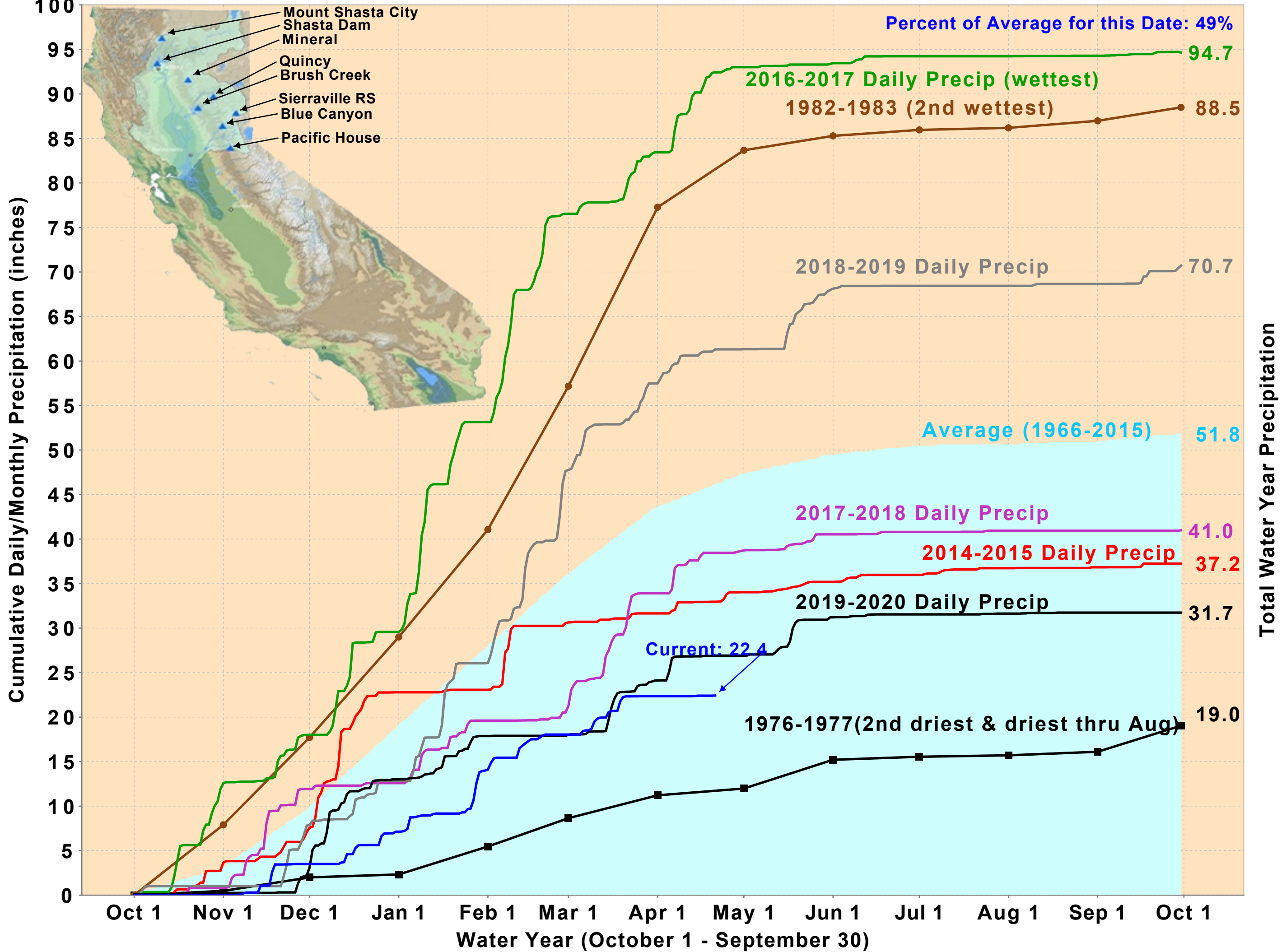
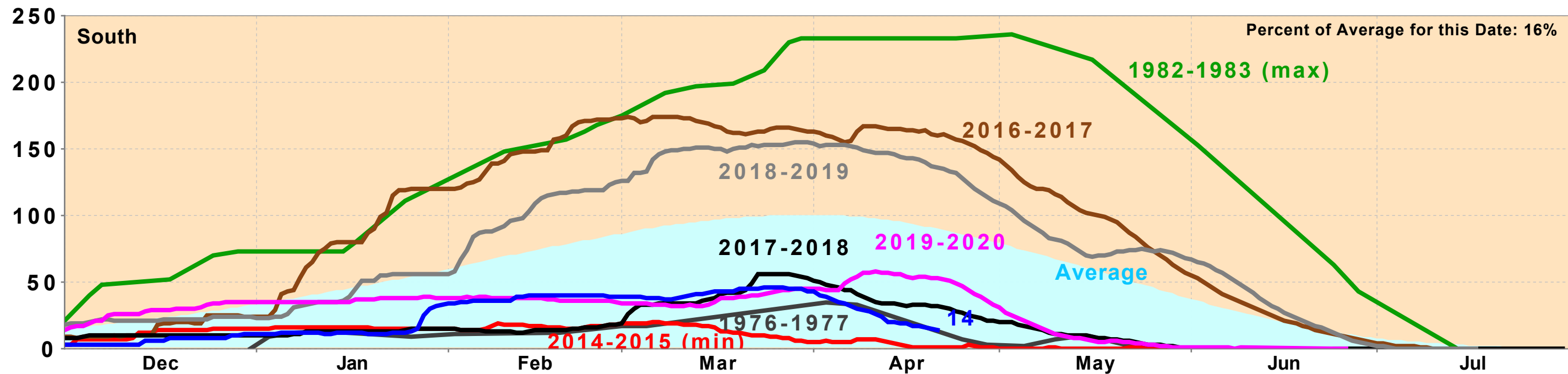
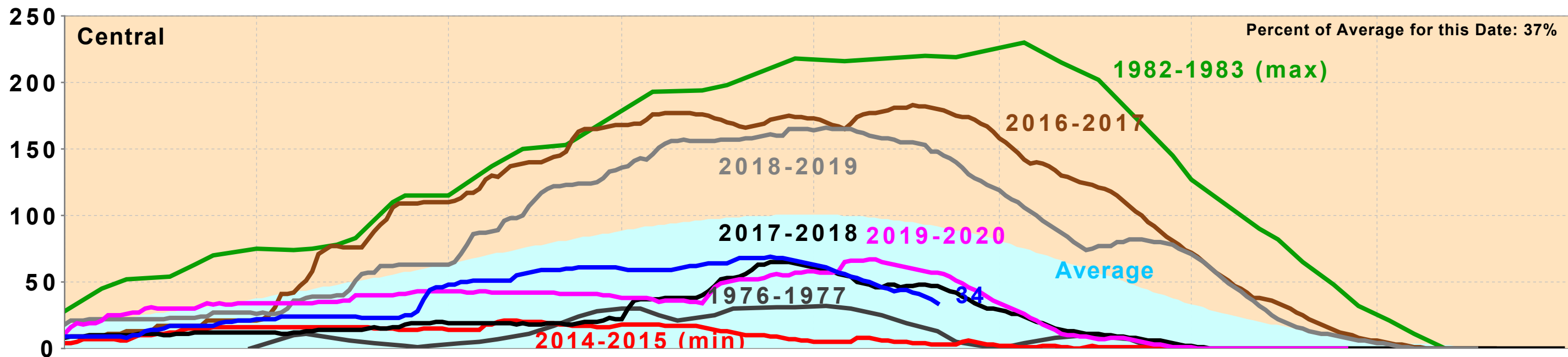
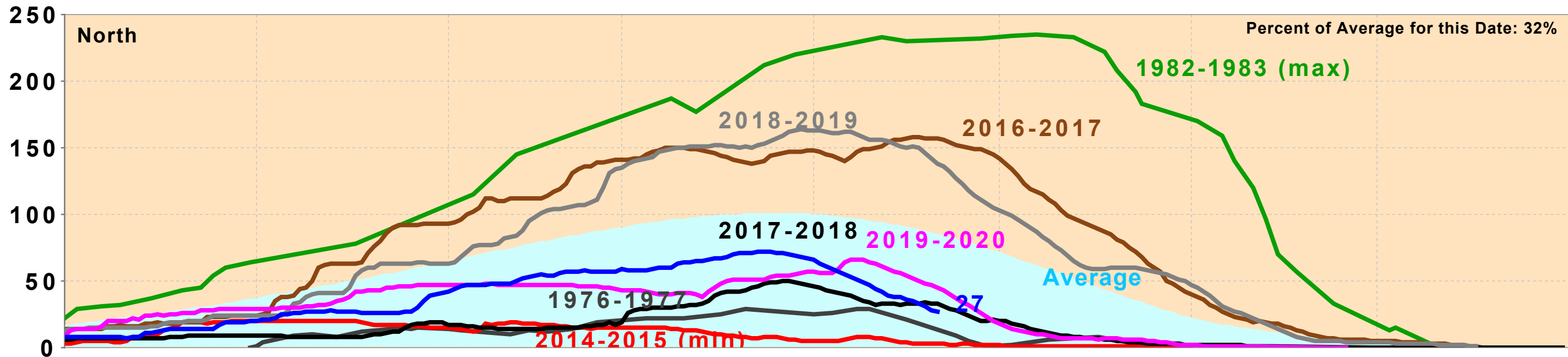


Northern Sierra Precipitation: 8-Station Index, April 21, 2021



California Snow Water Content, April 21, 2021, Percent of April 1 Average



Statewide Percent of April 1: 27%

Statewide Percent of Average for Date: 30%

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

DAILY CVP WATER SUPPLY REPORT

APRIL 20, 2021

RUN DATE: April 21, 2021

RESERVOIR RELEASES IN CUBIC FEET/SECOND

RESERVOIR	DAM	WY 2020	WY 2021	15 YR MEDIAN
TRINITY	LEWISTON	1,008	527	317
SACRAMENTO	KESWICK	6,969	6,460	6,460
FEATHER	OROVILLE (SWP)	1,550	1,100	1,550
AMERICAN	NIMBUS	1,472	2,056	2,012
STANISLAUS	GOODWIN	631	669	1,502
SAN JOAQUIN	FRIANT	384	346	384

STORAGE IN MAJOR RESERVOIRS IN THOUSANDS OF ACRE-FEET

RESERVOIR	CAPACITY	15 YR AVG	WY 2020	WY 2021	% OF 15 YR AVG
TRINITY	2,448	1,775	1,946	1,309	74
SHASTA	4,552	3,628	3,749	2,353	65
FOLSOM	977	680	637	357	52
NEW MELONES	2,420	1,524	1,909	1,495	98
FED. SAN LUIS	966	686	584	413	60
TOTAL NORTH CVP	11,363	8,293	8,825	5,927	71
MILLERTON	520	298	301	212	71
OROVILLE (SWP)	3,538	2,501	2,441	1,493	60

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

RESERVOIR	CURRENT WY 2021	WY 1977	WY 1983	15 YR AVG	% OF 15 YR AVG
TRINITY	218	102	1,380	645	34
SHASTA	1,618	1,527	7,751	3,329	49
FOLSOM	538	217	3,929	1,502	36
NEW MELONES	236	----	1,241	505	47
MILLERTON	283	116	1,825	538	53

ACCUMULATED PRECIPITATION FOR WATER YEAR TO DATE IN INCHES

RESERVOIR	CURRENT WY 2021	WY 1977	WY 1983	AVG (N YRS)	% OF AVG	LAST 24 HRS
TRINITY AT FISH HATCHERY	15.62	9.27	50.99	28.37 (59)	55	0.00
SACRAMENTO AT SHASTA DAM	23.04	11.04	104.29	55.56 (64)	41	0.00
AMERICAN AT BLUE CANYON	30.78	15.64	95.61	59.44 (46)	52	0.00
STANISLAUS AT NEW MELONES	16.65	----	41.89	25.02 (43)	67	0.00
SAN JOAQUIN AT HUNTINGTON LK	17.32	11.50	75.20	37.17 (46)	47	0.00

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 ³	LWS	DGC	NFH	Shasta Generation	Spring Creek P.P.	Keswick Total	RDD	BSF	RDB
Mar	49.7	49.1	48.5	49.7	50.1	50.5	51.4	51.9	52.6	52.5	48.4	48.0	48.0	47.8	3089	172	3644	53.0	51.3	53.2
04/01	50.2	49.7	49.7	51.1	51.8	52.7	54.6	55.8	56.8	57.0	50.7	50.5	52.7	52.0	3597	77	3456	61.0	59.2	62.3
04/02	50.0	49.4	49.5	51.4	52.0	52.7	54.7	55.9	56.8	57.3	50.6	50.5	53.0	52.3	3644	139	4037	60.5	58.5	61.5
04/03	50.0	49.5	49.4	51.1	51.8	52.6	54.3	55.4	56.2	56.8	50.6	50.7	52.6	52.2	3998	168	4496	58.0	56.9	59.5
04/04	49.9	49.5	49.1	50.7	51.6	52.4	54.2	55.4	56.3	56.7	50.9	51.4	53.1	52.7	4164	497	4495	56.5	56.1	57.6
04/05	49.9	49.3	49.7	50.6	51.5	52.4	54.5	55.9	56.8	57.2	51.5	51.3	55.4	54.1	4252	74	4496	62.0	59.1	58.9
04/06	49.9	? 49.4	-	50.9	51.8	52.5	54.5	55.8	56.8	57.4	51.3	51.0	55.1	54.2	3791	0	4500	60.5	58.5	60.9
04/07	49.8	49.5	-	50.8	51.8	52.6	54.9	56.2	57.1	57.6	51.4	51.2	55.2	54.1	3723	0	4551	60.0	58.0	58.8
04/08	49.9	? 49.6	50.2	50.9	51.6	52.3	54.3	55.7	56.7	57.4	50.9	51.4	54.1	53.1	4445	45	4968	58.5	58.1	59.2
04/09	50.1	? 49.8	49.8	50.8	51.7	52.4	54.2	55.4	56.3	56.9	51.2	51.9	54.3	53.1	4761	76	4956	58.5	57.2	59.1
04/10	49.9	50.2	49.8	50.8	51.6	52.3	54.4	55.7	56.7	57.2	51.2	51.2	54.4	52.9	2505	754	4951	61.5	60.1	62.5
04/11	50.7	51.7	49.6	51.1	51.8	52.5	54.3	55.5	56.6	57.1	51.4	50.4	54.5	53.5	4697	398	4944	66.5	63.7	65.3
04/12	51.1	50.5	49.9	51.9	52.3	53.0	? 54.5	55.7	56.7	57.1	51.4	50.3	54.4	53.9	4253	52	4950	67.0	67.7	67.2
04/13	50.9	50.3	50.2	51.8	52.4	53.1	54.9	55.9	56.7	57.0	51.2	50.0	54.1	53.8	4739	50	5485	61.5	59.5	61.4
04/14	51.3	50.7	50.1	51.4	52.2	52.8	? 54.2	55.2	56.1	56.7	51.1	50.0	53.7	53.2	5031	39	6007	63.5	63.1	63.2
04/15	50.6	? 50.2	49.3	51.7	52.2	52.7	54.3	55.3	56.3	56.8	51.1	49.5	57.0	53.7	5308	217	6014	58.5	57.3	59.2
04/16	50.7	? 50.3	50.1	51.8	52.5	53.2	54.9	55.9	56.8	57.1	51.6	49.3	57.9	54.8	5603	40	6011	63.5	61.5	64.8
04/17	50.7	? 50.1	50.4	51.4	52.2	52.9	54.9	56.2	57.2	57.9	51.7	49.8	55.9	53.0	5526	40	6015	65.0	63.5	67.7
04/18	50.6	? 52.2	50.4	51.3	52.1	52.8	54.7	56.0	57.0	57.7	51.9	49.4	56.9	53.6	4752	40	6562	67.0	64.6	67.5
04/19	? 50.6	52.3	? 50.2	52.2	52.6	53.2	54.9	56.2	57.2	57.9	52.4	49.4	57.8	54.5	4232	40	6481	68.0	66.5	67.6
04/20	51.3	55.1	50.5	53.1	53.4	54.0	55.7	56.9	57.8	58.3	52.1	49.5	55.4	53.7	2736	62	6460	64.0	61.3	64.7
04/21																				
04/22																				
04/23																				
04/24																				
04/25																				
04/26																				
04/27																				
04/28																				
04/29																				
04/30																				
-																				
Apr	50.4	50.5	49.9	51.3	52.1	52.7	54.6	55.8	56.7	57.2	51.3	50.4	54.9	53.4	4288	140	5192	62.1	60.5	62.4

Total CFS	85757	2808	103835
Total AF	170096	5570	205952

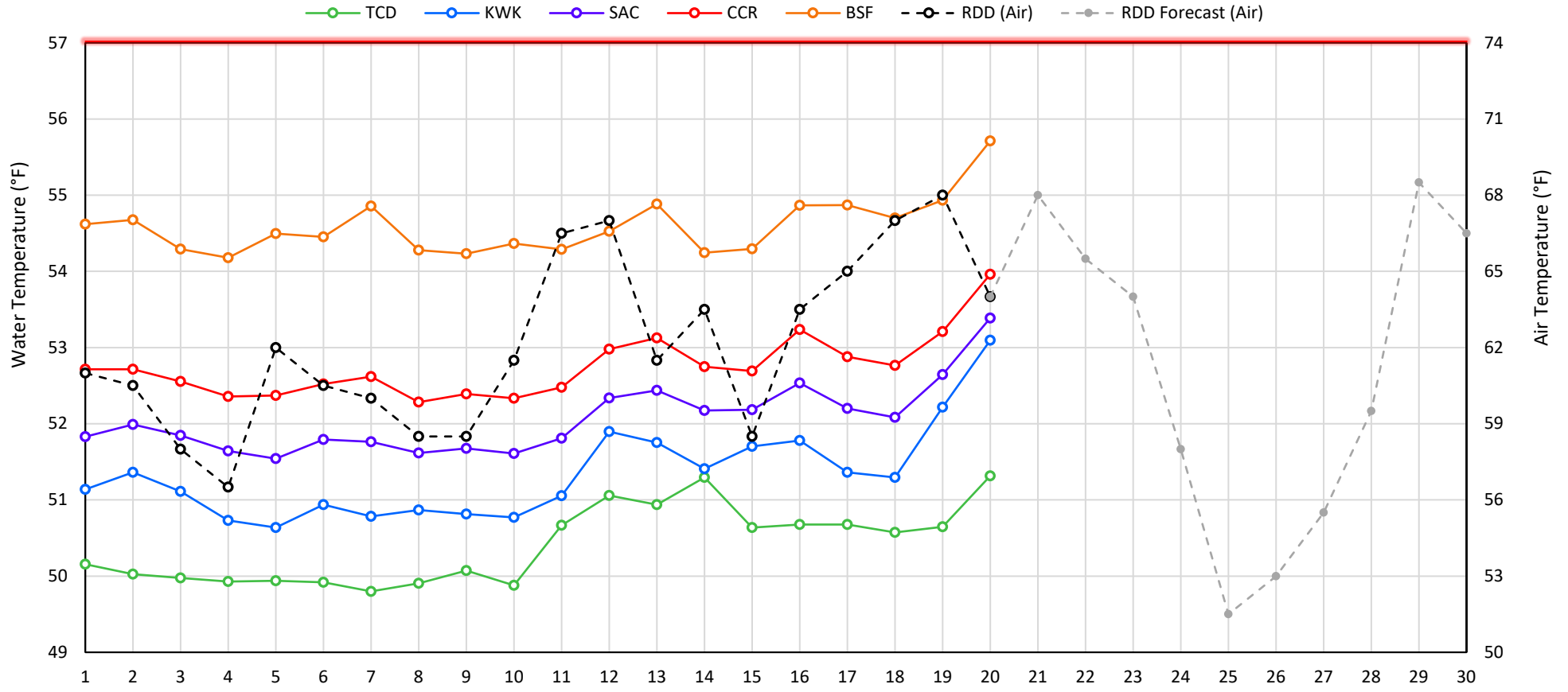
Legend

- ? = 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 Sacramento River control point (see page 4 for more details)

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	Clear Creek	7.3 miles downstream of Whiskeytown Dam	Click Here
LWS	Trinity River	1.1 miles downstream of Lewiston Dam	Click Here
DGC	Trinity River	19 miles downstream of Lewiston Dam	Click Here
NFH	Trinity River	38 miles downstream of Lewiston Dam	Click Here

Water Right Temperature Control Points

River	Point	Temp. (°F)	Begin Date	End Date
Sacramento	BSF	56	05/15/2019	09/20/2020
Sacramento	CCR	56	09/21/2020	TBD
Trinity	DGC	56	09/15/2020	10/01/2020
Trinity	NFH	56	10/01/2020	12/31/2020

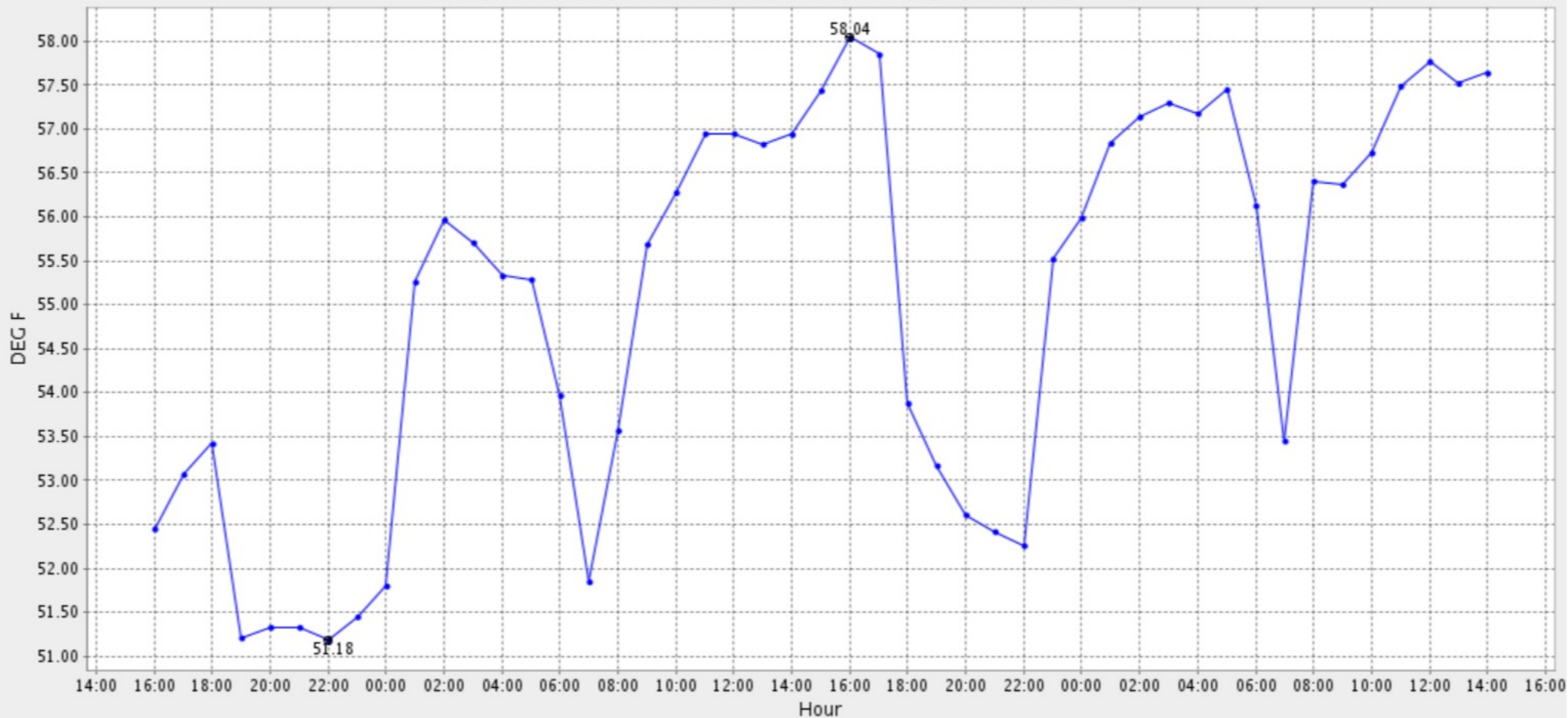
Notes

¹ Distances are approximate

SHASTA DAM (WATER QUALITY) (SHD)

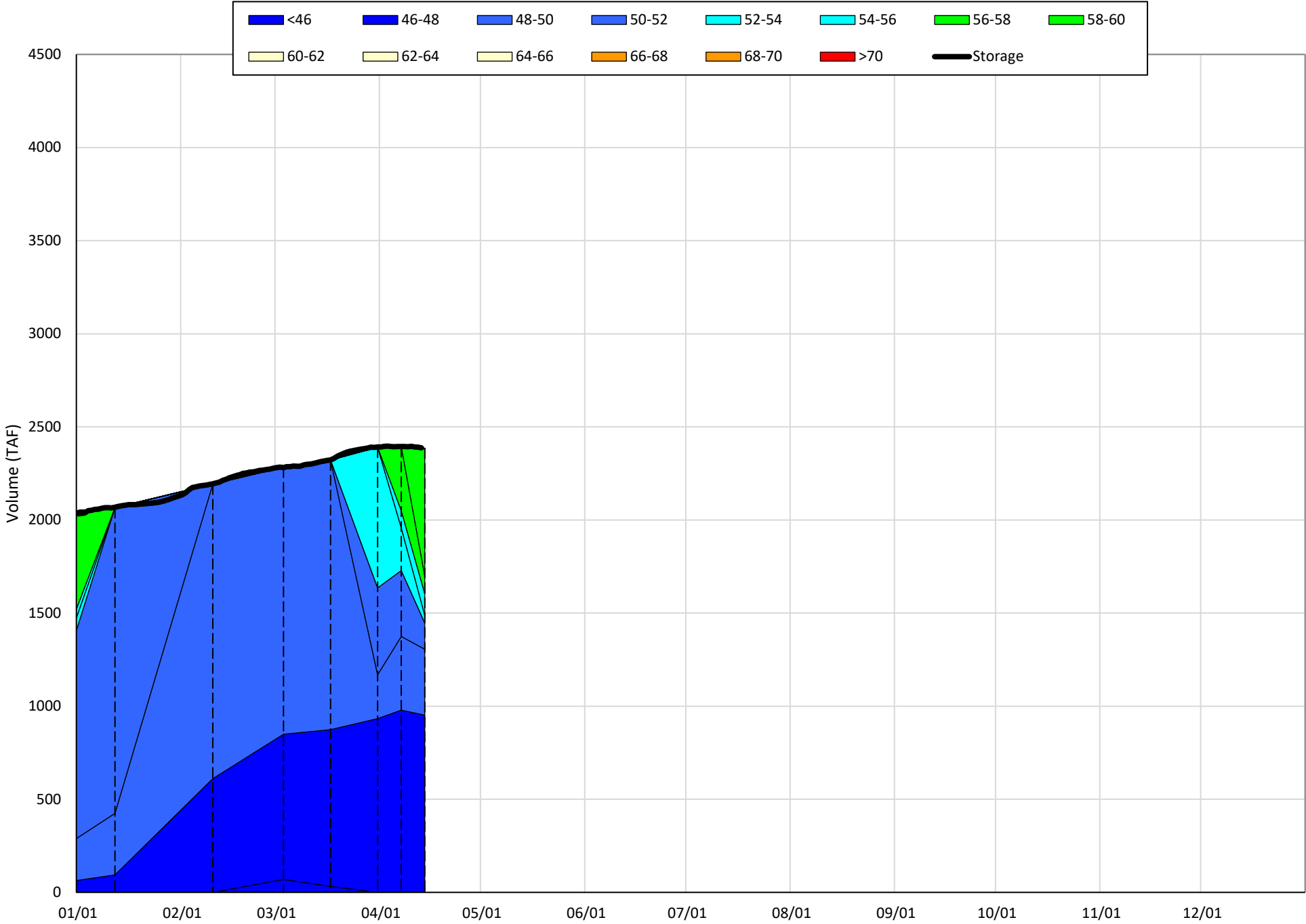
Date from 04/19/2021 15:08 through 04/21/2021 15:08 Duration : 2 days

Max of period : (04/20/2021 16:00, 58.04) Min of period : (04/19/2021 22:00, 51.18)

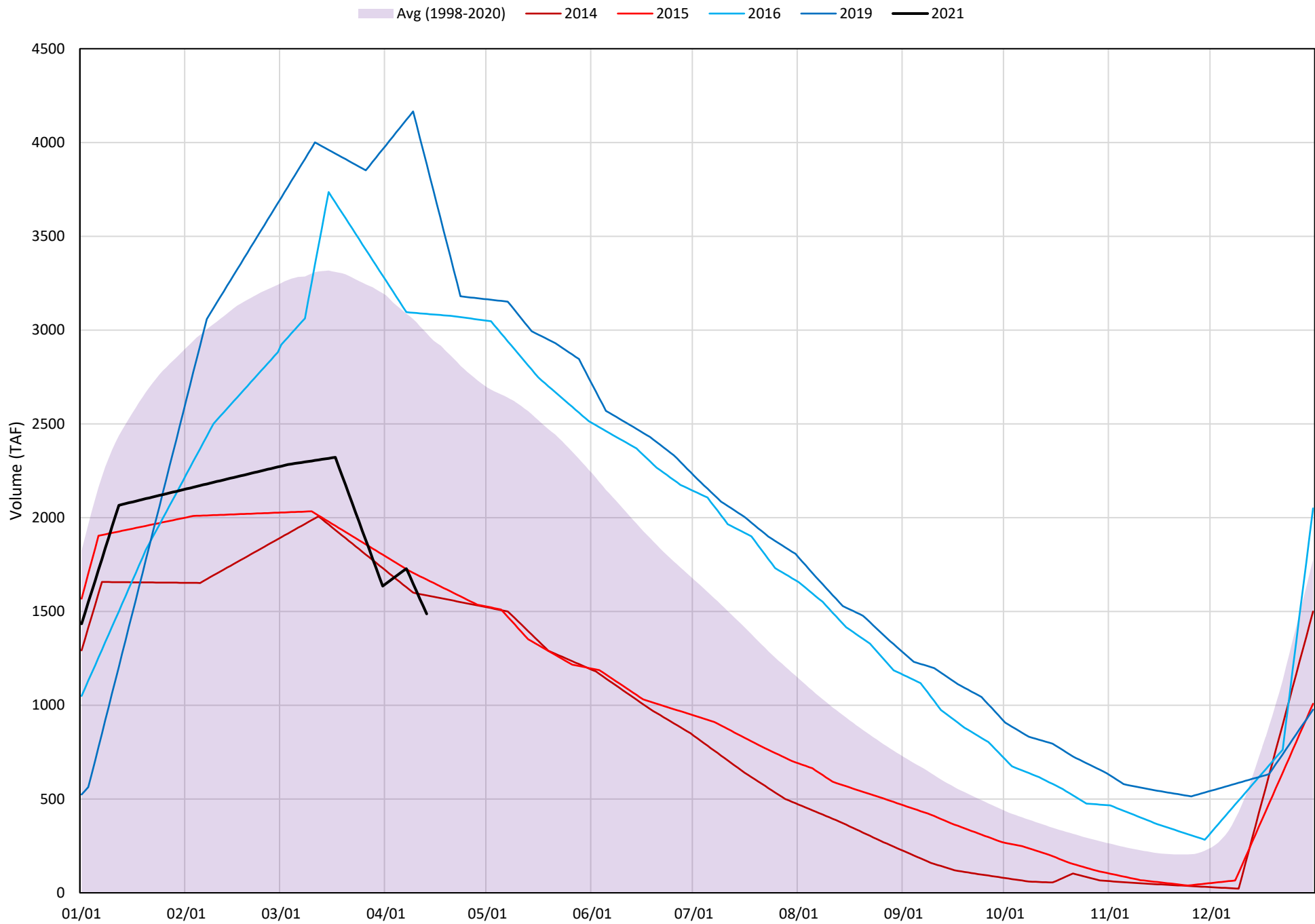


— TEMPERATURE, WATER - DEG F (1430)

Shasta Lake Isothermobaths Plot - 2021

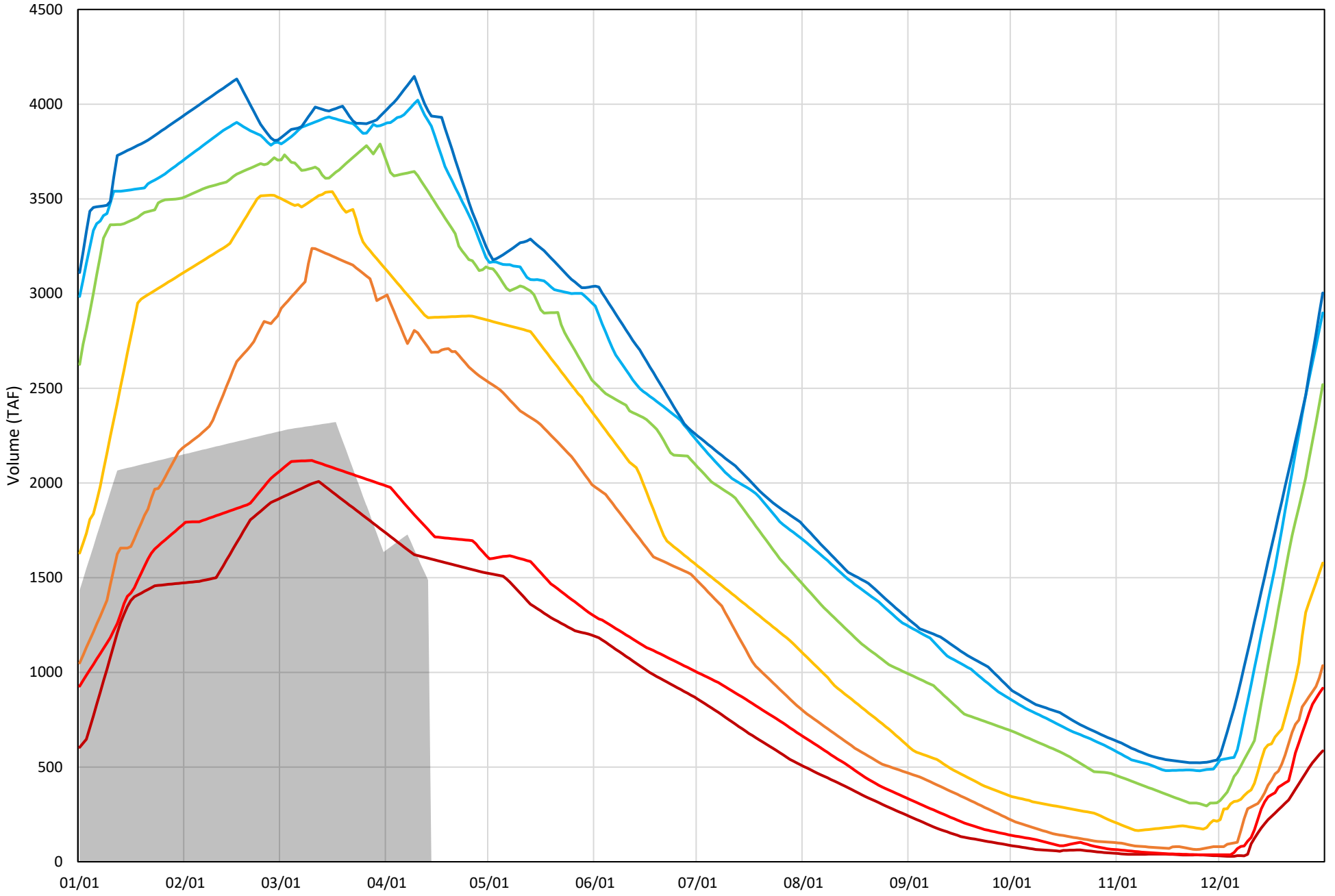


Shasta Lake Cold Water Pool Volume $\leq 52^{\circ}\text{F}$

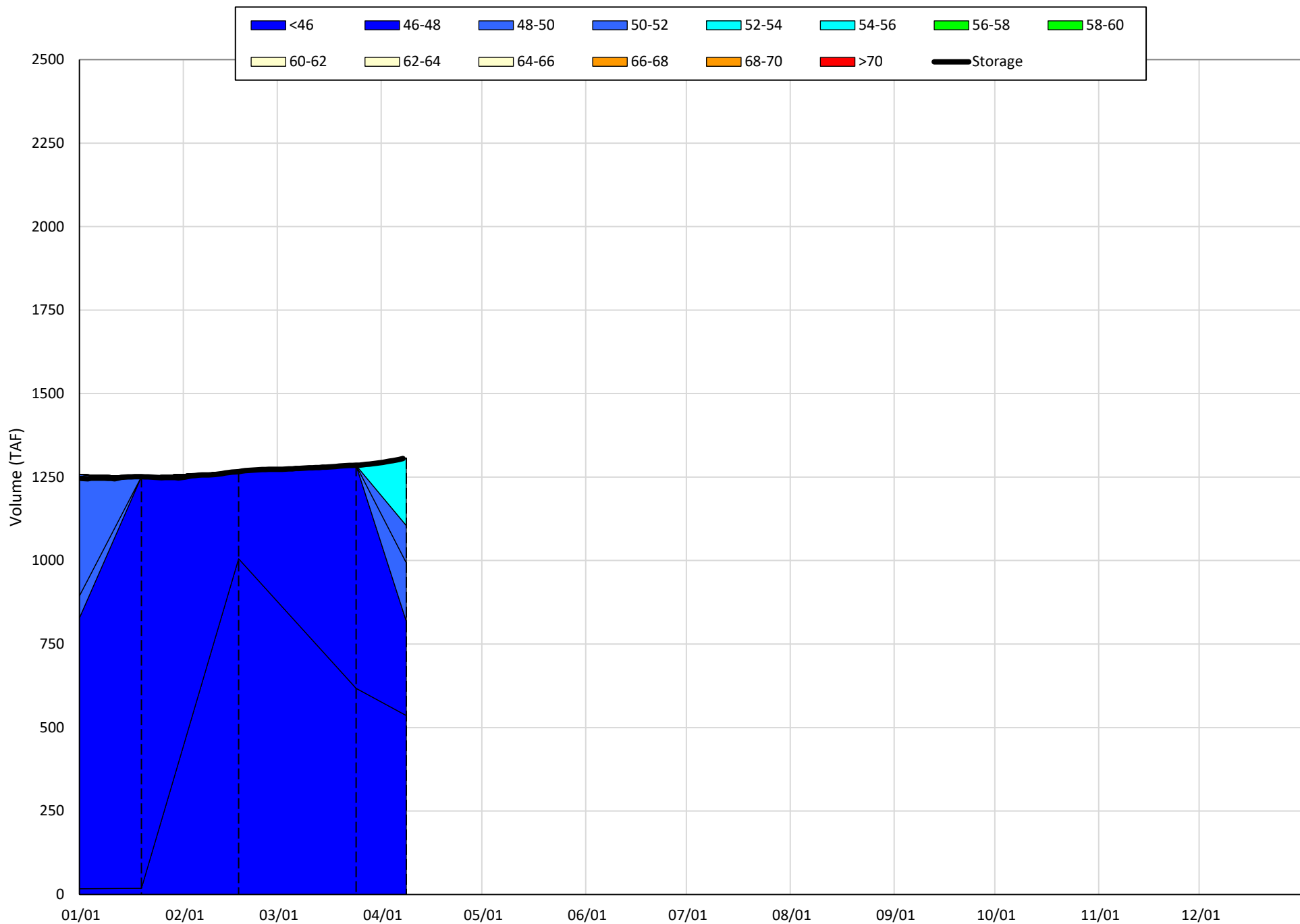


Shasta Lake Cold Water Pool Volume $\leq 52^{\circ}\text{F}$ - Percent Exceedances (1998-2020)

2021 95 90 75 50 25 10 5

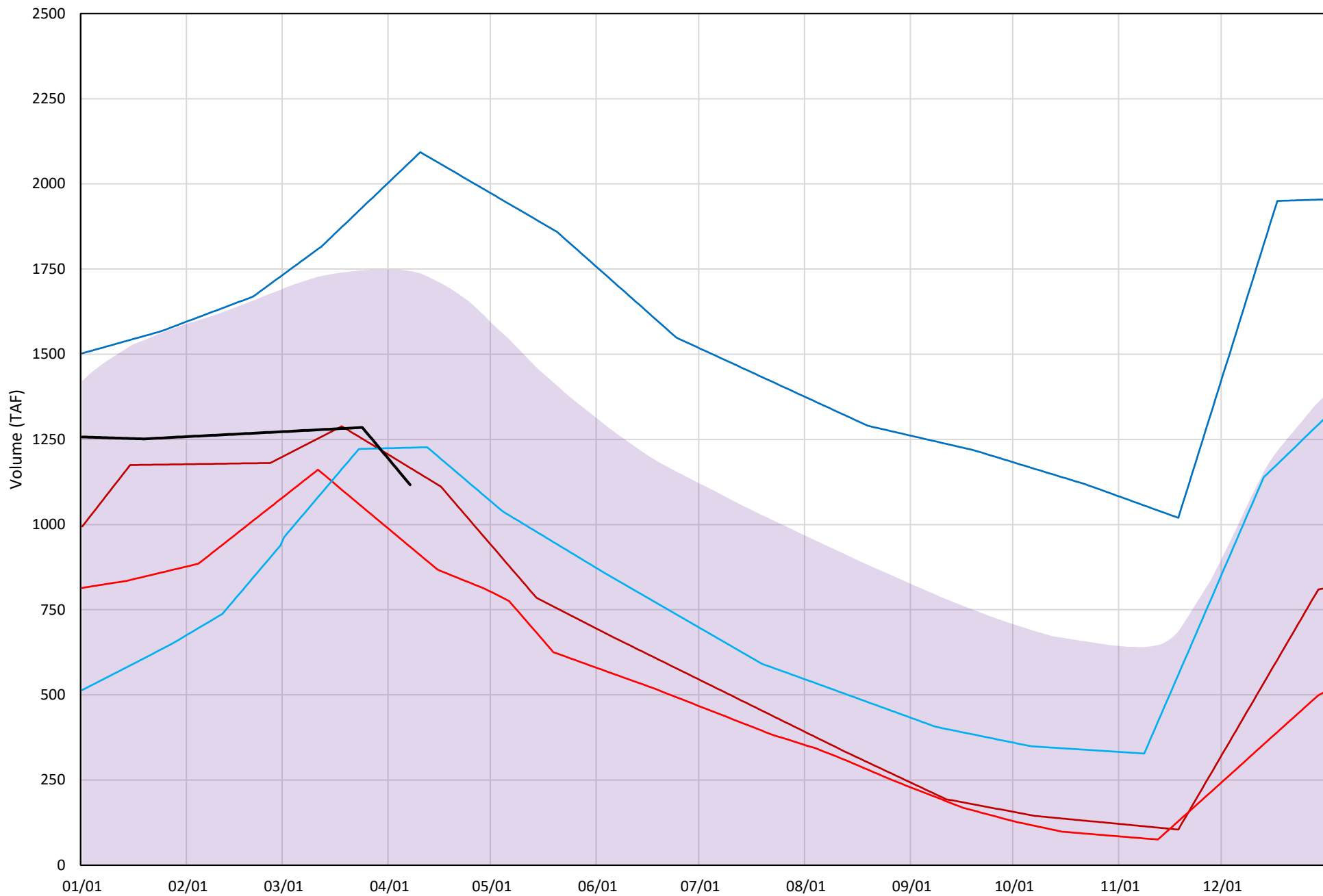


Trinity Lake Isothermobaths Plot - 2021



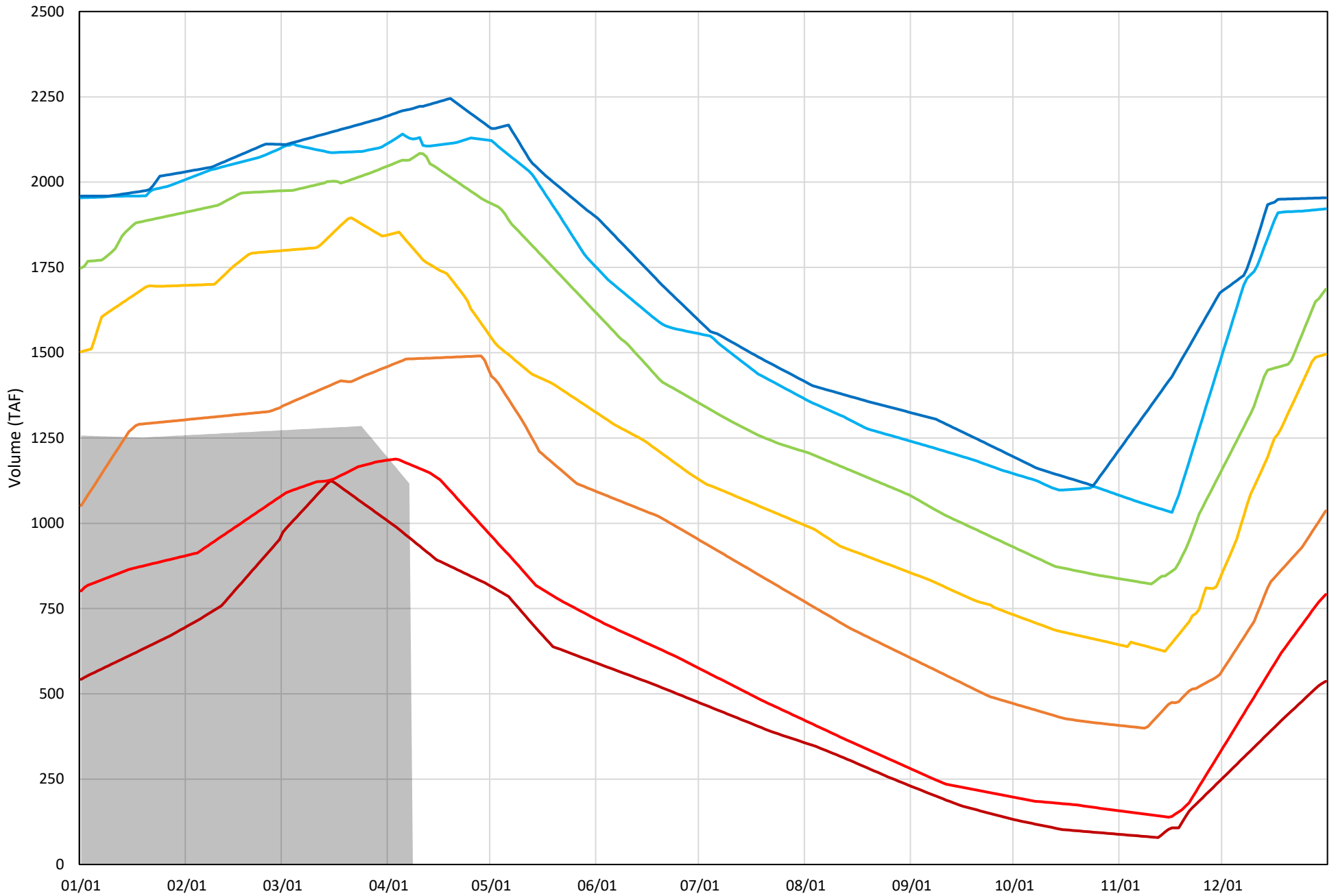
Trinity Lake Cold Water Pool Volume $\leq 52^{\circ}\text{F}$

Avg (2000-2020) 2014 2015 2016 2019 2021

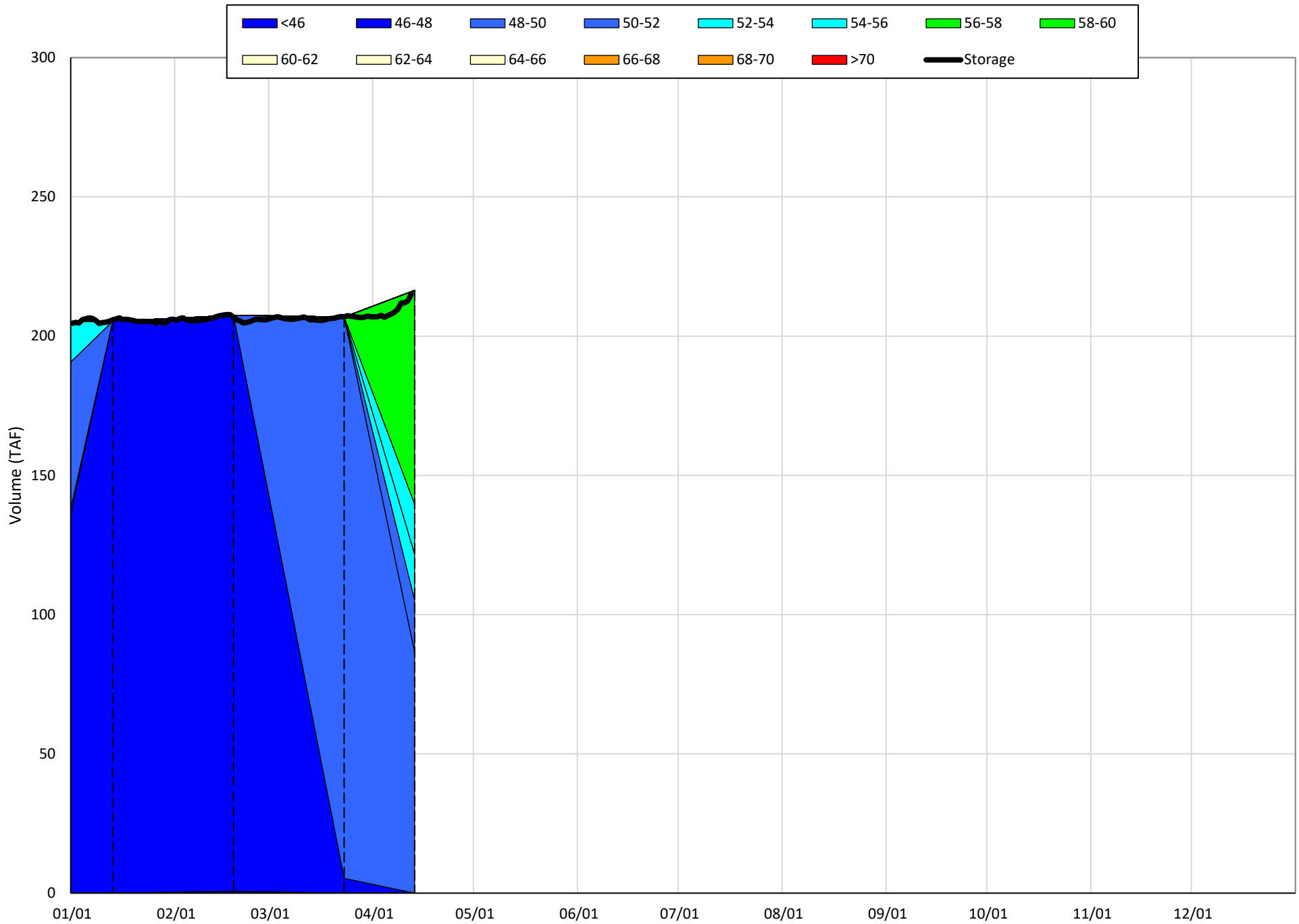


Trinity Lake Cold Water Pool Volume ≤52°F - Percent Exceedances (2000-2020)

2021 95 90 75 50 25 10 5



Whiskeytown Lake Isothermobaths Plot - 2021



Estimated CVP Operations 50% Exceedance

Storages

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

		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Trinity		1292	1347	1232	1099	973	820	667	631	613	624	644	715	818
	Elev.	2290	2279	2266	2252	2233	2212	2207	2204	2206	2209	2219	2233	
Whiskeytown		207	238	238	238	238	238	206	206	206	206	206	206	
	Elev.	1209	1209	1209	1209	1209	1209	1199	1199	1199	1199	1199	1199	
Shasta		2392	2363	2428	2261	1912	1646	1573	1496	1485	1601	1799	2161	2614
	Elev.	977	981	972	952	935	930	925	924	932	945	966	990	
Folsom		361	375	476	501	410	360	322	309	301	313	376	493	684
	Elev.	399	413	417	404	397	391	389	387	389	399	416	438	
New Melones		1539	1475	1403	1314	1227	1156	1113	1077	1089	1103	1117	1132	1156
	Elev.	1000	992	982	972	963	958	953	954	956	958	960	963	
San Luis		192	178	142	11	3	61	132	298	503	708	882	967	1092
	Elev.	426	411	382	370	369	375	409	442	481	509	523	543	
Total		5977	5919	5423	4763	4281	4045	4017	4197	4555	5023	5674	6569	

State End of the Month Reservoir Storage (TAF)

Oroville		1435	1555	1601	1480	1249	1104	1096	1110	1173	1274	1446	1742	2061
	Elev.	737	742	728	700	680	679	681	689	703	724	757	788	
San Luis		680	570	473	374	303	239	208	295	389	586	735	815	937
Total San Luis (TAF)		872	748	615	385	306	300	340	593	893	1294	1617	1783	2029
	Elev.	426	411	382	370	369	375	409	442	481	509	523	543	

Monthly River Releases (TAF/cfs)

Trinity	TAF	36	92	47	28	53	52	23	18	18	18	17	18
	cfs	600	1,498	788	450	857	870	373	300	300	300	300	300
Clear Creek	TAF	12	16	12	9	9	9	12	12	12	25	11	12
	cfs	200	265	200	150	150	150	200	200	200	400	200	200
Sacramento	TAF	357	349	476	615	523	327	338	274	215	200	180	200
	cfs	6000	5685	8000	10000	8500	5500	5500	4600	3500	3250	3250	3250
American	TAF	119	77	63	151	113	98	49	48	49	49	44	49
	cfs	2000	1250	1065	2461	1831	1650	805	808	800	800	800	800
Stanislaus	TAF	27	11	9	9	9	9	39	12	12	13	12	12
	cfs	460	185	150	150	150	150	635	200	200	213	214	200
Feather	TAF	65	49	89	226	172	68	74	57	58	58	53	58
	cfs	1100	800	1500	3680	2800	1150	1200	950	950	950	950	950

Trinity Diversions (TAF)

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Carr PP	54	92	96	99	100	99	23	21	12	15	17	11
Spring Crk. PP	35	90	90	90	90	90	45	15	12	10	35	26

Delta Summary (TAF)

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Tracy	60	105	48	212	235	211	260	256	235	195	129	180	
USBR Banks	0	0	0	0	0	0	0	0	0	0	0	0	
Contra Costa	10.0	10.0	9.8	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Total USBR	70	115	58	222	245	221	270	266	245	205	139	190	
State Export	30	26	13	24	21	22	128	115	200	195	135	180	
Total Export	99	140	71	246	266	243	398	381	445	400	274	370	
COA Balance	65	65	69	66	55	53	74	69	69	69	69	69	
Vernalis	TAF	117	110	56	48	46	51	108	83	83	92	111	120
Vernalis	cfs	1961	1785	940	784	752	856	1758	1393	1355	1498	1997	1957
Old/Middle River Std.													
Old/Middle R. calc.	cfs	-992	-1,544	-1,083	-3,318	-3,584	-3,350	-4,784	-4,894	-5,554	-4,926	-3,491	-4,344
Computed DOI		7094	4490	4001	4002	2993	3009	2993	3496	5157	9760	11418	12477
Excess Outflow		0	488	0	0	0	0	0	0	1659	5254	18	1074
% Export/Inflow		15%	24%	12%	31%	36%	39%	55%	58%	57%	41%	30%	32%
% Export/Inflow std.		35%	35%	35%	65%	65%	65%	65%	65%	65%	65%	45%	35%

Hydrology

	Trinity	Shasta	Folsom	New Melones
Water Year Inflow (TAF)	406	2,870	1,167	440
Year to Date + Forecasted % of mean	34%	52%	43%	42%

CVP actual operations do not follow any forecasted operation or outlook; actual operations are based on real-time conditions.
 CVP operational forecasts or outlooks represent general system-wide dynamics and do not necessarily address specific watershed/tributary details.
 CVP releases or export values represent monthly averages.
 CVP Operations are updated monthly as new hydrology information is made available December through May.

Estimated CVP Operations 90% Exceedance

Storages

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

		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Trinity		1292	1336	1256	1116	968	813	660	613	578	561	559	588	648
	Elev.	2289	2282	2268	2251	2233	2211	2204	2198	2195	2195	2200	2210	
Whiskeytown		207	238	238	238	238	238	238	206	206	206	206	206	
	Elev.	1209	1209	1209	1209	1209	1209	1199	1199	1199	1199	1199	1199	
Shasta		2392	2343	2174	1923	1566	1303	1230	1191	1209	1280	1408	1615	1943
	Elev.	976	967	953	930	911	905	902	903	909	919	933	954	
Folsom		361	378	417	342	246	246	246	239	234	238	252	275	399
	Elev.	400	406	394	377	377	377	376	375	375	378	383	403	
New Melones		1539	1490	1396	1307	1223	1154	1112	1071	1073	1077	1080	1075	1059
	Elev.	1002	992	981	971	963	957	952	952	953	953	953	950	
San Luis		205	188	153	62	-61	-142	-77	20	66	171	347	362	367
	Elev.	429	412	388	363	342	354	370	389	413	447	444	439	
Total		5973	5634	4988	4180	3613	3409	3339	3365	3533	3853	4122	4621	

State End of the Month Reservoir Storage (TAF)

Oroville		1532	1510	1315	1079	903	807	825	846	886	968	1097	1300
	Elev.	734	732	708	676	649	632	635	639	646	659	679	706
San Luis		583	467	372	325	286	284	283	369	455	594	547	494
Total San Luis (TAF)		885	772	620	434	264	145	206	303	435	627	942	861

Monthly River Releases (TAF/cfs)

Trinity	TAF	36	92	47	28	53	52	23	18	18	18	17	18
	cfs	600	1,498	783	450	857	870	373	300	300	300	300	300
Clear Creek	TAF	12	16	11	9	9	9	12	12	12	12	11	17
	cfs	200	265	190	150	150	150	200	200	200	200	200	275
Sacramento	TAF	357	454	521	615	492	297	281	230	200	200	180	200
	cfs	6000	7379	8750	10000	8000	5000	4570	3873	3250	3250	3250	3250
American	TAF	120	77	137	149	61	49	49	48	49	49	80	49
	cfs	2013	1256	2307	2422	988	821	800	800	800	800	1442	801
Stanislaus	TAF	27	24	9	9	9	9	39	12	12	13	12	18
	cfs	460	384	150	150	150	150	635	200	200	219	214	300
Feather	TAF	57	54	121	161	125	138	59	58	59	59	70	65
	cfs	950	878	2034	2619	2033	2320	960	975	960	960	1261	1057

Trinity Diversions (TAF)

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Carr PP	43	25	99	120	101	100	24	30	21	15	10	7
Spring Crk. PP	15	15	90	110	90	90	45	20	12	10	10	10

Delta Summary (TAF)

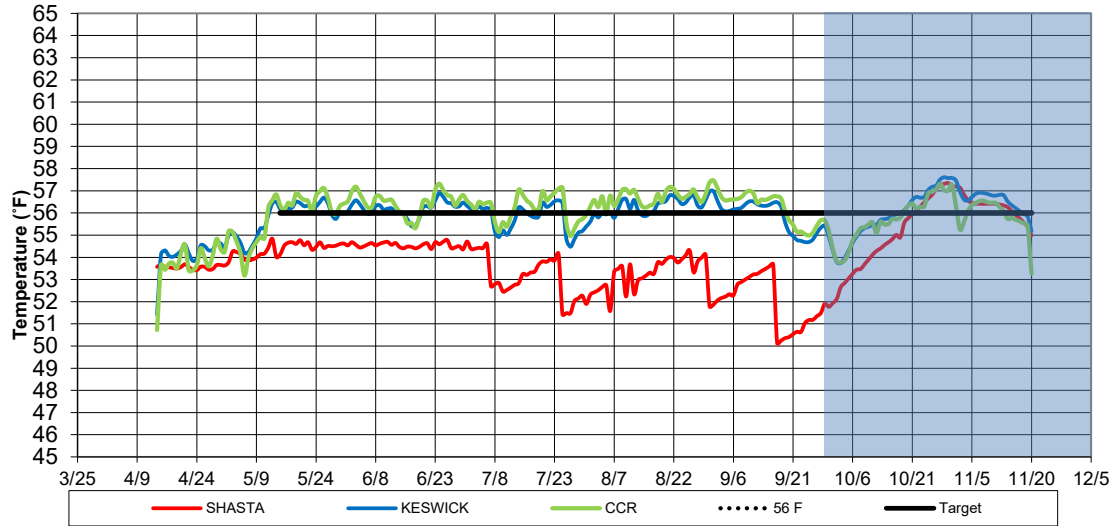
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Tracy	45	76	50	48	60	193	184	93	132	190	49	52	
USBR Banks	0	0	0	0	0	0	0	0	0	0	0	0	
Contra Costa	9.5	9.5	9.5	7.4	8.3	9.5	10.5	12.6	13.8	13.7	10.5	10.5	
Total USBR	54	86	60	55	68	203	195	106	146	204	60	63	
State Export	18	20	15	17	18	31	17	88	88	190	20	67	
Total Export	72	106	75	72	86	234	212	194	234	394	80	130	
COA Balance	56	78	113	184	204	150	126	145	125	125	80	0	
Vernalis	TAF	84	84	40	42	37	43	98	74	75	76	82	104
Vernalis	cfs	1419	1359	671	687	605	722	1595	1242	1225	1244	1475	1699
Old/Middle River Std.													
Old/Middle R. calc.		-884	-1,304	-1,253	-1,187	-1,399	-3,288	-2,521	-2,537	-2,967	-4,962	-1,029	-1,448
Computed DOI		7094	4002	4001	4002	2993	3009	4181	4942	4994	6214	11400	11403
Excess Outflow		0	0	0	0	0	0	0	0	0	1708	0	0
% Export/Inflow		11%	20%	12%	11%	16%	40%	36%	34%	39%	52%	10%	15%
% Export/Inflow std.		35%	35%	35%	65%	65%	65%	65%	65%	65%	65%	45%	35%

Hydrology

	Trinity	Shasta	Folsom	New Melones
Water Year Inflow (TAF)	347	2,685	1,022	357
Year to Date + Forecasted % of mean	29%	48%	38%	34%

CVP actual operations do not follow any forecasted operation or outlook; actual operations are based on real-time conditions.
 CVP operational forecasts or outlooks represent general system-wide dynamics and do not necessarily address specific watershed/tributary details.
 CVP releases or export values represent monthly averages.
 CVP Operations are updated monthly as new hydrology information is made available December through May.

**Sacramento River Modeled Temperature
2021 Apr 90%-Exceedance Water Outlook - L3MTO Meteorology**



	Shasta deg F	Keswick deg F	Clear Creek deg F	Igo deg F	Trinity deg F	Lewiston deg F
Apr	53.6	54.1	53.7	49.6	45.7	48.1
May	54.3	55.7	55.8	50.3	45.9	49.1
Jun	54.5	56.2	56.5	52.6	46.1	49.6
Jul	53.1	55.8	56.2	56.5	46.6	50.3
Aug	53.3	56.3	56.7	58.4	47.4	50.8
Sep	51.9	55.8	56.2	57.5	49.2	50.9
Oct	54.9	55.9	55.7	56.7	50.8	52.6
Nov	54.8	55.0	54.3	53.9	51.7	51.8

Run date: 4/20/21

EOM Sept storage: 1.2 MAF

Trinity profile date: 4/8/21

Whiskeytown profile date: 4/13/21

Shasta profile date: 4/14/21

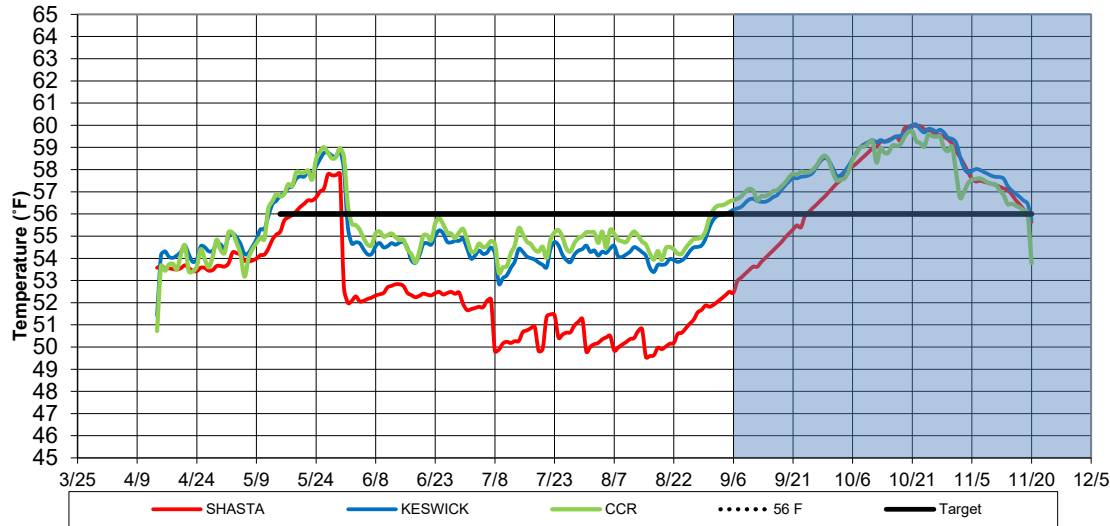
Projected Side gates: First Aug 13 Full Sep 18

Shaded area denotes period of model limitations - see Fall Temperature Index

End of September Cold-Water-Pool less than 56 deg F: 220 TAF

End of April Cold-Water-Pool less than 52 deg F: 1.4 MAF

**Sacramento River Modeled Temperature
2021 Apr 90%-Exceedance Water Outlook - L3MTO Meteorology**



	Shasta deg F	Keswick deg F	Clear Creek deg F	Igo deg F	Trinity deg F	Lewiston deg F
Apr	53.6	54.1	53.7	49.6	45.7	48.1
May	55.4	56.7	56.7	50.3	45.9	49.1
Jun	52.4	54.6	55.0	52.6	46.1	49.6
Jul	50.9	54.1	54.6	56.5	46.6	50.3
Aug	50.5	54.2	54.7	58.4	47.4	50.8
Sep	54.4	57.0	57.3	57.5	49.2	50.9
Oct	59.0	59.2	58.9	56.7	50.8	52.6
Nov	55.4	55.7	54.9	53.9	51.7	51.8

Run date: 4/20/21

EOM Sept storage: 1.2 MAF

Trinity profile date: 4/8/21

Whiskeytown profile date: 4/13/21

Shasta profile date: 4/14/21

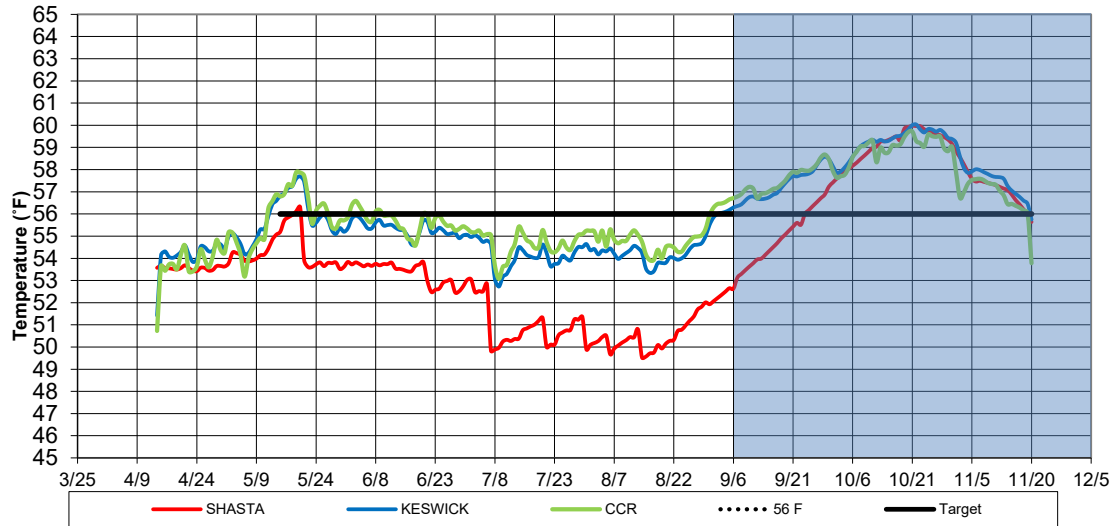
Projected Side gates: First Jul 25 Full Aug 16

Shaded area denotes period of model limitations - see Fall Temperature Index

End of September Cold-Water-Pool less than 56 deg F: 87 TAF

End of April Cold-Water-Pool less than 52 deg F: 1.4 MAF

**Sacramento River Modeled Temperature
2021 Apr 90%-Exceedance Water Outlook - L3MTO Meteorology**



	Shasta deg F	Keswick deg F	Clear Creek deg F	Igo deg F	Trinity deg F	Lewiston deg F
Apr	53.6	54.1	53.7	49.6	45.7	48.1
May	54.3	55.8	55.8	50.3	45.9	49.1
Jun	53.4	55.3	55.7	52.6	46.1	49.6
Jul	51.0	54.2	54.7	56.5	46.6	50.3
Aug	50.5	54.2	54.8	58.4	47.4	50.8
Sep	54.5	57.1	57.3	57.5	49.2	50.9
Oct	59.1	59.3	58.9	56.7	50.8	52.6
Nov	55.4	55.7	54.9	53.9	51.7	51.8

Run date: 4/20/21

EOM Sept storage: 1.2 MAF

Trinity profile date: 4/8/21

Whiskeytown profile date: 4/13/21

Shasta profile date: 4/14/21

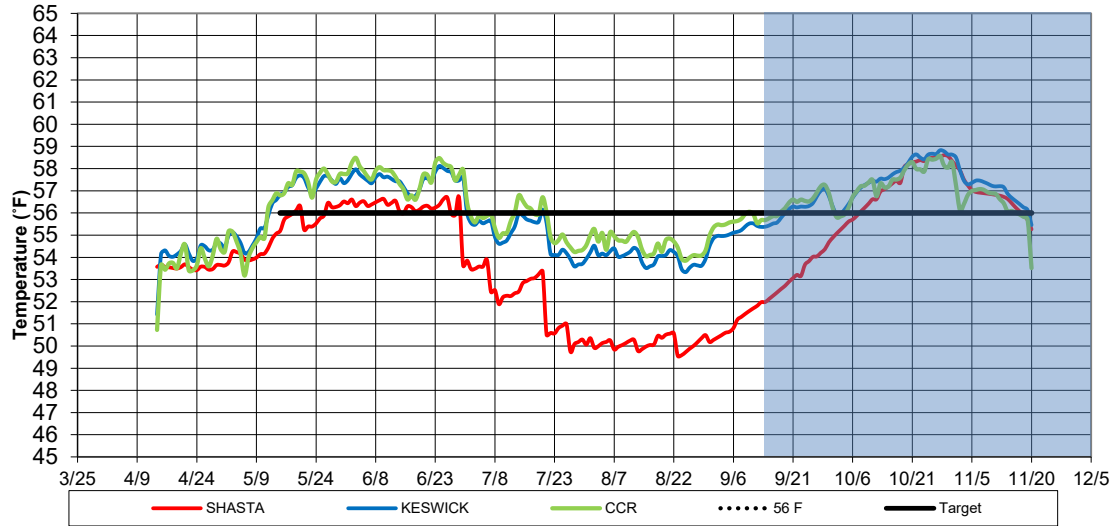
Projected Side gates: First Jul 22 Full Aug 15

Shaded area denotes period of model limitations - see Fall Temperature Index

End of September Cold-Water-Pool less than 56 deg F: 87 TAF

End of April Cold-Water-Pool less than 52 deg F: 1.4 MAF

**Sacramento River Modeled Temperature
2021 Apr 90%-Exceedance Water Outlook - L3MTO Meteorology**



	Shasta deg F	Keswick deg F	Clear Creek deg F	Igo deg F	Trinity deg F	Lewiston deg F
Apr	53.6	54.1	53.7	49.6	45.7	48.1
May	55.1	56.3	56.3	50.3	45.9	49.1
Jun	56.3	57.5	57.7	52.6	46.1	49.6
Jul	52.0	55.0	55.5	56.5	46.6	50.3
Aug	50.1	54.0	54.6	58.4	47.4	50.8
Sep	52.3	55.8	56.1	57.5	49.2	50.9
Oct	57.2	57.7	57.4	56.7	50.8	52.6
Nov	55.1	55.3	54.6	53.9	51.7	51.8

Run date: 4/20/21

EOM Sept storage: 1.2 MAF

Trinity profile date: 4/8/21

Whiskeytown profile date: 4/13/21

Shasta profile date: 4/14/21

Projected Side gates: First Jul 28 Full Aug 24

Shaded area denotes period of model limitations - see Fall Temperature Index

End of September Cold-Water-Pool less than 56 deg F: 150 TAF

End of April Cold-Water-Pool less than 52 deg F: 1.4 MAF

Figures 3-5 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 reaches.
3. Based on these records and estimates, the charts below illustrate a range of uncertainty in the expected river temperatures based on the end-of-September lake volume less than 56°F.

Sacramento River - Lake Shasta Early Fall Water Temperature - Keswick (KWK)

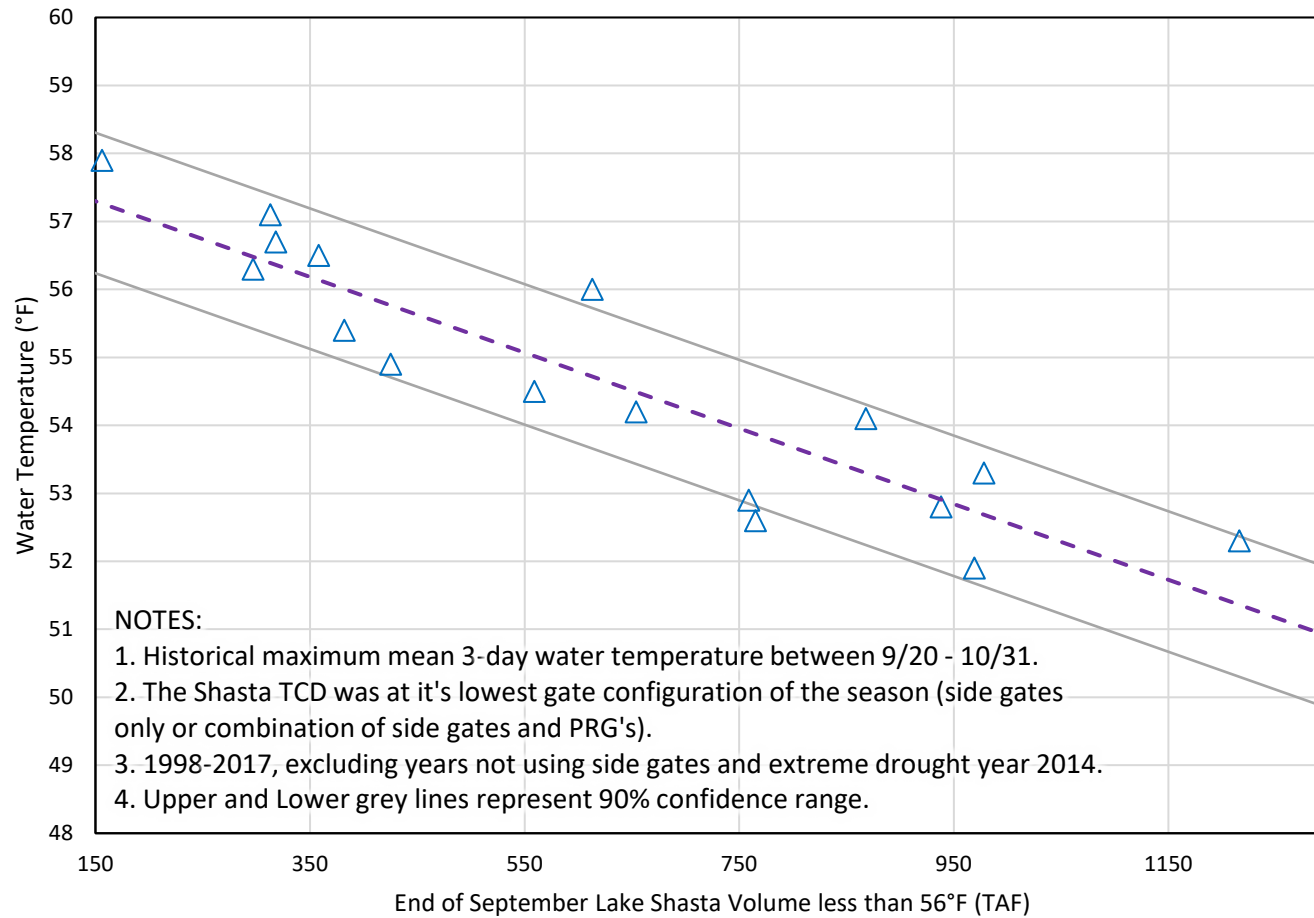


Figure 3. Historical relationship between Lake Shasta cold-water-pool characteristics and early fall Keswick water temperature.

Sacramento River - Lake Shasta
Early Fall Water Temperature - Sac River above Clear Creek (CCR)

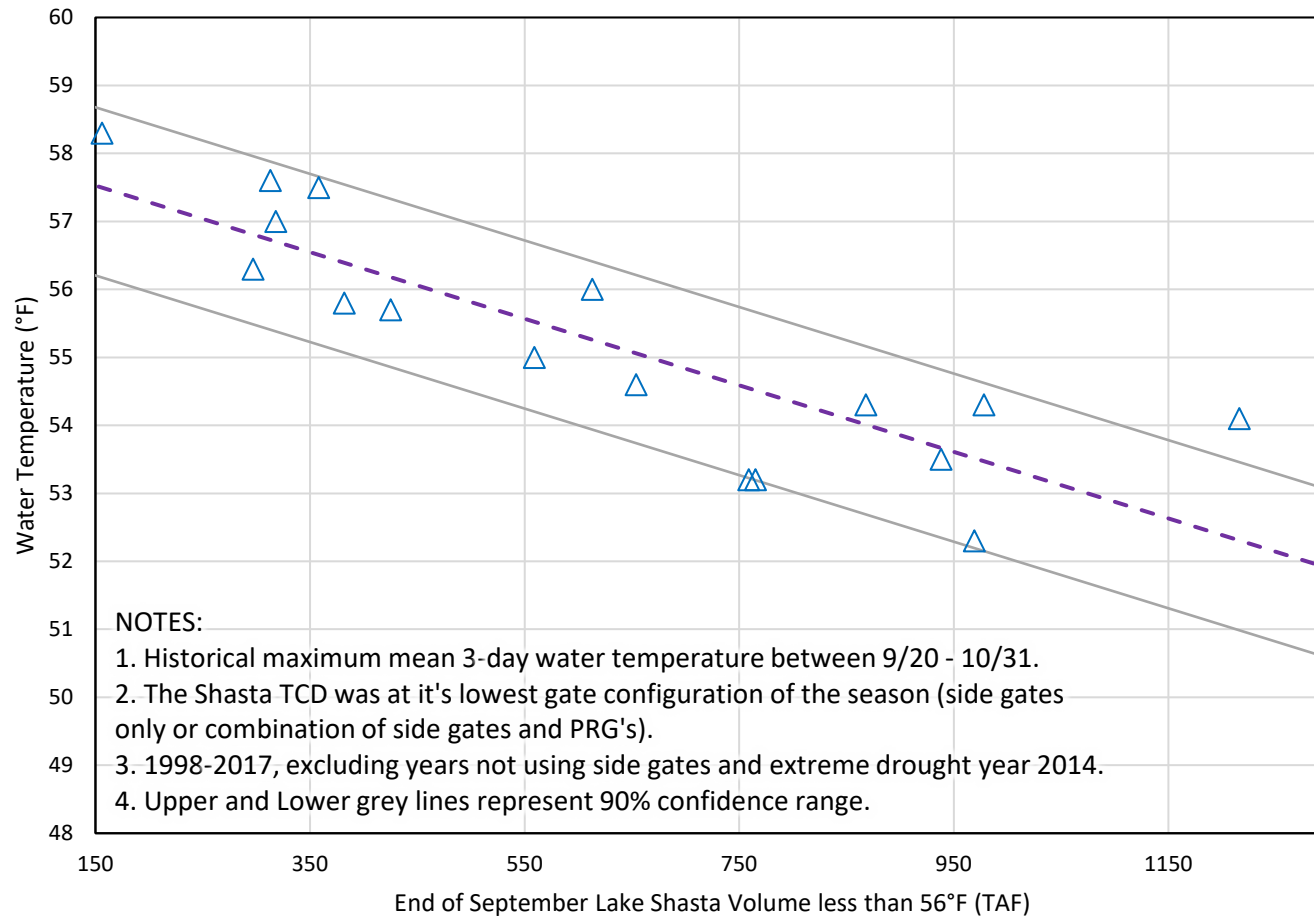


Figure 4. Historical relationship between Lake Shasta cold-water-pool characteristics and early fall Sacramento River above Clear Creek confluence water temperature.

**Sacramento River - Lake Shasta
Early Fall Water Temperature - Balls Ferry (BSF)**

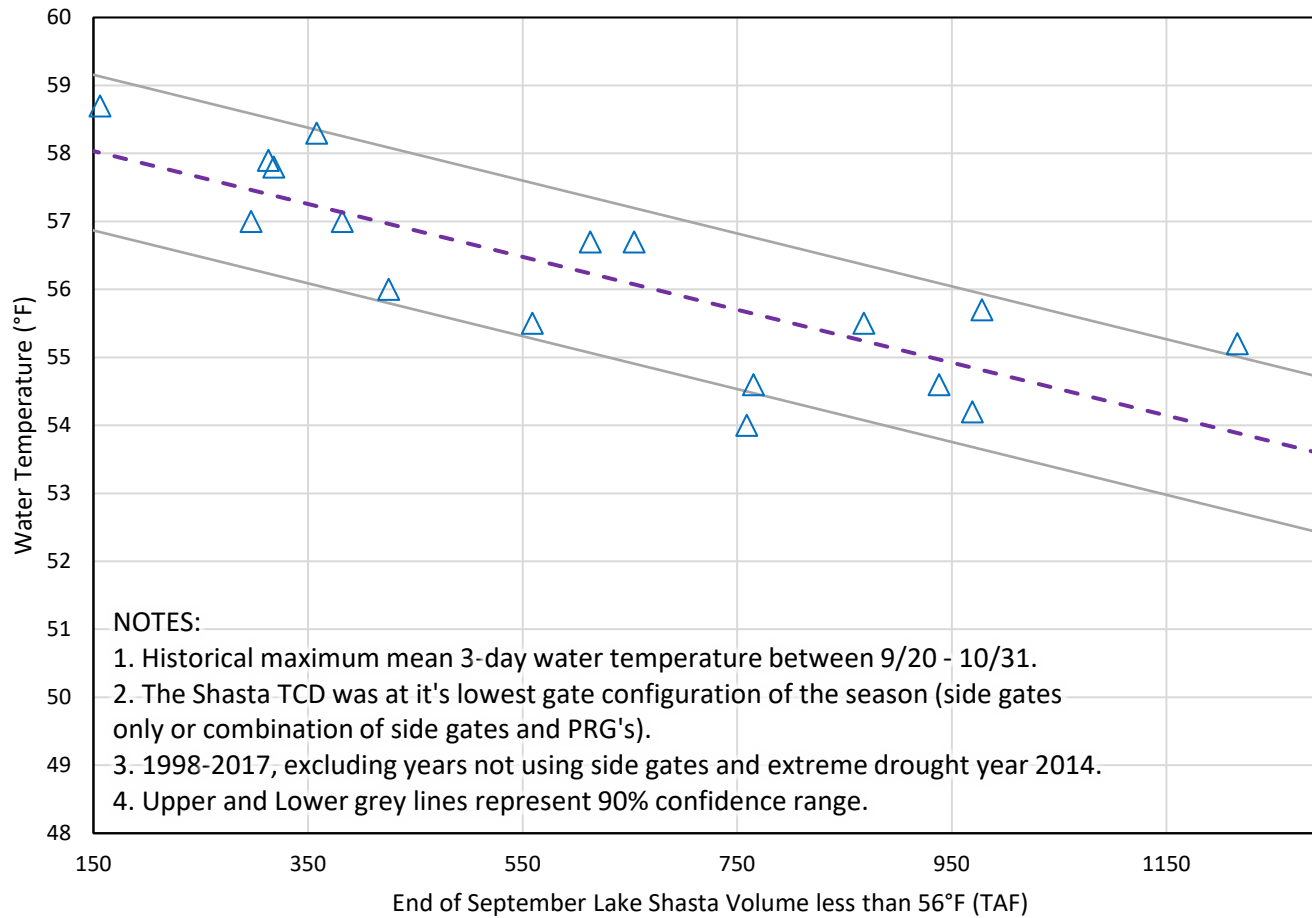
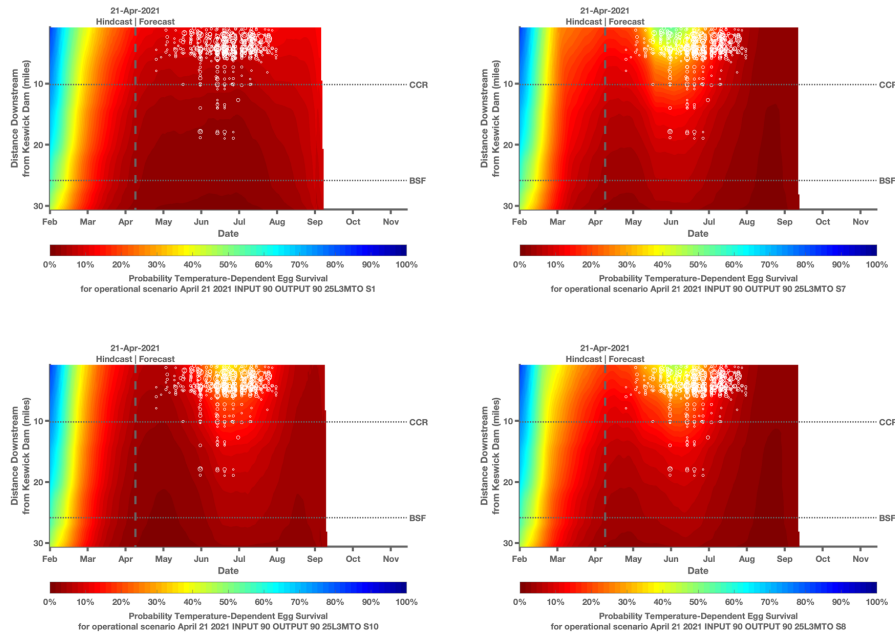


Figure 5. Historical relationship between Lake Shasta cold-water-pool characteristics and early fall Balls Ferry water temperature.

Summary Document for Shasta/Keswick Operational Scenarios
 Prepared by the Southwest Fisheries Science Center on April 21st, 2021

Below are results for four USBR scenario ran April 21st 2021. The scenario has hydrology (Input 90% exceedance) and air temperature (25% exceedance of L3MTO) as inputs. Inputs from the scenario are used to generate daily average Sacramento River water temperatures using the RAFT model and associated temperature-dependent egg mortality and survival estimates using the NMFS stage-independent temperature mortality model (Martin et al. 2017) for the 2021 temperature management season.

Further details of modeling methods are at: <https://oceanview.pfeg.noaa.gov/CVTEMP/>



Note: 2012-2019 redd distribution shown as white circles, scaled to the number of redds observed during the survey and 90% survival contour shown

Figure1: Estimated temperature-dependent egg survival produced by the NMFS stage-independent temperature mortality model under the four April 21st 2021 scenario. 2012-2019 redd distributions are used for all plots.

Table 1: Estimated temperature-dependent egg mortality under different scenarios assuming a 2012-2019 spatial and temporal redd distribution using output from the RAFT water temperature model.

Scenario	RIVER MODEL	Mean (%)	Median (%)
APR_21_2021_INPUT_90_OUTPUT_90_25L3MTO S1	RAFT	90	91
APR_21_2021_INPUT_90_OUTPUT_90_25L3MTO S7	RAFT	76	76
APR_21_2021_INPUT_90_OUTPUT_90_25L3MTO S10	RAFT	77	78
APR_21_2021_INPUT_90_OUTPUT_90_25L3MTO S8	RAFT	77	78