WATERFIX: MYTH VERSUS FACT!

MYTH	FACT
1. *The Delta tunnels will protect California's water supply from earthquakes.*	The threat to the Delta is minimal compared to other parts of the state. It has no major faults within 60 miles. The 2014 Napa quake (6.0 magnitude) caused no levee damage in the Delta. San Luis Reservoir crosses an active fault, and the California Aqueduct crosses the San Andreas Fault north of Los Angeles, and are at far more seismic risk.
2. *The Delta Tunnels solve sea level rise and salt water intrusion to the State's water supply.*	Climate change bodes reduced river flows to the Delta and San Francisco Bay with increased and prolonged drought. Tunnels will not be used 52% of the time, during dry periods, when water is pumped from existing facilities. The tunnels north Delta intakes would see more salt water intrusion from lower flows and rising sea levels—increasing Delta exports would worsen the problem. Four million people live in Delta region, and levee upgrades will still be necessary.
3. *The Delta Tunnels would increase water supply reliability for southern California.*	The water source for the Tunnels is snowpack and reservoirs which are vulnerable to droughts and floods, both of which will increase as our climate changes. Real water supply reliability means greater commitment to floodplain restoration and management, conservation, regional self-sufficiency, recycling, and other sources less vulnerable to drought and flood resilient.
4. *The Tunnels would take most water during wet years and seasons, and only small amounts in dry or drought years.*	The kernel of truth here is to divert as much flood flow as possible to storage south of the Delta using the Tunnels, so that diversions during drought are minimized to protect water quality and ecosystems in the Delta. Trouble is, climate change poses the problem of whether high flows can be captured without sedimentation for a big supply gulp, or if water diverted and stored for later supply can outlast the duration of future droughts. This means the Tunnels are an expensive, flood-and-drought-vulnerable investment.
5. *The Delta Tunnels would cost $17 billion (2017 $'s according to MWD) and are affordable to its beneficiaries.*	The $17 billion cost figure does not include operation & maintenance; debt service; depending on interest charges, debt service would add another $40 billion over the next 30 years to what Delta importing customers would have to pay. Paying more for the same or less water does not make economic sense. Cost estimate also omits cost-overruns, which can double or triple project cost.
6. *Delta Tunnels northern intakes would increase flexibility of when and where to take water from the Delta, while meeting ecological, fish and water quality standards.*	Tunnels construction would take 14 years, with major disruptions to Delta river channels, levee roads and traffic, air quality, farm economies, and community life. (Greenhouse gas emissions will be equivalent to 600,000 new cars on the road; purchasing carbon sequestration credits elsewhere will not mitigate pollution for Delta residents.) The new intakes would add new places in Delta channels where fish could get sucked into pumps or impaled on fish screens (new reverse flows), would further export food supplies from starving, endangered fish, and would reduce water supplies for farms, resulting in job loss.
7. *Only beneficiary water agencies and their customers will pay for the Tunnels.*	A suppressed 2015 cost study stated that taxpayer subsidies would be needed to fund agribusiness participation in the Tunnels. Silicon Valley and urban southern California will wind up subsidizing Stewart Resnick's almond and pistachio empire and the Westlands Water District. In normal water years, industrial agriculture uses 70% of the water exported from the Delta. The creation of a Joint Powers Authority (JPA) lends a hand to Trump-endorsed public-private partnerships that will ultimately commodify water to benefit corporate interests south of the Delta.
8. *Beneficiaries who pay will get the water.*	No one really knows for sure who pays and who will get water delivered by the Tunnels, but there are the "usual suspects": the corporate customers of Metropolitan Water District and its members, Westlands Water District, Kern County Water Agency, and the Santa Clara Valley Water District (Silicon Valley's water agency). The Tunnels may be used no more than about half the time, while their costs must be continually paid for regardless. Governor Brown wants water agencies to belly up to the bar by this September, or...?

THE PROBLEM:

1. **OUR INFRASTRUCTURE IS FAILING.**
2. **CLIMATE SCIENTISTS TELL US THAT EXTREME DROUGHTS AND FLOODS ARE THE NEW NORMAL FOR CALIFORNIA.**
3. **THE SAN FRANCISCO BAY-DELTA ESTUARY IS COLLAPSING AND THE WEST COAST'S HISTORIC FISH SPECIES AND INDUSTRIES ARE HEADED TOWARD EXTINCTION DUE TO EXCESSIVE WATER EXPORTS FROM THE DELTA.**

THE SOLUTION:

We can address these problems by not building the $17 billion Delta Tunnels and redirecting those funds to dozens of local projects that create long-term local/regional self-sufficiency and good, long-term jobs.

The California Natural Resources Agency created a California Water Action Plan that has many good, noncontroversial projects in it, but neither the Agency nor Governor Brown prioritize:

- needed flood control projects which can help restore groundwater basins and improve supplies.
- a multitude of small projects needed in California to improve and augment regional self-sufficiency.
- the 678 dams in need of repair to sustain our present water supply.
- upgrading water mains to eliminate leaks and increase our urban water supply by 15 percent.
- floodplain restoration to protect the lives and property of present and future Californians.

When asked about alternatives to the Delta Tunnels in 2015, Governor Jerry Brown said, "I don't think there is a Plan B."

THEN CAME OROVILLE DAM.

Nearly 200,000 Californians displaced for two days wondered if they would have homes and communities to go back to in the Sacramento Valley if Oroville spillway and dam failed. The crisis was a warning to all of us in California: Our existing water infrastructure has fallen into a dangerous state of disrepair.

THERE IS A PLAN B: THE CALIFORNIA SUSTAINABLE WATER PLAN

JOBS: Developing regional self-reliance is the best way to provide a more reliable water supply. This requires investment in water conservation, maximizing wastewater re-use and groundwater recharge, while capturing storm water and rainwater, gray water, and fixing leaky local pipes. Cleaning up polluted aquifers and providing jobs for local water makes good economic sense. Southern California labor units have expressed interest in mass deployment of gray water systems; workers are ready for these investments.

RE-USE AND RECYCLING: Two-thirds of the reuse potential is in coastal areas where wastewater is discharged into the Pacific Ocean or into streams draining to the ocean.

CONSERVATION AND EFFICIENCY: "Make conservation a California way of life," said the California Water Action Plan in 2014. There are many strategies, large and small, to achieve this. Urban and agricultural water conservation, floodplain restoration, and toxic farmland retirement are all good starts.

STORMWATER CAPTURE: Stormwater runoff from impervious surfaces in urban and suburban areas can be captured to increase California's water supplies dramatically—WHEREVER RAIN FALLS.

FOR MORE INFORMATION: The California Sustainable Water Plan 2017, bit.ly/cswp2017

THIS JUST IN ... Westlands Water District Issues Statement on California WaterFix

September 20, 2017 Maven Breaking News

From the Westlands Water District:

Westlands Water District After a thorough analysis by independent consultants and District staff, multiple special board meetings, and grower workshops, the Westlands Water District Board of Directors voted by a margin of 7 to 1 to not participate in the California WaterFix (CWF). The District appreciates the efforts of Governor Jerry Brown and his administration to balance the interests of many. Indeed, over the last twelve months the State administration worked diligently to define a viable project, but from Westlands' perspective, the project is not financially viable.

Westlands' principal source of water is the Central Valley Project, a project operated by the United States Bureau of Reclamation. The CVP is integrated both operationally and financially. However, under the "participation approach" announced by Reclamation for CWF, only CVP contractors that chose to participate in CWF would pay the costs of constructing and operating new facilities, with no assurance that those contractors would receive the water supply benefits resulting from CWF.

Westlands supported the development of CWF and has invested considerable financial resources, time, and expertise into its planning, but consistently stated that it would not obligate the farmers it serves to billions of dollars in debt without reasonable assurances that the project would produce reliable, affordable water supplies. The District recognizes that solving Delta conveyance issues is critical to ensuring reliable water supplies to support the economy of the State, but it cannot support a project that would make water supplies for its farmers unaffordable.

Westlands Water District is the largest agricultural water district in the United States, made up of more than 1,000 square miles of prime farmland in western Fresno and Kings Counties. Under federal contracts, Westlands provides water to 700 family-owned farms that average 875 acres in size.

San Jose Mercury News-September 30, 2017

Opinion: Delta farmers, not WaterFix tunnels, are our best climate change defense

By: Barbara Barrigan-Parrilla

California's wetlands function as the state's environmental liver. Without them, the planet has no natural defense system against greenhouse gas emissions.

- **East Bay water board backs Delta tunnels project**

Such a service performed by nature does not cost us humans a dime. As climate change-induced storm and drought events continue to wreak havoc across the country, our state can use all the natural and human defenses it can muster.

Jerry Meral, former director of the Bay Delta Conservation Plan—the official name for the Delta Tunnels before its rebranding as "California WaterFix"—urges the public to "help Delta farmers help themselves" by sacrificing their economically and ecologically productive Delta Islands for a "carbon sink" program, which would reduce greenhouse gas emissions by trapping carbon dioxide in restored wetlands on the islands.

Meral's suggestion is insulting. Most Delta farmers already practice no-till farming, soil conservation methods, and produce some of the least polluting farm drainage in California. They have to share waters with neighbors because the Delta is their home.

They adapted to land subsidence by becoming environmental stewards. The continuing partnership between the state Department of Water Resources and Delta reclamation (levee) districts—run and paid for by Delta farmers—prevented catastrophic flooding last winter.

While carbon dioxide inevitably accumulates from agricultural practices, only eight percent of California's carbon emissions comes from agriculture, according to the state's Air Resources Board. Transportation is the largest source (36 percent) followed by electric power (20 percent).

The fourteen years of construction required to build the Delta Tunnels is estimated to emit greenhouse gases equivalent to 600,000 new cars on the road each year. Muck trucks and dewatering pumps will run 24/7, and hundreds of new power poles and other electricity infrastructure (some of which will come from gas-fired power plants) will power construction and operate the intake pumps.

While reducing carbon emissions is vital, methane traps more heat than CO2. California's methane emissions are mostly produced by corporate feedlots whose pungent odors grace Interstate 5 in the western San Joaquin Valley.

Some 2.6 million head of cattle in the Valley (about two-thirds of which are dairy cows) release annual methane emissions that have the CO2 equivalency of 43 billion pounds into the atmosphere over a 20-year period, similar to 21 billion pounds of coal, or five coal-burning power plants.

These emissions dwarf those by today's Delta farmers. It makes more sense to create incentives to reduce Valley methane emissions than to put environmentally successful Delta farmers out of business.

As greenhouse gasses continue to warm the global climate, flood and rising sea level become a more immediate threat. The engineering report for the CA WaterFix proposal indicates that intakes in Hood would handle just 18 inches of sea level rise, yet the Delta Stewardship Council's plan indicates that we should plan for 55 inches of sea level rise.

WaterFix would come up three feet short. Four million people live in the Delta region, and levee upgrades are necessary to protect public safety there.

California must prepare for both floods and earthquakes. But in either case, investing in raised, fortified levees and regional storage projects as mandated by the Delta Reform Act is a plan that will protect public safety and water supplies. In the event of a Delta

levee failure or large earthquake, communities elsewhere would be able to rely on their local supplies instead of scrambling to receive imported water from the Delta.

We cannot afford to further compromise our wetlands in the San Francisco Bay estuary, nor can we sacrifice the people, fish and waterfowl that rely on a healthy Delta to survive. If we lose one, we lose them all.

Barbara Barrigan-Parrilla is executive director of Restore the Delta in Stockton. She wrote this for The Mercury News.

For Immediate Release: September 29, 2017

Contact: Nora Kovaleski, 408-806-6470, nora@kovaleskipr.com

Barbara Barrigan-Parrilla, Restore the Delta, 209-479-2053

Press Release

Unpacking Real Costs of California WaterFix

Stockton, CA — Delta tunnels opposition researchers have discovered a draft analysis dated September 15, 2017 of CA WaterFix costs completed by the Kern County Water Agency posted at the Wheeler Ridge-Maricopa Water Storage District.

This recent Kern County analysis provides a comprehensive review of how expensive the Delta tunnels project would be for Kern County farmers, and elucidates more realistic cost numbers for State Water Project Contractors than those touted by Metropolitan Water District. (You can also read the document at Restore the Delta's website.)

Researchers found that:

• Total WaterFix costs are estimated at $32.1 billion to $41.4 billion over 50 years; however, Kern County Water Agency only looked at interest rates of 3.55% or 3.88%. Higher interest rates would result in significantly higher total costs. These costs do not include potential cost overruns. (Page 72).

• Computations in 2033 dollars show that dividing the maximum capital costs by the average water supply yield results in an estimated cost range of $888 per acre-foot of water to $1427 per acre-foot of water for Kern County Water Agency water users. Using 2017 dollars, the price is discounted to $553 to $889 per acre-foot. (Page 76).

• Kern's total costs range from $4.9B to $7B, and annual costs range from $153.9M to $247.5M (page 73)

"Water this costly would cut deeply into profit margins for smaller farms within the Kern County Water Agency service area, and even the profits of big industrial farms like Stewart Resnick's Paramount Farms. It is feasible that the real end-goal is for urban ratepayers within the Kern service area and Metropolitan Water District to subsidize the project, or that Kern County Water Agency could resell a portion of water back to Metropolitan Water District to make enough revenue to cover bond repayment."

Prior to Westlands Water District's withdrawal from California WaterFix, Kern County Water Agency projected that their cost share would be 24.23% of the State Water Project's 55% share, or 13.33% of the total costs. (Page 71).

Barrigan-Parrilla added,

"It will be worth noting in the weeks ahead if KWCA will redo the math minus the Central Valley Project contribution of 45% to total costs, or if they will pretend that nothing has changed. It seems unlikely to us that farmers, who are businessmen first, would ignore this significant change in contribution percentages in the same way that Metropolitan Water District staff failed to acknowledge the loss of 45% of total project funding in their workshop to their Board of Directors on September 26, 2017. (All available workshop materials and presentations can be found here.) For farmers, such calculations are necessary to determine their bottom line."

Prior to Westlands September 19th vote, KCWA estimated their total contribution to fall within a cost range of $4.9 to $7 billion, about double the $4 billion number (in 2017 dollars) that MWD continues to state publicly, even though KCWA would receive about half the amount of water that MWD would receive. (Page 73).

Barrigan-Parrilla concluded,

"WaterFix does not pencil out for agriculture without a huge taxpayer subsidy from the State or Federal Government, and increased contributions from Metropolitan Water District and Silicon Valley water rateypayers."

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By John Kerin

The Water-Energy Nexus in Southern California

John Kerin

September 15, 2017

Often referred to as the "water-energy nexus," the use of energy for water transport, treatment, and usage is among the most energy-demanding activities in California. In 2005, the California Energy Commission estimated that about 19% of all electricity use was for "water-related purposes." Additionally, about 30% of the state's natural gas demand and 88 billion gallons of diesel went to these purposes.[1]

By far, the greatest contributors were water transport and end use (tap water, home appliances, etc.). Urban end use accounted for about 58% of all water-related electricity and over 98% of natural gas, while water supply and treatment accounted for about 22% of the electricity. Excluding end use, about 70% of the electricity used for urban water systems in Southern California was for water supply and conveyance. Distribution and wastewater treatment accounted for just over 29% and initial treatment less than 1%. The energy-intensity (kilowatt-hours per acre-foot) of water supply and conveyance for Northern California was only 48.9 kWh/AF compared to 2,900 kWh/AF for Southern California.[2] This huge discrepancy is due to Southern California importing much of its water from the State Water Project and Central Valley Project, which pump water along canals for hundreds of miles. If we wish to reduce water-related energy use in Southern California, saving money and reducing GHG emissions in the process, we should focus on scaling back water imports and installing water-and-energy-efficient residential and commercial appliances along with other conservation measures.

[1] California's Water-Energy Relationship, CEC (2005)

[2] ibid.

How can rethinking water help?

Many programs to reduce residential water use are already underway in Southern California. While these are concerned only with water and not with the associated electricity, they nevertheless have the additional benefit of reducing energy use overall. In 2010, the Pacific Institute proposed an urban water efficiency program to reduce annual water use by 320,000 AF, which would lead to a reduction of 2,300 GWh of electricity per year and 86.8 million therms (1 therm=100,000 BTUs) of natural gas. The study estimated a cost of –$99 per AF over the lifetime of the project.[3] This is consistent with other water efficiency programs, which have very low or even negative costs.

Localizing water supplies can have a similar effect. An analysis by the National Resource Defense Council and UCSB found that low impact development (LID)—practices that focus on capturing and using rainwater efficiently—in limited parts of San Francisco and Southern California could yield up to 405,000 AF per year, saving up to 1,225 GWh in electricity and 535,500 metric tons of $C0_2$ per year.[4] The conservation efforts proposed by the Pacific Institute authors would also reduce $C0_2$ equivalent emissions by up to 877,000 metric tons per year. Taken together, these programs would reduce California's electricity use by nearly 2% and GHG emissions by just over 0.3%. In addition, even at the industrial rate of $0.105/kWh, this corresponds to savings of over $365 million per year in electricity alone.

Imported versus Local Water

Long-range water conveyance is by far the most energy-intensive process in California's water supply systems. Depending on where it is pumped to, supplies from SWP can have embedded energy as low as 600 kWh/AF to as high as 4,000 kWh/AF. LADWP plans to drastically reduce supplies imported from SWP and get over 40% of its water from the Los Angeles Aqueduct by 2040.[5] This uses essentially zero energy since flow in the aqueduct is almost entirely due to gravity, whereas supplies from SWP and the Colorado River Aqueduct must

[3]California's Next Million Acre-Feet, Pacific Institute (2010)

[4]A Clear Blue Future, NRDC (2009)

[5]LADWP 2016 Briefing Book (2016)

	CEC (KWh/AF)	IUEA (kWh/AF)	LADWP (kWh/AF)
SWP East Branch		3200	3236
SWP West Branch		2500	2580
Colorado River Aqueduct		2000	2000
Los Angeles Aqueduct			0
Local Distribution	391		196
Wastewater Treatment	815		
Recycling		400	1,139
Groundwater Pumping		950	530

Figure 1: Energy intensities of water-system processes. Sourced from the California Energy Commission's 2005 estimates for Southern California[1], the Inland Empire Utilities Agency[1], and LADWP's reported averages for 2003-2009[6].

be pumped.[6]

We have seen that significant electricity reductions can be achieved through water conservation and improved stormwater capture and management. Water recycling and groundwater recharge/pumping also require much less energy than water imports (see Figure 1). These methods also reduce the amount of necessary wastewater treatment since less water is flushed to the ocean.

Importance for CA WaterFix

Already, SWP uses about 5,000 GWh per year, or 2–3% of California's total electricity usage. By contrast, *all* groundwater pumping in the state uses about 3,400 GWh per year.[7] The proposed CA WaterFix plans to stabilize or slightly increase water exports from the Sacramento-San Juaquin Delta that would otherwise decrease over the coming decades due to climate change. Its proponents claim that the water supply would be increased by as much as 1 million AF per year. Whether for storage or immediate use, all this water must be pumped to its final destination. While the amount of energy needed for pumping varies depending on the endpoint, even if we assume an average of 1,000–2,000 kWh/AF, this

[6]Urban Water Management Plan, LADWP (2010)

[7]Energy Down the Drain, NRDC (2004)

increased supply translates to 1,000–2,000 GWh of electricity per year, 0.5–1% of California's entire annual electricity use, or $100–$200 million in electricity annually.

Conclusion

One negative side effect of many distant water imports is significant energy use. Likewise, residential and commercial water end use requires a great deal of energy. By turning to conservation and local water supplies, we can not only secure a more sustainable water supply, but also reduce the electricity and natural gas needed for water consumption. This is one case in which a drawdown in one sector—water—to combat overuse and climate change, can lead to a beneficial reduction in another—electricity use and GHG emissions. Savings in both water and electricity costs can further free up funds to invest in critical green infrastructure. When thinking about sources for a sustainable water supply, energy-intensity should be an important consideration.

Costs of CA WaterFix versus Investment in Local Supplies for Southern California Ratepayers

John Kerin

September 5, 2017

Securing a sustainable water supply for California is more crucial than ever. With the effects of climate change already being felt, many have recognized the need for increased water conservation and investments in alternative sources and technologies. Since about 1960, Southern California has imported a large amount of its water from the northern part of the state. However, these imports have become increasingly expensive and unsustainable. Climate change threatens to decrease melt from the Sierra snowpack over the next century and further degrade the already delicate and deteriorating Sacramento-San Juaquin Delta ecosystem, from which the water is diverted and pumped. Decisions regarding affordable water, ecological health, and overall sustainability should be the task of residents. We propose investments in local projects to enhance existing infrastructure and create new capture, reuse, and conservation abilities through local involvement, ensuring environmental and resource sustainability.

MWD and CA WaterFix

Metropolitan Water District (MWD) supplies roughly 4 million acre-feet per year (AFY) of water to 19 million people in southern California and about 3 million acres of agricultural land. The water comes from local sources (about 2 million AFY), the State Water Project (SWP) (about 1.2 million AFY), and the Colorado River Aquaduct (about 0.9 million AFY).[1]

[1]MWD Integrated Water Resources Plan (2015)

For purposes of "water reliability," MWD is supporting the proposed CA WaterFix, a project to build new intakes and transport tunnels at the Sacramento-San Joaquin Delta. The "Delta Tunnels" would transport water from the State Water Project (SWP) and Central Valley Project (CVP) to pumping stations approximately 40 miles south of the intakes. MWD projects an initial cost of approximately $17 billion and a planning and construction period of 17 years. According to other sources, the project could exceed $50 billion and face numerous delays and setbacks. [2]

MWD estimates that, due to the effects of climate change, the combined supply from SWP and CVP would decrease from 4.9 MAFY to 4.7 MAFY by 2025, and further to 3.5-3.9 MAFY in the long-term. With the CA WaterFix, MWD estimates the long-term annual supply would be 4.7-5.3 MAFY.[3] However, supply estimates are highly uncertain and year-to-year outflow highly variable, since longer droughts with shorter, more intense periods of precipitation are anticipated. Furthermore, more precipitation will fall as rain due to the warming climate, meaning that the Sierra snowpack, the source of the Delta, is expected to decrease throughout the century. Highlighting this uncertainty, simulations in the January 2016 WaterFix biological assessment of Delta outflow over the next century found an average total increase of only about 225,000 AFY relative to the "Do Nothing" scenario, well below what MWD claims.[4,5]

Moreover, MWD only uses Delta water purchased from SWP, so its potential supply increase is much lower than the overall gain in captured Delta outflow. Nevertheless, MWD estimates that its annual supply would increase roughly 376,000 AFY on average, 160,000 AFY in the driest years, and 168,000 AFY in the wettest years compared to the "Do Nothing" scenario (see Figure 1).[6]

Cost estimates per AF for CA WaterFix supplies are similarly shaky. As the environmental group Restore the Delta noted in its response to a MWD white paper:

Cost per acre-foot comparisons for California WaterFix have varied widely, de-

[2]Green LA Opposition Letter (2017)

[3]California WaterFix Operations (MWD White Paper #2) (2017)

[4]Biological Assessment for the California WaterFix (2016)

[5]Benefit-Cost Analysis of the California WaterFix (2016)

[6]California WaterFix Operations (MWD White Paper #2) (2017)

TABLE 1: SUMMARY OF SWP SUPPLIES AVAILABLE TO METROPOLITAN WITHOUT ADDITIONAL INVESTMENTS (ACRE-FEET)

SWP	2016	2020	2025	2030	2035	2040
Minimum	210,000	154,000	154,000	154,000	154,000	154,000
Average	1,202,000	837,000	837,000	837,000	837,000	837,000
Maximum	2,022,000	1,695,000	1,695,000	1,695,000	1,695,000	1,695,000

TABLE 2: SUMMARY OF SWP SUPPLIES AVAILABLE TO METROPOLITAN WITH CALIFORNIA WATERFIX (ACRE-FEET)

SWP	2016	2020	2025	2030	2035	2040
Minimum	210,000	229,000	229,000	314,000	314,000	314,000
Average	1,202,000	984,000	984,000	1,213,000	1,213,000	1,213,000
Maximum	2,022,000	1,695,000	1,695,000	1,863,000	1,863,000	1,863,000

Figure 1: MWD supplies from SWP with and without CA WaterFix. Source: California WaterFix Operations (MWD White Paper #2) (2017)

> **pending upon who is performing the analysis. The Brattle Groups 2015 Draft Study of WaterFix stated that, "Looking across the SWP urban agencies considered, the value to ratepayers of the water preserved by the WaterFix is $1,414 per acre-foot. These values are at the low end of the range of water supply alternative costs, which is understandable since the water supplies preserved by the WaterFix vary considerably between wet and dry years, whereas alternatives such as recycling and desalination are more reliable." This cost appears to be for untreated water conveyed under the Delta, and may not contain the SWP transportation costs....**[7]

MWD Tier 1 treated water currently costs over $1000 per AF and prices have been rising by about 5% per year. With imported water becoming scarcer and more expensive, and efforts by Los Angeles and other communities to reduce their dependence on water imports, it makes a great deal more sense to look to alternative local sources.

[7] Open Letter from RTD to MWD (2017)

POTENTIAL WATER SAVINGS/SUPPLIES FROM VARIOUS CONSERVATION PROGRAMS

Conservation Program	Water Savings/Supplies (million acre-feet/year)
Urban Water Use Efficiency	up to 3.1 MAF
Recycled Municipal Water	up to 2.3 MAF
Conjunctive Management and Groundwater	up to 2.0 MAF
Agricultural Water Use Efficiency	up to 1.0 MAF
Ocean and Brackish Desalination	up to 0.4 MAF
Other	up to 0.9 MAF
TOTAL	**up to 9.7 MAF**

Source: California Dept. of Water Resources, 2009, as cited in *Delta Water Plan*, 2013 (Figure 3.7)

Figure 2: Abundance of alternative water supplies for California.

Alternative Local Water Sources

There are various types of local water supply and conservation opportunities that can be utilized as alternatives to imported water. Estimating costs has a high degree of uncertainty since the calculation must predict the intitial capital investment, annual operations and maintenance costs (O&M), and the lifespan of the project. While estimated cost ranges are often wide, they give some idea of the cost of alternative supplies compared to imported water. We summarize some of the main alternative sources below.

Stormwater Capture

A huge amount of rainwater from urban and suburban areas in Southern California runs off to the ocean due to impervious surfaces and poor management. The National Resources Defense Council (NRDC) estimates that urban areas in San Francisco Bay and Southern California could capture and use up to 600,000 AFY of runoff that is currently being lost.[8] In the city of Los Angeles, there is currently about 29,000 AFY of active stormwater capture and 35,000 AFY of incidental stormwater capture.[9] Los Angeles County as a whole recharges about 210,000 AFY of groundwater via stormwater capture.[10] Depending on the intensity of investment, LADWP estimates that an additional 68,000-114,000 AFY of stormwater could

[8]NRDC Stormwater Capture Potential (2014)

[9]LADWP Urban Water Management Plan (2015)

[10]DWR Urban Stormwater Runoff Management (2016)

be captured in the city of Los Angeles by 2035.

There are various storwater capture methods. According to LADWP, subregional infiltration (groundwater recharge) has a cost of approximately $600-$1300 per AF, green street programs $600-$2400 per AF, and centralized projects a median cost of about $1000 per AF. Subregional infiltration and green street programs alone have the potential to increase local stormwater capture in LA by 120,000 AFY, while on-site infiltration, though more expensive, provides another available 35,000 AFY increase. [11]

Illustrating the potential of stormwater capture in the region, the Department of Water Resources (DWR) notes:

> **The Los Angeles and San Gabriel Watershed Council (now known as the Council for Watershed Health) has estimated that if 80 percent of the rainfall that falls on just a quarter of the urban area within the watershed (15 percent of the total watershed) were captured and reused, total runoff would be reduced by about 30 percent. That translates into a new supply of 132,000 af of water per year or enough to supply 800,000 people for a year.**[12]

A study by NRDC found that stormwater capture in urbanized Southern California and parts of the San Francisco Bay area had the potential to increase water supplies by 229,000-405,000 AFY by 2030, with concomitant energy savings and reduction of greenhouse gas emissions.[13] Since stormwater capture can be accomplished in a variety of ways–rooftop collection, centralized projects, ground infiltration systems–it has very versatile and widespread implementation possibilities.

Urban Water Recycling

Water can be recycled for non-potable reuse or purified for groundwater injection. Urban water recycling has the potential to increase water supplies across California by nearly than 2 million AFY according to NRDC.[14] Already, LADWP plans to recycle 75,400 AFY by

[11] City of Los Angeles Recycled Water Master Plan (2012)
[12] DWR Urban Stormwater Runoff Management (2016)
[13] DWR Urban Stormwater Runoff Management (2016)
[14] Water Reuse Potential in California, NRDC (2014)

2040, providing 12% of the city's water supply, compared to only 2% today.[15]

DWR estimates the cost of urban water recycling at $300-$1300 per AF.[16]In 2012, a proposal by LADWP to recycle 59,000 AFY by 2035 consisted of a groundwater recharge project with a capital cost of approximately $400 million with O&M costs of about $17 million per year and supply of 30,000 AFY. Non-potable reuse projects would supply about 21,000 AFY with a capital cost of approximately $495 millon with O&M costs of about $4.5 million per year. LADWP projects that, together, these projects would pay for themselves (versus importing MWD water) by about 2045 (Figure 3). LADWP also notes that MWD water imports would be about 17-20% more expensive per-acre-foot than groundwater recharge over a 50-year period.[17]

MWD also recognizes the importance of investing in local resources and recycled water programs. It has run incentive program for water agencies to improve local supplies since 1986.[18] It recently approved a demonstration project that would capture water that is currently treated before being released to the ocean and instead purify and re-inject it into LA's declining water basins. The full project (capital investment of about $2.7 billion and O&M costs of $129 million per year) would provide 168,000 AFY of groundwater supply at a cost of about $1600 per AF, according to MWD.[19]

Graywater Recycling

Graywater recycling allows for the reuse of water that is typically not suitable for reuse (from dishwashers, washing machines, etc.) for on-site purposes such as irrigation or toilet water on a residential scale. According to a UCLA study[20], "Graywater recycling can reduce the Citys potable water consumption by 27% for single-family homes, and by 38% for a multi-family dwelling." This results not only in more efficient water usage but also in a significant reduction in electricity usage. Indeed, the same study found that for Los Angeles, importing MWD water is the most energy-intensive source compared with other current supply

[15]LADWP Recycled Water Annual Report (2016)
[16]DWR Municipal Recycled Water (2016)
[17]LADWP Recycled Water Master Planning (2012)
[18]MWD Local Resources Development (2016)
[19]MWD News Release (2017)
[20]Cost-Benefit Analysis of Onsite Residential Graywater Recycling (2015)

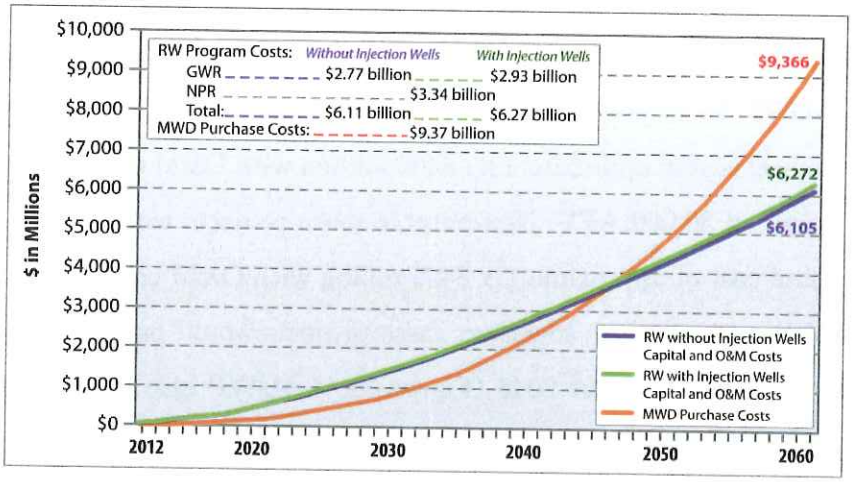

Figure ES-16: Future Annual Recycled Water Project Costs (GWR and NPR) Compared with Projected Annual MWD Tier 1 Imported Water Costs

Figure 3: LADWP recycled water versus MWD imported water costs. Source: LADWP Recyled Water Master Planning (2012)

sources (such as LADWP groundwater recycling and graywater recycling). The researchers also noted that the cost of graywater recycling per acre-foot is approximately the same as MWD Tier 1 treated water (currently around $1000 per AF). As a decentralized water-saving option, graywater recycling can be both cost effective and energy efficient.

Conservation

Urban water conservation, through the implementation of good practices and investment in high-efficiency appliances, can dramatically reduce water usage. LADWP has enacted a program to promote water conservation (such as rebates for high-efficiency appliances), which "saves water at an average cost of approximately $400/AF."[21] DWR estimates a median cost of $372.50 for urban use efficiency.[22]

Many other conservation programs are already underway throughout the state. The 2015 pLAn for the city of Los Angeles set a goal of reducing per capita potable water use 25% by 2035.[23] MWD set a target of 485,000 AFY in local water use reduction by 2040.[24]

[21] LADWP Urban Water Management Plan (2015)

[22] Benefit-Cost Analysis of the California WaterFix (2016)

[23] City of Los Angeles pLAn (2015)

[24] MWD Integrated Water Resources Plan (2015)

In reality, many conservation efforts likely have a "negative" cost. That is, the savings outweigh the costs of investment and maintenance. For example, one study[25] concluded that the cost of efficient shower heads would be approximately -$3000 per AF. Likewise, efficient clothes washers and toilets could have costs below -$500 per AF. Both DWR and NRDC agree that urban water use efficiency holds the largest water savings/supplies potential for California, between 3 and 5 million AFY.[26]

"Water reliability" for whom?

MWD water costs have been rising by about 5% per year. This imported water comes from a source that will inevitably decrease over the next century. Investments in local resources with roughly comparable costs avoid the increasing expense of imported water, eliminate a great deal of energy and transportation costs, and secure water resources in a smarter, more sustainable way. Much of Southern California is already aware that efforts should be directed toward increasing local supplies. Whereas LADWP currently imports about 57% of its water from MWD, on average, it plans to import only about 11% of its water from MWD by 2040. This is consistent with other city efforts to reduce water imports by at least 50% by 2024.[27]

The purported benefits of CA WaterFix are overblown and the uncertainties and opportunity costs underreported. MWD claims that a major benefit of CA WaterFix is resilience

[25]PI Cost of Alternative Water Supply (2016)

[26]NRDC Urban Water Conservation (2014)

[27]LADWP Recycled Water Annual Report (2016)

Table 1. Cost of Urban Water Supply Alternatives (source: California Department of Water Resources Water Plan 2013 Update)

	Low Cost ($ af)	High Cost ($ af)	Midpoint Cost ($ af)	Potential Supply by 2030 (million af annually)
Brackish Groundwater Desalination	500	900	700	.1-.2
Ocean Desalination	1000	2500	1750	.1-.2
Municipal Recycled Water	300	1300	800	1.8-2.3
Surface Storage	300	1100	700	.1-1.1
Urban Water Use Efficiency	223	522	372.5	1.2-3.1

Figure 4: Cost of urban water supply alternatives.

against both seismic events and sea-level rise due to climate change. However, these issues can be addressed in a manner excluding two 40 meter wide, 40 mile long tunnels buried 150 feet underground.

For example, measures such as fortifying delta levees can combat sea level rise in a more reasonable and environmentally conscious way. Earthquake risk has not been a major concern in the past, but once earthquake risks have been adequately studied, they should be dealt with on their own merits. In fact, CA WaterFix would be approved before almost 90% of the seismic risk assessment had been completed.[28] In either case, it is much more sensible to ensure a reliable water supply by investing locally while repairing existing infrastructure (a critical task) and tackle Delta problems on their own rather than embarking on a costly project with very uncertain outcomes.

Environmental concerns within the delicate delta ecosystem also serious. CA WaterFix does nothing to increase the health of the delta ecosystem, but merely proposes that it can divert more water without negatively impacting dwindling fish species. Environmental issues need to dealt with sincerely, not by supporting projects that *probably* won't make things worse.

Whether or not CA WaterFix would allow greater outflow during periods of high precipitation, it may not be much of a benefit. During the most recent drought, MWD's stored supplies fell below 1 million AF, considered a "critical" level. However, MWD's total water storage capacity below the Delta is only about 1.5 million AF: approximately 1 million AF in reservoirs and 0.5 million AF in groundwater basins. The rest of the MWD storage supply, about 5 million AF, consists of reservoirs north of the Delta, meaning increased Delta outflow would not contribute to this storage.[29] Moreover, in wet years, LADWP projects that, by 2040, less than 10% of its water will be purchased from MWD.[30] Therefore, sustainability in dry years and storing water in high precipitation years should be prioritized above increasing immediate supply.

Sources of financing for the project are also dubious. MWD proposes to pay for its share by increasing its rates, but depending on who signs on to fund the project, MWD

[28]MWD White Paper # 1 (2017)

[29]MWD Drought Surplus and Management Plan (2016)

[30]LADWP Urban Water Management Plan (2015)

may be caught footing a much larger bill than anticipated, whereby all the risk of the project falls on MWD customers. The increased "water reliability" could easily be secured through an array of local projects. Crucially, most of the potential outflow increase would even not go to MWD's residential and industrial customers in Southern California, but rather to large agricultural interests that purchase water cheaply from SWP and CVP to irrigate their Central Valley crops, which rely critically on imported water. While irrigation techniques have improved over the past decades, California continues to grow highly water-intensive crops in extremely dry areas rather than concentrating on sustainable growing practices. In fact, NRDC estimates that about 6 million AFY could be saved through improved agricultural practices.[31]

Meanwhile, MWD touts "increased water reliability" for its 19 million customers; yet it is clear who the main beneficiaries are. Despite the rhetoric (e.g. "Shoring up the reliability of Metropolitan's baseline imported supplies has proven to be a highly cost-efective investment that protects broad public interests as well as Southland ratepayers."), MWD did reveal an additional incentive for CA WaterFix:

> **The potential completion of the California WaterFix and a modernized water system in the Delta, for example, would create a new physical ability to move additional supplies in average and above-average years. In addition to providing water for storage management, this could also create opportunities for new markets and partnerships.**[32]

"New markets and partnerships" for MWD seem to have escaped mention in the long list of advantages advocated during MWD's WaterFix promotional campaign.

Conclusion

Residents of Southern California should be concerned about the future of their water supply. While there are many viable local projects that could be implemented in a piecemeal and tailored fashion, interests unconcerned with average residents are pushing for approval of

[31] NRDC Agricultural Water Conservation (2014)

[32] MWD Integrated Water Resources Plan (2015)

one of the largest public works projects in United States history with as little scrutiny as possible. To secure our own health and that of the environment we should be looking to more local investment and participation rather than one massive, obscure, and poorly understood project. We don't need to put $50 billion worth of eggs in a single unnecessary basket.

Water Conservation and Sustainability: California Jobs

John Kerin

September 27, 2017

Current Problems, Better Solutions

Historically, public investment in infrastructure has led to increased economic growth; yet such public investments have steadily over the past decades. In particular, investments in water infrastructure relative to GDP have fallen by more than a third since their peak in 1975 and water rates are continually rising.[1] Much of the water infrastructure in the United States—pipes, dams, sewer systems—has reached the end of its lifespan and is in critical need of repair. Nationally, around 15% of all drinking water is lost to pipe leaks.[2] Waterways have become highly polluted (40% of all rivers and 46% of all lakes[1]), and concerns about freshwater sustainability are increasing due to both contamination and climate change, especially in the country's drier regions. Two studies by the EPA in 2008 and 2012 estimated the cost of necessary repairs and upgrades for certain elements of the nation's water systems* to be around $280 billion.[3] In 2011, the EPA also reported that the total national need for drinking water infrastructure alone was $384 billion.[4] Other estimates for overall water infrastructure exceed $1 trillion.[1]

These are just some of the problems with existing traditional infrastructure. New methods of water use and conservation also need to be implemented to ensure environmental and water supply sustainability. Alternative green infrastructure like green roofs, constructed

[1] Water Works (2011)

[2] Water Loss, EPA (2013)

* Wastewater treatment systems, new pipes and pipe repairs, sewer overflow corrections, stormwater management programs, and recycled water distribution.

[3] Clean Water Shed Needs Survey, EPA (2008, 2012)

[4] Drinking Water Infrastructure Needs, EPA (2013)

wetlands, permeable pavement, stormwater harvesting, and water recycling may offer solutions. Investment in green infrastructure, conservation efforts, and other local measures can also create jobs and stimulate wide–ranging economic growth. In California, with its unique water supply issues, it is imperative to focus on critical repairs and upgrades along with conservation efforts and local sustainable supplies. These measures can be economically beneficial for a range of communities—likely more so than traditional water infrastructure projects.

Sustainable Water Jobs

The EPA estimates that California needs around $30 billion dollars in water system repairs and upgrades.[3] The group Water Works, focusing on new pipes and pipe repairs, sewer management, and stormwater management, estimated that a $188.4 billion (2011 dollars) investment in water infrastructure over five years for the entire United States would generate $265.6 in economic activity and create almost 1.9 million jobs.[1] In California, requiring about 10% of the national investment, this would create between 120,402 to 199,526 jobs, or approximately 6–10 jobs per $1 million of investment. These jobs would be a mix of traditional water infrastructure work (e.g. pipe repair) and "greener" work (e.g. better stormwater management).

An example of a strictly traditional, large-scale water infrastructure project is the proposed CA WaterFix. According to its website, the project would create 118,772 jobs.[5] Assuming a $17 billion dollar pricetag, this amounts to 7 jobs per $1 million of investment.

Supporting alternative water supplies has the potential to create a broader range of jobs and bigger economic benefits. A 2013 survey by the Pacific Institute found that sustainable water projects created at least as many jobs as traditional water projects.[6] The survey found, per $1 million of investment, 10–15 jobs in alternative water supplies, 5–20 in stormwater management, 12–22 in urban conservation and efficiency, 15 in agricultural efficiency, and 10–72 in restoration and remediation. There are a wide range of job types involved in water efficiency and conservation including maintenance and construction workers, engineers and

[5]https://www.californiawaterfix.com/

[6]Sustainable Water Jobs, Pacific Institute (2013)

architects, plumbers, environmental specialists, and systems operators.

A study by Economic Roundtable focusing on the Los Angeles area found similar results.[7] For 53 sampled projects in water conservation, graywater systems, stormwater, groundwater, and recycled water, the average number of jobs created per $1 million of investment was 12.6–16.6, with an average wage of $33,286–$52,828 (2011 dollars). These numbers are comparable to other infrastructure projects such as housing and utility construction. As in other studies, these numbers encompassed "direct", "indirect", and "induced" jobs. This means jobs generated to provide goods and services to the project as well as increased "downstream" economic activity through increased worker spending. Additionally, the study found that $1 million of investment in these projects stimulated between $1.91 million and $2.09 million in total sales (direct, indirect, induced).

Looking Forward

Both private and public investment in local, sustainable water infrastructure and conservation measures have the potential to solve some of California's water supply issues as well as create jobs and other economic benefits. In order to make the most of these opportunities, we should prioritize local solutions and investments above big, centralized projects. The Economic Roundtable researchers note that "local investments not only produce large multiplier effects where water users live and work, but also support better stewardship of this precious resource by residential and commercial water consumers." Involving community stakeholders and providing job training would promote both sustainability and equitable economic growth.

[7] Water Use Efficiency and Jobs, Economic Roundtable (2011)