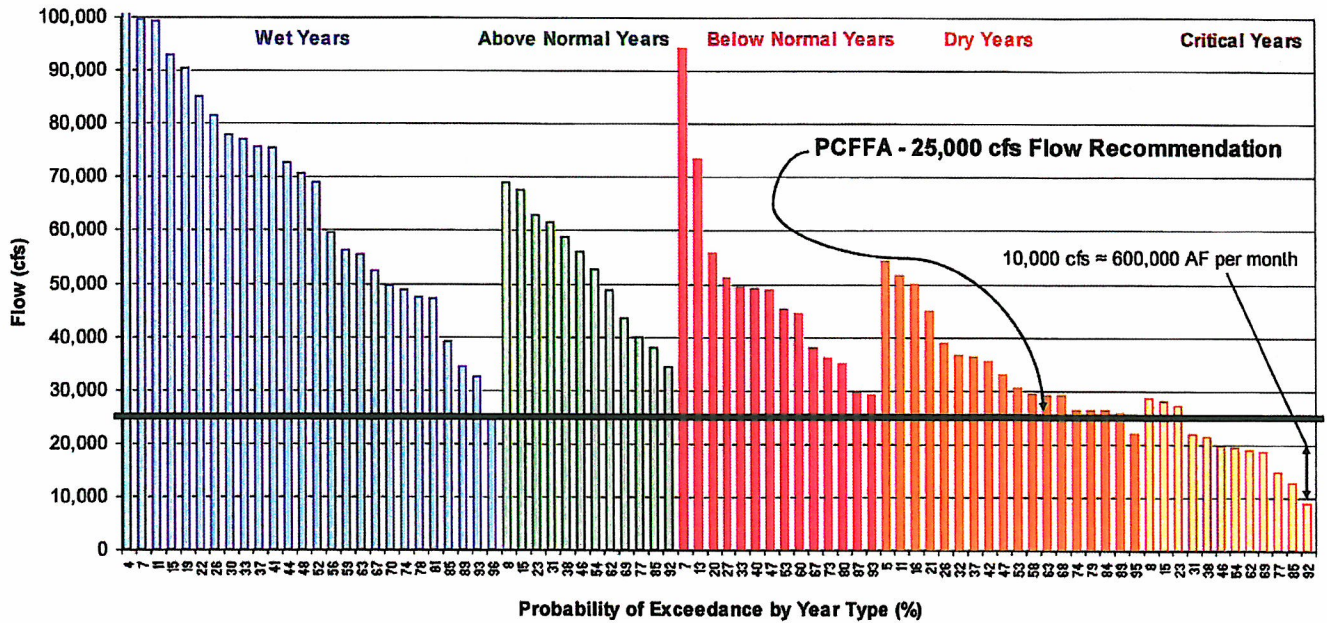
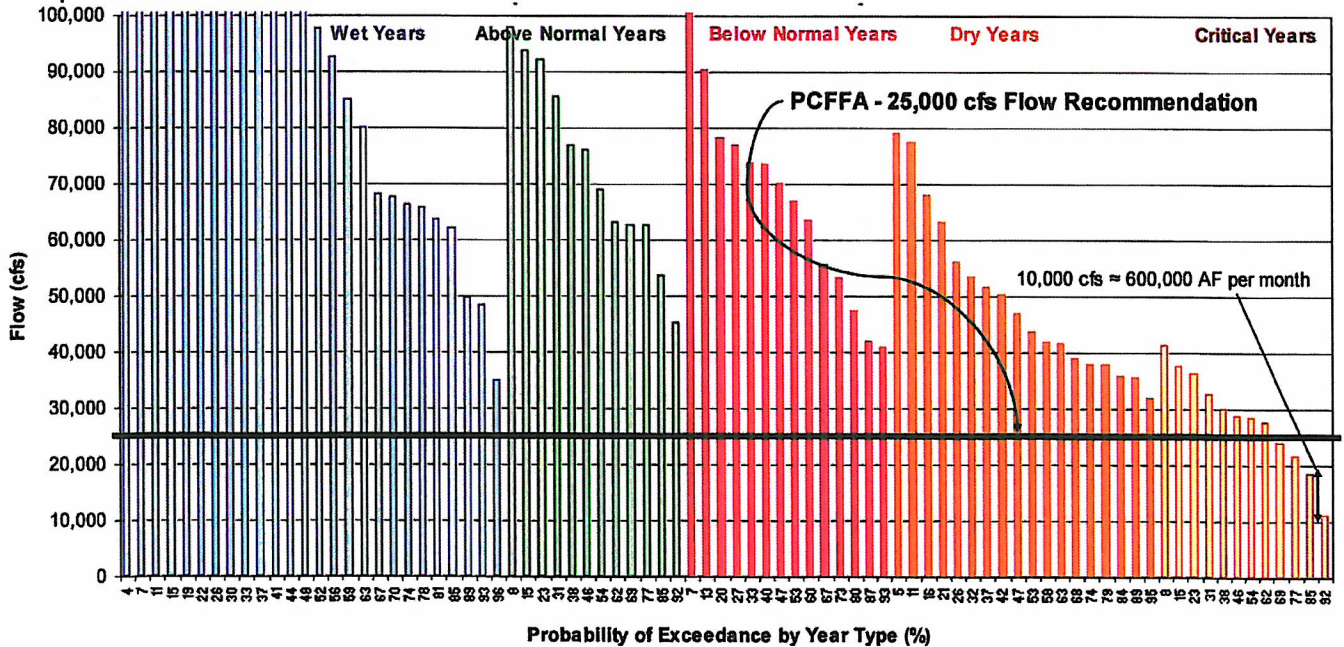


EXHIBIT SVWU-62 Pacific Coast Federation of Fishermen's Association (PCFFA)

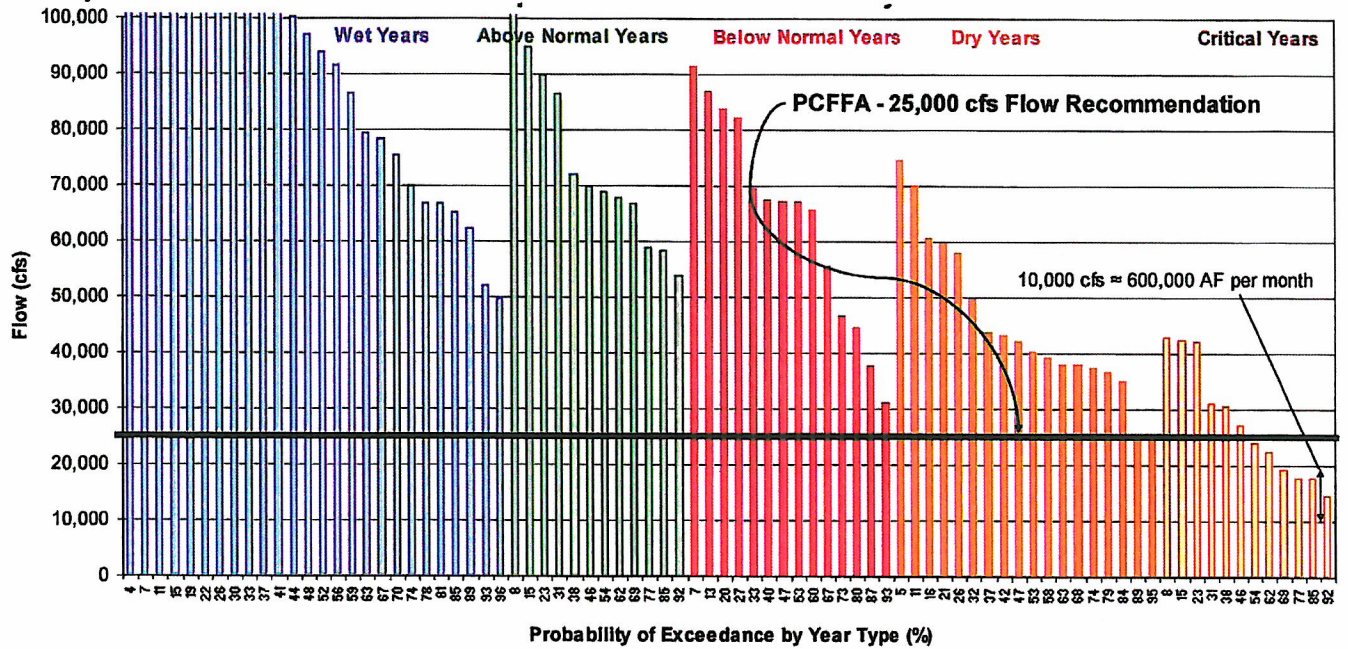
Unimpaired Sacramento River flow compared to PCFFA flow recommendation
For April



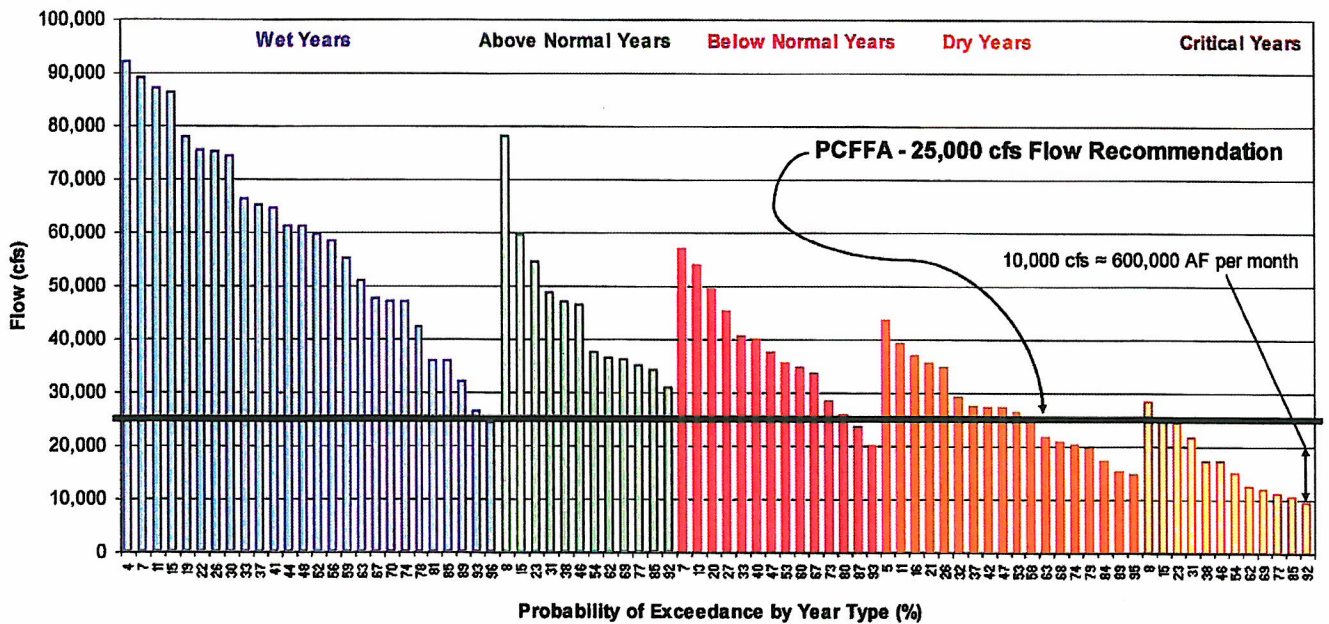
Unimpaired Delta outflow compared to PCFFA flow recommendation
For April



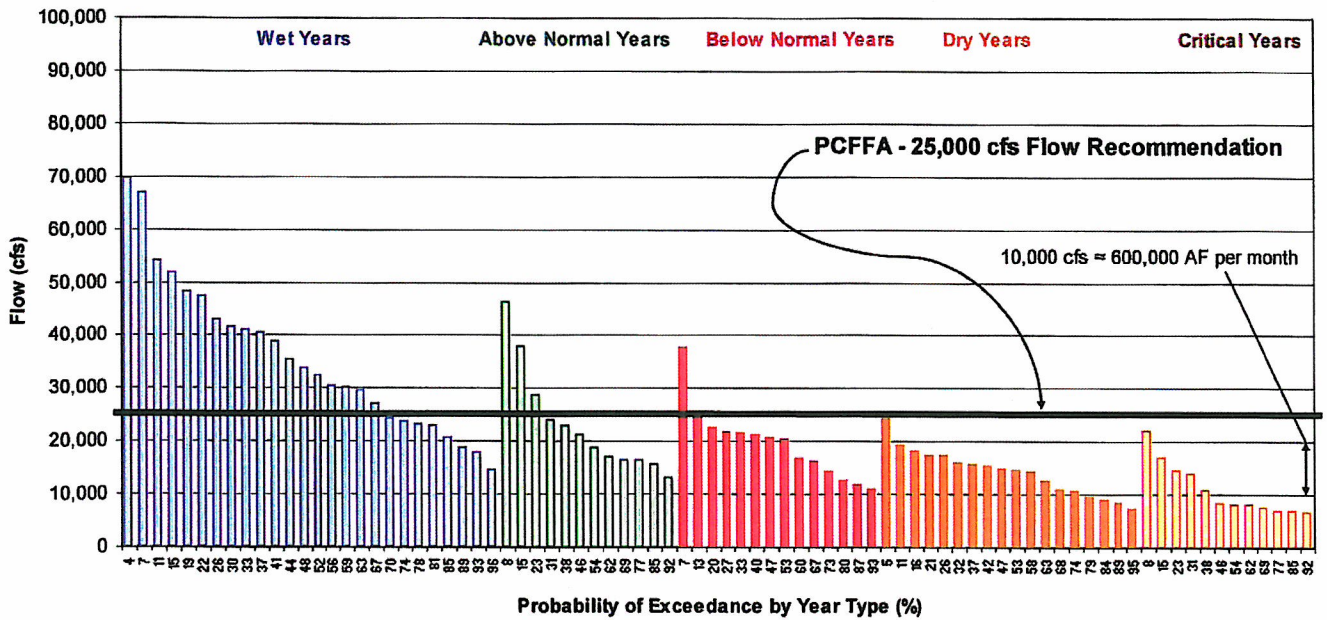
Unimpaired Sacramento River flow compared to PCFFA flow recommendation For May



Unimpaired Delta outflow compared to PCFFA flow recommendation For May



Unimpaired Sacramento River flow compared to PCFFA flow recommendation
For June



Unimpaired Delta outflow compared to PCFFA flow recommendation
For June

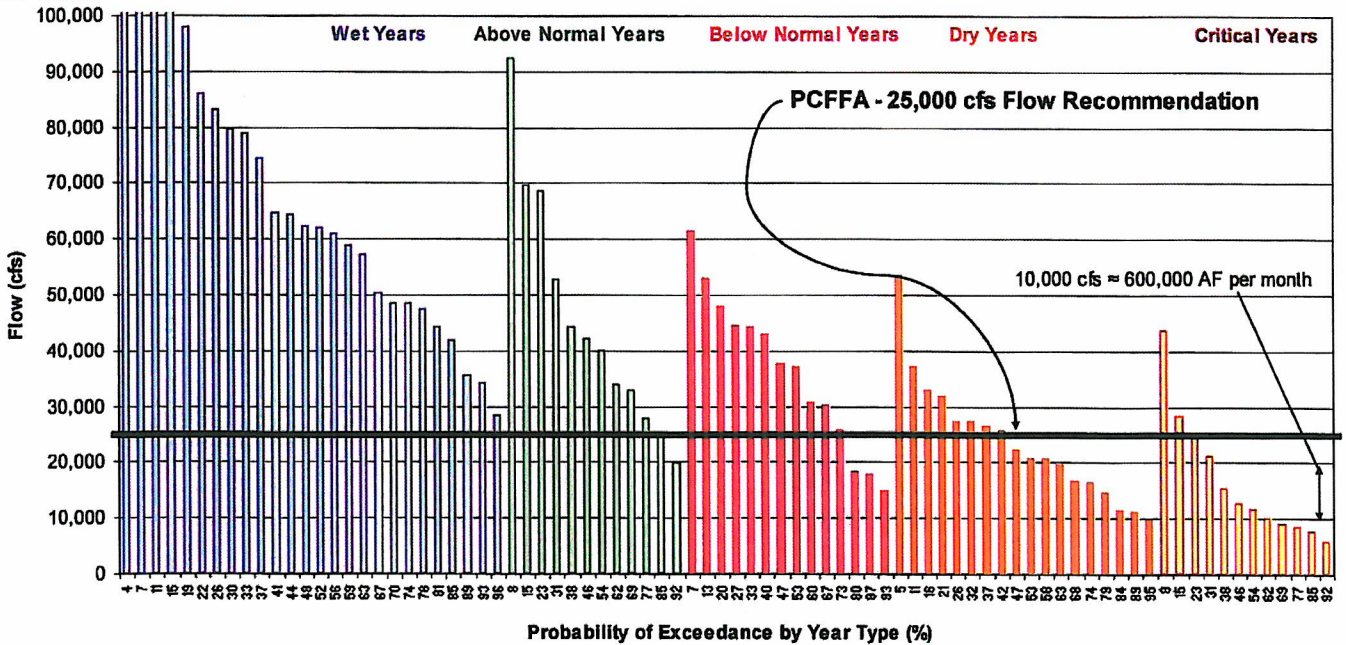
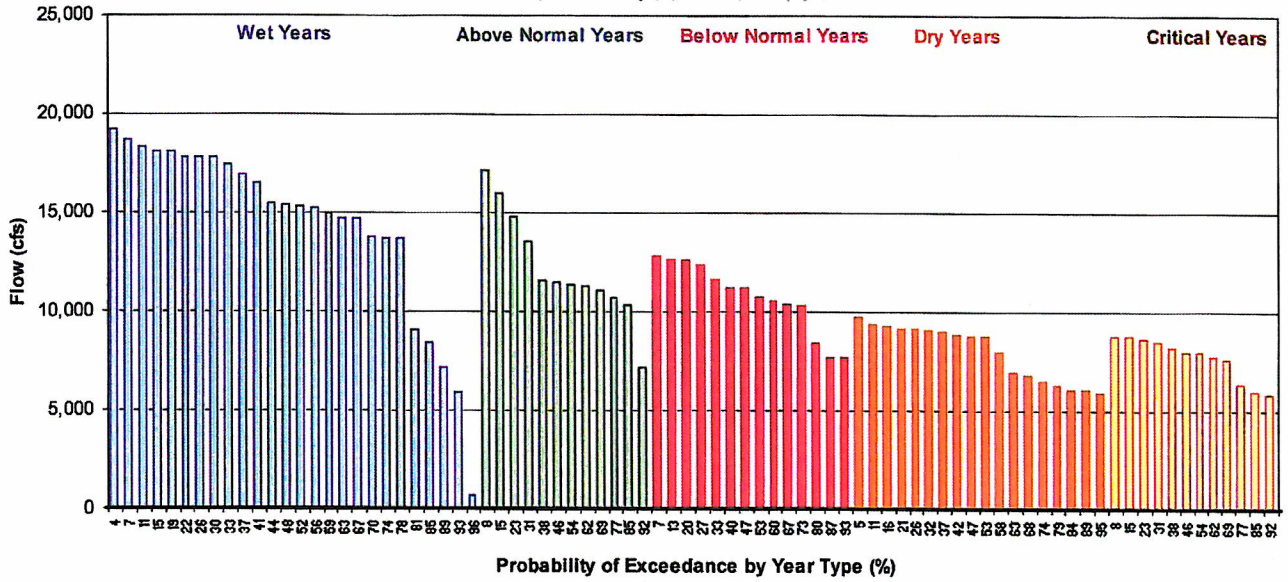


EXHIBIT SVWU-63 Bay Institute X2 Recommendation

(Delta outflow needed to meet X2) minus (unimpaired Delta outflow)
For September



(Delta outflow needed to meet X2) minus (unimpaired Delta outflow)
 For November

