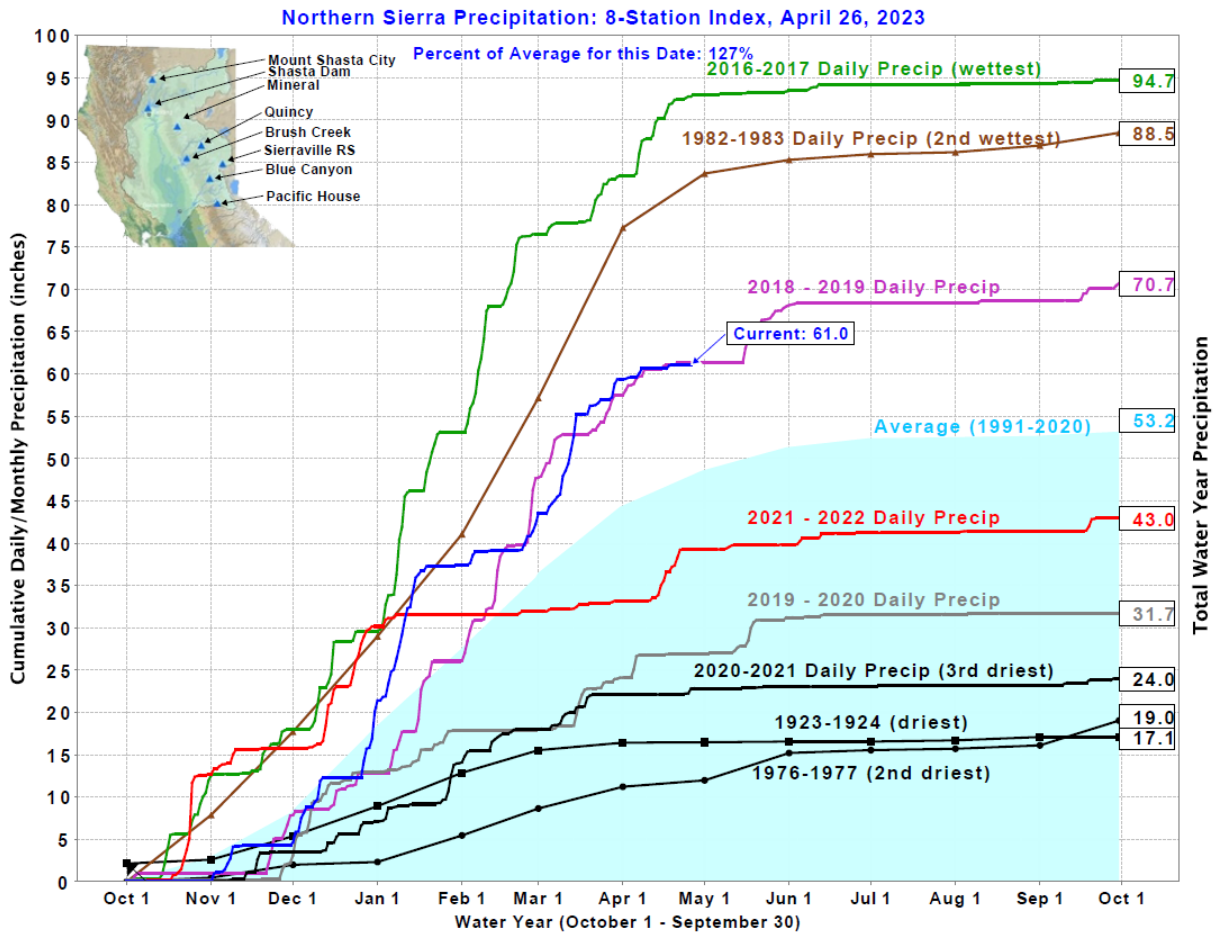




Sacramento River Temperature Task Group Meeting Packet

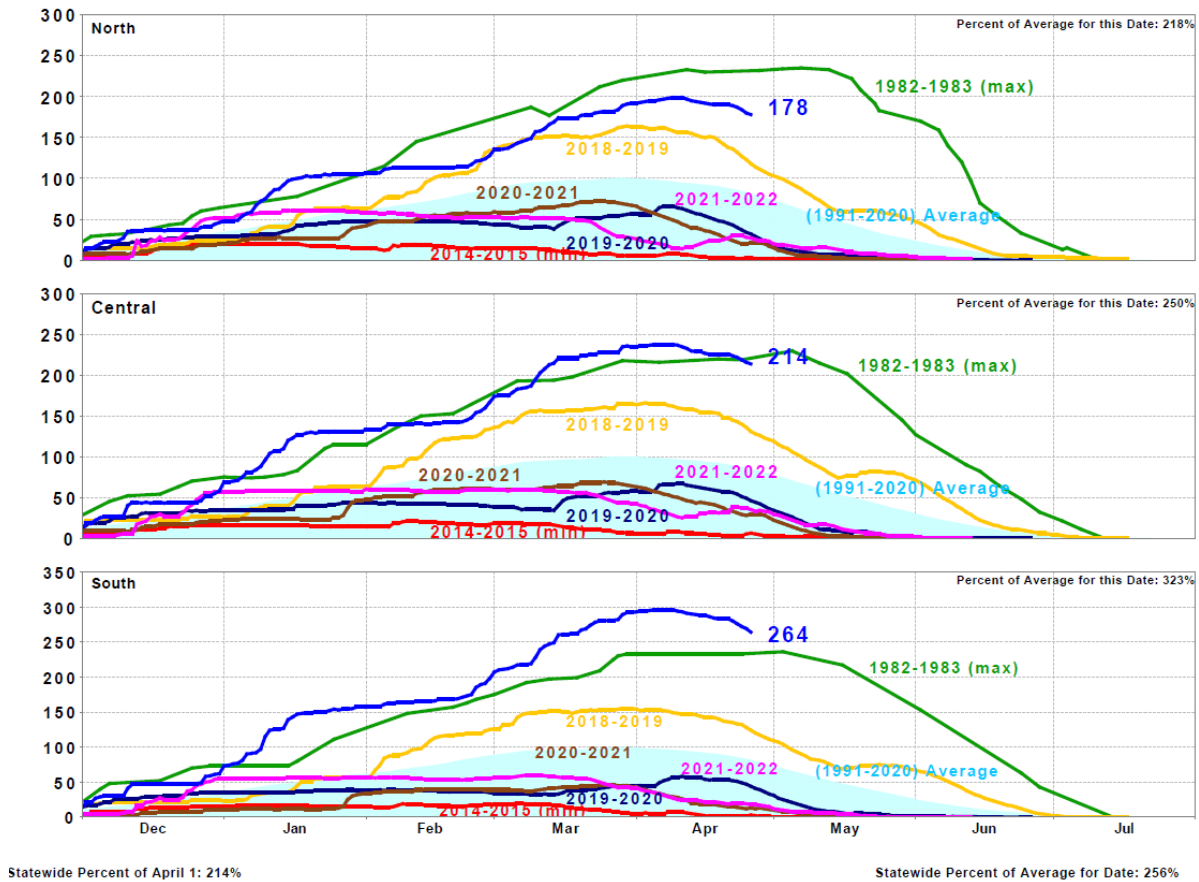
April 27, 2023



Northern Sierra Precipitation: 8-Station Index, April 26, 2023

This figure shows a line graph precipitation at the Northern Sierra 8-station Index. The graph includes the current cumulative daily and monthly precipitation, 61.0 (127% average for this date), in inches, average for 1991-2020 (53.2), daily precipitation for 2016-2017 (94.7 wettest), 1982-1983 (88.5 2nd wettest), 2018-2019 (70.7), 2021-2022 (43.0), 2019-2020 (31.7), 2020-2021 (24.0 3rd driest), 1976-1977 (19.0 2nd driest), and 1923-1924 (17.1 driest).

California Snow Water Content, April 26, 2023, Percent of April 1 Average



California Snow Water Content, April 26, 2023, Percent of April 1 Average

This figure shows three line graphs of percent snow water content for North, Central, and Southern California December – July. The graph shows 178%, 214%, and 264% of current April 1 average for North, Central, and Southern California, respectively. The graph also shows 1991-2020 average, 1982-1983 (max), 2014-2015 (minimum), 2018-2019, 2019-2020, 2020-2021, and 2021-2022.



— BUREAU OF —
RECLAMATION

Tables for BDO

United States Department of the Interior
U.S. Bureau of Reclamation, Central Valley Project-California
Daily CVP Water Supply Report

April 25, 2023

Run Date: April 26, 2023

Table 4. Reservoir Releases in Cubic Feet Per Second

Reservoir	Dam	WY 2022	WY 2023	15-Year Median
Trinity	Lewiston	1,783	5,657	1,024
Sacramento	Keswick	3,265	8,520	6,263
Feather	Oroville (SWP)	800	15,000	1,550
American	Nimbus	1,002	7,014	2,350
Stanislaus	Goodwin	572	1,500	1,507
San Joaquin	Friant	1,197	9,111	540

Table 5. Storage in Major Reservoirs in Thousands of Acre-Feet

Reservoir	Capacity	15-Yr Avg	WY 2022	WY 2023	% of 15 Yr Avg
Trinity	2,448	1,653	772	850	51
Shasta	4,552	3,589	1,791	4,358	121
Folsom	977	715	728	753	105
New Melones	2,420	1,455	926	1,487	102
Fed. San Luis	966	671	351	961	143
Total North CVP	11,363	8,083	4,568	8,409	104
Millerton	521	301	358	154	51
Oroville (SWP)	3,538	2,545	1,876	3,194	126

Table 6. Accumulated Inflow for water Year to Date in Thousands of Acre-Feet

Reservoir	Current WY 2023	WY 1977	WY 1983	15-Yr Avg	% of 15 Yr Avg
Trinity	676	394	1,404	681	99
Shasta	3,878	2,345	7,047	3,438	113
Folsom	2,851	789	4,281	1,711	167
New Melones	1,121	NA	1,242	581	193
Millerton	1,561	472	1,223	663	235

Table 7. Accumulated Precipitation for Water Year to Date in Inches

Reservoir	Current WY 2023	WY 1977	WY 1983	Avg (N Yrs)	% of Avg	Last 24 Hours
Trinity at Fish Hatchery	34.80	21.65	37.91	27.70 (63)	126	0.00
Sacramento at Shasta Dam	68.99	32.91	83.60	54.49 (68)	127	0.00
American at Blue Canyon	77.92	NA	112.06	59.49 (49)	131	0.00
Stanislaus at New Melones	46.55	NA	36.55	25.10 (46)	185	0.00
San Joaquin at Huntington LK	65.66	11.50	65.00	37.06 (50)	177	0.00

Sacramento River Station Temperature Summary Report

Date	MDWT TCD ¹	MDWT SHD	MDWT SPP ¹	MDWT KWK	MDWT SAC ²	MDWT CCR	MDWT BSF	MDWT BND	MDWT RBD	MDWT IGO	MDWT LWS	MDWT DGC ³	MDWT NFH	MDR Shasta Genera- tion	MDR Spring Creek PP	MDR Keswick Total	MDAT RDD	MDAT BSF	MDAT RDB
Mar	46.6	46.3	45.7	46.8	47.1	47.4	48.2	47.9	48.3	46.5	45.1	42.0	43.3	1729	883	3597	47.7	46.9	48.3
04/01	46.4	45.8	46.2	47.1	47.3	47.9	49.8	C	51.5	47.5	44.5	43.6	46.1	1717	460	3304	54.5	52.3	53.7
04/02	46.2	45.8	46.5	47.5	47.9	48.7	50.1	C	49.3 ^A	47.0	44.7	43.7	45.3	1018	1653	3315	51.0	51.4	52.3
04/03	46.4	45.8	46.7	47.1	47.3	47.8	49.2	C	50.9 ^A	46.7	45.7	43.8	44.5	965	1650	3322	46.5	45.5	47.4
04/04	46.4	45.9	46.8	47.2	47.6	48.2	49.1	C	50.1	46.8	46.5	43.8	44.9	2278	330	3321	46.0	44.9	47.3
04/05	47	46.9 ^A	47.4	47.2	47.7	48.7	50.1	C	50.9 ^A	47.6	45.9	43.9	45.6	2401	37	3320	48.0	48.1	49.6
04/06	47.4	46.8 ^A	47.4	47.2	47.4	48.1	50.5	C	51.8	47.8	45.9	44.0	45.9	2535	37	3303	53.0	50.9	51.0
04/07	47	47 ^A	46.7	47.5	48.0	48.2	50.4	C	51.4	48.6	46.4	44.1	46.1	2470	333	3281	53.5	53.3	53.0
04/08	47.1	46.6	46.6	47.9	48.8	49.2	51.2	C	52A	50.3	45.9	44.2	46.8	2241	533	3310	55.5	54.5	55.3
04/09	47.5	47.3 ^A	46.7	48.1	49.1	50.0	52.7	C	53.7	50.7	46.0	44.4	46.9	1119	1466	3356	59.5	58.5	59.5
04/10	47.4	46.7	46.9	48.3	49.5	50.7	54.3	C	55.9	51.9	46.2	44.5	48.1	1130	1561	3344	63.0	62.4	64.4
04/11	47.8	47.7	47.4	48.9	49.8	51.2	56.0	C	58.0	52.2	45.9	44.8	48.3	1893	676	2984	64.5	63.5	63.2
04/12	48.5	47.9	48.4	49.6	50.0	50.8	54.3	C	56.7 ^A	49.8	45.8	45.3	46.8	1645	945	2733	57.0	56.1	56.7
04/13	48.8	48.8	48.1	49.6	50.2	50.9	52.6	B	53.6 ^C	48.9	44.8	45.6	46.0	1724	1054	3329	57.0	54.4	55.8
04/14	48.4	48.9	47.9	49.2	50.0	51.2	52.9	52.9 ^A	53.7	49.5	44.5	45.7	46.1	1883	451	3341	57.0	52.0	54.3
04/15	48.3	47.9 ^A	47.7	49.4	50.1	51.3	53.6	54.2	54.9 ^A	50.3	44.7	45.7	46.9	2056	520	3311	57.0	55.5	56.7
04/16	48.2	47.4 ^A	47.7	49.8	50.4	51.7	54.6	55.4	56.1	50.7	44.9	45.6	47.1	2371	473	3310	57.5	56.0	56.4
04/17	47.8	47.9	48.3	49.9	50.0	59.8	53.7	55.2	55.8	49.4	43.9	45.5	45.7	2196	662	3296	52.5	52.8	53.6
04/18	47.8	47.1	48.2	49.7	50.0	50.6	52.0	52.6	53.6 ^A	48.2	43.4	45.3	44.5	1975	612	3318	48.0	48.9	51.5
04/19	48.3	47.4	48.0	49.2	49.9	51.0	52.7	53.1	54.0 ^A	48.6	43.6	45.1	44.8	2128	427	3309	50.5	52.5	54.5
04/20	48.7	48.4	48.3	49.0	49.7	50.9	53.2	53.7	54.5 ^A	49.4	44.2	44.9	45.3	1674	588	3294	56.0	54.9	56.7
04/21	49.1	48.2 ^A	48.4	49.0	49.9	51.1	53.9	55.1	55.8 ^A	50.9	44.6	44.7	46.6	3081	577	4102	64.0	62.5	65.3
04/22	49.4	48.2 ^A	48.1	49.7	50.5	51.7	54.5	56.2	57.3 ^A	51.9	44.4	44.6	46.7	3126	706	4414	74.0	69.8	71.8
04/23	49	47.5	48.5	50.1	51.1	52.3	55.6	57.4	58.6 ^A	52.2	44.7	44.7	47.1	3429	404	4528	68.0	66.3	70.1
04/24	49.4	47.8	48.7	50.1	50.6	51.5	55.1	57.4	58.8	51.5	44.9	45.0	47.0	5211	742	7403	63.5	62.9	64.7
Apr	47.8	47.3	47.6	48.7	49.3	50.2	52.6	54.8	54.1	49.5	45.1	44.7	46.2	2178	704	3577	56.5	55.4	56.9

Sacramento River Station Temperature Summary Table

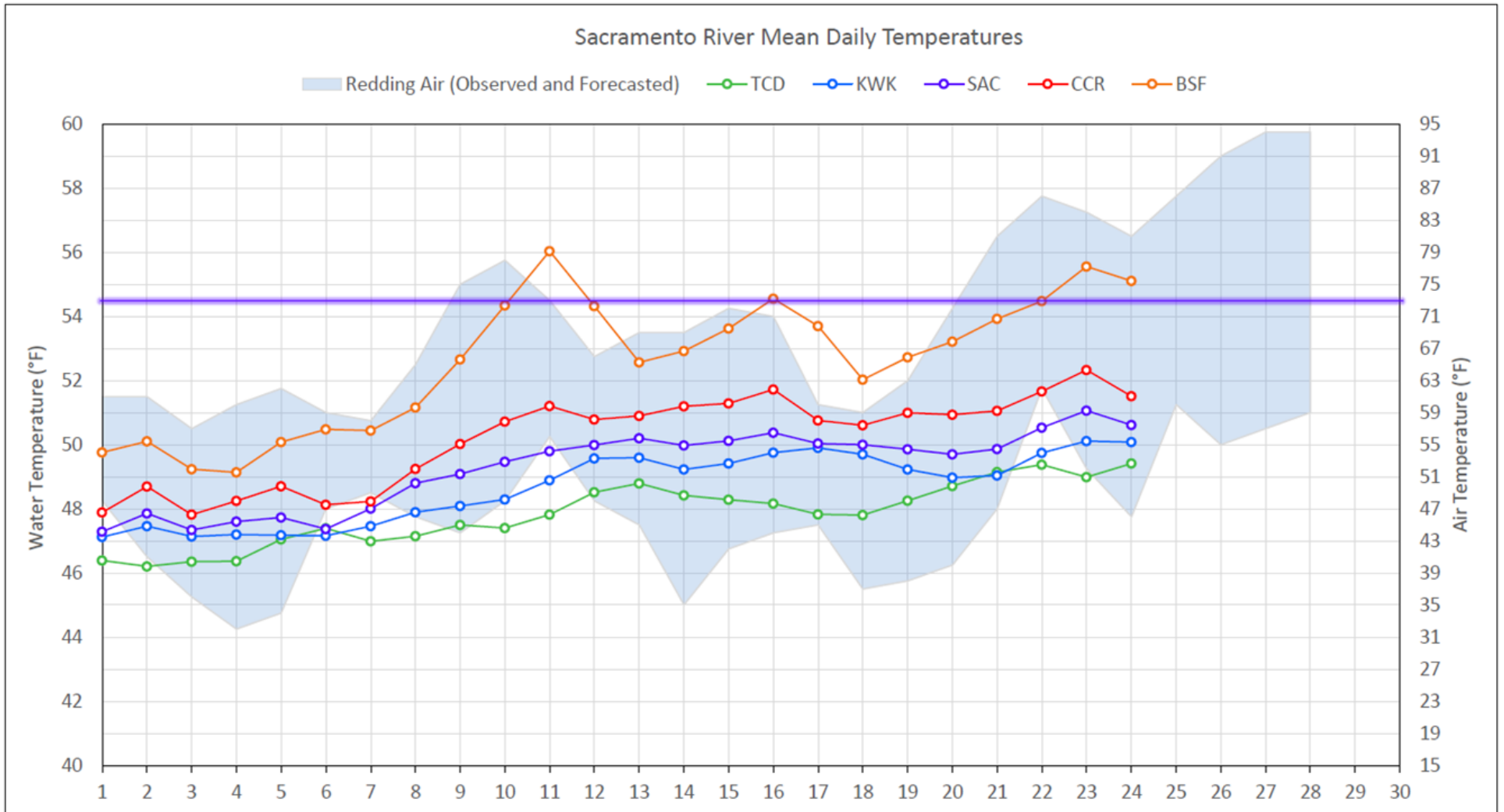
Totals	MDR Shasta Generation	MDR Spring Creek P.P	MDR Keswick Total
CFS	52266	16897	85848
AF	103667	33515	170276

Legend

- A = 1-9 hours of data missing (Average includes estimations)
- B = 10 or more hours of data missing (Average not calculated)
- C = Station out of service
- D = Record high air temperature
- E = Record low air temperature
- MDWT = Mean Daily Water Temperature (Fahrenheit)
- MDR = Mean Daily Release (CFS)
- MDAT = Mean Daily Air Temperatures (Fahrenheit)

Notes

- 1 Temperatures are weighted averages based on individual penstock flow and temperature
- X 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)
- 3 Data is currently being collected locally and periodically downloaded.
Once downloaded and certified by USGS, missing data will be added.



Sacramento River Mean Daily Temperatures

This figure shows mean Sacramento River daily temperatures in degrees Fahrenheit at Shasta Power Plant and various stations 0.8, 4.8, 9.7, and 25 miles downstream of Keswick Dam for the past 24 days. It also includes a shaded area depicting observed and forecasted air temperatures in degrees Fahrenheit in Redding California.

Station Details

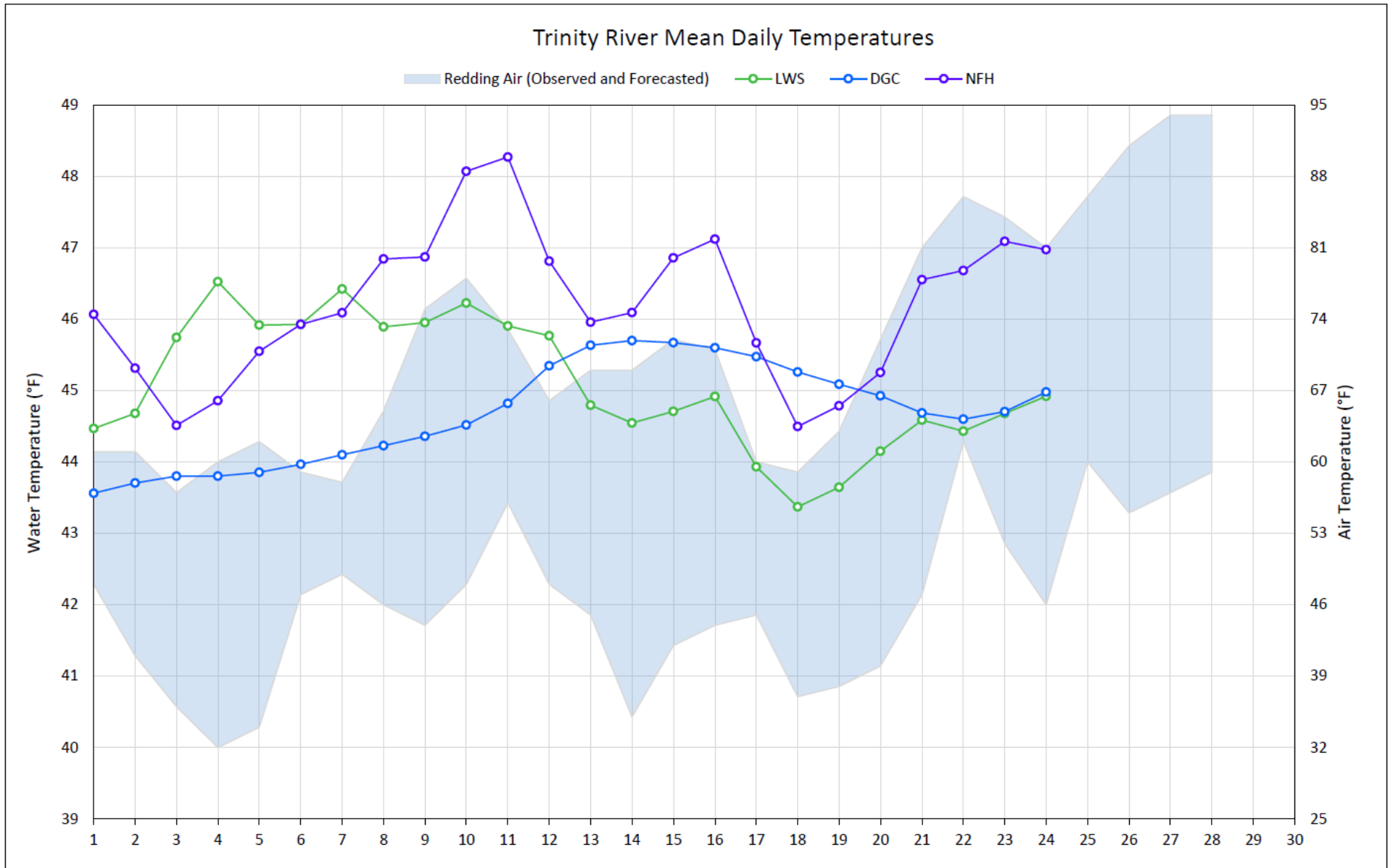
Code	Body of Water	Location ¹
TCD	N/A	Shasta Power Plant
SHD	Sacramento River	0.3 miles downstream of Shasta Power Plant
SPP	N/A	Spring Creek Power Plant
KWK	Sacramento River	0.8 miles downstream of Keswick Dam
SAC	Sacramento River	4.8 miles downstream of Keswick Dam
CCR	Sacramento River	9.7 miles downstream of Keswick Dam
BSF	Sacramento River	25 miles downstream of Keswick Dam
JLF	Sacramento River	34 miles downstream of Keswick Dam
BND	Sacramento River	41 miles downstream of Keswick Dam
RDB	Sacramento River	58 miles downstream of Keswick Dam
IGO	Clear Creek	7.3 miles downstream of Whiskeytown Dam

Water Right Temperature Control Points

River	Point	Temp (°F)	Begin Date	End Date
Sacramento	SAC	55	06/15/2021	05/02/2022
Sacramento	SAC	58	05/02/2022	06/07/2022
Sacramento	SAC	54.5	06/07/2022	TBD

Notes:

¹ Distances are approximate



Trinity River Mean Daily Temperatures

This figure shows mean Trinity River daily temperatures in degrees Fahrenheit at stations 1.1, 19, and 37 miles downstream of Lewiston Dam for the past 24 days. It also includes a shaded area depicting observed and forecasted air temperatures in degrees Fahrenheit in Redding California.

Station Details

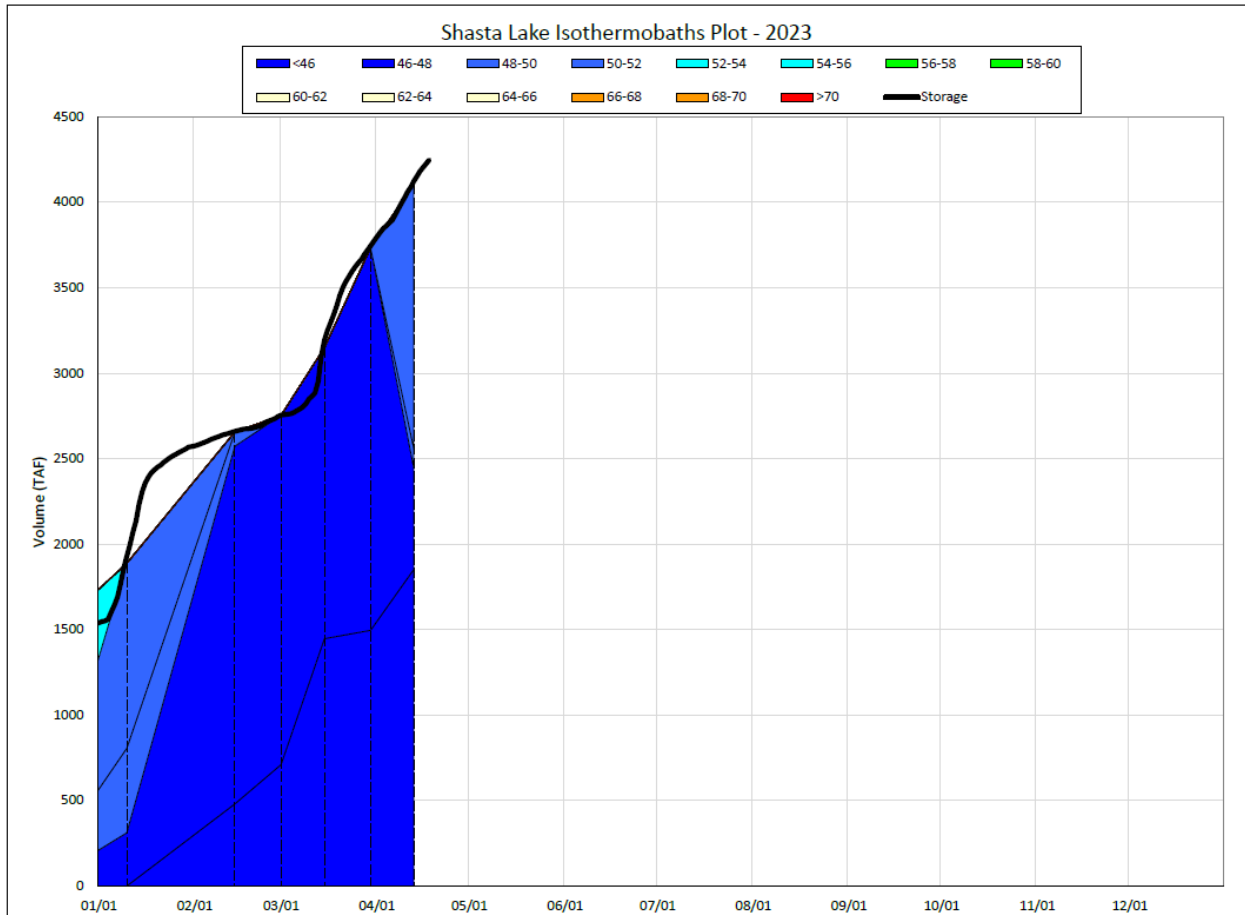
Code	Body of Water	Location¹
LWS	Trinity River	1.1 miles downstream of Lewiston Dam
DGC	Trinity River	19 miles downstream of Lewiston Dam
NFH	Trinity River	38 miles downstream of Lewiston Dam

Water Right Temperature Control Points

River	Point	Temp. (°F)	Begin Date	End Date
Trinity	DGC	56	Sep-15	Oct-01
Trinity	NFH	56	Oct-01	Dec-31

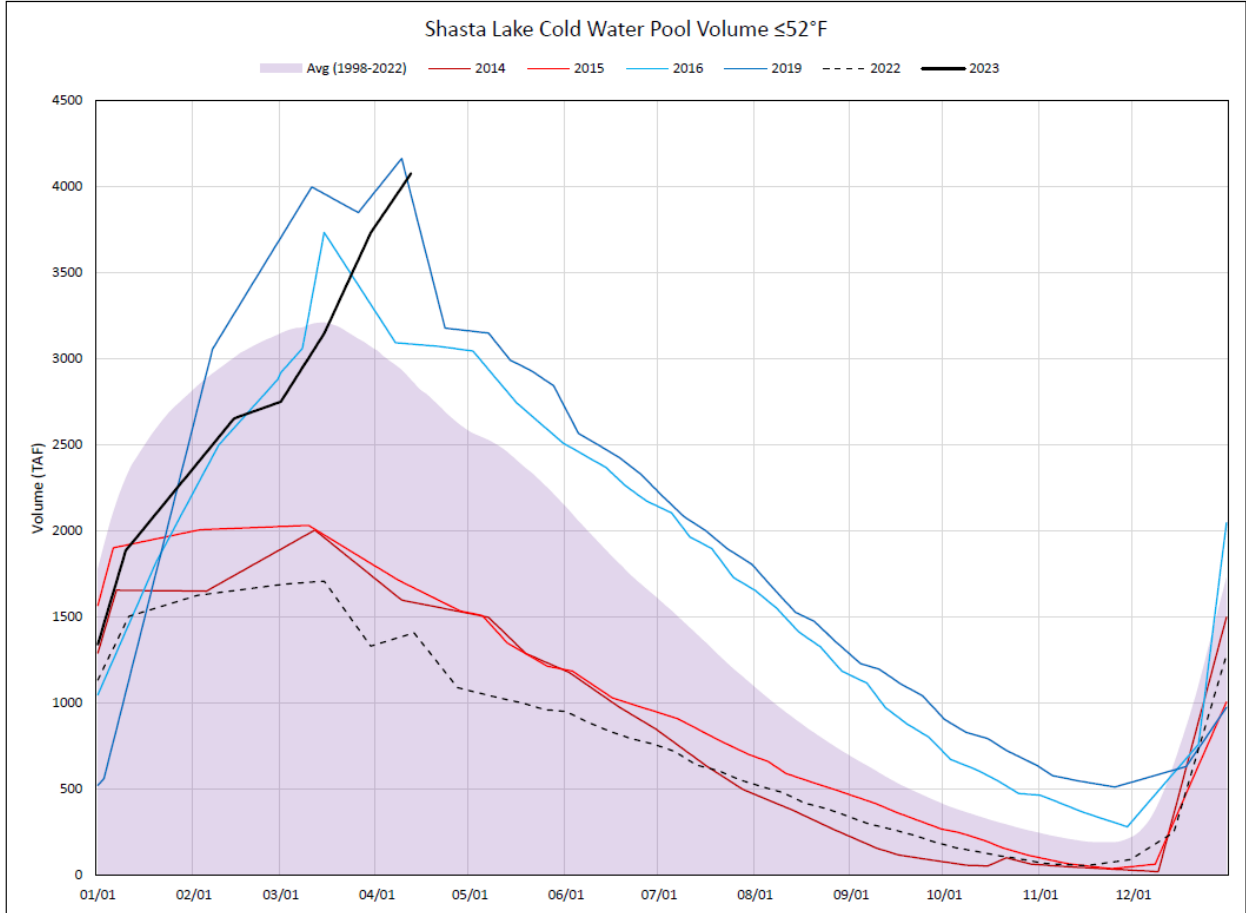
Notes

¹ Distances are approximate



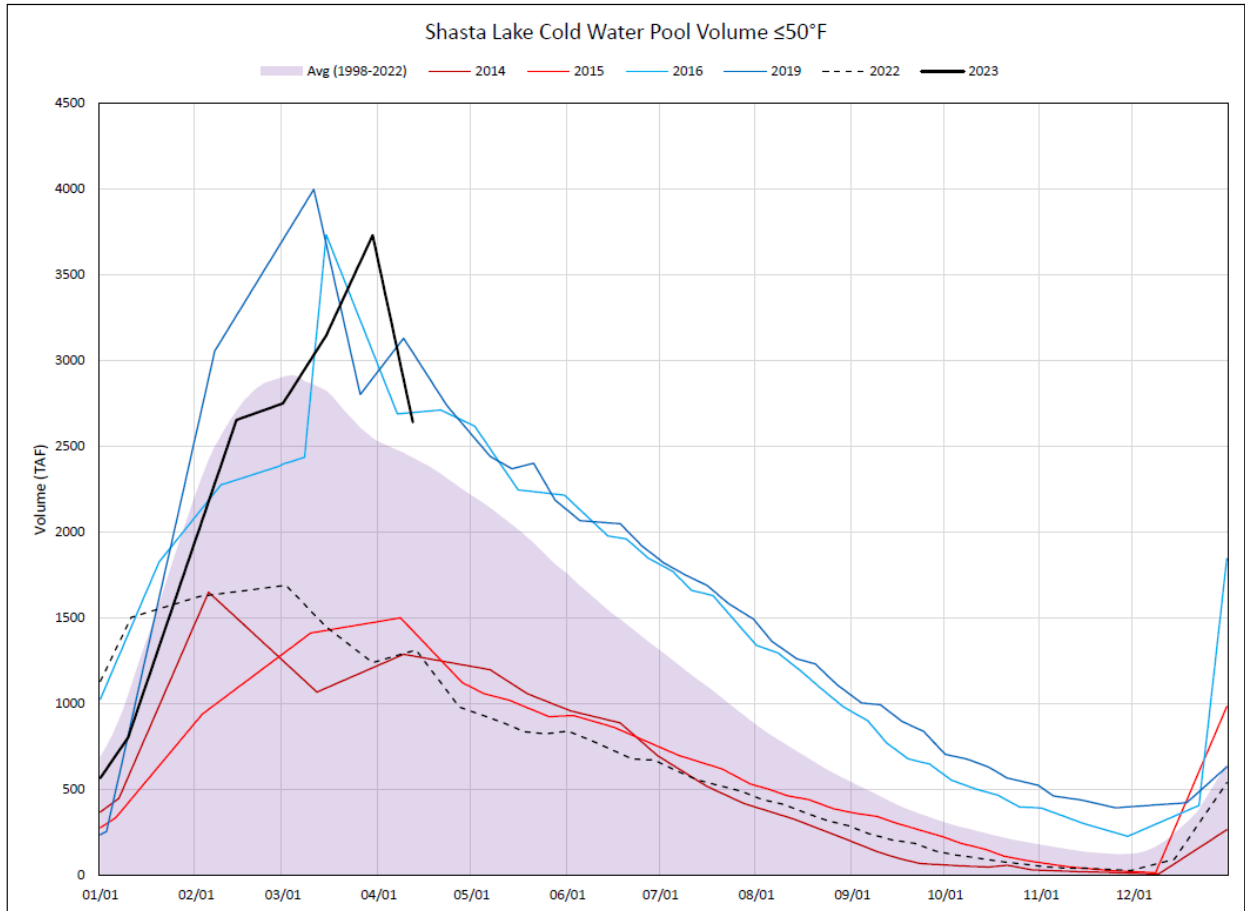
Shasta Lake Isothermobaths Plot – 2023

A chart that shows the temperature in degrees Fahrenheit and storage volume in thousands of acre-feet for 01/01 to 04/14 in Shasta Lake.



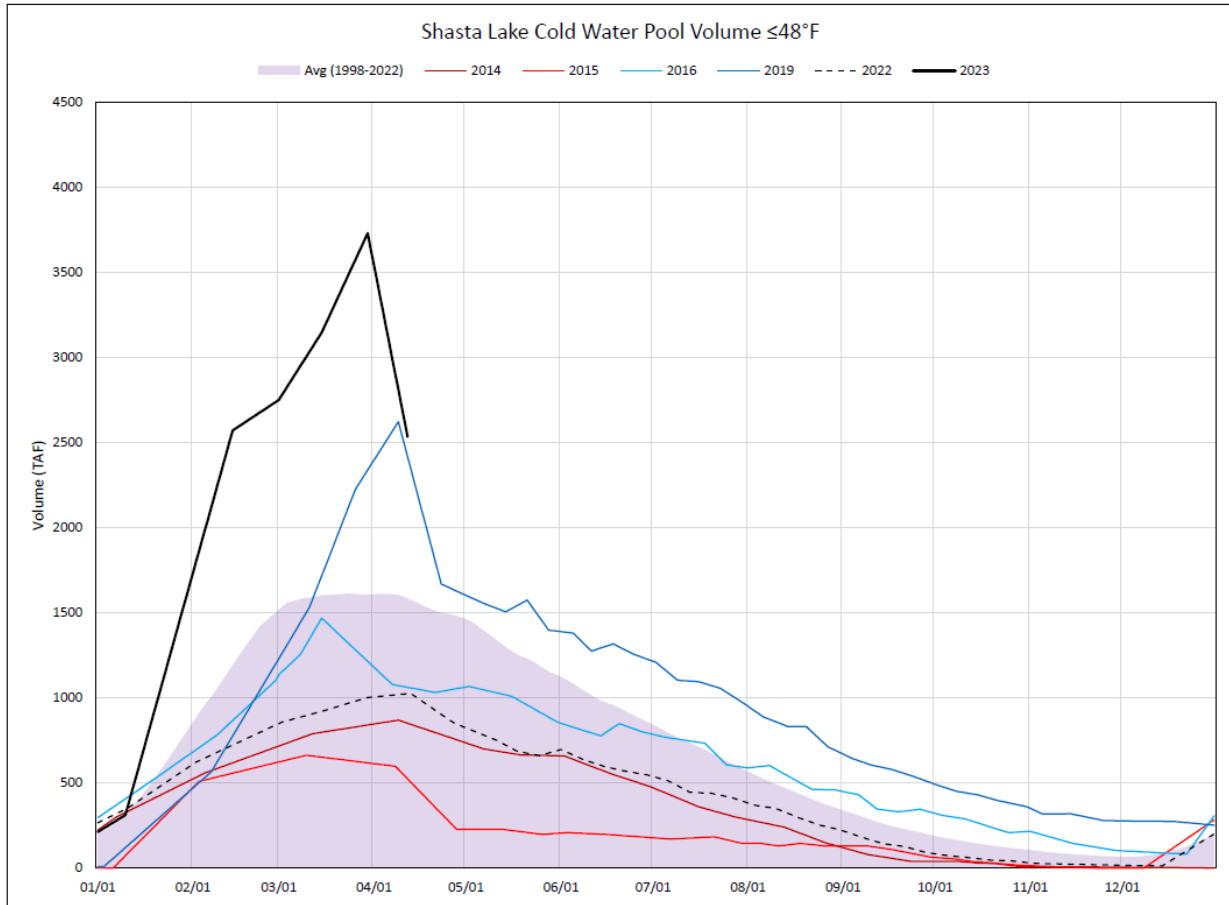
Shasta Lake Cold Water Pool Volume ≤52°F

This figure is a line graph showing Shasta Lake Cold Water Pool Volume equal to or less than 52 degrees Fahrenheit from 01/01 to 12/01. It includes a shaded area of the average 1998-2022 and lines depicting 2014, 2015, 2016, 2019, and 2022 data. The line showing 2023 data is from 01/01 to 04/14.



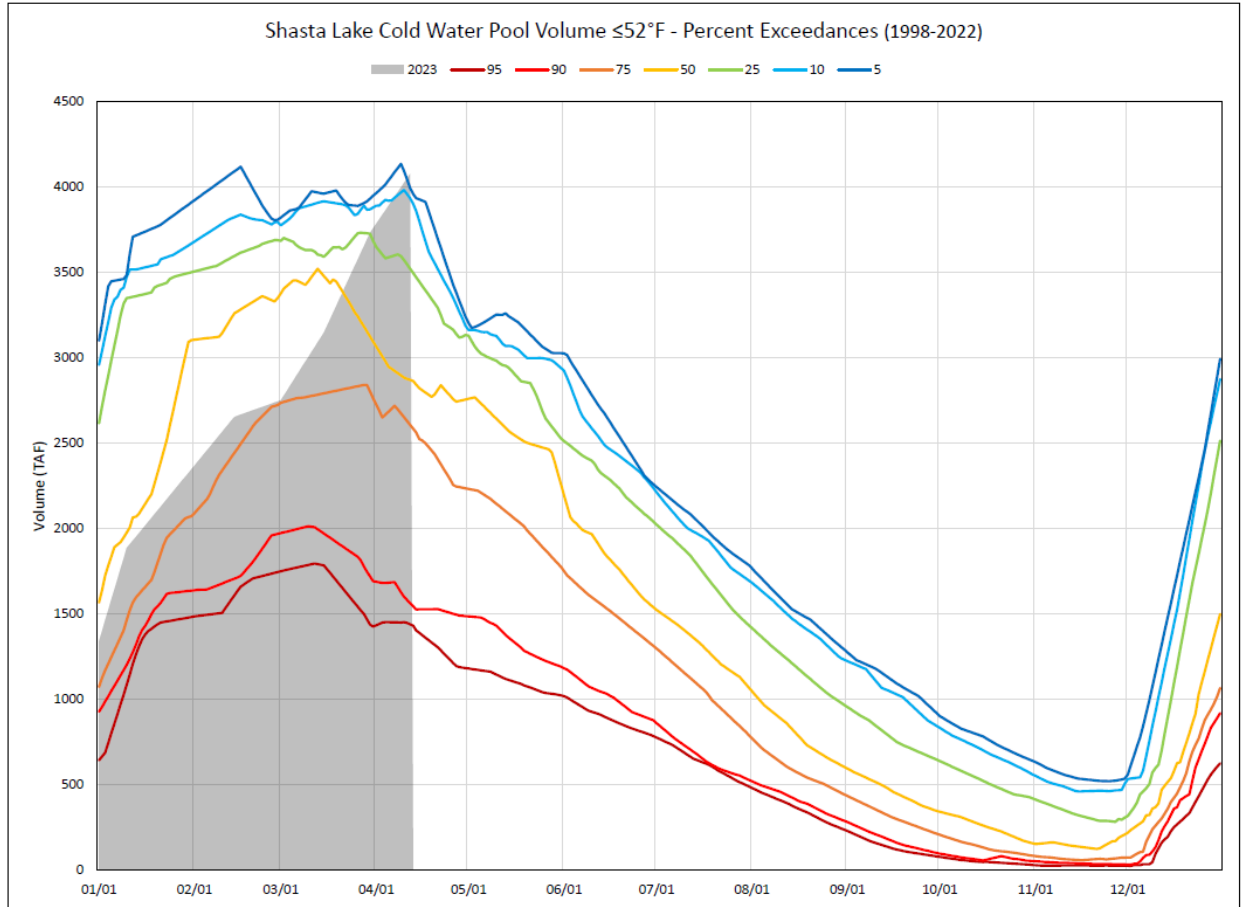
Shasta Lake Cold Water Pool Volume ≤50°F

This figure is a line graph showing Shasta Lake Cold Water Pool Volume equal to or less than 50 degrees Fahrenheit from 01/01 to 12/01. It includes a shaded area of the average 1998-2022 and lines depicting 2014, 2015, 2016, 2019, and 2022 data. The line showing 2023 data is from 01/01 to 04/14.



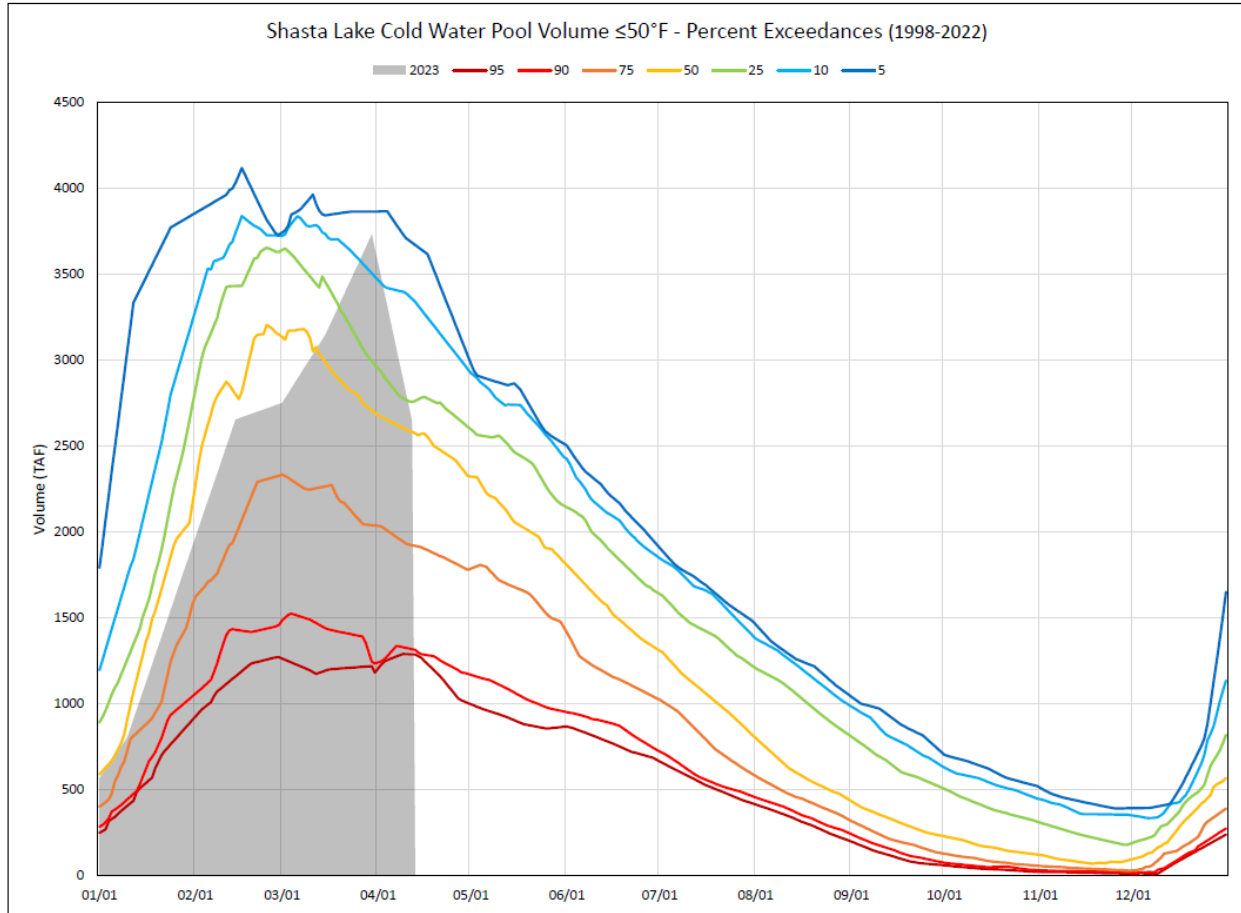
Shasta Lake Cold Water Pool Volume ≤48°F

This figure is a line graph showing Shasta Lake Cold Water Pool Volume equal to or less than 48 degrees Fahrenheit from 01/01 to 12/01. It includes a shaded area of the average 1998-2022 and lines depicting 2014, 2015, 2016, 2019, and 2022 data. The line showing 2023 data is from 01/01 to 04/14.



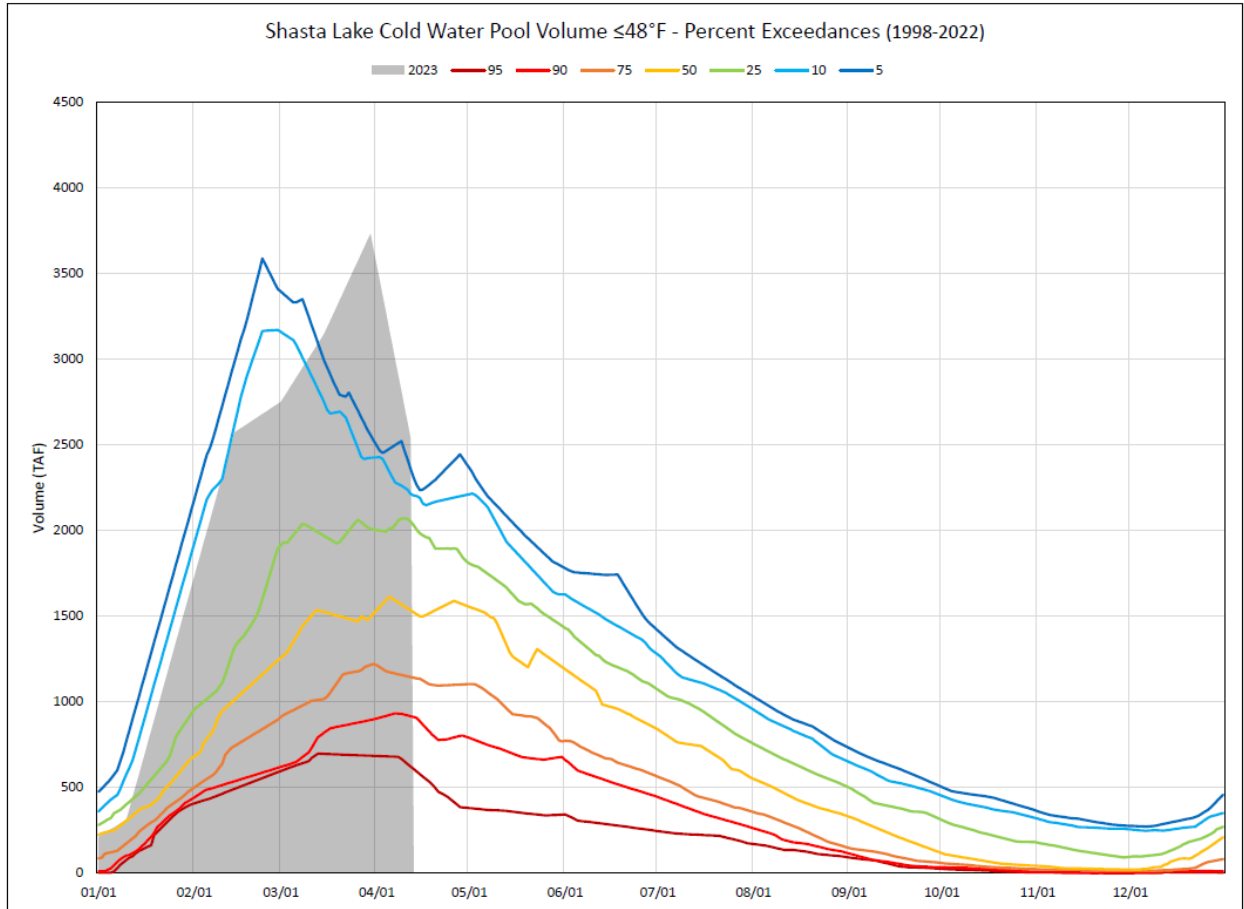
Shasta Lake Cold Water Pool Volume $\leq 52^{\circ}\text{F}$ - Percent Exceedances (1998-2022)

This figure is a line graph showing Shasta Lake Cold Water Pool Volume less than or equal to 52 degrees Fahrenheit as percent exceedances from 01/01 to 12/01. It includes a shaded area for 2023 data from 01/01 to 04/14 and lines depicting 95, 90, 75, 50, 25, 10, and 5% exceedances.



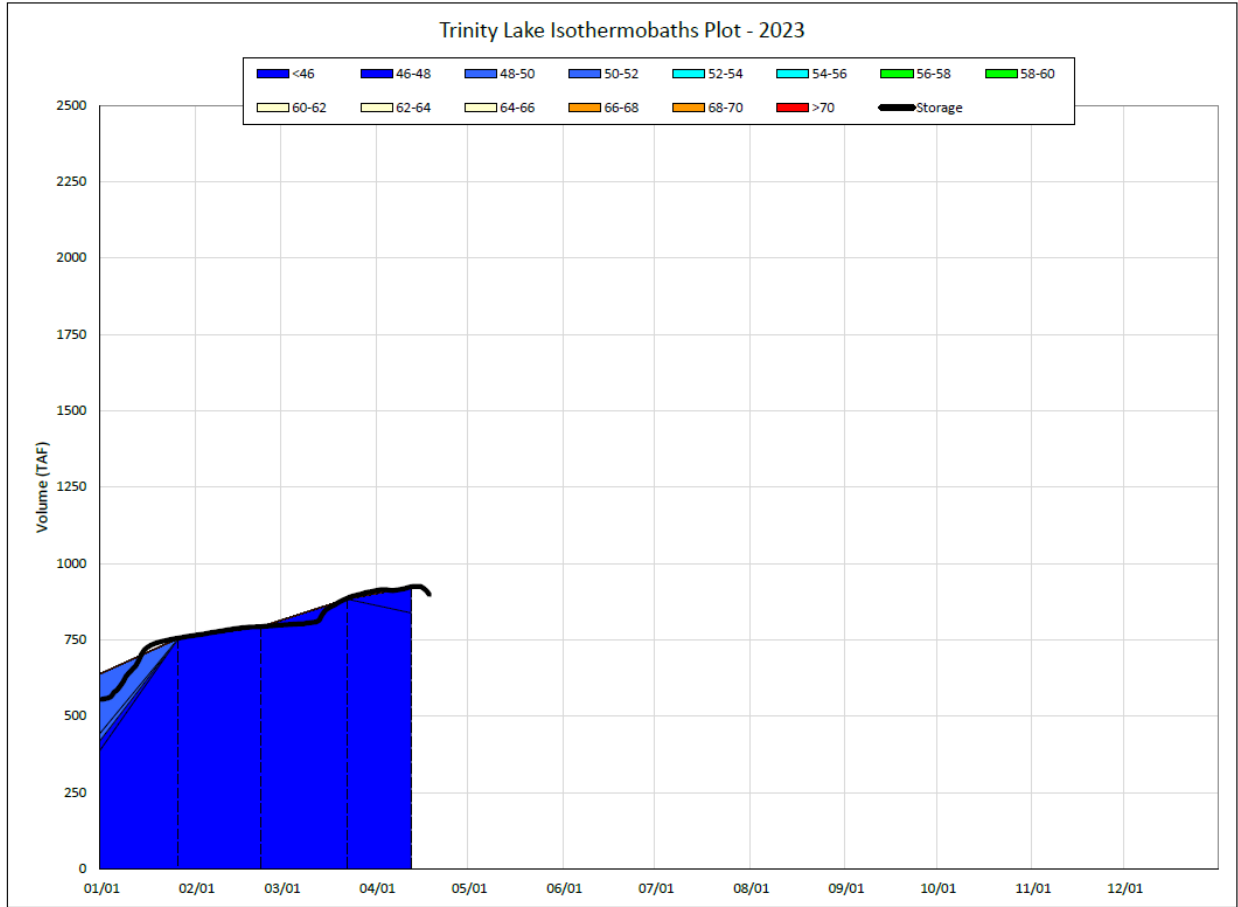
Shasta Lake Cold Water Pool Volume $\leq 50^{\circ}\text{F}$ - Percent Exceedances (1998-2022)

This figure is a line graph showing Shasta Lake Cold Water Pool Volume less than or equal to 50 degrees Fahrenheit as percent exceedances from 01/01 to 12/01. It includes a shaded area for 2023 data from 01/01 to 04/14 and lines depicting 95, 90, 75, 50, 25, 10, and 5% exceedances.



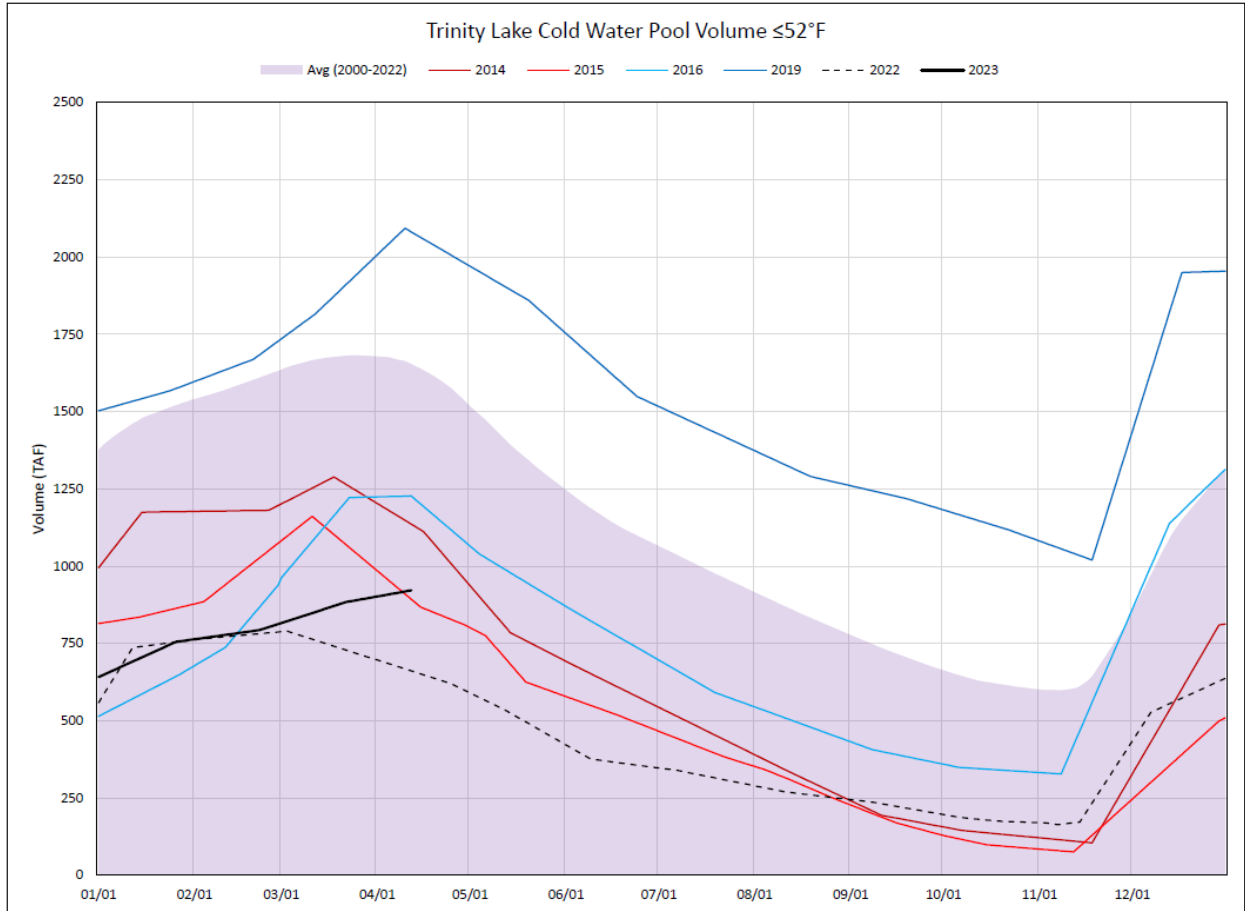
Shasta Lake Cold Water Pool Volume $\leq 48^{\circ}\text{F}$ - Percent Exceedances (1998-2022)

This figure is a line graph showing Shasta Lake Cold Water Pool Volume less than or equal to 48 degrees Fahrenheit as percent exceedances from 01/01 to 12/01. It includes a shaded area for 2023 data from 01/01 to 04/14 and lines depicting 95, 90, 75, 50, 25, 10, and 5% exceedances.



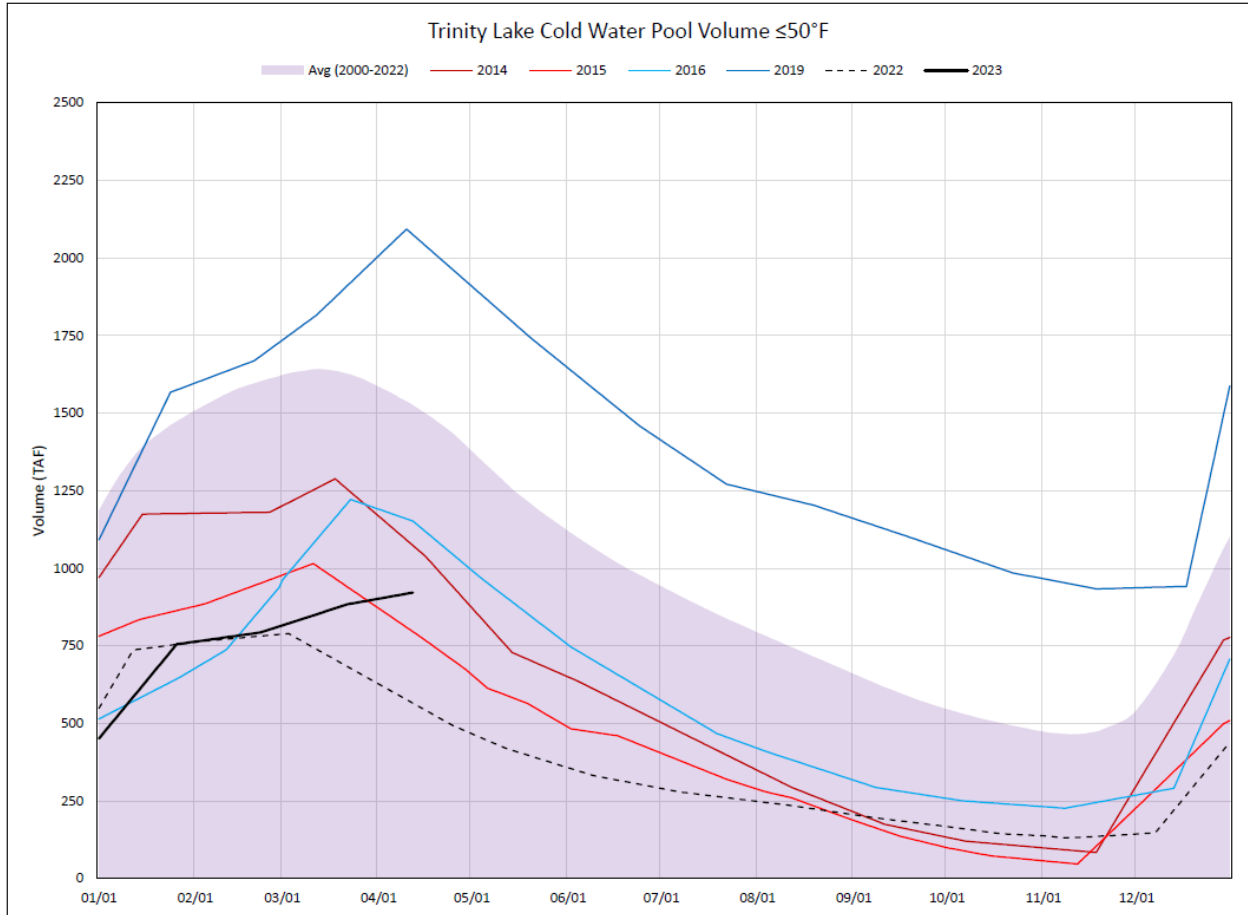
Trinity Lake Isothermobaths Plot – 2023

A chart that shows the temperature in degrees Fahrenheit and storage volume in thousands of acre-feet for 01/01 to 04/14 in Trinity Lake.



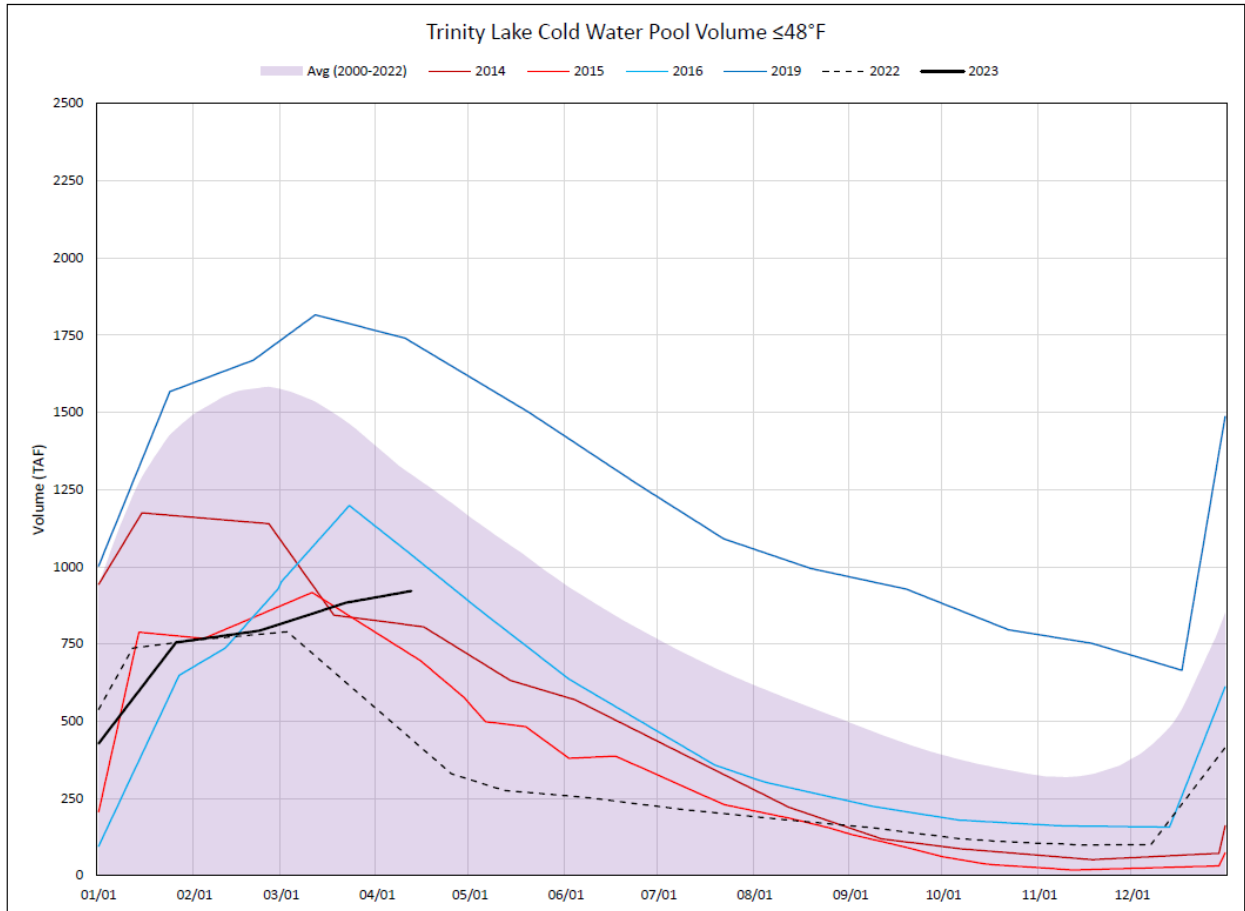
Trinity Lake Cold Water Pool Volume ≤52°F

This figure is a line graph showing Trinity Lake Cold Water Pool Volume equal to or less than 52 degrees Fahrenheit from 01/01 to 12/01. It includes a shaded area of the average 1998-2022 and lines depicting 2014, 2015, 2016, 2019, and 2022 data. The line showing 2023 data is from 01/01 to 04/14.



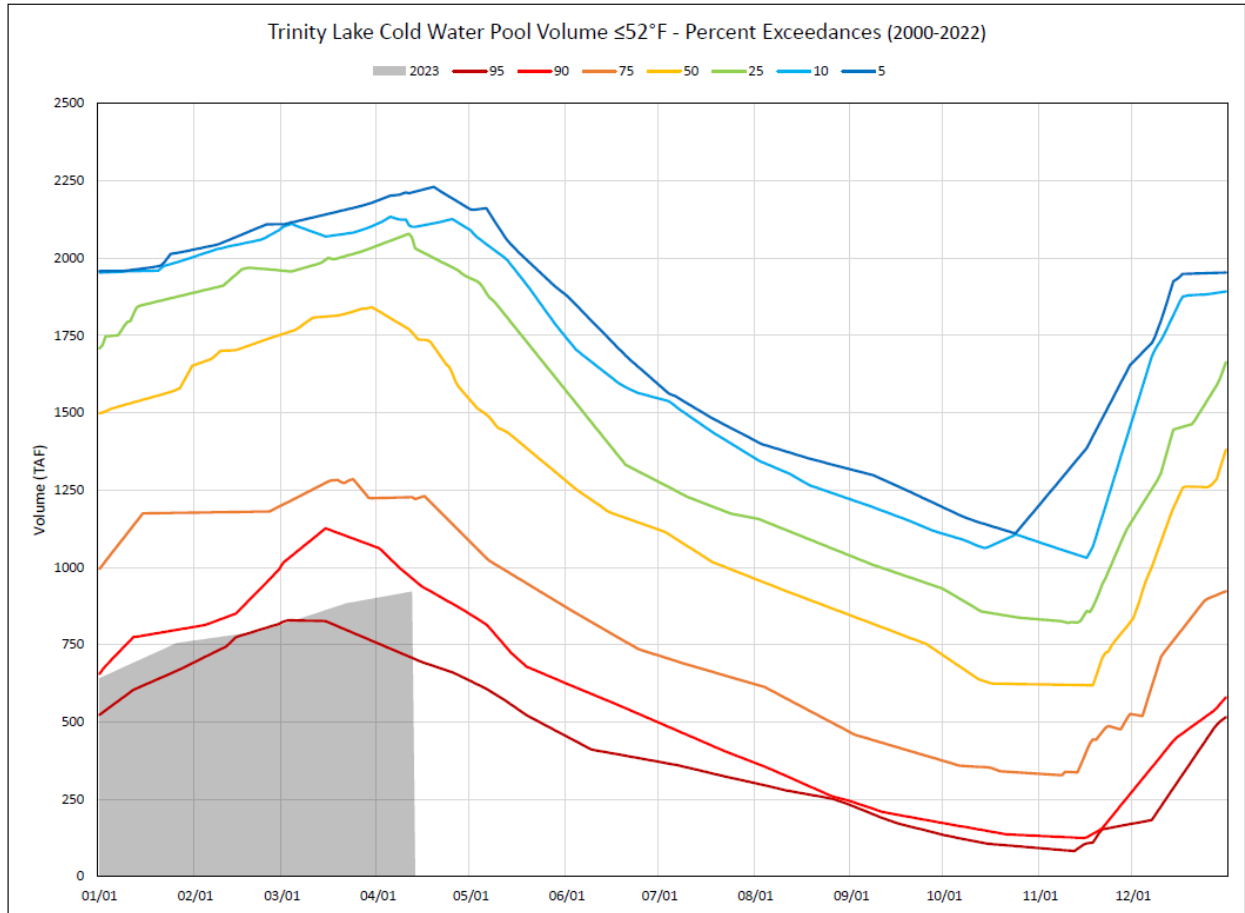
Trinity Lake Cold Water Pool Volume ≤50°F

This figure is a line graph showing Trinity Lake Cold Water Pool Volume equal to or less than 50 degrees Fahrenheit from 01/01 to 12/01. It includes a shaded area of the average 1998-2022 and lines depicting 2014, 2015, 2016, 2019, and 2022 data. The line showing 2023 data is from 01/01 to 04/14.



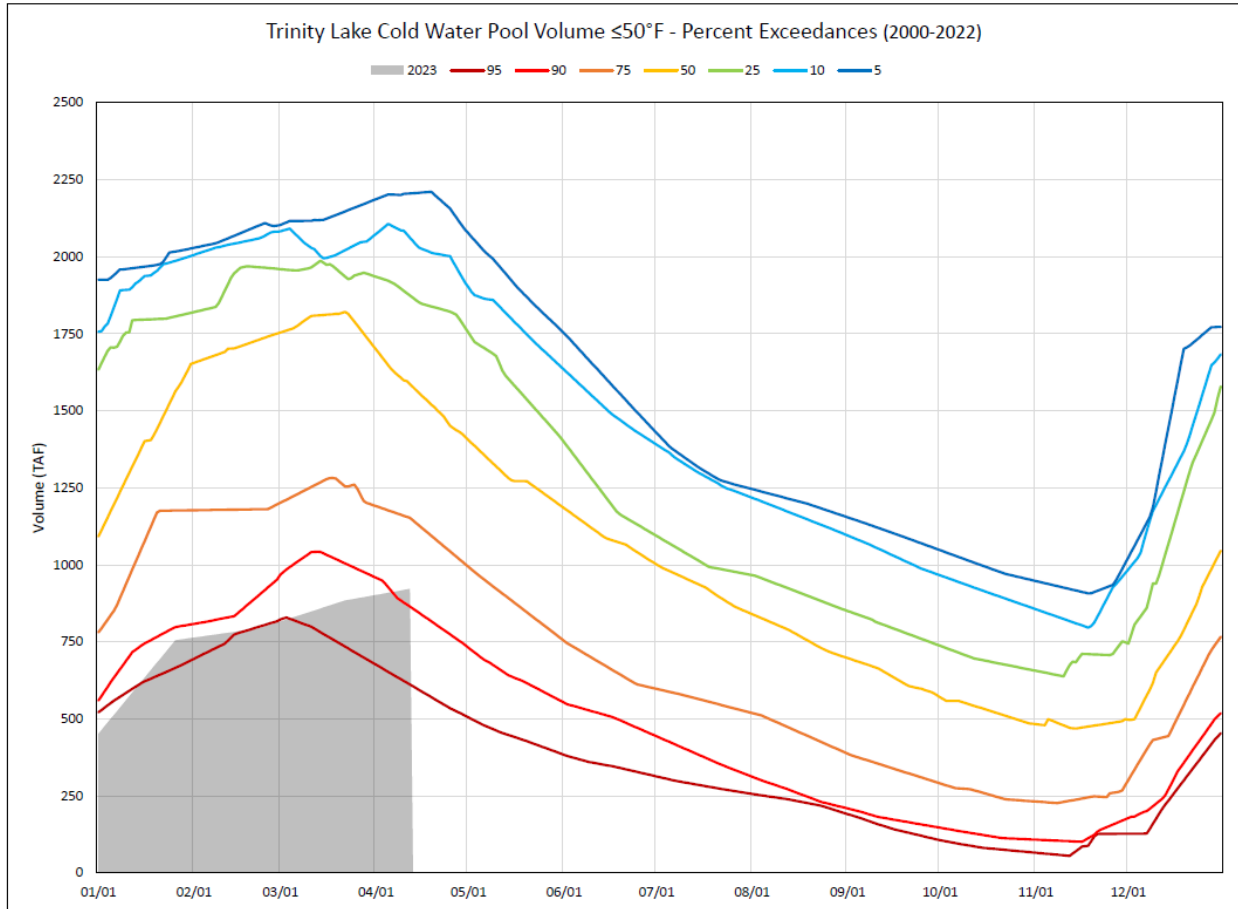
Trinity Lake Cold Water Pool Volume ≤48°F

This figure is a line graph showing Trinity Lake Cold Water Pool Volume equal to or less than 48 degrees Fahrenheit from 01/01 to 12/01. It includes a shaded area of the average 1998-2022 and lines depicting 2014, 2015, 2016, 2019, and 2022 data. The line showing 2023 data is from 01/01 to 04/14.



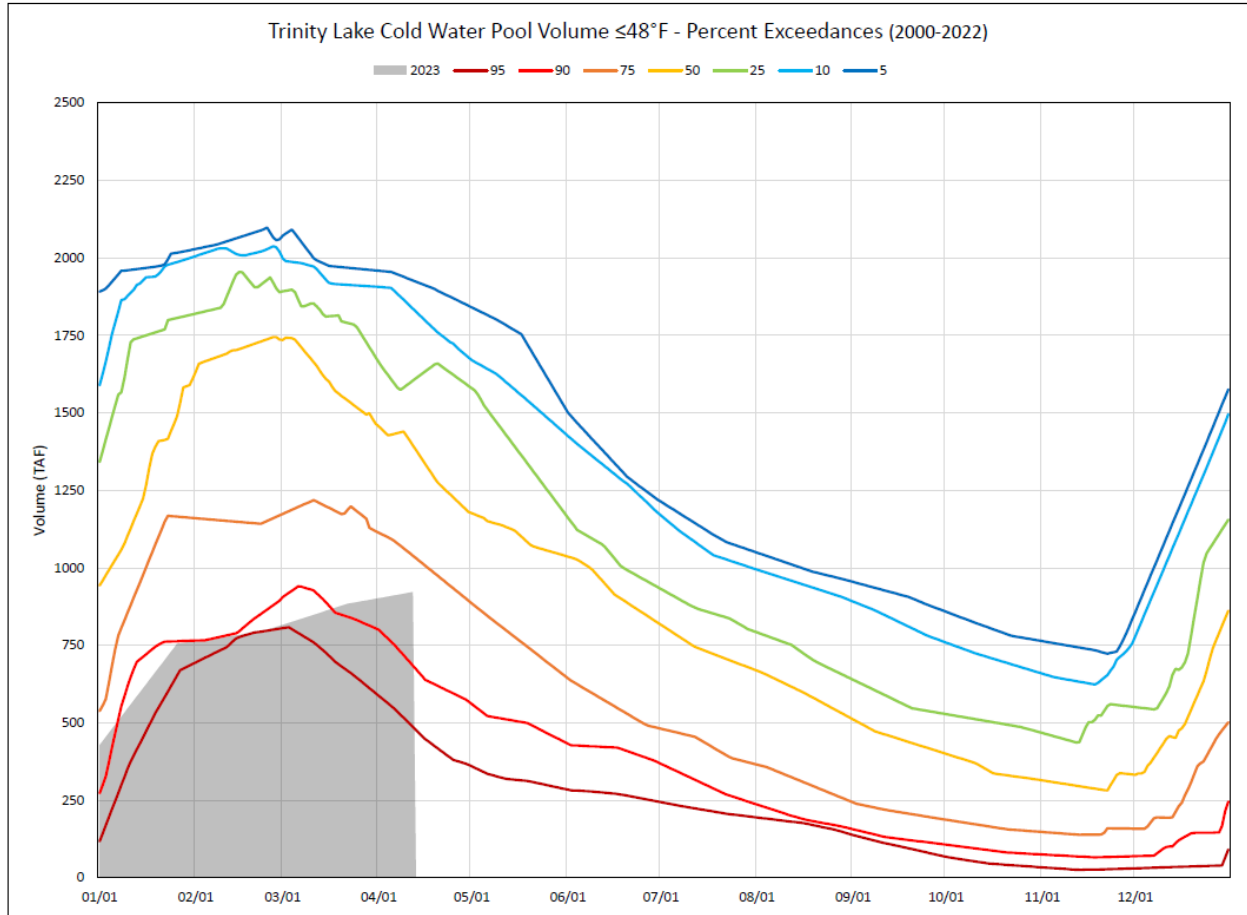
Trinity Lake Cold Water Pool Volume ≤52°F - Percent Exceedances (2000-2022)

This figure is a line graph showing Trinity Lake Cold Water Pool Volume less than or equal to 52 degrees Fahrenheit as percent exceedances from 01/01 to 12/01. It includes a shaded area for 2023 data from 01/01 to 04/14 and lines depicting 95, 90, 75, 50, 25, 10, and 5% exceedances.



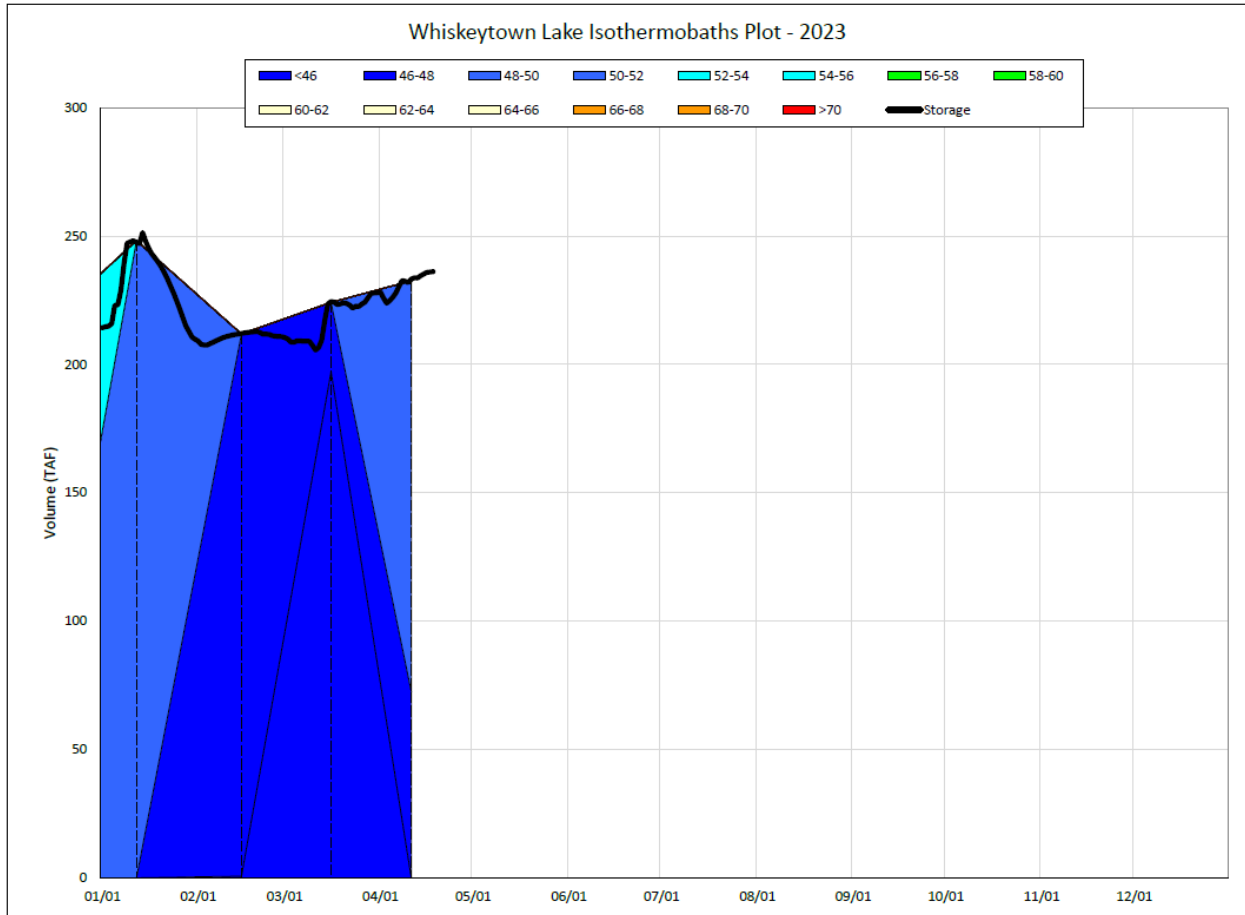
Trinity Lake Cold Water Pool Volume ≤50°F - Percent Exceedances (2000-2022)

This figure is a line graph showing Trinity Lake Cold Water Pool Volume less than or equal to 50 degrees Fahrenheit as percent exceedances from 01/01 to 12/01. It includes a shaded area for 2023 data from 01/01 to 04/14 and lines depicting 95, 90, 75, 50, 25, 10, and 5% exceedances.



Trinity Lake Cold Water Pool Volume $\leq 48^{\circ}\text{F}$ - Percent Exceedances (2000-2022)

This figure is a line graph showing Trinity Lake Cold Water Pool Volume less than or equal to 48 degrees Fahrenheit as percent exceedances from 01/01 to 12/01. It includes a shaded area for 2023 data from 01/01 to 04/14 and lines depicting 95, 90, 75, 50, 25, 10, and 5% exceedances.

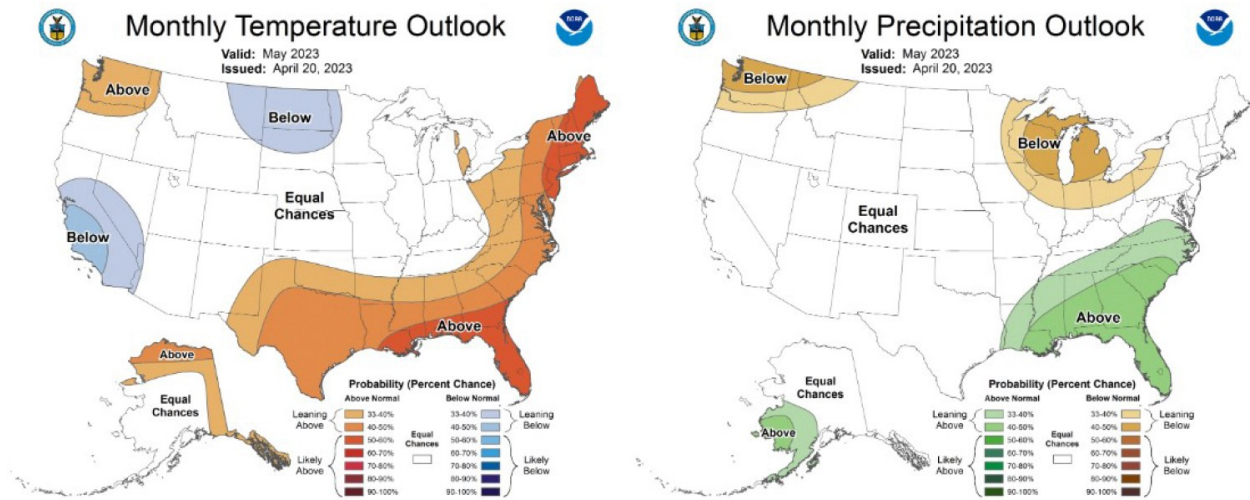


Whiskeytown Lake Isothermobaths Plot – 2023

A chart that shows the temperature in degrees Fahrenheit and storage volume in thousands of acre-feet for 01/01 to 04/14 in Whiskeytown Lake.

OFFICIAL 30-Day Forecasts

Issued: April 20, 2023



Official 30-Day Forecasts Issued on April 20, 2023

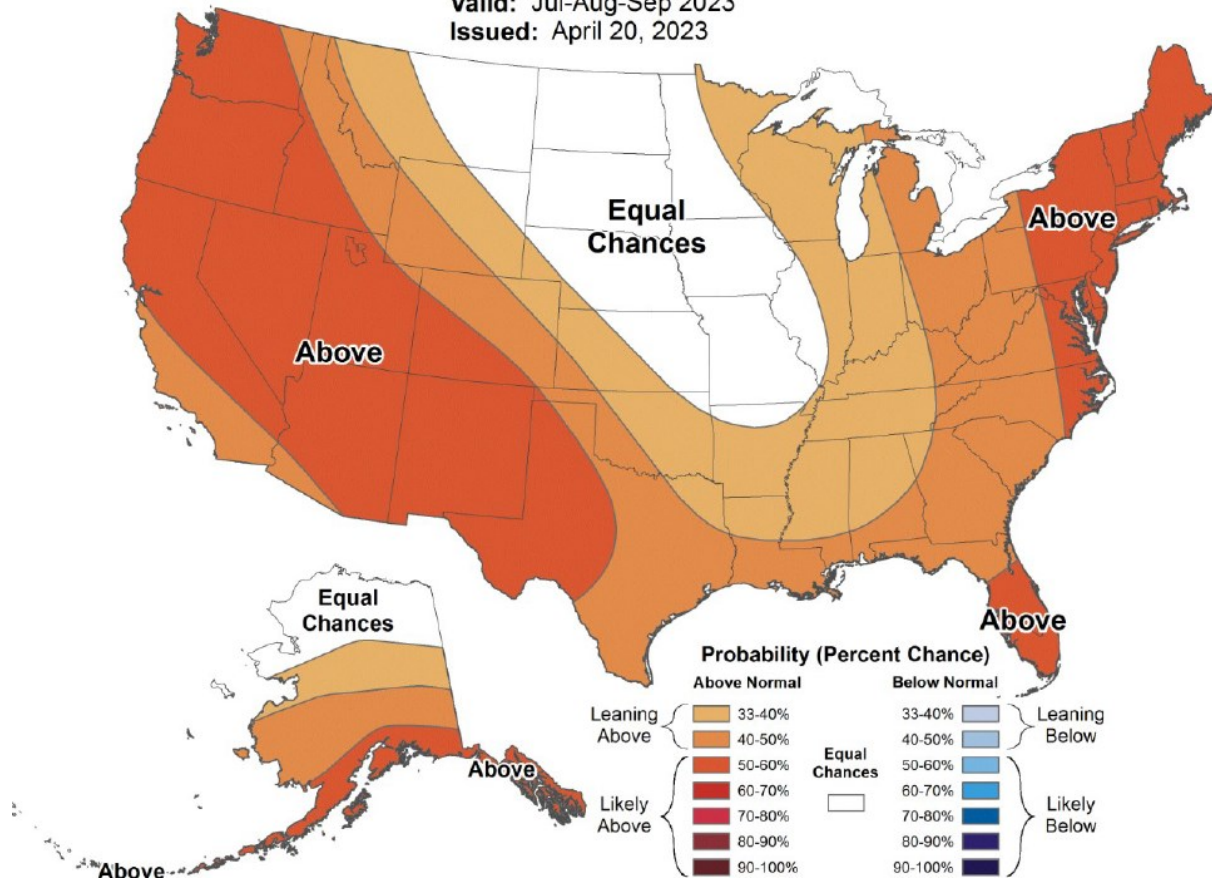
This figure shows two maps showing monthly temperature and precipitation outlook with present probability of below, normal, and above temperature and precipitation for all of the United States. The maps are valid for May 2023 and were issued on April 20, 2023.



Seasonal Temperature Outlook



Valid: Jul-Aug-Sep 2023
Issued: April 20, 2023



Seasonal Temperature Outlook

This figure shows a seasonal temperature outlook with the percent probability of near normal, below, or above normal temperatures for all of the United States. The figure is valid for July-September 2023 and was issued on April 20, 2023.

Estimated CVP Operations 90% Exceedance

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

Facility	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Trinity	910	858	974	1,130	1,126	1,078	1,032	1,018	1,015	1,036	1,070	1,156	1,267
Trinity Elev.	N/A	2,238	2,252	2,269	2,269	2,264	2,259	2,257	2,257	2,259	2,263	2,272	2,283
Whiskeytown	228	238	238	238	238	238	238	206	206	206	206	206	206
Whiskeytown Elev.	N/A	1,209	1,209	1,209	1,209	1,209	1,209	1,199	1,199	1,199	1,199	1,199	1,199
Shasta	3,771	4,362	4,343	4,195	3,865	3,538	3,302	3,195	3,173	3,216	3,333	3,610	3,749
Shasta Elev.	N/A	1,061	1,060	1,055	1,043	1,030	1,021	1,016	1,015	1,017	1,022	1,033	1,038
Folsom	667	812	950	911	794	669	661	578	502	442	447	527	677
Folsom Elev.	N/A	451	464	460	449	436	435	426	417	409	410	420	437
New Melones	1,393	1,478	1,682	1,887	1,915	1,879	1,865	1,821	1,834	1,848	1,861	1,874	1,901
New Melones Elev.	N/A	1,001	1,022	1,042	1,044	1,041	1,040	1,036	1,037	1,038	1,039	1,041	1,043
San Luis	928	964	877	697	353	113	82	69	93	197	339	275	353
Total	7,897	8,711	9,063	9,058	8,291	7,514	7,181	6,887	6,823	6,944	7,255	7,647	8,153

State End of the Month Reservoir Storage (TAF)

Facility	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Oroville	2,908	3,203	3,323	3,318	2,722	2,270	1,926	1,819	1,702	1,658	1,808	2,060	2,340
Oroville Elev.	N/A	878	886	886	844	807	776	765	753	748	764	788	813
State San Luis	1,062	1,027	1,059	990	939	873	896	643	542	498	553	576	600
Total San Luis (TAF)	1,990	1,991	1,936	1,687	1,291	986	979	712	635	695	891	851	953
Total San Luis (TAF) Elev.	N/A	540	536	515	481	451	451	422	414	421	442	437	448

Monthly River Releases (TAF/cfs)

River	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Trinity (TAF)	309	257	38	28	53	52	23	18	18	18	17	18
Trinity (cfs)	5194	4188	639	456	857	870	373	300	300	300	300	300
Clear Creek (TAF)	12	17	17	9	9	9	12	12	12	12	11	22
Clear Creek (cfs)	200	281	284	150	150	150	200	200	200	200	200	363

River	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Sacramento (TAF)	256	615	476	553	506	416	342	268	277	277	250	492
Sacramento (cfs)	4300	10000	8000	9000	8225	7000	5571	4500	4500	4500	4500	8000
American (TAF)	416	461	416	277	246	119	123	119	123	108	83	92
American (cfs)	7000	7500	7000	4500	4000	2000	2000	2000	2000	1750	1500	1500
Stanislaus (TAF)	83	96	56	18	18	18	49	12	12	13	12	12
Stanislaus (cfs)	1400	1555	940	300	300	300	797	200	200	219	221	200
Feather (TAF)	595	633	321	418	424	428	135	104	108	108	97	108
Feather (cfs)	10000	10300	5400	6800	6900	7200	2200	1750	1750	1750	1750	1750

Trinity Diversions (TAF)

Diversion Facility	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Carr PP	0	1	11	9	10	9	0	6	1	1	2	1
Spring Creek PP	27	0	0	0	0	0	22	0	1	8	20	6

Delta Summary (TAF)

Facility	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Tracy	144	215	250	265	265	255	165	136	186	225	66	235
USBR Banks	0	0	0	0	0	0	42	42	42	0	0	0
Contra Costa	9.5	9.5	9.5	7.4	8.3	9.5	14.0	14.0	14.0	13.7	13.7	10.5
Total USBR	153	225	260	272	273	265	221	192	242	239	80	246
State Export	244	332	363	439	441	426	83	192	229	155	105	160
Total Export	397	557	623	711	714	691	304	384	471	394	185	406
COA Balance	18	18	18	18	18	18	18	18	18	18	17	17
Vernalis (TAF)	1660	1555	818	444	260	207	172	74	75	76	82	98
Vernalis (cfs)	27904	25294	13749	7230	4237	3477	2789	1242	1225	1244	1482	1599
Old/Middle River calc. cfs	6827	3819	-2460	-6247	-7631	-7963	-3139	-5001	-5938	-4962	-2484	-4950
Computed DOI cfs	55960	48981	22357	10281	6881	7800	8426	5497	7271	9142	11400	13307
Excess Outflow	27669	23213	3833	2277	2879	4791	944	992	2765	3140	0	1903
% Export/Inflow	10%	15%	28%	44%	52%	52%	32%	49%	48%	42%	21%	33%
% Export/inflow std.	35%	35%	35%	65%	65%	65%	65%	65%	65%	65%	45%	35%

Hydrology

Statistic	Trinity	Shasta	Folsom	New Melones
Water Year Inflow (TAF)	1,430	5,593	4,437	2,232
Year to Date + Forecasted % of mean	118%	101%	163%	211%

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 Map



Sacramento River Temperature Modeling

Table 1. Facility Temperature Outlook in Degrees Fahrenheit

Month	Shasta	Keswick	CCR	Igo	Trinity	Lewiston
April	49.6	51.1	52.6	47.3	42.9	43.9
May	49.7	51 .2	52.1	47.5	44.7	46.0
June	49.0	51 .3	52.7	48.8	46.3	52.2
July	49.9	52.0	53.0	51 .0	47.1	53.5
August	49.8	52.0	53.1	51 .6	48.2	53.0
September	50.1	51 .8	52.7	51 .2	49.4	52.6
October	50.0	51 .5	52.2	51 .0	50.4	54.2
November	50.0	50.5	50.9	52.0	50.6	51.8

Run date: 4/24/23

EOM September Storage: 3.3 MAF

Trinity profile date: 4/12/23

Whiskeytown profile date: 4/11/23

Shasta profile date: 4/13/23

Projected side gates: First N/A Full N/A

September – November for Shasta, Keswick, and CCR output has limited model capabilities – see Fall Temperature Index

End of September Cold-Water-Pool less than 56 degrees Fahrenheit: 1.27 MAF

**Sacramento River Modeled Temperature
2023 April 90%-Exceedance Water Outlook - L3MTO 25% Meteorology**

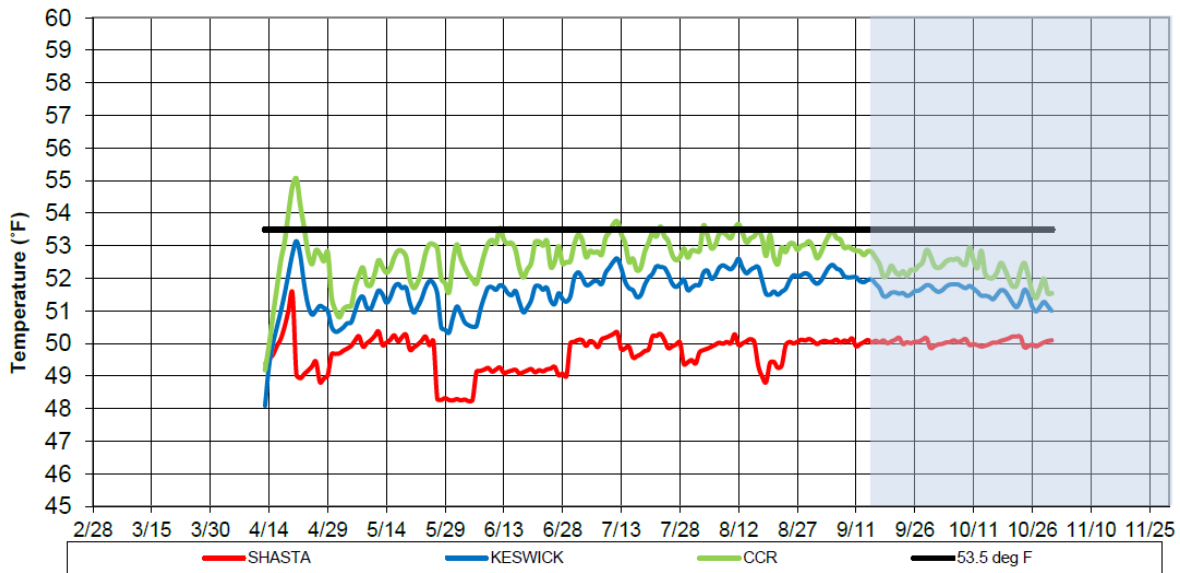


Figure 1: Sacramento River Modeled Temperature – April 2023 90%-Exceedance Water Outlook Historical 25% Meteorology

This figure shows Sacramento River modeled temperature in degrees Fahrenheit at Shasta and Keswick Dams, and above Clear Creek from 4/10 to 9/14 in percent exceedances. It also shows the desired degree range between 53.5 and 56 degrees Fahrenheit.

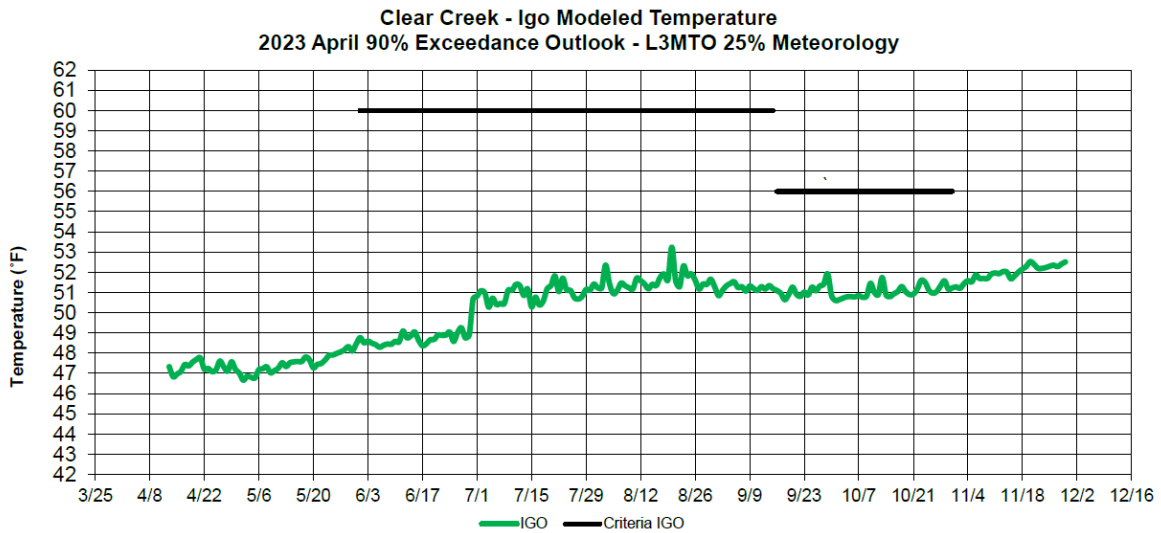


Figure 2: Clear Creek Igo Modeled Temperature – April 2023 90%-Exceedance Water Outlook Historical 25% Meteorology

This figure is a line graph showing Igo modeled temperature in degrees Fahrenheit at from 04/10 to 11/30.

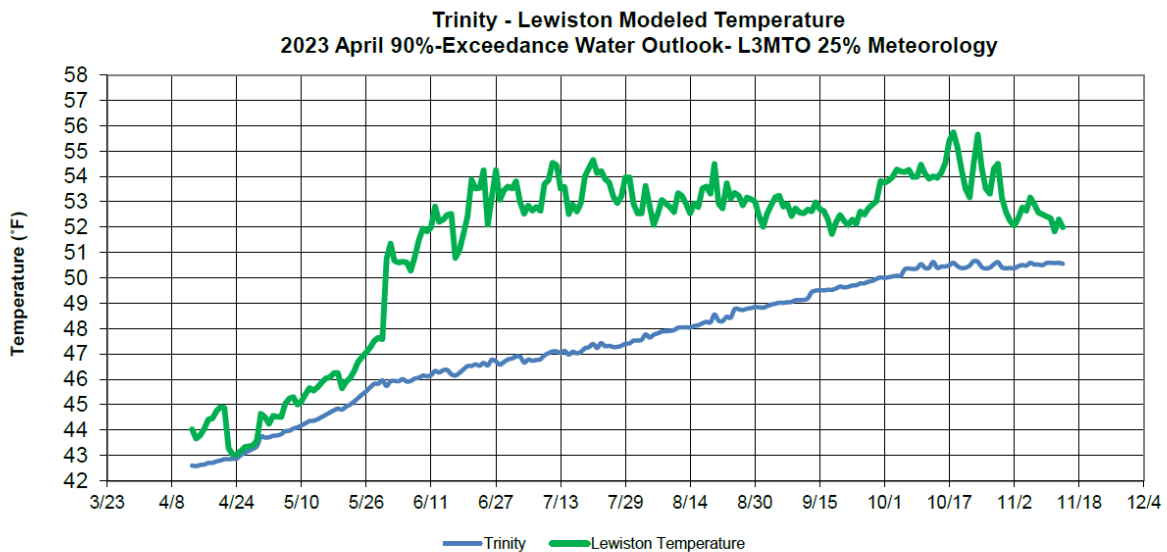


Figure 3: Trinity – Lewiston Modeled Temperature – April 2023 90%-Exceedance Water Outlook Historical 25% Meteorology

This figure is a line graph showing Trinity-Lewiston modeled temperature in degrees Fahrenheit from 04/10 to 11/10.

Summary Document for Shasta/Keswick Operational Scenarios

Prepared by the Southwest Fisheries Science Center (SWFSC) on April 12th, 2023

Below are results for one USBR scenario run April 12th 2023. The scenario has hydrology (Input 90% exceedance) and air temperature (25% exceedance of L3MTO) as inputs. Outputs from the scenarios 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 2023 temperature management season. Upstream temperature inputs into the RAFT model were from the USBR HEC-5Q model.

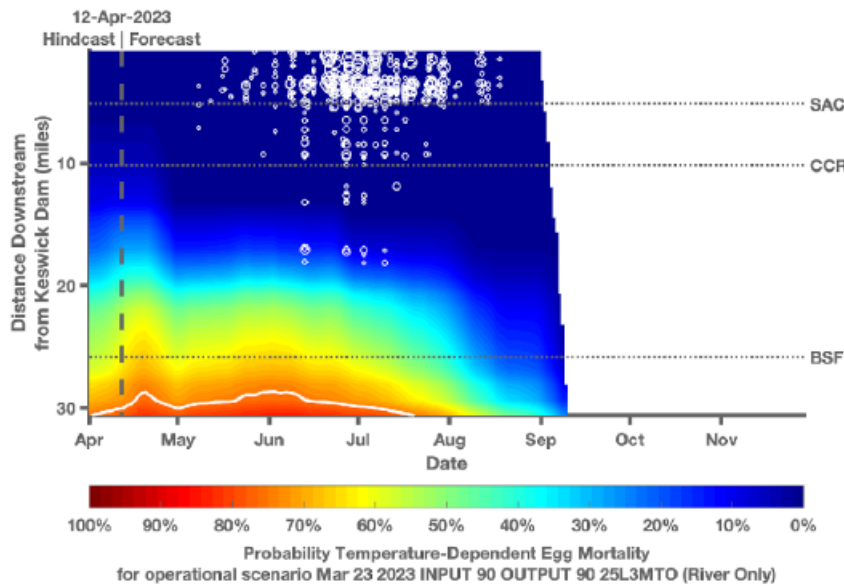
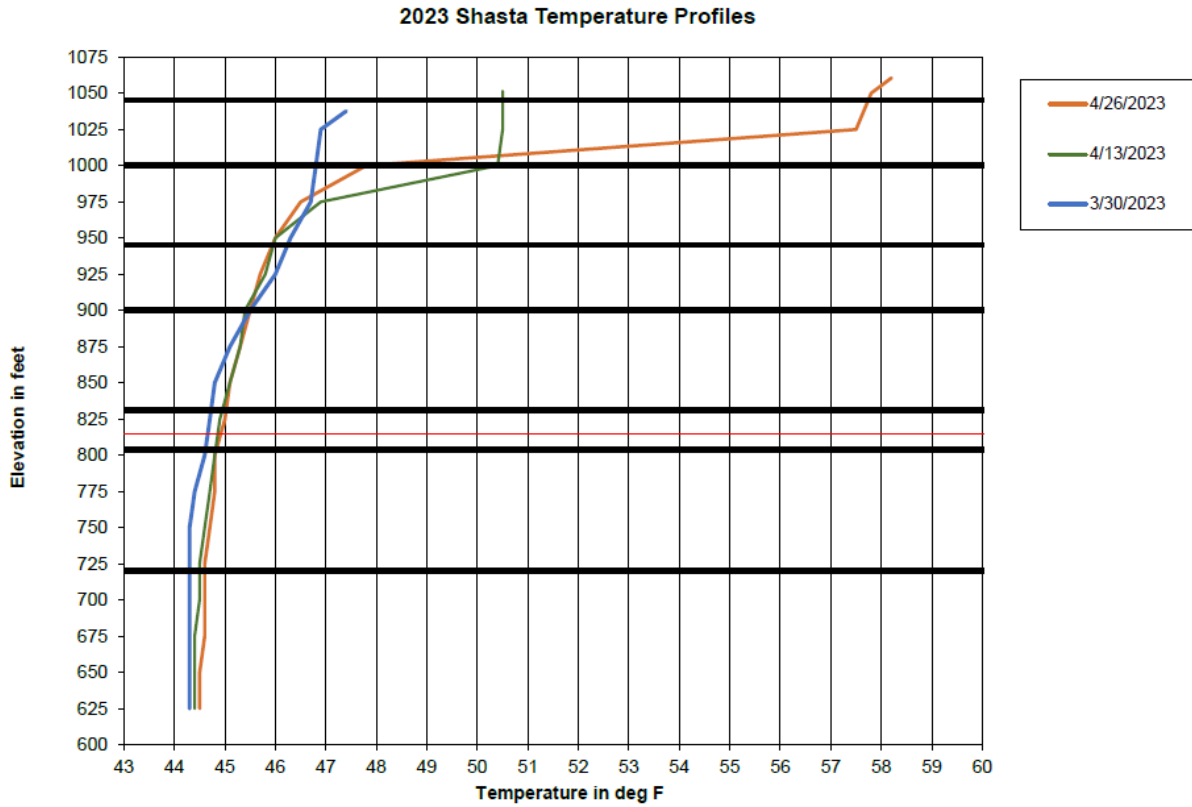


Figure 1: Estimated temperature-dependent egg mortality produced by the NMFS stage-independent temperature mortality model under the March 2023 scenario. 2016-2022 redd distributions are used for all plots.

Table 1: Estimated temperature-dependent egg mortality under different scenarios assuming a 2016-2022 spatial and temporal redd distribution using output from the RAFT water temperature model.

Scenario	Upstream input to RAFT model	Mean (%)	Median (%)
MAR_23_2023_INPUT_90_OUTPUT_90_25L3MTO	USBR HEC-5Q	2	1

Reference: Martin, B. T., Pike, A., John, S. N., Hamda, N., Roberts, J., Lindley, S. T. and Danner, E. M. (2017), Phenomenological vs. biophysical models of thermal stress in aquatic eggs. *Ecology Letters* 20: 50-59. doi:10.1111/ele.12705



2023 Shasta Temperature Profiles

This figure shows a line plot of Shasta Temperature in degrees Fahrenheit at elevations 625-1075 ft for March 30, and April 13 and 26, 2023.