



United States Department of the Interior

BUREAU OF RECLAMATION
Central Valley Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, California 95821

IN REPLY
REFER TO:

CVO-400
WTR 1.10

FEB 20 2014



Ms. Maria Rea
Assistant Regional Administrator
California Central Valley Area Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Subject: Transmittal of February 2014 Central Valley Project (CVP) Reservoir Operations
Forecasts per 2009 National Marine Fisheries Service (NMFS) Biological Opinion

Dear Ms. Rea:

The 2009 NMFS Biological Opinion Reasonable and Prudent Alternative (RPA) Action I.2.3 requires Reclamation to submit a series of forecasts of CVP operations and corresponding Sacramento River temperature modeling runs to NMFS for review and concurrence. The RPA also includes a number of actions for Reclamation to implement to improve the Sacramento River water temperatures. Due to the unprecedented drought conditions being experienced in California, the forecasts of operations, temperature modeling, and actions are not completely developed at this time. However, for your information, Reclamation has developed preliminary operational analyses based on a range of operations under the 90% and the 50% exceedence hydrology and the corresponding preliminary Sacramento River temperature modeling runs.

Since the September carryover storage under the 90% exceedence hydrology is projected to be well under 1.9 million acre-feet (maf) and the Clear Creek temperature compliance point does not appear to be achievable, RPA Action I.2.3.c requires the development of a contingency plan. Reclamation is developing the interim contingency plan with the cooperation of NMFS, the Department of Water Resources (DWR), the U.S. Fish and Wildlife Service (FWS), the California Department of Fish and Wildlife (DFW), and the State Water Resources Control Board (SWRCB) to submit to NMFS by March 1. A final contingency plan is scheduled to be completed by April 1. This final contingency plan will seek to balance fishery needs and the water resource needs in this water short year and will address the actions required under RPA I.2.3.c. The contingency plan will reference the Temporary Urgency Change Petition submitted by Reclamation and DWR to the SWRCB on January 29, 2014, and the SWRCB Order approving the petition dated January 31, 2014, as well as the SWRCB modifications dated February 7, 2014.

Reclamation was not able to finalize a 90% exceedence operational analysis due to the challenges presented by the extreme hydrology. Under the 90% hydrology, it may not be possible to meet all operational objectives upstream and in the Delta. The reservoir storages may fall to near minimum power pools with elevated river temperatures, or the Net Delta Outflow Index may fall short of the water quality control plan objectives. Until a reasonable plan can be determined, we are showing the reservoir storages and releases as a range of potential values. The operations will be reviewed and refined further during the development of the final contingency plan.

Preliminary Sacramento River temperature model results for a 90% exceedence hydrology scenario with higher reservoir storages and a 50% exceedence hydrology are attached. We have less confidence in these temperature modeling results than normal due to the extremely dry hydrology and the near empty reservoir storage conditions. But the results for the 90% exceedence suggest that a temperature target location at Clear Creek is only possible through July. By August, the Temperature Control Device (TCD) intake level would be through the side gates. Shasta Dam release temperature would be expected to exceed 56° F by mid-August, nearing 62° F by mid-September. Temperatures will vary depending on the actual 90% exceedence scenario selected.

The 50% exceedence hydrology suggests that a temperature target location at Clear Creek is possible through mid-September. By September, the TCD intake would be through the side gates. Shasta Dam release temperature would be expected to exceed 56° F by early October.

Both the 90% exceedence hydrology and the 50% exceedence hydrology would be classified as a Critical year type under the Sacramento Valley Index. The forecasted inflow to Shasta Lake is 1.98 maf under the 90% exceedence forecast and 2.57 maf under the 50% exceedence forecast. Both exceedence inflows trigger the shortage criteria to water rights settlement contractors, water rights exchange contractors, and wildlife refuges.

Under these conditions, Reclamation proposes to announce the following water supply allocations to our agricultural contractors and refuges under the 90% hydrology:

- 0 % to North of Delta agricultural water service contractors
- 40% to 75% to North of Delta refuges
- 40% to 75% to Water Rights Settlement Contractors
- 40% to 75% to Water Rights Exchange Contractors
- 0% to South of Delta agricultural contractors
- 40% to 70% to South of Delta refuges

Reclamation informed the water rights settlement contractors, water rights exchange contractors, and refuges that they will initially receive a 40% water supply because of the limited water supply. Reclamation has contractual obligations to deliver 75% water supply under a Critical Year classification to these contractors and will work towards that percent if the hydrology and conditions improve.

With the understanding that Reclamation, in coordination with NMFS, FWS, DWR, DFW, and SWRCB will continue to develop a final contingency plan and submit that plan to NMFS by April 1, and will continue to refine the operations forecasts, Reclamation requests your concurrence regarding compliance with the NMFS Biological Opinion related to the water supply allocation.

If you have any questions, please contact Ms. Elizabeth Kiteck at 916-979-2684.

Sincerely,



Paul Fujitani
Acting Operations Manager

Enclosures

cc: Sue Fry
Bay-Delta Office
Bureau of Reclamation
801 I Street, Suite 140
Sacramento, CA 95814

February Operations Analysis
50% Exceedence Hydrology

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Reservoir Storage (TAF)								
Trinity	1187	1257	1302	1178	993	818	636	457
Shasta	1795	1942	1993	1995	1770	1462	1221	1155
Foisom	290	405	419	454	367	326	285	281
New Melor	1055	1054	994	891	774	656	539	452
Reservoir Release (cfs)								
Lewistion	300	300	600	1498	782	450	450	450
Keswick	3500	3250	5000	6250	9250	9923	8723	6000
Nimbus	500	500	1630	686	2149	1232	1250	500
Goodwin	214	245	480	410	536	364	368	240
Exports (TAF)								
Jones PP	125	100	45	46	45	70	115	235

February Operations Analysis
 90% Exceedence Hydrology

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Reservoir Storage (TAF)								
Trinity	1148	1150	1111	963	795	639	484	334
Shasta	1678	1703	1566 to 1625	1326 to 1462	948 to 1244	442 to 928	194 to 707	150 to 690
Foisom	290	310	312 to 315	316 to 321	273 to 302	210 to 273	174 to 254	127 to 235
New Melones	1051	1026	962	876	782	875	569	491
Reservoir Release (cfs)								
Lewistion	300	300	600	1498	782	450	450	450
Keswick	3250	3250	5900 to 4900	7850 to 6600	10600 to 7900	12000 to 8889	7595 to 7095	4501 to 4000
Nimbus	500	500	500	534 to 500	908 to 500	1054 to 500	798 to 500	973 to 500
Goodwin	214	268	480	410	561	396	352	240
Exports (TAF)								
Jones PP	55	45	45	46	45	45	63 to 45	153 to 45

Upper Sacramento River – February 2014 Preliminary Temperature Analysis

Summary of Temperature Target Results by Month

Initial Target Location	JUN	JUL	AUG	SEP	OCT
90%-Exceedance Outlook (Figure 1)					
Sac. R. above Clear Creek (CCR)	CCR	CCR	Keswick ~ 56°F to 62°F		
50%-Exceedance Outlook (Figure 2)					
Sac. R. above Clear Creek (CCR)	CCR	CCR	CCR	Keswick ~ 56°F to 57°F	

Temperature Model Inputs, Assumptions, Limitations and Uncertainty:

1. Operation is based on the February 2014 Operation Outlooks (monthly flows, reservoir release, and end-of-month reservoir storage) for the 90% and 50% exceedances.
2. The profiles used for Shasta, Trinity and Whiskeytown were taken on February 5, February 17 (2010), and February 11, respectively.
3. Guidance on forecasted flows from the creeks (e.g., Cow, Cottonwood, Battle, etc.) between Keswick Dam and Bend Bridge is not available beyond 5 days. Model input side flows (Cottonwood Cr & Bend Bridge local flow w/o Cottonwood Cr) were selected from the historical record, and are consistent with the forecast exceedance frequency. During spring, the relatively warm creek flows can be a significant percentage of the flows at Bend Bridge.
4. Although mean daily flows and releases are temperature model inputs, they are based on the mean monthly values from the operation outlooks. Mean daily flow patterns are user defined.
5. Cottonwood Creek flows, Keswick to Bend Bridge local flows, and diversions are mean daily synthesized flows based on the available historical record for a 1922-2002 study period.
6. Meteorological inputs were derived from a database of 86 years of meteorological data (1920-2005). The meteorological inputs in the model represent "Average" meteorological conditions.
7. Meteorology, as well as flow volume and pattern, significantly influences reservoir inflow temperatures and downstream tributary temperatures; and consequently, the development of the cold-water pool during winter and early spring.

Temperature Analysis Results:

Note that for all exceedances, Lake Shasta storage is too low to utilize the upper gates of the TCD. This TCD limitation, along with the relatively small cold-water pool volume, significantly impacts temperature management.

90%-Exceedance:

A temperature target location at Clear Creek is possible through July (Figure 1). By August, the TCD intake level will be through the side gates. Shasta Dam release temperature is expected to exceed 56°F by mid-August, nearing 62°F by mid-September.

50%-Exceedance:

A temperature target location at Clear Creek is possible through mid-September (Figure 2). By September, the TCD intake will be through the side gates. Shasta Dam release temperature is expected to exceed 56°F by early October.

Sacramento River Modeled Temperature 2014 February 90%-Exceedance Outlook

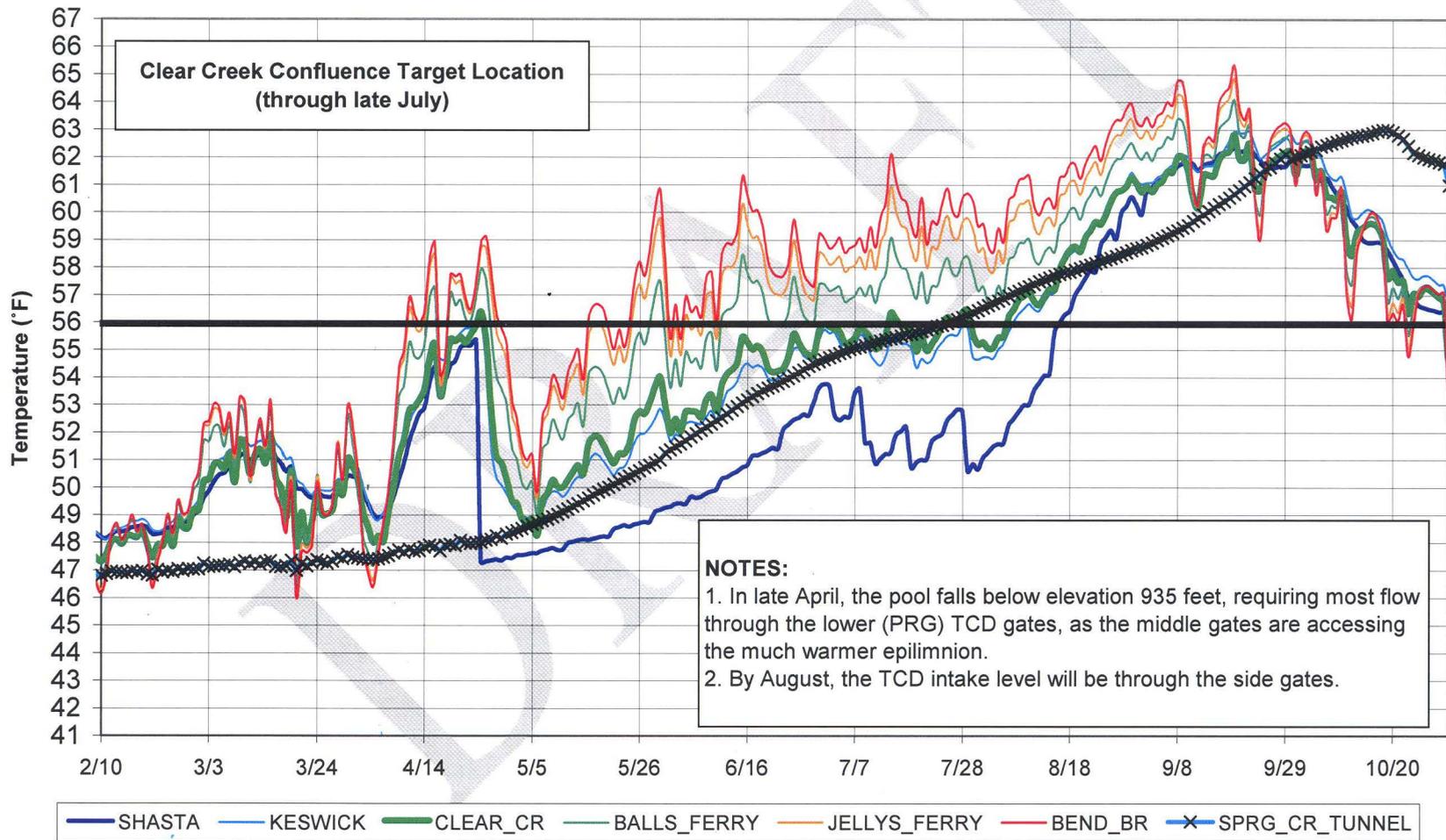


Figure 1

Sacramento River Modeled Temperature 2014 February 50%-Exceedance Outlook

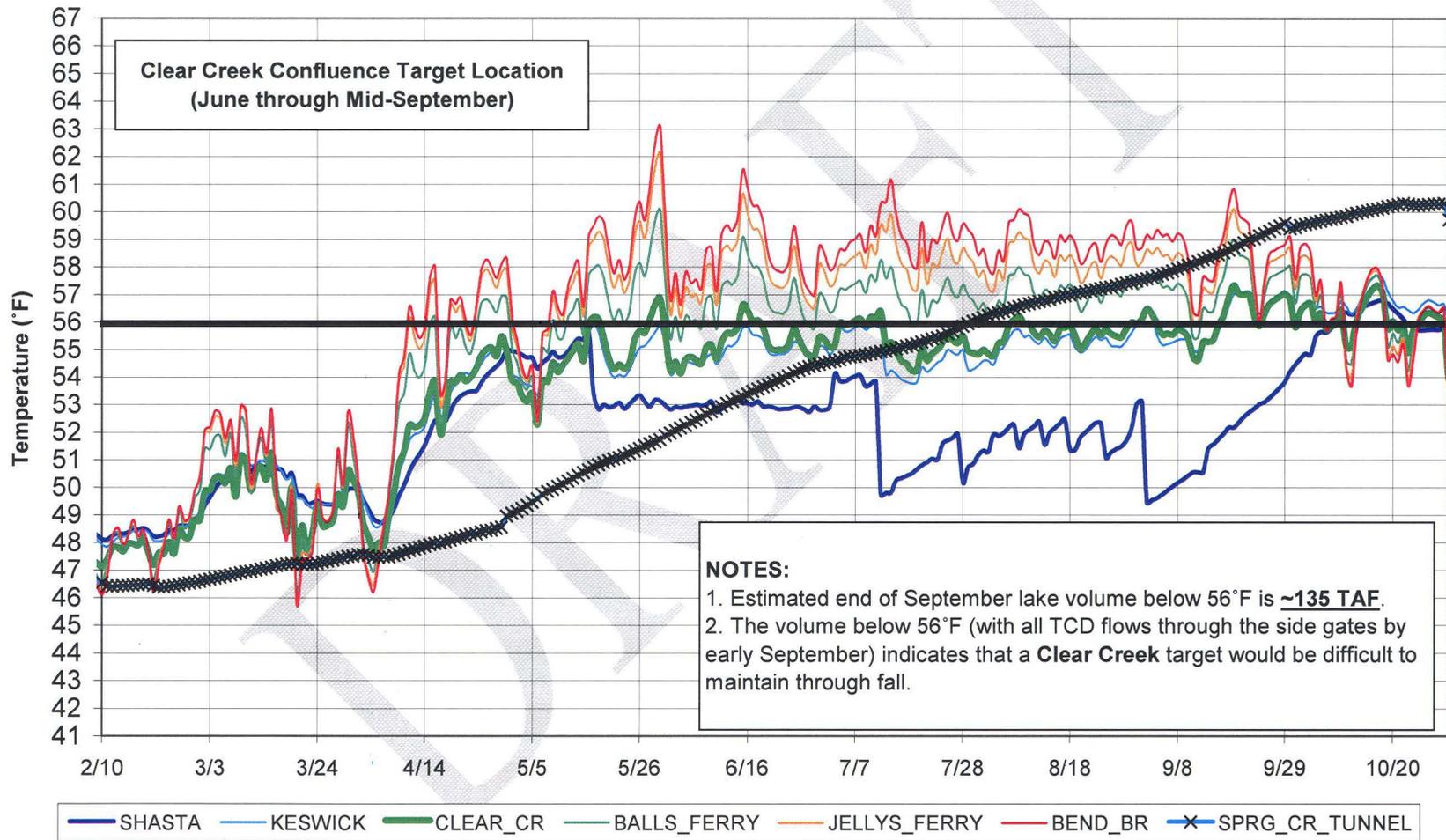


Figure 2

Model Performance and Fall Temperature Index:

1. Based on past analyses, the temperature model does not perform well from late September through fall. One factor is that the modeled release temperatures are cooler than has historically been achieved when all release is through the side gates (lowest gates), especially when there's a large temperature gradient between the pressure relief gates (PRG) and the side gates.
2. Based on historical records, the end-of-September Lake Shasta volume below 56°F is a reasonable indicator of fall water temperature in the river reach to Balls Ferry.
3. For river temperatures not to exceed 56 °F downstream to Balls Ferry, the end-of-September lake volume less than 56°F should be greater than about 650 TAF, see figure below:

**Sacramento River - Lake Shasta
Early Fall Water Temperature at Balls Ferry**

