

Sacramento River Temperature Task Group Meeting September 27, 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 ***
 - b. September 50% Forecast ***
4. Discussion of recent temperature model runs
 - a. Temperature studies packet ***
5. Temperature Review for September
 - a. August and September monthly temp report ***
 - b. Moving the control point from Jellys Ferry to Balls Ferry
6. Trinity Fall flows – update
7. Next meeting: Thursday, October 25th

***handouts

DAILY CVP WATER SUPPLY REPORT

SEPTEMBER 24, 2012

RUN DATE: September 25, 2012

RESERVOIR RELEASES IN CUBIC FEET/SECOND

RESERVOIR	DAM	WY 2011	WY 2012	15 YR MEDIAN
TRINITY	LEWISTON	473	453	450
SACRAMENTO	KESWICK	9,015	7,530	7,619
FEATHER	OROVILLE (SWP)	7,500	4,000	3,000
AMERICAN	NIMBUS	3,952	1,791	1,749
STANISLAUS	GOODWIN	2,265	256	251
SAN JOAQUIN	FRIANT	349	267	242

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	1,687	2,189	1,822	108
SHASTA	4,552	2,720	3,384	2,619	96
OROVILLE (SWP)	3,538	2,064	3,113	2,001	97
FOLSOM	977	553	758	461	83
NEW MELONES	2,420	1,565	2,079	1,514	97
FED. SAN LUIS	966	309	632	240	78
MILLERTON	520	260	374	313	120
TOT. N. CVP	11,360	6,834	9,042	6,656	97

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	1,009	218	2,883	1,437	70
SHASTA	3,939	2,566	10,740	5,913	67
FOLSOM	1,725	352	6,508	2,654	65
NEW MELONES	599	0	2,737	1,091	55
MILLERTON	1,022	369	4,662	1,774	58

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	15.44	58.10	32.65 (50)	80	0.00
SACRAMENTO AT SHASTA DAM	43.53	24.23	116.50	62.96 (55)	69	0.00
AMERICAN AT BLUE CANYON	57.30	17.57	104.31	66.00 (37)	87	0.00
STANISLAUS AT NEW MELONES	22.40	0.00	46.58	27.48 (34)	81	0.00
SAN JOAQUIN AT HUNTINGTON LK	24.89	17.60	83.40	43.49 (37)	57	0.00

Storages

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

		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
Trinity		1934	1815	1764	1741	1723	1782	1893	2021	2176	2130	1992	1837	1716
	Elev.	2328	2324	2322	2321	2325	2333	2342	2353	2350	2340	2329	2320	
Whiskeytown		238	238	206	206	206	206	206	238	238	238	238	238	238
	Elev.	1209	1199	1199	1199	1199	1199	1199	1209	1209	1209	1209	1209	1209
Shasta		2794.5	2561	2486	2516	2677	3092	3659	3998	4132	4048	3718	3130	2798
	Elev.	987	984	985	993	1012	1035	1048	1052	1049	1037	1013	999	
Folsom		502.7	451	419	390	379	376	430	510	695	909	887	753	616
	Elev.	410	406	402	400	400	407	418	439	460	458	445	430	
New Melones		1556.4	1474	1447	1457	1475	1502	1562	1625	1653	1692	1687	1579	1468
	Elev.	1000	997	998	1000	1003	1010	1016	1019	1023	1022	1011	1000	
San Luis		196.5	238	405	613	849	924	967	966	823	586	344	160	73
	Elev.	402	419	445	490	496	500	511	490	448	394	360	340	
Total		6777	6727	6922	7308	7882	8716	9326	9717	9602	8866	7697	6909	

State End of the Month Reservoir Storage (TAF)

Oroville		2229.5	1948	1874	1807	1823	1989	2341	2681	3026	3100	2931	2428	2043
	Elev.	778	770	764	765	782	813	841	866	871	859	820	787	
San Luis		402	302	273	312	550	540	538	664	574	362	135	82	63
Total San Luis (TAF)		598	539	678	925	1399	1464	1506	1631	1397	948	479	242	136

Monthly River Releases (TAF/cfs)

Trinity	TAF	27	23	18	18	18	17	18	28	258	126	68	28
	cfs	450	373	300	300	300	300	300	477	4,189	2,120	1,102	450
Clear Creek	TAF	9	12	12	12	12	11	12	12	12	12	5	5
	cfs	150	200	200	200	200	200	200	200	200	200	85	85
Sacramento	TAF	506	369	297	277	200	194	492	476	553	714	891	615
	cfs	8500	6000	5000	4500	3250	3500	8000	8000	9000	12000	14500	10000
American	TAF	113	108	119	123	154	208	231	238	246	238	246	231
	cfs	1900	1750	2000	2000	2500	3750	3750	4000	4000	4000	4000	3750
Stanislaus	TAF	15	48	18	19	19	17	18	52	92	35	25	22
	cfs	255	774	305	305	305	305	300	874	1500	592	400	366
Feather	TAF	327	114	104	108	108	97	108	178	184	238	461	383
	cfs	5500	1850	1750	1750	1750	1750	1750	3000	3000	4000	7500	6230

Trinity Diversions (TAF)

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Carr PP	99	38	35	57	6	1	1	21	1	106	105	96
Spring Crk. PP	90	60	30	60	28	34	26	1	3	100	100	90

Delta Summary (TAF)

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Tracy	268	282	274	282	125	130	163	48	49	170	279	282
USBR Banks	25	25	0	0	0	0	0	0	0	0	24	24
Contra Costa	14	16.8	18.4	18.3	14	14	12.7	12.7	12.7	9.8	11.1	12.7
Total USBR	307	324	292	300	139	144	176	60	62	180	314	319
State Export	298	282	290	420	125	140	175	42	43	170	384	410
Total Export	605	606	582	720	264	284	351	102	105	350	698	729
COA Balance	0	0	0	0	0	0	0	0	0	0	0	0

Old/Middle R. std.												
Old/Middle R. calc.	-7,988	-7,259	-7,333	-8,831	-3,042	-2,908	-3,340	-351	-490	-4,496	-8,869	-9,282

Computed DOI	4757	4522	5530	7532	17845	24332	27492	21752	19260	7447	6523	4051
Excess Outflow	1748	16	1025	3026	11843	12931	16088	12254	7857	17	16	49
% Export/Inflow	61%	65%	63%	63%	19%	17%	16%	6%	7%	33%	52%	64%
% Export/Inflow std.	65%	65%	65%	65%	65%	35%	35%	35%	35%	35%	65%	65%

Hydrology

Water Year Inflow (TAF)	Clair Engle	Shasta	Folsom	New Melones
Year to Date + Forecasted	1019	3,999	1,746	604
% of mean	84%	72%	64%	57%

Upper Sacramento River – September 2012 Preliminary Temperature Analysis

Summary of Temperature Compliance Results by Month

Initial Compliance Location	SEP	OCT
September 2012 50%-Exceedence Outlook		
Jellys Ferry (JLF)	JLF	BSF

Temperature Analysis Results:

Jellys Ferry: The SRTTG decided to move the target location upstream to Balls Ferry in October; however, the end-of-September cold-water pool in Lake Shasta suggests Jellys Ferry (Figure 1) is still possible through fall, although conditions aren't as favorable as in previous month's projections. High basin depletions through much of the summer influenced Keswick Dam release rates, which were somewhat higher than anticipated.

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 September 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 **September 19, August 28, and September 20**, 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 September 50%-Exceedance Outlook

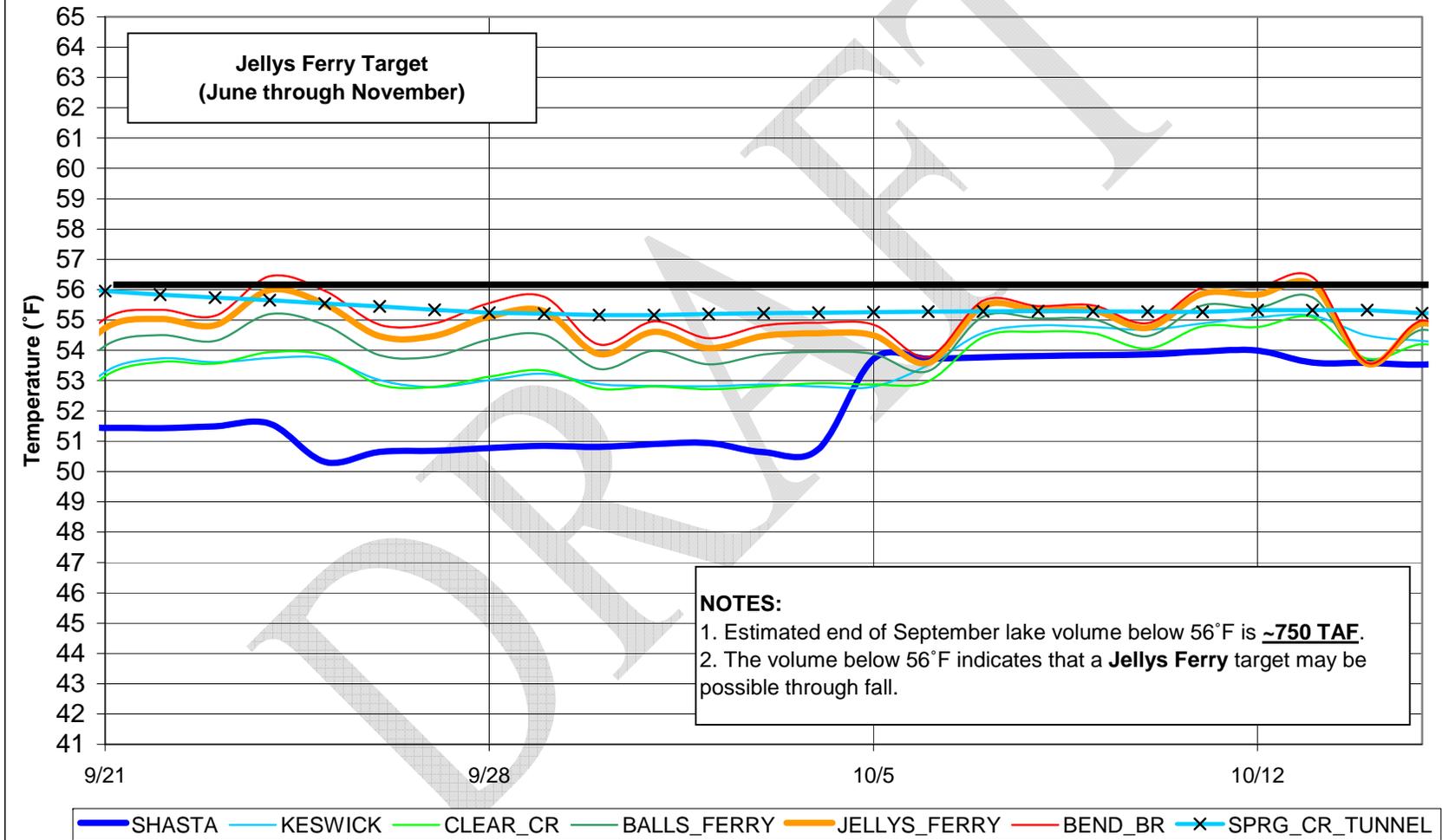


Figure 1

Clear Creek - Igo Modeled Temperature 2012 September 50%-Exceedance Outlook

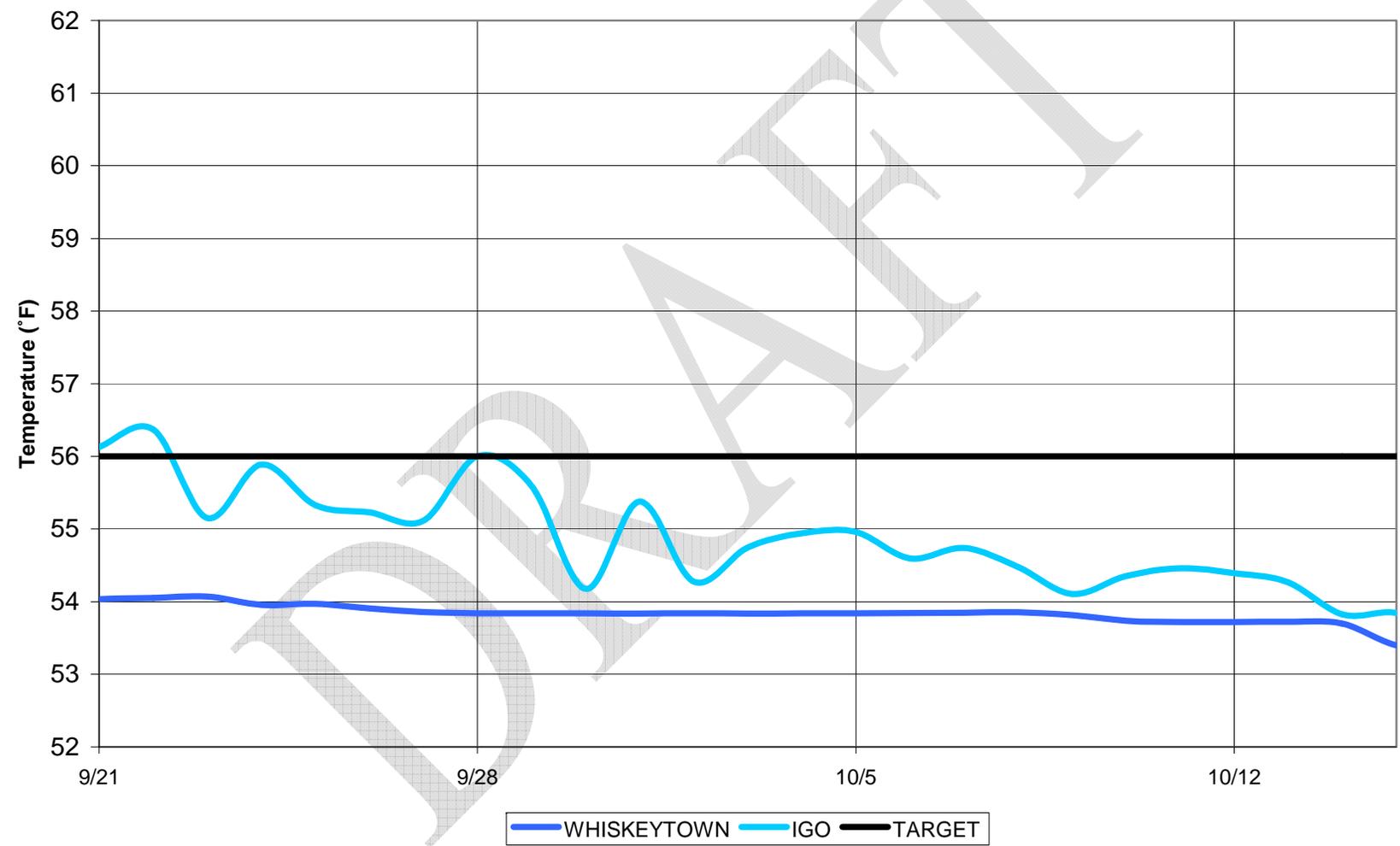


Figure 2

**Trinity River - 2012 September 50%-Exceedance Outlook
"Normal Year" Release Schedule
Mean Daily Water Temperature**

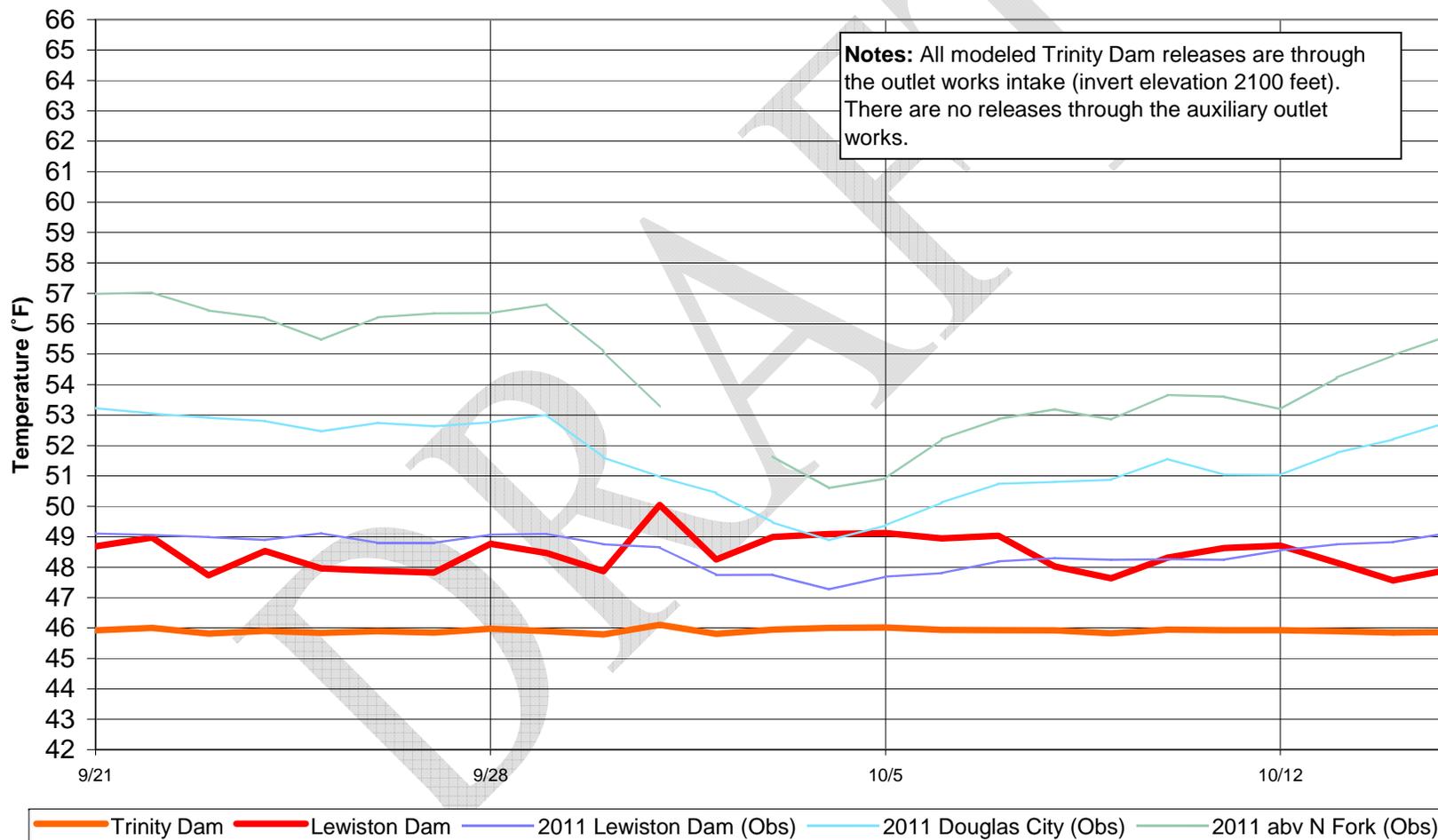
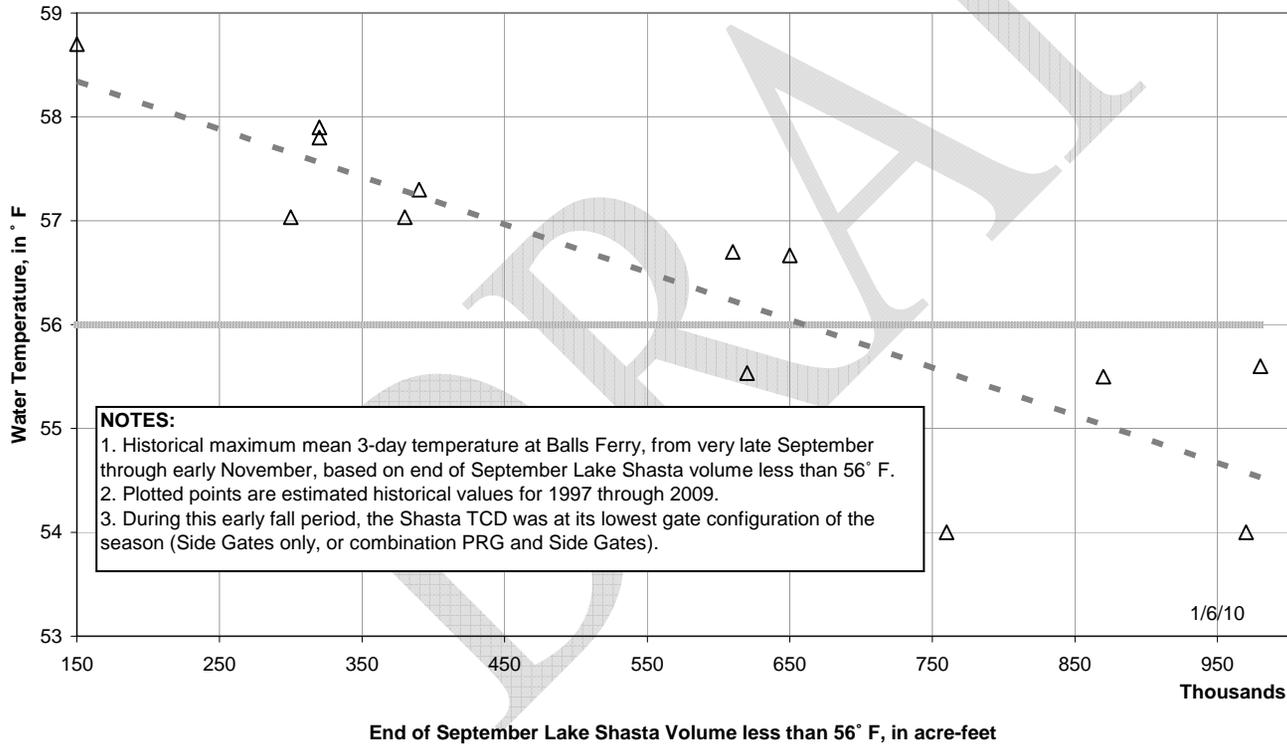


Figure 3

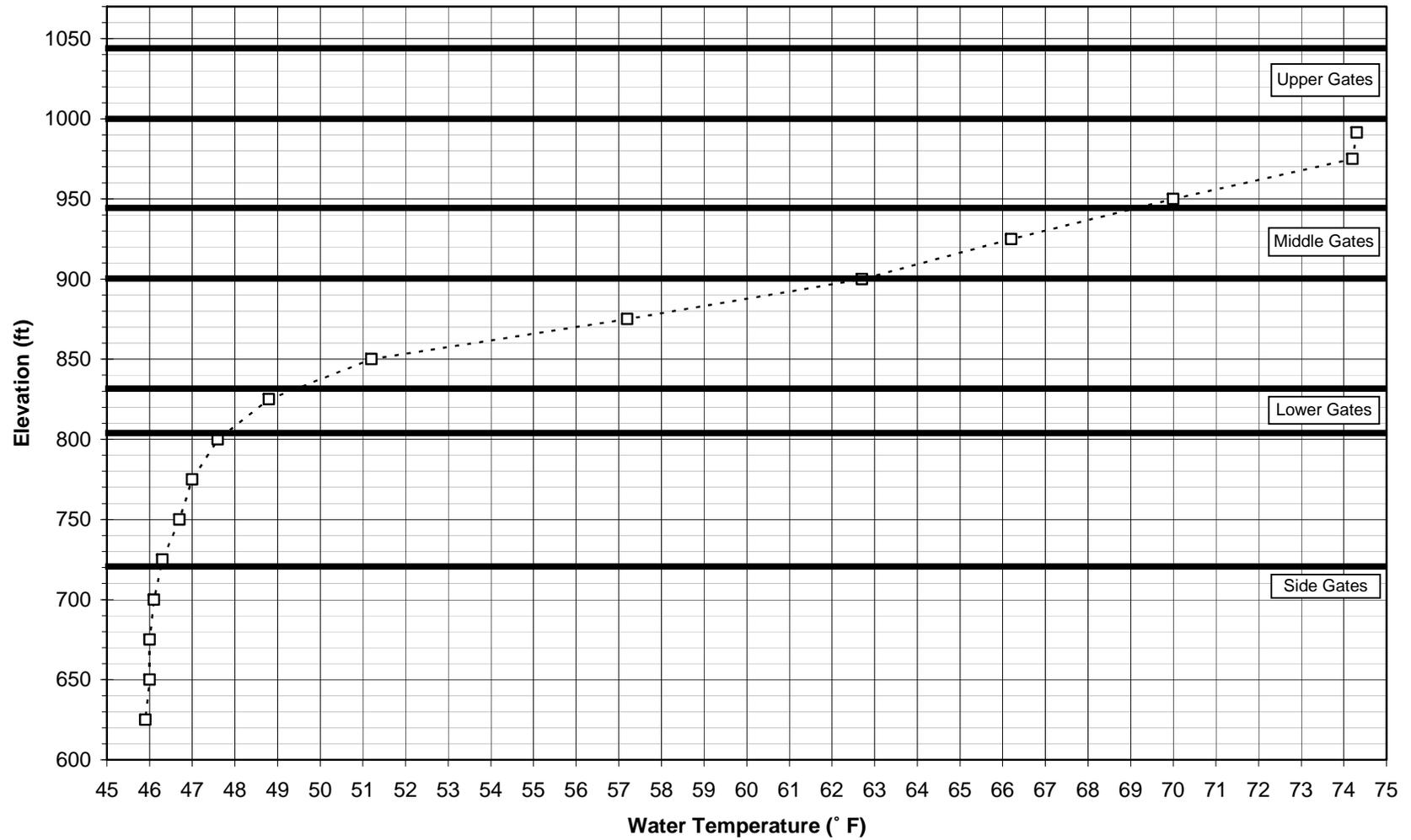
Model Performance and Fall Temperature Index:

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:

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



Lake Shasta Temperature Profile - 09/19/12



9/10/2012

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 8/31 Jlf	Bnd	Rdb	Lws	Ccr	Igo	Shasta Generation EI 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	77.1	
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	49.5	(1.0)	48.5	57.2	50.6	53.0	54.1	54.5	56.1	49.8	51.7	57.0	9,649	1,520	11,758	81.0	75.6	76.4	72.5	
23	49.5	(1.0)	48.5	57.2	50.8	53.2	54.3	54.7	56.4	49.8	51.9	57.0	9,173	1,489	11,501	79.5	74.3	74.7	71.5	
24	49.6	(1.1)	48.5	57.2	50.8	53.1	54.2	54.7	56.4	49.7	51.8	56.5	9,070	1,529	11,503	80.5	74.8	76.5	70.1	
25	49.7	(1.1)	48.6	57.2	50.8	53.0	54.2	54.6	56.3	49.6	51.7	56.0	8,667	1,467	11,100	77.5	72.5	73.9	68.8	
26	49.7	(1.1)	48.6	57.1	50.7	53.2	54.4	54.8	56.4	49.6	51.8	56.3	8,802	1,238	11,001	72.0	68.5	68.9	65.0	
27	49.8	(1.1)	48.7	57.2	50.6	53.0	54.2	54.7	56.3	49.6	51.7	56.0	9,335	1,173	11,008	71.5	67.7	68.6	64.8	
28	49.7	(1.0)	48.7	57.1	50.6	52.9	54.0	54.4	56.1	49.7	51.6	55.9	9,130	1,159	11,038	73.5	68.8	71.2	66.0	
29	49.7	(1.0)	48.7	57.1	51.0	53.1	54.1	54.5	56.0	49.5	52.0	56.4	8,192	1,562	10,802	76.5	71.6	73.3	66.8	
30	49.7	(1.0)	48.7	57.1	51.0	53.1	54.2	54.7	56.1	49.4	51.9	55.8	7,896	1,550	10,506	76.0	70.5	73.8	66.3	
31	49.7	(0.9)	48.8	57.0	51.1	53.5	54.6	54.9	56.4	49.1	52.2	55.8	8,020	1,523	10,502	70.5	67.0	67.4	65.7	
Avg	50.6		49.5	57.0	51.7	54.0	55.1	55.5	57.2	51.1	52.7	57.0	10,372	1,459	12,506	81.7	76.8	77.5	72.7	
Tot cfs													321,540	45,219	387,695					
Tot af													637,775	89,692	768,993					

= 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 8/31/2012

Temperature and Release Summary for Shasta and Trinity - September 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	Dgc	Shasta Generation EI 815	Spring Crk Powerplant Release	Keswick Total Release	RDD	BSF	RDB	LWS
Aug	50.6		49.5	57.0	51.7	54.0	55.1	55.5	57.2	51.1	52.7	57.0		10,372	1,459	12,506	81.7	76.8	77.5	72.7
Sep																				
1	49.8	(1.1)	48.7	56.9	51.1	53.4	54.5	54.9	56.6	49.4	52.1	56.0	51.9	7,748	1,529	10,511	71.0	67.5	66.5	65.9
2	49.8	(1.0)	48.8	56.9	51.1	53.3	54.3	54.7	56.2	49.1	52.1	55.9	52.0	7,987	1,528	10,507	75.0	68.8	68.7	66.8
3	49.9	(1.1)	48.8	56.8	51.0	53.4	54.5	55.0	56.5	49.1	52.1	56.4	52.0	8,023	1,530	10,036	76.5	71.0	73.5	68.9
4	50.0	(1.1)	48.9	56.8	51.2	53.5	54.6	55.1	56.8	49.2	52.2	56.3	52.2	8,059	1,528	10,013	77.5	72.5	74.8	68.8
5	50.0	(1.1)	48.9	56.7	51.0	53.3	54.6	55.0	56.6	49.2	52.1	56.0	52.0	7,197	1,166	9,534	77.0	71.5	74.3	66.3
6	49.9	(0.9)	49.0	56.6	51.3	53.7	55.1	55.7	57.3	49.4	52.5	56.7	52.5	6,657	1,498	9,101	78.0	73.6	75.9	67.7
7	50.0	(1.1)	48.9	56.5	51.5	53.9	55.2	55.8	57.5	49.4	52.6	56.4	52.7	5,104	1,557	9,081	76.0	71.4	73.6	68.2
8	50.1	(1.1)	49.0	56.5	51.5	54.0	55.5	56.1	57.9	49.5	52.7	56.9	52.8	5,353	1,568	9,088	79.5	74.6	75.5	69.2
9	50.3	(1.3)	49.0	56.5	51.5	54.2	55.5	56.0	57.9	49.2	52.8	56.6	51.9	6,752	1,561	8,456	76.0	70.8	71.9	63.5
10	50.1	(1.1)	49.0	56.5	51.5	54.0	55.2	55.8	57.7	49.2	52.7	56.3	52.0	7,014	1,387	8,472	75.5	70.2	72.4	64.2
11	50.1	(1.0)	49.1	56.5	51.4	54.2	55.3	55.8	57.6	49.2	52.6	56.5	51.9	6,890	1,110	8,516	76.5	71.4	73.5	66.1
12	50.1	(1.1)	49.0	56.4	51.3	54.1	55.4	55.9	57.7	49.2	52.5	56.2	51.9	5,593	1,116	8,045	77.0	71.2	72.7	67.8
13	50.4	(1.3)	49.1	56.4	51.6	54.3	55.5	56.0	57.8	49.0	52.7	56.5	52.0	5,808	1,381	8,014	78.5	72.8	75.1	69.6
14	50.4	(1.3)	49.1	56.3	51.7	54.5	55.6	56.3	57.9	49.1	52.8	56.4	51.9	5,779	1,382	8,000	78.5	73.2	75.4	69.5
15	50.4	(1.3)	49.1	56.3	51.9	54.8	55.9	56.5	58.2	49.1	53.2	56.4	52.0	5,723	1,356	7,992	77.0	71.7	73.2	67.9
16	50.4	(1.2)	49.2	56.3	52.0	54.5	55.7	56.3	58.1	49.2	53.1	55.8	51.7	5,500	1,329	8,006	74.5	69.2	72.9	65.9
17	50.4	(1.0)	49.4	56.2	51.9	54.6	55.8	56.3	58.0	49.1	53.1	55.8	51.6	5,905	1,376	7,999	79.0	71.8	74.8	66.2
18	50.4	(1.0)	49.4	56.2	52.0	54.7	55.9	56.5	58.3	49.3	53.0	56.2	51.8	5,459	1,467	8,011	75.5	70.8	73.2	67.2
19	50.3	(0.9)	49.4	56.1	52.1	54.6	55.8	56.2	58.0	50.0	53.1	56.2	52.5	5,729	1,506	7,999	74.5	69.0	71.0	66.1
20	50.5	(1.1)	49.4	56.2	51.9	54.5	55.6	56.0	57.9	50.2	52.9	55.7	53.2	6,035	1,193	7,986	74.5	69.3	71.4	65.4
21	49.1	(0.4)	48.7	56.1	51.8	54.4	55.6	56.1	57.7	50.2	52.9	55.8	53.2	5,462	1,175	7,545	75.0	69.4	72.5	63.8
22	49.2	(0.9)	48.3	56.1	51.7	54.5	55.6	56.1	57.6	50.2	52.9	55.9	52.9	5,354	1,529	7,506	75.0	69.2	72.2	63.2
23	49.2	(0.9)	48.3	56.0	51.2	54.3	55.5	56.1	57.8	50.5	52.4	56.3	54.1	4,886	1,517	7,497	78.0	71.0	73.4	67.7
24	49.3	(0.9)	48.4	56.0	51.5	54.0	55.2	55.7	57.4	50.2	52.5	56.5	53.3	5,110	1,544	7,530	78.0	69.8	72.4	62.8
25	49.4	(0.9)	48.5	56.0	51.1	54.0	55.2	55.6	57.2	50.3	52.2	56.5	53.0	5,364	1,544	7,511	79.5	70.0	74.8	63.3
26		0.0																		
27		0.0																		
28		0.0																		
29		0.0																		
30		0.0																		
Avg	50.0		48.9	56.4	51.5	54.1	55.3	55.8	57.5	49.5	52.6	56.2		6,180	1,415	8,518	76.5	70.9	73.0	66.5
Tot cfs														154,491	35,377	212,956				
Tot af														306,433	70,170	422,398				

= 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; Jellies Ferry 6/1/2012 to

PRELIMINARY