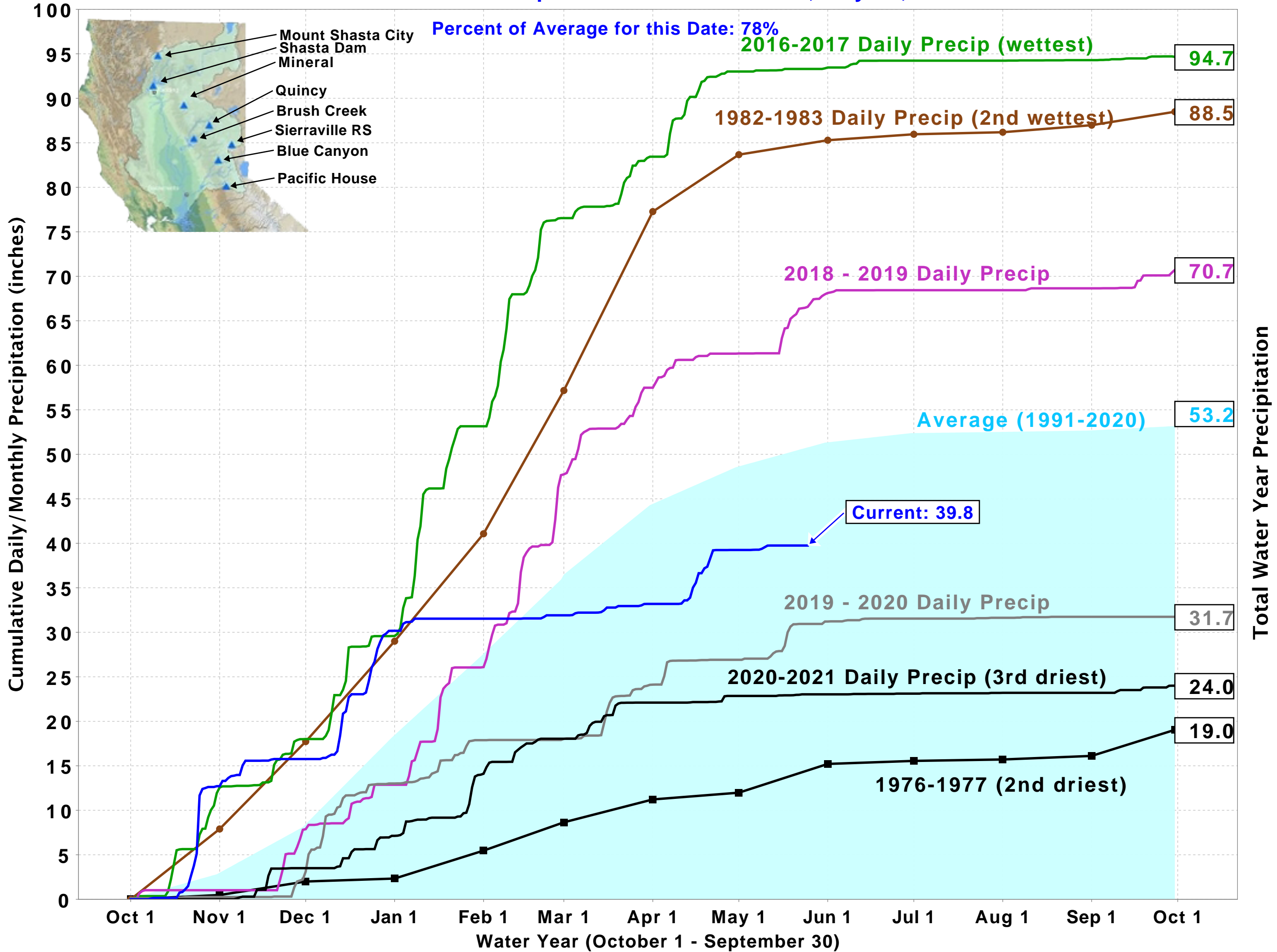
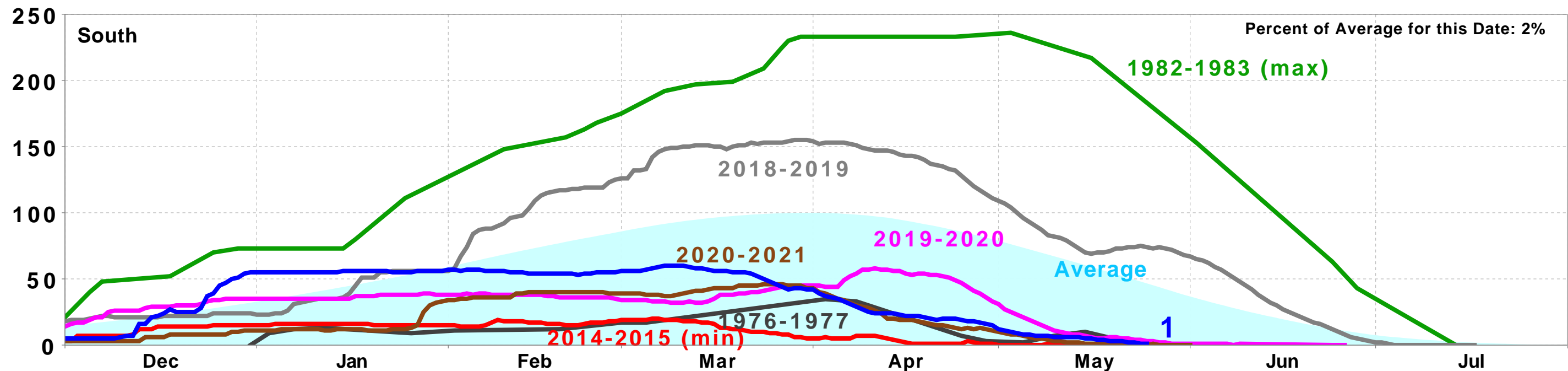
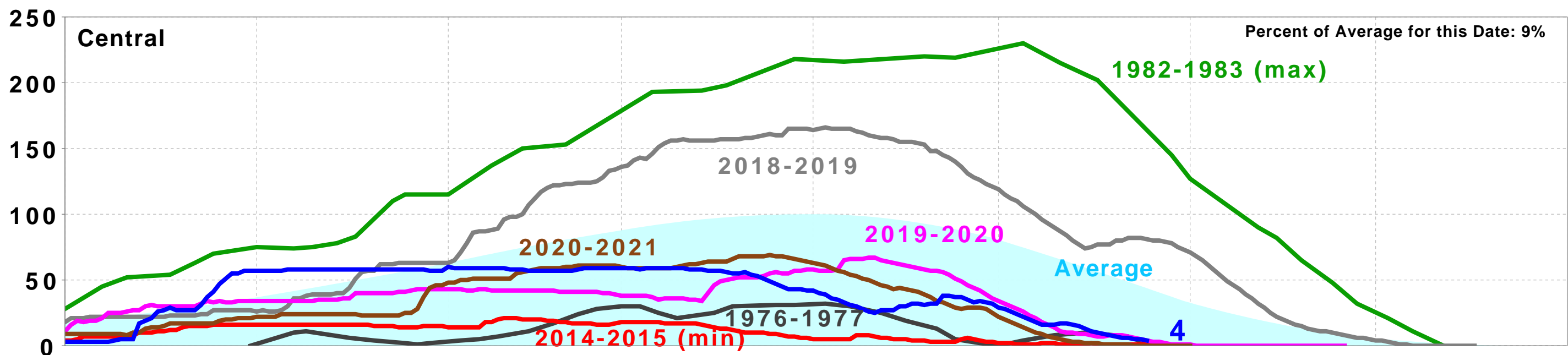
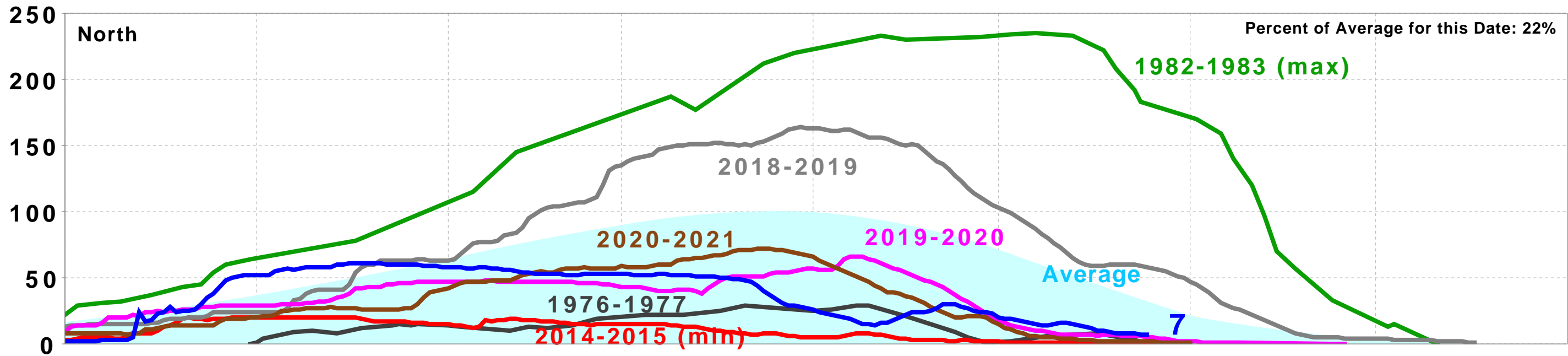


Northern Sierra Precipitation: 8-Station Index, May 25, 2022



California Snow Water Content, May 25, 2022, Percent of April 1 Average



Statewide Percent of April 1: 4%

Statewide Percent of Average for Date: 10%

OFFICIAL 30-Day Forecasts

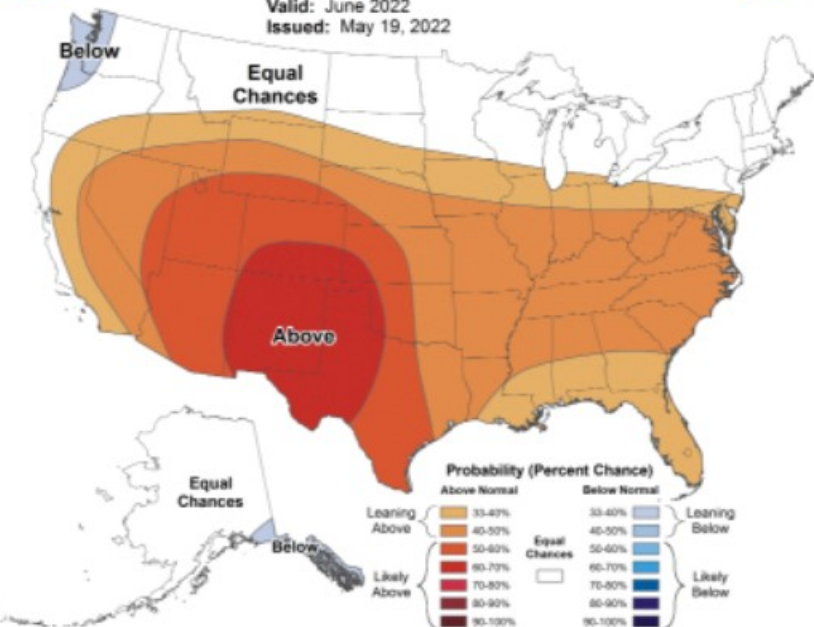
Issued: May 19, 2022



Monthly Temperature Outlook



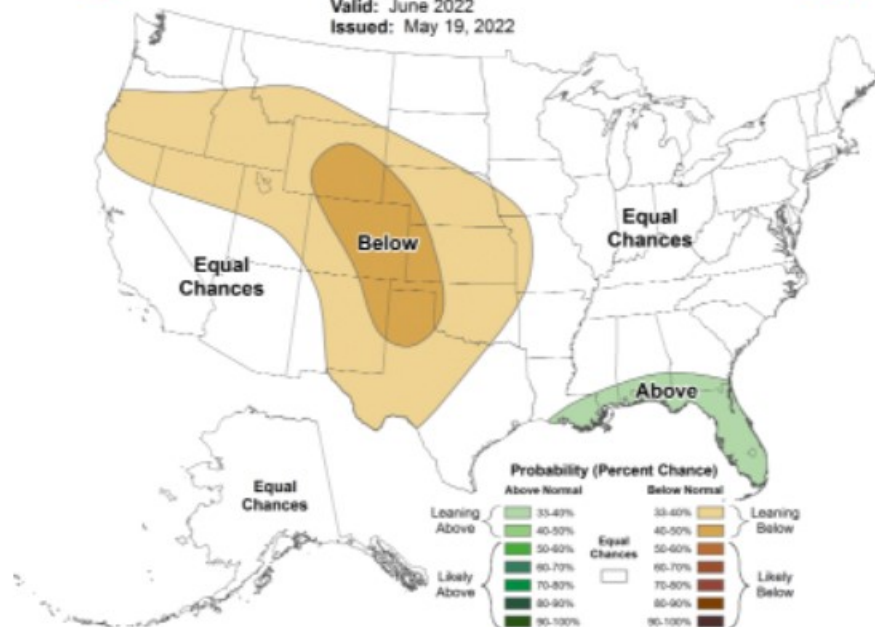
Valid: June 2022
Issued: May 19, 2022



Monthly Precipitation Outlook



Valid: June 2022
Issued: May 19, 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

May 24, 2022

Run Date: May 25, 2022

Table 4. Reservoir Releases in Cubic Feet Per Second

Reservoir	Dam	WY 2020	WY 2021	15-Year Median
Trinity	Lewiston	1,406	468	1,987
Sacramento	Keswick	8,516	3,761	8,516
Feather	Oroville (SWP)	2,250	2,200	2,050
American	Nimbus	1,017	1,514	1,747
San Joaquin	Friant	400	1,600	452

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

Reservoir	Capacity	15-Yr Avg	WY 2021	WY 2021	% O 15 Yr Avg
Trinity	2,448	1,684	1,277	744	44
Shasta	4,552	3,465	2,038	1,821	53
Folsom	977	774	367	856	111
New Melones	2,420	1,424	1,383	884	62
Fed. San Luis	966	550	319	345	63
Total North CVP	11,363	7,897	5,384	4,650	59
Millerton	520	358	261	375	105
Oroville (SWP)	3,538	2,469	1,379	1,931	78

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

Reservoir	Current WY 2021	WY 1977	WY 1983	15-Yr Avg	% O 15 Yr Avg
Trinity	424	153	1,816	838	51

Reservoir	Current WY 2021	WY 1977	WY 1983	15-Yr Avg	% O 15 Yr Avg
Shasta	2,259	1,765	8,961	3,763	60
Folsom	1,366	261	4,785	1,873	73
New Melones	458	NA	1,538	658	70
Millerton	616	126	2,281	810	76

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

Reservoir	Current WY 2021	WY 1977	WY 1983	Avg (N Yrs)	% of Avg	Last 24 Hours
Trinity at Fish Hatchery	17.83	12.06	54.59	29.72 (60)	60	0.00
Sacramento at Shasta Dam	40.11	16.24	112.07	58.33 (65)	69	0.00
American at Blue Canyon	61.73	15.64	103.28	63.45 (47)	97	0.00
Stanislaus at New Melones	19.31	NA	45.33	26.33 (44)	73	0.00
San Joaquin at Huntington LK	24.22	16.30	80.80	39.28 (47)	62	0.00

DATE	MDWT TCD ¹	MDWT SHD	MDWT SPP ¹	MDWT KWK	MDWT SAC ²	MDWT CCR	MDWT BSF	MDWT BND	MDWT RDB	MDWT IGO	MDWT LWS	MDWT DGC	MDWT NFH	MDR Shasta Generation	MDR Spring Creek P.P.	MDR Keswick Total	MDAT RDD	MDAT BSF	MDAT RDB		
May	52.1	50.9	50.2	52.4	52.8	53.6	55.1	56.3	57.0	51.1	49.1	50.3	51.5	2930	126	3259	59.8	57.6	59.4		
05/01	54.0	51.8	51.7	54.0	54.7	55.7	58.1	60.3	61.4	53.1	49.8	50.4 ^A	51.8	2589	75	3262	68.0	64.8	65.4		
05/02	53.4	51.4	51.8	54.0	54.7	55.9	58.6	60.1	60.8	53.0	50.0	51.2 ^A	52.8	2937	76	3269	59.5	61.0	60.4		
05/03	52.7	52.2	51.6	54.0	54.9	55.9	57.8	59.6	60.6	53.1	50.2	50.8 ^A	52.3	2663	174	3259	66.0	63.5	64.4		
05/04	53.2	51.6	52.0	54.1	55.2 ^A	56.6	59.3	61.2 ^A	61.8	54.3	50.2	51.7 ^B	NA	2742	75	3261	70.0	67.4	70.5		
05/05	53.6	52.1	51.9	54.1	54.3	54.8	57.9	60.3	61.5	53.0	49.9	51.5 ^B	NA	3505	75	3266	65.0	62.6	65.4		
05/06	52.1	51.3	52.0	53.8	54.4	54.9	57.9	60.3	61.5	53.1	50.0	50.7	51.5	3175	75	3259	64.5	63.0	65.2		
05/07	53.4	51.3	52.0	54.2	54.7	55.3	56.9	58.7	59.6	53.1	49.8	50.7	51.7	2828	75	3261	58.5	58.6	60.0		
05/08	52.6	51.2	52.3	54.1	54.4	54.6	56.6	57.9	58.8	51.6	49.8	50.2	49.8	2997	76	3261	51.5	50.0	53.1		
05/09	52.8	51.4	52.0	53.2	53.6	53.9	55.2	56.2	57.2	50.9	49.8	49.6	49.7	2862	77	3259	49.0	46.1	50.1		
05/10	53.9	52.7	52.0	53.0	53.6	54.0	54.9	55.5	56.1	51.4	49.1	49.6	50.3	3095	77	3263	52.0	48.8	49.6		
05/11	53.5	52.1	52.2	53.0	53.8	54.5	56.1	57.1	57.3	52.7	49.2	49.8	51.1	3390	77	3504	56.0	55.1	56.7		
05/12	53.1	52.0	52.3	53.6	54.1	54.6	56.8	58.2	58.9	52.4	49.3	50.3	51.3	2737	77	3539	62.0	58.6	58.7		
05/13	54.4	52.8	52.2	53.9	54.7	55.5	57.5	59.0	59.8	53.2	49.7	50.3	51.9	3186	77	3547	64.0	62.9	63.5		
05/14	54.3	53.3	52.4	54.0	55.0	56.1	58.9	61.1 ^A	61.7	54.4	50.1	51.5	54.0	3304	76	3535	69.5	67.4	71.2		
05/15	54.7 ^A	53.1 ^B	NA	54.5	55.4	56.4	59.6	62.1 ^A	63.3	54.7	50.5	52.8	55.3	3276	35	3517	74.0	70.9	74.0		
05/16	54.9 ^A	53.3 ^B	NA	55.2	56.0	57.0	60.0	62.6	63.6	54.6	50.8	53.7	55.7	3346	38	3525	69.0	68.5	68.8		
05/17	53.8 ^X	53.1	52.7	55.6	56.5	57.7	60.5 ^A	62.9 ^A	64.0	54.9	51.3	54.9	56.6	3245	0	3514	73.0	70.1	3.5		
05/18	52.8	50.1	52.7	55.8	56.8	58.2	61.5	63.9	65.0	55.2	51.5	56.4	58.2	3012	73	3552	82.0	73.9	79.0		
05/19	52.1	50.9	52.8	55.7	56.7	58.1 ^A	61.7	64.3	65.6	55.0	51.4	57.6	58.2	3188	73	3550	72.5	71.2	75.4		
05/20	53.7	50.7	52.8	56.2	56.9	57.3	58.9	60.8 ^A	62.6	54.0	51.8	56.6	56.8	2698	73	3551	68.5	65.7	67.1		
05/21	53.4	52.2	53.0	54.3	55.7	57.2	60.4	61.8 ^A	62.2	54.5	52.4	56.4	557.4	3478	74	3569	75.0	66.6	71.8		
05/22	53.2	50.2	53.0	54.4	55.5	56.6	59.9	62.7	64.1	55.0	52.2	57.3	58.7	3007	73	3541	75.5	69.4	74.5		
05/23	54.9 ^B	NA	53.2	54.7	55.9	57.1	60.4	62.9	64.2	55.3	52.2	57.9	59.5	3515	73	3550	80.5	75.1	79.0		
05/24	53.7	51.2	53.1	54.6	55.9	57.2	60.9	63.6 ^A	64.9	55.5	52.3	58.9	60.4	3904	73	3761	82.5	78.6	81.8		
May	53.5	51.8	52.4	54.3	55.1	56.1	58.5	60.4	61.4	53.7	50.5	52.9	54.3	3112	73	3432	67.0	34.2	66.6		
														Total CFS	74679	1747	82375				
														Total AF	148123	3465	163387				

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 (Farenheit)

MDR = Mean Daily Release (CFS)

MDAT = Mean Daily Air Temperatures (Farenheit)

Notes

¹ Temperatures are weighted averages based on individual penstock flow and temperature

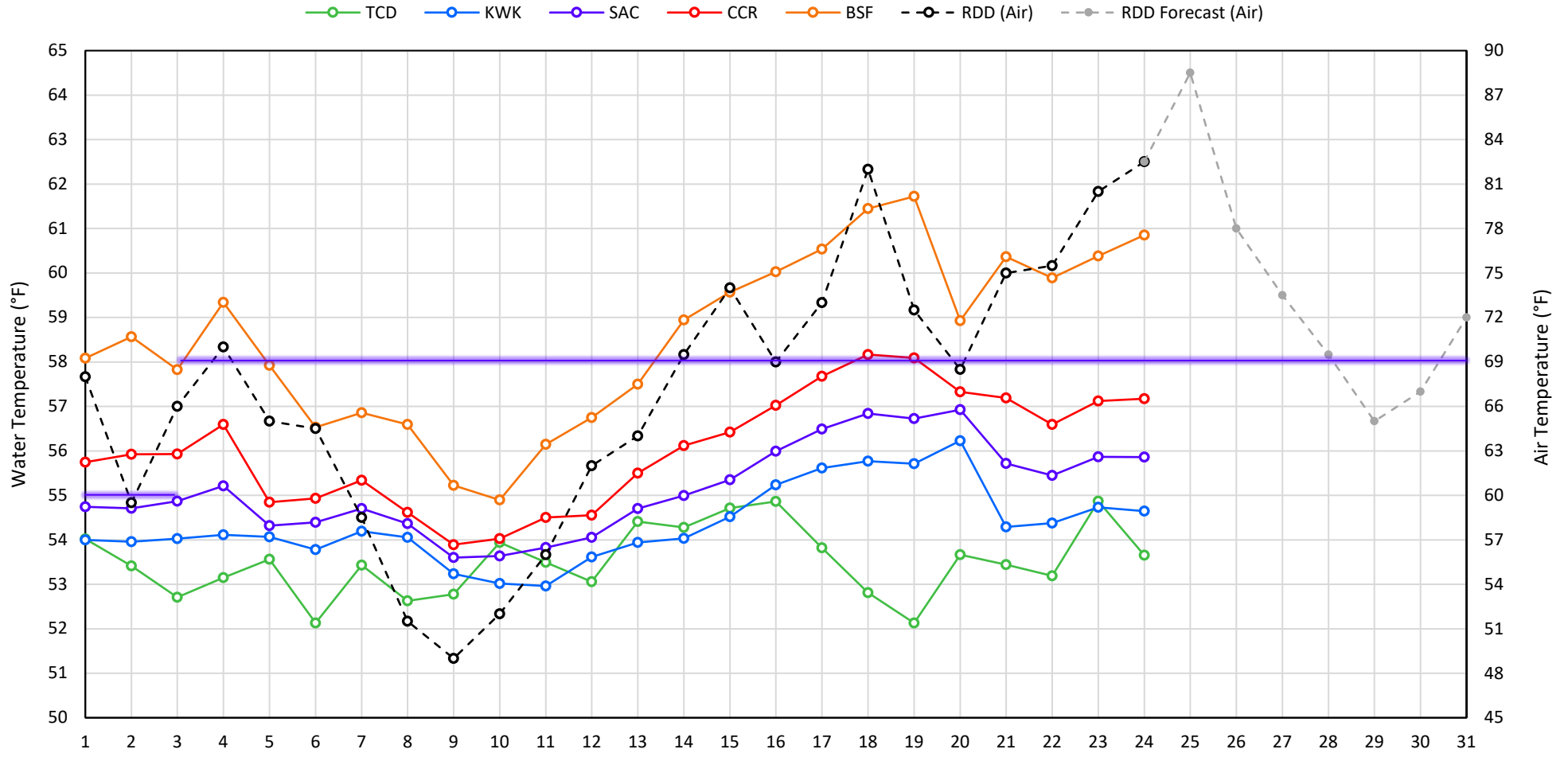
^X Highlighted cells in the TCD column indicate a TCD change was made on that day

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



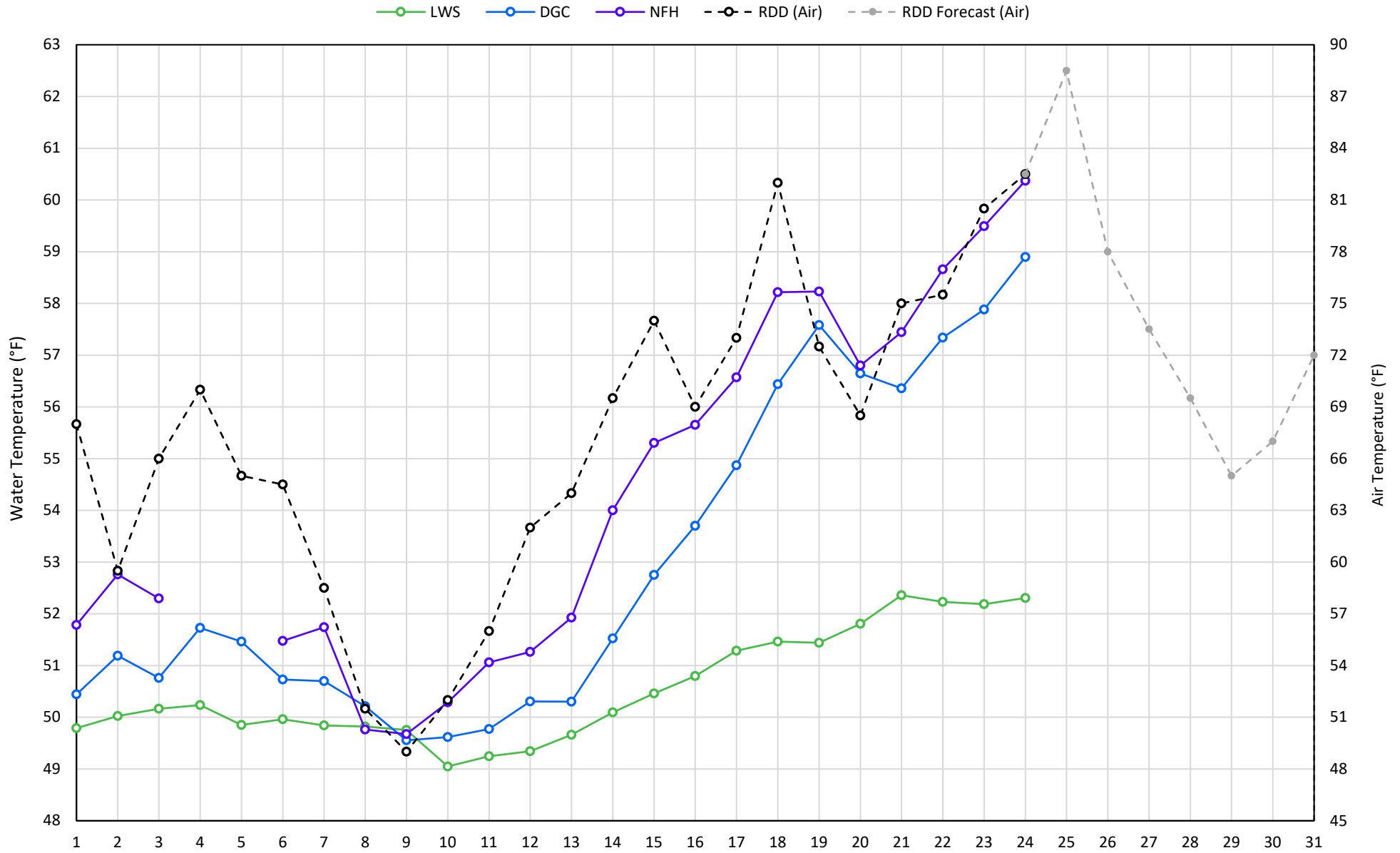
Station Details			
Code	Body of Water	Location ¹	CDEC Link
TCD	N/A	Shasta Power Plant	N/A
SHD	Sacramento River	0.3 miles downstream of Shasta Power Plant	SHD
SPP	N/A	Spring Creek Power Plant	N/A
KWK	Sacramento River	0.8 miles downstream of Keswick Dam	KWK
SAC	Sacramento River	4.8 miles downstream of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

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	TBD
Trinity	DGC	56	Sep-15	Oct-01
Trinity	NFH	56	Oct-01	Dec-31

Notes

¹ Distances are approximate

Trinity River Mean Daily Temperatures



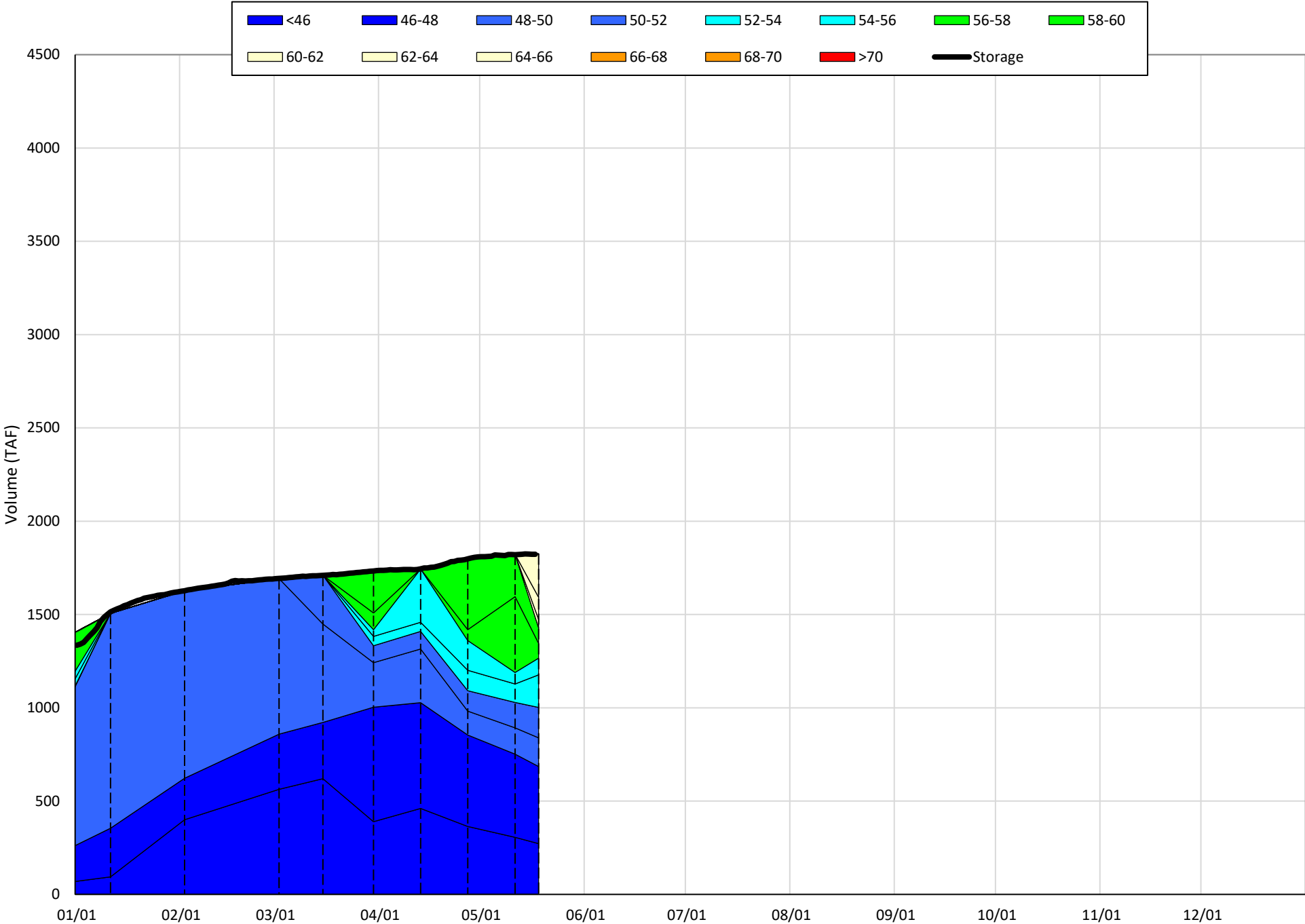
Station Details

Code	Body of Water	Location ¹	CDEC Link
LWS	Trinity River	1.1 miles downstream of Lewiston Dam	LWS
DGC	Trinity River	19 miles downstream of Lewiston Dam	DGC
NFH	Trinity River	38 miles downstream of Lewiston Dam	NFH

Notes

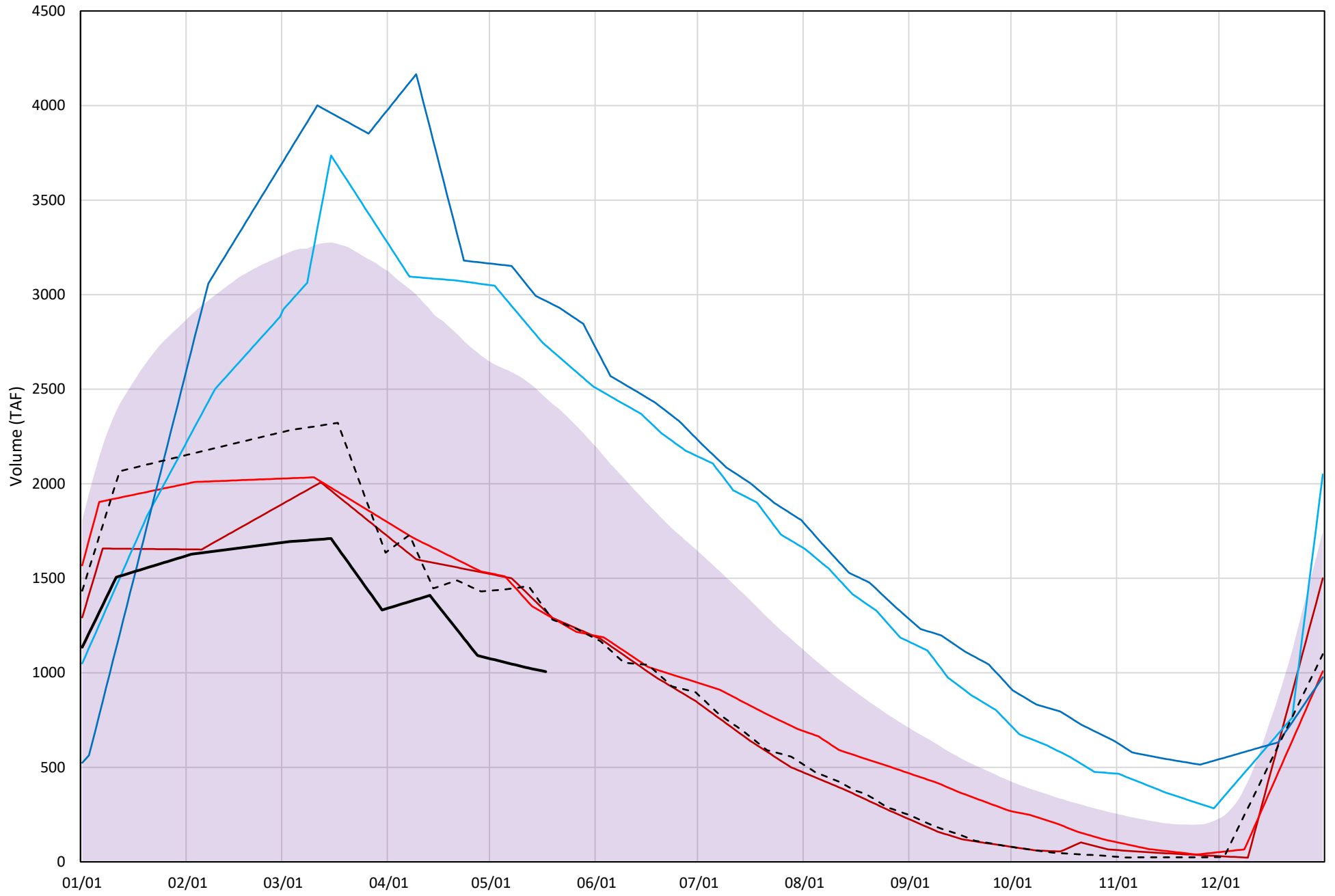
¹ Distances are approximate

Shasta Lake Isothermobaths Plot - 2022

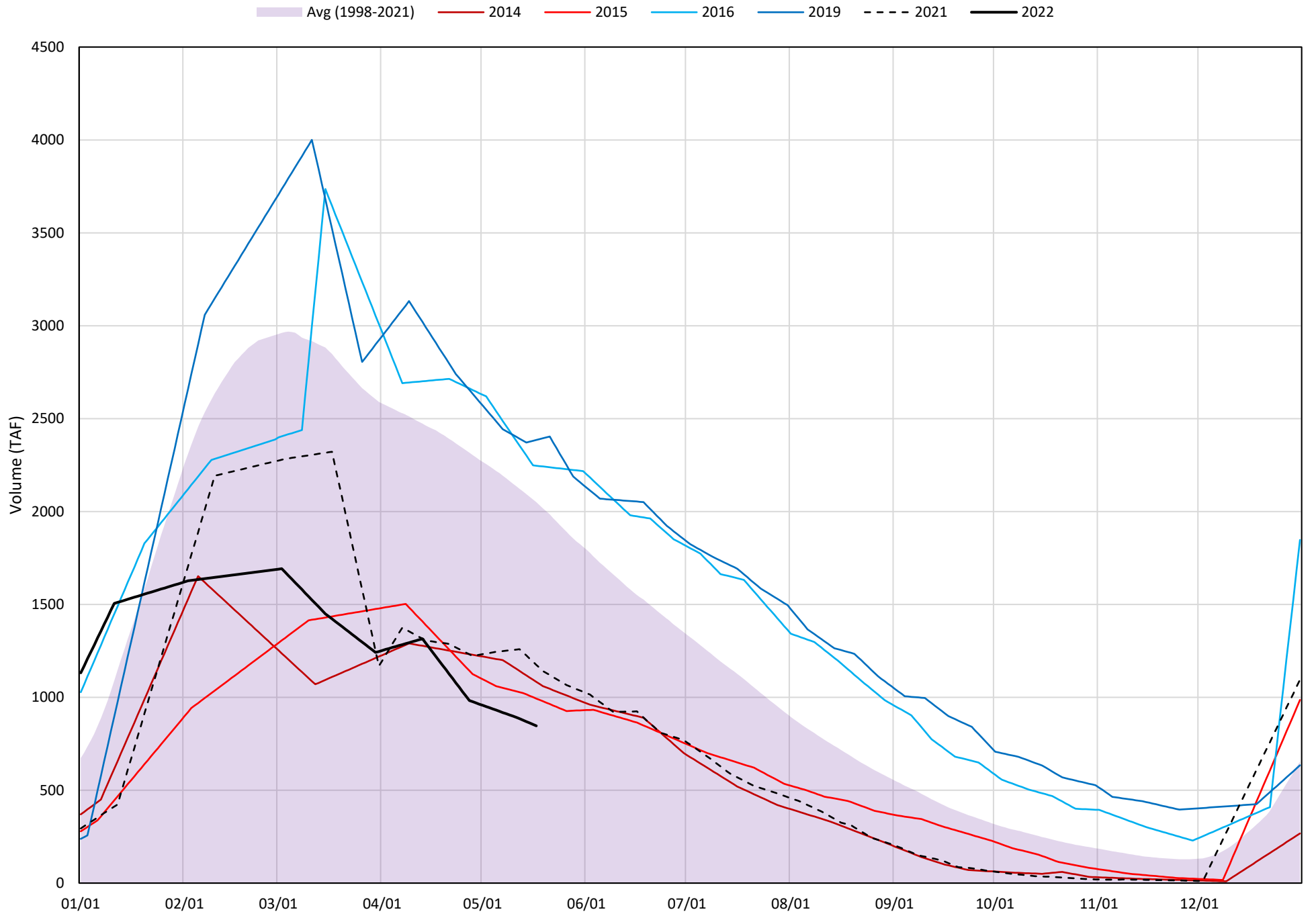


Shasta Lake Cold Water Pool Volume ≤52°F

Avg (1998-2021) 2014 2015 2016 2019 2021 2022

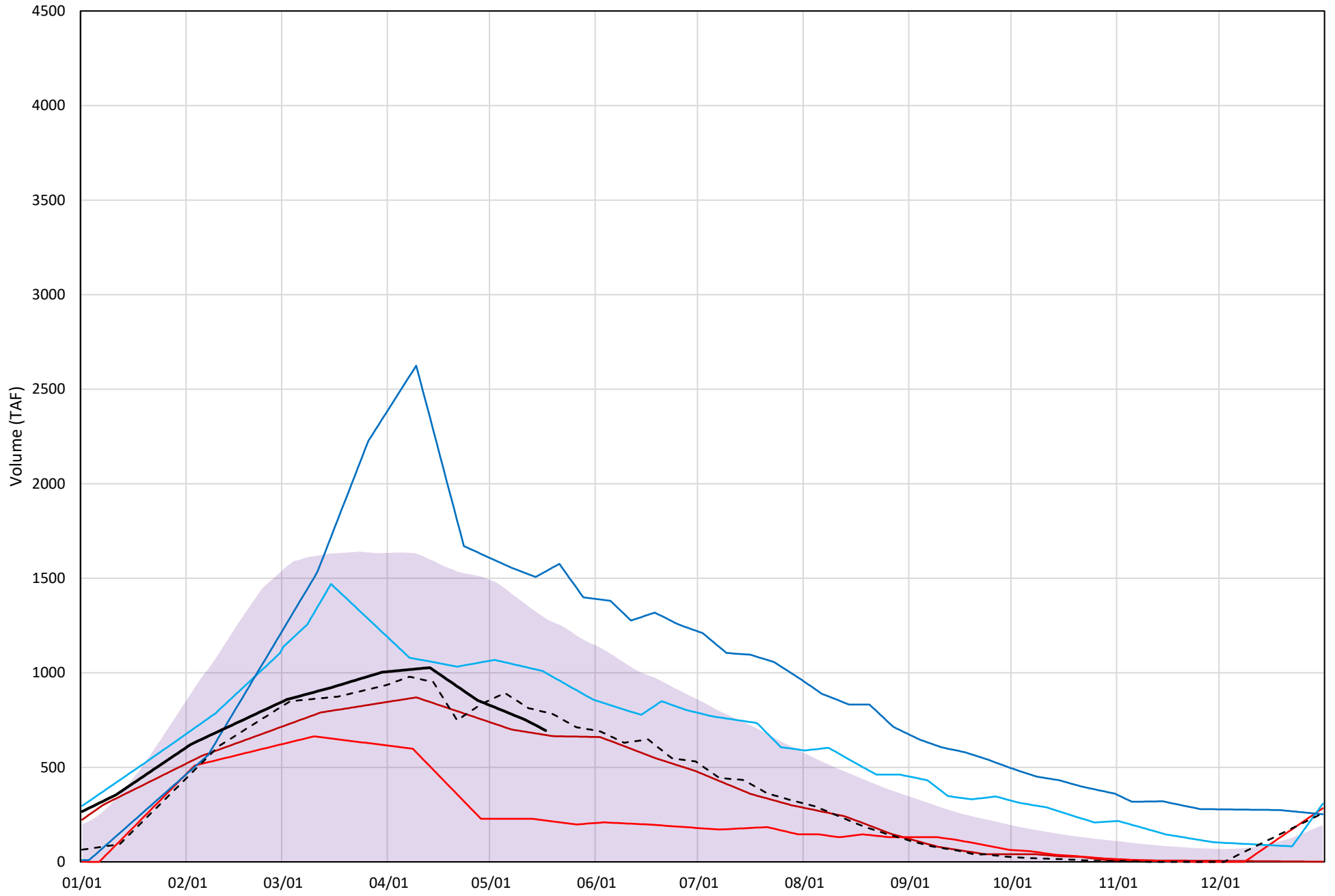


Shasta Lake Cold Water Pool Volume $\leq 50^{\circ}\text{F}$



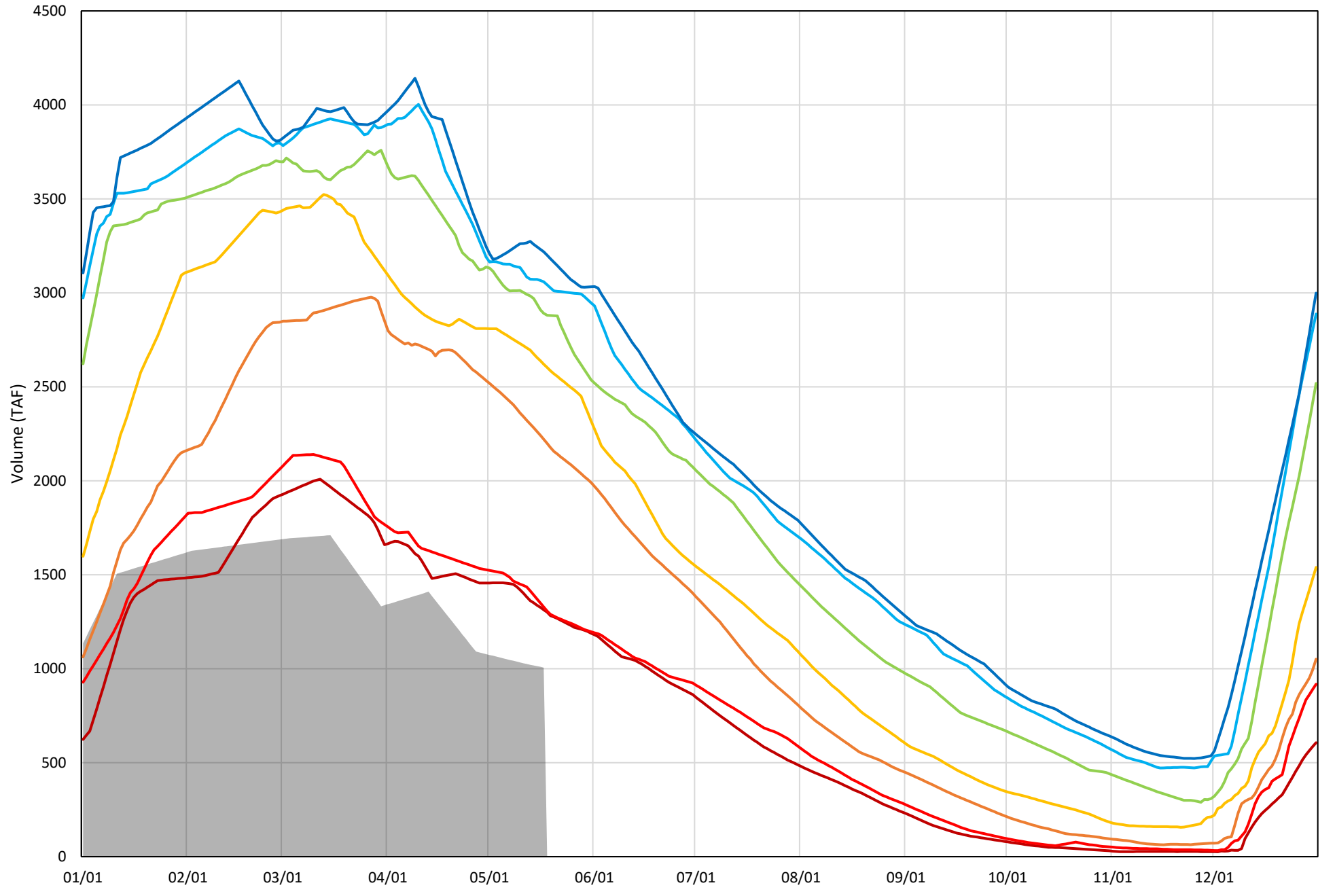
Shasta Lake Cold Water Pool Volume $\leq 48^{\circ}\text{F}$

Avg (1998-2021) 2014 2015 2016 2019 2021 2022



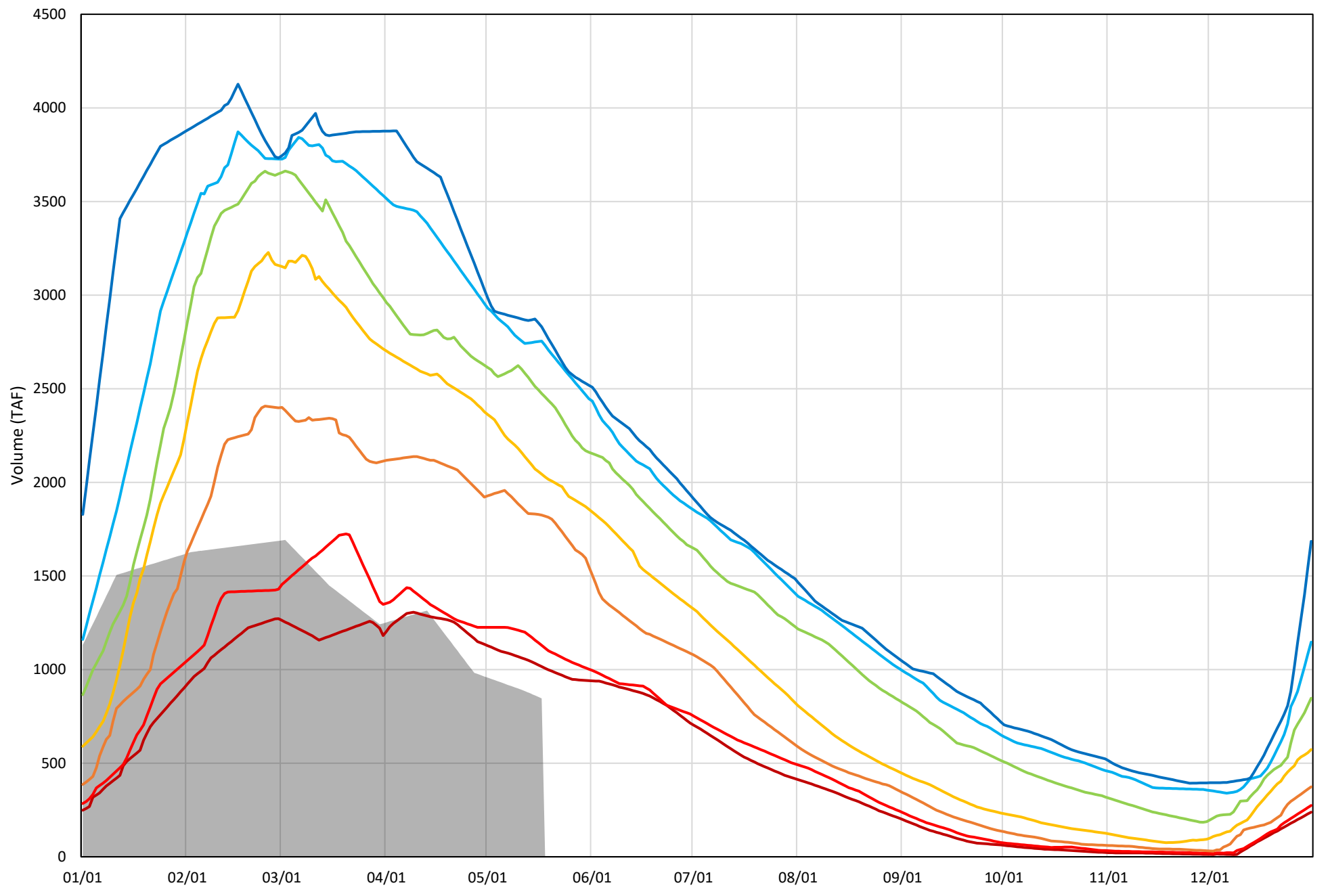
Shasta Lake Cold Water Pool Volume $\leq 52^{\circ}\text{F}$ - Percent Exceedances (1998-2021)

2022 95 90 75 50 25 10 5



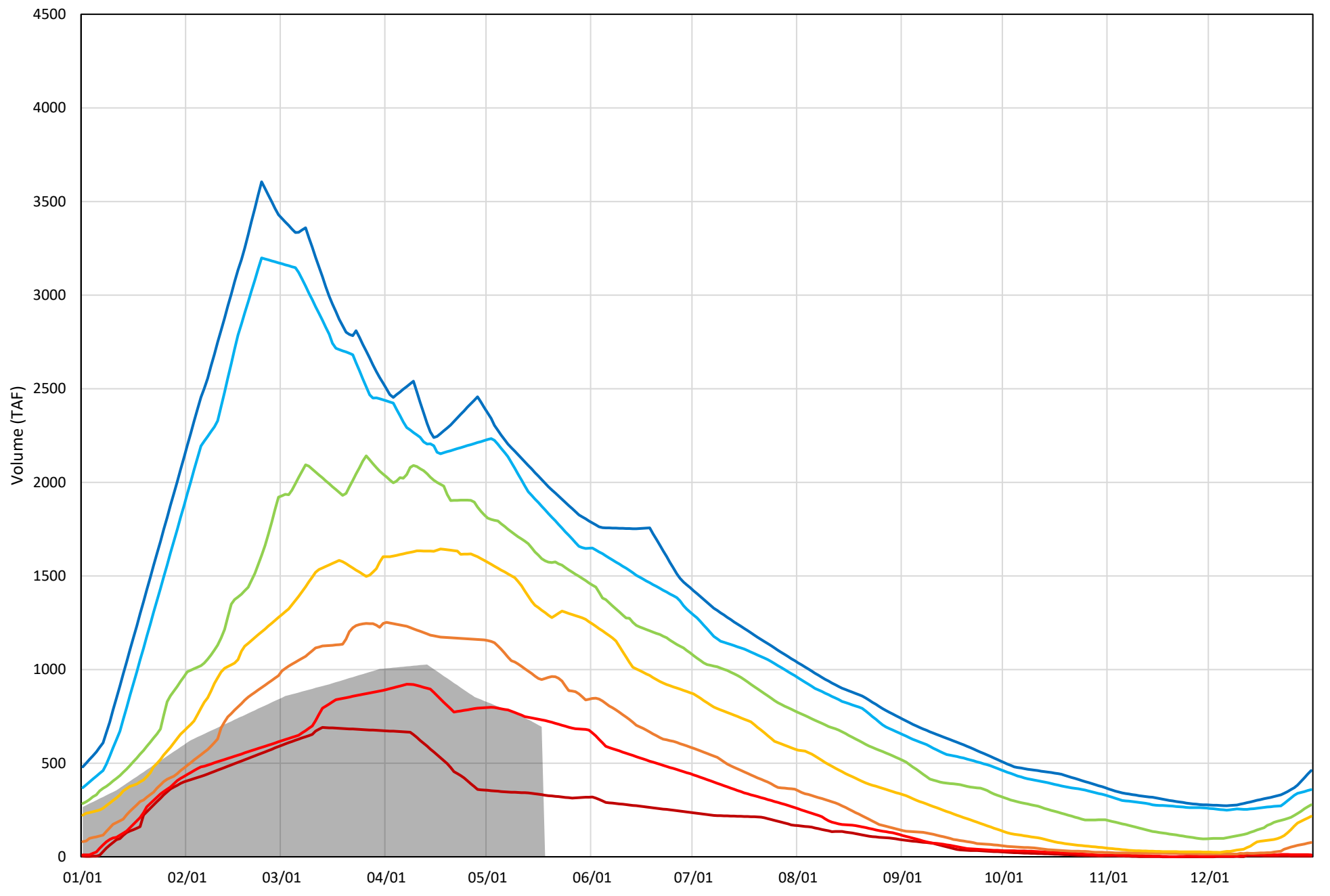
Shasta Lake Cold Water Pool Volume $\leq 50^{\circ}\text{F}$ - Percent Exceedances (1998-2021)

2022 95 90 75 50 25 10 5

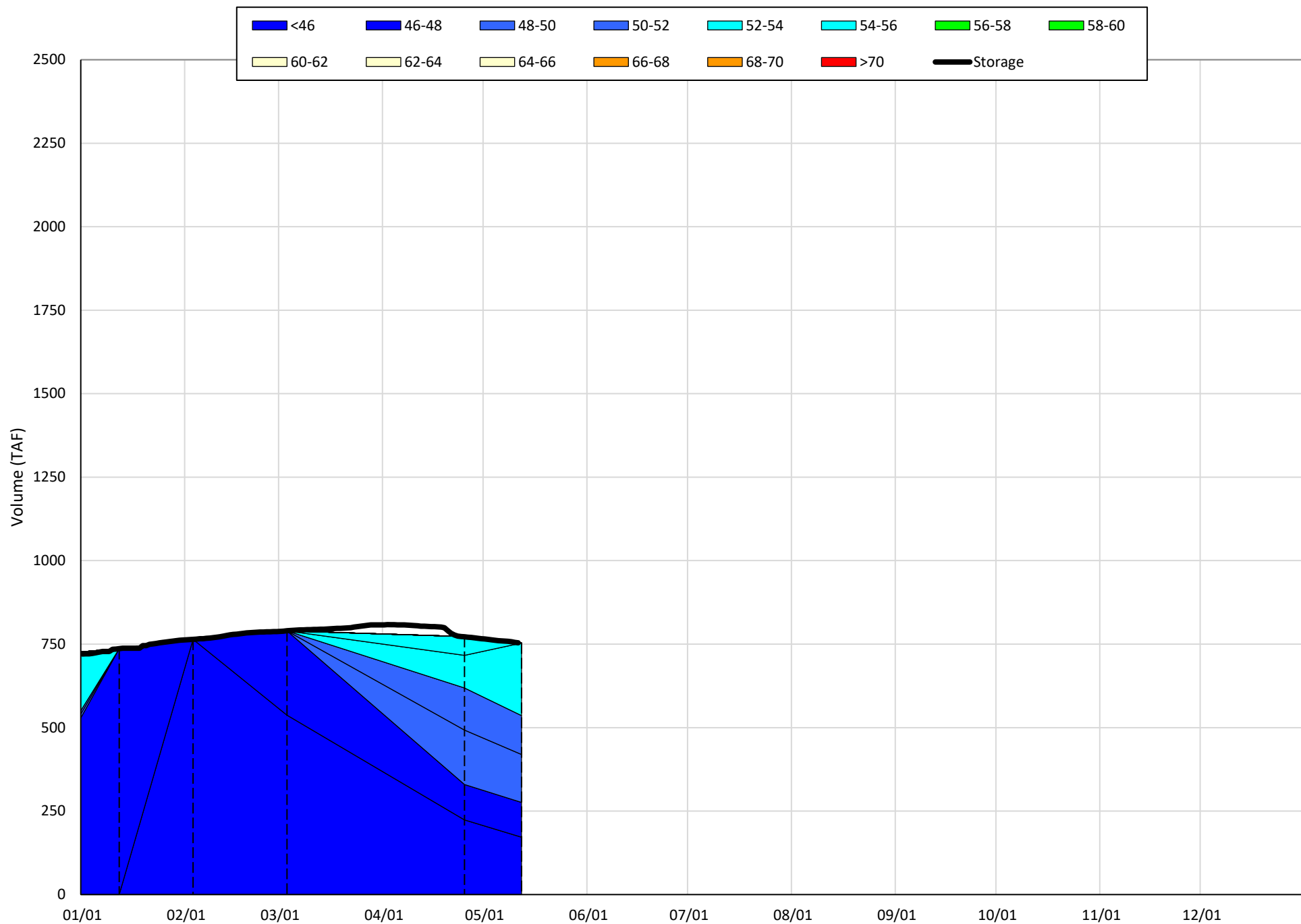


Shasta Lake Cold Water Pool Volume $\leq 48^{\circ}\text{F}$ - Percent Exceedances (1998-2021)

2022 95 90 75 50 25 10 5

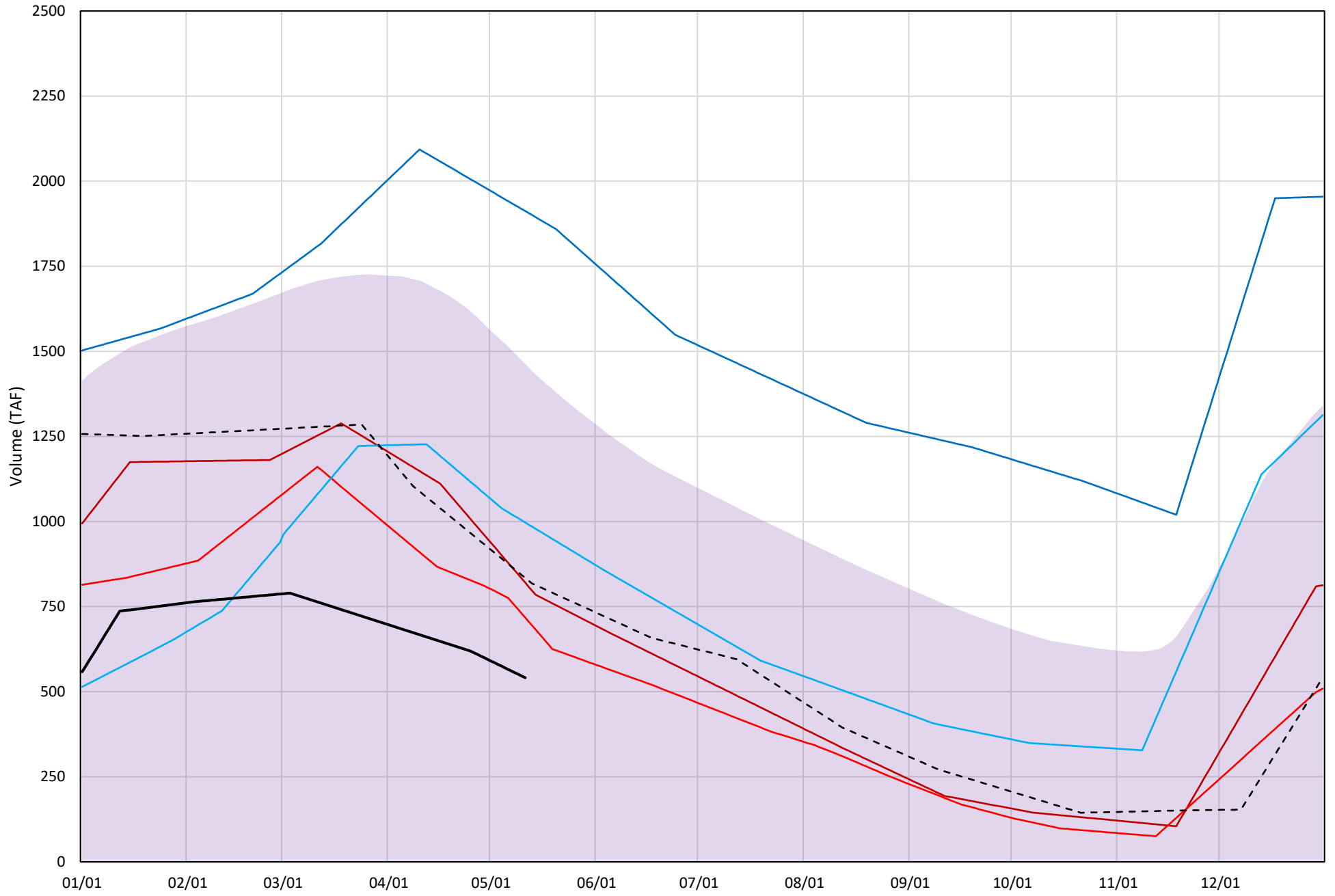


Trinity Lake Isothermobaths Plot - 2022



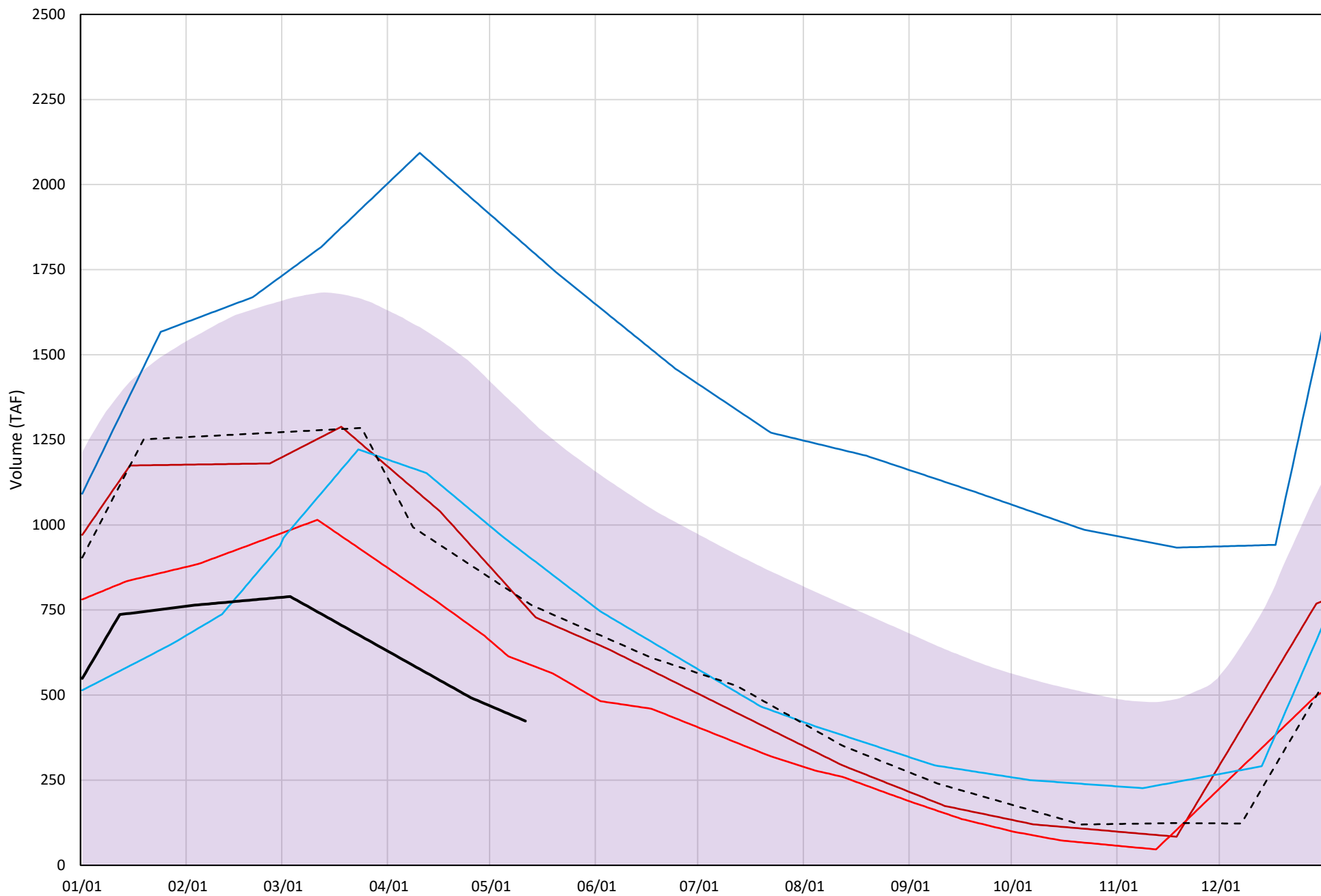
Trinity Lake Cold Water Pool Volume ≤52°F

Avg (2000-2021) 2014 2015 2016 2019 2021 2022



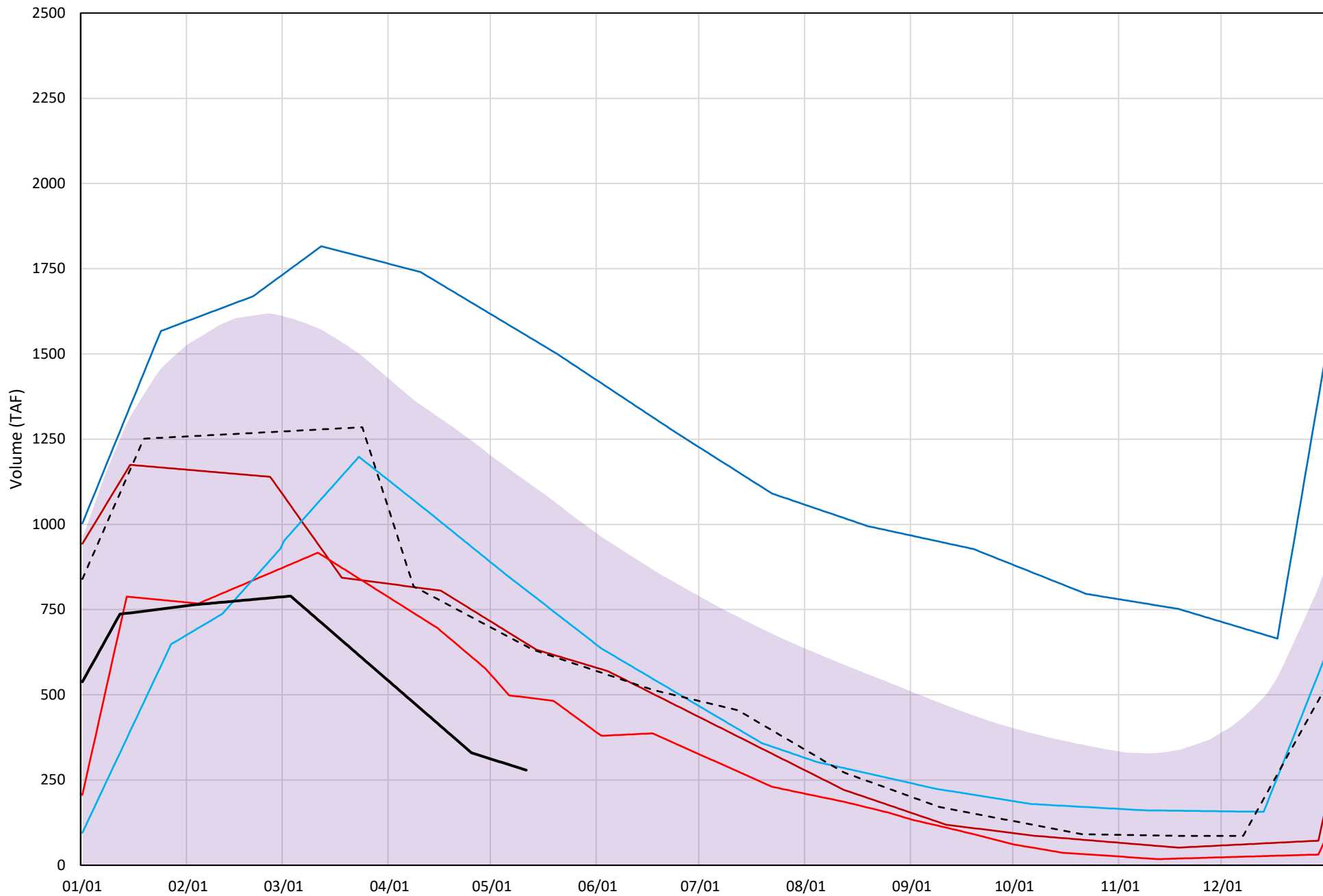
Trinity Lake Cold Water Pool Volume ≤50°F

Avg (2000-2021) 2014 2015 2016 2019 2021 2022

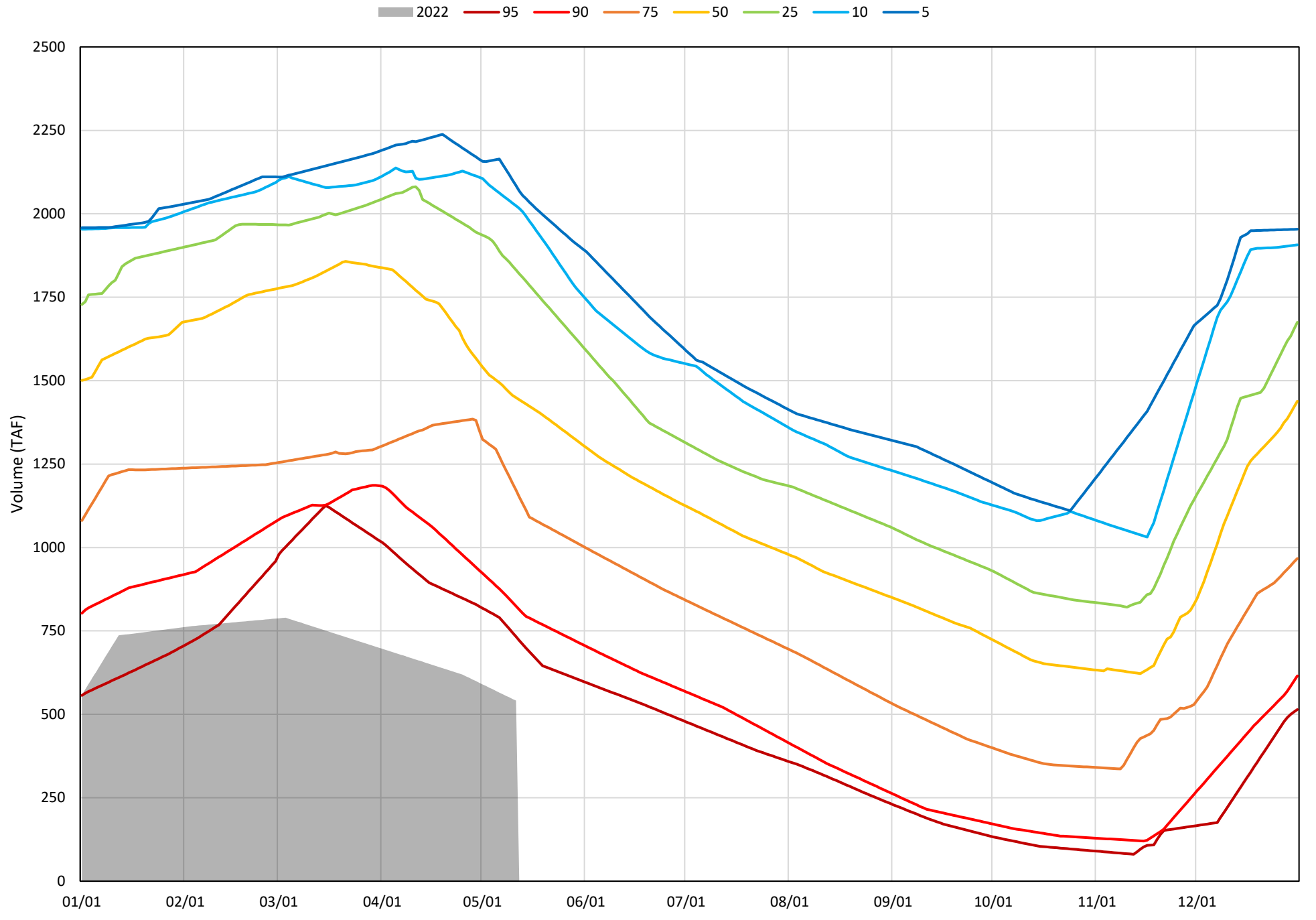


Trinity Lake Cold Water Pool Volume ≤48°F

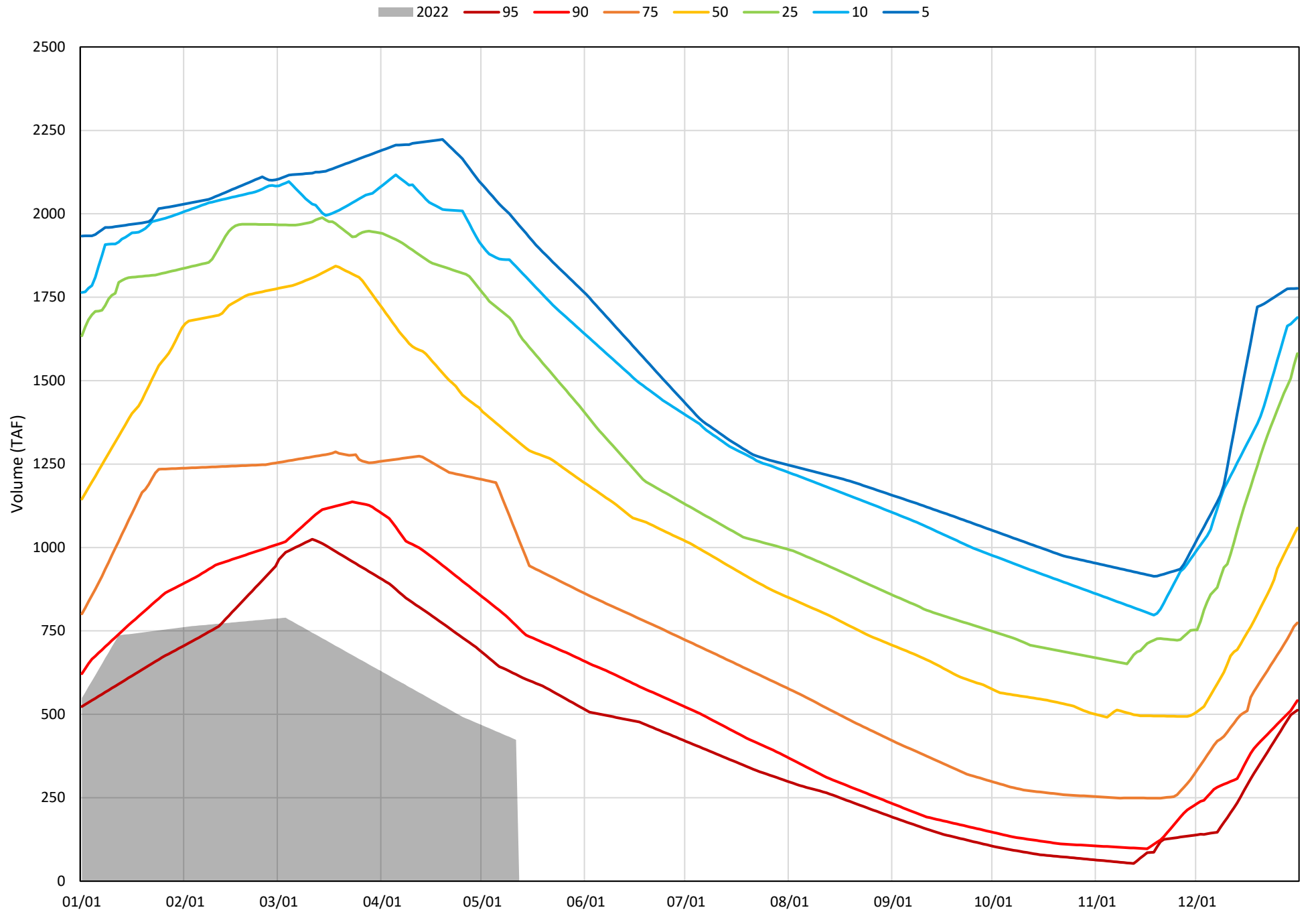
Avg (2000-2021) 2014 2015 2016 2019 2021 2022



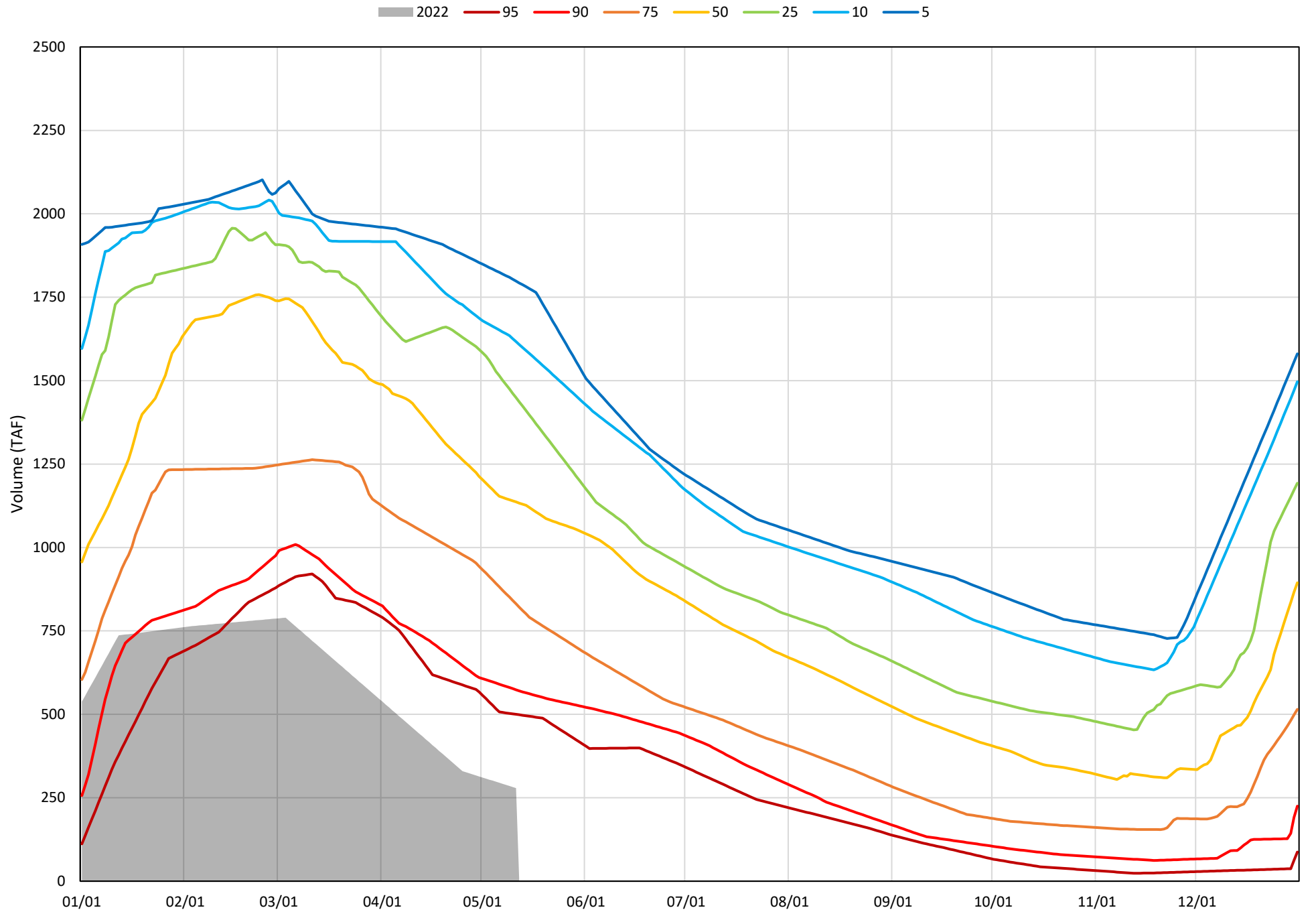
Trinity Lake Cold Water Pool Volume ≤52°F - Percent Exceedances (2000-2021)



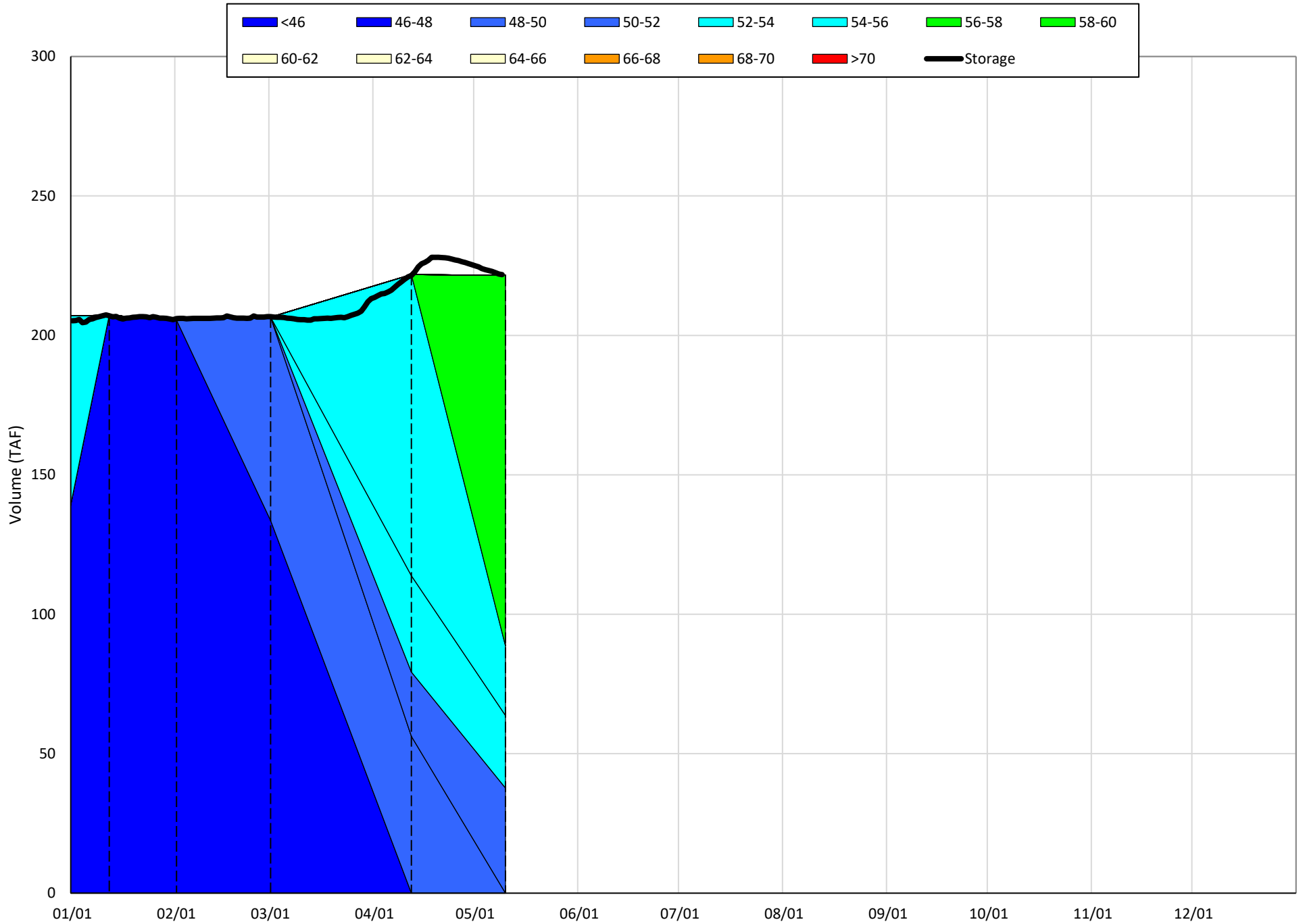
Trinity Lake Cold Water Pool Volume ≤50°F - Percent Exceedances (2000-2021)



Trinity Lake Cold Water Pool Volume $\leq 48^{\circ}\text{F}$ - Percent Exceedances (2000-2021)

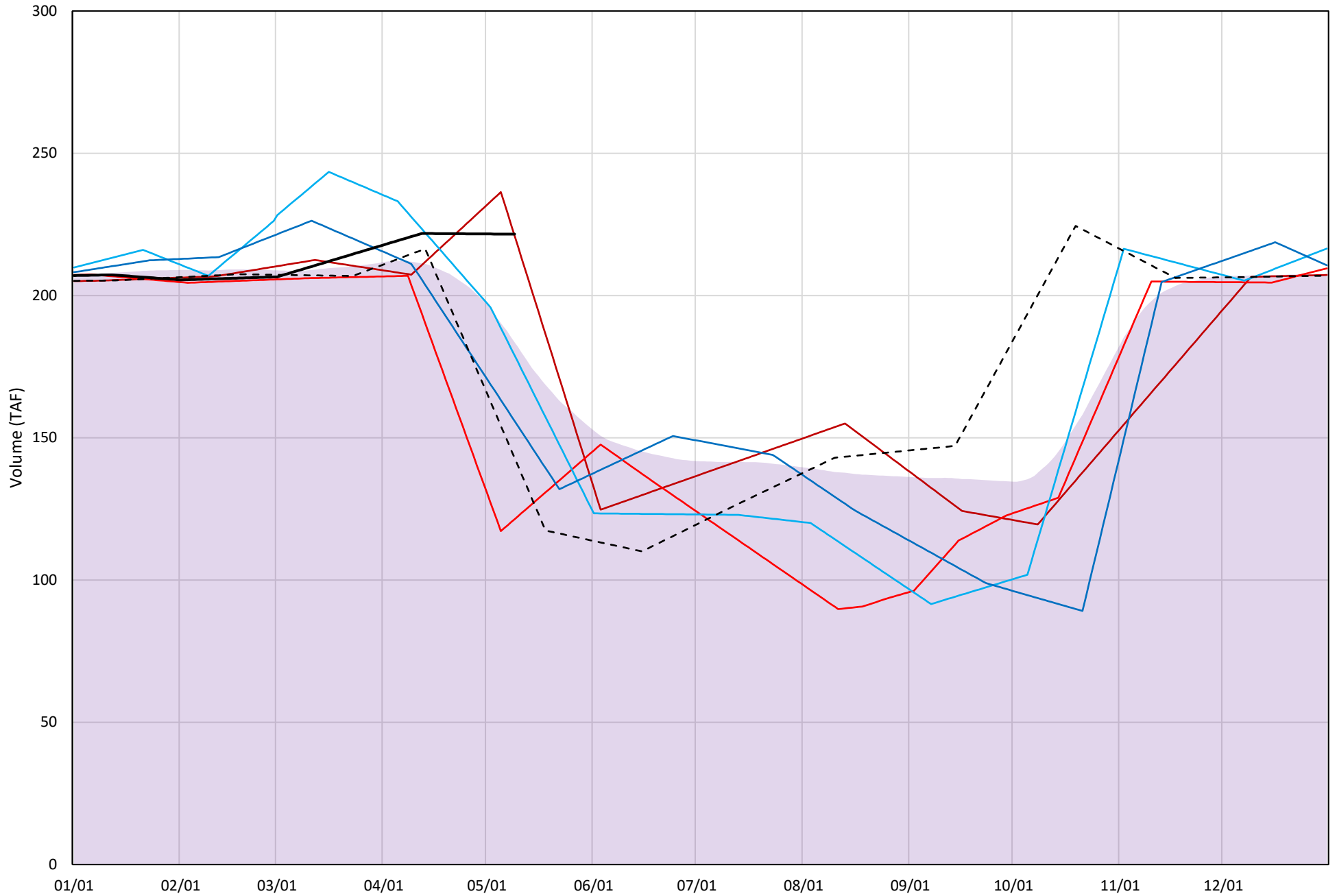


Whiskeytown Lake Isothermobaths Plot - 2022



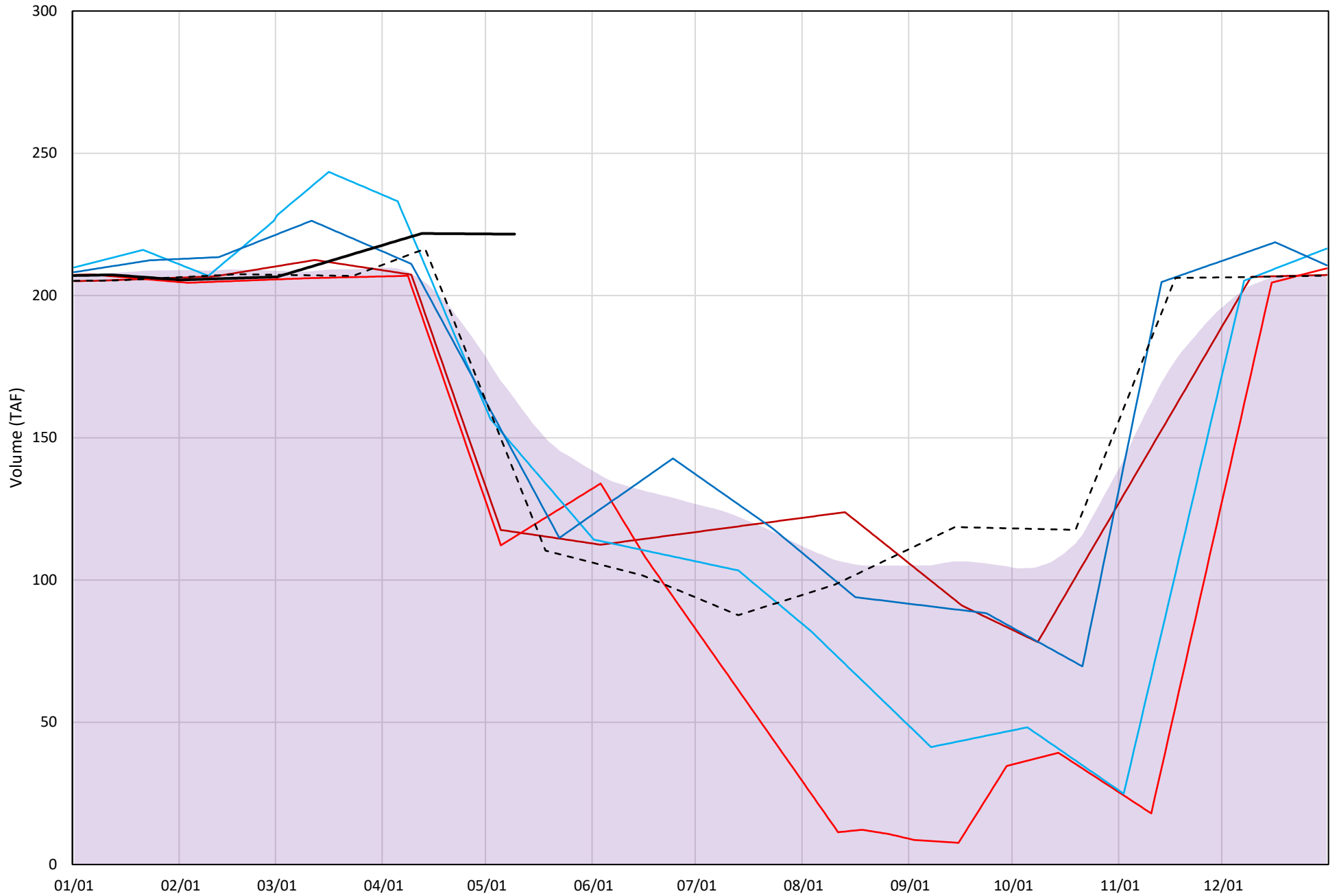
Whiskeytown Lake Cold Water Pool Volume $\leq 60^{\circ}\text{F}$

Avg (2000-2021) 2014 2015 2016 2019 2021 2022



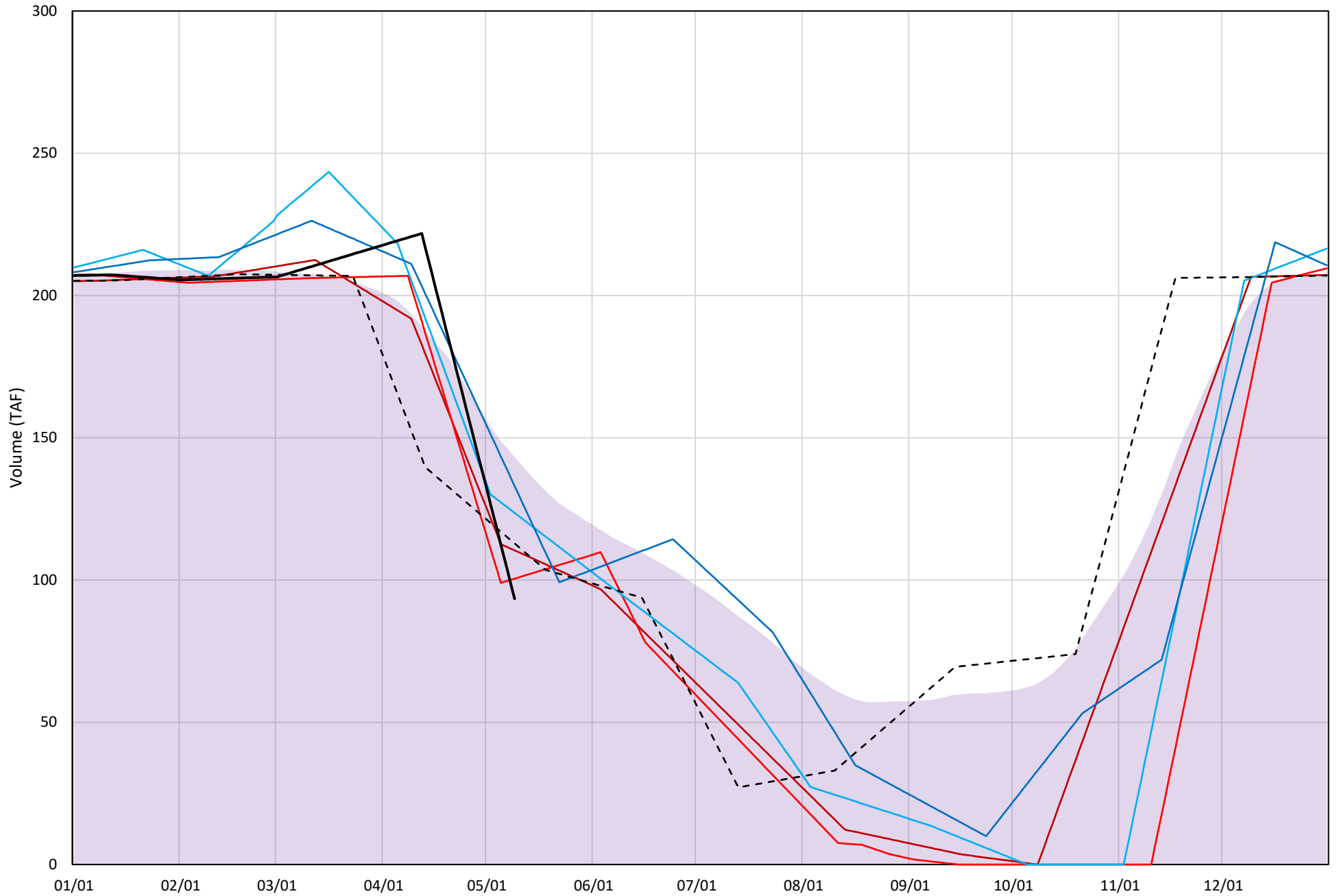
Whiskeytown Lake Cold Water Pool Volume $\leq 58^{\circ}\text{F}$

Avg (2000-2021) 2014 2015 2016 2019 2021 2022



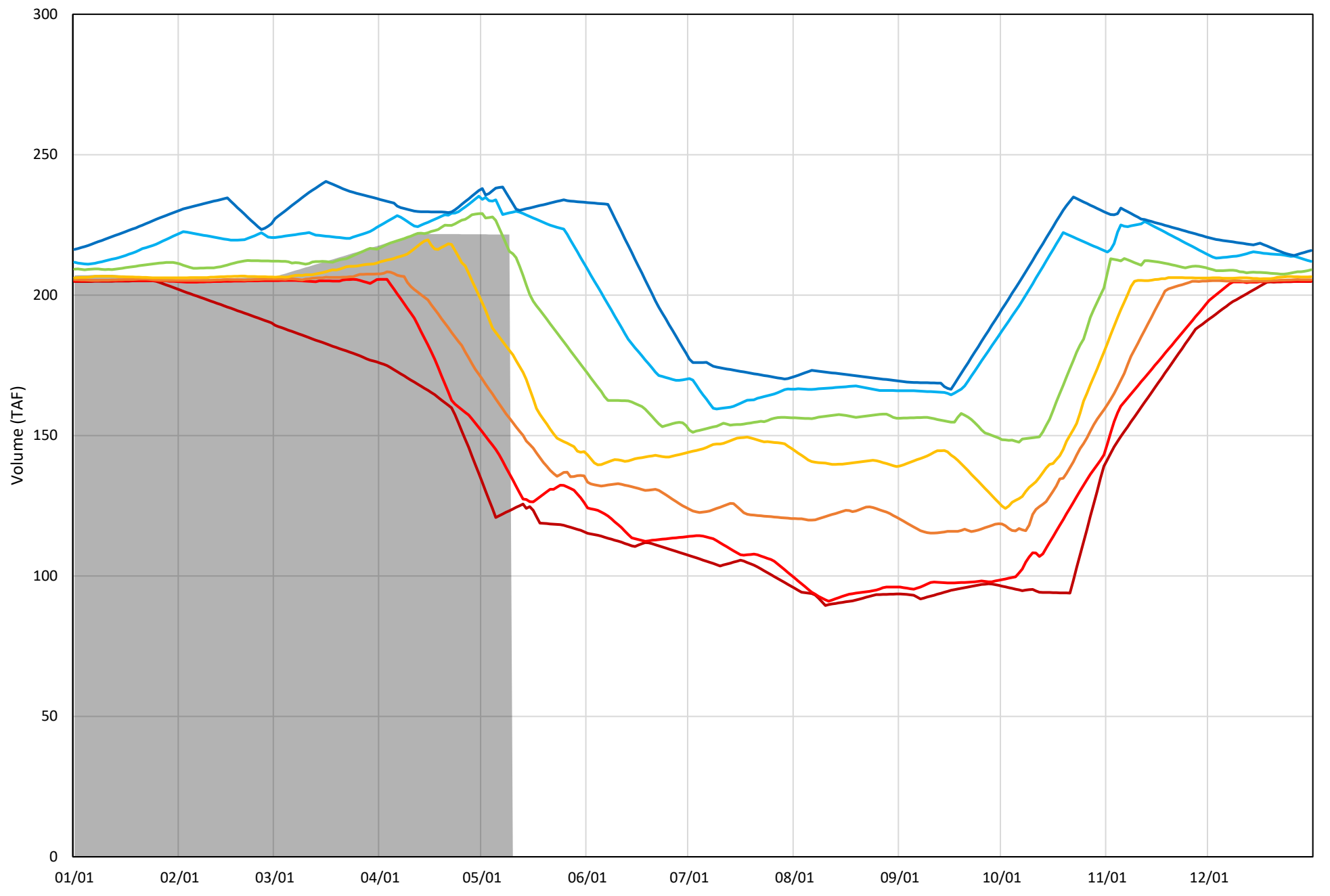
Whiskeytown Lake Cold Water Pool Volume $\leq 56^{\circ}\text{F}$

Avg (2000-2021) 2014 2015 2016 2019 2021 2022

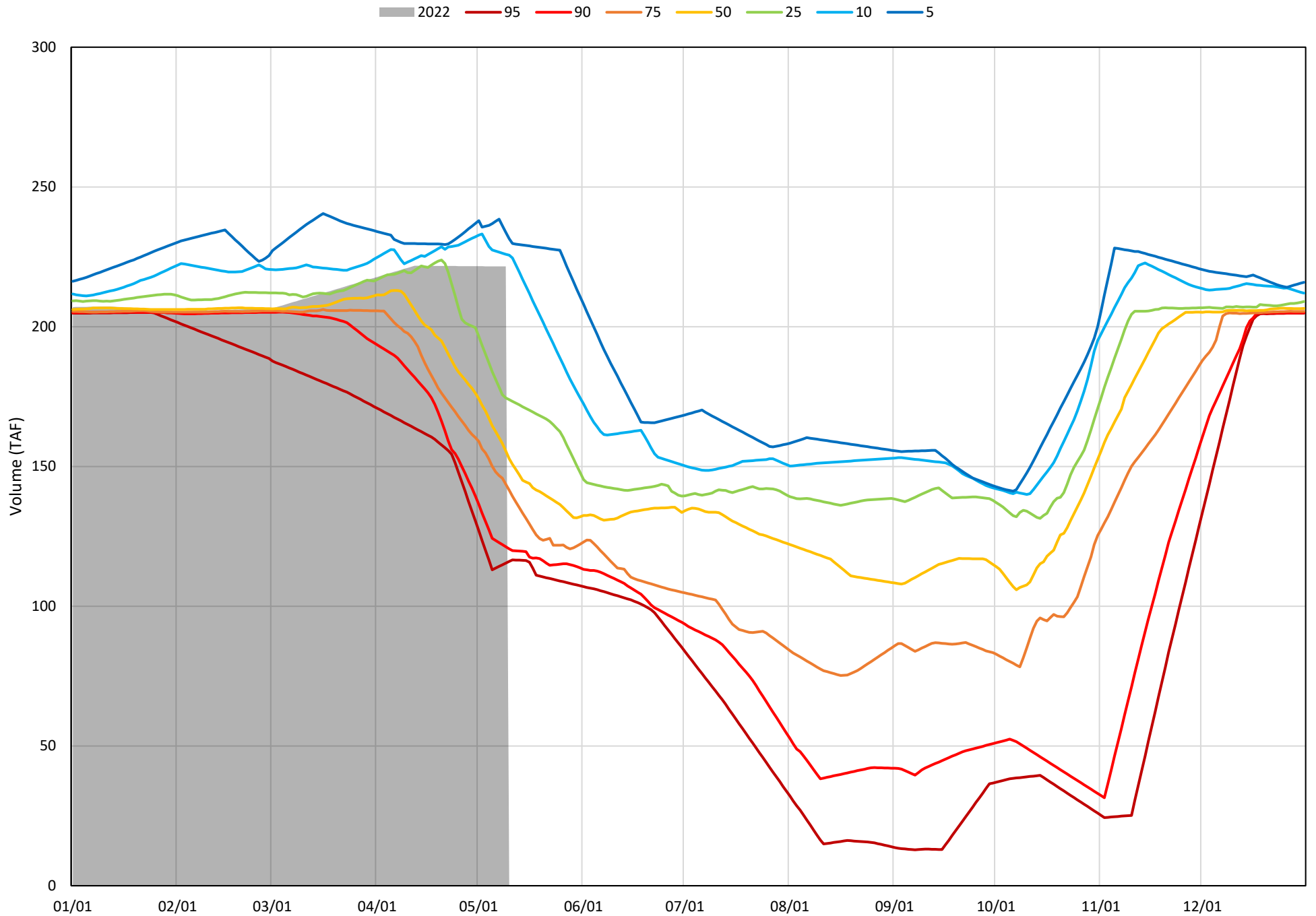


Whiskeytown Lake Cold Water Pool Volume $\leq 60^{\circ}\text{F}$ - Percent Exceedances (2000-2021)

2022 95 90 75 50 25 10 5

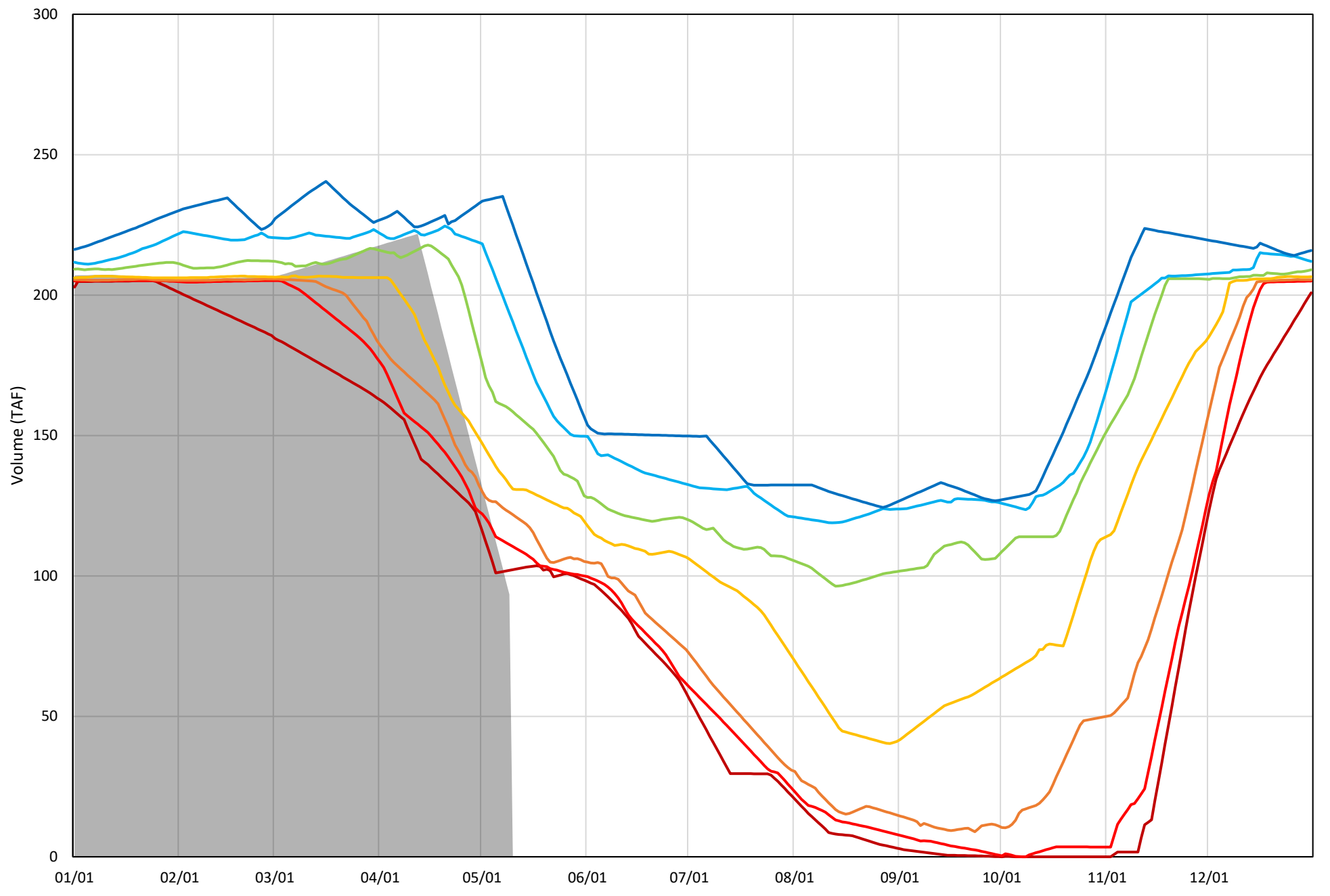


Whiskeytown Lake Cold Water Pool Volume $\leq 58^{\circ}\text{F}$ - Percent Exceedances (2000-2021)



Whiskeytown Lake Cold Water Pool Volume $\leq 56^{\circ}\text{F}$ - Percent Exceedances (2000-2021)

2022 95 90 75 50 25 10 5



Estimated CVP Operations 90% Exceedance

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

NA	NA	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Trinity	766	732	690	636	552	471	441	419	403	407	440	506	525
Trinity Elev.	NA	2222	2216	2208	2194	2179	2174	2169	2166	2167	2173	2186	2189
Whiskeytown	225	238	238	238	238	238	206	206	206	206	206	206	238
Whiskeytown Elev.	NA	1209	1209	1209	1209	1209	1199	1199	1199	1199	1199	1199	1209
Shasta	1808	1780	1673	1545	1412	1322	1318	1303	1292	1415	1618	1945	2205
Shasta Elev.	NA	944	937	929	919	912	912	911	910	919	933	954	969
Folsom	768	855	761	545	352	296	245	199	161	162	210	208	267
Folsom Elev.	NA	455	446	422	396	386	377	367	357	357	369	369	381
New Melones	922	863	776	720	674	655	613	616	618	624	621	617	604
New Melones Elev.	NA	922	909	900	900	888	880	881	882	882	882	881	879
San Luis	357	324	247	155	160	154	109	177	308	522	534	512	511
San Luis Elev.	NA	439	424	412	408	406	399	411	431	463	461	456	452
Total	NA	4791	4385	3839	3388	3135	2932	2919	2987	3336	3629	3994	4349

State End of the Month Reservoir Storage (TAF)

NA	NA	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Oroville	1917	1857	1637	1264	1127	1083	1055	1055	1105	1215	1314	1439	1545
Oroville Elev.	NA	769	746	702	683	677	672	672	680	695	708	723	736
State San Luis	593	544	481	463	428	421	408	439	483	583	551	523	482
Total San Luis (TAF)	950	868	728	618	588	575	517	616	791	1104	1085	1034	993
San Luis Elev	NA	439	424	412	408	406	399	411	431	463	461	456	452

Monthly River Releases (TAF/cfs)

NA	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Trinity (TAF)	67	27	28	53	52	23	18	18	18	17	18	80
Trinity (cfs)	1,902	450	450	857	870	373	300	300	300	300	300	1,347
Clear Creek (TAF)	12	12	9	9	9	12	12	12	12	11	12	12
Clear Creek (cfs)	200	200	150	150	150	200	200	200	200	200	200	200
Sacramento (TAF)	234	268	277	277	238	200	193	200	200	180	200	193
Sacramento (cfs)	3800	4500	4500	4500	4000	3250	3250	3250	3250	3250	3250	3250
American (TAF)	86	158	271	254	109	62	60	61	61	56	175	148
American (cfs)	1402	2654	4415	4138	1837	1011	1001	1000	1000	1002	2848	2493
Stanislaus (TAF)	25	30	9	9	9	35	12	12	13	12	12	27
Stanislaus (cfs)	406	500	150	150	150	577	200	200	213	214	200	461
Feather (TAF)	123	161	330	183	120	59	57	59	59	100	154	149
Feather (cfs)	2000	2700	5370	2970	2020	960	960	960	960	1800	2500	2500

Trinity Diversions (TAF)

NA	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Carr PP	29	25	30	31	30	10	10	10	10	5	3	39
Spring Creek PP	10	15	20	20	20	30	0	0	5	5	10	10

Delta Summary (TAF)

NA	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Tracy	55	54	120	161	124	61	140	175	230	62	46	54
USBR Banks	0	0	0	0	0	0	0	0	0	0	0	0
Contra Costa	6.6	6.8	7.8	7.8	6.5	5.0	2.8	2.7	2.1	2.0	5.2	4.3
Total USBR	62	61	128	169	131	66	143	178	232	64	51	58
State Export	37	18	59	20	19	18	51	47	161	26	18	36
Total Export	99	79	187	189	150	84	194	225	393	90	69	94
COA Balance	153	95	0	0	0	5	0	0	0	-71	-162	-253
Vernalis (TAF)	59	43	21	21	24	64	46	40	74	78	37	60
Vernalis (cfs)	956	719	345	345	402	1049	772	655	1205	1403	607	1012
Old/Middle River Std.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Old/Middle River calc.	-1,398	-1,287	-2,774	-2,800	-2,344	-1,170	-2,751	-3,110	-4,972	-1,207	-1,184	-1,346
Computed DOI	4002	4001	4652	3644	3009	3237	3496	3497	6279	11400	11403	9497
Excess Outflow	0	0	0	0	0	0	0	0	0	0	0	0
% Export/Inflow	19%	13%	24%	28%	30%	21%	43%	47%	54%	12%	9%	12%
% Export/inflow std.	35%	35%	65%	65%	65%	65%	65%	65%	65%	45%	35%	35%

Hydrology

NA	Trinity	Shasta	Folsom	New Melones
Water Year Inflow (TAF)	463	2,862	1,691	557
Year to Date + Forecasted % of mean	38%	52%	62%	53%

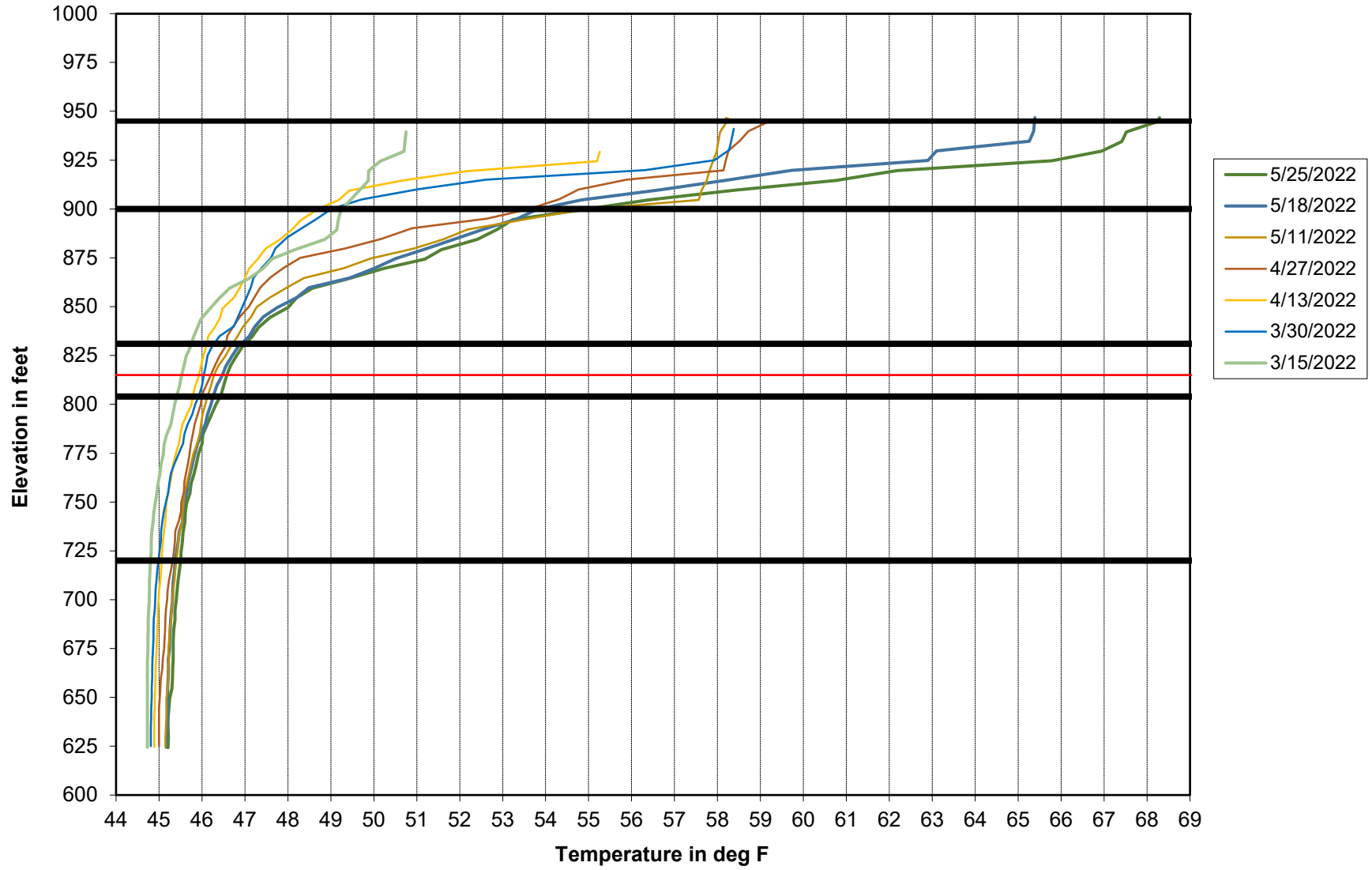
CVP actual operations do not follow any forecasted operation or outlook; actual operations are based on real-time conditions.

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

2022 Shasta Temperature Profiles



TDM Modeling

May 25, 2022
SWFSC

Additional information available at:
<https://oceanview.pfeg.noaa.gov/CVTEMP/download>

Modeling Assumptions

1. May 99% B120 Exceedance Forecast Shasta Inflow
2. May 18 Shasta initial profile
3. 2015 meteorology
4. Spring Creek PP contributions to Keswick as provided in USBR 90% exceedance operational outlook from April 26
5. SAC gage temperature target location (achieving target NOT guaranteed)
6. Redds distributed in time and space according to 2021 aerial redd surveys (a compressed distribution relative to historical variability; 2016-2021 for comparison)
7. One scenarios considered (Target Temperature of 54.5F)
8. Combination of CE-QUAL-W2 models for Shasta and Keswick, and RAFT for temperature predictions
9. USBR predicted temperatures plotted are from April 26 scenario.

Model Outputs (Scenario 1, 54.5F Target)

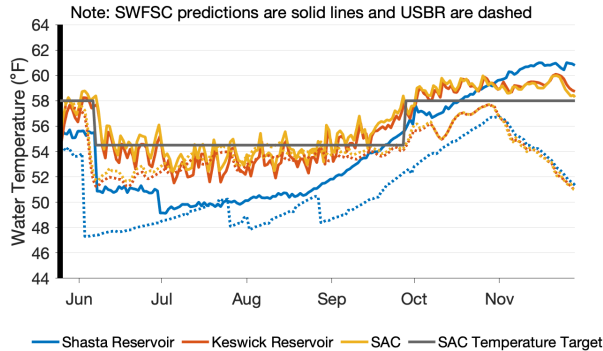
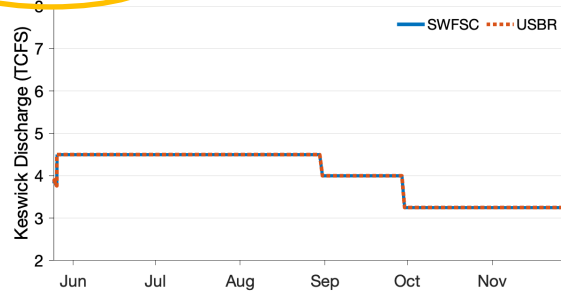
*Redd year specified

Model Run date

DRAFT: FOR DISCUSSION PURPOSES

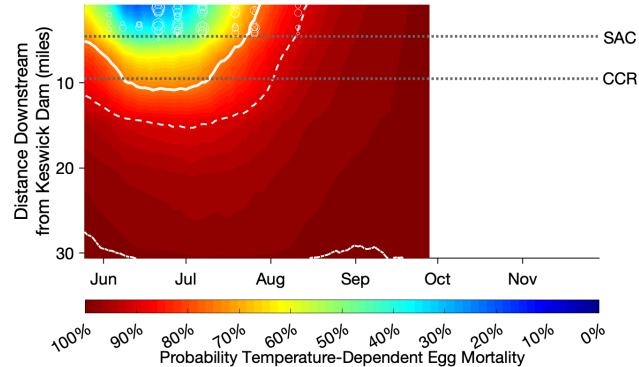
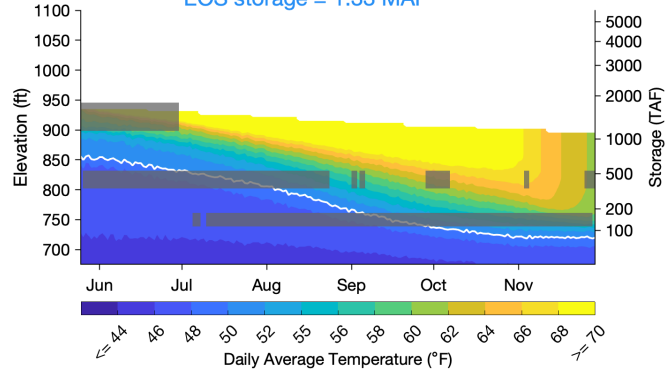
Scenario = 4500 cfs
 Center Date = 08/02/2022
 Target Temperature = 54.5°F
 Shoulder Temperature = 58°F
 Window Length = 16 weeks

25-May-2022
 Hindcast | Forecast



*Model output generated 25-May-2022

Mean annual TDM Redd Yr 2021= 47%
 Mean annual TDM Redd Yr 2016-2021= 54%
 Date first side gate = 05/Jul/2022
 EOS storage = 1.33 MAF



DRAFT - Preliminary Results - For Discussion Purposes Only

Model Outputs (*Last meeting's most similar*)

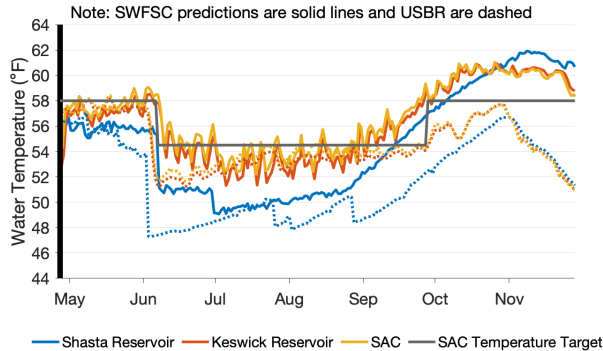
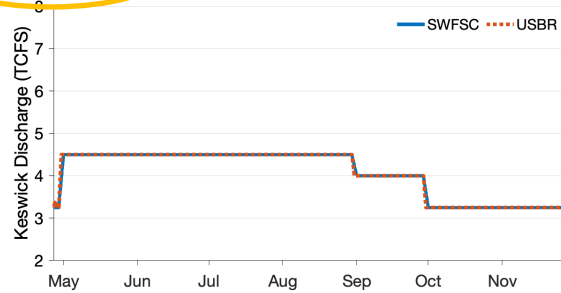
*Redd year specified

Model Run date

DRAFT: FOR DISCUSSION PURPOSES

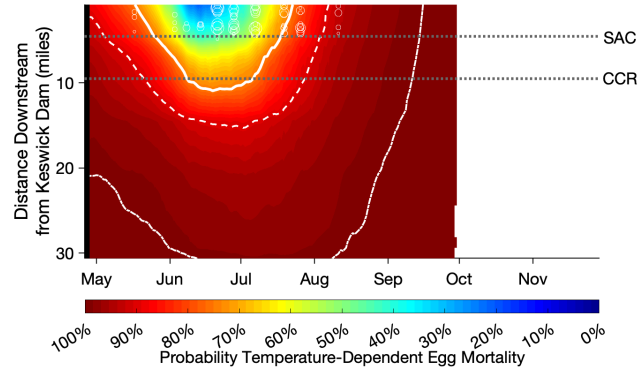
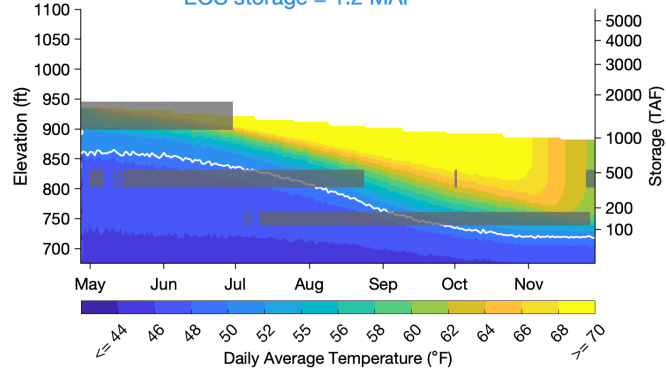
Scenario = 4500 cfs
 Center Date = 08/02/2022
 Target Temperature = 54.5°F
 Shoulder Temperature = 58°F
 Window Length = 16 weeks

27-Apr-2022
 Hindcast | Forecast



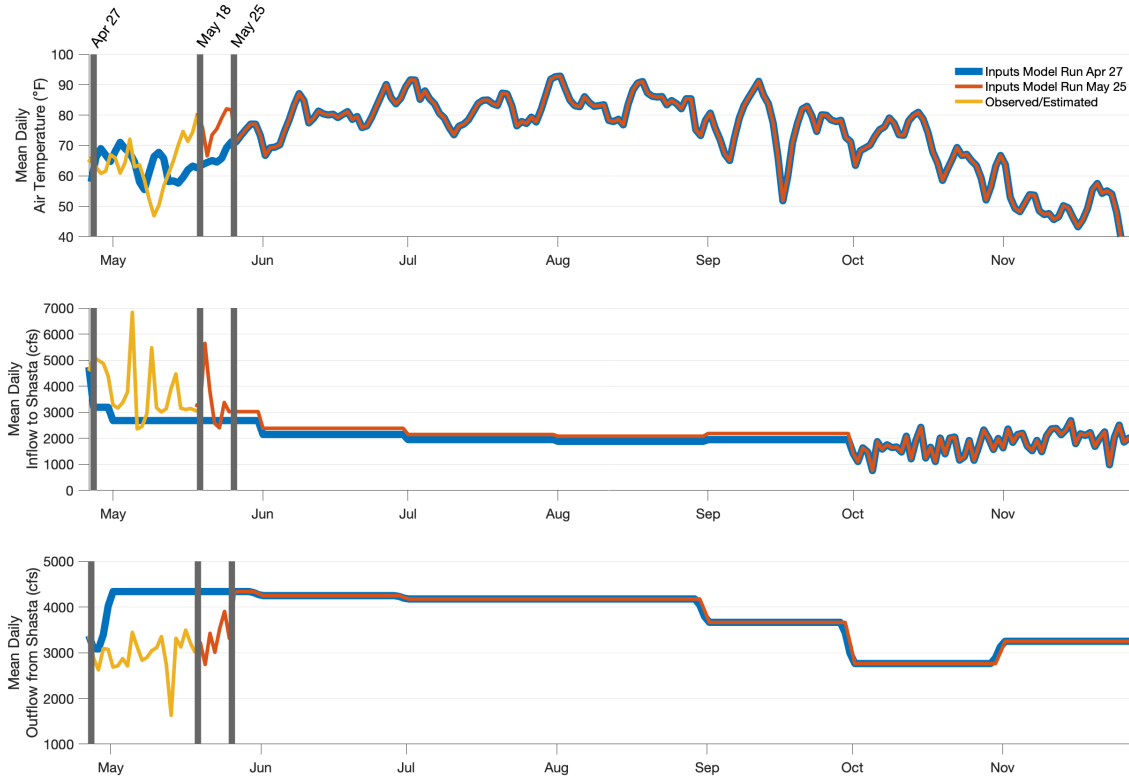
*Model output generated 27-Apr-2022

Mean annual TDM Redd Yr 2021= 52%
 Mean annual TDM Redd Yr 2016-2021= 58%
 Date first side gate = 05/Jul/2022
 EOS storage = 1.2 MAF



DRAFT - Preliminary Results - For Discussion Purposes Only

Example of what changed between model runs



DRAFT - Preliminary Results - For Discussion Purposes Only

Conclusions

- Mean annual TDM estimated to be between 47-54% depending redd distribution assumption.
- Mean annual TDM reduced by 5-6% points depending on redd distribution assumption between April 27 and May 25 Model runs.
- TDM reduction is due to change in forecasted versus observed model forcing, for example the inflow and outflow volumes from Shasta as shown in previous slide.