Performance Review:
California Reservoir Annual Forecast Tool (CRAFT)

October 2024

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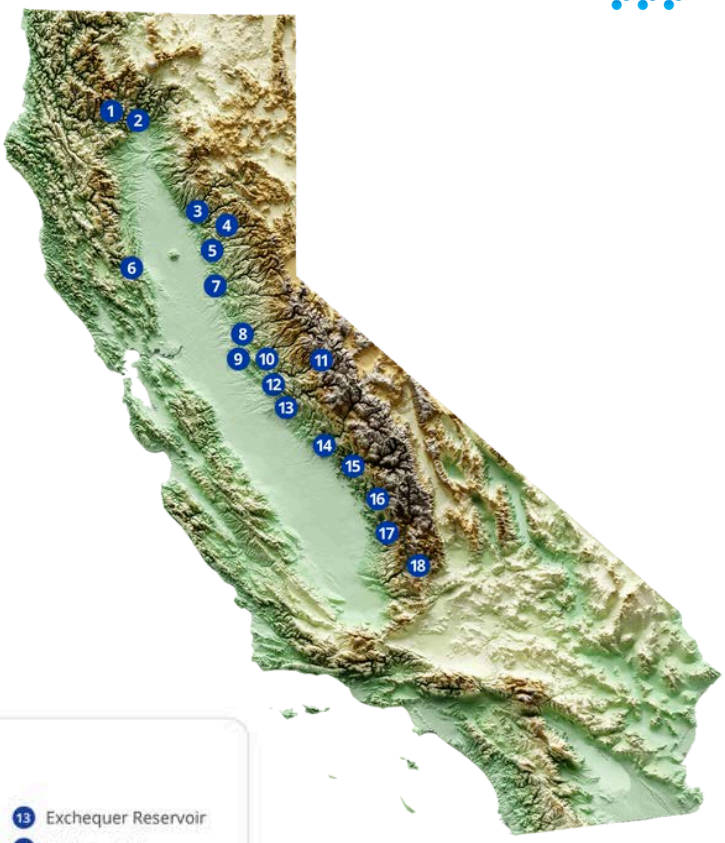
At Weather Tools, we're committed to solving our customers' most pressing challenges by developing tailored solutions using our flexible, seasonal-scale Business Intelligence (BI) core. The California Reservoir Annual Forecast Tool (CRAFT) allows us to meet the specific needs of water managers, ensuring they have the inflow data necessary to make informed decisions. With CRAFT's commercial release in November 2024, this review showcases the model's performance across all eighteen active reservoirs for the past 8 water years.



Forecasts available for:

1. Trinity Lake
2. Lake Shasta
3. Lake Oroville
4. New Bullards Bar Reservoir
5. Englebright Reservoir
6. Indian Valley Reservoir
7. Folsom Lake
8. Pardee Reservoir
9. New Hogan Reservoir
10. New Melones Reservoir
11. Hetch Hetchy Reservoir
12. New Don Pedro Reservoir
13. Exchequer Reservoir
14. Millerton Lake
15. Pine Flat Reservoir
16. Lake Kaweah
17. Lake Success
18. Lake Isabella

Addressing California's Water Management Challenges with CRAFT

Water managers across California face constant challenges in managing reservoirs, balancing water supply and demand, keeping the public safe, and ensuring compliance with regulatory requirements. Inaccurate or untimely forecasts can lead to underutilized resources, missed opportunities, or even flood risks.

In response to these challenges, and at the request of a water district manager, we leveraged our BI core to develop a reservoir inflow model. This model connects water year precipitation to inflow, with our California Annual Precipitation (CAP) forecast as the primary input.

A Hindcast of Our Inflow Model

To evaluate the performance of our model, Weather Tools conducted a hindcast over the past eight years for all eighteen reservoirs ranging from Lake Shasta and Trinity Lake in the north to Lake Isabella in the south. For each year, the CAP forecast—a range of California's expected precipitation (rainfall and snow water equivalent) for the water year—was used to generate a corresponding range of expected reservoir inflow in millions of acre-feet (MAF) for each storage facility through CRAFT's inflow regression model. The CRAFT inflow forecasts are constructed with a range of approximately 275,000 acre-feet for every million acre-feet of forecasted inflow.

The results herein highlight CRAFT's effectiveness in capturing the variability of inflow extremes across the entire portfolio. The lead time that CRAFT provides is as significant as its accuracy. Customers receive the water year inflow forecast during the first week of November, empowering them to make informed decisions and strategically allocate resources proactively, rather than reacting to mid-year updates. This greater lead time, and the fact that the forecast is never adjusted, allows for reliable long-term planning and improved water storage decisions resulting in more efficient resource management.

Accuracy Metrics

The accuracy of CRAFT's water year inflow forecasts is calculated based on the number of forecast "hits" relative to the number of opportunities. "Hits" refer to instances where the observed inflow falls within the forecast range. Each "hit" receives 1 point. Additionally, forecasts that fall within specific margins of the forecast range are awarded points as follows:

- Within ±3.75% of the range: 1 point
- Within ±3.75% to ±7.5% of the range: 0.75 points
- Within ±7.5% to ±11.25% of the range: 0.50 points
- Within ±11.25% to ±15.0% of the range: 0.25 points
- Beyond ±15% of the range: 0 points (not a hit)

Customer feedback indicates that even when water year inflow falls slightly outside of the forecast range, the CRAFT forecast still provides significant operational value. We designed the scoring system with this feedback in mind to ensure that our performance metrics accurately reflect their practical utility in real-world decision-making.

Delivering Tailored Solutions with Proven Accuracy

Weather Tools is committed to finding solutions for the needs of the various industries we serve. Our BI core allows us to efficiently prototype solutions to a wide array of expressed needs. We invite you to contact our team, share your challenges, and explore additional tailored forecasting solutions that could empower you to make confident, data-driven decisions.

The following pages highlight the 8-year performance at each of CRAFT's 18 reservoirs, comparing forecasted inflow ranges to observed water year inflows. We encourage you to explore the results for each reservoir and see the value CRAFT brings to California's water management challenges.

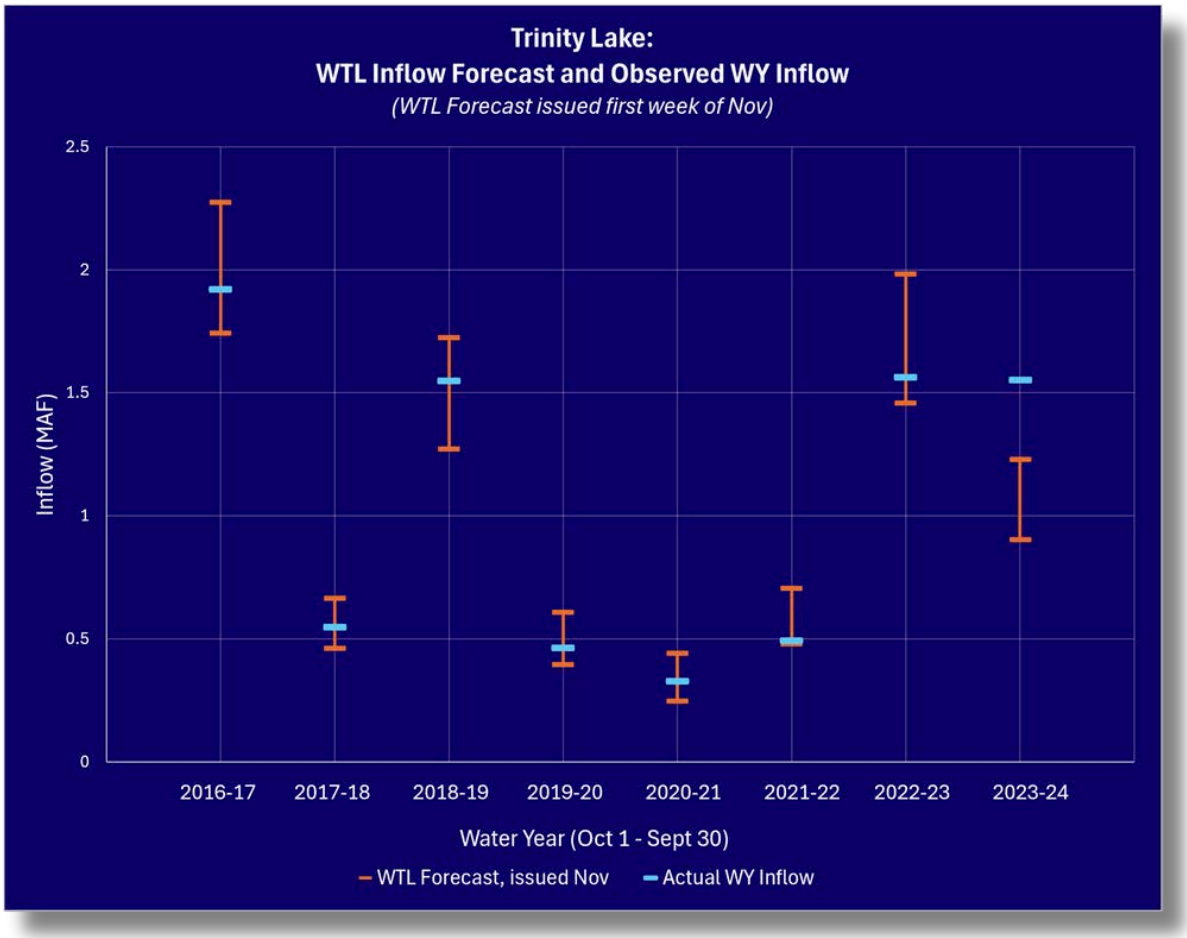
1 Trinity Lake

Forecast Performance Summary

Trinity Lake was formed in 1961 by the Trinity Dam on the Trinity River, as part of the Central Valley Project. This reservoir is essential for providing irrigation water to Central Valley agriculture and ensuring surface flows for downstream users. In addition to its agricultural significance, Trinity Lake offers recreational opportunities like fishing and boating, making it a valuable resource for both the environment and local communities.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Trinity Lake is 1.15 million acre-feet (MAF) and the total capacity 2.447 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

1 Trinity Lake

Forecast Performance Summary

The CRAFT forecast for Trinity Lake has an accuracy of 81.25% from WY 2017 to WY 2024. During this time, observed water year inflow to Trinity Lake was above the forecast range one time, with a departure of +26.1%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	1.741	2.273	1.918
2017/18 (Weak La Niña)	0.459	0.663	0.545
2018/19 (Weak El Niño)	1.270	1.723	1.547
2019/20 (Unclassified)	0.394	0.606	0.461
2020/21 (Moderate La Niña)	0.245	0.440	0.326
2021/22 (Weak La Niña)	0.478	0.704	0.49
2022/23 (Weak La Niña)	1.458	1.981	1.562
2024/24 (Strong El Niño)	0.900	1.227	1.547

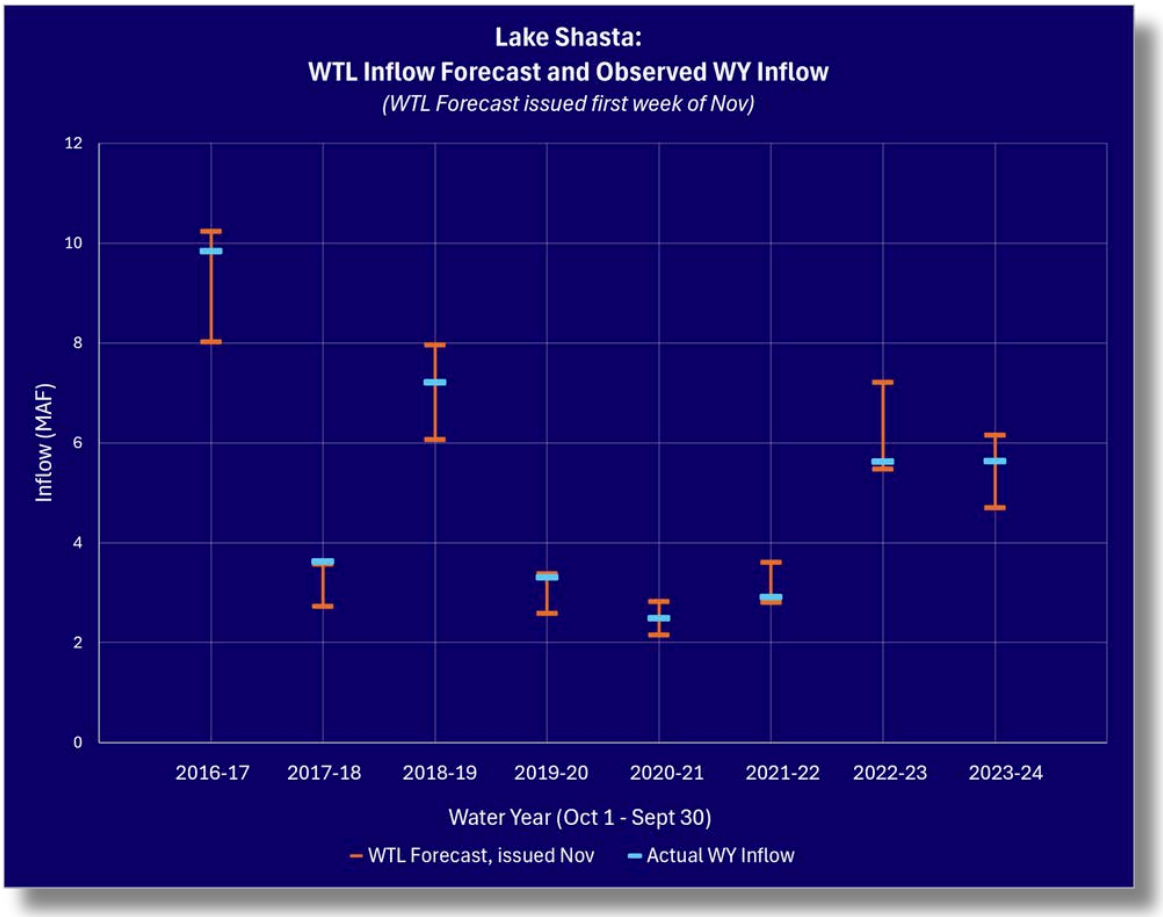
2 Lake Shasta

Forecast Performance Summary

Lake Shasta, situated in Shasta County in northern California, was created in 1945 with the construction of Shasta Dam on the Sacramento River. As California's largest reservoir, it plays a vital role in the Central Valley Project by supplying water for agricultural, urban, and environmental needs. Fed by multiple rivers—including the Sacramento, McCloud, and Pit—Lake Shasta is also a popular destination for outdoor activities such as fishing, boating, and camping.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Lake Shasta is 5.57 million acre-feet (MAF) and the total capacity 4.552 MAF.



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2 Lake Shasta

Forecast Performance Summary

The CRAFT forecast for Lake Shasta has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to Lake Shasta was above the forecast range one time, with a departure of +1.3%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	8.017	10.229	9.83
2017/18 (Weak La Niña)	2.719	3.567	3.614
2018/19 (Weak El Niño)	6.062	7.953	7.199
2019/20 (Unclassified)	2.577	3.372	3.304
2020/21 (Moderate La Niña)	2.144	2.814	2.479
2021/22 (Weak La Niña)	2.796	3.600	2.906
2022/23 (Weak La Niña)	5.470	7.207	5.617
2024/24 (Strong El Niño)	4.696	6.149	5.627

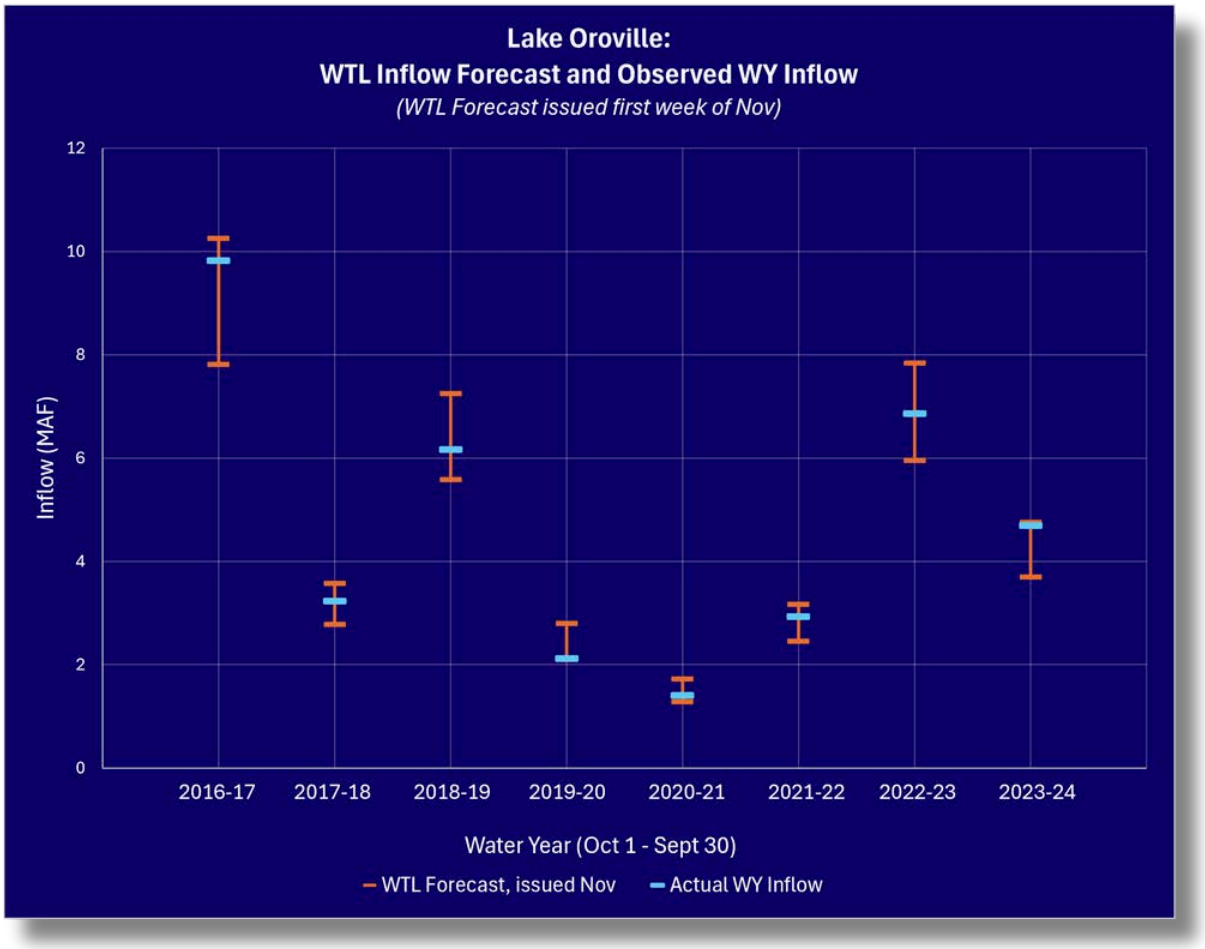
3 Lake Oroville

Forecast Performance Summary

In Butte County, California, Lake Oroville was established in 1968 after construction of the Oroville Dam on the Feather River. As the second-largest reservoir in California, it is a key component of the State Water Project, providing water for millions and supporting agricultural irrigation. The reservoir also functions as a flood control system and storage solution during droughts, underlining its importance in the state's water management strategy.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Lake Oroville is 4.08 million acre-feet (MAF) and the total capacity 3.424 MAF.



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3 Lake Oroville

Forecast Performance Summary

The CRAFT forecast for Lake Oroville has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to Lake Oroville was consistently within CRAFT's forecast range.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	7.804	10.242	9.813
2017/18 (Weak La Niña)	2.768	3.566	3.225
2018/19 (Weak El Niño)	5.575	7.235	6.159
2019/20 (Unclassified)	2.089	2.789	2.109
2020/21 (Moderate La Niña)	1.272	1.710	1.394
2021/22 (Weak La Niña)	2.442	3.161	2.922
2022/23 (Weak La Niña)	5.947	7.832	6.847
2024/24 (Strong El Niño)	3.685	4.747	4.681

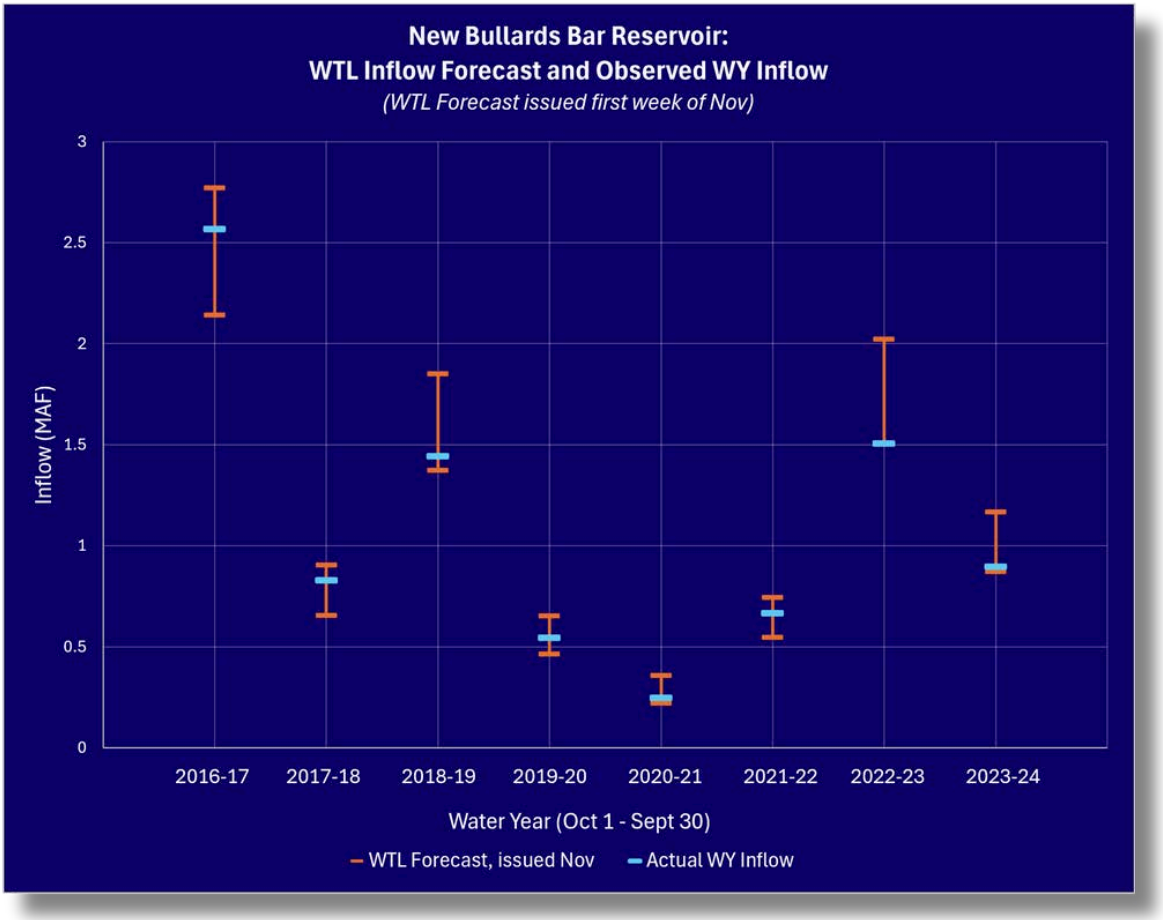
4 New Bullards Bar Reservoir

Forecast Performance Summary

New Bullards Bar Reservoir is located in Yuba County, California, and was formed in 1969 by the New Bullards Bar Dam on the North Yuba River. Managed by the Yuba Water Agency, it supplies water for irrigation, hydroelectric power generation, and flood control. Primarily fed by Sierra Nevada snowmelt, the reservoir plays a crucial role in sustaining regional water supply during dry seasons while effectively managing flood risks, particularly in winter and spring.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for New Bullards Bar Reservoir is 1.09 million acre-feet (MAF) and the total capacity 0.966 MAF.



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4 New Bullards Bar Reservoir

Forecast Performance Summary

The CRAFT forecast for New Bullards Bar Reservoir has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to New Bullards Bar Reservoir was consistently within CRAFT's forecast range.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	2.140	2.770	2.566
2017/18 (Weak La Niña)	0.654	0.902	0.827
2018/19 (Weak El Niño)	1.372	1.850	1.441
2019/20 (Unclassified)	0.462	0.651	0.543
2020/21 (Moderate La Niña)	0.218	0.355	0.246
2021/22 (Weak La Niña)	0.545	0.742	0.664
2022/23 (Weak La Niña)	1.503	2.021	1.504
2024/24 (Strong El Niño)	0.870	1.165	0.894

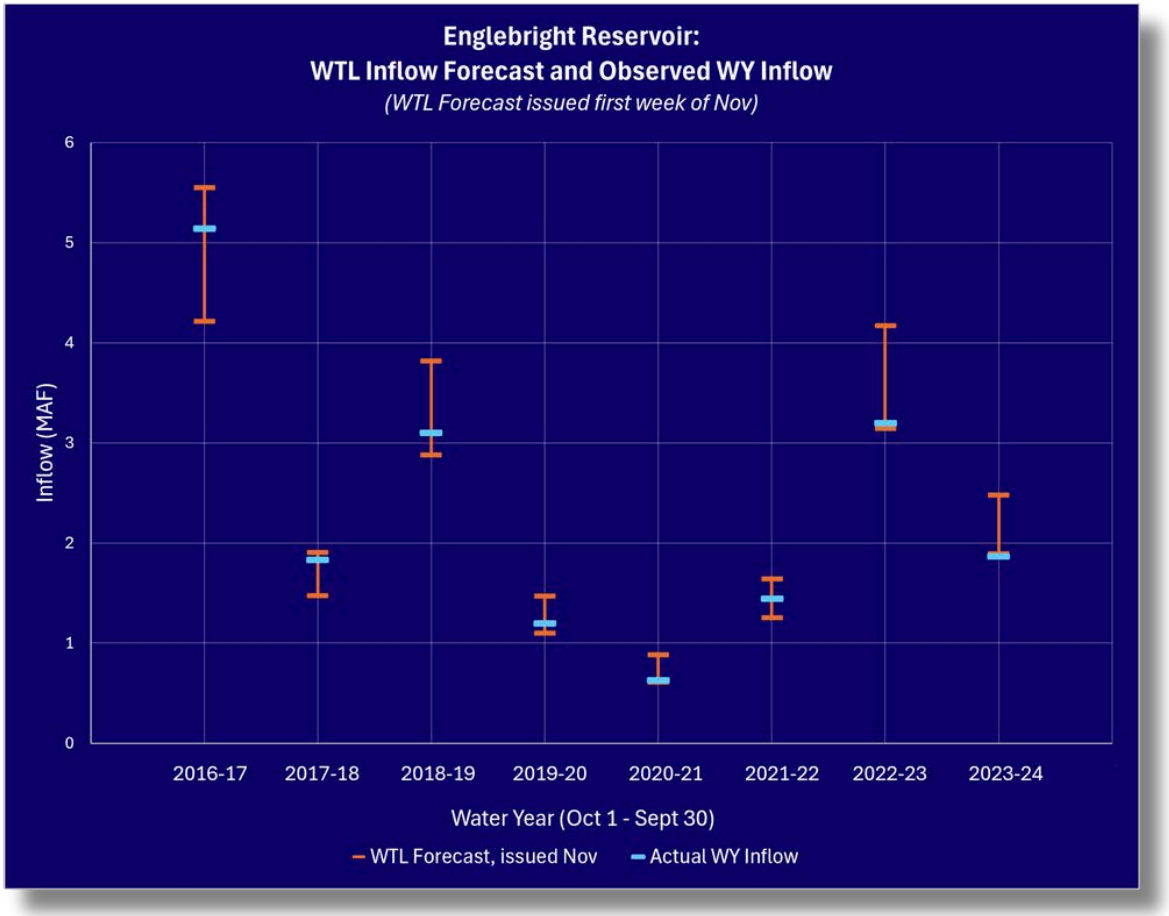
5 Englebright Reservoir

Forecast Performance Summary

Englebright Reservoir, located on the Yuba River in Nevada and Yuba Counties, was created in 1941 with the construction of Englebright Dam by the U.S. Army Corps of Engineers. Initially built for debris control following hydraulic mining activities, the reservoir now plays a key role in water management. Unlike larger reservoirs, Englebright Reservoir doesn't provide significant irrigation supply but serves as a regulating reservoir for downstream flows.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Englebright Reservoir is 2.17 million acre-feet (MAF) and the total capacity 0.070 MAF.



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5 Englebright Reservoir

Forecast Performance Summary

The CRAFT forecast for Englebright Reservoir has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to Englebright Reservoir fell below the forecast range one time, with a departure of -1.4%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	4.210	5.543	5.135
2017/18 (Weak La Niña)	1.470	1.900	1.827
2018/19 (Weak El Niño)	2.876	3.812	3.096
2019/20 (Unclassified)	1.097	1.467	1.19
2020/21 (Moderate La Niña)	0.607	0.877	0.624
2021/22 (Weak La Niña)	1.248	1.637	1.439
2022/23 (Weak La Niña)	3.141	4.166	3.193
2024/24 (Strong El Niño)	1.889	2.475	1.862

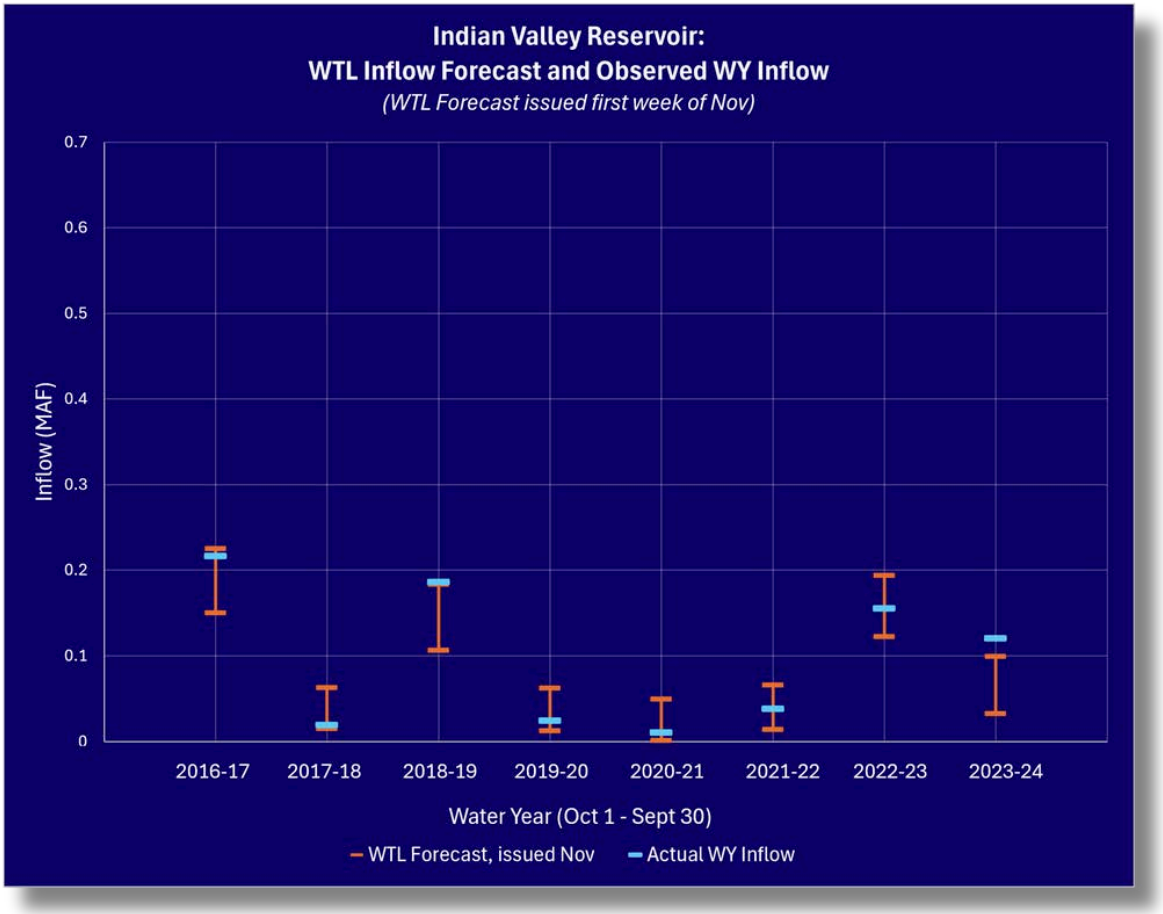
6 Indian Valley Reservoir

Forecast Performance Summary

Indian Valley Reservoir, situated in Lake County, California, impounded in 1976 by the Indian Valley Dam on the North Fork of Cache Creek. This reservoir primarily supports agricultural irrigation for nearby farmlands in Yolo County and acts as a backup water source during droughts. It also assists in downstream flood control, making it an essential asset for both agriculture and local recreation.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Indian Valley Reservoir is 1.15 million acre-feet (MAF) and the total capacity 0.300 MAF.



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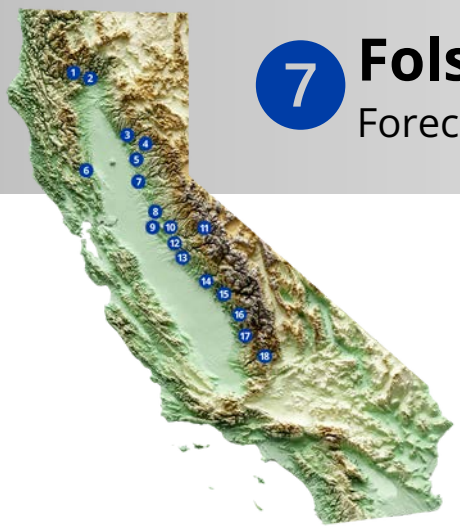
6 Indian Valley Reservoir

Forecast Performance Summary

The CRAFT forecast for Indian Valley Reservoir has an accuracy of 90.63% from WY 2017 to WY 2024. During this time, observed water year inflow to Indian Valley Reservoir was above the forecast range one time, with a departure of 10.1%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	0.150	0.225	0.216
2017/18 (Weak La Niña)	0.014	0.063	0.019
2018/19 (Weak El Niño)	0.106	0.183	0.186
2019/20 (Unclassified)	0.012	0.062	0.024
2020/21 (Moderate La Niña)	0.001	0.049	0.010
2021/22 (Weak La Niña)	0.014	0.066	0.038
2022/23 (Weak La Niña)	0.122	0.193	0.155
2024/24 (Strong El Niño)	0.032	0.099	0.120



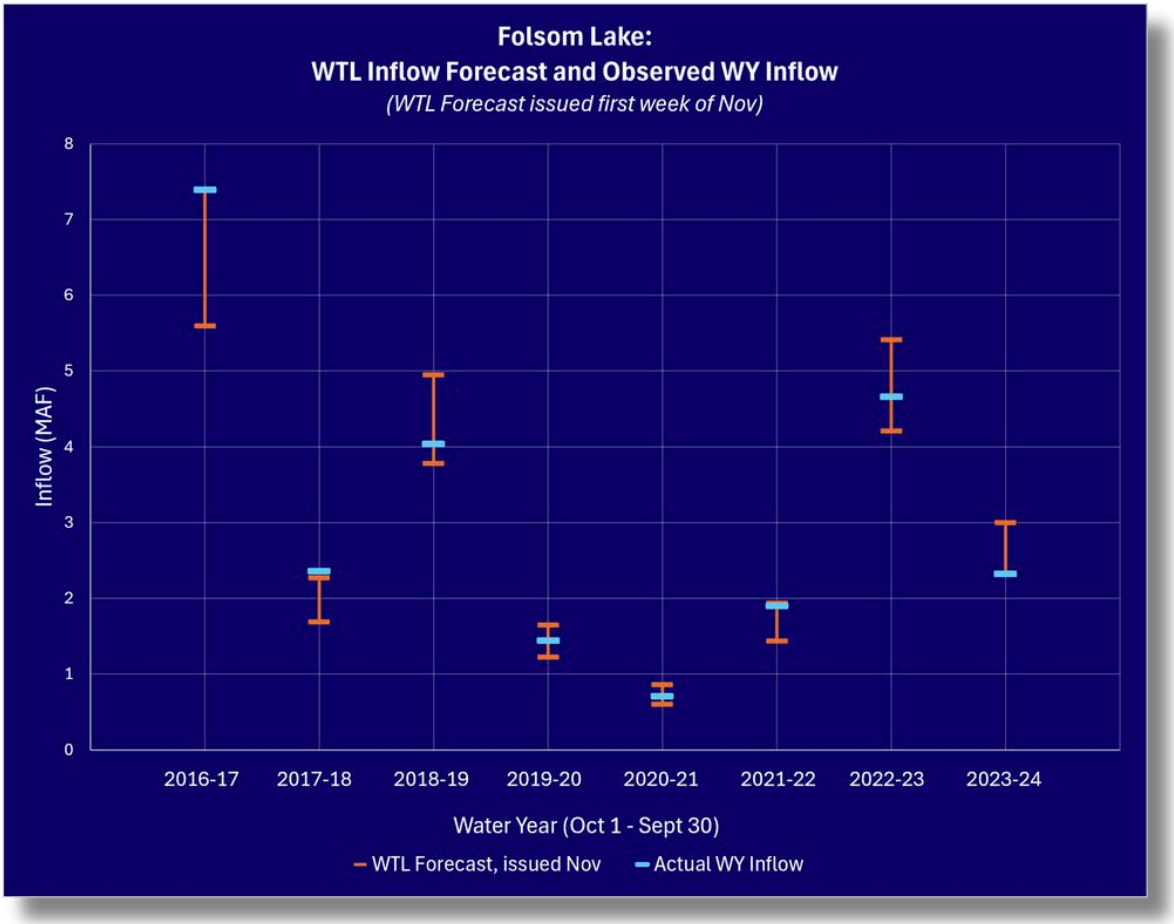
7 Folsom Lake

Forecast Performance Summary

Folsom Lake, located in the Sierra Nevada foothills, was created by the Folsom Dam on the American River in 1955 as part of the Central Valley Project. The lake plays a critical role in regional water management, providing water for urban areas like Sacramento, as well as agricultural irrigation in the Sacramento Valley. In addition to its water supply functions, Folsom Lake is a major source of hydroelectric power and helps regulate flood control during the rainy season.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Folsom Lake is 2.68 million acre-feet (MAF) and the total capacity 0.977 MAF.



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Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

7 Folsom Lake

Forecast Performance Summary

The CRAFT forecast for Folsom Lake has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to Folsom Lake was above the forecast range one time, with a departure of +3.7%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	5.592	7.393	7.388
2017/18 (Weak La Niña)	1.680	2.267	2.351
2018/19 (Weak El Niño)	3.774	4.944	4.031
2019/20 (Unclassified)	1.219	1.641	1.436
2020/21 (Moderate La Niña)	0.596	0.853	0.704
2021/22 (Weak La Niña)	1.429	1.929	1.897
2022/23 (Weak La Niña)	4.203	5.405	4.655
2024/24 (Strong El Niño)	2.311	2.994	2.317

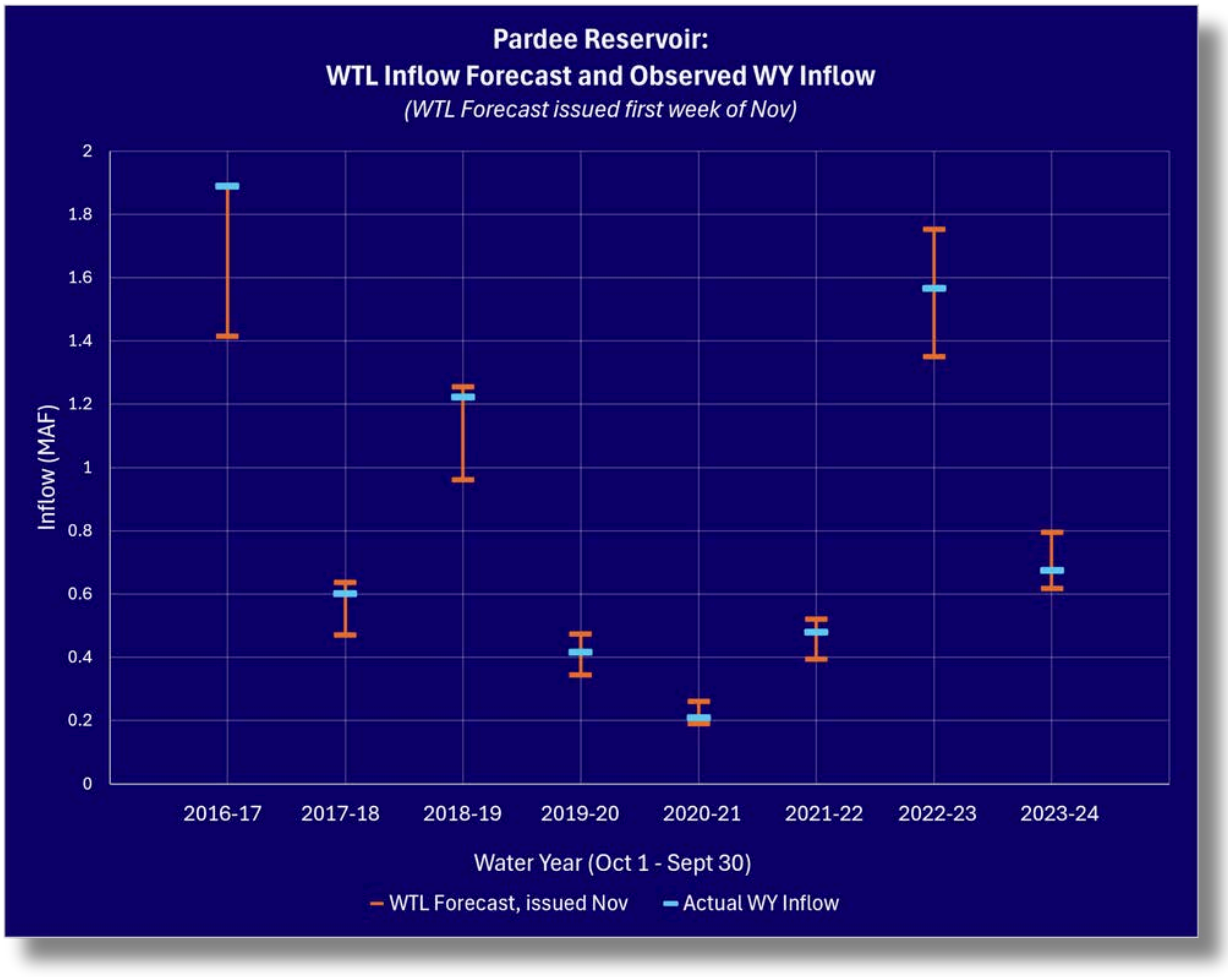
8 Pardee Reservoir

Forecast Performance Summary

Constructed in 1929 on the Mokelumne River, Pardee Reservoir serves the East Bay Municipal Utility District (EBMUD) and provides drinking water to over 1.4 million people. The reservoir is crucial for agricultural irrigation in the Mokelumne River watershed and supports hydroelectric power generation while managing downstream flows to meet environmental requirements.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Pardee Reservoir is 0.737 million acre-feet (MAF) and the total capacity 0.203 MAF.



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8 Pardee Reservoir

Forecast Performance Summary

The CRAFT forecast for Pardee Reservoir has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to Pardee Reservoir was above the forecast range one time, with a departure of +0.2%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	1.413	1.884	1.888
2017/18 (Weak La Niña)	0.469	0.635	0.6
2018/19 (Weak El Niño)	0.960	1.253	1.221
2019/20 (Unclassified)	0.343	0.472	0.415
2020/21 (Moderate La Niña)	0.189	0.259	0.208
2021/22 (Weak La Niña)	0.393	0.518	0.478
2022/23 (Weak La Niña)	1.349	1.752	1.564
2024/24 (Strong El Niño)	0.617	0.793	0.674

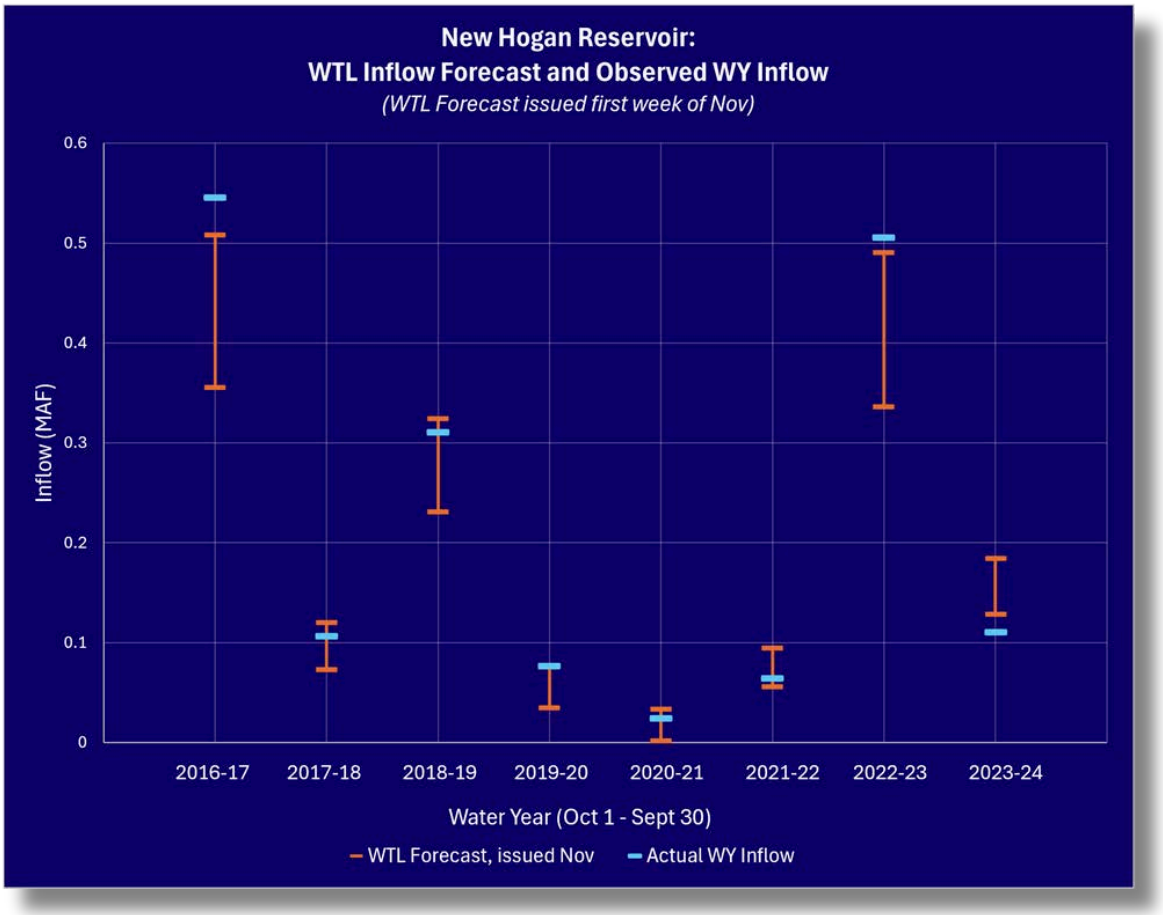
9 New Hogan Reservoir

Forecast Performance Summary

New Hogan Reservoir was impounded in 1963 by the construction of the New Hogan Dam on the Calaveras River, playing a significant role in flood control and regional water management. It provides agricultural irrigation to the San Joaquin Valley and municipal water supply for local communities, also contributing to hydroelectric power generation to enhance its value in water resource management.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for New Hogan Reservoir is 0.164 million acre-feet (MAF) and the total capacity 0.317 MAF.



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9 New Hogan Reservoir

Forecast Performance Summary

The CRAFT forecast for New Hogan Reservoir has an accuracy of 81.25% from WY 2017 to WY 2024. During this time, observed water year inflow to New Hogan Reservoir was below the forecast range once, with a departure of -14.1%, and above the range three times, with an average departure of +3.9%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	0.355	0.508	0.545
2017/18 (Weak La Niña)	0.073	0.120	0.106
2018/19 (Weak El Niño)	0.231	0.324	0.31
2019/20 (Unclassified)	0.034	0.075	0.076
2020/21 (Moderate La Niña)	0.001	0.033	0.024
2021/22 (Weak La Niña)	0.056	0.094	0.064
2022/23 (Weak La Niña)	0.336	0.490	0.505
2024/24 (Strong El Niño)	0.128	0.184	0.110

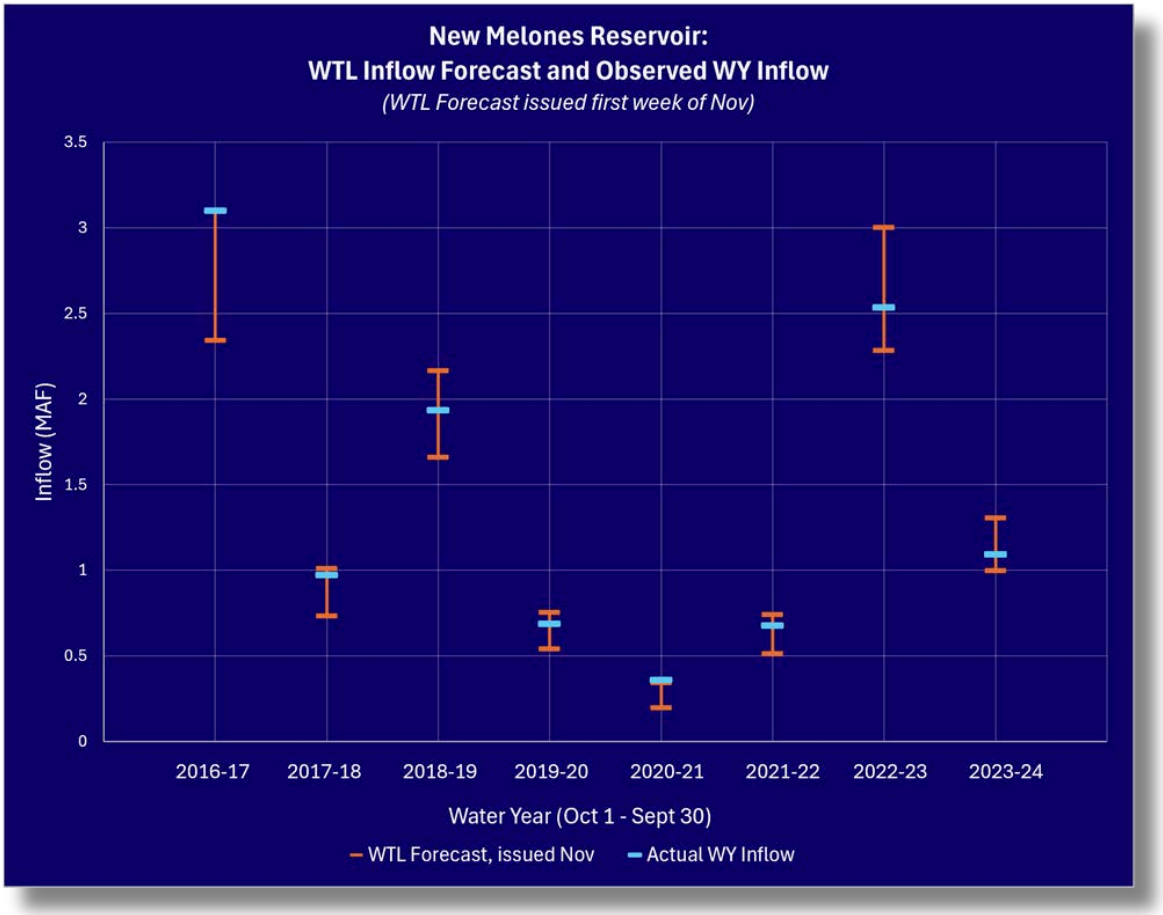
10 New Melones Reservoir

Forecast Performance Summary

Located in the Sierra Nevada foothills between Calaveras and Tuolumne counties, New Melones Reservoir was created in 1979 by the New Melones Dam on the Stanislaus River. A key part of the Central Valley Project, it supports agricultural irrigation, municipal and industrial water supply, and flood control, while also generating hydroelectric power, bolstering California's renewable energy efforts.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for New Melones Reservoir is 1.16 million acre-feet (MAF) and the total capacity 2.400 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

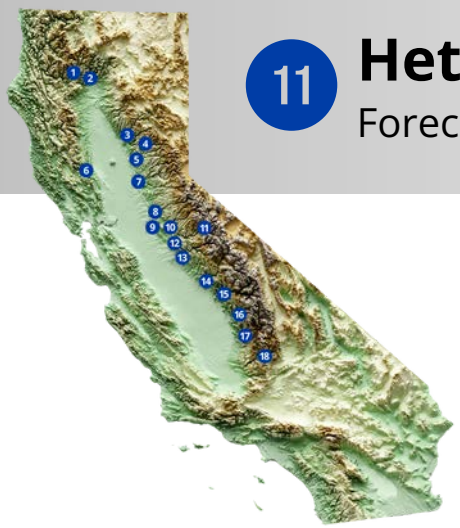
10 New Melones Reservoir

Forecast Performance Summary

The CRAFT forecast for New Melones Reservoir has an accuracy of 95.31% from WY 2017 to WY 2024. During this time, observed water year inflow to New Melones Reservoir was above the forecast range two times, with an average departure of +2.25%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	2.340	3.094	3.096
2017/18 (Weak La Niña)	0.731	1.008	0.97
2018/19 (Weak El Niño)	1.657	2.163	1.932
2019/20 (Unclassified)	0.540	0.753	0.685
2020/21 (Moderate La Niña)	0.194	0.342	0.357
2021/22 (Weak La Niña)	0.512	0.739	0.674
2022/23 (Weak La Niña)	2.280	3.000	2.532
2024/24 (Strong El Niño)	0.996	1.305	1.086



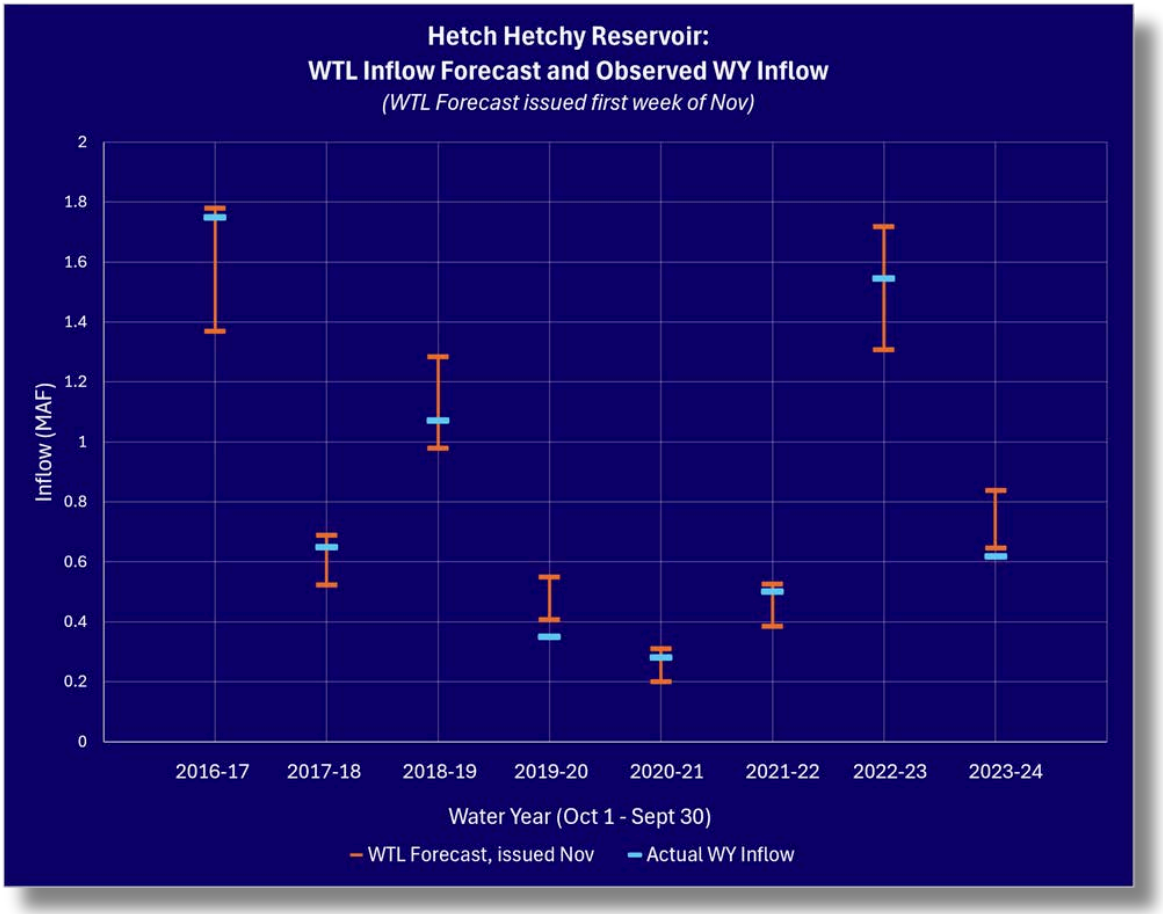
11 Hetch Hetchy Reservoir

Forecast Performance Summary

Hetch Hetchy Reservoir is located within Yosemite National Park in the Sierra Nevada, impounded by the O'Shaughnessy Dam on the Tuolumne River in 1923. It is integral to the Hetch Hetchy Aqueduct system, supplying high-quality drinking water and irrigation for parts of the San Francisco Bay Area. The reservoir also supports hydroelectric power generation and is managed to ensure reliable water delivery during drought conditions.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Hetch Hetchy Reservoir is 0.76 million acre-feet (MAF) and the total capacity 0.360 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

11 Hetch Hetchy Reservoir

Forecast Performance Summary

The CRAFT forecast for Hetch Hetchy Reservoir has an accuracy of 81.25% from WY 2017 to WY 2024. During this time, observed water year inflow to Hetch Hetchy Reservoir was below the forecast range two times, with an average departure of -9.05%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	1.367	1.778	1.747
2017/18 (Weak La Niña)	0.522	0.687	0.648
2018/19 (Weak El Niño)	0.977	1.282	1.07
2019/20 (Unclassified)	0.405	0.548	0.349
2020/21 (Moderate La Niña)	0.199	0.309	0.279
2021/22 (Weak La Niña)	0.383	0.524	0.5
2022/23 (Weak La Niña)	1.306	1.717	1.543
2024/24 (Strong El Niño)	0.645	0.836	0.617

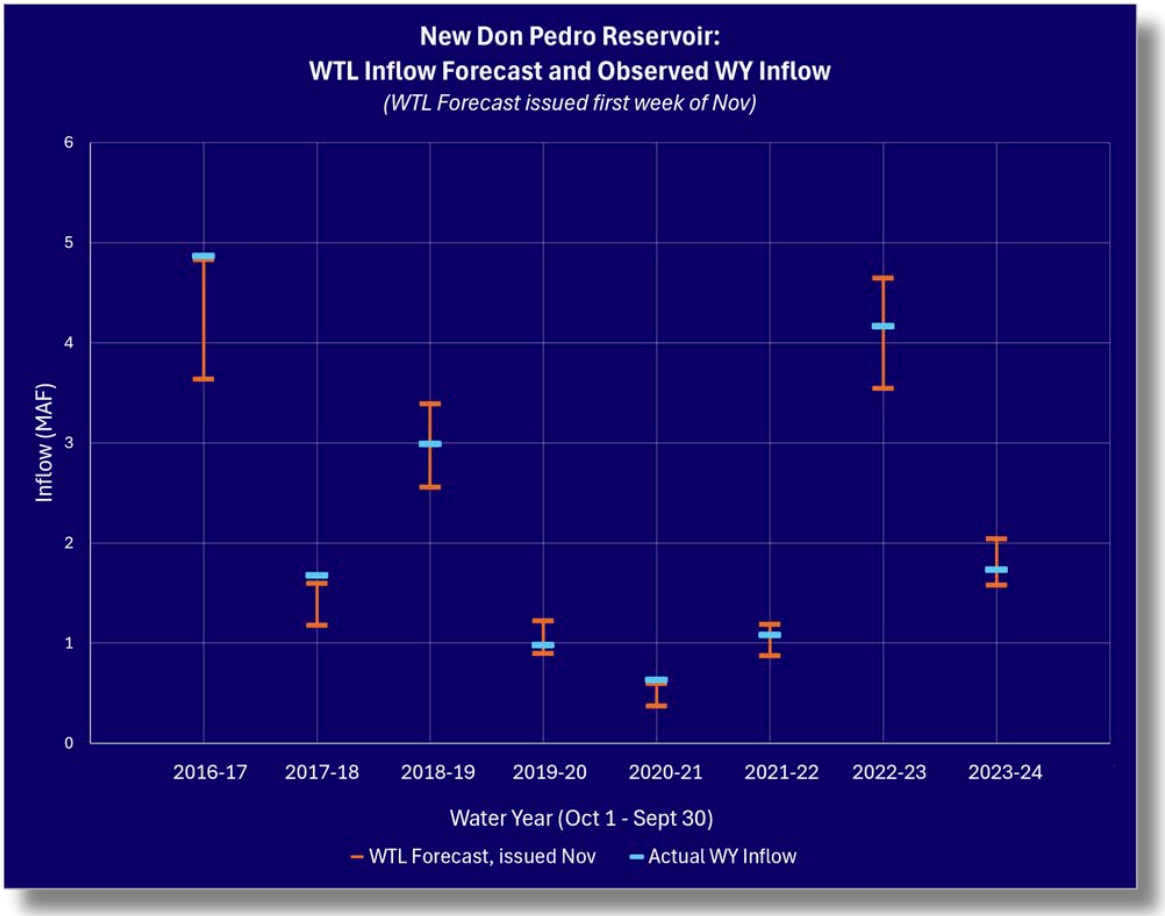
12 New Don Pedro Reservoir

Forecast Performance Summary

In Tuolumne County, California, New Don Pedro Reservoir was created in 1971 by the New Don Pedro Dam on the Tuolumne River. It is essential for the Modesto and Turlock Irrigation Districts, supplying water for extensive agricultural areas in the San Joaquin Valley. The reservoir also plays a significant role in flood control, hydropower generation, and municipal water supply.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for New Don Pedro Reservoir is 1.92 million acre-feet (MAF) and the total capacity 2.030 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

12 New Don Pedro Reservoir

Forecast Performance Summary

The CRAFT forecast for New Don Pedro Reservoir has an accuracy of 90.63% from WY 2017 to WY 2024. During this time, observed water year inflow to New Don Pedro Reservoir was above the forecast range three times, with an average departure of +3.8%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	3.633	4.828	4.862
2017/18 (Weak La Niña)	1.173	1.594	1.673
2018/19 (Weak El Niño)	2.553	3.386	2.983
2019/20 (Unclassified)	0.892	1.217	0.974
2020/21 (Moderate La Niña)	0.367	0.592	0.626
2021/22 (Weak La Niña)	0.868	1.183	1.078
2022/23 (Weak La Niña)	3.542	4.641	4.162
2024/24 (Strong El Niño)	1.575	2.037	1.728

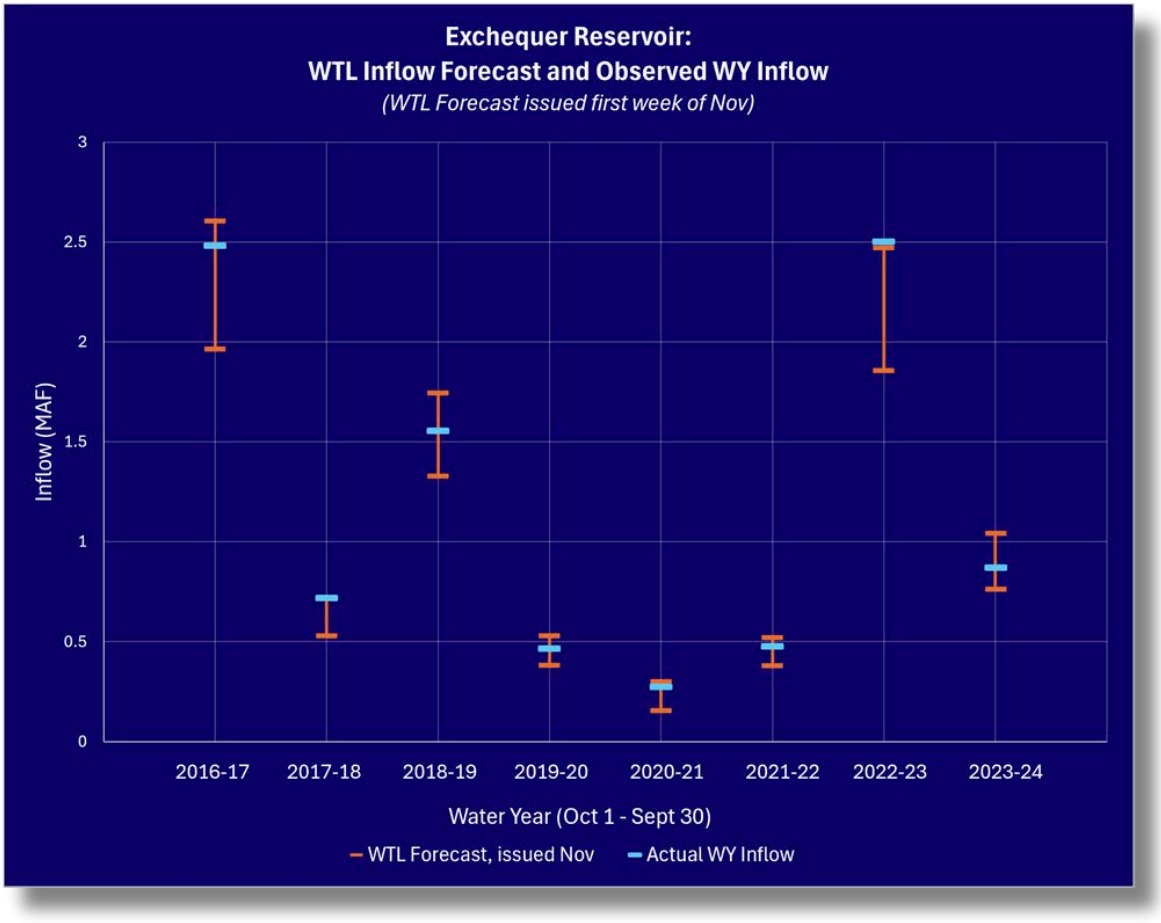
13 Exchequer Reservoir

Forecast Performance Summary

Located in Mariposa County, California, Exchequer Reservoir was formed in 1967 by the New Exchequer Dam on the Merced River. It serves as a vital water management resource for the Merced Irrigation District, providing irrigation for agricultural lands while also playing crucial roles in flood control, hydropower generation, and municipal water supply.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Exchequer Reservoir is 0.966 million acre-feet (MAF) and the total capacity 1.049 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

13 Exchequer Reservoir

Forecast Performance Summary

The CRAFT forecast for Exchequer Reservoir has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to Exchequer Reservoir was above the forecast range one time, with a departure of +1.3%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	1.963	2.603	2.48
2017/18 (Weak La Niña)	0.528	0.719	0.716
2018/19 (Weak El Niño)	1.327	1.743	1.554
2019/20 (Unclassified)	0.381	0.527	0.464
2020/21 (Moderate La Niña)	0.154	0.298	0.272
2021/22 (Weak La Niña)	0.378	0.518	0.474
2022/23 (Weak La Niña)	1.855	2.469	2.501
2024/24 (Strong El Niño)	0.761	1.040	0.868

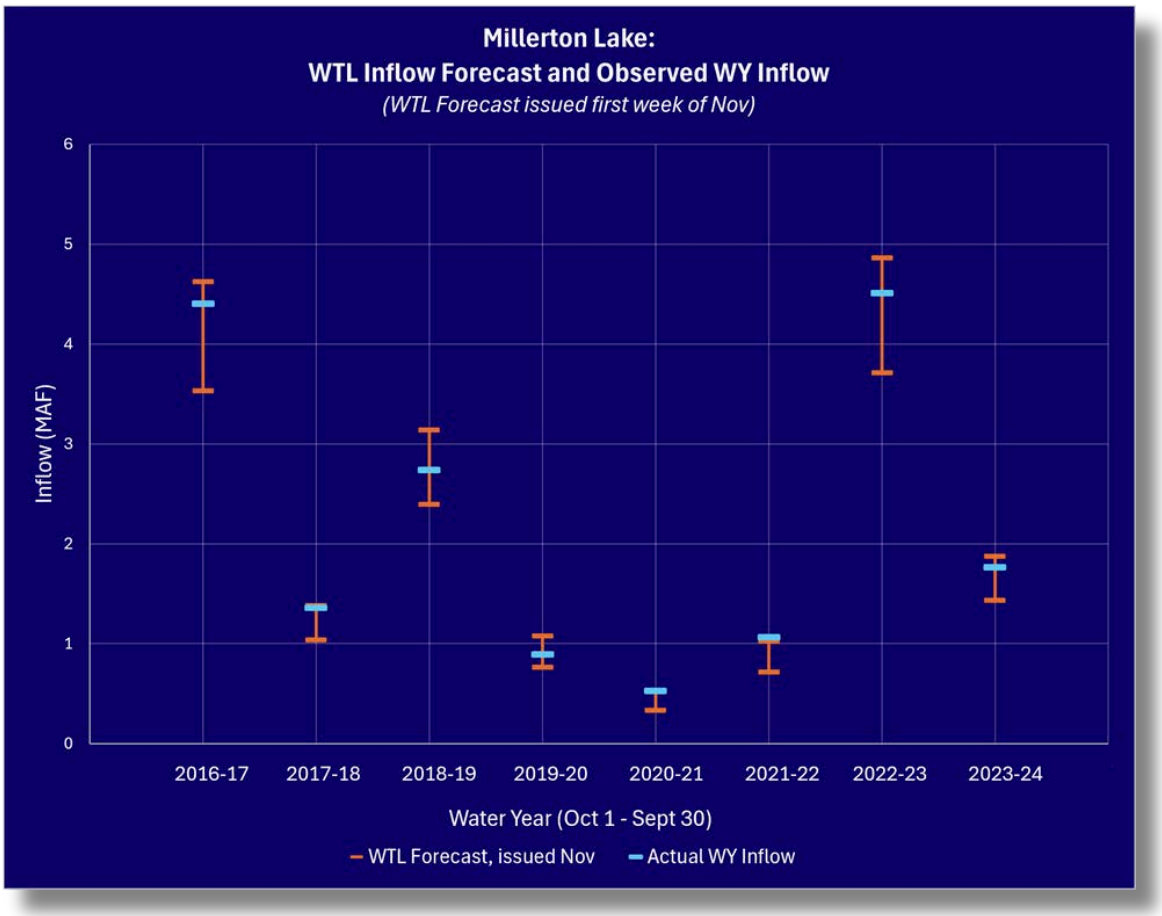
14 Millerton Lake

Forecast Performance Summary

Impounded by the Friant Dam on the San Joaquin River in 1944, Millerton Lake is situated in Fresno County, California. This reservoir is critical for irrigation water supply to agricultural lands in the surrounding San Joaquin Valley. Beyond its agricultural functions, Millerton Lake plays an essential role in flood control, recreation, and maintaining water levels during dry periods, contributing to local ecosystems and the broader water management strategy.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Millerton Lake is 1.78 million acre-feet (MAF) and the total capacity 0.520 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

14 Millerton Lake

Forecast Performance Summary

The CRAFT forecast for Millerton Lake has an accuracy of 95.31% from WY 2017 to WY 2024. During this time, observed water year inflow to Millerton Lake was above the forecast range two times, with an average departure of +2.75%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	3.526	4.621	4.397
2017/18 (Weak La Niña)	1.035	1.379	1.356
2018/19 (Weak El Niño)	2.392	3.134	2.735
2019/20 (Unclassified)	0.759	1.071	0.886
2020/21 (Moderate La Niña)	0.329	0.516	0.523
2021/22 (Weak La Niña)	0.712	1.019	1.061
2022/23 (Weak La Niña)	3.708	4.856	4.503
2024/24 (Strong El Niño)	1.431	1.869	1.762

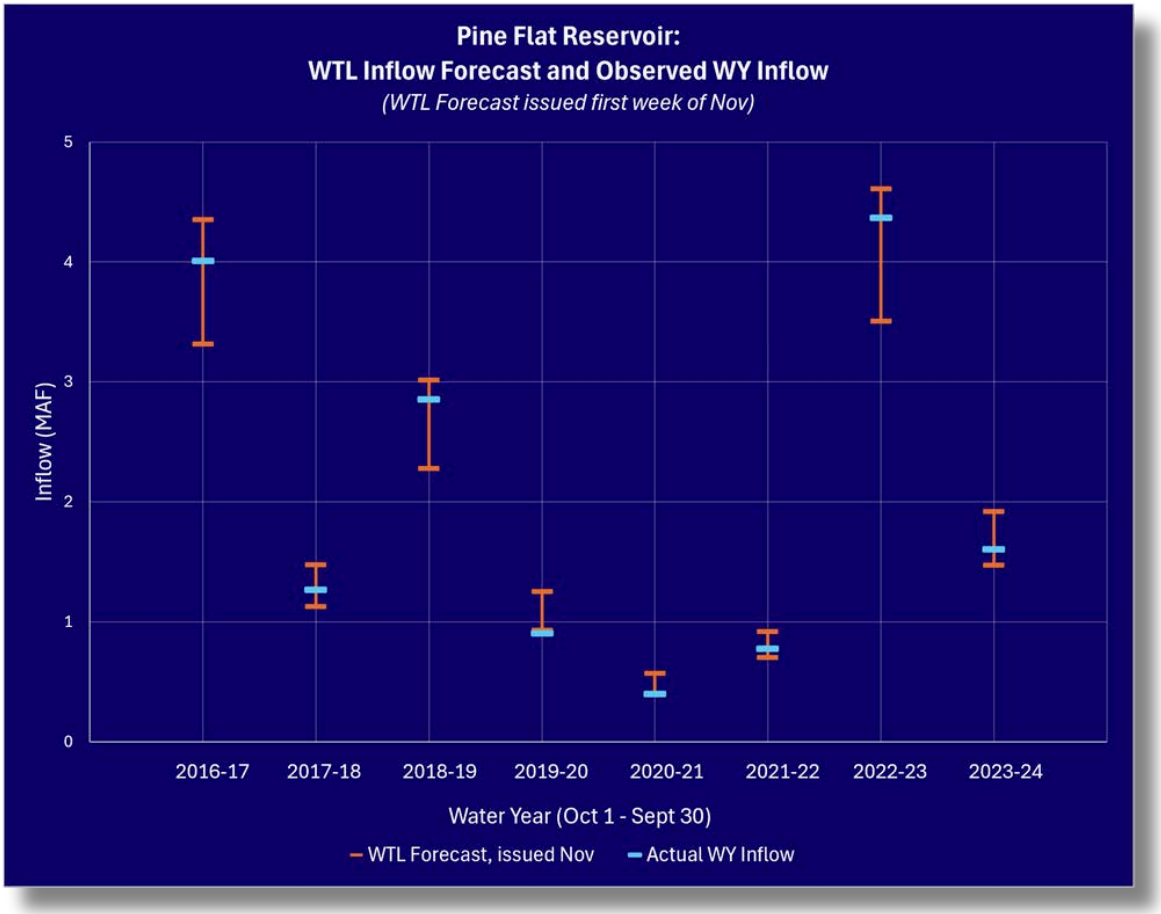
15 Pine Flat Reservoir

Forecast Performance Summary

Pine Flat Reservoir, established in 1975 by the Pine Flat Dam on the Kings River, serves as a key water management resource for the Fresno Irrigation District and Kings River Water Association. It provides irrigation water for extensive agricultural lands and is important for flood control, recreation, and municipal water supply in the region.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Pine Flat Reservoir is 1.68 million acre-feet (MAF) and the total capacity 1.0 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

15 Pine Flat Reservoir

Forecast Performance Summary

The CRAFT forecast for Pine Flat Reservoir has an accuracy of 100% from WY 2017 to WY 2024. During this time, observed water year inflow to Pine Flat Reservoir was below the forecast range one time, with a departure of -2.4%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	3.314	4.351	4.005
2017/18 (Weak La Niña)	1.126	1.474	1.264
2018/19 (Weak El Niño)	2.276	3.012	2.851
2019/20 (Unclassified)	0.924	1.248	0.902
2020/21 (Moderate La Niña)	0.391	0.568	0.393
2021/22 (Weak La Niña)	0.697	0.913	0.772
2022/23 (Weak La Niña)	3.503	4.606	4.364
2024/24 (Strong El Niño)	1.470	1.918	1.597

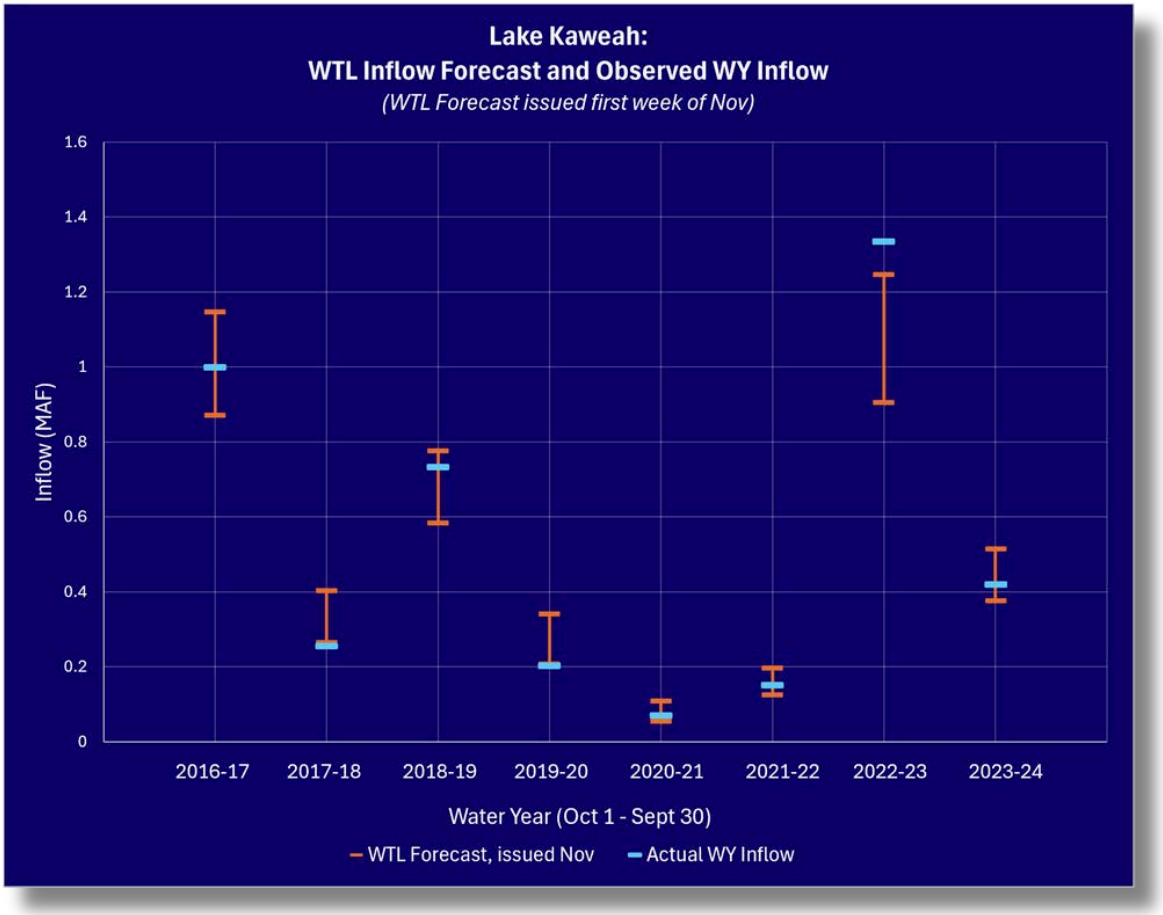
16 Lake Kaweah

Forecast Performance Summary

Lake Kaweah, formed in 1966 by the Kaweah Dam on the Kaweah River in Tulare County, California, serves as a crucial resource for the Kaweah Delta Water Conservation District. The reservoir provides irrigation water for agricultural lands in the San Joaquin Valley and plays a significant role in flood control, managing runoff from the Sierra Nevada during the spring melt.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Lake Kaweah is 0.435 million acre-feet (MAF) and the total capacity 0.185 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

16 Lake Kaweah

Forecast Performance Summary

The CRAFT forecast for Lake Kaweah has an accuracy of 95.31% from WY 2017 to WY 2024. During this time, observed water year inflow to Lake Kaweah was below the forecast range two times, with an average departure of -3.1%, and above the forecast range once, with a departure of +7.1%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	0.870	1.146	0.998
2017/18 (Weak La Niña)	0.264	0.402	0.254
2018/19 (Weak El Niño)	0.583	0.775	0.732
2019/20 (Unclassified)	0.206	0.339	0.201
2020/21 (Moderate La Niña)	0.054	0.107	0.069
2021/22 (Weak La Niña)	0.124	0.195	0.15
2022/23 (Weak La Niña)	0.905	1.246	1.334
2024/24 (Strong El Niño)	0.375	0.513	0.418

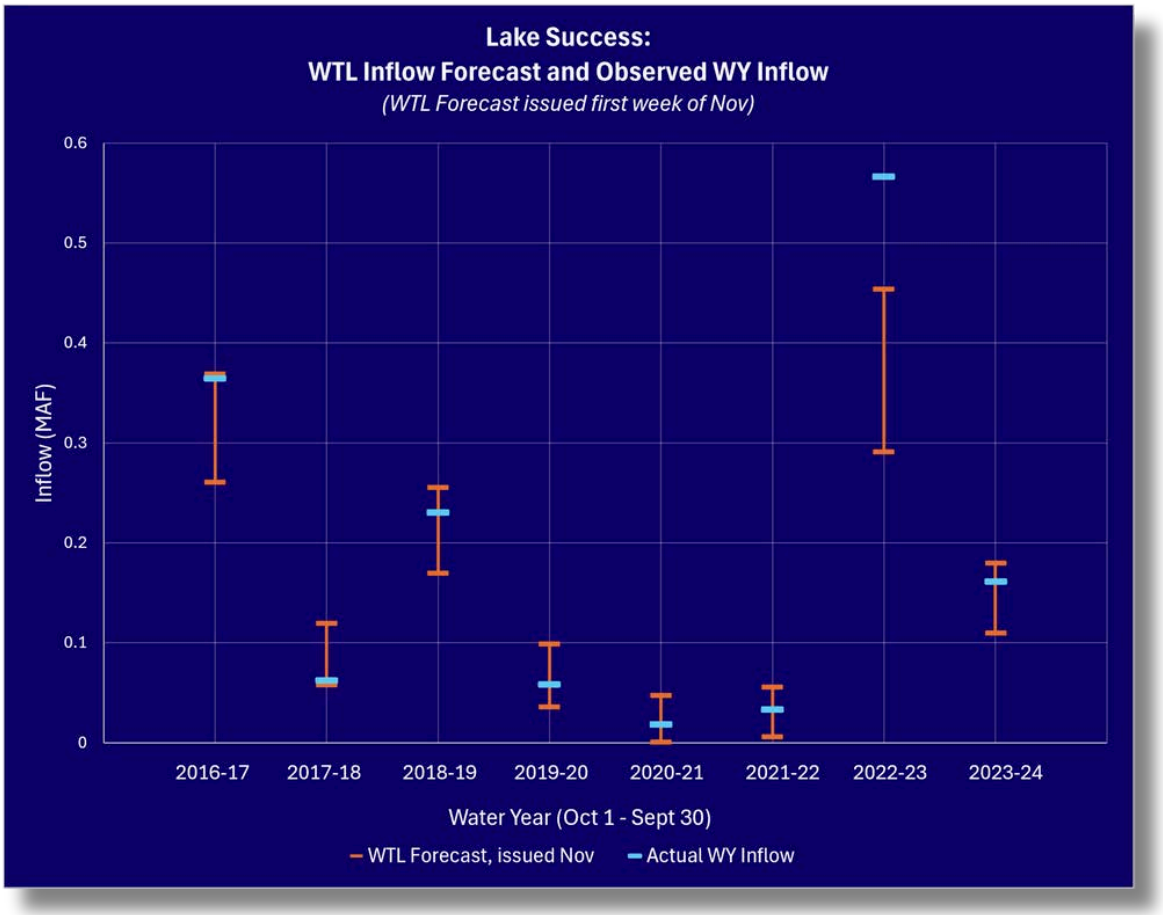
17 Lake Success

Forecast Performance Summary

Created in 1961 by the Success Dam on the Kaweah River, Lake Success is also located in Tulare County, California. This reservoir is important for the Kaweah Delta Water Conservation District, supplying irrigation water for San Joaquin Valley agriculture. Additionally, it plays a significant role in flood control by regulating Sierra Nevada runoff, contributing to the overall water supply in Southern California.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Lake Success is 0.139 million acre-feet (MAF) and the total capacity 0.082 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

17 Lake Success

Forecast Performance Summary

The CRAFT forecast for Lake Success has an accuracy of 81.25% from WY 2017 to WY 2024. During this time, observed water year inflow to Lake Success was above the forecast range one time, with a departure of +24.9%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	0.260	0.369	0.364
2017/18 (Weak La Niña)	0.058	0.119	0.062
2018/19 (Weak El Niño)	0.169	0.255	0.23
2019/20 (Unclassified)	0.035	0.098	0.058
2020/21 (Moderate La Niña)	0.000	0.047	0.018
2021/22 (Weak La Niña)	0.005	0.055	0.033
2022/23 (Weak La Niña)	0.291	0.453	0.566
2024/24 (Strong El Niño)	0.110	0.179	0.161

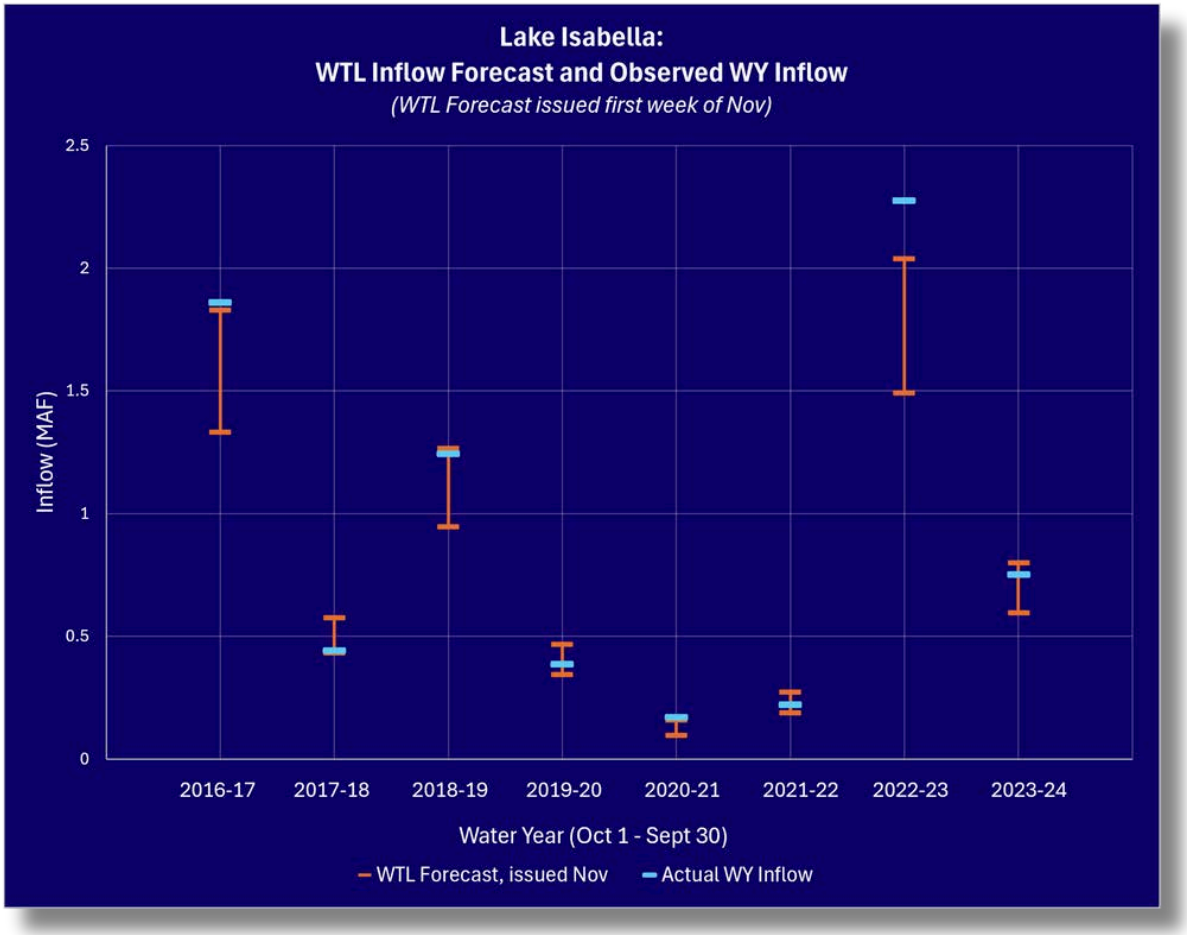
18 Lake Isabella

Forecast Performance Summary

Lake Isabella, situated in Kern County, California, was formed by the Isabella Dam on the Kern River in 1953. It serves as a vital water management resource for the Kern County Water Agency, providing irrigation water for local agricultural lands in the region, particularly in the San Joaquin Valley, and supporting regional water management efforts.

The chart below shows the forecasted and observed water year inflows. The orange bars represent the Weather Tools forecast range, issued in November of each year, while the blue line shows the observed total water year inflow, officially reported on September 30.

The historic average inflow for Lake Isabella is 0.702 million acre-feet (MAF) and the total capacity 0.568 MAF.



Average inflow data: California-Nevada River Forecast Center. (n.d.). Forecast ensemble data. National Oceanic and Atmospheric Administration (NOAA). Retrieved October 1, 2024, from https://www.cnrfc.noaa.gov/ensembleProduct.php
Reservoir capacity: California Department of Water Resources. (n.d.). Reservoir information. California Data Exchange Center. Retrieved October 1, 2024, from https://cdec.water.ca.gov/reportapp/javareports?name=ResInfo

18 Lake Isabella

Forecast Performance Summary

The CRAFT forecast for Lake Isabella has an accuracy of 81.25% from WY 2017 to WY 2024. During this time, observed water year inflow to Lake Isabella was above the forecast range three times, with an average departure of +7.0%.

Over the past eight years, California has experienced a variety of hydrological conditions, ranging from extreme droughts to exceptionally wet years. CRAFT has successfully captured these extremes, providing reliable forecast ranges. The table below offers specific annual values for both the forecast range and the observed inflows.

Water Year	Forecast Lower Bound (MAF)	Forecast Upper Bound (MAF)	Actual WY Inflow (MAF)
2016/17 (Weak La Niña)	1.330	1.827	1.858
2017/18 (Weak La Niña)	0.430	0.574	0.440
2018/19 (Weak El Niño)	0.944	1.264	1.242
2019/20 (Unclassified)	0.343	0.465	0.384
2020/21 (Moderate La Niña)	0.095	0.156	0.168
2021/22 (Weak La Niña)	0.186	0.270	0.220
2022/23 (Weak La Niña)	1.490	2.037	2.273
2024/24 (Strong El Niño)	0.594	0.798	0.750