



United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

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Memorandum

To: Regional Director, U.S. Fish and Wildlife Service
Pacific Southwest Region

From: **FOR** Donald R. Glaser *Donald R. Glaser*
Regional Director

Subject: Endangered Species Act Consultation on the Coordinated Operation of the Central Valley Project and State Water Project and Implementation of Reasonable and Prudent Alternative Component 3

On December 15, 2008, the Fish and Wildlife Service (Service) transmitted the Biological Opinion (BiOp) on the effects of the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) on delta smelt and its designated critical habitat. The Service included a Reasonable and Prudent Alternative (RPA) in the BiOp which included an action in the fall of certain years (Component 3 of the RPA), also referred to as the Fall X2 action. The purpose of this memorandum is to describe proposed coordinated CVP and SWP operations consistent with Component 3 of the RPA for the months of September, October and November 2011. As you know, average X2 position (an index for the location of the low salinity zone) is largely determined by average Delta outflow. Delta outflow depends on both Delta inflow and exports. The Bureau of Reclamation has made assumptions about the Department of Water Resources (DWR) projected operations in Reclamation's current forecast based on a 50 percent exceedance hydrology. Reclamation also assumes that both combined CVP and SWP reservoir releases and combined export reductions will be used to implement Component 3. Those combinations of actions are described below.

Reclamation intends that the CVP and SWP will operate in September to maintain monthly average X2 no greater than 74 kilometers (km). In order to meet that average through the month of September, Reclamation anticipates the CVP and SWP will begin to modify combined operations for the second half of August. Based on a 50 percent exceedance hydrology, in the second half of August, Reclamation anticipates average daily combined inflows to the Delta of 25,000 cubic feet per second (cfs), combined exports of about 11,400 cfs and net Delta outflow of 11,800 cfs that will move X2 near the 74 km target. Because of the high level of exports and reservoir releases for multiple purposes during this period, Reclamation has forecasted no water cost to either the CVP or SWP during the month of August.

Reclamation's current forecast projects an average outflow of 11,400 cfs to maintain X2 at 74 km. Reclamation is forecasting a continued average inflow to the Delta of about 25,000 cfs based on the 50 percent exceedance hydrology. Under these conditions, combined exports will be maintained near 11,000 cfs. Because of the high level of exports and reservoir releases for multiple purposes during this period, Reclamation has forecasted no water cost to either the CVP or SWP during the month of September.

Reclamation intends that the CVP and SWP will also operate in October to maintain a monthly average X2 position no greater than 74 km. In October, Reclamation is forecasting an average daily inflow of 18,200 cfs into the Delta. Combined average exports are expected to be reduced to approximately 6,300 cfs. The main reason for this reduction in total exports as compared to September is that the SWP has indicated that they will likely reduce reservoir releases on the Feather River from 7,000 cfs to 1,750 cfs in mid-October to avoid triggering a requirement to maintain those higher releases through the winter to prevent the dewatering of salmon redds in the Feather River. With the reduced reservoir releases, combined exports will be correspondingly reduced to maintain average X2 at 74 km. Reclamation believes Delta outflow required to maintain X2 at 74 km in October could be less than 11,400 cfs and that the initial calculation of outflow required is only an estimate.¹ Assuming Delta outflow of 11,400 cfs is required to maintain average X2 at 74 km, and that DWR will reduce its Feather River releases to 1,750 cfs, then Reclamation estimates reduced exports of up to 300,000 acre-feet (AF) by the SWP. If Delta outflow of 10,000 cfs proves to be sufficient to maintain average X2 at 74 km in October, the SWP would incur an estimated reduction of exports of about 210,000 AF for October. In addition, if DWR's river releases at Oroville Dam were to be set above 1,750 cfs, the SWP could increase exports while maintaining X2 at 74 km. Based on the 50 percent exceedance forecast and an outflow requirement of between 11,400 and 10,000 cfs, Reclamation estimates little or no water supply impact to the CVP for October.

Component 3 of the RPA describes requirements for November outflow :

“ . . . During any November when the preceding water year was wet or above normal as defined by the Sacramento Basin 40-30-30 index, all inflow into CVP/SWP reservoirs in the Sacramento Basin shall be added to reservoir releases in November to provide an additional increment of outflow from the Delta to augment Delta outflow up to the fall X2 of 74 km for Wet WYs or 81 km for Above Normal WYs, respectively. In the event there is an increase in storage during any November this action applies, the increase in reservoir storage shall be released in December to augment the December outflow requirements in SWRCB D-1641 . . . ”
Service BiOp at 282-283

¹ While the equation found in Kimmerer, W. & Monismith, S. 1993 “An estimate of the historical position of 2ppt salinity in the San Francisco Bay estuary” (*SFEP 1993 Managing Freshwater Discharge to the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary: The Scientific Basis for an Estuarine Standard*) generally suggests that an outflow of 11,400 cfs will result in a steady-state X2 position of 74 km, a review of information based on DSM2 modeling results indicates that somewhat less flow may be required to maintain an average X2 position at 74 km for moderate periods of time.

Because past experience has shown that an average outflow of 11,400 cfs has consistently resulted in an X2 position of 74 km, the 11,400 cfs value was used for the attached forecast.

This RPA component describes an outflow requirement for November but not a specific X2 requirement. There are several ways that this outflow requirement can be implemented. Reclamation believes the proposed approach satisfies the intent of the passage quoted above, and is implementable. The goal of the proposed operations is to allow November precipitation that increases Central Valley runoff to augment Delta outflow. A detailed description of the proposed operations is provided below.

Specific November Operations:

- A. Any accumulated CVP and SWP Sacramento Basin reservoir storage attributable to November runoff will be added to reservoir releases. To the extent possible, Reservoir releases will be adjusted as necessary to achieve no net increase of storage in the month of November. The total amount of runoff passed-through for release may be apportioned among the Sacramento River Basin CVP and SWP reservoirs in any combination, irrespective of the source of the reservoir inflow, as long as the combined total of releases equals the volume of November inflow into these reservoirs.
- B. For purposes of calculating the average November outflow required under these proposed operations, the average required outflow will be set at one half the computed Delta inflow in November, but will be no less than an average of 5,700 cfs². Delta inflow will be calculated in a manner consistent with the technique used in the State Water Resources Control Board's water right decision D-1641. At the beginning of the month of November, outflow will be based on one half the then current 14-day running average Delta inflow and will be adjusted through the month to achieve an average monthly outflow that is one half the computed average inflow for November.
- C. In the event there is a net increase in Sacramento Basin CVP and SWP storage during November, the increase in reservoir storage shall be released in December in a manner consistent with the RPA as quoted above. If this situation should arise, Reclamation will notify the Service to discuss project operations into the month.
- D. Nothing in this proposal should be construed to override potential flood operations at CVP and SWP reservoirs and facilities that operators judge to be required for health, safety, and protection of property. Reclamation will notify the Service if operations deviate from those outlined in this proposal due to any of these reasons.

² The minimum value of 5,700 cfs is the average November Delta outflow reported in DAYFLOW taken over the years 2002-2009. The underlying data (7331, 6626, 6708, 5249, 5182, 4290, 5534, and 4665 cfs for 2002-2009, respectively) represent November Delta outflow during the Pelagic Organism Decline (POD) years under the premise that the POD began after 2001. Use of the POD-era values reflects Reclamation's intent that the action should improve on POD-era outflow.

Properly implemented, these operations are intended to result in November, Delta outflow will vary in accordance with runoff from the Sacramento and San Joaquin River Basins. In the absence of significant November precipitation, this proposal would impose no additional reservoir releases at the CVP and SWP reservoirs beyond those needed to pass through projected November reservoir inflows, not requiring pumping reductions beyond those necessary to maintain a minimum Delta outflow of at least 5700 cfs, or other modifications to coordinated CVP and SWP operations beyond what is needed to meet any other relevant obligations, both upstream and in the Delta. With increasing November runoff, the proposed operations for this year would result in Delta outflow to increase until the 74 km X2 value required for September and October under the RPA is achieved. Runoff exceeding what is needed to achieve 74 km X2 could be retained in upstream reservoirs or exported consistent with D-1641 at the discretion of the CVP and SWP, as it would not be needed to achieve the outflow objectives of the action.

Reclamation intends that the CVP and SWP will operate in November to maintain a monthly average Delta outflow consistent with the methods described above. Applying these methods in November, Reclamation is forecasting that average Delta outflow for the month would be 8,500 cfs based on the 50 percent exceedance hydrology forecast. In a 90 percent exceedance hydrology forecast, Delta outflow is estimated to be around 7,000 cfs for the month of November. Reclamation would anticipate that a Delta outflow sufficient to maintain X2 at 74 km (11,400 cfs) would occur at about a 40 percent exceedance hydrology this fall.

The proposed Delta outflow is higher than the combined Sacramento Valley reservoir inflows minus losses anticipated for such flows to reach the Delta. These estimates reflect average flow losses that are seen in the Sacramento River system and are consistent with the losses that are generally assumed for water transfers or other water actions in the basin.

Based on a 50 percent exceedance forecast, Reclamation estimates a reduction in SWP pumping associated with a 8,500 cfs outflow requirement to be about 130,000 AF and little or no water supply impact to the CVP in November. Reclamation estimates that there would be little or no water costs associated with the action in November if conditions were wet enough to increase Delta inflow to a point where the prescribed outflow is sufficient to maintain an X2 position of 74 km.

Reclamation intends to ensure that any interaction between implementation of Component 3 and reservoir storage is analyzed and appropriately addressed by providing ongoing operations and forecast updates to the National Marine Fisheries Service (NMFS) and Service to facilitate review in accordance with NMFS' operations RPA Action 1.2.2.A. Criterion #3 specifies that NMFS will continue to participate in the Habitat Study Group, which we interpret to include other informal discussions among NMFS, Reclamation, and Service. In addition, if

... "a fall flow action is recommended that draws down fall storage significantly from historical patterns, then NMFS and USFWS will confer and recommend to Reclamation an optimal storage and fall flow pattern to address multiple species needs . . ." (NMFS BiOp at 593)

Additionally, as you know, Reclamation has been working on an Adaptive Management Plan (Plan) for implementation of Component 3. Reclamation intends to use this Plan to study factors related to ecosystem effects of outflow variability and delta smelt growth, fecundity, health, and survival. The information developed from implementation of this Plan may, as findings warrant, lead to changes in fall habitat actions. Reclamation submitted a draft version of the Plan to an independent science panel for review and received several helpful comments on the Draft Plan. Reclamation is still in the process of incorporating the comments into the Plan, which it intends to submit to the Service when it is ready. Reclamation anticipates that this revised Plan will be submitted to the Service by about August 5, 2011. In accordance with the reviewers' advice, the revised Plan is strongly focused on monitoring and studies intended to be implemented in fall 2011. The Plan also extends the conceptual model to the ecosystem level and more explicitly links physical drivers to delta smelt habitat to biological mechanisms expected to benefit delta smelt. The Plan will continue to be viewed as a "living document" that will evolve as it is implemented by the agencies and adaptive management proceeds into the future.

Reclamation appreciates the work of Service staff to implement the fall X2 action in this year and looks forward to continuing the good working relationship in the future.

Attachments:

CVP July, 2011 Forecast

Storages

Federal End of the Month Storage/Elevation (TAF/Feet)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Trinity	2419	2311	2197	2077	1996	1913	1864	1861	1976	2100	2216	2160	1981
Elev.	2362	2354	2346	2341	2335	2331	2331	2339	2348	2355	2352	2340	
Whiskeytown	239	238	238	238	206	206	206	206	206	238	238	238	238
Elev.	1209	1209	1209	1199	1199	1199	1199	1199	1199	1209	1209	1209	1209
Shasta	4402	3979	3619	3423	3284	3254	3261	3507	3792	4104	4306	4258	4037
Elev.	1047	1033	1026	1020	1019	1019	1029	1040	1051	1059	1057	1049	
Folsom	928	796	666	621	496	466	456	501	542	637	784	938	912
Elev.	449	436	431	416	412	411	417	422	433	448	462	460	
New Melones	2300	2250	2072	1918	1885	1896	1913	1923	1966	1955	1952	1959	1869
Elev.	1074	1059	1045	1042	1043	1044	1045	1049	1048	1048	1049	1040	
San Luis	899	532	311	362	449	603	767	899	966	966	757	729	748
Elev.	473	431	442	429	443	466	478	492	514	481	463	465	
Total	10105	9102	8638	8316	8337	8467	8896	9447	9968	10252	10282	9785	

State End of the Month Reservoir Storage (TAF)

Oroville	3515	3201	2735	2333	2232	2192	2232	2399	2750	3074	3353	3392	3207
Elev.	878	845	813	804	800	804	818	846	869	888	891	879	
San Luis	926	694	481	528	320	299	367	368	452	711	538	377	381
Total San Luis (TAF)	1825	1226	792	890	768	901	1134	1267	1418	1677	1295	1106	1129

Monthly River Releases (TAF/cfs)

Trinity	TAF	68	28	27	23	18	18	18	17	18	59	260	178
	cfs	1,102	450	450	373	300	300	300	300	300	1,000	4,225	3,000
Clear Creek	TAF	5	5	9	12	12	12	12	11	12	12	12	12
	cfs	85	85	150	200	200	200	200	200	200	200	200	200
Sacramento	TAF	768	676	506	461	416	461	430	472	523	416	523	595
	cfs	12500	11000	8500	7500	7000	7500	7000	8500	8500	7000	8500	10000
American	TAF	277	246	149	197	121	123	108	222	215	280	307	238
	cfs	4500	4000	2500	3207	2030	2000	1750	4000	3500	4700	5000	4000
Stanislaus	TAF	129	123	104	52	18	18	37	33	92	83	123	119
	cfs	2100	2000	1750	842	300	300	600	600	1500	1400	2001	2000
Feather	TAF	369	492	476	123	104	108	108	97	123	178	184	238
	cfs	6000	8000	8000	2000	1750	1750	1750	1750	2000	3000	3000	4000

Trinity Diversions (TAF)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Carr PP	94	96	99	68	95	87	68	-3	5	29	8	96
Spring Crk. PP	90	90	90	90	90	90	90	30	30	9	10	90

Delta Summary (TAF)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Tracy	260	263	253	259	250	240	210	196	185	48	98	250
USBR Banks	0	0	0	35	35	35	0	0	0	0	0	0
Contra Costa	11.1	12.7	14	16.8	18.4	18.3	14	14	12.7	12.7	12.7	9.8
Total USBR	271	276	267	311	303	293	224	210	198	60	111	260
State Export	405	410	383	79	220	240	210	230	330	42	98	390
Total Export	676	686	650	390	523	533	434	440	528	102	209	650
COA Balance	0	0	0	0	32	32	32	32	32	32	32	32

Old/Middle R. std.												
Old/Middle R. calc.	-6,986	-7,869	-7,754	-4,435	-6,587	-6,491	-5,039	-4,939	-5,017	-115	2,525	-2,700

Computed DOI	12200	11843	12237	11403	8506	13567	20741	28078	33023	23433	32648	22811
Excess Outflow	4197	2277	840	0	0	9061	14738	16677	21619	12036	6312	6068
% Export/Inflow	40%	43%	43%	34%	50%	40%	25%	21%	20%	6%	8%	29%
% Export/Inflow std.	65%	65%	65%	65%	65%	65%	65%	35%	35%	35%	35%	35%

Hydrology

Water Year Inflow (TAF)	Clair Engle	1713	Shasta	6,738	Folsom	4,680	New Melones	2064
Year to Date + Forecasted % of mean	142%	122%	172%	195%				