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August 16, 2017

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Westlands Water District

Daniel Errotabere, Vice President
Westlands Water District

Jim Anderson, Board Member
Westlands Water District

William Bourdeau, Board Member
Westlands Water District

Frank Coelho, Jr., Board Member
Westlands Water District

Larry Enos, Board Member
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P.O. Box 6056
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Subject: Westlands Water District Participation in California WaterFix

Dear President Peracchi, Vice President Errotabere, 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 the Westlands Water District (WWD) Board will be asked very soon to approve participation in the California WaterFix tunnels project (WaterFix). If constructed and completed, WaterFix would be integrated into the broader operations of

both the California State Water Project (SWP) and the federal Central Valley Project (CVP). Our letter (and its attached comments) is drafted in a spirit of what our regions have in common, and not about what pits us against each other in other settings.[1]

Restore the Delta (RTD) is rooted in an agricultural region—the Delta—where we understand clearly the importance of farming and related industries and businesses to our region's local economy. Farmers are practical business people. Like most, they think not only about today but about their children's futures. They also work hard to understand their markets, costs, prices, and perhaps most of all, risk. This letter is about risks stemming from the proposal to design, construct and operate California WaterFix.

Decision making about California WaterFix will be all about managing risk and evaluating facts as best we all know them now—not allowing the influence of unfounded rumors, half-truths, and glossy presentations short on substance. The scale of WaterFix 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 WWD Board of Directors' 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 (MWD), as well as to summarize who in the Delta's environmental justice communities would be harmed (and how) in Attachment 2 to this letter. There are literally hundreds of thousands of people comprising nearly a dozen large and small such communities. We appreciate you considering this information on Delta people as WWD board members deliberate on WaterFix.

Finally, we want you to have at least back-of-the-envelope cost comparisons for California WaterFix. In following this issue with WaterFix, we find a lack of even the roughest calculations to be adequate for evaluating the project as a business proposition. The WWD Board and its constituents deserve some ballpark cost estimates for WaterFix. We provide summary cost comparisons in Attachment 3 to this letter—and that includes adjustments to the recent analysis released by MWD.

Thank you for considering our comments and viewpoints. You have a difficult decision to make, one that will affect Delta residents and WWD farming 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).

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[1] RTD accepts the need to export some water from the Delta; the question is always how much is too much. But again, that is not the question this letter addresses.

Sincerely,

Barbara Barrigan-Parrilla
Executive Director

Tim Stroshane
Policy Analyst

cc: Thomas Birmingham, General Manager
Shelley Oslowski, Water Policy Manager

Attachments:
1. Specific Restore the Delta Comments on Risks of California WaterFix.
2. Summary of Delta Environmental Justice Communities and California WaterFix Impacts.
3. California WaterFix Cost Comparisons.

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

Restore the Delta is aware that WWD imports surface irrigation supplies from the Delta via the Delta Mendota Canal, San Luis Reservoir, and the San Luis Canal facilities of the CVP. WWD's water service contract with the Bureau of Reclamation provides for up to 1.15 million acre-feet (MAF) annually. In an average year your contract amount would amount to 23 percent of total exports of 4.9 MAF (were the Central Valley Project to allocate its supplies at 100 percent of WWD's CVP contract amount). In recent years, however, we understand that WWD has experienced drought and some environmental restrictions on exports, reducing CVP allocations to as low as zero in 2014 and 2015, 5 percent in 2016, and 20 percent in 2013. WWD has had a 5-year bad streak (2012 to 2016) where CVP supplies to WWD averaged just 178 thousand acre-feet (TAF; about 15 percent of WWD's CVP contract amount). Since 2005, WWD deliveries averaged about 629 TAF (only a little less than its average deliveries since 1988, about 649 TAF).

Between 2012 and 2016 (the recent drought years), WWD farmers pumped an average of nearly 580 TAF per year from their groundwater, and together with water transfers and other district sources, still managed to have average total supplies close to a million acre-feet a year on average in this period (about 969 TAF).[2] During this period, WWD farmers fallowed on average about 155,300 acres (about one-quarter of the District's total service area), but never below 113,000 acres. The worst fallowing year in this period was 2015, with 220,000 acres (over one-third of the District's total service area). Despite these challenges, WWD reported that crop acreages held nearly steady for 2015 and 2016 at between 568,000 and 570,000 acres in production. WWD's crop diversity continues to be impressive, spanning grains, beans, fruit and nut orchard and vineyard crops, truck, and a variety of other field crops.[3]

Whenever WWD faces reduced allocations from the CVP its farmers must pay more to irrigate their crops from groundwater lifts. They may also arrange water transfers that cross the Delta from willing sellers of surface supplies in the Sacramento Valley, which can be more expensive that WWD's water rates (see Attachment 3).

To improve its overall water supply reliability WWD has negotiated for and obtained the water service contract amounts from several smaller San Luis Unit water districts that

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[2] Summary statistics calculated from Westlands Water District, *District Water Supply.* Accessible August 10, 2017, at http://wwd.ca.gov/wp-content/uploads/2017/06/Water-Supply-Charts.pdf.

[3] Westlands Water District 2015 and 2016 Crop Acreage Reports. Both crop reports accessible August 10, 2017, at (2015) http://wwd.ca.gov/wp-content/uploads/2015/10/crop-report-2015.pdf, and (2016) http://wwd.ca.gov/wp-content/uploads/2016/10/crop-report-2016.pdf.

have gone out of business in recent years. Their modest contract amounts have since been added to WWD's main CVP water service contract to increase CVP deliveries.[4]

Water quality and drainage problems in the WWD service area can directly affect crop productivity and farm earnings depending on location. WWD's Agricultural Water Management Plan acknowledges these problems. Your service area is prone to salt build-up in the soil, "one of the oldest problems faced by irrigated agriculture," states the plan[5] due to relatively shallow clay layers that restrict natural drainage. Compounding this natural drainage limitation is the presence (upslope of WWD and in its soils) of selenium, a metalloid element that can be toxic in large doses to a variety of vertebrate species, including humans. We are aware of numerous ongoing efforts by water districts, including WWD, in the western San Joaquin Valley that address this serious water quality and drainage problem. As yet various drainage water treatment approaches remain in pilot stages.

WWD water rates for agricultural users increased sharply in recent years from a cost of service of $86 in 2012 to $166 per acre-foot in 2017, a nearly 100 percent increase in the cost of water to WWD farmers.[6] To deal with both drainage problems and rising agricultural water rates, WWD has invested intensively on behalf of its farmers in agricultural water conservation and efficiency, providing technical assistance, and actively measuring flows and monitoring its delivery system to detect and repair leaks.

Some lands in WWD's service area have been permanently retired—that is, land has been removed permanently from receiving irrigation water supplies due to drainage problems. We understand too that there is much concern about the future prospect of additional land retirement. This concern we take seriously because as advocates for a region dominated by agriculture in the Delta, we at Restore the Delta are sensitive to calls from other quarters to retire agricultural lands in the Delta, where some 80 percent of the farmland is considered by the California Department of Conservation to be prime farmland (in terms of both soil quality and water source reliability). Agriculture is our region's bread and butter, as it is in the western San Joaquin Valley.

In this fuller context that WWD faces, 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 risk issues that WWD must weigh. These issues include climate change, Delta flows, impacts to legal users of water, environmental justice, and project design, construction and operations. In addition, two recent biological opinions

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[4] These contract assignment acquisitions include Widren, Centinella, Broadview, and Mercy Springs water districts. Draft interim renewal contracts for these and WWD's main water service contract accessible August 10, 2017, at https://www.usbr.gov/mp/cvpia/3404c/lt_contracts/2016-int-cts/.

[5] Westlands Water District, 2012 Agricultural Water Management Plan, p. 14. Accessible August 10, 2017, at http://wwd.ca.gov/wp-content/uploads/2015/09/water-management-plan-2012.pdf.

[6] "New Law Full Cost" and "Old Law Full Cost" rates are even higher, ranging from $106 (new law) in 2011 to $221 in 2017, and $122 (old law) in 2011 to $270 in 2017. See Attachment 3 to this letter.

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 Westlands Water District expect to see if it participated?

We have found the expected yield of WaterFix to be a moving target, or lacking stable target yields altogether. In recent months, DWR, the Bureau, and MWD have issued documents or given presentations indicating that overall Delta exports yield with the WaterFix project is expected on average between 4.7 MAF to 5.3 MAF 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 MAF from the current average of 4.9 MAF. 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 MAF.[7] MWD has stated it expects its average share of WaterFix yield to be 248 TAF (from its 2015 Urban Water Management Plan).

The overall future export reductions are expected from application of tightened water quality and endangered species restrictions, which have not occurred and remain quite uncertain at present. 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.[8] 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).

As revealed in a Goldman Sachs presentation given at a July 17 workshop held by WWD, WaterFix supporters anticipate that the marginal water supply benefit of the WaterFix Tunnels would be about 1 MAF on average.[9] We have yet to see what would be WWD's share of this range of yield.

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[7] 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.

[8] 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.

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

But the yield target moves with WaterFix. MWD's third white paper claims that average annual WaterFix yield would be 1.3 MAF, of which MWD would receive on average about 337 TAF.[10]

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 the tunnels and their north Delta diversions.

WaterFix's inclusion of adaptive management is a source of additional risk in the WaterFix program of which WWD board members should be wary. ***California WaterFix claims "adaptive management" as an imaginary "hall pass" to inoculate itself against unforeseen environmental impacts, in the belief that whatever scientific results come about, WaterFix will protect fish and Delta communities from Tunnels operations.*** RTD sees this as an effort by DWR, the Bureau, and MWD to greenwash WaterFix with a veneer of science geared to solve future challenges and make the upcoming participation decision seemingly easier for district officials—yet they already decry regulatory restrictions that have reduced exports in the last decade. CWF supporters want it both ways: to have the greenwashing benefits of "adaptive management" to gain financing and permit approvals while down the road they would complain when new scientific results would lead to new 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 alternative WWD investment opportunities (let alone water supply reliability)—if the project goes forward and then WaterFix imports have to be reduced or curtailed because of water quality and fish protection needs?

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[10] Metropolitan Water District of Southern California and California WaterFix, "Modernizing the System: California WaterFix Finance & Cost Allocation," August 2017, p. 10, Table 2 and p. 14, Table 4; and for MWD's share of yield, p. 18, Table 7. Accessible at http://www.mwdh2o.com/DocSvcsPubs/WaterFix/assets/mwd_california_waterfix_policy_paper3_combined_august2017_final.pdf. The target moved again on August 14, 2017, at MWD's Bay-Delta Committee meeting when assistant General Manager Roger Patterson acknowledged that the project's EIR indicated a baseline yield of 228 TAF, yet the third white paper states a 1.3 MAF yield. Patterson stated he "disliked" the lower baseline but that "the 1.3 MAF baseline should not be regarded as absolute" because it "takes other things into account besides supply"; Patterson did not expand on what those other things were.

As if this was not sufficient WaterFix murk, Dr. Jeff Michael of the University of the Pacific Eberhardt School of Business and Economics wrote in the *Sacramento Bee* in September 2016 that Water Fix was a "muddled gamble." See http://www.sacbee.com/opinion/california-forum/article100874797.html. He later found that the WaterFix FEIR disclosed new yield numbers indicating that SWP contractors would receive a net increase of 186 TAF, while CVP contractors would see a ***decrease*** in their average yield of 14 TAF. See http://valleyecon.blogspot.com/2017/01/final-waterfix-eireis-shifts.html. WWD's own guess about project yield would be as good as anyone's, it appears.

There is also climate change risk to water supply yield. DWR, the Bureau, and MWD 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 in WaterFix talking points is that the project would divert as much storm flow as possible to storage south of the Delta, so that during droughts carryover is available 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 the uncertainty of whether water diverted and stored for later supply can outlast the duration of future droughts. ***This makes WaterFix's reliability very hard to assess realistically, let alone with any degree of accuracy.*** No one knows how this climate change risk will play out for the Central Valley water system. This means the Tunnels are an expensive, flood- and drought-vulnerable project, and therefore a very risky investment whose significant capital costs at a minimum must still be paid every year, rain or shine.

In the midst of these risks and uncertainties, WWD already has long term debts. As of February 2015, WWD had long-term debt (in certificates of participation and revenue bonds) exceeding $240 million, on which some $135 million in interest is owed (added to the $240 million over time). About $85 million of this interest comes due about the time that California WaterFix construction begins and revenue bonds for WaterFix would begin streaming.[11] The Goldman Sachs analysis presented on July 17 to WWD did not drill down into WWD's share of California WaterFix debt. But if WWD was responsible for 23 percent (based on average combined SWP/CVP Delta exports) of the costs reported by Goldman Sachs, that debt service would begin at about the same time WWD's existing debt obligations would be ramping up (2020 and beyond).

MWD's recent "white paper" on WaterFix financing and cost allocation claims CVP contractors would shoulder 45 percent of the $16.7 billion in capital costs of WaterFix, or about $7.515 billion. It is our understanding at this time that no CVP contractors have themselves stepped forward to assume any of this financing burden.

WWD is the largest south of Delta CVP contractor, and its participation, with its sizable tax and water sales base, is important to the project moving forward on the CVP side. By delivery volume, WWD's potential financial role could be quite variable depending on how one looks at the District's delivery history. WWD's share of deliveries from the CVP south-of-Delta average about 62 percent between 2005 and 2016, but ranged from 43 to 45 percent (2013 through 2015) to 73 percent (2011, a wet year). The average (62

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[11] Westlands Water District, Audited Financial Statements, Fiscal Year Ended February 28, 2015, Note K —Long Term Debt, pages 23 and 24. WWD's long term debt is only about $400 per acre in WWD's service area, but if one assumes there are about 700 distinct farms in the district, this works out to about $340,000 per farm in present long term debt obligations (and which over 40 years is about $8500 per year).

percent) might be the fairest of these shares, but that would mean that WWD's share of $7.515 billion would be about $4.7 billion.

MWD told its board that that District's average yield would be about 337 TAF from WaterFix. In Attachment 3 to this letter, Restore the Delta replicates a simple cost analysis of WaterFix for WWD based on MWD's paper for CVP contractors. Our analysis assumes an average yield to WWD of 337 TAF—the same as what MWD assumed for its own analysis. We also assume the same range of interest rates, and have provided scenario results for three CVP contractor participation scenarios mentioned in WWD's slide presentation from August 9—45 percent (consistent with MWD's assumption), 30 percent, and 20 percent. Finally, we used the same $16.7 billion capital cost of WaterFix used by MWD.

With these assumptions, for the 4 percent interest scenario, WWD could see per-unit water costs ranging from $312 to $700 per acre-foot of average yield on 337 TAF; for the 6-percent interest scenario, $409 to $917; and for the 8 percent interest scenario, $516 to $1,160 per acre-foot. These estimates do not include operating and maintenance costs.

These are sobering numbers. Given this analysis, the question becomes: How would WWD use its tax and water sales bases to meet such a potentially wide variation in annual WaterFix costs? Would the District need to create a California WaterFix property tax assessment it would impose on each farmer's acreage? Would it have to adjust water rates to customers each year? Or some combination of the two? The term on the bonds in RTD's analysis—as in MWD's analysis—is assumed to be 40 years, so a financial decision made in such a scenario would span nearly two generations of farmers into the future.[12] In addition, would municipal and industrial customers of WWD be exempt from WaterFix costs or would they be faced with dramatic increases in their property taxes and water rates to fund WaterFix for 40 years?

If WWD does not participate in California WaterFix, District managers would continue to maximize its CVP deliveries, carryover storage, and supplemental supplies whenever they come available. Contract-based allocations would continue for the remainder of the contract term. They would also have more future freedom to pay down WWD's long term debts.

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

Opting into WaterFix participation through the Bureau, WWD would receive a post-hoc accounting of WaterFix diversions for which it would pay extra above and beyond its regular CVP contract terms. Each year, the Bureau would work with DWR to determine what the actual increment of water was necessarily diverted by WaterFix in the water

[12] Further muddying the picture, Goldman Sachs' financing scenarios from July 17 used terms of 30, 50 and 75 years, but not 40 years as MWD did.

year, and what amount of water could have been diverted and stored by existing state and federal facilities. Then through post-hoc accounting, WWD would be billed extra (beyond its regular contract) for supplies attributable operationally to WaterFix.

Bureau representatives at the Westlands Water District meeting confirmed this approach at WWD's July 17th meeting—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, and that the Bureau would continue honoring existing WWD water contract terms for imported CVP supplies.[13]

Crucially, the Bureau at the WWD public workshop on July 17 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.[14] The capital costs of WaterFix however would still have to be paid by WaterFix participating contractors.

There are physical risks in the State Water Project that DWR, the Bureau, and MWD prefer not to emphasize.

These risks involve the management record of the agencies WWD would deal with in the decades to come with WaterFix. 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 exported from the Delta for use by SWP contractors.

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 independent review, it is likely that SWP 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. Loss of Oroville would set back long-term imports to them—with or without WaterFix, and with or without District participation in WaterFix—for years.

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[13] And in any case, if WWD's existing CVP water service contract was not honored for any reason, WWD would likely have strong legal grounds for a breach of contract suit.

[14] 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.

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 failure'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.[15]

After a hole in a spillway seam appeared between slabs of its chute, Oroville flood releases through control gates in early February resulted in the catastrophic blow-out of the lower spillway, which led to the (two-day) 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.[16] 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 from the dam face and vertical runoff patterns are observable on its face).[17] They are especially relevant when the scenario of a perfect storm is posed as a high runoff period

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[15] 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.

[16] 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.

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

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 SWP 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.[18]

MWD experienced its own recent challenges with a tunnel project all its own: the Inland Feeder Program's Arrowhead Tunnels. Begun in 1997, MWD expected the tunnels (which were to be bored through rock) to cost about $200+ million when it went to bid with contractors in 2001. Ultimately, it cost about $381 million for the Arrowhead Tunnels portion of the Feeder project when it was completed in 2009, several years behind schedule. In fairness, it was hit by two natural disasters. In October 2003 it was hit by a wildfire that burned everything outside the tunnel (Antelope West Tunnel portal). Two months later this same portal was hit by a massive mudslide that flooded the same tunnel portal site and the tunnel boring machine. The Tunnels were 12 years in the making, and were completed in 2009. They had to redesign the tunnels at least twice—once around 2001, and then again they finished a redesign about 2006 after which they finished the project in four more years.[19]

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 easily visible for inspection. Moreover, should MWD become the lead agency for the Construction Joint Powers Authority and/or Finance Joint Powers Authority, which MWD management

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[18] *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.

[19] Metropolitan Water District, "Quarterly Report for Inland Feeder Program," Corporate Resources Group, March 9, 2010; see also tunneltalk.com articles at https://tunneltalk.com/Arrowhead-Tunnels-redesign-and-rebid.php, https://www.tunneltalk.com/Final-breakthrough-for-Arrowhead.php, https://www.tunneltalk.com/Arrowhead-Success-from-the-extreme.php, and https://www.tunneltalk.com/Arrowhead-Jan10-Project-complete-TunnelCast.php.

described as possibilities at the August 14, 2017, Bay-Delta Committee Workshop on WaterFix, their managerial expertise in either area would not reduce the possibility of risk or cost overruns for the project, as exemplified by challenges they dealt with for the Inland Feeder Program's Arrowhead Tunnels.

In its first "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.[20]

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 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 first 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. The MWD first white paper's findings that the Tunnels would be constructed across 35 miles 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. These are pressing, uncertain construction cost matters that should make WWD officials skeptical.

Consequently, when MWD states in the first 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, geotechnical, hydrogeologic, and construction risk. (This was certainly the case with MWD's own Inland Feeder Program's Arrowhead Tunnels work.) They are saying only, "don't worry, we're doing what we can to take all risks into account

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[20] 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.

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 such as WWD 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 WWD does not participate in California WaterFix, it will continue to have rights through its CVP water service contract for imported supplies it now gets***.*** WWD would forego complexities, obligations, and liabilities it would take on by participating in the project. Consequently, WWD would have greater financial flexibility in the long term to undertake other investments that reduce other risks to its imported and locally managed supplies, as well as its other efforts in the areas of efficiency improvements, and groundwater quality and management.

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.

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 water contractor official may be deciding on their 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) in Santa Barbara County 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.[21]

Water agencies supporting the Tunnels are already organized as joint powers authorities (JPAs). 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.[22] They are allowed by law to issue revenue bonds without local approval.[23] 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. Of course, WWD currently belongs to the San Luis-Delta Mendota Water Authority, which is itself a JPA.

A 2015 Brattle Group study showed that the Tunnels project "does not produce benefits in excess of costs for most agricultural water users."[24] 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).

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

[22] 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.

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

[24] 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.

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[25] for what the infrastructure produces (in this case, a water tunnel), and sharing the burdens of JPA legal liabilities.

Seattle, Washington, has recent experience with a very large tunnel project (57 feet in diameter), 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 soon struck a metal pipe and overheated, and could not back up (a concrete wall had been installed behind it). The 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.[26]

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?[27] How will a member agency balance its fiscal, financial, and water or land use responsibilities if it has fiduciary obligations to the JPA?[28] 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?

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[25] 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.

[26] 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.

[27] 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.

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

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.[29] Add a private sector partner to the mix and any number of challenges can arise in P3s.[30]

If WWD does not participate in WaterFix, it can spare future Boards, staff, and District customers 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 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.

The north Delta diversions will *increase* reverse flow events in the north Delta which will harm Delta agriculture, economy, and fish. 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 WWD want a share of such WaterFix litigation costs that could 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. The 201 Brattle Group cost study stated that taxpayer subsidies

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

[30] 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.

would be needed to fund agribusiness participation in the Tunnels. This funding gap has been confirmed by WWD farmers' reaction to the July 17 Goldman Sachs presentation.[31] Skepticism of WaterFix in the western and southern San Joaquin Valley is not new, either.[32]

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[33], would further export food supplies from starving, endangered fish, and would reduce water supplies for farms, causing job losses. Such events would lead to the adaptive management restrictions that DWR, the Bureau, and water contractors generally fear.

Please also see Attachment 2 of this letter for more on potential impacts of California WaterFix to Delta environmental justice communities and the city of Stockton's drinking water supplies.

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[31] 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.

[32] Dale Kasler and Ryan Sabalow, "Price, risk weigh heavily on farmers who would draw from Delta water tunnels," *Sacramento Bee* August 8, 2015, accessible at http://www.sacbee.com/news/state/california/water-and-drought/article30511836.html.

[33] See California Fisheries Blog series on the Twin Tunnels Project, Part 1 at http://calsport.org/fisheriesblog/?p=1741; Part 2 at http://calsport.org/fisheriesblog/?p=1748; and Part 3 at http://calsport.org/fisheriesblog/?p=1756.

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.[34] 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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[34] 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.[35] 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.[36] 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."[37]

With enough time, whatever land saline water touches can turn salty, unless there is enough water to leach out salts.[38] Uses of water in the Delta depend largely on the quality of water available, but if quality degrades it may become unusable.[39] About one-quarter of Stockton's urban water supplies will rely on groundwater, a source that is

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[35] 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.

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

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

[38] 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.

[39] 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.[40] The region is at risk of salinity incursion regionally from the west due to increased salinization of Delta channels.[41]

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.[42] 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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[40] 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.

[41] 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.

[42] 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.[43]

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.[44] 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.[45]

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.[46] 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.[47] Our methods conservatively assume that each angler fishes just once a year, which probably

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

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

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

[46] 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.

[47] *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.[48] 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.[49]

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.[50]

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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[48] 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.

[49] *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.

[50] 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.[51] 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.[52]

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.[53] 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).[54] 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.[55]

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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[51] 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.

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

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

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

[55] *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.[56] United States Geological Survey groundwater modeling estimates that Delta surface channels lose between 100 to over 500 acre-feet per year to groundwater percolation.[57] 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).[58] 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.[59] 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."[60] 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.[61] 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.[62] 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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[56] 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.

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

[58] 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.

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

[60] *Ibid.*

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

[62] 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.[63]

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.[64]

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.[65] 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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[63] *Ibid.*

[64] *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.

[65] 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.

Attachment 3
California WaterFix Cost Comparisons

Westlands Water District Water Rates Comparison, 2011-2012 with 2017-2018 (Dollars per Acre-Foot)						
	2011-2012 Water Rates			2017-2018 Water Rates		
	Cost of Service	New Law Full Credit	Old Law Full Credit	Cost of Service	New Law Full Credit	Old Law Full Credit
Reclamation Charges						
Water Rates	$39.68	$59.28	$74.91	$105.20	$165.55	$214.68
Trinity PUD Assessment	$0.05	$0.05	$0.05	$0.30	$0.30	$0.30
Restoration Fund	$9.29	$9.29	$9.29	$10.23	$10.23	$10.23
SLDMWA O&M	$23.48	$23.48	$23.48	$25.79	$25.79	$25.79
WWD O&M	$15.21	$15.21	$15.21	$15.68	$15.68	$15.68
WWD Water Delivered Benefit	$1.04	$1.04	$1.04	$1.41	$1.41	$1.41
WWD Water Exchange Obligation	-	-	-	$0.31	$0.31	$0.31
WWD SWRCB Water Rights Fee	$0.47	$0.47	$0.47	$1.26	$1.26	$1.26
SLDMWA True-up	($2.93)	($2.93)	($2.93)	-	-	-
Total Ag Water Rates	**$86.29**	**$105.89**	**$121.52**	**$160.18**	**$220.53**	**$269.66**

Sources: Westlands Water District, *Agricultural Water Management Plan*, 2012; and WWD 2017-2018 Water Rates & Charges, June 20, 2017. Accessible at www.ca.gov.

Current WWD water rates are shown in this table for Fiscal Year 2017-2018.

For agricultural water rates from WaterFix, it is unknown which and how many predominantly CVP agricultural water 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 is more typical of what SWP agricultural water contractors would pay.

Using the following assumptions, Restore the Delta analyzed WWD's potential WaterFix costs, assuming (as MWD does) that CVP contractors would shoulder 45 percent of WaterFix's cost, and that specifically WWD would assume 62 percent of the costs borne by CVP contractors, based on recent historic CVP deliveries.

Restore the Delta replicates a simple cost analysis of WaterFix for WWD based on MWD's paper for CVP contractors. Our analysis assumes an average yield to WWD of 337 TAF—the same as what MWD assumed for its own analysis. We also assume the same range of interest rates, and have provided scenario results for three CVP contractor participation scenarios mentioned in WWD's slide presentation from August 9—45 percent (consistent with MWD's assumption), 30 percent, and 20 percent. Finally, we used the same $16.7 billion capital cost of WaterFix used by MWD.

With these assumptions, for the 4 percent interest scenario, WWD could see per-unit water costs ranging from $312 to $700 per acre-foot of average yield on 337 TAF; for the 6-percent interest scenario, $409 to $917; and for the 8 percent interest scenario, $516 to $1,160 per acre-foot. These cost estimates do not include operating and maintenance costs.

Restore the Delta Cost Estimates for WWD	4% Scenario	6% Scenario	8% Scenario
CVP High Share of Capital Costs (45%)	$380,000,000	$499,000,000	$630,000,000
CVP Medium Share of Capital Costs (30%)	$253,000,000	$333,000,000	$420,000,000
CVP Low Share of Capital Costs (20%)	$169,000,000	$222,000,000	$280,000,000
WWD Share of CVP High Share	$236,000,000	$309,000,000	$391,000,000
WWD Share of CVP Medium Share	$157,000,000	$206,000,000	$260,000,000
WWD Share of CVP Low Share	$105,000,000	$138,000,000	$174,000,000
WWD Cost per AF of CVP High Share	$700	$917	$1,160
WWD Cost per AF of CVP Medium Share	$466	$611	$772
WWD Cost per AF of CVP Low Share	$312	$409	$516

Source: Metropolitan Water District of Southern California, *California WaterFix: Financing and Cost Allocation*, August 2017; Restore the Delta.

Clearly the more CVP contractors participate—or the lower the overall participation rate (i.e., 20% versus 45%), the less expensive WaterFix supplies would be. While this

analysis is a “back of the envelope” rough estimate, it gives a sense of high and low WaterFix costs to WWD board members and farmers based on “participation decision” parameters described at WWD’s August 9 meeting. But even at a low participation rate, it still strikes RTD as a high cost to WWD for Delta imports.

From these two tables it is apparent that:

1) WWD’s basic cost of service agriculture water rate has nearly doubled since FYI 2011-2012, from $86 to $160 an acre-foot in FY 2017-2018. The Old Law Full Credit water rate has more than doubled, from $122 to $270 an acre-foot.

2) The cost per acre-foot of any scenario of California WaterFix bond interest rates (based on MWD’s interest rate assumptions) or various CVP participation rates in WaterFix, greatly exceeds current WWD water rates. With the highest level of WWD participation (45%) the marginal cost of WaterFix supplies would range from $516 to $1,160 per acre-foot. The lowest share of WWD participation (20 percent of project cost), the marginal cost of WaterFix supplies would range from $312 to about $700 per acre-foot.