# Sierra Club California's Smart Water Alternatives:

## To The Bay Delta Conveyance Project

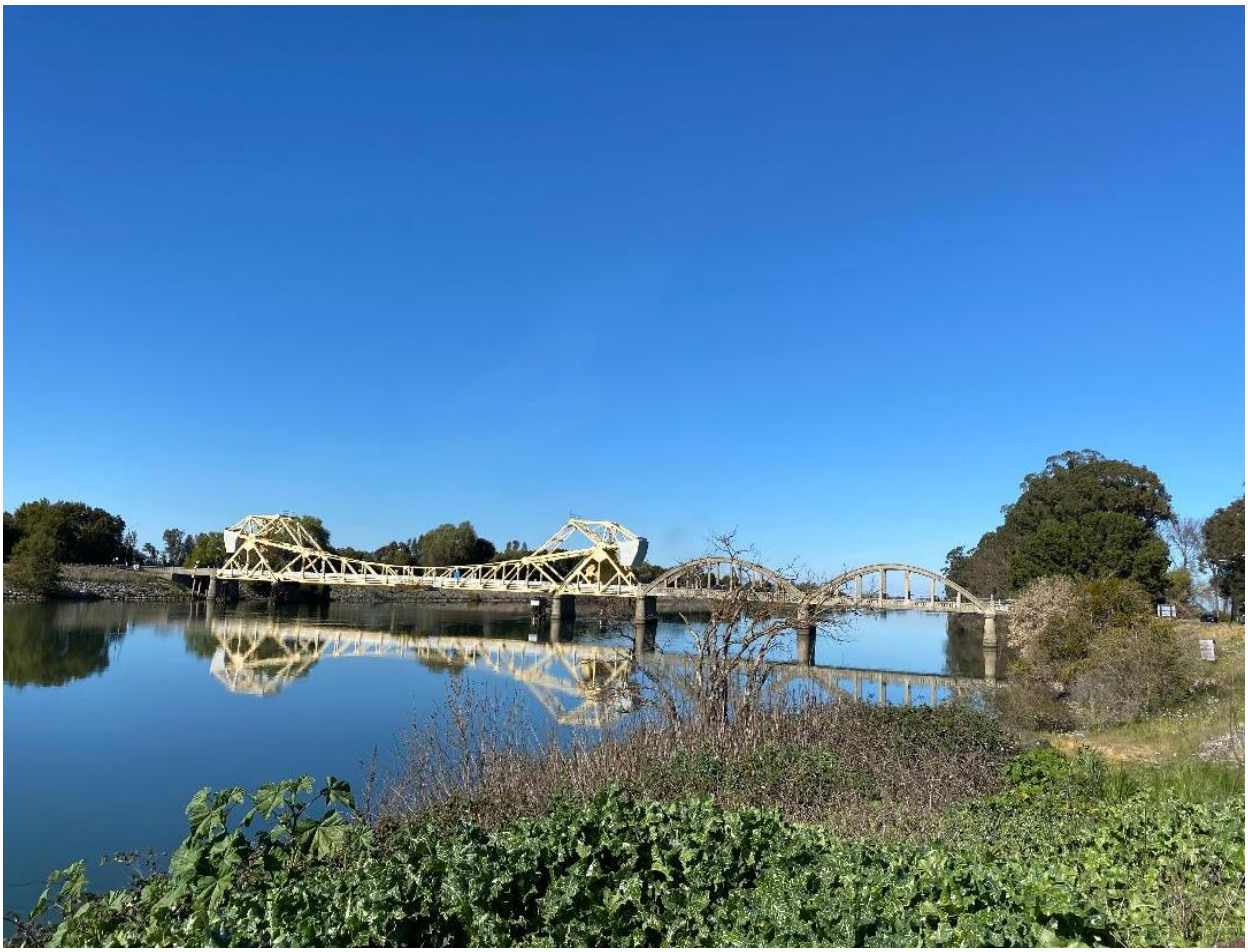

Photo by Molly Culton - Isleton Bridge - The Delta

**William Martin . Heinrich Albert . Charming Evelyn**

December 2022

Sierra Club California Water Committee Volunteers

# INTRODUCTION

California needs a statewide water policy that gives all Californians adequate clean drinking water; respects and protects our rivers, streams, bays and deltas; and supports a sustainable economy. We need an approach that recognizes the water supply and demand challenges that will come with global climate change and population growth. One that offers responsible, cost-effective solutions.

Since passage of legislation in 2009, California's water policy debate has been dominated by the controversy over a proposed tunnel that would divert water from the Sacramento River around the San Francisco Bay Delta for export south. It would accelerate the decline of the largest estuary on the West Coast of the northern hemisphere, a key component in the state's fishing industry and rich wildlife biodiversity. It would do nothing to reverse the damage related to the flow change created by the existing Tracy pumps. It recycles an old idea voters rejected decades ago, during an earlier Brown administration, when they rejected the Peripheral Canal and will burden Californians statewide with the financial and environmental impacts of an unnecessary and costly construction project that ultimately won't fix the state's water problems. The Draft Environmental Impact Report (DEIR) for the most recent tunnel proposal was released in late July 2022.

The Sierra Club opposes the proposed Delta Conveyance/Tunnel. Instead, we believe Californians should pursue a range of strategies that together will sustainably meet water needs while protecting the environment. With this document, Sierra Club California presents alternatives to the Delta Conveyance proposal. The list of alternatives in this document demonstrates that there are reasonable ways to meet California's water demand without diverting more water from the Delta.

## Best Water Management Strategies to Restore the Delta

- Increased agricultural and urban conservation
- Groundwater storage and management
- Increased water reuse
- Stormwater capture

## Potential Water Savings/Additional Supplies from a Portfolio of Resilient Strategies

| Resource Strategy | Water Savings/Supplies (million acre-feet/year) |
|---|---|
| Agriculture Water Use Efficiency | 5.6 - 6.6 |
| Urban Water Use Efficiency | 2.0 - 3.1[1] |
| Recycled Municipal Water | 1.8 - 2.1[1] |
| Stormwater Capture | 0.5 - 3.0[1] |
| Groundwater Storage and Conjunctive Management* | 0.5 - 2.0[2] |
| TOTAL | 10.4 - 16.8 |

This table has been compiled from a 2022 analysis by the Pacific Institute and 2016 analysis by the Department of Water Resources (DWR).

The Sierra Club opposes the more aggressive operation of reservoirs and the Delta pumping plants DWR proposes in order to achieve maximum gains from conjunctive groundwater storage as we believe these gains can be achieved using more sustainable and environmentally-friendly techniques. *

1.The Untapped Potential of California's Urban Water Supply: Water Efficiency, Water Reuse, and Stormwater Capture by Heather Cooley, Anne Thebo, Sonali Abraham, Morgan Shimabuku, Peter Gleick, Sarah Diringer

2. California Department of Water Resources, Conjunctive Management and Groundwater, A Resource Management Strategy of the California Water Plan, July 2016.

## The Delta's Multi-Faceted Role in California

The San Francisco Bay Delta is the freshwater body formed where the Sacramento, San Joaquin and several smaller rivers meet, near the city of Stockton. Snowmelt from the Sierra Nevada Mountain range in Northern California flows down the rivers and through the Delta on the way to the Suisun and San Francisco bays, before emptying into the ocean at the Golden Gate Bridge. The Delta and the two bays constitute the largest natural estuary on the West Coast, covering more than 1,100 square miles, an area about three times the size of the City of San Diego.

The Bay Delta is vital to the California economy. Massive pumps operated by the federal and state water projects near the San Joaquin County town of Tracy deliver water supplies from the Delta to 70 percent of the state's urban population and to much of the intensive agriculture in the southern half of the Great Central Valley.

The Bay Delta ecosystem has collapsed because of excessive water diversions, introduced nonnative invasive species, and water pollution. As water exports out of the Bay Delta have grown, populations of critical fish species that live in or migrate through the Delta have crashed. Since 1990, the amount of water that has been pumped out of the Delta has increased from an average of about 3.0 million acre-feet per year to over 5.2 million acre-feet. (A single acre-foot of water is 325,000 gallons, or enough water to serve two households for a year.) The number of salmon migrating back from the ocean through the Delta to spawn in Northern California rivers plummeted between 1990 and 2010. The commercial salmon season had to be canceled from 2008 to 2010 because there were not enough spawning salmon.

## A History of the 'Now' Delta Conveyance/Tunnel

The California tunnel project's first iteration was the Peripheral Canal and was reintroduced as the Bay Delta Conservation Plan (BDCP). The Department of Water Resources held the first meeting to discuss the BDCP in May of 2006[3], two months after the Emergency Petition to declare the Delta Smelt an endangered species was filed.[4]

3. Bay Delta Conservation Plan Steering Committee. Agenda, May 19, 2016.

4. Center for Biological Diversity, The Bay Institute, and Natural Resources Defense Council. "Emergency Petition to List the Delta Smelt (Hypomesus transpacificus) as an Endangered Species Under the Endangered Species Act," March 8, 2006.

The BDCP was proposed as a comprehensive Habitat Conservation Plan for the Delta which would address the collapse of endangered fish populations.

By November 2007, the steering committee, which included DWR, the Federal Bureau of Reclamation, water agencies, fishery agencies, the California Farm Bureau, and some environmental groups, had agreed on "a dual conveyance system the ultimate acceptability of which will turn on important design, operational and institutional arrangements that the Steering Committee will develop and evaluate through the planning process."[5] In 2009, the Delta Reform Act, which enacted the BDCP planning process into law, came before the legislature and was passed, though strongly opposed by Sierra Club, other environmental organizations and Delta stakeholders.

The BDCP steering committee proposed an enormous new conveyance in 2010, with five 3,000 cubic feet per second intakes in the North Delta, which would feed two 33-foot diameter pressurized tunnels. A draft Environmental Impact Report / Environmental Impact Statement was circulated in 2013. Environmental organizations that had initially supported the project protested the new two tunnels design.[6,7] In 2015, the project was changed to two 40-foot gravity flow tunnels, the number of intakes was reduced to three, and the tunnel alignment was moved to the east. The extensive federal Habitat Conservation Plan component of the project was dropped, and the remaining habitat restoration program[7] was rebranded as EcoRestore.[8]

When Gavin Newsom became Governor in 2019, he declared that a single tunnel was sufficient. The "preferred alternative," as described in the 2022 DEIR, places the tunnel further east than other alignments and reduces the number of intakes. The Sierra Club opposes Governor Newsom's proposal. Also, U.S. Congressmen representing the Delta have introduced legislation in Congress to prevent the tunnel from being approved.

The following sections present our portfolio alternative to the tunnel: increased agricultural and urban conservation, groundwater storage and management, increased water reuse, and stormwater capture.

5. Bay Delta Conservation Plan Steering Committee. "The Bay Delta Conservation Plan: Points of Agreement for Continuing into the Planning Process," Draft, November 16, 2017.

6. John Cain et. al., "NGO letter to Messr.s Laird, Hayes, Meral and Connor," September 30, 2011.

7. CALFED Bay Delta Program, Programmatic Record of Decision, August 28, 2000.

8. Acreage cited in comments by Local Agencies of the North Delta on the 2018 Draft California Water Action Plan Update.

## Alternatives - The Sierra Club California Water Portfolio

Our alternative plan proposes managing supplies in a way that sustains beneficial uses, including environmental uses, and safeguarding the water needs of the natural environment while avoiding hardship to humans due to shortages. A diverse water portfolio helps solve California's serious environmental and social problems:

- Harmful algal blooms throughout the Bay-Delta Estuary
- Inequity in water rights and availability of clean water
- Harm to endangered species such as chinook salmon and Delta smelt
- Socioeconomic harm to the Delta communities most affected by tunnel construction and operation

## Agricultural Water Conservation

Photo: USDA ERS

Water conservation in agriculture is crucial to reducing water consumption in California since agricultural water use represents about 80% of total annual human water use.[9] To avoid further diversions of water from the Bay Delta and its watersheds, new management systems and investment are required. Thanks to improved irrigation techniques, agricultural water use efficiency increased for most crops in California between 2001 and 2010, according to estimates by the UC Davis Water Management Research Laboratory.[10]

9. Jeff Mount and Ellen Hanak. "Just the Facts: Water Use in California," Public Policy Institute of California, July 2016

10. Samuel Sandoval-Solis, Ph.D., et. al. Spatial Analysis of Application Efficiencies in Irrigation for the State of California Water Management Research Laboratory, UC Davis, June 2013

Even though water efficiency has increased, water savings are still being directed towards agricultural production and more needs to be done to return water savings to the environment.

***Price irrigation water to incentivize water conservation***: Irrigation water supplied by public infrastructure is often very cheap, far below market prices. This enables wasteful use and puts environmentally responsible growers that invest in modern irrigation systems at a competitive disadvantage.[11] Public agencies that supply irrigation water must charge market prices to make crop irrigation sustainable.

***End irrigation subsidies that incentivize unsustainable cropping decisions:*** Low value crops (e.g. Alfalfa and other forage) that require large amounts of water continue to make up a large fraction of California acreage.[12] Alfalfa and other hay crops use about 10% of all irrigation water.[13] Crops like this are profitable only if water is very cheap. As public agencies that deliver irrigation water do so at an unsustainably low price, this constitutes a major subsidy to agribusiness and promotes cropping decisions that would not be made if irrigation water was priced at market rates.[14] Water prices that reflect market value and the true costs of public water infrastructure could encourage selection of more water efficient crops. In addition, winter crops (e.g., winter wheat) that require very little irrigation water would become more attractive in the face of quantity-limited or expensive irrigation water.[15]

***Increase irrigation efficiency***: Flood and furrow remain the predominant irrigation methods, accounting for 43% of all irrigated acres.[16] However, adoption of drip and micro-irrigation systems has been spreading rapidly, accounting for 39% of irrigated acres. This shift can be attributed partly to federal assistance mechanisms – farmers can benefit from a 50% discount on drip irrigation systems – and partly to the higher efficiency of new irrigation systems. Using these systems can result in increases in efficiency of applied water, from 10% to 20% or more.[17,18]

11. MacKenzie Elmer. These Imperial Valley Farmers Want to Pay More for Their Colorado River Water. Voice of San Diego, 5 Dec. 2022

12. California Department of Food and Agriculture. "Statistics Review 2020-2021"

13. Renee Johnson and Betsy Cody, California Agricultural Production and Irrigated Water Use, Congressional Research Service, June 30, 2015.

14. Ellen Bruno. "Pricing groundwater will help solve California's water problems." Knowable Magazine 12 Oct. 2022.

15.Caitlin Petersen , et. al. "Exploring the Potential for Water-Limited Agriculture in the San Joaquin Valley" Public Policy Institute of California, July 2022

16. Renee Johnson and Betsy Cody, California Agricultural Production and Irrigated Water Use, Congressional Research Service, June 30, 2015.

17. Samuel Sandoval-Solis, Ph.D., et. al. Op. cit.

18. United States Environmental Protection Agency, Water Efficiency Management Guide Landscaping and Irrigation, November 2017. Available at. 19. https://www.greenbuildermedia.com/hubfs/Documents/Irrigation_Study.pdf.

But the impacts on local groundwater basins must be carefully evaluated before implementing high-efficiency irrigation systems, as they can have detrimental impacts on groundwater recharge and can result in greater overall water use.[19]

***Employ soil management***: The Pacific Institute identifies irrigation technology, irrigation scheduling and regulated deficit irrigation for specific crops as the main water-saving practices in agriculture.[20] However, soil management techniques such as mulching, rotational grazing, cover crops integration, and conservation tillage,[21,22] not only provide significant water savings due to reduced evaporation, they also sequester and store carbon in the soil. Selecting water-efficient crops in arid regions over water-intensive ones is increasingly important as evapotranspiration rates increase due to climate change.

***Upgrade agricultural water district infrastructure:*** To boost water savings, capital investments need to be directed towards upgrading the infrastructure of agricultural water districts. In a district like the Oakdale Irrigation District, in which annual water losses amount to 100,000 acre-feet per year (AFY), with 45-55% of these coming from on-farm losses, reducing water spills by 75% could save 15,000 AFY of water.[23]

***Shift land uses:*** Another way to increase water efficiency in agriculture would be reclaiming and retiring degraded lands on the western side of the San Joaquin Valley to repurpose them for more sustainable uses. Partial or complete fallowing of degraded fields holds a high potential for water conservation. A comprehensive study in 1990 projected a total of 1,000,000 drainage impaired acres of land on the western side of the San Joaquin Valley by 2000.[24] Drainage impaired land has been going out of production. Westlands Water District reported 89,000 acres of retired land in 2006.[25]

20. Heather Cooley et. al., *Agricultural Water Conservation and Efficiency Potential in California*, Pacific Institute and Natural Resources Defense Council, June 2014.

21.Jeffrey P. Mitchell et. al., "No-tillage and high-residue practices reduce soil water evaporation," *California Agriculture* 66(2):55-61.

22.D.G. Sullivan et. al., "Potential impact of conservation tillage on conserving water resources in Georgia," Journal of Soil and Water Conservation, May/June 2007 vol. 62 no. 3 145-152.

23.Deanna Wulff, "California's Choices: Two Big Expensive Tunnels or Just Better Water Management," Bilingual Weekly, March 6, 2012.

24.A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley : Final Report of the San Joaquin Valley Drainage Program. U.S. Department of the Interior and California Natural Resources Agency, 1990.

24.A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley : Final Report of the San Joaquin Valley Drainage Program. U.S. Department of the Interior and California Natural Resources Agency, 1990.

25. Tom Birmingham, Testimony before the House Committee on Natural Resources, Subcommittee on Water and Power, September 21, 2006

The Department of Land Conservation's most recent report found a further net reduction of 276,000 irrigated acres of land in the San Joaquin Valley between 2006 and 2012[26] and a further reduction of almost 71,000 irrigated acres between 2012 and 2014.[27] A consortium of entities could consider buying more drainage-impaired acres of land – and associated water rights. Given its location, adjacent to major interties to the state electrical grid, the land could be used for the development of solar farms.

***Assess and manage water transfers***: Further legislative efforts should be made to establish and enforce rules and regulations aimed at assessing the environmental and economic impacts of water transfers. Transfers of water from one agricultural district to another (for example from Sacramento Valley to San Joaquin Valley) particularly deserve scrutiny during drought periods, while transfers from agricultural districts to urban agencies should be consistent with regional plans.

## Urban Water Conservation

The least expensive, least energy -intensive, and most environmental way to reduce water use is through conservation and public education. With existing technology as well as new landscaping, plumbing, metering, and green building ordinances, water savings in urban areas has increased over the years but we can still do more. The Pacific Institute states that with current technology only, California has the means to save between 2.0 and 3.1 million AFY through urban conservation.[28] Additionally, water efficiency appliances along with conservation contribute to not just water savings but energy savings water affordability, particularly for under-resourced communities. More effort should be made to include renters in water efficiency benefits.

***Limit landscaping water use***: On average, outdoor water uses accounts for about half of the water consumed in urban areas in the state. In areas such as Los Angeles, that amount increases to around 70%. Since most water use occurs outdoors, there's the potential for even greater water savings there. Water agencies should promote the use of soil-moisture based irrigation systems as well as regionally appropriate native plants. In July 2015, California's governor signed The Model Efficient Landscape Ordinance (MWELO) into law to reduce water use for new landscaping projects with more than 500 square feet of irrigated area, as well as

26. California Department of Conservation, Division of Land Resource Protection, California Farmland Conversion Report, 2015, p. 24

27. California Department of Conservation, Division of Land Resource Protection, *2014-2016 Farmland Conversion Report.*

28. The Untapped Potential of California's Urban Water Supply: Water Efficiency, Water Reuse, and Stormwater Capture, April 2022

landscape renovations greater than 2,500 square feet. Implementation of the new laws have been left to county and local government agencies and enforcement varies throughout the state. The legislature should revisit the existing program and determine if changes are required to ensure it applies to all areas of the state and that it reaches the maximum water savings.

***Capture rainwater*:** Rainwater capture reduces the reliance on potable water for landscaping needs and provides a recharge benefit to underlying groundwater aquifers. While legislation has made it easier and more cost effective to increase rainwater capture,[29] more needs to be done to encourage and help homeowners install rainwater capture systems. Collecting the first quarter inch of rain from a 1,000 square foot roof can produce as many as 150 gallons. If all of the approximately 3.5 million housing units in Los Angeles were to install just one single rain barrel, the city could save approximately 590 AFY of water.

***Reuse greywater:*** Greywater is primarily the byproduct of household water used for washing. This includes water from sinks, showers, bathtubs, and washing machines. With a greywater system, homeowners could reuse up to 80% of this water to irrigate plants and trees within their property, saving up to 50,000 gallons a year.[30] While the permitting process for greywater has been streamlined, interpretation of the codes is often left to individual inspectors. Continued education and resources could lead to greater implementation and water savings.

***Fix aging infrastructure***: A 2016 Validated Water Audit Data of California Water Utilities states: California water utilities distribute more than 1.2 trillion gallons of water a year to residents (equal to about a fifth of agricultural use), according to government data.[31] At least 7 percent of residential accessed water—or at least 84 billion gallons—is lost to known leaks. [32] If recovered this could provide water for 4 million Californians on an annual basis.[33] In Los Angeles alone, water officials estimate that almost 25 thousand AFY of water is lost to leaky pipes, firefighting, evaporation, theft and other unaccounted losses.[34]

29. In 2012, the Rainwater Recapture Act allowed residential users, and other private and public entities, to capture and use rainwater harvested from rooftops. In 2018, California Proposition 72 allowed Rainwater Capture systems to be added to the value of the home yet be excluded from property tax assessments.

30. Lucy Allen, Juliet Christian-Smith, and Meena Palaniappan, Overview of Greywater Reuse: The Potential of Greywater Systems to Aid Sustainable Water Management, The Pacific Institute, November 2010.

31. United State Geological Survey, **"Estimated Use of Water in the United States County-Level Data for 2015,** ScienceBase-Catalog.

32. With the 7 percent water loss estimated by a sample of 268 water utilities by Kunkel Water Efficiency Consulting, 2018. *Report on the Evaluations of 2016 Validated Water Audit Data of California Water Utilities*. Philadelphia, Penn.: Kunkel Water Efficiency Consulting, April, p. 7.

33.American Society of Civil Engineers, 2017 Infrastructure Report Card

34.Ben Poston and Matt Steven, "L.A.'s aging water pipes; a $1-billion dilemma," Los Angeles Times, February 6, 2015

The Bipartisan Infrastructure Law via the U. S. Environmental Protection Agency allocated $609 million in capitalization grants to California for water infrastructure improvements in 2022. Many leaks go undetected and unreported, though technology is available for early detection. Water districts may be reluctant to find leaks because California law requires districts to report leaks they find and then repair those with water losses greater than "acceptable" loss levels.[35]

***Desalinate brackish groundwater:*** The opportunities are great for providing water supply from brackish groundwater desalination as well as recovering contaminated groundwater. Brackish water desalination can be used to help relieve drought conditions, replace water lost from other sources, and replace water that can be used for river and stream ecosystem restoration. Although most estimate that brackish groundwater desalination will contribute less than 10% of the total water supply needs in California, this still represents a significant portion of the state's water supply portfolio.[36] Currently, there are more than 24 inland brackish water desalination plants in California and more coming online every year. Additional focus should be placed on brackish water desalination as it is generally cheaper and much less energy intensive than ocean water desalination. Newer projects in Antioch (6 million gallons per day or MGD),[37] Camarillo (3.4 MGD)[38] and Los Angeles (WRD 18 MGD)[39] will be adding to California's water portfolio.

## Water Reuse and Recycling

By investing in the infrastructure to maximize the amount of recycled water generated and reused while planning for the future of direct potable reuse (DPR), we can increase local water supply significantly, which promotes self-reliance and resiliency. Section 13561.2 of the California Water Code states: On or before December 31, 2023, the state board shall adopt uniform water recycling criteria[40] for direct potable reuse through raw water augmentation. With expected DPR legislation coming in 2023, many cities/water agencies are investing in Pure Water Facilities. The largest of these is a joint partnership between Metropolitan Water District

35.California Leaking: People, Pipes, and Prices By John McKenzie and Richard B. McKenzie

36. Heather Cooley and Rapichan Phurisamban, The Cost of Alternative Water Supply Efficiency Options, Pacific Institute, October 13, 2016.

37. Antioch Brackish Water Desalination Project

38. Brian J Varela, Ventura county Star, November 30, 2021 Camarillo's next wave of water unveiled with long-awaited desalter facility

39. Water Replenishment District's Regional Brackish Reclamation Project

40. National Water Research Institute: California state Water Board division of Drinking Water, Memorandum of Findings Expert Panel Preliminary Findings and Recommendations on Draft DPR Criteria , June 23, 2022

and Los Angeles County Sanitation District, which will produce 150 MGD when completed and provide purified water for up to 15 million people.[41] San Diego's, when completed, will produce 87 MGD.[42]

The 2019 proposed amendment to the State's Recycled Water Policy aims to "increase the use of recycled water...to 1.5 million AFY by 2020 and to 2.5 million AFY by 2030."[43] In 2015 the amount of recycled water used in the state was 714,000 AFY, today it is up to 785,000 AFY with an additional 285,000 AFY of treated wastewater reserved for instream flow and other environmental purposes. This increase is significant but is still below the reuse potential. Southern California is home to the state's more prominent reuse initiatives as compared to the rest of the state.

Orange County's Groundwater Replenishment System (OCGWRS) is one of the largest purification systems for indirect potable reuse in the world and is expanding to produce 130, 000 MGD of indirect potable water in 2023.[44] Sanitation Districts of Los Angeles County (SDLAC) has 10 facilities that recycle water, and during the 2020-2021 fiscal year, SDLAC reused 104,162 AFY of 153,150 AFY, which is at 54.5% operating capacity.[45] Additionally, the Inland Empire and San Diego County utilize various programs to introduce recycled water into their water supplies.

To put things into perspective, the 104,162-acre feet of recycled water beneficially used in FY 20-21 by the Los Angeles County Sanitation District (LACSD) is equivalent to the water supply for a population of 62,497,23 nearly the size of the city of Louisville, KY, the 29th largest city in the U.S.[45] The use of locally produced recycled water reduces the need to pump State Project water over the Tehachapi Mountains at a net energy cost of roughly 3,000 kilowatt-hours (kWh) per acre-foot.[45] Thus, over 312 million kWh of electricity were conserved in FY20-21, equivalent to the annual output of a 35.7-megawatt power plant with the energy equivalent of 169,338 barrels of oil. At $0.15/kWh (based on Southern California Edison residential billing rate), this equates to an annual savings of nearly $46.9 million in electricity. At $73.47/barrel, this equates to an annual savings of approximately $12.4 million in oil.[45] For years, tertiary-treated recycled water has been supplied to a number of reuse sites for fire protection

41. Metropolitan Water District's Pure Water Southern California

42. Pure Water San Diego

43. State Water Resources Control Board, Water Quality Control Policy for Recycled Water, 2018.

44. Orange County Water District's GroundWater Replenishment system (GWRS)

45. Los Angeles County Sanitation District's 32nd Annual Status Report on "Recycled Water Use" FY 2020 – 2021

throughout Los Angeles County. At these existing recycled water use sites, as well as some potential use sites, the fire suppression system is tied into the site's primary source of water, whether it is for irrigation or industrial processes, because of storage and gravity flow requirements for firefighting. Therefore, in many of these cases, a separate potable fire service is not physically possible unless the entire reuse site is converted back to using potable water.[46] To abandon the successful use of recycled water and return to using increasingly scarce potable water is not only in direct conflict with the mandate of the State Legislature, which has declared the use of potable water for such non-potable applications to be a "waste" and a violation of the State Constitution, but also in direct conflict with past emergency drought declarations from the Governor's office in 2014, 2015 and 2021.[47]

## Managing Groundwater Sustainably

As noted in the Delta Plan, more than 40% of Californians rely on groundwater for part of their water supply, and many small to moderate-size towns and cities are entirely dependent on groundwater for their drinking water systems. Groundwater is also a critical part of California's water storage.

According to DWR, California's groundwater basins have the capacity to hold somewhere between 850 million and 1.3 billion acre-feet. In comparison, surface storage from all the major reservoirs in California is less than 50 million acre-feet.[48] The state's most significant groundwater use occurs in regions that also rely on water from the Delta watershed, including the San Joaquin Valley, Tulare Lake, Sacramento Valley, Central Coast, and South Coast. The Tulare Lake region alone, in the southern San Joaquin Valley, accounts for more than one-third of the state's total groundwater pumping, according to the Department of Water Resources. [49]

Because of historical groundwater overdraft and resulting land subsidence experienced in these regions, water users switched to using surface water when the Central Valley Project and the State Water Project were completed in the late 1960s. However, groundwater pumping and overdraft became more severe as water demands exceeded available supplies. Satellite imaging published by Jay Famiglietti, of the University of California Center for Hydrologic Modeling, and

46. Los Angeles County Sanitation District': Using Recycled Water For Fire Fighting

47. Los Angeles County Sanitation District': Using Recycled Water For Fire Fighting

48. Source: https://storymaps.arcgis.com/stories/ff075c25b77e4b1d95ce86a82bf0fe96

49.Delta Stewardship Council, Delta Plan, adopted May, 2013

others reveals that the Central Valley lost approximately 25 million acre-feet of stored groundwater during the period of October 2003 to March 2010.[50]

California was one of the last states in the nation to regulate groundwater. Governor Jerry Brown signed major new groundwater management legislation, the Sustainable Groundwater Management Act (SGMA) in September 2014. For the first time in its history, California has a framework for sustainable groundwater management. SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and requires those GSAs to adopt Groundwater Sustainability Plans for crucial groundwater basins in California.

SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. However, the timelines for reaching this new sustainability stretch very far into the future. Under SGMA, the most over-drafted basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline.

The amount of groundwater that is at risk, and could be used more efficiently, is huge. Although the Bay Delta is a major source of water supply for California (approximately five million AFY), the Bay Del-ta supply is less than the amount of groundwater that is pumped by farmers (approximately eight mil-lion AFY). The State Water Board estimates that more than 30% of California's water for agriculture and urban use is pulled from the ground and reliance on groundwater increases to 40% during dry years when surface water supplies shrink.

The Public Policy Institute of California (PPIC) reviewed 36 plans across 11 overdrawn basins in the San Joaquin Valley, California's largest farming region. It found that those plans rely on boosting water supplies to fix more than three-quarters of their groundwater overdraft and use demand management to fix less than a quarter. This is the exact opposite of PPIC's own estimate of what's a reasonable way to solve that region's problems.[51]

We have a crisis building in the state. Groundwater reserves that could be a critically needed resource in times of drought for both farms and urban customers are shrinking. In 2015, DWR reported that groundwater is being depleted at a rate of 2 to 2.5 million AFY[52] though some

50. J.S. Famiglietti et al, "Satellites Measure Recent Rates of Groundwater Depletion in California's Central Valley", Geophysical Research Letters, February 2011.

51. Source: https://knowablemagazine.org/article/food-environment/2022/pricing-groundwater-will-help-solve-california-water-problems

52. California Department of Water Resources, California Water Plan Update 2013

estimates taking a shorter time period (October 2003 through March 2009) into account put the depletion rate much higher, as high as 4.4 million AFY.[53] The problem is especially critical in the San Joaquin Valley. It is estimated that groundwater reserves are shrinking by 2.5 million AFY in the Central Valley. "That is enough water to supply the needs of nearly 22 million people each year," Famiglietti told the Modesto Bee in November 2013.[54] "People need to truly understand groundwater is disappearing …without intervening, that water is not coming back."

The Sierra Club has the following recommendations to improve California's groundwater management:

***Amend the Sustainable Groundwater Management Act (SGMA)***: SGMA should ensure there is equitable representation on GSA Boards. The timeline for compliance must be accelerated. There needs to be a quicker route for the state to step in when a GSA is not performing. And there should be stricter rules regarding when the state turns over the management to the GSA, once the problems have been solved. SGMA also needs to direct the SWRCB to adopt a regulation with mandatory restrictions on pumping in areas with documented subsidence.

***Pass legislation that creates a new framework for aquifer recharge***: Legislation needs to direct funding to areas with greatest capacity to recharge aquifers used for domestic and environmental protection purposes. It should require funding awards to be contingent upon groundwater management operations that do not perpetuate damaging pumping levels. Require enforceable intergovernmental agreements that prevent GSAs that manage "sub-basins" from operating in ways that thwart achieving aquifer-wide sustainability and equity goals. Codify that the State Water Board's public trust responsibilities extend to groundwater management.

***Adopt new regulations for administration of groundwater basins:*** New regulations are needed to prioritize management on behalf of domestic well users, small farmers, and groundwater dependent ecosystems. There should be clear timelines for reducing unsustainable extractions and create meaningful penalties for violating those timelines. Regulations need to **prohibit privatization of recharge projects,** including prohibition of conjunctive use recharge projects designed to integrate Sacramento Valley aquifers into the Central Valley wide water supply system.

53. Peter Gleick, Stealing Water from the Future – California's Massive Groundwater Overdraft Newly Revealed, Circle of Blue Water News, December 16, 2009,

54. J.N. Sbranti, "Groundwater levels falling at alarming rate while lawmakers decide what to do," Modesto Bee, November 9, 2013

## Impact of Climate Change

One of the predictions about climate change is that California will get more rain overall, but this rain will be less evenly distributed over time.[55] There will be more intense storms with big rainfall years, and longer, more severe droughts. We're already beginning to see this change. One of the worst California droughts and the four biggest rainfall years post-1900 have all occurred since 1980.[56] Our water management and water use will have to change in response.

A key change will be the restoration of our groundwater reserves, which provide crucial supplies in drought, and are a day-to-day water source for many, particularly in disadvantaged Central Valley communities. To do this, we must accelerate the implementation of SGMA and aim for an increase in the current levels of groundwater, not just the avoidance of undesirable results compared against a degraded baseline.

Once our groundwater basins are managed so that no single individual or corporation is able to exploit them, we can ramp up efforts to restore our groundwater with the water from big rainfall years that climate change will bring.

## Financing

A white paper on alternatives to the Delta tunnel proposal would be remiss if it did not address alternative ways to spend the huge amount of money it will take to build the tunnel. The only official estimate, a cost of approximately $17 billion in 2016[57] is completely out of date. First, the current project is different. Second, inflation is now running much higher than it was when the last cost estimate was generated, especially in the construction industry.

A key issue in financing this project is that it will not produce one drop of new water. It will only, at best, facilitate the conveyance of water around the Delta which is currently conveyed through the Delta. Every one of the alternative approaches discussed above has the potential to add some new amount of water to California's portfolio of sources. The Sierra Club believes that it is in the best interests of the state to examine the costs and benefits of implementing the above strategies, versus the costs and benefits of the proposed Delta tunnel.

55. U.C. Riverside, "Global warming, El Niño could cause wetter winters, drier conditions in other months," AAAS Eureka Alert, September 4, 2018

56. NOAA National Centers for Environmental Information data mapper

57. Mariah, Restore The Delta, August 30, 2017, California WaterFix: The Real Costs, Choices and Criticisms

***Focus on smaller scale projects***: Spending the state's precious treasure on projects which increase the total amount of water is the more prudent approach. Advantages to small projects:

- ➢ The size of each project.
- ➢ Less time elapsing until implementation.
- ➢ Lower costs because short-term financing costs are typically lower than longer-term.
- ➢ Shorter time frames and less complexity, leading to fewer cost overruns and more accurate estimating.
- ➢ Frequently provides more local jobs and greater local economic benefits dispersed around the state

All of the alternatives listed have real-world examples currently operating today, thus providing a robust data set for implementation and operation that does not exist for the Delta tunnel proposal.

California's water managers need to **abandon** their "tunnel vision" and instead focus on all of the ways the state can improve its use of nature's bounty. Spending untold billions on a huge project which does not produce one drop of new water, but **does create irreparable environmental and socio-economic harm,** is a waste of everyone's dollars, no matter who is paying for it.

The State should determine the cost per acre-foot per year to produce the new water from each specific source.

- ➢ ***Brackish water desalination*** **-** The City of Antioch[58] has begun the construction of a brackish water desalination plant. The results of their bidding process could provide an estimate for the construction cost of the reclaimed water per acre-foot.
- ➢ ***Urban water recycling*** **-** The City of San Diego[59] invested in a substantial water recycling project of which Phase 1 is now under construction. Since June 2011, the city has produced 1 million gallons of purified water every day at its Pure Water Demonstration Facility.[60] Actual construction and operational costs are available, allowing finance experts to calculate the cost of the new water source per acre-foot.

58. Antioch Brackish Desalination Project

59. City of San Diego: Pure Water San Diego

60. City of San Diego: Pure Water San Diego Program Fact Sheet

- ***Fixing aging infrastructure*** - Every leak fixed is a new source of water, but will require investment. Cost per leak will vary significantly, but it is possible to estimate averages for agricultural and urban repairs.
- ***Stormwater capture -*** The County of Los Angeles has embarked on an ambitious plan, The Safe Clean Water Program[61] which could be used as a model for other counties.
- ***Conservation*** - Substantial research exists for what it has cost urban areas to reduce their per capita water consumption. Efficient fixtures never use more water once installed, and the replacement costs are low compared to the long-term water savings generated.
- ***Funding opportunities through U.S. government programs*** - Water reuse and recycling programs funded by the U.S. Bureau of Reclamation is one example.

## In Conclusion

Notably, these local and regional approaches to improve water efficiency and conservation create good jobs. In a 2011 report, the Economic Roundtable estimated that water efficiency measures in Los Angeles creates more jobs per million dollars invested than either motion picture and video production or housing construction.

The State of California already acknowledges the feasibility of these conservation programs. However, the political will to fund and implement them on a wide scale throughout the state is lacking. As noted in the 2013 Delta Plan, adopted by the Delta Stewardship Council, the Department of Water Resources estimates that the state could reduce water demand and increase water supplies in the range of five to ten million acre-feet per year by 2030 through the use of existing strategies and technologies If the state developed only half this water (about five million acre feet) through water efficiency and new local supplies, it would be sufficient to support the addition of almost 30 million residents, more than the population growth that is expected to occur by 2050. This means that water savings from water reclamation and other programs yields approximately as much "new water" savings as is currently exported from the Bay Delta.

California's water supply problems can be addressed without building the Delta Conveyance.

61. Los Angeles County's Safe Clean Water Program (Measure W)

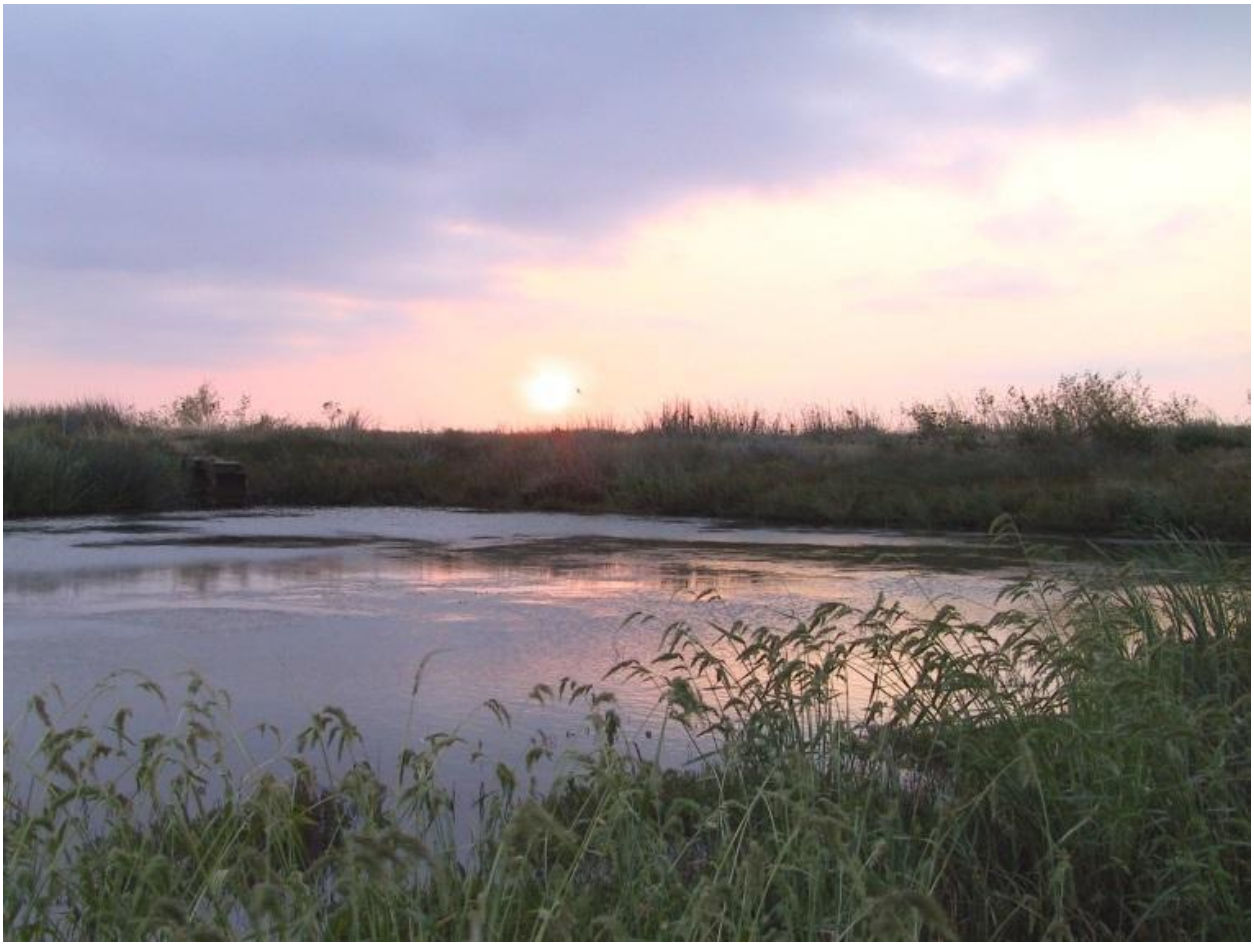

Photo: CA Department of Fish and Wildlife