Sacramento River Temperature Task Group Meeting

April 23, 2015
1:00 pm

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

Agenda

1. Introductions
    a. Michael Larsen – Note taker

2. Fishery update

3. Hydrology & Operations update
    a. Daily CVP Water Supply Report ***

4. Summarize Sub-Group meeting on April 17 --
    a. Current Shasta ops (bypass) SHA Handout ***

5. April 90% Exceedance Outlook ***

6. April Temperature studies ***
    a. April Temperature Packet
    b. Temperature control point -- Clear Creek at 58 degree until May 15 or when fish agencies notify spawning occurring
7. Next meeting

***handouts

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

DAILY CVP WATER SUPPLY REPORT

APRIL 22, 2015

RUN DATE: April 23, 2015

RESERVOIR RELEASES IN CUBIC FEET/SECOND

RESERVOIR	DAM	WY 2014	WY 2015	15 YR MEDIAN
TRINITY	LEWISTON	314	401	309
SACRAMENTO	KESWICK	3,684	4,689	6,049
FEATHER	OROVILLE (SWP)	800	1,300	1,300
AMERICAN	NIMBUS	1,522	597	1,786
STANISLAUS	GOODWIN	2,503	260	1,480
SAN JOAQUIN	FRIANT	174	197	211

STORAGE IN MAJOR RESERVOIRS IN THOUSANDS OF ACRE-FEET

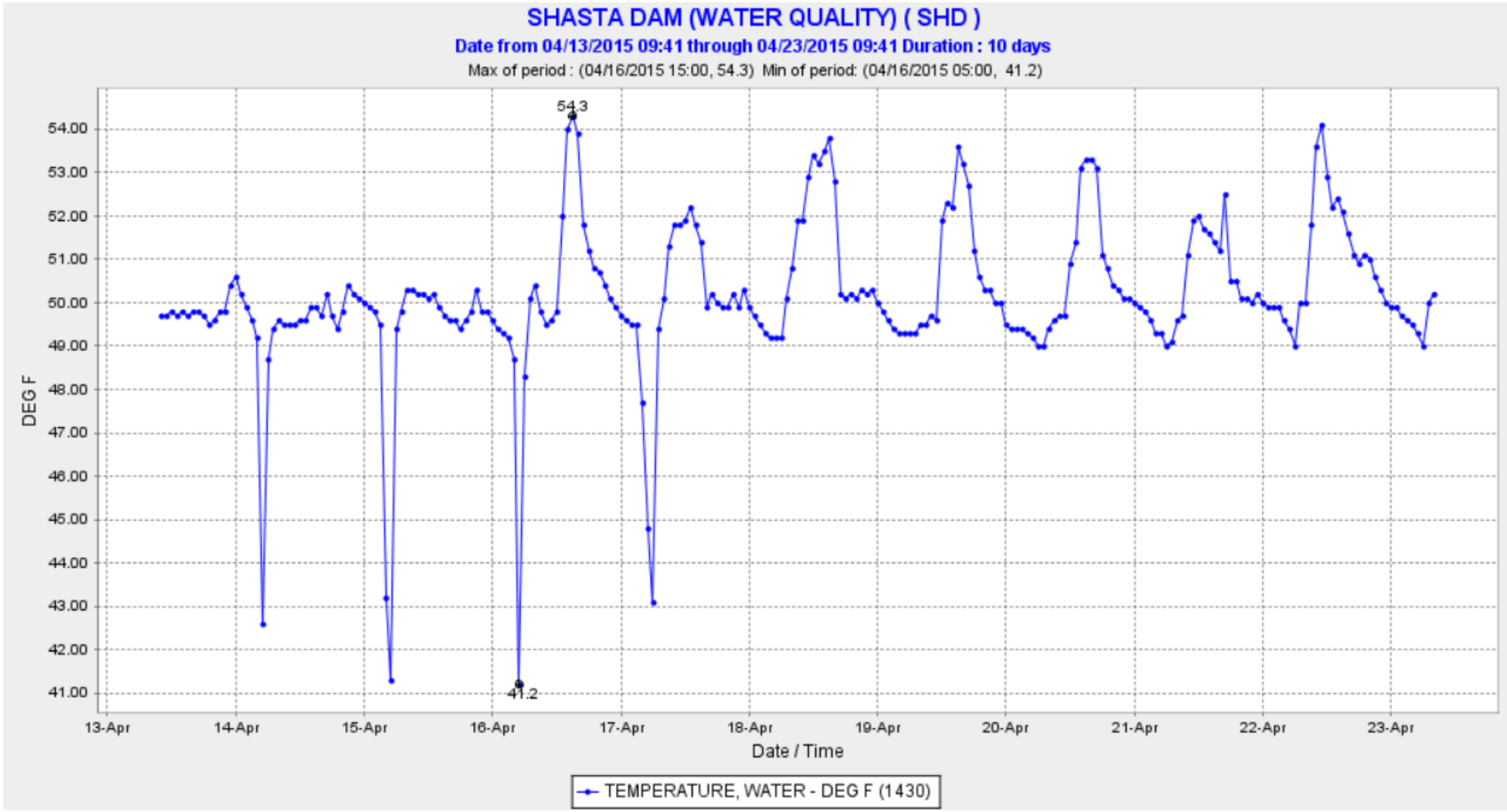
RESERVOIR	CAPACITY	15 YR AVG	WY 2014	WY 2015	% OF 15 YR AVG
TRINITY	2,448	1,870	1,298	1,199	64
SHASTA	4,552	3,770	2,404	2,714	72
OROVILLE (SWP)	3,538	2,568	1,862	1,803	70
FOLSOM	977	694	533	571	82
NEW MELONES	2,420	1,540	967	501	33
FED. SAN LUIS	966	779	558	385	49
MILLERTON	520	358	199	196	55
TOT. N. CVP	11,360	8,654	5,760	5,370	62

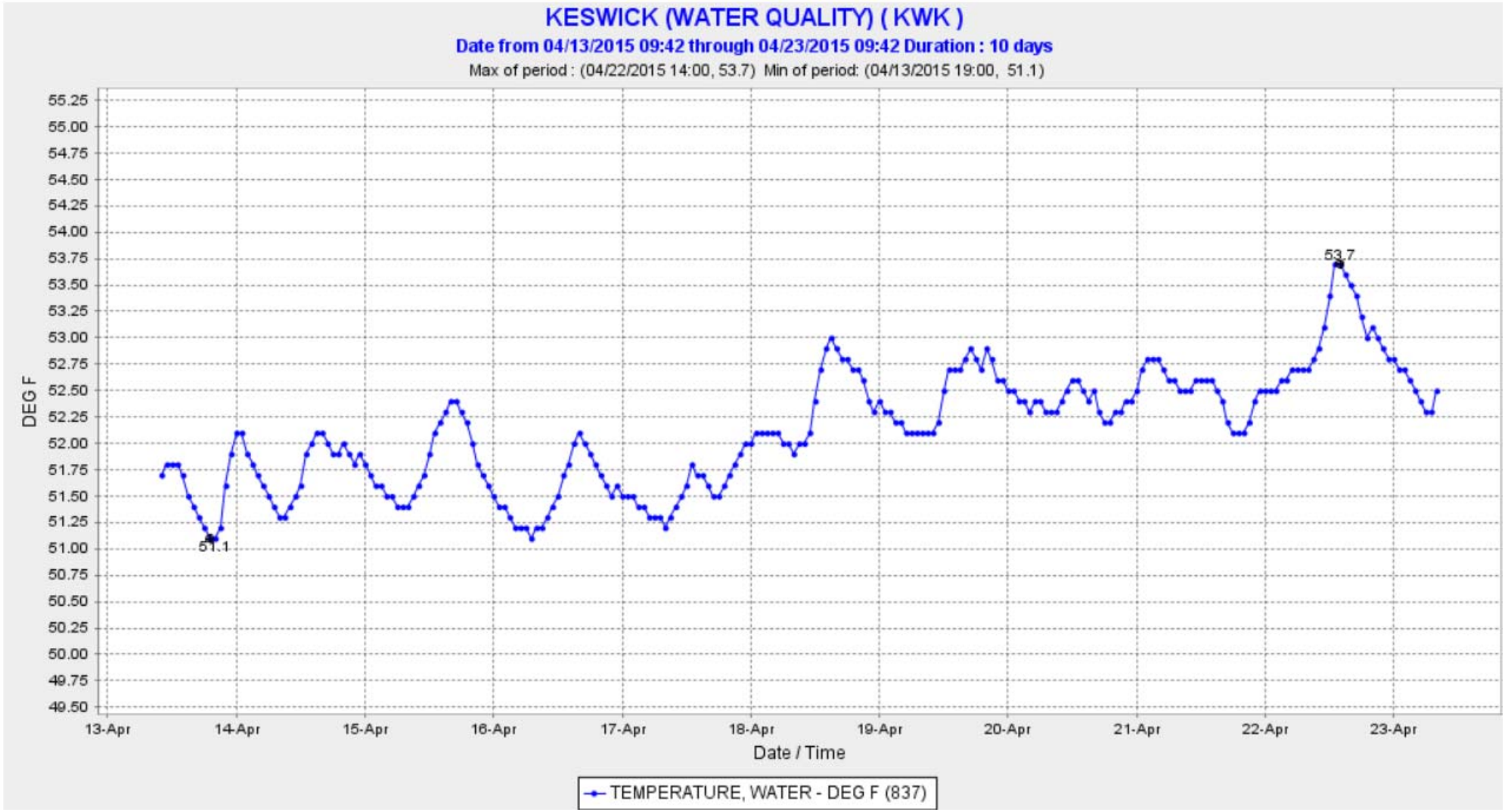
ACCUMULATED INFLOW FOR WATER YEAR TO DATE IN THOUSANDS OF ACRE-FEET

RESERVOIR	CURRENT WY 2015	DRIEST WY 1977	WETTEST WY 1983	15 YR AVG	% OF 15 YR AVG
TRINITY	797	105	1,403	702	114
SHASTA	2,769	1,546	7,811	3,464	80
FOLSOM	617	220	3,967	1,318	47
NEW MELONES	216	0	1,253	458	47
MILLERTON	91	116	1,847	516	18

ACCUMULATED PRECIPITATION FOR WATER YEAR TO DATE IN INCHES

RESERVOIR	CURRENT WY 2015	DRIEST WY 1977	WETTEST WY 1983	AVG (N YRS)	% OF AVG	LAST 24 HRS
TRINITY AT FISH HATCHERY	24.08	9.27	51.11	28.69 (53)	84	0.00
SACRAMENTO AT SHASTA DAM	47.83	11.04	104.32	55.90 (58)	86	0.00
AMERICAN AT BLUE CANYON	41.06	15.64	96.24	58.47 (40)	70	0.07
STANISLAUS AT NEW MELONES	16.92	0.00	42.10	24.43 (37)	69	0.00
SAN JOAQUIN AT HUNTINGTON LK	11.52	11.50	75.30	37.07 (40)	31	0.00


SHASTA DAM (WATER QUALITY) (SHD)
Date from 04/13/2015 09:41 through 04/23/2015 09:41 Duration : 10 days
Max of period : (04/16/2015 15:00, 54.3) Min of period: (04/16/2015 05:00, 41.2)
54.3
41.2
54.00
53.00
52.00
51.00
50.00
49.00
48.00
47.00
46.00
45.00
44.00
43.00
42.00
41.00
DEG F
13-Apr
14-Apr
15-Apr
16-Apr
17-Apr
18-Apr
19-Apr
20-Apr
21-Apr
22-Apr
23-Apr
Date / Time
TEMPERATURE, WATER - DEG F (1430)


KESWICK (WATER QUALITY) (KWK)
Date from 04/13/2015 09:42 through 04/23/2015 09:42 Duration : 10 days
Max of period : (04/22/2015 14:00, 53.7) Min of period: (04/13/2015 19:00, 51.1)
DEG F
55.25
55.00
54.75
54.50
54.25
54.00
53.75
53.50
53.25
53.00
52.75
52.50
52.25
52.00
51.75
51.50
51.25
51.00
50.75
50.50
50.25
50.00
49.75
49.50
53.7
51.1
13-Apr
14-Apr
15-Apr
16-Apr
17-Apr
18-Apr
19-Apr
20-Apr
21-Apr
22-Apr
23-Apr
Date / Time
TEMPERATURE, WATER - DEG F (837)

Draft 4/23/2015

Temperature and Release Summary for Shasta and Trinity - April 2015

(Updated twice a week November through April)

Day	Sacramento River Water Temperatures in Degrees F Collected from CDEC (California Data Exchange Center) except for TCD, SPP and Control Point														Mean Daily Release in CFS			Mean Daily Air Temp Degrees F			
	TCD Wt. Avg.	SHD minus TCD (Diff)		Shd	SPP Wt. Avg	Kwk	Bsf	Jlf	Bnd	Rdb	Lws	Control Point 4/1 Ccr	Igo			Shasta Generation El 815	Spring Crk Powerplant Release	Keswick Total Release	RDD	BSF	RDB	LWS
Mar	50.4			49.7	51.1	50.9	56.1	54.8	55.1	56.0	50.6	52.2	51.5			2,939	40	2,992	60.7	62.2	59.9	51.4
Apr																						
1	50.5	(0.8)	?	49.7	51.8	51.7	54.7	55.8	56.2	57.8	52.0	53.0	51.9			3,189	15	3,055	56.5	53.2	56.1	44.3
2	50.5	(50.5)	!		51.7	51.4	54.3	55.1	55.4	56.6	52.3	52.9	51.9			3,141	26	3,221	59.0	56.8	58.8	45.9
3	50.4	(50.4)	!		51.8	50.9	54.2	55.2	55.5	56.6	52.5	52.6	52.1			2,783	14	3,138	56.0	53.8	58.3	48.1
4	50.1	(0.8)	?	49.3	51.9	51.0	54.4	55.5	55.9	57.0	52.9	52.5	52.8			2,857	15	3,044	58.0	56.5	59.5	49.8
5	50.5	(1.3)	?	49.2	51.9	50.8	53.0	54.0	54.3	55.5	52.2	51.5	51.6			2,888	14	2,962	47.5	48.4	51.5	42.3
6	50.3	(1.0)		49.3	51.9	50.7	52.4	52.7	52.7	53.5	51.2	51.4	50.6			2,830	14	2,878	49.0	47.9	48.6	40.7
7	50.5	(1.1)		49.4	51.7	50.3	51.6	52.5	52.8	53.0	51.4	50.5	50.6			2,978	16	2,745	49.5	47.5	48.8	41.5
8	50.5	(1.0)		49.5	51.6	49.9	52.2	52.4	52.5	53.3	51.6	51.3	51.1			3,424	16	2,719	52.0	49.7	50.8	44.2
9	50.9	(1.2)		49.7	51.7	50.1	53.3	54.2	54.5	54.9	51.4	51.6	51.9			2,203	16	2,964	53.5	50.3	52.6	48.1
10	50.6	(1.0)		49.6	51.8	50.5	54.3	55.4	55.9	56.5	51.4	52.1	52.5			2,811	14	2,968	57.0	54.3	56.6	49.7
11	50.7	(1.1)		49.6	51.9	51.2	55.2	56.4	57.1	57.9	51.7	52.7	52.8			2,586	14	2,969	61.5	59.8	62.0	53.4
12	50.9	(0.4)		50.5	51.9	51.6	55.2	56.6	57.3	58.4	51.8	53.3	53.1			2,199	20	2,971	66.5	60.0	62.1	52.7
13	51.0	(2.0)		49.0	51.8	51.5	56.2	57.6	58.2	59.0	52.0	53.7	53.3			3,105	19	2,968	62.5	59.0	61.7	52.2
14	50.7	(1.2)		49.5	52.1	51.8	55.4	56.8	57.5	58.5	51.7	53.0	53.0			2,776	14	2,967	57.5	55.1	56.2	47.1
15	50.8	(1.6)		49.2	52.4	51.8	54.9	55.9	56.4	57.5	52.1	53.3	52.7			3,051	14	2,967	61.5	60.3	61.2	48.3
16	50.9	(0.7)		50.2	52.9	51.5	56.0	57.0	57.5	58.2	52.7	53.6	53.5			2,714	15	3,332	^ 69.5	64.2	64.3	54.8
17	51.1	(1.3)		49.8	52.6	51.5	56.0	57.4	58.3	59.6	52.9	53.5	53.9			3,353	17	3,716	^ 65.0	62.4	64.8	59.1
18	51.0	(0.1)		50.9	52.5	52.4	56.5	58.1	58.9	60.1	53.2	54.2	54.5			3,148	16	3,690	^ 70.0	65.6	66.0	61.1
19	51.1	(0.6)		50.5	52.5	52.5	57.4	59.1	59.9	61.0	53.2	54.7	54.7			2,734	20	3,689	^ 76.0	68.5	70.7	62.3
20	51.0	(0.6)		50.4	52.5	52.4	57.4	59.2	60.1	61.7	53.2	54.7	54.7			3,120	16	3,689	71.5	66.5	69.3	62.3
21	51.2	(0.8)		50.4	52.6	52.5	57.7	59.5	60.5	62.0	53.1	54.9	55.1			3,370	14	4,187	69.0	65.5	66.1	60.6
22	51.2	(0.2)		51.0	52.6	53.0	57.5	59.4	60.4	62.2	53.0	54.8	55.1			3,476	14	4,689	70.0	67.5	68.3	59.6
23		0.0																				
24		0.0																				
25		0.0																				
26		0.0																				
27		0.0																				
28		0.0																				
29		0.0																				
30		0.0																				
Avg	50.7			49.8	52.1	51.4	55.0	56.2	56.7	57.8	52.3	53.0	52.9	####		2,943	16	3,251	60.8	57.9	59.7	51.3
Tot cfs																64,736	353	71,528				
Tot af																128,404	700	141,876				

? = Average includes 1-9 estimated hourly readings ! = No Average (10-17 hours missing) & = No Average (18 to 23 hours missing)

= Station out of service ND = No hourly readings or incorrect

When available:
^ = Redding Air Temp Record High
* = Redding Air Temp Record Low

Control Point: Clear Creek 4/1/2015 to present 56.0.

DRAFT April 2015

90%-Runoff Exceedance Outlook:

Inflow based on the DWR April 2015 B120 Apr-Sep and 90% Historical Inflows Oct-Dec

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

		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Trinity		1179	1012	877	754	629	539	508	476	460
Shasta	2689	2633	2337	2035	1673	1353	1146	1065	1075	1100
Elev.		991	976	959	937	915	898	891	892	894

Monthly River Releases (cfs)

Keswick	4300	7500	8500	9000	8500	6500	5000	4000	4000

Trinity Diversions (TAF)

Carr PP	39	22	97	98	97	62	15	28	19
Spring Crk. PP	8	15	90	90	90	60	30	19	12

April Forecast Assumptions:

With TUCP relaxations

SRSC coordination diversion ops

Please note:

CVP actual operations do not follow any forecasted operation or outlook; actual operations are based on real-time conditions.

CVP operational forecasts or outlooks consider general system-wide dynamics and do not necessarily address specific watershed/tributary details.

CVP releases represent monthly averages.

CVP operations are updated monthly as new hydrology information is made available December through May.

April 23, 2015

Upper Sacramento River – April 2015 Preliminary Temperature Analysis

Summary of Temperature Target Results by Month

Initial Target Location	JUN	JUL	AUG	SEP	OCT
90%-Exceedance Outlook					
Sac. R. above Clear Creek (CCR~56˚F to 56.5+˚F)	CCR	CCR	CCR	CCR	CCR

Temperature Model Inputs, Assumptions, Limitations and Uncertainty:

1. Operation is based on the April 2015 Operation Outlooks (monthly flows, reservoir release, and end-of-month reservoir storage) for the 90% exceedances.
2. The profiles used for Shasta, Trinity and Whiskeytown were taken on April 8, April 15, and April 8, 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 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.

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 above Clear Creek is possible through September (Figure 1). By October, the TCD intake level will be through the side gates.

Figure 2 shows temperature results for Clear Creek at Igo.

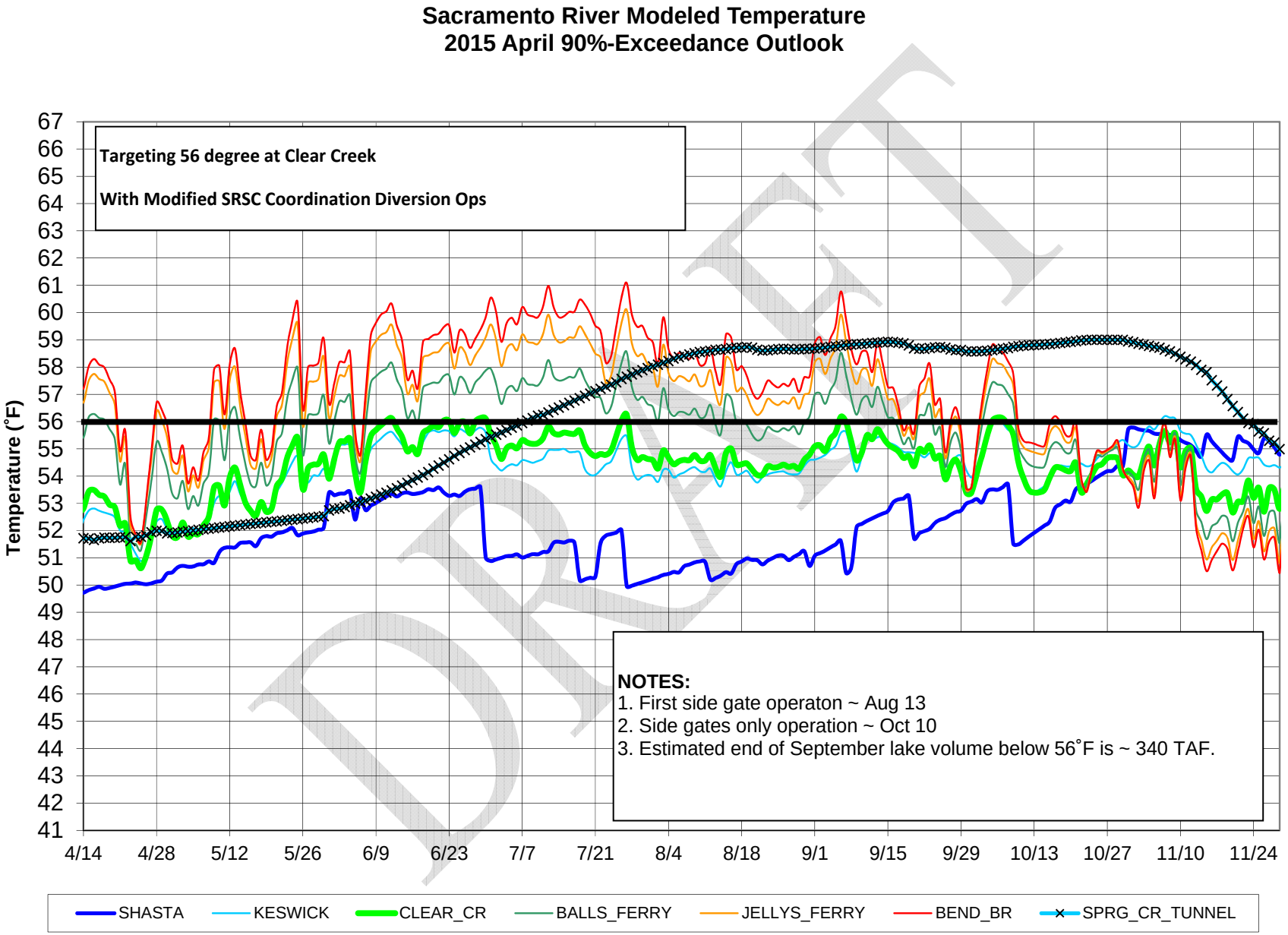

Sacramento River Modeled Temperature
2015 April 90%-Exceedance Outlook
Targeting 56 degree at Clear Creek
With Modified SRSC Coordination Diversion Ops
Temperature (˚F)
67
66
65
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
4/14
4/28
5/12
5/26
6/9
6/23
7/7
7/21
8/4
8/18
9/1
9/15
9/29
10/13
10/27
11/10
11/24
NOTES:
1. First side gate operaton ~ Aug 13
2. Side gates only operation ~ Oct 10
3. Estimated end of September lake volume below 56˚F is ~ 340 TAF.
SHASTA
KESWICK
CLEAR_CR
BALLS_FERRY
JELLYS_FERRY
BEND_BR
SPRG_CR_TUNNEL

Figure 1

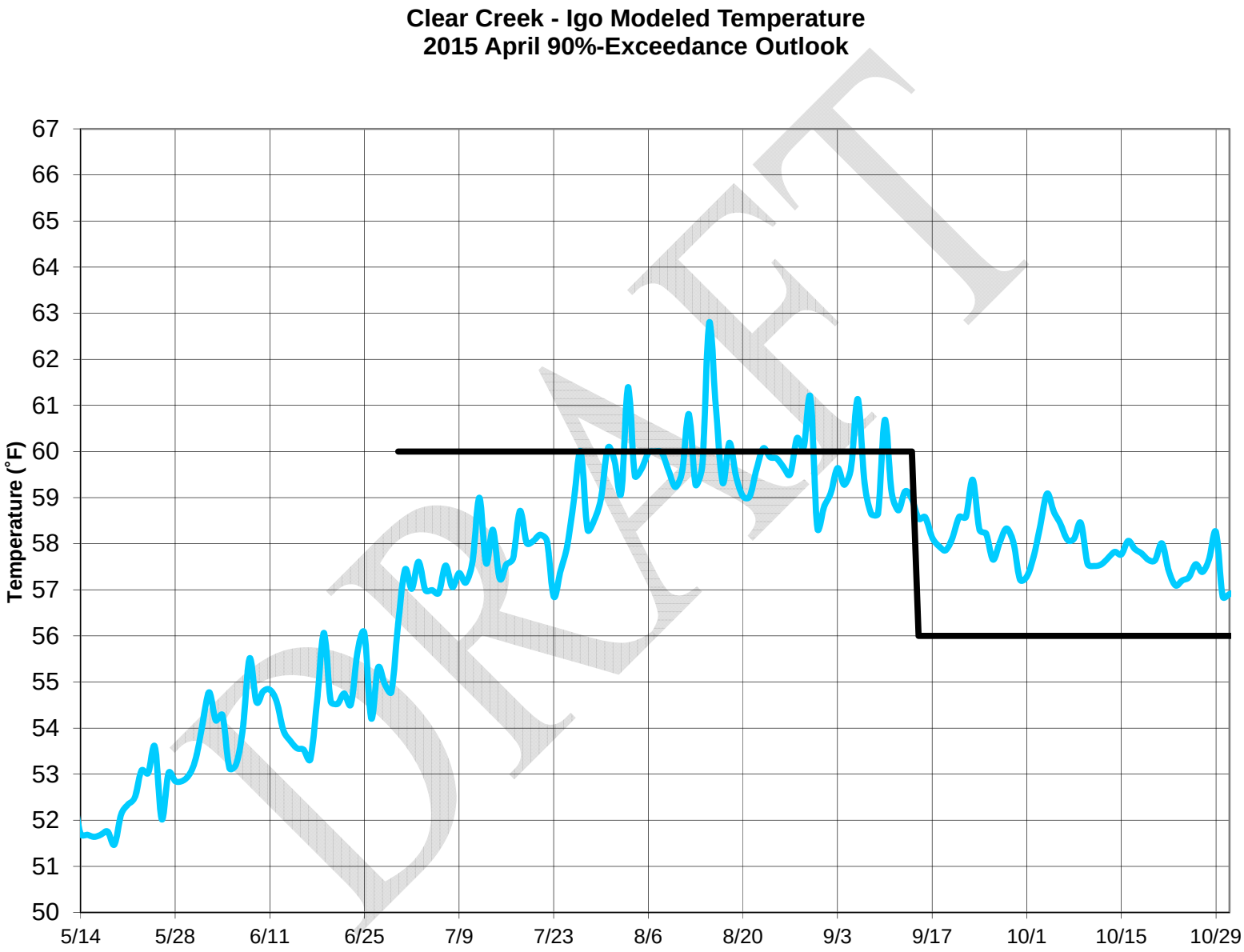
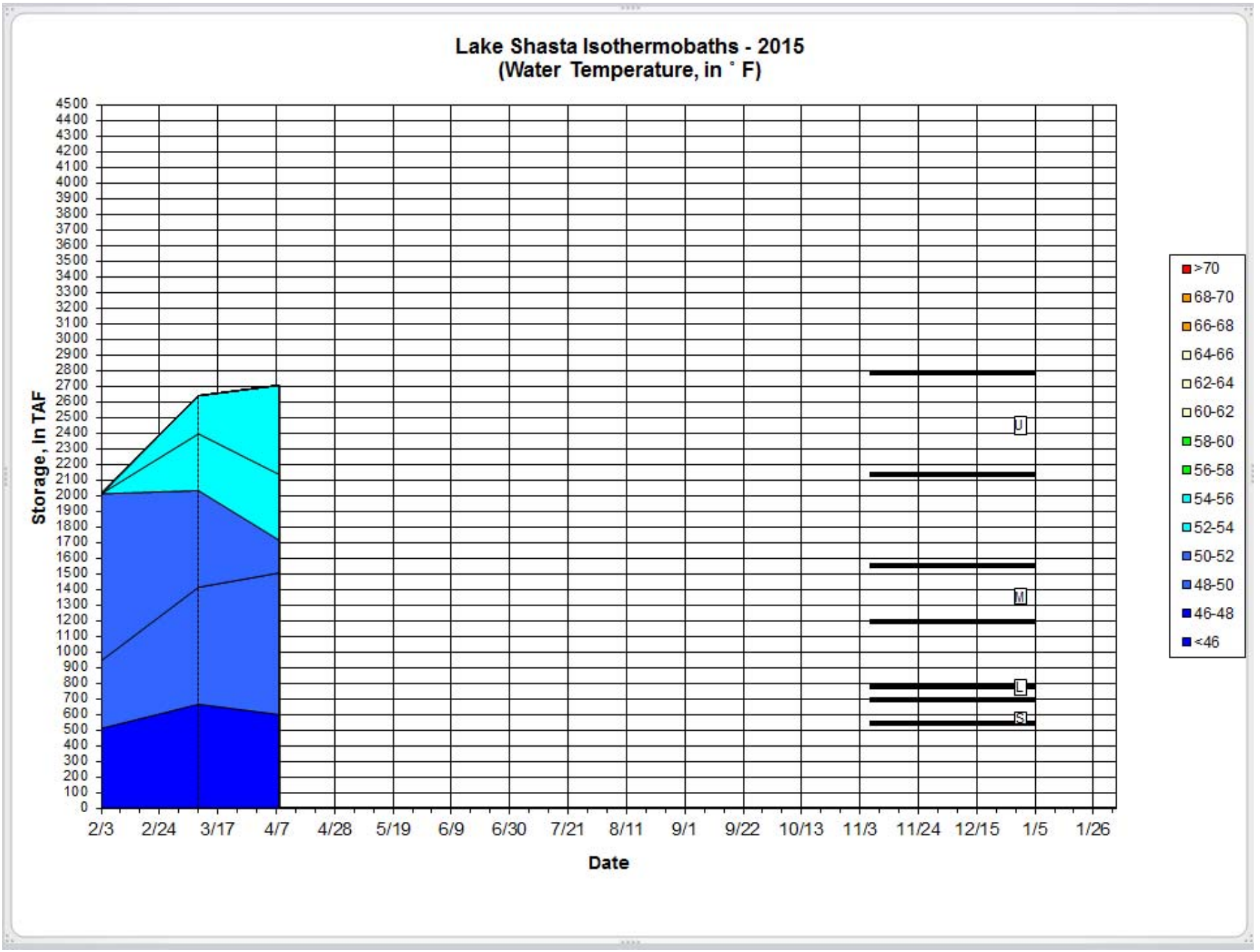

Clear Creek - Igo Modeled Temperature
2015 April 90%-Exceedance Outlook
Temperature (°F)
67
66
65
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
5/14
5/28
6/11
6/25
7/9
7/23
8/6
8/20
9/3
9/17
10/1
10/15
10/29
DRAFT

Figure 2


Lake Shasta Isothermobaths - 2015
(Water Temperature, in ˚ F)
Storage, In TAF
4500
4400
4300
4200
4100
4000
3900
3800
3700
3600
3500
3400
3300
3200
3100
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
2/3
2/24
3/17
4/7
4/28
5/19
6/9
6/30
7/21
8/11
9/1
9/22
10/13
11/3
11/24
12/15
1/5
1/26
Date
U
M
L
SL
>70
68-70
66-68
64-66
62-64
60-62
58-60
56-58
54-56
52-54
50-52
48-50
46-48
<46