Unreasonable Use of Water Complaint Against the SFPUC

Earth Day – April 22, 2025

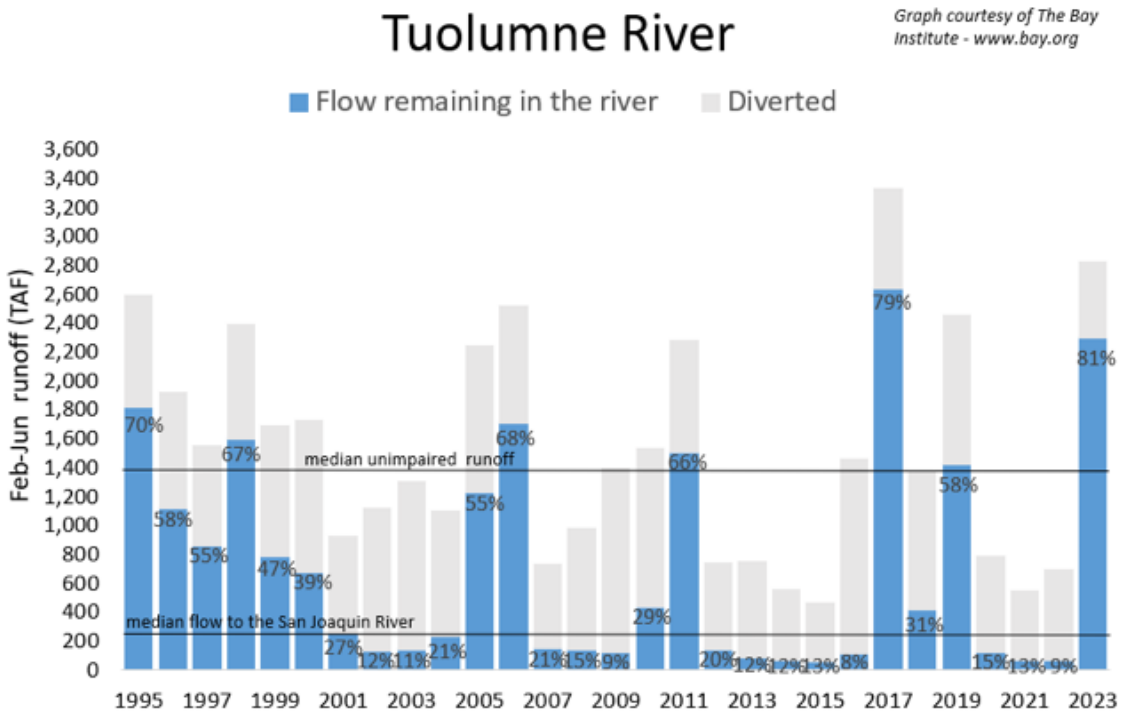
Submitted by Tuolumne River Trust: Peter Drekmeier, peter@tuolumne.org, (650) 248-8025.

1. Overview

The San Francisco Public Utilities Commission (SFPUC) hoards water in dry years to accommodate an irrational fear of a future drought that is 72% more severe than the worst drought in 1,100 years, based on tree ring data. As a result, the Tuolumne River and ratepayers suffer. This is clearly an unreasonable use of Public Trust water.

In years when the SFPUC's reservoirs (Hetch Hetchy, Cherry and Eleanor) and water bank at Don Pedro are not expected to fill, the SFPUC only releases the minimum required baseflows, which are woefully inadequate to sustain a healthy river. As a result, beneficial uses such as fish and wildlife habitat and recreation have suffered, and water rates have skyrocketed. The Tuolumne has experienced the worst salmon population decline of any tributary to the San Joaquin or Sacramento Rivers.

During the 2012-15 drought, plus an additional recovery year, releases into the lower Tuolumne River between February and June averaged just 12% of unimpaired flow (see graph below). Then in 2017, the water agencies were forced to spill most of their stored water, and the lower Tuolumne experienced 79% of unimpaired flow. The problem has repeated during every dry year sequence.



The SFPUC's terrible management of the Tuolumne River is driven by their "Design Drought," described as follows:

> "Our Level of Service objective for water supply (used since 1994 and adopted in 2008) is to survive a specific 8.5-year drought planning scenario (1987-92 followed by 1976-77) with no more than 20% rationing from a total system demand of 265 MGD."

The Design Drought was created following the 1987-92 drought. Much has changed since then, as described below, yet the SFPUC has refused to consider making even modest changes to their drought planning policy.

2. The Design Drought is arbitrary and unjustified.

Without any analysis, the Design Drought was created by simply combining the most severe drought on record (1987-92) with the driest two-year drought on record (1976-77) to manufacture an 8.5-year megadrought. Given the uncertainties of climate change, it might be prudent to plan for a worse drought than those we've experienced – but the Design Drought is 72% more severe than the worst drought on record. Urban Water Management Plans require water agencies to plan for their driest five-year sequence.

The SFPUC's Long-Term Vulnerability Assessment (LTVA)[1], shows that the 1987-92 drought creates a deficit (water needed from storage) of 707 TAF (see slide 1). While considerably shorter in duration, the 1976-77 drought requires 510 TAF from storage, making the total deficit of the Design Drought 1,217 TAF, plus additional water needed to cover the five month recovery period at the end (making the Design Drought 8.5 years). These calculations assume water demand of 269 thousand acre feet per year (TAF/y), which equals 240 million gallons per day (mgd), much greater than demand has been in recent years.

Entering the 1987-92 drought, water demand in the SFPUC service area peaked at 293 mgd (see slide 2). Despite population growth, demand has declined steadily since then and has been under 200 mgd for the past 10 years. In other words, the Design Drought's 265 mgd system demand assumption is 35% greater than demand has been for the past decade.

Using our water supply calculator, TRT found that the SFPUC could manage a repeat of the 1987-92 drought of record, with the Bay Delta Water Quality Control Plan in effect, without requiring any rationing or developing any new alternative water supplies. Incorporating modest rationing (that which people are used to) would enable the SFPUC to manage an unprecedented seventh year of drought. There's enough water available to manage a drought much worse than any on record while also maintaining environmentally sustainable flows in the Tuolumne.

[1] SFPUC Long-Term Vulnerability Assessment (2021) – https://www.sfpuc.gov/sites/default/files/about-us/policies-reports/LTVA_AdaptationPlanSFPUC_execsummary.pdf

The SFPUC has not challenged our conclusion, but simply points out that they are planning for the Design Drought.

3. The SFPUC has exceptional water rights and enviable storage.

The 1913 Raker Act established water rights on the Tuolumne River. As senior diverters, the Modesto and Turlock Irrigation Districts are entitled to the first 2,400 cubic feet per second (cfs) of runoff for most of the year, with the cutoff increasing to 4,000 cfs from mid-April to mid-June. In very dry years, the SFPUC's entitlements are poor, but in normal and we years they are exceptional (see slide 3). According to the Substitute Environmental Document (SED) for the Bay Delta Plan, "The 1922-2003 average calculated volume of water potentially available to CCSF [City and County of San Francisco] under the Raker Act was about 750 TAF/y."[2] With demand having been under 200 mgd (224 TAF) for the past decade, The SFPUC is entitled to enough water in an average year to last more than three years, so storage fills quickly following prolonged droughts.

Slide 4 shows the SFPUC's annual entitlements (cut off at 2 million acre feet) since 1922. Slide 5 demonstrates the variability in SFPUC entitlements over the past decade, with a low of 22 TAF in 2014, and highs of 3,309 TAF in 2017 and 2,774 TAF in 2023. Keep in mind that annual demand has been under 224 TAF for the past 10 years.

Historically, the SFPUC projected that water demand would be twice what it actually is today. Slide 6 shows projections from the 1970s and 1980s suggesting demand would be in the 350-450 mgd range. It's been under 200 mgd for the past decade.

In preparation for much higher projected demand, the SFPUC invested in considerable storage capacity. Slide 7 shows total system storage of 1,457 TAF. Of this, 96 TAF is inaccessible, leaving 1,361 TAF of useable storage. At full storage (the SFPUC's goal for July 1 of every year), the SFPUC has enough water available to last six years, making the system highly resistant to prolonged droughts.

During the 2012-15 drought, the SFPUC never had less than 3.5 years-worth of water in storage (see slide 8). In 2016 (an average year) storage filled quickly, and by 2017 the SFPUC needed only 373 TAF to reach full storage (see slide 9), but was entitled to 3,309 TAF. More than 85% of the SFPUC's entitlement had to be spilled at the expense of the five previous years in which unimpaired flow averaged just 12%.

[2] Bay Delta Water Quality Control Plan, Phase 1 SED, Appendix L, p. L-4 – https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2018_sed/docs/appx_l.pdf

4. SFPUC water demand will remain relatively flat.

The SFPUC's 2000 Urban Water Management Plan projected that water demand would be 50% greater today than it actually is (see slide 10). State legislation aimed at protecting against droughts certainly played a major role in reducing water consumption, but price elasticity also has been a huge driver, and will continue to be so.

In 2008, when the SFPUC adopted its Water System Improvement Program (80+ capital improvement projects), demand was projected to reach 285 mgd by 2018. To pay for the WSIP ($4.8 billion plus debt service), the price of water tripled by 2018 – sending a price signal to consumers – and actual demand was 196 mgd. Between 2008 and today, the cost of water has quadrupled (see slide 11) and will continue to increase (see slide 12). The SFPUC has projected that combined water and sewer bills in San Francisco will increase 8% per year for at least the next 10 years. Based on historic under-projections, rates will likely increase more rapidly.

<u>The SFPUC uses two sets of demand projections.</u>

The SFPUC uses two sets of demand projections, one overseen by the Water Enterprise for water supply planning and the other overseen by the Finance Bureau for financial planning. In 2022, at the direction of the Commission, SFPUC staff produced a report comparing the two sets of projections.[3] It found that both departments have consistently over-projected demand, but the Finance Bureau has been much closer to actual demand (see slide 13).

The report states:

> "The [Water Enterprise] projections represent an outside bound of whatever demand will occur in the next 25 years...These demands will likely always be greater than actual demands because not all developments materialize, or they materialize slower than projected."

And:

> "By contrast, for the purpose of financial planning and for short term water system management, we estimate the demand that we are likely to experience. For budgeting and rate setting we use demand projections that are as close to actual as we can make them. The SFPUC Finance Bureau projects water sales will remain flat for at least the next decade."

If the SFPUC were to simply use their Finance Bureau projections, it would reduce the perceived demand in 2045 by 37 mgd. Slide 14 compares Water Enterprise and Finance Bureau projections for the next 20 years.

[3] SFPUC "Water Enterprise and Finance Bureau Water Demand Projections," July 5, 2022 – https://sfpuc.sharefile.com/share/view/sa628ebe9c31e4326b84ffa2976f9f9a3

The SFPUC uses faulty population and jobs growth projections

The SFPUC and the Bay Area Water Supply and Conservation Agency (BAWSCA), which represents the SFPUC's 26 wholesale customers outside of San Francisco, used Plan Bay Area population and jobs growth projections to produce their 2020 Urban Water Management Plans (UWMPs). The projections were produced by the Association of Bay Area Governments and Metropolitan Transportation Commission, which embraced aggressive jobs growth assumptions and commensurate housing needs, adding 2 million more people to the Bay Area by 2050.

In comparison, the California Department of Finance (DOF) – the standard-bearer for population and jobs growth projections – assumed much slower growth. In 2020, Plan Bay Area projected 39% growth in San Francisco's population by 2045, whereas DOF projected 10% growth in the same time period. Corresponding numbers for the BAWSCA region were 31% and 14%.

In a 2022 water demand study, BAWSCA included a sensitivity analysis, finding that by using DOF growth projections, water demand would remain flat. The SFPUC has stalled on producing its own sensitivity analysis, and isn't planning to release anything until after the 2025 UWMPs have been finalized and submitted.

5. Climate change poses little risk to SFPUC water supply.

The SFPUC's Long-Term Vulnerability Assessment (LTVA), released in 2021, studied how climate change might impact their water supply. It found that we might expect greater swings in precipitation, but overall precipitation was unlikely to change much. The study states:

> "According to climate projections and expert elicitations, there is a central tendency of warming of +2°C and +4°C by 2040 and 2070 (Representative Concentration Pathway [RCP] 8.5), respectively, with no clear direction of change in mean annual precipitation over the planning horizon."[4]

The study found the likelihood of the Design Drought occuring to be infinitesimally small. Based on 100 years of recorded data, 1,100 years of tree ring data, and 25,000 simulated model runs, the worst drought the LTVA produced required about 1,200 TAF of water from storage (see slide 15). The Design Drought (at 240 mgd demand) would require 1,309 TAF of water from storage.

The LTVA includes return periods (likelihood of occurrence) for the known droughts (see slide 16), but inexplicably does not list a return period for the Design Drought. However, through a Public Records Act request, TRT uncovered a document from 2020 showing that the authors

[4] LTVA Executive Summary, p. 2.

had previously calculated the return period for the Design Drought to be once in 25,000 years (see slide 17).

The consultants had concerns with their original model and recalibrated the return periods for the known droughts for the final LTVA. Their numbers were adjusted downward significantly. Although a return period for the Design Drought was not included in the final LTVA, one could surmise that it also should be adjusted in proportion to the known droughts. This results in a return period for the Design Drought of once-in-8,000-years (see slide 18).

Removing a year from the Design Drought (it would still be the most conservative drought plan in the state) would reduce the amount of water needed from storage by 25 mgd, water that could be used for environmental purposes.

6. The SFPUC's mismanagement of water harms people and the environment.

Hoarding water unnecessarily causes environmental degradation.

It is well documented that the Tuolumne River ecosystem has been in decline for decades. The Tuolumne diverters recently completed an in-river habitat restoration project aimed at improving *spawning* habitat, and thus the production of juvenile fish, or fry. However, studies suggest that fry production is not a limiting factor for salmon recovery. The lack of sufficient *rearing* habitat, such as floodplains, is what constrains the salmon population. A 2008 limiting factor analyses[5] commissioned by USFWS, NMFS and CDFG stated:

> "The limiting factor analyses suggest that Chinook salmon recruitment…is highly correlated with the production of smolt outmigrants in the Tuolumne River and that winter and spring flows are highly correlated with the number of smolts produced. Other evidence from rotary screw trap studies indicate that many more fry are produced in the Tuolumne River than can be supported with the existing minimum instream flow schedules, and so, producing more fry by restoring spawning habitat is unlikely to increase adult recruitment. Stock-recruitment relationships based on the long-term escapement and harvest data suggest that the rearing habitat is saturated with juvenile fish when at least 500 adults return to spawn. Low spawner abundances (< 500 fish) have occurred as a result of extended periods of drought when juvenile survival is reduced as a result of low winter and spring flows and not as a result of high rates of ocean harvest."

With extremely low instream flows during drought years (averaging just 12% of unimpaired flow between 2012 and 2016, for example), it's no mystery why the Tuolumne salmon population is struggling. For native fish populations to rebound, floodplains need to be restored and activated by higher flows.

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[5] "Limiting Factor Analyses & Recommended Studies for Fall-run Chinook Salmon and Rainbow Trout in the Tuolumne River (draft)," USFWS, NMFS, CDFG (2008) – https://static1.squarespace.com/static/5eebc0039b04b54b2fb0ce52/t/6806d67dcdc6d0507fbebed5/1745278591397/Mesick+-+Limiting+Factors+Analysis+-+2008+Report.pdf

Hoarding water leads to imprudent investments and skyrocketing water rates.

Based on the SFPUC's contention that the Bay Delta Plan could lead to 51% rationing, the City of Palo Alto recently completed a $559,000 "One Water Plan" to address an assumed water supply shortfall. After educating themselves about the Design Drought and inflated water demand projections, the City's Utilities Advisory Committee rejected the Plan, finding it was based on a false premise. The report will now gather dust on a shelf.

The Palo Alto example is only the tip of the iceberg. Based on the Design Drought and inflated demand projections, the SFPUC recently produced an Alternative Water Supply Plan that suggests they might need to develop 92-122 mgd of alternative water supplies at a cost of $17-$25 billion. Water rates in the SFPUC service area are already the highest in the State, and would skyrocket if the SFPUC were to invest in unneeded infrastructure. Ratepayers would pay the price.

In November 2021, the SFPUC declared a Water Shortage Emergency. At the time, they had enough water in storage to last 4.5 years and never dropped below four years-worth of stored water during the 2020-22 drought. In April 2022, they imposed a 5% drought surcharge on San Francisco ratepayers.

In 2023, the SFPUC was entitled to enough water from the Tuolumne River (2,774 TAF) to last 12 years. It was clear early in the year that the drought was over (see slide 19), yet for budgeting purposes the SFPUC assumed the drought surcharge would remain in place for fiscal year 2023/24. This resulted in a huge budget shortfall, which was explained as follows:

> *"Water and Wastewater:* revenues are projected to be below budget. The budget was adopted assuming the drought surcharge would remain. It was removed May of 2023. Additionally, the wholesale water volumes are lower than expected."[6]

Slides 20 and 21 show the budgetary impacts of this extremely poor (and perhaps manipulative) planning. The annual budget shortfall for combined water and sewer revenues in San Francisco alone was $55 million – a deficit passed on to ratepayers.

Hoarding water puts downstream communities at risk of flooding.

From 2012 through 2016, the Tuolumne diverters released only minimum baseflows. The water people conserved during the drought was impounded behind dams, providing no environmental or societal benefits. The reservoirs began to fill in 2016 (an average year), and by early 2017 it was clear the reservoirs would easily fill and spill, which resulted in 79% of unimpaired flow in the lower Tuolumne River between February and June.

[6] SFPUC Quarterly Budget Report, Slide 2, December 12, 2023 – https://sfpuc.sharefile.com/share/view/se1f88d7d5b3a41829939713649bc1802

For three months, releases into the lower Tuolumne River hovered around 9,000 cfs – the maximum allowed by the flood rules (see slide 22). However, for one week in March, the water agencies were forced by nature to release up to 15,000 cfs. Fortunately, downstream flooding was limited due to improvements made since the 1997 flood. Had releases been higher during the drought, Don Pedro Reservoir would have had more capacity to capture floodwater and Modesto would have been at less risk of flooding in 2017.

7. Conclusion

The SFPUC manages its Tuolumne River water supply based on an unjustifiable Design Drought and inflated demand projections that lead to hoarding water in dry years when the River needs it most, and then spilling excessive amounts of water in wet years. As a result, people and the environment suffer. We hope the State will agree that this is an unreasonable use of water and will act accordingly to project the Public Trust and all beneficial uses.

Note: Slides presented on following pages.

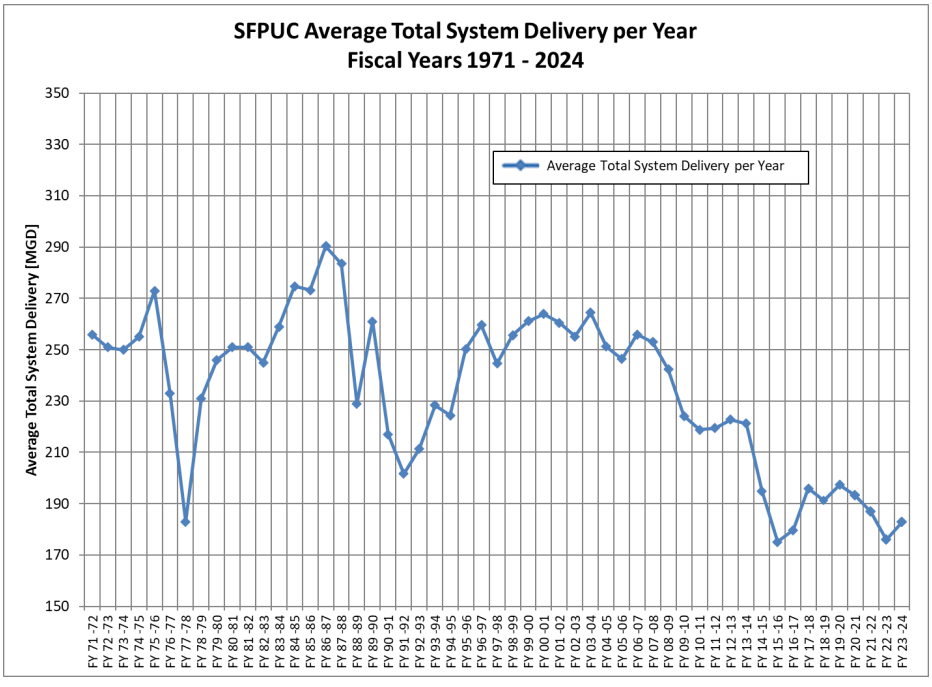
The Design Drought is 72% more severe than the worst drought on record

Table 3-9. Extracted Drought Events from Historical Tuolumne Flow at La Grange for Two Different Thresholds.
For each threshold, the drought events are sorted by decreasing severity.

Threshold: 269 TAF			Threshold: 365 TAF		
Year Drought ends	Severity [TAF]	Duration of Deficit [Years]	Year Drought Ends	Severity [TAF]	Duration of Deficit [Years]
1992	707.39	6	1992	1283.39	6
2015	594.35	4	2015	978.35	4
1977	510.18	2	1977	702.18	2
1961	389.44	3	1961	677.44	3
1931	312.14	3	1931	600.14	3
1924	233.66	1	2008	418.98	2
2008	226.98	2	1934	357.10	2
1934	218.34	1	1924	329.66	1
1994	204.77	1	1968	229.06	1
1968	133.06	1	1939	223.20	1
1939	127.20	1	1947	190.42	1
1947	94.42	1	1964	189.19	1
1964	93.19	1	1981	165.90	1
1981	69.90	1	1972	154.99	1
1972	58.99	1	1985	118.42	1
1985	22.42	1	1955	104.96	1
1955	8.96	1	2001	75.15	1
			1926	72.70	1
			1966	45.69	1
			1944	37.45	1
			2004	37.09	1

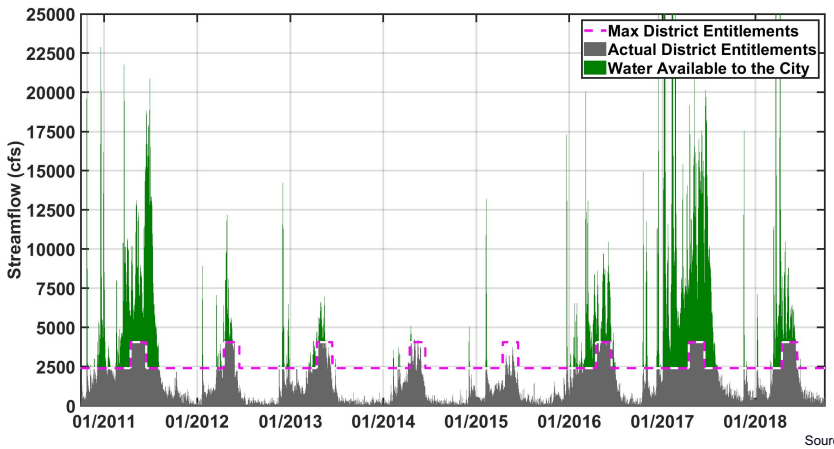
Source: SFPUC LTVA, 2021

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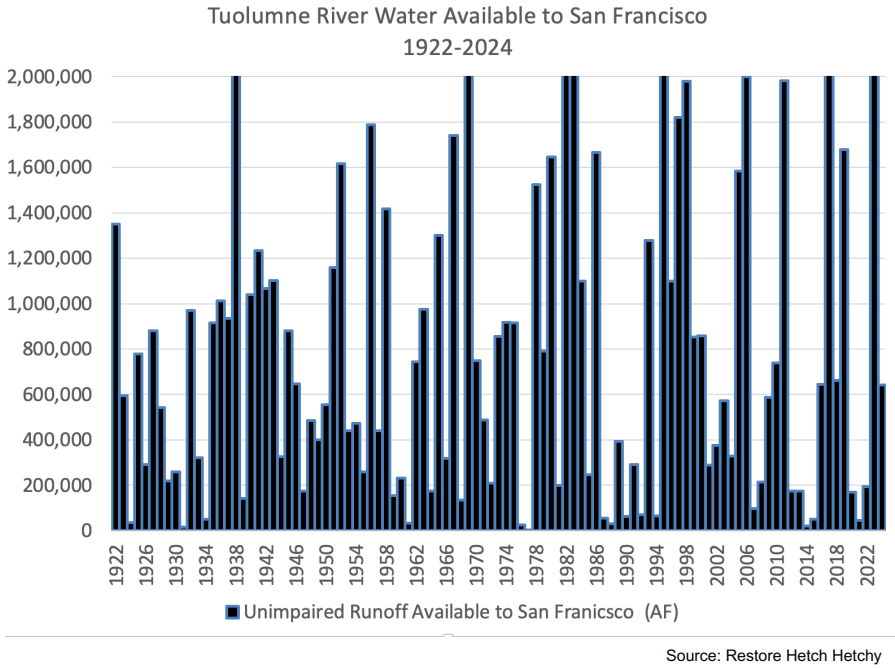
Tuolumne River Water Entitlements



Source: SFPUC

The SFPUC's water rights are poor in dry years, but exceptional in normal and wet years.

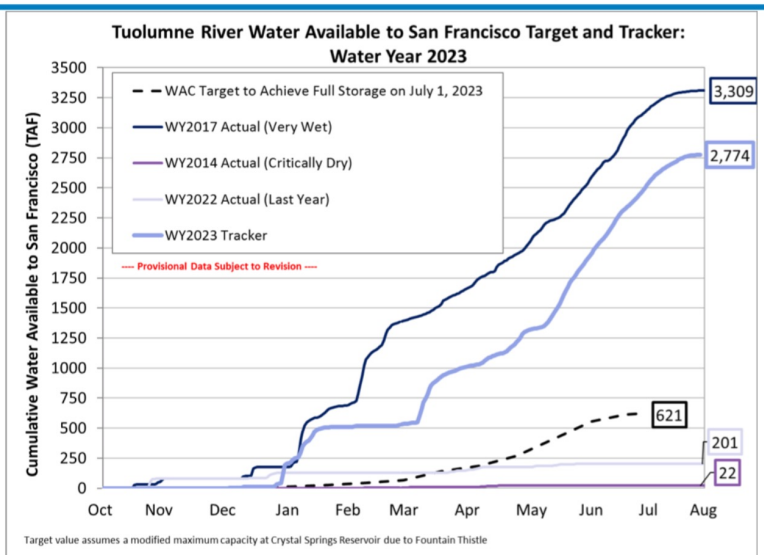
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Source: Restore Hetch Hetchy

4

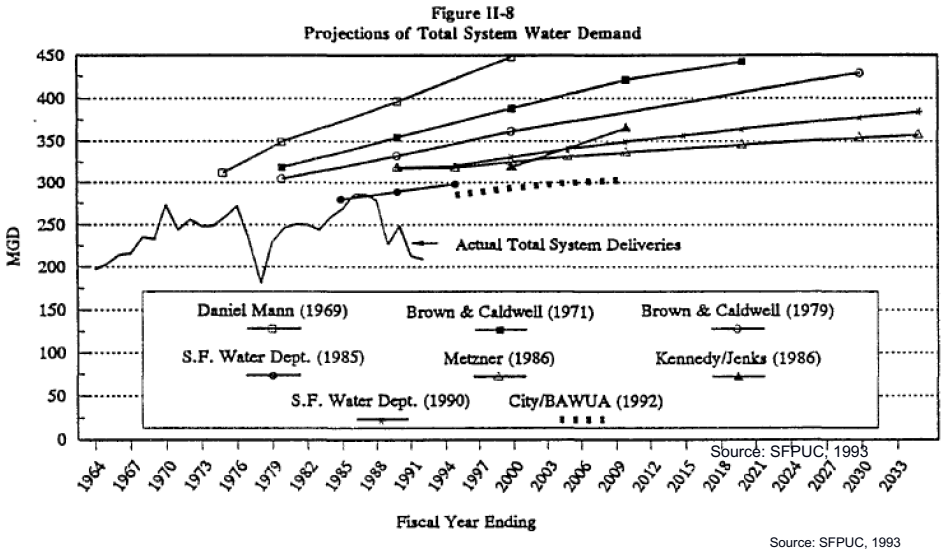
Tuolumne River Water Available to the City



Source: SFPUC

5

The SFPUC Planned for Much Higher Demand



Source: SFPUC, 1993

Source: SFPUC, 1993

6

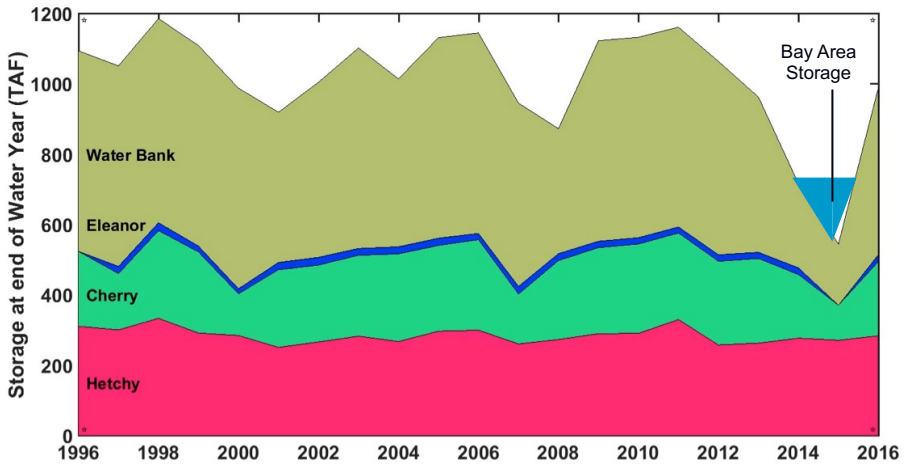
April 14, 2025, Reservoir Storage

Reservoir	Current Storage[1,2,3] (AF)	Maximum Storage[4] (AF)	Available Capacity (AF)	Percent of Maximum Storage	Normal Percent of Maximum Storage[5]
Tuolumne System					
Hetch Hetchy	273,700	360,360	86,660	76.0%	**60.3%**
Cherry	246,900	273,345	26,445	90.3%	-
Eleanor	24,200	27,100	2,900	89.3%	-
Water Bank	570,000	570,000	0	100.0%	**99.5%**
Total Tuolumne Storage	**1,114,800**	**1,230,805**	**116,005**	**90.6%**	-
Local System					
Calaveras	78,577	96,670	18,093	81.3%	-
San Antonio	45,189	53,266	8,077	84.8%	-
Crystal Springs	43,737	68,953	25,216	63.4%	-
San Andreas	15,746	18,675	2,929	84.3%	-
Pilarcitos	1,974	3,125	1,151	63.2%	-
Total Local Storage	**185,223**	**240,689**	**55,466**	**77.0%**	-
Total System Storage	1,300,023	1,471,494	171,471	**88.3%**	**79.8%**
Total without water bank	730,023	901,494	171,471	**81.0%**	-

Source: SFPUC

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SFPUC Tuolumne River Storage

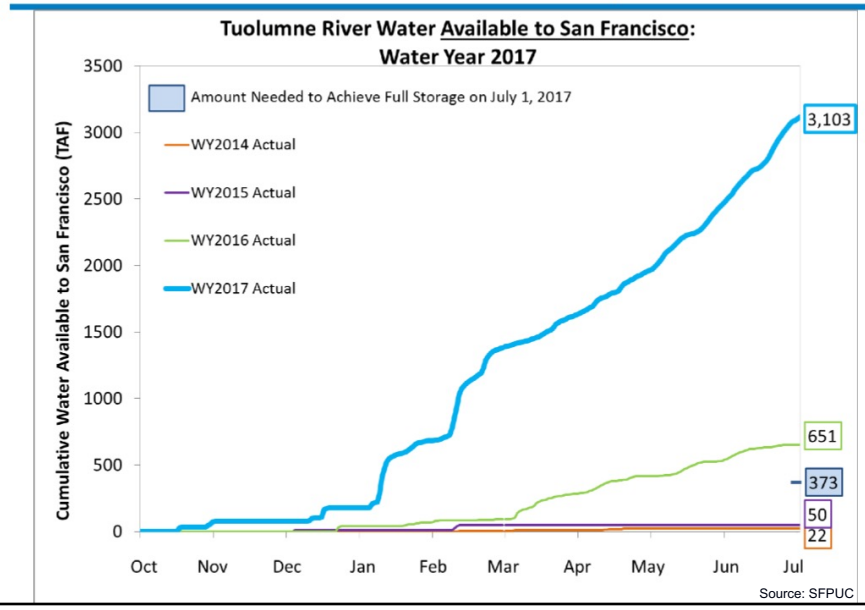


Source: SFPUC (Bay Area storage added)

During the 2012-15 drought, the water bank took the hit.
Hetch Hetchy was managed to remain close to full.
In 2016 (an average year) the water bank recovered quickly.

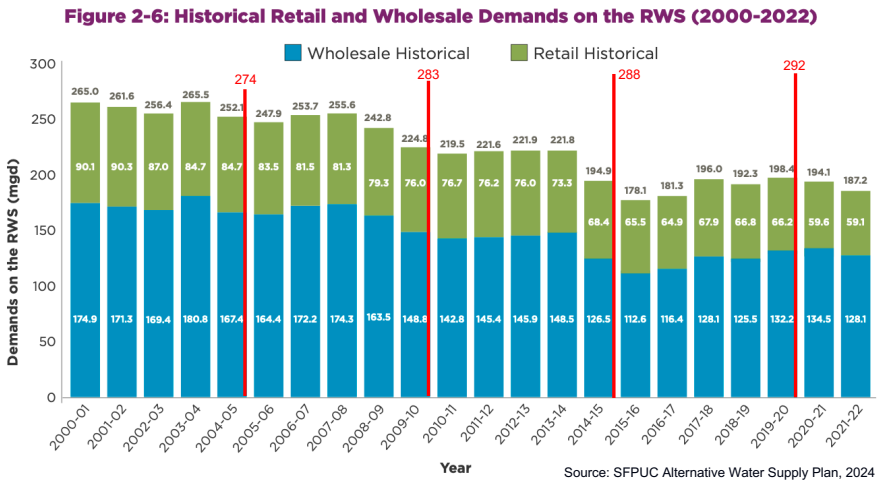
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Tuolumne River Water Available to the City



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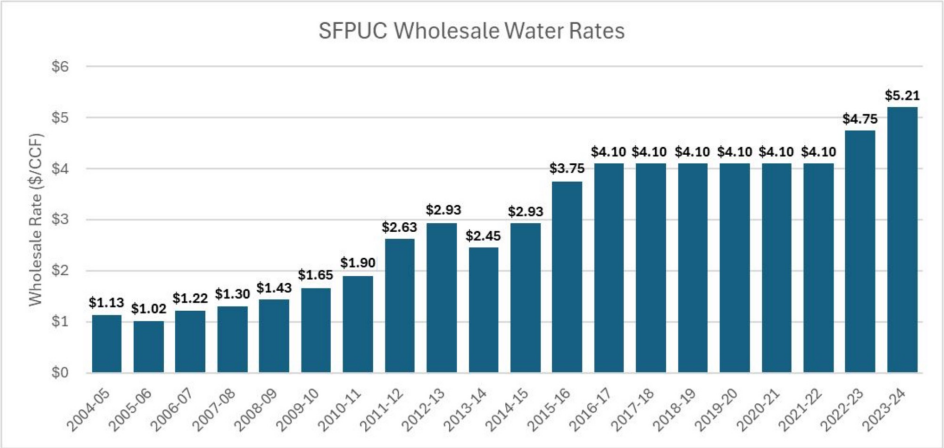
2000 Urban Water Management Plan (UWMP) projections were much higher than actual demand



Red lines (added) are projections from the SFPUC's 2000 UWMP.

10

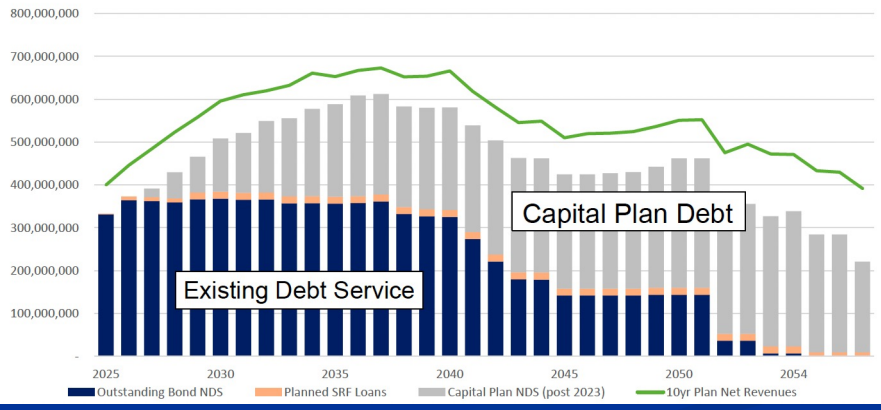
Water rates have quadrupled over the past two decades, primarily to catch up on deferred maintenance and to cover debt service



Source: Mid-Peninsula Water District

11

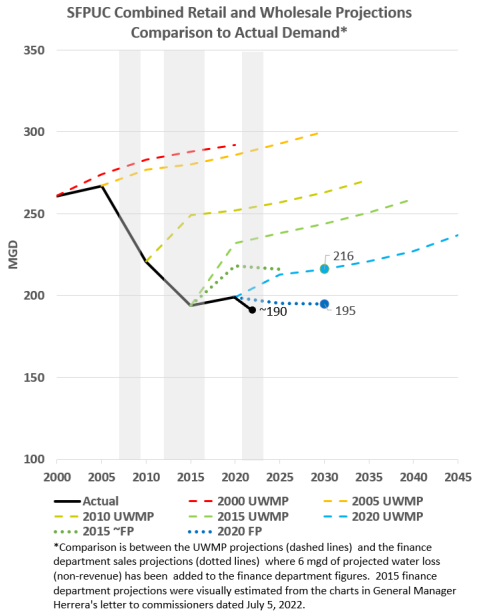
Water Existing and Projected Debt Service
(10-Year Plan Assumptions)



Source: SFPUC Budget Hearing, January 22, 2024

12

Combined Demand Projections Comparison

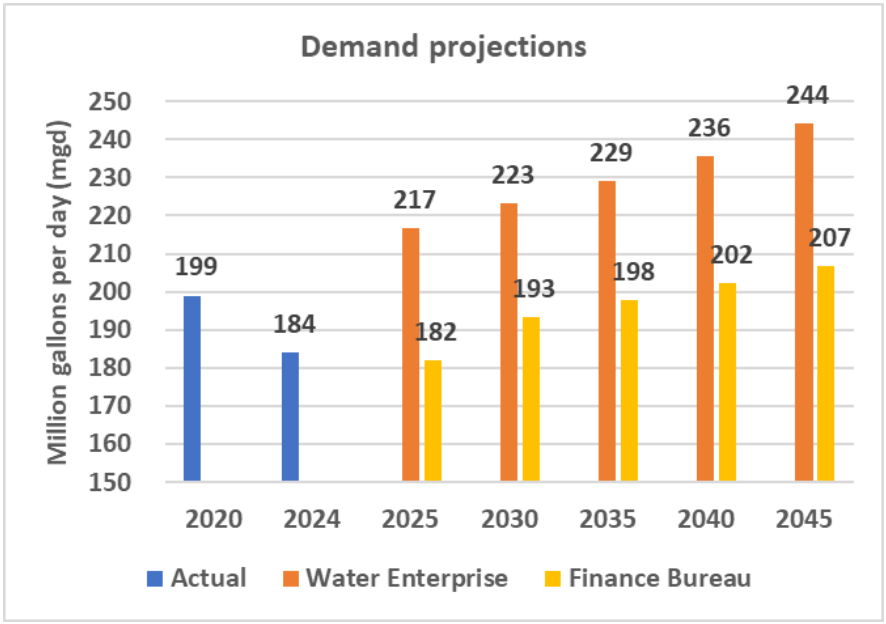


*Comparison is between the UWMP projections (dashed lines) and the finance department sales projections (dotted lines) where 6 mgd of projected water loss (non-revenue) has been added to the finance department figures. 2015 finance department projections were visually estimated from the charts in General Manager Herrera's letter to commissioners dated July 5, 2022.

Sources: Data = SFPUC; Graph = TRT

13

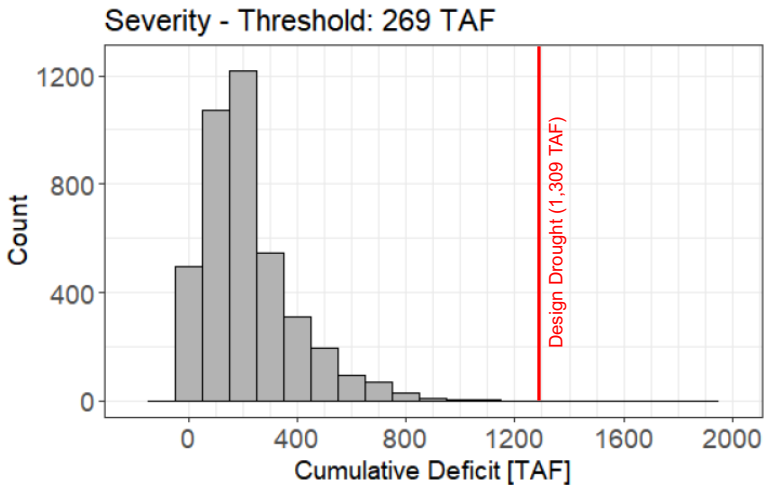
SFPUC Water Enterprise vs Finance Bureau Projections



Source: Data = SFPUC; Slide = TRT

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The LTVA's most severe drought used less than 1,200 TAF of storage



Source: LTVA, Figure 3-29 (Design Drought added)

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Drought Return Periods

How likely are droughts to occur?

Table 5-1. Effect of Precipitation and Temperature Change on the Return Periods Associated with the Severity of the Historic Droughts.

Return periods are round off to the nearest 5 years.

Threshold [TAF]	Drought Event	Changes in Precipitation			Changes in Temperature [°C]		
		0%	-10%	-20%	0	+2	+4
269	1976-1977	100	45	25	100	105	130
	1987-1992	420	120	45	420	495	675
	2012-2015	180	70	35	180	200	260

Source: LTVA

Numbers represent how many years might be expected to pass between droughts as severe as those listed. The LTVA projects "no clear direction of change in mean annual precipitation over the planning horizon."

The LTVA did not include a return period for the Design Drought, and the SFPUC will not say what it is.

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A 2020 document uncovered through a Public Records Act request suggested the return period for the Design Drought might be 25,000 years.

Return periods of historical drought

Drought Event	Deficit (TAF)	Duration (Year)	Return Period (Year) (best estimate and 95% confidence interval)		
			Deficit	Duration	Deficit and Duration
1976-77	517	2	217 (188; 255)	30 (29; 31)	316 (273; 371)
1987-92	797	6	1,456 (1,031; 2,140)	486 (422; 563)	20,406 (14,589; 29,851)
2012-16	752	4	1,093 (820; 1,520)	121 (110; 133)	4,250 (3,190; 5,899)
Design Drought	1,309	8	25,293 (12,940; 56,679)	1,954 (1,620; 2,376)	1,371,578 (720,390; 2,997,390)

Source: "Hydrological Drought Frequency Analysis for the Upper Tuolumne River," 12/8/2020

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The final LTVA adjusted the return periods for the known droughts downward significantly, suggesting the same should be done for the Design Drought.

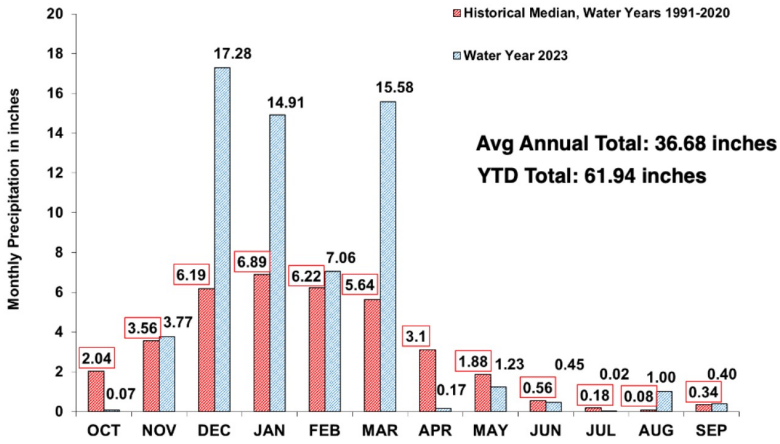
Drought Event	2020 Report	LTVA	LTVA / 2020
1976-77	217	98	45%
1987-92	1,456	420	29%
Combined	1,673	518	31%
Design Drought	25,293	7,841*	31%

*An adjusted return period for the Design Drought, based on 31% of the return period listed in the 2020 report, suggests it might occur once in 7,841 years.

Note: The return period for the Design Drought at current demand would be considerably longer because both the 2020 report and the LTVA used 240 mgd as demand (23% higher than the 2021 demand of 195 mgd).

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Upcountry 6-station Precipitation Index as of September 17, 2023



Avg Annual Total: 36.68 inches

YTD Total: 61.94 inches

Source: SFPUC

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FY 2023-24 Water Budgetary Variances

- **Net operating result: ($3.6M)**
- Total sources down ($24.4M), and $20.8M in cost savings
- Programmatic Savings & Legal Settlements ($8.4M)
- *Net impact on fund balance: ($12.0M)*

Sources

- ($25.0M) or -7.2% retail revenues
- ($5.2M) or -1.6% wholesale revenues
- $5.9M or 11.1% non-operating revenues

Uses

- $6.2M or -1.9% debt service
- $4.0M or -5.2% bureau overhead
- $2.3M or -2.0% salaries and benefits
- $2.3M or -2.4% non-personnel costs
- $5.9M or -100% general reserve planned to go unspent

Source: SFPUC Quarterly Budget Report, 9/24/24

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FY 2023-24 Wastewater Budgetary Variances

- **Net operating result: $20.9M**
- Total sources down ($21.3M), and $42.2M in cost savings

Sources

- ($30.4M) or -7.3% sewer service charges
- $9.1M or 102.6% non-operating revenues

Uses

- $6.9M or -7.9% salaries and benefits
- $2.9M or -3.0% debt service
- $2.5M or -2.6% non-personnel costs
- $2.1M or -4.6% bureau overhead
- $27.8M or -100% general reserve planned to go unspent

Source: SFPUC Quarterly Budget Report, 9/24/24

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2017 releases into the lower Tuolumne River



55 feet on the gage = 9,000 cfs.

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