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August 7, 2017

Sent via email: board@valleywater.org

John L. Varela, Board Chair District 1	Richard Santos, Vice Chair District 3
Barbara Keegan, Director District 2	Linda J. LeZotte, Director District 4
Nai Hsueh, Director District 5	Tony Estremera, Director District 6
Gary Kremen, Director, District 7 Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118-3686	

Subject: Santa Clara Valley Water District Participation in California WaterFix

Dear Chair Varela, Vice Chair Santos, and District Board Members:

Restore the Delta advocates for local Delta stakeholders to ensure that they have a direct impact on water management decisions affecting the water quality and well-being of their communities, and water sustainability policies for all Californians. We work through public education and outreach so that all Californians recognize the Sacramento-San Joaquin Delta as part of California's natural heritage, deserving of restoration. We fight for a Delta whose waters are fishable, swimmable, drinkable, and farmable, supporting the health of the San Francisco Bay-Delta Estuary, and the ocean beyond. Our coalition envisions the Sacramento-San Joaquin Delta as a place where a vibrant local economy, tourism, recreation, farming, wildlife, and fisheries thrive as a result of resident efforts to protect our waterway commons.

We have been involved with nearly all facets of the California WaterFix project, and before that the Bay Delta Conservation Plan unveiled by Governor Jerry Brown in July 2012. We understand that your Board will be asked this fall to approve participation in the California WaterFix tunnels project, which, if constructed and completed, would be

integrated into the broader operations of both the California State Water Project (SWP) and the federal Central Valley Project (CVP).

We are aware that Santa Clara Valley Water District imports about 40 percent of its supplies on average from the Delta. That amount represents two to three percent of average total water exported directly from the Delta. The District is the only water agency in California that contracts with both the SWP and CVP. We recognize that having relationships with both projects increases the District's access to Delta imports, but it may also increase complexity of decision making for the District when it comes to matters like whether to participate in California WaterFix.

We further understand from District imports manager Cindy Kao's presentation on July 11, 2017, that the District's relationships with the California Department of Water Resources (DWR) and the United States Bureau of Reclamation (USBR) are under negotiation at this time over California WaterFix, and may result in differing approaches to water allocation, accounting, and payment for benefits received from the tunnels project.

Board member concerns were expressed the same day that if the District were not to participate in the California WaterFix project, a water grab at the expense of Santa Clara Valley's normal allocation could ensue. We think such concerns are unfounded, intended to scare decision makers into California WaterFix participation. Instead, opting out of California WaterFix will neither undermine nor change the amount of water the District would continue to be legally entitled to from both the SWP and the CVP through existing water service contracts. The District would also avoid increased imported water costs beyond what might occur with your present SWP and CVP contracts because it would have no incremental cost of WaterFix-delivered water. Those savings could continue to be available for other District water supply priorities such as storm water capture and reclamation/recycling investments. Our attached comments will address this issue as well as a number of other aspects of the tunnels project.

Decision making about California WaterFix will be all about managing risk and evaluating facts—not allowing the influence of unfounded rumors, half-truths, and glossy presentations short on substance. The scale of this Tunnels project is so large that risk issues arise in many contexts—legal, organizational/management, intergenerational, water supply, environmental, economic/fiscal, scientific, and social. Our comments on a variety of risks are found in Attachment 1 to this letter.

Moreover, the project's scale is so large that the Board of Directors of the Santa Clara Valley Water District's decision to participate in WaterFix will have consequences beyond the District's customer base or service area. Your decision to participate would take in the Delta itself. That is why Restore the Delta feels compelled to communicate our views about many "selling points" advanced by DWR, the Bureau and the Metropolitan Water District of Southern California, as well as to summarize who in the Delta's environmental justice communities would be harmed (and how) in Attachment 2 to this letter. (This information was provided in greater detail to the State Water Board

by Restore the Delta in December 2016 as part of the California WaterFix's water rights change petition proceeding. We appreciate you considering this information on Delta people as the District decides on WaterFix.)

District customers already provide little support for WaterFix. From April 2017 FMC Research survey results presented to the District on May 9, the District learned that 47 percent of survey respondents indicated they were unwilling to pay for such improvements. Just one in six respondents (16 percent) were "very willing" and 11 percent were "willing" to pay increased rates for District investments in storage and conveyance improvements to maintain imported water supplies from the Delta.[1]

District Board member Barbara Keegan requested correspondence containing cost comparison information for alternative water supply and efficiency sources. We provide summary cost comparisons in Attachment 3 to this letter.

In Attachment 4 to this letter, we provide summary information on California water solutions that address supply reliability and drought resistance.

Thank you for considering our comments and viewpoints. You have a difficult decision to make, one that will affect Delta residents and District customers for generations to come. If you have questions or concerns about our comments, do not hesitate to contact Barbara Barrigan-Parrilla (209.479.2053, barbara@restorethedelta.org) or Tim Stroshane (510.847.7556, tim@restorethedelta.org).

Sincerely,

Barbara Barrigan-Parrilla
Executive Director

Tim Stroshane
Policy Analyst

cc: Norma Camacho, Chief Executive Officer, SCVWD
Cynthia Kao, Imports Program Manager, SCVWD

Attachments:
1. Specific Restore the Delta Comments on Risks of California WaterFix.
2. Summary of Delta Environmental Justice Communities and California WaterFix Impacts.
3. Cost Comparisons Among Alternative Water Supply and Efficiency Sources.
4. California Water Solutions.

[1] FMC Research, Telephone Survey of Santa Clara County Voters Re: Water Conservation, conducted for Santa Clara Valley Water District, April 2017, slide 24.

Attachment 1
SPECIFIC RESTORE THE DELTA COMMENTS ON THE RISKS OF CALIFORNIA WATERFIX

Restore the Delta's specific comments here address not only issues brought by District staff to the Board on July 11 but also other issues the Board may have yet to consider or address fully. A large evidentiary record generated by the water rights change petition for California WaterFix before the State Water Board helps shed light on at least some of the issues that the District weighs, particularly with regard to climate change, Delta flows, impacts to legal users of water, environmental justice, and project design, construction and operations. In addition, two recent biological opinions provide additional updated information about the project as well. The proceeding will continue well into 2018 before the State Water Board issues an order on the WaterFix petition.

What water supply yield is expected from California WaterFix? What yield could Santa Clara Valley Water District expect to see if it participated?

In recent months, California WaterFix supporters, including the California Department of Water Resources (DWR), the U.S. Bureau of Reclamation (the Bureau), and the Metropolitan Water District of Southern California (MWD) have issued documents or given presentations indicating that the yield of the WaterFix project is expected on average to be between 4.7 million acre-feet to 5.3 million acre-feet annually. MWD expresses its belief that combined future SWP and CVP average annual exports from the Delta could potentially decrease to 3.5 to 3.9 million acre-feet from the current average of 4.9 million acre-feet. With California WaterFix, using its vaunted "big-gulp, little-sip" theory of operation, MWD informed its Board that annual exports would range between 4.7 to 5.3 million acre-feet.[2]

WaterFix's future export reductions are expected from application of greater water quality and endangered species restrictions. Elsewhere, DWR has complained that because of "regulatory restrictions" (primarily biological opinions concerning endangered fish issued in 2008 and 2009) Delta exports have been reduced by 10 percent from their previous historical levels.[3] These restrictions came about because of scientific studies of rare and endangered fish and other species throughout the Delta, and they represent contemporary application of "adaptive management" and science to the operations and features of state and federal project facilities (storage, pumping plants, and conveyance).

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[2] Metropolitan Water District of Southern California and California WaterFix, "Modernizing the System: California WaterFix Operations," Second White Paper, July 2017 p. 4. Accessible at http://mwdh2o.com/DocSvcsPubs/WaterFix/assets/ca_waterfix_operations_07_2017.pdf.

[3] California Department of Water Resources [DWR], *The State Water Project Draft Delivery Capability Report 2015*, April 2015, p. 6. Accessible at https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-aeff-8d7a2a7b21e4, with appendices https://msb.water.ca.gov/documents/86800/c97c3baa-0189-4154-bf19-aa88392026ac.

As revealed in a Goldman Sachs presentation given at a July 17 workshop held by Westlands Water District, WaterFix supporters anticipate that the marginal water supply benefit of the Tunnels would be about 1 million acre-feet on average (that is, the difference between about 3.9 million acre-feet of Delta exports in the future and a near mid-point of the future range of Delta exports including use of WaterFix tunnels, or about 4.9 million acre-feet).[4]

Despite their dislike of water quality and fish protection regulations, DWR, the Bureau, and MWD include an "adaptive management" framework in WaterFix that they expect is at least politically critical to future operation of key WaterFix facilities: the tunnels and north Delta diversions.

There are two potential problems with WaterFix's inclusion of adaptive management. First, ***California WaterFix claims "adaptive management" as an imaginary "hall pass" to inoculate itself against unforeseen impacts, in the belief that whatever scientific results come about, they will protect fish and Delta communities from Tunnels operations.*** This is problematic because DWR, the Bureau and MWD would like to greenwash the WaterFix project with a veneer of science geared to solve future challenges, yet they already decry regulatory restrictions that have reduced exports at present. CWF supporters want it both ways: to have the greenwashing benefits of "adaptive management" while they would complain when scientific results must impose restrictions on future WaterFix diversions. ***Whatever your view of regulations on SWP and CVP operations this is a source of future regulatory risk to water supply yield and financial soundness for WaterFix.*** What will be the consequences for Santa Clara Valley Water District investment opportunities—if the project goes forward and then WaterFix exports have to be curtailed because of water quality and fish protection needs?

Second, there is climate change risk to water supply. DWR and the Bureau claim that California WaterFix responds to climate change risks to state water supply, but really, the project is highly vulnerable to both drought and flood.

The kernel of truth of WaterFix talking points is for the project to divert as much storm flow as possible to storage south of the Delta, so that storage during drought is harbored as carryover to protect water quality and ecosystems in the Delta, as well as to preserve storage for project customers over long-term droughts. The trouble is, climate change poses the problem of whether high flows will be frequent enough so they can be captured for a big supply gulp, or if water diverted and stored for later supply can outlast the duration of future droughts. ***No one knows how this climate change risk will play out for the Central Valley water system.*** This means the

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[4] Accessible at https://www.nrdc.org/sites/default/files/media-uploads/delta_tunnels_goldman_analysis.pdf.

Tunnels are an expensive, flood- and drought-vulnerable, and therefore very risky investment whose capital costs at a minimum must be paid every year, rain or shine.

Santa Clara Valley Water District's share of State Water Project contract yield (Table A deliveries) between 2005 and 2014 was about 1.9 percent of 1,837 thousand acre-feet of south-of-Delta exports, or 34,231 acre-feet on average.[5] The District's share of Central Valley Project south-of-Delta yield (deliveries, excluding the Exchange Contractors and refuge supplies) over the same period was about 9.2 percent, or about 96,942 acre-feet out of about 1,009 thousand acre-feet. Adding together these average contract deliveries, the District received about 131,173 acre-feet of imports combined from the CVP and SWP Delta exports (2,953 thousand acre-feet for the period). In all, District imports from the Delta were about 4.4 percent of total combined Delta exports from these projects between 2005 and 2014. The District's 10-year average percent of its SWP Table A deliveries has been 34 percent.

DWR's State Water Project Delivery Capability Report (2015) shows the District made good use of both carryover storage (at Oroville and probably Semitropic Water Storage Water District). However, "Article 21" surplus water has dwindled with the onset of recurrent droughts in this period, a harbinger of climate change's impacts on that source of SWP deliveries. SWP turnback pool deliveries increased in recent years, but fluctuate with the needs of other SWP contractors in the system. Annual SWP import deliveries averaged about 54,193 acre-feet between 2005 and 2014. The District's 2015 Urban Water Management Plan indicates that imports from the SWP and CVP will be essentially flat in the foreseeable future.[6] On average over this period, the District has received 64 percent of its CVP contract amount, a generally more reliable import supply than that of its SWP contract.

If the District does not participate in California WaterFix, District managers would continue to maximize its State Water Project deliveries—including Table A deliveries, carryover storage, and obtain supplemental supplies from the turn back pool and surplus waters whenever they came available. They would also continue to manage their CVP supplies for south County agriculture and long-term groundwater storage. Contract-based allocations from both projects would continue for the remainder of their terms.

What is involved with District participation? How does it work?

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[5] DWR, State Water Project Delivery Capability Report, 2015, data from Tables 7-2 through 7-11.

[6] Santa Clara Valley Water District, 2015 Urban Water Management Plan, p. 6-8. Accessible at http://www.valleywater.org/uploadedFiles/Services/CleanReliableWater/WaterSupplyPlanning/Urban_Water_Managment_Plan/SCVWD%202015%20UWMP-Report%20Only.pdf, and appendices at http://www.valleywater.org/uploadedFiles/Services/CleanReliableWater/WaterSupplyPlanning/Urban_Water_Managment_Plan/SCVWD%202015%20UWMP-Appendices%20Only-a.pdf.

As you know, Santa Clara Valley Water District is the only water agency in California holding water service contracts with both the State Water Project and the federal Central Valley Project. According to the District's web site, imported water from the Delta from these projects accounts for about 40 percent of District supplies in an average year. More than 70 percent of these imports go to drinking water, and 15 percent to local groundwater recharge, a vital program that has helped prevent continuing land subsidence in the Santa Clara Valley.

With this context in mind, the District must evaluate its participation in California WaterFix. The Bureau of Reclamation will not finance, own or operate the WaterFix. Cindy Kao, the District's imports program manager, informed the Board that on one hand, the federal Central Valley Project's terms of participation would entail the District "opting in" to WaterFix, while as a south-of-Delta State Water Project contractor, the District would have to opt out of WaterFix if it did not wish to participate (see below). Ms. Kao's description of these general terms are consistent with what Restore the Delta staff heard at a public workshop held by Westlands Water District on July 17.

Central Valley Project Participation. Opting in through the Bureau, the District would receive a post-hoc accounting of WaterFix diversions for which it would pay extra above and beyond its CVP contract terms. The Bureau would work with DWR to determine what the actual increment of water was necessarily diverted by WaterFix in the water year, and what amount of water could have been diverted and stored by existing state and federal facilities. Then through post-hoc accounting, the District would be billed extra for the increment of supplies that would be attributable operationally to WaterFix.

District Board members had expressed concern on July 11 what effect not participating in WaterFix would have on District supplies going forward, and whether there would be some sort of "water grab" by other contractors if the District did not join WaterFix. Ms. Kao informed Board members that the Bureau of Reclamation would continue to honor existing contract amounts using its usual method of water allocation each year. Bureau representatives at the Westlands Water District meeting confirmed this approach—that the Bureau would continue to allocate water to meet demands of existing water contractors, effectively continuing to honor existing contracts regardless of WaterFix participation status. This means there would be no "water grab" from other CVP contractors. It further means that existing District contract terms for existing imported supplies from the CVP would continue to be honored by the Bureau.

Crucially, the Bureau at the Westlands public workshop stated that if post-hoc modeling and accounting determined that the water year was wet enough, despite having used WaterFix to divert water, that water allocations could have been handled without use of WaterFix, then whatever water was diverted to storage by WaterFix would be converted to standard CVP supplies (for example, at San Luis) and accounted for under normal

water allocation procedures for that wet water year.[7] The capital costs of WaterFix however would still have to be paid by WaterFix participating contractors.

State Water Project Participation. Unlike the Bureau, the California Department of Water Resources anticipates owning and operating the tunnels as part of the SWP. In the case of the District's water service contract with the SWP, WaterFix participation would be assumed, since the District is south of the Delta. However, the District could opt out, as we understand it, and this understanding was publicly stated to the Board by Ms. Kao on July 11 and at the Westlands Water District workshop on July 17. And whether or not the District opted out of WaterFix accounting through DWR, the District would retain its normal water service contract relationship with DWR and all non-WaterFix allocations from the SWP would be honored by DWR. Again, no "water grab" would occur because of continuation of existing state water allocations through the District's long-standing SWP contract.[8]

Risk Management and California WaterFix

Physical Risks to Delta Diversions. DWR and the Bureau also claim that CWF allows flexible pumping operations in a dynamic fishery environment, and complies with salinity and flow criteria required by the State Water Board.

Climate change bodes reduced river flows to the Delta and San Francisco Bay with increased and prolonged drought. Because of its proposed flexible approach to exports with WaterFix, its Tunnels will not be used 52 percent of the time (primarily during dry periods) when water is then pumped from existing south Delta 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 the Delta region, and levee upgrades will still be necessary to protect this dual approach to exports.

There are other physical risks in the State Water Project that DWR, the Bureau, and MWD prefer not to emphasize. Most recently, Oroville Dam—the system's flagship reservoir north of the Delta—has emerged as a facility facing a lot of uncertainty as to its future operational safety and integrity. Lake Oroville is the source of stored water that is exported from the Delta for use by contractors such as the District. As you are doubtless aware, the reservoir's spillway suffered catastrophic damage last winter during releases amid heavy runoff from the Feather River Basin. While DWR has hired a contractor to replace the spillway in time for next winter, questions about the integrity of Oroville Dam itself have emerged from independent consultant review of dam safety and federal regulatory inspection reports. Whatever comes of the

[7] This type of accounting change raises the specter of WaterFix participants getting water from the project, having it convert post hoc to regular allocation status, and still having to pay for the Tunnels.

[8] And if the District's SWP contract was not honored by DWR for any reason, the District would likely have strong legal grounds for a breach of contract suit against DWR.

independent review, it is likely that state water contractors, who are responsible for paying the State of California for the costs of operating, maintaining and repairing SWP facilities, will face a bill of unknown proportions. The District would be wise to harbor its financial resources for just such a "rainy day" purpose. Loss of Oroville would set back long-term imports to the District—with or without WaterFix, and with or without District participation in WaterFix—for years.

As important are the human-behavior reasons that problems with Oroville's spillway—and potentially the dam itself—have emerged in recent months. The spillway's "root causes" followed a fatal, if long-term sequence of events:

- There were construction mistakes made: the spillway's concrete slabs were constructed over a foundation that included compacted clays over bedrock, when earlier design drawings had called for encasing the bedrock in concrete, not soft, pliable clays. "DWR used compacted clayey material (fines) to level the irregular subsurface rock grade," which was highly erodible
- Drain lines were emplaced in spillway slabs, causing the slabs to be thinner and weaker, and which contributed to poor control of drainage under the slabs which contributed in turn to erosion of the fine clay material. This undermined structural integrity of the spillway over time.
- Slab anchors (L-shaped steel beams) that attached the spillway to its (problematic) foundation also contributed to failure.
- Poor drainage and slab-cracking led to water corroding steel-reinforcement within the concrete slabs, while erosion of the poor quality foundation materials undermined structural support for the spillway itself.[9]

After a hole in a seam appeared between spillway slabs in the downhill section of the Oroville spillway, flood releases through the control gates in early February resulted in the catastrophic blow-out of the spillway, which led to the evacuation order February 13.

On the afternoon of August 1, 1975, the vicinity around Oroville Dam was hit by a significant earthquake, with Richter scale magnitude of 5.7.[10] The quake left many people wondering for a time about the seismic safety of Oroville Dam. Those fears have been rekindled and reignited by this winter's experience and revelations about the history of how DWR managed the Oroville Dam spillway. Additional questions are being raised about the spillway's control gates structure (with many anchor tendons in sub-par condition) and about the Dam itself (a massive earthen dam where vegetation grows

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[9] Robert G. Bea and Tony Johnson, "Root Causes Analyses of the Oroville Dam Gated Spillway Failures and Other Developments," Center for Catastrophic Risk Management, University of California at Berkeley, July 20, 2017, Appendix B, pp. 1-10. Accessible at http://alumni.berkeley.edu/california-magazine/just-in/2017-07-27/bob-bea-takes-us-deep-dive-through-his-dire-oroville-report.

[10] California Department of Water Resources, *Bulletin 203-78: Performance of the Oroville Dam and Related Facilities During the August 1, 1975, Earthquake*, April 1977, p. 3. Accessible at https://archive.org/details/up8performanceoforo203calirich.

from the dam face and vertical runoff patterns are observable on its face).[11] They are especially relevant when the scenario of a perfect storm is posed as a high runoff period coupled with an earthquake of potentially larger magnitude in the Oroville area? Does DWR have emergency response plans in place for such an event, and has the Department done all it can to ensure survivability of all of the Dam and Spillway structures? In the back of water contractors minds should also be the question: will my District's customers have to pay for any disaster at Oroville that such an event might pose?

What does this have to do with WaterFix risks? WaterFix would be owned and operated by the owner of Oroville Dam, the California Department of Water Resources. DWR is singled out in the "root causes" analysis for its failure to recognize and prevent conditions at the spillway that were visible, annually inspected, and potentially fatal to the spillway structure's integrity.[12]

Restore the Delta understands that the past is not necessarily predictive. But we are concerned—and it should concern every district and agency considering WaterFix participation—that DWR so poorly managed its Oroville spillway, especially since the spillway is above ground. The tunnels of California WaterFix will not be visible for easy inspection.

In a recent "White Paper" on WaterFix construction, MWD acknowledges that the project is only about 10 percent designed at present, and that there would be a waste of water associated with the Tunnels design and operation. On page 24, MWD estimates seepage flow from external groundwater into the tunnels (about 1/10 of a percent of a 2.4 million acre-foot average annual estimate); however, this passage also acknowledges that there could be leakage from the tunnels into surrounding sediments and muds as well.[13]

So, even MWD does not expect the tunnels to be water-tight as a water tunnel project. As a policy matter, this is an acknowledgement of water waste and could be a problem during dry and drought years, presenting a risk for litigation in the future. In practical

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[11] Bea and Johnson, *op. cit.*, opening section, pp. 11-16.

[12] *Ibid.*, Appendix B, p. 11. About DWR's role, the consultants conclude, "***Given the evidence of the findings in this report, the Oroville Spillway was destroying itself over time until the weakest section would finally give way.*** This engineering situation was completely preventable. Recognition, Remedial Action, Correction, and the ultimate restoration of the spillway's structural integrity should have resulted many decades ago, especially when U.S. Bureau of Reclamation was warning dam owners of the dangers" of the combined potential catastrophic effects of sub-spillway erosion, structural undermining, and powerful penetrating flow of water in and under the spillway making failure more and more likely with each passing spillway release over the years. Emphasis added.

[13] Metropolitan Water District of Southern California, *Modernizing the System: California WaterFix Infrastructure*, July 2017, p. 24. Accessible at http://mwdh2o.com/DocSvcsPubs/WaterFix/assets/cawaterfix_infrastructure_070317a_final_submit.pdf.

terms, constant leakage could have negative impacts under Delta levees and soils for neighboring properties leading to public safety issues, and could be an even more problematic cause for future litigation.

WaterFix supporters have long touted the need for the Tunnels as a hedge against seismic risk, but MWD's white paper recognizes that below-ground geotechnical studies are far from complete. This means they do not know for certain what conditions exist underground, and whether there would be adequate geology through which to put two 40-foot diameter tunnels. These are pressing, uncertain construction cost matters that should make Santa Clara Valley Water District officials skeptical. The white paper's findings that the Tunnels would be constructed well under peat soils is based on some 240 geotechnical borings and other studies conducted to date. However, MWD acknowledges that another 2,000 more geotechnical investigations must be completed to gain a clear picture of what's under the surface. It will take a few years to complete these geotechnical studies, analyze the results, and translate the findings into management decisions controlling cost and risk.

Consequently, when the authors state in the white paper's conclusion on page 29, "For California WaterFix, the key risk areas have been identified, and tools to mitigate these risks have been incorporated into the project's risk management process," the authors are NOT saying that they have definitively controlled cost risk. Such a statement cannot be made because costs may increase as they learn more about how to adequately manage logistical and construction risk. They are saying only, "don't worry, we're doing what we can to take all risks into account as we do more geotechnical work. Trust us." In short, MWD continues to sell their "adaptive management" strategy as a proactive approach in order to secure funding before completing approximately 88% of the remaining geotechnical research needed to understand the full scope of the tunnels' construction cost risks.

In short, construction risks and costs are de-emphasized by MWD to help skeptical decision makers decide to fund the project. Water districts need to understand that a yes vote to fund the proposal issues a multi-generational commitment to a project situated in a watershed that will decline with climate change.

If the District does not participate in California WaterFix, the District will continue to have rights through its water service contracts to both projects for imported supplies it now gets***.*** The District would forego the complexities and liabilities it would take on by participating in the project. Consequently, the District would have greater financial flexibility to undertake other investments that reduce the many risks to its imported and locally managed supplies, as well as its other responsibilities in the areas of water conservation, flood protection, and levee integrity.

What about WaterFix reducing earthquake risk?

DWR and the Bureau claim that WaterFix will protect California's water supply from earthquakes that would cause numerous catastrophic Delta levee failures.

And yet, in 1975, as we mentioned above, there was a 5.7 magnitude earthquake whose cause was at least partly attributed to the existence of Lake Oroville having been filled in recent years. San Luis Reservoir—from which the District draws its CVP allocation—crosses an active Ortigalita Fault, and the California Aqueduct crosses the San Andreas Fault north of Los Angeles in the Tehachapi Range. The South Bay Aqueduct crosses the Calaveras Fault in southern Alameda County. These facilities are at far greater direct seismic risk than are Delta levees.

The Delta has no major active faults within about 60 miles. The 2014 Napa quake (6.0 magnitude) caused no levee damage in the Delta. The 1989 Loma Prieta earthquake (magnitude 6.9 on the Richter scale) caused no levee damage in the Delta, despite the extensive damage it caused in the Bay Area.

If the District does not participate in WaterFix, it would be more able to afford to invest in maintenance and repairs to these existing facilities, especially in light of events at Oroville Dam.

Will participating in the Joint Powers Authority and a Public-Private Partnership address these risks and the financial risks of the WaterFix adequately?

Nobody knows with certainty right now what the vehicle of participation in WaterFix will look like. Each District board member may be deciding on the District's participation without knowing what any other water contractors in either project will decide for themselves. As a result right now, California WaterFix faces enormous financial headwinds to pay for its $17 billion price tag. How might its financing be arranged?

MWD points to the Central Coast Water Authority (CCWA) as the type of governmental vehicle for organizing the design, construction, and operation of the California WaterFix Project. But the California Water Impact Network (C-WIN), based in Montecito, California, views CCWA's experience developing its Coastal Aqueduct to bring State Water Project Coastal Branch deliveries to eastern Santa Barbara County communities in the late 1980s and early 1990s as a cautionary tale at best.

According to C-WIN, the project suffered steep cost overruns, ran well over schedule, and today is barely used by several of the member agencies because it does not supply water from the State Water Project during droughts.[14]

Water agencies supporting the Tunnels are already organized as joint powers authorities (JPAs). The District currently belongs to the San Luis-Delta Mendota Water

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[14] California Water Impact Network, "The Coastal Branch: A Cautionary Tale," accessible at https://c-win.org/c-win-the-coastal-branch-a-cautionary-tale/.

Authority, which is itself a JPA. As you are likely aware, JPAs are a legal way for public entities to share and spread financial and legal risk and pool their financial power and legal reach, while undertaking activities of mutual interest and concern among multiple governmental entities.[15] They are allowed by law to issue revenue bonds without local approval.[16] This bonding authority makes JPAs ideal public partners for public-private partnerships (P3s) organized to undertake infrastructure projects like water tunnels, since the public side of funding an infrastructure need not face voter scrutiny—and private funding almost never does.

A 2015 Brattle Group study showed that the Tunnels project "does not produce benefits in excess of costs for most agricultural water users."[17] Among other things, this draft report informed the state of California that WaterFix would require subsidies for agricultural customers. If agricultural water users will not commit to funding it, this leaves a significant gap in financing the Tunnels project.

That is where a P3 may come in: a private construction firm could bring not only their construction engineering and management expertise to the Tunnels project, they could help finance the Tunnels. P3s are legal in California (California Government Code Section 5956.4).

Many pitfalls await JPAs and their offspring, P3s. Two pitfalls in infrastructure planning and politicking are the government's tendencies to underestimate project costs and overestimate demand[18] for what the infrastructure produces (in this case, a water tunnel), and the sharing the burdens of JPA legal liabilities.

Seattle, Washington, also has recent experience with a tunnels project, a boring machine and a P3 used to finance and construct it. The Seattle tunnel project was to replace the Alaskan Way Viaduct along the city's waterfront, a single deep-bore tunnel to contain two levels of traffic with a large diameter of 57.5 feet, 1.7 miles long. (By comparison, WaterFix Tunnels would be 40 feet in diameter, two bores, about 35 miles in length.) Beginning to dig in July 2013, the boring machine struck a metal pipe and overheated, and could not back up (a concrete wall had been installed behind it). The

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[15] California State Legislature, Senate Local Government Committee. 2007. *Governments Working Together: A Citizen's Guide to Joint Powers Agreements*. August, p. 11. Accessible at sgf.senate.ca.gov/sites/sgf.senate.ca.gov/files/GWTFinalversion2.pdf.

[16] *Ibid.*, p. 13, 19.

[17] Brattle Group. 2015. *CalWater Fix Economic Analysis DRAFT*. Prepared for California Natural Resources Agency by David Sunding. November 15, p. 2. http://www.restorethedelta.org/wp-content/uploads/2016/09/CA-WaterFix-Economic-Analysis-Sunding.pdf.

[18] Flyvbjerg, B., N. Bruzelius, and W. Rothengatter. 2003. *Megaprojects and Risk: An Anatomy of Ambition.* New York, NY: Cambridge University Press. ; and Flyvbjerg, B., M. Garbuio, and D. Lovallo. 2009. "Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster." *California Management Review* 51(2): 170-193. Winter. https://ora.ox.ac.uk/objects/uuid:3aa12b48-3281-412b-904a-cb5bbd9dca8e.

machine had to be excavated, disassembled, repaired and reassembled, ***a process that took two years***. The tunnel's new completion date is early 2019; the schedule slipped, and the political and legal controversy over who is responsible for cost overruns of the project will go on for years to come. A P3 was the vehicle used to organize, finance, and construct the project.[19]

Then there is potential for conflict among the member agencies that make up a JPA. For instance, are all members responsible if the JPA, acting in their names, gets sued for damages?[20] How will a member agency balance its fiscal, financial, and water or land use responsibilities if it has fiduciary obligations to the JPA?[21] For example, if a water district as part of a JPA also faces revenue shortfalls in its individual budget from its customers conserving water, yet its JPA requires a minimum payment for debt service or other financial contribution, what should that district do? To whom does it owe primary loyalty?

Their pitfalls can extend to whether the JPA conducts its business in public as well as to conflicts of interest of its member officials under state law.[22] Add a private sector partner to the mix and any number of challenges can arise in P3s.[23]

If the District does not participate in WaterFix, it can spare future Boards, staff, and District customers all of the pain, expense, controversy, and heartache of joining a JPA and a P3 to fund, design, construct, and try to operate an exceptionally risky tunnels project.

One person's flexibility for "dual conveyance" and north versus south Delta diversions is another person's redirected impacts.

Redirected impacts occur when a new action shifts impacts from one location or population already affected by the existing project operations and shifts impacts

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[19] See Conner Everts, "Delta Tunnel Planners Should learn from Seattle's Expensive Goof," KCET, November 2, 2016. Accessible at https://www.kcet.org/redefine/delta-tunnel-planners-should-learn-from-seattles-expensive-goof.

[20] League of California Cities. n.d. *Joint Powers Authorities: Opportunities & Challenges*. Prepared by Joan L. Cassman and Jean B. Savaree. www.cacities.org/getattachment/5768b027-71a7-4bc5.../LR-Cassman,-Savaree.aspx. Gives practical legal tips for organizing JPAs, and highlights common pitfalls for those considering JPAs, from financing to legal to public access issues.

[21] *Ibid.*, p. 12.

[22] *Ibid.*, p. 15, 18-22.

[23] Sabol, P. and R. Puentes. 2014. *Private Capital, Public Good: Drivers of Successful Infrastructure Public-Private Partnerships*. Brookings Metropolitan Infrastructure Initiative. https://www.brookings.edu/research/private-capital-public-good-drivers-of-successful-infrastructure-public-private-partnerships/. Provides a breezy critique of P3s and why they were in vogue in 2014; and Stitt, C. 2017. *Infrastructure Spending and Public-Private Partnerships*. Hudson Institute. https://www.hudson.org/research/13407-infrastructure-spending-and-public-private-partnerships.

elsewhere. WaterFix supporters DWR, the Bureau, and MWD claim that the project allows flexible pumping operations in a "dynamic fishery environment," while complying with salinity and flow criteria required by the State Water Board.

"Flexible operations" redirects new impacts of the state and federal projects to the north Delta that would not have previously existed. As we have noted, climate change bodes reduced river flows to the Delta and San Francisco Bay with increased and prolonged drought. Because of the flexible approach to exports with WaterFix, its Tunnels will not be used about half the time, and seldom during dry periods, when water is then pumped from existing south Delta 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 the Delta region, and levee upgrades will still be necessary to protect this dual approach to exports, a facet of the project DWR and the Bureau prefer not to acknowledge after 11 years of planning.

The north Delta diversions will contribute greatly to *increased* reverse flow events in the north Delta which will harm Delta agriculture, economy, and fish. This means that sometimes flows get low enough already along the Sacramento River in the north Delta, and operation of the WaterFix's north Delta diversions will increase frequency of those events. East Bay MUD has testified persistently before the State Water Board that the WaterFix's increased reverse flow events would result in legal injury to their use of the legally prior Freeport diversion upstream of WaterFix intake sites. Does the District want a share of such WaterFix litigation costs that would result?

DWR and the Bureau have overstated the positive effects of WaterFix on the Delta as a regional economy, regional ecosystem, unique cultural and historical place.

The Bureau and DWR claim that California WaterFix is sized to protect the Delta environment. Only increased fresh flows, water quality protection, and restoration actions will protect the Delta environment and economy. WaterFix is sized to benefit water contractors and have redundancy for times when one tunnel needs to be shut down for maintenance. A suppressed 2015 cost study stated that taxpayer subsidies would be needed to fund agribusiness participation in the Tunnels. This has been confirmed by Westlands' farmers' reaction to the July 17 Goldman Sachs presentation.[24] 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, agribusiness uses 70% of Delta exported water. Creation of a Joint Powers Authority lends a hand to a Trump-endorsed public-private partnership (P3) that will ultimately commodify water to benefit corporate interests south of the Delta.

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[24] Dale Kasler, "These farmers say they may not pay for tunnels pushed by Gov. Brown," Sacramento Bee, July 17, 2017, accessible at http://www.sacbee.com/news/state/california/water-and-drought/article161881208.html.

California WaterFix claims to avoid impacts to Delta communities. 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 Delta roads; purchasing carbon sequestration credits elsewhere will not relieve direct pollution for Delta residents, which would become a sacrifice area.) The new intakes would add new places in Delta channels where fish would be injured and killed by fish screens and predators, would further export food supplies from starving, endangered fish, and would reduce water supplies for farms, causing job losses.

Please also see Attachment 2 of this letter for more on potential impacts of California WaterFix to Delta environmental justice communities.

Attachment 2
IMPACTS OF CALIFORNIA WATERFIX
ON BAY-DELTA ENVIRONMENTAL JUSTICE COMMUNITIES
AND THEIR DRINKING WATER SUPPLIES

Environmental justice—the potential for public decisions to avoid or mitigate disproportionate or discriminatory environmental impacts (including water-related impacts) to minority and low-income people and populations—is a solemn and vital consideration in the deliberations of state and federal agencies. They must simultaneously consider environmental justice concerns in the framework of the public interest, "the greatest public benefits," and protection of public trust resources.

Environmental justice law and policy require consideration by state and federal agencies of whether environmental justice (EJ) communities bear disproportionate environmental impacts and risks from new developments or policies. EJ communities are defined along three lines: race and ethnicity, poverty level, and degree of language isolation, all characteristics that are measurable from U.S. Census and American Community Survey data.

In the five-county region of the Bay-Delta Estuary:

- The most significant non-white populations occur in the cities of Antioch, Pittsburg, Fairfield, Suisun City, Lathrop, Sacramento, and Stockton. Within the Delta, several smaller communities are also home to significant non-white populations: Freeport, Hood, Courtland, and Isleton—all of which would experience direct construction or operational impacts from the California WaterFix.

- The Delta is called home by high concentrations of low-income and impoverished residents. Significant numbers of individuals and families with incomes below the 2014 poverty line reside in Antioch, Pittsburg, Clarksburg, Stockton, Sacramento, and West Sacramento.

- Significant concentrations of language-isolated residents reside in Antioch, Pittsburg, Lathrop, Fairfield, Tracy, Stockton, Sacramento, and West Sacramento.

- Delta region residents of color and low-income residents, including those facing language barriers, live in quantifiably distressed areas.

- San Joaquin County, making up 40 percent of Delta region geography, has the highest level of economic distress among Delta counties.[25] 43 percent of the county's population lives in distressed zip codes. Stockton ranked sixth nationally and first among large California cities over 100,000 population where 70 percent of its residents face economically distressed conditions.

- Sacramento, Antioch, and Pittsburg also are sites of significant economic distress in the Delta region.

- Economic distress manifests in the spread of food deserts in the Delta region. US Department of Agricultural Economic Research Service mapping data reveal that Stockton, Manteca, Lodi, Pittsburg, Antioch, Suisun City, Fairfield, Vacaville, Davis and south Sacramento have numerous low-income census tracts whose residents face low access to grocery stores and healthful fresh food. 54 percent of the five Delta counties' census tracts are low income and have low access to grocery stores serving healthful fresh food.

- Bay-Delta environmental justice community members cope with poverty partly through subsistence fishing to obtain dietary protein. Restore the Delta estimated that annually as many as 65 to 110 people may engage in subsistence fishing daily from licensing and creel survey data—in the tens of thousands annually.

California WaterFix will harm Stockton's Delta drinking water supply and in turn the city's Environmental Justice communities.

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[25] A recent study uses a "Distressed Communities Index" (DCI) that combines indicators of educational attainment (i.e., no high school degree), housing vacancy rate, adults not working, poverty rate, median income ratio (i.e., the ratio of community median income to that of the state), and changes in employment and business establishments between 2010 and 2013. Economic Innovations Group, The 2016 Distressed Communities Index: An Analysis of Community Well-Being Across the United States, p. 5. Accessible at http://eig.org/wp-content/uploads/2016/02/2016-Distressed-Communities-Index-Report.pdf. The DCI draws from seven indices of social and economic conditions using currently available data from the American Community Survey of the United States Census Bureau and other government data. They were chosen, according to this study, because:

> Distress manifests itself in a lack of residential investment, in shuttering businesses, and in disappearing job opportunities; prosperity the inverse. A high school diploma is the entry-level ticket to opportunity in the economy, and they remain scarce in many struggling neighborhoods.
>
> Low rates of adult employment identify communities where connections to the labor market have frayed; prospering communities, on the other hand, draw people back into the labor market with job opportunities. Poverty rates differentiate well-off from struggling communities too. And neighborhood median income relative to state median income sizes [i.e., measures] earnings differentials while controlling for differences in cost of living across the country.
>
> …The DCI does not surmount…inherent challenges [of the indicators used], but the index approach does mitigate their individual biases.

The City of Stockton is a majority minority city, and is the largest city closest to the legal Delta. The city and its environmental justice communities faces an array of threats to its fresh water supply and water quality. This attachment summarizes these threats, and the City of Stockton's efforts to address them.

The City of Stockton draws water from the Delta for domestic and municipal use. The City of Stockton obtained water right permit 21176 (Application 30531A) from the State Water Resources Control Board on December 20, 2005, to divert a flow not to exceed 317 cubic feet per second and 33,600 acre-feet per year from the San Joaquin River at the southwest tip of Empire Tract.[26] This permit required the City to complete its point of diversion, raw water and treated water transmission pipelines, and its 30 million-gallon-per-day (MGD) water treatment facility by December 31, 2015. Permit 21176 requires the City to complete application of water to its authorized uses by December 31, 2020.

The City of Stockton is concerned about the future reliability of water quality at its DWSP intake and potential water treatment cost increases if California WaterFix facilities are constructed and operated. The City of Stockton alleges that DWR and the Bureau have failed to use data collected near the City's Delta Water Supply Project (DWSP) for impact analysis of potential harm.[27] Instead, Petitioners relied on a DWR monitoring station at Buckley Cove, nearly 10 miles southeast of the City's DWSP diversion point. The City stated that "Buckley Cove cannot be considered representative of the water quality available at the City's intake."[28]

With enough time, whatever land saline water touches can turn salty, unless there is enough water to leach out salts.[29] Uses of water in the Delta depend largely on the quality of water available, but if quality degrades it may become unusable.[30] About one-quarter of Stockton's urban water supplies will rely on groundwater, a source that is

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[26] Stockton Retail Water Sources, 2015, accessible at the end of Attachment 5 and at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_225.pdf.

[27] City of Stockton, 2014 Bay Delta Conservation Plan comments, pp. 38-43.

[28] *Ibid.*, p. 38, 39.

[29] Thomas H. Means, Salt Water Problem, San Francisco Bay and Delta of Sacramento and San Joaquin Rivers, April 1928, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_213.pdf, and California Department of Water Resources, Quantity and Quality of Waters Applied to and Drained from the Delta Lowlands, Report No. 4, July 1956, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_148.pdf.

[30] W. Turrentine Jackson and Alan M. Paterson, The Sacramento-San Joaquin Delta: The Evolution and Implementation of Water Policy, an Historical Perspective, Caliofrnia Water Resources Center, Contribution No. 163, June 1977, http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_215.pdf.

connected to Delta surface water percolation.[31] The region is at risk of salinity incursion regionally from the west due to increased salinization of Delta channels.[32]

Delta agriculture continues as the region's economic base, and irrigation water quality is the foundation for the sustainability of that future growth. California WaterFix threatens beneficial uses of water by environmental justice communities in the Delta region, particularly in the Stockton area where the largest and most distressed environmental justice communities are found.

Delta environmental justice communities are isolated from more mainstream levels of prosperity by language barriers, low educational attainment rates, and lack of economic opportunity. Since environmental justice communities are closely linked to issues raised by California WaterFix like drinking water quality; agricultural, land use, and socioeconomic issues; and fish contamination issues, their residents are made more vulnerable by the disproportionately distressed conditions in which they live. Water quality impacts from construction and operation of California WaterFix would be environmental blunt trauma to a region on the threshold of recovery and sustainable prosperity, if water quality in the Delta and underground water sources can be improved.

Operation of California WaterFix Facilities would degrade water quality in Delta channels, which would in turn degrade raw water diversions and, via deep percolation, the eastern San Joaquin County groundwater basin, both of which serve as sources of drinking water for Stockton metropolitan area residents.

The City informed the State Water Resources Control Board in January 2016 that it sought to develop the DWSP to protect regional groundwater from increasing overdraft and to reduce its draw on groundwater because of that source's higher TDS content.[33] The City stated:

> Groundwater levels improved over the past few decades in the Stockton vicinity, but if groundwater must be relied upon more extensively as a result of the proposed action, groundwater levels will be expected to decline, and TDS levels in potable supplies and wastewater discharges will increase. Indirect

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[31] Stockton Retail Water Sources, 2015, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_225.pdf; and Projected Water Supplies for Stockton, 2020 to 2040, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_226.pdf.

[32] Northeastern San Joaquin County Groundwater Banking Authority, Eastern San Joaquin Groundwater Basin, Groundwater Management Plan, 2004, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_146.pdf; and San Joaquin County Flood Control and Water Conservation District, Water Management Plan, Phase 1 - Planning Analysis and Strategy, October 2001, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_147.pdf.

[33] City of Stockton, Protest of California WaterFix Change Petition, January 5, 2016, p. 2.

> groundwater-related effects of this nature would be inconsistent with the Sustainable Groundwater Management Act or its goals.[34]

The City's DWSP was developed under a California Water Code section that provides that a municipality discharging water into the San Joaquin River "may file an application for a permit to appropriate an equal amount of water, less diminution by seepage, evaporation, transpiration or other natural causes between the point of discharge and the point of recovery, downstream from said disposal plant and out of the San Joaquin River or the Sacramento-San Joaquin Delta." (Cal.Water Code § 1485.) The DWSP now appropriates Delta water supplies to serve some 47,000 residential, commercial, and industrial customers with an estimated service population of 170,000 people in the City's service area.[35] The City expressed grave concerns that DWR and the Bureau have ignored City water rights, quality, and supply, as these would be affected by California WaterFix during the BDCP environmental review process in 2013-2014 as well as the California WaterFix environmental review process during 2015.[36]

Petition Facilities' potential to degrade water quality would affect subsistence fish consumption by environmental justice communities in the Delta region, should the frequency of environmental conditions that foster toxic algal blooms increase.

DWR and the Bureau acknowledge occurrence of subsistence fishing and risks of adverse effects to people consuming fish caught from Delta channels in the period when California WaterFix operates. There has never been a census of Delta subsistence anglers, despite the potential health risks of catching and consuming fish routinely from Delta channels. Using publicly available data from the California Department of Fish and Wildlife (DFW), Restore the Delta estimates through two distinct methodologies that there are, on any given day, between 66 and 110 licensed subsistence anglers from distressed communities fishing Delta water ways.[37] Our methodologies rely on both an angling hours survey and county-level fishing license data from DFW. Assumptions are spelled out in our exhibits accepted into evidence by the State Water Board detailing how we arrived at our estimates.[38] Our methods conservatively assume that each angler fishes just once a year, which probably

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[34] *Ibid.*, Attachment 2, p. 2, and Attachment 4, p. 1.

[35] City of Stockton, 2014 Bay Delta Conservation Plan Comments, p. 1.

[36] *Ibid.*; City of Stockton, 2015 California WaterFix RDEIR comments.

[37] Methodology for Estimating Population of Delta Region Subsistence Anglers from Fishing License Data, p. 2, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_229.pdf; and Methodology for Estimating Delta Counties Subsistence Anglers from Angling Intensity (Hours) Data, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_230.pdf.

[38] *Ibid.*

underestimates total subsistence fishing activity in the Delta. Despite this limitation of our methods, we estimate between 24,000 to 40,000 subsistence fishing visits annually in the Delta from local residents of distressed communities. We offer no estimate of the mass of fish nor the number of persons actually consuming those fish.

Delta region subsistence anglers have been found to fish along both the Sacramento and San Joaquin Rivers, despite the latter being an impaired water body for a number of contaminants.[39] Delta region subsistence anglers are known to catch and consume a variety of native and introduced fish species, including American shad, bluegill, carp, catfish, crappie, Chinook salmon, largemouth bass, pike minnow, Sacramento split tail, Sacramento sucker, steelhead/rainbow trout, striped bass, sturgeon, and sunfish.[40]

Many fish caught and consumed by subsistence anglers consume prey from the bottom of river channels where contaminants can accumulate. Other fish consumed by subsistence anglers feed on prey consumed in open water or other parts of river channels. In the course of consuming prey, these species may also consume contaminants such as mercury, pesticides, selenium, and other chemicals that accumulate in prey tissues and that are regulated via Total Mean Daily Loads adopted by the State Water Board and Central Valley Regional Water Quality Control Board. Consequently, environmental justice communities are at risk of heightened exposure to health risks associated with consuming fish caught through subsistence angling in the Delta.[41]

In addition, such fish may be vulnerable to disease and death from exposure to toxins released by harmful algal blooms, such as microcystin, a hepatotoxin (toxic to liver tissue and skin) produced by *Microcystis*, a common cyanobacterium found in the Delta

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[39] F. Shilling, et al, 2010. Contaminated fish consumption in California's Central Valley Delta. *Environmental Research* 110(2010): 335, Figure 1, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_231.pdf.

[40] *Ibid*., p. 336 Table 1; J.A. Davis, et al., 2008. Mercury in sport fish from the Sacramento-San Joaquin Delta region, California, USA. *Science of the Total Environment*, 391: 69, Table 2, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_232.pdf.

[41] Shilling, et al, 2010; Davis, et al, 2008; E. Silver, et al, 2007. Fish consumption and advisory awareness among low-income women in Sacramento0-San Joaquin Delta, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_235.pdf.

since 1999.[42] Key factors believed by scientists to drive algal blooms that cause harm in open water ways include water temperature, sunlight irradiating water, water clarity, a stratified water column coupled with long residence times of water; availability of nitrogen and phosphorus, and salinity.[43]

Two of these factors would be directly affected by operation of Petition Facilities: residence time of water and salinity. Increased residence time of water decreases the loss rate of cyanobacteria from a water body.[44] Increased residence time of water also influences inversely the stratification of the water column; the slacker the flow of water the more the upper levels of a water column can warm to an optimal growth temperature range for *Microcystis*, between 25 and 35 degrees Centigrade (77 to 95 degrees Fahrenheit).[45] Such conditions may occur mainly in late summer months, but climate change effects may shorten California's winter wet season and contribute to extending the season during which harmful algal blooms may occur.[46]

Operation of California WaterFix would also increase residence time of water in the Delta. When such increased residence time is combined with reduced flows and increased salinity, also caused by California WaterFix, the period of time could increase during which environmental conditions favor algal blooms.

The environmental justice effects of increased harmful algal blooms would include increased contamination of fish populations locally from microcystin uptake and accumulation and increased risk of illness and death for environmental justice community members and pet dogs they may take with them fishing, due to contact with water while engaged in subsistence fishing. These effects would be borne disproportionately by racial and ethnic minorities, people in poverty, and people challenged by language barriers. These disproportionate effects would accumulate with the economic distress already prevalent in their communities and would undermine long-term growth in jobs, economic output, and sustainable economic development in the Stockton region.

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[42] Berg, M. and M. Sutula, 2015. Factors affecting the growth of cyanobacteria with special emphasis on the Sacramento-San Joaquin Delta, Southern California Coastal Water Research Project Technical Report 869, August 2015, p. 4, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_236.pdf; and P.W. Lehman, et al, 2013. Long-term trends and causal factors associated with *Microcystis* abundance and toxicity in San Francisco Estuary and implications for climate change impacts. *Hydrobiologia* 718: 142, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_237.pdf.

[43] Berg and Sutula, *ibid.*, p. ii, and pp. 21-33.

[44] *Ibid.*, p. 33.

[45] *Ibid.*, p. 31, 33.

[46] *Ibid.*, p. iii, 32, 48, 51.

Water quality effects of California WaterFix include effects on groundwater supplies for municipal beneficial uses.

Such water quality effects in Delta channels would affect groundwater, since surface and groundwater supplies in the Delta are connected. The Delta area has a large pumpage depression or "cone of depression" that causes an influx of water from the Delta to percolate to underground water supplies.[47] United States Geological Survey groundwater modeling estimates that Delta surface channels lose between 100 to over 500 acre-feet per year to groundwater percolation.[48] Surface water was also found to recharge groundwater from Calaveras and Stanislaus rivers and Dry Creek. On average there was a net lateral inflow to the groundwater system of 120,000 acre-feet between 1970 and 1993 (an estimated annual average of about 5,000 acre-feet per year).[49] Generally, groundwater pumping rates in San Joaquin County in 2004 were found to exceed the sustainable yield of the groundwater basin, estimated to be approximately 150,000 to 160,000 acre-feet.[50] The eastern San Joaquin groundwater basin management plan assumed that "all basin inflow in west Stockton is saline" because "accretions in the western fringes of the Basin and the Lower San Joaquin River are undesirable due to elevated salinity levels. Saline groundwater intrusion has forced the closure of several wells in the Calwater service area."[51] The City of Stockton's domestic water supply permit from the State Water Resources Control Board shows that Stockton has nine inactive wells and has destroyed another 17 wells.[52] Increased west-to-east flow is considered by San Joaquin County's groundwater basin management plan is "undesirable," as this water is typically higher in TDS and chloride levels and causes degradation of water quality in the Basin.[53] The plan further states:

> Degradation of water quality due to TDS or chloride contamination threatens the long-term sustainability of a very important water resource for San Joaquin

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[47] Faunt, C.C., ed., 2009, Groundwater Availability of the Central Valley Aquifer, California: U.S. Geological Survey Professional Paper 1766, p. 167, column 2, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_145.pdf.

[48] *Ibid.*, pp. 171-172, Figure C19.

[49] Northeastern San Joaquin County Groundwater Banking Authority, Eastern San Joaquin Groundwater Basin, Groundwater Management Plan, 2004, p. 69, Section 2.3.4.4. Accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_146.pdf.

[50] *Ibid.*, p. 69, Section 2.3.6.

[51] *Ibid.*

[52] State Water Resources Control Board, Transmittal of Water Supply Permit to City of Stockton, *op. cit.*, pp. 13-14.

[53] Northeastern San Joaquin County Groundwater Banking Authority, Eastern San Joaquin Groundwater Basin, *op. cit.*, p. 71, Section 2.3.7.

> County, since water high in TDS and/or chloride is unusable or either urban drinking water needs or for irrigating crops. Damage to the aquifer system could for all practical purposes be irreversible due to saline water intrusion, withdrawal of groundwater from storage, and potential subsidence and aquifer consolidation.[54]

The saline front of groundwater intrusion beneath south and downtown Stockton is projected to move another 1.5 miles east by 2030, just as future urban water demand was expected to see a net increase among the cities of San Joaquin County of 146,600 acre-feet per year.[55]

Summary of Water Quality Degradation for Delta Environmental Justice communities.

Increased groundwater percolation from Delta channels containing surface water that is made more saline by operation of California WaterFix facilities would increase the risk that poorer DWSP water quality would force Stockton and its other urban water supplier, California Water Service Company, to rely more on groundwater sources to supply their customers.

There are many legal users of water in the north Delta, where major agricultural crops include pears, vineyards, and other permanent deciduous crops which depend on good quality fresh water supplies. Removal of 20 percent or more of the fresh water in this region of the agricultural Delta will reduce fresh water supplies to farmers and cause injury to their water rights and crop productivity when salts build up in soil horizons, which must be leached out.[56] Available salinity modeling from the RDEIR/SDEIS indicates that central Delta locations will see increased salinity conditions as an effect of construction and operation of Petition facilities. Increased salinity conditions in affected parts of the Delta will mean agricultural uses will be injured by having either to accept lower crop yields or shift to more salt-tolerant crops, or both.

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[54] *Ibid.*

[55] *Ibid.*, p. 74, Figure 2-27, p. 75, Table 2-4; San Joaquin County Flood Control and Water Conservation District, Water Management Plan, Phase 1 - Planning Analysis and Strategy, October 2001, pp. 2-15 to 2-16, Figures 2-8 and 2-9, and p. 2-18, Table 2-3, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_147.pdf.

[56] California Department of Water Resources, Quantity and Quality of Waters Applied to and Drained from the Delta Lowloands, Report No. 4, July 1956, accessible at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/RestoretheDelta/RTD_148.pdf.

Attachment 3

Alternative Water Supply and Efficiency Cost Comparisons for California

District Board member Barbara Keegan expressed interest in seeing cost comparisons for alternative water supply options. Any cost comparison must start with a description of the District's existing water rates. The relatively low groundwater and surface water charges in the District's South County zone (Zone W-5) reflects the fact that a significant portion of that area's supply is subsidized by U.S. taxpayers through the Central Valley Project. From its web site these rates are as follows:

Santa Clara Valley Water District Water Charges for Fiscal Year 2017-2018 (effective July 1, 2017)		
Type of Charge	**Agricultural Water ($/AF)**	**Non-Agricultural Water ($/AF)**
Groundwater—Zone W-2 (North County)	$25	$1,175
Groundwater—Zone W-5 (South County)	$25	$418
Surface Water—Zone W-2	$58	$1,208
Surface Water—Zone W-5	$58	$451
Surface Water—Minimum Charge—Zone W-2	$19	$881
Surface Water—Minimum Charge - Zone W-5	$19	$314
Treated Water	NA	$1,275
Recycled Water	$49	$398
Source:	http://valleywater.org/Services/WaterCharges.aspx, accessed 2 August 2017.	

Cost per acre-foot comparisons for California WaterFix have varied widely, depending upon who is performing the analysis. The Brattle Group's 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 alternatives," but this cost figure for SWP urban agencies, which include the District, exceeds the District's own non-agricultural treated water rates ($1,275/acre-foot, shown above).[57] District decision makers should bear in mind that the cost allocated to agricultural users of WaterFix supplies (and how and whether they are subsidized and by whom) will affect the $1,414

[57] The Brattle Group, Draft CalWater Fix Economic Analysis, prepared for California Natural Resources Agency by David Sunding, November 15, 2015, p. 13. Emphasis added. Accessible at http://www.restorethedelta.org/wp-content/uploads/2016/09/CA-WaterFix-Economic-Analysis-Sunding.pdf.

per acre-foot figure quoted above—again, there is risk involved in who and how many water agencies decide to participate in WaterFix.

For agricultural water rates from WaterFix, it is unknown which and how many predominantly agricultural water agencies (such as Kern County Water Agency and Westlands Water District, and potentially other smaller such agencies) will decide to participate in WaterFix. Without Congressional action to help subsidize the construction and operation of WaterFix (and no such action is on the horizon), CVP contractors who choose to participate in WaterFix will likely pay a marginal cost that may reflect no U.S. taxpayer subsidies, meaning that they would pay a marginal cost that is more typical of what SWP agricultural water contractors would pay. It is likely to be much higher than $19 to $58 an acre-foot reflected in current District charges for FY 2017-2018.

In 2016, the Pacific Institute produced a report for urban water supply and efficiency alternatives. The following table provides a summary of their cost comparisons.

Pacific Institute Survey of Alternative Water Supply and Efficiency Alternatives, 2016			
Water Supply Source	Total Cost ($ per AF)		
	Low	Median	High
Stormwater capture - small	$930	$1,500	$1,600
Stormwater capture - large	$570	$590	$600
Recycled water - non-potable	$1,500	$1,500	$2,100
Recycled water - indirect potable reuse small	$2,000	$2,300	$2,700
Recycled water - indirect potable reuse large	$1,600	$1,800	$2,000
Desalination brackish small	$1,000	$1,600	$1,800
Desalination brackish large	$950	$1,100	$1,300
Desalination seawater small	$2,700	$2,800	$4,300
Desalination seawater large	$2,100	$2,100	$2,500
Residential Efficiency Options			
Toilet - 3.5 to 1.28 gpf	-$630	NA	-$190
Toilet - 1.6 to 1.28 gpf	$1,200	NA	$4,600
Showerhead	-$3,000	NA	-$2,800
Clothes washer	-$760	NA	-$190
Dishwasher	$12,000	NA	$19,000

Pacific Institute Survey of Alternative Water Supply and Efficiency Alternatives, 2016			
Water Supply Source	Total Cost ($ per AF)		
	Low	Median	High
Landscape conversion at $2/square foot (SF)	-$4,500	NA	-$2,600
Landscape conversion at $5/SF	$580	NA	$1,400
Non-residential Efficiency			
Toilet - 3.5 to 1.28 gpf	-$680	NA	-$70
Toilet - 1.6 to 1.28 gpf	$1,800	NA	$6,500
Urinal	$970	NA	$1,800
Showerhead	-$3,000	NA	-$2,800
Faucet aerators	-$1,200	NA	-$700
Pre-rinse spray valve	-$1,700	NA	-$1,200
Medical steam sterilizer modifications	-$1,300	NA	-$1,200
Food steamer	-$14,000	NA	-$13,000
Ice machine	-$3,600	NA	-$1,100
Clothes washer	-$1,600	NA	-$1,100
Source:	Pacific Institute, *The Cost of Alternative Water Supply and Efficiency Options in California*, prepared by Heather Cooley and Rapichan Phurisamban, October 2016, Tables 1, 2, 4, 5 and 6.		

As can be seen readily in this table, there are many cost-effective options compared with committing to finance California WaterFix. We urge District Board members to give serious consideration to the opportunity cost of investing in a variety of these options as compared with committing the District's own credit worthiness and property tax base on behalf of a very risky conveyance project that would damage the Delta estuary and its regional economy.

Attachment 4

California Water Solutions

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 local/regional self-sufficiency and good permanent 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, 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**