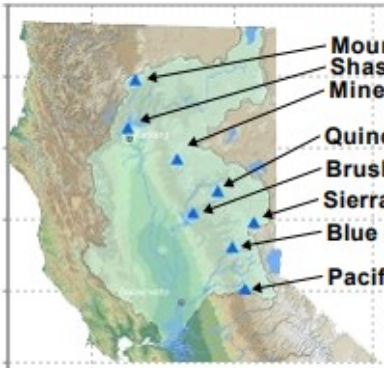
Northern Sierra Precipitation: 8-Station Index, July 27, 2022



Percent of Average for this Date: 79%

2016-2017 Daily Precip (wettest) 94.7

1982-1983 Daily Precip (2nd wettest) 88.5

2018 - 2019 Daily Precip 70.7

Average (1991-2020) 53.2

Current: 41.3

2019 - 2020 Daily Precip 31.7

2020-2021 Daily Precip (3rd driest) 24.0

1976-1977 (2nd driest) 19.0

Cumulative Daily/Monthly Precipitation (inches)

Total Water Year Precipitation

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 Mar 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1

Water Year (October 1 - September 30)

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

July 26, 2022
Run Date: July 27, 2022

Table 4. Reservoir Releases in Cubic Feet Per Second

Reservoir	Dam	WY 2020	WY 2021	15-Year Median
Trinity	Lewiston	454	472	462
Sacramento	Keswick	9,295	4,506	11,462
Feather	Oroville (SWP)	2,300	0	5,500
Stanislaus	Goodwin	1,502	306	330
American	Nimbus	1,026	4,224	3,425
San Joaquin	Friant	275	230	349

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	1,509	1,030	672	45
Shasta	4,552	2,851	1,496	1,700	60
Folsom	977	602	248	620	103
New Melones	2,420	1,345	1,068	723	54
Fed. San Luis	966	284	55	179	63
Total North CVP	11,363	6,590	3,897	3,894	59
Millerton	520	356	225	295	83
Oroville (SWP)	3,538	1,935	916	0	0

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	476	196	2,756	991	48
Shasta	2,608	2,166	10,160	4,276	61
Folsom	1,587	302	6,160	2,232	71
New Melones	526	NA	2,593	869	60
Millerton	788	259	4,130	1,282	61

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	18.88	12.06	55.19	30.83 (60)	61	0.00
Sacramento at Shasta Dam	41.35	17.42	112.58	60.15 (65)	69	0.00
American at Blue Canyon	64.06	15.64	103.88	65.08 (47)	98	0.00
Stanislaus at New Melones	19.39	NA	45.33	26.82 (44)	72	0.00
San Joaquin at Huntington LK	24.26	17.20	81.40	40.43 (47)	60	0.00

Northern CVP Water Temperature Report

July - 2022

BUREAU OF RECLAMATION

All Data in this Report is Preliminary and Subject to Change

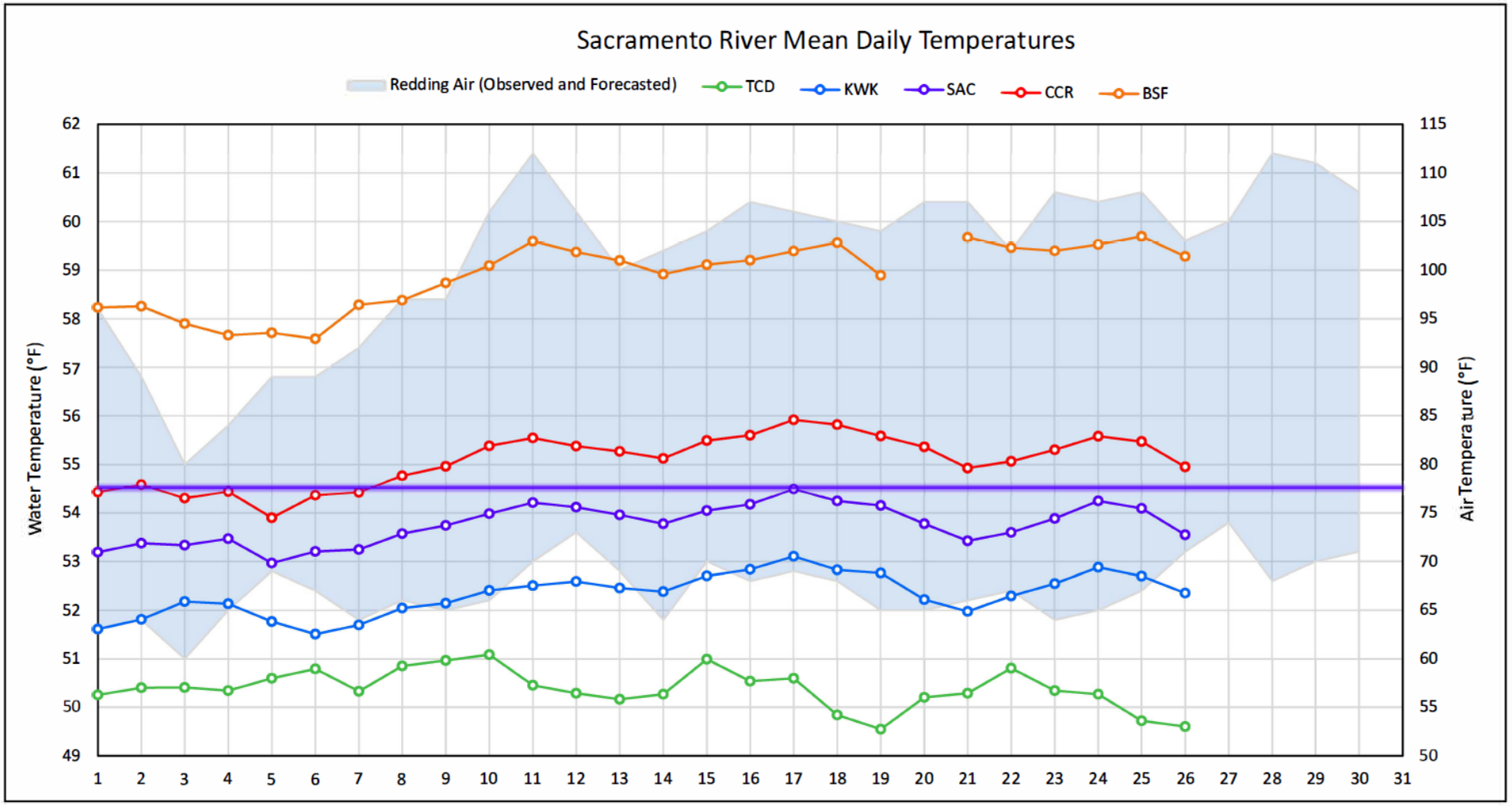
DATE	MDWT TCD[1]	MDWT SHD	MDWT SPP[1]	MDWT KWK	MDWT SAC[2]	MDWT CCR	MDWT BSF	MDWT BND	MDWT RDB	MDWT IGO	MDWT LWS	MDWT DGC	MDWT NFH	MDR Shasta Generation	MDR Spring Creek P.P.	MDR Keswick Total	MDAT RDD	MDAT BSF	MDAT RDB
Jun	50.8	49.2	54.6	52.4	53.9	55,2	59.1	62.0	64.0	57.5	54.6	60.7	63.5	3448	299	4072	78.1	74.4	76.2
07/01	50.3[A]	49.1	55.1	51.6	**53.2**	54.4	58.2	61.4	63.8	59.0	57.1	63.3	67.6	3675	366	4516	79.5	75.3	74.5
07/02	50.4[A]	49.2	56.3	51.8	**53.4**	54.6	58.3	61.4	63.6	58.9	57.1	63.8	67.1	3668	447	4544	76.5	71.9	71.6
07/03	50.4[A]	49.0	55.2	52.2	**53.3**	54.3	57.9	60.8[A]	62.9	57.9	56.4	61.9	65.7	3448	388	4557	70.0	68.3	67.3
07/04	50.3[A]	49.1	56.2	52.1	**53.5**	54.4	57.7	60.2	62.3	58.1	55.8	60.8	64.6	3996	366	4536	74.5	72.0	70.6
07/05	50.6	48.9	55.3	51.8	**53.0**	53.9	57.7	61.0	62.9	57.9	55.3	60.9	64.4	3791	376	4539	79.0	76.3	76.4
07/06	50.8[A]	49.2	55.2	51.5	**53.2**	54.4	57.6	60.7[A]	63.3	58.9	55.1	61.2	65.4	3689	359	4535	78.0	74.9	73.3
07/07	50.3	48.9	55.3	51.7	**53.2**	54.4	58.3	61.5	63.6	59.3	55.5	62.5	66.7	3366	347	4534	78.0	74.0	73.6
07/08	50.9[A]	49.2	55.2	52.0	**53.6**	54.8	58.4[B]	NA	63.8	59.3	55.3	62.5	67.4	4207	373	4537	81.5	76.5	78.0
07/09	51.0	49.8	55.4	52.1	**53.7**	55.0	58.7[B]	NA	64.1	58.3	56.0	62.8	67.9	3802	361	4537	81.0	76.8	76.5
07/10	51.1	49.8	55.3	52.4	**54.0**	55.4	59.1	62.2	64.5	58.7	56.3	63.8	68.8	3679	359	4551	86.0	82.3	84.0
07/11	50.5	49.1	55.5	52.5	**54.2**	55.5	59.6	63.0	65.3	58.7	56.2	64.4	70.2	3798	355	4573	91.0	86.2	86.4
07/12	50.3	49.1	55.5	52.6	**54.1**	55.4	59.4	63.0	65.5	58.4	56.1	64.0	70.2	5203	362	4571	89.5	84.1	84.4
07/13	50.2	49.2	56.6	52.5	**54.0**	55.3	59.2	62.4[A]	64.8	58.6	56.4	64.2	70.3	4248	360	4573	84.5	79.5	78.9
07/14	50.3	49.4	55.7	52.4	**53.8**	55.1	58.9	62.3	64.6	58.6	56.4	64.1	69.6	3173	351	4563	83.0	79.6	79.8
07/15	51.0[A]	49.5	56.3	52.7	**54.1**	55.5	59.1	62.3	64.5	58.7	56.8	64.2	69.5	4345	75	4555	87.0	81.8	81.8
07/16	50.5	50.0	56.8	52.8	**54.2**	55.6	59.2	62.4	64.6	58.7	56.5	64.5	69.9	3803	360	4528	87.5	82.1	83.3
07/17	50.6	49.9	55.8	53.1	**54.5**	55.9	59.4	62.5	64.6	58.8	56.0	64.4	70.1	3793	363	4515	87.5	83.2	84.9
07/18	49.8[X]	49.3	55.8	52.8	**54.2**	55.8	59.6	62.8	64.8	58.7	56.1	63.8	69.9	3257	494	4516	86.5	82.2	83.6
07/19	49.6	48.6	57.0	52.8	**54.2**	55.6	58.9	62.4	64.7	58.5	56.2	63.9	69.9	3833	364	4507	84.5	80.9	81.9
07/20	50.2	49.3	56.0	52.2	**53.8**	55.4[A]	NA	62.1	64.4	58.5	55.9	63.7	69.9	3750	327	4504	86.0	81.3	82.1
07/21	50.3	49.3	56.0	52.0	**53.4**	54.9	59.7	62.1	64.4	58.7	56.3	63.4	69.2	3878	360	4504	86.5	82.4	81.9
07/22	50.8	49.5	57.3	52.3	**53.6**	55.1	59.5	61.9	64.3	58.6	56.5	63.2	68.4	3241	362	4504	84.5	81.5	81.0
07/23	50.3	50.0	56.1	52.5	**53.9**	55.3	59.4	61.8	64.0	58.7	56.6	63.7	68.9	3605	373	4505	86.0	81.3	80.0
07/24	50.3	49.2	57.2	52.9	**54.3**	55.6	59.5	61.9	63.9	58.7	56.8	64.2	70.0	4047	366	4501	86.0	80.6	80.3
07/25	49.7[X]	49.0	56.2	52.7	**54.1**	55.5	59.7	62.3	64.2	58.5	56.5	63.9	70.1	3657	362	4505	87.5	83.0	81.2
07/26	49.6	48.6	57.3	52.4	**53.5**	54.9	59.3	61.6	63.8	58.5	56.5	63.9	70.2	4003	433	4506	0.0	81.6	79.7
Jul	50.4	49.3	56.0	52.3	53.8	55.1	58.9	61.9	64.1	58.6	56.2	63.3	68.5	3806	362	4531	80.1	79.2	79.1
													Total CFS	98945	9409	117816			
													Total AF	196253	18662	233683			

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.

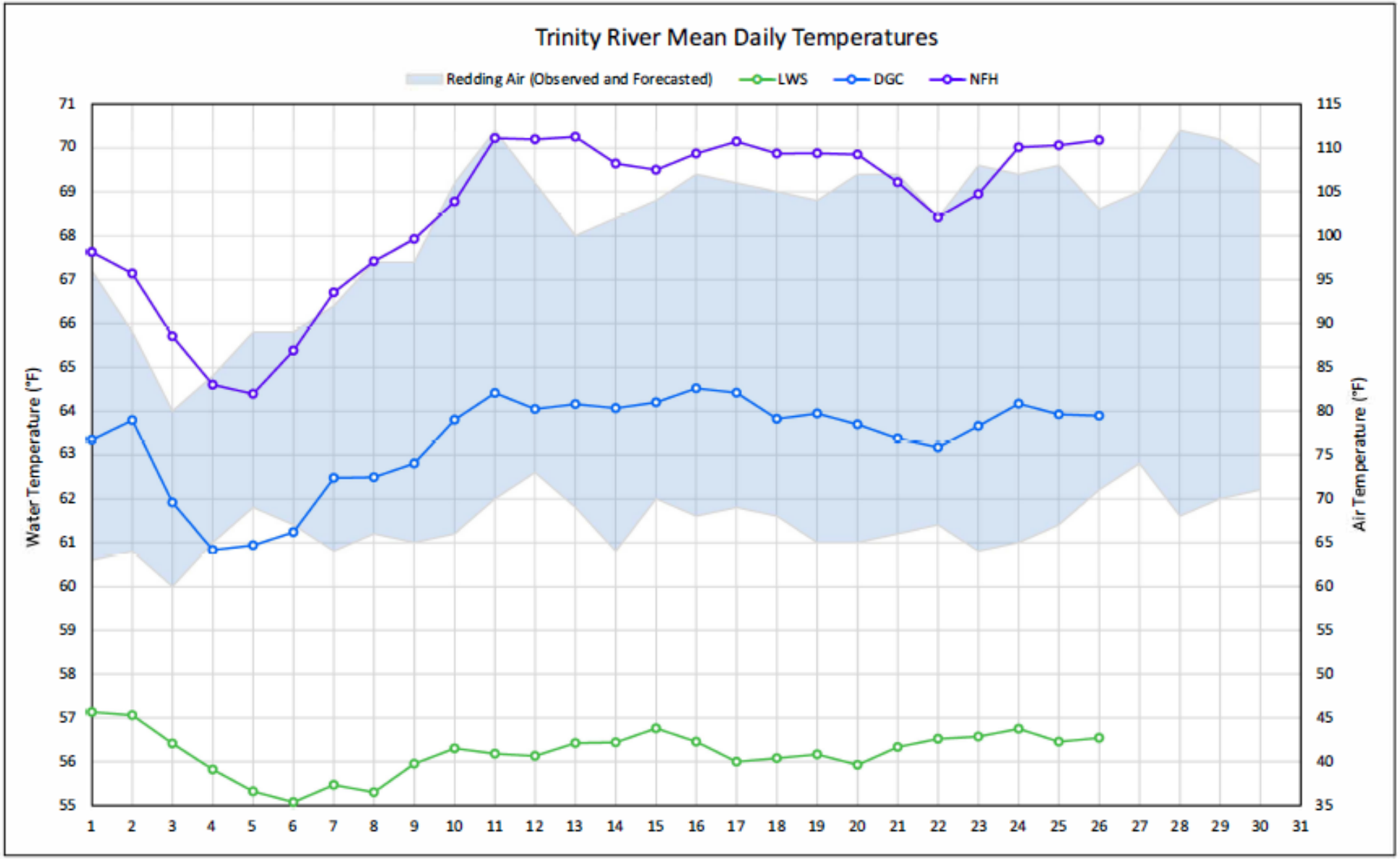


Station Details			
Code	Body of Water	Location[1]	CDEC Link
TCD	N/A	Shasta Power Plant	N/A
SHD	Sacramento River	0.3 miles downstream of Shasta Power Plant	SHD
SPP	N/A	Spring Creek Power Plant	N/A
KWK	Sacramento River	0.8 miles downstream of Keswick Dam	KWK
SAC	Sacramento River	4.8 miles downstream of 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	06/07/2022
Sacramento	SAC	54.5	06/07/2022	TBD

Notes

[1] Distances are approximate

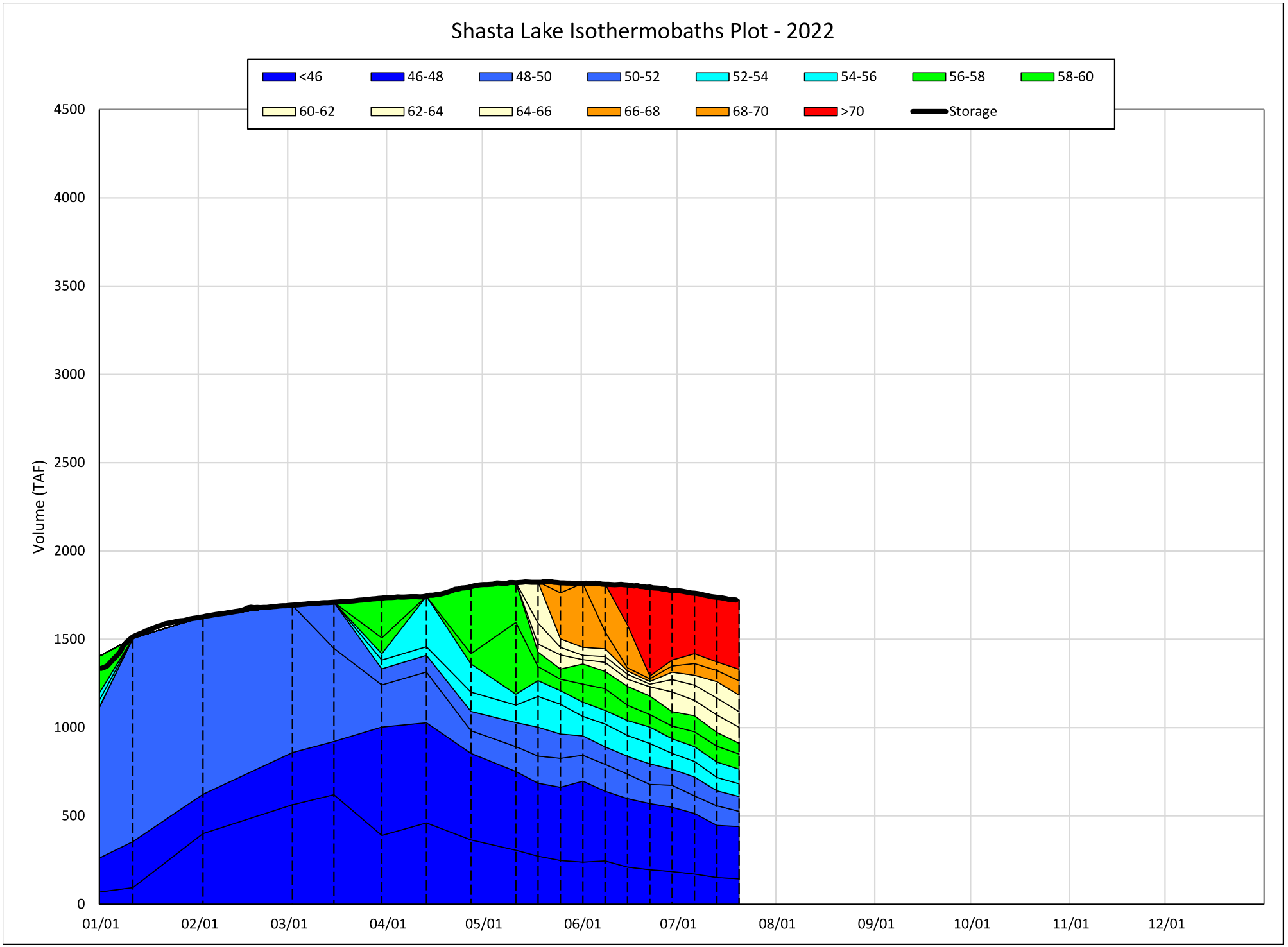


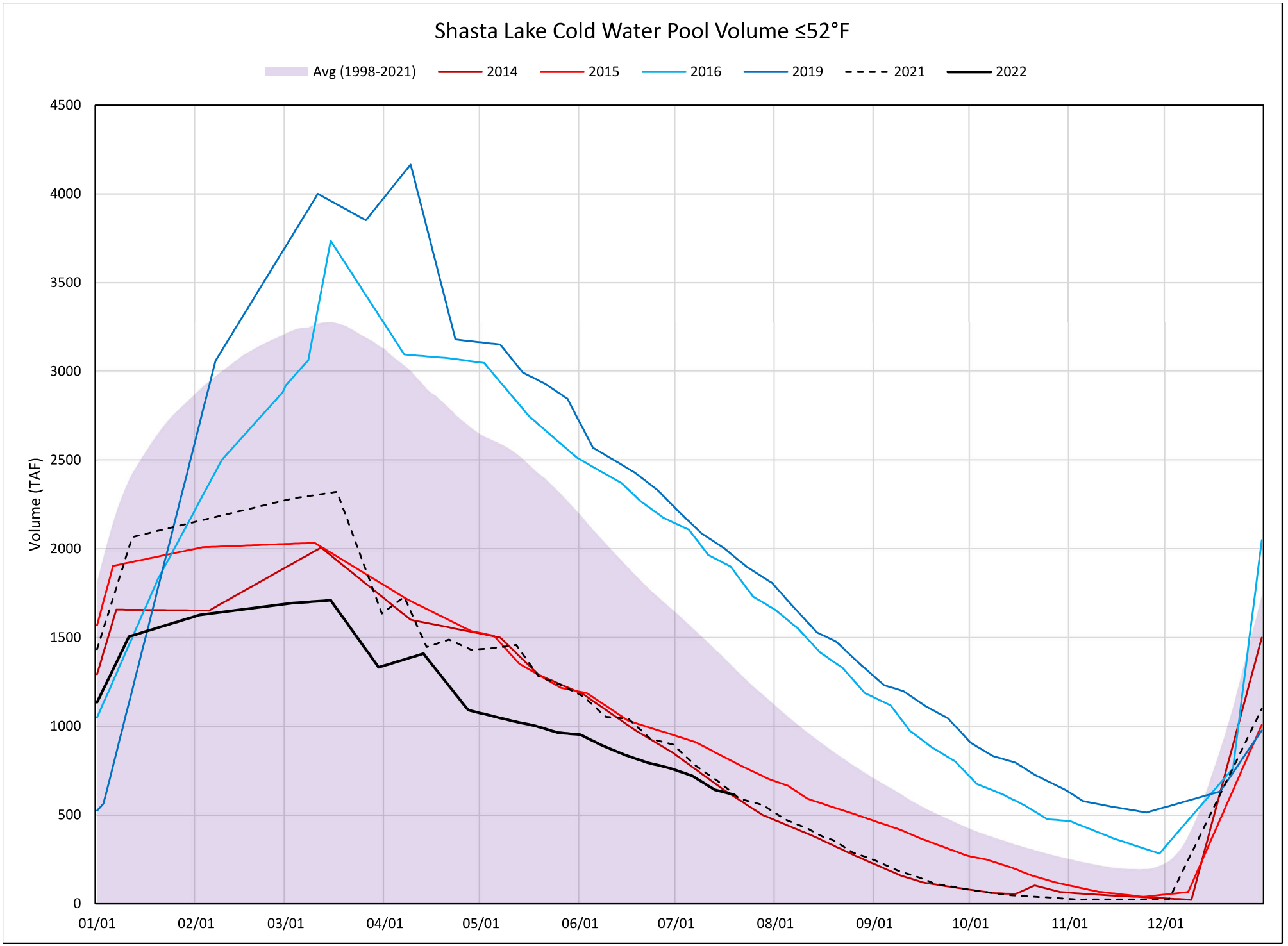
Station Details			
Code	Body of Water	Location[1]	CDEC Link
LWS	Trinity River	1.1 miles downstream of Lewiston Dam	LWS
DGC	Trinity River	19 miles downstream of Lewiston Dam	DGC
NFH	Trinity River	38 miles downstream of Lewiston Dam	NFH

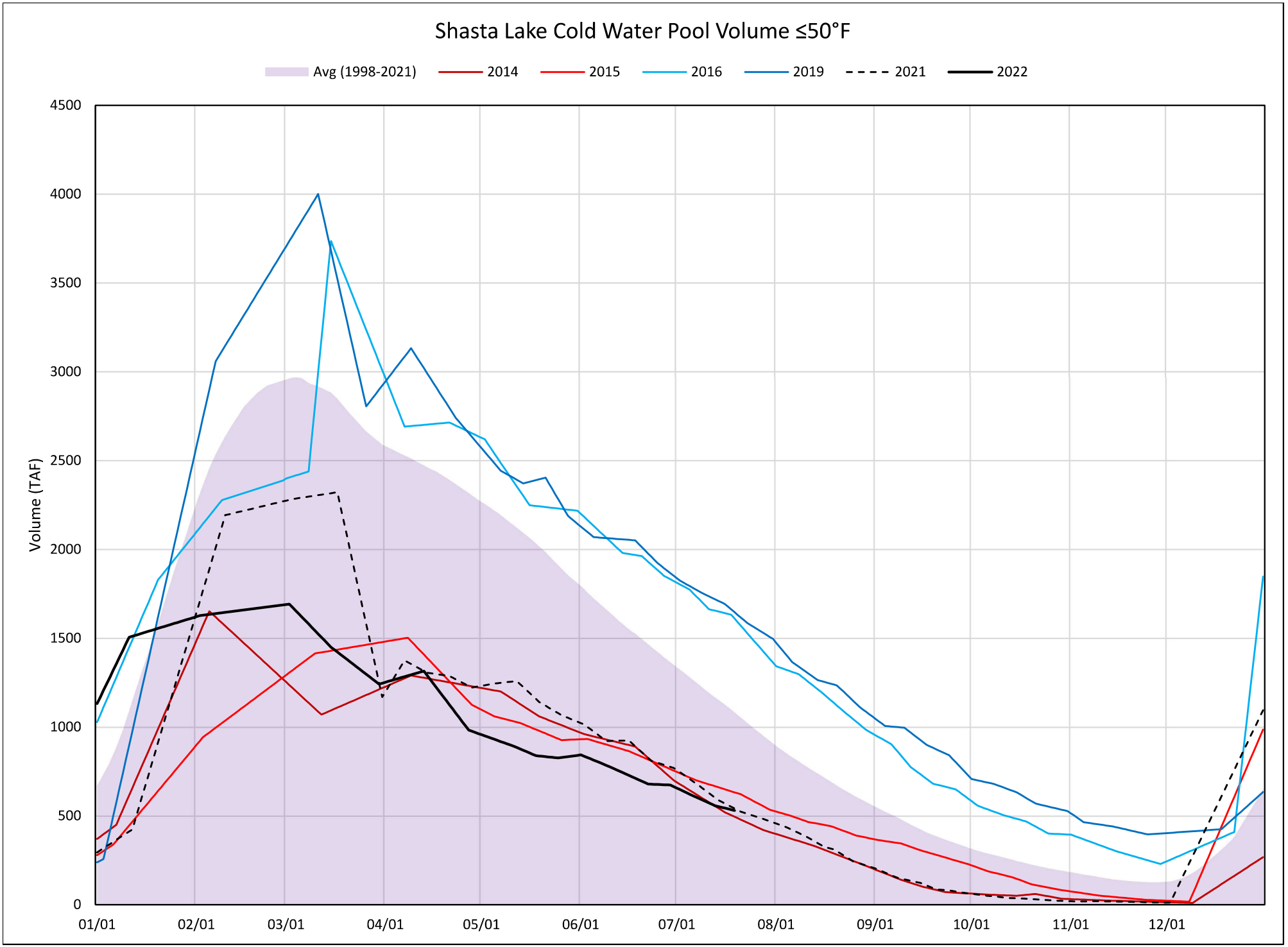
Water Right Temperature Control Points				
River	Point	Temp. (°F)	Begin Date	End Date
Trinity	DGC	56	Sep-15	Oct-01
Trinity	NFH	56	Oct-01	Dec-31

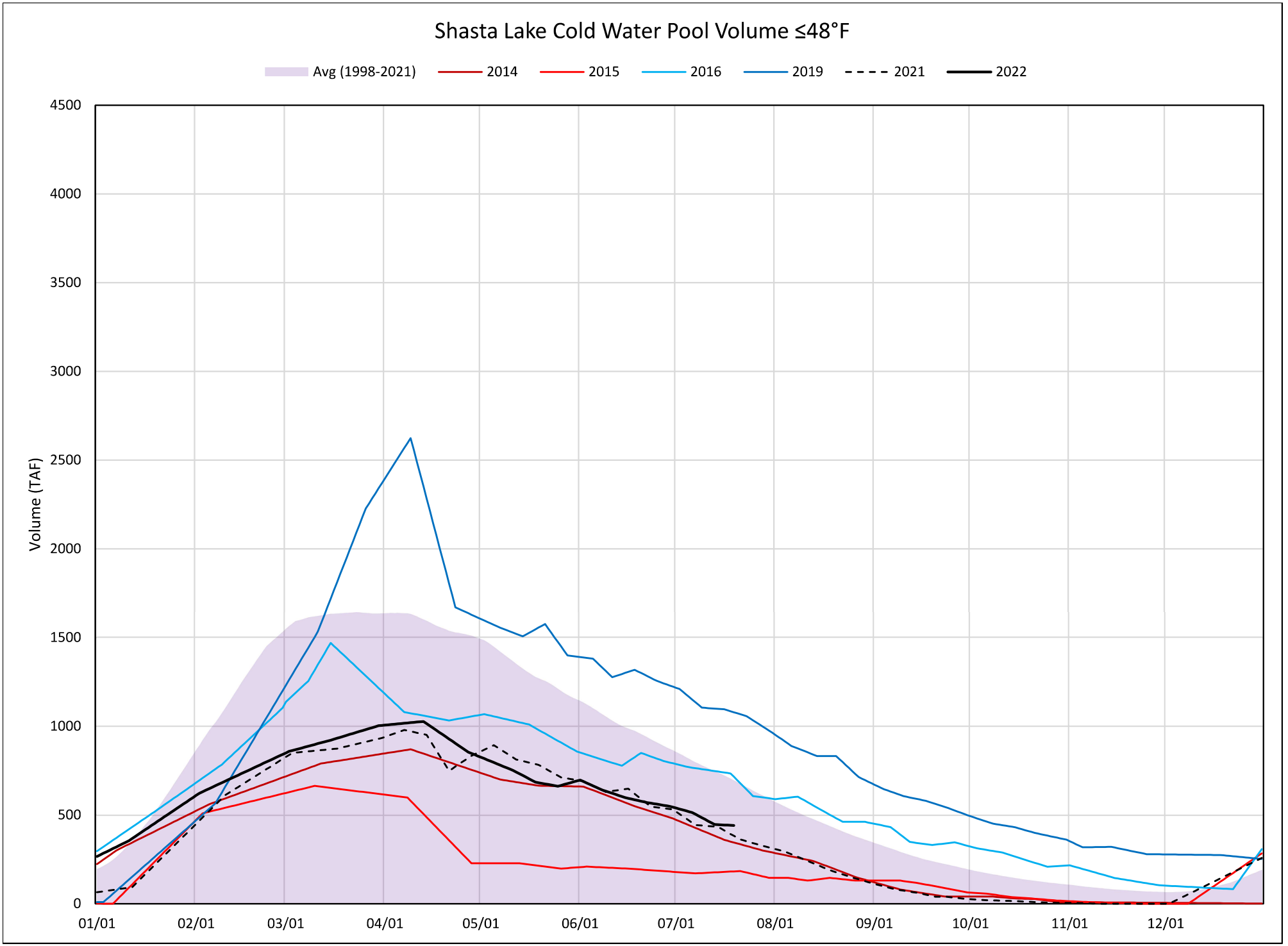
Notes

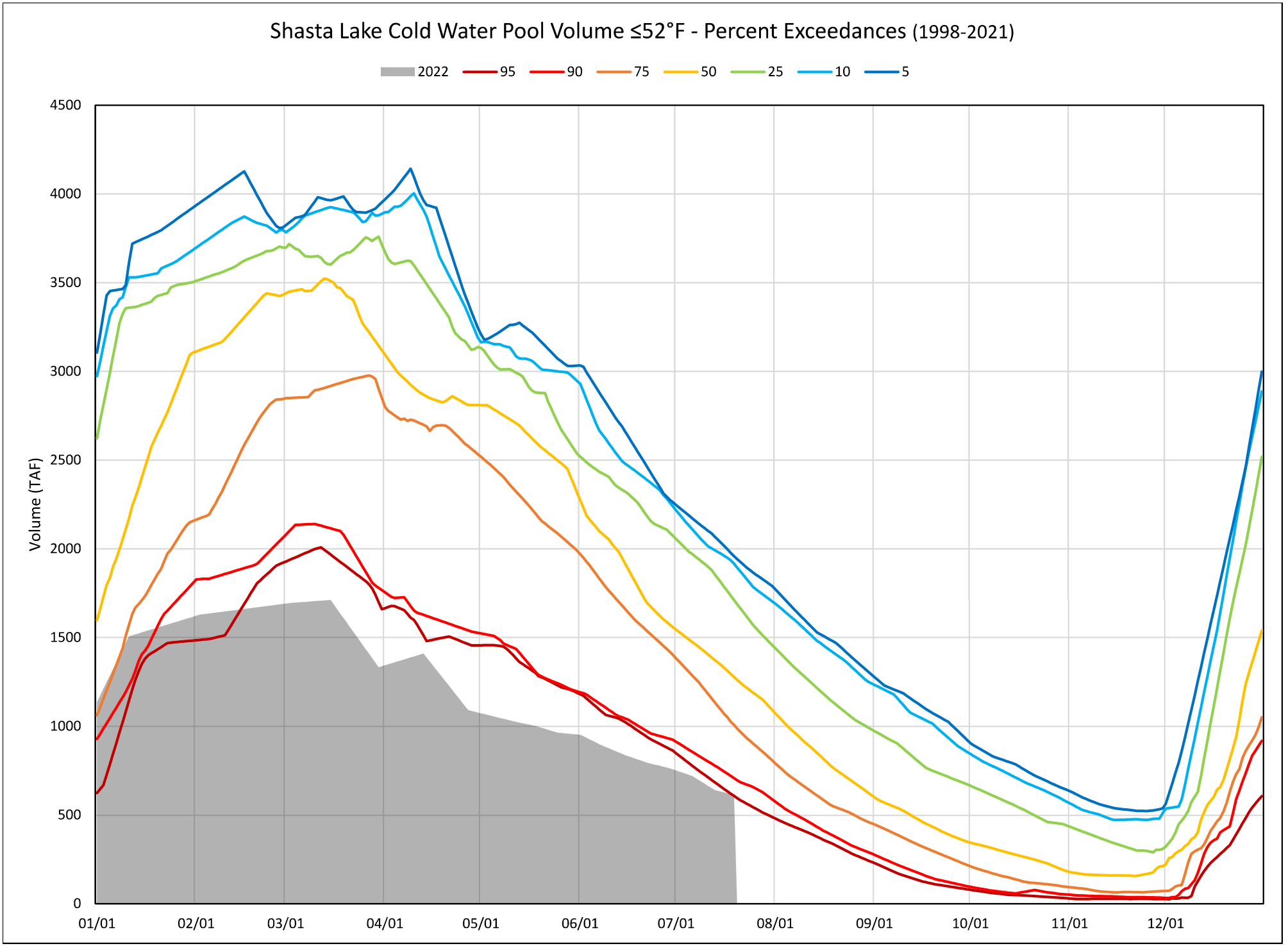
[1] Distances are approximate

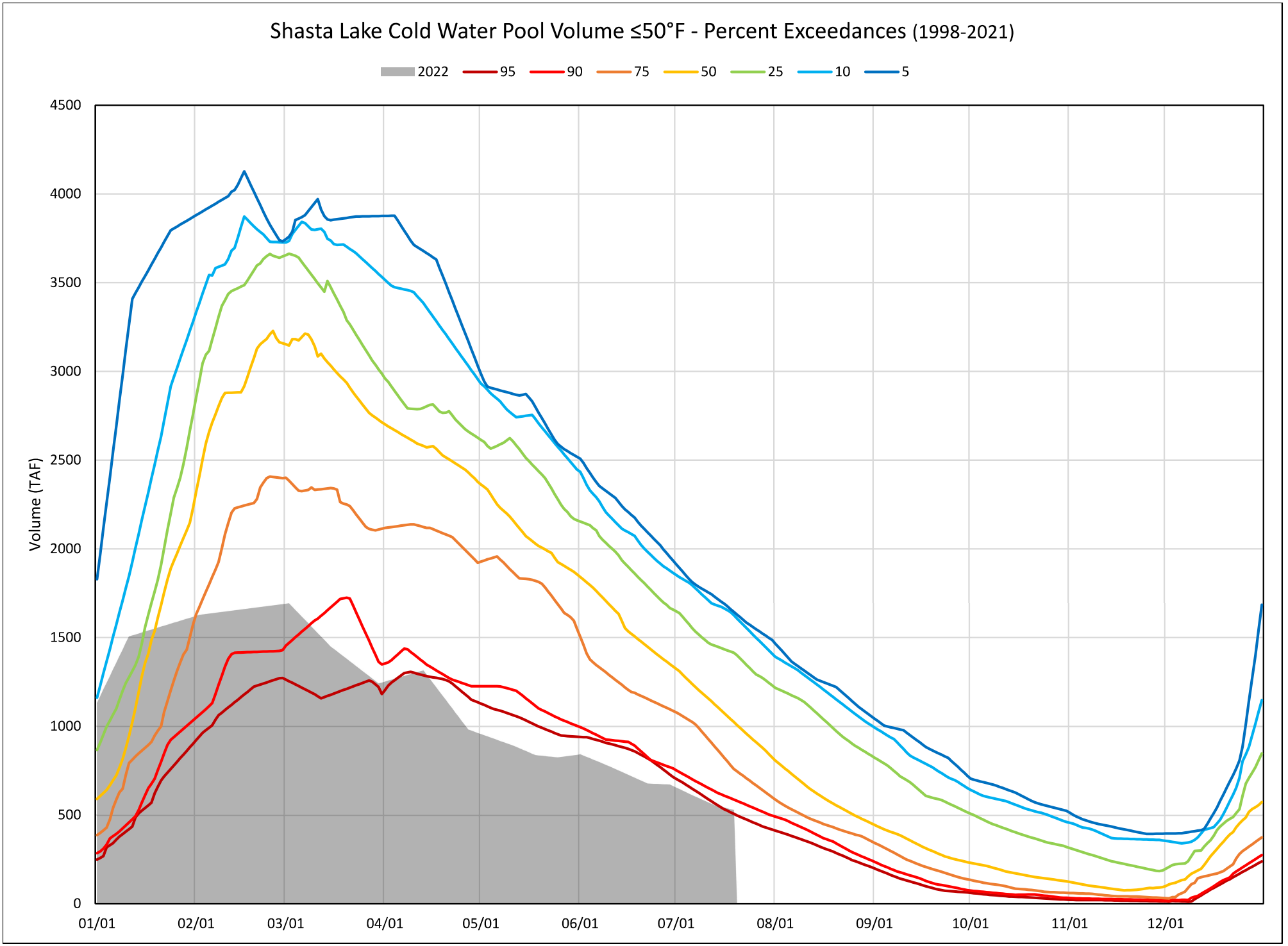

Shasta Lake Isothermobaths Plot - 2022
<46
46-48
48-50
50-52
52-54
54-56
56-58
58-60
60-62
62-64
64-66
66-68
68-70
>70
Storage
Volume (TAF)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

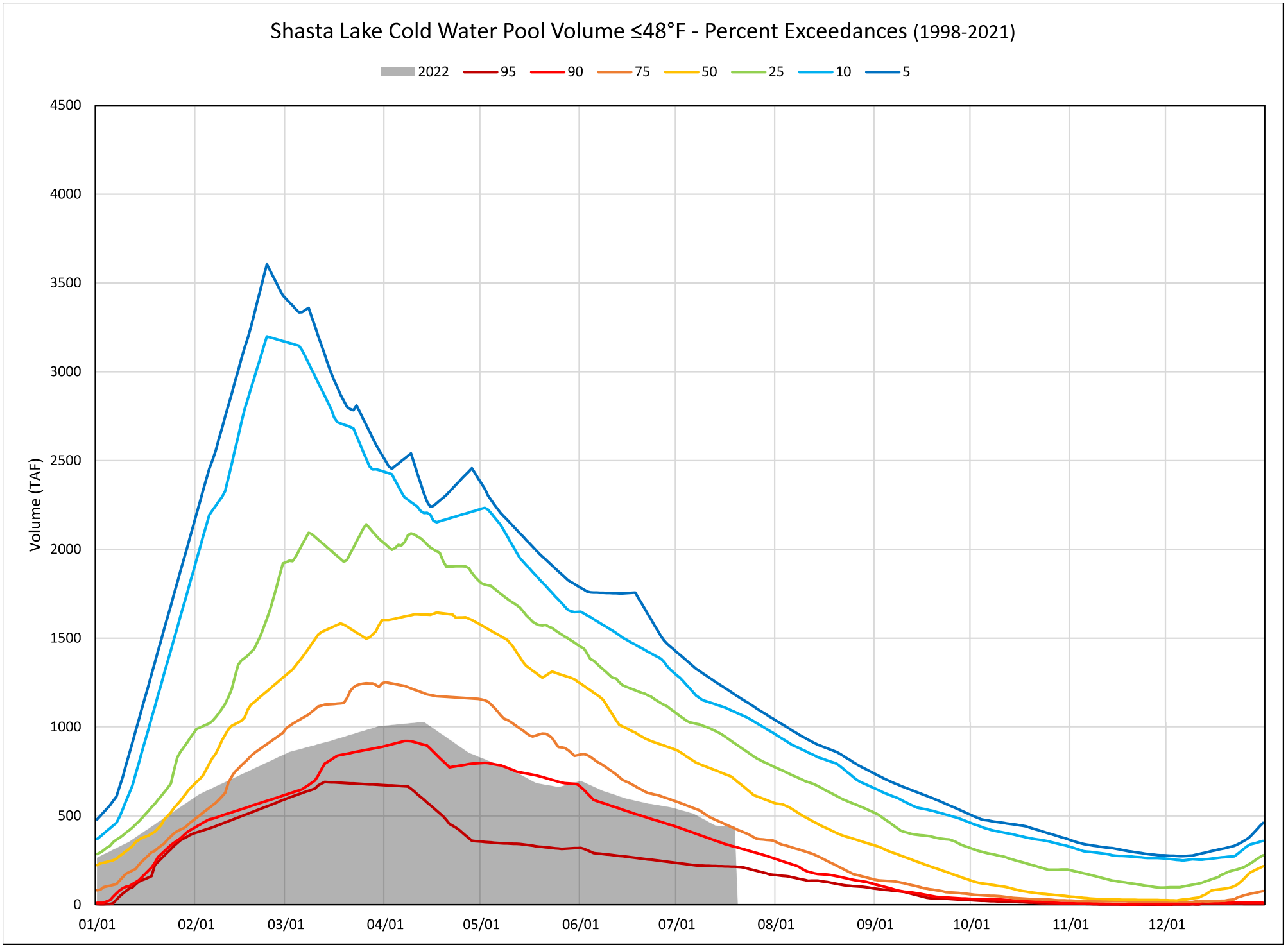

Shasta Lake Cold Water Pool Volume ≤52°F
Avg (1998-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Shasta Lake Cold Water Pool Volume ≤50°F
Avg (1998-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01/01
02/01
03/04
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Shasta Lake Cold Water Pool Volume ≤48°F
Avg (1998-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

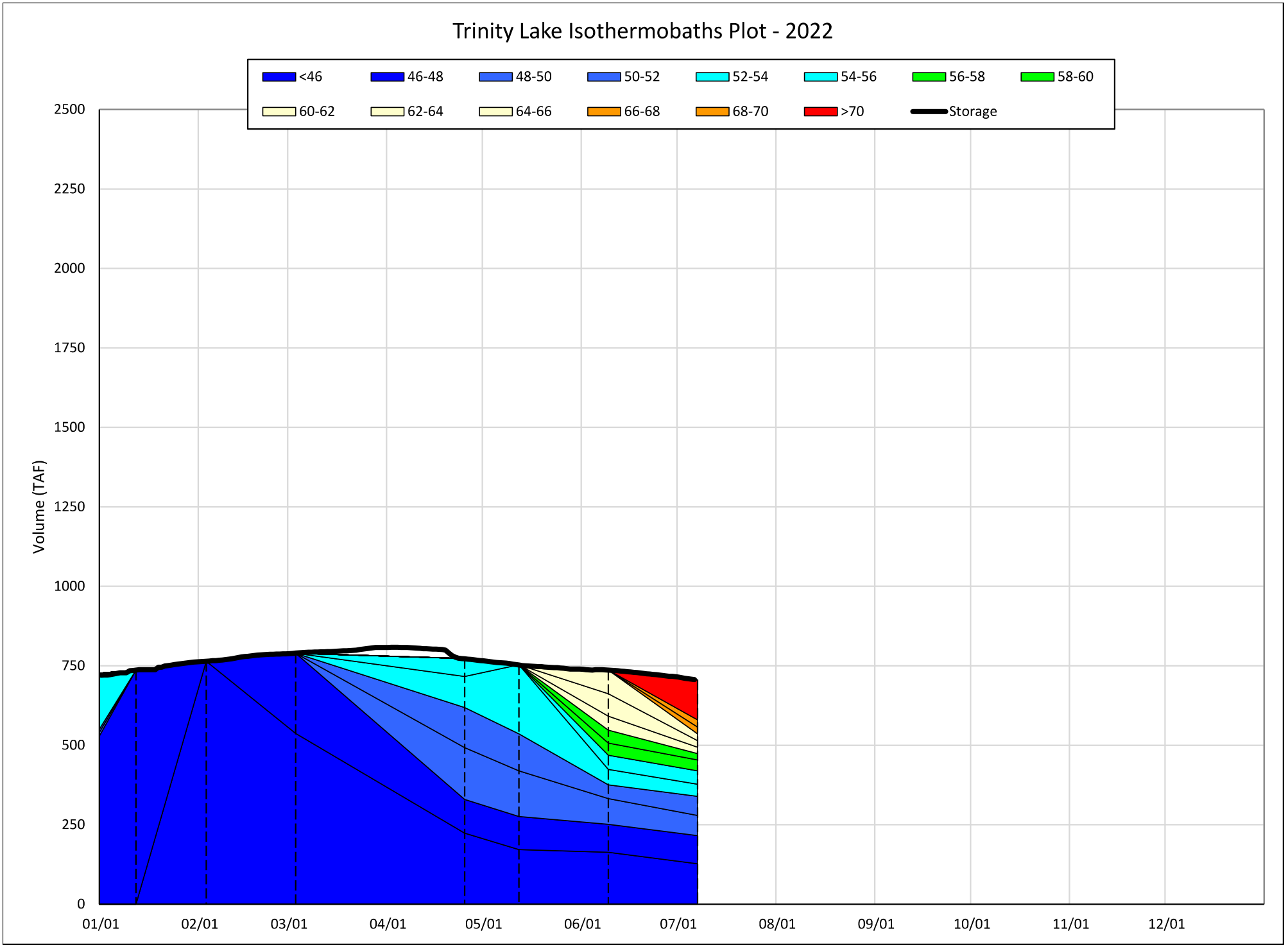

Shasta Lake Cold Water Pool Volume ≤52°F - Percent Exceedances (1998-2021)
2022
95
90
75
50
25
10
5
Volume (TAF)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

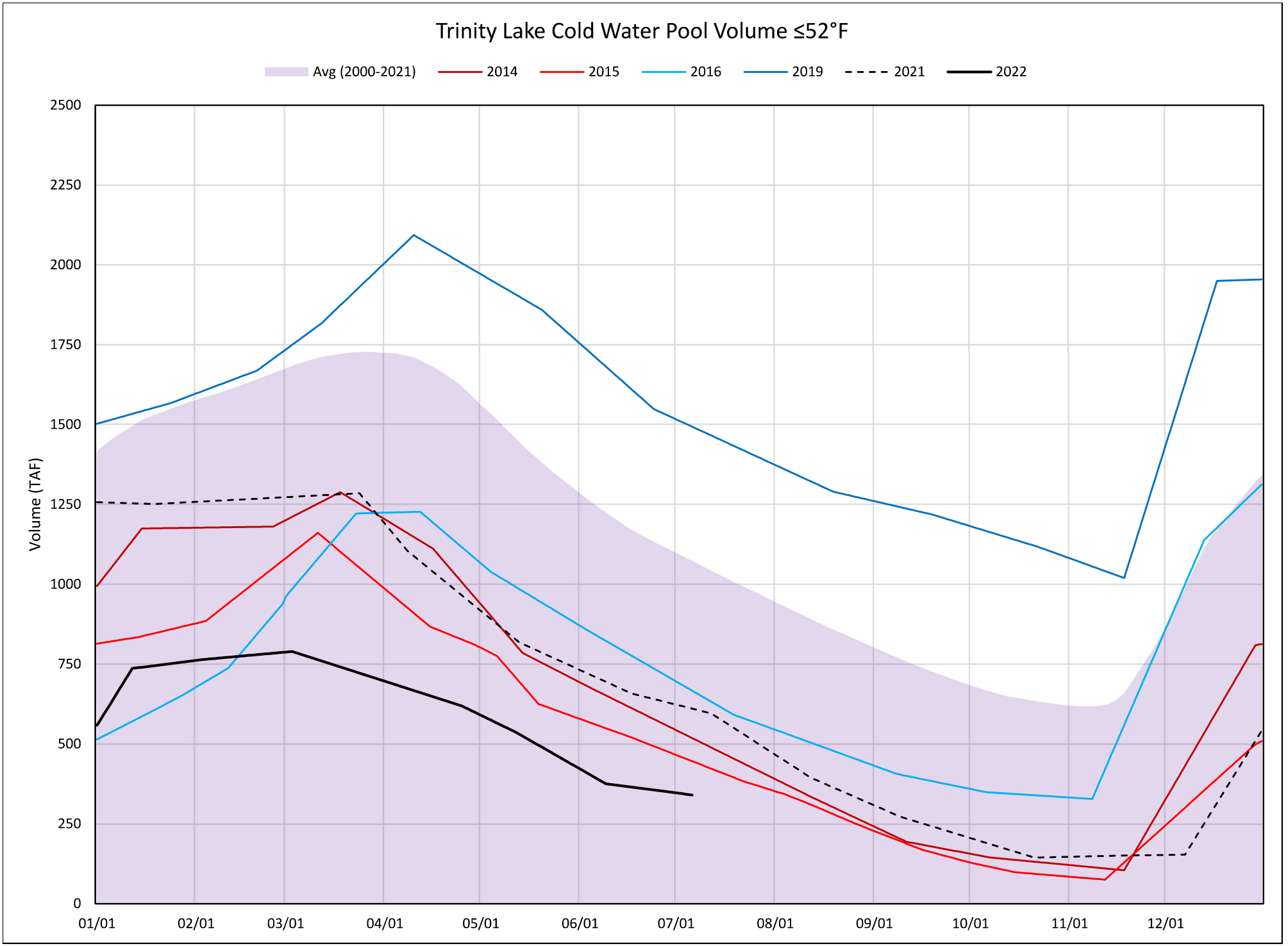

Shasta Lake Cold Water Pool Volume ≤50°F - Percent Exceedances (1998-2021)
2022
95
90
75
50
25
10
5
Volume (TAF)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

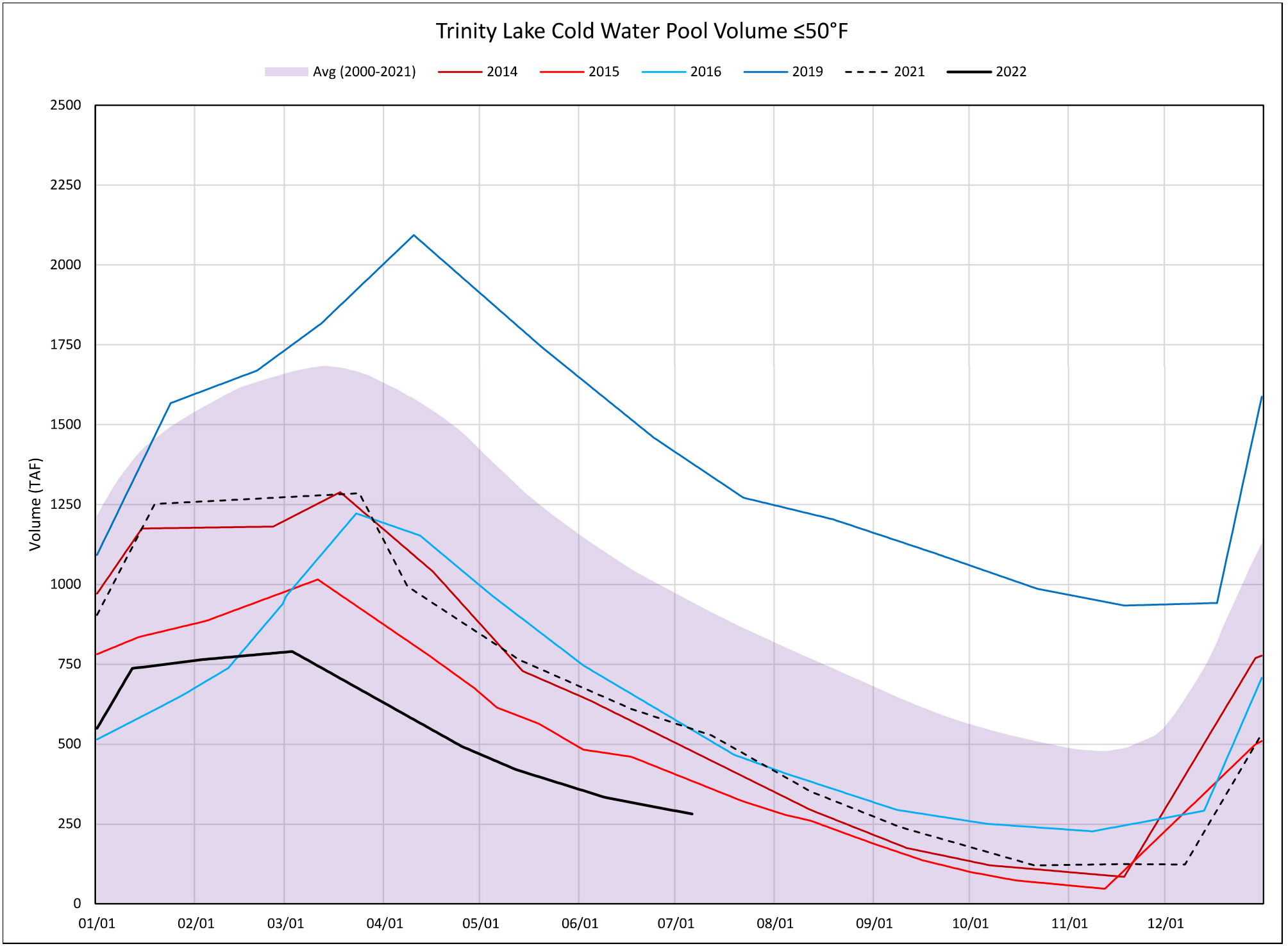

Shasta Lake Cold Water Pool Volume ≤48°F - Percent Exceedances (1998-2021)
2022
95
90
75
50
25
10
5
Volume (TAF)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

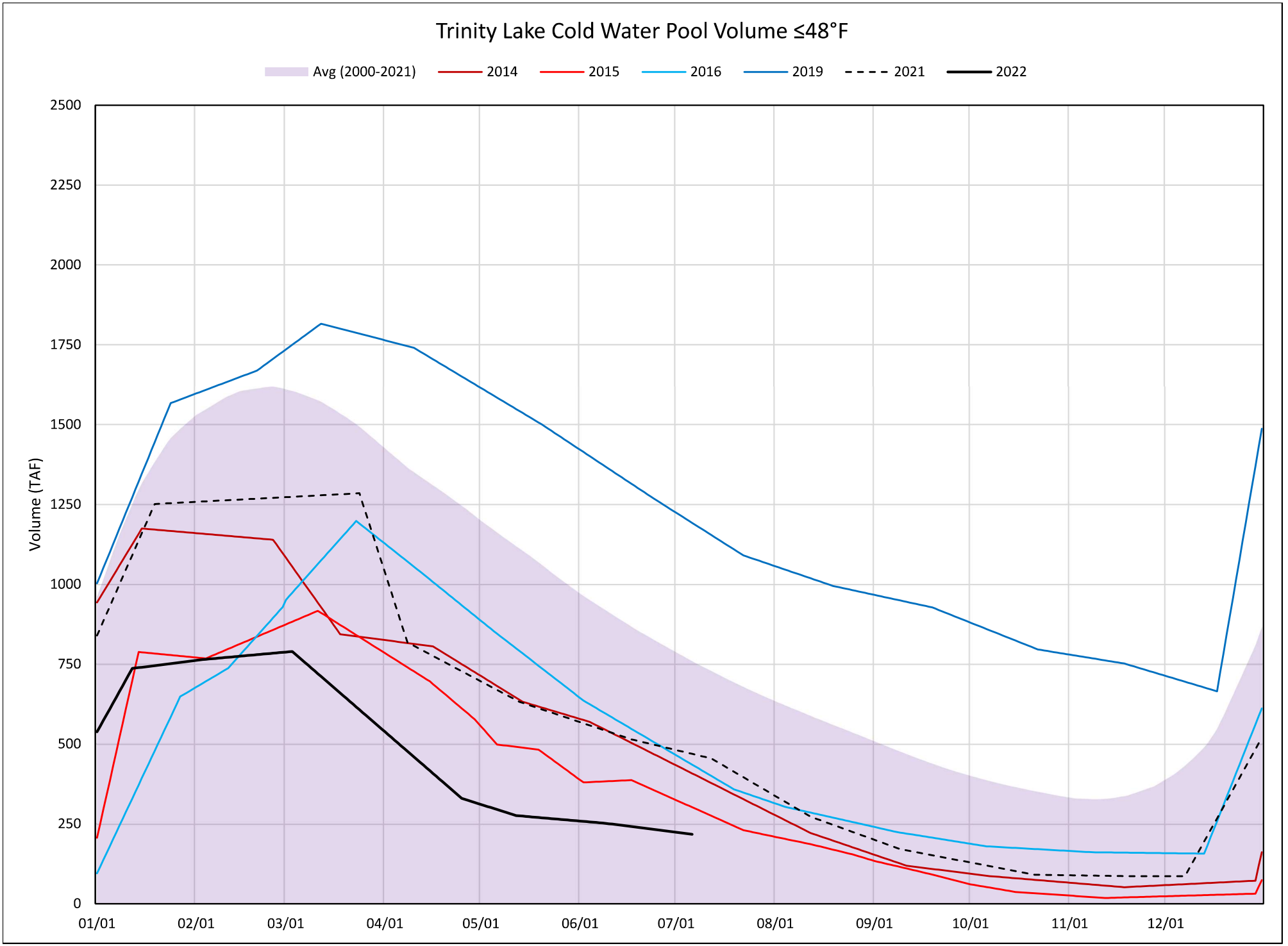
Shasta Lake Cold Water Pool Comparison by Year (July 20, 2022)

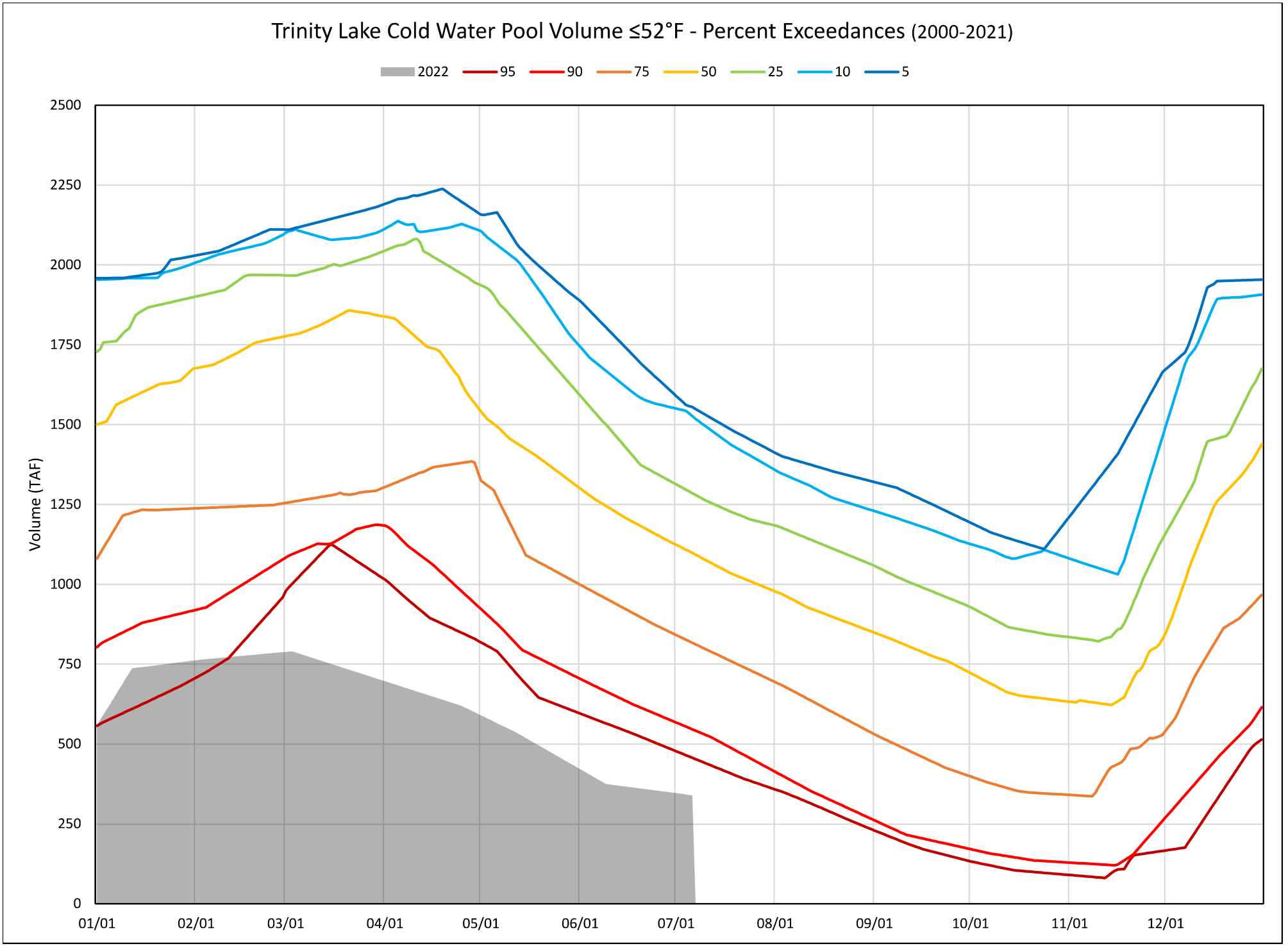
Jul-20 2022	Difference in TAF: ≤ 52°F	Difference in TAF: ≤ 50°F	Difference in TAF: ≤ 48°F	Difference in TAF: Absolute Average	Percent Difference: ≤ 52°F	Percent Difference: ≤ 50°F	Percent Difference: ≤ 48°F	Percent Difference: Absolute Average
1998	789	430	77	432	128	81	17	76
1999	938	828	652	806	153	156	148	152
2000	618	368	-31	339	101	69	-7	59
2001	532	502	378	471	87	95	86	89
2002	811	697	450	653	132	132	102	122
2003	685	197	-133	338	111	37	-30	60
2004	390	287	150	276	63	54	34	51
2005	375	210	-71	219	61	40	-16	39
2006	995	773	436	734	162	146	99	136
2007	569	531	412	504	93	100	93	95
2008	219	205	182	202	36	39	41	38
2009	401	356	256	338	65	67	58	64
2010	1190	910	474	858	194	172	108	158
2011	1345	1110	774	1077	219	210	176	201
2012	1133	1022	555	904	184	193	126	168
2013	545	485	339	456	89	92	77	86
2014	-10	-35	-96	47	-2	-7	-22	10
2015	184	102	-259	182	30	19	-59	36
2016	1261	1081	275	873	205	204	62	157
2017	1203	903	493	866	196	170	112	159
2018	988	741	176	635	161	140	40	114
2019	1344	1116	638	1033	219	211	145	191
2020	645	444	50	380	105	84	11	67
2021	4	12	-58	25	1	2	-13	5
2022	0	0	0	0	0	0	0	0

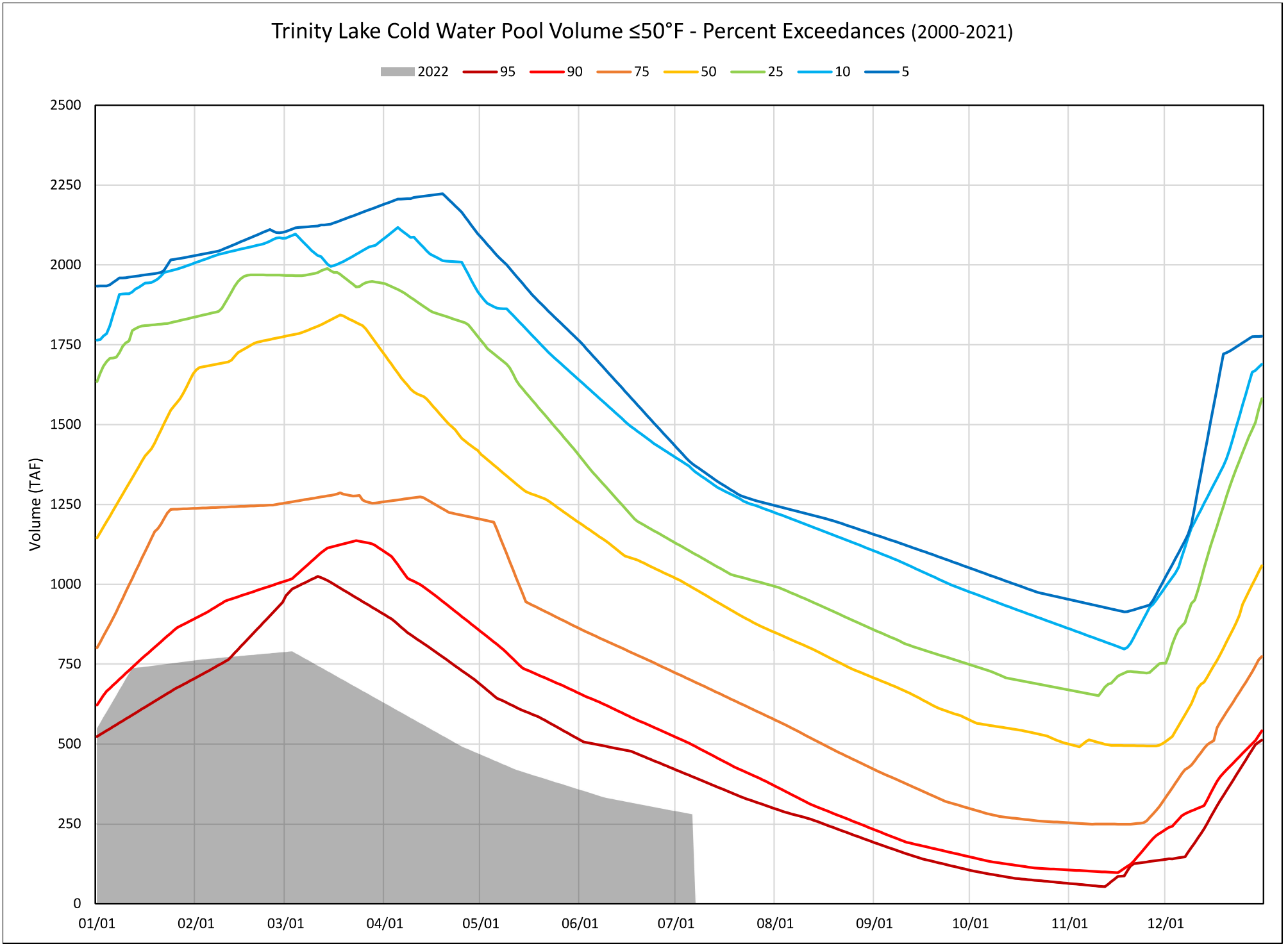

Trinity Lake Isothermobaths Plot - 2022
<46
46-48
48-50
50-52
52-54
54-56
56-58
58-60
60-62
62-64
64-66
66-68
68-70
>70
Storage
Volume (TAF)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

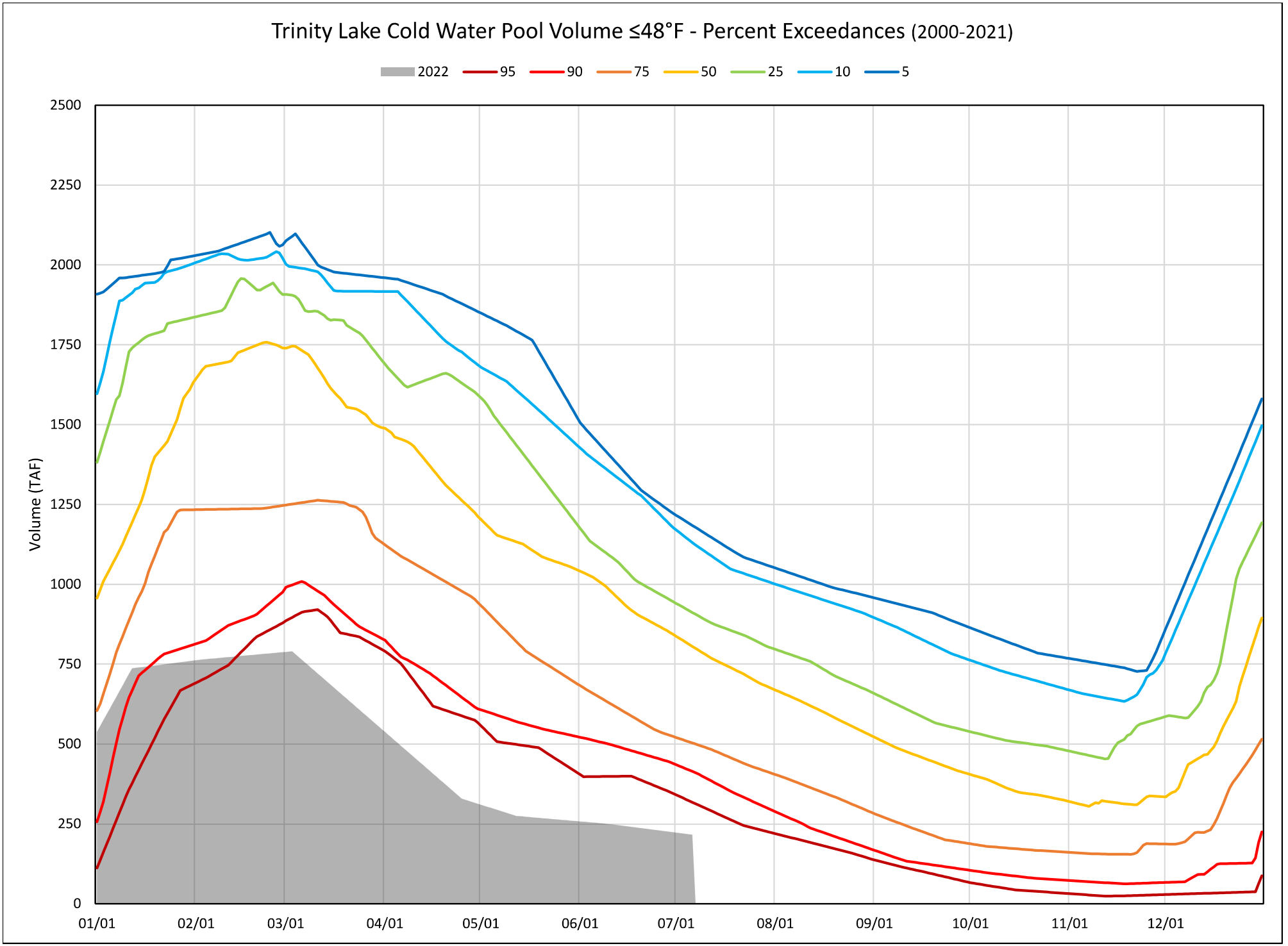

Trinity Lake Cold Water Pool Volume ≤52°F
Avg (2000-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Trinity Lake Cold Water Pool Volume ≤50°F
Avg (2000-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Trinity Lake Cold Water Pool Volume ≤48°F
Avg (2000-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

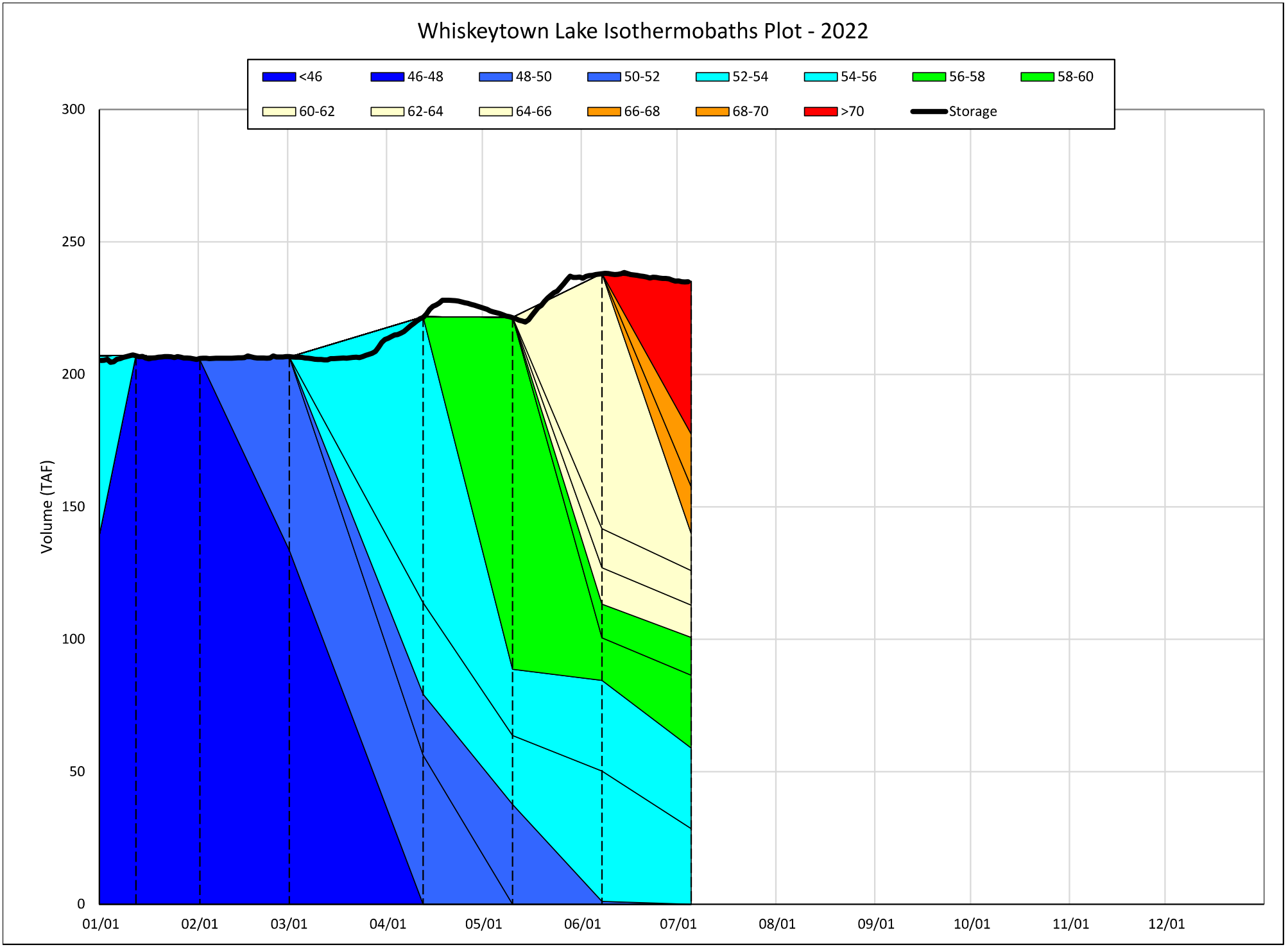

Trinity Lake Cold Water Pool Volume ≤52°F - Percent Exceedances (2000-2021)
2022
95
90
75
50
25
10
5
Volume (TAF)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

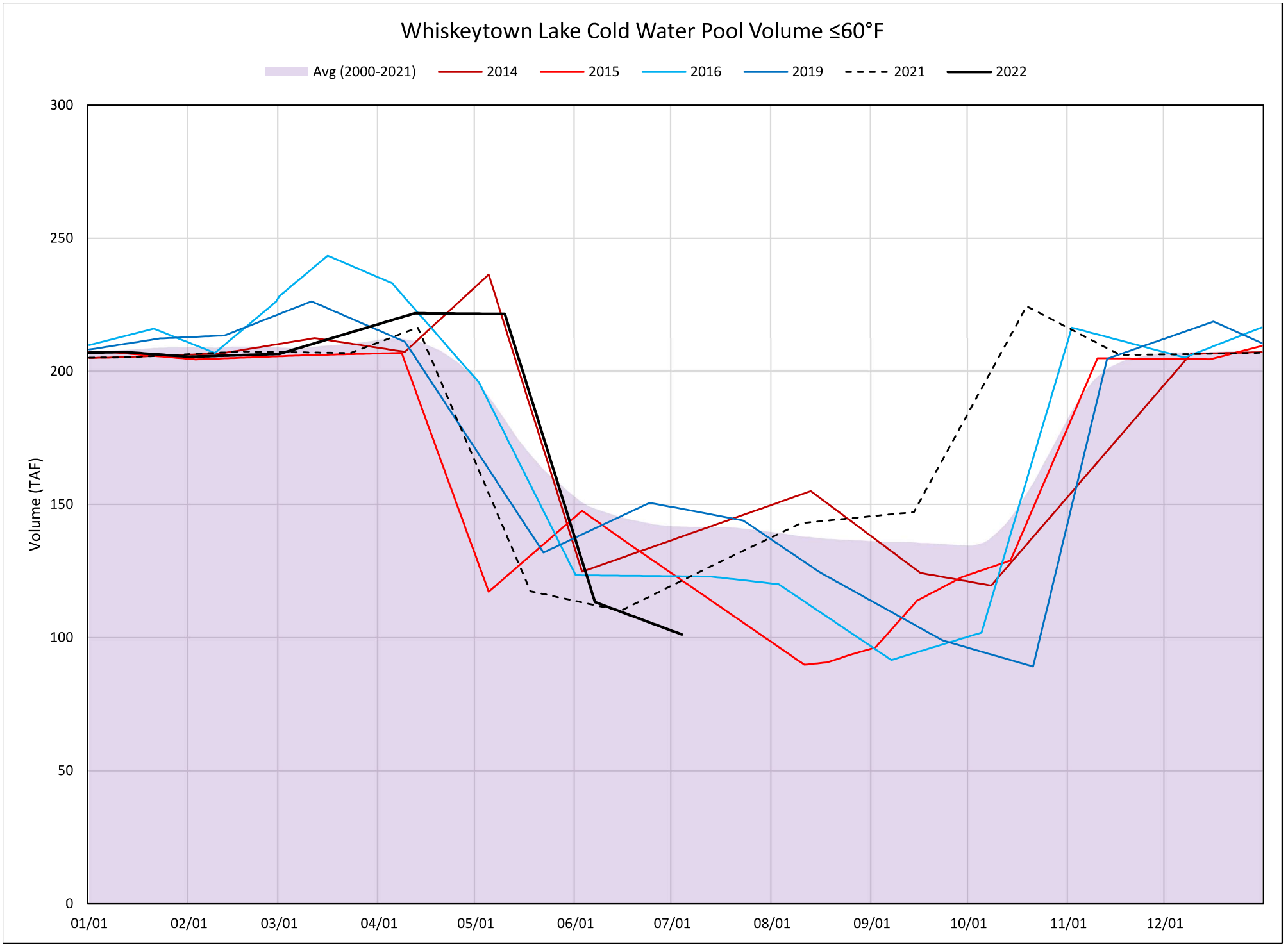

Trinity Lake Cold Water Pool Volume ≤50°F - Percent Exceedances (2000-2021)
2022
95
90
75
50
25
10
5
Volume (TAF)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

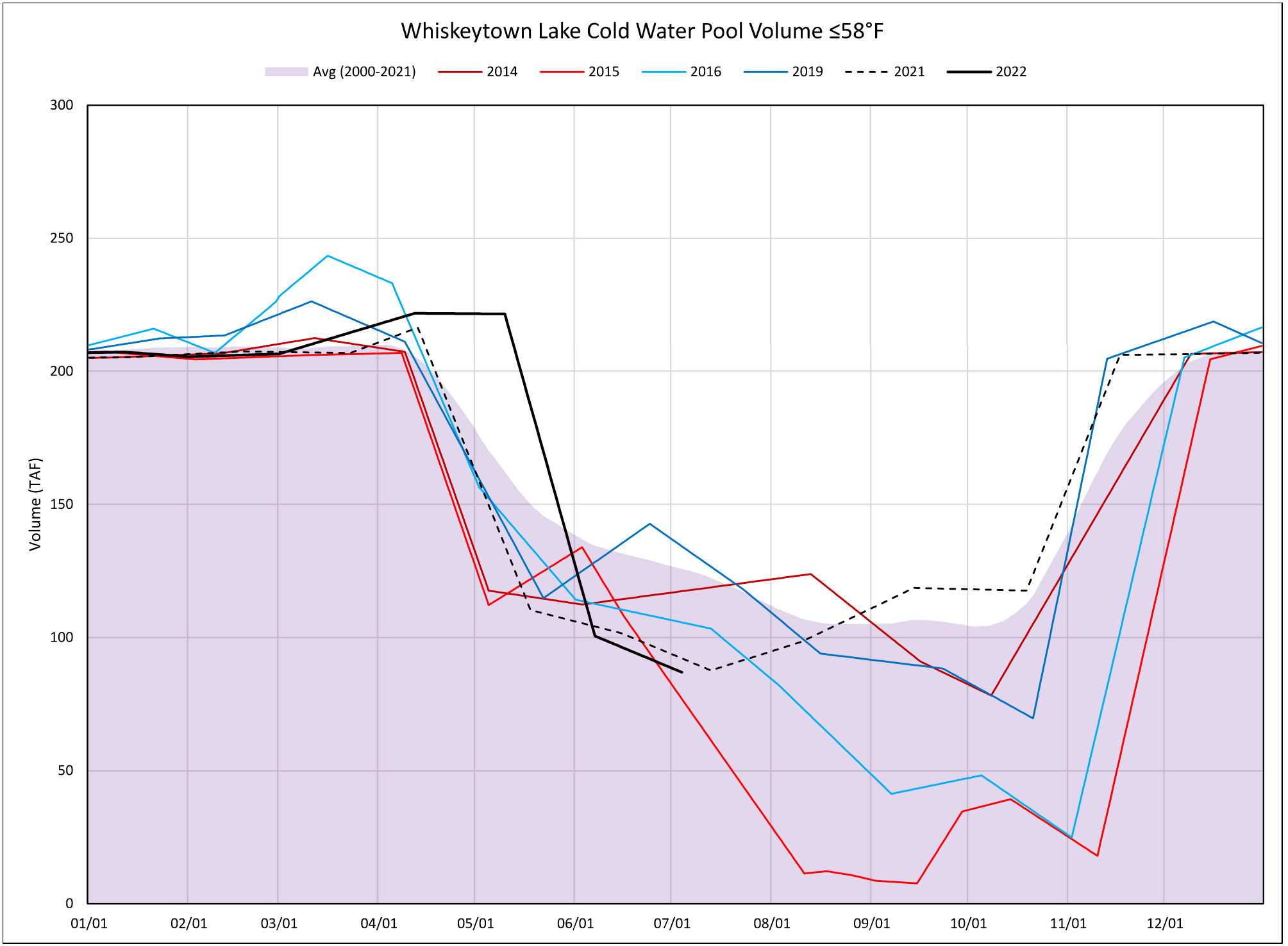

Trinity Lake Cold Water Pool Volume ≤48°F - Percent Exceedances (2000-2021)
2022
95
90
75
50
25
10
5
Volume (TAF)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

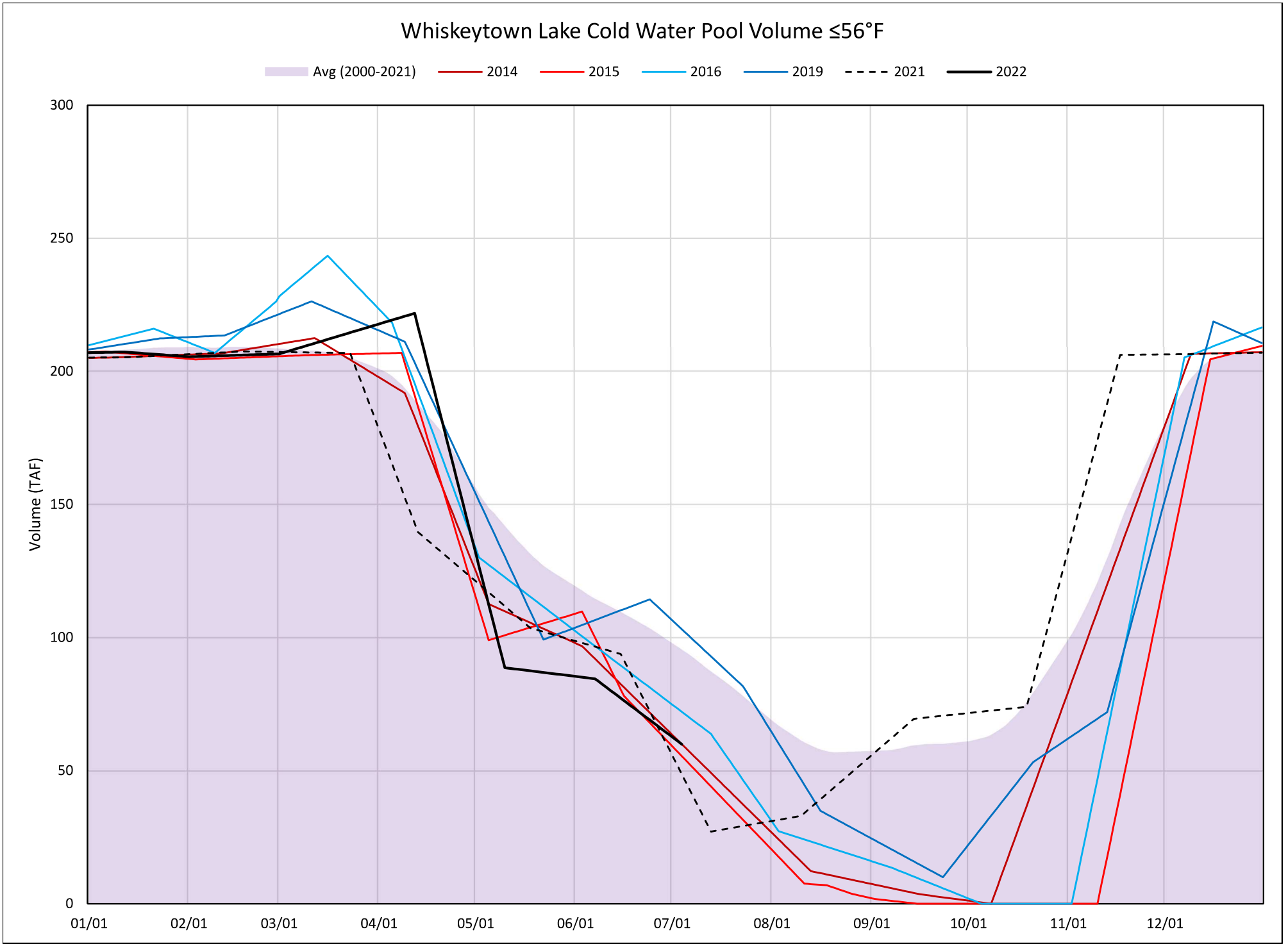
Trinity Cold Water Pool Comparison by Year (July 07, 2022)

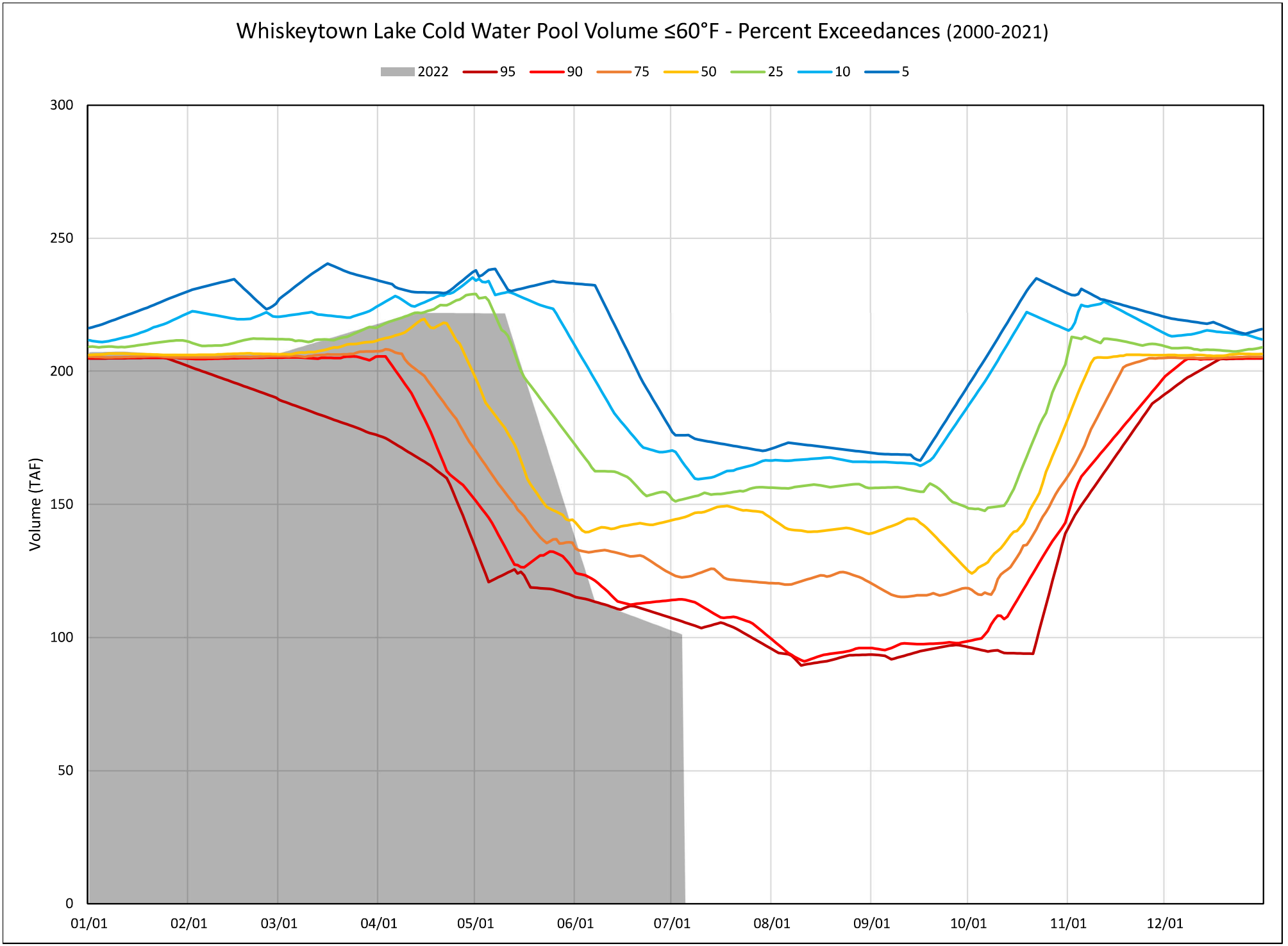
Jul- 07 2022	Difference in TAF: ≤ 52°F	Difference in TAF: ≤ 50°F	Difference in TAF: ≤ 48°F	Difference in TAF: Absolute Average	Percent Difference: ≤ 52°F	Percent Difference: ≤ 50°F	Percent Difference: ≤ 48°F	Percent Difference: Absolute Average
2000	903	784	640	776	265	279	295	280
2001	754	691	611	685	221	246	281	250
2002	719	695	623	679	211	248	287	249
2003	1128	924	719	924	332	329	331	331
2004	815	723	566	702	239	258	261	253
2005	892	745	467	702	262	265	215	248
2006	1201	1094	889	1061	353	390	409	384
2007	762	737	681	727	224	263	313	267
2008	516	455	297	423	152	162	137	150
2009	358	305	212	292	105	109	98	104
2010	722	613	366	567	212	218	169	200
2011	1217	1048	818	1027	358	373	376	369
2012	1055	1035	924	1005	310	368	425	368
2013	644	614	510	589	189	219	235	214
2014	178	197	191	188	52	70	88	70
2015	106	103	85	98	31	37	39	36
2016	326	263	218	269	96	94	100	97
2017	908	776	650	778	267	276	299	281
2018	789	757	687	744	232	270	316	272
2019	1153	1098	975	1075	339	391	449	292
2020	684	674	551	636	201	240	254	232
2021	270	266	252	263	79	95	116	97
2022	0	0	0	0	0	0	0	0

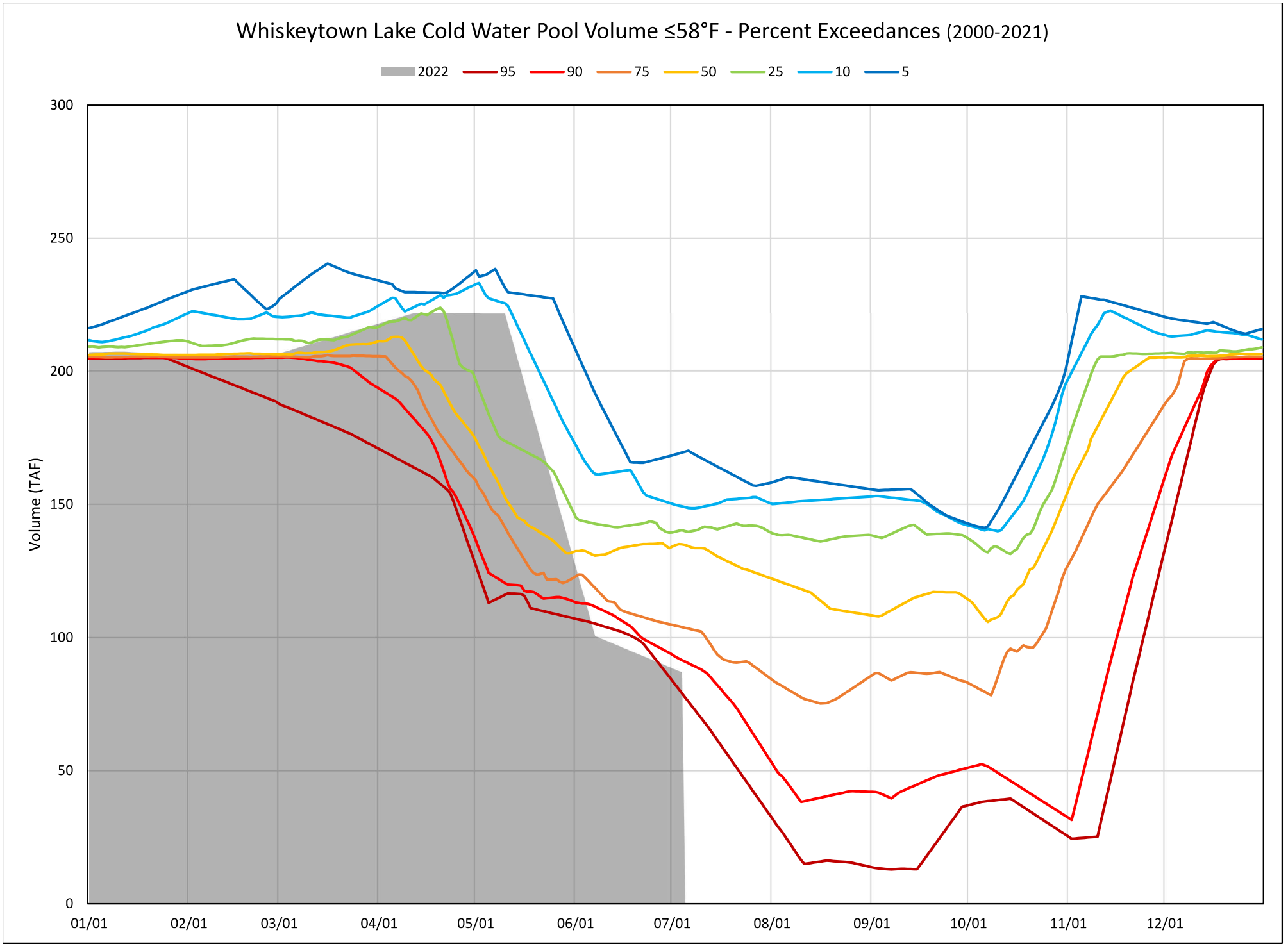

Whiskeytown Lake Isothermobaths Plot - 2022
<46
46-48
48-50
50-52
52-54
54-56
56-58
58-60
60-62
62-64
64-66
66-68
68-70
>70
Storage
Volume (TAF)
300
250
200
150
100
50
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

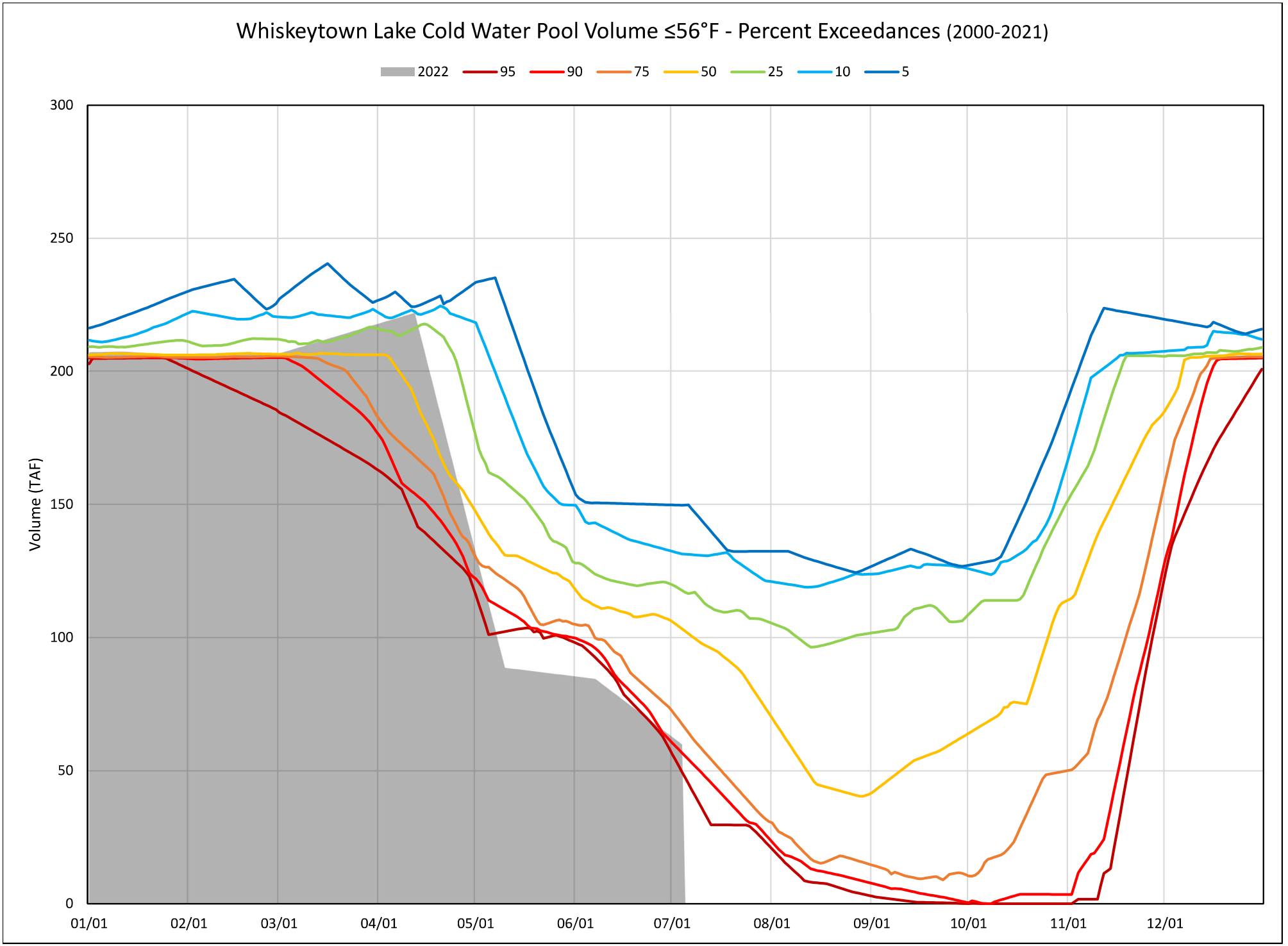

Whiskeytown Lake Cold Water Pool Volume ≤60°F
Avg (2000-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
300
250
200
150
100
50
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Whiskeytown Lake Cold Water Pool Volume ≤58°F
Avg (2000-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
300
250
200
150
100
50
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Whiskeytown Lake Cold Water Pool Volume ≤56°F
Avg (2000-2021)
2014
2015
2016
2019
2021
2022
Volume (TAF)
300
250
200
150
100
50
0
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Whiskeytown Lake Cold Water Pool Volume ≤60°F - Percent Exceedances (2000-2021)
2022
95
90
75
50
25
10
5
300
250
200
150
100
50
0
Volume (TAF)
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Whiskeytown Lake Cold Water Pool Volume ≤58°F - Percent Exceedances (2000-2021)
2022
95
90
75
50
25
10
5
300
250
200
150
100
50
0
Volume (TAF)
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01


Whiskeytown Lake Cold Water Pool Volume ≤56°F - Percent Exceedances (2000-2021)
2022
95
90
75
50
25
10
5
300
250
200
150
100
50
0
Volume (TAF)
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01

Whiskeytown Cold Water Pool Comparison by Year (July 05, 2022)

Jul- 05 2022	Difference in TAF: ≤ 52°F	Difference in TAF: ≤ 50°F	Difference in TAF: ≤ 48°F	Difference in TAF: Absolute Average	Percent Difference: ≤ 52°F	Percent Difference: ≤ 50°F	Percent Difference: ≤ 48°F	Percent Difference: Absolute Average
2000	49.4	53.5	63.7	55.5	48.9	61.6	106.3	72.3
2001	44.3	48.9	46.3	46.5	43.8	56.3	77.3	59.1
2002	44.1	49.3	48.3	47.2	43.6	56.7	80.7	60.3
2003	54.4	53.3	56.7	54.8	53.8	61.4	94.7	69.9
2004	42.9	48.9	61.2	51.0	42.5	56.2	102.1	66.9
2005	10.4	9.0	1.7	7.0	10.2	10.4	2.9	7.8
2006	75.9	86.1	93.0	85.0	75.1	99.1	155.3	109.8
2007	43.6	49.8	43.6	45.6	43.1	57.2	72.8	57.7
2008	48.0	51.9	50.8	50.2	47.5	59.7	84.8	64.0
2009	19.9	4.3	1.2	8.5	19.6	5.0	2.0	8.9
2010	42.9	33.6	9.5	28.7	42.5	38.6	15.9	32.3
2011	68.9	61.9	54.3	61.7	68.1	71.2	90.6	76.6
2012	35.6	32.5	18.4	28.9	35.2	37.4	30.7	34.5
2013	55.7	59.7	71.5	62.3	55.1	68.7	119.4	81.1
2014	36.8	30.5	0.0	22.4	36.4	35.1	-0.1	23.8
2015	20.3	-10.0	-4.5	11.6	20.1	-11.5	-7.5	13.1
2016	21.9	18.8	12.2	17.6	21.6	21.6	20.3	21.2
2017	56.1	62.5	71.5	63.4	55.5	72.0	119.3	82.3
2018	49.5	44.3	18.6	37.4	48.9	51.0	31.0	43.6
2019	47.2	47.3	43.2	45.9	46.7	54.4	72.1	57.7
2020	4.0	11.7	32.4	16.0	3.9	13.4	54.1	23.8
2021	20.3	5.2	-11.4	12.3	20.0	6.0	-19.0	15.0
2022	0	0	0	0	0	0	0	0

Estimated CVP Operations 90% Exceedance

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

NA	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Trinity	716	660	577	495	471	456	450	460	497	562	591	640	658
Trinity Elev.	NA	2211	2198	2184	2179	2176	2175	2177	2184	2196	2200	2208	2211
Whiskeytown	235	238	238	238	206	206	206	206	206	206	238	238	238
Whiskeytown Elev.	NA	1209	1209	1209	1199	1199	1199	1199	1199	1199	1209	1209	1209
Shasta	1777	1521	1521	1521	1450	1485	1544	1662	1860	2187	2273	2143	1867
Shasta Elev.	NA	927	927	927	922	924	928	936	949	968	973	965	949
Folsom	807	386	386	386	298	264	237	232	268	373	423	426	293
Folsom Elev.	NA	401	401	401	387	380	375	274	381	399	406	407	386
New Melones	784	671	671	671	621	628	636	642	639	635	621	599	544
New Melones Elev.	NA	891	891	891	882	883	884	886	885	884	882	878	867
San Luis	256	217	217	217	206	270	397	579	585	573	521	383	175
San Luis Elev.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	4575	4048	3611	3353	3252	3309	3469	3779	4054	4536	4667	4429	3775

State End of the Month Reservoir Storage (TAF)

NA	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Oroville	1721	1389	1257	1207	1185	1182	1222	1332	1477	1697	1862	1825	1596
Oroville Elev.	NA	717	701	694	691	691	696	710	728	752	769	766	741
State San Luis	535	496	462	458	499	590	708	838	798	850	791	724	660
State San Lui Elev.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total San Luis (TAF)	791	702	679	663	705	860	1105	1417	1382	1423	1312	1106	835
San Luis Elev	NA	421	419	417	422	438	463	492	489	493	483	463	436

Monthly River Releases (TAF/cfs)

NA	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Trinity (TAF)	NA	28	53	52	23	18	18	18	17	18	80	92	27
Trinity (cfs)	NA	450	857	857	373	300	300	300	300	300	1347	1498	450
Clear Creek (TAF)	NA	9	9	9	12	12	12	12	11	12	12	12	12
Clear Creek (cfs)	NA	150	150	150	200	200	200	200	200	200	200	200	200
Sacramento (TAF)	NA	277	277	238	200	193	200	200	280	200	357	461	506
Sacramento (cfs)	NA	4,500	4500	4000	3250	3250	3250	3250	3250	3250	6000	7500	8500
American (TAF)	NA	286	252	102	80	78	80	68	67	68	157	172	208
American (cfs)	NA	4646	4099	1717	1304	1304	1303	1100	1211	1102	2640	2795	3494
Stanislaus (TAF)	NA	18	9	9	35	12	12	13	12	12	27	25	12
Stanislaus (cfs)	NA	300	150	150	577	200	200	213	214	200	461	406	200
Feather (TAF)	NA	277	165	120	59	57	59	59	53	59	89	123	238

NA	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Feather (cfs)	NA	4500	2690	2020	960	960	960	960	960	960	1500	2000	4000

Trinity Diversions (TAF)

NA	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Carr PP	33	31	30	9	10	9	5	1	3	29	6	10
Spring Creek PP	20	20	20	30	0	0	0	1	10	0	0	0

Delta Summary (TAF)

NA	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Tracy	163	166	119	107	136	170	200	40	44	42	43	42
USBR Banks	0	0	0	0	0	0	0	0	0	0	0	0
Contra Costa	7.8	7.8	6.5	5.0	2.8	2.7	2.1	2.0	5.2	4.3	6.6	6.8
Total USBR	171	174	126	112	139	1173	202	42	49	46	50	49
State Export	37	22	22	72	111	122	191	17	99	18	18	18
Total Export	208	196	148	184	250	295	393	59	148	64	68	67
COA Balance	0	0	0	0	0	0	0	-35	-77	-62	-43	-24
Vernalis (TAF)	26	17	18	94	74	75	76	82	98	60	59	43
Vernalis (cfs)	430	280	301	1537	1242	1225	1238	1475	1599	1012	956	721
Old/Middle River calc. cfs	-2,999	-2,916	-2,364	-2,203	-3,264	-3,730	-4,957	-744	-1,727	-961	-1,012	-1,130
Computed DOI	4652	3644	3009	3237	3496	3497	6409	11400	11403	9497	7109	7144
Excess Outflow	0	0	0	0	0	0	0	0	0	0	0	0
% Export/Inflow	26%	29%	30%	38%	49%	54%	53%	8%	18%	9%	10%	8%
% Export/inflow std.	65%	65%	65%	65%	65%	65%	65%	45%	35%	35%	35%	35%

TDM Modeling

July 28, 2022
SWFSC
DRAFT

Additional information available at:

https://oceanview.pfeg.noaa.gov/CVTEMP/download

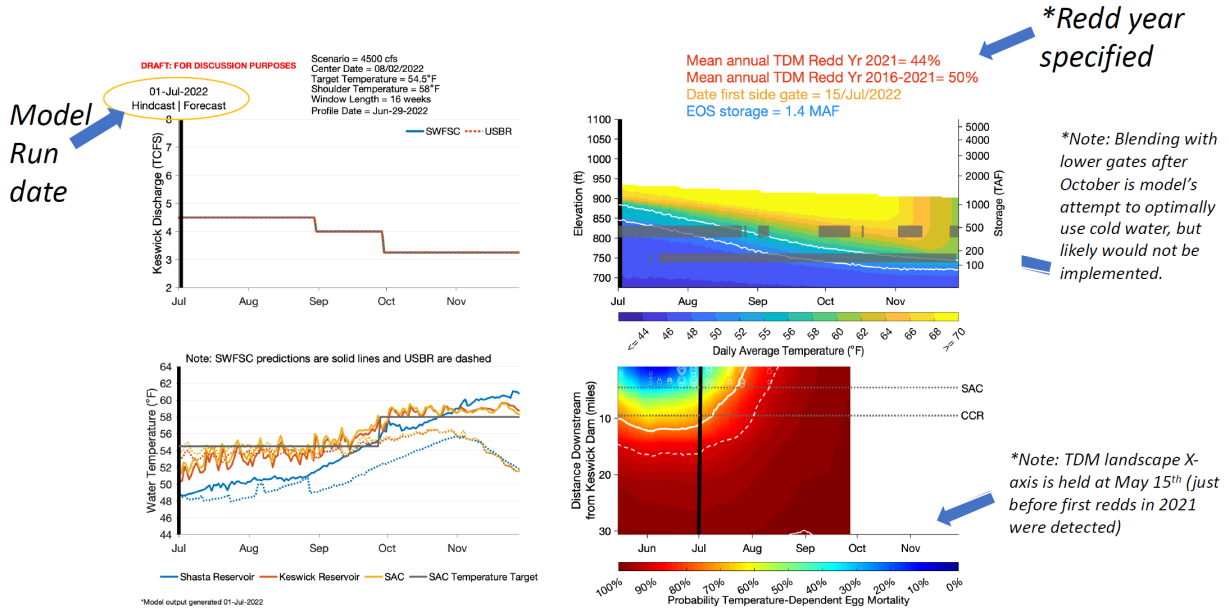
DRAFT - Preliminary Results - For Discussion Purposes Only

Planning Phase Outputs

Modeling Assumptions

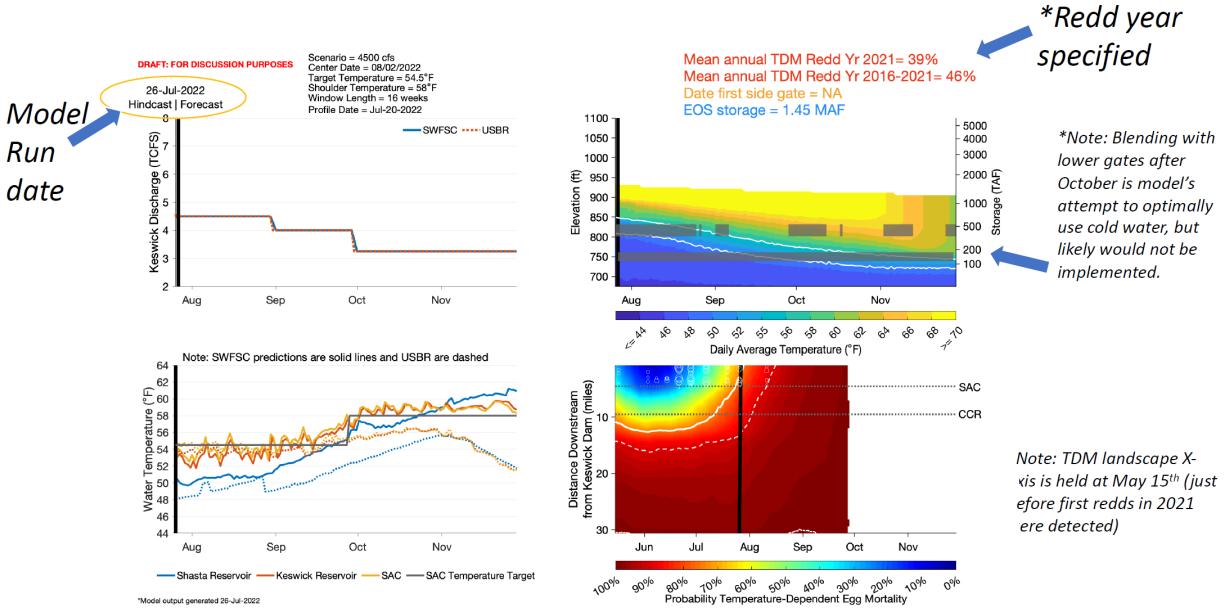
1. May 99% B120 Exceedance Forecast Shasta Inflow
2. July 20 Shasta initial profile
3. 2015 meteorology
4. Spring Creek PP contributions to Keswick as provided in USBR 90% exceedance operational outlook from June 2
5. SAC gage temperature target location (achieving target NOT guaranteed)
6. Redds distributed 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 June 2 scenario.

Model Outputs (Last meeting's)



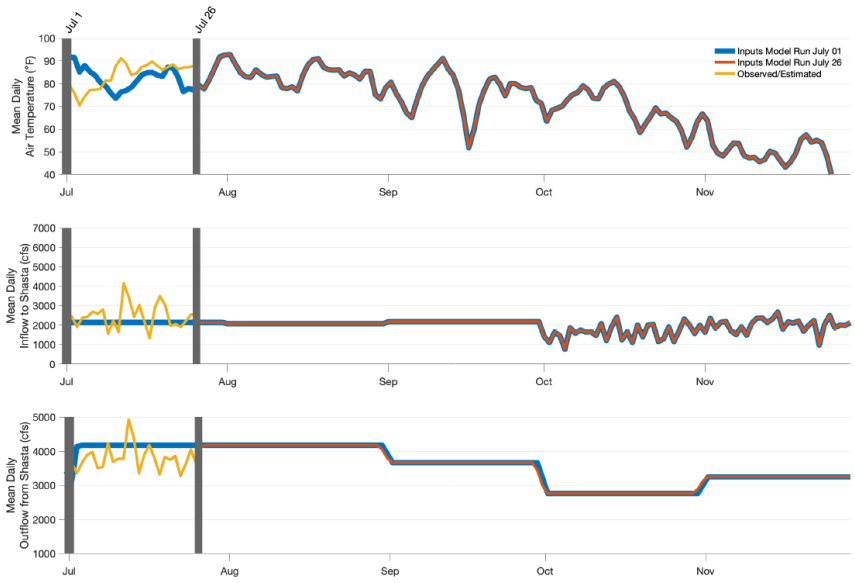
DRAFT - Preliminary Results - For Discussion Purposes Only

Model Outputs (Scenario 1, 54.5F Target)



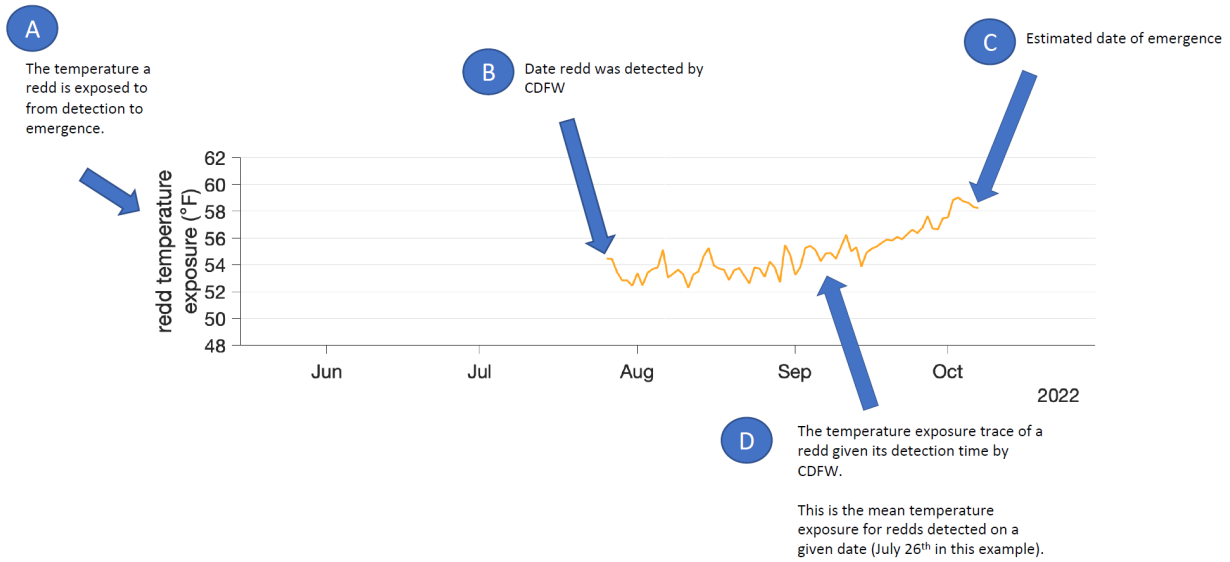
Example of what has changed between model runs

- Observed air temperature not identical to forecast
- Observed inflow a little higher than forecast.
- Observed outflow less than forecast

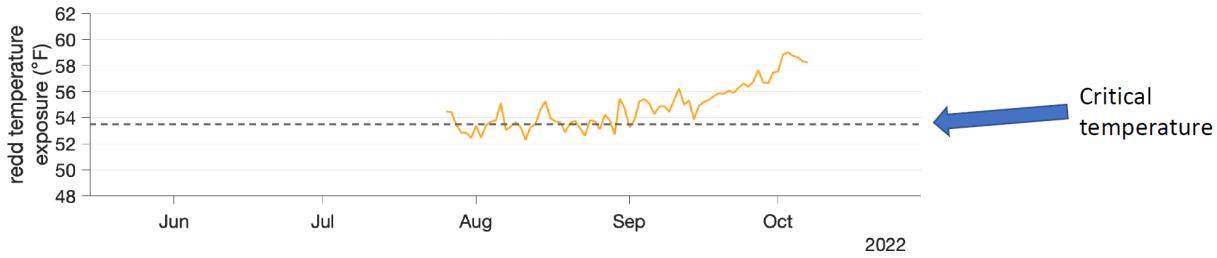


How Updates to Model Have Changed Redd Temperature Exposure This Season

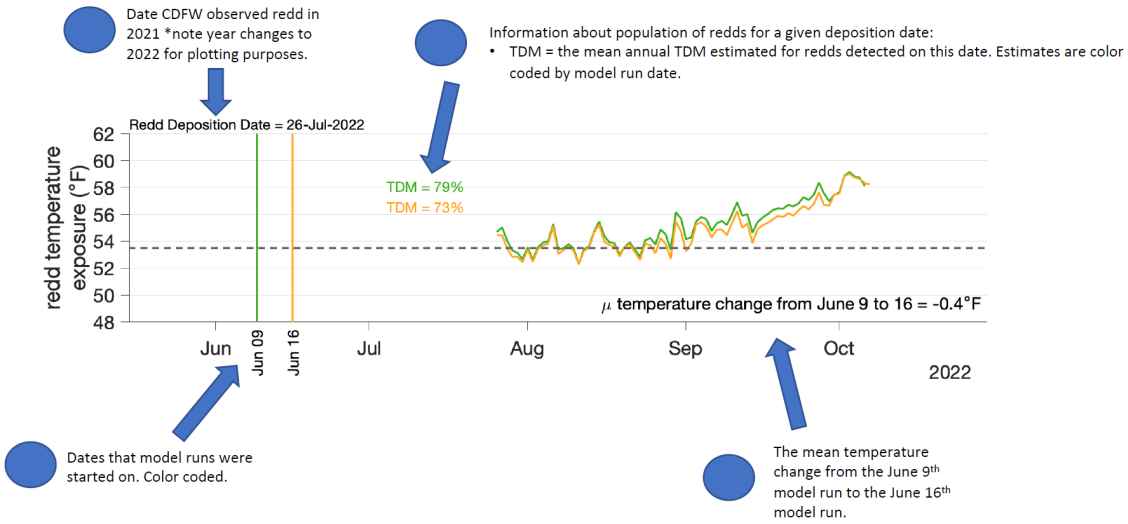
We can plot the temperature exposure of a Redd



Only changes in temperature exposure above ~53.5F will affect TDM



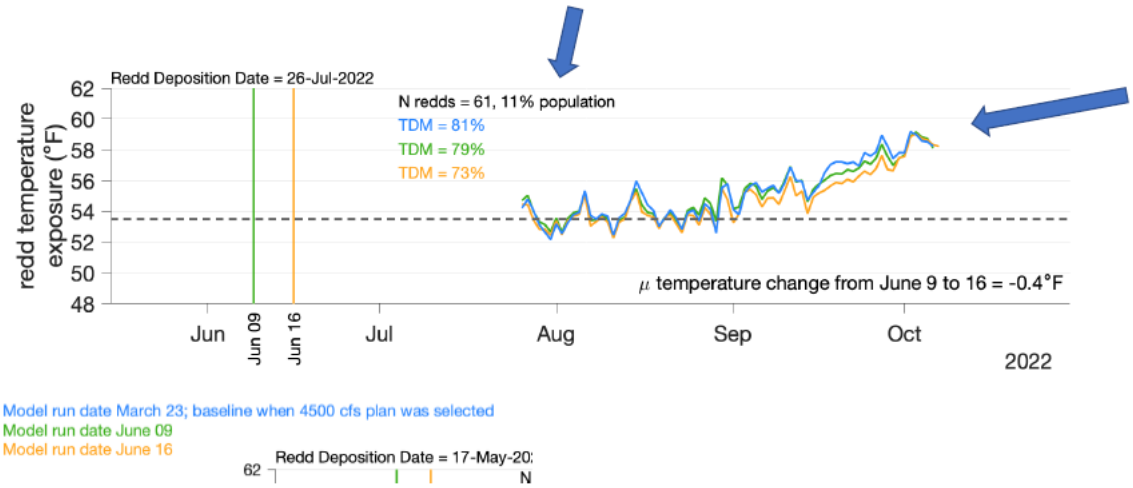
We can add traces from other model runs and related information



This information can be shared for each redd detection date

Information about population of redds for a given deposition date:

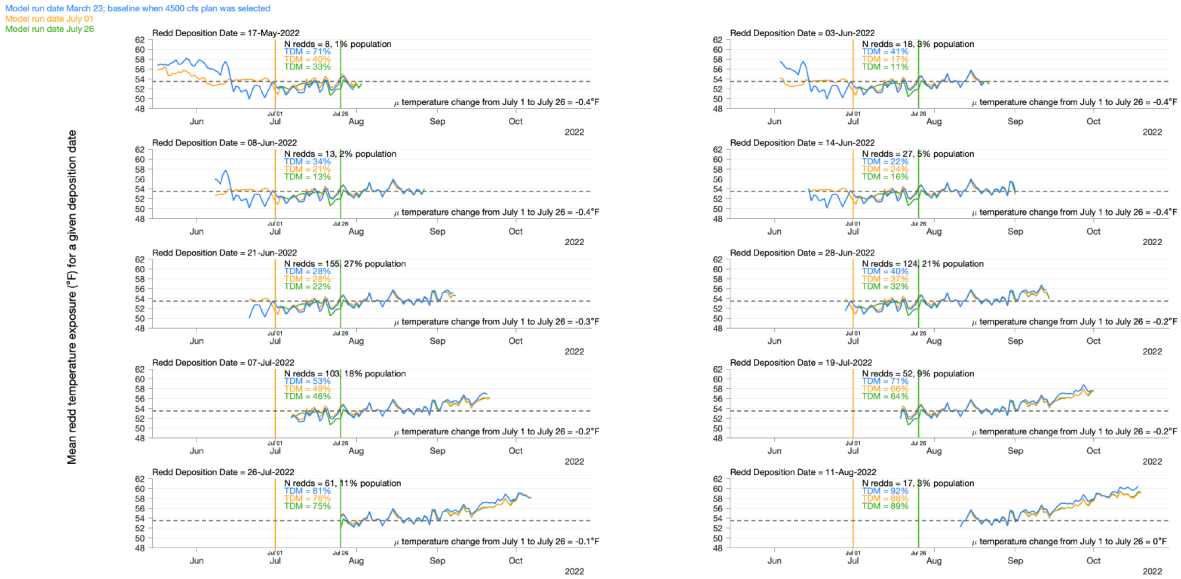
N redds = number redds detected on a survey for a given date
% population = the percent of the population detected over the entire season observed on this date.
TDM= the mean annual TDM estimated for redds detected on this date. Estimates are color coded by model run date



The temperature exposure trace of a redd given its detection time by CDFW. Color coded by model run date.

This is the mean temperature exposure for redds detected on the date. In this example there were 61 redds detected on July 26 at varying locations in the river.

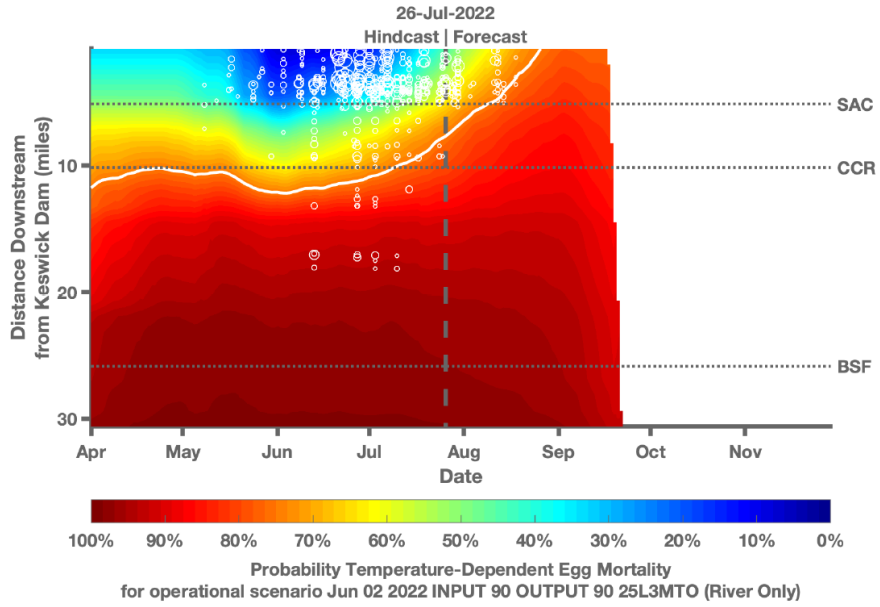
Changes in Exposure for all Redd Detection Dates from 2021, Applied to 2022 Season



Note: Redd distribution from year 2021 plotted on temperature landscape for year 2022 to estimate TDM.

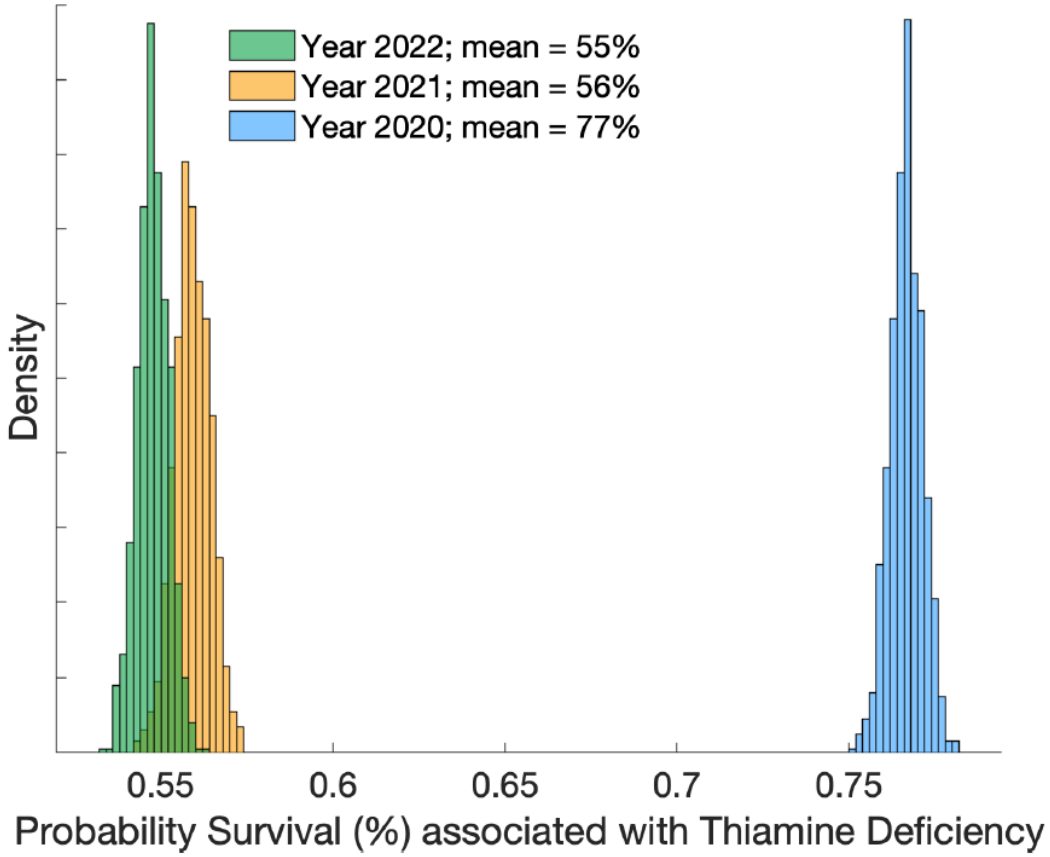
Implementation Phase Outputs

Mortality Landscape and TDM Estimate for June 16th Scenario



Mean annual TDM based on 2016-2021 redd distribution = 40%

Thiamine population level effects



Preliminary

Collaborators: USFWS, CDFW, UCD, and others.

Conclusions

For the "planning" output: Mean annual TDM estimated to be between 39-46% depending on redd distribution assumption. "This is about a 5% decrease from the July 1st run.

For the "implementation" output: Mean annual TDM estimated to be 40% using the 2016-2021 redd distribution. * 6% drop from the July 1st run.

Changes in TDM for the planning output from July 1st to July 26th can, in part, be described using the redd temperature exposure plots, with mean exposure often being ~0.4-0.1 °F lower in the July 26th run.