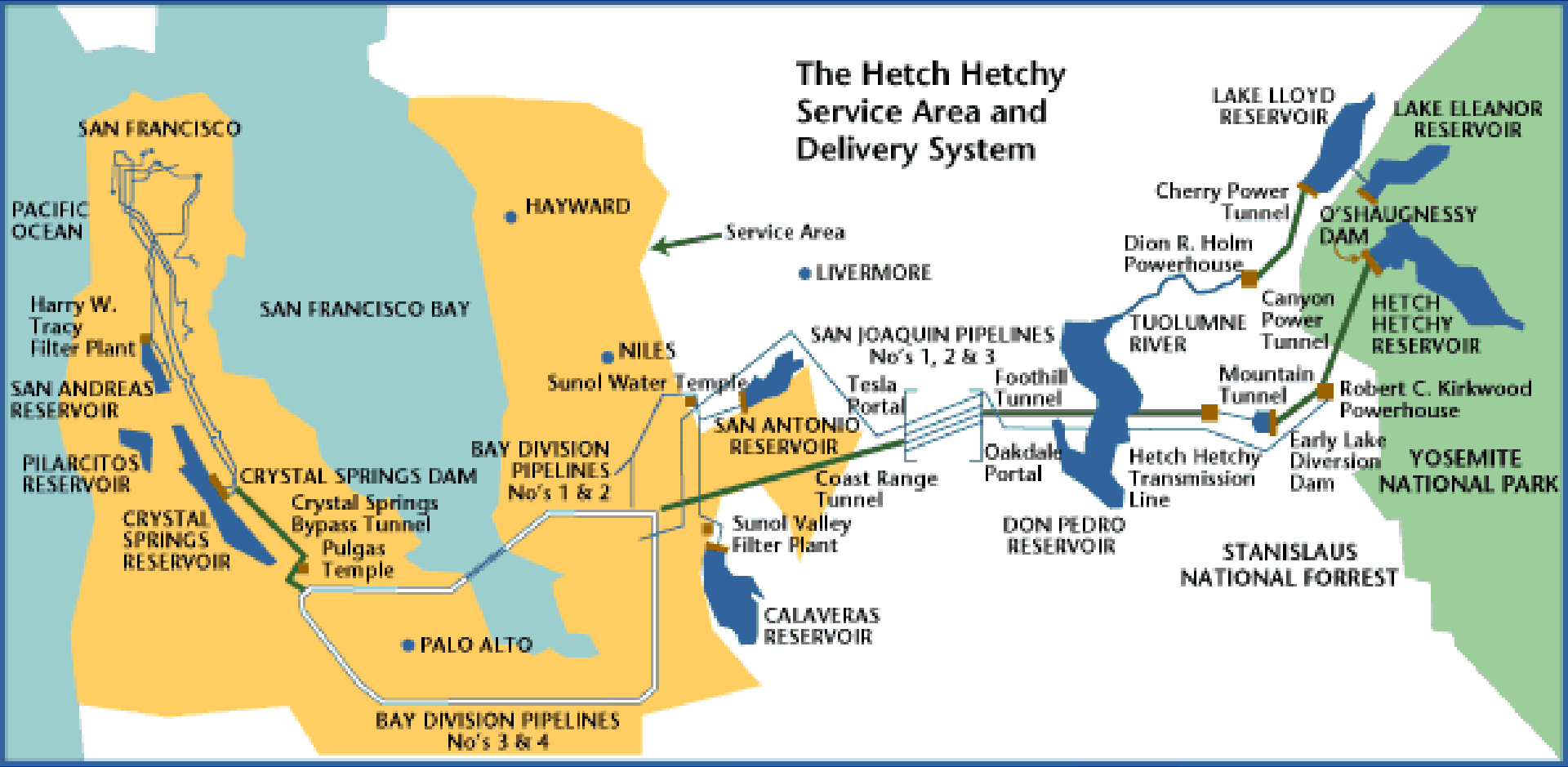
# San Mateo County Water Supply
## (A few things you might not have been told)

Peter Drekmeier
Tuolumne River Trust
December 12, 2019

# The Regional Water System Operated by the SFPUC




Tuolumne River = 85%  Bay Area Watersheds = 15%

# “The San Francisco Bay-Delta is an ecosystem in crisis.”

-Felicia Marcus, President, State Water Resources Control Board

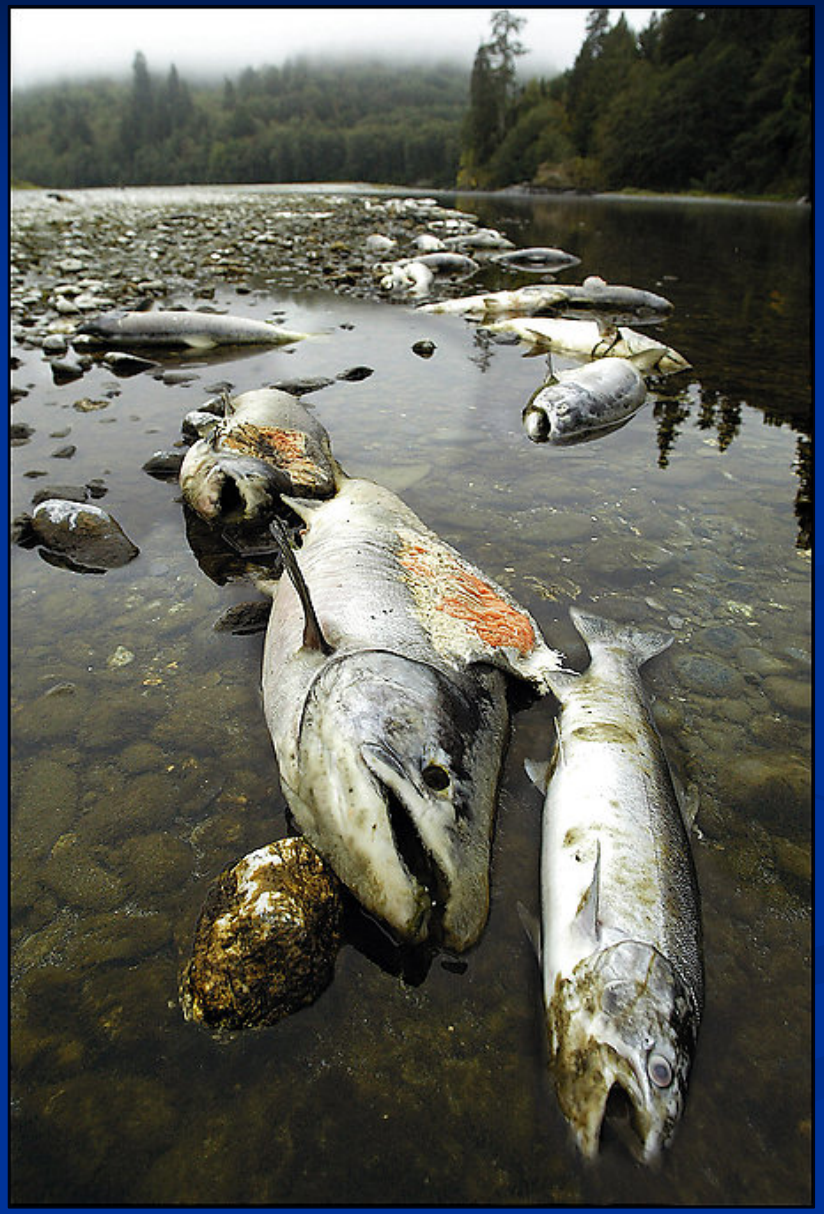
# Bay Delta Water Quality Control Plan

Co-Equal Goals:
Ensuring Reliable Water Supply
Restoring the Bay Delta Ecosystem

# Why Focus on Flow?

- Scientific studies show that flow is a major factor in the survival of fish like salmon
- Many benefits of flow, including improved growth and survival of native fish by improving water temperatures and increasing floodplain habitat
- Flow affects risk of disease, risk of predation, reproductive success, growth, smoltification, migration, feeding behavior, and other ecological factors
- Non-flow measures can also be important but State Water Board has limited authority to require non-flow measures

# Low flows impact temperature and water quality

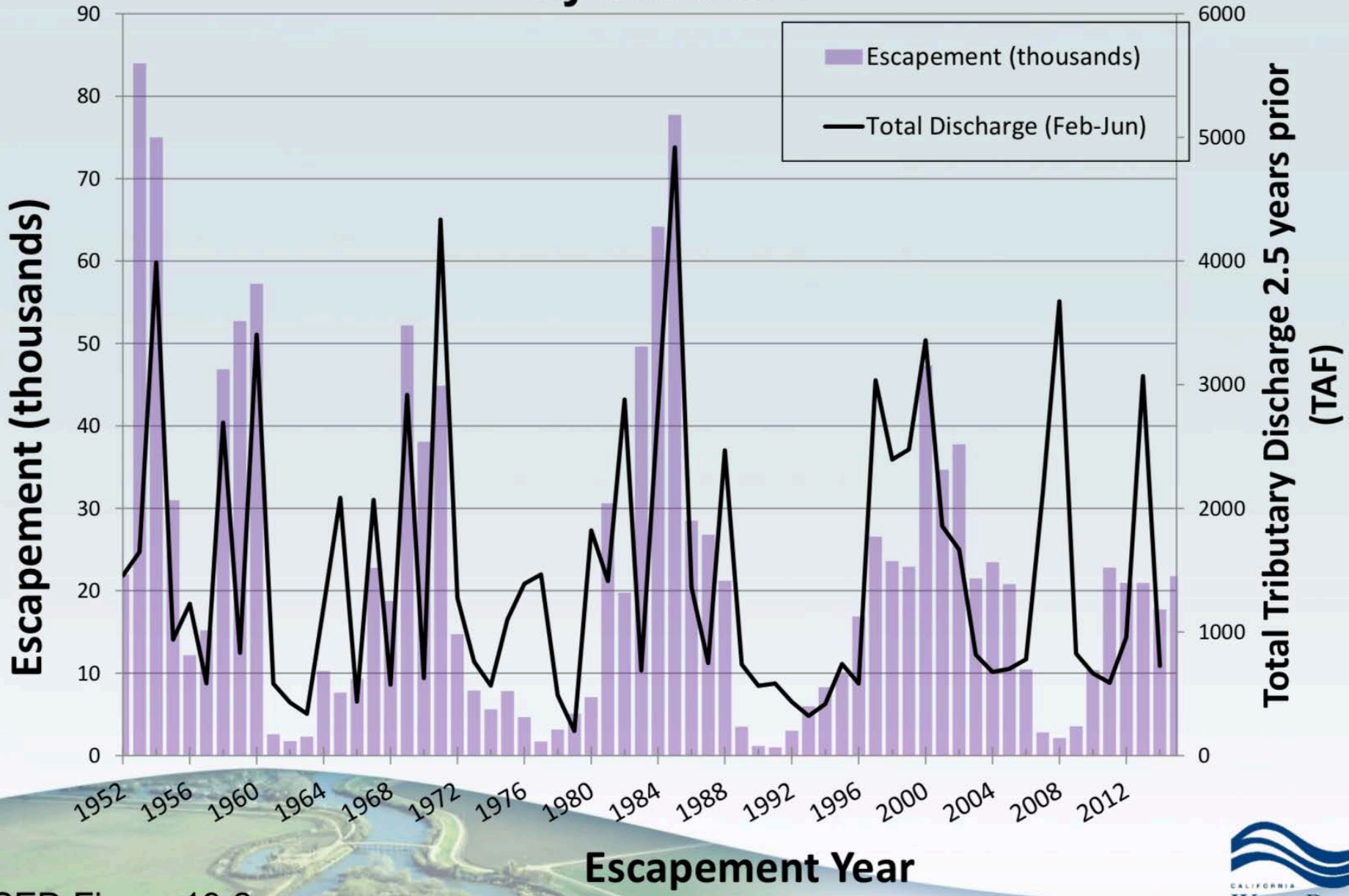


# Floodplains are rarely inundated

# Low flows hinder fish migration

Both to and from their natal streams to the ocean.

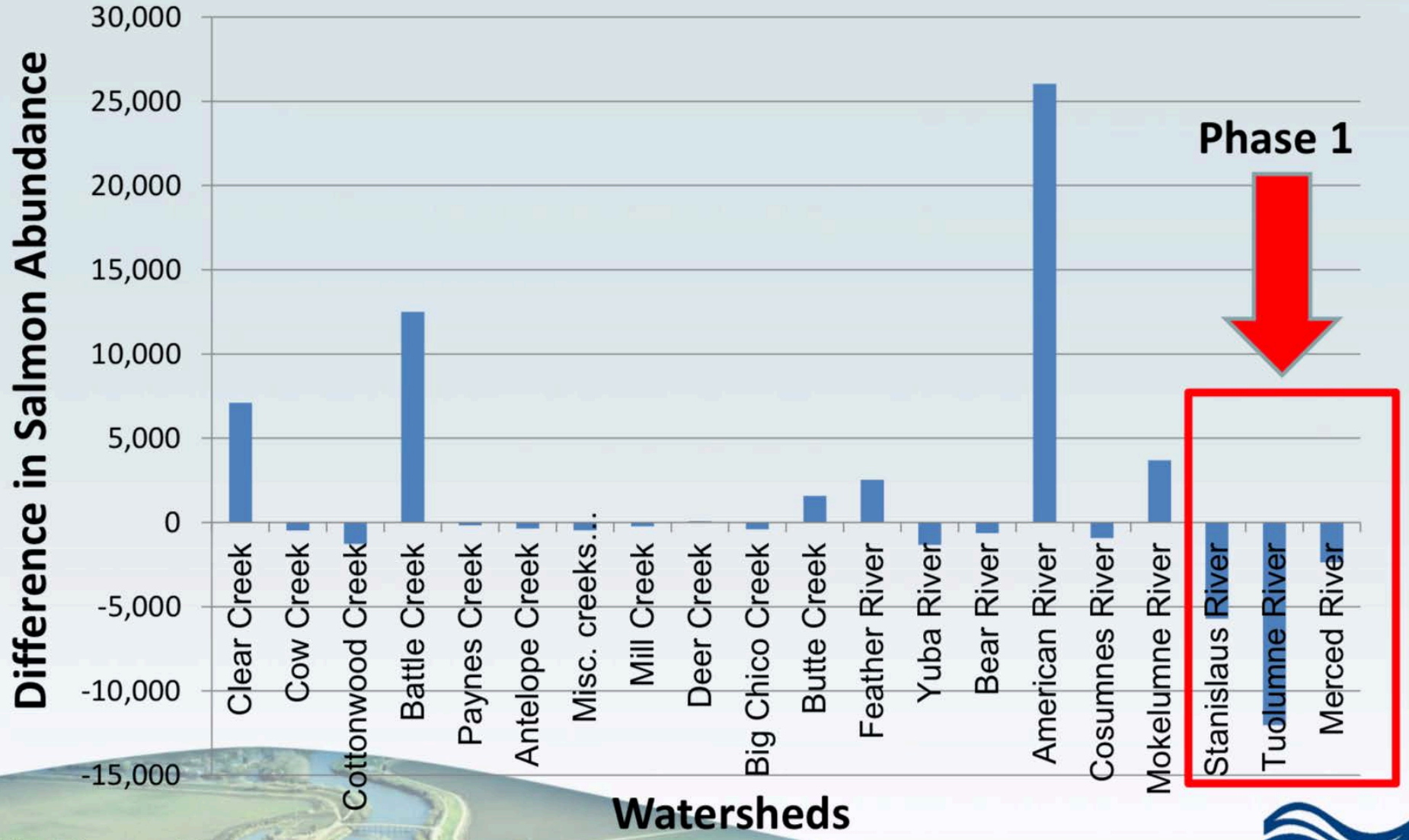
# Adult Salmon Returns and Flows Experienced by Juveniles




SED Figure 19-2

California Water Boards

# Difference in Adult Fall-run Chinook Salmon Natural Production (1992 to 2011 average minus 1967 to 1991 average)

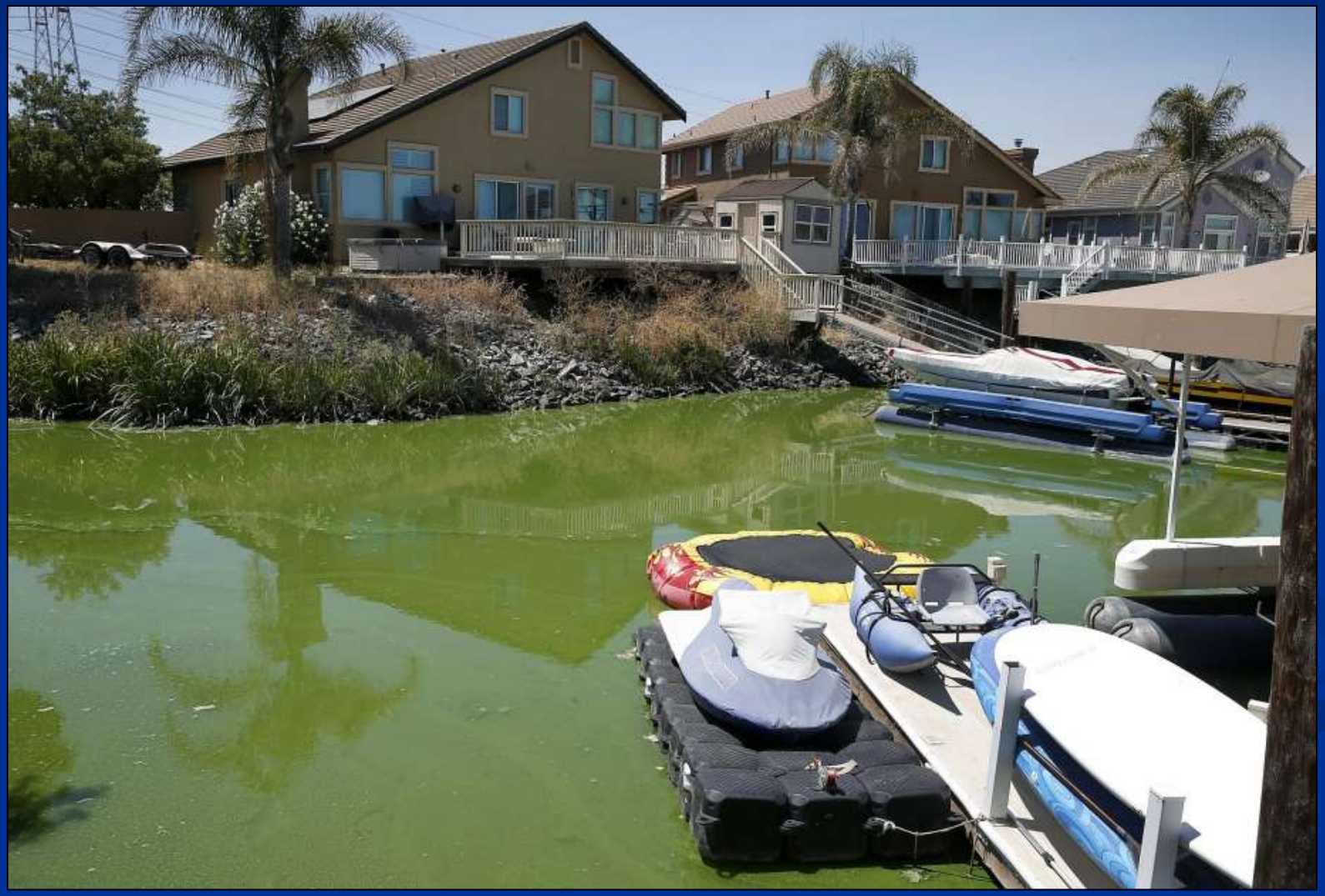



SED Figure 19-1
Corrected Tuolumne River

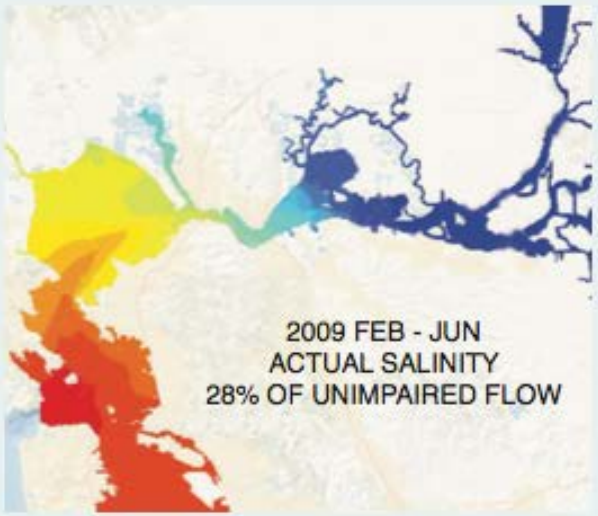
California Water Boards

# Non-native species thrive under low flow conditions

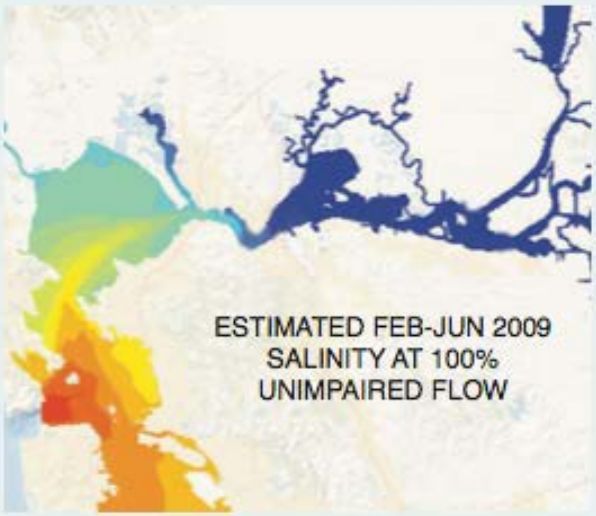
# Slow-moving, warm water has led to toxic algae blooms in the Delta



# THE EFFECT OF WATER DIVERSION ON SALINITY IN THE BAY



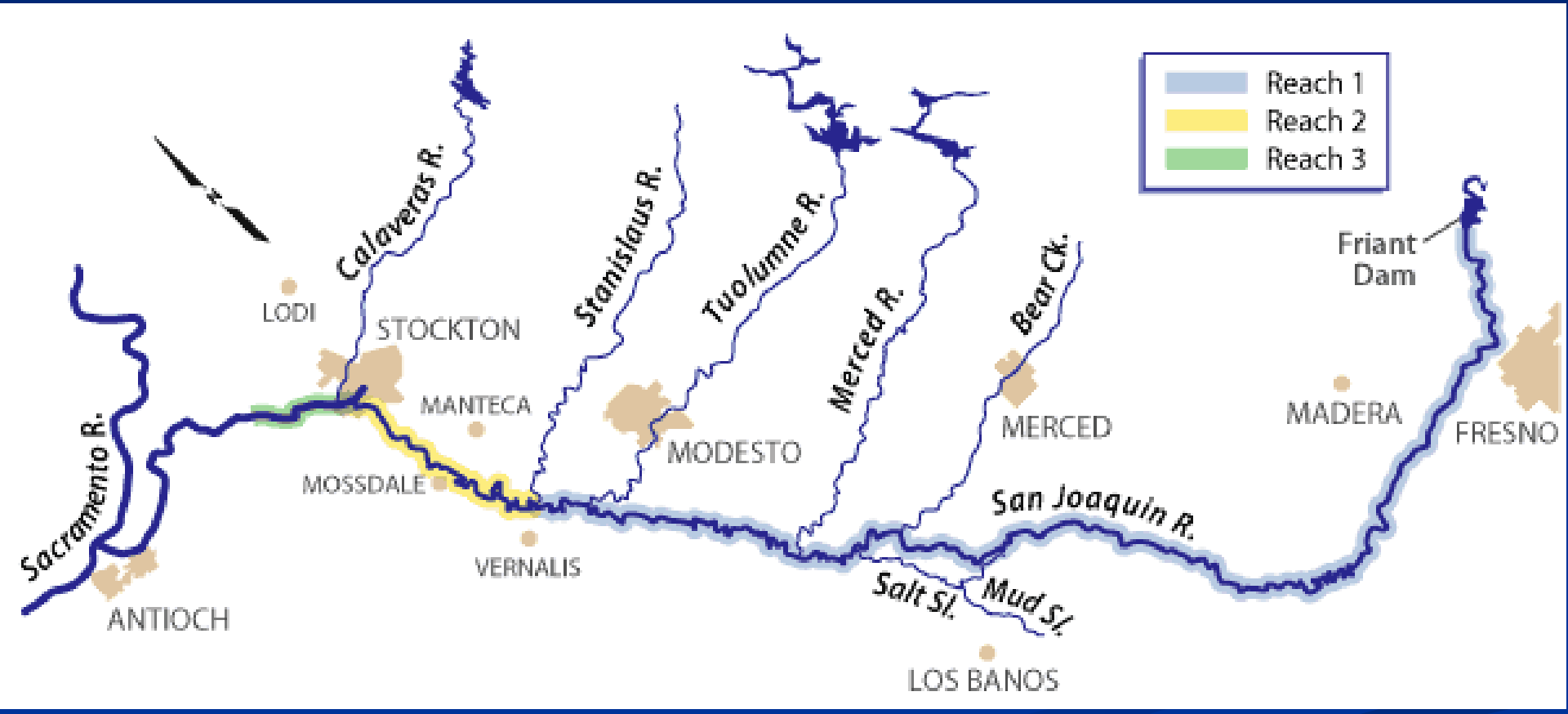

In 2009, a Dry year in the Bay's watershed, only 28% of available runoff from the Central Valley made it to the Bay; the rest was diverted, stored, or exported. Because there was so little fresh water, Central Bay, San Pablo Bay, and even parts of Suisun Bay became very salty.




Had no water been stored, diverted, or exported, the salinity distribution in 2009 would have looked more like this (the actual salinity distribution in 1980). Fish and wildlife that use freshwater and brackish habitats would have been able to use all of Suisun Bay and most of San Pablo Bay.


"San Francisco Bay: The Freshwater-Starved Estuary"
(The Bay Institute)

# The Bay Delta Plan established 40% of unimpaired flow between February and June



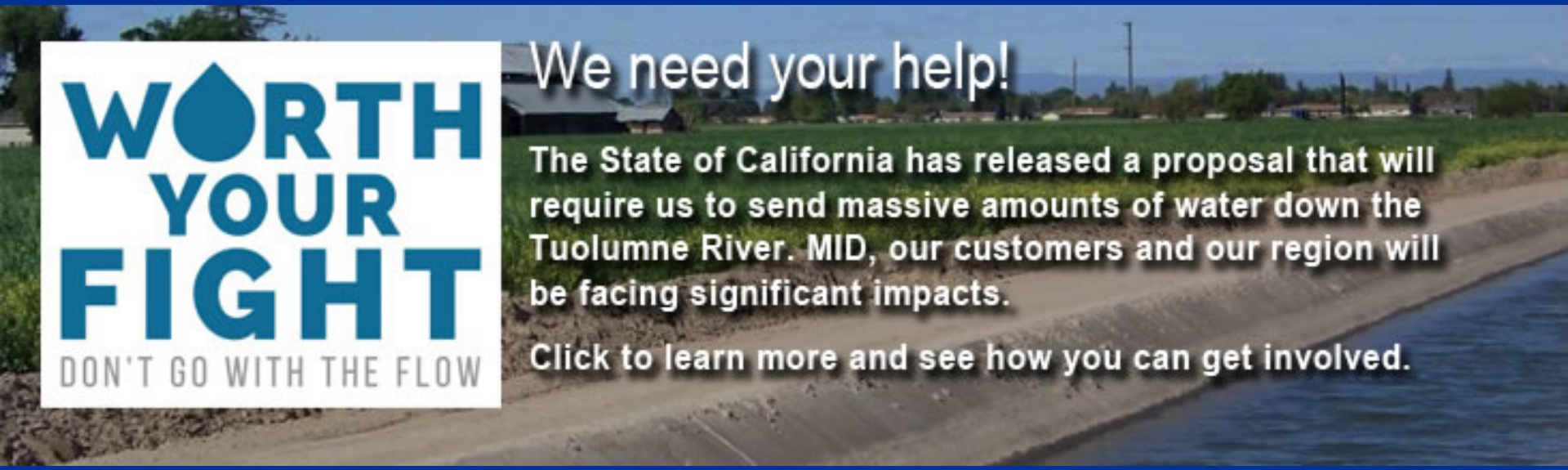

## Current Flow Averages

Stanislaus: 40%  Tuolumne: 21%  Merced: 26%

# Flows could range from 30-50% of unimpaired flow

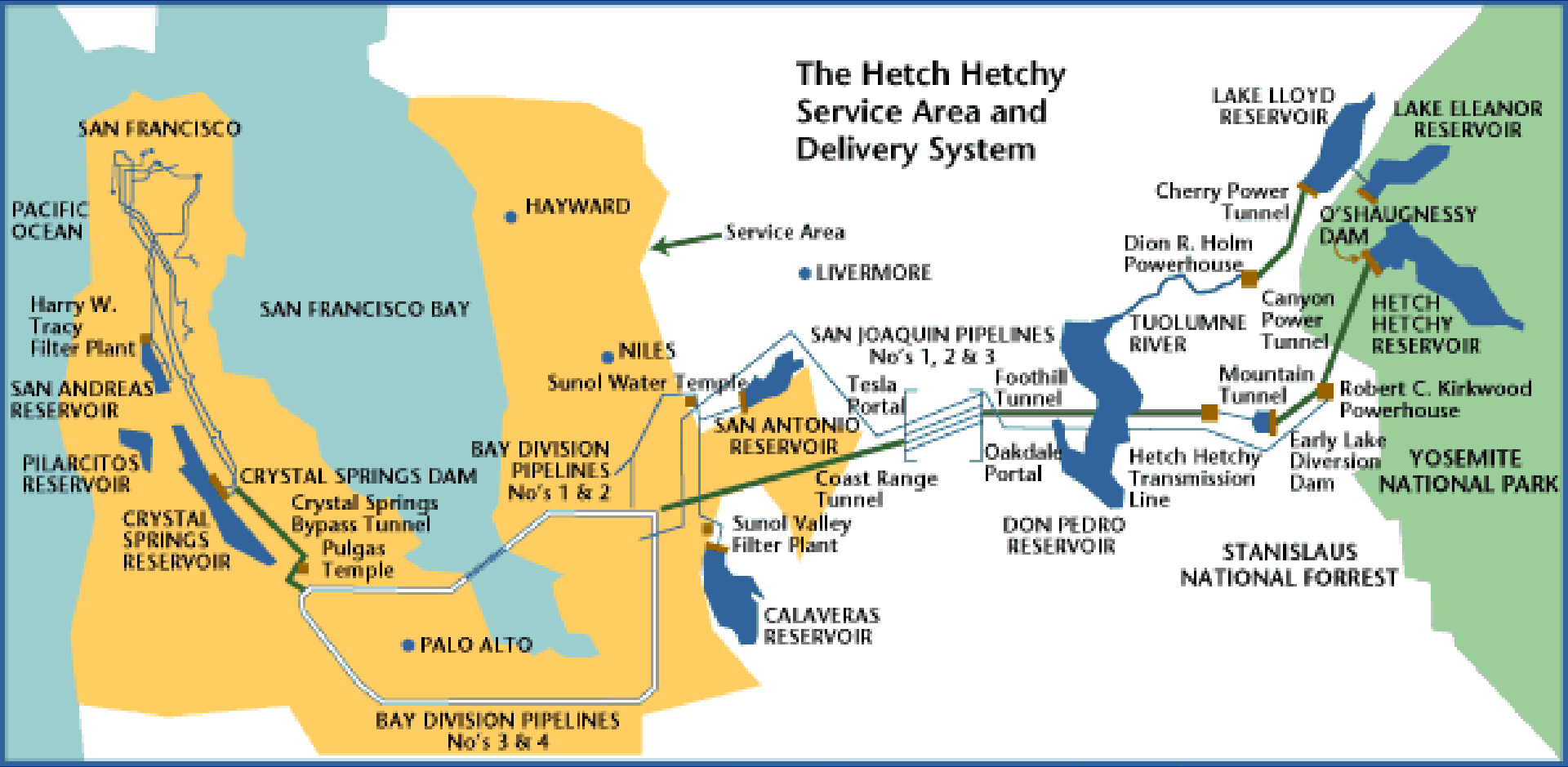
Depending on whether biological goals are met.

# The Irrigation Districts sued the State Water Board



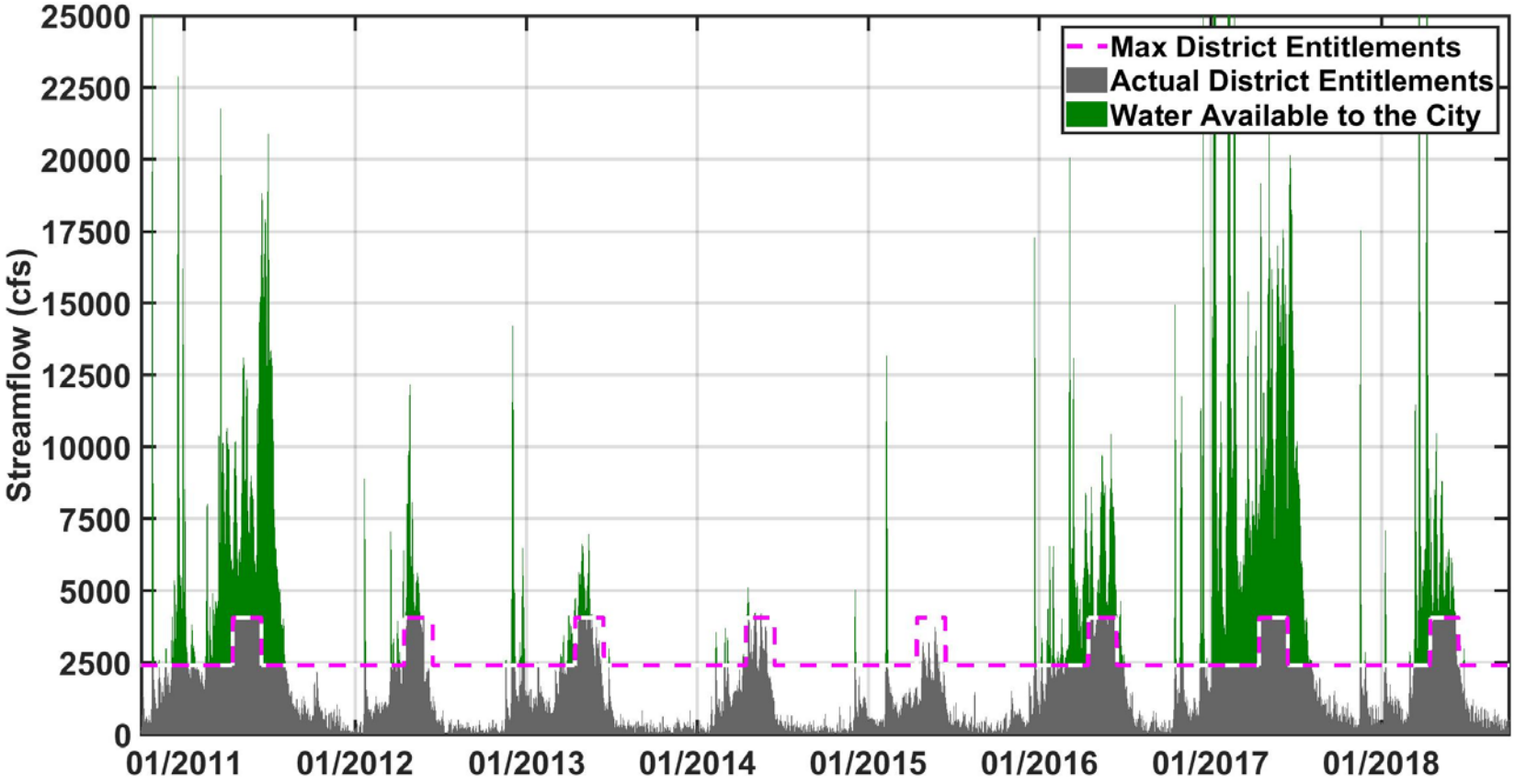

And the SFPUC joined them.

# SFPUC Water Entitlements, Demand and Storage




Tuolumne River = 85%  Bay Area Watersheds = 15%

# Tuolumne River Water Entitlements




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

# SFPUC Water Supply & Demand

"The 1922-2003 average calculated volume of water potentially available to CCSF under the Raker Act was about **750 TAF/y** [thousand acre-feet per year]"

"According to a SFPUC planning document, an average of **244 TAF/y** is diverted from the Tuolumne River… based on data from 1989-2005"

Source: Bay Delta Plan SED

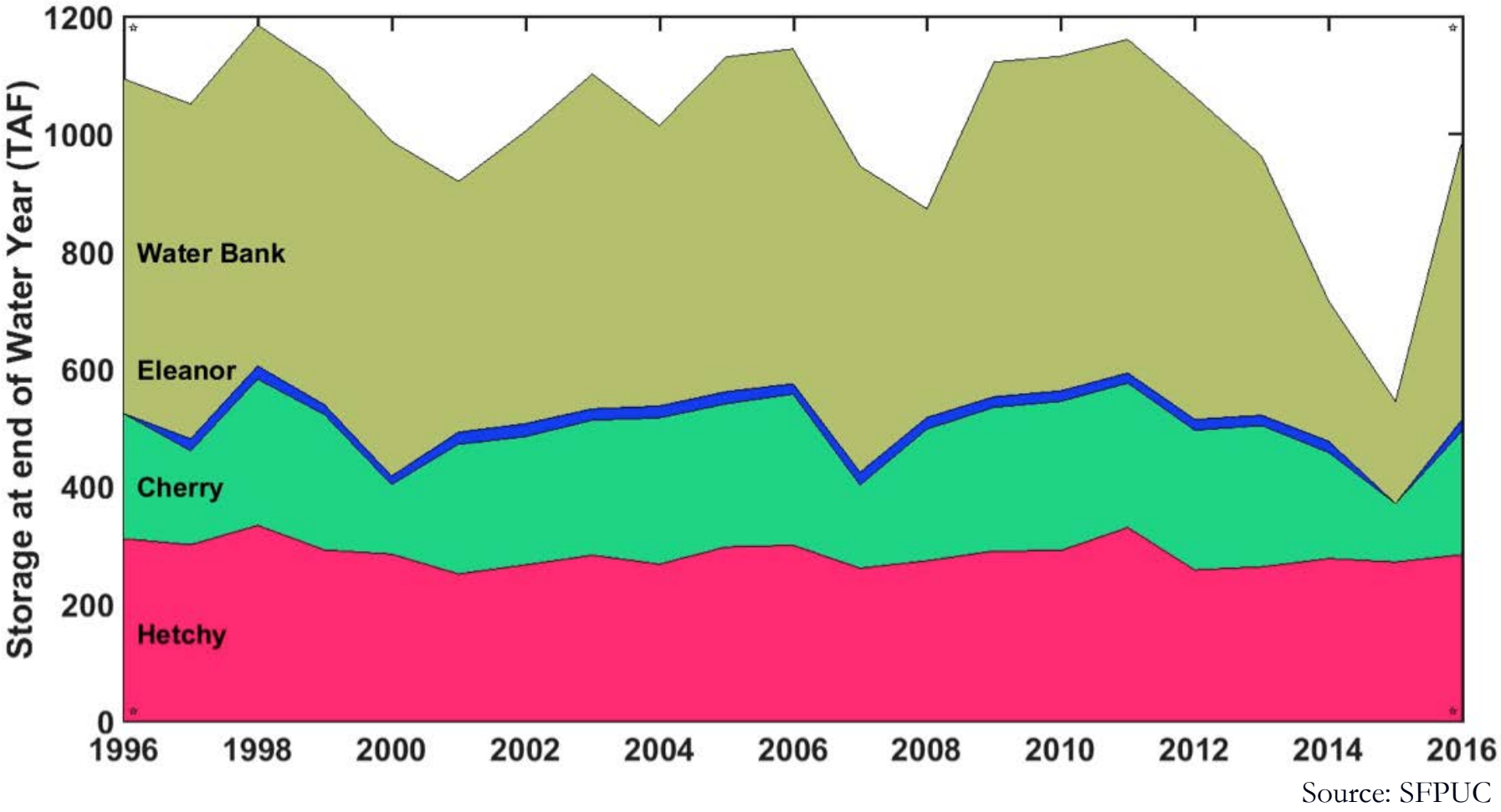
Figures do not include Bay Area water supplies.

# SFPUC Storage Capacity

| Reservoirs | Capacity (Acre-Feet) |
|---|---|
| Tuolumne Reservoirs | 660,973 |
| Don Pedro Water Bank | 570,000 |
| Bay Area Reservoirs | 227,711 |
| **Total Storage** | **1,458,684** |

The SFPUC has enough storage capacity to last six years. It can count on storage to manage multiple dry years.

# SFPUC Tuolumne Storage




Source: SFPUC

At the height of the recent drought, the SFPUC had enough water in storage to last three years. (Bay Area storage not included.)

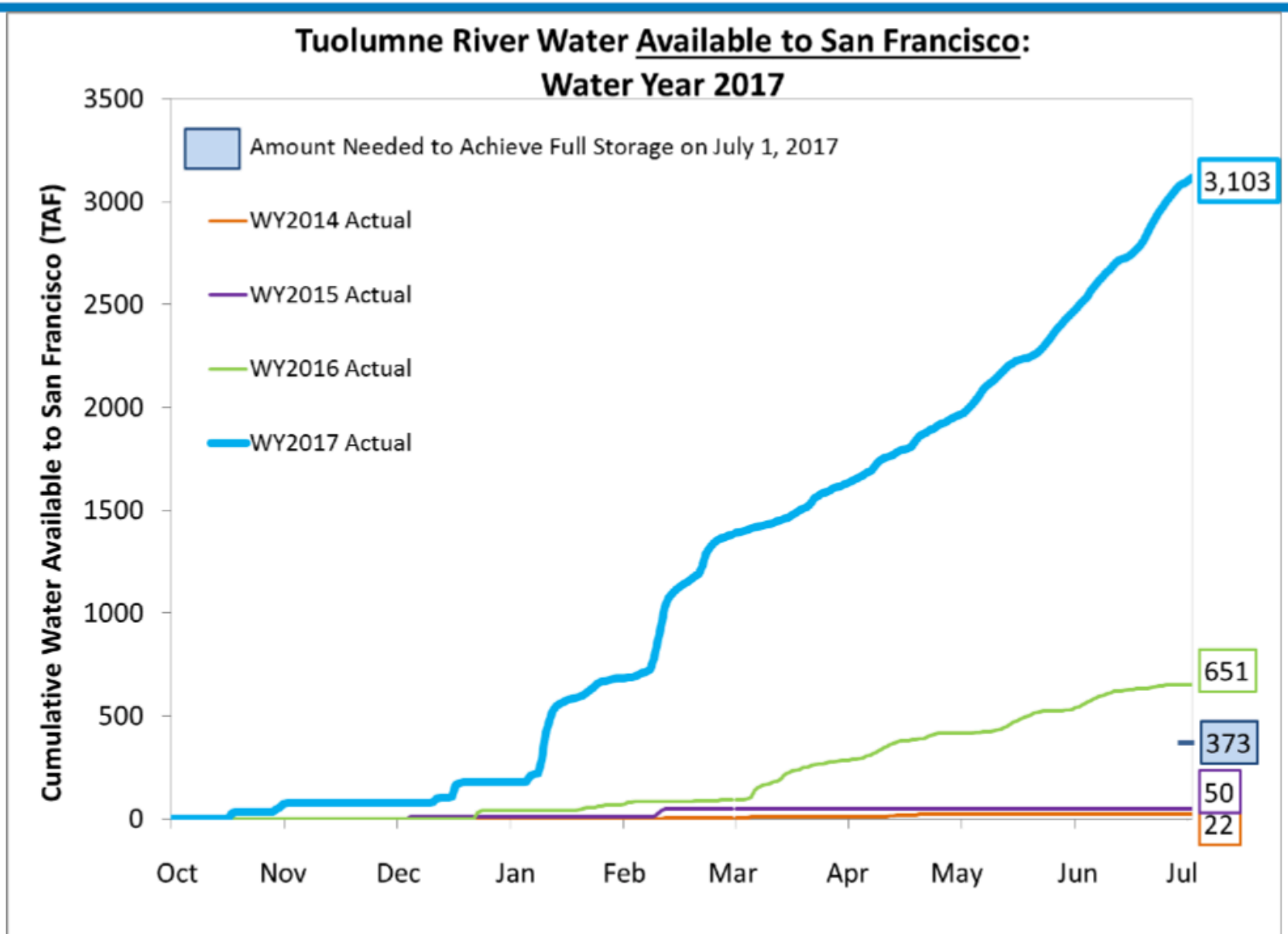
Hetch Hetchy Regional Water System

# July 31, 2016 Reservoir Storage Levels

| Reservoir | Current Storage[1,2,3] (AF) | Maximum Storage[3,4] (AF) | Available Capacity (AF) | Percent of Maximum Storage | Normal Percent of Maximum Storage[5] |
|---|---|---|---|---|---|
| Tuolumne System | | | | | |
| Hetch Hetchy | 347,560 | 360,360 | 12,800 | 96.4% | **95.3%** |
| Cherry | 256,170 | 273,500 | 17,330 | 93.7% | - |
| Eleanor | 22,800 | 27,113 | 4,313 | 84.1% | - |
| Water Bank | 421,410 | 570,000 | 148,590 | 73.9% | **96.0%** |
| **Total Tuolumne Storage** | **1,047,940** | **1,230,973** | **183,033** | **85.1%** | - |
| Local System | | | | | |
| Calaveras | 35,419 | 96,670 | 61,251 | 36.6% | - |
| San Antonio | 43,522 | 50,637 | 7,115 | 85.9% | - |
| Crystal Springs | 53,386 | 58,309 | 4,923 | 91.6% | - |
| San Andreas | 17,960 | 19,027 | 1,067 | 94.4% | - |
| Pilarcitos | 2,504 | 3,069 | 565 | 81.6% | - |
| **Total Local Storage** | **152,790** | **227,711** | **74,921** | **67.1%** | - |
| **Total System Storage** | 1,200,730 | 1,458,684 | 257,954 | **82.3%** | **90.0%** |
| **Total without water bank** | 779,320 | 888,684 | 109,364 | **87.7%** | - |

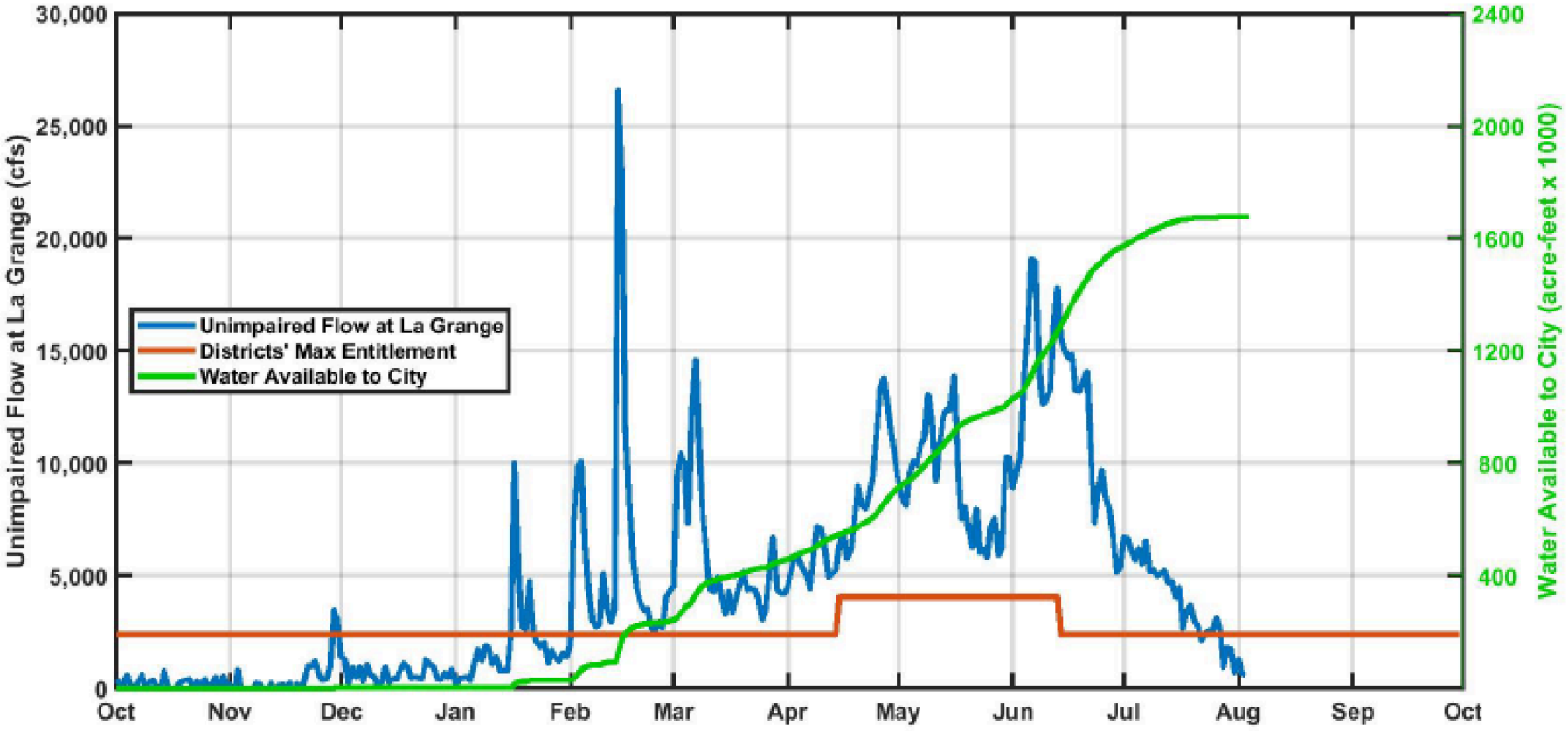
Hetch Hetchy Regional Water System

# Tuolumne River Water Available to the City



Hetch Hetchy Regional Water System

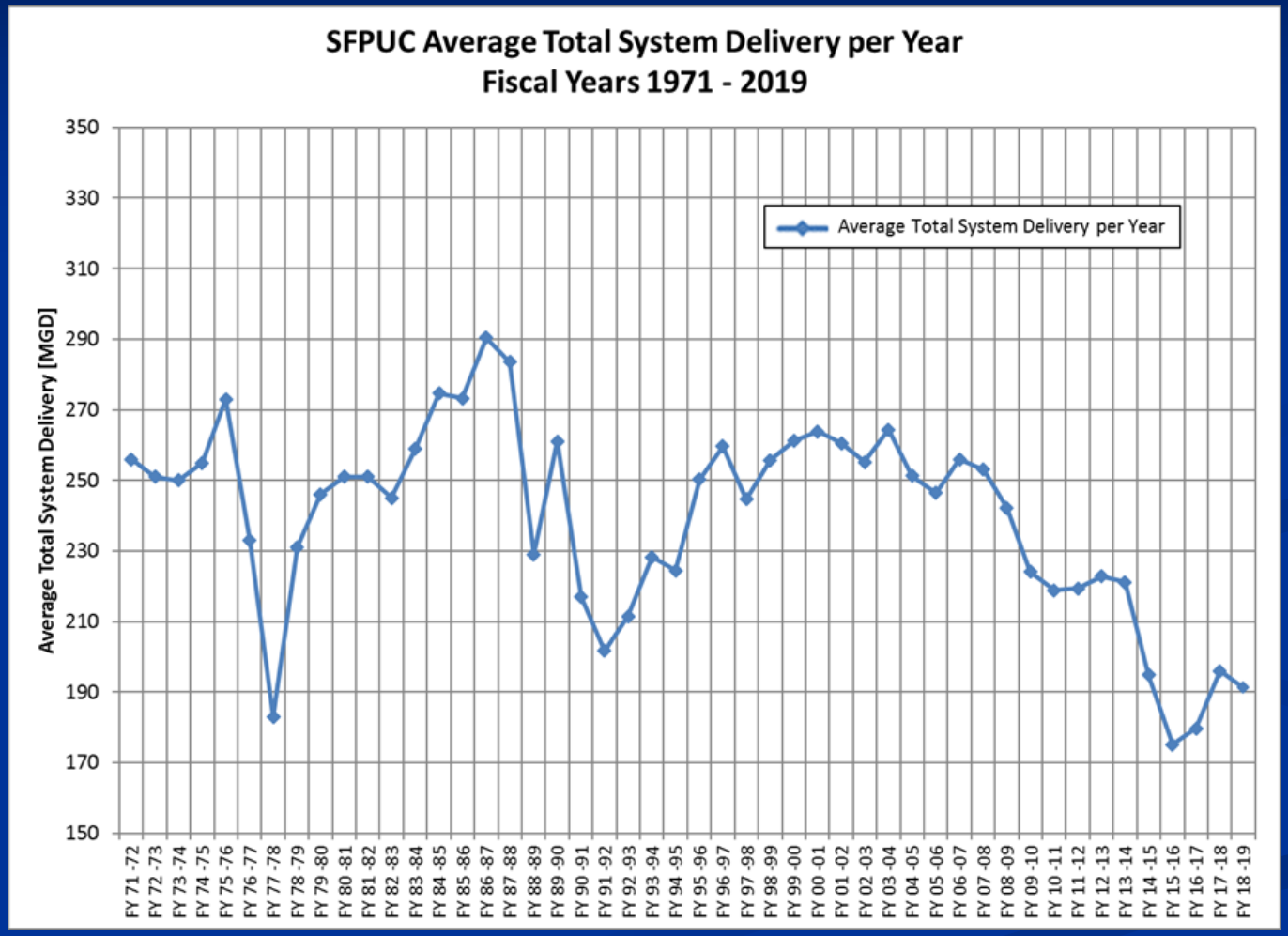
# Water Available to the City




**Water Year 2018/19**

Source: SFPUC

# The Hetch Hetchy service area has demonstrated conservation potential




30% reduction in water demand: 2006-2016

# Water Demand in the SFPUC Service Area

2018 Demand Projections = **285 mgd**
(from 2007 WSIP EIR)

2008 Sales Cap = 265 mgd

2013 (pre-drought) = 223 mgd

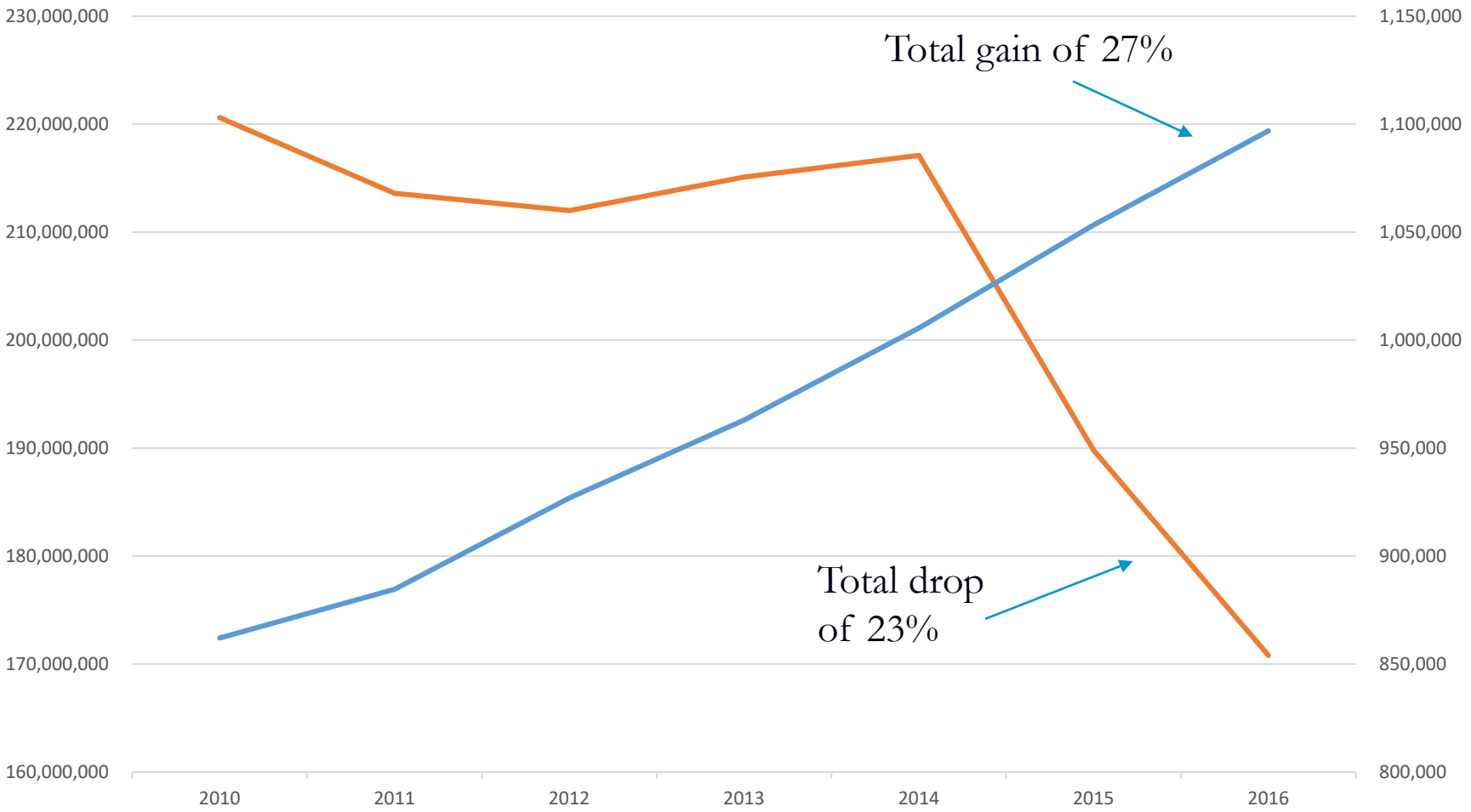
2016 = 175 mgd

2017 = 180 mgd

2018 = **196 mgd**

Water demand in 2018 was 31% lower than projected.

# SFPUC Water Deliveries and Employment, 2010-2016
# San Francisco and San Mateo Counties

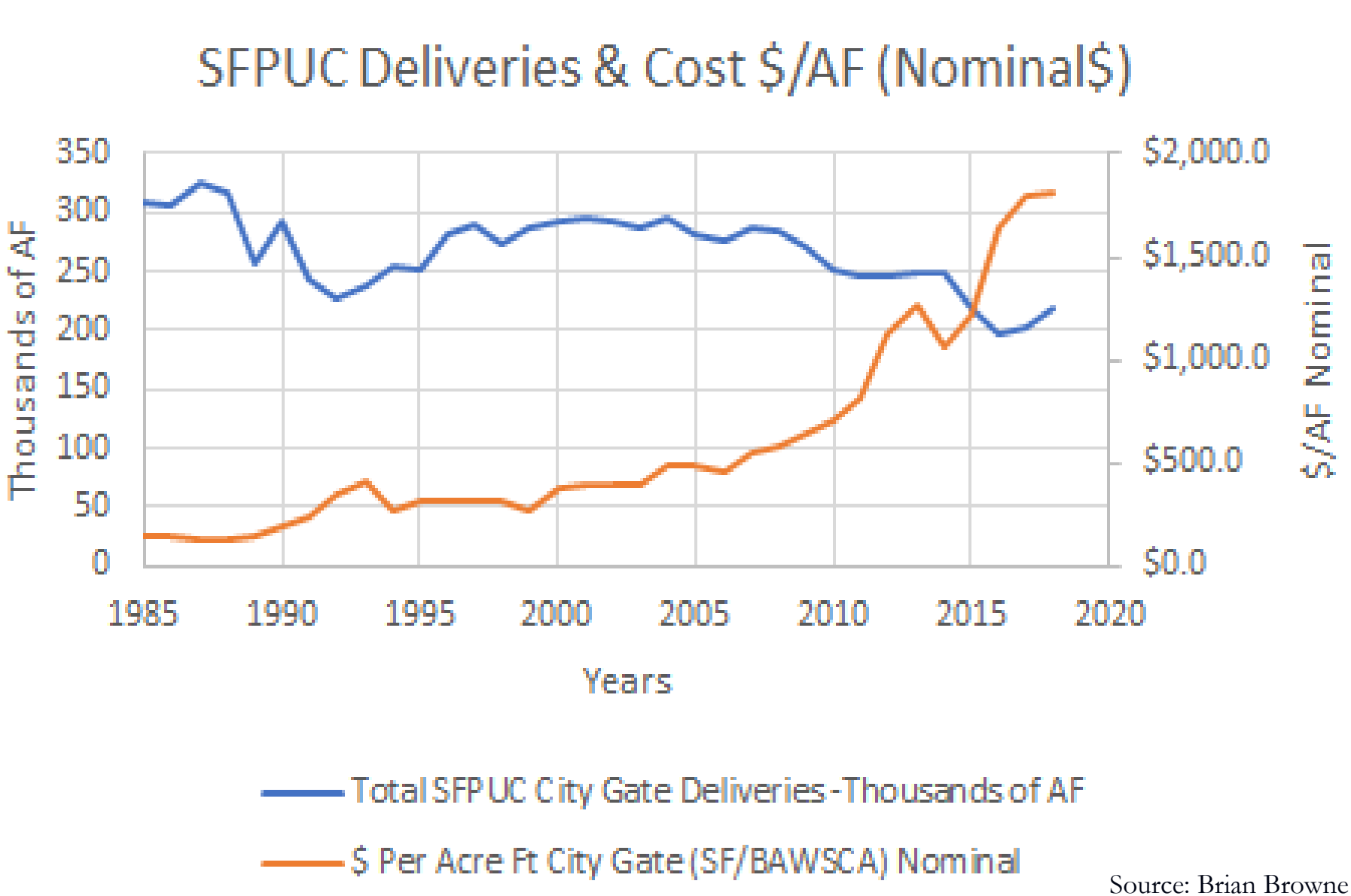



Orange Line = SFPUC water sales

Blue Line = Total employment for San Francisco and San Mateo Counties

Source: Bill Martin, Sierra Club

# Water Rates Have Depressed Demand




Source: Brian Browne

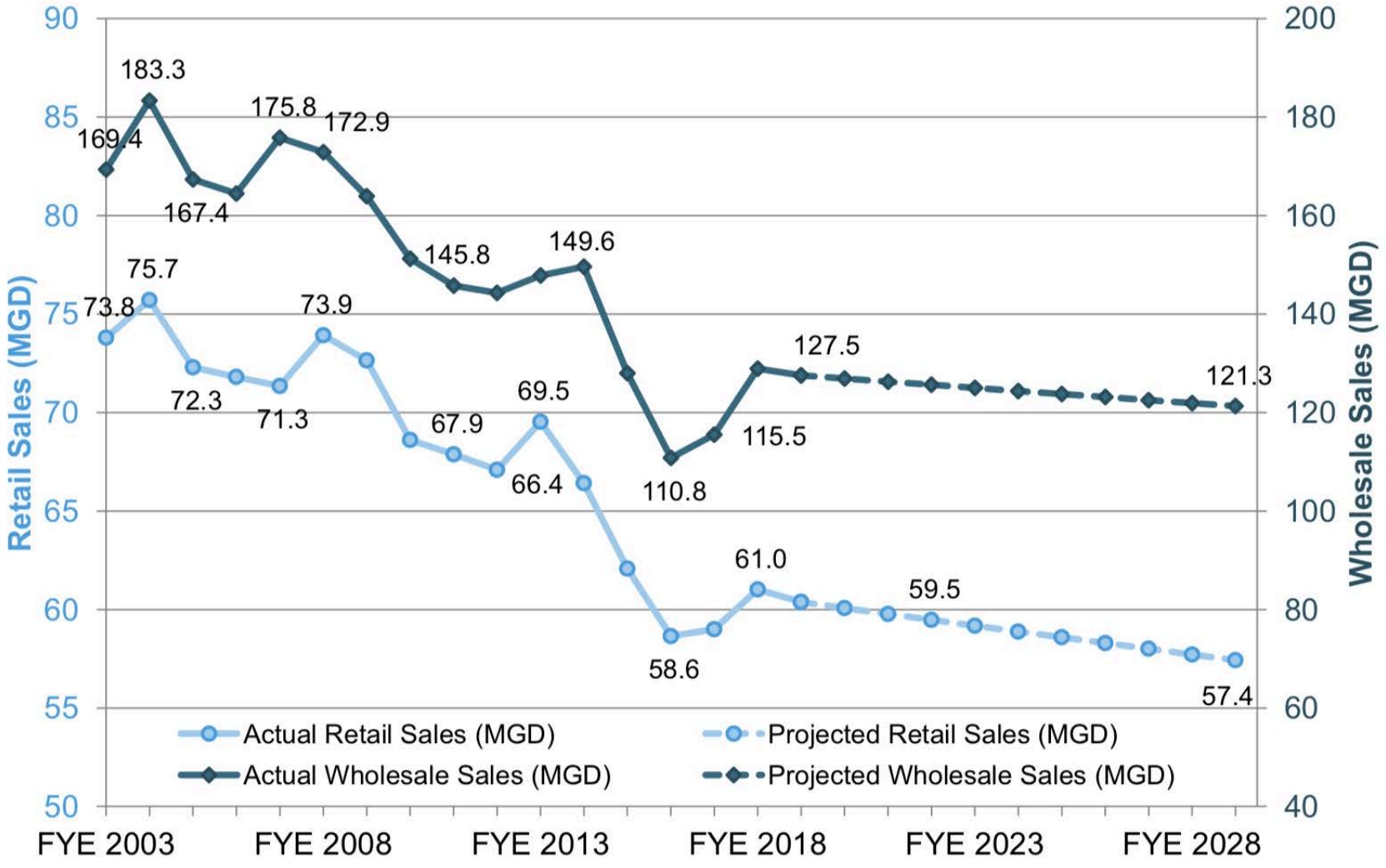
# 10-Year Financial Plan Update

## FYE 2020 through FYE 2029

Eric Sandler, Chief Financial Officer

March 12, 2019

# Water Sales Volumes



# TRT 6-Year Drought Model

## (223 mgd baseline, 40% unimpaired flow Feb-June)

| Year | Level of Rationing | SFPUC Storage Reduction (TAF) | SFPUC Water in Storage (TAF) |
|---|---|---|---|
| =1986 | | | 1,517 |
| =1987 | 0% | 478 | 1,039 |
| =1988 | 0% | 347 | 692 |
| =1989 | 10% | 45 | 647 |
| =1990 | 10% | 292 | 355 |
| =1991 | 20% | 75 | 280 |
| =1992 | 20% | 220 | **60** |

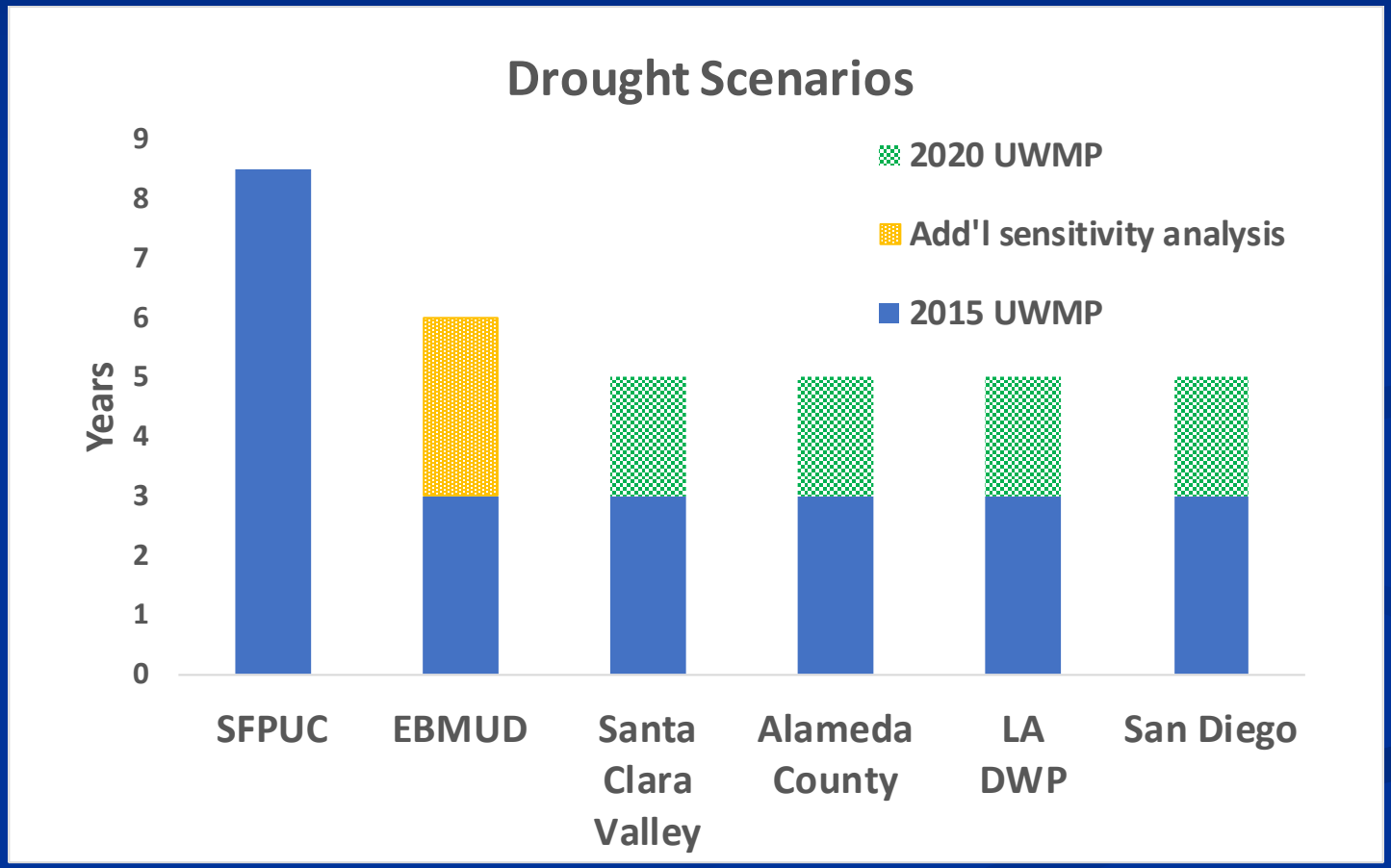
If the past 100 years of precipitation were to repeat, and the Bay Delta Plan were in place, the SFPUC would not run out of water.

# The SFPUC's "Design Drought"

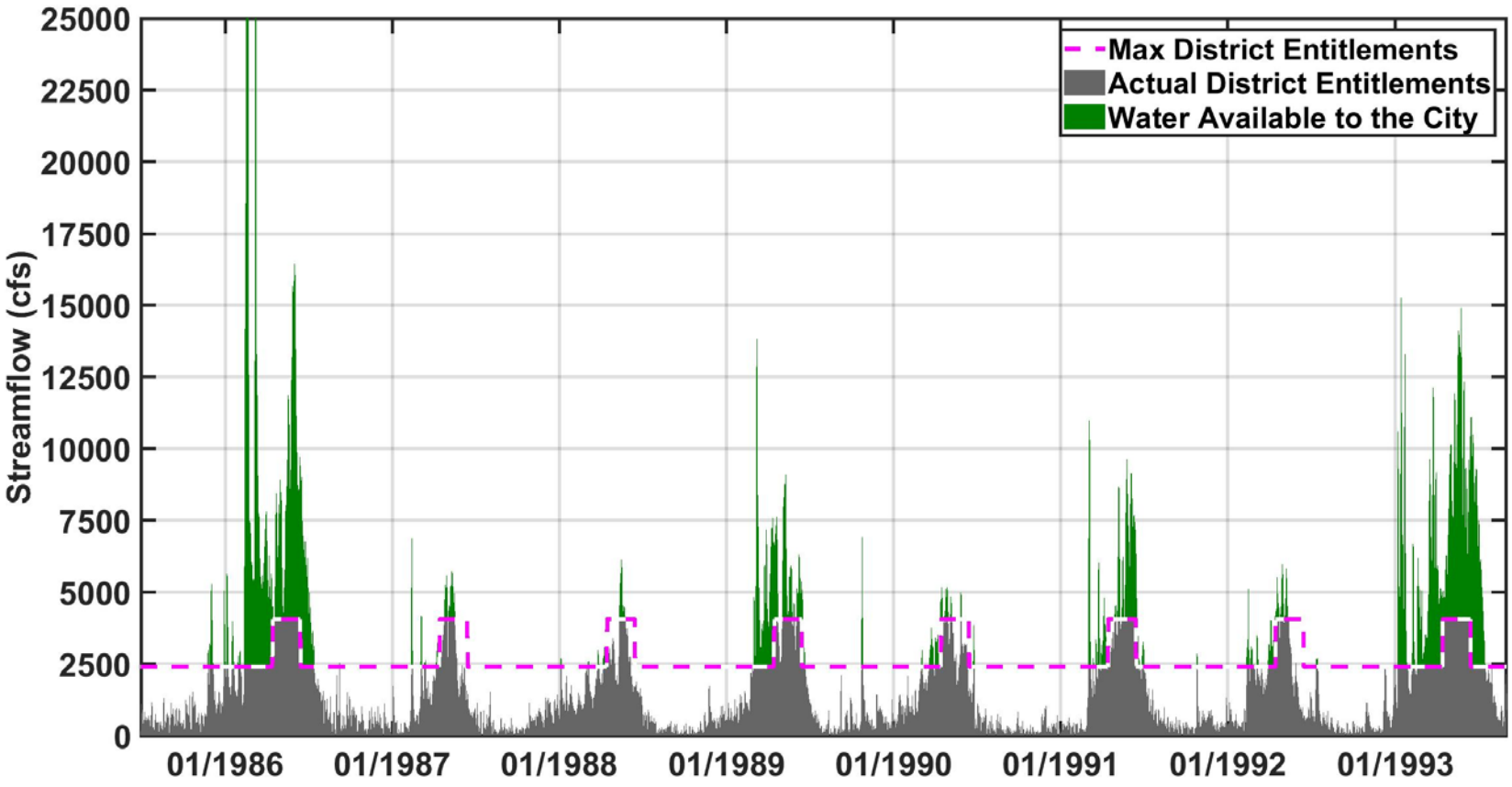
"Our Level of Service objective for water supply is to survive the drought planning scenario (**1987-92 followed by 1976-77**) with no more than 20% rationing from a total system **demand of 265 MGD**…We need to plan for each year as if it is the beginning of our drought planning scenario."

*-SFPUC, January 10, 2017*

# The SFPUC has the longest drought scenario of California's major water districts



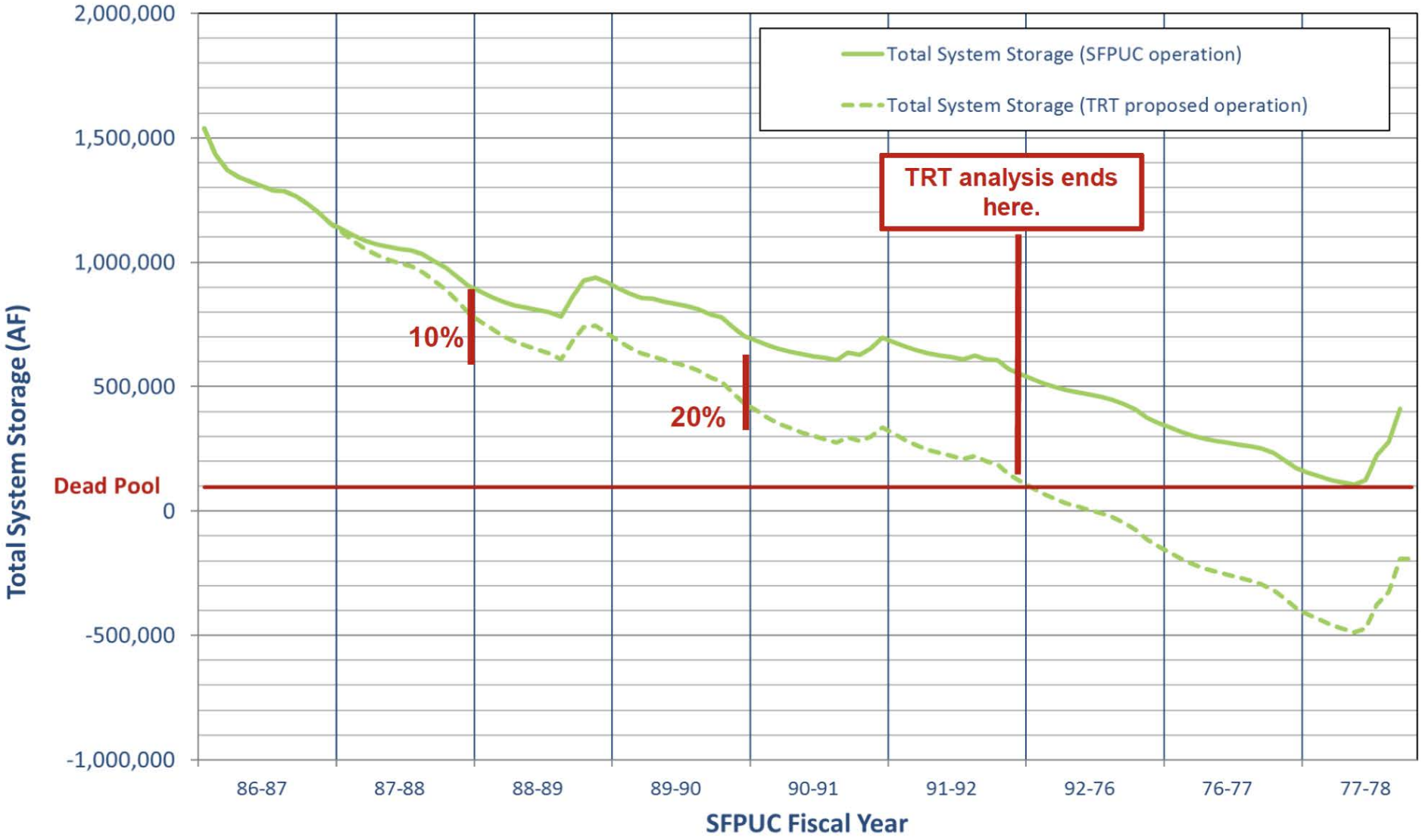
# Changes Since the 1987–1992 Drought




- Demand was at its peak in 1987 (290 mgd).
- The SFPUC adopted its Water First Policy.
- Cherry Lake (273 TAF) was drained in 1989.

Hetch Hetchy Regional Water System

# TRT Analysis: Impacts of Bay-Delta Plan in Effect at Demand of 223 MGD



Hetch Hetchy Regional Water System

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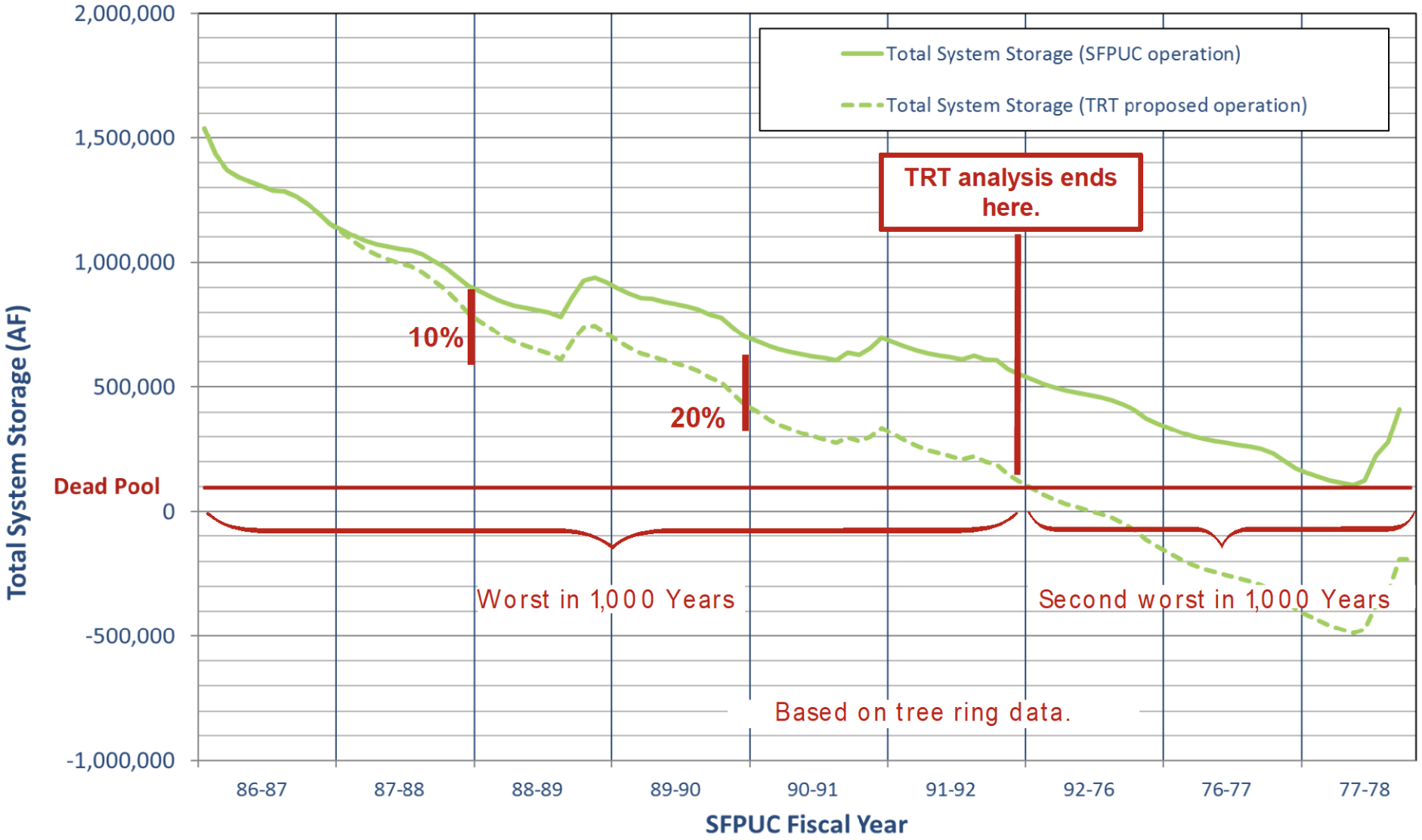


# Design Drought Flaws

## Based on 265 mgd demand

- Demand has been lower than 200 mgd for the past five years (192 mgd in FY 2019).
- The SFPUC's 10-Year Financial Plan projects a 0.5% decrease in water sales per year.

## Covers 8.5 years

- The 1987-1992 drought (six years) was the most severe in 1,000 years.
- Urban Water Management Plans require planning for a five-year drought.

## Assumes no new water supplies are developed

- SFPUC is far behind every other major water agency in developing recycled water.
- Santa Clara Valley Water District has identified 73 mgd of new water.

# Santa Clara Valley Water District
## Planned Water Supply Projects (73 mgd)

## Master Plan Projects

- **Baseline Projects[1]**
- **Delta Conveyance Project**
- **Additional Conservation & Stormwater Projects**
- **Potable Reuse (Phase 1- 24,000 AF by FY28)**
- **Pacheco Reservoir Expansion**
- **Transfer-Bethany Pipeline**
- **South County Recharge**

[1] Dam seismic retrofits, Rinconada Water Treatment Plan reliability improvement project, 10-year pipeline rehabilitation program, Vasona pumping plan upgrade, 100,000 AFY water conservation savings, and assumes 33,000 AFY of countywide non-potable recycled water.

| Project | Average Annual Yield (AFY) | Valley Water Lifecycle Cost[3] | Unit Cost (AF) | Risk |
|---|---|---|---|---|
| Delta Conveyance Project | 41,000 | $630 million | $600 | High/ Extreme |
| Additional Conservation & Stormwater Projects | 11,000 | $100 million | $400 | Medium |
| Potable Reuse | 19,000 | $1.2 billion | $2,000 | Medium |
| Pacheco Reservoir Expansion[1] | 6,000[2] | $340 million[4] | $2,000 | Medium |
| Transfer-Bethany Pipeline[2] | 3,500 | $78 million | $700 | Medium |
| South County Recharge | 2,000 | $20 million | $400 | Medium |

Ultimately the amount of project yield and benefit that is usable by Valley Water depends on the portfolio of water supply projects that Valley Water ultimately implements and the outcome of ongoing regulatory processes.
[1] Assumes Prop. 1 Water Storage Investment Program funding. Costs would roughly double without funding.
[2] Based on Prop. 1 Water Storage Investment Program (WISP) application.
[3] Valley Water lifecycle (100 year) costs are presented in 2018 present value dollars.
[4] Assumes Prop. 1 and WIIN funding, WIFIA loan, and partner agencies pay 20% of the project.

Valley Water

valleywater.org

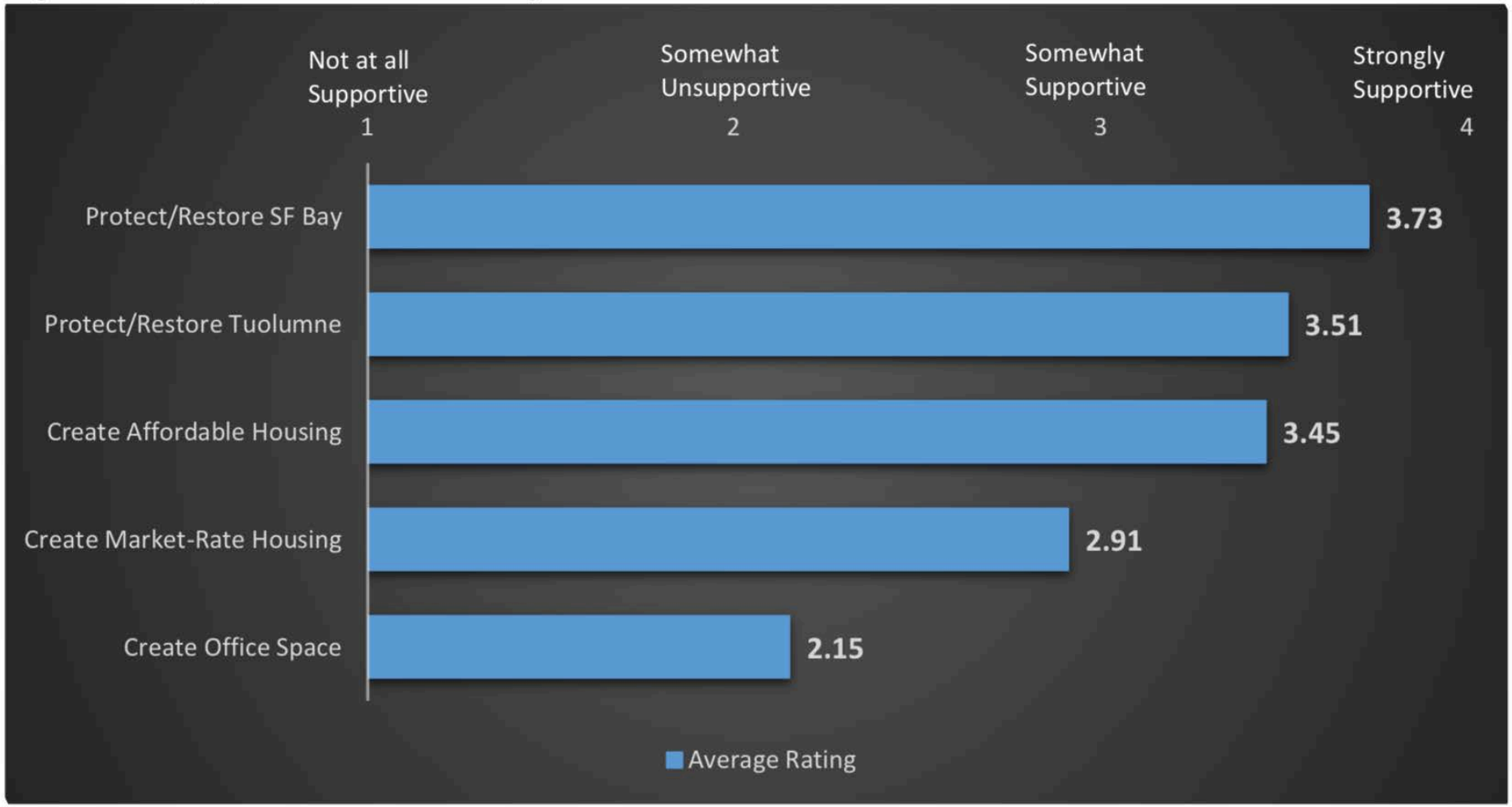
# SFPUC Design Drought Rationing Scenario
## (223 mgd baseline, 40% unimpaired flow Feb-June)

| Year | Level of Rationing | SFPUC Storage Reduction (TAF) | SFPUC Storage (TAF) |
|---|---|---|---|
| =1986 | | | 1,517 |
| =1987 | 39% | 379 | 1,138 |
| =1988 | 39% | 248 | 890 |
| =1989 | 39% | -29 | 919 |
| =1990 | 49% | 194 | 725 |
| =1991 | 49% | 2 | 723 |
| =1992 | 49% | 147 | **576** |

At the end of a repeat of the 6-year drought of record, the SFPUC would have enough water in storage to last more than two years.

# 97% support for San Francisco Bay

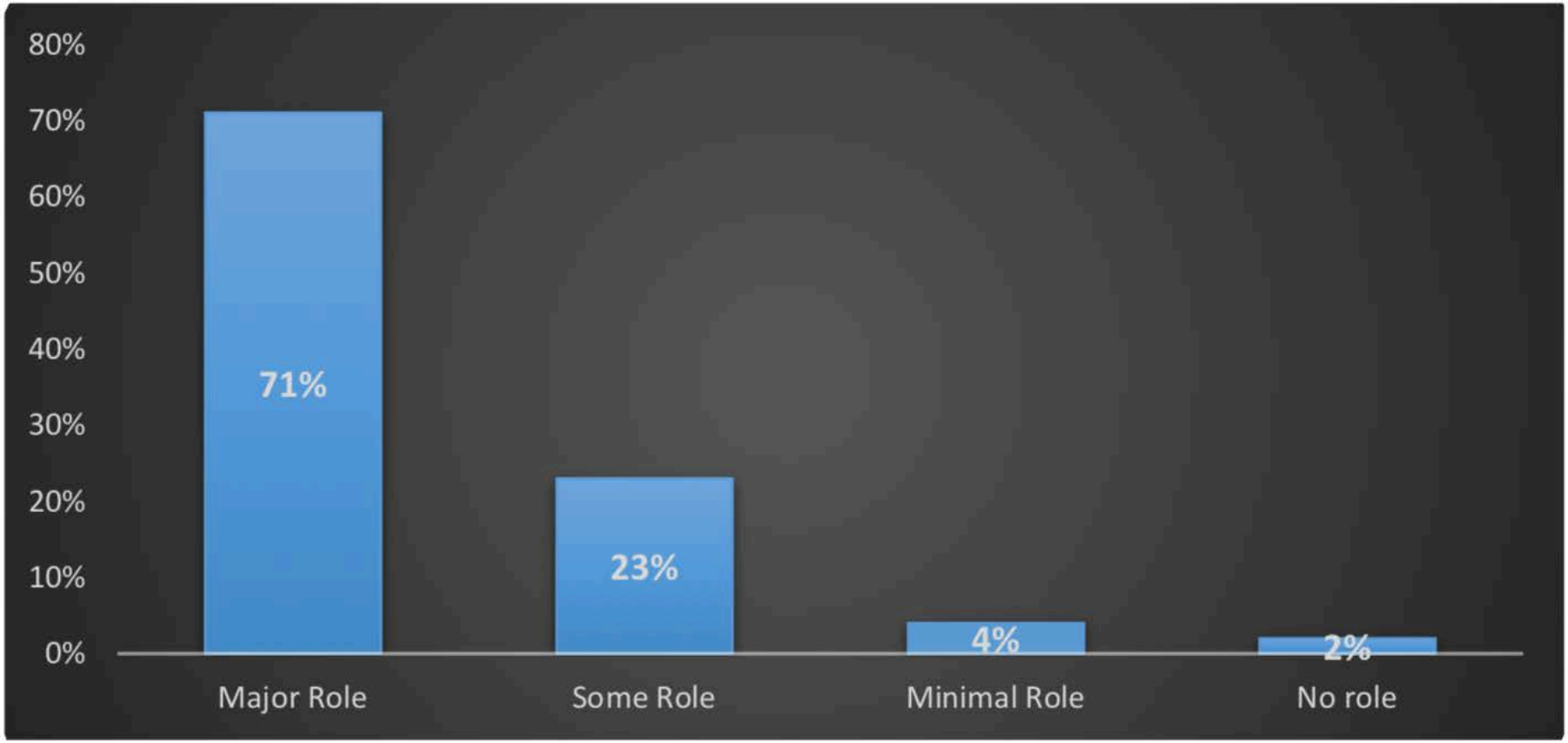
**Figure 6. Support for Potential City-Wide Measures**




# 92% support for the Tuolumne River

# Environmental protection is an extremely strong motivator to conserve water

**Figure 3. Role of Environmental Concerns in Water Conservation Efforts**

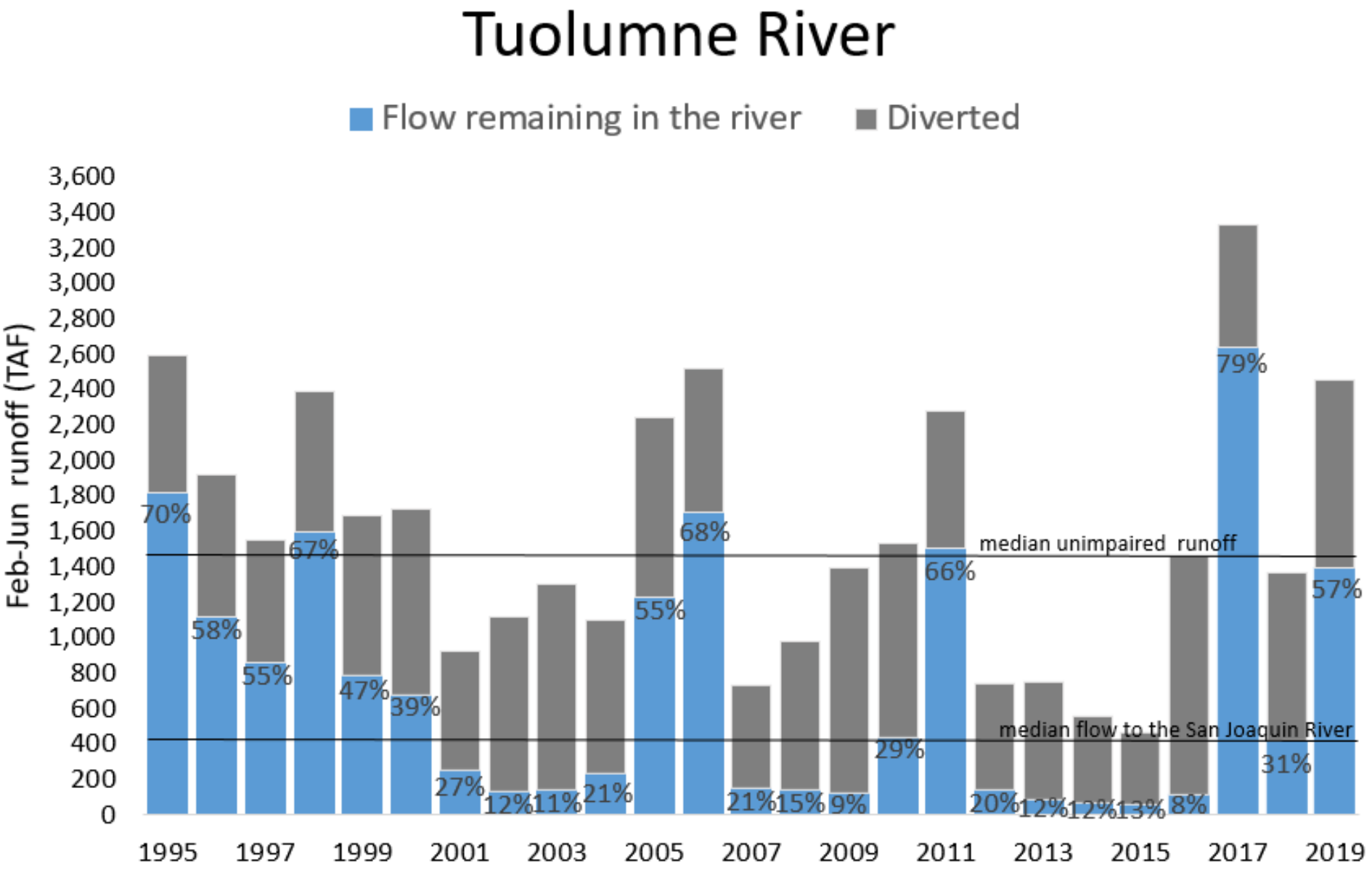


Conserved water was just impounded

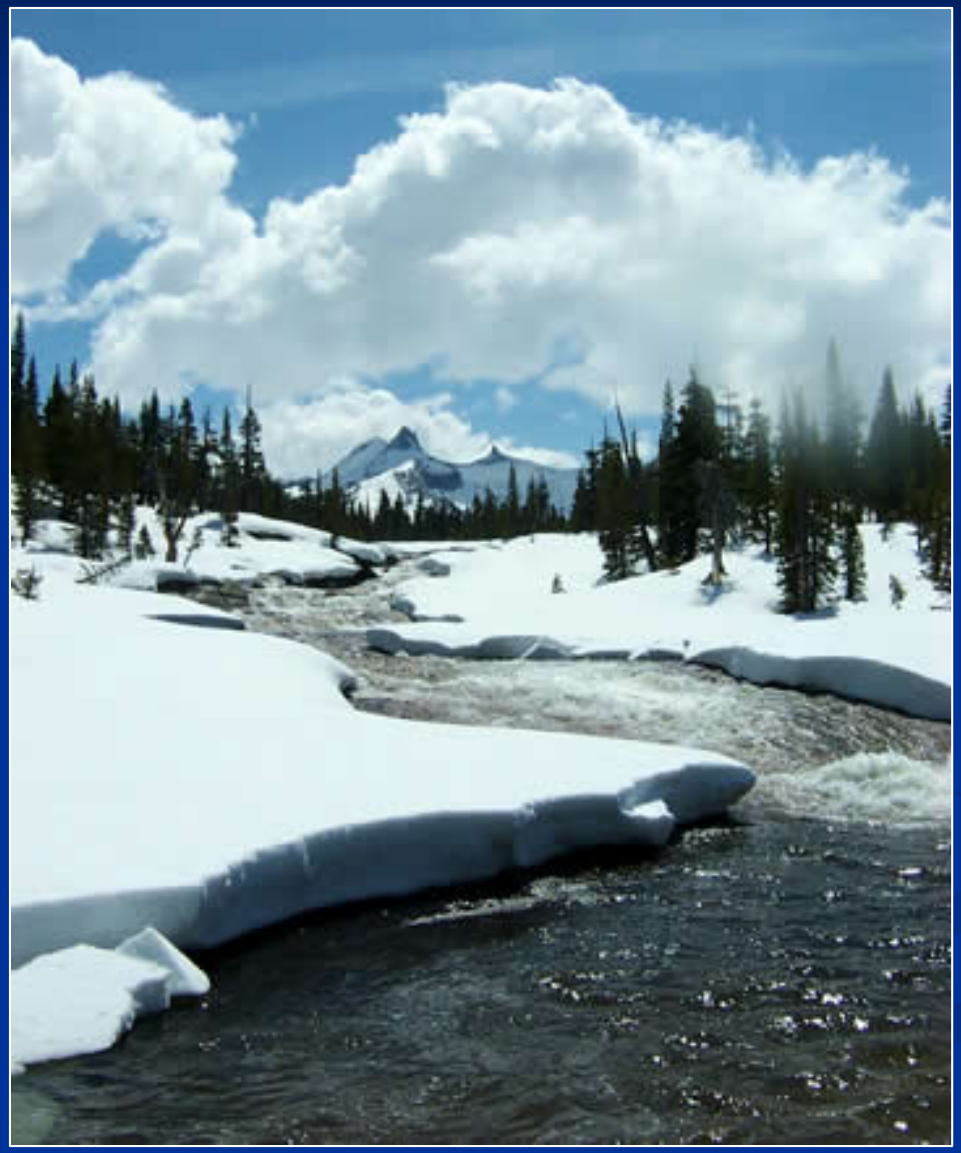
# Current FERC Flow Schedule

| Season | Dry Year | Normal Year | Wet Year |
|---|---|---|---|
| Oct. 1-15 | 100 cfs | 200 cfs | 300 cfs |
| Oct. 16 – May 31 | 150 cfs | 175 cfs | 300 cfs |
| June 1 – Sep. 30 | 50 cfs | 75 cfs | 250 cfs |

# Current policy devastates the River in dry years



# How might climate change affect us?

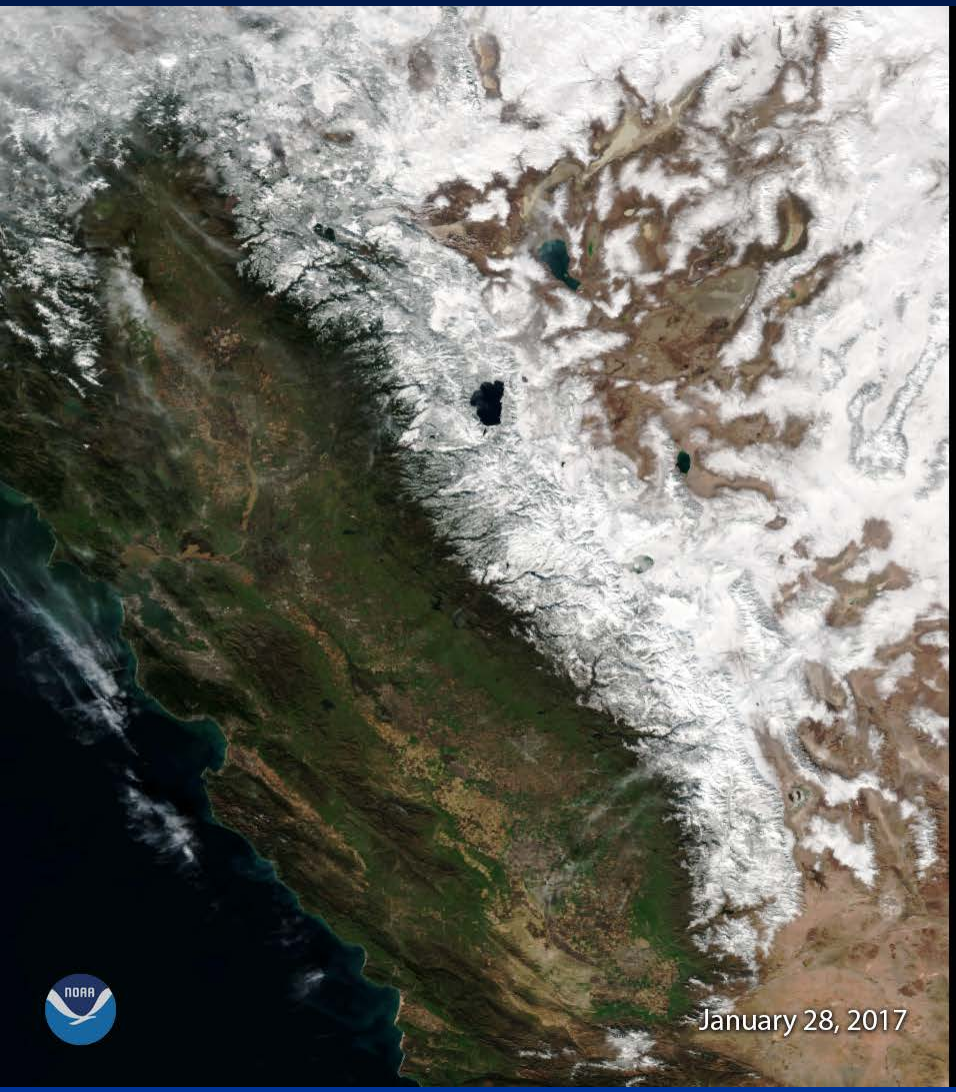


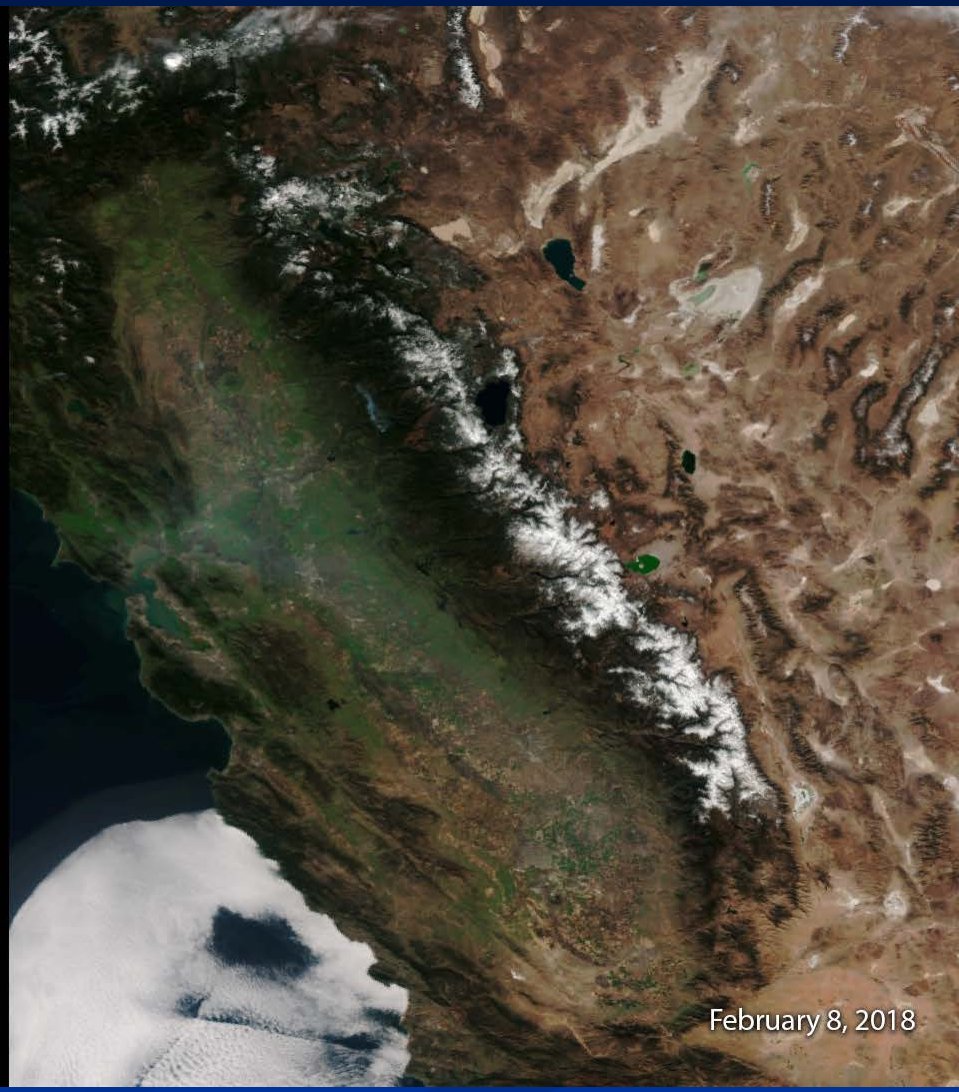
# The Mount Lyell Glacier is disappearing


But provides just 0.2% of our water supply.

Stretches of the Lyell Fork will dry up in the summer.

# We will experience greater swings in water year types

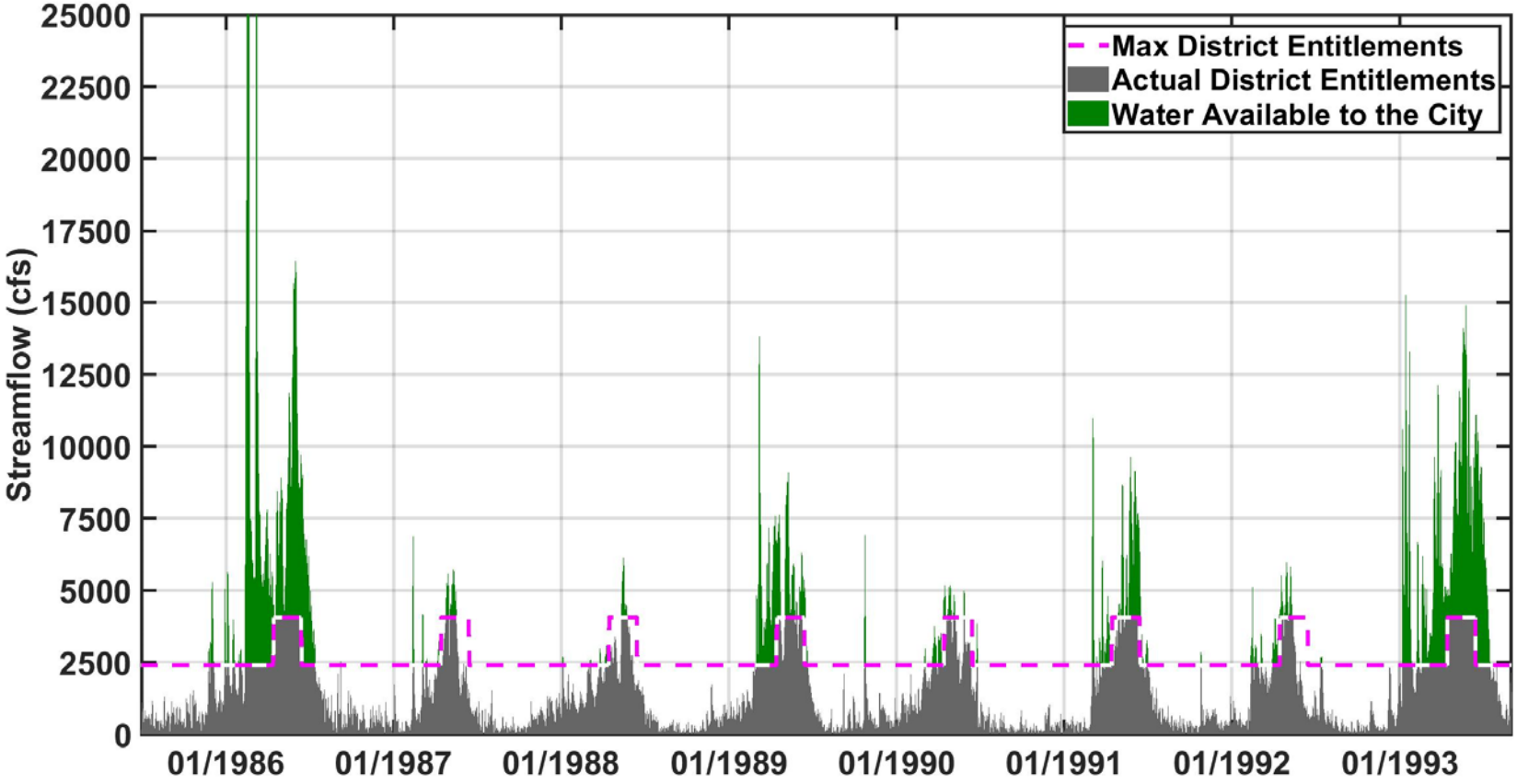



Being storage rich, the SFPUC is well-positioned.

# More precipitation will fall as rain and less as snow, leading to earlier runoff

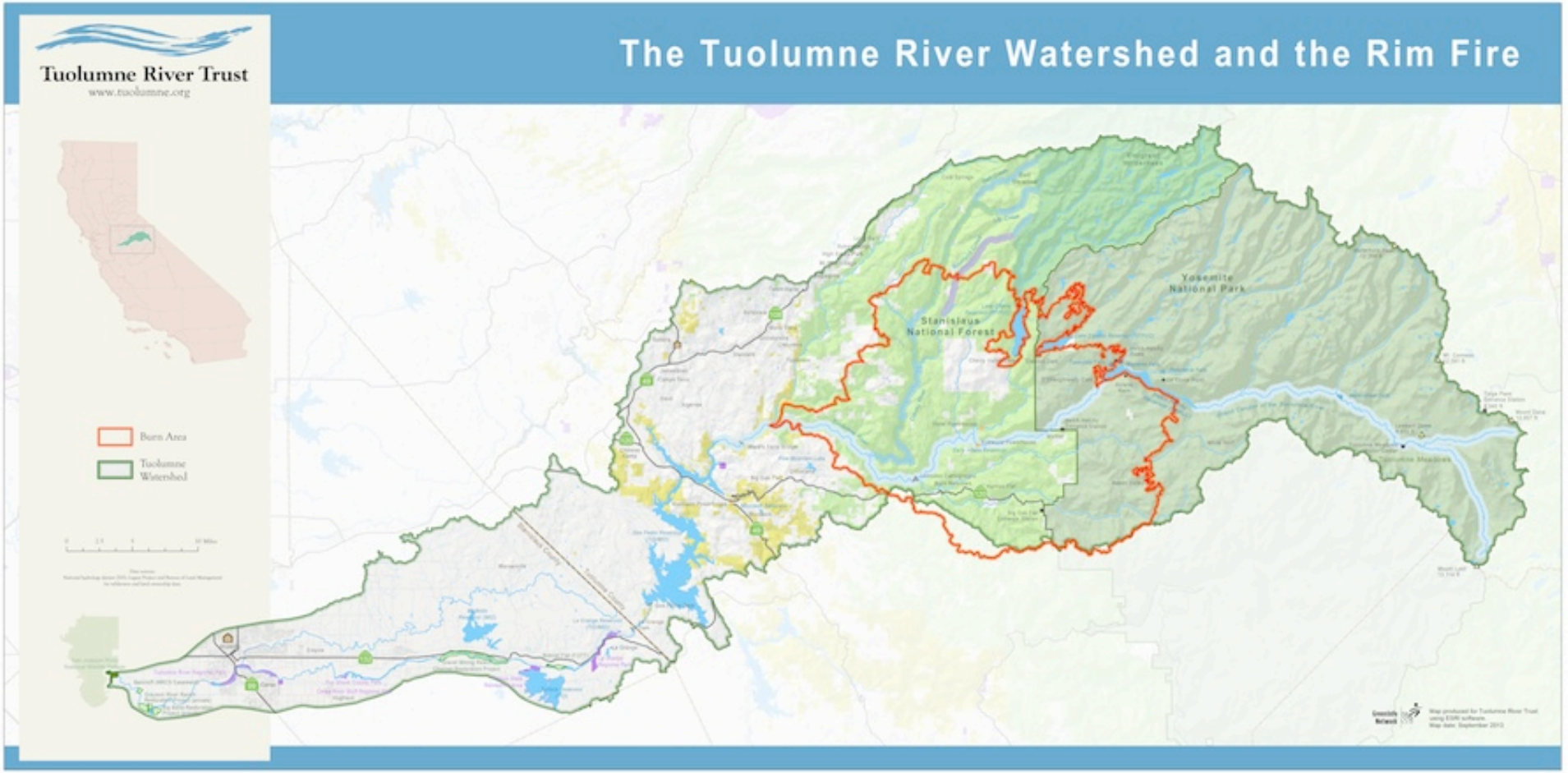

# The SFPUC's water rights could improve




Three week shift in runoff = 217 TAF

# Wildfires will become more common

# Poor forest health will lead to increased runoff

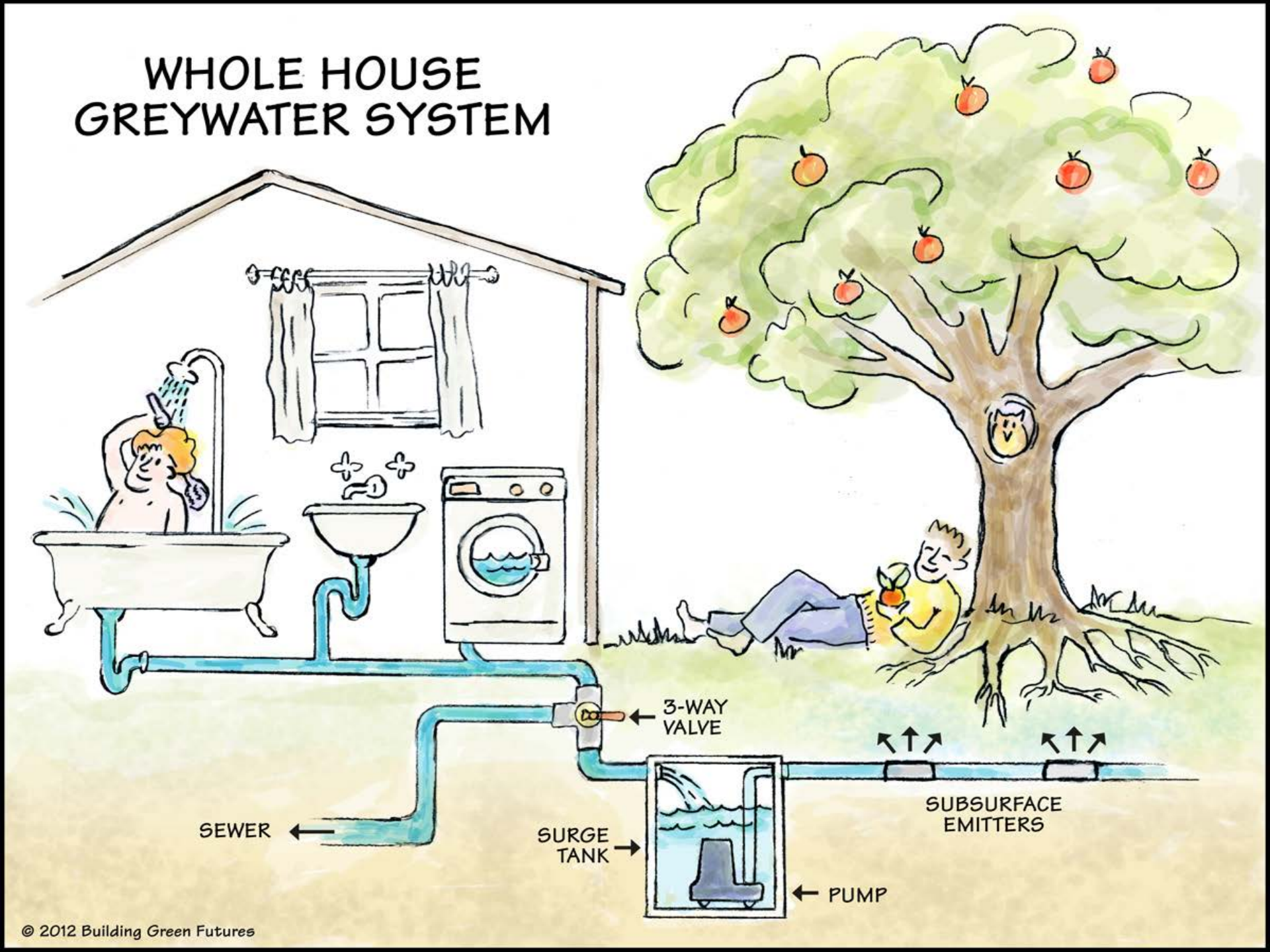



2017 was the second wettest year on record,
but produced the most runoff.

SILICON VALLEY
# WATER CONSERVATION AWARDS


# Climate-appropriate landscaping

# WHOLE HOUSE GREYWATER SYSTEM




RECYCLED WATER
DO NOT DRINK


Recycled
Water
is being used in this
water feature

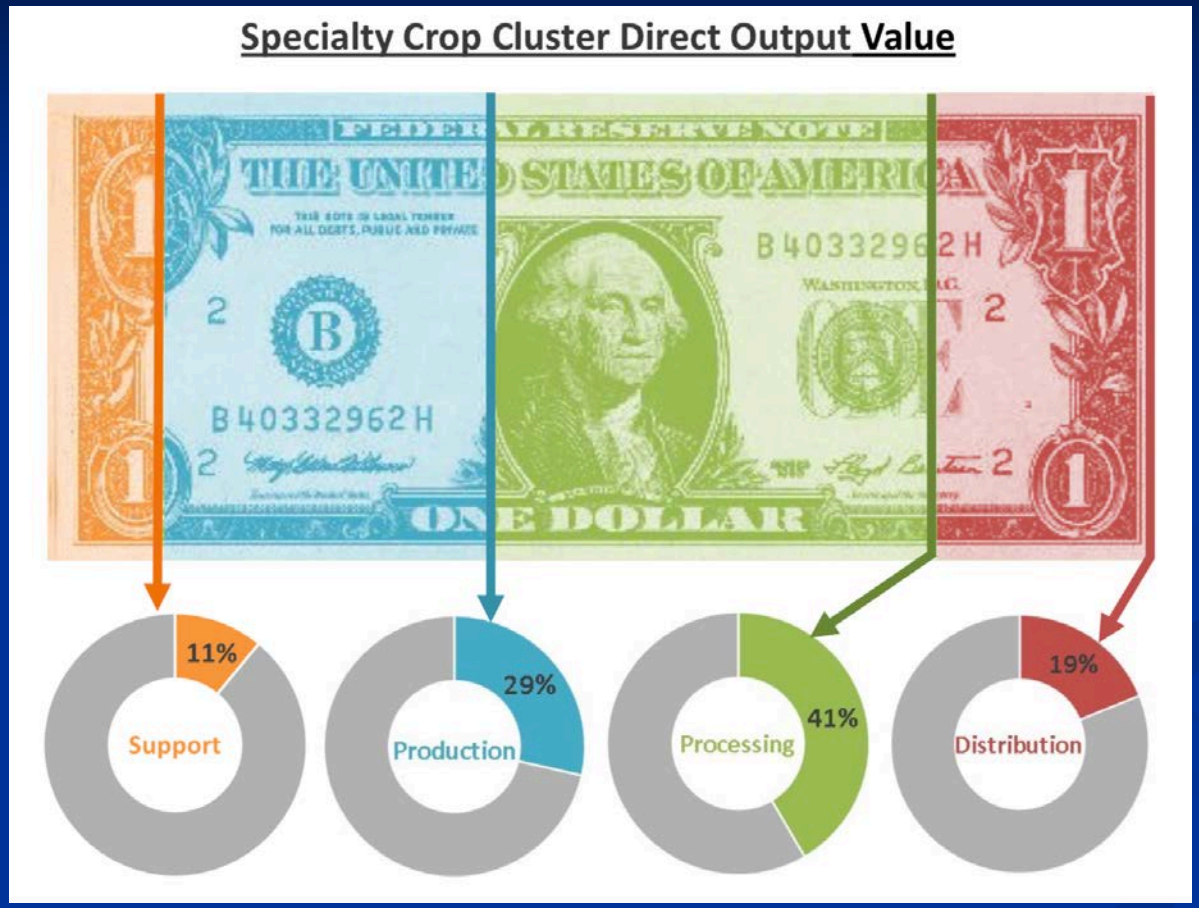

NOTICE
RECYCLED
WATER USED TO
WASH VEHICLES


siliconvalley
ADVANCED WATER
PURIFICATION CENTER
Photo by C. Hearn

# Water-efficient irrigation practices and crop shifting reduce water use

# Water could be purchased from irrigation districts

# What about the multiplier effect?




The value of water for low-value crops is less than $1,000 per acre-foot. BAWSCA member agencies currently pay almost $2,000 per acre-foot.

# Potential Water Savings and Estimated Cost

**Retained Water**

The average amount of water to be retained annually will be between 25,000 and 40,000 acre feet

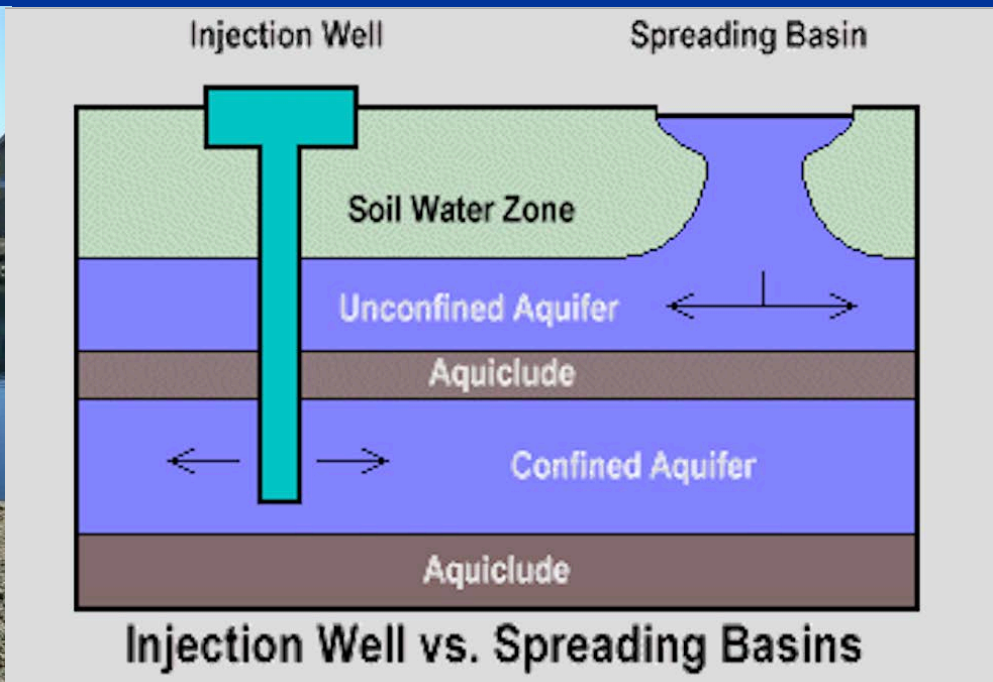
**Cost**

The total estimated cost of all anticipated improvements will be about $115 million

February 2012

Amortized over 20 years = $144-$230 per AF

# The SFPUC could partner with MID/TID to recharge groundwater in wet years and establish a water bank similar to Don Pedro




Injection Well vs. Spreading Basins