

Sacramento River Temperature Task Group Meeting

May 26, 2016 -- 1:00 pm

Conference Line: 877-718-6527

Pass code: 1954134

Agenda

1. Introductions
2. Fishery update
 - a. Arial REDD counts table
3. Hydrology & Operations update (information is available on CVO's web-page)
 - a. Mean Daily Water Temperatures
 - b. Reading 10-Day Forecasted Air Temperatures
 - c. Sac River Gage temp plot and air temp plot
 - d. Lake Shasta Isothermalbaths Plot
 - e. Lake Shasta Current TCD Configuration
4. May Temperature studies
 - a. April 90% Temperature Model
 - b. Temperature control point – Daily Average Temp vs. 7DADM
5. Next meeting -- June 23, 2016

2016 Winter-Run Carcass counts by river area as of 5-23-16			
Section	Carcasses	2016 Percent	% Average years (2003-2015)
1- Keswick Dam to ACID Dam (rm 302 to 298)	2	13.3%	36.5%
2- ACID Dam to Hwy 44 Brg (rm 296)	10	66.7%	38.8%
3- Hwy 44 Brg down to Clear Crk Powerlines (rm 288)	2	13.3%	21.4%
4- Clear Crk Pwrl to Balls Ferry Brg (rm 276)	1	6.7%	3.2%
Total	15	100.0%	100.0%

2016 Winter-Run aerial Redd counts by river area as of 5-19-16					
Flight Sections		river mile	Redds	2016 Percent	% Average (2003-2015)
Keswick to A.C.I.D. Dam.	Carcass Section 1	298	0	0.0%	44.5%
A.C.I.D. Dam to Highway 44 Bridge.	Carcass Section 2	296	1	50.0%	43.6%
Highway 44 Br. to below Clear Crk	Carcass Section 3	284	1	50.0%	11.3%
Below Clear Crk. to Balls Ferry Br.	Carcass Section 4	275	0	0.0%	0.0%
Balls Ferry Br. to Battle Creek.	Below Carcass	271	0	0.0%	0.2%
Battle Creek to Jellys Ferry Br.	Below Carcass	266	0	0.0%	0.1%
Jellys Ferry Br. to Bend Bridge	Below Carcass	257	0	0.0%	0.1%
Bend Bridge to Red Bluff Diversion Dam	Below Carcass	242	0	0.0%	0.1%
Red Bluff Diversion Dam to Tehama Br.	Below Carcass	229	0	0.0%	0.0%
		total	2	100%	100%

DATE	Mean Daily Water Temperatures (°F)													Mean Daily Release (CFS)			Mean Daily Air Temperatures (°F)			
	TCD ¹	SHD	SPP ¹	KWK	SAC	CCR ²	BSF	JLF	BND	RDB	IGO	LWS	----- ³	Shasta Generation	Spring Creek P.P.	Keswick Total	RDD	BSF	RDB	LWS
Apr	51.9	50.6	51.7	52.4	53.1	53.6	-	57.1	57.5	58.5	52.5	52.2	-	4518	88	4684	64.3	61.1	62.8	55.4
05/01	53.5	51.9	53.9	54.4	55.2	55.8	#	59.4	59.8	60.8	53.4	48.4	-	5242	14	5178	72.0	70.3	71.8	58.1
05/02	53.0	52.3	54.3	54.6	55.5	56.1	#	60.1	60.6	61.9	53.4	47.9	-	5090	14	5192	68.0	65.3	67.8	58.6
05/03	53.6	!	54.5	54.4	54.9	55.4	#	59.4	60.1	61.6	52.7	47.8	-	5425	14	5192	69.5	64.9	67.8	56.1
05/04	54.2	!	54.6	53.9	54.3	54.8	#	58.3	58.8	60.1	52.9	47.6	-	5403	14	5672	69.5	63.5	66.0	56.3
05/05	52.8	?	51.6	54.6	54.0	54.6	#	58.6	58.8	59.7	53.6	46.6	-	5577	14	5696	67.0	60.3	59.6	54.3
05/06	53.3	?	51.9	54.5	54.2	54.6	#	57.8	58.3	59.5	52.9	46.5	-	5974	14	5692	60.5	58.7	59.1	54.7
05/07	52.8	?	51.6	54.5	53.4	53.6	#	56.8	57.2	58.1	52.5	46.3	-	5855	14	5756	59.5	58.6	59.1	57.8
05/08	53.2	52.2	53.9	53.0	53.7	54.3	#	57.3	57.4	58.1	53.0	46.7	-	5462	14	5842	65.5	63.2	63.2	61.3
05/09	52.2	51.9	53.4	53.3	54.1	54.7	#	58.7	59.2	60.8	54.2	46.8	-	5628	14	5953	72.0	68.1	67.8	63.9
05/10	52.0	51.0	53.3	54.1	54.8	55.4	!	59.5	59.9	61.4	54.1	46.1	-	6251	14	6237	73.5	68.1	70.5	62.0
05/11	52.1	50.8	53.5	52.9	53.9	54.8	57.9	59.5	60.1	61.6	53.7	46.2	-	5895	14	6242	71.5	67.9	71.7	62.0
05/12	51.7	50.5	53.3	52.9	53.7	54.4	57.6	58.9	59.8	61.5	53.9	46.6	-	5890	14	6241	72.0	68.9	71.0	62.5
05/13	51.8	51.0	53.2	52.7	53.8	54.6	57.5	59.4	60.3	61.9	54.5	46.7	-	5820	14	6199	75.0	71.7	72.1	66.0
05/14	51.6	50.6	53.3	52.8	53.4	54.2	57.1	58.9	59.8	61.4	53.7	46.2	-	5853	14	6193	65.5	64.3	63.9	59.7
05/15	51.9	50.8	53.3	52.7	53.6	54.5	57.0	58.7	59.5	61.0	53.8	46.2	-	5725	14	6194	68.5	67.8	70.0	58.4
05/16	50.9	50.1	53.3	52.6	53.5	54.4	57.1	58.8	59.8	61.4	54.2	46.7	-	5955	14	6193	74.5	71.0	72.6	60.8
05/17	50.7	50.0	53.3	52.6	53.7	54.7	57.4	59.1	60.0	61.5	54.3	47.2	-	6264	14	6195	80.5	75.6	76.9	63.3
05/18	50.7	49.9	53.6	51.7	52.7	53.9	57.1	59.2	60.3	62.2	54.6	46.8	-	6124	14	6192	79.5	76.1	79.3	66.4
05/19	50.9	50.2	52.9	51.8	52.6	53.6	56.4	58.3	59.4	61.1	54.0	47.2	-	6492	20	6191	72.0	67.8	72.8	59.3
05/20	50.6	49.9	51.9	51.3	51.5	52.1	54.0	55.4	56.4	58.2	52.3	47.3	-	6069	14	6193	56.0	55.5	56.4	50.0
05/21	50.3	49.4	51.8	50.8	51.2	51.8	53.5	54.4	54.9	55.6	52.1	46.5	-	5913	14	6193	58.5	56.1	56.8	47.7
05/22	51.3	49.6	51.8	50.6	51.1	51.8	53.6	54.7	55.4	56.4	52.8	46.4	-	5653	14	6193	62.0	59.3	59.9	52.6
05/23	51.0	50.2	51.9	51.0	51.6	52.3	54.5	55.5	56.0	57.1	53.5	?	46.7	6077	14	6192	65.5	62.1	62.0	54.9
05/24	51.3	50.1	51.5	51.6	52.4	53.1	55.7	57.2	58.0	58.9	53.5	46.8	-	6475	70	6194	68.5	63.8	63.7	56.9
05/25																				
05/26																				
05/27																				
05/28																				
05/29																				
05/30																				
05/31																				
May	52.0	50.8	53.3	52.8	53.5	54.2	56.2	58.1	58.7	60.1	53.5	46.8	-	5838	17	5967	68.6	65.4	66.7	58.5

Total CFS	140112	398	143215
Total AF	277906	789	284061

Legend

- ? = 1-9 hours of data missing (Average includes estimations)
- ! = 10 or more hours of data missing (Average not calculated)
- # = Station out of service
- ↑ = Record high air temperature
- ↓ = Record low air temperature
- ☐ = Monthly Averages

Notes

- ¹ Temperatures are weighted averages based on individual penstock flow and temperature
- Highlighted cells in the TCD column indicate a TCD change was made on that day
- ² Current control point (see page 3 for more details)
- ³ Column not used this month

D A T E	Redding (RDD) Daily Air Temperatures (°F)																																				
	Actual			Forecasted																																	
	Previous Day			Current Day			1 Day			2 Days			3 Days			4 Days			5 Days			6 Days			7 Days			8 Days			9 Days			10 Days			
	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	↓	↑	Avg	
05/01	57	82	69.5	59	86	72.5	53	84	68.5	54	81	67.5	55	75	65.0	51	74	62.5	51	80	65.5	52	80	66.0	58	78	68.0	57	81	69.0	54	82	68.0	52	80	66.0	
05/02	59	85	72.0	54	84	69.0	53	82	67.5	56	77	66.5	51	72	61.5	52	76	64.0	54	79	66.5	54	79	66.5	55	83	69.0	55	90	72.5	55	86	70.5	57	84	70.5	
05/03	52	84	68.0	56	82	69.0	56	79	67.5	52	76	64.0	53	77	65.0	54	77	65.5	53	81	67.0	56	84	70.0	55	84	69.5	55	90	72.5	54	87	70.5	58	83	70.5	
05/04	55	84	69.5	60	79	69.5	52	75	63.5	54	77	65.5	54	76	65.0	54	80	67.0	55	84	69.5	57	87	72.0	55	86	70.5	54	90	72.0	53	84	68.5	56	85	70.5	
05/05	59	80	69.5	57	74	65.5	54	75	64.5	55	77	66.0	55	80	67.5	56	82	69.0	53	86	69.5	55	88	71.5	52	91	71.5	55	94	74.5	56	89	72.5	58	84	71.0	
05/06	57	77	67.0	54	74	64.0	54	74	64.0	55	80	67.5	56	82	69.0	55	87	71.0	55	89	72.0	57	92	74.5	56	91	73.5	57	88	72.5	56	86	71.0	57	84	70.5	
05/07	54	67	60.5	59	71	65.0	53	80	66.5	57	81	69.0	56	87	71.5	56	87	71.5	56	86	71.0	56	85	70.5	53	82	67.5	53	87	70.0	55	85	70.0	57	87	72.0	
05/08	58	61	59.5	58	78	68.0	56	80	68.0	55	86	70.5	55	87	71.0	55	85	70.0	53	82	67.5	52	82	67.0	53	85	69.0	55	87	71.0	56	86	71.0	55	87	71.0	
05/09	57	74	65.5	64	81	72.5	52	87	69.5	53	88	70.5	54	87	70.5	56	86	71.0	53	79	66.0	53	82	67.5	56	88	72.0	57	86	71.5	54	81	67.5	52	83	67.5	
05/10	63	81	72.0	60	86	73.0	53	88	70.5	54	89	71.5	58	87	72.5	53	77	65.0	53	79	66.0	54	84	69.0	56	87	71.5	58	80	69.0	53	81	67.0	52	85	68.5	
05/11	59	88	73.5	54	90	72.0	55	90	72.5	58	88	73.0	53	76	64.5	53	79	66.0	53	82	67.5	56	87	71.5	61	87	74.0	55	80	67.5	52	77	64.5	52	83	67.5	
05/12	53	90	71.5	53	89	71.0	58	88	73.0	53	75	64.0	53	79	66.0	55	83	69.0	56	87	71.5	58	84	71.0	62	86	74.0	56	85	70.5	53	84	68.5	55	86	70.5	
05/13	53	91	72.0	60	88	74.0	53	75	64.0	52	79	65.5	53	84	68.5	56	89	72.5	59	88	73.5	57	84	70.5	57	79	68.0	51	77	64.0	54	81	67.5	53	84	68.5	
05/14	59	91	75.0	55	74	64.5	52	80	66.0	54	84	69.0	56	91	73.5	60	89	74.5	58	80	69.0	51	72	61.5	49	76	62.5	51	81	66.0	53	84	68.5	54	82	68.0	
05/15	54	77	65.5	54	79	66.5	55	84	69.5	58	90	74.0	61	91	76.0	55	79	67.0	51	71	61.0	50	73	61.5	47	74	60.5	51	79	65.0	51	78	64.5	53	85	69.0	
05/16	53	84	68.5	62	86	74.0	57	92	74.5	61	92	76.5	54	78	66.0	51	69	60.0	49	72	60.5	51	75	63.0	51	77	64.0	53	76	64.5	54	78	66.0	54	86	70.0	
05/17	62	87	74.5	68	92	80.0	61	95	78.0	56	80	68.0	52	69	60.5	50	70	60.0	50	73	61.5	52	76	64.0	52	75	63.5	54	77	65.5	53	79	66.0	53	81	67.0	
05/18	68	93	80.5	63	94	78.5	56	80	68.0	51	67	59.0	49	67	58.0	50	72	61.0	52	75	63.5	52	74	63.0	52	82	67.0	56	88	72.0	56	91	73.5	58	88	73.0	
05/19	61	98	79.5	66	79	72.5	52	68	60.0	50	66	58.0	50	72	61.0	52	72	62.0	53	76	64.5	53	77	65.0	51	81	66.0	52	82	67.0	55	84	69.5	57	89	73.0	
05/20	60	84	72.0	56	68	62.0	50	66	58.0	51	71	61.0	53	73	63.0	53	75	64.0	53	80	66.5	54	82	68.0	53	86	69.5	56	90	73.0	58	89	73.5	59	86	72.5	
05/21	51	61	56.0	52	62	57.0	50	67	58.5	51	69	60.0	50	73	61.5	52	76	64.0	53	78	65.5	53	77	65.0	52	73	62.5	53	83	68.0	54	85	69.5	58	88	73.0	
05/22	52	65	58.5	55	69	62.0	50	71	60.5	52	74	63.0	54	77	65.5	53	78	65.5	53	77	65.0	52	78	65.0	49	77	63.0	53	84	68.5	58	86	72.0	59	89	74.0	
05/23	55	69	62.0	50	72	61.0	53	74	63.5	55	78	66.5	53	82	67.5	55	80	67.5	54	80	67.0	55	84	69.5	60	89	74.5	61	88	74.5	58	84	71.0	56	84	70.0	
05/24	55	76	65.5	61	75	68.0	55	79	67.0	55	84	69.5	54	82	68.0	56	84	70.0	57	85	71.0	57	86	71.5	57	88	72.5	59	88	73.5	57	90	73.5	59	90	74.5	
05/25	57	80	68.5	54	80	67.0	55	85	70.0	56	84	70.0	56	87	71.5	57	86	71.5	59	88	73.5	60	91	75.5	58	91	74.5	58	92	75.0	58	92	75.0	61	92	76.5	
05/26																																					
05/27																																					
05/28																																					
05/29																																					
05/30																																					
05/31																																					

[Web Links](#)

[Legend](#)

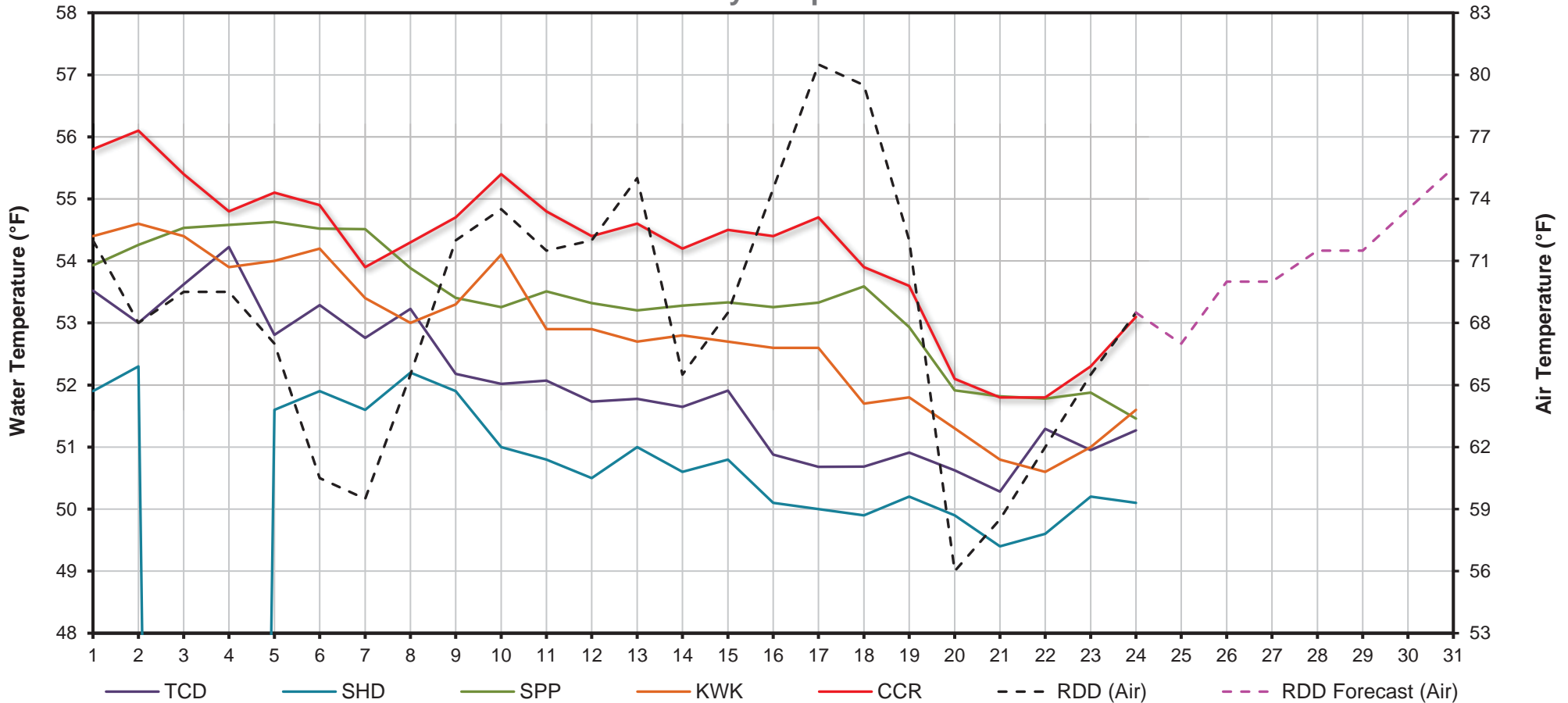
[10-Day Min/Max Forecast](#)

[Previous Days Min/Max Actuals](#)

NR = Forecasted temperatures not recorded

100 = Previous day actual temperatures in red and bolded indicate a record temperature for that date

Mean Daily Temperatures



Station Details			
Code	Body of Water	Location ¹	CDEC Link
TCD	N/A	Shasta Power Plant	N/A
SHD	Sacramento River	0.3 miles downstream of Shasta Power Plant	Click Here
SPP	N/A	Spring Creek Power Plant	N/A
KWK	Sacramento River	0.8 miles downstream of Keswick Dam	Click Here
SAC	Sacramento River	4.8 miles downstream of Keswick Dam	Click Here
CCR	Sacramento River	9.7 miles downstream of Keswick Dam	Click Here
BSF	Sacramento River	25 miles downstream of Keswick Dam	Click Here
JLF	Sacramento River	34 miles downstream of Keswick Dam	Click Here
BND	Sacramento River	41 miles downstream of Keswick Dam	Click Here
RDB	Sacramento River	58 miles downstream of Keswick Dam	Click Here
IGO	Cleer Creek	7.3 miles downstream of Whiskeytown Dam	Click Here
LWS	Trinity River	1.1 miles downstream of Lewiston Dam	Click Here
DGC ²	Trinity River	19 miles downstream of Lewiston Dam	Click Here
NFH ³	Trinity River	38 miles downstream of Lewiston Dam	Click Here

Temperature Control Point		
Point	Temp. (°F)	Date Range

Notes

¹ Distances are approximate

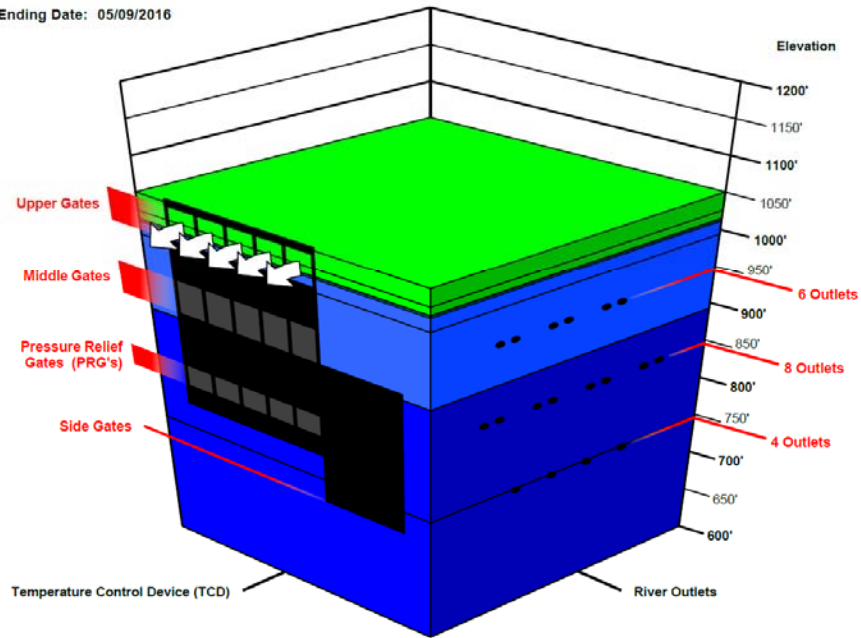
² DGC is only reported in September

³ NFH is only reported in October, November and December

Shasta TCD Configuration

Starting Date: 03/15/2016

Ending Date: 05/09/2016

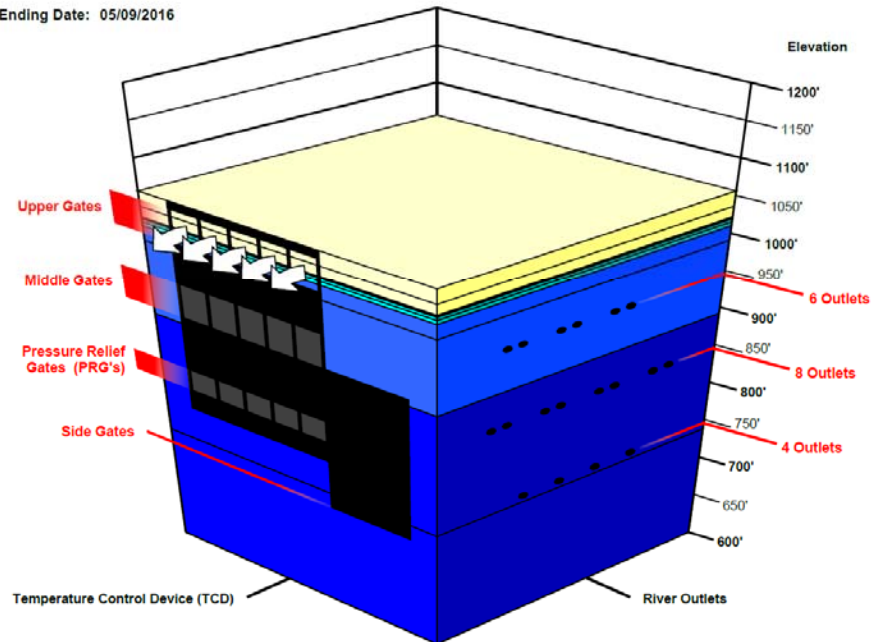


April 7, 2016 Profile

Shasta TCD Configuration

Starting Date: 03/15/2016

Ending Date: 05/09/2016

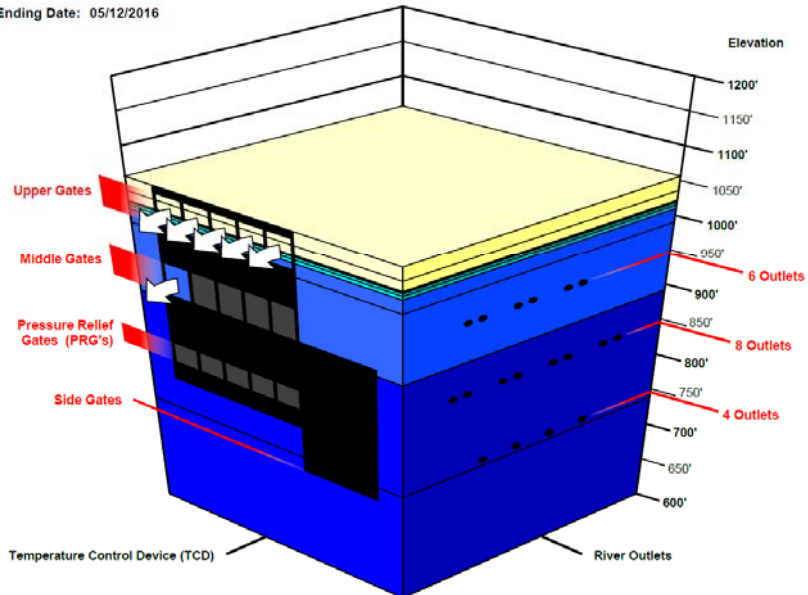


May 2, 2016 Profile

Shasta TCD Configuration

Starting Date: 05/09/2016

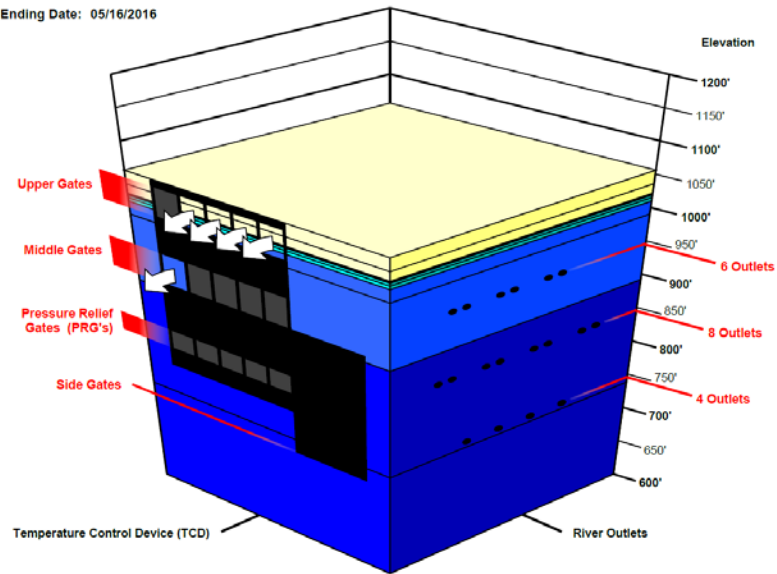
Ending Date: 05/12/2016



Shasta TCD Configuration

Starting Date: 05/12/2016

Ending Date: 05/16/2016

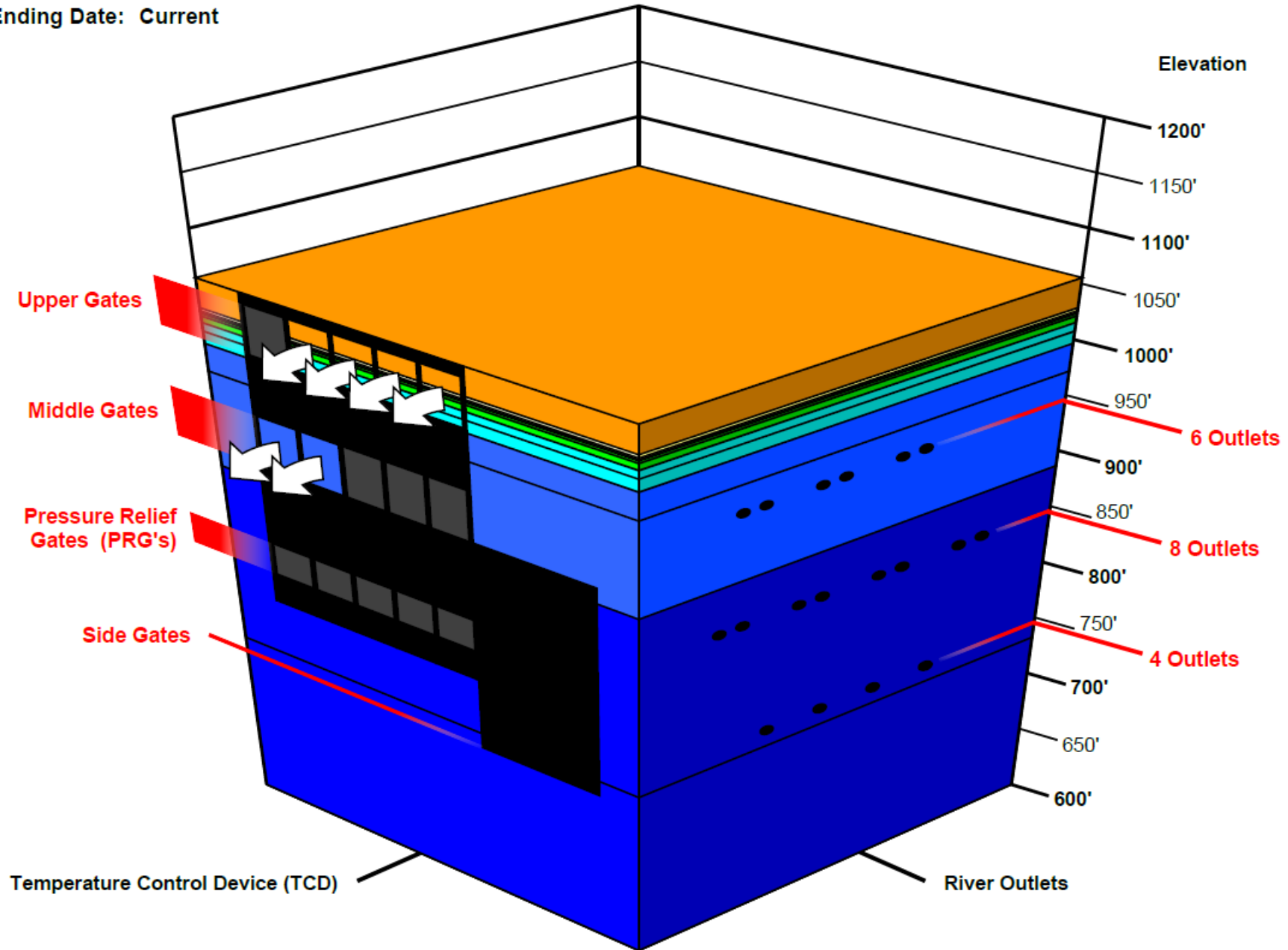


May 2, 2016 profile

Shasta TCD Configuration

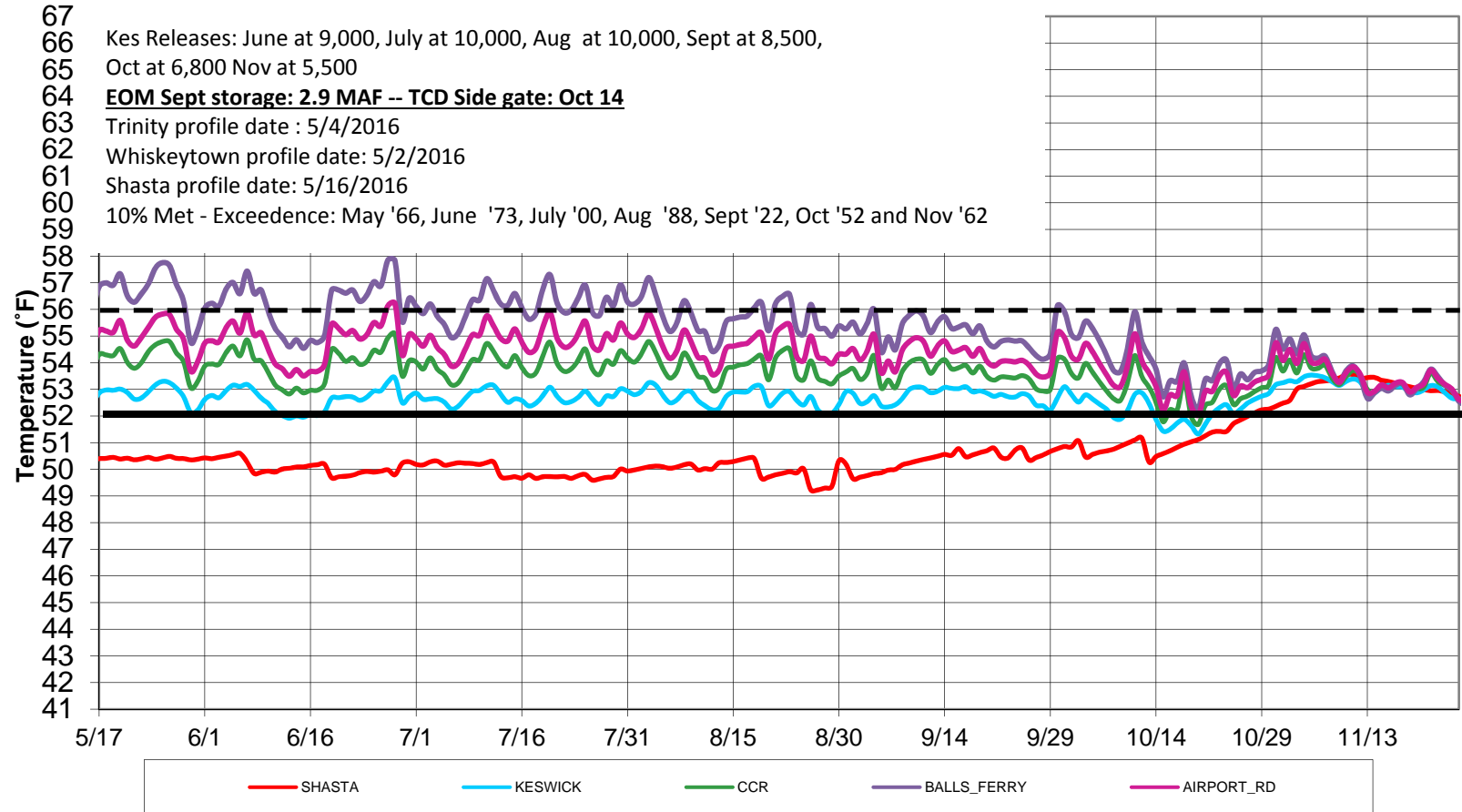
Starting Date: 05/16/2016

Ending Date: Current



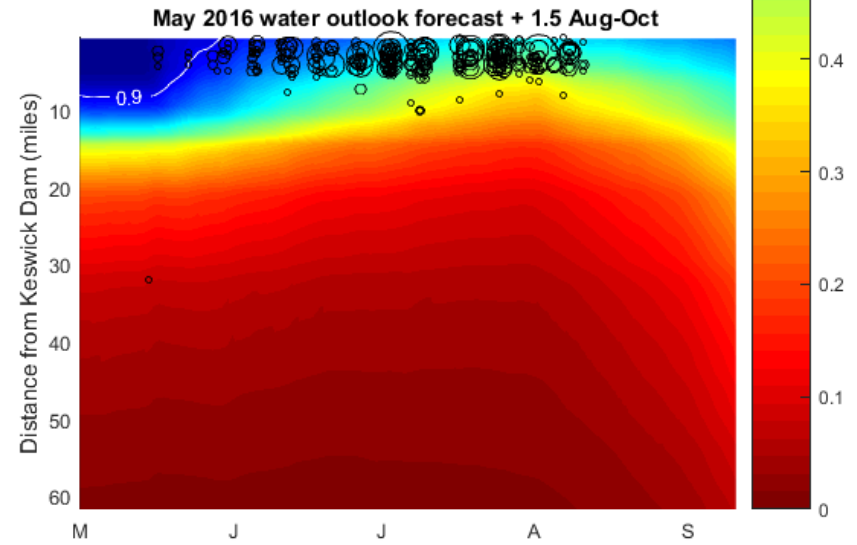
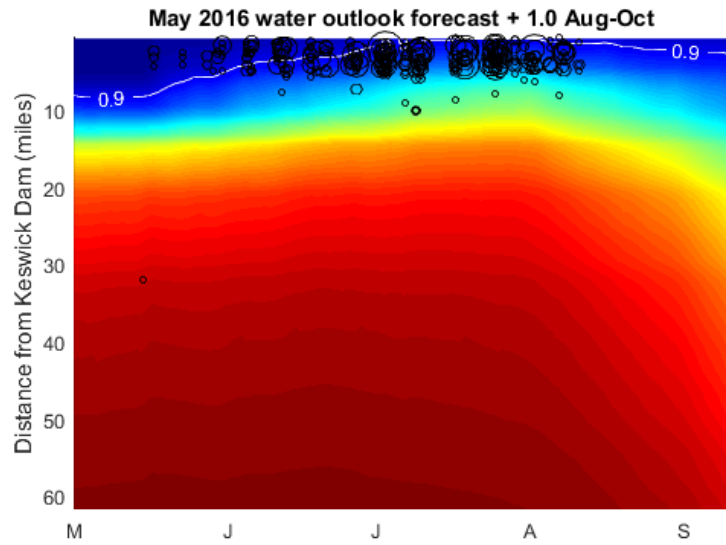
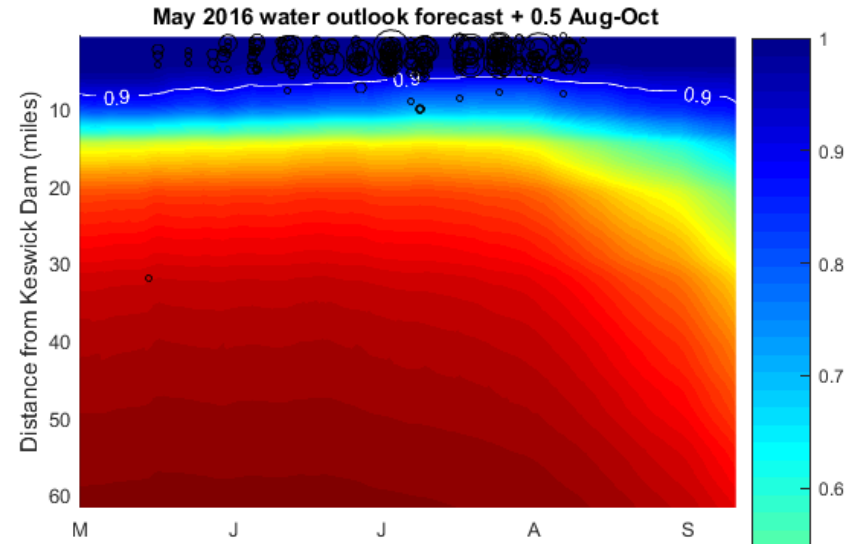
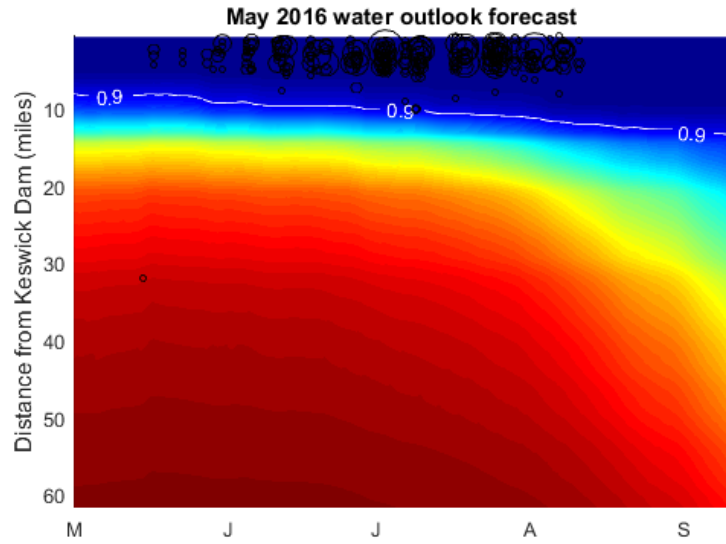
May 16, 2016 profile

Sacramento River Modeled Temperature 2016 May 90%- Hydrology Keswick at 53 degree



May 90% Temp Model Run	May 90% Temp Model Run							Full Side Gates	Egg to Emergence temp dependent mortality above Clear Creek (Zeug et al 2012)
	May	June	July	Aug	Sep	Oct	Nov		
Keswick		9000	10000	10000	8500	6800	5500	14-Oct	5.8%
KES Monthly Ave Temp	52.55	52.63	52.71	52.68	52.75	52.29			
CCR Monthly Ave Temp									
-- Modification model -- 1.3 degree from Kes to CCR	53.42	53.91	53.96	53.81	53.61	52.98			
Balls Ferry	55.73	56.18	56.17	55.70	55.13	54.07			

Predicted Survival using Median Survival Parameters



Percent Temperature-dependent Mortality			
Run	Mean	Median	2.5 - 97.5 Percentiles
May 2016 water outlook forecast	7.11	0.28	0.084 - 51.52
May 2016 water outlook forecast + 0.5 Aug-Oct	12.8	4.31	0.088 - 59.84
May 2016 water outlook forecast + 1.0 Aug-Oct	24.45	21.84	0.088 - 66.21
May 2016 water outlook forecast + 1.5 Aug-Oct	39.34	42.17	0.088 - 71.65

CCR 7DADM

