



— BUREAU OF —
RECLAMATION

Sacramento River Group

Thursday, October 22, 2026

1:00 pm – 3:00 pm

Virtual Meeting Only

Teams Meeting: [JOIN HERE](#); +1 321-209-6143, 145576470#

Action Items from 9/24

- **Reclamation** to share graphic/visual displaying TCD and unit connectivity (including penstocks).
- **Miles Daniels/SWFSC and Reclamation** to coordinate development of a cost benefit analysis to assess impact on TDM from marginal temperature changes.
- **Kaitlin Dunham** to share reference materials on hatchery temperature risk management levels

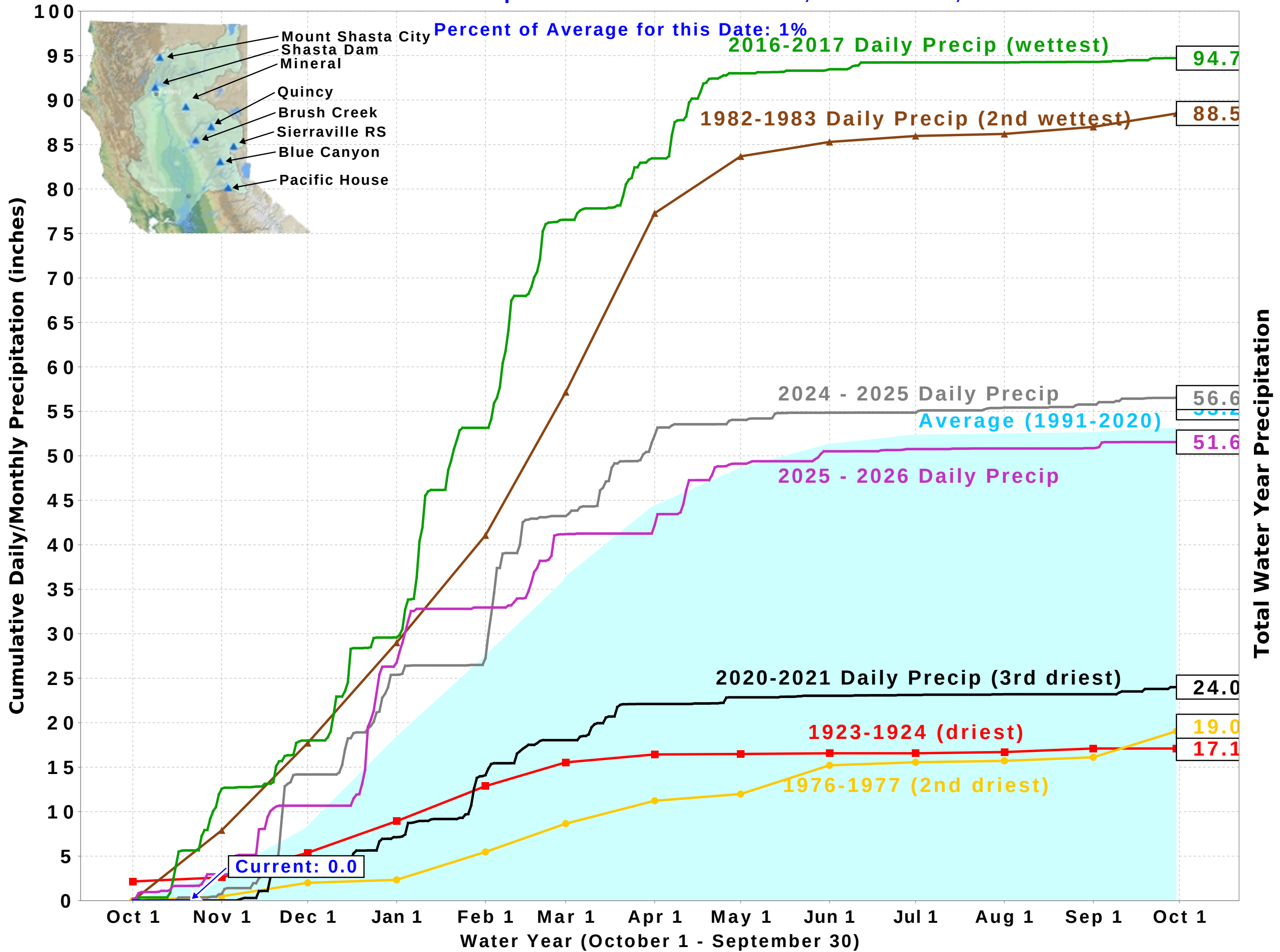
Meeting Objectives:

1. Provide overview of updated group norms and expectations document.
2. Review current hydrologic conditions, releases, and Shasta coldwater pool and temperature management, including the state of the power bypass decision.
3. Receive the fall flows report out, which will include the latest redd, carcass, and dewatering information relative to the 1% take threshold.
4. Provide an update on current fish and hatchery conditions at Livingston Stone and Coleman hatcheries and winter-run Chinook passage at Red Bluff Diversion Dam.
5. Discuss the latest SWFSC temperature dependent mortality (TDM) model results.

Agenda

	<i>Topic</i>	<i>Presenter</i>
1	Welcome, Roll Call, Agenda Review, Housekeeping • Participation Survey • Winter Meeting Schedule	Mia Schiappi, Kearns & West
2	Group Norms & Expectations	Mia Schiappi, Kearns & West
3	Hydrology and Operations Update • Temperature Management/Power Bypass • Fall Flows Report Out	Tom Patton, Reclamation
4	CDFW Sacramento River Fish Monitoring Update • Carcass Surveys • Redd Counts • Stranding and Dewatering surveys	Jamie Ebenal, CDFW
5	USFWS Fish Conditions, Forecasts and Hatchery Updates • Fall Run Chinook Salmon Update – Brett Galyean, Coleman National Fish Hatchery • Winter Run Chinook Update – Kaitlin Dunham, Livingston Stone Hatchery • Estimated percentage of the population upstream of Red Bluff Diversion Dam for steelhead, winter-run, and spring-run Chinook salmon and RST updates– Bill Poytress, USFWS	Brett Galyean, USFWS Kaitlin Dunham, USFWS Bill Poytress, USFWS
6	TDM Updates • SWFSC	Miles Daniels, NOAA SWFSC
7	Additional Announcements & Review Action Items	Mia Schiappi, Kearns & West
8	Adjourn	

Northern Sierra Precipitation: 8-Station Index, October 21, 2026





October 20, 2026

Reservoir Releases in Cubic Feet/Second

Reservoir	Dam	WY 2026	WY 2027	15 Yr Median
Trinity	Lewiston	283	257	300
Sacramento	Keswick	7,131	5,974	6,484
Feather	Oroville(SWP)	2,450	2,400	2,400
American	Nimbus	1,104	1,475	1,475
Stanislaus	Goodwin	460	267	653
San Joaquin	Friant	486	395	395

Storage in Major Reservoirs in Thousands of Acre-Feet

Reservoir	Capacity	15 Yr Avg	WY 2026	WY 2027	% of 15 Yr Avg
Trinity	2,448	1,270	1,750	1,647	130
Shasta	4,552	2,250	2,591	2,336	104
Folsom	977	395	432	390	99
New Melones	2,420	1,295	1,620	1,508	116
Fed. San Luis	966	324	253	469	145
Total North CVP	11,363	5,534	6,646	6,350	115
Millerton	521	248	254	227	91
Oroville (SWP)	3,425	1,517	1,871	1,505	99

Accumulated Inflow for Water Year to Date in Thousands of Acre-Feet

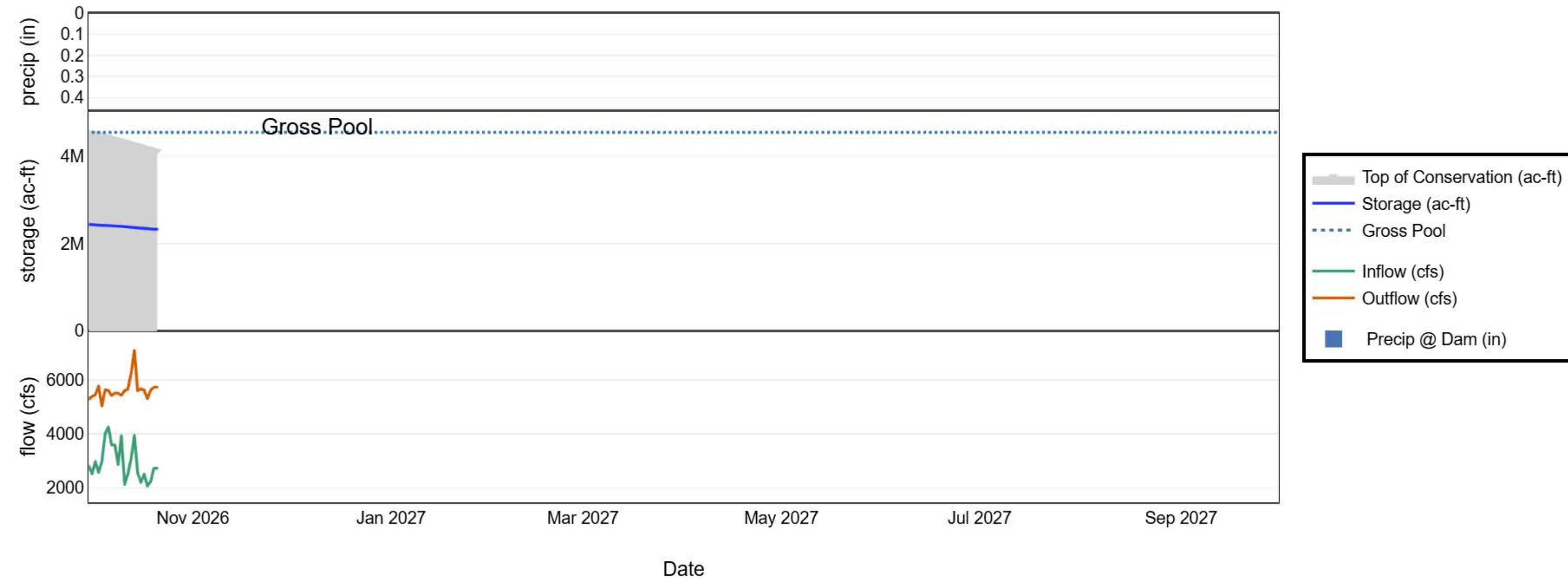
Reservoir	Current WY 2027	WY 1977	WY 1983	15 Yr Avg	% of 15 Yr Avg
Trinity	1	5	5	4	29
Shasta	118	151	154	114	104
Folsom	47	41	68	36	132
New Melones	20	---	33	24	83
Millerton	58	21	95	39	149

Accumulated Precipitation for Water Year To Date in Inches

Reservoir	Current WY 2027	WY 1977	WY 1983	Average (N Years)	% of Average	Last 24 Hours
Trinity at Fish Hatchery	0.00	0.13	0.45	0.76 (66)	0	0.00
Sacramento at Shasta Dam	0.00	0.07	0.26	1.31 (71)	0	0.00
American at Blue Canyon	0.00	0.87	0.73	1.41 (52)	0	0.00
Stanislaus at New Melones	0.00	---	0.30	0.57 (49)	0	0.00
San Joaquin at Huntington Lk	0.00	1.20	0.00	1.08 (53)	0	0.00

Shasta Dam & Lake - Sacramento River Basin

WY 2027 | Generated: 2026-10-21T16:06:24-0700



D A T E	Mean Daily Water Temperatures (°F)													Mean Daily Release (CFS)			Mean Daily Air Temperatures (°F)		
	TCD ¹	SHD	SPP ¹	KWK	SAC	CCR ²	BSF	BND	RDB	IGO	LWS	DGC	NFH	Shasta Generation	Spring Creek P.P.	Keswick Total	RDD	BSF	RDB
Sep	53.6	52.9	58.8	54.2	54.7	55.4	56.7	55.5	59.3	57.5	50.3	53.1	55.9	9909	1292	11414	82.9	77.2	77.6
10/01	55.1	54.4	59.4	55.4	55.9	56.7	57.9	#	60.4	57.5	50.7	54.3	57.3	5405	556	5967	76.5	69.7	72.3
10/02	55.1	54.5	59.2	55.5	56.0	56.9	58.1	#	60.5	57.7	50.8	54.8	57.6	5460	150	6003	78.5	70.8	74.3
10/03	55.1	54.6	59.2	55.7	56.2	57.1	58.2	#	60.6	57.7	50.8	54.7	57.9	5786	300	6006	79.0	72.4	75.8
10/04	55.3	54.7	59.3	55.6	56.0	56.6	57.9	#	60.2	57.5	50.8	54.1	56.9	5050	488	6003	78.0	70.0	74.0
10/05	55.4	54.8	59.3	55.6	56.1	56.8	58.2	#	60.3	58.0	51.0	54.1	57.0	5648	412	5974	82.5	74.9	79.0
10/06	55.5	54.9	59.3	55.9	56.3	57.1	58.3	#	60.7	58.0	50.7	54.7	57.7	5627	288	5956	↑ 81.5	74.5	77.6
10/07	55.6	55.0	59.2	56.0	56.4	57.2	58.5	#	60.8	57.8	50.6	54.5	57.8	5437	154	5952	80.0	72.6	75.4
10/08	55.8	55.2	59.2	56.0	56.4	57.2	58.5	#	60.8	57.8	50.8	54.4	57.5	5527	287	5917	81.0	73.0	76.5
10/09	55.8	55.2	59.3	56.1	56.6	57.3	58.6	#	60.9	57.8	50.8	54.5	57.5	5523	290	5900	79.5	73.5	76.8
10/10	56.0	55.3	59.2	56.1	56.5	57.1	58.1	#	60.5	57.4	50.7	53.9	56.4	5443	277	5904	67.0	65.3	66.9
10/11	56.2	55.5	59.4	56.0	56.2	56.5	57.0	#	58.7	56.7	50.6	52.1	54.5	5622	135	5920	66.5	64.8	66.2
10/12	56.2	55.5	59.3	55.7	55.9	56.1	56.4	#	57.0	56.5	50.9	50.6	52.3	5678	194	5942	61.0	61.2	63.0
10/13	56.5	55.8	59.3	55.7	55.8	56.1	56.3	#	56.8	56.4	50.2	50.3	51.7	6251	275	5931	61.5	56.2	60.6
10/14	56.4	55.7	59.3	56.0	56.1	56.6	56.8	#	57.1	57.1	49.8	50.4	52.0	7108	284	5955	66.5	60.5	64.1
10/15	56.4	55.9	59.0	56.2	56.4	57.0	57.6	!	58.3	57.4	49.5	51.3	53.0	5618	302	5991	70.0	64.8	69.7
10/16	56.5	56.1	58.7	56.4	56.5	57.2	57.6	58.1	58.7	57.2	49.3	50.9	53.2	5683	307	5945	70.0	64.0	70.3
10/17	56.6	56.2	58.7	56.5	56.6	57.2	57.6	58.1	58.7	56.9	49.3	50.8	52.9	5641	309	5920	67.0	61.4	65.9
10/18	56.7	56.3	58.9	56.5	56.6	57.1	57.6	58.0	58.5	56.7	49.4	50.8	53.2	5321	517	5906	64.5	59.3	62.8
10/19	56.8	56.5	58.9	56.5	56.6	57.0	57.4	57.8	58.3	56.4	49.3	50.4	52.2	5635	523	5897	59.5	55.0	57.0
10/20	56.9	56.4	58.9	56.6	56.6	57.0	57.3	57.4	57.9	56.4	49.5	50.1	52.3	5607	569	5974	60.5	56.2	59.8
10/21																			
10/22																			
10/23																			
10/24																			
10/25																			
10/26																			
10/27																			
10/28																			
10/29																			
10/30																			
10/31																			
Oct	56.0	55.4	59.2	56.0	56.3	56.9	57.7	57.9	59.3	57.2	50.3	52.6	55.0	5654	331	5948	71.5	66.0	69.4

Total CFS	113070	6617	118963
Total AF	224270	13125	235958

Legend

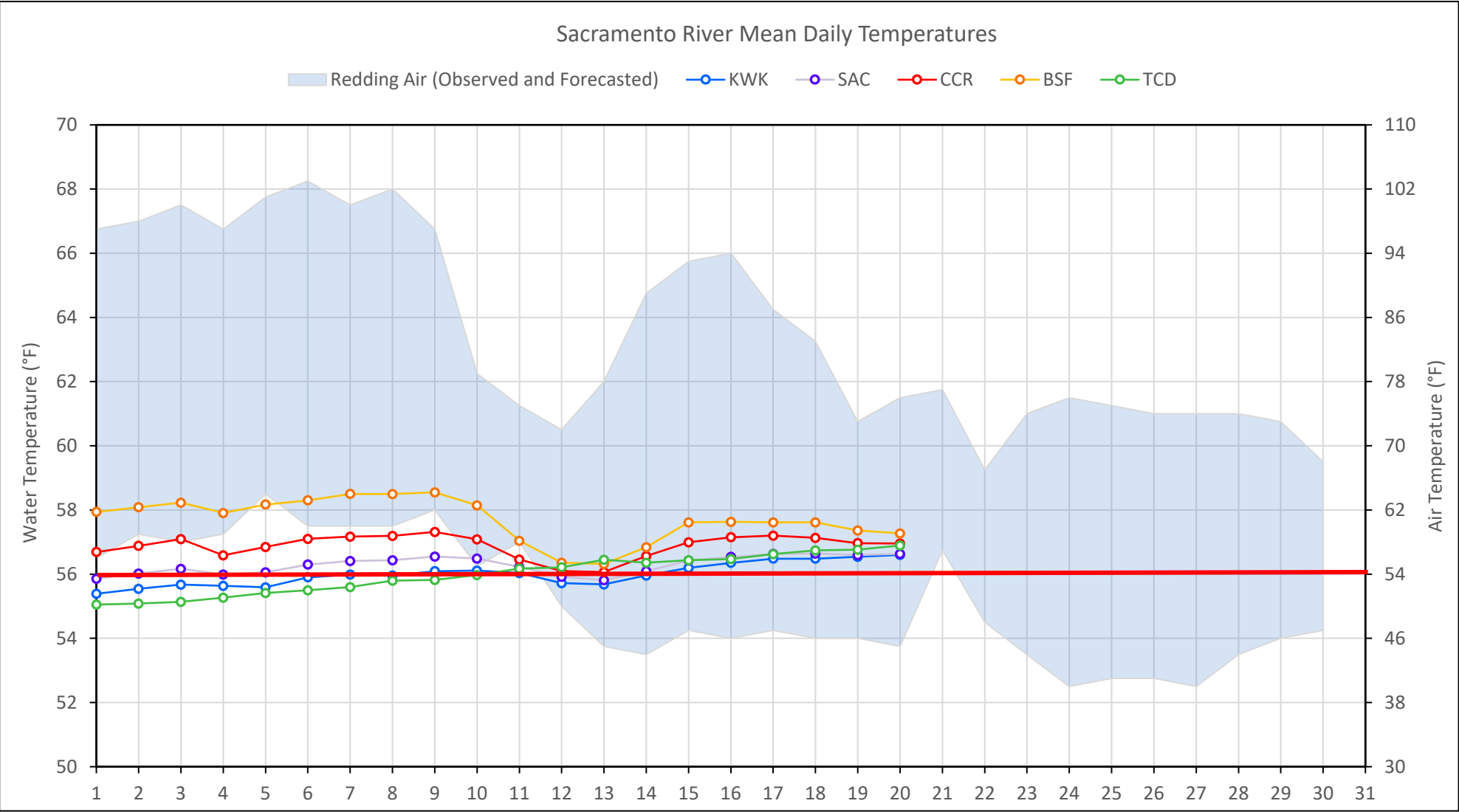
- ? = 1-9 hours of data missing (Average includes estimations)
- ! = 10 or more hours of data missing (Average not calculated)
- # = Station out of service
- ↑ = Record high air temperature
- ↓ = Record low air temperature
- = Monthly Averages

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 Clear Creek River control point (see page 3 for more details)



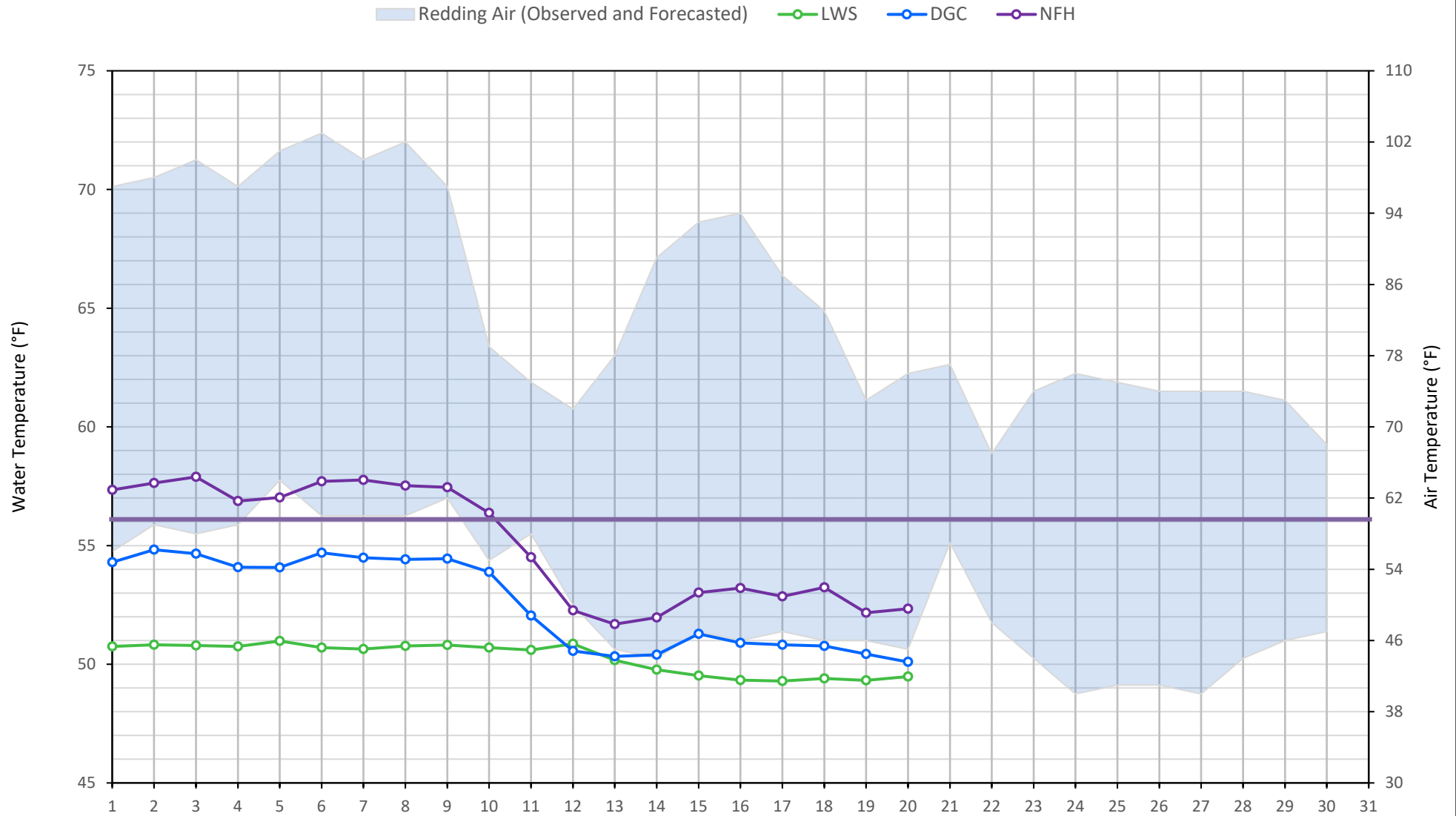
Station Details			
Code	Body of Water	Location ¹	CDEC Link
TCD	N/A	Shasta Power Plant	N/A
SHD	Sacramento River	0.3 miles downstream of Shasta Power Plant	Click Here
SPP	N/A	Spring Creek Power Plant	N/A
KWK	Sacramento River	0.8 miles downstream of Keswick Dam	Click Here
SAC	Sacramento River	4.8 miles 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

Water Right Temperature Control Points				
River	Point	Temp. (°F)	Begin Date	End Date
Sacramento	CCR	58.0	Mar-01	May-15
Sacramento	CCR	53.5	May-15	Aug-31
Sacramento	CCR	55.0	Sep-01	Sep-15
Sacramento	CCR	56.0	Sep-16	

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	Click Here
DGC	Trinity River	19 miles downstream of Lewiston Dam	Click Here
NFH	Trinity River	38 miles downstream of Lewiston Dam	Click Here

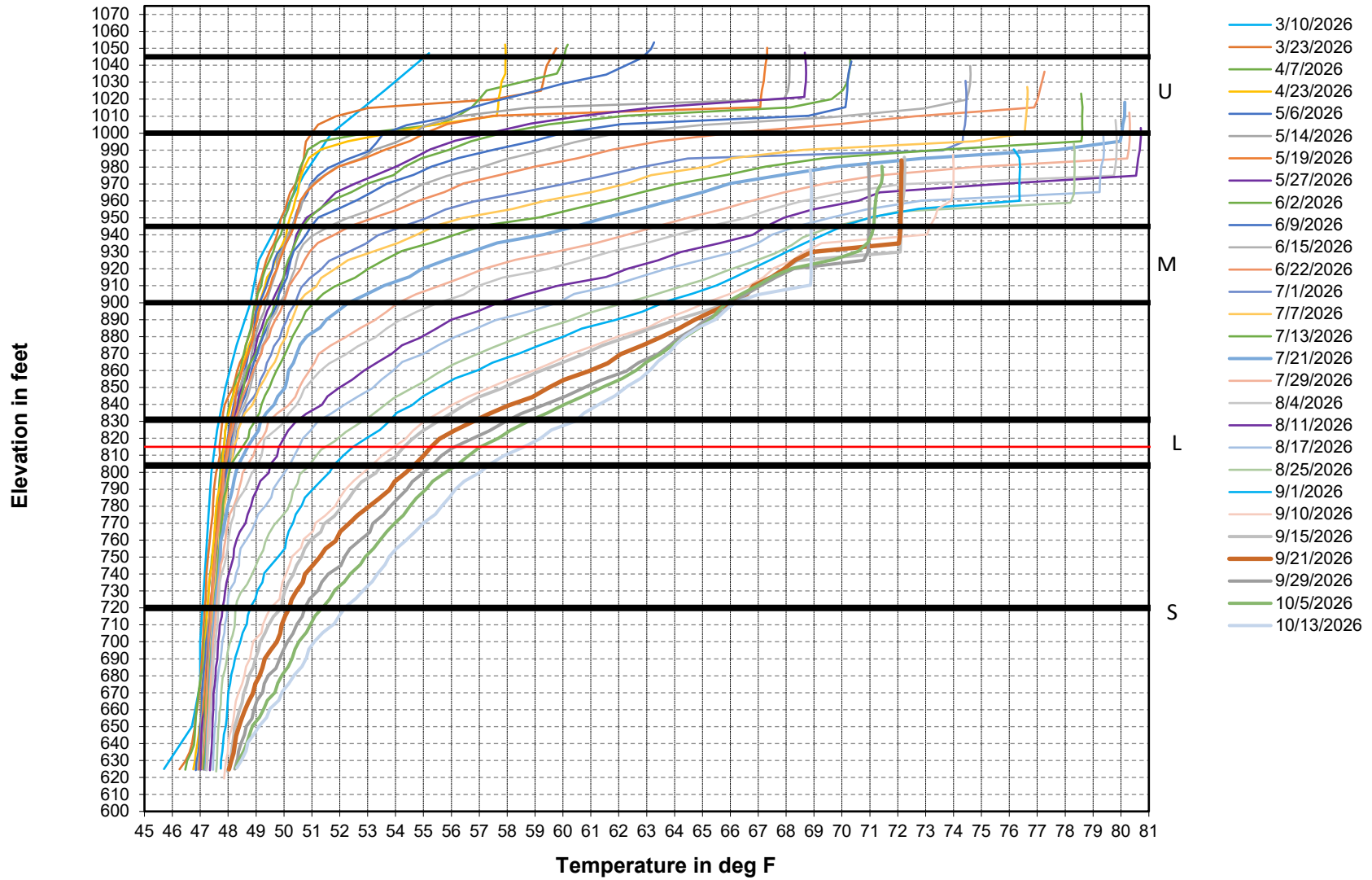
Water Right Temperature Control Points

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

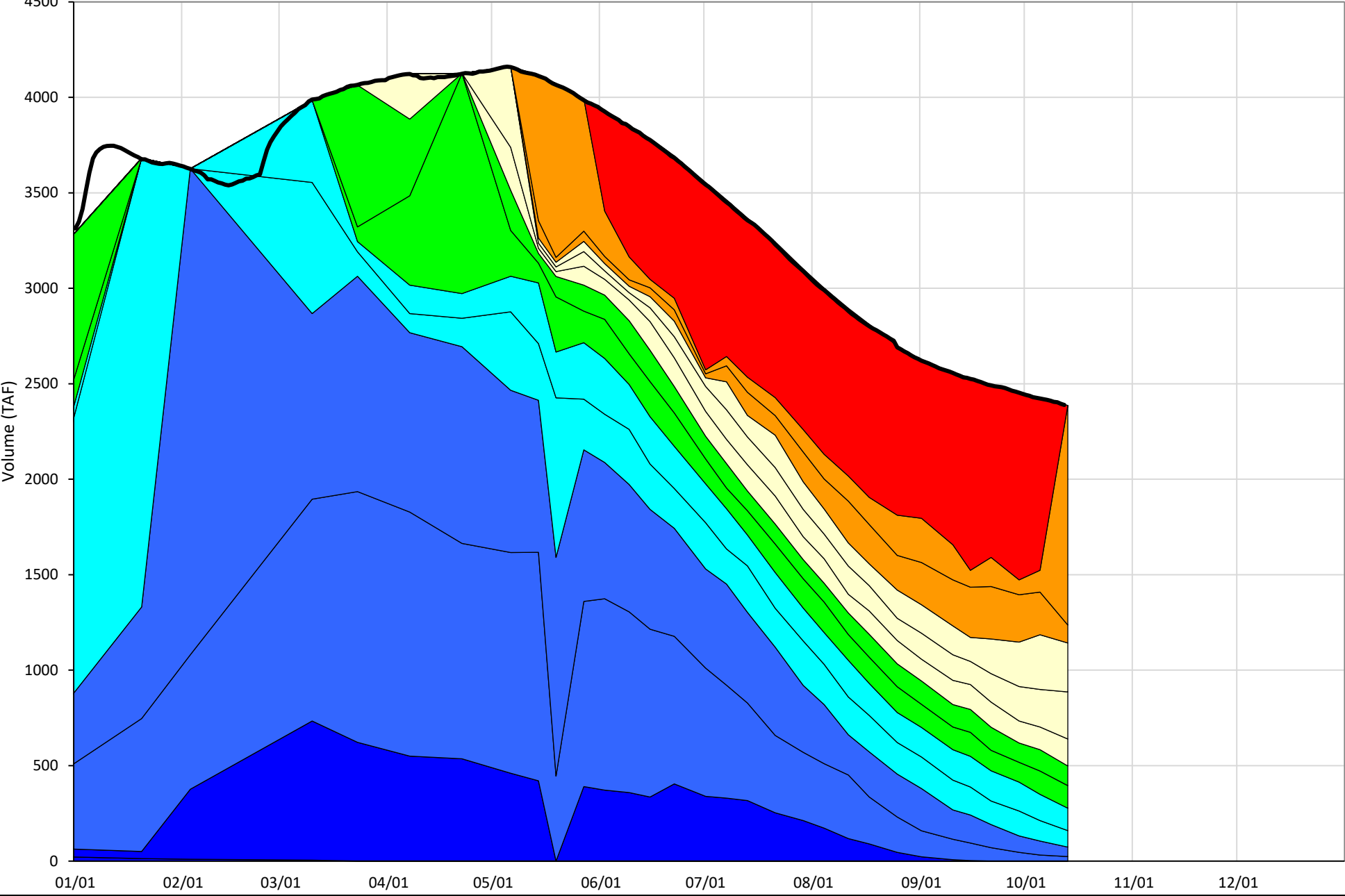
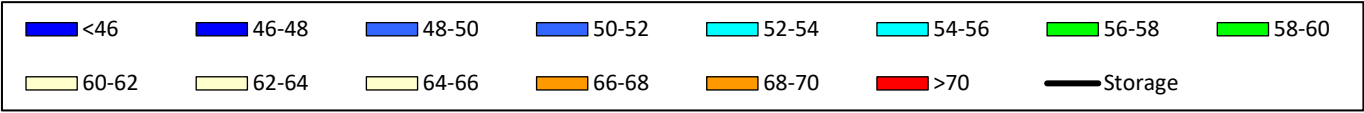
Notes

¹ Distances are approximate

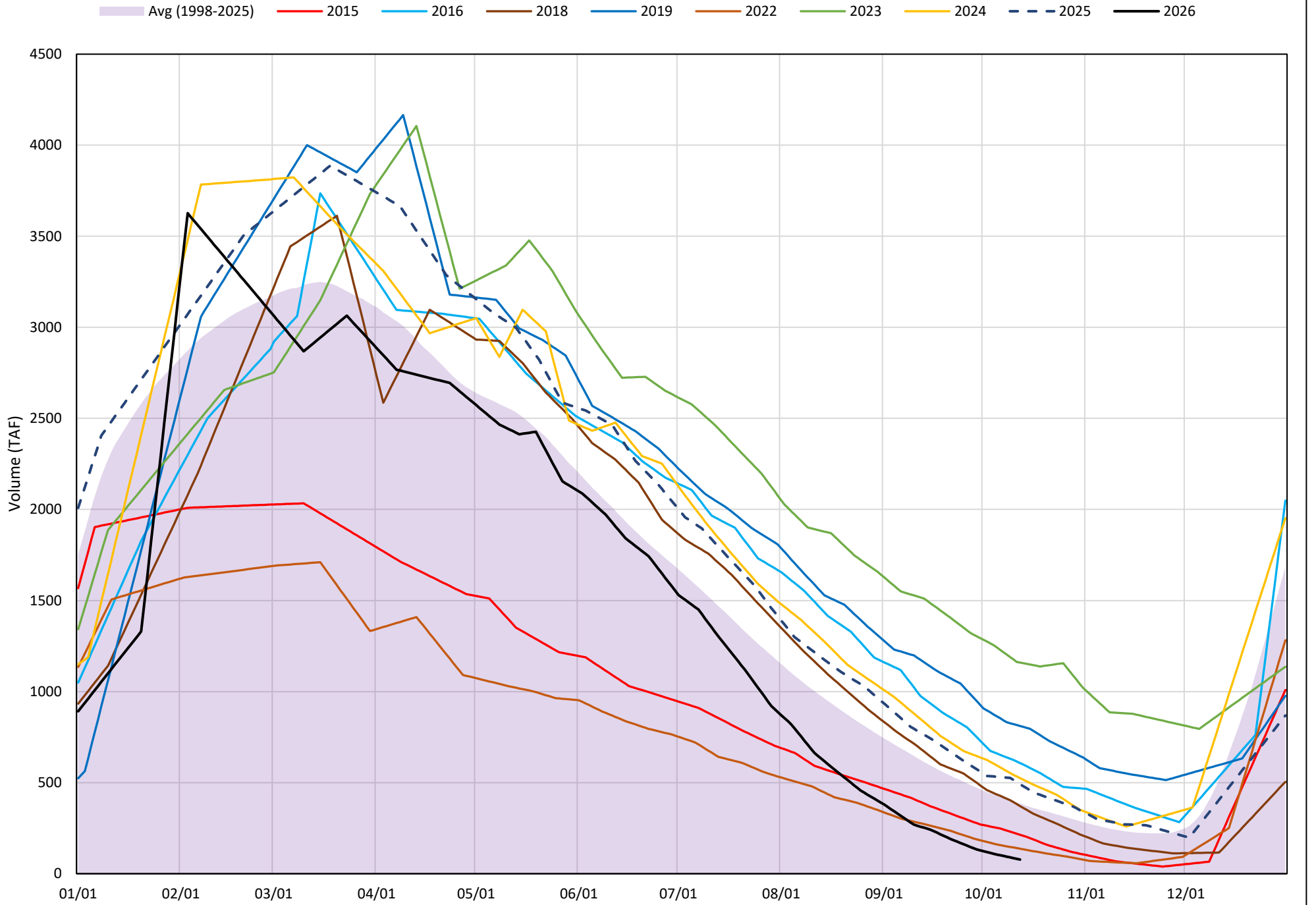
2026 Shasta Temperature Profiles



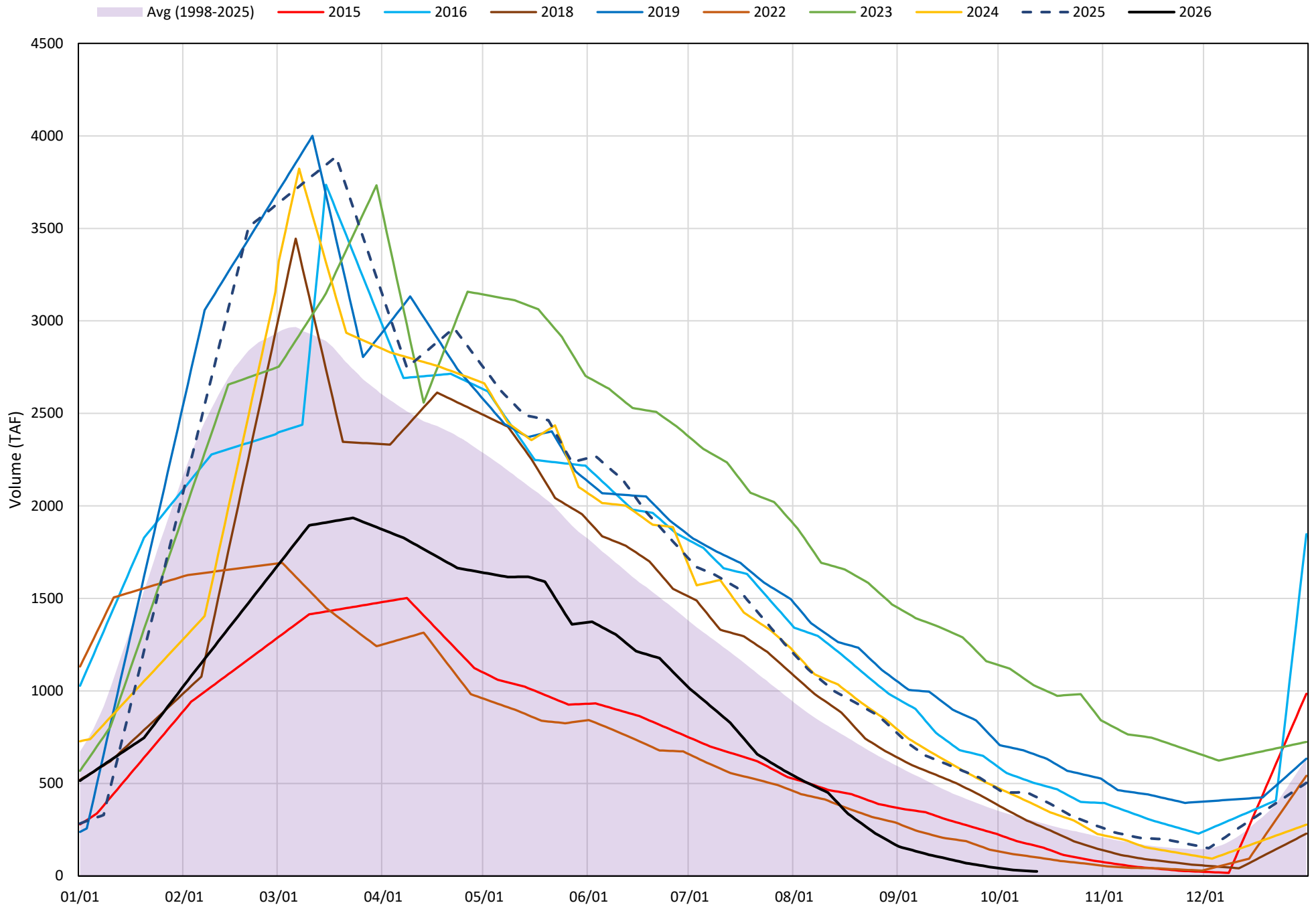
Shasta Lake Isothermobaths Plot - 2026



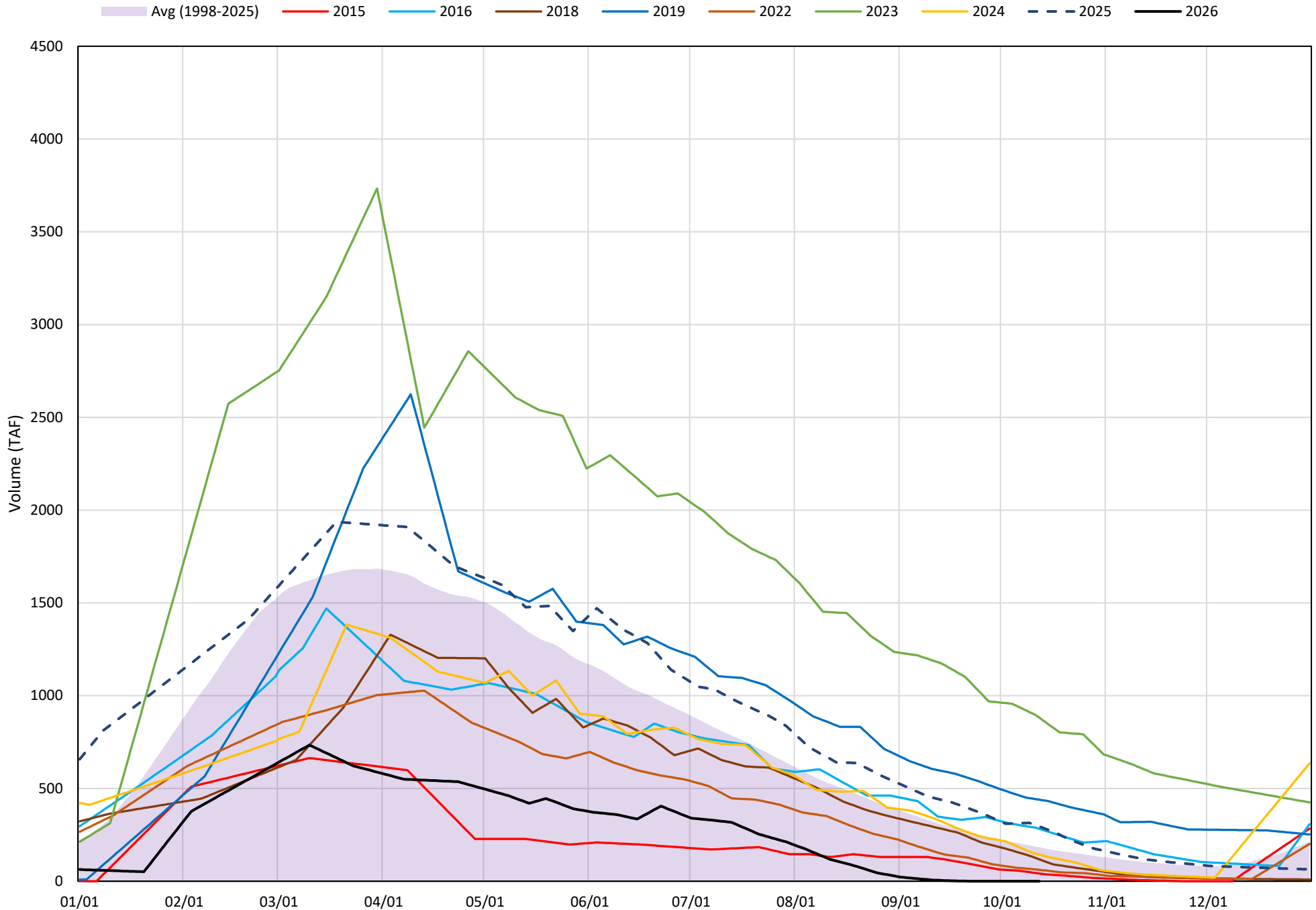
Shasta Lake Cold Water Pool Volume ≤52°F



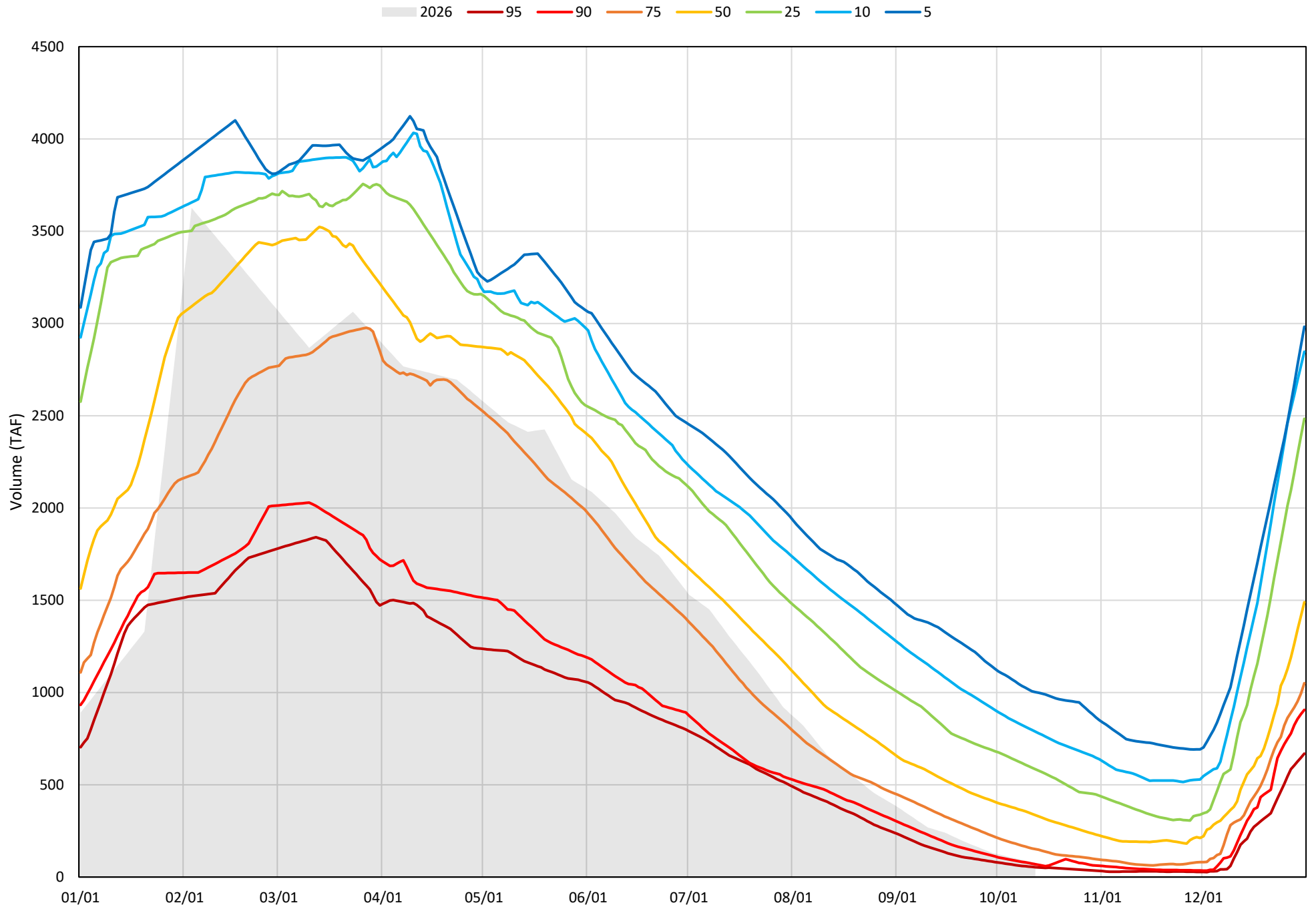
Shasta Lake Cold Water Pool Volume ≤50°F



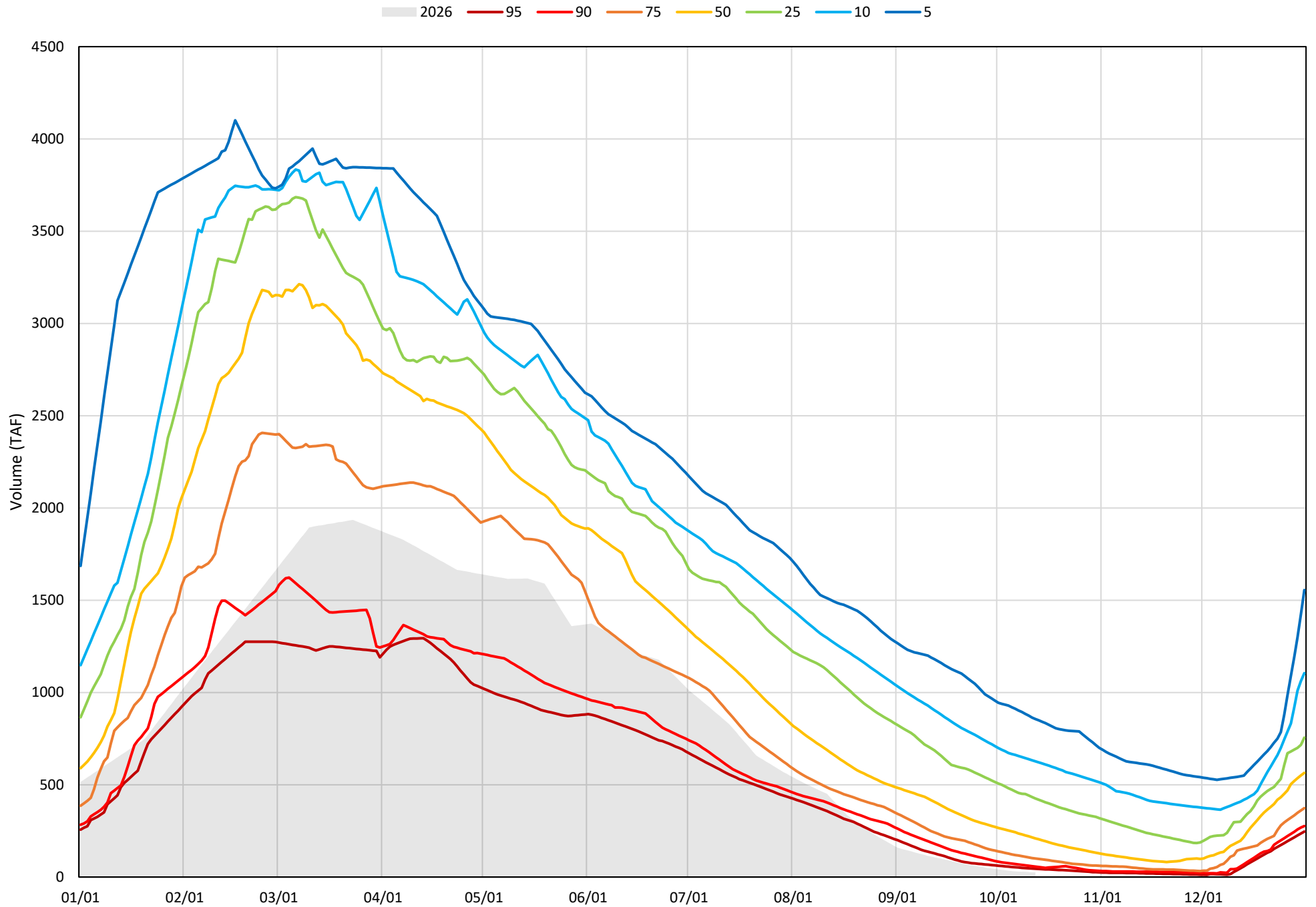
Shasta Lake Cold Water Pool Volume ≤48°F



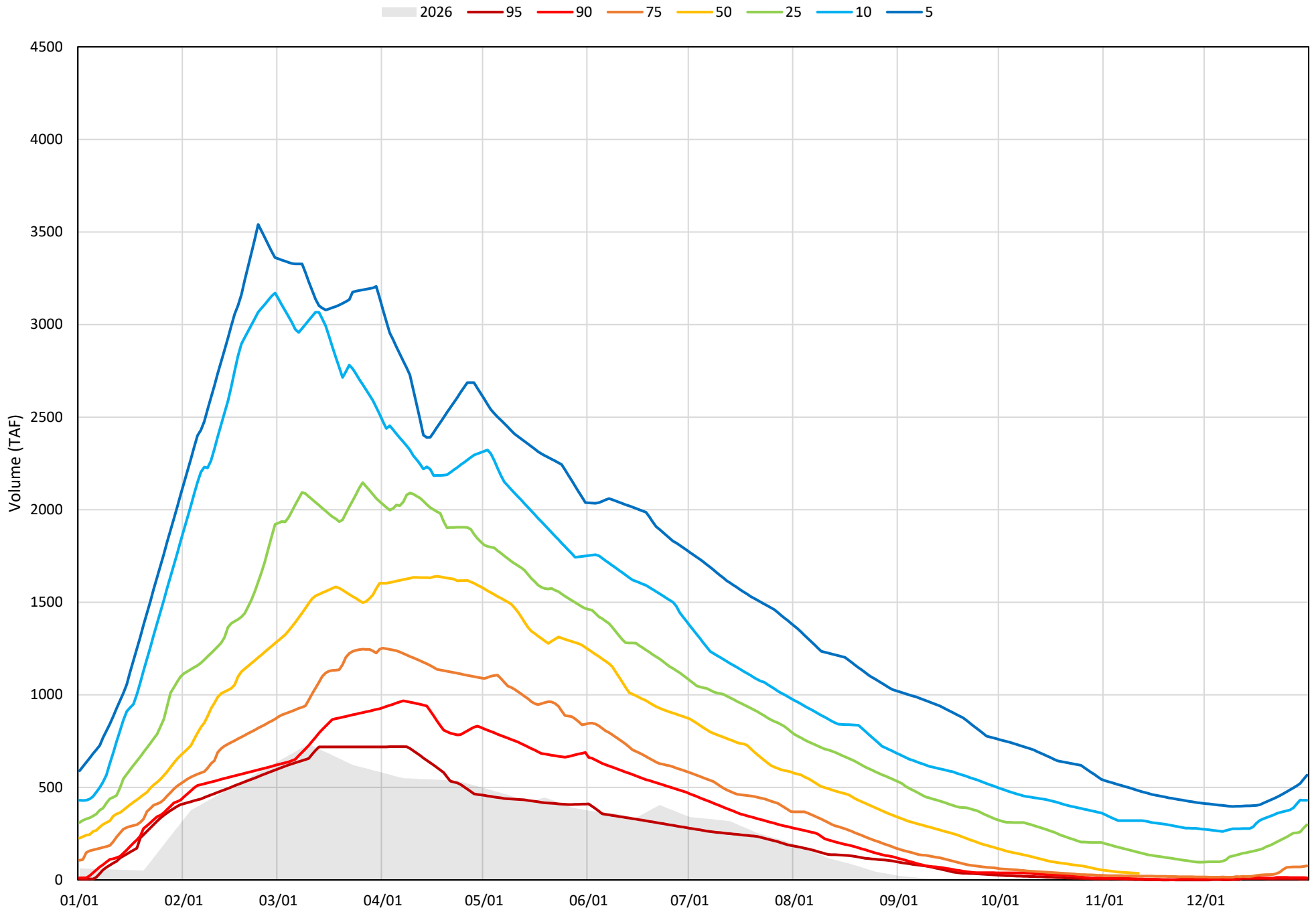
Shasta Lake Cold Water Pool Volume $\leq 52^{\circ}\text{F}$ - Percent Exceedances (1998-2025)



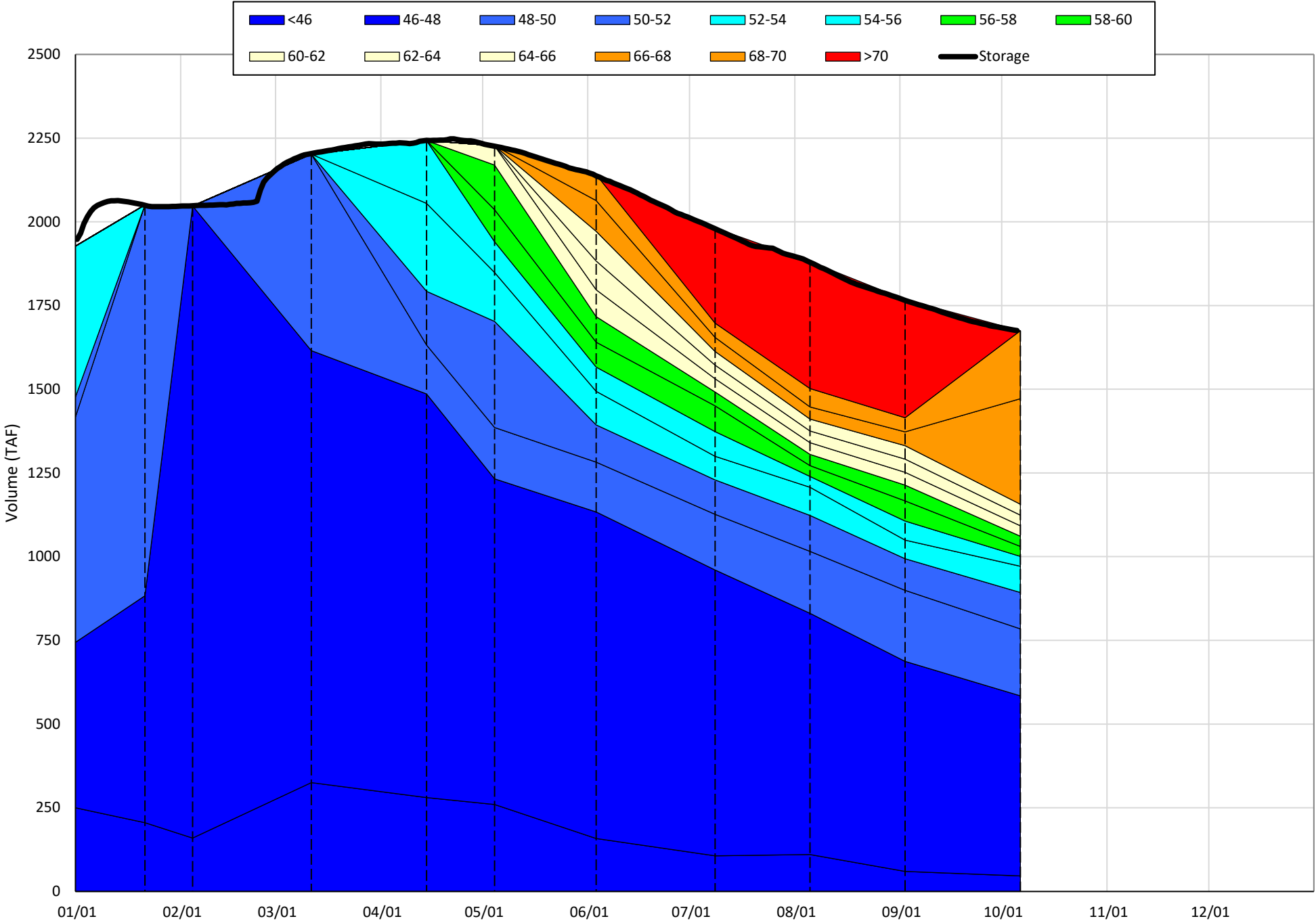
Shasta Lake Cold Water Pool Volume $\leq 50^{\circ}\text{F}$ - Percent Exceedances (1998-2025)



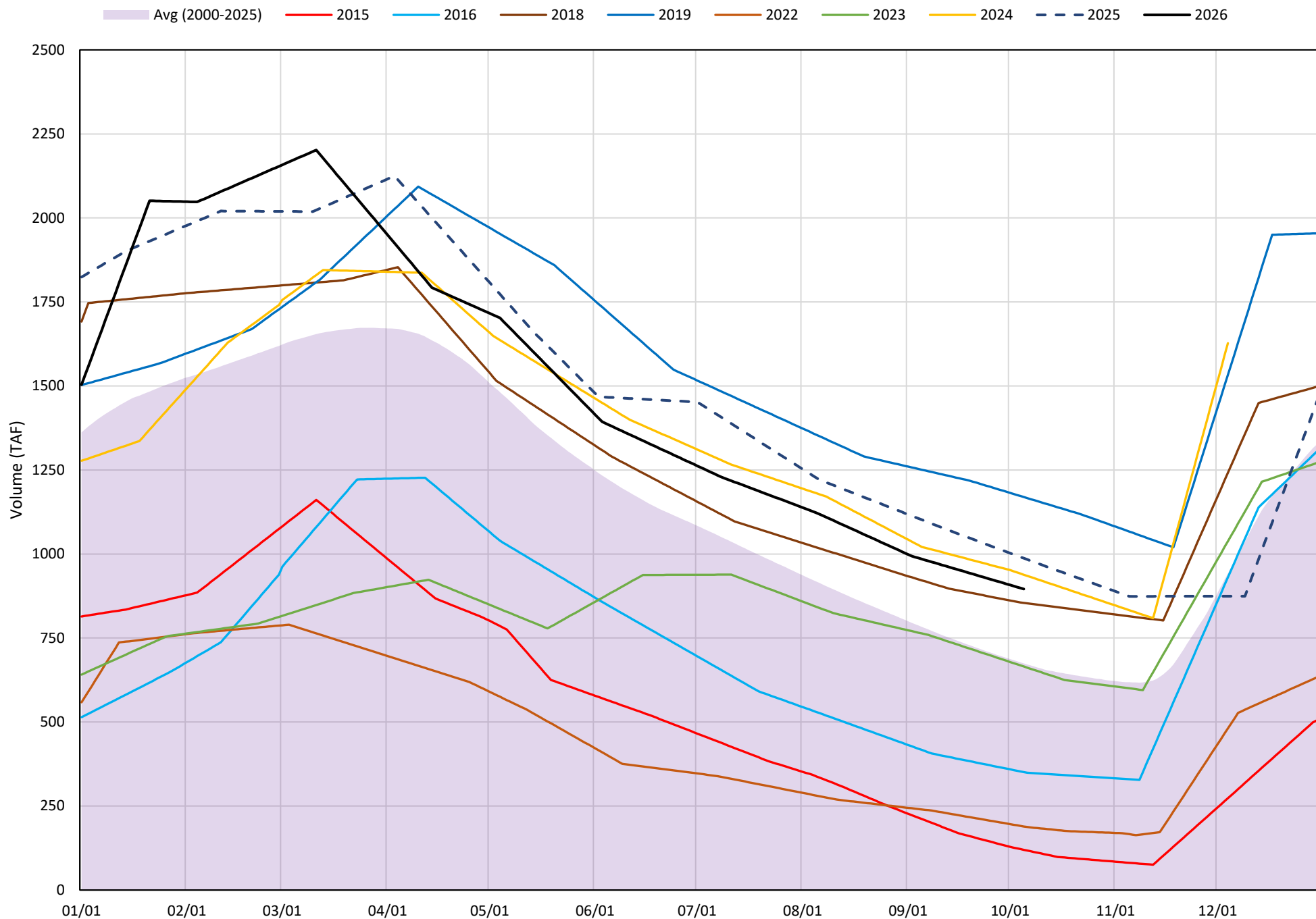
Shasta Lake Cold Water Pool Volume $\leq 48^{\circ}\text{F}$ - Percent Exceedances (1998-2025)



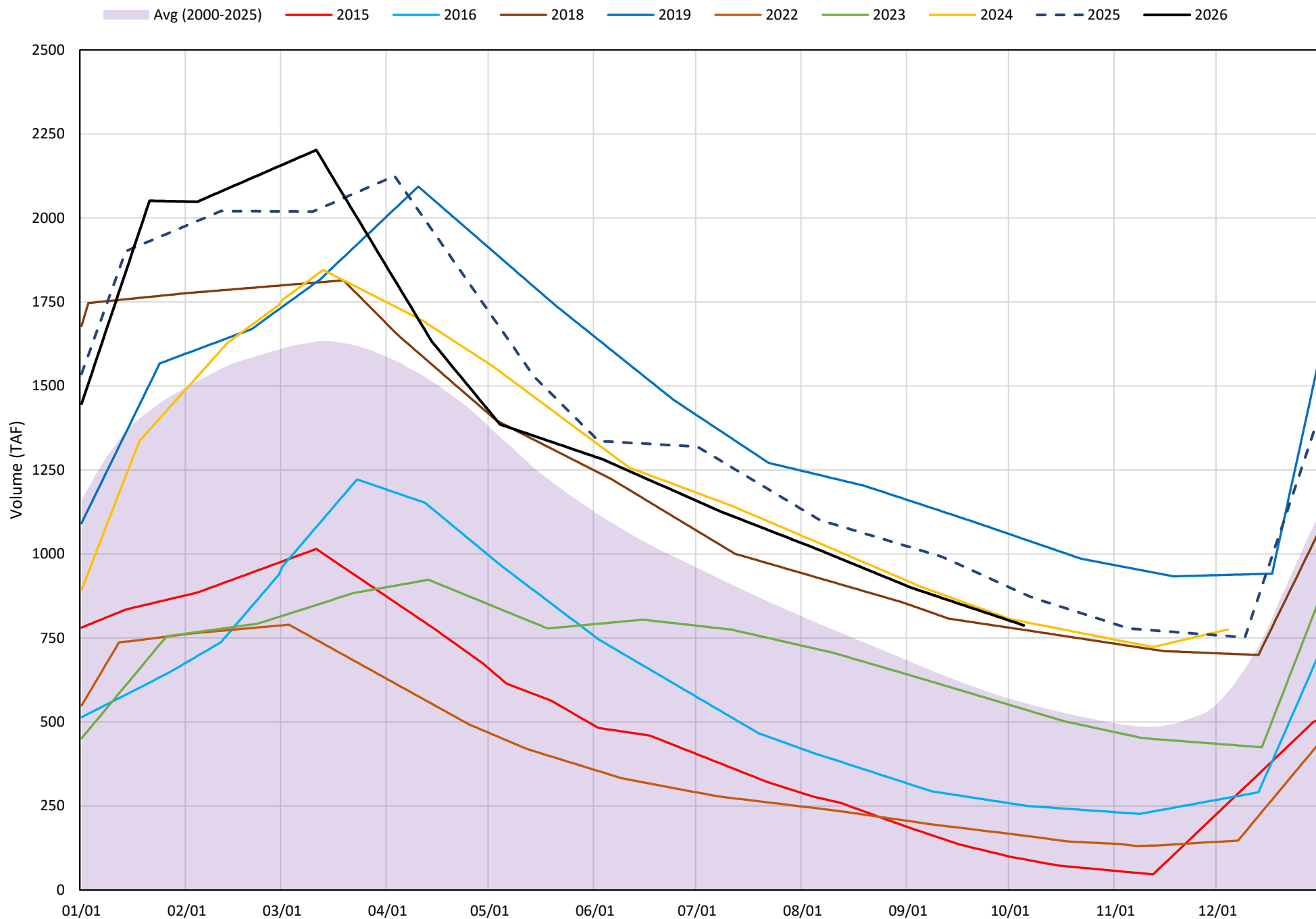
Trinity Lake Isothermobaths Plot - 2026



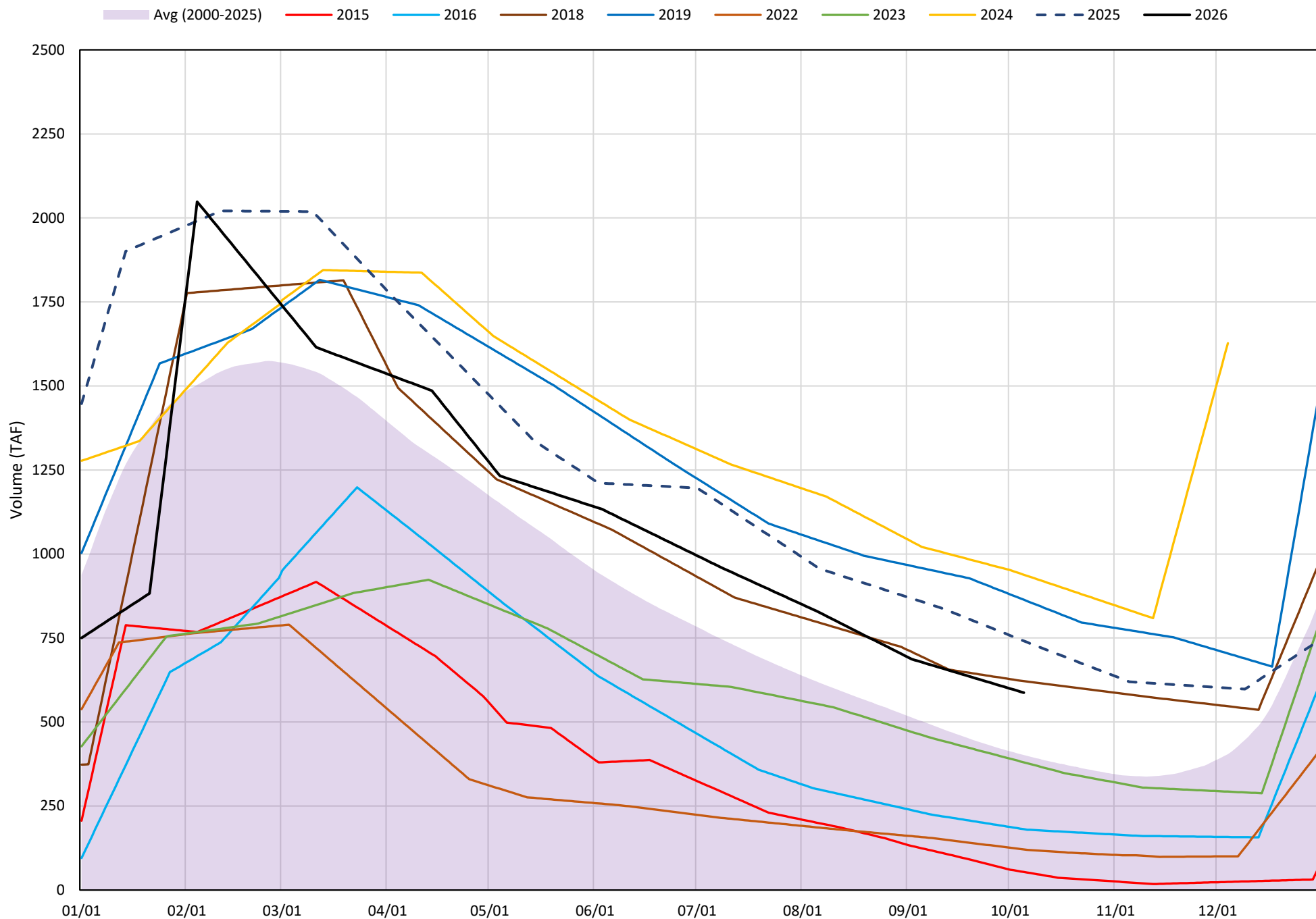
Trinity Lake Cold Water Pool Volume ≤52°F



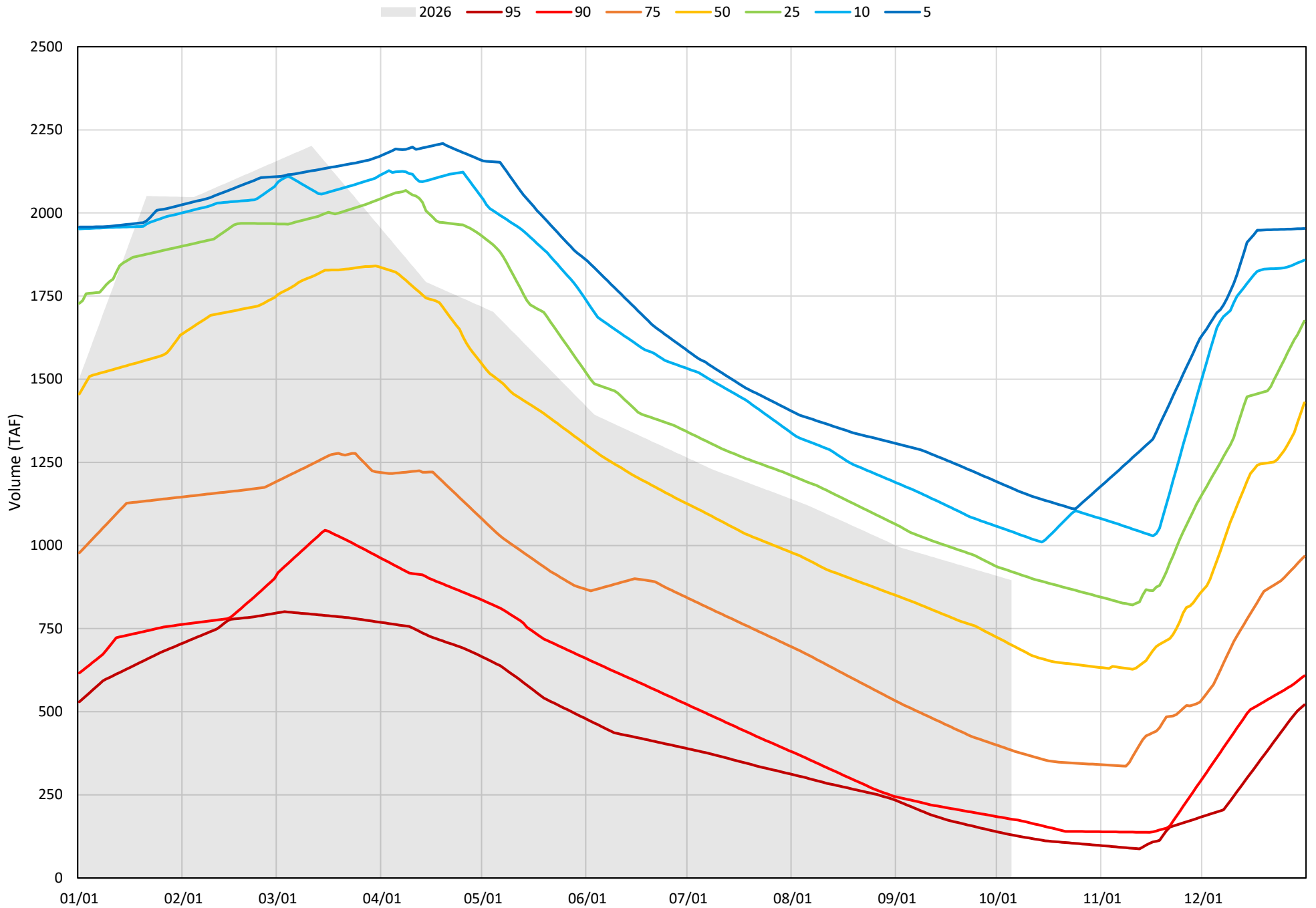
Trinity Lake Cold Water Pool Volume ≤50°F



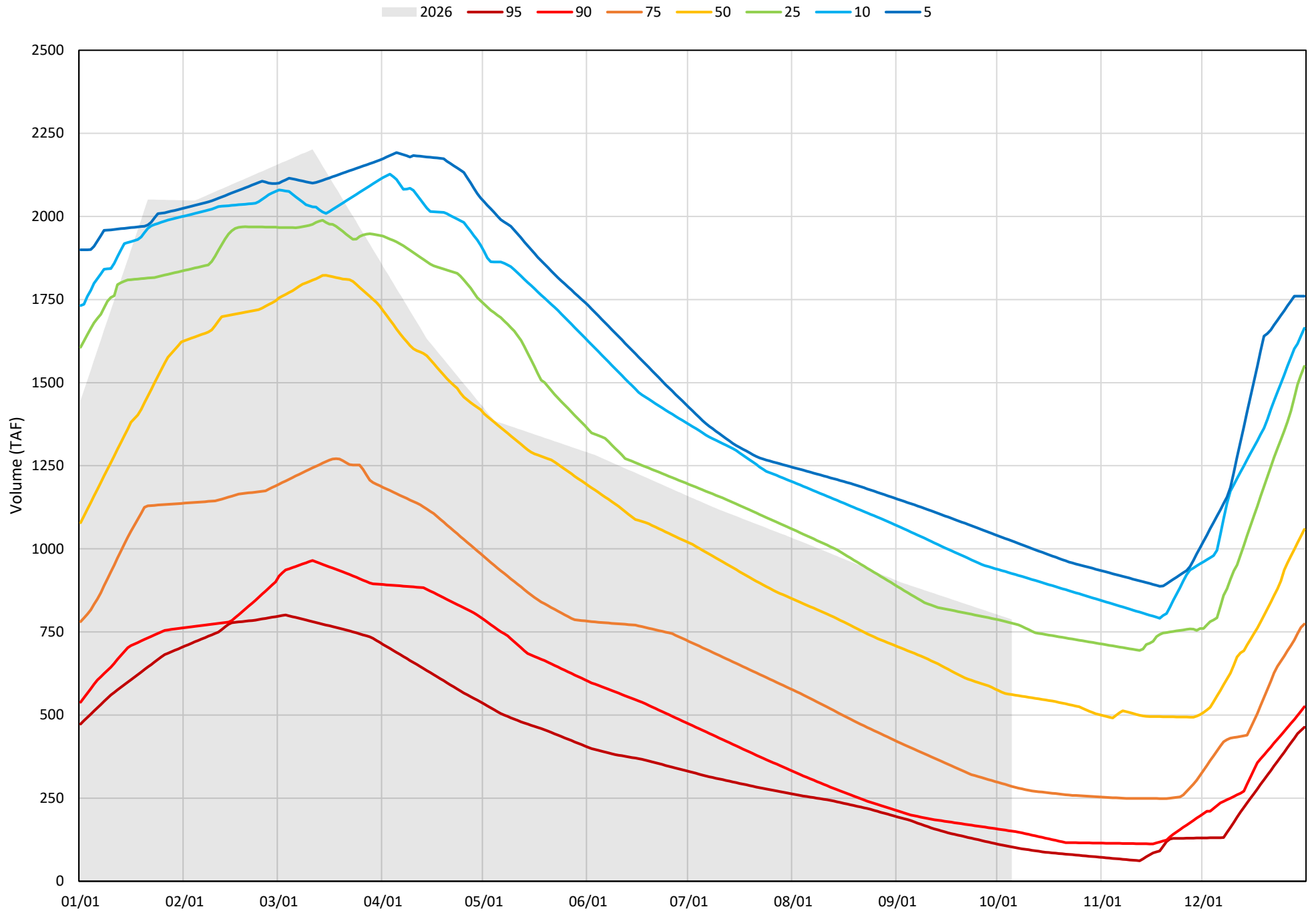
Trinity Lake Cold Water Pool Volume ≤48°F



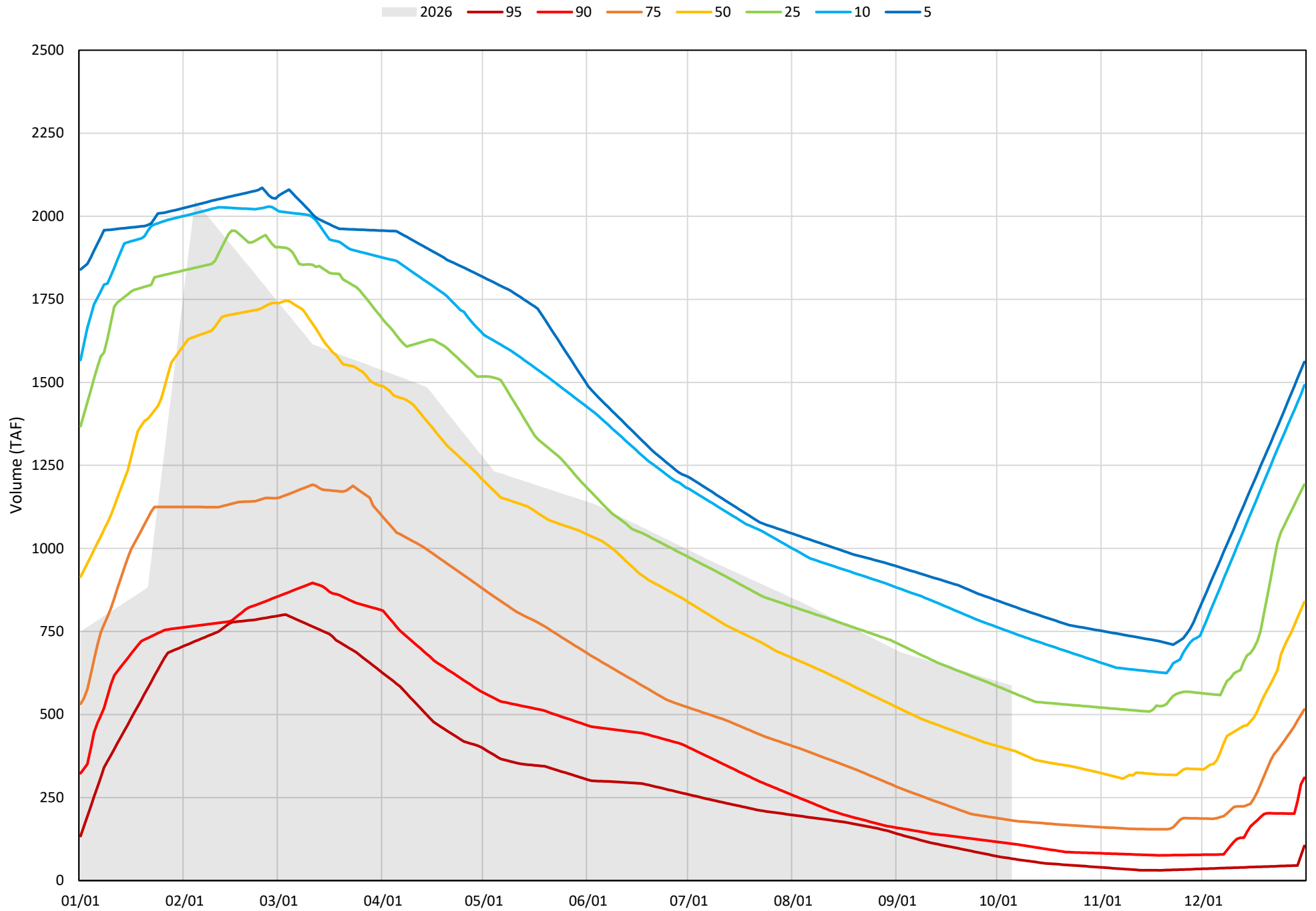
Trinity Lake Cold Water Pool Volume $\leq 52^{\circ}\text{F}$ - Percent Exceedances (2000-2025)



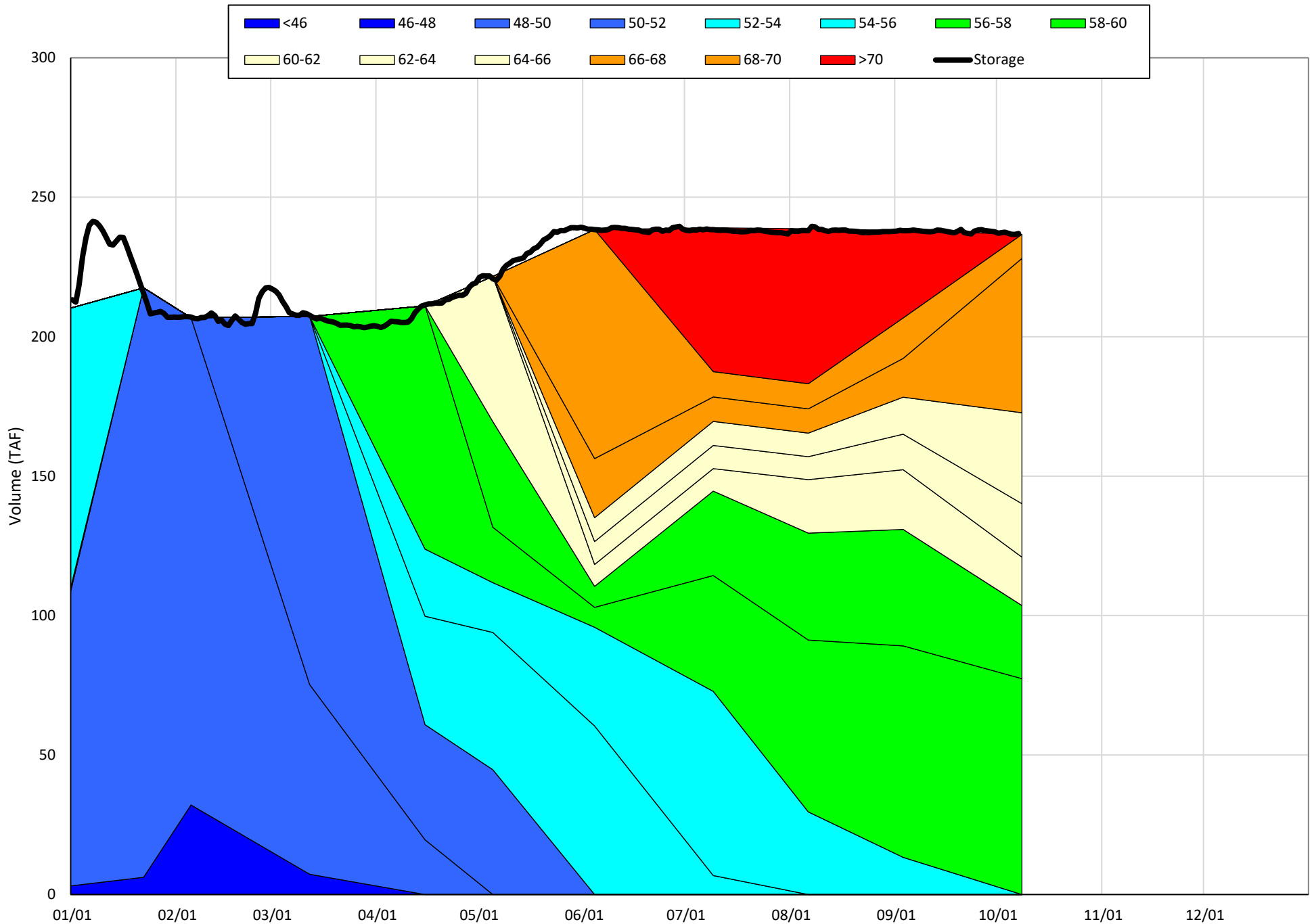
Trinity Lake Cold Water Pool Volume $\leq 50^{\circ}\text{F}$ - Percent Exceedances (2000-2025)



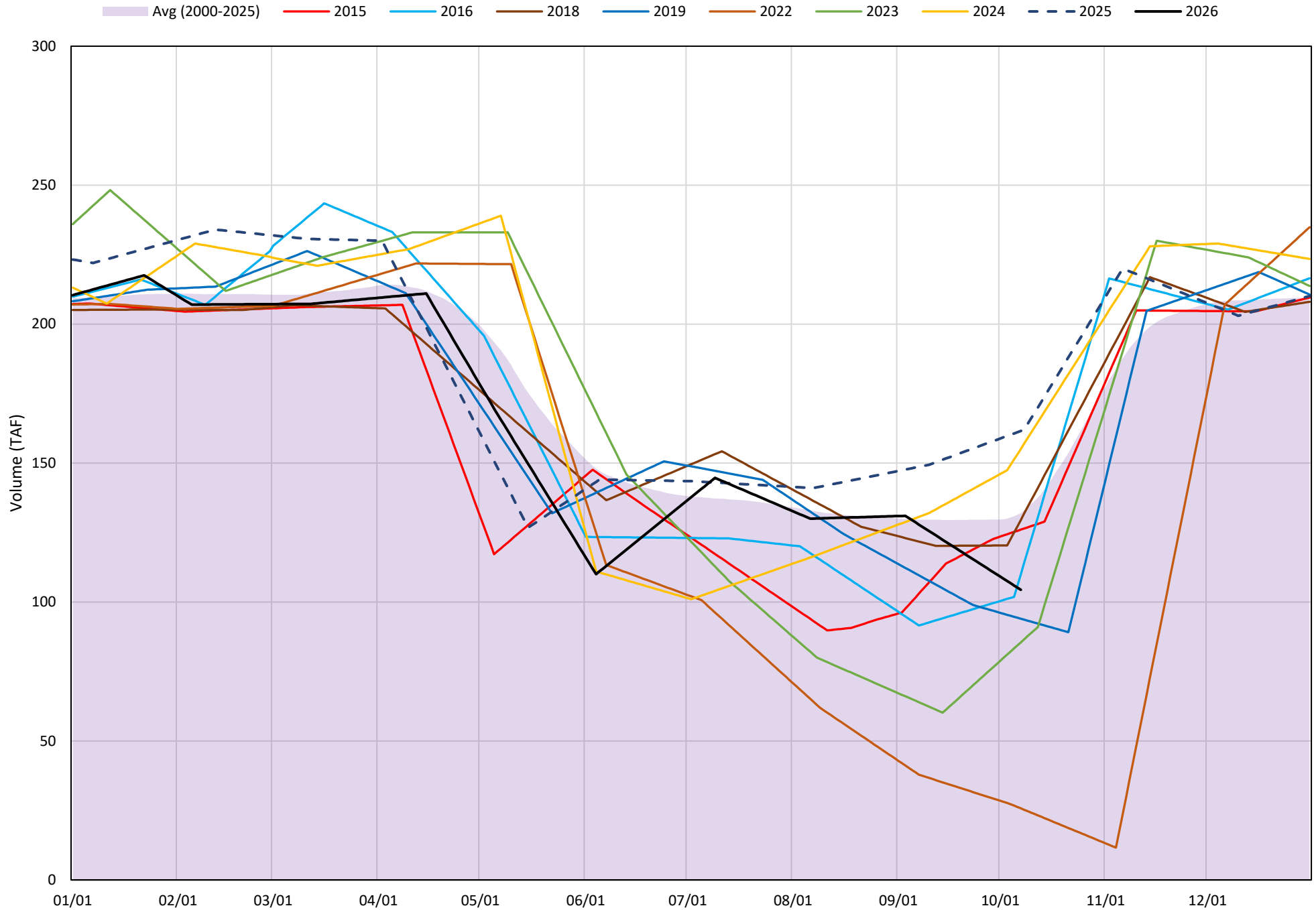
Trinity Lake Cold Water Pool Volume $\leq 48^{\circ}\text{F}$ - Percent Exceedances (2000-2025)



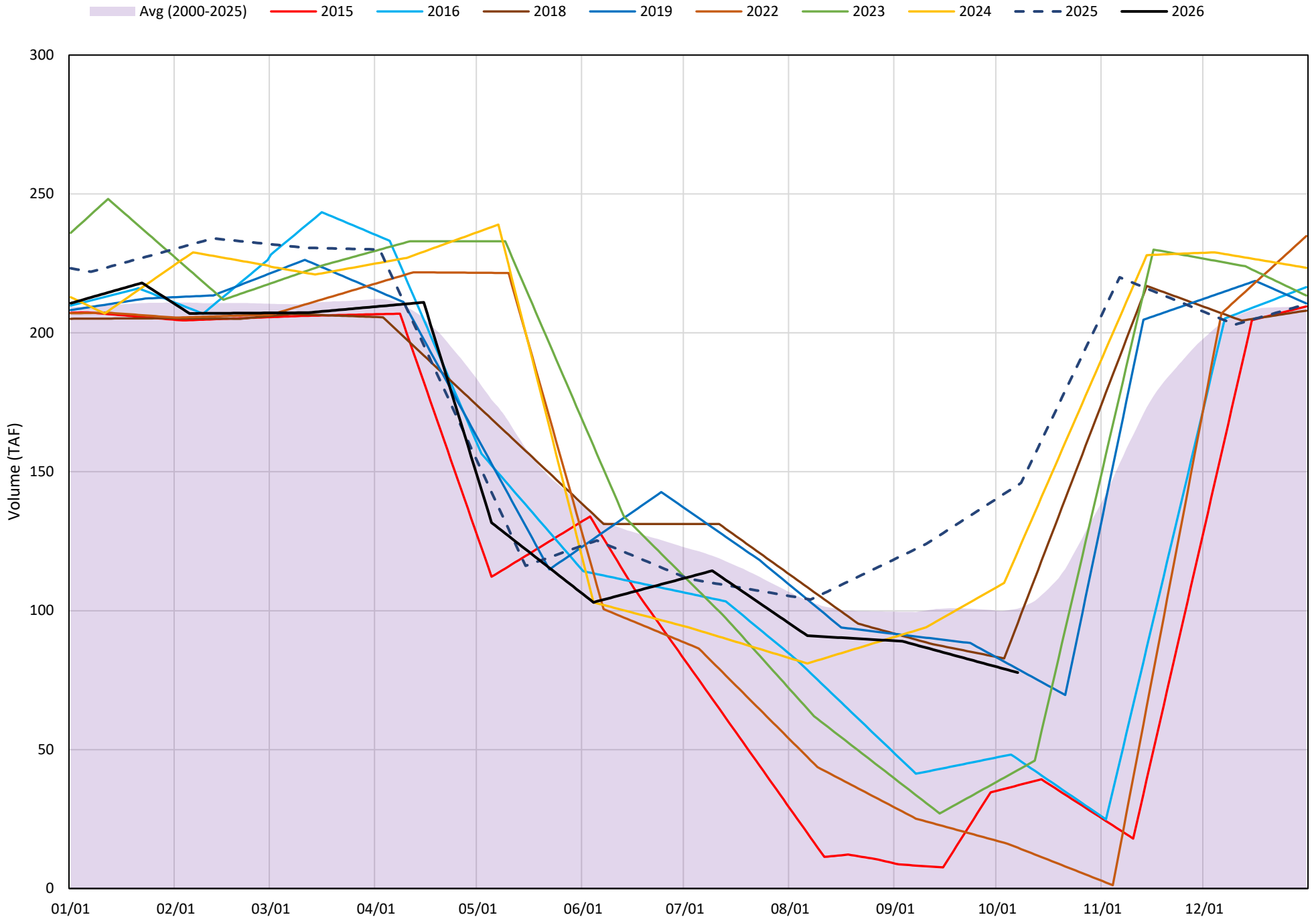
Whiskeytown Lake Isothermobaths Plot - 2026



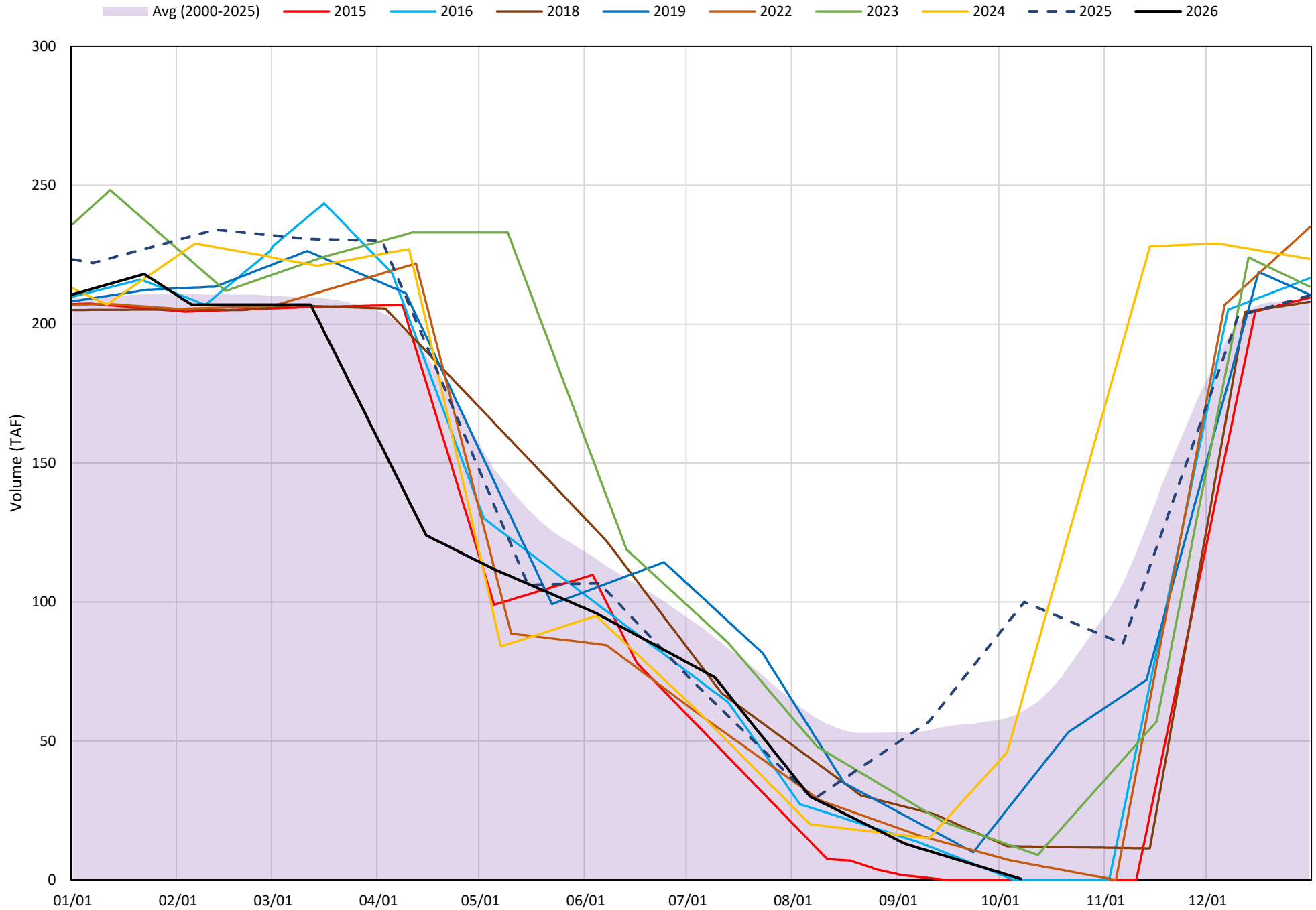
Whiskeytown Lake Cold Water Pool Volume ≤60°F



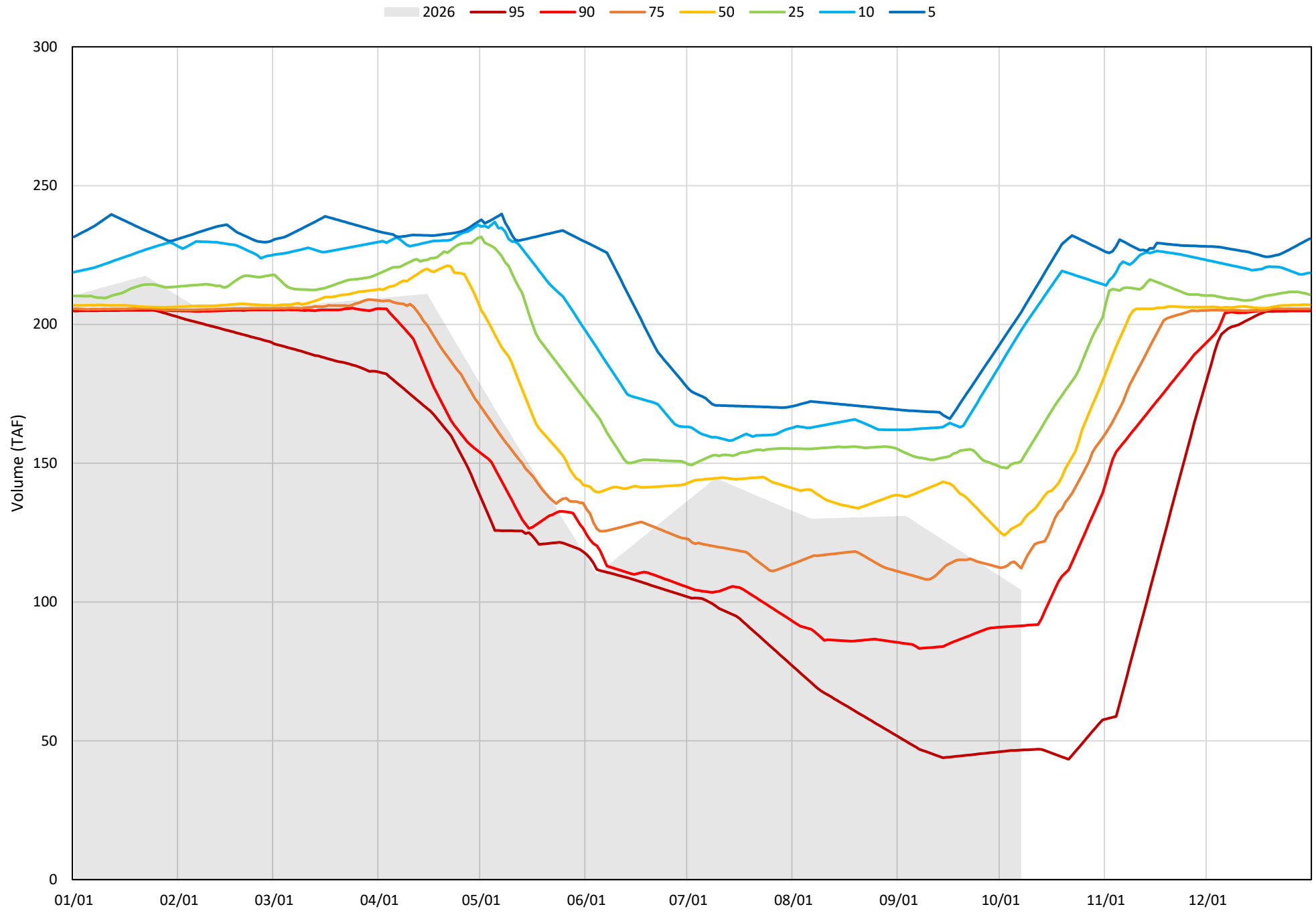
Whiskeytown Lake Cold Water Pool Volume ≤58°F



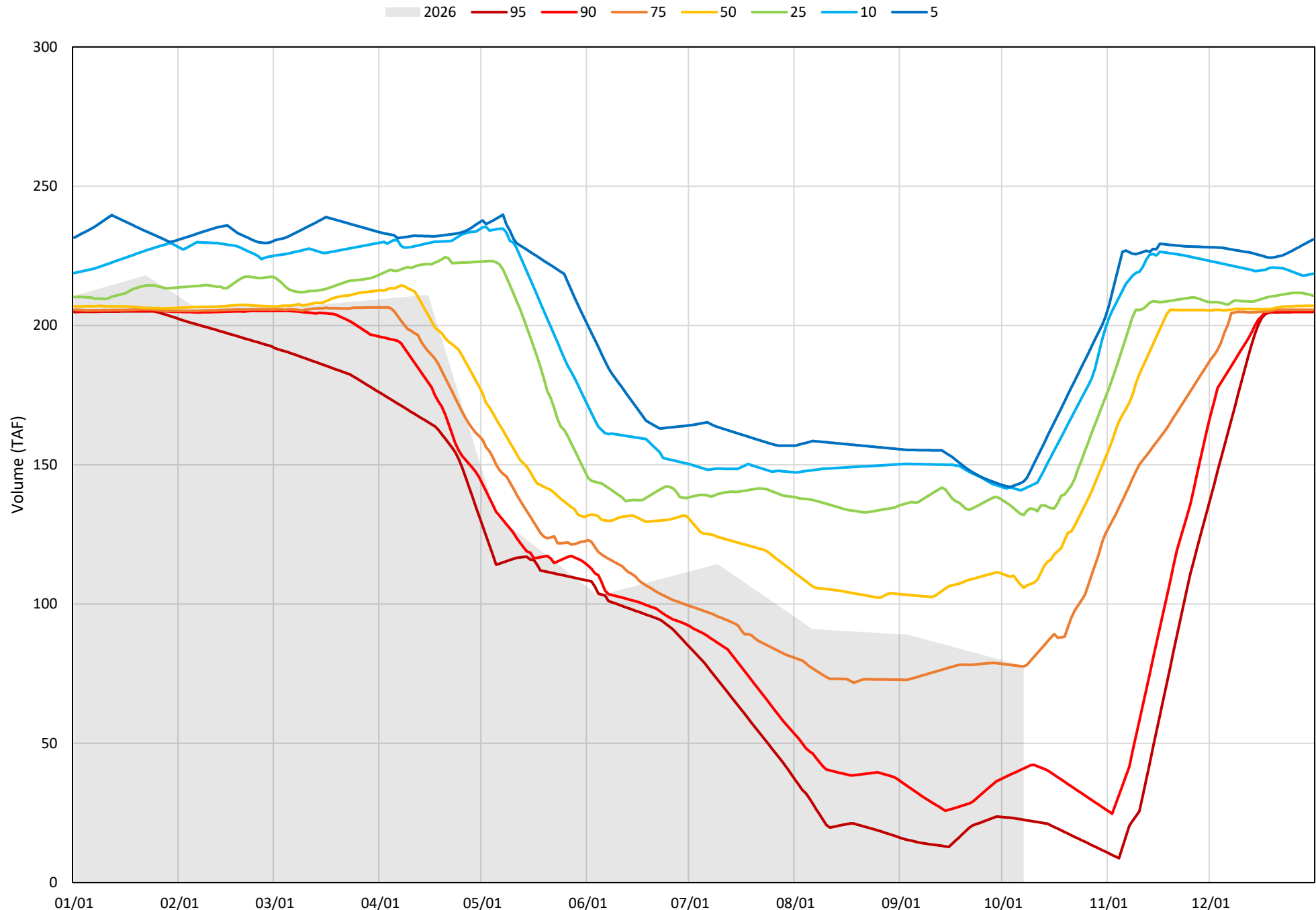
Whiskeytown Lake Cold Water Pool Volume ≤56°F



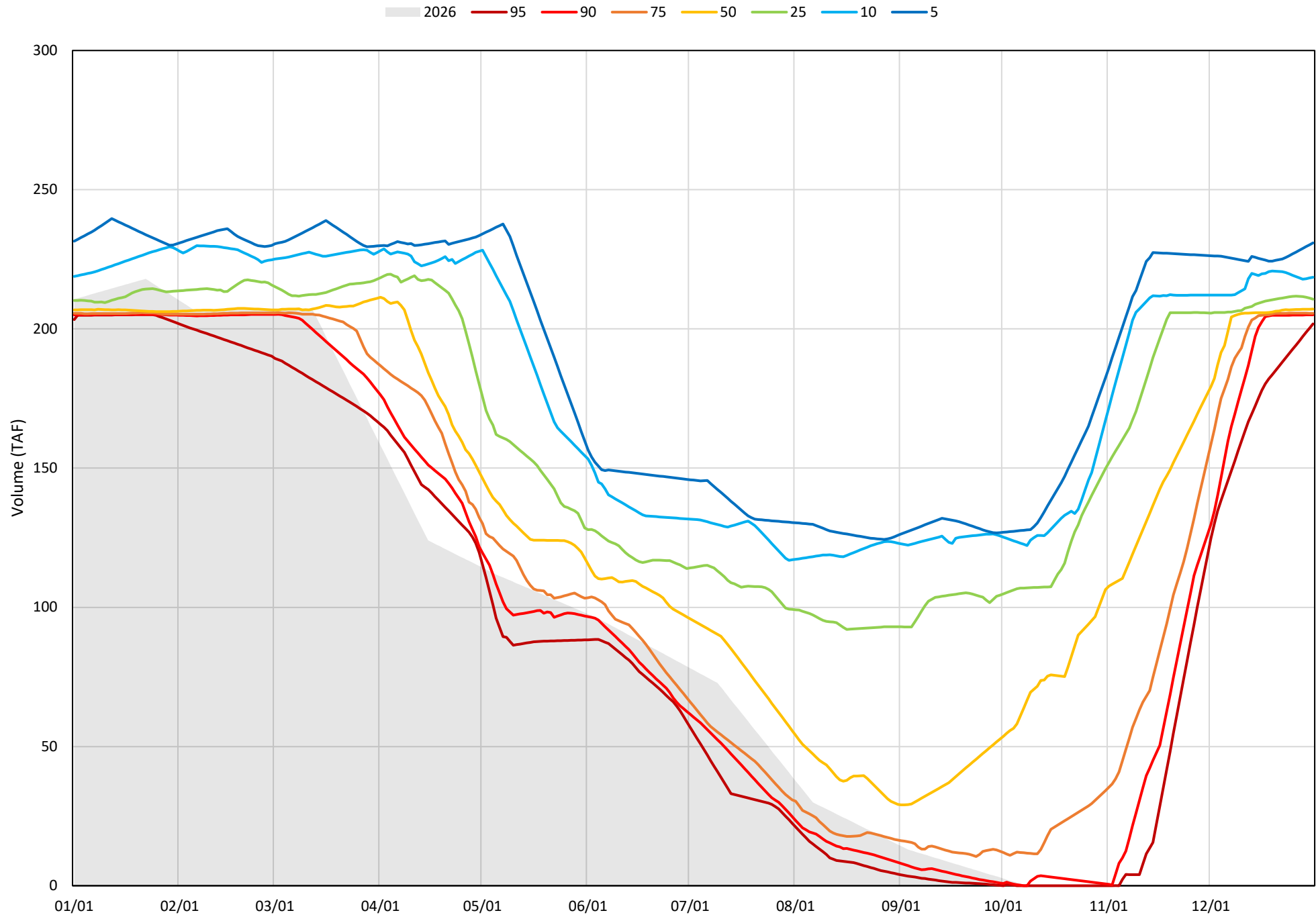
Whiskeytown Lake Cold Water Pool Volume ≤60°F - Percent Exceedances (2000-2025)



Whiskeytown Lake Cold Water Pool Volume ≤58°F - Percent Exceedances (2000-2025)



Whiskeytown Lake Cold Water Pool Volume $\leq 56^{\circ}\text{F}$ - Percent Exceedances (2000-2025)



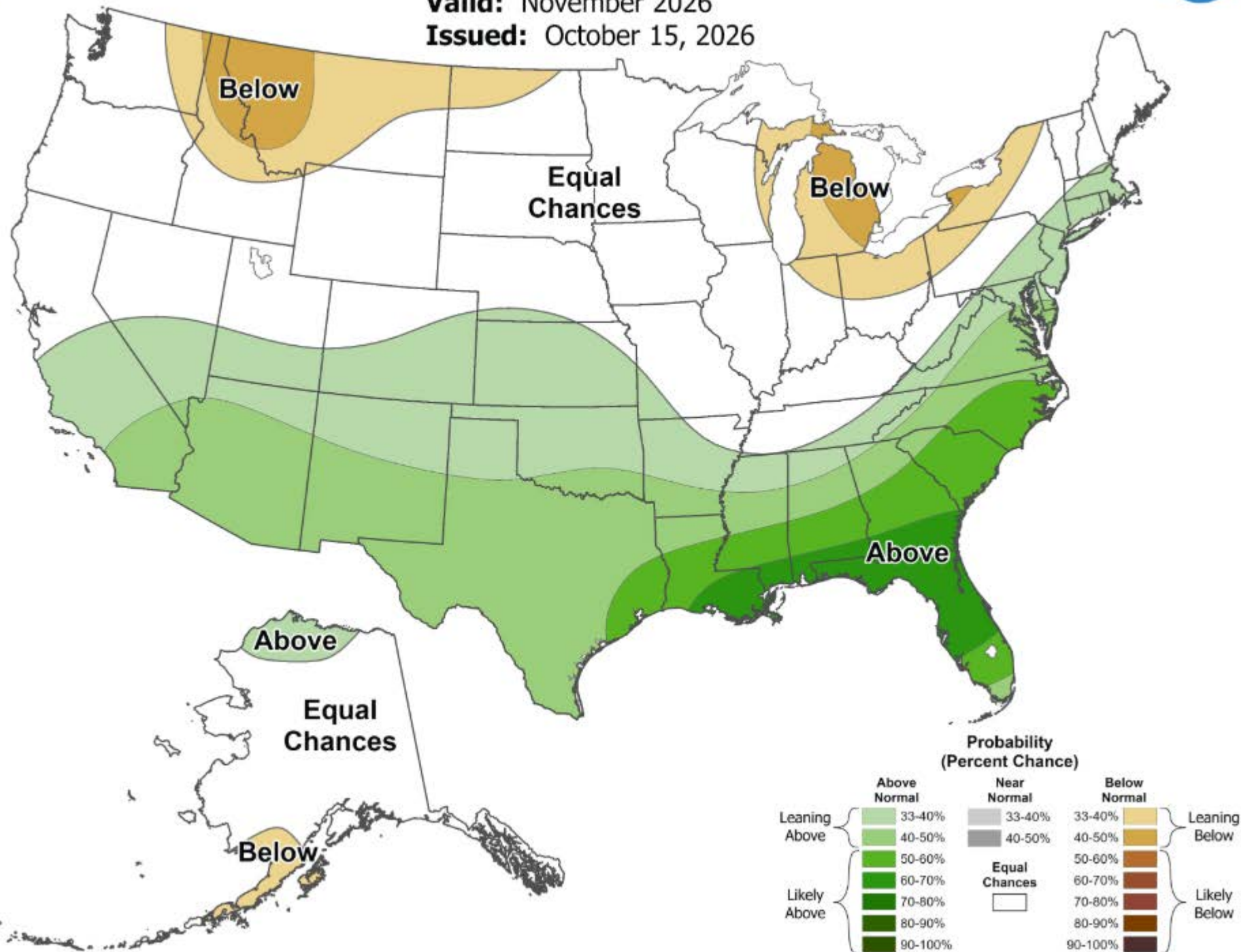


Monthly Precipitation Outlook



Valid: November 2026

Issued: October 15, 2026



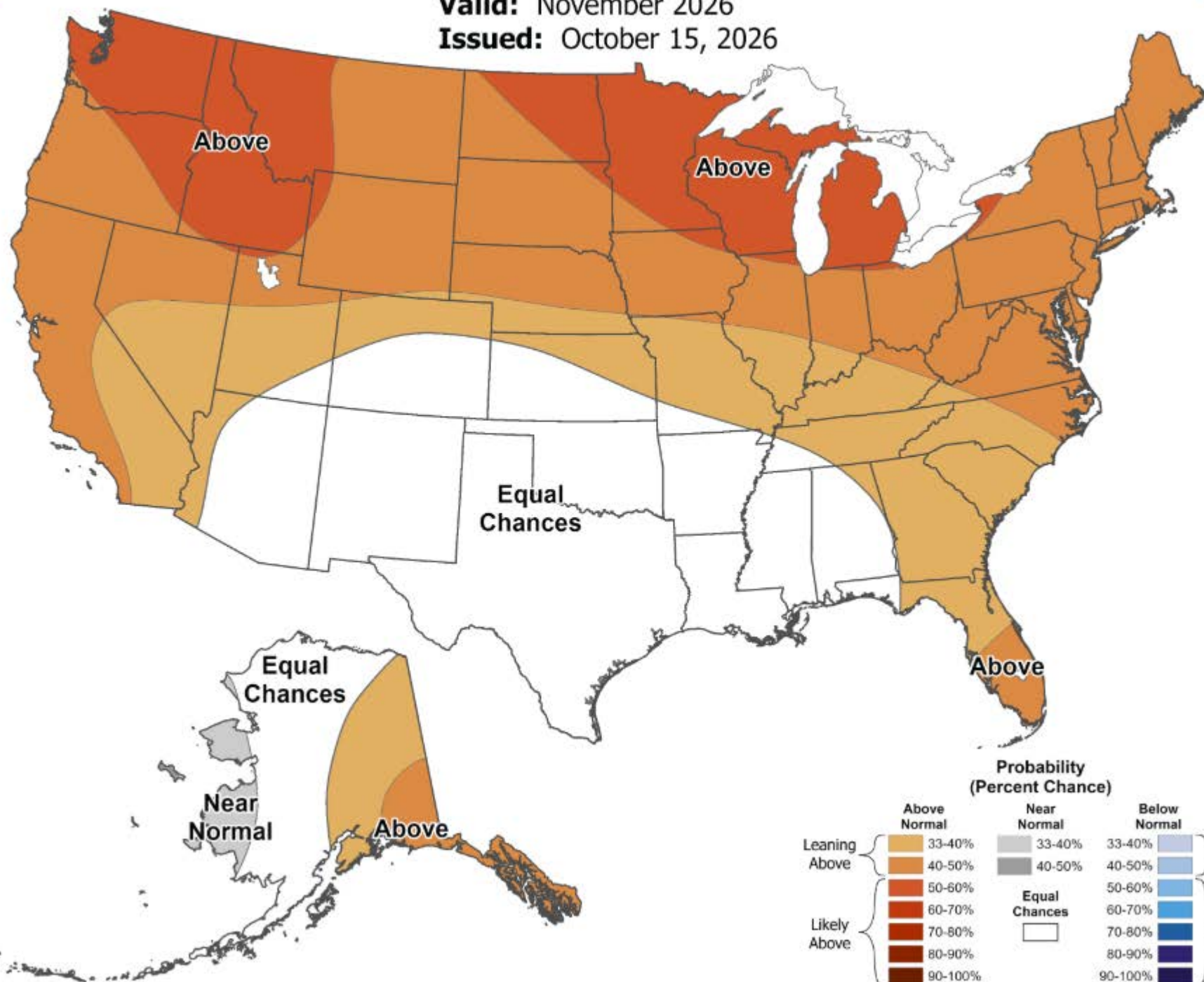


Monthly Temperature Outlook



Valid: November 2026

Issued: October 15, 2026



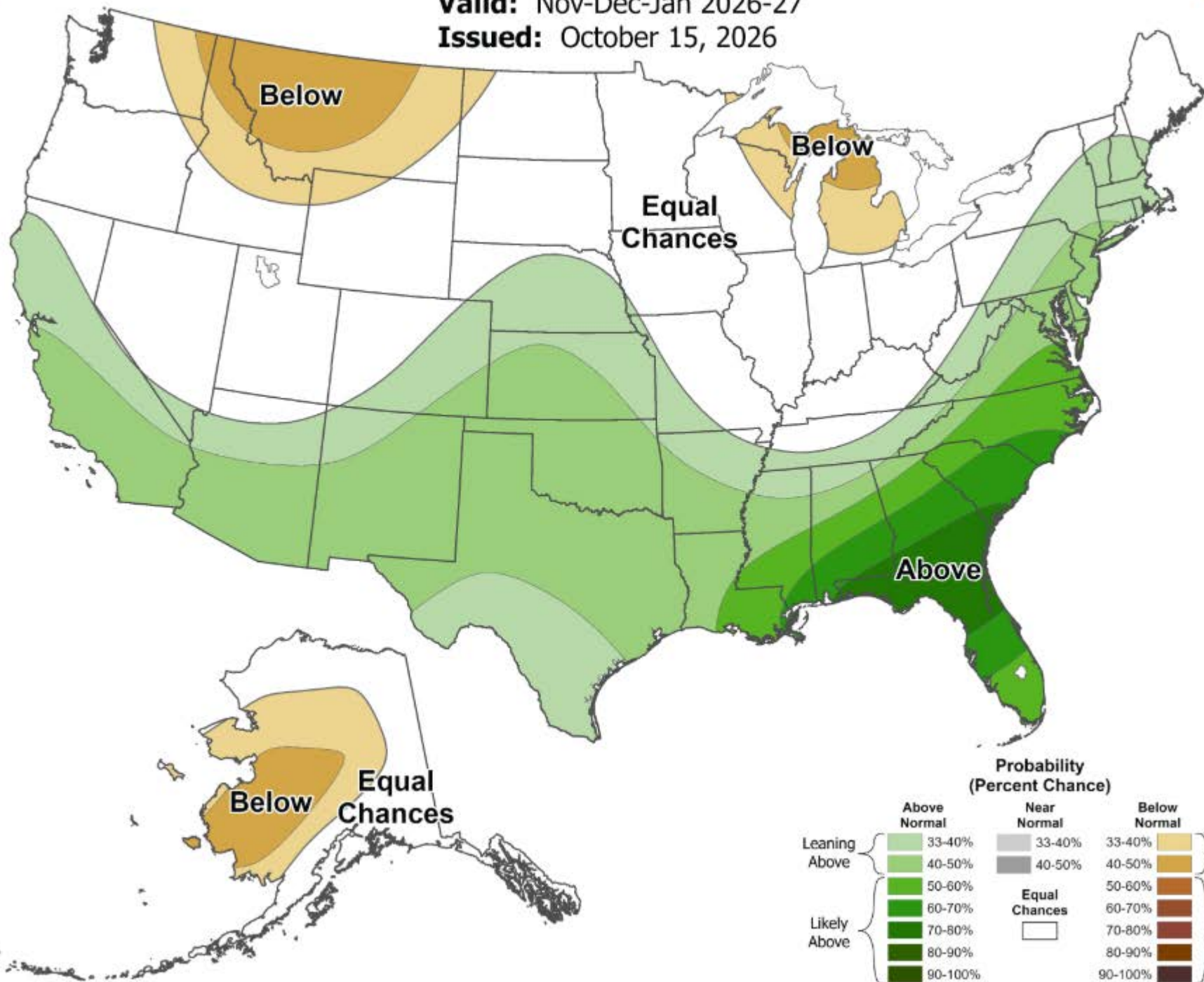


Seasonal Precipitation Outlook



Valid: Nov-Dec-Jan 2026-27

Issued: October 15, 2026



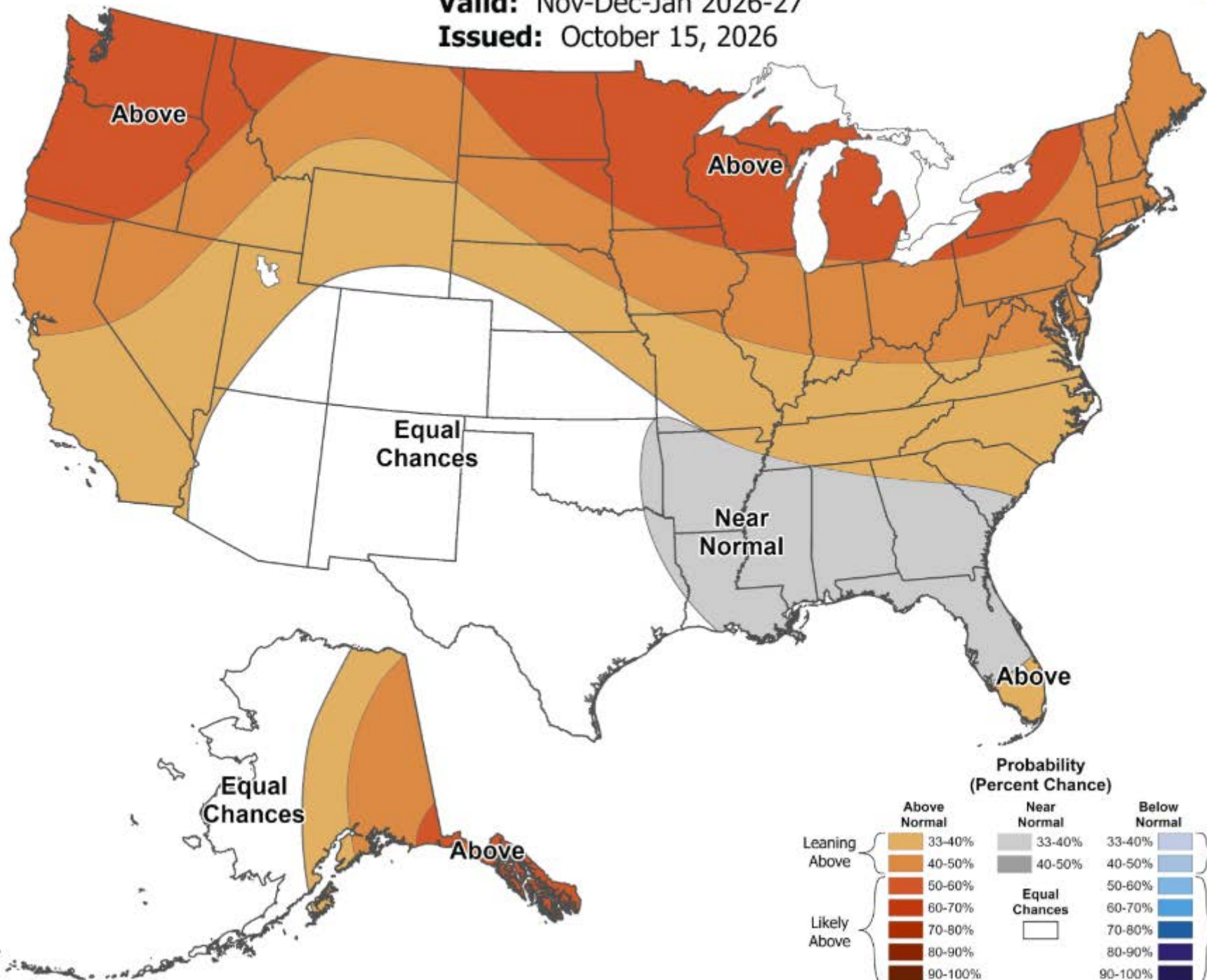


Seasonal Temperature Outlook



Valid: Nov-Dec-Jan 2026-27

Issued: October 15, 2026



Estimated CVP Operations 90% Exceedance

Storages

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

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trinity	1685	1662	1632	1575	1596	1633	1658	1671	1547	1436	1330	1178	1042
Elevation		2316	2314	2309	2311	2314	2316	2317	2307	2298	2288	2274	2260
Whiskeytown	238	206	206	206	206	206	206	206	238	238	238	238	238
Elevation		1199	1199	1199	1199	1199	1199	1199	1209	1209	1209	1209	1209
Shasta	2448	2273	2216	2267	2354	2418	2539	2513	2283	1987	1612	1291	1168
Elevation		973	969	972	977	980	986	985	973	957	933	910	900
Folsom	426	390	391	395	427	504	623	663	617	513	382	316	249
Elevation		402	402	402	407	417	431	435	430	418	400	390	378
New Melones	1533	1463	1477	1502	1538	1555	1571	1486	1391	1300	1226	1158	1104
Elevation		999	1001	1003	1007	1009	1011	1002	991	981	972	963	956
Federal San Luis	487	435	395	398	603	704	794	739	601	417	229	75	20
Elevation													
Total	6817	6430	6317	6343	6723	7020	7391	7278	6677	5891	5017	4256	3822

State End of the Month Reservoir Storage (TAF/Feet)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Oroville	1628	1444	1299	1232	1307	1463	1649	1736	1624	1323	957	670	589
Elevation		724	706	697	707	726	747	756	744	709	657	606	589
State San Luis	981	973	998	1043	1042	1058	1061	1007	909	784	609	443	301
Elevation													
Total San Luis (TAF)	1468	1408	1393	1441	1644	1763	1854	1746	1510	1201	838	519	320
Elevation		491	490	494	512	522	529	520	500	472	436	399	372

Monthly River Releases (TAF/cfs)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trinity		23	18	78	18	17	28	36	92	47	28	53	52
cfs		373	300	1,276	300	300	450	600	1,498	783	450	857	870
Clear Creek		18	18	18	18	17	18	15	18	13	7	6	7
cfs		300	300	300	300	300	286	247	295	215	113	100	120
Sacramento		369	327	264	246	250	200	357	523	553	615	553	357
cfs		6000	5500	4300	4000	4500	3250	6000	8500	9300	10000	9000	6000
American		86	76	75	52	46	49	123	172	173	193	109	101
cfs		1404	1272	1218	841	827	800	2070	2802	2915	3134	1768	1691
Stanislaus		50	12	12	12	16	12	27	25	11	9	9	9
cfs		813	200	200	200	293	200	460	400	189	150	150	150
Feather		215	74	77	77	58	49	48	61	212	255	221	119
cfs		3500	1250	1250	1250	1050	800	800	1000	3560	4150	3600	2000

Trinity Diversions (TAF)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Carr PP		11	35	12	7	0	5	31	97	89	99	98	84
Spring Crk. PP		25	20	0	0	0	0	25	50	75	90	90	75

Delta Summary (TAF)

Facility/Location/Metric	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Tracy		103	50	50	247	194	177	54	55	48	52	50	150
USBR Banks		0	0	0	0	0	0	0	0	0	13	13	13
Contra Costa		14.0	14.0	14.0	14.0	14.0	12.0	12.0	12.0	10.0	11.0	12.0	12.0
Total USBR		117	64	64	261	208	189	66	67	58	76	75	175
State Export		145	139	147	135	131	164	36	37	21	22	21	21
Total Export		262	203	211	396	339	353	101	104	79	98	96	196
COA Balance		5	5	0	-54	-54	-54	-12	48	49	49	49	49
Vernalis TAF		109	74	75	75	86	98	84	85	42	42	37	43
Vernalis cfs		1773	1242	1225	1225	1554	1599	1419	1377	710	687	605	722
Old/Middle R. calc. cfs		-3,074	-2,659	-2,682	-4,999	-4,592	-4,292	-1,262	-1,276	-1,293	-1,508	-1,520	-2,802
Computed DOI cfs		6507	7497	7499	7499	7510	7499	8388	7499	7497	8004	7499	6001
Excess Outflow cfs		0	0	0	0	0	0	0	0	0	0	0	0
% Export/Inflow		33%	27%	28%	47%	44%	44%	13%	13%	9%	10%	11%	26%
% Export/Inflow std.		65%	65%	65%	65%	45%	35%	35%	35%	35%	65%	65%	65%

Hydrology

Water Year Inflow (TAF)	Trinity	Shasta	Folsom	New Melones
Year to Date + Forecasted	466	2,964	1,229	443
% of mean	39%	54%	45%	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 50% Exceedance

Storages

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

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trinity	1685	1663	1662	1670	1785	1941	2149	2371	2193	2096	1984	1845	1740
Elevation		2316	2316	2317	2326	2337	2351	2365	2354	2347	2340	2330	2322
Whiskeytown	238	206	206	206	206	206	206	206	238	238	238	238	238
Elevation		1199	1199	1199	1199	1199	1199	1199	1209	1209	1209	1209	1209
Shasta	2448	2336	2302	2494	2936	3562	3983	4322	4445	4224	3722	3221	3037
Elevation		976	974	984	1005	1031	1047	1059	1063	1056	1037	1017	1009
Folsom	426	391	440	524	562	559	753	900	963	962	702	511	472
Elevation		402	409	419	424	424	445	459	465	465	439	418	413
New Melones	1533	1463	1491	1525	1574	1548	1545	1480	1411	1318	1264	1213	1172
Elevation		999	1002	1006	1011	1008	1008	1001	993	983	976	970	965
Federal San Luis	487	444	475	620	801	925	965	941	809	687	534	429	432
Elevation													
Total	6817	6503	6577	7038	7864	8741	9601	10219	10058	9526	8443	7457	7090

State End of the Month Reservoir Storage (TAF/Feet)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Oroville	1628	1504	1449	1561	1815	2183	2655	3055	3221	3018	2481	1972	1569
Elevation		731	725	737	765	799	839	868	880	865	825	780	738
State San Luis	981	884	834	947	924	930	853	722	549	422	484	494	608
Elevation													
Total San Luis (TAF)	1468	1328	1309	1567	1725	1855	1818	1664	1358	1109	1018	923	1040
Elevation		484	482	505	518	529	526	513	487	463	455	445	457

Monthly River Releases (TAF/cfs)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trinity		23	18	78	18	17	18	27	289	150	68	53	52
cfs		373	300	1,276	300	300	300	460	4,709	2,526	1,102	857	870
Clear Creek		18	18	18	18	17	18	15	18	13	7	6	7
cfs		300	300	300	300	300	286	247	295	215	113	100	120
Sacramento		369	327	246	246	222	492	416	492	654	799	768	416
cfs		6000	5500	4000	4000	4000	8000	7000	8000	11000	13000	12500	7000
American		86	60	71	141	233	154	250	261	196	369	271	104
cfs		1400	1004	1160	2300	4200	2500	4200	4250	3300	5996	4415	1750
Stanislaus		50	12	12	12	91	102	105	95	87	15	15	15
cfs		813	200	200	200	1637	1663	1763	1541	1469	250	250	250
Feather		184	74	77	65	58	65	62	65	297	492	498	476
cfs		3000	1250	1250	1050	1050	1050	1050	1050	5000	8000	8100	8000

Trinity Diversions (TAF)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Carr PP		12	19	3	1	0	0	1	121	93	94	96	57
Spring Crk. PP		30	15	15	32	47	37	18	90	90	90	90	50

Delta Summary (TAF)

Facility/Location/Metric	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Tracy		160	131	197	235	234	260	148	169	250	256	253	250
USBR Banks		0	0	0	0	0	0	0	0	0	13	13	13
Contra Costa		14.0	16.0	18.0	14.0	14.0	12.7	12.7	12.7	9.8	11.1	12.7	14.0
Total USBR		174	147	215	249	248	273	161	182	260	280	279	277
State Export		130	143	289	155	182	200	60	49	168	390	380	367
Total Export		304	290	504	404	430	473	221	231	428	670	659	644
COA Balance		16	0	0	0	0	0	0	0	-16	-16	-16	-16
Vernalis TAF		119	83	83	91	190	210	194	187	134	54	52	57
Vernalis cfs		1935	1393	1355	1485	3420	3420	3263	3041	2259	884	852	956
Old/Middle R. calc. cfs		-3,527	-3,717	-6,293	-4,982	-5,014	-4,972	-1,976	-2,116	-5,111	-8,586	-8,457	-8,495
Computed DOI cfs		6507	8001	8004	15714	22909	24970	17919	11615	9497	9500	8996	6505
Excess Outflow		0	0	0	7711	11509	13567	6522	1188	0	0	0	504
% Export/Inflow		35%	33%	49%	30%	25%	23%	15%	20%	35%	43%	44%	52%
% Export/Inflow std.		65%	65%	65%	65%	45%	35%	35%	35%	35%	65%	65%	65%

Hydrology

Water Year Inflow (TAF)	Trinity	Shasta	Folsom	New Melones
Year to Date + Forecasted	1428	5,552	2,403	917
% of mean	118%	100%	88%	87%

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

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CVP releases or export values represent monthly averages.

CVP Operations are updated monthly as new hydrology information is made available December through May.

Temperature-Dependent Mortality (TDM) Estimates for the 2026 Sacramento River Temperature Management Season

October 21, 2026

Southwest Fisheries Science Center · UC Santa Cruz · CVTEMP Operational Platform

The Southwest Fisheries Science Center (SWFSC) simulated one Keswick release scenario, a USBR 90th-exceedance forecast (Forecast_90), to evaluate temperature-dependent mortality (TDM). The Forecast_90 values were provided by USBR in the September 90% forecast. The scenario was forced with hydrology from the May B120 90th percentile Shasta inflow, meteorology from the historical year 2014, selected as a representative warm year consistent with the NOAA seasonal outlook for 2026, and a downstream temperature target at Clear Creek of 53.6 °F. TDM was estimated using the stage-independent egg-mortality model (Martin et al., 2017) and the stage-dependent model (Anderson et al., 2022) over 13 historical redd-year distributions (2013–2025).

Carcass survey data were used as a second method of estimating where and when spawning occurred, alongside the aerial redd survey data, over the same 13 years. Data from the 2026 season were also used to estimate this year's TDM: the 2026 aerial redd survey, and the 2026 carcass survey are provided as a provisional estimate.

Predicted mean monthly water temperatures are shown in Table 1. These are monthly averages of daily mean water temperatures under the September Forecast_90 scenario at three sites, Shasta, Keswick, and CCR, from October through December. October is now mostly observed rather than forecast: observed CCR temperatures over 1–20 October averaged 56.9 °F, about 2 °F warmer than the September summary forecast for the same days.

Over 2013–2025, the choice of mortality model mattered more than the spawning distribution. Population-mean TDM was 25% (range 15–54) stage-independent versus 5% (0–24) stage-dependent using redd distributions, and 23% (15–38) versus 5% (1–13) using carcass distributions. 2025 was the highest year in all but the carcass stage-dependent case (redd: 54% and 24%; carcass stage-independent: 38%). Stage-independent values are up from the September summary (17% redd, 16% carcass) because of warmer observed early-October temperatures; stage-dependent values are unchanged.

Carcass and aerial survey data for 2026 added further context (Table 5). The 2026 carcass distribution is strongly upstream-weighted, with 66% of carcasses recovered in section 1 (nearest Keswick Dam) against 39% in 2025, and it has run earlier: the median spawn date is 15 July for 2026 against 19 July for 2025. The carcass survey data stage-independent TDM of 31% is now close to final. The newly updated 2026 aerial redd survey gives the same stage-independent estimate, 31%.

Below is a summary of the model setup, followed by results.

For additional details see <https://cvtemp.ucsc.edu/>

1. Overview

Total release scenarios simulated: 1

- Keswick (KWK) release scenario based on USBR September 90% operations forecast (Forecast_90)

TDM Forecast start date: 04/01/2026

Reservoir Forecast start date: 10/21/2026

Simulation start date: 09/21/2026

Simulation end date: 12/31/2026

Models used:

Shasta Reservoir	CE-QUAL-W2 hydrodynamic model (Cole & Wells, 2006; Daniels et al., 2018)
Keswick Reservoir	CE-QUAL-W2 hydrodynamic model (Cole & Wells, 2006)
Upper Sacramento River	RAFT river temperature model (Pike et al., 2013; Daniels et al., 2018)
Temperature-dependent egg mortality	Stage-independent model (Martin et al., 2017) & Stage-dependent model (Anderson et al., 2022)

2. Reservoir Release Scenarios

A single reservoir release scenario was simulated and paired with a Spring Creek (SPP; Trinity import) profile.

Keswick Releases (CFS) — monthly mean

Label	Description	Oct	Nov	Dec
Forecast_90	USBR 90th exceedance flow forecast	5750	5100	4000

Trinity Imports via Spring Creek PP (TAF/month)

Month	Oct	Nov	Dec
Release	85	40	0

3. Hydrology

All simulations were forced with DWR Bulletin 120 (B120) Shasta Reservoir inflow forecasts at the exceedance level of 90th percentile. Exceedance level affects only Shasta Reservoir inflow.

Inflow method: B120 (DWR Bulletin 120)

B120 file date: May 2026

Exceedance level: 90th percentile

4. Meteorology

All simulations used the meteorological time series from the historical record for year 2014 applied over the full forecast window (10/21/2026 – 12/31/2026). Over the hindcast window (4/01/2026 – 10/21/2026) output from the Global Forecast System (GFS; NCEP 2004) was used. The 2014 meteorological year was selected for this single-year simulation as a representative warm-year condition. Previous analyses (shared 5/11/2026) identified 2014 as a comparatively warm year in the historical record, and the NOAA 90-day seasonal outlook (as of 9/17/2026) projects leaning-above-normal temperatures across the Shasta region for Oct through December.

5. Initial Shasta Conditions

Temperature profile date: 09/21/2026

6. Temperature Window / Target Parameters

All scenarios share the same temperature window shaping parameters.

Target location	Clear Creek (CCR)
Window temperature	12.0°C (53.6°F)
Shoulder temperature	NA
Window length	26 weeks
Center date	08/15/2026
Window start (derived)	05/16/2026
Window end (derived)	11/14/2026

7. TDM Model Parameters

All scenarios estimated TDM based on two models.

Model	Tcrit (°C)	bT (°C ⁻¹ day ⁻¹)	Critical window	egg data source
Stage-independent	12.00	0.0240	Deposition to emergence	Aerial and carcass survey **
Stage-dependent	11.82	0.4361	4 days prior to hatch	Aerial and carcass survey **

*see references for more information

**note, stage-independent model was calibrated with aerial survey data and stage-dependent model was calibrated using carcass survey data

Disclaimer

Results presented here are derived from numerical simulation and statistical models. All models are simplifications of complex physical and biological systems subject to structural uncertainty, parameter uncertainty, and errors in boundary condition data. Model outputs should not be interpreted as precise predictions or relied upon as the sole basis for operational or regulatory decisions without independent validation and expert judgment. Specifically, the CE-QUAL-W2 simulations include an automated Temperature Control Device (TCD) gate selection algorithm that adjusts Shasta Dam outlet configurations to minimize deviation from a prescribed downstream temperature target. This algorithm may achieve temperature targets with greater consistency than is attainable in real-world operations. These simulations carry additional biological uncertainty as well: the temperature-dependent mortality (TDM) estimates translate simulated water temperatures into predicted mortality using relationships that are themselves simplified statistical representations calibrated from laboratory and field observations. Therefore, simulation results are intended to evaluate the relative merit of alternative strategies, not to guarantee achievable outcomes.

RESULTS

8. Mean Monthly Temperatures

To provide context for the TDM results that follow, mean monthly water temperatures from the SWFSC simulations are shown (Table 1) at three locations: Shasta Dam release, Keswick Dam release, and Clear Creek (CCR). Values represent the mean across a single meteorology source used to drive the simulation.

Table 1. Mean monthly water temperatures (°F) based on daily means at Shasta Reservoir, Keswick Reservoir, and Clear Creek Gage (CCR) for October–December 2026 under the September Forecast_90 scenario from the SWFSC models.

Month	SWFSC Forecast_90		
	Shasta (°F)	Keswick (°F)	CCR (°F)
October	54.3	55.9	56.2
November	57.2	56.3	56.2
December	56.3	55.5	55.2

9. TDM Results

For the SWFSC temperature model, TDM is computed using the stage-independent temperature dependent egg mortality model (Martin *et al.*, 2017) and the stage-dependent model (Anderson *et al.*, 2022), run over 13 historical year distributions of redd and carcass data (2013–2025). Table 2 summarizes the population-mean TDM (with range across years) and the year 2025 case. Full year-by-year values are provided in Table 3 and Table 4.

Table 2. Predicted egg-to-fry mortality (%) under the September Forecast_90 scenario for the SWFSC temperature source, two mortality models (stage-independent and stage-dependent), and redd- and carcass-based spawning distributions. Each source shows the 2013–2025 population mean (range in parentheses) and the 2025 value.

Model	SWFSC Forecast_90	
	Population mean (2013–2025)	Year 2025
Redd Stage-independent	25 (15-54)	54
Carcass Stage-independent	23 (15-38)	38
Redd Stage-dependent	5 (0-24)	24
Carcass Stage-dependent	5 (1-13)	9

Table 3. Mean annual TDM (%) by redd and carcass year under the **stage-independent model** for the single flow scenario for the SWFSC temperature models. Values are mean TDM across all redds within each year (i.e., population average). *Estimates of uncertainty are available upon request.

	SWFSC Forecast_90	
Redd Year	Redd stage-independent model	Carcass stage-independent model
2013	31	23
2014	20	19
2015	23	17
2016	24	21
2017	34	35
2018	18	32
2019	21	18
2020	16	19
2021	15	19
2022	19	18
2023	30	15
2024	22	21
2025	54	38
Population Mean (2013-2025)	25	23
Population Min (2013-2025)	15	15
Population Max (2013-2025)	54	38

Notes: Values are weighted by observed count per year and represent an annual mean value of TDM for a population.

Table 4. Mean annual TDM (%) by redd and carcass year under the **stage-dependent model** for the single flow scenario for the SWFSC temperature models. Values are mean TDM across all redds within each year (i.e., population average). *Estimates of uncertainty are available upon request.

	SWFSC Forecast_90	
Redd Year	Redd stage-dependent model	Carcass stage-dependent model
2013	3	3
2014	1	1
2015	3	2
2016	9	4
2017	2	13
2018	0	7
2019	8	4
2020	3	3
2021	1	3
2022	1	2
2023	4	2
2024	8	8
2025	24	9
Population Mean (2013-2025)	5	5
Population Min (2013-2025)	0	1
Population Max (2013-2025)	24	13

Notes: Values are weighted by observed count per year and represent an annual mean value of TDM for a population.

10. Provisional 2026 Carcass and Aerial Temperature-Dependent Mortality

Under the September forecast, the 2026 carcass-year distribution yields a stage-independent temperature-dependent mortality of 31%, against 38% for the completed 2025 distribution. The 2026 aerial redd survey distribution yields 31%, against 54% for 2025.

Table 5. Provisional 2026 estimate from carcass and aerial survey data

Spawning distribution	SWFSC Forecast_90	
	Stage-independent	Stage-dependent
2026 aerial redd survey	31	3
2026 carcass survey	31	5
2025 redd, for comparison	54	24
2025 carcass, for comparison	38	9

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