BUREAU OF RECLAMATION

The Sacramento River Group

Thursday, September 24, 2026
1:00 pm – 3:00 pm
Virtual (Online) Meeting Only
Teams Meeting: JOIN HERE; +1 321-209-6143, 145576470#

Table 1. Agenda

No.	Topic	Presenter
1	**Welcome, Roll Call, Agenda Review**	Mia Schiappi, Kearns & West
2	**Hydrology and Operations Update** • Temperature Management Plan/Power Bypass • Fall Flows Report Out Objective: report on the latest data and information regarding current hydrologic conditions, including temperatures and flows, and implications for the Sacramento River System	Tom Patton, Reclamation
3	**CDFW Sacramento River Fish Monitoring Update** • Carcass Surveys • Redd Counts • Stranding and Dewatering surveys Objective: share the latest state agency information about fish movement and conditions that might affect temperature management	Jamie Ebnal, CDFW
4	**USFWS Fish Conditions, Forecasts and Hatchery Updates** • Fall Run Chinook Salmon Update – Brett Galyean, Coleman National Fish Hatchery • No Current Updates • 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 Objective: share the latest federal agency information regarding hatchery activities, fish movement and related conditions that might affect temperature management	Brett Gaylean, USFWS Kaitlin Dunham, USFWS Bill Poytress, USFWS
5	**TDM Updates** • SWFSC Updates Objective: Discuss the TDM Model Updates	Miles Daniels, SWFSC

No.	Topic	Presenter
6	**Additional Announcements & Review Action Items**	Mia Schiappi, Kearns & West
7	**Adjourn**	All

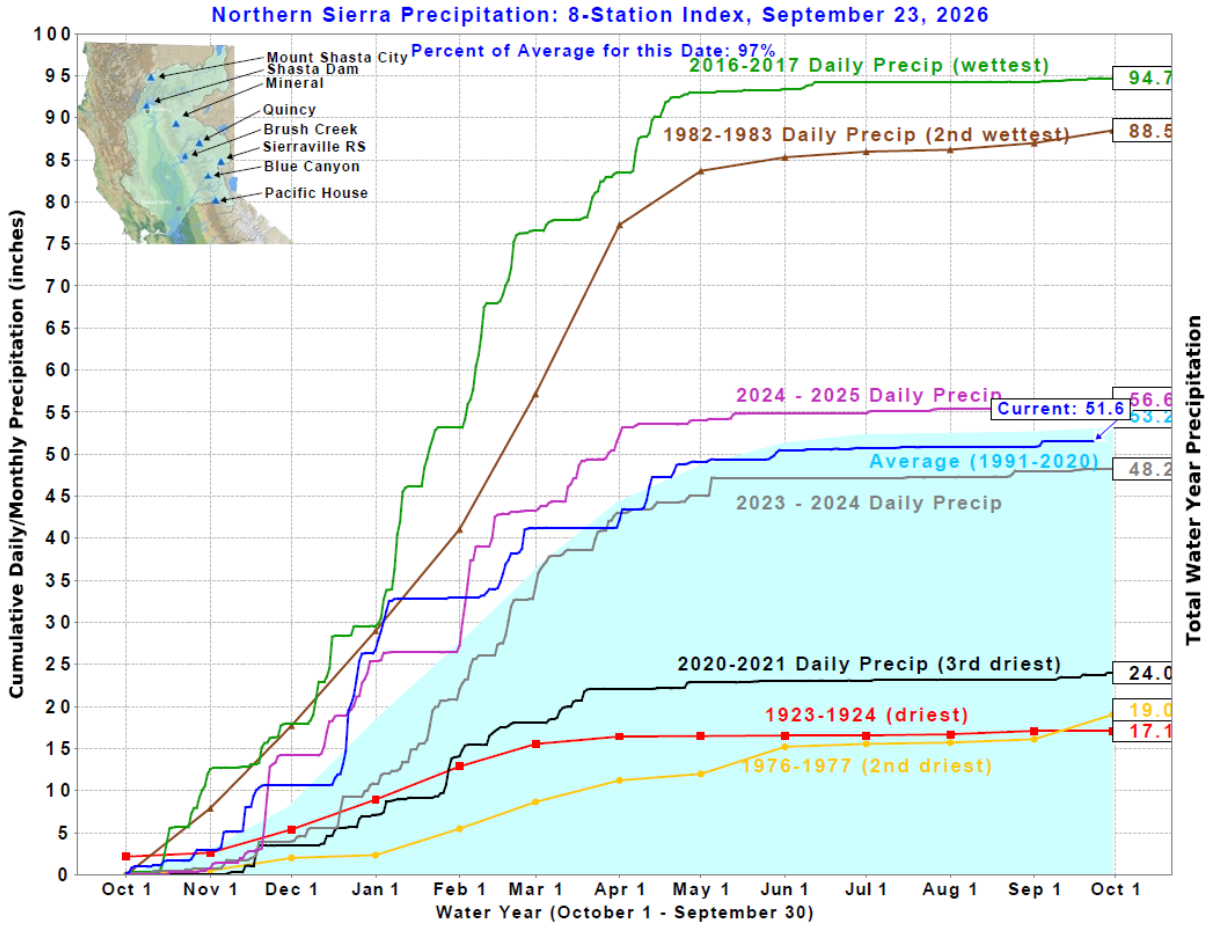


Figure 1. Northern Sierra Precipitation: 8-Station Index, September 23, 2026

Northern Sierra 8-Station precipitation index for Water Year 2024-2025 through September 23, 2026. Cumulative precipitation is 51.6 inches, approximately 97% of the historical average of 53.2 inches for this date. Current conditions are below the wettest historical years (88.5 to 94.7 inches) and well above the driest years (17.1 to 24.0 inches).

Table 2. Reservoir Releases in Cubic Feet/Second

Reservoir	Dam	WY 2025	WY 2026	15 Yr Median
Trinity	Lewiston	438	853	461
Sacramento	Keswick	7,404	5,970	6,900
Feather	Oroville (SWP)	6,271	8,000	4,500
American	Nimbus	1,666	1,804	1,768
Stanislaus	Goodwin	205	202	205
San Joaquin	Friant	241	375	375

Table 3. Storage in Major Reservoirs in Thousands of Acre-Feet

Reservoir	Capacity	15 Yr Avg	WY 2025	WY 2026	% of 15 Yr Avg
Trinity	2,448	1,435	1,977	1,793	125
Shasta	4,552	1,335	1,855	1,702	127
Folsom	977	2,395	2,718	2,487	104
New Melones	2,420	445	453	435	98
Fed. San Luis	966	1,309	1,623	1,541	118
Total North CVP	11,363	330	249	475	144
Millerton	521	5,814	6,898	6,640	114
Oroville (SWP)	3,425	265	258	231	87

Table 4. Accumulated Inflow for Water Year to Date in Thousands of Acre-Feet

Reservoir	Current WY 2026	WY 1977	WY 1983	15 Yr Avg	% of 15 Yr Avg
Trinity	1,095	217	2,880	1,061	103
Shasta	4,920	2,553	10,718	4,741	104
Folsom	2,439	351	6,499	2,508	97
New Melones	779	N/A	2,734	971	80
Millerton	1,472	366	4,647	1,565	94

Table 5. Accumulated Precipitation for Water Year to Date in Inches

Reservoir	Current WY 2026	WY 1977	WY 1983	Average (N Years)	% of Average	Last 24 Hours
Trinity at Fish Hatchery	31.54	13.79	56.67	30.83 (66)	102	0.00
Sacramento at Shasta Dam	69.79	24.37	114.50	60.05 (71)	116	0.00
American at Blue Canyon	59.36	17.51	104.10	64.57 (52)	92	0.00
Stanislaus at New Melones	28.42	NA	46.48	26.71 (49)	106	0.00
San Joaquin at Huntington Lk	31.51	17.60	83.40	40.17 (53)	78	0.02

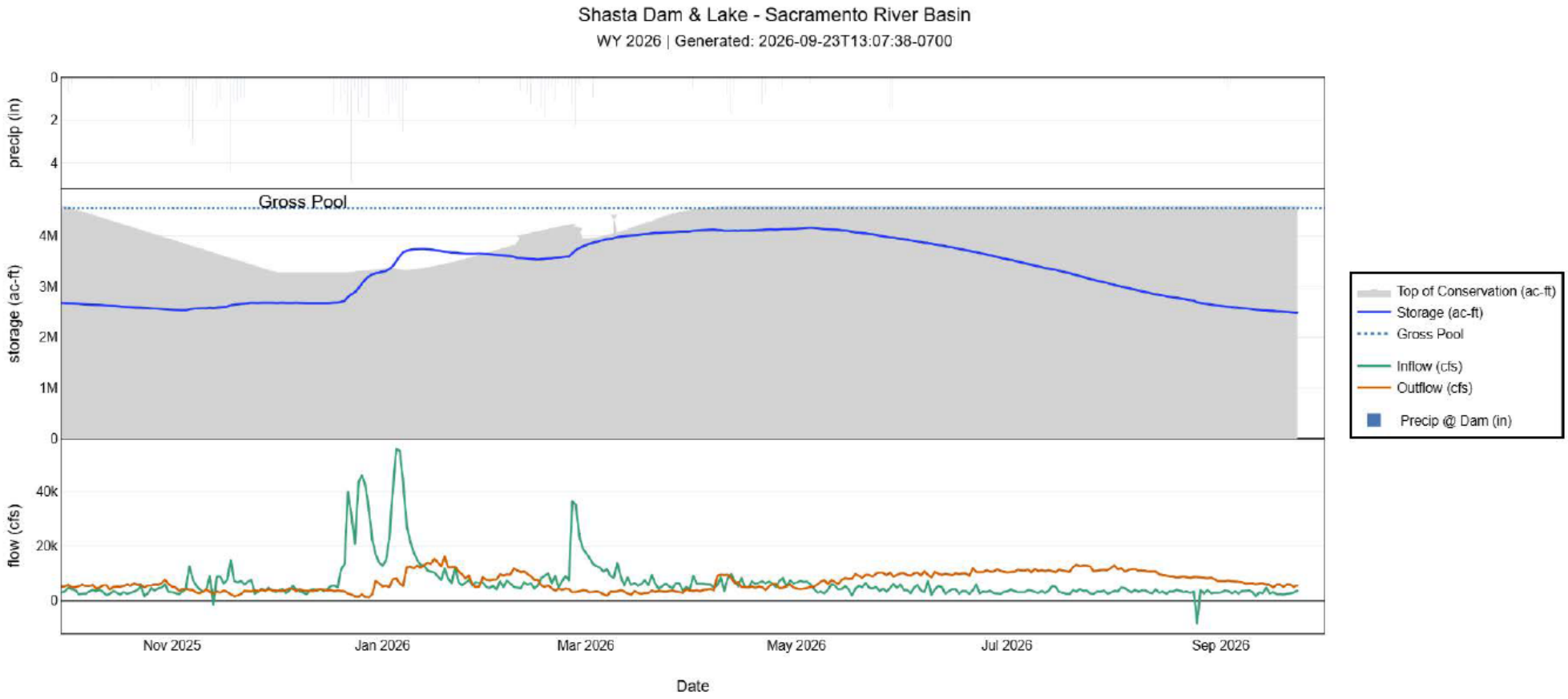


Figure 2. Shasta Dam & Lake – Sacramento River Basin

Shasta Dam and Lake storage, inflow, outflow, and precipitation for Water Year 2026 through September 23, 2026. Reservoir storage increased from about 2.6 million acre-feet in autumn 2025 to a peak near 4.1 million acre-feet in spring 2026, then declined to about 2.5 million acre-feet by late September. Peak inflows occurred during winter storm events in January and March, while outflows generally increased during summer. Storage remained below the gross pool level throughout the water year.

Table 6. Sacramento River Station Temperature Summary Report

Date	MDWT TCD[1]	MDWT SHD	MDWT SPP[1]	MDWT KWK	MDWT SAC	MDWT CCR[2]	MDWT BSF	MDWT BND	MDWT RDB	MDWT IGO	MDWT LWS	MDWT DGC	MDWT NFH	MDR Shasta Gene-ra-tion	MDR Spring Creek PP	MDR Keswick Total	MDAT RDD	MDAT BSF	MDAT RDB
Aug	51.8	50.8	58.5	52.6	53.1	53.7	55.1	56.5	58.1	58.8	51.2	59.2	64.7	9909	1292	11414	82.9	77.2	77.6
09/01	52.4	51.6	58.4	53.0	53.3	53.7	55.0	56.6	58.1	56.4	51.1	54.0	57.0	7290	363	7992	64.5	63.4	63.6
09/02	52.4	51.7	58.6	52.7	52.9	53.2	54.3	55.5	56.9	56.3	51.0	53.0	55.2	7262	363	7971	63.0 E	62.1	66.2
09/03	52.6	51.9	58.8	52.5	52.7	52.9	53.7	54.5	55.6	56.5	50.5	52.3	54.4	7491	487	7624	59.0 E	61.2	63.9
09/04	52.8	52.2	58.5	52.8	53.2	53.7	55.0	55.3	56.0	56.8	49.7	52.3	54.4	7239	487	7773	62.5	62.7	64.2
09/05	52.7	52.0	58.4	53.4	53.8	54.5	55.8	C	58.1	57.5	49.8	52.3	55.2	7116	358	7402	70.0	65.3	66.6
09/06	52.8	52.1	58.4	53.4	53.9	54.6	56.2	C	58.7	57.7	50.1	52.9	55.6	7061	411	7395	68.5	65.6	65.6
09/07	52.8	52.2	58.6	53.6	54.0	54.8	56.2	C	58.9	57.7	50.1	52.6	55.6	6881	451	7053	76.5	67.8	69.5
09/08	52.9	52.2	58.6	53.7	54.2	54.9	56.3	C	59.2	57.8	50.3	52.8	55.7	6383	502	7053	76.5	69.6	72.8
09/09	53.0	52.3	58.6	53.9	54.4	55.2	56.6	C	59.3	58.2	50.2	52.8	55.6	6496	496	6992	81.0	73.8	77.5
09/10	53.2	52.5	58.8	53.9	54.3	55.0	56.8	C	60.1	58.3	50.2	53.1	56.4	6556	518	7006	84.0	78.1	79.0
09/11	53.2	52.4	58.5	53.8	54.4	55.3	56.8	C	60.0	58.1	50.2	52.9	55.5	6081	365	6983	76.0	72.5	73.8

Date	MDWT TCD[1]	MDWT SHD	MDWT SPP[1]	MDWT KWK	MDWT SAC	MDWT CCR[2]	MDWT BSF	MDWT BND	MDWT RDB	MDWT IGO	MDWT LWS	MDWT DGC	MDWT NFH	MDR Shasta Gene-ra-tion	MDR Spring Creek PP	MDR Keswick Total	MDAT RDD	MDAT BSF	MDAT RDB
09/12	53.4	52.6	58.6	54.0	54.4	55.2	56.9	C	60.3	58.1	50.1	52.8	55.8	6473	359	6936	74.5	71.1	71.5
09/13	53.4	52.7	57.6	54.1	54.6	55.4	56.6	C	59.4	57.4	50.3	52.3	54.7	6499	181	6516	67.5	64.6	67.4
09/14	53.5	52.8	58.8	54.1	54.6	55.5	56.8	C	59.4	57.7	50.4	52.6	55.1	5992	525	6483	77.0	73.2	74.8
09/15	53.5	52.8	58.9	54.0	54.6	55.4	56.9	C	59.7	57.8	50.2	52.6	55.2	5884	530	6485	71.5	67.5	69.3
09/16	53.6	52.9	58.8	54.3	54.8	55.7	57.1	C	59.8	58.0	50.0	52.5	55.2	4929	533	6483	69.0	65.8	67.9
09/17	53.6	52.9	58.9	54.6	54.9	55.6	56.9	C	59.7	57.8	50.1	52.2	54.7	5941	527	6485	66.0	62.6	64.0
09/18	53.7	53.1	58.8	54.7	55.2	56.2	57.4	C	59.6	57.8	50.0	52.5	55.0	5204	515	6095	71.0	67.8	69.5
09/19	53.9	53.3	N/A	54.9	55.4	56.4	57.7	C	60.5	57.6	49.9	52.5	55.2	5985	17	5982	76.0	70.5	73.4
09/20	54.0	53.4	N/A	54.7	55.3	56.1	57.7	C	60.5	57.3	50.0	52.4	55.1	5891	44	5981	75.5	69.1	70.6
09/21	54.0	53.4	59.1	54.8	55.3	56.2	57.7	C	60.6	57.4	50.1	52.8	55.5	4695	996	5974	75.5	70.5	70.3
09/22	54.1	53.6	58.9	55.0	55.6	56.5	58.0	C	60.9	57.7	50.1	52.9	55.8	5351	530	5970	72.0	68.0	67.4
Sep	53.2	52.6	58.6	53.9	54.4	55.1	56.5	55.5	59.1	57.6	50.2	52.7	55.4	6305	434	6847	71.7	67.9	69.5
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Total CFS	138700	9558	150634	N/A	N/A	N/A

Date	MDWT TCD[1]	MDWT SHD	MDWT SPP[1]	MDWT KWK	MDWT SAC	MDWT CCR[2]	MDWT BSF	MDWT BND	MDWT RDB	MDWT IGO	MDWT LWS	MDWT DGC	MDWT NFH	MDR Shasta Gene-ration	MDR Spring Creek PP	MDR Keswick Total	MDAT RDD	MDAT BSF	MDAT RDB
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Total AF	275106	18958	298776	N/A	N/A	N/A

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 Clear Creek River control point (see page 3 for more details)
3 Data is currently being collected locally and periodically downloaded.
Once downloaded and certified by USGS, missing data will be added.

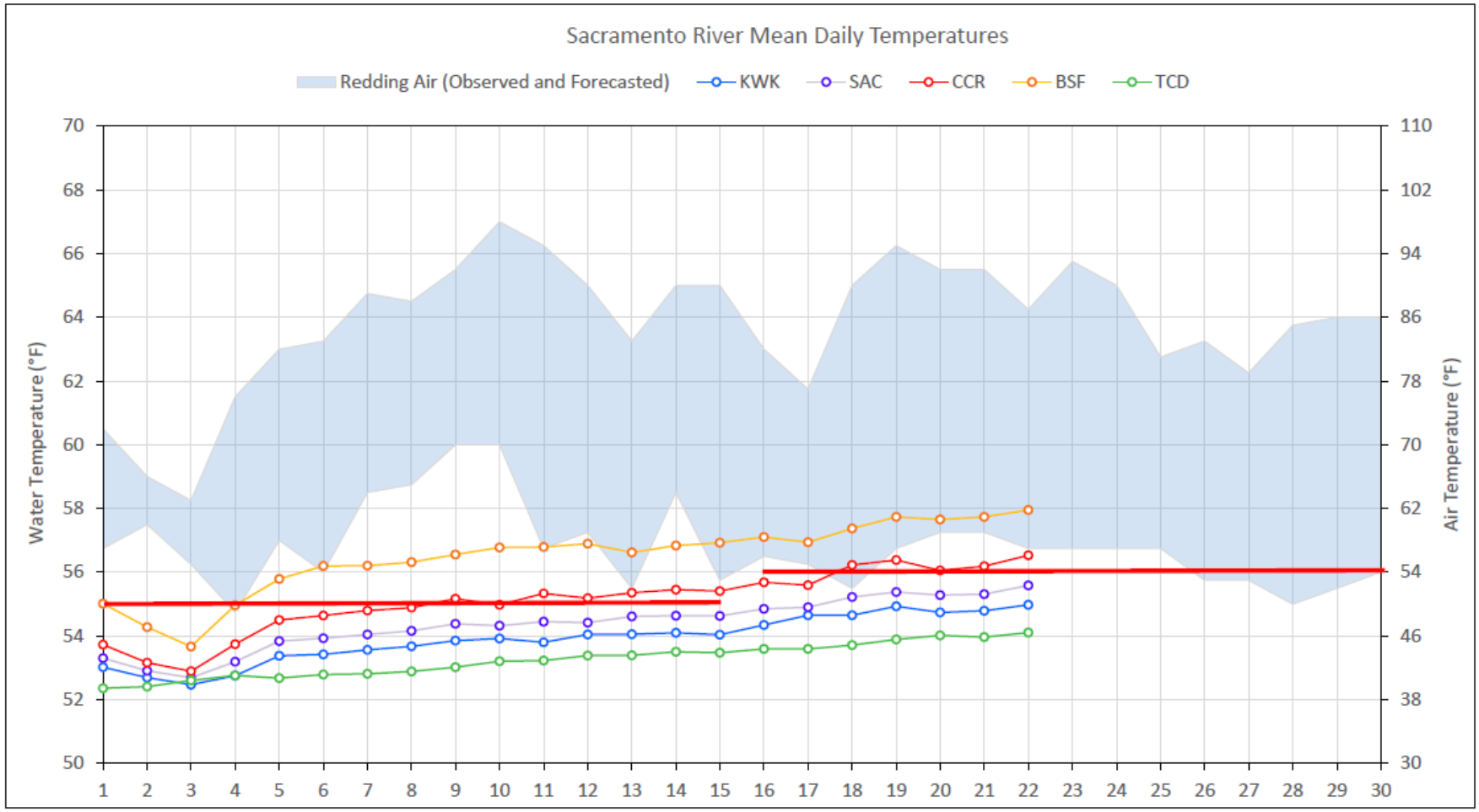


Figure 3. Sacramento River Mean Daily Temperatures

Mean daily Sacramento River water temperatures at five monitoring locations and Redding air temperatures during September 2026. River temperatures generally increased over the period, ranging from about 52°F to 58°F, with the warmest temperatures observed at the BSF site. Most locations remained at or below the 56°F temperature threshold shown by the red reference line, with CCR briefly exceeding it near the end of the record. Air temperatures fluctuated throughout the month and were consistently higher than river temperatures.

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	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	N/A

Notes: 1 Distances are approximate

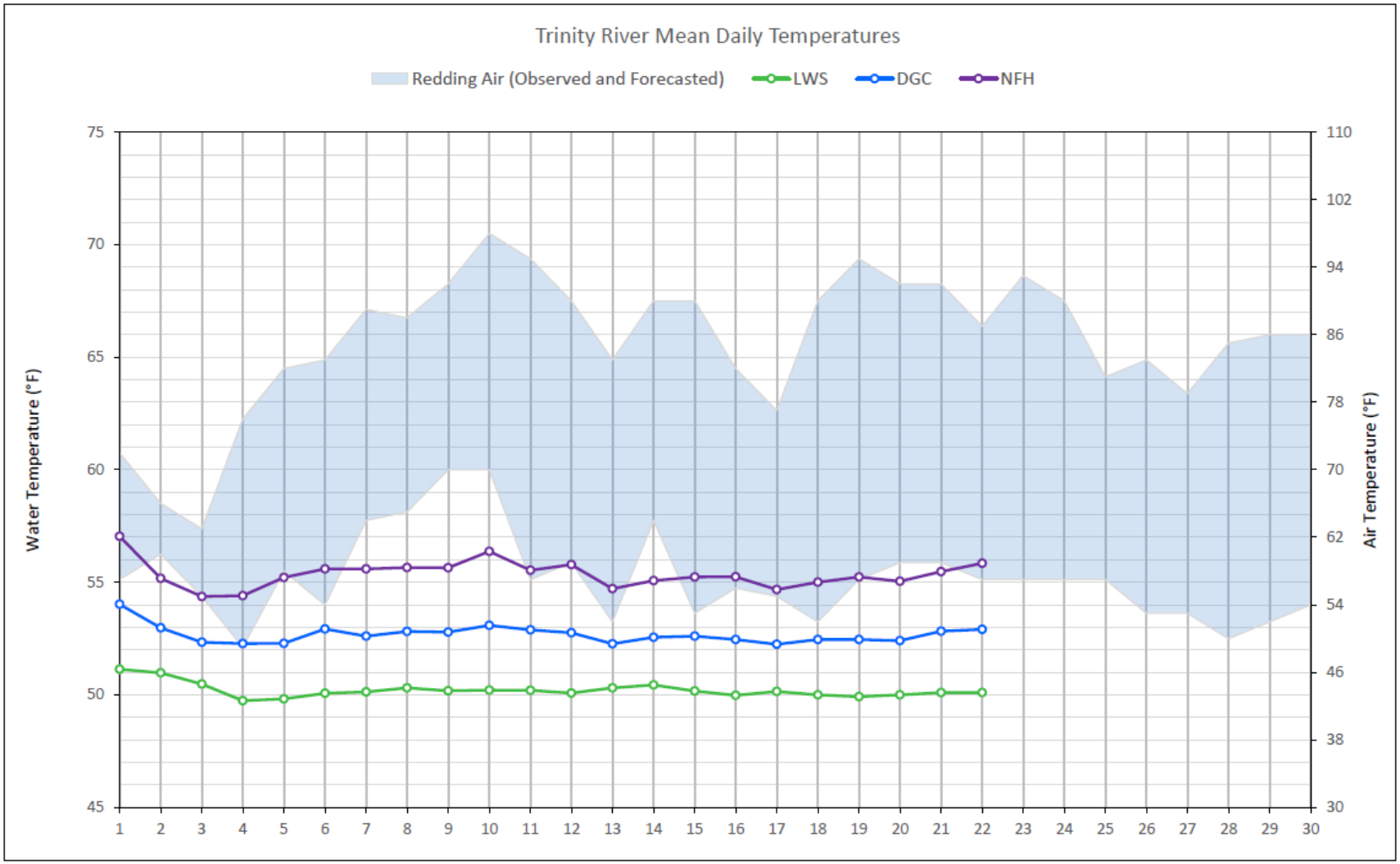


Figure 4. Trinity River Mean Daily Temperatures

Mean daily Trinity River water temperatures at three monitoring locations and Redding air temperatures during September 2026. Water temperatures remained relatively stable, ranging from about 50°F to 56°F, with NFH consistently warmest, DGC intermediate, and LWS coolest. Air temperatures fluctuated throughout the month and remained substantially higher than river temperatures. No strong warming or cooling trends were observed during the reporting period.

Station Details

Code	Body of Water	Location[1]
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

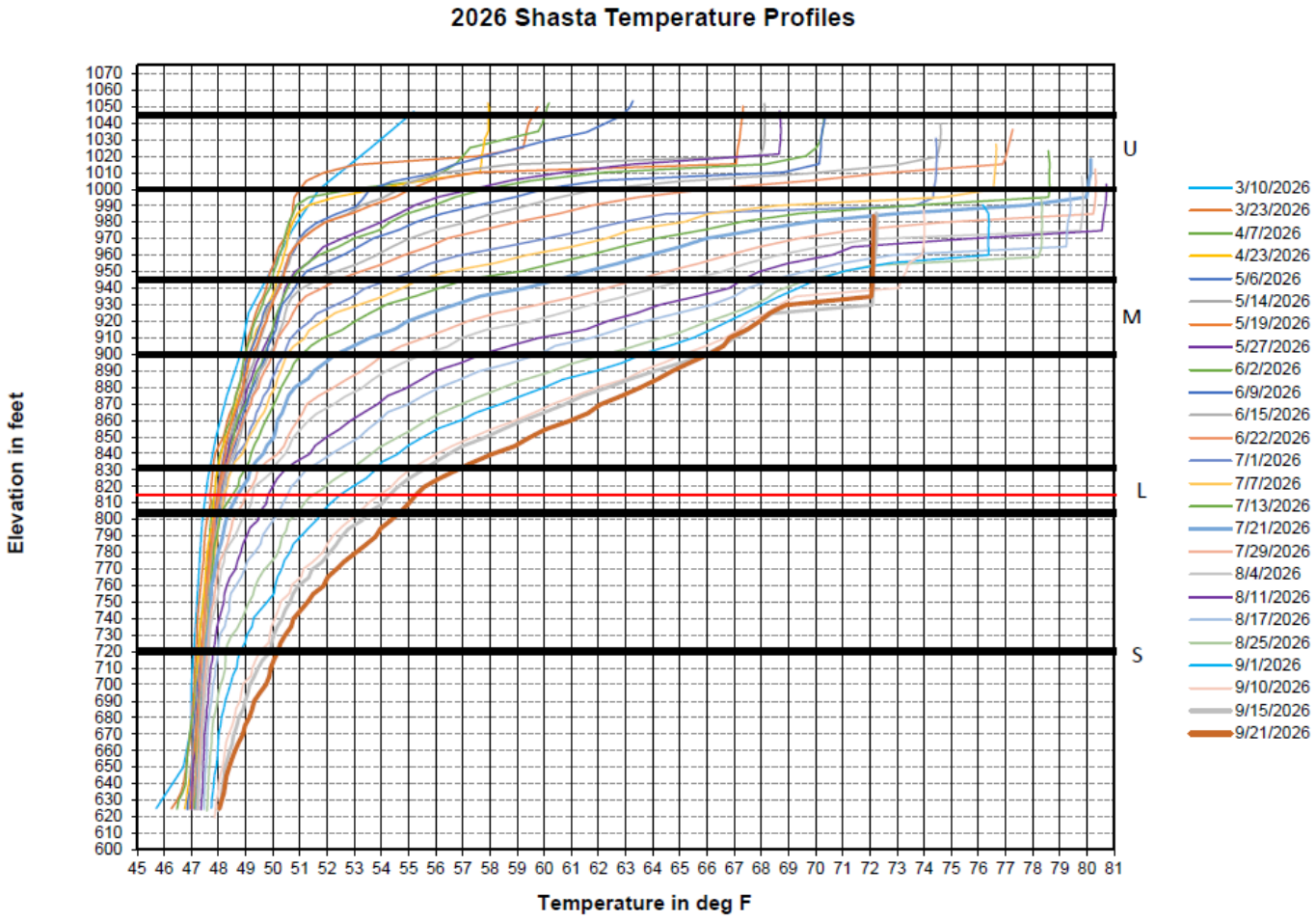


Figure 5. 2026 Shasta Temperature Profiles

Temperature profiles in Shasta Reservoir from March through September 2026 show seasonal warming and increasing thermal stratification. Surface waters warmed from about 50°F in early spring to nearly 80°F by late summer, while deeper waters remained near 47 to 50°F. The strongest temperature gradients developed between approximately 800 and 1,000 feet elevation during summer. Profiles indicate progressively warmer surface conditions and cooler, more stable temperatures at depth throughout the season.

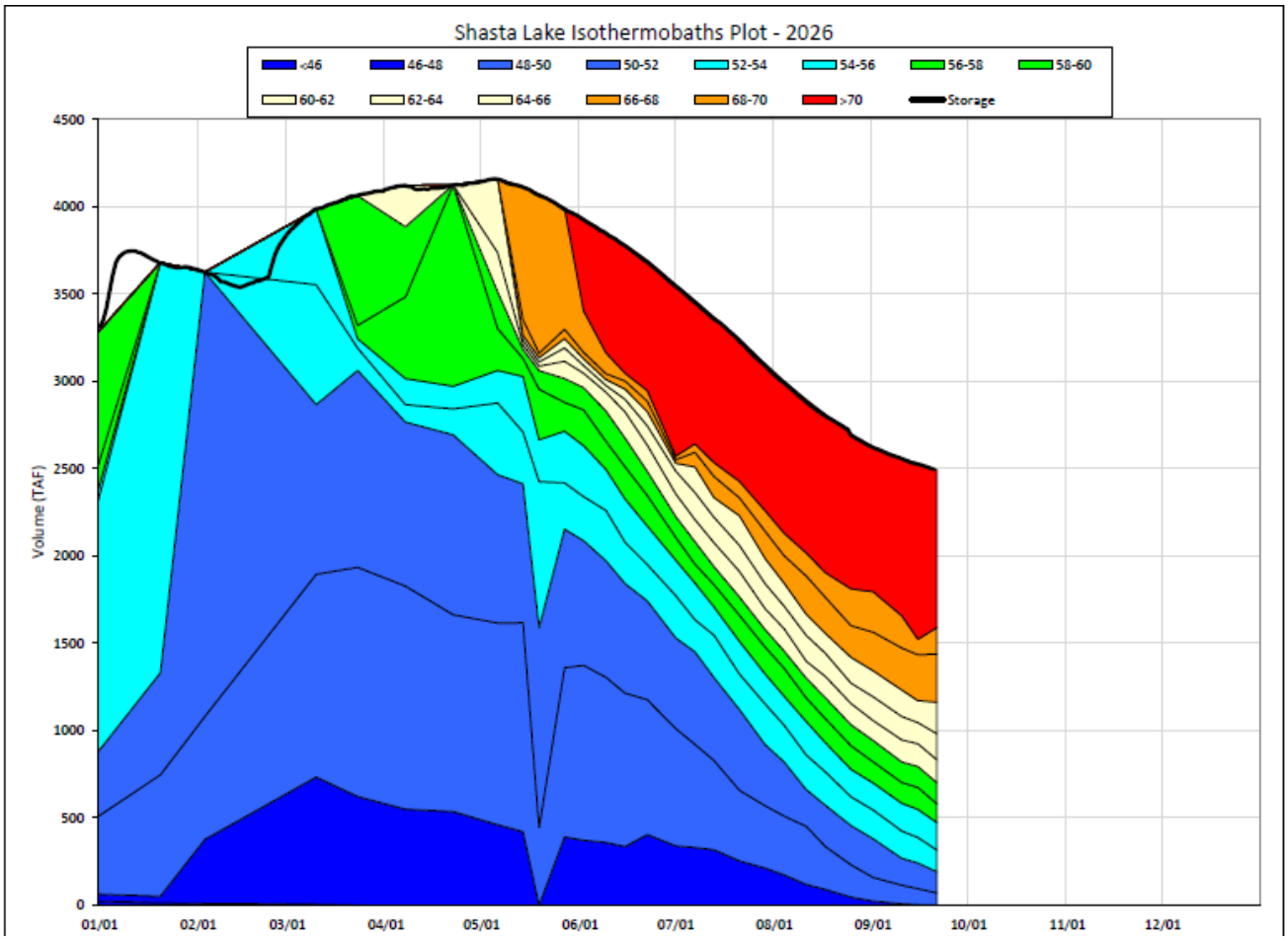


Figure 6. Shasta Lake Isothermobaths Plot - 2026

Shasta Lake isothermobath data for 2026 show seasonal warming and thermal stratification as reservoir storage changed through the year. Cold water below 50°F dominated much of the lake volume during winter and spring, while warmer water above 70°F expanded during summer and early fall. As storage declined from spring into late summer, the volume of cold-water habitat decreased and warmer surface layers became more prevalent. The black line indicates reservoir storage, which peaked in spring and gradually declined through September.

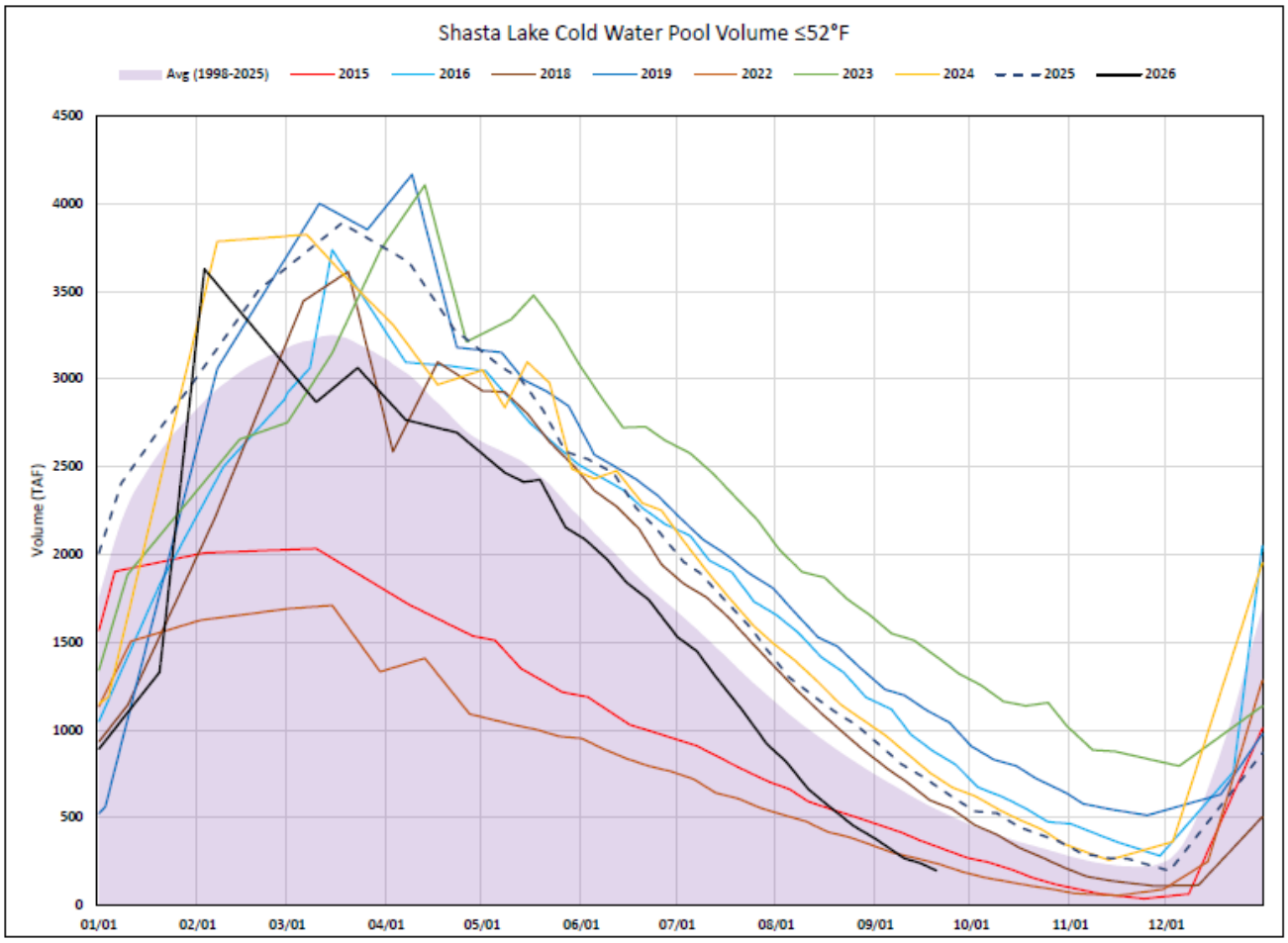


Figure 7. Shasta Lake Cold Water Pool Volume ≤52°F

Shasta Lake cold-water pool volume (≤52°F) during 2026 declined steadily from approximately 3,600 TAF in February to less than 200 TAF by late September. The 2026 cold-water pool remained near or below the long-term average and decreased more rapidly than several recent years. Seasonal depletion accelerated during summer as reservoir warming intensified. The graph compares 2026 conditions with historical averages and selected water years from 2015 through 2025.

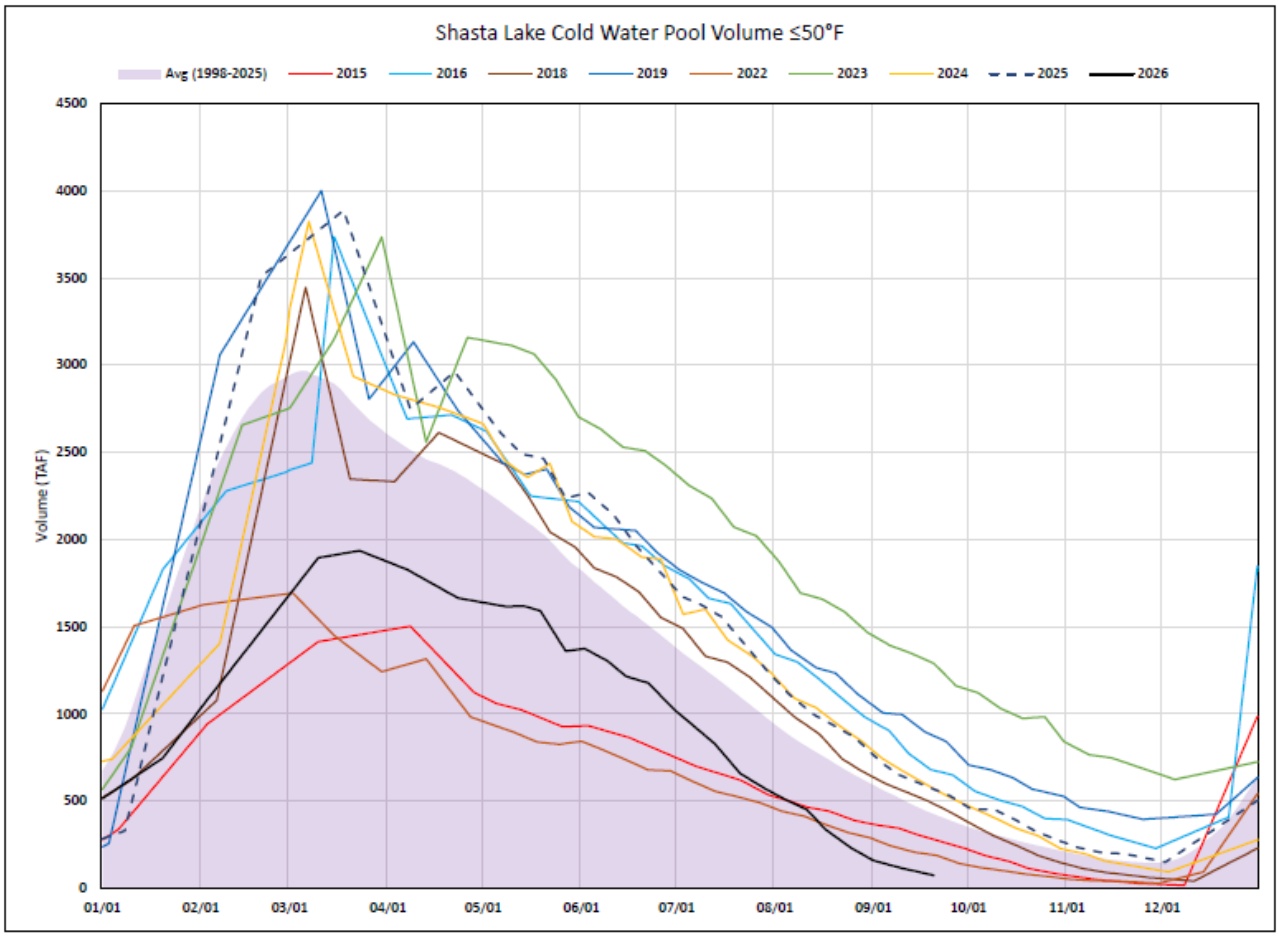


Figure 8. Shasta Lake Cold Water Pool Volume ≤50°F

Shasta Lake cold-water pool volume (≤50°F) during 2026 increased to about 1,900 TAF in early spring before steadily declining through summer. The 2026 cold-water pool remained below the long-term average and below most recent wet-year conditions. By late September, the volume of water colder than 50°F had decreased to less than 100 TAF. The graph compares 2026 conditions with the historical average and selected water years from 2015 through 2025.

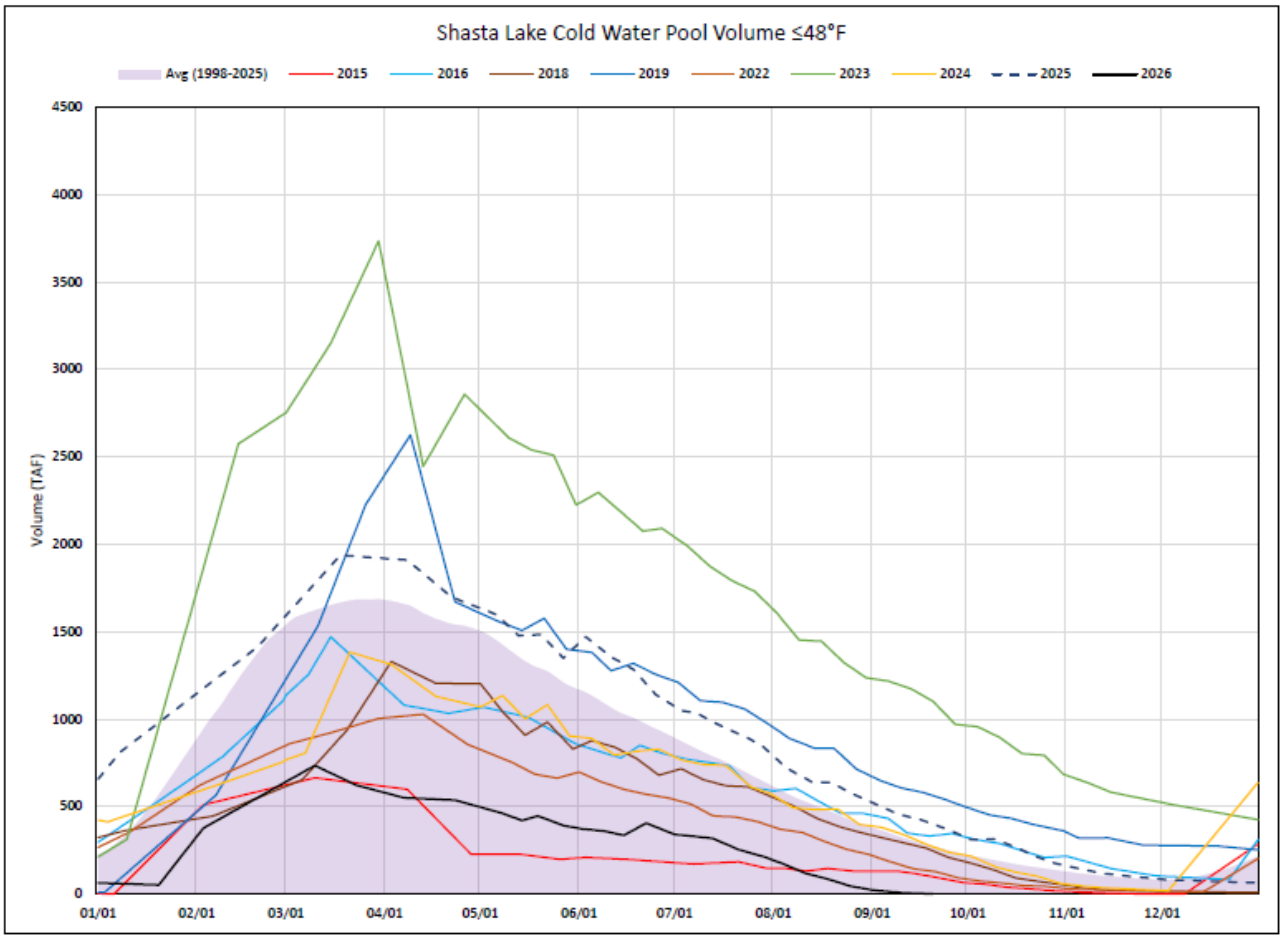


Figure 9. Shasta Lake Cold Water Pool Volume ≤48°F

Shasta Lake cold-water pool volume (≤48°F) during 2026 increased to about 700 TAF in early spring before steadily declining through summer. The 2026 volume remained well below the long-term average and below most recent wetter water years. By late August, the volume of water colder than 48°F was nearly depleted. The graph compares 2026 conditions with the historical average and selected water years from 2015 through 2025.

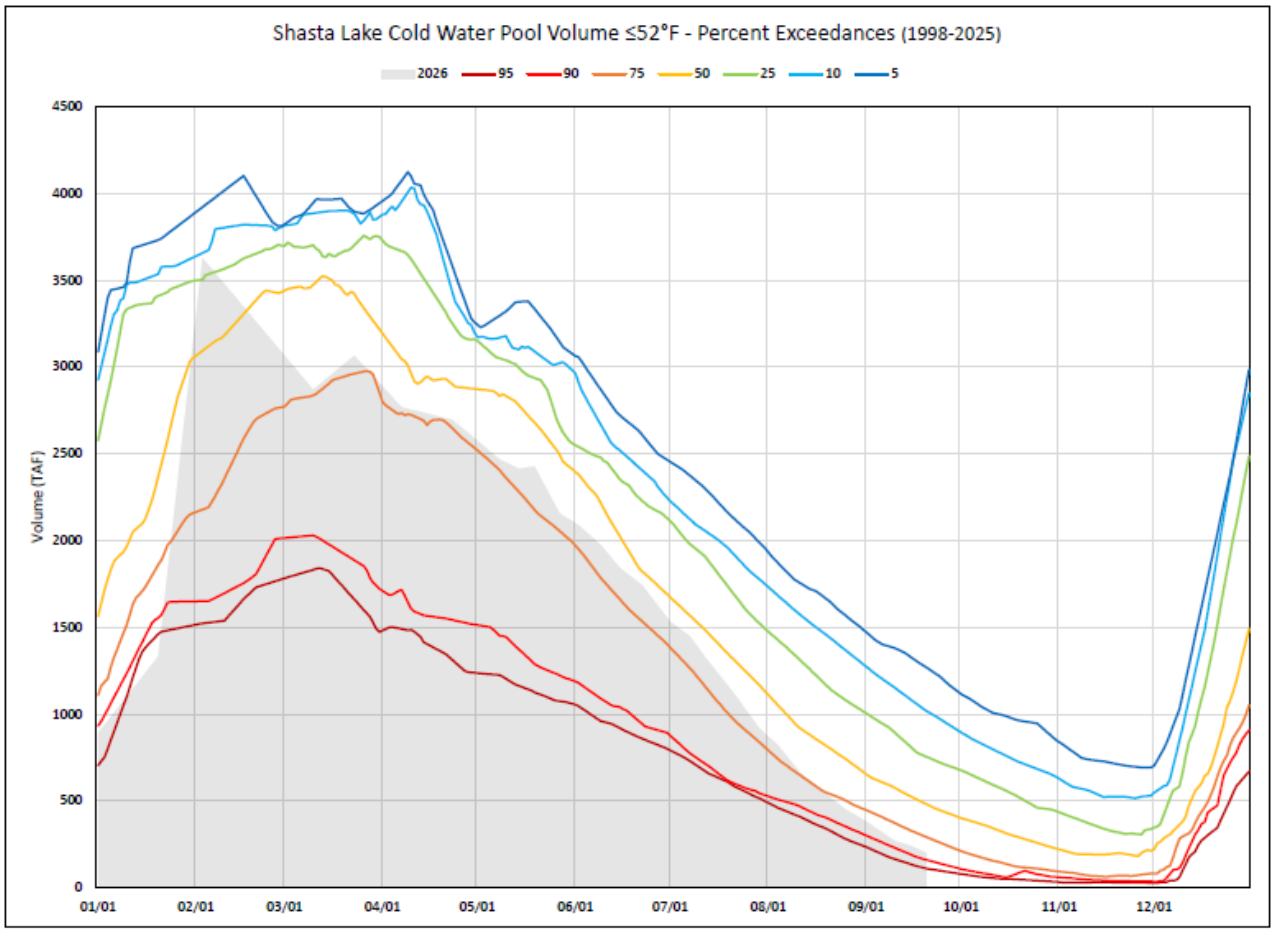


Figure 10. Shasta Lake Cold Water Pool Volume ≤52°F - Percent Exceedances (1998-2025)

Shasta Lake cold-water pool volume (≤52°F) in 2026 is shown against historical exceedance curves for 1998-2025. Cold-water volume peaked at approximately 3,600 TAF in February and then declined steadily through summer to less than 200 TAF by late September. Throughout most of the year, 2026 tracked between the 75th and 90th percentile exceedance levels, indicating below-average cold-water storage relative to historical conditions. The graph illustrates seasonal depletion of the cold-water pool compared with the historical range of observed years.

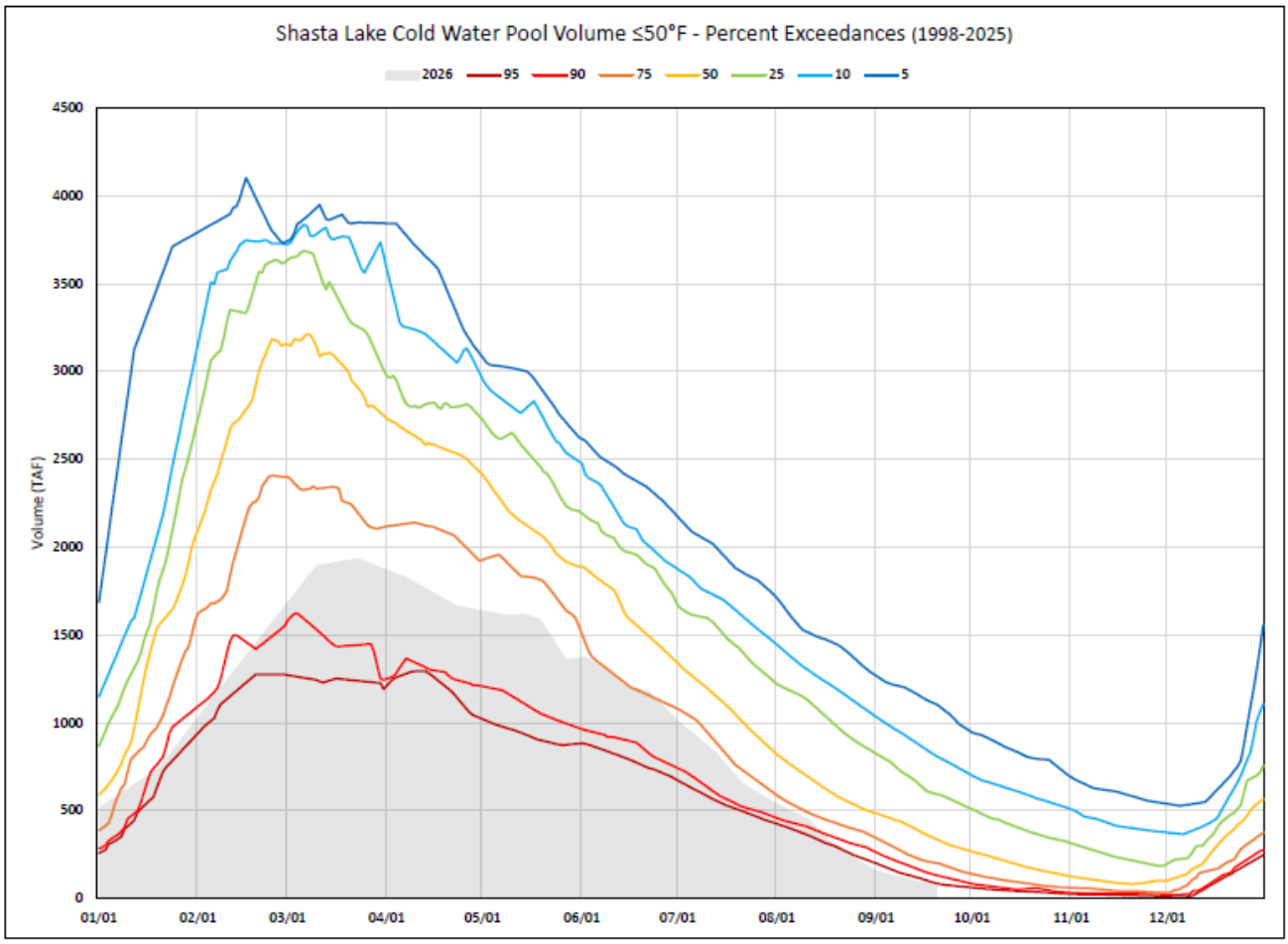


Figure 11. Shasta Lake Cold Water Pool Volume ≤50°F - Percent Exceedances (1998-2025)

Shasta Lake cold-water pool volume (≤50°F) in 2026 is shown relative to historical exceedance percentiles for 1998-2025. The cold-water pool peaked at approximately 1,900 TAF in late March and then declined steadily through summer, falling below 200 TAF by September. Throughout most of the year, 2026 remained near the 90th to 95th percentile exceedance levels, indicating lower-than-average cold-water storage compared to historical conditions. The graph illustrates seasonal depletion of the cold-water pool within the context of the historical range of observed years.

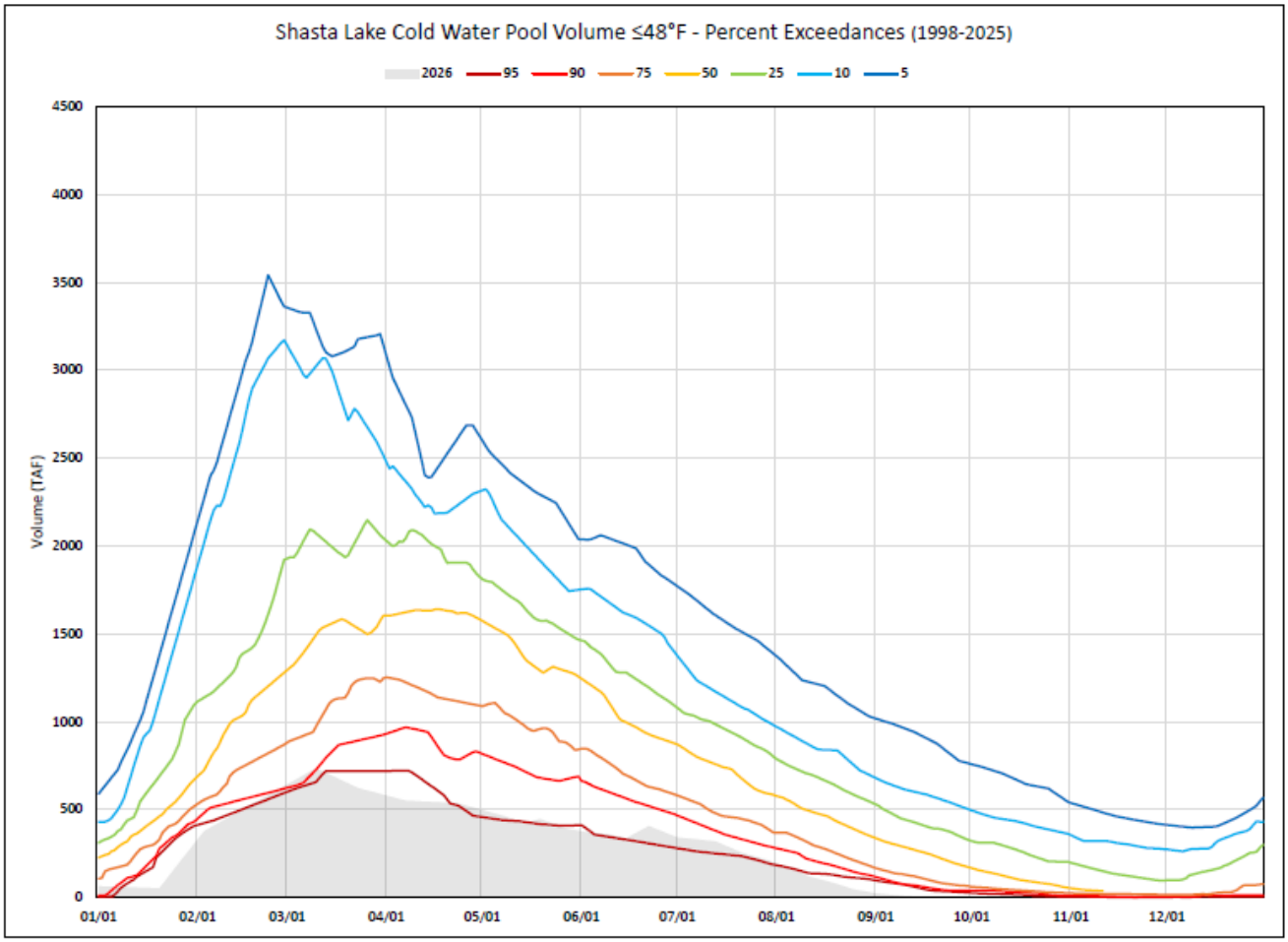


Figure 12. Shasta Lake Cold Water Pool Volume ≤48°F - Percent Exceedances (1998-2025)

Shasta Lake cold-water pool volume (≤48°F) in 2026 is shown relative to historical exceedance percentiles for 1998-2025. The volume peaked at approximately 700 TAF in early spring and then steadily declined through summer, reaching near-zero levels by late August. Throughout most of the year, 2026 tracked near the 90th to 95th percentile exceedance levels, indicating substantially lower cold-water storage than average historical conditions. The graph illustrates seasonal depletion of the cold-water pool compared with the historical range of observed years.

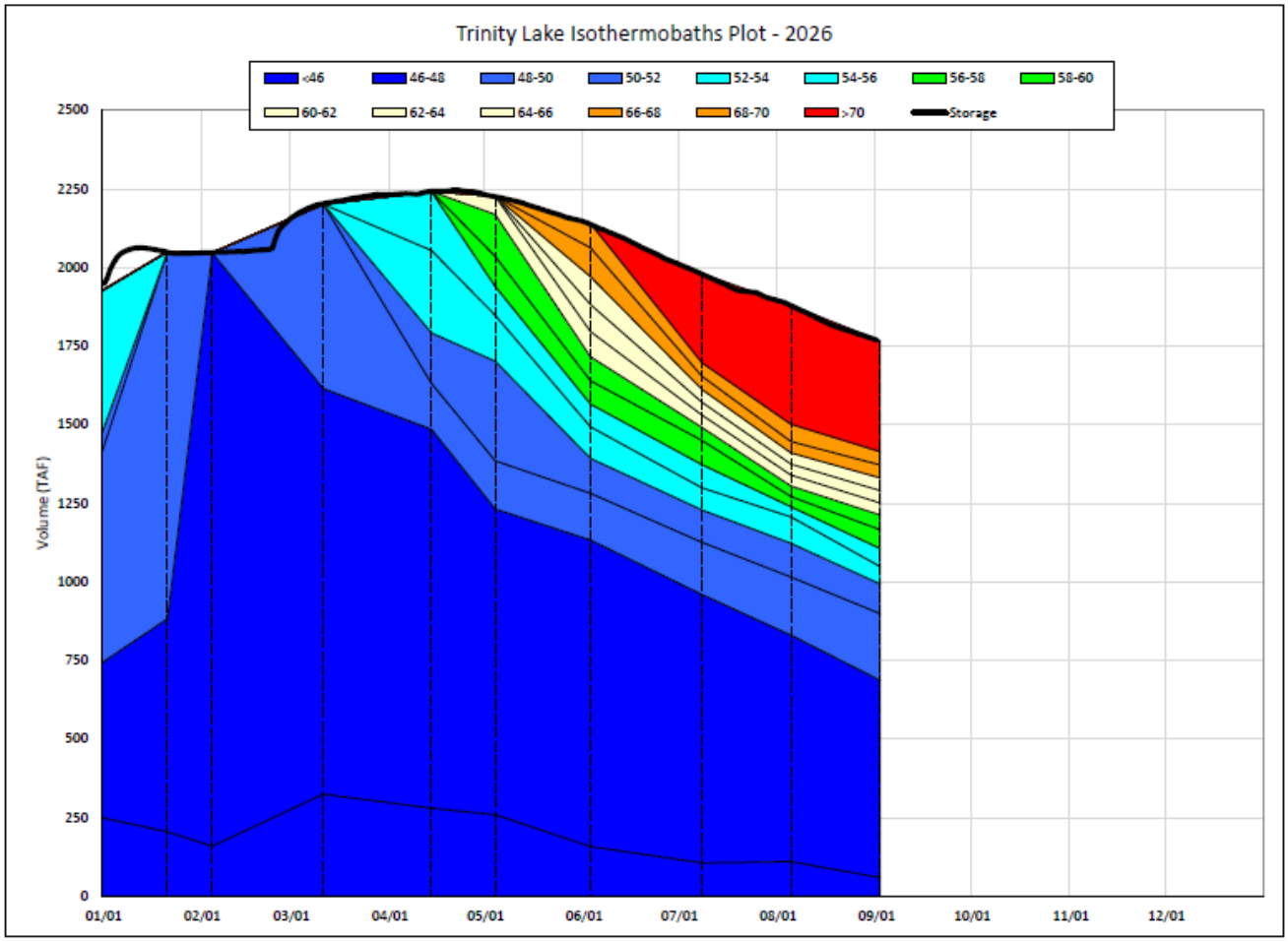


Figure 13. Trinity Lake Isothermobaths Plot - 2026.

Trinity Lake isothermobath data for 2026 show seasonal warming and development of thermal stratification as reservoir storage declined from spring through summer. Water colder than 48°F occupied a large portion of the reservoir volume during winter and spring, while warmer water above 70°F expanded near the surface during late summer. Cold-water habitat decreased steadily as storage fell from about 2.2 million acre-feet in spring to about 1.8 million acre-feet by September. The black line represents reservoir storage throughout the year.

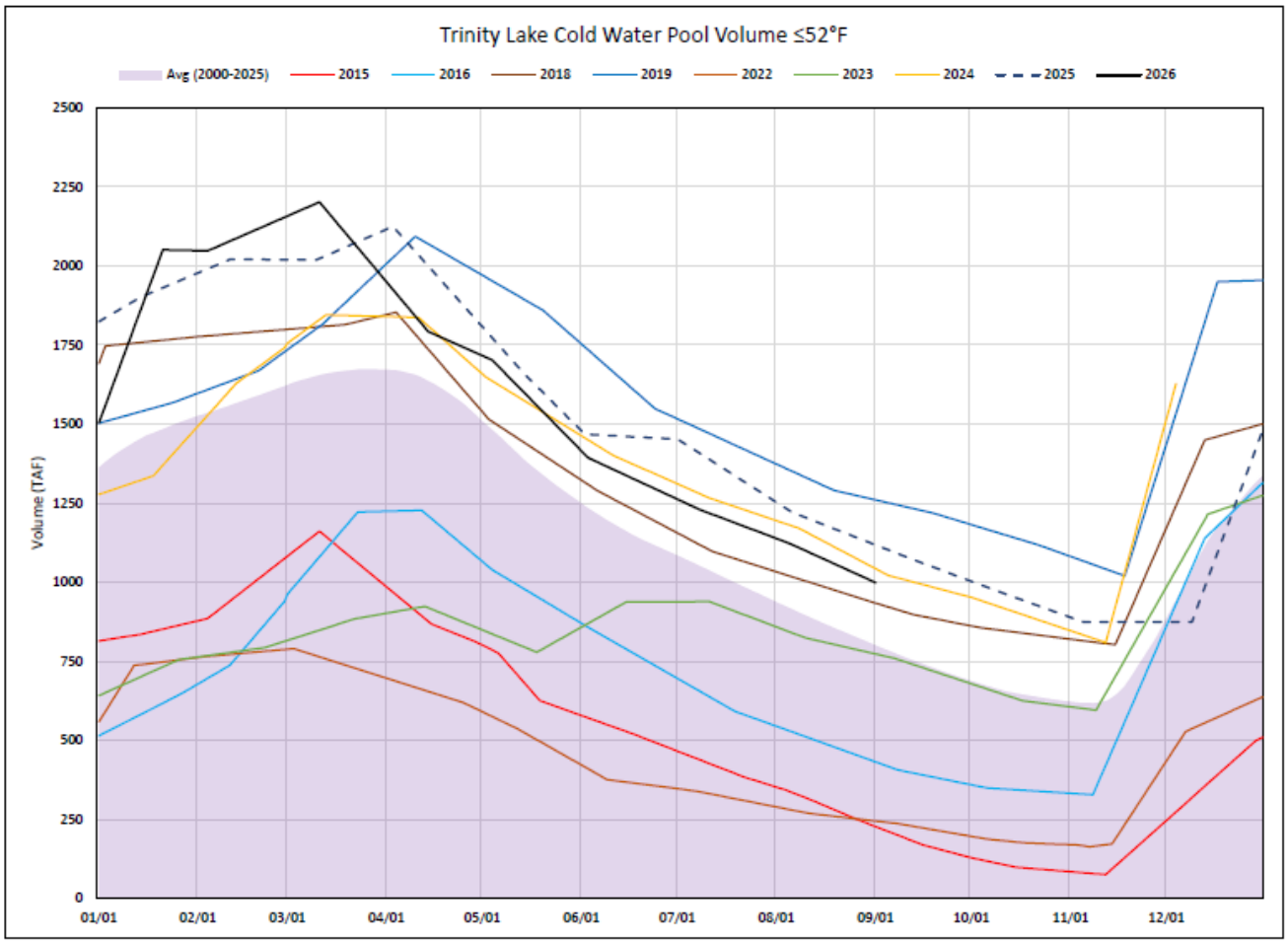


Figure 14. Trinity Lake Cold Water Pool Volume ≤52°F

Trinity Lake cold-water pool volume (≤52°F) during 2026 increased to approximately 2,200 TAF in early spring before steadily declining through summer. By September, the cold-water pool had decreased to about 1,000 TAF. Throughout most of the year, 2026 remained above the long-term average and among the higher cold-water pool volumes observed in recent years. The graph compares 2026 conditions with historical averages and selected water years from 2015 through 2025.

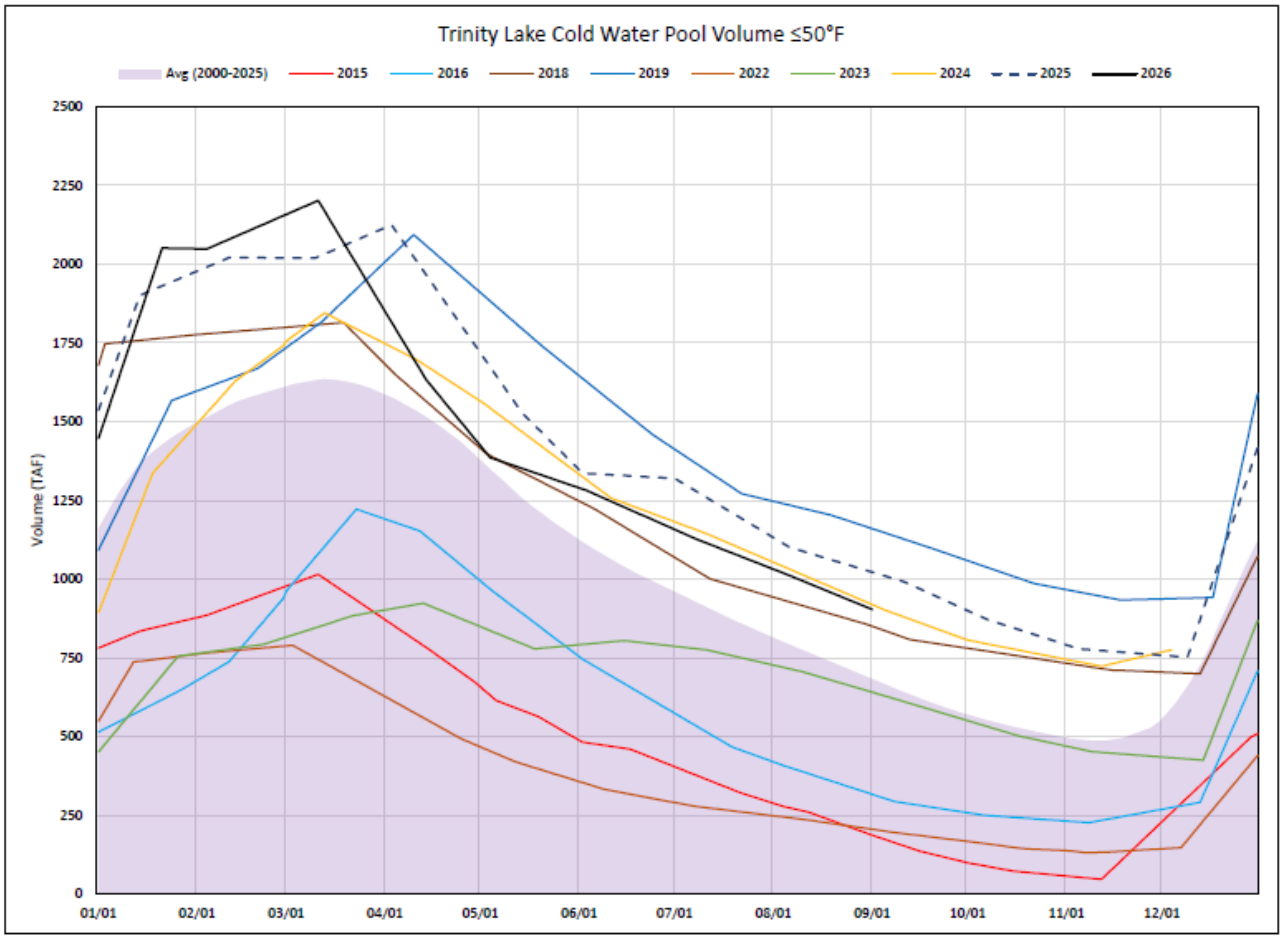


Figure 15. Trinity Lake Cold Water Pool Volume ≤50°F

Trinity Lake cold-water pool volume (≤50°F) during 2026 increased to approximately 2,200 TAF in early spring before declining steadily through summer. By September, the volume had decreased to about 800 TAF but remained above the long-term average for most of the year. The 2026 cold-water pool tracked among the higher volumes observed in recent years, although below peak conditions seen in some wetter years. The graph compares 2026 conditions with historical averages and selected water years from 2015 through 2025.

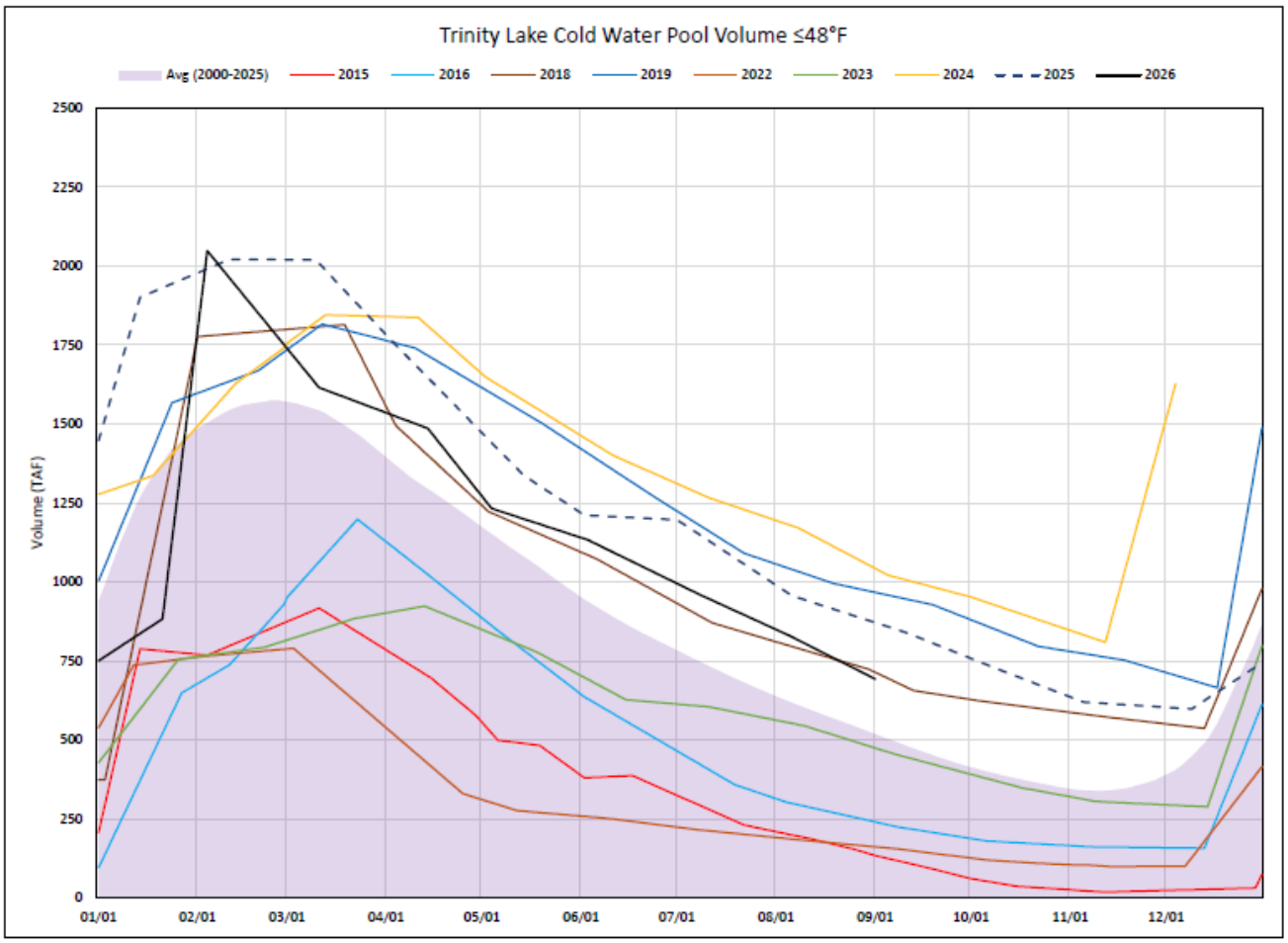


Figure 16. Trinity Lake Cold Water Pool Volume ≤48°F

Trinity Lake cold-water pool volume (≤48°F) during 2026 increased to approximately 2,000 TAF in February before declining steadily through summer. The volume remained above the long-term average during much of the year and was among the higher values observed in recent years. By September, the cold-water pool had decreased to about 700 TAF. The graph compares 2026 conditions with historical averages and selected water years from 2015 through 2025.

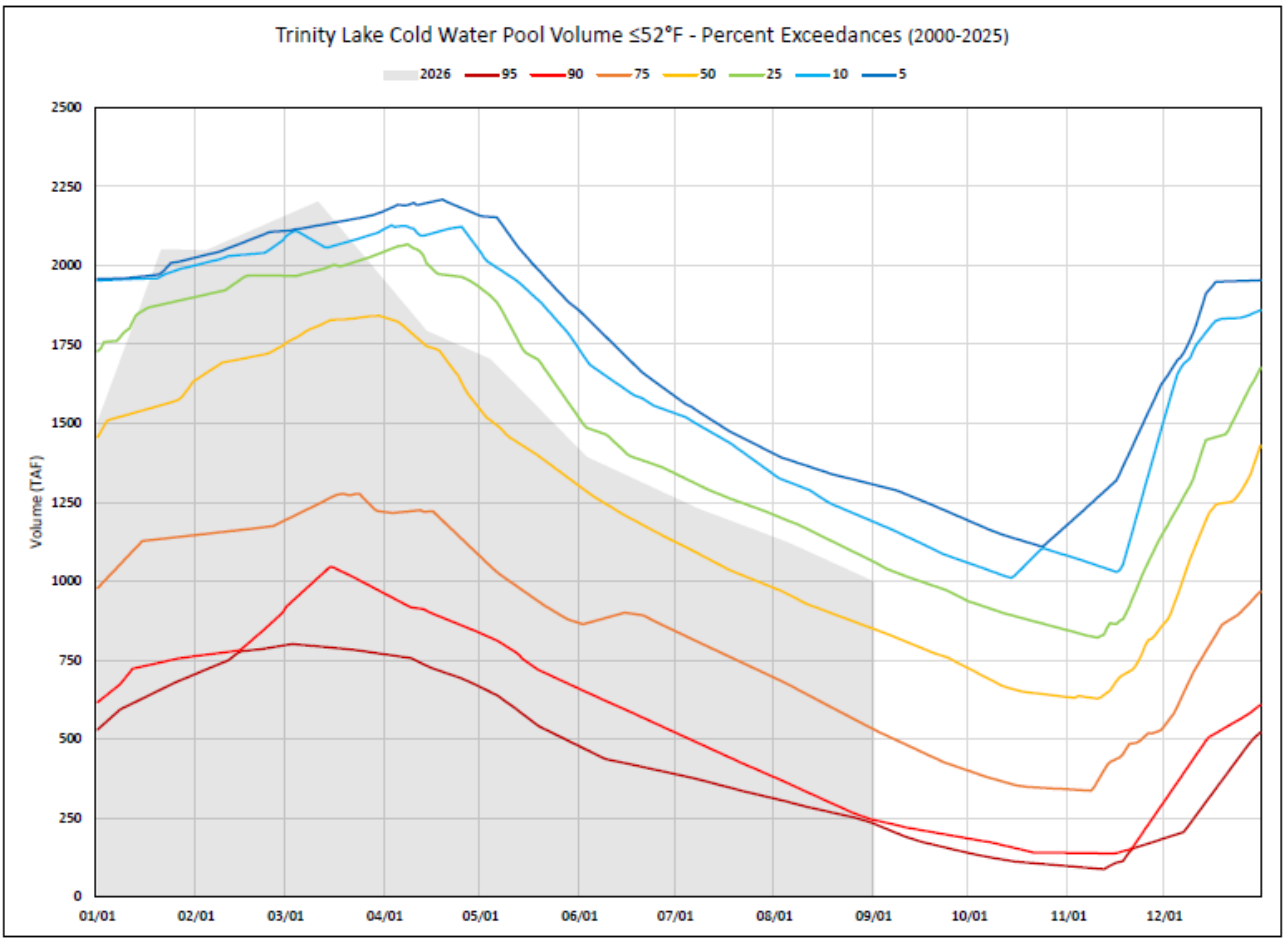


Figure 17. Trinity Lake Cold Water Pool Volume ≤52°F – Percent Exceedances (2000-2025)

Trinity Lake cold-water pool volume (≤52°F) in 2026 is shown relative to historical exceedance percentiles for 2000-2025. The cold-water pool peaked at approximately 2,200 TAF in spring and declined to about 1,000 TAF by September. Throughout the year, 2026 generally tracked between the 10th and 25th percentile exceedance curves, indicating above-average cold-water storage compared to most historical years. The graph illustrates seasonal depletion of the cold-water pool within the context of the historical range of observed conditions.

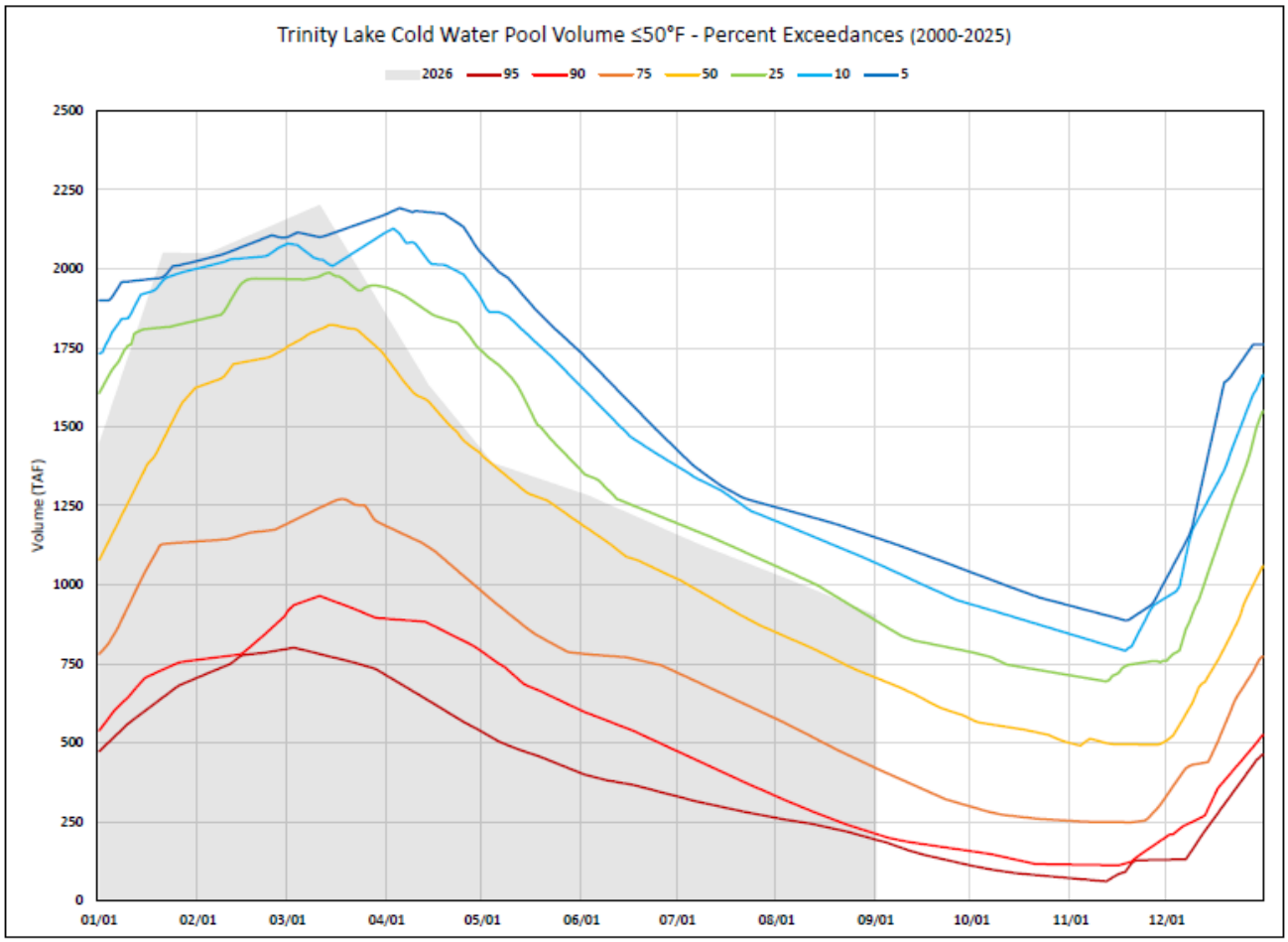


Figure 18. Trinity Lake Cold Water Pool Volume ≤50°F – Percent Exceedances (2000-2025)

Trinity Lake cold-water pool volume (≤50°F) in 2026 is shown relative to historical exceedance percentiles for 2000-2025. The cold-water pool peaked at approximately 2,200 TAF in spring and declined to about 800 TAF by September. Throughout most of the year, 2026 tracked between the 10th and 25th percentile exceedance curves, indicating above-average cold-water storage compared to historical conditions. The graph illustrates seasonal depletion of the cold-water pool within the historical range of observed years.

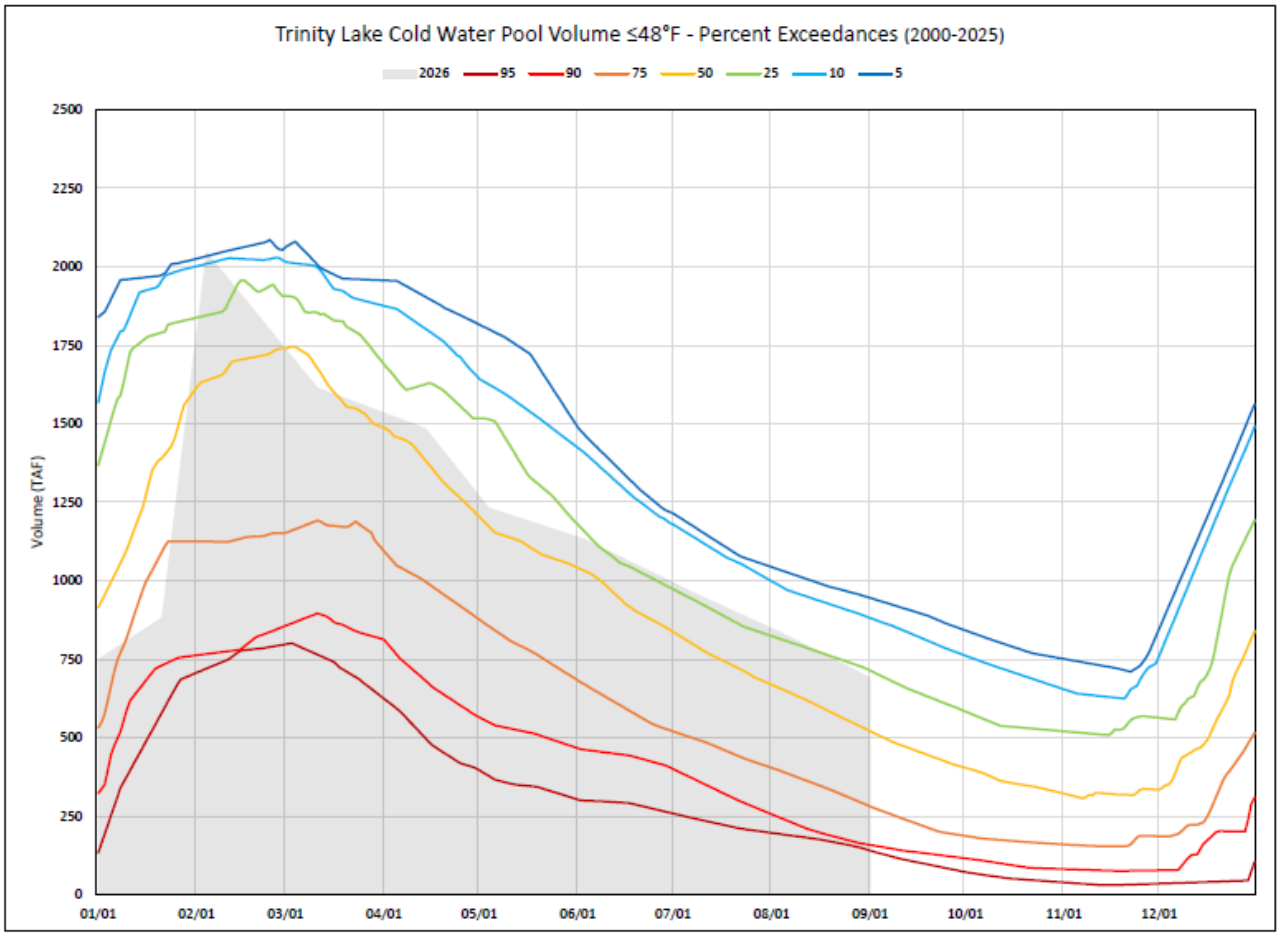


Figure 19. Trinity Lake Cold Water Pool Volume ≤48°F – Percent Exceedances (2000-2025)

Trinity Lake cold-water pool volume (<48°F) in 2026 is shown relative to historical exceedance percentiles for 2000-2025. The cold-water pool peaked at approximately 2,000 TAF in February and declined steadily through summer to about 700 TAF by September. Throughout most of the year, 2026 tracked between the 10th and 25th percentile exceedance curves, indicating above-average cold-water storage compared to historical conditions. The graph illustrates seasonal depletion of the cold-water pool within the historical range of observed years.

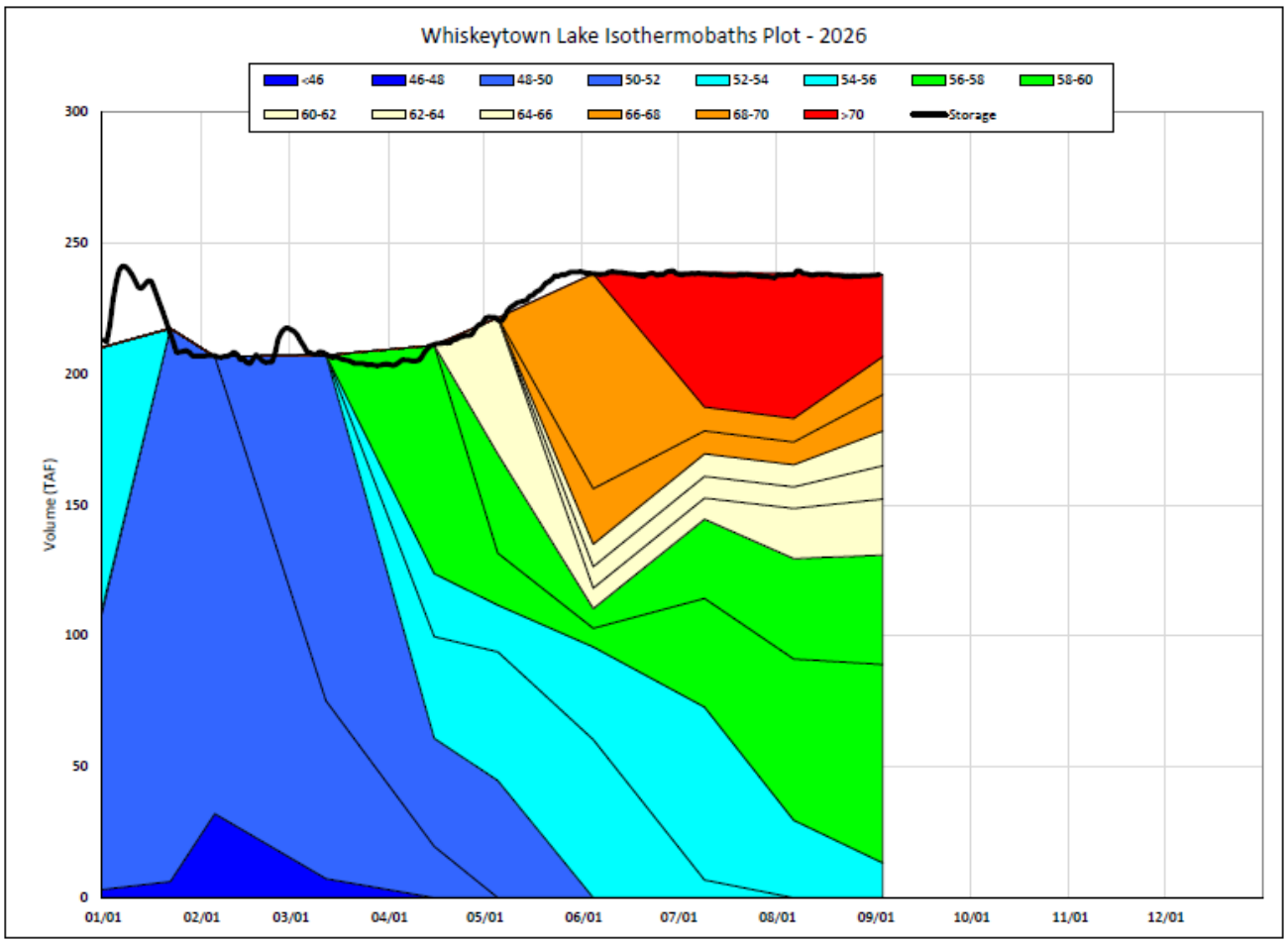


Figure 20. Whiskeytown Lake Isothermobaths Plot - 2026

Whiskeytown Lake isothermobath data for 2026 show seasonal warming and thermal stratification while reservoir storage remained relatively stable near 210 to 240 TAF. Cold water below 50°F dominated much of the reservoir during winter and early spring but declined rapidly by early summer. Warmer water above 60°F expanded through the summer, with surface temperatures exceeding 70°F by August and September. The black line represents reservoir storage throughout the year.

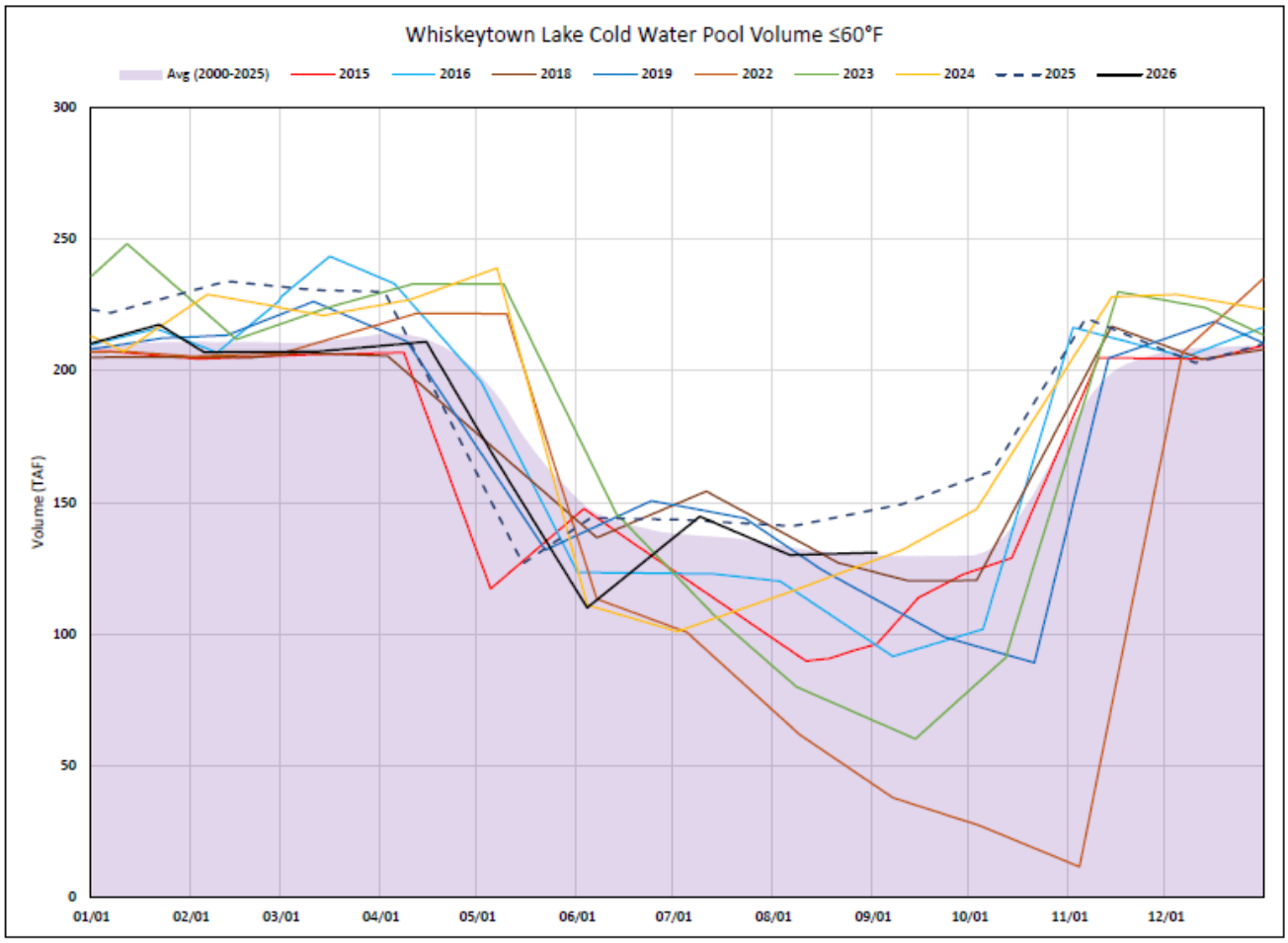


Figure 21. Whiskeytown Lake Cold Water Pool Volume ≤60°F

Whiskeytown Lake cold-water pool volume (≤60°F) during 2026 remained near 205 to 215 TAF through spring, declined to about 110 TAF in early June, and stabilized near 130 TAF through September. Cold-water pool volume remained close to the long-term average for most of the year. Seasonal reductions in cold-water storage were less pronounced than in several drier years shown for comparison. The graph compares 2026 conditions with historical averages and selected water years from 2015 through 2025.

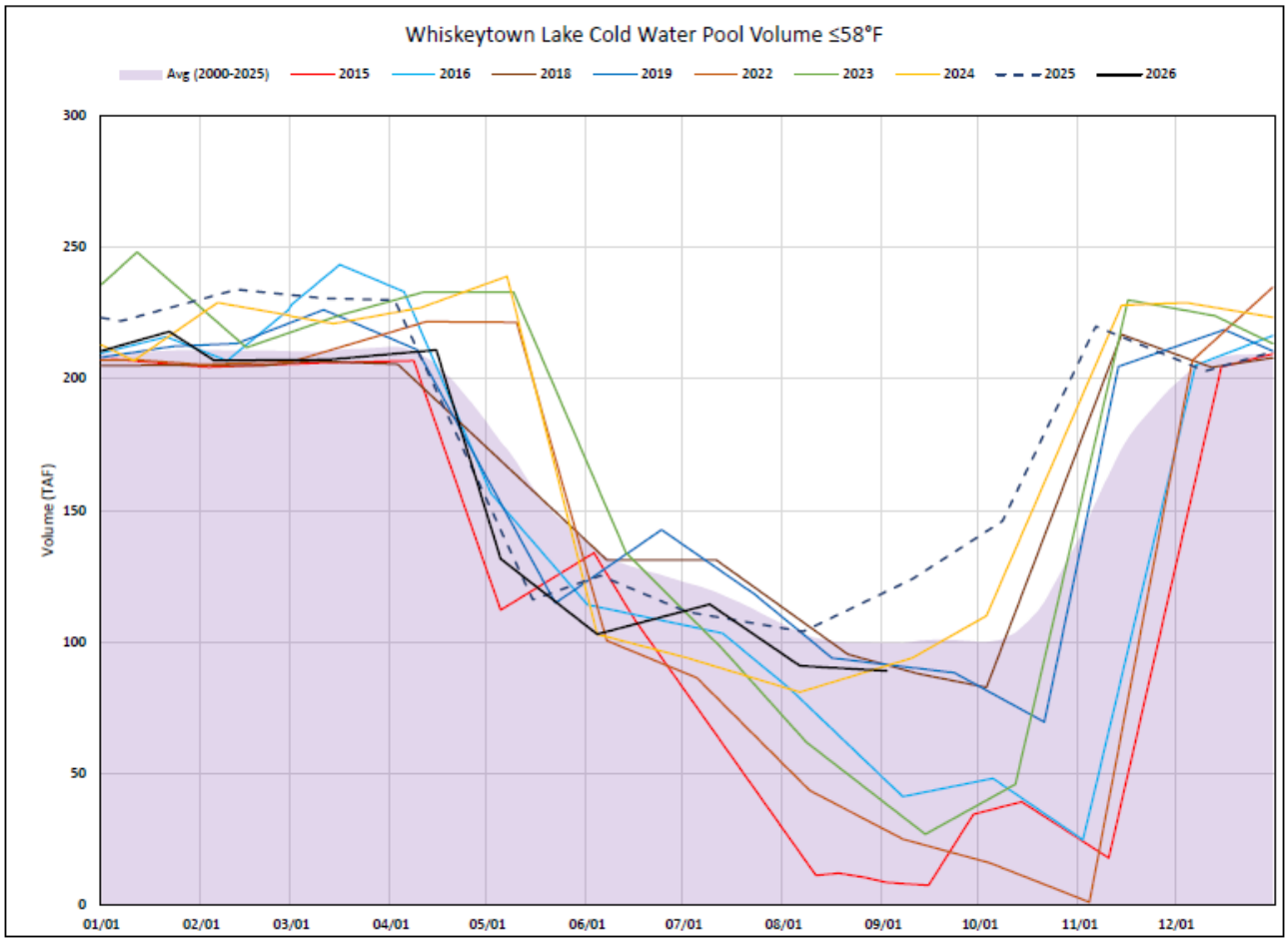


Figure 22. Whiskeytown Lake Cold Water Pool Volume ≤58°F

Whiskeytown Lake cold-water pool volume (≤58°F) during 2026 remained near 205 TAF through spring, then declined to about 90 TAF by late summer. Cold-water storage remained close to the long-term average for most of the year and was generally within the historical range of observed conditions. Seasonal reductions were moderate compared to several drier years shown in the record. The graph compares 2026 conditions with historical averages and selected water years from 2015 through 2025.

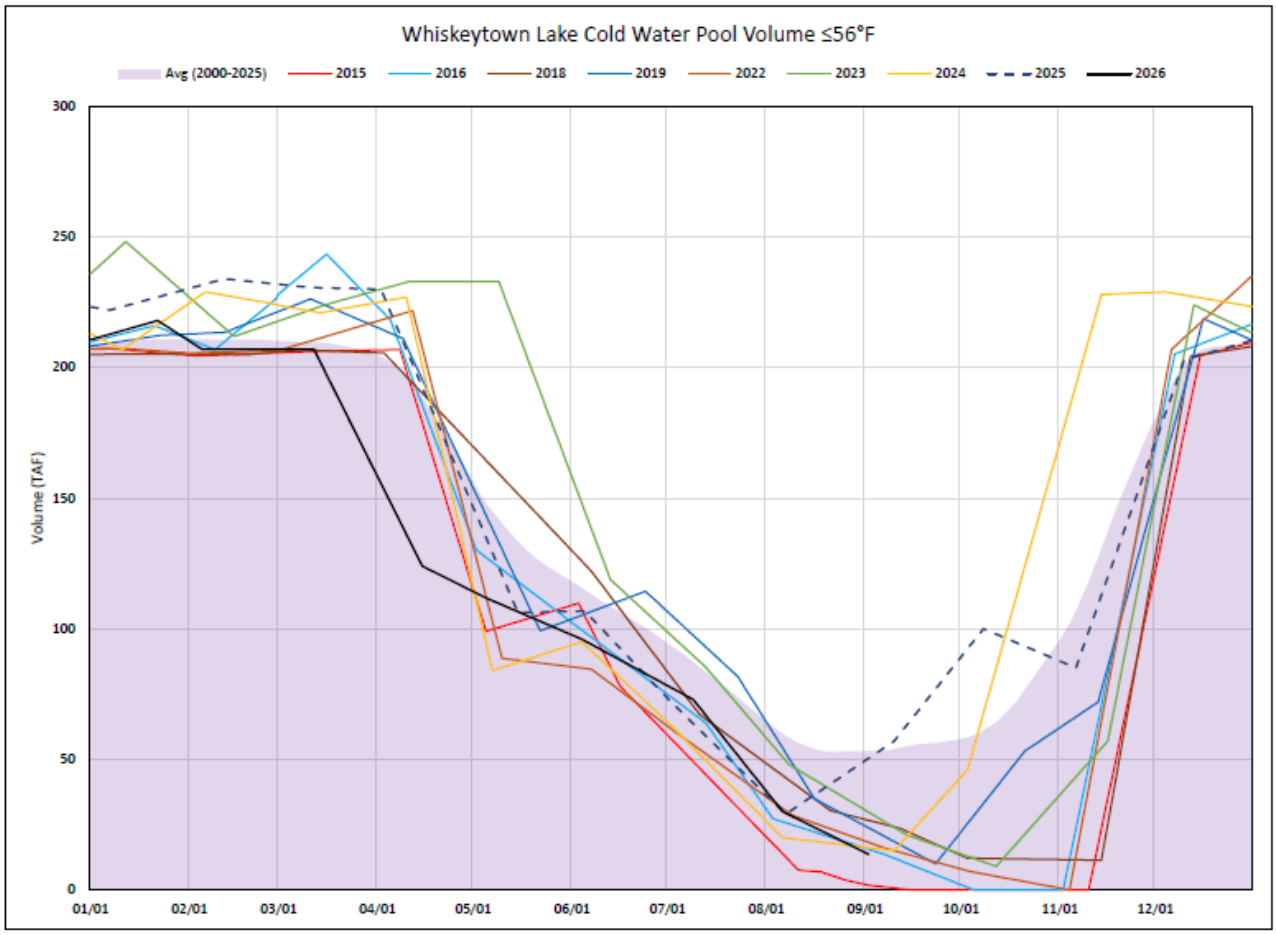


Figure 23. Whiskeytown Lake Cold Water Pool Volume ≤56°F

Whiskeytown Lake cold-water pool volume (≤56°F) during 2026 remained near 205 TAF through early spring, then declined sharply to less than 20 TAF by September. The cold-water pool volume tracked near the long-term average during spring and summer before reaching some of the lowest seasonal values observed in recent years. Cold-water storage was largely depleted by late summer as reservoir temperatures increased. The graph compares 2026 conditions with historical averages and selected water years from 2015 through 2025.

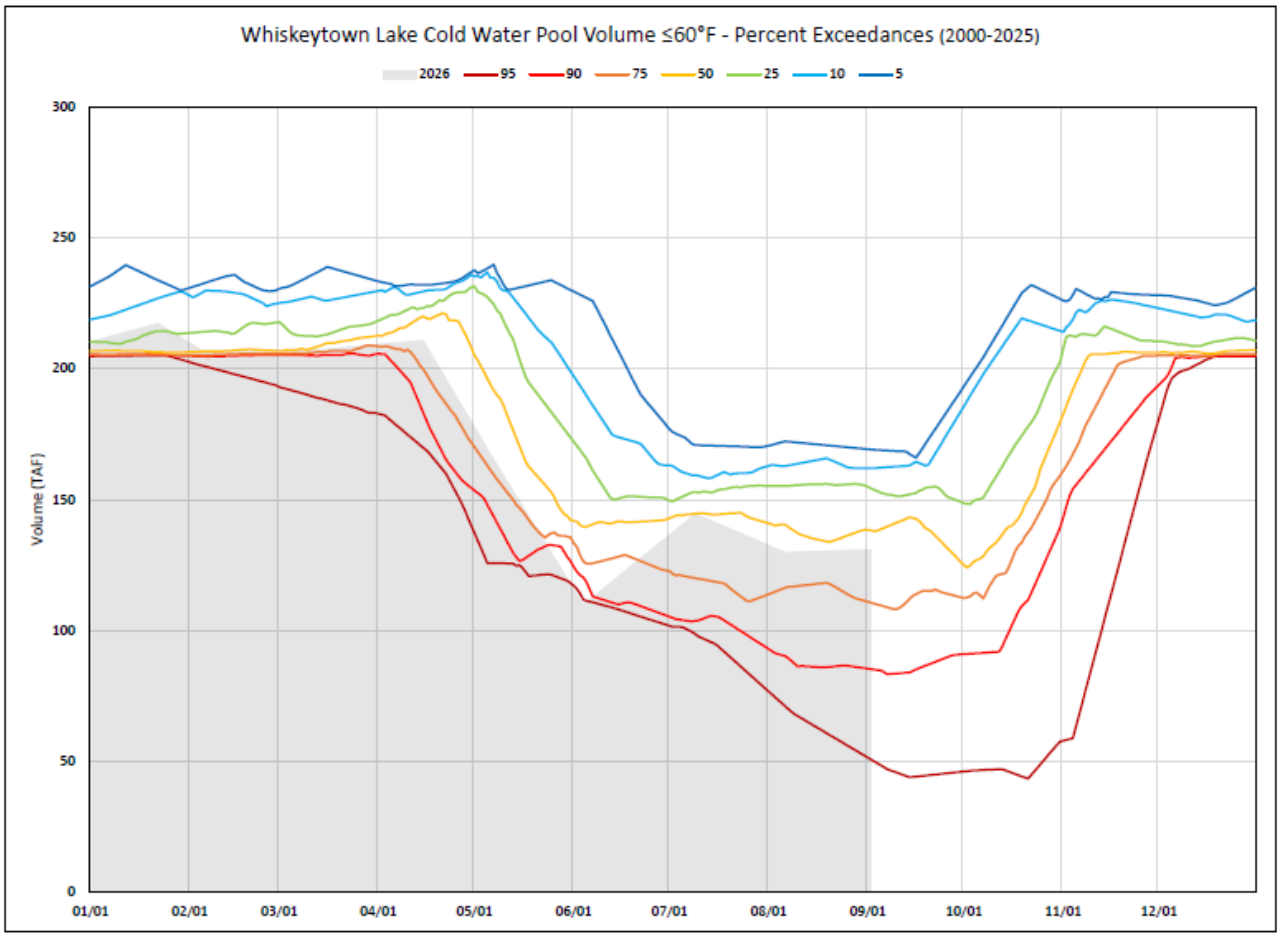


Figure 24. Whiskeytown Lake Cold Water Pool Volume ≤60°F – Percent Exceedances (2000-2025)

Whiskeytown Lake cold-water pool volume (≤60°F) in 2026 is shown relative to historical exceedance percentiles for 2000-2025. The cold-water pool remained near 200 TAF through spring, declined to approximately 110-145 TAF during summer, and stabilized near 130 TAF by September. Throughout most of the year, 2026 tracked near the 50th percentile exceedance curve, indicating near-average cold-water storage compared to historical conditions. The graph illustrates seasonal changes in cold-water pool volume within the historical range of observed years.

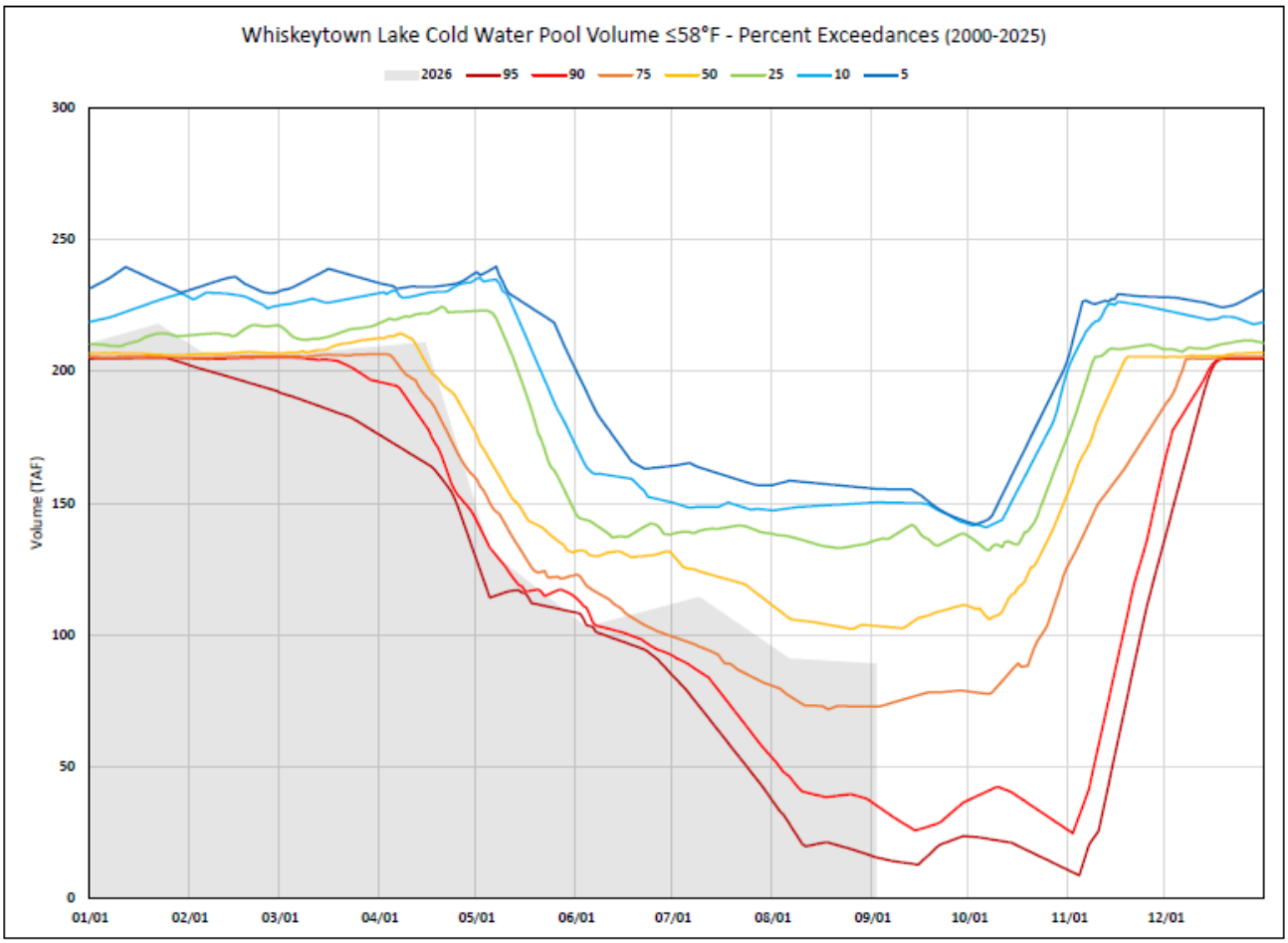


Figure 25. Whiskeytown Lake Cold Water Pool Volume ≤58°F – Percent Exceedances (2000-2025)

Whiskeytown Lake cold-water pool volume (≤58°F) in 2026 is shown relative to historical exceedance percentiles for 2000-2025. The cold-water pool remained near 205 TAF through spring, declined to about 90 TAF during late summer, and stabilized near that level through September. Throughout most of the year, 2026 tracked near the 50th percentile exceedance curve, indicating near-average cold-water storage compared to historical conditions. The graph illustrates seasonal changes in cold-water pool volume within the historical range of observed years.

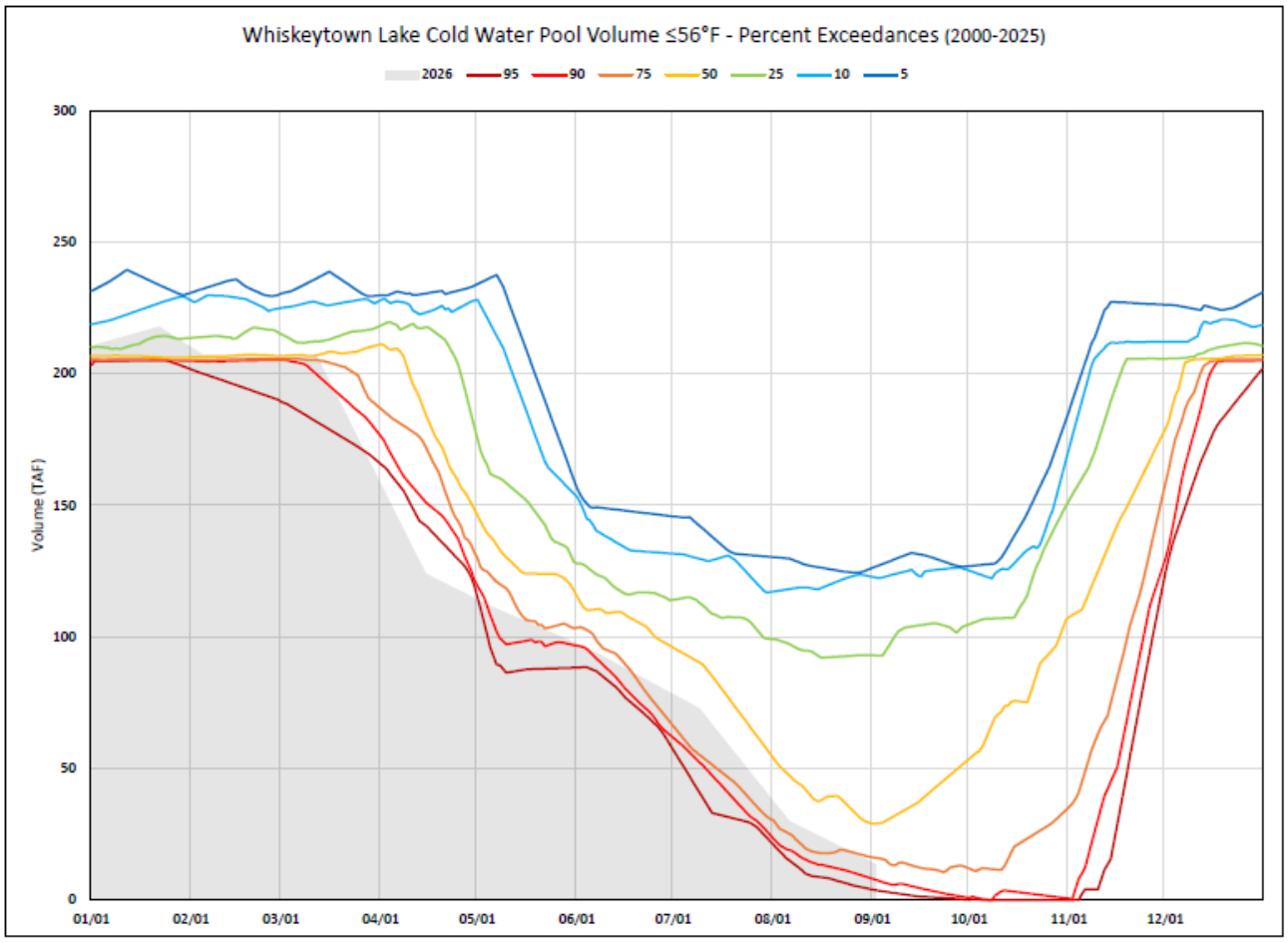


Figure 26. Whiskeytown Lake Cold Water Pool Volume ≤56°F – Percent Exceedances (2000-2025)

Whiskeytown Lake cold-water pool volume (≤56°F) in 2026 is shown relative to historical exceedance percentiles for 2000-2025. The cold-water pool declined from about 205 TAF in early spring to less than 20 TAF by early September. Throughout most of the year, 2026 tracked near the 50th percentile exceedance curve, indicating near-average cold-water storage compared with historical conditions. The graph illustrates seasonal depletion of the cold-water pool within the historical range of observed years.

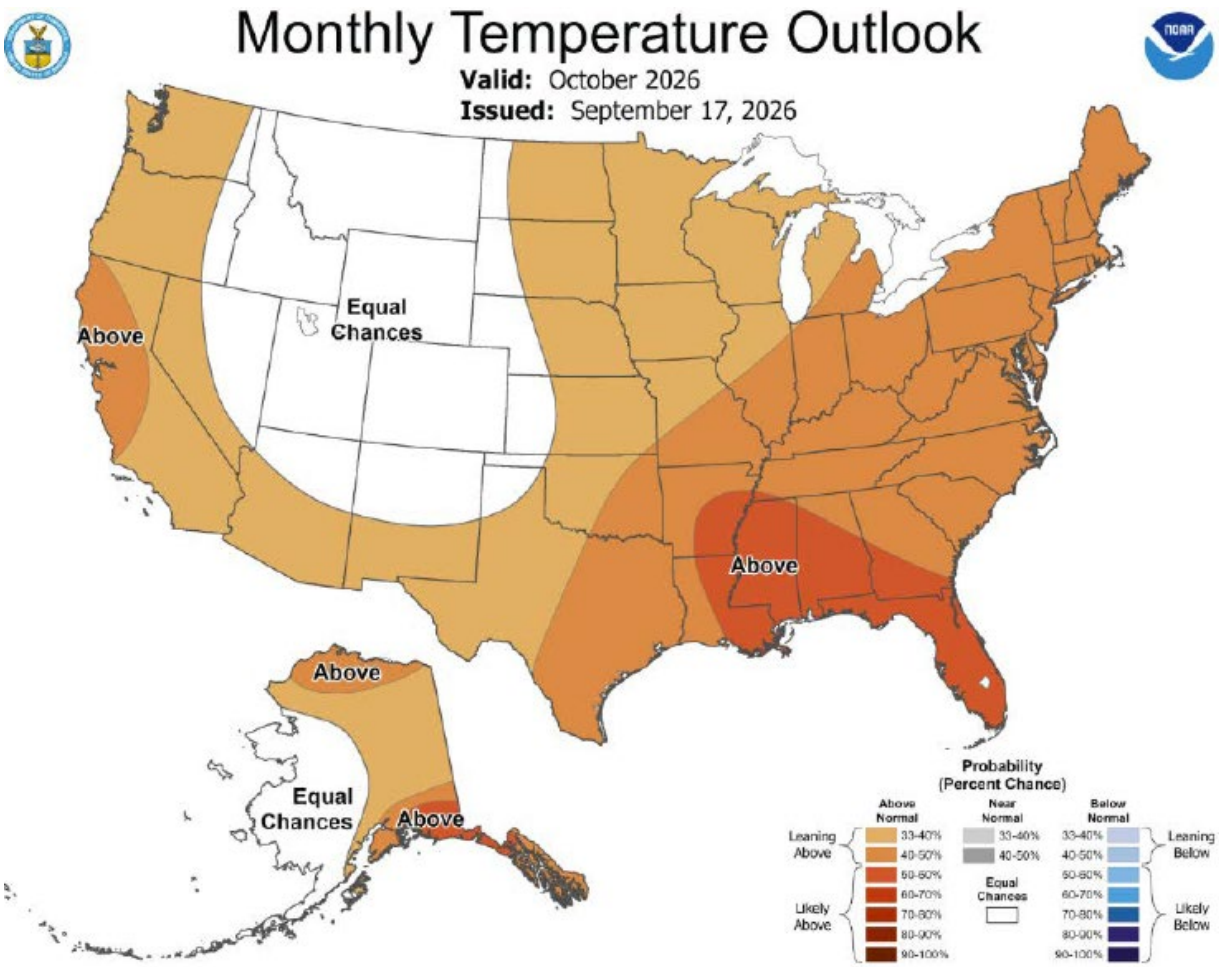


Figure 27. Monthly Temperature Outlook

NOAA's October 2026 temperature outlook indicates an increased probability of above-normal temperatures across most of the United States. The highest likelihood of above-normal temperatures is forecast for the Gulf Coast, Southeast, and portions of Alaska. Equal chances of above-, near-, or below-normal temperatures are shown for parts of the central Rocky Mountains and adjacent interior western states. Shaded areas represent the probability of above-normal temperatures relative to climatological averages.

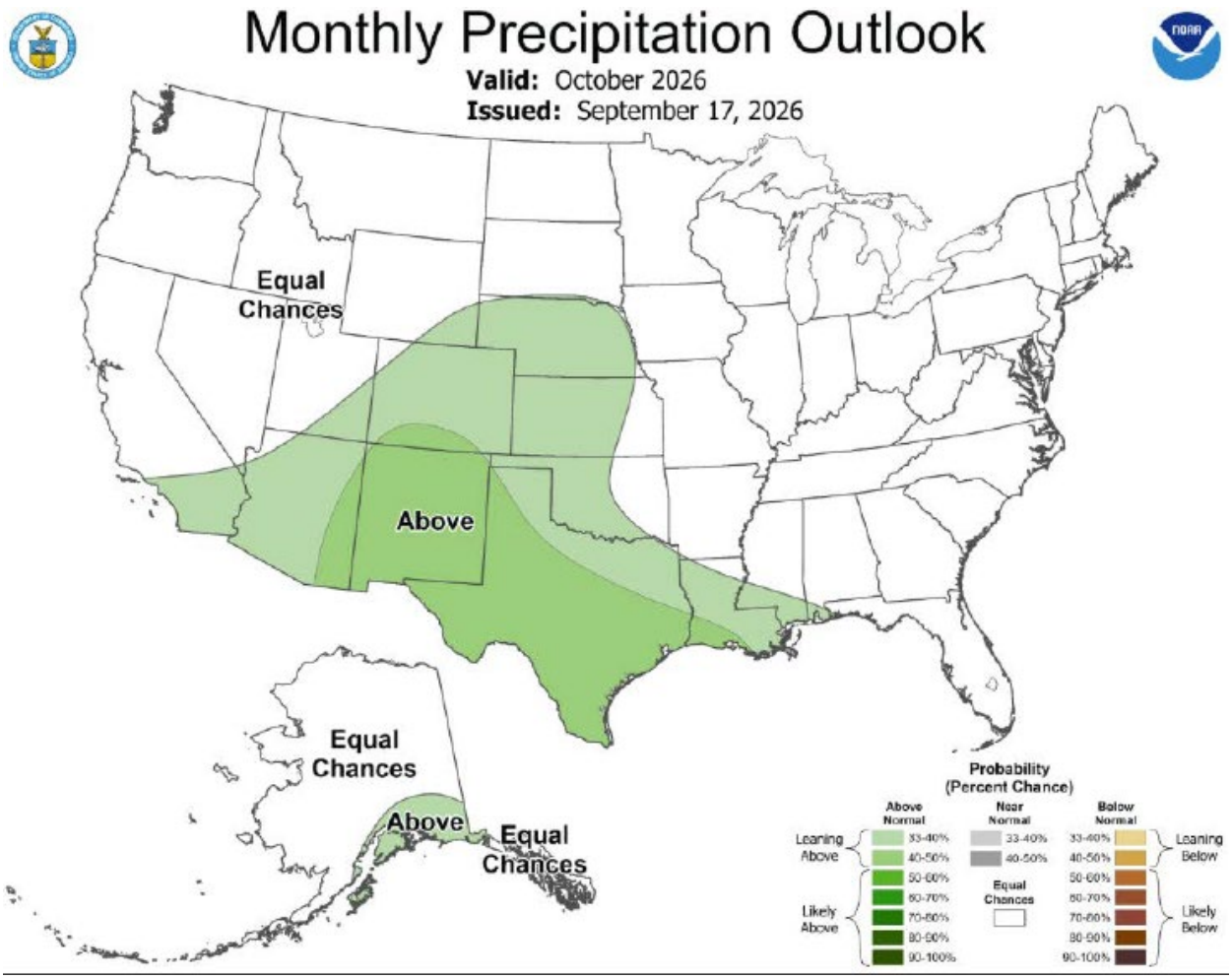


Figure 28. Monthly Precipitation Outlook

NOAA's October 2026 precipitation outlook indicates an increased probability of above-normal precipitation across portions of the Southwest, southern Plains, and western Gulf Coast, with the strongest signal centered over New Mexico and west Texas. Most other areas of the contiguous United States are forecast to have equal chances of above-, near-, or below-normal precipitation. Southern Alaska is also forecast to have an increased likelihood of above-normal precipitation. Shaded areas represent the probability of above-normal precipitation relative to climatological averages.

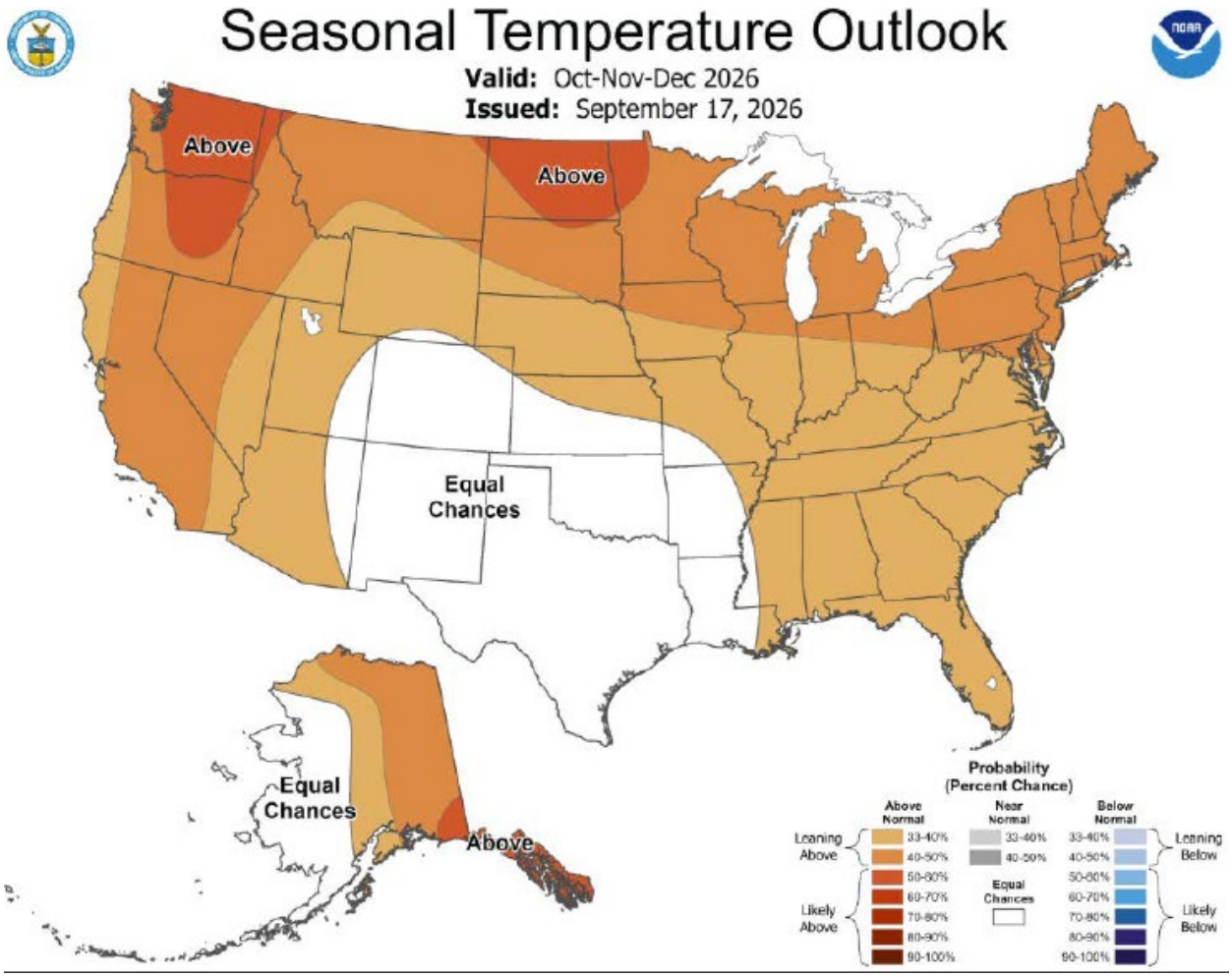


Figure 29. Seasonal Temperature Outlook Oct-Dec 2026

NOAA's seasonal temperature outlook for October through December 2026 indicates an increased probability of above-normal temperatures across most of the United States. The highest likelihood of above-normal temperatures is forecast for parts of the Pacific Northwest, northern Plains, and southern Alaska. Equal chances of above-, near-, or below-normal temperatures are forecast for portions of the southern Great Plains and interior Southwest. Shaded areas represent the probability of above-normal temperatures relative to historical averages.

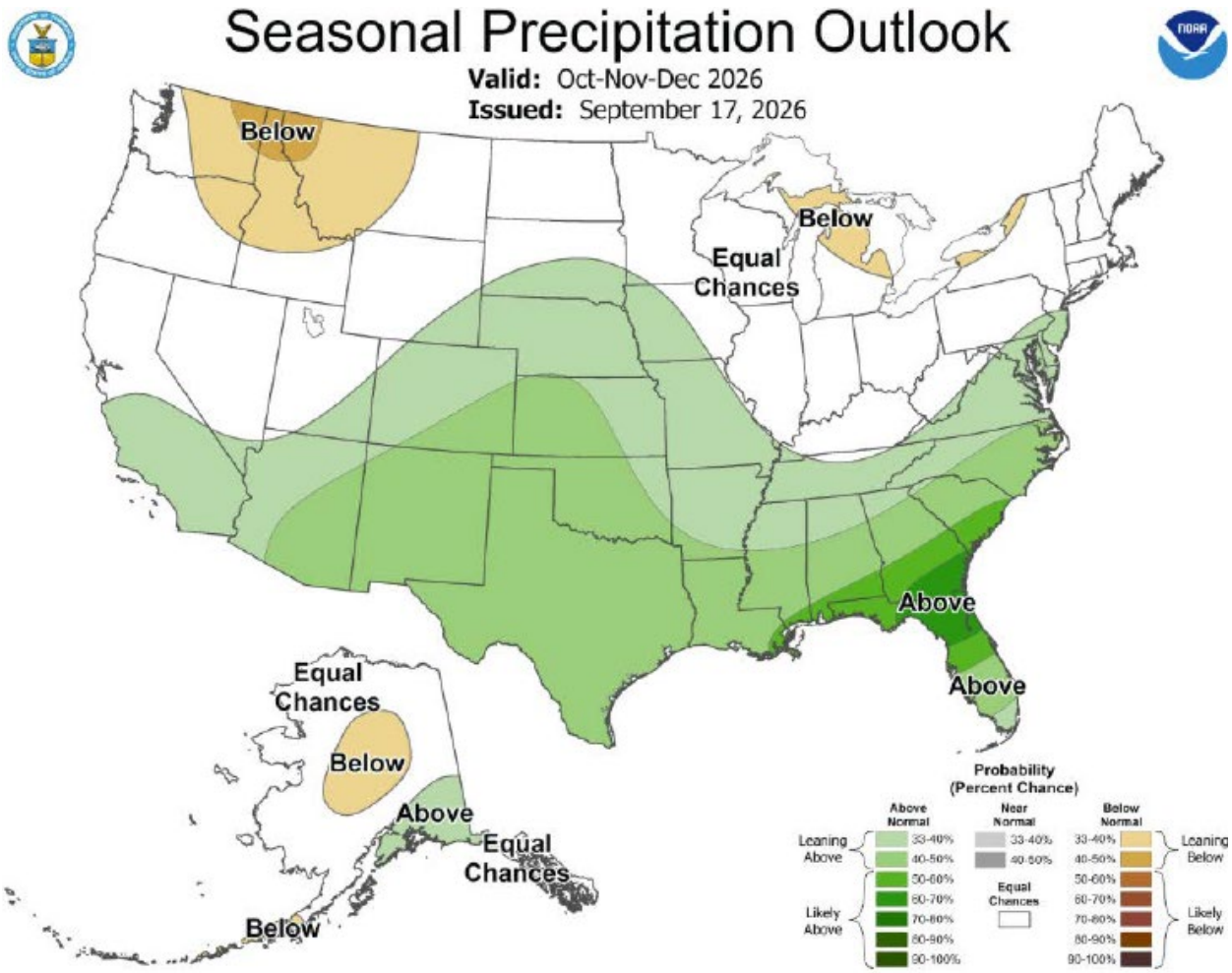


Figure 30. Seasonal Precipitation Outlook Oct-Dec 2026

NOAA's seasonal precipitation outlook for October through December 2026 indicates an increased probability of above-normal precipitation across much of the southern United States, with the highest probabilities in the Southeast and Florida. Increased chances of below-normal precipitation are forecast for parts of the Pacific Northwest, the western Great Lakes region, and portions of Alaska. Equal chances of above-, near-, or below-normal precipitation are forecast for much of the northern and central United States. Shaded areas represent the probability of above- or below-normal precipitation relative to historical averages.

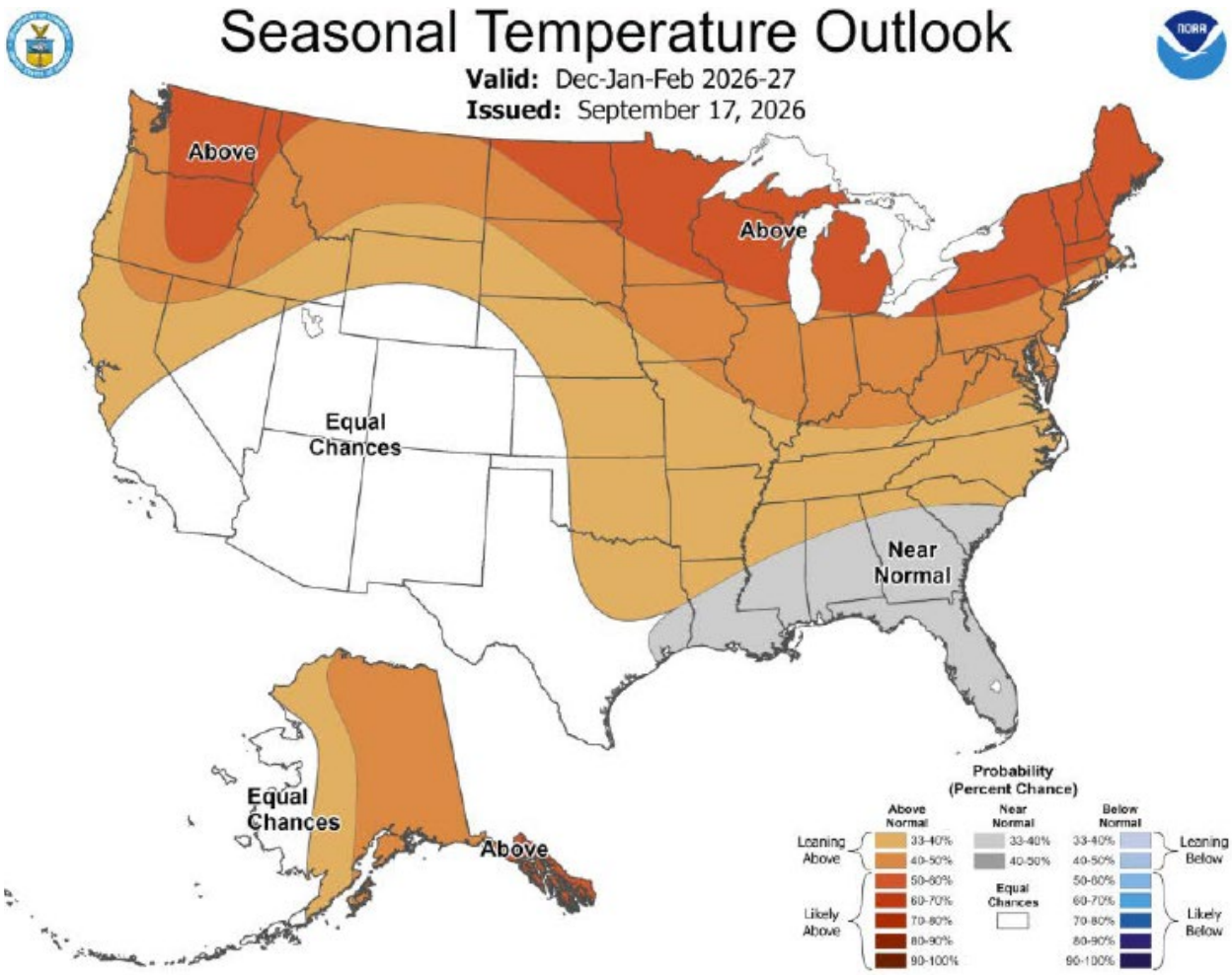


Figure 31. Seasonal Temperature Outlook Dec-Feb 2026

NOAA's seasonal temperature outlook for December 2026 through February 2027 indicates an increased probability of above-normal temperatures across much of the United States, with the highest probabilities in the Pacific Northwest, northern Plains, Great Lakes region, and Northeast. Equal chances of above-, near-, or below-normal temperatures are forecast for portions of the Southwest and southern Rockies. Near-normal temperatures are favored across parts of the Southeast and Gulf Coast. Shaded areas represent the probability of above-normal temperatures relative to historical averages.

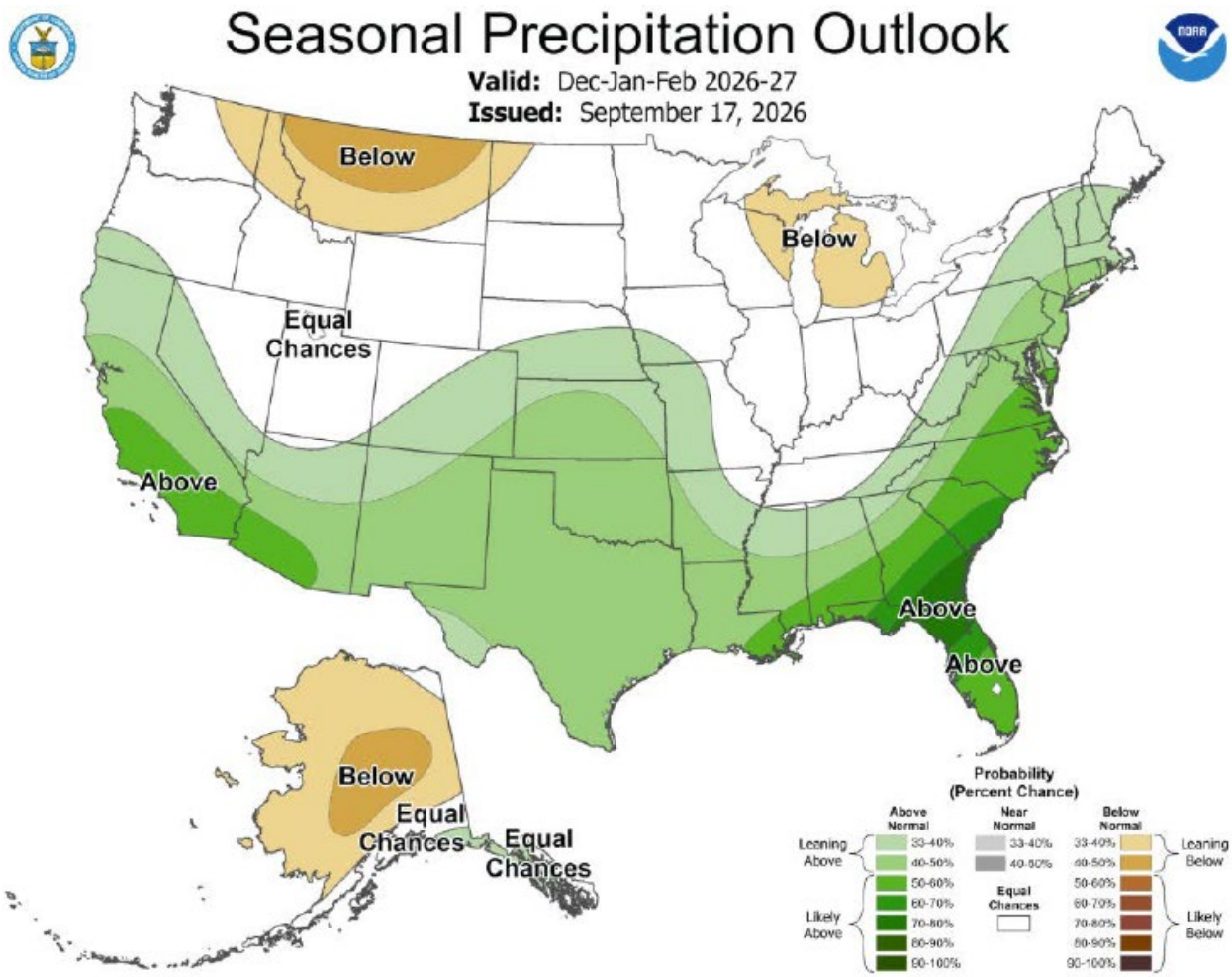


Figure 32. Seasonal Precipitation Outlook Dec-Feb 2026

NOAA's seasonal precipitation outlook for December 2026 through February 2027 indicates an increased probability of above-normal precipitation across much of the southern United States, including California, the southern Plains, Gulf Coast, and Southeast. Increased chances of below-normal precipitation are forecast for parts of the northern Rockies, western Great Lakes, and interior Alaska. Equal chances of above-, near-, or below-normal precipitation are forecast for portions of the interior West and southern Alaska. Shaded areas represent the probability of above- or below-normal precipitation relative to historical averages.

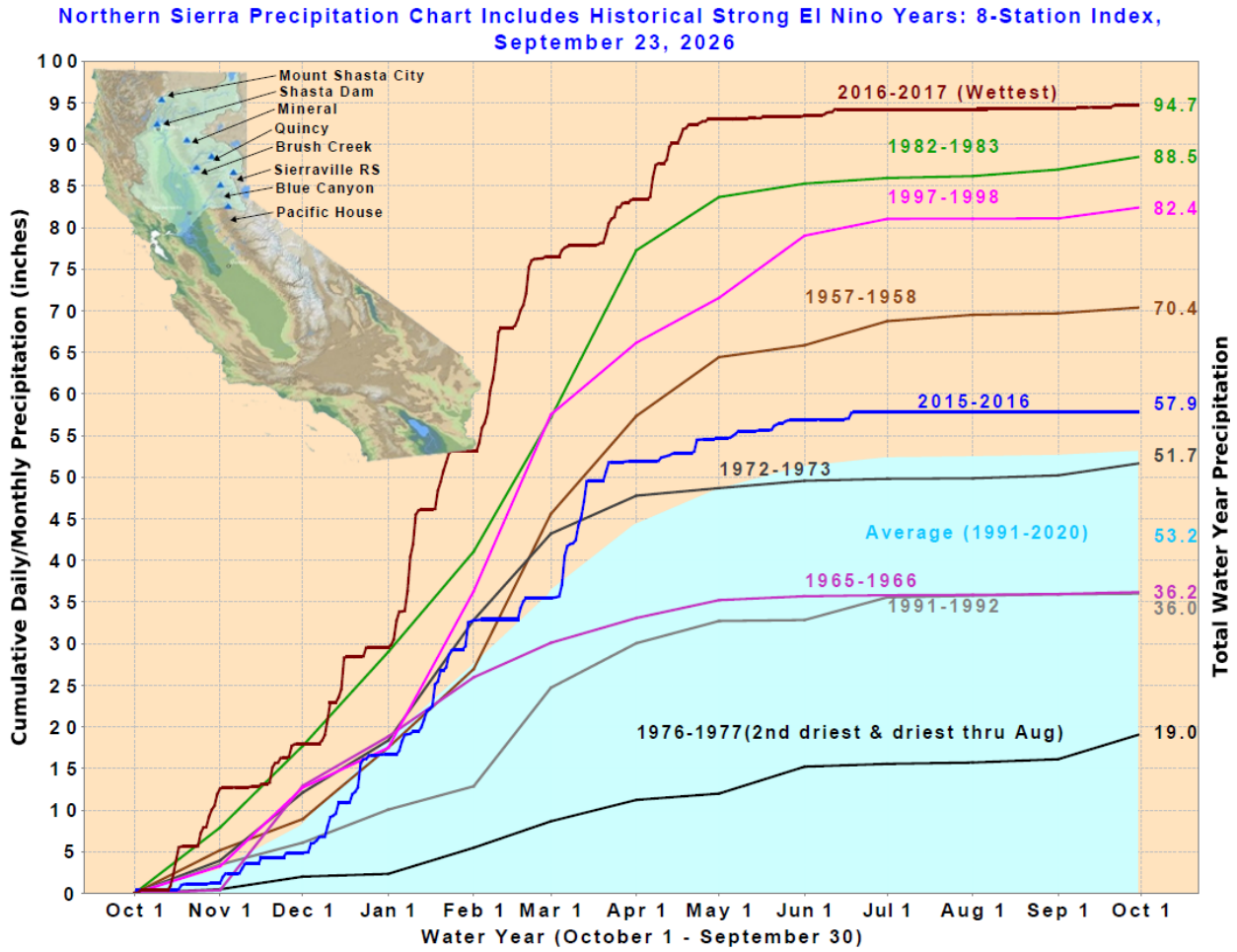


Figure 33. Northern Sierra Precipitation Chart Includes Historical Strong El Nino Years: 8-Station Index, September 23, 2026

Northern Sierra 8-Station precipitation index through September 23, 2026, compared with historical wet, average, and dry water years, including several strong El Niño years. Cumulative precipitation reached 51.7 inches, slightly below the 1991-2020 average of 53.2 inches. Precipitation was substantially lower than the wettest historical years (82.4 to 94.7 inches) but well above the driest year (19.0 inches). Most precipitation occurred between January and April, with little accumulation during summer.

Estimated CVP Operations 50% Exceedance

Table 7. Storages – Federal End of the Month Storage/Elevation (TAF/Feet)

Facility	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Trinity	1773	1684	1666	1632	1611	1675	1786	1915	2076	1905	1778	1632	1485
Trinity Elev.	NA	2318	2316	2314	2312	2317	2326	2335	2346	2334	2325	2314	2302
Whiskeytown	238	238	206	206	206	206	206	206	206	238	238	238	238
Whiskeytown Elev.	NA	1209	1199	1199	1199	1199	1199	1199	1199	1209	1209	1209	1209
Shasta	2630	2450	2361	2400	2691	3048	3581	4037	4255	4319	4008	3508	3022
Shasta Elev.	NA	982	977	979	994	1010	1032	1049	1057	1059	1048	1029	1009
Folsom	463	422	405	438	489	562	560	749	877	941	914	682	488
Folsom Elev.	NA	406	404	408	415	424	424	444	457	463	460	437	415
New Melones	1562	1513	1463	1475	1493	1529	1558	1618	1628	1716	1719	1646	1589
New Melones Elev.	NA	1005	999	1000	1002	1006	1009	1016	1017	1025	1026	1018	1013
Federal San Luis	429	402	361	359	482	663	778	908	890	761	640	365	247
Total	7095	6709	6461	6509	6970	7682	8469	9434	9932	9880	9296	8071	7069

Table 8. State End of the Month Reservoir Storage (TAF)

Facility	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Oroville	1973	1610	1437	1382	1494	1712	2102	2486	2895	3064	2888	2377	1867
Oroville Elev.	NA	743	723	716	730	754	792	825	857	869	856	816	770
State San Luis	859	955	930	909	1062	1039	1014	907	777	604	437	452	462
Total San Luis (TAF)	1288	1357	1291	1268	1544	1702	1791	1815	1667	1365	1077	817	709
Total San Luis Elev.	NA	487	481	478	503	517	524	526	514	487	460	434	422

Table 9. Monthly River Releases (TAF/cfs)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Trinity (TAF)	59	23	18	78	18	17	18	28	258	126	68	53
Trinity (cfs)	1,000	373	300	1,276	300	300	300	477	4,189	2,120	1,102	857
Clear Creek (TAF)	7	10	12	16	18	17	18	15	18	13	7	6
Clear Creek (cfs)	120	157	210	260	293	300	286	247	295	215	113	100
Sacramento (TAF)	393	353	297	246	246	222	369	416	492	684	799	768
Sacramento (cfs)	6600	5750	5000	4000	4000	4000	6000	7000	8000	11500	13000	12500

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
American (TAF)	104	99	60	62	80	233	123	297	400	249	350	292
American (cfs)	1750	1605	1005	1006	1300	4200	2000	5000	6500	4183	5698	4758
Stanislaus (TAF)	12	39	12	12	12	28	32	53	54	37	12	12
Stanislaus (cfs)	200	635	200	200	200	497	523	898	880	630	200	200
Feather (TAF)	446	203	74	77	65	58	65	62	65	226	467	498
Feather (cfs)	7500	3300	1250	1250	1050	1050	1050	1050	1050	3800	7600	8100

Table 10. Trinity Diversions (TAF)

Diversion Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Carr PP	32	5	46	0	0	0	0	16	126	97	96	96
Spring Creek PP	25	30	40	0	17	28	20	25	90	90	90	90

Table 11. Delta Summary (TAF)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Tracy	197	162	97	176	235	225	250	154	173	250	148	253
USBR Banks	36	0	0	0	0	0	0	0	0	0	0	0
Contra Costa	14.0	14.0	16.0	18.0	14.0	14.0	12.7	12.7	12.7	9.8	11.1	12.7
Total USBR	247	176	113	194	249	239	263	167	185	260	159	266
State Export	350	202	172	329	155	150	171	60	49	129	342	380
Total Export	597	378	285	523	404	389	434	227	234	389	501	646
COA Balance	0	0	0	0	0	0	0	0	0	0	0	0
Vernalis (TAF)	54	108	83	83	91	127	140	143	146	84	51	49
Vernalis (cfs)	906	1757	1393	1355	1485	2280	2280	2398	2380	1420	834	802
Old/Middle River calc.	-7,909	-4,534	-3,652	-6,531	-4,982	-4,959	-4,997	-2,443	-2,456	-4,983	-6,491	-8,317
Computed DOI	6001	7499	7497	7499	14706	22513	21961	17751	13144	9497	11501	9500
Excess Outflow	0	0	0	0	6702	11112	10557	6354	2717	0	0	0
% Export/Inflow	52%	38%	34%	51%	31%	23%	24%	16%	19%	33%	33%	43%
% Export/inflow std.	65%	65%	65%	65%	65%	45%	35%	35%	35%	35%	65%	65%

Table 12. Hydrology

Statistic	Trinity	Shasta	Folsom	New Melones
Water Year Inflow (TAF)	1109	4980	2440	785
Year to Date + Forecasted % of mean	91%	90%	90%	74%

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

CVP operational forecasts or outlooks represent general system-wide dynamics and do not necessarily address specific watershed/tributary details.

CVP releases or export values represent monthly averages.

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

Estimated CVP Operations 90% Exceedance

Table 13. Storages – Federal End of the Month Storage/Elevation (TAF/Feet)

Facility	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Trinity	1773	1678	1654	1607	1523	1525	1556	1614	1717	1547	1461	1367	1251
Trinity Elev.	NA	2317	2316	2312	2305	2305	2308	2312	2320	2307	2300	2292	2281
Whiskeytown	238	238	206	206	206	206	206	206	206	238	238	238	238
Whiskeytown Elev.	NA	1209	1199	1199	1199	1199	1199	1199	1199	1209	1209	1209	1209
Shasta	2630	2440	2311	2264	2292	2363	2518	2836	2892	2758	2482	2133	1847
Shasta Elev.	NA	981	975	972	974	977	985	1000	1003	997	983	965	948
Folsom	463	412	355	308	312	325	384	507	654	759	621	384	276
Folsom Elev.	NA	405	396	388	389	391	401	417	434	445	431	401	383
New Melones	1562	1512	1452	1449	1447	1453	1411	1390	1300	1200	1079	1003	948
New Melones Elev.	NA	1004	998	998	997	998	993	991	981	969	953	943	935
Federal San Luis	429	436	380	338	340	480	549	631	577	439	256	54	-112
Total	7095	6717	6357	6172	6119	6352	6624	7185	7345	6941	6137	5179	4447

Table 14. State End of the Month Reservoir Storage (TAF)

Facility	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Oroville	1973	1599	1397	1251	1185	1241	1382	1595	1766	1687	1416	1056	798
Oroville Elev.	NA	742	718	700	691	698	716	741	760	751	721	673	631
State San Luis	859	970	913	869	817	870	905	814	719	557	377	123	-112

Facility	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Total San Luis (TAF)	1288	1406	1293	1207	1157	1350	1453	1445	1295	995	632	176	-224
Total San Luis Elev.	NA	491	481	472	468	486	495	495	481	452	413	348	NA

Table 15. Monthly River Releases (TAF/cfs)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Trinity (TAF)	59	23	18	78	18	17	28	32	180	47	28	53
Trinity (cfs)	1,000	373	300	1,276	300	300	450	540	2,924	783	450	857
Clear Creek (TAF)	7	10	12	16	18	17	18	15	18	13	7	6
Clear Creek (cfs)	120	157	210	260	293	300	286	247	295	215	113	100
Sacramento (TAF)	393	353	303	246	246	222	200	387	553	583	615	553
Sacramento (cfs)	6600	5750	5100	4000	4000	4000	3250	6500	9000	9800	10000	9000
American (TAF)	104	99	90	49	49	44	49	59	69	210	297	169
American (cfs)	1750	1605	1510	800	800	800	800	1000	1128	3531	4825	2753
Stanislaus (TAF)	12	39	12	12	12	57	54	68	72	53	12	12
Stanislaus (cfs)	200	635	200	200	200	1019	881	1151	1167	899	200	200
Feather (TAF)	446	203	74	77	77	58	65	62	105	214	255	197
Feather (cfs)	7500	3300	1250	1250	1250	1050	1050	1050	1700	3600	4150	3200

Table 16. Trinity Diversions (TAF)

Diversion Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Carr PP	33	6	41	27	10	5	0	1	134	91	87	86
Spring Creek PP	25	30	30	15	0	0	2	1	90	80	80	80

Table 17. Delta Summary (TAF)

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Tracy	191	99	48	49	182	161	170	54	55	48	50	50
USBR Banks	36	0	0	0	0	0	0	0	0	0	0	0
Contra Costa	12.0	14.0	14.0	14.0	14.0	14.0	12.0	12.0	12.0	10.0	11.0	12.0
Total USBR	239	113	62	63	196	175	182	66	67	58	61	62
State Export	352	173	126	101	197	175	120	36	37	36	38	39
Total Export	591	286	188	164	393	350	302	101	104	94	99	101
COA Balance	0	0	-1	-13	3	3	3	-7	-16	-16	-15	-15

Facility	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Vernalis (TAF)	46	98	74	75	75	127	140	125	132	84	45	40
Vernalis (cfs)	772	1595	1242	1225	1225	2280	2280	2109	2143	1420	737	655
Old/Middle River calc.	-7,892	-3,455	-2,464	-2,093	-4,961	-4,418	-3,347	-952	-931	-1,168	-1,498	-1,560
Computed DOI	6001	7499	7497	7499	7499	7510	9256	8539	7499	8506	8996	7499
Excess Outflow	0	0	0	0	0	0	1757	0	0	0	0	0
% Export/Inflow	53%	33%	26%	23%	47%	45%	35%	13%	13%	10%	10%	11%
% Export/inflow std.	65%	65%	65%	65%	65%	45%	35%	35%	35%	35%	65%	65%

Table 18. Hydrology

Statistic	Trinity	Shasta	Folsom	New Melones
Water Year Inflow (TAF)	1094	4970	2430	784.16896
Year to Date + Forecasted % of mean	91%	90%	89%	74%

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.

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

September 23, 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 August 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. Carcass survey data from the 2026 season were also carried forward as a provisional estimate of this year's carcass-based TDM. Unlike previous runs, no comparison to USBR's Water Temperature Modeling Platform (WTMP) is included.

Predicted mean monthly water temperatures are shown in Table 1. These are monthly averages of daily mean water temperatures under the August Forecast_90 scenario at three sites, Shasta, Keswick, and CCR, from October through December. Temperatures rise from October to a November peak and then ease in December. At CCR the monthly mean climbs from 55.0 °F in October to 56.4 °F in November before falling back to 55.3 °F in December. At CCR, the 53.6 °F is no longer being met.

Averaged over the 2013–2025 series, predicted TDM was driven more by the choice of mortality model than by the spawning distribution. The stage-independent model produced higher mortality than the stage-dependent model: population means of 17 (10-36) versus 5 (0-24) using redd-based spawning distributions, and 16 (12-25) versus 5 (1-13) using carcass-based distributions (percent, with the range across years in parentheses). Within each model, redd- and carcass-based distributions gave broadly similar long-term means, but they diverged sharply in individual years, reflecting the different spatial and temporal egg placements the two methods assume. 2025 was the highest-mortality year under both redd-based combinations (36% stage-independent, 24% stage-dependent) but not under the carcass-based ones: 2017 exceeded it, at 25% versus 24% under the stage-independent model and 13% versus 9% under the stage-dependent model.

Carcass survey data for 2026 added further context (Table 5). The 2026 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 now run through 30 August, and season completion projects only 12 additional carcasses, so the provisional 2026 stage-independent TDM of 20% is now close to final.

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

For additional details visit the Central Valley Temperature and Exposure webpage.

Overview

Total release scenarios simulated: 1

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

TDM Forecast start date: 04/01/2026

Reservoir Forecast start date: 09/23/2026

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)

Reservoir Release Scenarios

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

Table 23. Keswick Releases (CFS) — monthly mean

Label	Description	Oct	Nov	Dec
Forecast_90	USBR 90th exceedance flow forecast	7000	5150	4000

Table 24. Trinity Imports via Spring Creek PP (TAF/month)

Month	Oct	Nov	Dec
Release	85	40	0

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

Meteorology

All simulations used the meteorological time series from the historical record for year 2014 applied over the full forecast window (9/23/2026 – 12/31/2026). Over the hindcast window (4/01/2026 – 9/23/2026) 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.

Initial Shasta Conditions

Temperature profile date: 09/21/2026

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

TDM Model Parameters

All scenarios estimated TDM based on two models.

Table 25. TDM 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

Mean Monthly Temperatures

To provide context for the TDM results that follow, mean monthly water temperatures from the SWFSC and USBR simulations are shown (Table 25) 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 25. 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 August Forecast_90 scenario from the SWFSC models.

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Month	SWFSC Forecast_90 Shasta (°F)	SWFSC Forecast_90 Keswick (°F)	SWFSC Forecast_90 CCR (°F)
October	53.9	54.6	55.0
November	57.3	56.5	56.4
December	56.5	55.7	55.3

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 26. Predicted egg-to-fry mortality (%) under the August Forecast_90 scenario for two temperature sources (SWFSC and USBR), 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)	SWFSC Forecast_90 Year 2025
Redd Stage-independent	17 (10-36)	36
Carcass Stage-independent	16 (12-25)	24
Redd Stage-dependent	5 (0-24)	24
Carcass Stage-dependent	5 (1-13)	9

Table 27. 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.

Redd Year	SWFSC Forecast_90 Redd stage-independent model	SWFSC Forecast_90 Carcass stage-independent model
2013	20	16
2014	14	13
2015	15	12
2016	19	14
2017	22	25
2018	13	22
2019	18	13
2020	12	13
2021	10	13
2022	13	12
2023	20	12
2024	14	16
2025	36	24
Population Mean (2013-2025)	17	16
Population Min (2013-2025)	10	12
Population Max (2013-2025)	36	25

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

Table 28. 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.

Redd Year	SWFSC Forecast_90 Redd stage-dependent model	SWFSC Forecast_90 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.

Provisional 2026 Carcass-Year Temperature-Dependent Mortality

Under the August forecast, the provisional 2026 carcass-year distribution yields a stage-independent temperature-dependent mortality of 19%, against 26% for the completed 2025 distribution. Season completion at p10/p50/p90 are shown. See document shared on 8/19/26 for more details.

Table 29. Provisional 2026 estimate.

Parameter	Result
Carcasses observed (through 30 Aug 2026)	2350
Projected carcasses (p50)	12
Observed-only TDM (a floor)	19%

Parameter	Result
Projection p10	19%
Projection p50 (reported value)	20%
Projection p90	20%
2025 actual, for comparison	24%

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