



# 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-100  
WTR-2.00

**MAY 23 2017**



VIA ELECTRONIC MAIL AND U.S. MAIL

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 2017 Final Sacramento River Temperature Management Plan per Reasonable and Prudent Alternative (RPA) I.2.4 of the National Marine Fisheries Service 2009 Coordinated Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) Biological Opinion (NMFS 2009 BiOp)

Dear Ms. Rea:

This letter transmits the Sacramento River Temperature Management Plan (SRTMP) for Water Year 2017. The Bureau of Reclamation (Reclamation) is requesting concurrence from the National Marine Fisheries Service (NMFS) on the SRTMP as required by NMFS 2009 BiOp RPA Action I.2.4.

NMFS 2009 BiOp RPA Action I.2.4 requires Reclamation to submit a series of forecasts of CVP operations and corresponding Sacramento River temperature modeling runs to NMFS for review and concurrence. In accordance with this requirement, Reclamation has provided several sets of forecasts and temperature model runs and worked with NMFS during early spring 2017 to develop a SRTMP to protect the cold water pool in Shasta Reservoir. As you are aware, appropriate management of the Shasta Reservoir cold water pool is important so that suitable spawning and egg/alevin incubation can be maintained in the Sacramento River during the summer and fall season for federally-listed endangered Sacramento River winter-run Chinook salmon and threatened Central Valley spring-run Chinook salmon. This is especially critical given poor conditions for winter-run Chinook salmon during the recent drought years. On March 21, 2017, and clarified by Reclamation in a letter transmitted on April 12, 2017, NMFS concurred with Reclamation's proposed operation and initial water supply allocation based on associated release and temperature management projections, and committed to work with Reclamation to adjust the Keswick release schedules to minimize the potential for winter-run and fall-run Chinook salmon redd dewatering.

The SRTMP represents a balanced approach to management of the cold water pool in Shasta Reservoir during the summer and fall of 2017. Reclamation is recommending an approach that

DWR



focuses on maintaining a reasonable temperature target that will maximize protection of the species, while ensuring that the cold water will be able to be fully utilized through the season. This approach will help Reclamation meet other obligations and maintain commitments for operation of the CVP and SWP. The SRTMP has also been developed to limit impacts to other beneficial uses, such as Folsom Reservoir levels, American River temperature management for species protection, Delta water quality, and water supplies for contractors throughout the CVP and SWP. Reclamation has developed this plan utilizing our current understanding of anticipated conditions this summer and fall related to management and operations of other components of the Central Valley's rivers and facilities, including potential operations of Oroville Dam as well as summer and fall fisheries management in the Delta. The plan includes an operation to meet Fall X2 requirements from the Fish and Wildlife Service's 2008 Biological Opinion, assuming adequate contributions from releases at Oroville Dam. Should the expectations of these operations and conditions change, we will coordinate with you and other applicable agencies on the effects of those changes on the SRTMP.

As clarified in Reclamation's April 12, 2017, correspondence the SRTMP consists of a compliance point at Balls Ferry, using 56°F daily average temperature (DAT) metric from May 15 through October 31. The proposed temperature management operation also includes an evaluation study targeting 53°F DAT at the Sacramento River-Clear Creek (CCR) gaging station during the same time frame. This acts as a surrogate location and temperature for 55°F seven day average daily maximum at the most downstream winter-run redd. If redds are monitored farther downstream from the CCR gaging station, the agencies will further discuss any potential changes to the proposed operational study. The study is anticipated to run through winter-run emergence but, as previously noted in Reclamation's April 12, 2017, correspondence and associated discussions between the agencies, this topic may be reevaluated based on other considerations such as anticipated fall and winter releases, storage and cold water pool management, and fall-run redd dewatering.

Preliminary temperature operation modeling results were distributed at the April 27, 2017, Sacramento River Temperature Task Group meeting and again to NMFS on May 10, 2017. Reclamation solicited feedback from members on the proposed operation/simulation results and no comments were received as of the writing of this letter. Additional modeling results are attached based on the most recent runoff forecasts. Please find attached four graphs of the latest temperature modeling results that combine both the 50% and 90% exceedance hydrology forecasts for May with both the 10% and 50% exceedance 3-month meteorological forecasts.

Operational release performance was based on the two probabilistic hydrologic assumptions rather than fixed flowrates; actual release operations are expected to be within the specified ranges based on the hydrologic and operational considerations at that time. Results show end of September storage in Shasta Reservoir of about 3.3 million acre-feet. The suite of results indicated high likelihood of accomplishing temperature management and that partial side gate use of the Shasta Reservoir Temperature Control Device would begin between late August and early September.

As you know, RPA Action I.2.4 requires that Reclamation achieve DATs between May 15 and October 31 "[n]ot in excess of 56°F at compliance locations between Balls Ferry and Bend Bridge" from June through October of each year. It also requires Reclamation to manage Shasta Reservoir in a way that provides "cold water releases from Shasta Reservoir to provide suitable

habitat temperatures . . . in the Sacramento River between Keswick Dam and Bend Bridge, while retaining sufficient carryover storage to manage for next year's cohorts." Given the terms of RPA Action I.2.4 and the commitments above, Reclamation believes this proposed SRTMP is fully compliant with the NMFS 2009 BiOp and the guidance provided in your March 21, 2017, concurrence letter and Reclamation's clarification on April 12, 2017. We therefore request your concurrence on the SRTMP as required under RPA Action I.2.4.

Reclamation proposes to conduct monitoring and tracking of the performance of this SRTMP through the Sacramento River Temperature Task Group (SRTTG). The Shasta Water Interagency Management group that has been developed in recent years would only become involved if necessary to address issues that cannot be resolved through the SRTTG.

We look forward to working with you and your staff as we manage water resources and temperature this water year. Should you have questions or wish to discuss further, please feel free to contact me at 916-979-2199.

Sincerely,



Ronald Milligan  
Operations Manager

Enclosures -6

cc: Mr. Barry Thom  
Regional Administrator  
NOAA Fisheries West Coast Region  
1201 Northeast Lloyd Blvd., Suite 1100  
Portland, OR 97232

Mr. Tom Howard  
Executive Director  
State Water Resources Control Board  
1001 I Street  
Sacramento, CA 95814

Mr. Chuck Bonham  
Director  
California Department of Fish and Wildlife  
1416 Ninth Street  
Sacramento, CA 95814

Continued on next page.



cc: Continued from previous page.

Ms. Cindy Messer  
Chief Deputy Director  
California Department of Water Resources  
1416 Ninth Street  
Sacramento, CA 95814

Ms. Kaylee Allen  
Field Supervisor  
Bay Delta Fish and Wildlife Office  
U.S. Fish and Wildlife Service  
650 Capitol Mall, Suite 8-300  
Sacramento, CA 95814

Mr. William Croyle  
Acting Director  
California Department of Water Resources  
1416 Ninth Street  
Sacramento, CA 95814

Mr. John Leahigh  
Operations Control Office  
California Department of Water Resources  
3310 El Camino Avenue, Suite 300  
Sacramento, CA 95821

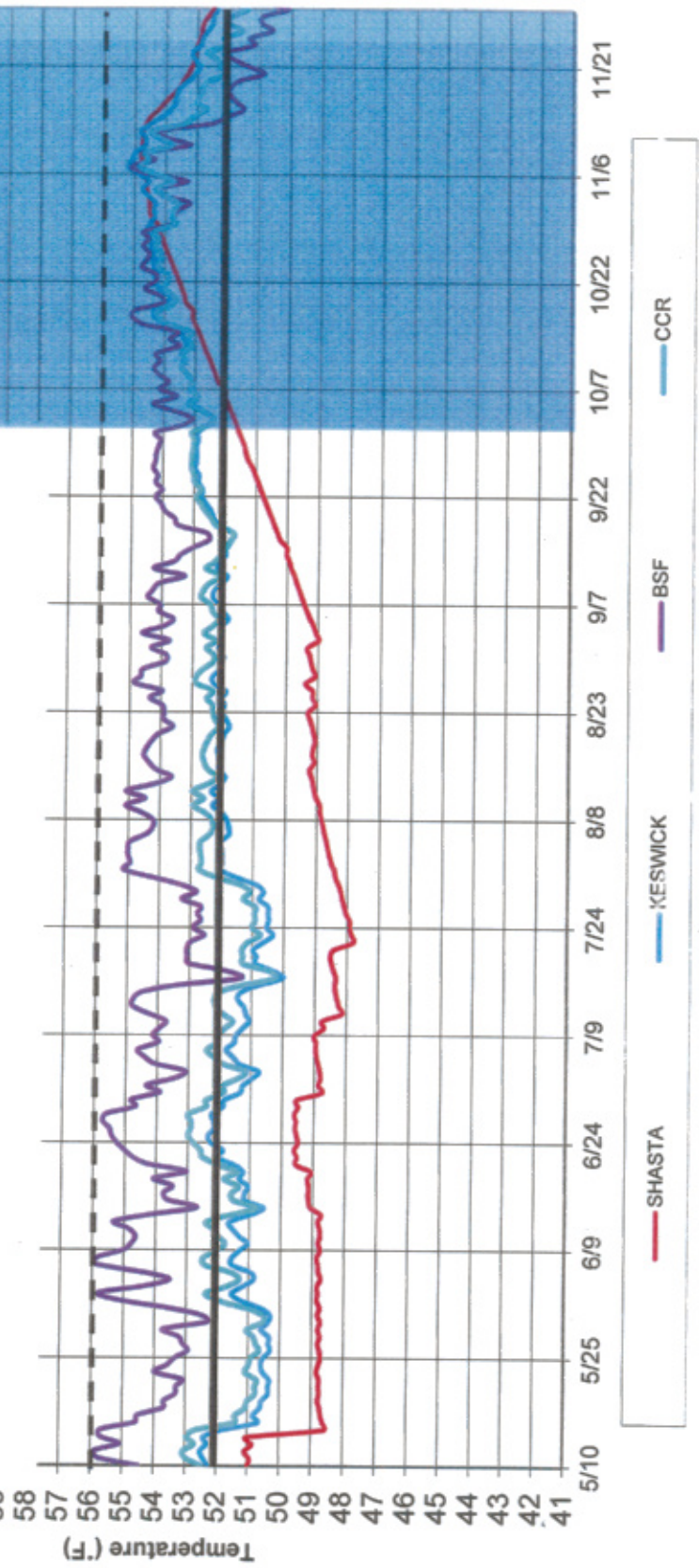
Mr. Paul Souza  
Regional Director  
Pacific Southwest Region  
U. S. Fish and Wildlife Service  
2800 Cottage Way  
Sacramento, CA 95825

Mr. Pablo Arroyave  
Acting Regional Director  
Mid-Pacific Region  
Bureau of Reclamation  
2800 Cottage Way  
Sacramento, CA 95825

Mr. David Mooney  
Acting Area Manager  
Bay-Delta Office  
Bureau of Reclamation  
801 I Street, Suite 140  
Sacramento, CA 95814  
(w/encl to each)

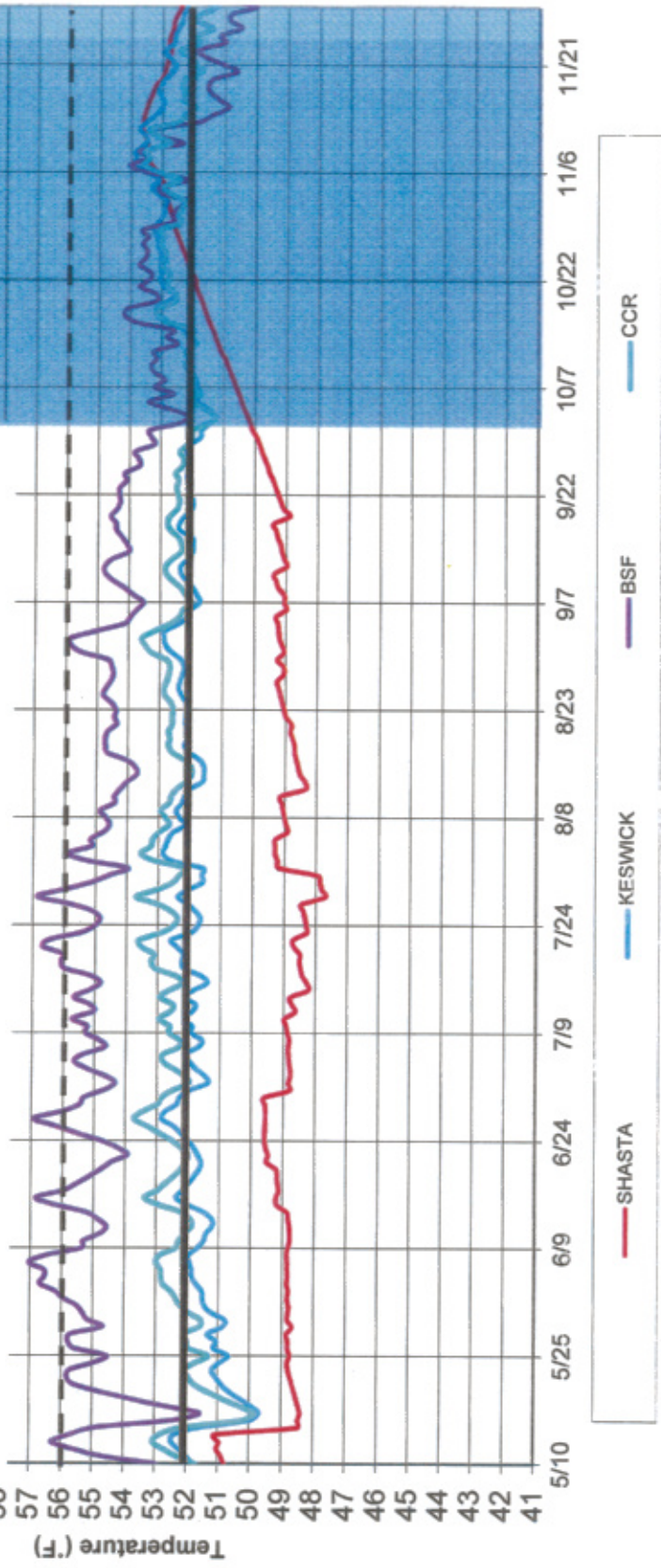
**Sacramento River Modeled Temperature  
 2017 May 50%-Exceedance Water Outlook - L3MTO 50% Meteorology  
 Target: Approximately 52 degree at Keswick**

67 **EOM Sept storage: 3.3 MAF**  
 66 Trinity profile date : 5/3/2017  
 65 Whiskeytown profile date: 5/2/2017  
 64 Shasta profile date: 5/10/2017  
 63 Side gate: Sep 3, Full Side Gates Not Used  
 62 Shaded area denotes period of model limitations  
 61 **End of September Cold-Water-Pool less than 56 ° F : 778 TAF**  
 60 **Temp Run date: May 18, 2017**  
 59  
 58



**Sacramento River Modeled Temperature  
 2017 May 90%-Exceedance Water Outlook - L3MTO 10% Meteorology  
 Target: Approximately 52 degree at Keswick**

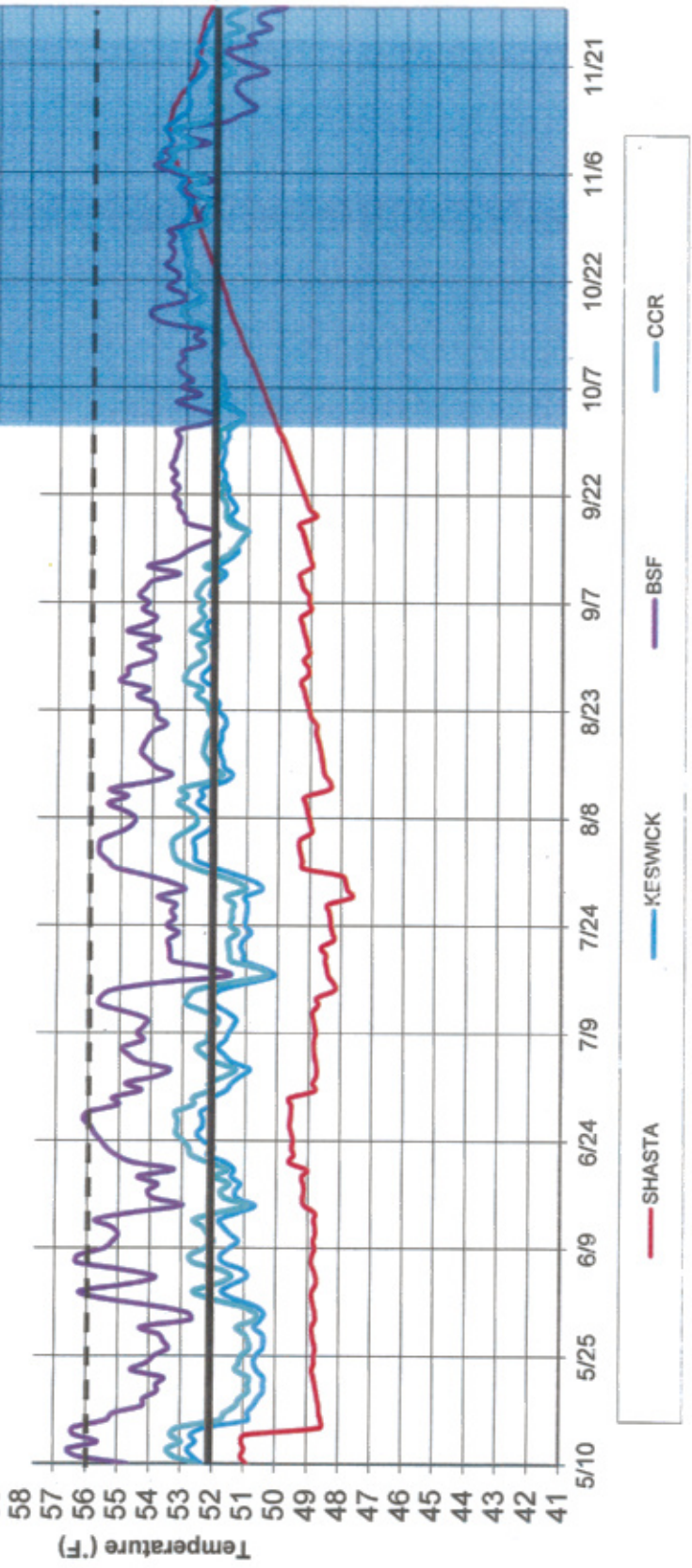
67 **EOM Sept storage: 3.3 MAF**  
 66 Trinity profile date : 5/3/2017  
 65 Whiskeytown profile date: 5/2/2017  
 64 Shasta profile date: 5/10/2017  
 63 Side gate: Sep 20, Full Side Gates Not Used  
 62 Shaded area denotes period of model limitations  
 61 **End of September Cold-Water-Pool less than 56 °F : 965 TAF**  
 60 **Temp Run date: May 11, 2017**  
 59  
 58





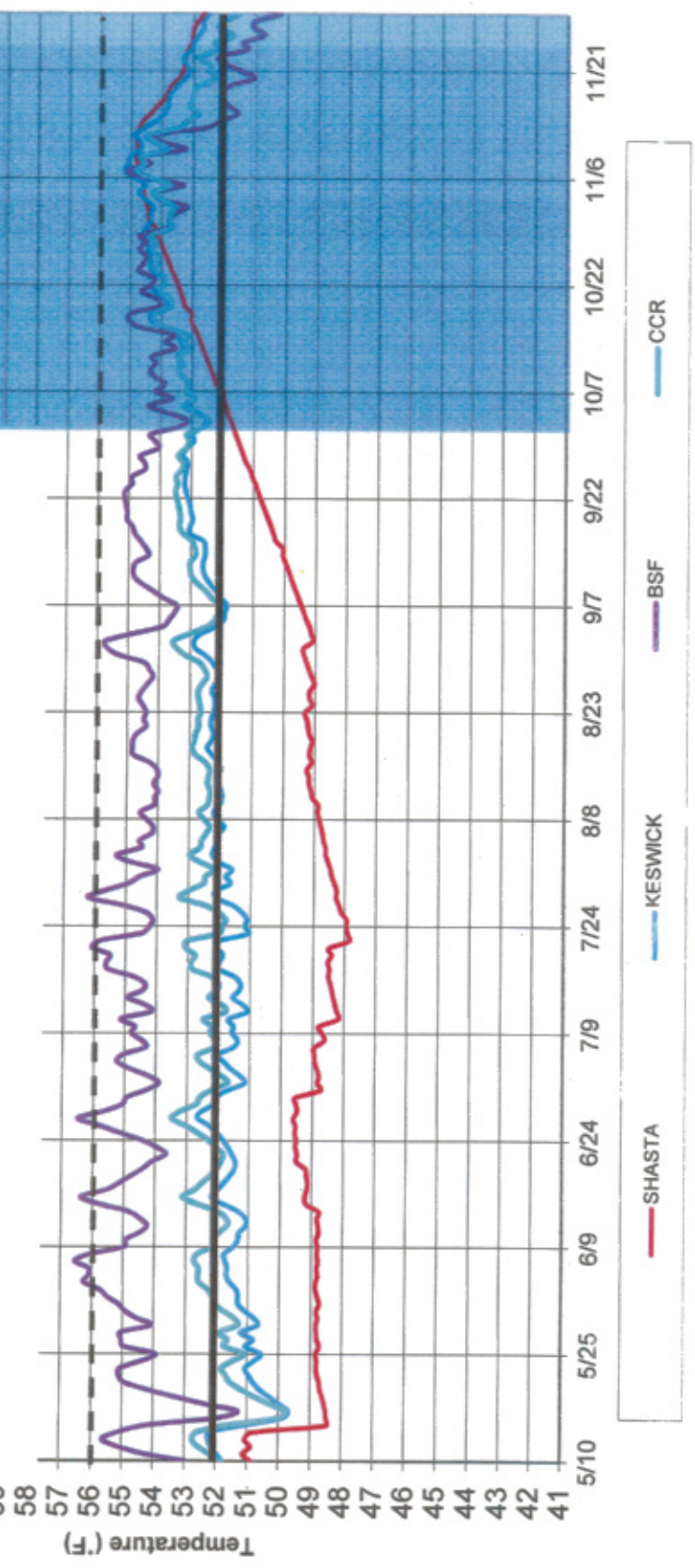
**Sacramento River Modeled Temperature  
 2017 May 90%-Exceedance Water Outlook - L3MTO 50% Meteorology  
 Target: Approximately 52 degree at Keswick**

67 **EOM Sept storage: 3.3 MAF**  
 66 **Trinity profile date : 5/3/2017**  
 65 **Whiskeytown profile date: 5/2/2017**  
 64 **Shasta profile date: 5/10/2017**  
 63 **Side gate: Sep 20, Full Side Gates Not Used**  
 62 **Shaded area denotes period of model limitations**  
 61 **End of September Cold-Water-Pool less than 56 °F : 965 TAF**  
 60 **Temp Run date: May 11, 2017**



**Sacramento River Modeled Temperature  
 2017 May 50%-Exceedance Water Outlook - L3MTO 10% Meteorology  
 Target: Approximately 52 degree at Keswick**

67 **EOM Sept storage: 3.3 MAF**  
 66 Trinity profile date : 5/3/2017  
 65 Whiskeytown profile date: 5/2/2017  
 64 Shasta profile date: 5/10/2017  
 63 Side gate: Sep 3, Full Side Gates Not Used  
 62 Shaded area denotes period of model limitations  
 61 **End of September Cold-Water-Pool less than 56 °F : 778 TAF**  
 60 **Temp Run date: May 19, 2017**  
 59  
 58





Estimated CVP Operations Apr 50% Exceedance

Storages

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

		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Trinity	2302	2303	2256	2132	1982	1818	1789						
	Elev.	2361	2358	2350	2340	2328	2326						
Whiskeytown	232	238	238	238	238	230	206						
	Elev.	1209	1209	1209	1209	1207	1199						
Shasta	4263	4409	4269	3898	3571	3345	3116						
	Elev.	1062	1057	1044	1031	1022	1013						
Folsom	724	934	946	925	750	658	597						
	Elev.	462	463	461	445	435	428						
New Melones	2002	1988	2158	2141	2035	1941	1911						
	Elev.	1051	1066	1065	1055	1047	1044						
San Luis	966	909	725	338	83	30	119						
	Elev.	526	506	453	406	387	364						
Total		10781	10591	9671	8659	8022	7737						

State End of the Month Reservoir Storage (TAF)

Oroville	2622	2739	2451	1991	1511	1202	1046						
	Elev.	845	822	782	732	693	671						
San Luis	1032	911	854	664	488	395	151						
Total San Luis (TAF)	1998	1820	1578	1002	571	425	269						

Monthly River Releases (TAF/cfs)

Trinity	TAF	261	172	78	31	77	23						
	cfs	4,246	2,899	1,269	503	1,290	373						
Clear Creek	TAF	13	17	7	7	9	12						
	cfs	216	288	120	120	150	200						
Sacramento	TAF	799	714	738	676	535	492						
	cfs	13000	12000	12000	11000	9000	8000						
American	TAF	553	595	307	307	208	135						
	cfs	9000	10000	5000	5000	3500	2201						
Stanislaus	TAF	307	89	74	74	71	52						
	cfs	5001	1500	1200	1200	1200	842						
Feather	TAF	799	714	553	553	416	184						
	cfs	13000	12000	9000	9000	7000	3000						

Trinity Diversions (TAF)

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Carr PP	125	111	102	128	91	16						
Spring Crk. PP	120	100	95	120	90	30						

Delta Summary (TAF)

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Tracy	195	262	270	273	265	222						
USBR Banks	0	0	0	0	0	44						
Contra Costa	12.7	9.8	11.1	12.7	14.0	16.8						
Total USBR	208	272	281	286	279	283						
State Export	195	390	410	410	395	142						
Total Export	403	662	691	696	674	425						
COA Balance	0	0	0	0	0	0						
Old/Middle River Std.												
Old/Middle R. calc.	3,759	-4,041	-7,089	-7,505	-7,495	-4,412						
Computed DOI	66110	41738	16463	14185	13918	11403						
Excess Outflow	37480	17869	8459	10183	2521	0						
% Export/Inflow	9%	20%	35%	38%	40%	34%						
% Export/Inflow std.	35%	35%	65%	65%	65%	65%						

Hydrology

Water Year Inflow (TAF)	Trinity	2436	Shasta	10,264	Folsom	7,760	New Melones	2854
Year to Date + Forecasted % of mean		202%		185%		285%		270%

Estimated CVP Operations 90% Exceedance

Storages

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

		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Trinity	2302	2306	2249	2117	1967	1800	1770						
	Elev.	2361	2358	2349	2339	2327	2324						
Whiskeytown	232	238	238	238	238	230	206						
	Elev.	1209	1209	1209	1209	1207	1199						
Shasta	4263	4356	4220	3867	3533	3315	3097						
	Elev.	1060	1056	1043	1030	1021	1012						
Folsom	724	933	956	889	698	614	514						
	Elev.	462	464	458	439	430	418						
New Melones	2022	2028	2170	2110	2010	1921	1890						
	Elev.	1055	1067	1062	1053	1045	1042						
San Luis	966	919	713	412	221	194	159						
	Elev.	532	506	472	446	442	411						
<b>Total</b>		10781	10546	9633	8667	8075	7636						

State End of the Month Reservoir Storage (TAF)

Oroville	2622	2677	2447	1938	1406	1078	953						
	Elev.	840	822	777	719	676	657						
San Luis	1032	974	867	783	711	703	457						
<b>Total San Luis (TAF)</b>		1998	1893	1580	1195	932	616						

Monthly River Releases (TAF/cfs)

Trinity	TAF	261	172	78	31	77	23						
	cfs	4,246	2,899	1,269	503	1,290	373						
Clear Creek	TAF	13	17	7	7	9	12						
	cfs	216	288	120	120	150	200						
Sacramento	TAF	676	654	676	645	506	461						
	cfs	11000	11000	11000	10500	8500	7500						
American	TAF	523	506	307	307	196	135						
	cfs	8500	8500	5000	5000	3300	2196						
Stanislaus	TAF	280	56	68	68	65	49						
	cfs	4550	940	1100	1100	1100	797						
Feather	TAF	768	595	523	523	416	154						
	cfs	12500	10000	8500	8500	7000	2500						

Trinity Diversions (TAF)

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Carr PP	87	115	103	129	92	16						
Spring Crk. PP	75	100	95	120	90	30						

Delta Summary (TAF)

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Tracy	162	260	271	272	260	102						
USBR Banks	0	0	0	0	0	33						
Contra Costa	12.7	9.8	11.1	12.7	14.0	16.8						
<b>Total USBR</b>	175	270	282	285	274	152						
State Export	206	260	410	410	395	58						
<b>Total Export</b>	381	530	692	695	669	210						
COA Balance	0	0	0	0	0	0						
Old/Middle River Std.												
Old/Middle R. calc.	2,792	-4,021	-7,512	-7,538	-7,476	-2,325						
Computed DOI	51535	28996	12526	11761	11548	11403						
Excess Outflow	22904	9884	4522	7760	151	0						
% Export/Inflow	10%	21%	39%	41%	43%	19%						
% Export/Inflow std.	35%	35%	65%	65%	65%	65%						

Hydrology

Water Year Inflow (TAF)	Trinity	Shasta	Folsom	New Melones
Year to Date + Forecasted	2388	9,974	7,584	2736
% of mean	198%	180%	279%	259%