Sacramento River Temperature Task Group Meeting
August 23, 2012 1:00pm

Conference Line: 877-718-6527
Pass code: 1954134

Agenda

1. Introductions
2. Fishery update
3. Hydrology & Operations update
    a. Daily CVP Water Supply Report ***

4. Discussion of recent temperature model runs
    a. Temperature studies packet ***

5. Temperature Review for August
    a. July and August monthly temp report ***

6. Partial Power Peaking for August -- update
7. Trinity Fall flows – update

    Actions items:

8. Next meeting: Thursday, September 27th

***handouts

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. BUREAU OF RECLAMATION-CENTRAL VALLEY PROJECT-CALIFORNIA

DAILY CVP WATER SUPPLY REPORT

AUGUST 21, 2012

RUN DATE: August 22, 2012

RESERVOIR RELEASES IN CUBIC FEET/SECOND

RESERVOIR	DAM	WY 2011	WY 2012	15 YR MEDIAN
TRINITY	LEWISTON	452	1,015	450
SACRAMENTO	KESWICK	11,112	12,156	9,716
FEATHER	OROVILLE (SWP)	3,500	5,500	4,500
AMERICAN	NIMBUS	3,451	2,511	2,005
STANISLAUS	GOODWIN	2,030	252	275
SAN JOAQUIN	FRIANT	351	348	279

STORAGE IN MAJOR RESERVOIRS IN THOUSANDS OF ACRE-FEET

RESERVOIR	CAPACITY	15 YR AVG	WY 2011	WY 2012	% OF 15 YR AVG
TRINITY	2,448	1,841	2,319	1,986	108
SHASTA	4,552	2,973	3,750	2,913	98
OROVILLE (SWP)	3,538	2,291	3,388	2,345	102
FOLSOM	977	614	878	523	85
NEW MELONES	2,420	1,630	2,176	1,580	97
FED. SAN LUIS	966	268	687	169	63
MILLERTON	520	299	446	277	93
TOT. N. CVP	11,360	7,326	9,810	7,171	98

ACCUMULATED INFLOW FOR WATER YEAR TO DATE IN THOUSANDS OF ACRE-FEET

RESERVOIR	CURRENT WY 2012	DRIEST WY 1977	WETTEST WY 1983	15 YR AVG	% OF 15 YR AVG
TRINITY	1,003	203	2,839	1,426	70
SHASTA	3,744	2,329	10,415	5,674	66
FOLSOM	1,631	322	6,340	2,544	64
NEW MELONES	556	0	2,675	1,033	54
MILLERTON	899	311	4,433	1,655	54

ACCUMULATED PRECIPITATION FOR WATER YEAR TO DATE IN INCHES

RESERVOIR	CURRENT WY 2012	DRIEST WY 1977	WETTEST WY 1983	AVG (N YRS)	% OF AVG	LAST 24 HRS
TRINITY AT FISH HATCHERY	26.15	13.76	55.46	32.10 (50)	81	0.00
SACRAMENTO AT SHASTA DAM	43.65	17.28	112.64	61.93 (55)	70	0.00
AMERICAN AT BLUE CANYON	57.30	15.70	103.88	65.29 (37)	88	0.00
STANISLAUS AT NEW MELONES	22.40	0.00	45.73	27.24 (34)	82	0.00
SAN JOAQUIN AT HUNTINGTON LK	24.89	17.50	83.00	42.82 (37)	58	0.00

August 23, 2012

Upper Sacramento River – August 2012 Preliminary Temperature Analysis

Summary of Temperature Compliance Results by Month

Initial Compliance Location	AUG	SEP	OCT
Modified July 50%-Exceedance Outlook			
Jellys Ferry (JLF)	**JLF**	**JLF**	**JLF**

Temperature Analysis Results:

Jellys Ferry: Jellys Ferry (Figure 1) is still possible through fall, although conditions aren't as favorable as in last month's projection. High basin depletions through July and into August influenced Keswick release rates, which were somewhat higher than anticipated. Note that the model run does include a supplemental release (~ 48 TAF) to the Trinity River.

Figure 2 shows temperature results for Clear Creek at Igo.

Figure 3 includes results for the Trinity River at Lewiston Dam. The dashed lines are the 2011 mean daily temperatures at selected locations.

Temperature Model Inputs, Assumptions, Limitations and Uncertainty:

1. Operation is based on the July 2012 Operation Outlook (monthly flows, reservoir release, and end-of-month reservoir storage) adjusted for initial conditions in August.
2. The latest available profiles for Shasta, Trinity and Whiskeytown were taken on **August 7**, **July 18**, and **August 15**, respectively.
3. Guidance on forecasted flows from the creeks between Keswick Dam and Bend Bridge (e.g., Cow, Cottonwood, Battle, etc.) 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, based on current flows and future 5-day trends. **(NOTE: Lacking further guidance, future side flows may differ significantly from those input into the model.)** The creek flows cause additional warming in the upper Sacramento River during spring.
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 NOAA-NWS Local Three-Month Temperature Outlook (L3MTO), as a means of estimating air temperature expectation, was used to select each month's meteorology from the database.
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.

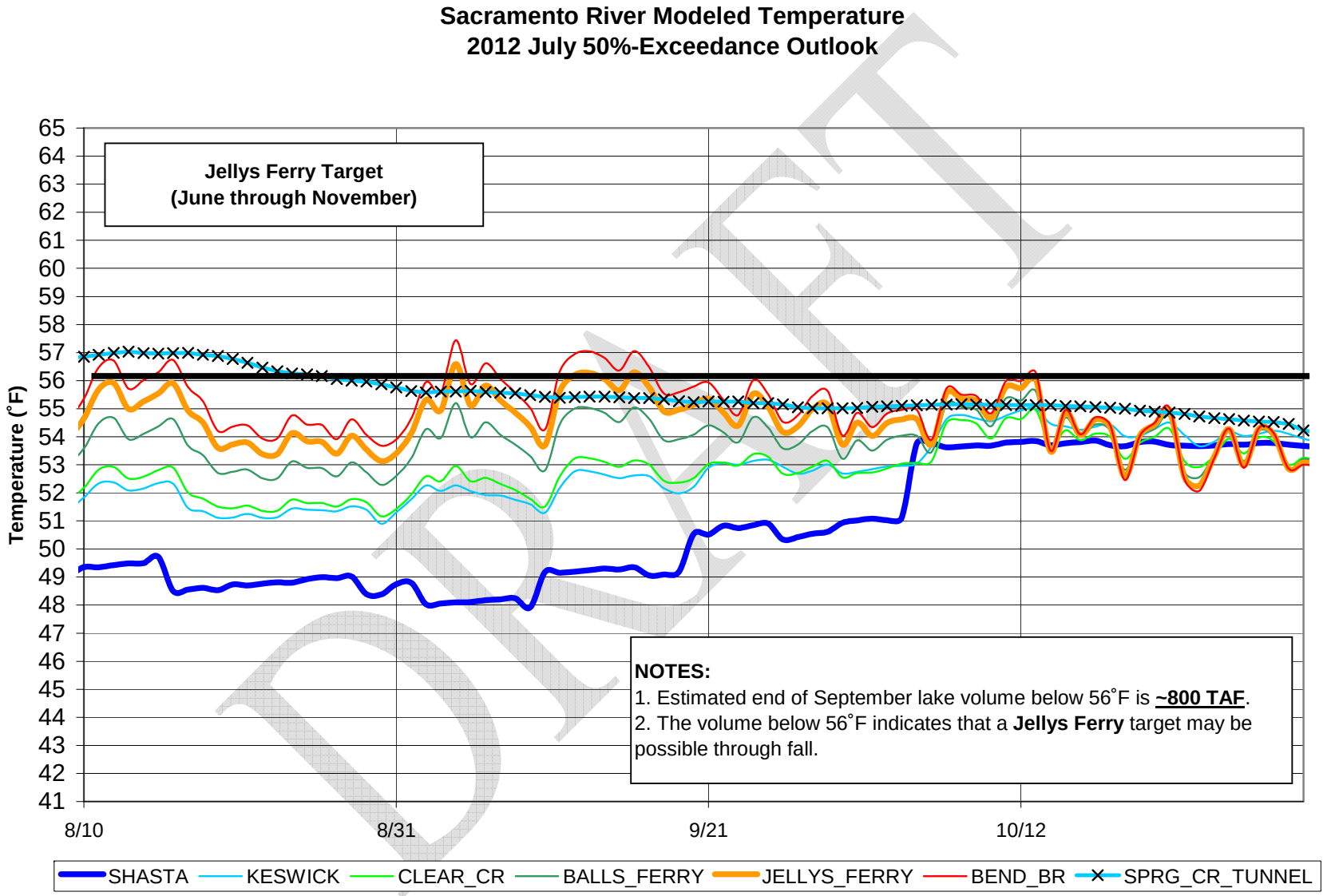

Sacramento River Modeled Temperature
2012 July 50%-Exceedance Outlook
Jellys Ferry Target
(June through November)
Temperature (˚F)
65
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
8/10
8/31
9/21
10/12
NOTES:
1. Estimated end of September lake volume below 56˚F is ~800 TAF.
2. The volume below 56˚F indicates that a Jellys Ferry target may be possible through fall.
SHASTA
KESWICK
CLEAR_CR
BALLS_FERRY
JELLYS_FERRY
BEND_BR
SPRG_CR_TUNNEL

Figure 1

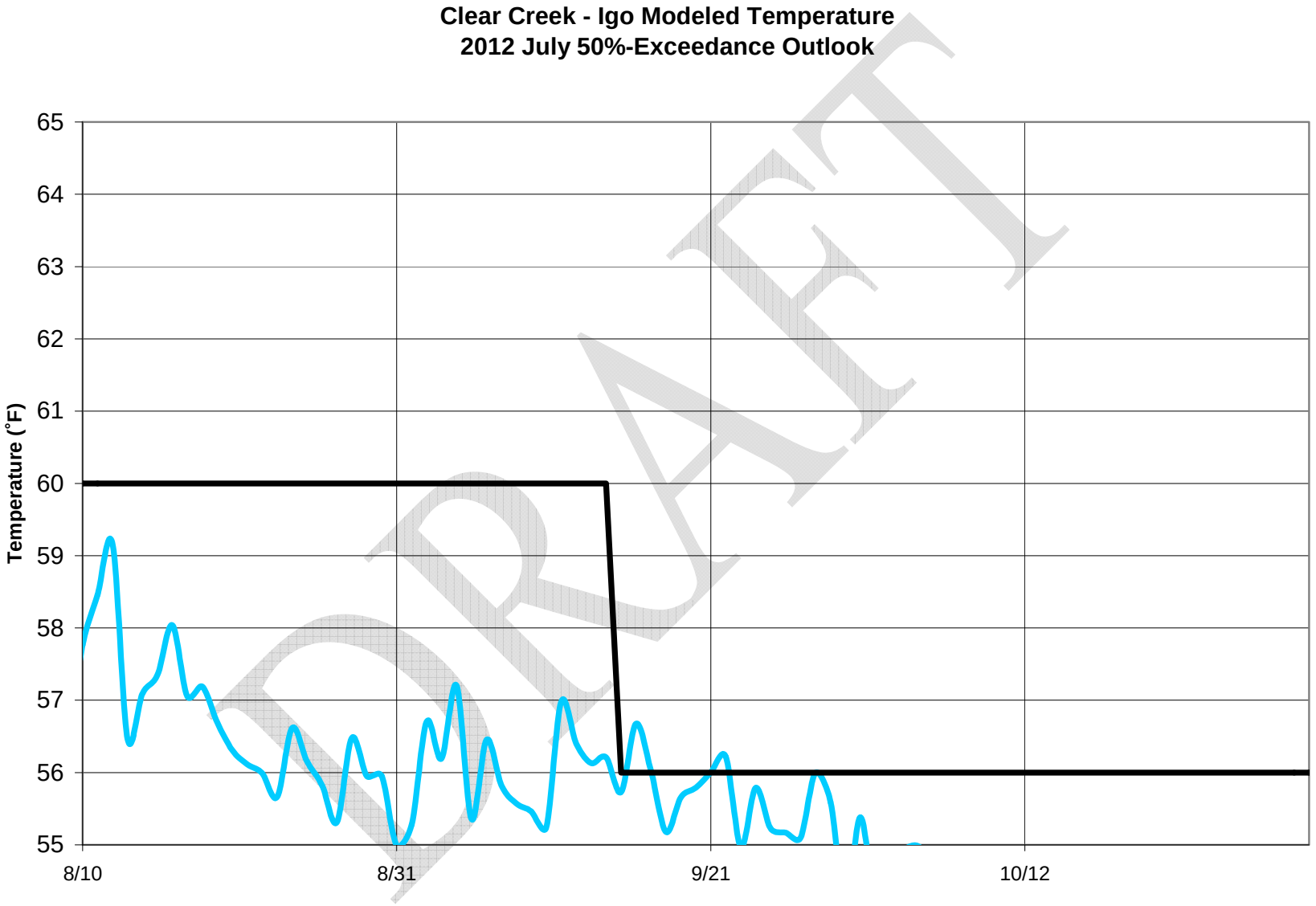

Clear Creek - Igo Modeled Temperature
2012 July 50%-Exceedance Outlook
Temperature (°F)
65
64
63
62
61
60
59
58
57
56
55
8/10
8/31
9/21
10/12
DRAFT

Figure 2

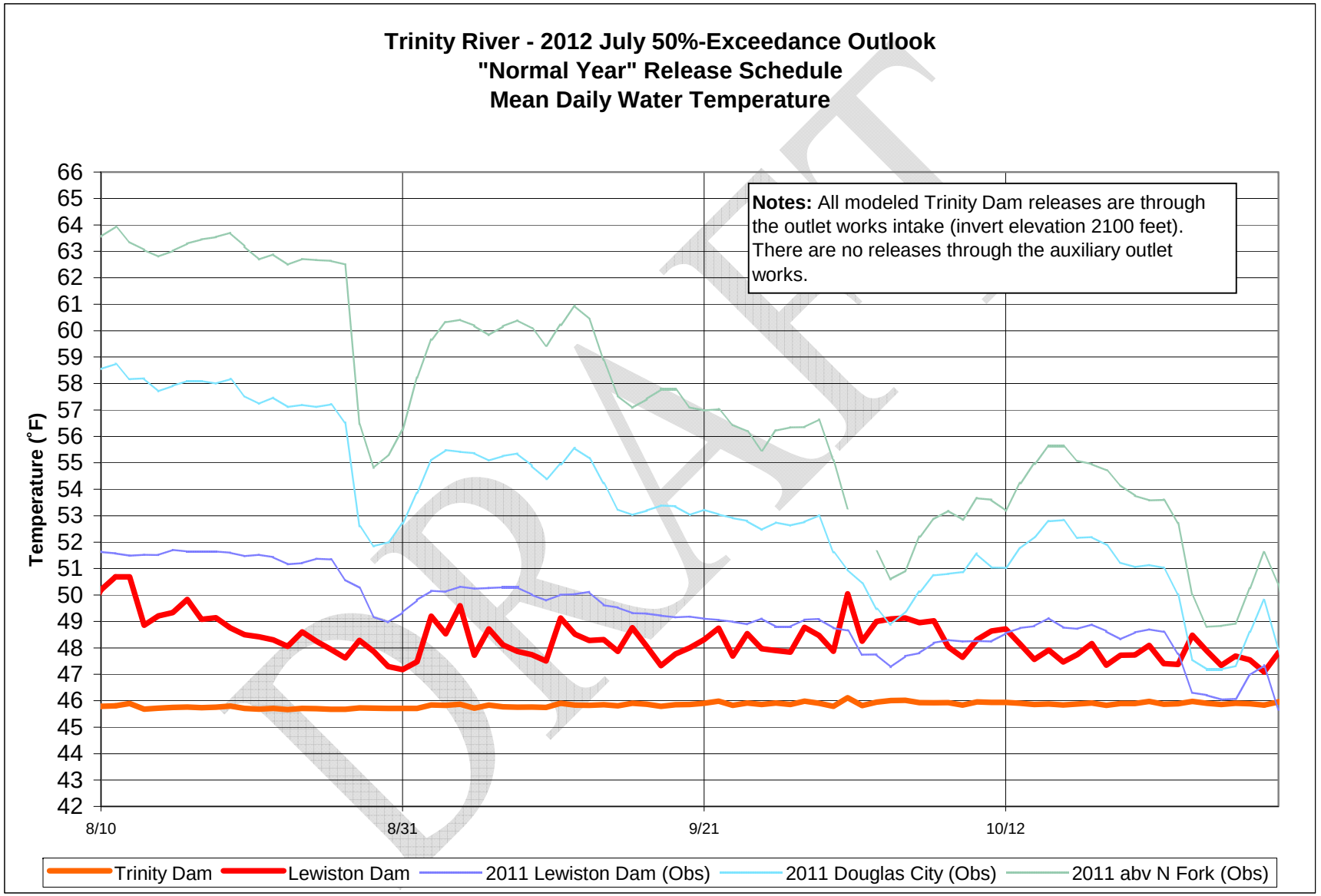
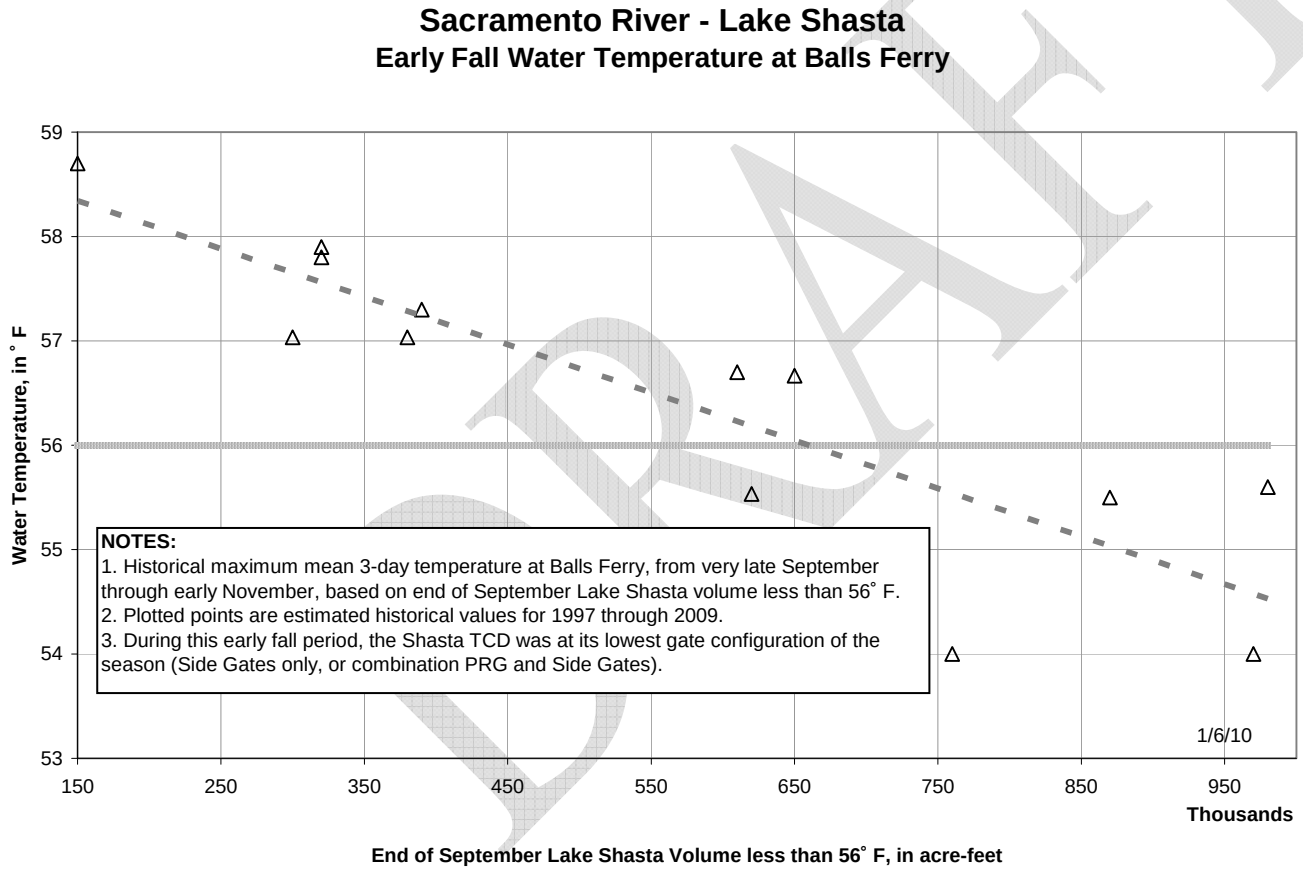
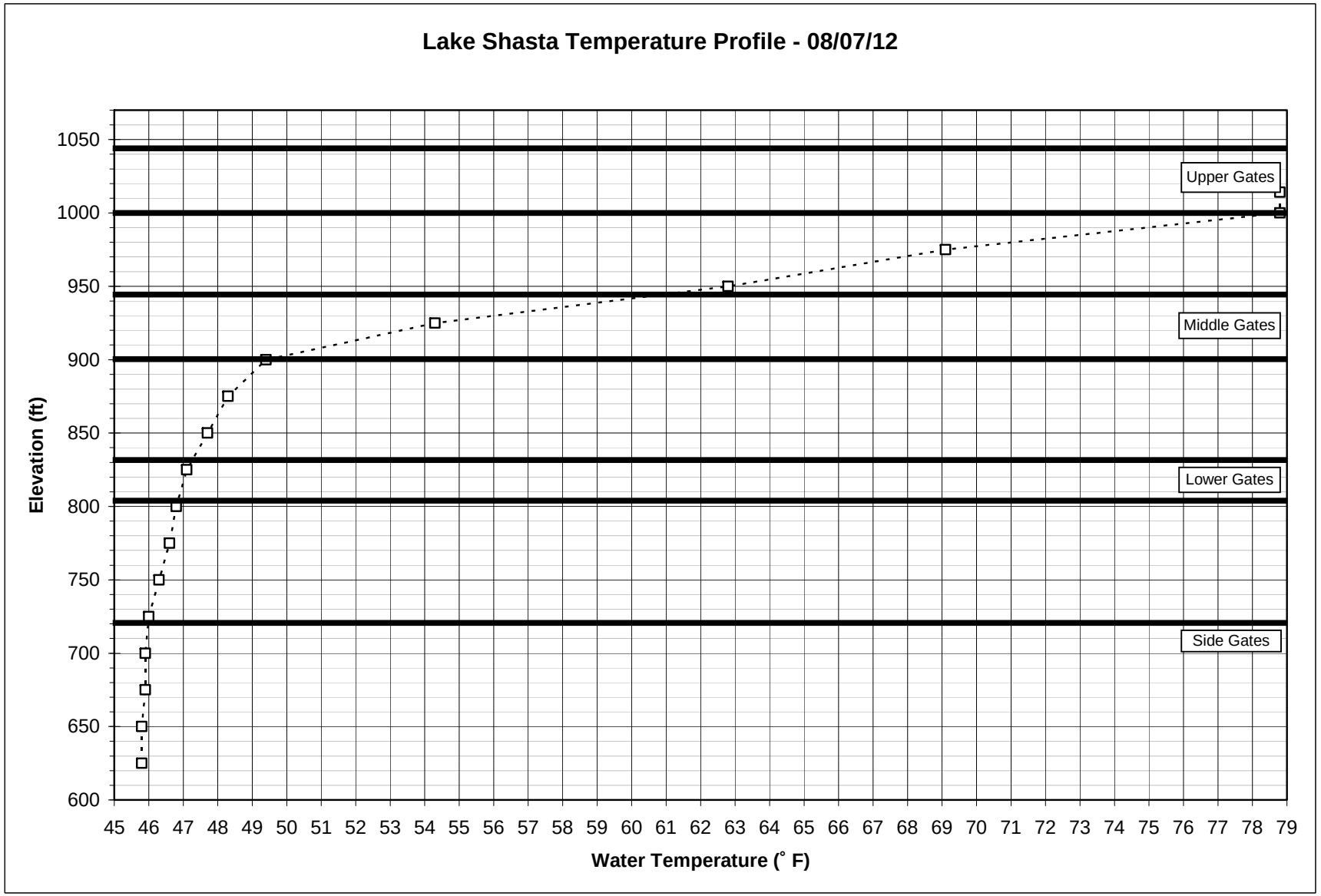

Trinity River - 2012 July 50%-Exceedance Outlook
"Normal Year" Release Schedule
Mean Daily Water Temperature
Notes: All modeled Trinity Dam releases are through the outlet works intake (invert elevation 2100 feet). There are no releases through the auxiliary outlet works.
Temperature (°F)
66
65
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
8/10
8/31
9/21
10/12
Trinity Dam
Lewiston Dam
2011 Lewiston Dam (Obs)
2011 Douglas City (Obs)
2011 abv N Fork (Obs)
DRAFT

Figure 3

Model Performance and Fall Temperature Index:

1. Based on past analyses, the temperature model does not perform well in late September and October. 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 good 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 600 TAF, see figure below:




Lake Shasta Temperature Profile - 08/07/12
Elevation (ft)
1050
1000
950
900
850
800
750
700
650
600
Upper Gates
Middle Gates
Lower Gates
Side Gates
45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
Water Temperature (˚ F)

8/7/2012

Temperature and Release Summary for Shasta and Trinity - July 2012

(Updated twice a week November through April)

Day	Sacramento River Water Temperatures in Degrees F Collected from CDEC (California Data Exchange Center)													Mean Daily Release in CFS			Mean Daily Air Temp Degrees F			
	TCD Wt. Avg.	SHD minus TCD (Diff)	Shd	Spp	Kwk	Control Point 4/16 to 5/31 Bsf	Control Point 6/1 to 7/31 Jlf	Bnd	Rdb	Lws	Ccr	Igo		Shasta Generation El 815	Spring Crk Powerplant Release	Keswick Total Release	RDD	BSF	RDB	LWS
Jun	50.2		49.1	51.4	50.5	53.4	54.8	55.4	56.9	48.8	51.8	54.2		10,605	810	11,873	74.9	72.1	73.4	62.8
Jul																				
1	50.0	(1.1)	48.9	53.3	50.5	53.5	55.2	55.9	57.8	49.4	51.9	57.4		12,614	1,086	14,082	81.5	79.0	76.6	70.5
2	50.0	(1.1)	48.9	53.3	50.6	53.1	54.6	55.1	56.8	49.6	51.7	57.7		12,307	1,561	13,982	81.0	78.4	77.5	70.8
3	50.0	(1.0)	49.0	53.6	50.5	53.1	54.5	55.0	56.8	49.7	51.7	57.6		12,663	1,206	14,259	78.5	78.1	79.6	68.4
4	50.0	(1.0)	49.0	53.7	50.7	53.1	54.4	54.6	56.4	49.9	51.8	59.4		12,307	1,418	14,393	80.5	76.0	77.5	69.4
5	50.1	(1.0)	49.1	54.0	50.6	53.2	54.5	54.7	56.6	49.9	51.8	59.9		12,591	1,592	14,280	78.0	74.5	74.5	68.7
6	50.3	(1.0)	49.3	54.2	50.6	52.9	54.2	54.5	56.3	49.9	51.6	59.7		12,755	860	14,177	76.5	74.4	74.9	69.3
7	50.1	(0.9)	49.2	54.2	50.9	53.1	54.3	54.5	56.1	49.8	51.9	59.5		12,915	1,430	14,283	81.5	77.7	78.5	71.4
8	50.4	(1.0)	49.4	54.4	50.8	53.2	54.4	54.7	56.5	49.9	51.9	59.8		12,853	1,290	14,282	83.5	79.2	80.7	74.0
9	50.4	(1.0)	49.4	54.5	51.1	53.3	54.5	54.7	56.4	49.8	52.1	59.8		12,546	1,600	14,314	81.0	77.2	77.7	73.0
10	50.3	(0.9)	49.4	54.7	50.9	53.3	54.4	54.7	56.5	50.0	52.0	59.5		12,744	1,253	14,334	84.0	79.8	80.6	73.6
11	50.3	(0.8)	49.5	54.7	50.9	53.3	54.3	54.8	56.4	50.0	52.0	59.7		12,830	1,180	14,045	85.0	80.7	82.3	77.0
12	50.4	(0.9)	49.5	54.9	51.0	53.4	54.4	54.9	56.5	50.1	52.2	59.2		12,882	1,185	13,923	85.0	80.7	83.1	76.2
13	50.5	(0.9)	49.6	55.0	51.1	53.5	54.5	55.1	56.9	50.3	52.2	57.3		12,809	1,238	13,917	83.5	79.3	79.2	74.2
14	50.5	(0.9)	49.6	55.0	51.3	53.5	54.5	55.0	56.8	50.5	52.3	56.8		12,142	1,634	13,985	79.0	75.0	73.0	72.1
15	50.7	(1.0)	49.7	55.2	51.3	53.6	54.6	55.0	56.8	50.5	52.4	57.0		12,353	1,611	14,139	82.0	77.8	77.8	73.0
16	50.8	(0.9)	49.9	55.3	51.3	53.7	54.7	55.2	57.0	50.6	52.4	57.0		13,070	1,187	14,115	76.0	72.8	72.7	66.9
17	51.0	(1.0)	50.0	55.5	51.2	53.0	53.9	54.4	56.2	50.0	52.1	55.6		12,860	1,230	14,126	66.5	66.0	63.8	59.0
18	51.0	(0.9)	50.1	55.6	51.4	53.2	54.0	54.4	55.8	49.9	52.2	56.5		12,857	1,227	14,178	72.5	70.2	70.4	63.7
19	51.0	(1.0)	50.0	55.6	51.6	53.8	54.7	55.1	56.5	49.8	52.6	56.9		12,404	1,269	14,174	74.5	71.4	72.8	64.8
20	51.3	(1.0)	50.3	55.7	51.6	53.8	54.6	55.1	56.7	50.3	52.6	57.2		12,829	1,266	14,155	76.5	74.5	75.0	67.9
21	51.3	(1.0)	50.3	55.7	51.9	54.1	55.0	55.4	56.9	50.8	52.9	57.8		12,952	1,237	14,177	84.5	79.2	81.0	71.5
22	51.4	(1.1)	50.3	55.7	52.1	54.3	55.3	55.7	57.4	51.3	53.1	57.9		12,384	1,550	14,151	85.5	81.7	83.6	73.8
23	51.0	(0.8)	50.2	55.9	52.2	54.5	55.5	56.0	57.8	51.6	53.3	58.1		12,442	1,553	14,202	86.0	81.6	81.5	73.8
24	50.7	(0.7)	50.0	56.0	51.6	54.4	55.5	56.1	58.0	52.0	53.0	56.3		12,646	1,188	14,294	82.0	77.6	76.5	75.5
25	50.9	(0.7)	50.2	56.0	51.4	53.5	54.5	55.0	57.0	52.7	52.4	55.4		12,924	1,213	14,286	78.0	74.5	75.8	70.7
26	50.8	(0.8)	50.0	56.1	51.7	53.8	54.6	55.0	56.7	52.9	52.6	55.7		12,468	1,597	14,314	78.5	74.9	75.6	72.2
27	51.0	(0.8)	50.2	56.1	51.6	53.8	54.7	55.2	56.9	52.7	52.6	56.3		12,516	1,605	14,317	78.5	74.8	74.6	72.2
28	51.2	(0.8)	50.4	56.2	51.6	53.8	54.7	55.2	56.8	53.0	52.6	56.9		12,756	1,219	14,326	79.0	74.9	75.2	70.2
29	51.4	(0.9)	50.5	56.2	51.8	53.9	54.8	55.2	56.8	53.0	52.8	57.4		13,081	1,204	14,267	80.0	75.6	75.3	72.0
30	51.5	(0.9)	50.6	56.3	52.1	54.2	55.1	55.5	57.1	52.9	53.0	57.8		12,644	1,525	14,301	83.0	80.3	80.2	73.0
31	51.6	(0.8)	50.8	56.4	52.1	54.3	55.2	55.7	57.4	53.0	53.1	57.9		12,836	1,250	14,270	84.0	79.9	80.2	73.5
Avg	50.7		49.8	55.1	51.3	53.6	54.6	55.1	56.8	50.8	52.3	57.8		12,677	1,338	14,195	80.2	76.7	77.0	71.0
Tot cfs														392,980	41,464	440,048				
Tot af														779,476	82,244	872,835				

\# = Station out of service ^ - estimated (7 hours or less available) ? = Avg. includes estimated data

! = 17 hours or less of readings & = 18 to 23 hours of reading ND = No hourly readings or incorrect

Control Point: Balls Ferry 4/16/2012 to 5/31/2012; Jellys Ferry 6/1/2012 to 7/31/2012.

Draft 8/22/2012

Temperature and Release Summary for Shasta and Trinity - August 2012

(Updated twice a week November through April)

Day	Sacramento River Water Temperatures in Degrees F Collected from CDEC (California Data Exchange Center)													Mean Daily Release in CFS			Mean Daily Air Temp Degrees F			
	TCD Wt. Avg.	SHD minus TCD (Diff)	Shd	Spp	Kwk	Control Point 4/16 to 5/31 Bsf	Control Point 6/1 to Jlf	Bnd	Rdb	Lws	Ccr	Igo		Shasta Generation El 815	Spring Crk Powerplant Release	Keswick Total Release	RDD	BSF	RDB	LWS
Jul	50.7		49.8	55.1	51.3	53.6	54.6	55.1	56.8	50.8	52.3	57.8		12,677	1,338	14,195	80.2	76.7	77.0	71.0
Aug																				
1	51.9	(0.9)	51.0	56.5	52.4	54.5	55.5	55.8	57.5	53.0	53.3	57.9		12,621	1,561	14,253	84.0	79.6	80.1	74.0
2	51.7	(0.8)	50.9	56.5	52.5	54.7	55.7	55.9	57.5	53.0	53.5	57.6		12,507	1,548	14,228	82.5	78.8	79.2	74.8
3	51.5	(1.0)	50.5	56.6	52.3	54.7	55.8	56.0	57.6	53.1	53.4	57.5		12,518	1,570	14,191	84.5	79.8	79.6	76.4
4	51.7	(1.1)	50.6	56.6	52.2	54.3	55.4	55.6	57.3	52.8	53.2	57.4		12,601	1,580	14,197	81.5	76.4	76.2	76.6
5	52.0	(1.1)	50.9	56.7	52.3	? 54.6	55.7	55.9	57.6	53.2	53.3	57.9		12,988	1,371	14,250	84.0	79.4	78.2	76.8
6	51.8	(0.9)	50.9	56.7	52.6	54.7	55.7	55.9	57.6	53.2	53.5	57.3		12,323	1,582	14,213	80.0	76.1	75.8	73.7
7	52.0	(1.1)	50.9	56.8	52.4	54.6	55.7	55.9	57.6	53.1	53.4	57.2		12,402	1,218	14,140	81.0	76.5	77.8	72.4
8	51.2	(1.0)	50.2	56.9	52.6	54.7	55.8	55.9	57.5	53.3	53.5	57.5		11,945	1,219	13,315	85.5	80.6	79.8	73.1
9	51.2	(1.1)	50.1	56.9	52.0	54.5	55.6	56.0	57.7	53.1	53.1	57.3		11,353	1,528	13,239	83.5	78.4	79.9	73.5
10	51.4	(1.3)	50.1	56.9	52.1	54.5	55.6	56.0	57.5	52.8	53.1	57.9		11,806	1,525	13,357	86.0	80.7	82.5	74.1
11	51.5	(1.2)	50.3	57.0	52.2	54.4	55.5	56.0	57.7	52.8	53.1	57.4		11,433	1,363	13,769	86.0	80.5	82.1	75.2
12	51.4	(1.4)	50.0	57.0	52.3	54.6	55.6	56.0	57.6	52.7	53.3	56.9		10,394	1,335	12,892	86.5	80.3	82.4	76.0
13	51.1	(1.2)	49.9	57.0	52.4	54.7	55.9	56.4	58.0	51.4	53.4	57.3		10,293	1,548	12,514	89.0	83.8	85.9	76.7
14	50.8	(1.3)	49.5	57.1	52.2	54.8	56.0	56.5	58.2	50.8	53.4	57.7		10,122	1,502	12,508	90.0	82.2	83.7	77.7
15	50.6	(1.2)	49.4	57.1	51.7	54.0	55.3	55.8	57.7	50.2	52.7	56.8		9,830	1,566	12,560	87.0	81.5	81.2	75.9
16	50.7	(1.1)	49.6	57.2	51.6	54.1	55.3	55.7	57.3	49.8	52.8	57.5		9,527	1,505	12,090	86.5	82.2	80.0	79.5
17	50.9	(1.5)	49.4	57.1	51.9	54.5	55.7	56.2	57.9	49.9	53.0	57.6		9,797	1,526	12,101	86.0	81.3	80.3	77.2
18	50.9	(1.4)	49.5	57.1	52.0	54.6	55.9	56.5	58.4	50.2	53.1	57.8		9,809	1,511	12,453	87.5	82.2	82.7	72.1
19	49.7	(0.8)	48.9	57.1	52.0	54.6	55.8	56.3	58.1	50.0	53.2	57.5		9,693	1,488	12,458	83.5	78.6	78.6	73.1
20	49.5	(1.0)	48.5	57.1	51.0	53.9	55.3	55.9	57.7	50.1	52.5	56.9		9,779	1,454	12,092	81.0	74.9	75.2	72.6
21	49.6	(1.1)	48.5	57.1	50.7	53.0	54.3	54.9	56.8	49.9	51.7	56.8		9,865	1,509	12,156	79.5	75.2	75.8	70.9
22		0.0																		
23		0.0																		
24		0.0																		
25		0.0																		
26		0.0																		
27		0.0																		
28		0.0																		
29		0.0																		
30		0.0																		
31		0.0																		
Avg	51.1		50.0	56.9	52.1	54.4	55.6	56.0	57.7	51.8	53.1	57.4		11,124	1,477	13,189	84.5	79.5	79.9	74.9
Tot cfs														233,606	31,009	276,976				
Tot af														463,358	61,506	549,382				

\# = Station out of service ^ - estimated (7 hours or less available) ? = Avg. includes estimated data

! = 17 hours or less of readings & = 18 to 23 hours of reading ND = No hourly readings or incorrect

Control Point: Balls Ferry 4/16/2012 to 5/31/2012; Jellys Ferry 6/1/2012 to