

Melissa Stone

From: Nicholas R Virgallito <nrvirga@sbcglobal.net>
Sent: Tuesday, May 01, 2018 1:25 PM
To: Board of Directors
Subject: Brown's Tunnel Boondoggle

This is a water grab. Please vote NO on your minimum \$650 million contribution. Thank you.

Sent from my iPhone.

Melissa Stone

From: Michael Seaman <michaeljseaman@gmail.com>
Sent: Tuesday, May 01, 2018 1:16 PM
To: Board of Directors
Subject: Please vote NO on the Delta Tunnels project

As one who grew up in the Bay Area, as a former resident of Santa Clara County, and as a graduate of San Jose State University, I respectfully ask that your Board vote NO on the California Water Fix/Delta Tunnels project at your special meeting on May 2, 2018.

Your District's mission statement speaks to providing water for your constituents in a way that respects the environment and the economy. Because the Water Fix/Tunnels project is highly detrimental to both the environment and the economy, it not only merits a NO vote from your Board, it actually deserves your opposition. The Delta Tunnels (whether 1 or 2) is well-known as a serious environmental threat to the largest estuary on the West Coast, since it will divert a massive amount of the Delta's fresh water inflow away from the Delta. The Delta ecosystem requires a saltwater/freshwater balance that the Tunnels project will intensively disrupt. That will cause major stress for species -- including salmon and steelhead -- that depend on the Delta's estuarine system. It will also cause great harm to key pillars of the Delta economy, agriculture (e.g. sustainable crops like Chenin Blanc grapes) and recreation (e.g. fishing). Your constituents are also at risk from those impacts because the Delta is intimately related to -- actually is a part of -- the San Francisco Bay ecosystem. The fisheries of the Delta are also fisheries of the San Francisco Bay Area, hence harm to commercial and sport fishing industries in the Delta is also problematic for the southern Bay Area. Likewise, the economic well-being of the Delta is directly connected with the economic well-being of the economy across the rest of the Bay Area.

Still another reason for your Board to be wary of the Tunnels is the project's direct impact on your ratepayer's bills. It is misleading to think of the project as requiring an investment of \$16 billion or so. By the time the costs of borrowing are figured in, and giving consideration to project cost escalation common to enormous public works projects of this nature, the price tag will likely run up to around the \$64 billion. Yet, even with conservative estimates of the project's costs, your ratepayers are likely to see hikes in their monthly water bill ranging from \$4.47 to \$10.26. Such increases will shift significant funds away from the local consumer economy. Unfortunately, those local funds will not be buying "new" water. Instead, they will be primarily subsidizing cheap water for Corporate Welfare Queens, Big Oil Frackers and Sleazy Water Purveyors in the San Joaquin Valley.

There is also a concern that there may have been a back-room deal to enable your District to win a water storage grant as a result of an affirmative vote on the Tunnels. I most certainly hope that concern is unfounded. I am a local elected official of a special district in suburban Sacramento County and a former member of the Board of Directors of the California Special Districts Association. I know from experience that even an appearance of a conflict of interest can be regarded as a conflict of interest, even if no such actual conflict exists. I am greatly concerned about how lack of ethics on the part of some local governmental entities -- whether real or merely perceived -- can stain all local governments. Please know that I could applaud your efforts to find "new" water by fixing the current water infrastructure and investing in sensible surface or underground water storage projects. But under no circumstances can I condone any project that is not built on a rock-solid foundation of ethics, openness and transparency.

Finally, over the course of many years of participation in statewide special district matters, I have established relationships with water system leaders up and down the state. My conversations with them have consistently concluded that the Delta Tunnels Project is a boondoggle that will be tied up in litigation for years, with strong potential for ultimate failure. It has been particularly interesting to me that my water supply colleagues in Southern California have been quick to deny even the need for the project, in addition to their grim outlook on its end game.

Please cast your votes against the California Water Fix/Delta Tunnels project. Thank you for your attention to my input, which I request you enter into the record.

--

Michael Seaman
Arden Arcade CA 95825

Local control was a good idea in 1776 and it still is
Energy efficiency 1st in the loading order.
Take a ski or snowboard lesson from a Pro.

Melissa Stone

From: Elizabeth Morales <ejr_morales@yahoo.com>
Sent: Tuesday, May 01, 2018 1:59 PM
To: Clerk of the Board
Subject: OP-ED for SCVWD Board

VOTE NO...DELTA TWIN TUNNEL AQUEDUCT HAS ALTERNATIVES NOT CONSIDERED

Hilbert Morales, EL OBSERVADOR.....For EO editon Dated 05.03.2018 Embargoed until 7:00 AM Friday, 05.03.2018

The Santa Clara Valley Water District Board needs to continue to support its original decision not to support the proposed twin tunnel project which will divert water southward towards Los Angeles, CA. It is time to get beyond 'diversion' projects which began with taking all the water from the Owens Valley.

An alternative is to build on DESALINIZATION OF SALTY OCEAN WATERS: Using solar energy to provide the electricity needed and the solar energy, both of which are readily available, desalinization facilities need to be build all along the Pacific Coast from the San Francisco Bay down to San Diego.

Of course, the high initial cost is what many planners and policy decision-makers use as a rationale to continjue to do the traditional thing: Diversion of river's water towards the needs of California's Southland. **THIS APPROACH DOES NOT ADD POTABLE WATER TO THE UNRELIABLE SOURCES OF NATURAL WATER WHICH ARE REPLENISHED BY ANNUAL CYCLE OF RAINFALLS.** California is now in its sixth year of drought. The unusually ample rainfalls of January/February 2017 replenished (just in time) most reservoirs resulting in a temporary reprieve.

Let's begin building DESALINIZATION FACILITIES beginning in the San Francisco Bay Area all trhe way down to San Diego, California. DESALINIZATION PROCESSES will add to existing potable water replenished annually by rainy weather seasons...which are now quite unreliable because of the GLOBAL CLIMATE CHANGES being experienced.

Desalinization processes exist; are being used in the Mid-East as a source of potable water for major urban centers. The best practices of existing desalinization processes could be implemented. Imagine adding more desalinization facilities to those already being used in San Diego and Santa Barbara. **THIS APPROACH WILL ADD POTABLE WATER TO EXISTING SUPPLIES IN A VERY RELIABLE WAY.**

The solar panel farms needed currently are placed on open land. Why not develop incentives to have homeowners agree to place solar panels on their roofs and back-feeding the electricity produced using existing public utility wiring? This would decrease the land areas used for 'solar farms'.

Consider that the SUN will continue to provide the earth with sunshine for hundred millions of years into the future. Most importantly, it is CLEAN ENERGY which adds no 'greenhouse gases' (carbon dioxide and methane) to the atmosphere thereby not adding any support to the global warming process.

The construction of desalinization facities will produce a 'multi-facility system' whose production processes could be managed and controlled to produce potable water as needed...eliminating the need to build: a) more dams; b) more reservoirs; and c) more aqueducts and canals.

Decision-makers from Governor Brown, CA Water Commission, SCVWD board and others need to take the time to compare the costs of what they are proposing (twin water tunnels under the Delta, build Paceheco Pass dams; etc.) which extends the current tradition of diversion of natural waters) with the costs of building desalinization facilities along the Pacific Coast shoreline...and even pumping the potable water produced over the Pacific Coast mountain ranges to release it into exiting dry creek beds which will act as water conduits down to the San Juaquin River...and along the way enter into existing natural portals to replenish existing 'valley acquifers' currently being depleted by excessive pumping to irrigate orchards and other crops.

I can imagine the entire San Juaquin (and other valleys...Imperial & Salinas vally) being used for year round agricultural production because with enough desalinization facilities in operation, this State of California's agri-business and population could continue to grow and thrive because it has built the required desalinization facilities necessary to earn complete reliability with respect to potable water. It could become totally independent of the vagaries of weather...and that is important now that global warming has disrupted traditional weather patterns.

The continued construction of diversion facilities such as the proposed Twin Tunnels under the San Juan Delta is a great boondoggle especially when the alternative (desalinization of oceanic waters) is not being considered for development and implementation. The traditional reason to not consider desalination technologies and facilities is their perceived 'very high costs', but when I add up all those traditional projects being proposed today (dams, reservoirs, aqueducts)...I come up with a very high total investment into traditional approaches WHICH DO NOT ADD ONE GALLON OF POTABLE WATER TO THOSE PRODUCED BY NATURAL PHENOMENON.

MY ADVICE TO THE BODY POLITIC: DO NOT LET CURRENT ELECTED OFFICIALS ENCUMBER CURRENT TAX REVENUES TO UNDERWRITE 'FIX WATER PROJECTS' BECAUSE THE FUTURE OF CALIFORNIA DEPENDS UPON POTABLE WATER WHICH MAY BE PRODUCED IN REQUIRED VOLUMES BY THE USE OF SOLAR ENERGY, EXISTING TECHNOLOGIES...so that solar energy and oceanic waters (both available in copious amounts) are put to use in a sustainable and very reliable potable water production system which can be managed to produce what is needed as needed. One cannot say that about the current efforts which continue to rely upon unreliable natural weather phenomenon being altered by global warming.

The use of desalinization technology and its facilities can be very affordable when the California Water Commission plans a 'total system' and encourages local jurisdictions to build and manage their own local plants. In the County of Santa Clara, Alviso would be a logical site for its desalinization facility designed to produce 3 gallons of potable water per resident....and allocate some potable water produced to being pumped up the valley to the higher levels and released into local creeks which would 'feed that water into existing natural aquifers (which is already being done).

There is a shortage of the understanding and resolve to use existing knowledge and resources to develop an 'alternative source' of reliable potable water. All of California will benefit from the use of existing desalinization technology. It is possible to make the whole State of California and specifically the County of Santa Clara (Santa Clara Valley) totally independent of the vagaries of weather and global climate changes.

LET US BEGIN BY "VOTE NO ON THAT DELTA TWIN TUNNEL AQUEDUCT PROJECT WHICH HAS ALTERNATIVES NOT BEING CONSIDERED. Δ

Melissa Stone

From: ML Stefan <mlstefan2013@gmail.com>
Sent: Tuesday, May 01, 2018 2:09 PM
To: Board of Directors
Cc: mei-ling@ecogg.org
Subject: Please do not return to Twin Tunnels
Attachments: Letter_SCVW_2018May1.pdf

Honorable Board of the Santa Clara Valley Water District:

I am a Sunnyvale resident, writing to urge you NOT to reverse your decision made in October last year with regard to the WaterFix project.

The \$11 B commitment from the Metropolitan Water District has not improved the merits of the twin tunnels, or improved the transparency of the State Water Department, or made the project less of a financial risk for us in terms of real costs and benefits. Besides, a collaboration with the MWD on the twin tunnels would be like playing see-saw with a heavy-weight champion. SCVWD may well be stuck in a position that makes it hard to get back to the ground.

Moreover, the twin tunnels are potentially even more damaging to the Delta ecosystem than the current practice. While there is no consensus among scientists on whether the twin tunnels are better or worse for fish [1,2], a basic consequence of reduced outflow of fresh water from the Sacramento River is worsened water quality in the Delta. Water quality (turbidity, pollutants) and temperature are important stressors to wildlife species, along with loss of habitat, insufficient river outflows, and wrong flow pattern. Different species have different levels of sensitivities to various stressors. Warm water and pollutants (nutrients) also encourage undesirable algae growth.

Only recently have I learned that the multiple sections of the San Joaquin River are listed as “impaired waters” owing to high temperature, turbidity or pollutants [3]. According to a 2012 report from the National Academy of Sciences [4]: “Continued study is essential, ... ecological risks from water quality changes, especially selenium, of changing flow paths in ways that increase the ratio of San Joaquin River to Sacramento River water entering the bay.” (p.144 of report)

The State Water Resources Control Board is in the process of finalizing the update of the bay delta water quality control plan.

I imagine this is a most difficult decision for you. If the Board feels inclined to join the twin tunnels, please give us the chance to vote this November – at least an advisory vote. Most people do not know about the twin tunnels. From my limited observations, when people are asked to vote, many will really start thinking and studying. So a vote may even serve as an excellent opportunity to educate the public on both the preciousness and the cost of water. Thank you.

Sincerely,

Mei-Ling Stefan

References

- [1] “Effects of the proposed California WaterFix North Delta Diversion on flow reversals and entrainment of juvenile Chinook salmon (*Oncorhynchus tshawytscha*) into Georgiana Slough and the Delta Cross Channel, northern California”, US Geological Survey, <https://pubs.er.usgs.gov/publication/ofr20181028>
- [2] “Making the Delta a Better Place for Native Fishes”, Peter Moyle et al, www.coastkeeper.org/wp-content/uploads/2018/03/Delta-White-Paper_completed-3.6.pdf (March 2018 report commissioned by the Orange County Coastkeeper)
- [3] “California Impaired Waters” <https://archive.epa.gov/region9/mediacenter/web/html/index-20.html>

[4] The National Academies of Sciences, "Sustainable Water and Environmental Management in the California Bay-Delta" <https://www.nap.edu/download/13394> (create account and download pdf for free) 17 scientists in the report committee, independently reviewed by 11 external scientific experts. See Table 3-2 and p. 144.

Melissa Stone

From: William Godwin <bgodwinn@gmail.com>
Sent: Tuesday, May 01, 2018 3:39 PM
To: Board of Directors
Subject: Objection to Delta Tunnels plan and SCVWD participation

Hello Board of the Santa Clara Valley Water District (Board),

I strongly discourage the Board from participating with the Metropolitan Water District of Southern California (MWD) on, or changing your October vote against the Delta Tunnels project.

The project is a water grab by urban and agricultural interests to the detriment of the Bay Delta system. Diverting water at the proposed intake and diverting it south directly beneath the delta would only reduce the amount of fresh water from reaching the delta and San Francisco Estuary. This reduction of fresh water would allow the saltwater/freshwater interface to push further east thus contaminating farmland and wells. While not exactly the same mechanism, saltwater intrusion has and continues to threaten our water all up and down the coast of California. Once an aquifer has been contaminated with saline water, it is no longer viable...period.

There is no logical explanation for how a "Water Fix" via this tunnel "improves the plumbing" or "improves the fisheries" of the Delta. Just look at the degradation so far over the last 70 years. Less fresh water = less habitat and health for this ecosystem.

In addition the costs for this "underground peripheral canal" would be exorbitant for rate payers, legitimate rural water users and taxpayers alike. I have experience in tunnel design and construction. This will be a challenging and expense project.

Do not be swayed by powerful interests to the south. Stick to your original vote and plan from before. SCVWD has several reservoirs that garner your attention now (seismic concerns) in addition to the recent funding for the Pacheco Reservoir expansion. Look to the future of our state. Advocate for the Delta. Vote NO on the Delta Tunnel project.

I request that this letter be included in the record for May 2, 2018 Board meeting.

William Godwin, PG, CEG
Consulting Geologist
25525 Shafter Way
Carmel, California 93923
bgodwinn@gmail.com
(M) 831 884 3308

Melissa Stone

From: certifiedhypnotist <certifiedhypnotist@yahoo.com>
Sent: Tuesday, May 01, 2018 3:33 PM
To: Board of Directors
Subject: The Twin Tunnels project

Please represent the best interests of your ratepayers and of the people of California and do not vote to fund the Twin Tunnels. This project will not create new water and will not alleviate drought conditions. Studies confirm that California has never actually had enough water to meet all past commitments, some of them made in questionable back-room deals. This situation is is getting worse.not better.

Qualified experts agree: the project, if passed, will expose your rate payers to pointless additional expenses Given the cost of the project, if it goes ahead, other Californians will be burdened as well. Worst of all, it is well documented that it will greatly harm, even destroy our precious Delta.

We need funds to secure levees and water infrastructure against earthquakes and floods. We need to promote and to subsidize water conservation measures. It is foolish beyond reason to promote further drains on a supply that is already inadequate to meet past paper water agreements. The climate is changing and we can no longer use water in the same way, especially not to grow export crops in the desert that are dependent on abundant water.

Please think of all Californians and of the future and do not destroy what we have left. You have to live with your conscience.

Gail Sredanovic
2161 Ashton Av.
Menlo Park, CA 94025
650-854-0344

I would attend the meeting but have a prior committment at which I am making a presentation.

Melissa Stone

From: david <bezanpsy3506@hotmail.com>
Sent: Tuesday, May 01, 2018 3:40 PM
To: Board of Directors
Subject: The Water Fix

Hi Board,

Please vote no on The Water Fix - an ecological travesty that does not bring any additional water into CA.
Cost overruns in the billions are likely.

Instead, enact conservation/recycling measures and impose graduated taxes on usage above minimal subsistence levels.

Thanks,

David Bezanson
local resident

Melissa Stone

From: amgibr-md@yahoo.com
Sent: Tuesday, May 01, 2018 3:50 PM
To: Board of Directors
Cc: John Varela; Gary Kremen; keegan@valleywater.org; Nai Hsueh; Richard Santos; Linda LeZotte; Tony Estremera; joe.simitian@bos.sccgov.org
Subject: Comment memo for Special Board Meeting on California WaterFix, May 2, 2018, Item 2.1
Attachments: Giberson memo for 522018 SCVWD board meeting.docx

Included (attached and below) is our submission regarding the Santa Clara Valley Water District Special Board Meeting on California WaterFix, May 2, 2018, Item 2.1.

Please distribute it to the SCVWD Board members timely via e-mail and also include the memo in the public information to be distributed at the 5/2/2018 SCVWD Board meeting.

Thank you,

Alan and Meg Giberson

May 1, 2018

TO: Honorable Members of the Santa Clara Valley Water Board

FROM: Alan and Meg Giberson

RE: **Special Board Meeting on California WaterFix, May 2, 2018, Item 2.1**

We appreciate the opportunity to comment again on WaterFix. The Santa Clara Valley Water District (SCVWD) Board should demonstrate leadership by vigorously promoting increased use of local, available water—through means such as recycling, reuse, conservation and stormwater capture with associated groundwater storage—and not by seeking water from the twin tunnel project called California WaterFix (CWF).

The progress that SCVWD has made to date in considering these “alternate” sources (as reflected in its “no regrets” portfolio) has been largely ceremonial, given the huge potential for local water amounts, which far exceed the possible deficit of 36,000 acre-feet per year (afy), if no WaterFix were built.

The report before the Board repeats flaws in previous assessments by promoting CWF despite many potentially costly uncertainties and risks inherent in the project.

CWF problems for SCVWD include, without limitation (*see* Giberson Attachments A and B, *infra*, for more specifics):

- increasing financial costs, including, but not limited to, future debt increases from rate increases (*see, e.g.*, the 15% rise in long-term US treasury bills in just the past six months, which is at odds with previous SCVWD analyses that assumed a 3% inflation rate);

- likely construction cost overruns (especially given the costs of tunneling at up to \$1 billion a mile);
- potential minimal yield from CWF as low as 28,500 afy (5/2/2018 staff report, Attchmt. 5, p. 3 of 22);
- failure transparently to monetize and credit the positive net benefits of local water use;
- decreases in water quality (proposed CWF intakes are miles closer to outflow from Sacramento sewage treatment plant than current intakes—likely to offset the supposed gains in salinity quality improvements);
- insecure funding (SCVWD’s 10/13/17 report noted that its anticipated \$620 million contribution to CWF cost could double if full anticipated funding were not available; full funding is questionable in view of currently-identified problems);
- increased risk from: dependence on uncertain future agreements with MWD/ Reclamation/others to resolve substantial concerns regarding funding (JPA, bonds, security agreement, etc.), construction details and SCVWD ability to control same, SCVWD’s future obligations and questionable ability to influence outcomes; legal outcome of validation action; problems newly-identified in SWRCB WaterFix hearings Parts 1 and 2 (for instance, regarding reported failure to design tunnels to withstand the maximum-expected Delta seismic event in existing soft alluvial soils, likely problems due to proposed tunneling through existing gas fields with insufficient study, etc.).

SCVWD previously (9/19/17) identified CWF as its riskiest proposed water source in its weighted cost risk analysis of thirteen projects. The considerations outlined in this document, with accompanying memos, demonstrate that risk assessment continues to be the case.

CONCLUSION:

Alternate water supplies featuring surface water—including recycling, reuse, conservation and stormwater capture with associated groundwater storage—should be pursued; their benefits include, without limitation:

- cleaning up discharges to the Bay from sewage treatment plants (POTWs);
- reducing algal blooms from POTW discharges;
- greatly enhancing stormwater capture that could dramatically increase local supply—regarding stormwater harvesting in San Jose, Dr. David Sedlak^[1], has noted that “if San Jose could just capture half of the water that fell within the city, they’d have enough water to get them through an entire year” (accessible at https://www.ted.com/talks/david_sedlak_4_ways_we_can_avoid_a_catastrophic_drought);
- providing open space and recreation facilities during dry seasons;
- enhancing local water supplies^[2];
- providing local control over our water supply.

Dams are an expensive alternate to storing water in groundwater aquifers, and should not be pursued. As Professor Barton Thompson of Stanford has said, 8.4 maf of groundwater storage capacity could be developed using the Proposition 1 (2014) water bond monies—about seven times more than the 1.4 maf of new water storage that could be developed if the same funds were used for dam construction.

We submit this document for the public record, along with included Attachments A and B, our previously-submitted memos dated October 13, 2017 ("Attachment A") and September 19, 2017 ("Attachment B"), which—although timely submitted—were never included in the printed public record.

ATTACHMENT A to Giberson 5/1/2018 memo re SCVWD WaterFix Special Board Meeting on California WaterFix, 5/2/2018

October 13, 2017

TO: Honorable Members of the Santa Clara Valley Water District Board

FROM: Alan and Meg Giberson

RE: October 17, 2017, SCVWD WaterFix meeting

California WaterFix (CWF or WF) is a fantasy project. The years-long process of "study" has left a "project" that seems no more real than it did 10 years ago because so much about it is unknown. Only 5% to 10% of the project has been designed so far; 90% to 95% of its design has yet to be determined. With its legal status as part of the SWP uncertain, with construction costs unknowable because of WaterFix's incomplete design stage, with as-yet-undeterminable borrowing costs (being dependent in part on whether a JPA or government/state actor will be the borrower), and with uncertain amounts of yield and cost per acre-foot of any WaterFix water, nothing about WaterFix can be relied on.

Currently available information demonstrates that WaterFix is a quagmire not a solution. California residents are being asked to trust, but there is insufficient data with which to verify. Need for this project cannot be demonstrated because local projects and local water sources will yield more reliable water at an equal or lesser cost.

COST will soar; COST OVERRUNS to be expected

CWF costs will rise above what has been promoted; accurate costs of construction and/or resulting cost per acre foot of water have not been—and cannot be—assured. CWF water costs presented to SCVWD board have been low-balled at \$600 per acre-foot (according to SCVWD projects' cost analysis, 9/19/17, Item 2.1-E, Handout, Attachment 4, revised page 13 of 42). However:

- staff has also labeled WaterFix cost as the riskiest, in a Weighted Cost Risk analysis of thirteen projects (Fig. 3, Attachment 3, SCVWD Item # 2.1, 9/19/17);
- costs will reach \$888 to \$1427 per acre-foot (in 2033 dollars) according to Kern documents (“Kern document” at <https://wrmwsd.com/wp-content/uploads/2017/08/KCWA-CWF-Overview-Public-Version-Complete-9.15.17.pdf>, page 72).

Cost overruns have plagued projects in this state and elsewhere. The Bay Bridge and high-speed rail are but two California examples.

The Legislative Analyst's Office also reported in 2009 an “upward expenditure cycle [of the SWP] ... due in part to the lack of effective budgetary oversight of the (State Water Project).” The LAO has recommended making the State Water Project's entire budget part of the state budgeting process. Such a process might help CWF's soaring bottom line, but such oversight seems extremely unlikely in view of DWR /CWF activities to date.

Kern Water Agency's consultant 5RMK, while noting that CWF design was only “5 to 10 percent complete”, was told to base its estimate on a “design definition” requiring a 10 to 30 percent complete” project. (Kern County Water Agency's Analysis of California WaterFix Impacts—“Kern analysis”—page 27.) With just this minimal information, 5RMK signaled possible WF capital cost increases that could be more than one and one-half times 5RMK's lowest estimate. (Kern Analysis, page 76.)

FAULTY PROJECT DESIGN, reliability jeopardized:

Given the preliminary status of WaterFix design, all cost estimates are guesswork, based on missing and/or inadequate data. Comparisons and estimates cannot be considered reliable, and border on speculation because of so many unknowns.

The ≈35% construction contingency figure reported for WaterFix by both SCVWD^[3] and Kern County Water Agency would be drastically low for a large tunneling project such as this, given the “iron law of megaprojects”: “over time, over budget, over and over again.” Considering the 5% to 10% design stage^[4] of WaterFix and the identified weakness of the construction method using concrete segments that are subject to leakage at segment joints, costs will soar with likely tunnel failure; water reliability will be jeopardized.

Initial DWR design documents indicate large segmented concrete tunnels are planned, but without the inner lining that had been considered earlier. (See: Informational comments submitted

by Des Jardins for the 10/10/2017 SCVWD meeting, quoting DWR 2010a, p.9.) This cheaper design nearly guarantees leakage from sources such as: 1) seismic activity, 2) subsidence of the soft soils surrounding proposed tunnel placement, 3) long-term degradation of segmental concrete lining, resulting in 4) increased forces pulling the tunnels apart. Consequences will be increased cost to 1) redesign and construct tunnels, or 2) repair, if built as preliminarily designed.

The Des Jardins 10/10/2017 submission cited EMBUD's 2015 comments on the tunnel design:

Long-term degradation of segmental concrete lining may result in failure of the lining. In the event that the tunnel lining fails and results in a tunnel collapse or blowout, a collapse during operations would result in major ground movement extending to the ground surface and potentially sinkholes or blowout.

STATE AUDITOR'S REPORT critical of WATERFIX:

The State Auditor's Report is critical of WaterFix; it should be heeded as a warning not to proceed with the project. DWR's lack of transparency is not new, and bodes ill for any WaterFix future. The State Auditor's report re WaterFix (October 2017, Report 2016-132) indicates ongoing lax management on the part of DWR, which was responsible for:

- no demonstration of financial viability, incomplete financial analysis, yet "[t]he financial analysis is critical in determining whether water contractors are willing and able to pay for the construction of WaterFix" (State Auditor's Report, pages 34- 35);
- unqualified consulting firm hired, with multi-million dollar CWF contract, but no competitive bid process;
- amended contracts for BDCP consultant costs resulting in cost increases of nearly five times the original amount, with funding or spending "not fully track[ed]" (State Auditor's Report, page 17);
- no finished economic analysis;
- \$50 million allegedly misused to pay planning costs;
- planning alone 200%-500% over budget.

With DWR making the critical and final decisions re WaterFix management, WaterFix is a bad choice for Santa Clara Valley ratepayers.

DESIGN AND COST CONSIDERATIONS:

Design and cost considerations coalesce in ballooning costs if WaterFix is allowed to proceed. California already faces a staggering cost of infrastructure maintenance, leak detection and repair. Dams in California, for instance, need expensive upgrades/repairs.

- The same people (DWR) who brought us Oroville—with repair costs rising potentially to \$1 billion— have suggested a CWF design that proposes tunnel construction involving

demonstrably problematic construction techniques. SWP contractors, such as SCVWD (and ratepayers), may be on the hook for expenses such as the Oroville repair, according to a statement by Gov. Brown's Department of Finance in February this year.

- Of the dams owned by SCVWD, the California Division of Safety of Dams September 2017 report listed four as only "fair", with significant downstream hazards due to extremely high potential for loss of life/infrastructure in the event of dam failure. SCVWD ratepayers will be on the hook for such catastrophic events.

- <https://www.eenews.net/stories/1060053463>: "The 240-foot Anderson Dam near Morgan Hill ... impounds a 90,000-acre-foot reservoir that is threatened by an earthquake on the same fault. If it fails, a deluge would reach the pricey real estate in Morgan Hill in less than 15 minutes. Downtown San Jose would be under 8 feet of water in three hours. The dam's owner, the Santa Clara Valley Water District, has sought to avoid surprises.... But that hasn't kept its price tag from ballooning. The project cost jumped from \$200 million to \$400 million when new geologic studies concluded the upstream slope of the dam could collapse in an earthquake."

BETTER CHOICE: RELIABLE, DROUGHT-PROOF, CLIMATE-RESILIENT, LOCAL WATER SOURCES

The Pacific Institute notes that **urban water conservation and efficiency measures** are less expensive than most new water supply options and are thus the most cost-effective ways to meet current and future water needs. Indeed, many residential and non-residential measures have a "negative cost," which means that they save the customer more money over their lifetime than they cost to implement.

Stormwater capture projects can cost less, and use local water.

- A median cost of \$590 per af for large stormwater capture projects is projected by a Pacific Institute study/report. (The Cost of Alternative Water Supply and Efficiency Options in California, Pacific Institute, October 2016)

- UCSC's Dr. Andy Fisher is currently working on distributed stormwater recharge projects in Pajaro Valley ("Pajaro"), which has a similar precipitation pattern to Silicon Valley's. Pajaro receives no imported water; it is dependent on groundwater, which—at over 1 mafy—represents 83-85% of Pajaro's demand. See: <https://mavensnotebook.com/2017/09/20/dr-andy-fisher-enhancing-groundwater-recharge-with-stormwater/>. The recharge initiative has four components: mapping, modeling, field project, monetizing incentives for stakeholders. Similar projects could help recharge Santa Clara Valley's aquifers.

- Work by Dr. Richard Luthy, Stanford, also demonstrates enormous potential for stormwater capture. See: <https://mavensnotebook.com/2016/08/18/stormwater-capture-treatment-and-recharge-for-urban-water-supply/> Dr. Luthy projects the possibility that LA could boost its aggressive plan for stormwater capture (of 258,000 afy by 2099) up to 300,000 af stormwater.

- Considerable tech expertise is available in Silicon Valley to address these, and similar, water source issues.

Alternate sources:

The averaged cost of \$400 per acre-foot of the nine projects listed in SCVWD 9/19/017 Water Supply Master Plan Update demonstrates potential for sourcing water from other than megaprojects such as WaterFix. ("Project and Programs Currently Being Considered for Inclusion in the 2017 Water Supply Master Plan", Attachment 1, page 1 of 9).

- **Landscape conversion** can save up to 2,000,000 acre-feet per year in California, and is one of the lowest cost water supplies (The Cost of Alternative Water Supply and Efficiency Options in California, Pacific Institute, October 2016, page 17, Table 5, "Residential Water Efficiency Measures")

• Recycled water

- Recycled water has received **approvals** from numerous groups: Cal. Med. Assoc. (2012 Resolution 119-12); Santa Clara County voters (SCVWD/EMC April 2017 Survey); Bay Area Council 2015 (88 percent of those surveyed favored expanding recycled water programs); NRC/National Academies: Reuse of Municipal Wastewater has Significant Potential to Augment Future U.S. Drinking Water Supplies ("Moreover, new analyses suggest that the possible health risks of exposure to chemical contaminants and disease-causing microbes from wastewater reuse do not exceed, and in some cases may be significantly lower than, the risks of existing water supplies.") (press release) Also see: <http://www8.nationalacademies.org/onpinews/newsitem.aspx?recordid=13303>.

- **Various areas and agencies** safely process and use large amounts of recycled water:

- OCWD 103,000 afy (project uses half the energy it would take to pump imported water; cost \$525/af with subsidies, \$850/af without subsidies);
- Singapore 192,640 afy;
- LA County Sanitation Districts plan up to 168,000 afy. LADWP reported in May 2010 that its water recycling/replenishment will use "about 50% less energy than it takes to import water from Northern California and the Colorado River and it will lessen the strain on California's Bay Delta."
- Del Puerto district (Stanislaus County) will receive 30,600 acre-feet of highly-treated wastewater (recycled water) from Modesto (from a \$100 million project) that will supply one-third of the needs for Del Puerto farmers and give them a stable water source; ultimately 59,000 afy is anticipated. <http://www.modbee.com/news/state/california/water-and-drought/article30198939.html#storylink=cpy>

HIGH RISK: WaterFix was listed as the riskiest project in SCVWD staff's rating of 13 potential water supply projects. Members of the SCVWD board have also repeatedly mentioned being risk-averse; that risk aversion was again cited at the 10/10/2017 SCVWD board meeting. SCVWD and DWR documents have repeatedly reported that the WaterFix design is subject to change. (SCVWD

staff reports, along with the Kern consultant 5RMK have identified the same 35% construction contingency.) WaterFix doesn't merit taking that risk.

BORROWING COSTS: If WaterFix is not legally considered part of the SWP (pursuant to a Validation Action in a Sacramento court) issuance of bonds may not be possible as a state action. Financing would then need to be provided through a JPA, which might have to pay higher interest rates than state-backed bonds receive. (And DWR has already had to increase its short-term—and thus more costly— borrowing capacity to pay for Oroville spillway repair work.)

CONCLUSION: A long, 15-year, delay in WaterFix water availability is projected (assuming all goes perfectly for the project, unlikely in view of the problematic design and multiple lawsuits challenging it). Local projects can be built faster and may be less costly, with local control and more reliable water as a result. History does not favor large infrastructure such as WaterFix; water transfer projects haven't been the solutions they were supposed to be. WaterFix is not the fix Santa Clara Valley needs.

Our five-page memo submitted for the September 19, 2017, SCVWD 2017 Water Supply Master Planboard hearing is hereby referenced and included in this memo, as if fully set forth herein.

Please see Attachment B, next page

ATTACHMENT B to Giberson 5/1/2018 memo re SCVWD WaterFix Special Board Meeting on California WaterFix, 5/2/2018, Item 2.1

TO: Honorable Members of the Santa Clara Valley Water District Board

FROM: Alan and Meg Giberson, ratepayers

RE: 2017 Water Supply Master Plan

DATE: September 19, 2017

The Delta Reform Act of 2009 mandated reducing reliance on the Delta eight years ago. Water Code § 85021. The Water Supply Master Plan and update of 2012 and 2015 could have included these “no regret” projects, and more.

However, SCVWD’s 2017 Water Supply Master Plan (current draft) still looks to increase imports through WaterFix, seeking a projected 41,000 afy from WaterFix (more even than the 39,000 afy projected shortfall that was identified last week in the SCVWD 9/12/2017 staff packet “modeled long-term average” graphic).

Too much time and money have been spent on WaterFix tunnels, a project that is fraught and tainted by too many unknowns and behind-the-scenes negotiations, dodgy ownership and payment options. It is time to look to local and regional projects for the “shortfall” water and put a hold—preferably permanent—on WaterFix.

Strategies to reduce reliance on imported water such as conservation, recycling and stormwater capture can more than compensate for projected future delivery shortfalls (even without WaterFix).

Singapore, for example, with a population three times that of Santa Clara County, currently meets 40% of its water demand (~192,640 afy) with recycled water. By 2060 Singapore expects to meet up to 55% of its demand. Recycled water has allowed industries there to reduce their costs because of the high level of purity in the recycled water.

Creative local solutions acknowledging our situation should be pursued. Some of Santa Clara County is at or below sea level, where buildings’ lower levels are impacted by infiltrating water: basements of both residences and businesses need to be fitted out with pumps to remove the continuing inflow of water. At a recent SCVWD hearing, Roger Castillo, a local RCD director, pointed to the obvious: the water that pump stations remove from downtown buildings could be pumped to the upper watersheds to replenish the system. Palo Alto residents complained several years ago about large new construction that required ongoing pumping of basements—which then lowered the groundwater level for their areas. The same basement pumping situations are occurring elsewhere in this county.

Demand and supply can be managed through thoughtful, proactive, investments in projects that will benefit the health of our economy, our Bay and our community, as well as those of the Delta. What has been proposed in the “No Regrets Package” is a good start, but needs to be pursued more intensively. Growing population doesn’t have to mean increases in water use. Strategies that involve less imported water can meet reasonable demands.

The time factor also should be accounted for. The “no regrets” package can be started immediately, with costs and construction overseen by our local authorities, with foreseeable benefits to our economy. The WaterFix will not be operational for well over a decade, with as-yet-undetermined costs and uncertain product, but whose costs will require more ratepayer/taxpayer dollars immediately.

A State Water Resources Control Board policy established a mandate (in 2009) to increase the use of recycled water in California:

We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and

maintenance of supply infrastructure and the use of stormwater (including dry-weather urban runoff) in these plans; these sources of supply are drought-proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

The SCVWD should consider the following examples of conservation and recycling projects that have been successfully planned or successfully implemented by others, as projects to emulate.

Water conservation—we are doing well, but could do better: Santa Clara Valley and Santa Clara Valley Water District can meet future demand even without WaterFix.

- There would be a **shortfall** of about **23%** of our modeled long-term average Delta imports in a future with no WaterFix (assuming the 39,000 afy shortfall mentioned in last week's memo) and increased restrictions on water from the Delta; according to SCVWD predictions —future shortfalls could equal 37,000 afy (average year, 2040) to 137,000 afy (drought, 2040)

- Conservation in the recent drought has already saved **28%** according to SCVWD (approximately 84,000 afy);

- conservation predicted in the 2012 Water Master Plan shows that conservation and water recycling strategies will reduce Delta water reliance by **25%**.

Water recycling—we could do more:

- SCVWD looks to only **32,000 acre-feet per year (afy)** of non-potable recycled water by 2040. Current recycle figure for the county is up to **≈15,000 afy**. (population of Santa Clara County ~ 1.9 million)

- **Singapore** (population ~ 5.7 million) recycles wastewater effectively
 - recycled currently meets 40% water demand (**~192,640 afy**)
 - has allowed industries to reduce their costs because of the high level of purity in the recycled water.

- **Orange County Water District** already recycles **103,000 afy** that it uses to recharge its underground aquifer for drinking water purposes (unit cost \$525 with subsidies and \$850 without subsidies)

- **LA County Sanitation Districts**, in partnership with Metropolitan Water District, are planning a Regional Recycled Water Program with an eventual production target of up to **168,000 afy**

- The **LADWP** reported in May 2010 that its water recycling/replenishment will use "about 50% less energy than it takes to import water from Northern California and the Colorado River and it will lessen the strain on California's Bay Delta."

- An April 2017 **SCVWD/EMC survey** showed many more voter/customers willing to pay for recycled water than were willing to invest in maintaining the level of imported water from the Sacramento-San Joaquin [Delta]

- A survey by the Bay Area Council in 2015 found **88 percent** in favor of **expanding recycled water programs**

(See: <http://www.bayareacouncil.org/news/2015-bay-area-council-poll/>.)

- DWR's 2005 Water Plan found that "[t]here is a potential of about **0.9 million to 1.4 million acre-feet annually** of **additional** water supply from recycled water by the year 2030."

- Consequences of not cleaning up wastewater could be **finest of \$5 billion to \$10 billion**, which could be imposed on sewage treatment plants around the Bay for discharging substances that are fouling the Bay (http://www.mercurynews.com/bay-area-news/ci_24630366/san-francisco-bay-waters-are-becoming-clearer-but)

Local stormwater capture could potentially replace a large part of Santa Clara Valley's imported water.

- SCVWD used **imported water to fill its groundwater basins**, even when local water from this past rainy winter could have been used to recharge our local aquifers. (See: <http://www.mercurynews.com/2017/03/02/water-district-perc-ponds-pass-on-turbid-water-full-of-sediment/>). As SCVWD says, local aquifers hold nearly half the water used in the county and constitute a vast storage capacity (> 2 times local reservoirs).

- **"Groundwater basins** are the only thing that even approximate in size of storage [what] we're going to lose when we lose our snowpack in the decades to come." (Felicia Marcus, SWRCB Chair, speaking at a GGU water law conference, Jan. 2015)

- **Los Angeles** has proposed long-term stormwater capture of **179,000 acre-feet/year** (conservative estimate) to **258,000 acre-feet/year (afy)** (aggressive estimate) by 2099. Santa Clara Valley receives about the same amount of precipitation as LA and should prepare the same aggressive program.

- LA might even capture **up to 300,000 af** stormwater says Dr. Richard Luthy, a Stanford professor of civil and environmental engineering and the director of the National Science Foundation's Engineering Research Center. <https://mavensnotebook.com/2016/08/18/stormwater-capture-treatment-and-recharge-for-urban-water-supply/>

- The October 2014 stormwater capture bill signed by Gov. Brown points to the opportunity to capture **more than 600,000 afy** within the Bay Area and Southern California.

Population growth, other areas' experience has shown, does not mean greater water demand (although population growth appears to be SCVWD stated reason for greater projected demand).

- In fact, LA population grew by one million while water demand stayed at about the same level for the past 45 years or

- so. <https://www.newsdeeply.com/water/articles/2016/11/08/how-water-use-has-declined-with-population-growth> (Also see: **Urban Water Demand in California to 2100: Incorporating Climate Change** (Aug. 2012) <http://pacinst.org/wp-content/uploads/2014/04/2100-urban-water-efficiency.pdf>)

- **San Francisco** Public Utilities Commission saw water use drop 17 percent for its retail customers between 2005 and 2015 while population increased by 10 percent.

- SCVWD in its 2012 Water Master Plan looked to a population growth of only 600,000 people by 2035 (ABAG projection) yet **claimed** that growth will result in an **increase** in water demand of **94,000 afy** by 2035

Leaks account for a lot of lost water:

- "Studies suggest that leak detection surveys could reduce annual water losses by **260,000 gallons per mile surveyed**, at a cost of \$300 per mile." Oct. 2016, *The Cost of Alternative Water Supply and Efficiency Options in California* (Pacific Institute)

- DWR estimates that leaks in water district distribution systems siphon away more than **700,000 acre-feet of water** a year in California—enough to supply 1.4 million homes for a year. Audits of water utilities have found an average loss through leaks of 10 percent of their total supply. [From Governor's 5/9/2016 drought message]

- **Finding leaks in pipes** may get easier -- saving money and water according to an MIT study.

https://www.wateronline.com/doc/finding-leaks-while-they-re-easy-to-fix-0001?vm_tld=2015739&user=92da4b24-340f-483f-abe0-59407f92cf31&utm_source=et_10759433&utm_medium=email&utm_campaign=WOL_08-10-2017&utm_term=92da4b24-340f-483f-abe0-59407f92cf31&utm_content=Finding+Leaks+While+They%2527re+Easy+To+Fix

Local jobs are created by local/regional projects (that can't be outsourced):

- SEIU Local 721—the largest public sector union in Southern California—opposes California WaterFix/tunnels and questions the financial plan and higher costs of WaterFix. Their July 13, 2017 letter enumerates the jobs that environmentally sustainable water capture at the local level can create. SEIU Local 721 supports recycling and stormwater capture (Letter already submitted to SCVWD Board).

- The Sacramento Regional Sanitary upgrade will create up to 600 construction jobs (at peak construction) (see: <http://www.kcra.com/article/600-workers-will-build-2b-mega-project-in-sacramento/6419879>). Similar projects locally could create local jobs.

Tech: Silicon Valley technology can address many of these water supply issues, by using its ability to innovate, not by promoting an improvident WaterFix project.

Dams are a questionable proposition:

- dams and their reservoirs leak or lose billions of gallons of water to evaporation: <https://projects.propublica.org/killing-the-colorado/story/arizona-cotton-drought-crisis>
- a 2016 algae bloom in San Luis Reservoir became severe, resulting in an advisory level upgraded to “warning” from “caution” <http://www.fresnobee.com/news/local/article110480652.html>

Conclusion: The proposed WaterFix has too many unknowns and uncertainties; it is not the water solution for Santa County residents and ratepayers. Other, better solutions should be aggressively pursued.

WaterFix unknowns and problem issues, for example, include:

- the accusation that taxpayer money was “wrongly used” to plan California water tunnel project according to an Inspector General report (federal), issue covered by the LA Times <http://www.latimes.com/local/california/la-me-water-tunnel-funds-20170908-story.html> (some \$50-80 million, depending on media reporting). Transparency and accountability have been lacking in this process

- whether WaterFix will be **legally considered** part of the SWP—an issue to be decided in “validation action” in Sacramento Court;
- if WF is not found to be part of SWP, then there is **questionable** ability under Water Code to **authorize bonds** to construct, etc.
- who will control project if “**validation action**” fails and DWR is not “owner”
 - proposal that Joint Finance JPA, or “designee”, could assume ownership, with question of who would control then (“ongoing negotiations, discussions” are being held, in private)

-“In the scenario that DWR does not have the authority, **SWP contractors** that are members of the Finance JPA would have to ‘**step up**’ to **pay the debt service** for the outstanding Finance JPA Bonds.” (from previous SCVWD Bd. Agenda Memo, Item 2.1, § F.1)

- whether State Water Board will allow the change in point of diversion to the proposed northern intakes (if not, the project will not go forward); the continued hearings on that are scheduled to begin in Jan. 2018
- WaterFix project projected **capital costs \$16.7 billion**, that may ultimately **cost up to \$60 billion or more**, including debt financing
- an ultimate **high cost** to SCVWD ratepayers (risk volatility is inherent in project)
- ultimate **water allocation** amount
 - can depend on % from SWP, CVP, etc., regulatory actions, SLR, climate change
 - SCVWD looks to approximately **28,000 to 44,300 afy gain** from WaterFix
- **opt-in/opt-out “choices”**: opt-in for CVP participation in WF; opt-out of SWP participation in WF
- will **ratepayers** of Santa Clara County still have to pay for WaterFix even if SCVWD opts out of participation in SWP part of WaterFix; will SCVWD opt in to participation under CVP?

^[1] UC Berkeley, Plato Malozemoff Professor, Co-Director of Berkeley Water Center, Deputy Director NSF Engineering Research Center for Reinventing the Nation's Urban Water Infrastructure (ReNUWIt), Director of Institute for Environmental Science and Engineering (IESE)

^[2] SCVWD's projected potential annual water supply deficit, if no WaterFix were built, has been reduced just in the past six months. In its 5/2/2018 report, SCVWD staff cites a potential water supply deficit of 36,000 afy with no WaterFix, yet just over six months ago staff identified a potential water supply deficit of 39,000 afy. This 3,000 afy deficit reduction appears to reflect increasing conservation. With conservation continuing, local supplies can easily supply the projected deficit in the future, in addition to supplying increased environmental and monetary benefits.

Indeed, the Sustainable Silicon Valley (SSV) event (December 2017, <http://www.wp.sustainablesv.org/no-drop-left-behind/>), attended by two of SCVWD's Board members, highlighted that sustainable, attainable water future. SSV participants demonstrated how Silicon Valley companies and Stanford University—among others such as SFPUC—are implementing these strategies aimed at reducing consumption and attaining sustainability through many techniques using locally-available water, despite increasing population numbers. (For just a few examples see <https://www.collaborativedesign.org/>.)

^[3] SCVWD Sep 12, 2017 Board memo, Section D (“Total WaterFix costs”), Table 1 (Calif. WaterFix Cost Summary) cited “Contingency (36%)” under capital costs (and directly following “construction” costs

^[4] Design is at only 5% to 10% stage (“the design definition for California WaterFix currently is between 5 to 10 percent complete”, according to <https://wrwmsd.com/wp-content/uploads/2017/08/KCWA-CWF-Overview-Public-Version-Complete-9.15.17.pdf>

Melissa Stone

From: daniel witte <boatboy@pacbell.net>
Sent: Tuesday, May 01, 2018 9:12 PM
To: Clerk of the Board
Subject: opposition to twin tunnels or Claifornia WaterFix (please enter my comment into the record)

(Please enter my comments into the record) Dear Santa Clara Valley Water Board Members,

My name is Daniel Witte, and I strongly oppose the twin tunnels, or California WaterFix for many reasons.

The Delta Tunnels don't generate additional water for California. Instead, they take existing water and move it to another location, while harming the environment in the process.

There are many better solutions to California's water problems such as desalination, which would generate more water for the state, and water conservation.

The twin tunnels will severely decrease the quality of Northern California's water. As of now, Northern California receives its water from both the Sacramento and San Joaquin Rivers simultaneously. If the tunnels are in place, Northern California will only receive water from the San Joaquin River, which is much smaller and more polluted. The California Water Act requires people to receive high quality water, which the San Joaquin River cannot meet.

The Delta Tunnels will devastate the commercial salmon industry, which generates \$25000000000 per year. The largest salmon run on the West Coast, passes through the California Delta to reach their spawning grounds. If the tunnels are built, there will be inadequate fresh water in the Delta for the salmon. If the salmon can't reach their spawning grounds and reproduce, there will be no fish for the commercial fishermen to catch. If there are no fish, then the commercial fishermen won't make any money.

The tunnels will cost at least 17000000000 taxpayer dollars. Repairing and maintain the Delta levees to prevent dangerous flooding in Delta communities as the result of earthquakes, would be much cheaper. In fact, the Delta Tunnals don't meet earthquake standards, and would be much harder and more expensive to repair if they collapsed.

Lastly, the Delta Tunnels will negatively impact Delta farmers. If the tunnels are built, salt water from the Bay will intrude farther up into the Delta, because there will be less fresh water flowing down to keep it out. The Delta farmers cannot irrigate with salt water because it would kill their crops. If the farmers can't grow their crops, they won't make any money. Most of California's vegetable come from Delta farms.

Over all, please take my comments and concerns seriously, and vote against the twin tunnels.

Sincerely,

Daniel

6727 Sunnyslope Avenue Castro Valley California 94552

Melissa Stone

From: Robin Dosskey <robindosskey@gmail.com>
Sent: Wednesday, May 02, 2018 8:26 AM
To: Board of Directors
Subject: Oppose Waterfix Project

May 2, 2018

Dear SCVWD,

I am writing to urge the SCVWD not to join the CA WaterFix Project.

Your responsibility to your SCVWD customers and our fragile California environment. It is imperative that a thorough study of the Waterfix Project be made so SCVWD can protect our Delta's precious and vulnerable fresh/salt water ecosystems. Our health and economy depend on the Delta.

Don't believe it is a simple fix. The cost to consumers would keep increasing!

It is a risk to begin that huge a project without all the project details and responsibilities not clearly defined or negotiated by transparent agreement. Many reports and water project analyses confirm that there are too many costs and risks involved with the CA WaterFix project. The almost \$15 billion estimate will increase significantly as design and construction problems are identified and addressed. For instance, earthquake retrofits must be included in the designs.

We know the Big One is coming! We must not risk losing precious water supplies through a natural disaster which could be prevented.

The CA WaterFix Project is simply too big and complex. We should support smaller, local project to many smaller, geographically diverse projects in order to solve our state's water shortages.

Sincerely,
Robin Dosskey
1525 Canna Court
Mountain View, CA 94043

Melissa Stone

From: Elsa Schafer <elsaschafer@comcast.net>
Sent: Tuesday, May 01, 2018 10:19 PM
To: Board of Directors
Subject: Please Vote NOT to Help Build/Use Water from One or Two Tunnels

Dear Board -

PLEASE do not be party to this atrocious act of environmental degradation!

None of the four voting members of my family can believe that you would so decimate the Delta and send water to wealthy southern millionaire and billionaire landowners in areas that should be desert.

PLEASE preserve our quality of water, our fish, our environment, and not decimate it for the sakes of those running businesses that have no right being there in the first place. You'll wreck many lives in the North for the short-term sakes of a few wealthy people in the South.

Please cease and desist - don't support this 60 year old project from Jerry Brown's Father that should have been re-evaluated by now given all we currently now and the present water situation. You're bright - do the right thing ASAP Please!!!!

Please enter my comments into the record.

Thank you,

Asha, Ravi, Shashi and Elsa Schafer Raval Voters in California and the Bay Area

Melissa Stone

From: ZC <zaharo88@gmail.com>
Sent: Tuesday, May 01, 2018 10:15 PM
To: Board of Directors
Subject: Opposed to SCVWD supporting tunnels plan

Importance: High

Dear Members of the Santa Clara Valley Water District Board,
I am staunchly opposed to the plan to build two massive tunnels, each 35 miles long and 40 feet high, under the Sacramento-San Joaquin River Delta.

PLEASE DO NOT VOTE TO FUND THIS WITH OUR WATER DISTRICT FUNDS!!!!

Thank you, Sharon Storms, resident of Santa Clara Valley

Melissa Stone

From: Katy Merritt <katymspt@yahoo.com>
Sent: Tuesday, May 01, 2018 10:09 PM
To: Board of Directors
Subject: Against Delta Tunnels

Santa Clara Water District Board Members,

My husband and I spend a large amount of time on the water, here in our Bay and also in the San Joaquin River Delta. We love the natural beauty and peaceful surroundings. But deeper than that, we appreciate the checks and balances that a healthy ecosystem cultivates in order to continue thriving. It's a beautiful thing.

We oppose the Delta Tunnels, because the overwhelming negative effects would be devastating to the local ecosystem and beyond. The impacts would be catastrophic. Local fishing, agriculture, and tourism would be adversely affected, not only in the Delta, but throughout the entire Bay Area. Salt and chemical levels would rise to dangerous levels in the water, creating a public health dilemma.

A better solution to the water-needs in areas of California hoping to benefit from the tunnels would be to adopt systems and behaviors that better use the currently available water. Using cisterns, low-flow plumbing, and more efficient landscape watering, as well as recycling water when possible would make lasting effects. Adopting these small changes on a large scale will make grand changes throughout California without needing tunnels.

We urge you to oppose the Delta Tunnels. The long-term devastation of the tunnels would greatly outweigh any short-term gains.

Jonathan and Katy Rosen

(Please enter my comments in opposition to the Delta Tunnels into the May 2nd meeting record.)

Melissa Stone

From: Donald Henderson <5elements@sbcglobal.net>
Sent: Tuesday, May 01, 2018 9:29 PM
To: Board of Directors
Subject: Twin Tunnels

Board of Santa Clara,

I highly encourage the board not to buy in to the twin project. The Delta is stressed already and we can't afford to add another factor to its decline.
Please enter my comment into the record.

Thank You,
Don Henderson
5elements@sbcglobal.net

Melissa Stone

From: Alexander Drukarev <alexdruk@sonic.net>
Sent: Tuesday, May 01, 2018 9:07 PM
To: Board of Directors
Subject: CA WaterFix project

I am troubled that the SCVWD is again considering to participate in the CA WaterFix Project. I am writing to urge the SCVWD not to join the CA WaterFix Project.

Alexander Drukarev

460 Azalea Way, Los Altos

Melissa Stone

From: Pat Blevins <seaglass103@sbcglobal.net>
Sent: Tuesday, May 01, 2018 7:46 PM
To: Board of Directors
Subject: Vote NO on the Twin Tunnels ie Water Fix

Dear SCVWD Board Members,

I was shocked to read today in the Mercury News that the SCVWD Board members are going back on the decision made they made in 2017 NOT to support the Water Fix. The SCVWD meetings I attended in 2017 left the impression that while a single tunnel project would possibly be considered if the circumstances were right for the ratepayers, the Board would not vote without knowing the full cost and benefits to the ratepayers of SCVWD.

Further, Ms. LeZotte said it best when she said she would not vote for one penny to be spent to send water to the Central Valley agriculture businesses.

Further, there was concern for the damage to the Delta that these tunnels would create.

Its as if none of those meetings occurred, none of us spoke on the record, and no common sense is to be applied at all as the Board is now considering voting "yes" on the WaterFix. Nothing has changed. The project is still deeply flawed and no cost estimates are even known.

You must vote "no" once and for all and reject the WaterFix. If you value your seats on the Board you will not shirk your duties to the ratepayers of SCVWD.
Patricia Blevins

Melissa Stone

From: Paula Bettencourt <prvbettencourt@gmail.com>
Sent: Tuesday, May 01, 2018 7:34 PM
To: Board of Directors
Subject: Delta Tunnels

As a resident of Cupertino, Santa Clara County, I am opposed to the tunnel project, either single, twin or phased. I am also opposed to a partnership with the Metropolitan Water District. Please do not support the plan or partnership. Please enter my email into the record. Thank you.

Paula Bettencourt

Sent from my iPad

Melissa Stone

From: Cheryl Cavanagh <rooniecav@gmail.com>
Sent: Tuesday, May 01, 2018 6:25 PM
To: Board of Directors

If you cannot attend the meeting to deliver a comment in person, you can submit a comment to Board@valleywater.org via email. **Please include in your email that you would like your comment to be entered into the record.**

I do NOT want tunnels to run through the delta.

I am a registered voter:
Cheryl Cavanagh
P.O. Box 1
Courtland, CA 95615

From: Pravin Soni <psoni05@gmail.com>
Sent: Tuesday, May 01, 2018 6:15 PM
To: Board of Directors
Subject: Water -twin tunnels

Dear Madam/Sir

I am troubled that the SCVWD is again considering to participate in the CA WaterFix Project. I am writing to urge the SCVWD not to join the CA WaterFix Project.

Your responsibility to your customers is to support only projects that stand on their individual merits. Do not bend to backroom deals that give away your customers money in turn for support of another project you believe has merit.

Numerous reports and analyses confirm that the costs and risks of the CA Water Fix make smaller local and regional water projects a much better solution for SCVWD and California water agencies. The CA WaterFix Project is simply too big, complex, risky and expensive.

Joining the CA WaterFix without reliable estimates of the cost to your customer rates is negligent. Design and construction of the CA WaterFix without operating agreements is not prudent. Proceeding with the CA WaterFix without understanding the impacts on the Delta's environmental ecosystems and the people and business that rely on those ecosystems is not prudent.

The almost \$15 Billion CA WaterFix concept estimate will increase significantly as complexities are identified and addressed.

Recent reports indicate that the conceptual tunnel design must be revised to withstand modest earthquake loading, adding significant and currently unestimated construction costs to project. In the event of a major earthquake or other natural disaster, the CA WaterFix would concentrate risk rather than spread the risk to many smaller, geographically diverse projects.

SCVWD and other importing water agencies would better serve their customers by investing in local projects that conserve, improve and protect water supplies, and that also protect the Delta and its fresh water / salt water environment.

Thanks
Pravin Soni

Melissa Stone

From: Darlene Dawson <pcddawson@yahoo.com>
Sent: Tuesday, May 01, 2018 5:58 PM
To: Board of Directors
Subject: Waterfix vote

I am against the seemingly selfless monetary backing of the Calif. Water Fix (twin tunnels) by the Metropolitan Water District.

I would hope that the Santa Clara Water District continues to reject the California Water Fix (twin tunnels).

My fear is that allowing this to go forward would destroy a National Treasure and put an unfair financial burden on individual water customers.

Please include my comment in the record.

Thank you.

Darlene Dawson
3205 Camby Rd.
Antioch, California

Sent from my iPad

Melissa Stone

From: Terra Wilson <terra_wilson@yahoo.com>
Sent: Tuesday, May 01, 2018 5:10 PM
To: Board of Directors
Cc: barbara@restorethedelta.org
Subject: Please enter the following statement into the record: Twin Tunnels project is bad for the Bay Area Delta and short sighted for California!

Please enter the following statement into the record:

May 1, 2018

Dear Santa Clara Valley Water District Board Members,

Please reject supporting the twin tunnels project. Depleting more fresh water from the Delta would put it in further jeopardy. Delta smelt populations are already suffering and are a "canary in a coal mine" indicator to the health of the Delta. Our Delta is not healthy! Drought conditions due to climate change have already stressed our Delta. We can expect further deterioration due to low snow pack and future drought conditions.

Are you really willing to completely destroy our already inadequate source of fresh water? This is ludicrous and shortsighted! There simply isn't enough water to share. You cannot suck any more water through a straw once the glass is empty. Therefore, the Santa Clara Valley Water District will be wasting tax payer's money on a boondoggle project that cannot succeed. It is a shortsighted waste of money. That money could be used to help SoCal's water problems without destroying Northern California's most important water source.

Additionally, some news reports have stated that So Cal has not shown a willingness to conserve water in a meaningful way. We would be throwing our water and money away to golf courses and mansions. No thanks!

To conclude, since this project is bound to fail due to a lack of water resources, I implore you to reject collaborating with Metropolitan Water District.

Don't throw away the smelt, the salmon and the livelihoods of Northern California for the golf courses and mansions of Southern California!

Terra Wilson, Concerned Citizen

517 Maureen Lane

Pleasant Hill, CA 94523

Melissa Stone

From: Florence LaRiviere <florence@refuge.org>
Sent: Tuesday, May 01, 2018 4:52 PM
To: Board of Directors
Subject: Tunnels

Dear Members of the Board,

I respectfully request that you make NO deal involving the tunnels planned to carry northern river waters to the south.

There are no assurances that the Delta and San Francisco Bay will not be irrevocably harmed by such drastic disruptions to the normal river flows. In fact, it's time we quit disrupting our natural world with no understanding of its impacts.

Thank you for considering my comments,

Florence M. LaRiviere
453 Tennessee Lane
Palo Alto, CA 94306
650 493 5540

Melissa Stone

From: Daphne Rountree <porcecame@mindspring.com>
Sent: Tuesday, May 01, 2018 4:46 PM
To: Board of Directors
Subject: Oppose twin tunnel water "fix"

The SCVWD should not to join the CA WaterFix Project.

The CA WaterFix Project is simply too big, complex, risky and expensive.

Do not let the corrupt legacy of Beau Goldie and the shady back room deals with agribusiness and other water importing agencies determine your vote. Local Santa Clara Bay Area voters are watching how you vote. We are the ones who will vote in November for SCVWD Board members who demonstrate they will support our interests.

SCVWD and other importing water agencies would better serve their customers by investing in local projects that conserve, improve and protect water supplies, and that also protect the Delta and its fresh water / salt water environment.

sincerely Daphne Rountree, Sunnyvale resident

Melissa Stone

From: Lynda Tatrai <lulabelldesigns@me.com>
Sent: Wednesday, May 02, 2018 8:50 AM
To: Board of Directors
Subject: Please stop the water tunnels

Hi I'm writing to you regarding the water tunnels. I'm sorry I cannot attend the board meeting on this. Please do not support any water tunnels to Southern Ca. Encourage them to collect water by tanks and by other means. I believe it would hurt our ecology and delicate eco-system if you were to differ the water. Thank you for your time. Sincerely, Lynda Tatrai

Sent from my iPhone

Melissa Stone

From: Kathryn Barnard <kbarnardflute@gmail.com>
Sent: Wednesday, May 02, 2018 9:30 AM
To: Board of Directors
Subject: Vote NO on the Tunnels

Please read this comment into the record at the May 2nd, 5 pm meeting of the Santa Clara Water Board.

Dear Santa Clara County Water District Board

Please vote NO on the tunnels for the following reasons:

1. The State of California is required by law to maintain the quality of the water in the North Delta for the North Delta farmers and for the Delta wildlife. Building tunnels and stealing the river north of the Delta would be illegal, and would kill family farms in the Delta as well as wildlife. These 2 entities have a higher right to the water. By bumping off 2 entities that have a higher right to the water, you and other water districts are trying to "jump" the water line-up, and it's the wrong thing to do.

My great-grandfather served in the Union Navy in the Civil War and then purchased land in the Delta to start a farm. He planted pear trees. He toiled on the farm for the rest of his life. He had one son, my grandfather, who survived the depression and toiled on the farm his entire life. My grandfather had four children, including two sons. My uncles have toiled on the farm their entire lives and are still farming. Pear trees cannot grow in salt water. By stealing the river north of the Delta, you would be killing the wildlife and taking the family farms.

2. These tunnels are MONSTROUS and would be a disaster for the environment and for the taxpayers of Santa Clara County. You will burden all the people of California with a huge load of debt. Did you calculate how many truckloads of dirt it will take to dig these huge chunnels and the carbon emissions alone? Did you calculate how much you will need to pay for all the family farms that you take? You'd not only be taking the family farms and killing the wildlife, but you'd also be leaving the Delta with more pollution and mountains of dirt. The cost is expected to far exceed the estimated \$17 billion.

We count on our government officials to do the right thing. Vote NO on the tunnels.

Sincerely,

Kathryn A Barnard
Attorney at Law
Resident of Silicon Valley

Melissa Stone

From: Melissa Stone
Sent: Wednesday, May 02, 2018 11:22 AM
To: Board of Directors
Subject: FW: Tunnels Vote

From: Sonja Cook [mailto:sonjalocook@gmail.com]
Sent: Tuesday, May 1, 2018 5:37 PM
To: Communications Unit <CRU@valleywater.org>
Subject: Tunnels Vote

Dear Sirs,

I understand there is a significant vote coming up tomorrow. Unfortunately, we cannot attend because of a previous commitment but I would like to offer some thoughts.

We oppose the Tunnel project for many reasons.

1. It would be smarter to get Southern California to better conserve water.
If you recall, during the multi-year drought, Northern California saved much more water than Southern California.
I object to filling their swimming pools and watering their extensive landscaping when we are xeroscaping our yards up here.
2. The Delta is fragile enough already without pulling yet more water out of it.
A better idea to consider might be covering the existing canals to reduce evaporation.
3. This seems like a hugely expensive project that will only benefit Southern California, both urban and agricultural.
Meanwhile, Northern California will pay higher water rates.
As it is, the less water we use, the higher the water rates to balance your budget.
Ironically, several agencies in those very areas have voted against the project.
4. Given several areas in both North and South California have voted against this project, why is it still being pursued?
To satisfy Governor Brown. Sorry, not on.
He's done a fantastic job as Governor, especially in keeping within budget, but this is just a pet project he wants as his legacy.

I sincerely hope the SCC Water Board will vote AGAINST the Tunnel Project on Wednesday evening. We cannot nor should not be addressing our joint water concerns with this Project. There are more responsible ways to handle the increasing lack of water in California.

Regards, Sonja Cook

Melissa Stone

Subject: FW: Don't approve dual delta tunnels

From: John Cordes [<mailto:mrjohncordes@gmail.com>]

Sent: Wednesday, May 2, 2018 10:43 AM

To: Communications Unit <CRU@valleywater.org>

Subject: Don't approve dual delta tunnels

Dear Board of Supervisors,

In you meeting tonight, please do not change your vote on the California Waterfix. You made the right decision when you voted only to help fund a single tunnel. Santa Clara ratepayers should not be required to pay more for water infrastructure changes that primarily benefit Southern Californians and water districts.

Regards,

John Cordes

Email: mrjohncordes@gmail.com

Phone: (860) 576-9645

Skype id: jgcordes

twitter id: jcordes



FRIENDS OF THE RIVER

1418 20TH STREET, SUITE 100, SACRAMENTO, CA 95811
916/442-3155 • FAX: 916/442-3396 •
WWW.FRIENDSOFTHERIVER.ORG

May 2, 2018

Santa Clara Valley Water District Board Members **via Email**
5750 Almaden Expressway
San Jose, CA 95118-3986

Re: URGENT Economic and Legal Information about California Water Fix Tunnels project

Dear Members of the Board of the Santa Clara Valley Water District:

SUMMARY

We write to you because of the crisis threatening the San Francisco Bay-Delta. "The San Francisco Bay Delta watershed covers more than 75,000 square miles and includes the largest estuary on the West coasts of North and South America. It also contains the only inland Delta in the world." (EPA website). Virtually everyone recognizes that the Delta needs more freshwater flowing through it, not less. Presently, water for export is diverted from the south Delta. As a result, Delta public health, agriculture, water quantity, and water quality benefit by the fact that freshwater flows through the Delta before being diverted. This is called "through-Delta conveyance." But the proposed California Water Fix Delta Water Tunnels project would worsen the existing crisis in the Delta by diverting massive quantities of freshwater upstream from the Delta. The flows diverted upstream would no longer provide any benefits by first flowing through the already impaired Delta.

There is a simple but often overlooked economic fact. That is, the existing through-Delta conveyance is already operating and paid for. The proposed Water Fix Tunnels that would reduce freshwater flows through the Delta would be a new public works project costing billions of dollars.

Here are several additional financial facts: *first*, California's Department of Water Resources (DWR) has consistently represented to the public over the years that the beneficiaries of the California Water Fix Delta Tunnels project would pay all project costs. It turns out that is a lie. The *Cal WaterFix Economic Analysis* prepared for California's Natural Resources Agency and its DWR, and concealed by them, shows that either a substantial public subsidy would be necessary for the project *or* ratepayers would wind up paying far more than they are told they would pay for the project.

Second, the only benefit- cost study done for the project shows that the costs would exceed the benefits by four to one. The project makes no economic sense.

Third, the project will cost at least three or four times the ridiculously low \$17 billion estimate. That would drastically magnify the amount of the burden on ratepayers.

The Water Fix Tunnels project is an absurdly expensive project. California's Natural Resources Agency and DWR have not told you the bad financial news about this giant boondoggle they now seek to inflict on ratepayers and/or taxpayers.

Finally, this environmentally and economically destructive public works project would absorb billions of dollars of public funds that could instead be far better spent on better alternatives --modern water supply measures such as recycling and conservation.

California's Tunnels Agencies Conceal the Bad News

DWR has always represented that the users of water conveyed by the project would pay all project costs. It turns out that in November of 2015, the economic consultant for the project, David Sunding of The Brattle Group, prepared a draft *CalWater Fix Economic Analysis* for the California Natural Resources Agency. (November 15, 2015).¹ That *Economic Analysis*, purporting to justify the economic feasibility of the project, assumed that the federal government or some other entity would need to provide a subsidy of \$6.5 billion to make the Water Tunnels a breakeven proposition for agricultural users of the water. (*Economic Analysis* pp. 2-4).² That is more than one third of the projected (by the State) \$17 billion in construction and mitigation costs. Honest project proponents would have made that *Economic Analysis* immediately available to the public. Instead, there was a cover up. The *Economic Analysis* was concealed from the public. It took many months including demands under California's Public Records Act (the State equivalent of the Federal Freedom of Information Act) to obtain the suppressed *Analysis*. The continuing representations to the public that the project's beneficiary water users would pay all project costs at the same time that the State's own Draft *Economic Analysis* to the contrary was being concealed instead of disclosed, constituted continuing misrepresentation of material facts. A common dictionary definition of "fraud" is "an act of deceiving or misrepresenting." Webster's Ninth New Collegiate Dictionary (1985.)

Word finally did get out on the cover up by the State. An example is the news article, *California water tunnels would need US funding, an analyst says* (Associated Press, by Ellen Knickmeyer, September 14, 2016):

Giant tunnels that Gov. Jerry Brown wants to build to haul water across California are economically feasible only if the federal government bears a third of the nearly \$16 billion cost because local water districts may not benefit as expected, according to an analysis that the state commissioned last year but never released.

¹ A copy of the *Economic Analysis* is attached.

² Dr. Jeffrey Michael, Executive Director, Center for Business and Policy Research, Eberhardt School of Business and McGeorge School of Law, University of the Pacific has explained (Comments, September 12, 2016) that "The report actually refers to the subsidy as \$3.9 billion, but this figure is in present value terms including a 3% real discount rate. This is equivalent to \$4.6 billion in actual costs, which is the appropriate figure to compare to the nearly \$16 billion in construction and mitigation costs." He also explained that "the report finds an additional \$1.9 billion subsidy would be needed to make the tunnels a break-even proposition for agriculture."

The findings run counter to longstanding state pledges that the districts that would get water from the tunnels would pay the full cost. . .

The State has tried, so far without success, to convince the federal government to fund the project. California State law requires that the water exporters pay all costs for “any new Delta water conveyance facility.” California Water Code § 85089. That includes, “The costs of the environmental review, planning, design, construction, and mitigation. . . required for the construction, operation, and maintenance of any new Delta water conveyance facility. . .” (*Id.*).

The only reasonable conclusion is that ratepayers will end up paying for a bad project for which the costs exceed the benefits if the project goes forward.

The only Benefit-Cost Analysis shows Costs Exceed Benefits by at least four to one

It gets worse. A far greater public subsidy would be required for the project than is admitted in DWR’s secret *Economic Analysis*. The first comprehensive benefit-cost analysis of the Water Fix shows that the project would only provide \$.23 of benefits for each dollar of cost. *Benefit-Cost Analysis of the California WaterFix*.³

This analysis is based on data and assumptions in the revised environmental documents produced by DWR to support the proposal’s environmental review. The results show the WaterFix costs are four times larger than its benefits, and thus the project is not economically justified.⁴

It makes no sense to proceed with a massive public works boondoggle where the costs exceed the benefits by a factor of four. As the *Benefit-Cost Analysis* points out (at p. 2):

The Water Fix is the most costly water proposal in California history, so it is unusual that the California Department of Water Resources (DWR) has not followed its own planning guidelines and issued a benefit-cost analysis of the proposal.

This would be an Absurdly Expensive project

It gets still worse. An Op-Ed in the Los Angeles Times (November 20, 2016), by Jacques Leslie, *The delta tunnels-a project only engineers can love*, reminds everyone of what The Mercury News reported back in December 2013:

Most notably, the number [\$17 billion cost estimate] doesn’t include financing costs which given the tunnels’ decade-long projected construction time and probable reliance on interest-bearing bonds, are expected to be enormous.

The Mercury News reported in December 2013 that a staff member of the wealthy Westlands Water District, which was an early project advocate, and a Citigroup bond consultant told the Westlands board that including long-term financing, the project would

³ By Dr. Jeffrey Michael, Executive Director, Center for Business and Policy Research, Eberhardt School of Business and McGeorge School of Law, University of the Pacific (August 2016). A copy of this Benefit-Cost Analysis is attached.

⁴ *Benefit-Cost Analysis of The California WaterFix* at 2.

cost between \$51 billion and \$67 billion. The reporter checked the figures with Water Resources Director Mark Cowin, who 'confirmed the estimates are accurate.'

The same Op-Ed makes clear what is at stake:

The imbalance of costs and benefits is only one reason to object to WaterFix. The tunnels represent a failure of imagination. . . The tunnels would not only exacerbate the environmental crisis [in the Delta], they would divert funding and attention from other better, cheaper sources of water.

Los Angeles, Santa Monica and many other of the state's communities are pioneers in 21st century 'soft path' approaches that mimic or reinforce natural resource processes instead of trying to overcome them: storm water recapture, wastewater recycling and plain old conservation. These strategies-not an absurdly expensive project that serves chiefly to perpetuate the existence of the bureaucracies that support it-would reduce pressure on the Delta while showing the way to California's water future.

California has proven to be an impressive offender in inflicting megaproject fiascoes on taxpayers. The recent Oakland-San Francisco Bay Bridge reconstruction exploded from a projected \$1 billion project to a project costing over \$6 billion riddled with defects. Moreover, there have been huge cost overruns during the construction of the \$4 ½ billion Trans Bay Transit Center in San Francisco. Willie Brown, former San Francisco mayor and speaker of the California State Assembly has written about that project: "We always knew the initial estimate was way under the real cost. . . The idea is to get going. Start digging a hole and make it so big, there's no alternative to coming up with the money to fill it in." Willie L. Brown, Jr., *When Warriors Travel to China, Ed Lee Will Follow* (San Francisco Chronicle, July 27, 2013); Jacques Leslie, *The Trouble with Megaprojects* (The New Yorker, p. 4, April 11, 2015); Chris Edwards and Nicole Kaeding, *Federal Government Cost Overruns* (Cato Institute, Tax & Budget Bulletin, September 2015).

As shown above, the State's own economic consultant concluded in the hidden Economic Analysis that it only makes economic sense for ratepayers to pay about \$10 billion for the Delta Water Tunnels. That means that in the real world the ratepayers would be inflicted with providing \$50 billion more than the project is worth to pay for the real project. California's agencies are following Willie Brown's playbook, cited above, perfectly: "The idea is to get going. Start digging a hole and make it so big, there's no alternative to coming up with the money to fill it in."

The Water Fix Tunnels proponents want you to fill that big hole in with billions of dollars inflicted on ratepayers.

The Water Tunnels are a Megaproject Disaster that will be Difficult to Halt if it gets started

The Water Fix Tunnels would be a "megaproject," a term commonly understood as projects that cost at least \$1 billion. "[B]ecause such projects take so long to build—more than eight and a half years for the average large dam—they are vulnerable to a kind of entropy, in

which even unrelated events produce huge setbacks.” Jacques Leslie, *The Trouble with Megaprojects* (The New Yorker, p. 2, April 11, 2015). Megaprojects “are ‘the Vietnams of policy and management: easy to begin and difficult and expensive to stop.’” (*Id.*, p. 3.). “[M]egaproject planners are often outright dishonest, systematically overestimating benefits and underestimating costs.” (*Id.*, p. 4). “Unfortunately, false cost-benefit estimates have a way of elevating big projects over more cost-efficient, less environmentally disruptive ones.” (*Id.*, p. 4).

A leading article on megaproject dishonesty is: Bent Flyvberg, *Delusion and Deception in Large Infrastructure Projects*, 51 California Management Review 170 (Winter 2009). A more recent article addressing these issues is, Chris Edwards and Nicole Kaeding, *Federal Government Cost Overruns* (Cato Institute, Tax & Budget Bulletin, September 2015). The Cato Institute Tax & Budget Bulletin article concludes: “Cost overruns on large government projects are pervasive. The problem appears to stem from a mixture of deception and mismanagement, and it has not diminished over time. One of the consequences is that taxpayers are likely footing the bill for many projects that cost more than the benefits delivered.”

The project proponents are trying to get this train wreck of a project in motion leaving the ratepayers stuck with the tab and the Delta stuck with the destruction.

The Project Proponents Stack the Deck by refusing to Consider Sensible Alternatives

DWR has now marched along for seven years, deliberately refusing to develop and evaluate a range of reasonable alternatives, or indeed, any real alternatives at all, that would increase flows by reducing exports and turn to modern measures such as recycling and conservation. The National Academy of Sciences declared in reviewing the then-current version of the draft BDCP *back in 2011* that: “[c]hoosing the alternative project before evaluating alternative ways to reach a preferred outcome would be post hoc rationalization—in other words, putting the cart before the horse. Scientific reasons for not considering alternative actions are not presented in the plan.” (National Academy of Sciences, Report in Brief at p. 2, May 5, 2011).

The differences among the alternatives in the Project’s Draft EIR/EIS were slight. “The 15 action alternatives are variations of conservation plans that differ primarily in the location of intake structures and conveyance alignment, design, diversion capacities (ranging from 3,000 to 15,000 cfs), and operational scenarios of water conveyance facilities that would be implemented under CM1.” (Draft EIR/EIS, ES p. 26).

The Final Water Fix EIR/EIS (December 2016) did nothing to cure the failure to include the required range of reasonable alternatives in the previous Drafts that had been issued for public and decision-maker review and comment. As explained by the Final EIR/S:

The 18 action alternatives are variations of alternative water conveyance plans and restoration actions or Environmental Commitments that differ primarily in the location, design, conveyance capacity, and rules that would determine the operation of water conveyance facilities. For instance, the alternatives range from the proposed construction of one 3000-cubic feet per second (cfs) intake to five such intake facilities, representing a range of north Delta conveyance capacities from 3000 cfs to 15,000 cfs. (Water Fix Final EIR/S, Vol. I, Chapter 3, Alternatives, p. 3-2).

It is as if there were no Delta Reform Act or CEQA (California Environmental Quality Act) establishing legal requirements requiring development and consideration of reasonable alternatives. Alternatives were limited to what the project proponents want as opposed to what the law and common sense require before embarking upon this enormous project having profound environmental and economic consequences for our future. Friends of the River, other public interest organizations and several public agencies have been trying to get the project proponents to consider sensible alternatives starting back in 2012. The only reasonable conclusion to reach is that the project proponents have always refused to consider sensible alternatives because they fear the result. The public would, if given the opportunity, favor alternatives that would save the Delta and at the same time, save money.

The Delta already faces crises including diminishing mountain runoff in the watershed; increasing salinity intrusion from San Francisco Bay and the ocean; and projections that these conditions will continue to worsen in the future. Taking freshwater flows away upstream from the Delta would greatly exacerbate these already bad conditions. If this project is ultimately constructed the most likely outcomes will be either enormous economic waste resulting from a stranded asset or the destruction of the Delta.

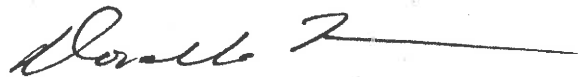
CONCLUSION

California's hiding its own *Economic Analysis*, combined with the State not performing the usual benefit to cost analysis for an expensive public works project, are red flags that the project is a bad one that should not be supported by the Santa Clara Valley Water District. Such support would be contrary to the best interest of the citizens of our community, and therefore contrary to the mission of the Water District.

Sincerely,



Senior Counsel
Friends of the River



/s/Donelle Morgan, Board Member
Friends of the River

Attachments:

CalWaterFix Economic Analysis Draft for Natural Resources Agency, November 15, 2015
Benefit-Cost Analysis of the California WaterFix, August 2016,

CalWater Fix Economic Analysis

DRAFT

PREPARED FOR

California Natural Resources Agency

PREPARED BY

David Sunding

NOVEMBER 15, 2015

THE **Brattle** GROUP

..... [REDACTED]

This report was prepared for the California Natural Resources Agency. All results and any errors are the responsibility of the authors and do not represent the opinion of The Brattle Group or its clients.

Acknowledgement: We acknowledge the valuable contributions of many individuals to this report and to the underlying analysis, including members of The Brattle Group for peer review.

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I. Introduction

The existing system of pumps and water transport canals south of the Delta can move 15,000 cubic feet per second through the combined State Water Project and Central Valley Project. These facilities deliver water to farms and cities in the San Joaquin Valley, Southern California, the Bay Area and the Central Coast. On average, roughly 60% of the non-refuge supplies delivered by these facilities go to agriculture and the remaining 40% go to urban users.

While the state and federal projects have performed well since their creation and have generated significant benefits to their customers and other Californians, the system has proven to be vulnerable to several emerging risks. In the short-term, tighter environmental regulations aimed at protecting Delta-dependent species and their habitats have reduced project deliveries, and are expected to continue to do so. Volumes of water exported through the Delta have decreased over time, partly as a result of increased environmental regulation. Going forward, Delta exports may deteriorate further, due to the likelihood of more stringent protections for the Delta smelt and other species.

The Delta's water infrastructure is also vulnerable to seismic risks. These risks may be small in any given year, but cumulate over time. Over the next two decades, it is more likely than not that the state will experience a large earthquake in or near the Delta that would disrupt water deliveries for some period of time. Looking further into the future, climate change impacts will result in sea level rise that would cause water quality in the south Delta to deteriorate, making it impossible to operate the state and federal pumps for large periods of time.

The proposed CalWater Fix addresses these immediate and longer-term risks to the Delta's water infrastructure. The proposed project is to construct three new intakes on the Sacramento River and two tunnels with a combined diversion capacity of 9,000 cfs, which is less than the capacity of the current system. The project is expected to result in combined state and federal deliveries of approximately 4.9 MAF upon completion of the project.

There are two basic questions with respect to the economics of the CalWater Fix. First, is the project affordable? That is, do the water users who would pay for the construction and operation of the tunnels have the ability to repay the associated debt and operating costs? The recent Treasurer's report answered this question in the affirmative, while acknowledging that it is a much closer call for agriculture than for urban users. Second, does investment in the CalWater

Fix generate benefits to the water users that are greater than the costs? This is the classic benefit-cost question, and it is often a more exacting test than ability to pay.

Answering the cost-benefit question requires comparing the costs of the WaterFix to the costs of reducing agricultural and urban water use and the cost of investing in alternative water supplies. Potential urban water supply alternatives include desalination, recycling, stormwater capture, groundwater remediation including brackish water desalination, and others. Feasible agricultural water supply alternatives are much more limited. As a result, following is the primary way that farmers will cope with reduced water deliveries in the future.

The purpose of this report is to examine the relative direct benefits and costs of the WaterFix, and to outline some of the major indirect economic effects of implementing the program. The benefits of the tunnels are analyzed with respect to a no-tunnel baseline with the same operating criteria as the WaterFix. It is apparent that the WaterFix would not be a sensible investment from a water supply perspective if current levels of Delta deliveries were guaranteed into the future. However, it is expected that Delta operations will be subjected to tighter environmental regulations, and it is with respect to this tighter future baseline that I assess the benefits of the WaterFix.

With respect to direct impacts, I conclude that the WaterFix passes a cost-benefit test in aggregate. Urban users clearly have the ability to afford the project and receive most of its benefits (nearly twice the level of their allocated costs). However, under the currently negotiated operating criteria, the WaterFix does not produce benefits in excess of costs for most agricultural water users.

This analysis assumes that the federal government or some other entity makes a roughly \$3.9 billion contribution to the capital and operating costs of WaterFix to cover the costs allocated to the exchange contractors and refuges. If these costs must be borne by the other Delta water users, then the net benefits of the project are even more negative for agricultural contractors.

It should be noted that these overarching conclusions regarding the economics of WaterFix can be altered by several factors. In particular, by facilitating cross-Delta conveyance, the WaterFix can facilitate additional water transfers from the Sacramento Valley to urban and agricultural users south of the Delta. Further, the WaterFix increases the benefits of additional storage projects both north and south of the Delta. Neither of these benefits is quantified in this analysis.

In addition, allowing for increased water trading among south of Delta water users can greatly increase the benefits of the WaterFix by reallocating supplies to the users with the greatest willingness to pay for them. Allowing willing contractors to sell some of their available supplies also helps address lingering questions about the affordability of the project to certain agricultural users since they would be able to sell their WaterFix benefits for more than the cost share allocated to them. In this sense, additional water trading creates a real “win-win” for the agricultural and urban contractors.

The report also considers the public benefits of WaterFix and demonstrates that the project would provide significant indirect and public benefits to Californians, even those who do not directly consume Delta water supplies. These indirect and public benefits justify a state contribution to the project in addition to the assumed public contribution to cover the costs allocated to the refuges and the exchange contractors. The report also indicates ways in which such a public contribution could be spent. One possibility is to defray construction costs. Another, more attractive possibility is to use any state contribution to acquire more water supplies to increase project yields.

The report also examines different possible configurations of the tunnels. For example, would it be preferable to build a smaller set of tunnels, say 6,000 cfs or even 3,000 cfs as suggested by the NRDC? This scaled-down project would have lower construction costs, but would also result in reduced water supply benefits. The conclusion on this issue is clear: reducing tunnel size is an engineering solution to a governance problem, and makes little economic sense. There are powerful economies of scale in tunnel construction and the incremental cost of building 9,000 cfs tunnels as compared to 6,000 or 3,000 cfs tunnels is far lower than the cost of any available water supply alternative.

Ultimately, different proposals provide different levels of risk reduction at a different cost. The proposed WaterFix investment appears to strike a balance between these risk and cost reduction objectives, as compared to other possible configurations of the project and the available set of water supply alternatives and conservation possibilities.

It is important for the state and its public water agencies relying on Delta water supplies to find the appropriate balance between “small is beautiful” local control, and re-investing in state infrastructure that provides important economies of scale. Delta supplies are delivered through state and federal projects in which large historic, sunk investments have been made, and for

which debt is still being repaid. These costs will not be reduced if local utilities shift away from imported water supplies.

It is also important to remember that investing in Water Fix does not eliminate the need to pursue local conservation programs and develop alternative water supplies. WaterFix stabilizes Delta deliveries at roughly the levels of the past two decades, providing insurance against the risk of future declines. Dealing with growth will require that the state's water providers pursue other strategies as well.

II. WaterFix Costs and Cost Allocation Assumptions

The total design and construction enterprise costs for WaterFix are estimated at \$14.94 billion in undiscounted terms. Section 7 mitigation requirements during construction will cost between \$557 and \$817 million. These initial capital costs will not be distributed evenly over the anticipated ten-year construction time frame; rather roughly 40% of costs will be incurred during the first five years and the remaining 60% during the subsequent five years.

The present value of the sum of these initial capital costs, discounted to 2015 using a 3% real rate of interest, is \$13.25 billion, incorporating the high-end figure for mitigation. For the first ten years following the end of construction, facility operating and maintenance costs are estimated to be \$25 million per year. Thereafter, O&M costs are anticipated to increase to \$40 million annually, taking the cost of replacement capital into account. Using a 3% real interest rate and assuming a project life of 50 years, the present value of all future O&M costs is \$622 million. The present value of total costs over the entire project lifetime, including construction, mitigation, and operating expenses, is therefore \$13.9 billion. This cost measure is the appropriate one to use in a cost-benefit comparison.

For purposes of making cost-benefit comparisons, I assume that project construction and operating costs are apportioned across water users on an equal, proportional basis. That is, I assume that every acre-foot of water exported from the Delta absorbs the same cost. As is typical in cost-benefit analysis, I calculate benefits and costs on an incremental basis, measuring the difference between outcomes with and without the WaterFix investments.

In the analysis that follows, I evaluate benefits and costs under several alternative scenarios. I utilize the EIR No Action Alternative to characterize outcomes under current conditions. Next, I consider benefits and costs under the proposed project of a 9,000-cfs North Delta conveyance

facility. Third, I consider the impact of future environmental restrictions by analyzing a scenario with existing conveyance and the same, stricter operating criteria being considered to go with the new conveyance. Last, I consider two scenarios under climate change. These scenarios incorporate a 140-cm rise in sea level, and I evaluate supplies in this case with and without the North Delta conveyance facility.

III. Environmental Compliance Benefits

This section of the report addresses the environmental compliance benefits of the WaterFix. The ESA and other regulations are part of the baseline, and compliance with these laws and associated regulations is not discretionary on the part of the state or the water contractors. The relevant question, then, is whether the WaterFix allows water managers to operate the state and federal projects in a way that increases project yields while still complying with applicable environmental laws and regulations.

A. WATER SUPPLY IMPACTS

Estimates of future SWP deliveries are forecasted using the California Department of Water Resources' CALSIM II model, a generalized water resource simulation that generates hydrologic time series forecasts of large, complex river basins. This model relies on early long-term water demand forecasts for the year 2020 and an extended record of runoff patterns. Data produced using CALSIM II are used to estimate the water to be exported from the Delta and distributed to SWP contractors under the following scenarios:

- EIR No Action Alternative
- Existing Conveyance with Proposed Project Operating Criteria
- Proposed Project
- Extreme Climate Change with Existing Conveyance
- Extreme Climate Change with Proposed Project

Combined state and federal deliveries after implementation of the WaterFix are expected to be 4.9 maf upon completion of the project, including deliveries to refuges and the exchange contractors. This level of deliveries assumes a number of existing and new regulatory constraints that would be included in the proposed action. These include Scenario 6 operations above the OMR criteria and San Joaquin River import-export ratio in the BiOps, Fall X2 and spring outflow requirements for longfin smelt.

If the state does not invest in the WaterFix, an important question is what would be the level of state and federal project deliveries (i.e., what is the appropriate “baseline” to use when evaluating the economic impacts of the WaterFix?). To evaluate this issue, this report considers two no-project cases. The first case is the EIR No Action Alternative that represents current conditions. In this case, total Delta exports are 4.7 maf. The second baseline assumes existing conveyance and the same operating criteria as the proposed action. This scenario is the more likely of the two, and results in an “apples to apples” comparison with the proposed project that isolates the costs and benefits of the tunnels and new intakes. In this version of the baseline, state and federal deliveries decline to 3.9 maf – a reduction of 0.8 maf from current levels, and almost 1 maf below the level of deliveries under the WaterFix. This second scenario is intended to capture the risk of tighter environmental regulations in the Delta that would be imposed to ensure compliance with the Endangered Species Act and other federal laws and regulations.

Tables 1-4 display project deliveries for the subset of agencies that may experience significant yield improvements as a result of implementing the WaterFix. The CALSIM II model projects yield changes for the following groups of water districts:

- Central Valley Project
 - San Felipe
 - SLDMWA Ag Service Contractors
 - Cross Valley Canal
- State Water Project
 - MWD
 - Bay Area Urban
 - Other SWP Urban
 - KCWA
 - Other SWP Ag

Table 1 and Table 3 show yields and changes in yields for each group of CVP contractors. The table shows that the agricultural service contractors in the SLDMWA can expect deliveries averaging 773 thousand acre-feet in the No Action case. With existing conveyance and the same operating criteria as the proposed project, CVP deliveries to these contractors decline to 502 thousand acre-feet annually, a drop of 259 thousand as shown in Table 3. It should be noted that project deliveries to these contractors are actually slightly lower under the proposed action than

in the No Action case, an outcome due to the significant constraints the proposed action operating criteria impose on the CVP.

Yields for the SWP contractors are shown in Table 2 and Table 4. Table 2 shows that SWP deliveries to MWD are 1,126 thousand acre-feet in the No Action case and 1,212 thousand acre-feet after implementation of WaterFix, an improvement of only 85 thousand acre-feet as shown in Table 3. Compared to the existing conveyance baseline with tighter operating criteria, however, the WaterFix provides MWD with an additional 291 thousand acre-feet of supply. KCWA benefits by 180 thousand acre-feet when comparing between these same two cases.

Table 3 and Table 4 demonstrate the importance of a north Delta intake as a measure to mitigate the effects of climate change. The extreme climate change scenarios considered here assume 140 centimeters of sea level rise, an effect that results in frequent increase in salinity in the vicinity of the south Delta pumps. For the SLDMWA agricultural service contractors, for example, yields under extreme climate change with the existing conveyance facilities would average only 608 thousand acre-feet per year (assuming the current BiOp operating criteria). After implementation of WaterFix, these yields would be 647 thousand acre-feet, or an increase of 40 thousand acre-feet annually.

The benefits of the WaterFix as a climate change adaptation measure are especially dramatic for the SWP. Looking at the summary column of Table 4, the WaterFix preserves 1,159 thousand acre-feet of SWP deliveries that would otherwise be lost. MWD alone enjoys deliveries that are 641 thousand acre-feet higher than without the WaterFix.

Table 1: CVP Yields (AF Thousands)

Scenario	San Felipe	SLDMWA	Cross Valley Canal	Total
NAA	129	773	48	950
PA No Tunnels	106	502	19	627
PA Tunnels	129	760	55	945
140cmSLR No Tunnels	117	608	23	748
140cmSLR Tunnels	114	647	48	809

Table 2: SWP Yields (AF Thousands)

Scenario	South Bay Aqueduct	MWD	Other SWP Urban	Kern CWA	Other SWP Ag	Total
NAA	134	1,126	492	522	97	2,371
PA No Tunnels	115	920	409	417	76	1,937
PA Tunnels	144	1,212	520	596	111	2,582
140cmSLR No Tunnels	97	479	285	369	81	1,311
140cmSLR Tunnels	145	1,120	502	584	119	2,470

Table 3: Change in CVP Yields (AF Thousands)

Scenario	San Felipe	SLDMWA	Cross Valley Canal	Total
PA Tunnels vs. NAA	0	-13	7	-6
PA Tunnels vs. PA No Tunnels	23	259	36	317
140cmSLR Tunnels vs. 140cmSLR No Tunnels	-3	40	25	61

Table 4: Change in SWP Yields (AF Thousands)

Scenario	South Bay Aqueduct	MWD	Other SWP Urban	Kern CWA	Other SWP Ag	Total
PA Tunnels vs. NAA	9	85	28	74	14	211
PA Tunnels vs. PA No Tunnels	29	291	110	180	35	645
140cmSLR Tunnels vs. 140cmSLR No Tunnels	48	641	217	215	38	1,159

B. URBAN WATER SUPPLY BENEFITS

The analysis of urban water supplies and demands is performed at the individual agency level using the Supply-Demand Balance Simulation Model (or SDBSIM), developed by The Brattle Group and detailed in Chapter 9 and Appendix 9A of the Bay Delta Conservation Plan. SDBSIM is a stochastic simulation model that calculates changes in economic welfare of consumers in 36 major water urban agencies receiving Delta water supplies directly or indirectly. These agencies were chosen for analysis because they receive the bulk of the SWP urban deliveries and because they have the largest potential to experience changes in welfare as a result of variations in Delta yields. Some of these agencies are members of the Metropolitan Water District of Southern California, which receives roughly half of all available yields from the SWP. Many of these 36 agencies are wholesalers themselves. For these agencies, it is necessary to model demand and supply conditions in the retail agencies they serve. At the retail level, the analysis covers nearly 120 individual retail agencies throughout California.

The data requirements of such a disaggregated analysis are significant, but this type of approach is necessary to accurately calculate changes in the welfare of urban water customers. Water rates vary widely in California, and knowledge of existing rate structures is essential to calculating changes in consumer welfare following water shortages. Further, accurate estimates of the price elasticity of urban water demand are essential to measuring the costs of mandatory conservation. The SDBSIM incorporates the most comprehensive set of water price and consumption data available in California. This data allows for the use of existing rate structures to calculate impacts and to econometrically estimate the price elasticity of demand at the agency level.

The SWP is the most important source of imported water for the urban agencies included in the SDBSIM. SWP deliveries to these agencies consist of both Table A and Article 21 supplies. Table A supply is a contracted quantity that totals roughly 2.6 MAF per year across all the urban member agencies in the model (California Department of Water Resources 2013). Article 21 deliveries are unscheduled water that is available in wet years, and is essentially the surplus water that remains after all operational, water quality, and Delta requirements are met.

The first step toward valuing the urban water supply benefits of the WaterFix is to identify the associated patterns of urban water shortages relative to those occurring under the existing conveyance scenario with the same operating criteria as the WaterFix. These calculations are performed using the SDBSIM, which is a probabilistic water portfolio simulation model that apportions and values shortages on an agency level (as developed by The Brattle Group). The SDBSIM evaluates water shortages in each sector¹ given demand levels over time and water supply forecasts for each of the SWP agencies. The model runs 83 different trials for each agency by rotating through a historical hydrologic sequence. The shortage and demand outputs are then used to calculate the value of losses to consumers associated with a shortage given a constant elasticity of demand and avoided marginal cost of service. The water supplies considered in the SDBSIM consist of the local and imported supplies discussed in the preceding section. The water demands considered in the SDBSIM

¹ All sectors are composed of single-family residential, multifamily residential, commercial/industrial/institutional, and agriculture.

are based on an econometric forecast model, discussed in detail in the subsequent section. For the purposes of this report, the SDBSIM incorporates the 26 MWD water agencies along with Alameda County, Antelope Valley-East Kern, Castaic Lake, Santa Maria, Mojave, Palmdale, San Bernardino Valley, San Geronio, Santa Clara Valley and Zone 7.

The SDBSIM uses an indexed sequential Monte Carlo simulation method to measure the supply-demand balance outcomes for forecasted years given the pattern of historical hydrologic conditions between years 1922 and 2004. It adjusts the demand and supplies of a forecasted year given a past year of hydrologic conditions, then takes the next sequential forecasted year and adjusts the demand and supplies for that year given the next sequential historical hydrologic year conditions, and so on. For example, the SDBSIM would adjust the forecasted demand and supplies for the year 2012 given the hydrologic conditions of the year 1922, and adjust the forecasted demand and supplies of year 2013 given the hydrologic conditions of year 1923, and so on. By preserving the series of climate patterns, or *hydrologic trace*, the model is able to capture the operation of storage resources that are drawn upon and refilled over the forecast horizon given a probabilistic sequence of hydrologic conditions. The model then starts over and shifts the hydrologic year by one for each forecasted year. That is, it will adjust the 2012 forecast given the 1923 historical hydrologic conditions, and accordingly will adjust 2013 given 1924 conditions, and so forth. This shifting process is done 83 times such that each forecasted year is evaluated under each hydrologic condition, while still preserving the order of the hydrologic conditions, resulting in 83 different reliability outcomes for each forecast year. The model considers the hydrologic conditions of 2004 to be followed by those of year 1922. Thus, when forecasting using a trace that starts with a late hydrologic year, it simply loops back around to the beginning of the climate cycle.

For each year, the SDBSIM compares the forecasted demand to the sum of available projected local supplies and imported supplies less conservation savings in order to assess the disparity between the amount of water desired and the amount that can be provided. If a shortage exists, the SDBSIM may release additional supplies from storage or transfer programs until supply and demand are balanced or until these supplies are exhausted. A net shortage for the year results if the gap between supplies and demands is too large to be balanced by storage and transfer programs. If a surplus exists, the SDBSIM may allocate surplus water to various storage accounts until all storage capacity is used; any remaining surplus supplies are considered unused or “wasted” and are not available for use in subsequent years of the

forecast. The remainder of this subsection details the supply and demand forecasts used in the SDBSIM.

The value of water supplies to consumers can be accurately measured by combining economic theory and econometric estimation of urban water demand relationships. The economic costs of water supply alternatives are not easily measured at a planning level, however, because they depend heavily on site-specific factors, pertinent regulations, and demands for water of varying quality. However, by examining the actual cost of past alternative water supply projects, it is possible to portray a range of potential costs that can be compared to the costs of conservation.

Table XX shows the cost per acre-foot for recycling projects in Southern California. Recycling project costs per acre-foot are calculated using data on total costs and acre-feet yearly. Because there is a lack of information about length of operations, what total costs include, and other project parameters that are needed for an exact calculation, this analysis assumes the cost per acre-foot is equal to the total present value cost per acre-foot yearly at an interest rate of 4.5%, a representative interest rate available to urban water supply agencies.

There is no single estimate of the cost of recycled water because its cost is closely tied with the details of the project. The cost of recycled projects depends on the location at which the water will be used, or, more precisely, on the distance between the recycling plant and end users. Recycled water generally cannot be transported through existing infrastructure, requiring the installation of “purple pipe” to move the water from the recycling plant to end users. These barriers to implementing recycled water projects are the primary reason that goals for recycled water in the California 2005 water Plan update and the California Water Boards Strategic Plan Update: 2008–2012 were not met.

Table XX. Cost of Recycling Projects (\$/acre-foot)

Project Title	Project Location	Estimated Cost per Acre-Foot
Groundwater Replenishment System ^a	Orange County Water District	\$955
Regional Recycle Water Program, Northwest Area Project ^b	Inland Empire Utilities Agency	\$1,467
Southeast Water Reliability Project Phase 1 ^c	Central Basin Municipal Water District	\$1,672
Widomar Recycle Water System ^b	Elsinore Valley Municipal Water District	\$1,312

^a Orange County Water District groundwater replenishment calculations are before subsidies and have a 5% annual escalation of operating costs from 2009 to 2012 (Groundwater Replenishment Systems 2010)
^b Bureau of Reclamation 2012
^c Central Basin Municipal Water District 2012 Southeast Water Reliability Project description

Unit costs of recycled water supplied by the projects in Table XX range from \$1,000 to \$1,700 per acre-foot. Other projects outside the study area but still within the State, such as the Eastside recycled water project currently being developed in the City of San Francisco, are projected to have even higher costs. The unit cost of water supplied by a recent project of the San Francisco Public Utilities Commission is expected to be in excess of \$8,000 per acre-foot. Taken together, available data indicate that it is difficult to project the costs of recycled water supplies with any accuracy. The data also indicate that recycled water costs can vary widely as a function of project-specific characteristics.

Like recycled water, the costs of desalinated water depend on numerous project details. Permitting, regulatory, and planning considerations, the cost of capital, availability and costs of energy, and proximity to distribution systems are prominent among the challenges to further development of seawater desalination. Costs are also influenced by the type of feed water, as well as the available concentrate disposal options. The largest cost of seawater desalination is electrical energy, which represents 38% of total costs. The remainder of the cost is comprised of 25% capital costs, 16% labor, 11% chemicals, 5% membranes, and 5% maintenance (California Department of Water Resources 2009: Chapter 9). Costs are lowest for desalination of brackish groundwater at \$1,000 to \$1,500 per acre-foot, followed by seawater desalination at recent costs of \$2,000 to \$2,300 per acre-foot.

Table YY. Cost of Desalination Projects (\$/acre-foot)

Project Title	Project Location	Estimated Cost per Acre-Foot
Carlsbad Desalination Project ^a	Carlsbad, San Diego County, CA	\$2,014-\$2,257
Huntington Beach Seawater Desalination Project ^b	Huntington Beach, Orange County, CA	\$1,768-\$1,812
West Basin Municipal Water District Desalination Project ^c	El Segundo and Redondo Beach, Los Angeles County, CA	\$1,273 for brackish \$1,700 for seawater
Camp Pendleton Seawater Desalination Project ^d	Camp Pendleton, San Diego County, CA	\$1,900-\$2,340
Oxnard GREAT Program ^e	Oxnard, Ventura County, CA	\$1,680 first phase \$1,191 second phase

Notes:

Poseidon Resources, LP and San Diego County Water Authority 2012

Municipal Water District of Orange County and Poseidon Resources, LP 2013. Range includes total costs before any subsidies and includes conveyance costs

University of Arizona Water Resources Center 2011

RBF Consulting 2009; Pacific Institute 2012

Wenner 2012

The costs of recycling and desalination can be compared to the value of water calculated using the SDBSIM model. Looking across the SWP urban agencies considered, the value to ratepayers of the water preserved by the WaterFix is \$1,414 per acre-foot. These values are at the low end of the range of water supply alternative costs, which is understandable since the water supplies preserved by the WaterFix vary considerably between wet and dry years whereas alternatives such as recycling and desalination are more reliable. Because demand reduction is a feasible option, and because the costs of feasible water supply alternatives cannot be known with precision for any individual water agency, for planning purposes it is appropriate to measure the urban benefits of WaterFix using the water values produced by SDBSIM rather than the cost of alternatives. It should be noted, however, that for most water agencies the benefits of WaterFix will not be dramatically different under either approach.

C. AGRICULTURAL WATER SUPPLY BENEFITS

Turning to agriculture, there are in general few water supply alternatives available to growers beyond surface diversion and groundwater extraction. There have been some attempts to desalinate agricultural tailwater in the San Joaquin Valley, but these are only at the pilot stage at present. The most straightforward way to value agricultural water supplies is to calculate the value of water implicit in land prices, and on the water transfer market. Since the market value of cropland should equal the capitalized value of the stream of future agricultural profits, land values are often used to measure the implicit value of water used for crop production.

The Statewide Agricultural Production (SWAP) model is the evolution of a series of production models of California agriculture developed by the University of California at Davis and DWR, with support from Reclamation. SWAP is a regional model of irrigated agricultural production and economics that simulates the decisions of agricultural producers in California. The model assumes that farmers maximize profit subject to resource, technical, and market constraints. It incorporates project water supplies (SWP and CVP), other local water supplies, and groundwater. As conditions change within a SWAP region (e.g., the quantity of available project water supply increases or the cost of groundwater pumping increases), the model optimizes production by adjusting the crop mix, water sources and quantities used, and other inputs. It also fallsow land when that appears to be the most cost-effective response to resource conditions.

For this report, SWAP was used to compare the long-run producer responses to changes in SWP and CVP irrigation water delivery and to changes in groundwater conditions associated with WaterFix. Water supply projections from the CALSIM II model, described earlier, were used as inputs into SWAP through a standardized data linkage procedure.

The analysis of agricultural economic effects of water supply changes provides benefits in the following categories:

- Change in groundwater pumping and cost
- Change in net return from crop production (excluding change related to groundwater pumping)
- Change in benefits to consumers of agricultural products through food price changes

An important feature of our analysis of agricultural benefits is that it incorporates the effects of the Sustainable Groundwater Management Act (SGMA). This modification is significant since

surface and groundwater are substitutes, and groundwater limitations can be expected to increase the value of surface water used for crop irrigation.

To date, no agricultural regions or contractors within the Central Valley have yet developed quantified sustainable yield estimates for purposes of implementing SGMA. SGMA addresses a number of factors and criteria for sustainable yield, but for this analysis we address only the average volume of pumping that can be sustained over a period of time without reducing groundwater storage (designated here as safe yield, SY). The most recent calibration results from a groundwater flow model, the California Central Valley Groundwater-Surface Water Simulation Model (C2VSIM), are used to derive an approximation of SY for purposes of this analysis. The intent is not to develop a precise or accurate estimate of sustainable pumping (which is not possible given the current state of knowledge), but rather to provide an assessment of direction and rough magnitude of change that such limits could impose on existing and future pumping. Further, this will be used to assess how pumping limits could affect the benefits or impacts of changes in surface water irrigation delivery, the marginal value of water for irrigation, and the willingness to pay for surface water supply.

The following general steps describe how the pumping limits were developed.

1. The latest C2VSim calibration results include estimates of average annual groundwater pumping and average annual change in groundwater storage for each of the 21 depletion study areas (DSAs) in the Central Valley. As a first approximation for purposes of this analysis, the average change in storage is treated as the amount by which average annual pumping exceeds safe yield. In a long-term safe yield condition, groundwater storage would trend neither up nor down. Therefore, adjusting the average annual pumping by the average annual change in storage provides such a first-cut estimate. It is recognized that reducing pumping in this way would change recharge rates and gradients that would, in turn, change the net water balances and flows. A more complete assessment would use C2VSIM to evaluate all of the effects – however, no testing of this approach has been undertaken by C2VSIM modelers. Safe yield (SY) is estimated here as the average annual pumping minus the average annual change in groundwater storage. Total SY for each region was apportioned to agricultural pumping based on its share of the total annual pumping in the calibration estimates, and the result was expressed as a percentage of average annual agricultural pumping.
2. The SY percentage was applied to the corresponding regional average annual groundwater pumping estimated by SWAP for the No Action Early Long-term condition, resulting in an average annual SY pumping limit. We did not use the absolute magnitude of the estimated SY from step 1 due to differences in the calibration land use and water

use data in the two models. Also, though the regional boundaries of the two models are mostly similar, some of the SWAP regions split a DSA into two or three sub-regions. In these cases, the same SY percentage was applied to each of the sub-regions. Figure 1 displays the SWAP regions; the C2VSIM regions and numbering are the same except that they do not split some regions into two or more sub-regions (as designated in SWAP by the suffix a, b, or c).

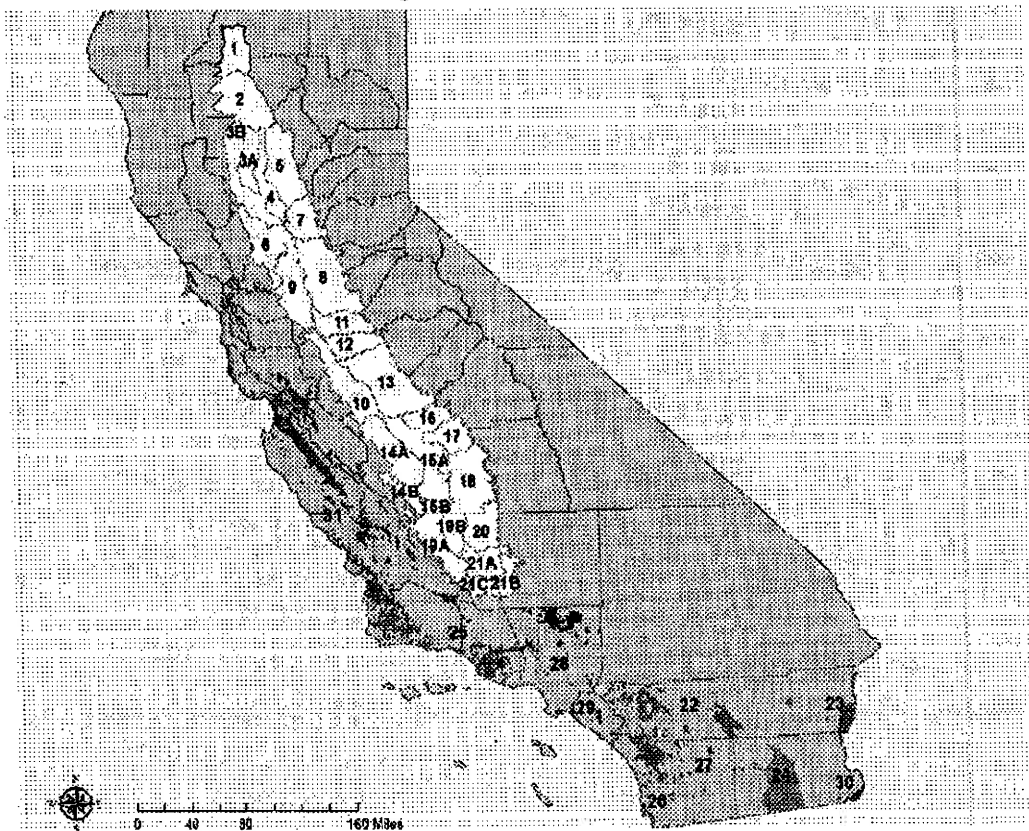
3. An important exception to the procedure described in step 2 is the development of safe yield for Westlands Water District (WWD). WWD has developed its own estimate of the safe yield of the confined aquifer underlying the district. Groundwater above the confining layer is subject to quality degradation and may not be usable for irrigation over the long term. WWD estimates in its 2012 Water Management Plan that the safe yield is between 135 and 200 TAF per year. We have used 200 TAF as the average annual pumping limit for this SWAP region. Ideally, other regions' SY estimate would also take account of water quality in different aquifer layers, including regions 10, 15, 19, and 21. At this time, we do not have detailed data to make such adjustments in other regions, so this analysis relies solely on the water balance-based estimates described in steps 1 and 2.
4. SY limits are unlikely to be imposed equally in every year. In future, regional groundwater management agencies implementing SGMA would likely allow greater pumping in dry and critical water years due to lower surface water availability, offset by lower pumping volumes in the other years, so that the groundwater resource is optimally allocated over time. We have not derived an optimal pattern of pumping limits by year type, but have developed a simple approach using the same No Action estimates from the 2013 BDCP analysis. The dry/critical pumping limit is increased (relative to the average annual limit) enough to offset the loss of surface water in dry/critical years versus the overall average, but subject to two constraints. First, the weighted average pumping over all year types must not exceed the average annual limit (a feasibility condition); and second, the dry/critical year pumping can be no more than twice the overall average (a reasonability condition to avoid infeasible or implausible solutions in three of the regions).

The SWAP regions are shown in Figure 1. The Delta export regions' pumping limit estimates that result from this procedure are shown in Table 5. GW SY Average is the overall average pumping SY. The next column displays that value as a percentage of the groundwater pumping from the early long-term No Action analysis prepared in 2013. The final column is the dry/critical year pumping limit.

Table 5: Estimated Safe Yield Groundwater Pumping Limits (AF Thousands)

Region	GW SY, Average	As Percentage of	
		No Action Avg. GW Pumped	GW SY, Dry/Critical Years
V10	285.2	0.97	424.9
V14A	200.0	0.42	400.0
V14B	40.0	0.69	40.0
V15A	905.1	0.95	931.8
V15B	30.9	0.95	40.1
V19A	73.1	0.68	116.7
V19B	199.6	0.68	254.9
V20	173.5	0.49	212.2
V21A	124.8	0.73	167.8
V21B	38.4	0.73	76.8
V21C	81.0	0.73	92.9

Figure 1: SWAP Regions



D. SUMMARY OF WATER SUPPLY BENEFITS

The environmental compliance benefits of the WaterFix relative to the existing conveyance baseline with comparable operating criteria, are substantial. For SWP urban contractors, these benefits total \$10.172 billion over the 50-year operating period. For the SWP agricultural contractors, environmental compliance benefits are \$1.333 billion, while benefits for the CVP contractors are \$1.482 billion. Thus, the total water supply benefits of the WaterFix are \$12.987 billion.

It is also possible to calculate the present value of water user benefits per 100,000 af of average year supply increase:

- SWP Urban Contractors: \$2.882 billion
- SWP Ag Contractors: \$665 million
- CVP Ag Service Contractors: \$572 million

These figures can be used to approximate the water supply benefits from other WaterFix scenarios, and to calculate the implicit cost of environmental restrictions such as Scenario 6, changes in the CVP/SWP split, and the performance of the WaterFix with different assumptions about north and south of Delta storage. For instance, Scenario 6 results in the loss of roughly 500 thousand acre-feet of SWP and CVP water supplies. Assuming current rules for allocating water, Scenario 6 results in a loss of roughly \$7.5 billion in producer and consumer welfare.

IV. Water Quality Benefits

Construction of the WaterFix tunnels will substantially lower the salinity of Delta water supplies. Table 6 below displays estimates of average water quality at the Banks and Jones Pumping Plants. These reductions in salinity benefit farmers and urban water users, and this section describes the methods used to value water quality improvements.

Table 6: Water Quality Changes Resulting from WaterFix

Parameter	Units	Proposed Action Without Tunnels	Proposed Action With Tunnels	Difference
Banks PP				
TDS	(mg/L)	283.51	197.67	-85.84
Chloride	(mg/L)	81.29	48.17	-33.12
Jones PP				
TDS	(mg/L)	278.45	198.39	-80.06
Chloride	(mg/L)	78.62	47.84	-30.78

The economic effects of changes in water quality of irrigation water are complex and may occur in the short term and over the long term. Numerous water quality constituents may specifically affect agricultural production, but salinity, measured as electrical conductivity or parts per million (ppm) of TDS, is the single best indicator of effect for water delivered from the Delta. Improved irrigation water quality means less water is applied to leach salts, and for purposes of this analysis, that saved water is valued at the avoided cost of additional water supply (groundwater pumping is the incremental water supply avoided). Calculations account for the different crops grown in affected delivery areas.

The long-term value of salinity changes depends upon interactions between irrigation management, crop selection, and groundwater conditions. Poor drainage conditions in many areas receiving irrigation water from the Delta indicate that costs of drainage management could be avoided or postponed by improved quality of delivered water. Changes in surface water delivered also affects the use of groundwater for irrigation, which can have up to or three times the TDS concentration as water from the Delta. Longer-term implications of salt management in areas receiving Delta irrigation water are not evaluated here. Therefore, the quantified salinity benefits should be viewed as a conservative estimate.

The salt leaching benefit provided by the improved SWP/CVP delivered water quality is calculated in two components:

- For the portion of project supply that replaces groundwater pumping, the benefit is calculated relative to the applied groundwater quality.
- For all other applied project water, the benefit is calculated relative to the baseline project water quality. For each alternative, Proposed Action and SWRCB Alternative, the baseline is the no-tunnels configuration of that alternative.

These two components affect how the overall irrigation water quality changes, especially in the context of groundwater replacement of changes in surface water delivery.

For both alternatives, the tunnels provide a substantial improvement in quality of delivered water, and also provide increased delivery of surface water. Annual water quality benefits to the SWP agricultural contractors are roughly \$5.5 million, and are roughly \$12.1 million to the CVP agricultural water users. Assuming an operational date of 2027, WaterFix results in water quality benefits to CVP and SWP agricultural water users of \$216.5 million and \$97.0 million, respectively.

Urban water quality benefits are calculated using two models. The Lower Colorado River Basin Water Quality Model (LCRBWQM) assesses the cost to water users for the MWD service area. The South Bay Water Quality model was used for the Bay Area urban agencies. These models value reduced salinity according to improvements in taste and expended appliance life, among other factors.

Both regions (South Coast and Bay Area) receive water quality improvement of delivered water. For the MWD service area, annual water quality benefits are \$106.7 million, while for the Bay Area urban customers annual benefits are \$14.5 million. The present value of reduced salinity to SWP urban consumers is \$2.3 billion.

V. Reduction of Seismic Risks

By adding redundancy to the Delta's water conveyance infrastructure, the California WaterFix addresses the seismic risks that plague the current infrastructure. Figure 2 displays active faults and historic seismicity in the area surrounding the Delta. Of particular interest is the Hayward-Rodgers Creek Fault (H-RCF). The H-RCF is located west of the Delta and east of San Francisco Bay. Based on the USGS analysis of earthquake potential in the Bay Area, the Hayward-Rodgers Creek Fault has the highest probability (27 percent) of a magnitude 6.7 or greater event occurring in the next 30 years of all the major faults in the region. Estimates of the maximum magnitude for the Hayward-Rodgers Creek Fault vary from 6.5 to 7.3. To demonstrate the seismic risk reduction benefits of the California WaterFix, this report considers the effects of a magnitude 6.7 earthquake on the Hayward-Rodgers Creek Fault.

In the event of a future earthquake that occurs on the H-RCF, numerous levee failures could occur that leads to island flooding and significant salt water intrusion. Depending on a number of

factors (e.g., the size of the earthquake, the number of levee failures), the salinity intrusion could have a major impact on California's water supply.

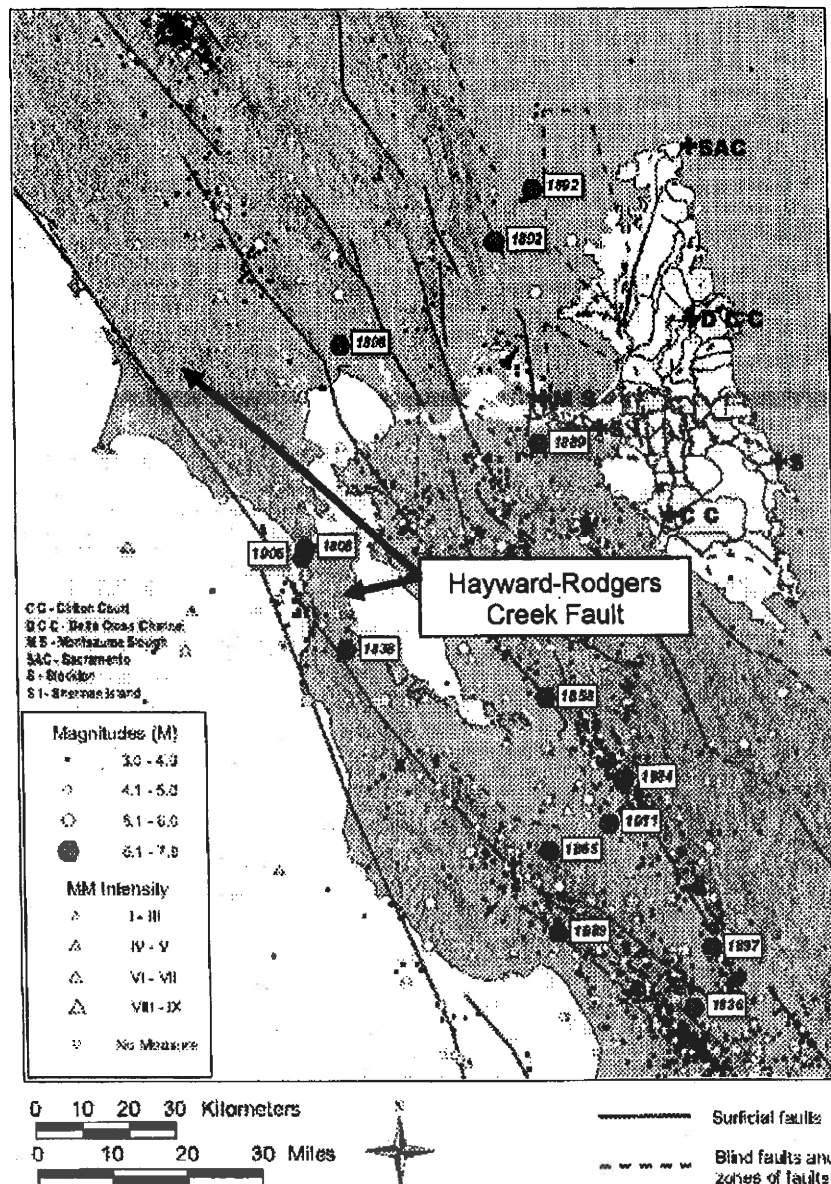
This section details the steps taken to simulate changes in Delta exports following a large earthquake near the Delta. This section also describes the IRPSIM model developed by MWD that was used to simulate changes in end use, storage and costs of operations for MWD and several other SWP contracting water agencies. The section concludes with a description of economic impacts using the impact framework detailed in the previous section.

The earthquake scenario considered in this report is evaluated using the tools developed as part of the California Department of Water Resources Delta Risk Management Strategy (DRMS) project (URS/JBA, 2009). Specifically, the DRMS Seismic Risk Analysis (SRA), Emergency Response and Repair (ERR) and the Water Analysis Module (WAM) tools (software packages) are used to evaluate the water supply impact of seismically initiated levee failures in the Delta.

Earthquake Scenario - The first step in the analysis is to define the earthquake scenario to be evaluated. An earthquake scenario is defined for a specific seismic source (e.g., fault), a specified earthquake size (magnitude), and a location. The size of the earthquake is typically selected as the estimated maximum magnitude that can be generated by the fault. The earthquake location is defined by the closest approach of the fault to the site or region of interest.

Seismic Risk Analysis (SRA) - Given the occurrence of an earthquake on a fault of a specific magnitude (an earthquake scenario), the DRMS seismic risk analysis software evaluates the earthquake ground motions that may be generated and the performance of the levees on each island in the Delta. Empirical studies of earthquake ground motions demonstrate the ground motions that can be generated are random, even for an event that occurs on a specific fault of known magnitude. Similarly, the response of Delta levees to earthquake shaking cannot be predicted exactly and as a result how many and which levees may fail during an earthquake is also random. The DRMS seismic risk analysis code evaluates the randomness of ground motions and levee performance and generates sequences of flooded islands. A sequence is a specific list of which levees have failed and which islands are breached as a result of an earthquake. Since the ground motions that can occur and the performance of the levees are random, there are many possible combinations of flooded islands that can occur as a result of single earthquake. As a result, the SRA calculates thousands of sequences (each representing a different combination of flooded islands) that quantify the randomness in levee performance.

Figure 2: Earthquake Faults near the Delta



Emergency Response and Repair (ERR) - Following an earthquake that results in levee failures, repairs are made to close levee breaches and damaged levee sections and to dewater flooded islands. The ERR is a simulation code that models the repair of levees that were damaged or breached in a sequence. It takes into account the rate of quarry production, rock placement, and the potential for levee interior erosion that can occur on flooded islands (e.g., such as occurred on Jones Tract in 2004). The ERR model produces a time series of breach closures and island

dewatering that serves as input to the WAM model. In addition, ERR estimates the cost of levee repairs.

Water Analysis Module (WAM) - The Water Analysis Module simulates direct, water-quality-related consequences of levee breach sequences. Specifically, WAM incorporates initial island flooding, upstream reservoir management response, Delta water operations, water quality (salinity) disruption of Delta irrigation, Delta net losses (or net consumptive water use), hydrodynamics, water quality (initially represented by salinity), and water export. The module receives the description of each breach scenario (e.g., resulting from a seismic or other event) and details of the levee repair process from the ERR. The model produces hydrodynamic, water quality, and water supply consequences for use in the economic and ecosystem modules. The water quality consequences of levee failures (i.e., salinity) are dependent, not only on the initial state of the Delta at the time of failure, but also on the time series of tides, inflows, exports, other uses, and on the water management decisions that influence these factors. Thus, WAM tracks water management and the Delta's water quality response starting before the initial breach event and proceeding through the breach, emergency operations, repair, and recovery period.

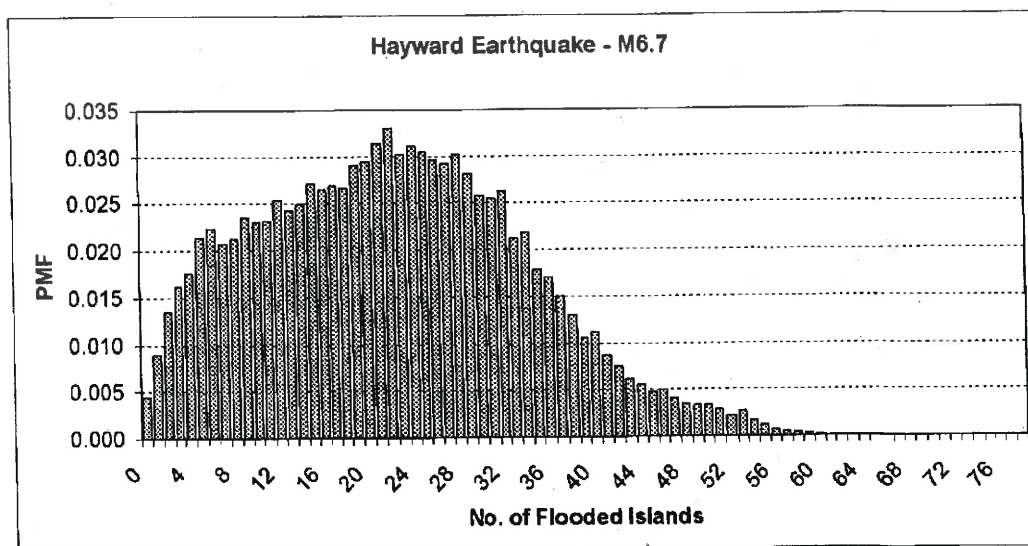
As described above, this report examines the consequences of a magnitude 6.7 earthquake on the H-RCF. The DRMS study team generated thousands of levee failure sequences for each earthquake simulated. Figure 3 shows the distribution of the number of flooded islands for the 6.7 earthquake scenario on the H-RCF. As seen in the figures, the randomness in ground motions and levee performance provides a wide range in terms of the number of islands that are flooded as a result of levee failures.

For purposes of estimating economic consequences, the mean number of flooded islands was used. For the M 6.7 event, the mean number of flooded islands is 22. To estimate economic impacts, a sequence with the mean number of islands was selected. These sequences were used in the ERR and WAM calculations to estimate the water conveyance impacts.

The impact of levee failures to water conveyance in the Delta depends on the time of the year the event (Start Time) occurs and the hydrologic conditions at the time. For instance, does the event occur in the middle of a long drought or during a period of above normal precipitation and snow? To model the impact of hydrologic conditions on water conveyance following the random occurrence of earthquake in or near the Delta, a set of alternative hydrologic conditions were selected from the historic hydrologic record for California.

Calsim II input and output for the no breaches case defines the baseline including reservoir storages, reservoir releases, Delta salinity, inflow, outflow, pumping, and project deliveries – namely, the Calsim Run for 2005 Level of Development, extended hydrology, D-1641, and B-2 (the most current, available 2005 version from the Common Assumptions Model Package). Water delivery deficits reported by the WAM are calculated relative to this baseline.

Figure 3: Probability Density of the Number of Flooded Islands for a Magnitude 6.7 Earthquake on the Hayward Fault



Calsim input and output have been computed for the entire 82-year hydrologic sequence derived from the historic record. WAM has the flexibility to use the beginning of any Calsim month as the levee breach initiation time and uses the Calsim state-of-the-system at that time as its starting condition. WAM then uses the Calsim hydrologic conditions for the next several years as the input hydrology for the duration of the event.

To characterize the variability in economic impacts across hydrologic conditions, this report displays ten scenarios that are broadly representative of the hydrologic record over the period 1922-2004. The method of sequential analysis captures the operation of storage resources that are drawn upon and refilled based on supplies and demands. The specific years and the hydrologic conditions considered in this analysis are as follows:

- Wet year followed by 2 wet years -- 1969
- Wet year followed by 2 normal years -- 1971
- Wet year followed by 2 below normal or dry years-- 1958

- Normal year followed by 2 above normal or wet years -- 1972
- Normal year followed by 2 normal years -- 1936 (Note – There was no sequence in the historic record that matched this condition; 1938 is a wet rather than normal year)
- Normal year followed by 2 below normal or dry years -- 1946
- Dry year followed by 2 above normal or wet years -- 1939
- Dry year followed by 2 normal years -- 1949
- Dry year followed by 2 below normal or dry years -- 1947
- Dry followed by two dry or critical years -- 1987

There exists uncertainty about the exact number and location of failed levees, optimal repair methods and times, and daily natural inflow following a particular earthquake. All of these factors result in uncertainty about the exact pattern of water supply outages. To model this uncertainty, the DRMS post-earthquake water supply scenarios were modified as follows. The DRMS water supply runs for the 10 hydrologies specified above list a unique recovery date after which the post-earthquake and baseline water supplies converge. Water supplies may be available to some degree prior to this recovery date, but not in all cases. The study team defined four partial outage scenarios for this analysis. These partial delivery scenarios specify no Delta exports for some fraction (25, 50, 75 and 100 percent) of the DRMS-specified recovery time. The average recovery time across the 10 hydrologies was 30 months, meaning that the average cessation of Delta exports in the 25 percent scenario is 7.5 months, 15 months for the 50 percent scenario, etc.

An additional dimension to the analysis is that we consider two scenarios for the allocation of end-use shortages. In the first scenario, all losses are absorbed by the residential sector. While this common approach preserves businesses and protects jobs, it can also lead to large economic losses for residential consumers. For this reason, we also consider an optimal reduction scenario where the residential, commercial, industrial and agricultural sectors are targeted to minimize welfare loss.

Delta export losses are translated into changes in end-use with an augmented version of the SDBSIM model that incorporates MWD wholesale agencies and several non-MWD urban contractors. SDBSIM is based on MWD's IRPSIM model and is implemented using a Monte Carlo simulation approach that integrates projections of water demands and imported water supplies for each forecast year and adjusts each projection according to weather conditions based on assumed hydrologies. For agencies within the MWD service area, the SDBSIM model integrates

retail urban water demand projections (MWD-MAIN), local supply and imported water projections (MWD Sales Model), SWP imported water supplies (CALSIM/DWRSIM), and Colorado River Aqueduct (CRA) imported water supplies (CRSS) and results in a set of supply and demand conditions over the 10 year period 2010-2019 that are indexed to various hydrologies. For non-MWD agencies, similar information on demands, imported water and storage is provided directly.

At the time of the analysis, SDBSIM included the following agencies:

- Alameda County Flood Control and Water Conservation District, Zone 7
- Alameda County Water District
- City of Santa Maria
- Castaic Lake Water Agency
- Metropolitan Water District of Southern California
- Mojave Water Agency
- San Bernardino Valley Municipal Water District

Water supply losses vary widely by hydrology, as does recovery time. It bears repeating that these water supply losses are entirely caused by changes in the salinity that make it impossible to export water during some months. Recovery times are defined as the number of months following the earthquake necessary for baseline and post-earthquake water quality profiles to converge.

Table 6 reports urban losses from a major earthquake on the Hayward-Rogers Creek Fault. In the 25 percent outage case, roughly corresponding to an outage lasting 7.5 months, average impacts are \$499 million when allocated to the residential sector and \$419 million when allocated across all sectors to minimize welfare loss. In the latter case, however, job losses average 3,419, with a minimum of 0 and a maximum of 18,123 (again in the 1987 case).

Assuming a 50 percent duration outage, which is around 15 months, economic impacts of a magnitude 6.7 earthquake are larger. Welfare losses average \$2.1 billion when shortages are all allocated to the residential sector, and \$1.4 billion when allocated to minimize welfare loss in which case job losses average 17,523 but can be as large as 71,271 in the 1987 hydrology.

These two cases (25 percent and 50 percent) represent the most likely outage scenarios. There is considerable work underway at both DWR, MWD and elsewhere on post-earthquake repair

times, and many experts believe that Delta water supplies can be recovered within a period as brief as 6 months. In consideration of this fact, DWR has asked urban water agencies to assume a 6 month Delta outage when preparing water supply reliability analyses as part of their Urban Water Management Plans.

Nonetheless, it is instructive to examine cases of longer-duration outages. Such cases may not be as likely as the three described above, but they are still possible. In the case of a 75 percent duration outage, average impacts are \$6.0 billion in the all-residential case and \$3.2 billion when the shortage can be allocated to all sectors. Job losses average 47,800 in this case, but can be as high as 157,657 were the earthquake to occur in 1987 hydrologic conditions. In the 100 percent outage case (with an elimination of Delta exports averaging 30 months), impacts average \$8.1 billion in the all-residential shortage case and \$4.4 billion when spread across residential and non-residential demand segments. Job losses average 65,793 in this case, and range as high as 231,330 in the 1987 hydrology.

Table 7: Urban Losses from Earthquake-Induced Reductions of Delta Water Supplies (\$ Thousands)

Scenario	Category	Mean	Low	High
25% Outage Duration	Total Case 1 Impacts	\$ 499,010	\$ 30,577	\$ 1,736,164
	Total Case 2 Impact (less jobs)	\$ 419,713	\$ 30,599	\$ 1,395,254
	Case 2 Lost Jobs	3,419	0	18,123
50% Outage Duration	Total Case 1 Impacts	\$ 2,053,101	\$ 239,680	\$ 7,540,172
	Total Case 2 Impact (less jobs)	\$ 1,415,804	\$ 239,623	\$ 4,847,254
	Case 2 Lost Jobs	17,523	76	71,271
75% Outage Duration	Total Case 1 Impacts	\$ 6,028,504	\$ 554,495	\$ 24,518,967
	Total Case 2 Impact (less jobs)	\$ 3,170,458	\$ 534,435	\$ 10,337,506
	Case 2 Lost Jobs	47,600	462	157,857
100% Outage Duration	Total Case 1 Impacts	\$ 8,089,637	\$ 811,003	\$ 33,211,210
	Total Case 2 Impact (less jobs)	\$ 4,403,388	\$ 790,107	\$ 14,315,895
	Case 2 Lost Jobs	65,793	555	231,330

This analysis indicates that while expected losses from an earthquake-induced cessation of Delta water supplies may not be large, there are realistic cases where losses can be serious. For example, even in the conservative 25 percent outage scenario, losses can exceed \$1.4 billion if the earthquake is followed by a series of dry years (such as California is experiencing at present). Further, if the outage is total during the period of recovery (averaging 30 months), then average losses can exceed \$4.4 billion across the historic hydrology. If the worst occurs and a 100 percent outage is followed by a series of dry years, then urban losses can exceed \$33.2 billion if all mandatory conservation is placed on the residential sector. If this proves to be infeasible and

water shortages must be allocated across all sectors, then job losses balloon to as much as 231,330, which is equivalent to a 1.2 percent increase in the state's unemployment rate.

Seismic risk reduction benefits to ag are negligible (DRMS concluded this).

VI. Summary of Quantified Direct Benefits and Costs

This part of the report has presented the benefits and costs of the WaterFix from the perspective of ratepayers in the agencies whose water supplies will be affected by its implementation. Impacts are expected to result from four basic types of effects: more efficient environmental compliance, improved water quality, reduced seismic risks and mitigation of the effects of sea level rise caused by climate change. These categories of impacts correspond to the major types of risk facing the Delta's water infrastructure at present and over the coming decades.

Table 8 summarizes the discussion of direct benefits to three categories of water users: SWP urban, SWP agricultural and CVP users.

Table 8: Summary of WaterFix Direct Benefits and Costs (\$ Thousands)

Benefits	SWP Urban	SWP Ag	CVP	Total
Environmental Compliance	\$ 10,172,400	\$ 1,333,326	\$ 1,481,990	\$ 12,987,716
Water Quality Improvements	\$ 2,301,324	\$ 96,935	\$ 216,489	\$ 2,614,748
Avoided Seismic Risks	\$ 499,010	\$ -	\$ -	\$ 499,010
*Avoided Seismic Risks - Upper Bound	\$ 8,089,637	\$ -	\$ -	\$ 8,089,637
Cost Allocation	\$ 5,337,967	\$ 2,012,283	\$ 2,688,678	\$ 10,038,928
Net Benefits	\$ 7,634,767	\$ (582,022)	\$ (990,199)	\$ 6,062,547

Taken together, the benefit and cost figures show that the WaterFix easily passes a benefit cost comparison in aggregate. Costs allocated to the SWP and CVP contractors have a present value of \$10.038 billion, and produce benefits of \$16.100 billion, for a net benefit of \$6.062 billion. There are a number of factors that could influence the cost-benefit comparison, and some are discussed below. Further, note that if one considers the higher figure for seismic risk reduction benefits resulting from an earthquake coinciding with a drought, the cost-benefit comparison becomes even more favorable.

However, looking at the results more closely, under the currently negotiated operating criteria the level of direct benefits for state and federal agricultural contractors is not sufficient to justify investing in the project. For the SWP agricultural contractors as a whole, the net benefits of the

WaterFix are -582 million, and for the CVP agricultural service contractors are -990 million. By comparison, the WaterFix passes a cost benefit comparison for urban agencies by a factor of well over 2 to 1, using the more conservative figure for seismic risk reduction benefits and not counting the benefits of mitigating sea level rise. Urban benefits may be even larger if one considers the higher levels of seismic risk that occur should an earthquake coincide with a dry period, and the effects of mitigating sea level rise over a longer time horizon.

The cost allocation shown in Table 7 assumes that there are third party contributions to cover costs allocated to the exchange contractors and refugees. The present value of this contribution is roughly \$3.9 billion. Should these funds not materialize and the contractors be forced to absorb these costs, the project would not be as attractive in aggregate, or to the urban contractors.

To conclude this section, it should be noted that there are additional relevant factors and risks that are difficult to quantify at present. Whether the WaterFix ultimately turns out to be a sound investment for all groups of contractors depends on how these issues are resolved.

It is assumed that the WaterFix construction can be completed within the assumed budget. While the WaterFix construction cost estimate includes provisions for overruns in most cost categories, there is no guarantee that the project will be completed on budget. Of course, if costs are higher than anticipated, the cost-benefit comparison may not be favorable, depending on the magnitude of the overrun.

Another significant consideration is future environmental outcomes in the Delta, such as the level of future populations of listed species. The WaterFix will be permitted under Section 7 of the Endangered Species Act (whereas the Bay Delta Conservation Plan would have been permitted under Section 10) and a new Biological Opinion will be issued that will govern operations of the tunnels and other Delta export facilities. Should environmental conditions continue to deteriorate even after construction of the tunnels, it is possible that the fish agencies could re-initiate consultation and issue a new Biological Opinion. It is an open question whether some degree of regulatory assurances, or similar mechanisms, can be built into the WaterFix permit and governance structure.

While Section 7 does not contain the same level of regulatory assurances as Section 10, and thus the current permitting structure carries additional risks that may not exist with a Habitat Conservation Plan issued under Section 10, it should be borne in mind that the tunnels result in additional water deliveries under a wide range of environmental outcomes. That is, if smelt

populations continue to decline after construction of the WaterFix, the relevant question for investment analysis becomes what would have been the level of deliveries without the tunnels? Viewed this way, future environmental outcomes may affect the *level* of deliveries more than the *difference* between deliveries with and without tunnels. It is, of course, the difference in yields that results from the tunnels that is relevant for cost-benefit analysis.

Show water supply results under a range of operating criteria WaterFix with same operating criteria as at present would produce average deliveries of 5.9 maf. This would increase aggregate benefits by roughly \$15 billion and result in positive returns above allocated costs for all major user groups.

Another factor that may be relevant in the future but is difficult to fully analyze at present is the possible construction of future storage projects. Storage north or south of the Delta is complementary to the WaterFix since the yield benefits of such projects can be larger with more conveyance possibilities across the Delta.

To take one example, consider Sites Reservoir, a contemplated offstream storage project west of the Sacramento Valley and north of the Delta. Assuming the current conveyance infrastructure in the Delta, Sites would produce water supplies of 246 thousand acre-feet on average and 383 thousand acre-feet in an average dry or critically dry year. With construction of the WaterFix, the average water supply produced by Sites would be 344 thousand acre-feet in an average year, and 510 thousand acre-feet in an average dry or critically dry year. Thus, the WaterFix increases the productivity of an investment in Sites Reservoir by 98 thousand acre-feet in an average year and by 127 thousand acre-feet in an average dry or critically dry year. Using the approximate water values discussed earlier in this section, it follows that implementing the WaterFix would increase the present value benefits of the Sites Reservoir project by roughly \$1.5 billion.

The WaterFix can create additional opportunities for water transfers, thereby increasing the benefits from the project. By making it easier to convey water across the Delta, the WaterFix could allow for additional water to move from the Sacramento Valley to the state and federal contractors in the San Joaquin Valley, the Bay Area, and Southern California. **More detail?**

Water trading *among* south of Delta users also has the potential to increase the aggregate benefits from the WaterFix. By allowing users to sell their available supplies to other contractors, establishing more robust markets within the state and federal projects can put each group of contractors in a position where their net benefits are positive. This outcome could be

accomplished at minimal facilities cost, although it would be important to consider the impact of supply reallocation on areas of origin, including local labor markets and groundwater resources. As shown in Section III, every 100 thousand acre-feet that is reallocated from the average SWP agricultural contractor and CVP water service contractor to the average SWP urban agency creates roughly \$2.0 billion in net direct benefits. Allowing agricultural water contractors to sell their water allocations for more than their cost share of the WaterFix also helps alleviate concerns about the affordability of the project to all users.

VII. Adaptation to Climate Change

Sea level rise poses a significant threat to the Delta's water supply infrastructure. The current intakes are close to sea level, and any rise in the ocean's surface level means that the state and federal pumps are inundated with salt water more frequently, resulting in a loss of project deliveries. The WaterFix is expected to mitigate the impacts of sea level rise due to the construction of a second set of intakes on the Sacramento River upstream of the Delta and at a higher elevation than the current intakes. Indeed, the water supply tables presented in Section III show that the WaterFix maintains SWP deliveries through the Delta at roughly their current levels. Without north Delta intakes, yields fall significantly. This result makes adaptation to climate change one of the strongest arguments in favor of WaterFix, although it is a difficult one to quantify with certainty.

For the SWP, WaterFix preserves 1,220 thousand acre-feet of Delta supplies annually that would otherwise be lost due to sea level rise and other climate impacts. Absent construction of the Delta tunnels, urban contractors would lose over 900 thousand acre-feet of supply across all water year types. MWD alone would lose an average of 641 thousand acre-feet of supply annually, an amount of water equivalent to over 11 Carlsbad desalination projects. For the CVP, WaterFix preserves 61 thousand acre-feet annually.

This report does not monetize the value of these climate change mitigation benefits of the WaterFix. There is substantial uncertainty about how climate change will evolve over the coming decades, and the results presented here should be considered as illustrative. Second, there is uncertainty about the exact timing of climate impacts. While the model results correspond to 2100 levels of development, sea level rise may occur more rapidly or slowly than expected. Nonetheless, the water supply results for 140-cm of sea level rise should be of concern to water

district managers and policy makers, and show that the WaterFix can be an important part of California's overall strategy to mitigate the effects of climate change on the state's economy.

VIII. Indirect and Public Benefits of Cal WaterFix

The analysis to this point has focused on benefits and costs from the perspective of the water users. WaterFix provides benefits to a much larger cross-section of Californians, however, even though the current financing plan has no provision for any group other than the water users to pay for the new facilities.

A. FOOD PRICES AND CONSUMER IMPACTS

Stabilizing Delta supplies with WaterFix will increase California farm output and benefit consumers through reduced food prices, primarily for fresh fruits, nuts and vegetables. The food price reductions resulting from improved conveyance are especially large in light of SGMA's restriction of groundwater overdraft.

Using the SWAP model described earlier, I calculated the annual and present value of food price reductions resulting from WaterFix, as compared to the existing conveyance and tighter environmental regulation baseline. Table AA below displays the results of the calculations.

Implementing WaterFix will provide annual consumer benefits of \$78 million in the form of reduced food prices. Most of these benefits come as a result of stabilizing SWP deliveries at roughly their current levels. In present value terms, WaterFix provides over \$1.7 billion in consumer benefits over the life of the project. For certain SWP agricultural contractors, the consumer benefits of WaterFix are nearly as large as the grower benefits.

It should be pointed out, however, that the food price decreases resulting from implementation of WaterFix actually harm California growers operating in other regions of the state as they are forced to sell their output at lower prices. According to the SWAP model output, these losses amount to roughly \$1.2 billion in 2015 dollars. Thus, the WaterFix has important distributional implications within California agriculture.

Further, most of the consumer gains from the WaterFix are realized by outside of California.

B. JOB GAINS FROM CONSTRUCTION OF NEW CONVEYANCE FACILITIES

Estimates of job impacts from the construction and the operation and maintenance of the water facility are based on employment multipliers generated by the IMPLAN model. IMPLAN is an input-output model that is used to calculate employment impacts based on the amount of dollars spent in a particular industry.² We partition the facility construction and O&M costs into different categories of spending (i.e. labor, materials, equipment, design and project management, subcontractors, and O&M).^{3,4} We run the category-specific costs through IMPLAN using industry-specific multipliers to get direct, indirect, and induced impacts under each category. In cases where there are detailed manning tables on employment associated with costs, such as direct labor, direct design and project management, and direct O&M, we use the manning table employment numbers rather than the IMPLAN results (described in more detail in the next section). We then combine all the employment impacts by category into aggregated direct, indirect, and induced impacts as seen in Table 9 below.⁵

Table 9: Job Impacts from the Construction and O&M of New Delta Conveyance⁶

Type	FTE Impacts		
	Construction	O&M	Total
Direct	19,973	3,200	23,173
Indirect	64,479	967	65,446
Induced	34,319	1,642	35,961
Total	118,771	5,809	124,580

² IMPLAN is widely used by federal and state government agencies when assessing economic impacts of large scale projects. Official IMPLAN website: <https://implan.com/>

³ These costs do not include land acquisition costs. Costs are taken from November 2013 Bay Delta Conservation Plan, Public Draft, Chapter 8, Table 8-5. Available at: www.BayDeltaConservationPlan.com

⁴ Roughly \$2.0 billion of these costs are assumed to be spent out-of-state on tunnel boring machine equipment, large valves and pumps, and out-of-state administrative costs. Out-of-state costs do not generate job impacts for California and are therefore left out of this analysis.

⁵ Direct employment impacts are related to expenditures on construction and design & project management. Indirect impacts are associated with purchases of materials and equipment necessary for project implementation. Induced employment impacts are associated with fluctuations in spending by households experiencing income changes resulting from direct and indirect impacts.

⁶ These figures do not include induced employment impacts associated with household income increases from payments received for the land acquisition necessary for the facility construction.

Direct employment impacts from the construction of the water facility are comprised of direct labor (i.e. tradesman, craftsmen, and machine operators) and design and project management employment. The direct labor employment is taken from the manning tables outlined in the 5RMK estimates.⁷ Direct labor employment is broken down into specific job types and categorized into sub-projects (the intakes, forebays, different tunnel reaches, etc.). We aggregate the employment impacts for the sub-projects by county (Sacramento, San Joaquin, and Contra Costa) according to the location of the specific sub-project. The direct design and management employment figures are taken from a manning table provided by the DHCCP.⁸ Design and project management jobs are not grouped by county as it is not yet determined where this work will be based. The resulting impacts can be seen in Table 10.

Table 10: County-Level Job Impacts from the Construction of New Delta Conveyance

County		FTE Impacts
Sacramento County	Intake 2	804
	Intake 3	666
	Intake 5	709
	Forebay	191
	Total Tunnels & Shafts Jobs	3,429
	TOTAL	5,798
San Joaquin County	Total Tunnels & Shafts Jobs	5,529
	TOTAL	5,529
Contra Costa County	Byron Forebay	1,599
	Total Tunnels & Shafts Jobs	1,507
	TOTAL	3,105
Across All Counties	Remaining Jobs Along Entire Alignment	583
Location TBD	Design and PM Jobs	4,958
Total Impacts		19,973

The direct employment detailed breakdown is taken from the manning tables described above. Table 11 shows the aggregate direct FTE impacts by job type.

⁷ 5RMK estimates were provided by DHCCP on January 30, 2013.

⁸ Design and PM manning tables were provided by DHCCP on April 9, 2014.

Table 11: Direct Job Impacts by Profession from the Construction of New Delta Conveyance

Job Type	FTE Impact
Machine Operator	2,613
Design & Management	4,958
Trade & Craft	12,402
Total	19,973

It is important to note that there will be employment gains associated with water supply alternative investments that will occur in urban areas should the WaterFix not be implemented. It is not possible to calculate the precise magnitude of such job gains at present since it is not known exactly what types of alternatives will be constructed in areas receiving SWP and CVP supplies. However, it is reasonable to assume that the location of such newly created jobs will be different than under WaterFix. In particular, jobs created by heavier investment in desalination and water reclamation will tend to be located in the Bay Area and Southern California, and not primarily in the Delta region. Thus, failing to implement WaterFix will shift some degree of economic activity out of the Delta counties and toward the Los Angeles and San Francisco metropolitan areas. Again, like many large infrastructure projects, the WaterFix has important distributional implications within the State.

It is also important to note that if urban agencies invest in the WaterFix or replace lost Delta supplies with more expensive water supply alternatives (albeit ones under local control) that water rates will rise, creating a drag on economic activity in the State. **More detail from earlier report**

C. FALLOWING AND FARM JOB IMPACTS

The SWAP modeling described earlier indicates that without WaterFix in place, more restrictive environmental regulations in the Delta will result in the fallowing of 179 thousand acres of farmland in the San Joaquin Valley. Of this amount, 115 thousand acres will be in the CVP service area (mainly on the west side of the Valley), and the remaining 64 thousand acres in the SWP service area (primarily in Kern County).

Farmland losses of this magnitude will cause significant impacts to the farm labor market. **Describe statistical analysis.**

Using these estimated coefficients together with data on average compensation among agricultural workers compiled by the California Employment Development Department, it

follows that the WaterFix preserves 10,106 farm jobs each year providing approximately \$193 million in annual wages. The present value of this farmworker income is \$6.1 billion evaluated over the 100-year life of the project.

D. INDIRECT AND INDUCED ECONOMIC ACTIVITY FROM FOLLOWING

Value added and revenue multipliers imply roughly 2x the farm-level impacts.

IX. Alternative Versions of CalWater Fix

Critics and commentators have suggested several alternatives to CalWater Fix proposed project. These include reinforcing existing levees (i.e., creating an “armored Delta”), building smaller capacity tunnels (e.g., 6,000 and 3,000 cfs) and building a single bore tunnel. All of these alternatives reduce construction and operating cost, but result in lower levels of species protection, water quality and water supply benefits as well. All of these alternatives have been studied extensively, and all have been demonstrated to be less desirable than the proposed project.

Reinforcing existing levees was included as an EIR alternative, and was also studied as a take alternative in the BDCP. This alternative involves through-Delta conveyance with Delta channel modifications and different intake locations than the proposed project. The total costs of this project are significantly lower than the proposed project at a present value of \$5.2 billion. Water supplies would average 4.2 maf. While these tradeoffs appear to be reasonable as compared to the proposed action, through Delta conveyance does not produce acceptable environmental outcomes.

The BDCP examined 6,000 and 3,000 cfs tunnels. These alternatives also result in lower construction and operating costs: the 6,000 cfs tunnels reduce costs by \$1.2 billion and the 3,000 cfs tunnels lower costs by \$3.2 billion. Water supplies under these alternatives are 4.5 and 4.2 maf, respectively.

To understand why these alternatives are inferior to the proposed project, consider that moving to the 6,000 cfs version saves \$1.2 billion but costs 0.2 maf of project deliveries. Put another way, moving from 6,000 cfs to 9,000 cfs produces 0.2 maf of additional supply for an annual cost of only \$300 per acre-foot, which is far less expensive than any available water supply alternative. Similarly, moving from 3,000 to 9,000 cfs produces an additional 0.7 maf of supply at a cost of

\$230 per acre-foot per year. These results demonstrate the huge economies of scale associated with tunnel construction. They also indicate that the contractors have already made a significant concession by moving from a 15,000 cfs facility to a 9,000 cfs one.

Lastly, some commentators have suggested saving construction cost by building a single bore tunnel. This alternative would not produce the same level of benefits as the proposed dual bore tunnels. With a single bore tunnel, the facility would need to be off-line for routine maintenance. It would also need to be shut down in the event of a failure requiring repair. Both types of events reduce the water supplies that would ultimately be produced by the project, and would not be worth the associated cost savings.

This discussion has another important implication with respect to cost allocation and financing. If there are concerns about whether the project makes economic sense to the agricultural contractors, it is economically preferable to reallocate the supplies produced by a 9,000-cfs project, than it is to reduce the size of the project. There are certainly urban and agricultural contractors that are willing to pay more for water than the incremental cost of increasing the size of the tunnels from 3,000 or 6,000 cfs to 9,000 cfs. Thus, keeping the project at its current size and allowing contractors to trade the incremental benefits of the WaterFix is more efficient and produces a higher level of aggregate benefits than reducing the tunnel capacity to solve the cost allocation problem.

X. Conclusions and Implications for Cost Allocation and Financing

Project passes a benefit cost test but not for all groups under the operating criteria being considered at present. Yields being considered now are significantly lower than those contemplated in Chapter 9, and thus the cost-benefit comparison is not as favorable. Have also lost some degree of certainty with respect to project outcomes now that the permitting has migrated from Section 10 to Section 7.

Can implement different operating criteria and increase project yields

State can contribute to the project in recognition of the indirect economic benefits from agricultural production, reducing seismic risks and mitigating the long term effects of climate change.

State can allow users to trade available SOD supplies

State can go broader and acquire water from willing sellers north of the Delta, thus enhancing SWP and CVP deliveries.

These approaches, or a combination of them, could improve the attractiveness of the project to virtually all users and allow the state to proceed with the WaterFix.

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Center for Business & Policy Research

Benefit-Cost Analysis of The California WaterFix

August 2016

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The Center for Business and Policy Research is located at Pacific's Sacramento and Stockton campuses. The Center's mission is to perform independent research and analysis of economic issues and trends in the state and region. The Center has extensive experience analyzing the economic impact of water issues including reports on policy choices related to the Delta and droughts. The Delta Counties Coalition made a \$10,000 grant to the Center for Business and Policy Research to support the development of this report.

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Executive Summary

This report is the first comprehensive benefit-cost analysis of the California WaterFix, a significant revision to the plan for water conveyance tunnels under the Delta originally proposed as part of the Bay-Delta Conservation Plan (BDCP). The WaterFix is the most costly water proposal in California history, so it is unusual that the California Department of Water Resources (DWR) has not followed its own planning guidelines and issued a benefit-cost analysis of the proposal. Thus, the benefit-cost analysis presented in this report fills a critical information gap so that the public and decision-makers can better assess the merits of the WaterFix proposal. This analysis is based on data and assumptions in the revised environmental documents produced by DWR to support the proposal's environmental review. The results show the WaterFix costs are four times larger than its benefits, and thus the project is not economically justified.

Background

The California WaterFix is the most expensive and arguably most controversial water infrastructure proposal in the state's history. It would add large water diversions to the Sacramento River and that would convey water through tunnels 35 miles in length under the Delta to the State Water Project (SWP) and Central Valley Project (CVP). The goal of the project is to secure water exports from the Delta by reducing the use of the current south Delta diversion that relies on the stability of Delta levees and causes reverse flows in Delta channels that harm endangered species such as Delta Smelt and Winter-run Chinook Salmon. In addition to its estimated \$16 billion construction cost, the concerns of opponents include the risk of harming endangered fish at the new water intakes and degrading water quality in the Delta for human and environmental uses because of reduced freshwater flows from the Sacramento River.

This benefit-cost analysis includes base and optimistic scenarios that closely follow the project description and environmental analysis produced by project proponents, and makes a number of assumptions that are favorable to the WaterFix such as the use of a low-discount rate, a 100 year operating lifespan, and no environmental costs. The analysis does not include a pessimistic scenario, and thus does not consider the possibility of cost overruns or the risk of harm to endangered species. In addition, this analysis does not include financing costs of the bond debt that is expected to be used to pay construction costs.

Results and Conclusion

Although the study includes assumptions favorable to the WaterFix, the results clearly show that the WaterFix is not economically justified under both the base and optimistic scenarios. The base scenario finds a net present value of -\$10.2 billion, and a benefit-cost ratio of 0.23. That means the WaterFix is estimated to provide only 23 cents of benefits for each dollar of cost. In the optimistic scenario, the net present value is -\$7.8 billion and the benefit-cost ratio is 0.39.

Thus, even under optimistic assumptions, costs are still more than 2.5 times larger than benefits.

The primary economic problem for the WaterFix is its low water yield, that is the difference in water supply with and without the WaterFix, relative to its \$16 billion construction cost. The results of the base scenario analysis show that it could only be economically justified if its construction and mitigation costs were below \$2 billion or if its water yield could be increased from an annual average of 225,000 acre feet per year to about 2 million acre feet per year without negatively impacting the environment or causing any additional harm to other water users.

The WaterFix has the physical capacity to increase water exports more than the constrained operations assumed in the current proposal, and many project opponents fear that the economic demands created by project financing could result in much higher exports that harm the environment and other water users. This report shows the concern of project opponents is well justified, and raises questions as to why state and federal water agencies are seeking environmental approval for the WaterFix without a benefit-cost and financial feasibility analysis consistent with the operating assumptions it is using to obtain regulatory approval.

Present Value of Benefits and Costs of the California WaterFix.

2014 dollars, 3.5% real discount rate, 15 years of construction, and 100 years of operation.

	Base scenario	Optimistic Scenario
Benefits		
Export Water Supply	\$1,319,521,208	\$2,822,409,124
Export Water Quality	\$1,677,361,307	\$1,677,361,307
Earthquake Risk Reduction	\$0	\$435,796,554
Total Benefits	\$2,996,882,515	\$4,935,566,984
Costs		
Construction and Mitigation	\$11,676,474,531	\$11,676,474,531
Operation and Maintenance	\$591,658,075	\$591,658,075
Ecosystem	\$0	\$0
In-Delta Municipal	\$111,279,332	\$37,093,107
In-Delta Agriculture	\$682,807,143	\$293,953,421
In-Delta Transportation	\$132,205,755	\$132,205,755
Total Costs	\$13,194,424,836	\$12,731,384,889
Net Benefit	(\$10,197,542,281)	(\$7,795,817,905)
Benefit/Cost ratio	0.23	0.39

Introduction

The WaterFix is the most costly and arguably the most contentious and controversial water infrastructure proposal in California history. The tunnels would divert water from the Sacramento River and convey it around the Delta to state and federal water projects serving southern California rather than continuing to convey the fresh water through Delta channels. The goal of the project is to increase water supply reliability for water contractors south of the Delta who receive deliveries from the State Water Project and the Central Valley Project, and to reduce fish mortality associated with the operation of the current pumps in the south Delta. In addition to its costs, other concerns with the WaterFix include new problems for endangered species created by operating the three new intakes, water quality degradation for municipal and agricultural users in the Delta who would be downstream of the new intakes, and environmental and community impacts from a 15-year construction process.

Surprisingly, the WaterFix proposal does not include a benefit-cost analysis that is commonly part of the planning for major water infrastructure despite its estimated \$16 billion construction cost and billions more in interest and operating costs that will be paid over time. This report is the first comprehensive benefit-cost analysis of the WaterFix proposal, and fills a critical information gap so that the public and decision-makers can better assess the merits of the Water Fix proposal.

This benefit-cost analysis is based on the project description and environmental analysis in the environmental impact report and other documents produced by the California Department of Water Resources (DWR) or the U.S. Bureau of Reclamation (BOR) to support the WaterFix proposal. The values to various benefits and costs are derived directly from the findings in these environmental documents and other reports that have been generated or referenced by DWR and BOR for similar projects. It follows benefit-cost principals accepted by these agencies, and adopts a number of assumptions that favor large infrastructure expenditures like the tunnels such as tabulating benefits over a 100-year period and using a relatively low 3.5% discount rate.

The results clearly show that the WaterFix is not economically justified under both a base and optimistic scenarios. The base scenario finds a negative net benefit of nearly \$11 billion, and a benefit-cost ratio of 0.23. That means the WaterFix is estimated to provide only 23 cents of benefits for each dollar of cost. Using an optimistic set of study assumptions where all values of benefits and costs are taken from reports produced to advocate for the WaterFix, net benefits are still a negative \$7.8 billion and the benefit-cost ratio only increases to 0.39. Thus, under optimistic assumptions, costs are still more than 2.5 times larger than benefits.

The report begins with a brief history and background of the WaterFix proposal and its origins in the Bay Delta Conservation Plan, followed by a review of benefit-cost principles and previous economic analysis done when the tunnels were part of the BDCP. The next section estimates the value of the WaterFix benefits in three categories: 1) export water supply to cities and farms south of the Delta, 2) export water quality, and 3) earthquake risk reduction. WaterFix costs are

estimated in six categories: 1) capital costs for construction and mitigation, 2) operating and maintenance costs, 3) ecosystem costs, 4) in-Delta municipal water supplies, 5) costs to in-Delta agriculture, and 6) impacts to transportation in the Delta. The report ends with a summary and conclusion and an appendix that briefly discusses some practical financial challenges that could impact construction of the WaterFix that go beyond the scope of a benefit-cost analysis.

History and Background of the WaterFix Proposal

The California WaterFix is a slightly modified version of the Delta tunnels that were originally the center piece of the Bay Delta Conservation Plan (BDCP). The BDCP planning process began in 2006. In addition to the tunnels, the BDCP included twenty additional conservation measures, including over 100,000 acres of habitat restoration, with a total estimated cost of both the tunnels and habitat conservation measures of \$25 billion. The BDCP was a habitat conservation plan (HCP) under section 10 of the U.S. Endangered Species Act, and a natural community conservation plan (NCCP) under California law. Approval of an HCP/NCCP requires a finding that the plan will improve the overall condition of the endangered and threatened species covered by the plan such as salmon and delta smelt. In return for investing in the plan to help the recovery of species, regulated entities such as the water contractors that receive water exported from the Delta would receive assurance that no additional money, water or other resources would be required from them under state and federal laws protecting species covered by the plan. Water contractors who receive water exported from the Delta were to pay for the construction, mitigation, and operation of the tunnels, and public funds were to pay for the other conservation elements.

After years of planning and evaluation, it became clear that the BDCP was falling short of its goal to improve the overall condition of covered species and was not going to receive approval as an HCP/NCCP. Despite the advantages of reducing reverse flows in the Delta associated with the south Delta pumps, the BDCP raised new concerns about the negative effects of the new intakes on the Sacramento River on migrating salmon and other fish, the impacts of degraded water quality in the Delta south of the intakes, and the effectiveness of the planned habitat restoration. In 2015, the California Department of Water Resources decided to abandon the BDCP and split the tunnels from the other conservation measures in a more focused proposal called the California WaterFix.

While the stated goals of the WaterFix remain the same as the BDCP, the tunnels-only WaterFix proposal is not an HCP/NCCP and is seeking approval under section 7 of the Endangered Species Act. The environmental standards under section 7 consultation are lower than section 10. Specifically, WaterFix requires a finding that it is not likely to jeopardize the continued existence of listed species, whereas the BDCP required improvement to the overall condition of listed species. The lower environmental requirements of section 7 improve the likelihood of the tunnels receiving regulatory approval, and were the primary reason for the

change to WaterFix. However, the lower environmental bar comes with a cost to water exporters who lose the 50-year permit and no-surprises regulatory assurance under section 10. Thus, the shift from BDCP to WaterFix significantly increases the long-term economic risk to water contractors since investing in the tunnels would not come with any assurance that limited future reductions to water supplies or other financial obligations to protect endangered species.

In a July 2015 press call promoting the revised WaterFix proposal, the Director of the Department of Water Resources answered a reporter's question about the change from BDCP to WaterFix, and how the resulting loss in a 50-year permit and regulatory assurance would impact benefit-cost analysis as follows,

"A 50-year permit term would have been something that any investor in this project would have liked to have been able to obtain, no doubt about that. And the business decision that remains without that as a benefit is going to cause some reconsideration...

We'll have more detail on that through improved benefit-cost ratio soon, perhaps August, if things go well for us, so yes, we will have another revised cost benefit ratio economic analysis of these benefits in that kind of time frame."¹

It is now a year later, and the Department of Water Resources has still not released the promised economic analysis of the benefits and costs of the WaterFix. This report fills the information void to provide the public and policymakers with relevant information to evaluate the WaterFix proposal.

Benefit-Cost Analysis Principles

Benefit-cost analysis of large infrastructure projects is common practice, and broadly considered to be an essential part of good public policy analysis of large capital projects. The agencies proposing the WaterFix, the California Department of Water Resources and the Bureau of Reclamation, routinely perform benefit-cost analysis in the planning process for large water infrastructure projects. For example, the two largest current reservoir proposals in California, Sites and Temperance Flat, both contain benefit-cost analysis within their draft feasibility studies. High-speed rail, the other California mega-project in the news, has included multiple benefit-cost assessments as the business plan has evolved. However, there has been limited economic analysis done for the Delta tunnels throughout a decade of planning.

¹ <https://mavensnotebook.com/2015/07/13/media-call-director-mark-cowin-on-the-revised-environmental-documents-for-california-water-fix/>.

The Department of Water Resources (DWR) has an Economic Analysis Guidebook that provides a comprehensive description of DWR's approach to benefit-cost analysis and its importance to project planning and assessment.²

Economic analysis is a critical element of the water resources planning processes because it not only evaluates the economic justification of alternative plans but it can assist in plan formulation. (p. 1)

The economic analysis should answer questions such as, Should the project be built at all? Should it be built now?, Should it be built to a different configuration or size? Will the project have a net positive social value for Californians irrespective of to whom the costs and benefits accrue? (p. 5)

Benefit-cost analysis is the procedure where the different benefits and costs of proposed projects are identified and measured (usually in monetary terms) and then compared with each other to determine if the benefits of the project exceed its costs. Benefit-cost analysis is the primary method used to determine if a project is economically justified. A project is justified when:

- estimated total benefits exceed total estimated economic costs;
- each separable purpose (for example, water supply, hydropower, flood damage reduction, ecosystem restoration, etc.) provides benefits at least equal to its costs;
- the scale of development provides maximum net benefits; and
- there are no more-economical means of accomplishing the same purpose. (p. 13)

The benefits and costs of an investment occur at different points in time, and can extend for very long time horizons. Benefit-cost analysis examines a full stream of costs and benefits over the expected life of the project. This analysis examines 100 years of operations of the WaterFix tunnels after a 15 year construction period is complete in 2031.

The long streams of benefits and costs are compared using a present discounted value in current dollars. A discount rate, comparable to an interest rate, is used to account for the time value of money or the opportunity costs of using funds for a public investment. Public investment has opportunity costs, because it competes with and crowds out funding for private consumption, investment or alternative public investments.

Benefit-cost results can be sensitive to the level of the discount rate, and the choice of discount rate is sometimes controversial in benefit cost analysis. Federal government guidelines recommend the use of a 7% discount rate.³ The DWR Economic Analysis Guidebook endorses a 6% discount rate. In recent years, many economists have recommended using lower discount rates that reflect current financial conditions, especially when looking at very long-lived investments or regulations to combat long-run, global issues such as climate change. This analysis uses a real discount rate of 3.5%, consistent with recent guidelines for evaluating

² http://www.water.ca.gov/pubs/planning/economic_analysis_guidebook/econguidebook.pdf

³ See Office of Management and Budget, Circular No A-94. http://www.whitehouse.gov/omb/circulars_a094#7

public benefits of water storage projects approved by the California Water Commission.⁴ These assumptions of a long time horizon and relatively low discount rate are very favorable to the WaterFix.

Previous Benefit-Cost Analysis of the Bay Delta Conservation Plan

In July 2012, the University of the Pacific Business Forecasting Center released a benefit-cost analysis of the tunnels as described as part of the BDCP.⁵ The report assumed 600,000 acre feet of average annual yield from constructing the tunnels, more than double the level in the current WaterFix proposal, and calculated a benefit-cost ratio of 0.3 to 0.5 indicating that the tunnels were not economically justified. The report also pointed out that the tunnels were not a necessary component of a habitat conservation plan in the Delta, and thus it focused exclusively on the tunnels as a separable component of the BDCP. While the exclusive focus on the tunnels was consistent with DWR's economic analysis guidelines, the primary criticism of the report was that it failed to quantify environmental benefits from the habitat enhancements in the BDCP. The second major criticism was that it did not value the regulatory assurance water exporters' received from the habitat conservation plan under section 10 of the Endangered Species Act. The report argued that this benefit to water exporters was inappropriate to include in statewide benefit-cost analysis since the regulatory assurance does not reduce the physical risk of the project, but merely shifts risk away from water exporters and onto the environment and other statewide interests.

In August 2013, the DWR released its first comprehensive economic analysis, the *Draft Bay Delta Conservation Plan Statewide Economic Impact Report*.⁶ Unlike the University of the Pacific report, it was not focused specifically on the tunnels and found an overall benefit-cost ratio for the BDCP of nearly 1.4. However, this conclusion rested on a critical assumption that water yields of the project were actually much higher than reported in the BDCP's environmental impact report (EIR/EIS). It assumed that without the BDCP, water exports to the state and federal water projects would be cut by more than additional one million acre feet due to

⁴ For a good current discussion of selecting a discount rate and justification for the California Water Commissions' selection of a 3.5% real discount rate, see pages 8-10 of the "Working paper for WSIP common assumptions – economics"

https://cwc.ca.gov/Documents/2015/08_August/August2015_Agenda_Item_12_Attach_5_ProposalforEconomicCommonAssumptions_Final.pdf

⁵ The July 2012 report is similar in structure and has the same primary author as this report.

http://www.pacific.edu/Documents/school-business/BFC/BenefitCostDeltaTunnel_7%202012.pdf

This report can be seen as an update to that initial report that reflects new information and the change in the proposal from BDCP and WaterFix.

⁶ *Draft Bay Delta Conservation Plan Statewide Economic Impact Report*. August 2013. Jonathan Hecht, ICF International and David Sunding, The Brattle Group.

http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Draft_BDCP_Statewide_Economic_Impact_Report_8-5-13.sflb.ashx

deteriorating environmental conditions, and that BDCP's regulatory assurance under section 10 of the Endangered Species Act would protect water exporters from further reductions in water exports. This assumption added over \$10 billion to water supply benefits compared to using the scenario used in the BDCP EIR/EIS. Other notable criticisms of the 2013 *Draft BDCP Statewide Economic Impact Report* included a) an overestimate of future water shortage costs due to the use of outdated, high population growth projections, b) an assumption that no additional conservation or alternative water supplies would be put in place over the next several decades, and c) it used much different water yield assumptions for environmental benefits than water supply benefits, an inconsistency that greatly inflated the benefits of the BDCP.⁷ While the consultants said a final revised report was being developed that considered feedback on the draft, no revision to the draft report was ever released. Despite these problems, the *Draft BDCP Statewide Economic Impact Report* was valuable in that it supported an organized, structured economic discussion around the tunnels proposal, showed the critical assumptions underpinning its conclusions, and highlighted the essential role of securing the regulatory assurance of the habitat conservation plan under section 10 of the ESA to the BDCP approach.

Benefits of the WaterFix

The delta water supply tunnels would provide three types of economic benefits: higher export water supply, improved export water quality, and reduced physical risk from a massive earthquake or flood that could disrupt water exports from the Delta.

For the optimistic scenario, values for these three types of benefits are derived directly from the Public Draft Bay Delta Conservation Plan, Appendix 9A, Economic Benefits of the BDCP and Take Alternatives⁸ referred to hereafter as Public Draft BDCP Economic Benefits Report. For the Base Scenario, values for water supplies are derived from a broader range of recent reports from the Department of Water Resources and other state agencies. According to the WaterFix biological assessment from January 2016, the average annual water yield for the tunnels is 225,432 acre feet.⁹ This is the most up to date estimate in any of the WaterFix official planning documents, and is in the middle of the range of water yields from the RDEIR/SDEIS released in summer 2015.

⁷ For a detailed review, see <http://www.pacific.edu/Documents/school-business/BFC/BDCP%20economic%20impact%20report%20review%20final.pdf>

⁸ [http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Appendix_9A - Economic Benefits of the BDCP and Take Alternatives.sflb.ashx](http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Appendix_9A_-_Economic_Benefits_of_the_BDCP_and_Take_Alternatives.sflb.ashx)

⁹ For detailed estimates by month and type of water year, see page 605 of the biological assessment, https://s3.amazonaws.com/californiawater/pdfs/n5upr_Appendix_5.A_DraftBA.pdf

Export Water Supply:

The optimistic scenario value for water supply is derived from the Public Draft BDCP Draft Economic Benefits Report. As discussed earlier, this report provides a high value of water supplies because it exaggerates the severity of water shortages by overestimating future demand and assuming little future development of alternative water supplies. Nevertheless, it is an appropriate source to use for the optimistic scenario since it is the most recent value of water supply from the Delta Tunnels put forward by project proponents, and accounts for the possibility that the value of water grows faster than overall inflation. The BDCP presents the value of various levels of water supply as a present value over 50 years using a 3% discount rate. We fit a regression model to the value for each of the "high outflow scenario" models in the report to derive an average value of incremental water supply resulting from the Delta tunnels at \$761 per acre foot in 2012 dollars (\$785 in 2014 dollars). This represents the weighted average value of the tunnels' incremental water supply across both agricultural and urban users over a 50-year period.

The base scenario values incremental water supply from the delta tunnels for urban users with the cost of alternative water supplies. The Department of Water Resources' Water Plan Update 2013¹⁰ provides cost estimates and potential water supply from alternatives as shown in the table. A weighted average based on the midpoint cost of each alternative and the potential supply is \$633 per acre foot. However, the base analysis uses a higher value, the midpoint cost of municipal recycled water at \$800 per acre foot to represent the value of urban water supplies since this is by far the largest potential supply of non-conservation sources.

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

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

The base scenario values for agricultural water supplies are derived from California Department of Food and Agriculture's Agriculture Statistics Review for 2014-15.¹¹ It reports the rental rate of irrigated cropland in California was \$405 per acre in 2014, whereas the rental rate for nonirrigated cropland was \$32. The difference between irrigated and non-irrigated rental rates was \$373. Given that 3 feet of water per acre is a typical irrigation supply in California, this

¹⁰ California Department of Water Resources. California Water Plan Update 2013.
<http://www.water.ca.gov/waterplan/cwpu2013/final/index.cfm>

¹¹ California Department of Food and Agriculture. Agricultural Statistics Review 2014-15.
<https://www.cdffa.ca.gov/Statistics/PDFs/2015Report.pdf>

implies the value of agricultural water supply averaged \$124 per acre foot in 2014. However, we adjust the value up to \$150 per acre foot for the base scenario. Assuming roughly 2/3 of the incremental water supply from the tunnels is utilized by agriculture and 1/3 goes to urban users, the base scenario values incremental water supplies from the tunnels at \$367 per acre foot in 2014 dollars.

Thus, the water supply values in the base scenario can be seen as favorable to the WaterFix as the value is adjusted upwards by about 20% from levels clearly derived from current reports by state agencies. While the calculations assume the inflation adjusted value of water is constant over the analysis period, this upward adjustment provides a reasonable buffer to account for the possibility that the value of water in California could grow faster than inflation. This analysis does not include a pessimistic scenario, even though a lower value to average incremental water supplies could be easily justified, and the WaterFix water supply benefits are skewed towards wet years when incremental water supplies have below average values.

Using the estimated yield from the WaterFix biological assessment and the value described above, the annual water supply value of the WaterFix is \$176.9 million in the optimistic scenario and \$82.7 million in the base scenario. Using a 3.5% discount rate, the present value of water supply benefits from 2031 to 2131 is \$2.8 billion in the optimistic scenario and \$1.3 billion in the base scenario.

Table 2. Export Water Supply Benefits of the WaterFix.

Scenario	Tunnels' Annual Water Yield	Average Value of Water Supply	Annual Value	Present Value over 100 years
Optimistic	225,432 af	\$785	\$176.9 million	\$2,822.4 million
Base	225,432 af	\$367	\$82.7 million	\$1,319.5 million

Export Water Quality Benefits:

The WaterFix would improve water quality for the SWP and CVP, because it would add new intakes to a stretch of the Sacramento River between Clarksburg and Courtland where water quality is better than the current intakes. The Public Draft BDCP Economic Benefits Report estimated the present value of water quality benefits over 50 years at \$1.819 billion using a 3% discount rate. This equates to \$102 million in annual benefits to delta water exporters in 2012 dollars or \$105.2 million in 2014 dollars. Using the assumptions of this study, 15 year construction period followed by 100 years of water quality benefits discounted at a 3.5% real interest rate, the present value of water quality benefits to exporters is \$1.677 billion. This value of water quality benefits is reasonable and we were unable to identify any recent alternative sources. Thus, this valuation of export water quality benefits is utilized for both the optimistic and the base scenarios.

Earthquake Risk Reduction:

A massive earthquake that floods dozens of Delta islands and disrupts water conveyance is frequently cited by political and business leaders who support the WaterFix as the most important economic justification for the project. This argument is inaccurate. It overstates the economic risk posed by a low-probability temporary loss of Delta water exports, inaccurately suggests that the disruption of water exports is the primary risk to the state economy from a massive earthquake-induced failure of delta levees, and inaccurately portrays the WaterFix as the only option to reduce the risk.

This was confirmed by the Public Draft BDCP Economic Benefits report which found relatively modest earthquake risk-reduction benefits to the tunnels. The report assumed a 2% annual probability that an earthquake would cause twenty or more Delta islands to flood and interrupt water exports for a year. While using high estimates of both the probability of the earthquake and the duration of the resulting water export interruption, the Economic Benefits report found the present value of earthquake reduction benefits over 50 years were only \$364 million to \$470 million dollars. This equates to an expected average annual benefit of \$27.4 million in 2014 dollars. We use this annual value from the BDCP for the optimistic scenario, and calculate a total present value of \$436 million over 100 years of tunnel operation. Even in an optimistic scenario, the earthquake risk reduction benefits are only equal to 2.5% of the tunnels' construction cost.

This relatively low value of the tunnels for flood-risk reduction is surprising to many people given the emphasis on this risk in public discussion. Thus, it is important to make a simpler explanation of why the lower this lower than expected benefit makes economic sense. First, it is important to remember that people use about 40 million acre feet of water in California in an average year and only one-eighth (5 million acre feet) of that is exported from the Delta. Furthermore, the tunnels only protect a portion of this supply from flood risk. For the earthquake flood scenario, the Draft BDCP Economic Benefits report estimated the tunnels would increase water exports by 2.8 million acre foot over an entire year compared to no tunnels, protecting a little more than half of normal water exports from the flood.

For perspective on the value of preventing a low-probability risk of a 2.8 million acre foot surface water shortage, consider that UC researchers estimate that the current drought reduced surface water supply in California by over 11 million acre feet in both 2014 and 2015. Although costly, these much larger shortages due to drought were not devastating to the California economy. In fact, the California economy grew robustly throughout the drought. The protection provided by the WaterFix from a hypothetical loss of water supply due to a very severe Delta earthquake is only one-fourth the loss of surface water supply experienced during a single year of the recent drought. While the water supply disruption from a Delta flood would be very costly to water exporters, it is apparent from the state's recent experience with much larger water shortages that claims of statewide economic devastation are greatly overstated in the media and political discourse.

In addition, the likely duration of an earthquake-induced interruption of Delta exports is now described as “weeks or months” by the Director of the Department of Water Resources and other water agency officials, not years.¹² New information shows that Delta levees are in better condition than assumed in the estimates used for the Draft BDCP Economic Benefit report. Thus, a more realistic assumption that could be used for the base scenario is a 1% probability of a flood-induced outage lasting 3 months. This would lead to an estimate of annual average benefits from earthquake risk reduction that are one-eighth the level of the optimistic scenario, or about \$3.5 million in expected annual benefits. However, even this may be too high a value for earthquake risk reduction benefits of the WaterFix. When considering the full economic and public safety impacts of this massive flood and the alternative approaches to reduce the risk, a reasonable argument can be made that the earthquake protection value of the WaterFix is zero or negative.

If a massive earthquake were to cause ten or more Delta islands to simultaneously flood, the human and economic losses that would result are much larger than the impact on water supplies. According to the Delta Risk Management Strategy (DRMS) reports, hundreds of people in the Delta would drown in such a catastrophic flood. In addition, the DRMS reports found that interruptions of export water supply would be only 20% of the economic loss of such an event.¹³ Much larger economic losses would come from disruptions to natural gas systems, electricity transmission and generation, state highways, ports, railroads, and significant losses of in-Delta businesses, homes, and farmland. Given the scale of these potential losses to multiple types of economic infrastructure, it makes sense to consider seismic upgrades to the Delta levee system that protect all economic values in the Delta, including water exports. Unlike a tunnel, seismic levee upgrades could also save hundreds of lives and prevent environmental destruction from a massive flood.

Two reports by state agencies have identified seismic levee upgrades as a viable earthquake risk reduction strategy in the Delta.¹⁴ The Delta Protection Commission Economic Sustainability Plan estimated the cost of 300 to 600 miles of seismic levee upgrades at between \$2 billion and \$4 billion, including riparian habitat enhancements on the enlarged levees. The Department of Water Resources' January 2008 AB 1200 found an “Improved Levees” scenario with 100 miles

¹² <https://mavensnotebook.com/2015/07/13/media-call-director-mark-cowin-on-the-revised-environmental-documents-for-california-water-fix/>.

¹³ See phase 1 summary report of the Delta Risk Management Strategy for a summary of public safety and economic consequences of a flood. Total economic consequences include interruption to water exports and flood losses to in-Delta property and other infrastructure such as transportation.

http://www.water.ca.gov/floodsafe/fessro/levees/drms/docs/drms_execsum_ph1_final_low.pdf

The finding that water exports are only 20% of the economic loss from the massive Delta flood can be derived from the technical appendices to the DRMS Phase 1 report and has been confirmed in the Delta Protection Commission Economic Sustainability Plan and its review under the auspices of the Delta Stewardship Council. The result is also clear by examining Table 18-2 in the DRMS Phase 2 report.

http://www.water.ca.gov/floodsafe/fessro/levees/drms/docs/DRMS_Phase2_Report_Section18.pdf

¹⁴ “Economic Sustainability Plan for the Sacramento-San Joaquin River Delta.” Delta Protection Commission. January 2012. “Risks and Options to Reduce Risks to Fishery and Water Supply Uses of the Sacramento/San Joaquin Delta.” Department of Water Resources and Department of Fish and Game. January 2008. http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/AB1200_Report_to_Legislature.pdf.

of seismic upgrades to eight islands in the south Delta was the lowest cost of three promising risk reduction strategies, including a peripheral canal.¹⁵ In addition, a 2007 PPIC report estimated the cost of a similar Dutch style, "Fortress Delta" strategy at \$4 billion.¹⁶ Seismic levee upgrades are 1/6 to 1/3 the cost of the proposed water conveyance tunnel, and provide a much larger and broader range of risk reduction benefits to the economy.

Understanding the larger picture of earthquake risk is essential because benefit-cost analysis is based on "with and without" comparisons to the next best alternative. If a significant positive value is given to seismic-risk reduction from the WaterFix as in the optimistic scenario, it means that there is an implicit assumption that there will be no action to reduce the seismic risk to human life and other economic assets in the Delta. If the WaterFix is a substitute for Delta levee upgrades as some advocates of the tunnels have suggested, then it could have a negative seismic risk reduction value since the WaterFix could result in unnecessary loss of life of property compared to a less costly levee upgrade alternative. In addition, it is important to recognize that California voters approved more bond funding to further strengthen Delta levees in 2014, and the California Water Plan and the Delta Stewardship Council's Delta Plan both support the creation of an assessment district for delta levees that will generate financial contributions to upgrade and maintain the system from a much larger group of beneficiaries than currently contribute. Since the WaterFix only provides partial protection of water exports from earthquake, it is very possible that a levee upgrade strategy could provide even more earthquake protection for water exports than the tunnels.

As shown in the above discussion, it isn't clear that the WaterFix adds significant seismic protection benefits over what can be reasonably expected to occur if the tunnels are not constructed. Thus, the base scenario estimates zero value for the earthquake risk reduction benefits of the WaterFix.

Costs of the WaterFix

The costs of the WaterFix include the construction, mitigation, operating and maintenance costs that state and federal water contractors are expected to pay, as well as negative impacts that could accrue to other water users and the environment. This report makes some initial estimates of the value of negative impacts on in-Delta municipal and agricultural users, and the environment. These costs are likely conservative as these initial estimates do not include any

¹⁵ The seismic upgrade of only 8 islands was found to reduce the cost of water export interruptions from the largest Delta earthquake by 2/3, and the strategy had the largest overall economic risk reduction because it also protected other economic assets from flood in the case of an earthquake.

¹⁶ The PPIC ruled out a "fortress Delta" solution in 2007, because its \$4 billion cost was too high compared to a peripheral canal they assumed would cost only \$3 billion. The PPIC also ignored or downplayed public safety and the risk to non-water supply infrastructure. See "Envisioning Futures for the Sacramento-San Joaquin Delta" Public Policy Institute of California, February 2007. <http://www.ppic.org/main/publication.asp?i=671>

costs on water users upstream of the Delta, or non-water user impacts in the Delta such as negative impacts on Delta recreational values or construction impacts on Delta residents.

Construction and Mitigation Costs:

Construction and mitigation costs are taken from the California WaterFix Design and Construction Enterprise Budget and Schedule.¹⁷ It estimates \$ 795,952,611 in mitigation costs over 25 years with most actions complete in the first ten years. The construction budget is \$ 14,943,458,684 in 2014 dollars with a 15 year construction period, for a total cost of over \$15.7 billion. The budget states "At this level of project definition, the corresponding level of accuracy is +30% to -20%." For this report, we distributed the construction and mitigation costs evenly over a 15 year construction period, \$1,049,294,086 in annual costs from 2017 to 2031. The present value of these costs using a 3.5% discount rate is \$11,676,474,531. While water contractors will finance construction with bonds, benefit-cost analysis does not consider financing costs.

Operating and Maintenance Costs:

The estimate of operation and maintenance costs is taken from chapter 8 of the Public Draft Bay Delta Conservation Plan.¹⁸ The BDCP estimated these costs in 2012 dollars at \$25.1 million for the first five years, and \$38.1 million annually after the first five years. For this analysis, these costs were adjusted to 2014 dollars and applied to 100 years of operations. Using a 3.5% discount rate, the present value of these operating and maintenance costs is \$591,658,075.

Environmental Effects:

There has been significant debate about the environmental effects of the WaterFix. While there would be some environmental benefits from less use of the south Delta intakes that cause reverse flows in the Delta, there would be offsetting environmental harms from the construction and operation of the north Delta intakes. However, there is no basis to argue for overall environmental benefits from the WaterFix when the Bay Delta Conservation Plan – which

¹⁷ See Exhibit E of Design and Construction Enterprise documents on the WaterFix webpage.

http://cms.capitoltechsolutions.com/ClientData/CaliforniaWaterFix/uploads/Draft_Final_DCE_Agreement_Combined.pdf

¹⁸ http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Chapter_8_-_Implementation_Costs_and_Funding_Sources.sflb.ashx

included much more extensive habitat restoration – could not demonstrate that it would lead to overall improvement of endangered species to meet the standards of an HCP/NCCP under section 10 of the Endangered Species Act. The WaterFix is attempting to meet a lower regulatory standard for a section 7 consultation under the ESA. In contrast to Section 10's standard of improvement, a Section 7 consultation only requires a finding that the WaterFix is not likely to jeopardize the continued existence of listed species or adversely modify critical habitat. The revised biological assessment prepared by DWR and BOR to support the WaterFix proposal finds that the project is "likely to adversely affect" Delta Smelt, Chinook Salmon and other threatened and endangered species.¹⁹ However, DWR and BOR argue that the harm is insignificant and point to other potential environmental benefits of the project.²⁰

Given the section 7 standard and the findings of the biological assessment, it would be reasonable to assign an environmental cost to the WaterFix for benefit-cost analysis. However, both the optimistic and base scenario in this analysis assigns zero environmental cost to the WaterFix, and thus accepts the conclusion of WaterFix proponents that the impacts are insignificant. The assumption of zero environmental costs used in this benefit-cost analysis is favorable to the WaterFix, but maintains this analysis' consistency with environmental documents produced by DWR and BOR to support the proposal. It is important to recognize that the finding of zero environmental cost depends critically on the relatively small water yields in these documents.

While this analysis does not include a pessimistic scenario, it is important to recognize that many fishery experts have stated that the adverse risks to salmon are much larger than reported in the WaterFix environmental documents on which this reports' estimates are based. For example, David Vogel, who has been a principal scientific investigator on dozens of studies of salmon in the Central Valley and Delta for the U.S. Fish and Wildlife Service, Bureau of Reclamation and other agencies, summarized the impacts of the Delta tunnels as follows:

"the proposed north Delta water diversions are an unprecedented, extremely high-risk experiment with a very high probability of failure for fish protection and an irreversible commitment of resources. Adverse impacts to anadromous fish could potentially be catastrophic."²¹

¹⁹ See Table 7-1, page 7-36 of the Biological Assessment for a summary.

http://cms.capitoltechsolutions.com/ClientData/CaliforniaWaterFix/uploads/Ch_7_Effects_Determinations.pdf

²⁰ See News Release for the Biological Assessment.

http://cms.capitoltechsolutions.com/ClientData/CaliforniaWaterFix/uploads/FIX_eBlast_BioAssessment_8216_Rev.pdf

²¹ Quote from page 1 of Dave Vogel's comments on the Public Draft BDCP EIR/EIS available at http://www.norcalwater.org/wp-content/uploads/BDCP_Comments-Vogel.pdf

In-Delta Municipal Water Supply Costs

While the WaterFix would improve water quality for South of Delta exporters, the WaterFix would move much of their diversions upstream of some significant existing drinking water intakes in the Delta, including the Contra Costa Water District, City of Stockton, and the Barker Slough intake to the North Bay Aquaduct that serves Solano and Napa counties. As a result of the WaterFix, water quality will be degraded at these municipal intakes. The most frequent concerns raised by these water users are that reduced freshwater flows from the Sacramento River will result in increased salinity, and greater proliferation of biological contaminants such as the bacteria, *Microcystis*.²²

On March 29, 2016, the Contra Costa Water District reached a settlement with the Department of Water Resources regarding the water quality impacts of the WaterFix.²³ As a result of the settlement, the export water contractors who benefit from the tunnels will pay the costs of building an intertie between the Contra Costa Water District and the tunnels or allow diversion at another location upstream of the WaterFix intakes. The settlement does not include a cost estimate for these actions to protect water quality for Contra Costa Water District. To get an estimate of implementing the settlement, we spoke to two individuals with knowledge of the Water District facilities and the cost of building similar infrastructure and identified a cost range of \$50 million to \$150 million.

Solano County estimates moving the Barker Slough intakes to a location upstream of the WaterFix intakes would cost \$550 million, a proposal that has been developed independent of the WaterFix effort due to existing water quality challenges at Barker Slough.²⁴ WaterFix would increase these water quality issues, and therefore increase the need for the new intake. While it would be inaccurate to attribute all of this \$550 million cost to the WaterFix, a significant portion of it could be used to represent additional municipal water quality costs. We are unaware of any cost estimates for mitigating water quality impacts to the City of Stockton or other municipal and industrial intakes. Thus, we used the high-end range for Contra Costa Water District settlement costs in the base scenario to represent all in-Delta municipal water supply costs although this would be an understatement if any more than one-fifth of the cost of moving Barker Slough intakes was attributed to the Waterfix. The low-end \$50 million cost estimate for the optimistic scenario was spread over the 15 year construction period, resulting in a present value of \$37 million. The \$150 million cost estimate for the base scenario was modeled as \$10 million over 15 years for a present value of \$111 million.

²² For example, see the Contra Costa Water District on the WaterFix RDEIR/RDEIS <http://www.ccwater.com/DocumentCenter/Home/View/1495>, and the City of Stockton's protest of the WaterFix to the State Water Resource Control Board http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/noi_protests/docs/cityofstockton_protest.pdf

²³ <http://www.ccwater.com/317/Bay-Delta-Conservation-Plan-Comments>

²⁴ <http://www.scwa2.com/home/showdocument?id=918>

Delta Agriculture Costs

The WaterFix will negatively impact agriculture in the Delta in two primary ways: loss of land to facility construction and mitigation, and water quality degradation. Other potential impacts on Delta agriculture have been identified but are not quantified in this report, including disruption of transportation, dewatering groundwater for construction, and a drop in river levels below intakes.

The estimate of Delta agriculture land lost due to construction of the tunnels comes from the BDCP RDEIR/SDEIS, Table 14-8, which estimates 3,909 acres permanently lost to the facilities and 1,495 acres where production is temporarily disrupted during construction for a total of 5,404 acres of farmland in which production is permanently or temporarily lost. The vast majority of this land is prime farmland in the north and south Delta where agricultural productivity is high. In 2009, these areas averaged \$1,949 per acre in revenue according to the Delta Protection Commission Economic Sustainability Plan which equates to \$2,150.67 per acre in 2014 dollars. Both the optimistic and base scenarios assume \$11.618 million in annual lost revenue during the construction period, and \$8.404 million in annual lost revenue after construction is complete in 2031. The present value of these costs for the optimistic scenario is \$293,953,421.

Water quality impacts for the optimistic scenario are taken from the Draft Bay Delta Conservation Plan Statewide Economic Impact Report.²⁵ In this report, BDCP consultants estimated \$1.86 million in annual revenue loss due to water quality degradation using water quality modeling conducted for the BDCP that showed salinity increases of a few percentage points in select locations and model of salinity impacts on Delta crop production developed for the Delta Protection Commission Economic Sustainability Plan. When combined with the decline in revenue from land loss, the total Delta agricultural revenue loss in the optimistic scenario after the construction period is \$10.324 million annually in 2014 dollars.

Similar to the case of in-Delta municipal water quality impacts, opponents of the WaterFix are strongly contesting the water quality predictions made in the WaterFix environmental documents for Delta agriculture. In addition, it should be noted that while the California Department of Water Resources has told the State Water Resource Control Board (SWRCB) that the project will comply with water quality regulations in the Delta, in a separate application before the SWRCB, the Department of Water Resources is proposing a 41% increase in growing season salinity standards in the Delta from 0.7 mS/cm to 1.0 mS/cm.²⁶ At this point, there is no generally accepted prediction of water quality impacts, but it is reasonable to assume that WaterFix proponents will take advantage of at least some of the relaxation in agricultural water

²⁵ Draft Bay Delta Conservation Plan Statewide Economic Impact Report. August 2013. Jonathan Hecht, ICF International and David Sunding, The Brattle Group.

²⁶ Review of the San Joaquin River Flow and Southern Delta Water Quality Objectives and Program of Implementation (Phase I of the Bay-Delta Effort)
http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/index.shtml

quality standards they are seeking. Thus, the base scenario assumes only a 25% increase in salinity of Delta irrigation water over historical conditions even though the standards proposed by the Department of Water Resources would allow for even larger increases. Using the model of salinity impacts on Delta crop production developed for the Delta Protection Commission Economic Sustainability Plan, the base scenario predicts a \$26.301 million decline in agricultural revenue in 2014 dollars. When combined with the declines from land loss, the base scenario projects \$11.619 million dollars in annual agricultural revenue losses during the construction period, and a total of \$34.705 million in annual agricultural revenue losses after tunnel construction is complete in 2031. The present value of these costs for the base scenario is \$682,807,143.

Transportation Disruption Costs

The \$15 billion tunnels construction project will have substantial impacts on the Delta's rural road network, significantly altering other commercial activity and the quality of life over an estimated 15 year construction period. The Draft BDCP Statewide Economic Impact Report quantified some of these effects by estimating the cost of traffic delays on state highways in the Delta. It estimates construction generated traffic delay costs could reach \$28 million in some years. In particular, the report estimates large increases in vehicle counts on State Route 4 in San Joaquin County and State Route 160 in Sacramento County. Vehicle counts on State Route 4 at 7 A.M. are estimated to increase 50%, and vehicle counts for SR 160 at 7 A.M. are estimated to more than double. State Route 4 accounts for most of the delay costs as it is a busy road that includes the main access for trucks into the Port of Stockton from I-5, as well as the movement of people and equipment for local agricultural operations, movement of people between Stockton and Contra Costa County communities such as Discovery Bay and Brentwood. SR 160 is not as busy as SR 4, but is a scenic route connecting most of the Delta's legacy communities, and heavy construction traffic will not only cause local delays but disrupt the Delta's recreation and tourism economy. Both the optimistic and base scenarios apply the delay costs from the Draft BDCP Statewide Economic Impact Report from 2013 to the updated construction scenario in this report, and find the present value of costs of \$132.2 million. This is a conservative estimate that does not account for transportation impacts on local roads in the Delta.

Other Unquantified Costs

There are several other costs to the project that are not quantified in this analysis. Among the most important of these are negative impacts on Delta recreation and tourism, and risks to water supplies for upstream water interests. Some of the most significant costs on Delta recreation are described in the following excerpt from Steamboat Resort's protest to the WaterFix.

"Construction of the intake facilities will result in barge traffic and restricted boating zones that will directly conflict with recreational uses for the duration of the construction period, an estimated 14 years. Continuous barge traffic will essentially make boating recreation dangerous. A significant amount of boaters utilize the Sacramento River near to and downstream of the intakes along the proposed barge routes in the summer and peak fishing periods. Barge traffic will make the river extremely congested to the point where it will turn people away from recreating in the areas of the Delta where construction is taking place for a significant amount of time. The noise impacts from construction, primarily pile driving, will also deter tourism and recreational users."²⁷

Water users upstream of the Delta in the Sacramento and San Joaquin Valleys are also protesting the WaterFix, because they believe their upstream water diversions could be reduced to provide greater freshwater flows into the Delta to compensate for the WaterFix reducing incoming freshwater flows from the Sacramento River. For example, the North State Water Alliance representing water users in the watershed of the Sacramento River states:

"The California Water Fix appears to be designed to require additional flows into the Delta that would directly reduce available water supplies, both surface and groundwater, for the north states economy and environment."²⁸

San Joaquin Tributaries Association and Friant Water Users have also protested the WaterFix, because of the potential impact on water supplies for their members upstream of the Delta in the watershed of the San Joaquin River.

Benefit-Cost Results and Conclusion

Table 2 summarizes the benefits and costs detailed in the previous section. The results clearly show that the WaterFix is not economically justified under both the base and optimistic scenarios. The base scenario finds a net present value of less than -\$10 billion, and a benefit-cost ratio of 0.23. That means the WaterFix is estimated to provide only 23 cents of benefits for each dollar of cost. Using an optimistic set of study assumptions where all values of benefits and costs are taken from reports produced to advocate for the WaterFix, the net present value is -\$7.8 billion and the benefit-cost ratio only increases to 0.39. Thus, under optimistic assumptions, costs are still more than 2.5 times larger than benefits.

This report does not include a pessimistic scenario, and many key assumptions were structured in ways that benefit the Water Fix. This analysis uses a long 100 year operation period for benefits, does not consider the possibility of construction cost overruns, uses a low discount

²⁷ WaterFix Protest of Steamboat Resort to the State Water Resource Control Board Division of Water Rights. http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/noi_protests/docs/sbr_protest.pdf

²⁸ <http://northstatewater.org/assets/nemethwaterfix.lettercommentsoct2015.pdf>

rate, and does not consider the potential for environmental damage. The analysis does not quantify several important costs such as negative impacts on Delta recreation, upstream water users, and transportation impacts on local roads, or include all in-Delta municipal water supply impacts. Third party impacts to the Delta region are conservatively estimated.

Table 3. Present Value of Benefits and Costs of Delta Tunnels Through the Year 2131.

Includes 15 years of construction, and 100 years of operation. Values are in 2014 dollars, using a 3.5% discount rate consistent with recommendations of California Water Commission.

	Base scenario	Optimistic Scenario
Benefits		
Export Water Supply	\$1,319,521,208	\$2,822,409,124
Export Water Quality	\$1,677,361,307	\$1,677,361,307
Earthquake Risk Reduction	\$0	\$435,796,554
<i>Total Benefits</i>	<i>\$2,996,882,515</i>	<i>\$4,935,566,984</i>
Costs		
Construction and Mitigation	\$11,676,474,531	\$11,676,474,531
Operation and Maintenance	\$591,658,075	\$591,658,075
Ecosystem	\$0	\$0
In-Delta Municipal	\$111,279,332	\$37,093,107
In-Delta Agriculture	\$682,807,143	\$293,953,421
In-Delta Transportation	\$132,205,755	\$132,205,755
<i>Total Costs</i>	<i>\$13,194,424,836</i>	<i>\$12,731,384,889</i>
Net Benefit	(\$10,197,542,281)	(\$7,795,817,905)
Benefit/Cost ratio	0.23	0.39

The primary economic problem for the WaterFix is its low water yield relative to its \$16 billion construction cost. The results of the base scenario analysis show the WaterFix could only be economically justified if its construction and mitigation costs were below \$2 billion or if its water yield could be increased from an annual average of 225,000 acre feet per year to about 2 million acre feet per year without negatively impacting the environment or causing any additional harm to other water users.

The WaterFix has the physical capacity to increase water exports more than the constrained operations assumed in the current proposal, and many project opponents fear that the economic demands created by project financing could result in much higher exports that harm the environment and Delta communities. This report shows the concern of project opponents is well justified, and raises questions as to why state and federal water agencies are seeking environmental approval for the WaterFix without a benefit-cost and financial feasibility analysis consistent with the operating assumptions it is using to obtain regulatory approval.

Appendix: Financing Challenges

This benefit-cost report is not a financial feasibility analysis, but the results have important implications for financial feasibility. For instance, the benefit-cost results can be focused to look only at the benefits and costs to the water exporters to analyze their return on investment. If only the benefits and costs to water exporters who would pay for the tunnels are considered (all the benefits and the first two cost categories in Table 3) the costs still exceed benefits by more than \$7 billion in the most optimistic scenario. While this demonstrates that building the tunnels is not in their ratepayers' best interest, some export water agency executives and political leaders will still want to finance and build the WaterFix. A benefit-cost ratio below one reflects a poor return on investment, but does not mean that water agencies do not have the financial capacity to make the investment.

Despite a decade of planning for the tunnels, a financial assessment or detailed financial plan has never been released for either the BDCP or the WaterFix. The most detailed analysis of financial issues was conducted by Blue Sky Consulting in 2014 for the California State Treasurer's Office.²⁹ The report analyzed the tunnels as described in the 2013 BDCP, and in its base scenario estimated over \$20 billion in bonds would be needed to finance the project, resulting in over \$1.5 billion in annual debt service payments. The report did not analyze the WaterFix proposal, and thus did not consider the increase in costs and construction time from 10 years to nearly 15 years, reduced water yields and loss of regulatory assurance from the transition from BDCP to WaterFix. Despite using an analysis that overestimated farmers' capacity to pay,³⁰ the Blue Sky Consulting found substantial challenges and financial changes that would be needed for agricultural CVP contractors.

"Even if the CVP contractors develop a new credit with a take-or-pay obligation and similar credit features of DWR bonds, it is not clear at this point whether \$10.25 billion of bonds (assuming a 50/50 split) in the Base Case could reasonably be issued without a large rate stabilization fund or other credit enhancement or subsidy from the federal government, state government, or SWP contractors." (page 8)

The financial challenges for the WaterFix go beyond the poor return on investment described in the benefit-cost analysis, and the potential need for new contract provisions and subsidies as found in the Blue Sky Consulting report. Below is a brief list of additional financial challenges that will have to be addressed before bonds can be issued to finance construction of the tunnels.

²⁹ Blue Sky Consulting. 2014. "The Bay Delta Conveyance Facility: Affordability and Financing Considerations" http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Bay_Delta_Conveyance_Facility-Affordability_and_Financing_Considerations_Report_11-14-14.sflb.ashx

³⁰ For more detailed reviews of the Blue Sky Consulting Analysis, see <http://valleyecon.blogspot.com/2015/02/treasurers-report-on-delta-tunnels.html>, and <http://hydrowonk.com/blog/2014/12/10/is-bdcp-a-doable-deal-redux-part-2/>

- **Cost allocation:** Proponents say that "costs will follow water", and this is consistent with California Proposition 218. However, most of the water from the tunnels and thus most of the cost under this scenario goes to agricultural users who receive lower benefits from the tunnels and have the least capacity to pay.
- **Making debt payments during droughts:** As demonstrated in recent years, the revenue of water agencies decline substantially during droughts, but fixed costs such as debt service must be paid. The WaterFix will not significantly enhance water supplies during droughts, but will greatly increase agencies' costs during drought years. Bond investors will require some protections to ensure they are paid during a drought. For example, they could require a significant drought contingency reserve to be funded up front or a general taxpayer guarantee.
- **Step-up provisions for cost overruns or default:** The \$16 billion cost estimate represents only 10% design. It is not unusual for costs of tunneling projects to escalate significantly once underway. A financial plan will have to identify which agencies or entities will be responsible for cost-overruns and step-up to pay more in the case that other agencies do not meet their financial obligations.
- **Credit Quality of Agricultural Agencies:** Many of the agricultural agencies involved in the project do not have significant experience with large revenue bond issues and may not have a credit rating. Recently, the largest agricultural water agency, Westlands Water District, was found by the Securities and Exchange Commission to be misleading investors, becoming only the 2nd municipal bond issuer to be fined by the SEC.³¹
- **Legal Challenge to Using Property Taxes Without a Public Vote:** Many water agencies expect to pay part of their share of the WaterFix costs with property taxes, and argue that they can levy these taxes without a new vote because the WaterFix is part of the State Water Project already authorized by California voters in 1960. The Howard Jarvis Taxpayers Association and others have challenged this interpretation, and the ability of water agencies to use property taxes to pay for the WaterFix is almost certainly headed to court.
- **Proposition 53 on the Fall 2016 ballot:** Proposition 53 would require voter approval before the state could be involved in issues certain revenue bonds over \$2 billion. If Proposition 53 passes, the WaterFix bonds would have to be approved in a statewide vote. Currently, there is no such requirement.
- **Impact of Tunnels Debt on Other Projects:** Many water agencies are planning extensive capital investments in the near future, and have environmental obligations that are not yet funded. Issuing \$20 billion in bonds for Delta tunnels could impact the cost and capacity of water agencies to fund these other initiatives.

³¹ <https://www.sec.gov/news/pressrelease/2016-43.html>

Melissa Stone

From: shani kleinhaus <shanibirds@gmail.com>
Sent: Wednesday, May 02, 2018 11:37 AM
To: Board of Directors
Subject: No 2 delta tunnels

Dear Chair Santos and SCVWD Board,

I am a resident of Palo Alto, and write to ask that you do not support the Delta Tunnels project. This project will deprive the San Francisco Bay Delta of needed freshwater flows, harming fragile ecosystems and water quality in the Delta and the Bay, and cost at least \$17 billion dollars. Please demonstrate environmental and fiscal leadership, and do not support the project.

Thank you,
Shani Kleinhaus
Palo Alto

Melissa Stone

From: Board of Directors
Subject: FW: Brown's Folly Drainage

-----Original Message-----

From: Tom Foxen [mailto:nc73026@sbcglobal.net]
Sent: Monday, April 30, 2018 3:16 PM
To: Communications Unit <CRU@valleywater.org>
Cc: nc73026@sbcglobal.net
Subject: Brown's Folly Drainage

To whom it may concern.

I was made aware on the news last night the SCVWD board is to vote this week on the diversion tunnels that Gov. Brown is ramming through. I would like to get my message passed to the Board members with what is my (and a lot of other ratepayers) opinion on this vote.

Why in the world is the SCVWD even considering supporting much less committing \$650 million to this diversion of water to the almond growers and S.CA. districts? Your stated mission on the e-mail I just received is: Water Supply, Flood Protection, and Stream Stewardship. None of these seem to fit the proposed commitment.....at all. Water supply, we have nothing to gain from sending water south. Flood Protection.....ask the people flooded out a year ago how your district is doing on this matter.....and/or look at the debris in current concrete open culverts. Stream Stewardship.....180 degrees out of line with the stated mission. The Delta is a treasure for all forms of wildlife and not fish. It also is a huge recreational area enjoyed by young and old alike. Take a minute (or day) to look at the case being made by those trying to preserve this resource as it is today.

So, as a ratepayer I am strenuously objecting to this action which appears to me to be a backroom handshake between agencies trusted with fulfilling the stated mission. Hopefully the courts will be able to accomplish what is in the best interest of the people of N. CA.

Regards

Tom Foxen

This email has been checked for viruses by Avast antivirus software.
<https://www.avast.com/antivirus>

Melissa Stone

From: loren rhodes <jusdabluz@att.net>
Sent: Wednesday, May 02, 2018 11:37 AM
To: Board of Directors
Subject: Tunnels

I urge the board to vote down any support for the tunnels project that will destroy one of the greatest estuary's in the world. Enough money has been wasted on this doomed project and Lord knows the suspicious if not down right illegal activities that cloud this already expensive adventure. There are way too many other means of collecting and delivering water to California. Please enter my comments into the record if possible.

Thank You

Loren S Rhodes Jr.
email jusdabluz@att.net

Melissa Stone

From: Sandy Rhodes <luvdabluz@att.net>
Sent: Wednesday, May 02, 2018 11:51 AM
To: Board of Directors
Subject: Tunnels

Please quit wasting tax payers dollars on the tunnel projects that will destroy the Delta and it's ecosystem. If the board truly believes that a project like this will actually be completed with the already astronomical price tag and that Metropolitan Water District will really do as they say you are the only folks in the state of California that believes it. It seems that with every project started by the state of California with promises that it will cost the taxpayer very little winds up costing us way more than promised. There are way too many cheaper, better alternatives for storing and delivering water in our state. Please place my comment in the record.

Sandy Rhodes

email luvdabluz@att.net

Melissa Stone

From: Keith Howe <tahac408@yahoo.com>
Sent: Wednesday, May 02, 2018 12:31 PM
To: Board of Directors
Subject: Tonights meeting 05-02-18

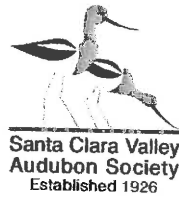
05-02-18

Please enter this comment into tonight's meeting's records.

The Delta Tunnel project must be stopped. The corrupt Jerry Brown wants to steal Californians water and store it underground in massive tunnels so he can ransom it back to us by creating shortages with geo-engineered, droughts. This will generate billions of dollars of money by this mobster and his affiliate gangsters. We cannot let this racketeering succeed.

Water is a God given right that no Jesuit thief should have control over.

Keith Howe, D.C.



May 2nd, 2018

Re: California WaterFix

Dear Chair Santos and Santa Clara Valley Water District Directors,

The Santa Clara Valley Audubon Society urges you not to authorize support of and participate in the California WaterFix Project. Many of our members visit the Delta for bird watching and wildlife viewing, and we are especially concerned with unpredictable and potentially significant environmental impacts associated with the Twin Tunnels project.

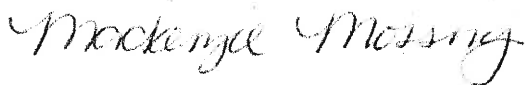
The project poses a significant threat to the health of the San Francisco Bay-Delta estuary, along with its diverse populations of fish, birds and other wildlife. The Delta ecosystem is already in a state of collapse, due to excessive water conversions, the introduction of invasive species, and increased pollution. Please do not support this additional threat to the Delta's future and function.

Building two, four-story-high, 35-mile-long underground tunnels to transport water is an outdated approach to water management, especially in the face of climate change and sea level rise. These tunnels will divert much needed fresh water away from fish and wildlife in the Delta, and could lead to devastating impacts to the largest estuary on the West Coast.

Human health and well-being is tied to the success of our natural ecosystems. The collapse of the Delta could have unpredicted impacts on the regions ecology – impacts that could trickle down to the human population.

We urge you to demonstrate environmental leadership, and vote against the California Waterfix Project and instead focus on local solutions that will reduce the County's reliance on the Delta.

Sincerely,



Mackenzie Mossing
Environmental Advocacy Associate
Santa Clara Valley Audubon Society

Melissa Stone

From: Darlene Dawson <pcddawson@yahoo.com>
Sent: Wednesday, May 02, 2018 12:37 PM
To: Board of Directors
Cc: northdeltacaresclarksburg@gmail.com
Subject: Waterfix vote.

I am against the California Water Fix (twin tunnels).

Please vote against this.

Please include my comment in the record.

Thank you.

Clark Dawson

Pccdawson@yahoo.com

Sent from my iPad

Melissa Stone

From: Jacklyn Shaw <jjjshaw@verizon.net>
Sent: Wednesday, May 02, 2018 1:58 PM
To: Board of Directors
Cc: AndyC Wid
Subject: Options for Santa Clara? Desalination costs less than concrete: like need for more Navy ships, Stanford and Cal invention since 1970 & used in 100 nations. Fwd: Santa Clara Valley Water District Board of Directors Auto Reply

Fwd: Santa Clara Valley Water District Board of Directors Auto Reply

Dear Dick Santos and Board of Directors, Santa Clara:

My name is Jacki Shaw, Grower in Lodi, part of Delta Breeze.

RE: What are Productive Options for Santa Clara resources?

Reclamation and Desalination costs less than destructive
Delta River concrete.

Consider Desalination tech like with more Navy ships,
Stanford salt-energy in Desalination
and Cal invention since 1970 & used in 100 nations.

Are you aware that 50% fresh food crops for USA are grown
much in fertile Delta River counties, NorCal?

Increased salinity is not a solution for anyone.

Not a drop of water will come from Delta River destruction.

The productive Coalition of five Delta River counties protest this waste.

This is a tax grab, for there will be no more water to grab.

Daresay, It is River Rape to put under the Delta River,
any tunnels the size of two lane highway.

Instead, let us see California innovation for business.

Growers were told that it would cause a Delta "Dust Bowl".
Kansas dust blew into NY before anyone listened.

See resources like Delta Life magazine, with maps in agri-tourism.

Or Natural Ground Water Cycle poster (NRSC / USDA poster, 2012).

It takes 100 years for a drop of water to go the the Aquifer.

Avoid earthquakes over quakes not levees.

Avoid flooding by restoring deep, pure Delta Dredging
with Pacific Army Corps.

Tour the Delta River Grand Mansion, which Pres. Reagan said
was the White House of the West.

And of course visit Lodi Lake Zin Fest, with Sip Shuttle year round.

God bless, California,

Jacklyn Shaw, grower & winemaker.

L.S. vineyard

Lodi, CA 95242

Note: Jeff Michaels, UOP Institute; and concerned community at large.

Melissa Stone

From: Board of Directors
Subject: FW: 650 million dollars to build water tunnels to LA !!!@!?

From: Austen Austen [<mailto:tkcapitola@att.net>]
Sent: Sunday, April 29, 2018 10:29 AM
To: Communications Unit <CRU@valleywater.org>
Subject: 650 million dollars to build water tunnels to LA !!!@!?

Dear Santa Clara Water District,
We the people are watching close at your vote this Wednesday to tax us 650 MILLION dollars
To send our water from this drought area to southern California!!!
What do our farmers think about these huge expensive tunnels taking our water to Los Angeles?
Brown the Clown's dad tried to do this in the 1960's and failed because it is wrong!
Please let me know if Santa Clara Water district is being paid off in any way to make brown's
Bad idea go through. Please let me know!
Please vote against this new tax. Our super high California tax already has to support illegal aliens
Legal fees, schools, food, cell phones and much more.
Brown the clown is also spending how much tax payer money toward a super train to nowhere.
DO NOT RAISE OUR TAXES AGAIN! Steven Austen Aptos California kinkadecapitola@yahoo.com
Sent from Mail for Windows 10

Melissa Stone

From: Darlene Dawson <pcddawson@yahoo.com>
Sent: Wednesday, May 02, 2018 1:04 PM
To: Board of Directors
Cc: northdeltacaresclarksburg@gmail.com
Subject: Waterfix vote

I am against the California Water Fix.
Please vote against this.
Please put my comment in the record.
Amy Dawson
Aedawson12@yahoo.com

Sent from my iPad

Melissa Stone

From: Mae Empleo <mae@semlawyers.com>
Sent: Wednesday, May 02, 2018 2:05 PM
To: Board of Directors; Clerk of the Board
Cc: Osha Meserve; Tom Keeling; Toni Robancho; Nomellini, Grilli & McDaniel PLCs; dean@mohanlaw.net; Bee Speer; John Varela; Gary Kremen; keegan@valleywater.org; Nai Hsueh; Richard Santos; Linda LeZotte; Tony Estremera
Subject: Comments on the May 2, 2018 Special Board Meeting on California WaterFix
Attachments: LAND et al Comments SCVWD 5.2.18.pdf

Dear Board of Directors:

Attached please find the correspondence submitted on behalf of Local Agencies of the North Delta, San Joaquin County, Central Delta Water Agency, and South Delta Water Agency regarding the Santa Clara Valley Water District May 2, 2018 Special Board Meeting on the California WaterFix. Please include this letter as part of the hearing record. Should you have questions, please do not hesitate to contact our office.

Sincerely,

Mae Ryan Empleo
Legal Assistant
Soluri Meserve, A Law Corporation
510 8th Street
Sacramento, CA 95814

tel: 916.455.7300 ■ fax: 916.244.7300 ■ mobile: 559.361.5363 ■ email: mae@semlawyers.com

This email and any attachments thereto may contain private, confidential, and privileged material for the sole use of the intended recipient.



tel: 916.455.7300 • fax: 916.244.7300
510 8th Street • Sacramento, CA 95814

May 2, 2018

SENT VIA EMAIL (board@valleywater.org; clerkoftheboard@valleywater.org)

Santa Clara Valley Water District
Board of Directors
5700 Almaden Expressway
San Jose, CA 95118

**RE: COMMENTS ON THE MAY 2, 2018 SPECIAL BOARD MEETING
ON CALIFORNIA WATERFIX**

Dear Board of Directors:

This letter is submitted on behalf of Local Agencies of the North Delta,¹ San Joaquin County, Central Delta Water Agency, and South Delta Water Agency. These agencies are within and around the Delta; the constituents would be profoundly injured by construction and operation of the California WaterFix (“Delta Tunnels”) project. This comment letter describes why it would not be in the interest of the Santa Clara Valley Water District (“District”) to take the actions recommended in the May 2, 2018 Staff Report pertaining to participation of the District in the Delta Tunnels project. This letter focuses on just three of many major problems with the Delta Tunnels project that dictate against participation by the District:

- Only about halfway through the permit process, the Delta Tunnels project is already mired in litigation, which will take many years to resolve.
- The State Water Resources Control Board (“SWRCB”) water rights process for the change necessary for the Delta Tunnels to be built and operated is ongoing and, if granted, is likely to lead to additional constraints on water deliveries.
- Changes to the Delta Tunnels project since certification of the Final Environmental Impact Report/Environmental Impact Statement (“FEIR/S”) in July 2017 precluding the District’s reliance on the FEIR/S for any decisions, and exposing the District to litigation risks.

As a fellow Northern California water agency, our agencies are interested in helping to ensure that the District has reliable water supplies now and in the future.

¹ LAND member agencies cover approximately 118,000 acres in the northern geographic area of the Delta.

A. The Delta Tunnels Project's Permitting Is Far from Complete

After twelve years, the Delta Tunnels are only about halfway through the environmental review and permitting process. The Delta Tunnels have received the following approvals:

- National Marine Fisheries/NOAA and U.S. Fish and Wildlife Service ("FWS") Biological Opinions (June 2017)
- DWR certified Final EIR and approved Alternative 4A project (July 2017)
- California Department of Fish and Wildlife issued Incidental Take Permit under CESA (July 2017)

Notably, the 2017 FWS Biological Opinion relied on a **mixed standard/programmatic approach that delayed the permitting under the Endangered Species Act of critical Project elements, including the enormous intakes for the tunnels, and of operation of the Project itself.** (2017 FWS BO, p. 11.) Thus, additional consultation with and permitting from FWS is necessary to complete construction, and to actually operate, the Delta Tunnels.

Along with the litigation already underway, several pending approvals could lead to more litigation. Both state and federal law could be implicated should the respective approvals be granted. Additional approvals still needed include:

- Bureau of Reclamation project approval and issuance of Record of Decision under NEPA;
- SWRCB change in water rights permit with conditions;
- SWRCB Section 401 water quality certification;
- USACE approvals under the Federal Clean Water Act including
 - Section 404 fill permit for about hundreds of acres of wetlands,
 - Section 408 Rivers and Harbors Act permit to alter a federally authorized flood control project;
 - Programmatic Agreement for identification of historic properties within the Area of Potential Effect under Section 106 of the National Historic Preservation Act;
- DFW Alteration Agreement under Section 1602 of the Fish and Game Code Streambed Alteration Agreement;
- FWS Biological Opinion for completion of construction of project (e.g. intakes, intermediate forebay) and operation of project.

B. There Is Already an Avalanche of Litigation Challenging the Delta Tunnels

There are twenty separate challenges to DWR's Delta Tunnels approvals under state law, including the California Environmental Quality Act, the California Endangered Species Act, the 2009 Delta Reform Act, among other claims, were filed in August 2017. This litigation includes 82 public agencies, nonprofit groups, and landowners, including water districts, reclamation districts, utilities, environmentalists, and farmers. According to a filing by DWR, the "claims in the 18 actions are diverse and complicated, and raise important issues that will shape how water is stored and delivered throughout the state in the future."

In addition, there are two cases regarding compliance with the federal Endangered Species Act, filed by environmental organizations. These cases primarily focus on the failures of the project to comply with ESA protections for longfin smelt and Chinook salmon. These cases highlight the fact that, consistent with the ever-present reality of "no free lunch," while the Delta Tunnels could potentially reduce impacts at the existing South Delta pumps, they would adversely impact fish in the North Delta.

There were also nearly twenty answers filed in response to the DWR validation complaint that assert various affirmative defenses. Only a few of the answers filed were in support of DWR's validation Complaint. In the validation action, DWR seeks a judgment validating \$11 billion in revenue bonds for the tunnels project. The project still lacks multiple approvals required by law that the challenging parties in the litigation claim is unlawful for a host of reasons. The answering parties contend that the project is one of the most costly and risky water infrastructure projects proposed in California's history. Other claims include:

- the project is premature: essential details of the Delta tunnels project and its financing remain undefined, unapproved, or both;
- the outcome of pending administrative proceedings, federal decision-making, stakeholder financing decisions, and legal claims challenging compliance with CEQA, state laws protecting the Delta, the public trust doctrine, and other state and federal laws could, and almost certainly will, fundamentally transform the composition of the project;
- DWR lacks the authority to issue revenue bonds as proposed to cover capital costs for the Delta Tunnels because the project is not part of the SWP as defined by the Central Valley Project Act, and the bond validation requested by DWR would violate numerous provisions of that Act.
- DWR cannot issue Central Valley Project revenue bonds for the Delta tunnels in the absence of amendments to State Water Project ("SWP") contracts. Bond

validation in this case would place undisclosed additional strains on taxpayers, ratepayers, and SWP contractors, violate environmental and Delta protection laws, and run contrary to the will of California's voters, who expressly rejected or have not approved the Delta tunnels or any of their precursors.

Notably, the validation action seeks validation only of a 55 percent cost share by the SWP for the Delta Tunnels project. The more recent decision of the Metropolitan Water District to finance a larger share of the project would bring the SWP share to 66 percent. That additional 11 percent is not part of the validation action.

Given the complexities of the legal issues, the numerosity of the parties and claims, it could take up to two years to get to a trial court judgment on the claims discussed above. Regardless of the outcome of the trial court judgment, an appeal will likely ensue, which could take an additional two years. After that, it is quite possible that a petition for review at the California Supreme Court would be granted. Similarly, the CalFed litigation in the late 90's and early 2000's culminated at the California Supreme Court.

If all of the necessary permits are obtained, the project proponents could attempt to proceed with construction. Notably, the 2009 Delta Reform Act requires that construction may not commence until the water rights permit has been granted. (Wat. Code, § 85088.) Plaintiffs would seek injunctive relief if the proponents of the Delta Tunnels attempt to proceed with construction.

When considering issuance of a temporary restraining order or preliminary injunction, the court weighs two "interrelated" factors: (1) the likelihood that the moving party will prevail on the merits; and (2) the interim harm that the parties would suffer from the issuance or non-issuance of injunctive relief. (*Right Site Coalition v. Los Angeles Unified School Dist.* (2008) 160 Cal.App.4th 336, 341-342; see also Code. Civ. Proc., § 527.)

C. The SWRCB Water Rights Changes Proceeding Is Incomplete and Will Likely Change the Assumed Operations of the Delta Tunnels

Among the remaining permits still needed, the Delta Tunnels requires a change in water rights to be approved by the SWRCB before any construction can begin. DWR and the Bureau of Reclamation are the petitioners with respect to issuance of a change in their water rights that would permit new diversions to occur in the North Delta, *in addition to* the existing SWP/CVP diversions in the South Delta. About 80 individual protestants are

involved, though many of them are grouped for efficiency. The SWRCB proceedings are divided into two parts:

- **Part 1:** Addressed **injury to legal uses of water** and commenced in 2016 and concluded in summer 2017. Thirty-two hearing days were involved with Part 1.
- **Part 2:** Addressing **unreasonable impacts to fish and wildlife, Public Trust and Public Interest**, and commenced in fall 2017.² Part 2 is approximately one-third of the way complete. No schedule is set for submission of rebuttal evidence in Part 2, however, due to the recent revelation that a Supplemental EIR/EIS will be prepared to address major engineering and other changes to the previously analyzed Delta Tunnels project (discussed further below).

Protestants have presented a tremendous amount of information regarding both the Petitioners' (DWR and Bureau of Reclamation³) failure to carry their burden to show the construction and operation of the Delta Tunnels would not injure other water users (with our clients' concerns being primarily the thousands of other water users in the Delta) as well as the unreasonable impacts of the Delta Tunnels on fish and wildlife, and the project's inconsistency with Public Trust and Public Interest considerations within the jurisdiction of the SWRCB.

With the remainder of the SWRCB water rights Hearing unscheduled, and with significant additional evidentiary and legal steps in the process, it is unclear when the Hearing will conclude. At this point, it appears the Hearing may not conclude until well into 2019. Whenever it does conclude, *if the petition is granted*, it is likely that it would be necessary for *numerous additional substantive conditions* to be placed on the Delta Tunnels project to prevent injury to users of water, and to prevent unreasonable impacts to fish and wildlife, protect Public Trust Resources and the Public Interest. In addition, the SWRCB Delta Flow criteria adopted as part of the Water Quality Control Plan Update would likely also impact the amount of water that may be diverted into the Delta Tunnels and delivered to the District.

² For additional information about Part 1 of the SWRCB proceedings, see <http://www.downeybrand.com/Resources/Publications/132107/California-WaterFix-A-Snapshot-of-the-SWRCB-Water-Rights-Change-Hearings>.

³ Consistent with the uncertain and apparently waning role of Reclamation in the Delta Tunnels project, Reclamation has participated very little in the part 2 Hearing process.

D. Due to Major Changes in the Delta Tunnels Project, the District Cannot Rely on the Certified Final EIR/EIS

On March 28, 2018, DWR issued a letter in the SWRCB water rights proceeding that announced major new changes to the project description, including tunnel realignment and significant relocations of major project components and impacts. (See Exhibit A.)⁴ Affected project components include: (1) **the Intermediate Forebay (“IF”)** (including addition of a Reusable Tunnel Material parcel and relocation of a Fuel Station); (2) **Intake 3 to IF** (including a tunnel realignment and relocation of a temporary tunnel work area); (3) **Staten Island** (including relocations of vent shaft and retrieval shaft and “Safe Haven” area, tunnel realignment, and addition of a “Safe Haven”); (4) **Bouldin Island** (including tunnel realignment, relocation of shafts, realignment of access road, relocation of Barge Landing Facility and Concrete Batch Plant and Fuel Station); (5) **Venice Island** (tunnel realignment); (6) **Mandeville Island** (relocation of shaft and modification of access road); (7) **Victoria Island** (tunnel realignment); (8) **Clifton Court Forebay** (identified impacts supposedly “removed”); and (9) **Byron Tract** (including addition of a new tunnel forebay, modification of Reusable Tunnel Material areas, addition of a Concrete Batch Plan and Fuel Station, and reconfiguration of New Canal sections).⁵

Downplaying the obvious significance of these changes and their implications, DWR branded the changes as a mere refinement. “The proposed optimization of the project is a *refinement of engineering detail*, which is the progression of the project from a level of detail contained in the Conceptual Engineering Report.” (Exhibit A, March 28, 2018, DWR Letter, p. 1, italics added.) Yet DWR has admitted that the changes are substantial enough to require a Supplemental EIR, meaning that there are significant new or more severe environmental impacts. (See Pub. Resources Code, § 21166; CEQA Guidelines, § 15162.) DWR’s characterization of these changes as an “optimization of

⁴ Available at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/docs/petitions/2018/20180329_dwr_notice.pdf. Despite all of this very public description of contemplated and “agreed upon” changes to the project approved by DWR in July 2017, DWR has not released a notice of preparation (“NOP”) of a Supplemental EIR to further describe these changes. (CEQA Guidelines, §§ 15163, subd. (c); 15087, subd. (c) (must include a description of the proposed project).)

⁵ Missing from the “Fact Sheet” is any information about the changes in power supply plans for the northern Delta, which was the subject of an Addendum to the Final EIR/S adopted by DWR in January 2018.

the project” and a mere “refinement of engineering detail” is a masterstroke of Orwellian obfuscation.

More important for the District, however, is the fact that there is **no disclosure or analysis** of these major project changes in the Board Agenda Memorandum for today’s meeting. The Memorandum’s discussion of environmental review erroneously assumes that the Delta Tunnels project is unchanged from that described in the Final EIR/S certified in July 2017. (See Memorandum, pp. 10-11.) **It is not.** Therefore, the Board cannot adopt DWR’s CEQA Findings for that different project today as suggested in the Memorandum. (See Memorandum Attachment 8.) Instead, the District must either prepare its own environmental review of the project changes, or wait for DWR to complete its review. (See CEQA Guidelines, § 15096.) While a CEQA responsible agency must assume the Final EIR complies with CEQA pending final determination of the legal actions (Pub. Resources Code, § 21167.3), this provision does not allow an agency from making findings that are clearly wrong. (See, e.g., CEQA Guidelines, §§ 15091, 15093.)

In addition, as mentioned above, Reclamation’s participation in the Delta Tunnels project is becoming increasingly uncertain. The previously certified Final EIR/S assumes participation of Reclamation. If Reclamation is not going to participate, or is going to participate differently as indicated in the recent funding decision by the Metropolitan Water District of Southern California, a new environmental document would need to describe the changes to the environment that would result. (See Pub. Resources Code, § 21166; CEQA Guidelines, § 15162.) This could include impacts relating to the availability of water at the proposed new diversions as well as upstream reservoir operations, among other impacts. Moreover, the Resolution (Attachment 7) assumes a SWP share that is larger than analyzed in the Final EIR/S (50% CVP, 50% SWP). Again, this change must be analyzed in the appropriate environmental document before any action is taken by the District.

Since the District knows that the current version of the Delta Tunnels project is different than described in the certified Final EIR/S, it cannot act today on the project or make CEQA findings as a responsible agency. In addition to violating CEQA and further increasing litigation risks, taking action prior to adequate analysis of the known project changes is unfair to the District’s constituents because the consequences of these major changes requiring a supplemental EIR (not just an EIR Addendum, for instance) are as of yet unknown.

E. Conclusion


As representatives of the agencies and landowners most directly impacted by the construction and operation of the Delta Tunnels, we urge the District to very carefully consider a decision to commit to financial participation in the Delta Tunnels. Construction and operation of these Tunnels will permanently damage the Delta, including Delta waterways, sustainable agriculture and the environment/fish and wildlife. Thousands of acres of farmland would be converted, hundreds of acres of wetlands filled, and roughly half the average flow of the Sacramento River would be removed before it can ever enter the Delta.

Far from helping resolve longstanding water conflicts, the Delta Tunnels ensure that conflicts will continue indefinitely into the future. The District must not join forces with entities outside our region to make the Delta into yet another sacrifice zone where the environment and communities are destroyed to provide water elsewhere. We respect the water supply needs of the District, and view Santa Clara as a neighbor. We do not believe it is acceptable, however, for your District to attempt to meet its water supply needs by impairing Delta water users' local supplies, and depriving the Delta of the freshwater flows that are essential to imperiled fish and the entire ecosystem.

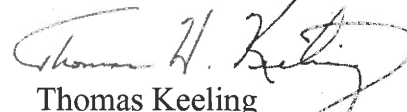
We hope you will embrace this opportunity to reject the Delta Tunnels and instead join with us to work toward better solutions for our entire region. Thank you for considering these comments.

Very truly yours,

SOLURI MESERVE
A Law Corporation


By: 
Osha R. Meserve
Local Agencies of the North Delta

FREEMAN FIRM


By: 
Thomas Keeling
County of San Joaquin

Santa Clara Valley Water District
Board of Directors
May 2, 2018
Page 9 of 9

NOMELLINI, GRILLI & McDANIEL
Professional Law Corporations

By: 
Dante Nomellini
Central Delta Water Agency

MOHAN, HARRIS, RUIZ,
WORTMANN, PERISHO &
RUBINO LP

By: 
Dean Ruiz
South Delta Water Agency

ORM/mre

Attachment: Exhibit A, March 28, 2018 DWR Letter and Fact Sheet

cc: District Board members
jvarela@valleywater.org
gkremen@valleywater.org
keegan@valleywater.org
nhsueh@valleywater.org
rsantos@valleywater.org
llezotte@valleywater.org
testremera@valleywater.org

EXHIBIT A

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791



March 28, 2018

VIA ELECTRONIC MAIL: CWFHearing@waterboards.ca.gov

Tam Doduc, Hearing Officer
Felicia Marcus, Hearing Officer
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Re: Public Availability of Project Optimization Fact Sheet

Dear Hearing Officers Doduc and Marcus,

On Friday, March 23, 2018 I announced as a housekeeping matter the fact that the Department of Water Resources would be making available to the public additional engineering detail proposed for the California WaterFix. The proposed optimization of the project is a refinement of engineering detail, which is the progression of the project from a level of detail contained in the Conceptual Engineering Report.

Attached to this letter is the public announcement, in the form of a fact sheet, of this proposed optimization. DWR also provides below tables of the additional information such that the Hearing Officers can easily identify what aspects of the project are addressed. As you will see in the tables, and is stated in the fact sheet, the intent of the proposed engineering refinements is to further limit the potential effects of the construction of the California WaterFix.

It is the contention of DWR that all the aspects of the information released here is within the proper scope of rebuttal in Part 2 of the California WaterFix water rights change hearing. Should the Hearing Officers agree, parties to this hearing may utilize this information in preparing rebuttal testimony.

Sincerely,

A handwritten signature in black ink, appearing to read "Tripp Mizell".

Tripp Mizell
Sr. Attorney, Office of the Chief Counsel
California Department of Water Resources

Project Footprint Change Description

The proposed project would include the same major components included as part of approved project. In some instances these components have been modified with the goal of further mitigating the environmental impacts disclosed in the Final EIR/EIS. Modifications to the project components would, in some cases, result in changes to how the components would be constructed. These footprint modifications are further described below.

Location	Description of Change
Intakes 2/3/5	No Changes
Intermediate Forebay (IF)	The 2 northernmost RTM impacts on DWR parcels removed. Remaining 3 parcels have impact trimmed to remove actual pond areas.
	Zacharias Island RTM and Barge Unloading Facility removed.
	RTM area added to parcel adjacent to east of IF.
	Fuel Station shifted from NW side of Concrete Batch Plant to SE side of Concrete Batch Plant.
Intake 3 to IF	East tunnel shifted to run from Intake 3 south and east of Hood until it parallels with West Tunnel from Intake 5.
	Temporary tunnel work area moved south of Lambert road.
Staten Island	Safe Haven added to northern part of island at Walnut Grove Rd.
	Northern vent shaft shifted south approximately 22,600 ft.
	Safe Haven area moved south approximately 2,300 ft.
	Southern retrieval shaft shifted north 18,200 ft.
	Tunnel curve extended to move tunnel further east where it crosses the South Mokolumne River.
	Tunnel alignment straightened heading onto Bouldin Island from the north.
Bouldin Island	Shafts moved East to directly south of Highway 12 Interchange.
	Access road from Hwy 12 to launch shaft straightened.
	RTM area on east side of island moved north to avoid wetland impacts.
	Tunnel alignment shifted to accommodate new locations for Bouldin launch shafts.
	Barge Landing Facility moved east approximately 1,500 ft.
	Concrete Batch Plant and Fuel Station moved SE to be adjacent to west side of Bouldin launch shafts.
Venice Island	Tunnel alignment – see above description at Bouldin Island
Mandeville Island	Shaft location shifted north approximately 1,900 ft.
	Access road modified to connect to shaft at further north location.
Victoria Island	Tunnel makes westerly curve west south of CA Hwy 4 to intersect new terminal forebay.
Clifton Court Forebay	No changes are being made to the existing conditions at Clifton Court Forebay. Any and all impacts at this location that were described under Alternative 4A in the Final EIR/EIS have been removed.
Byron Tract	New terminal forebay added in location of prior RTM area NW of CCF.

	RTM areas modified to be directly north of terminal forebay. Impact removed from adjacent to river levee.
	New Canal section runs west out of terminal forebay until siphon crosses under Byron Highway, then turns southeast to intersect CA Aqueduct.
	New Canal section connects CA Aqueduct and Delta Mendota Canal.
	Concrete Batch Plant and Fuel Station added directly north of shafts.

Location	Power
WAPA (South)	PG&E Interconnection option removed.
	New line follows canal alignment to new terminal forebay then runs along west and north edges of new terminal forebay.
	Alignment follows east side of tunnel easement, with diversions that make shorter waterway crossings between Bacon and Mandeville Islands, over the San Joaquin River, and between Venice and Bouldin Islands.

Figure 1. Construction Effects on Listed Fish Species

Chapter 11 – Fish and Aquatic Resources	Alternative	
	Approved Project ¹	Proposed Project
Impacts AQUA-1, AQUA-19, AQUA-37, AQUA-55, AQUA-73, AQUA-91, AQUA-109, AQUA-127, AQUA-145, AQUA-163, AQUA-181, and AQUA-199: Effects of Construction of Water Conveyance Facilities on Delta Smelt, Longfin Smelt, Chinook Salmon (Winter-Run ESU), Chinook Salmon (Spring-Run ESU), Chinook Salmon (Fall-/Late Fall-Run ESU), Steelhead, Sacramento Splittail, Green Sturgeon, White Sturgeon, Pacific Lamprey, River Lamprey, and Non-Covered Aquatic Species of Primary Management Concern	Tidal perennial habitat ² : 52.0 acres; Channel margin habitat ³ : 1.02 miles; Shallow water habitat ⁴ : 500.6 acres.	Tidal perennial habitat ² : 48.9 acres; Channel margin habitat ³ : 1.02 miles; Shallow water habitat ⁴ : 500.6 acres.
	LTS/NA	LTS/NA
¹ Based on impacts described in Table 3.4.1 in Chapter 3 of the updated CWF BA. ² Comprises: 26.7 acres at North Delta Diversions; 2.9 acres at Head of Old River; and 22.4 acres for barge landings under approved project, and 19.3 acres for barge landings under proposed project. ³ All at the North Delta Diversions. ⁴ From the downstream end of intake 5 to the upstream observed limit of delta smelt occurrence (Knights Landing).		

Figure 2. Acres of Permanent and Temporary Impact on Natural Communities

Project Impact Acreage	Approved Project	Proposed Project
Agricultural	10,891	10,317
Alkali Seasonal Wetland Complex	1	3
Developed	136	133
Grassland	695	485
Managed Wetland	364 ^a	336 ^b
Nontidal Freshwater Perennial Emergent Wetland	5	4
Nontidal Perennial Aquatic	80 ^c	32 ^d
Tidal Freshwater Emergent Wetland	9	5
Tidal Perennial Aquatic	368 [2,299 ^c]	87
Valley/Foothill Riparian	71	35
Vernal Pool Complex	22	2
Total	12,276 [14,575 ^c]	11,439

^a 321 acres of this impact are from tidal restoration, which would not be a loss of wetland but a conversion and an improvement in wetland functions and services.

^b 317 acres of this impact are from tidal restoration, which would not be a loss of wetland but a conversion and an improvement in wetland functions and services.

^c 16 acres of this impact are from tidal restoration, which would convert open water to tidal wetland.

^d Includes 1,931 acres that are dredging of Clifton Court Forebay.

Figure 3. Acres of Permanent and Temporary Impact on Federally and Stated Listed Species

Species	Federal/State Status	Approved Project	Proposed Project
Boggs Lake hedge-hyssop	-/E	23	5
CA Least Tern	E/E	2,389 ^a	169
California Black Rail	-/T, FP	35	22
Conservancy Shrimp	E/-	6	0.001
California red-legged frog	T/SSC	54	472
California tiger salamander	T/T	52	403
Delta button celery	-/E	96	79
Giant garter snake	T/T	1,320	737
Greater sandhill crane	-/T, FP	9,709	8,409
Least Bell's vireo	E/E	78	41
Longhorn fairy shrimp	E/-	6	0.001
Masons Lilaeopsis	-/R	53	28
Riparian brush rabbit	E/E	0	0
Riparian woodrat	E/SSC	0	0
San Joaquin kit fox	E/T	327	488
Swainson's hawk	-/T	11,914	11,009
Tricolored blackbird	-/CE	10,779	9,494
Valley elderberry longhorn beetle	T/-	489	252
Vernal pool fairy shrimp	T/-	6	0.001
Vernal pool tadpole shrimp	E/-	6	0.001
Yellow-billed cuckoo	T/E	59	32

^a Includes 1,930 acres of Clifton Court Forebay dredging.



DESIGN REFINEMENTS PROPOSED

To Minimize Impacts, Improve Performance and Reduce Costs

Design improvements are being proposed to minimize impacts of the WaterFix project on local communities and the environment. The proposed changes build on past modifications that significantly reduced the project's footprint and costs. The new optimizations also seek to minimize impacts on Delta wetlands and the natural environment.

The proposed optimizations will be subject to environmental review as a part of the forthcoming Supplemental Environmental Impact Report expected in Spring 2018.

KEY BENEFITS OF THE NEWLY PROPOSED OPTIMIZATIONS



Significantly reduces wetland impacts



Reduces impacts to salmon and smelt at the Clifton Court Forebay



Reduces the number of power poles and lines required which improves aesthetics, reduces impacts to birds, and minimizes the need for power facilities near the town of Courtland, while also eliminating the need to relocate large 230 kV and 500 kV transmission lines



Consolidates the reusable tunnel material (RTM) footprint to minimize impacts to Stone Lakes Wildlife Refuge and nearby agricultural lands



Reduces potential impacts to the town of Hood and a residential neighborhood on Kings Island

DESIGN REFINEMENTS & PROPOSED MODIFICATIONS

WaterFix will reduce permanent impacts to Delta wetlands by

MORE THAN
500
ACRES

And reduce temporary impacts to wetlands by

2,000
ACRES

Eliminate barge landing at Snodgrass Slough

BENEFITS: Reduces barge traffic in the northern portion of the Delta; reduces impacts to wetlands

Move a shaft site on Mandeville Island

BENEFITS: Avoids wetlands

Eliminate the Clifton Court Forebay modifications by moving the terminus of the main tunnels and forebay to a new location

BENEFITS: Reduces impacts to wetlands, salmon, and smelt; improves construction access; reduces permanent impacts to wetlands by 270 acres and temporary impacts to wetlands by over 1,900 acres

Eliminate the need to relocate a 500 kV and 230 kV transmission line from the Tracy substation

BENEFITS: Reduces wetland impacts and eliminates unnecessary costs

Move the north tunnel alignment to the east just outside the town of Hood instead of directly below it

BENEFITS: Reduces potential impacts to the town of Hood

Move power line alignment to use SMUD's existing transmission corridor*

BENEFITS: Fewer powerlines required, improves aesthetics, reduces impact to birds, reduces need for large substation near the town of Courtland

Consolidate the Reusable Tunnel Material (RTM) footprint near the Intermediate Forebay into a single site

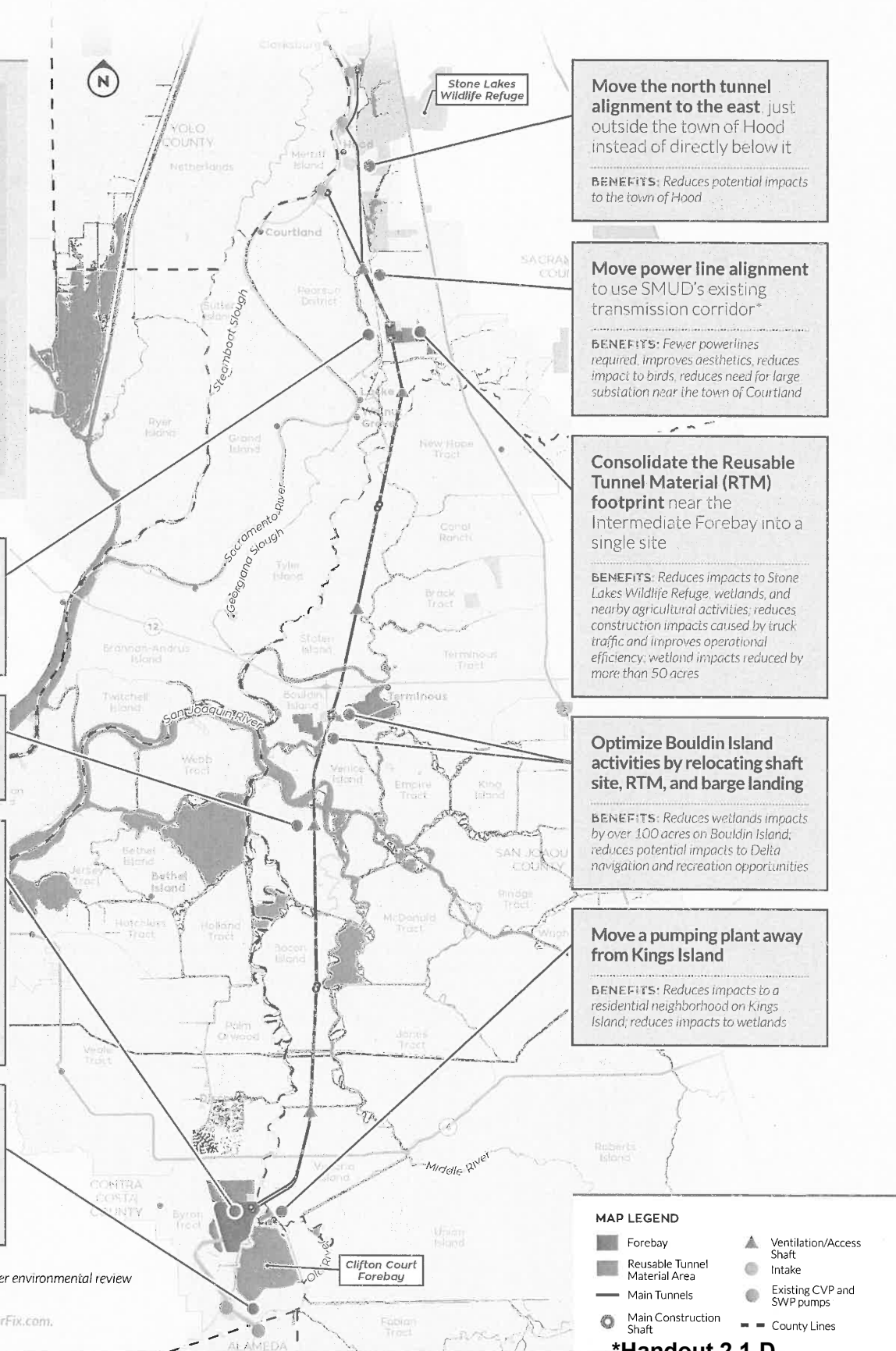
BENEFITS: Reduces impacts to Stone Lakes Wildlife Refuge, wetlands, and nearby agricultural activities; reduces construction impacts caused by truck traffic and improves operational efficiency; wetland impacts reduced by more than 50 acres

Optimize Bouldin Island activities by relocating shaft site, RTM, and barge landing

BENEFITS: Reduces wetlands impacts by over 100 acres on Bouldin Island; reduces potential impacts to Delta navigation and recreation opportunities

Move a pumping plant away from Kings Island

BENEFITS: Reduces impacts to a residential neighborhood on Kings Island; reduces impacts to wetlands



* Previously implemented, not subject to further environmental review

An updated Conceptual Engineering Report will soon be available at www.CaliforniaWaterFix.com.

Melissa Stone

From: sodier@mindspring.com
Sent: Wednesday, May 02, 2018 2:54 PM
To: Clerk of the Board
Subject: SCVWD Agenda Comment Form

Agenda Comment Form

Current Date:	05-02-2018
Name:	Sonia Diermayer
Address:	12721 Brookpark Rd.
City:	Oakland
State:	CA
Zip Code:	94619
Telephone:	Ext:
Email Address:	sodier@mindspring.com
Agency, Business or Group (if applicable):	
Contact:	Attention: Clerk of the Board
Board Meeting Date:	05/02/18
Board Item Number:	18-0372
I would like to:	Express Opposition
Comments:	<p>Dear Members of the Board, Unfortunately I'm unable to attend your Special Board Meeting on May 2, 2018, but I request that the following comment be entered into the meeting record: I strongly urge you to REJECT the Santa Clara Valley Water District's participation in CA WaterFix. There is an overwhelming plethora of reasons why participating would be extremely detrimental for your customers, your agency, and the SF Bay-Delta as a whole. You should not approve the project's Final CEQA conclusions as they are highly flawed. This project would be an environmental disaster for the Delta, the SF Bay and marine life that depends on the fragile estuary. It would starve the entire ecosystem of badly needed fresh water, tilting the balance against native flora and fauna, and hitting fisheries and the Delta economy hard. Engineering experts agree that the tunnels' design and assumptions about their structural integrity in a seismically active area are badly flawed. Your agency would be at risk for enormous future liabilities. Please recall the recent issues at Oroville Dam's spillways, where DWR was also warned about design flaws prior to construction. Even barring possible tunnel failure, the costs of the project are prohibitive and represent a very bad investment for your customers. The actual price tag will likely be much higher than current estimates, due to the inevitable lawsuits, delays and construction problems. It is very questionable how much access to water SCVWD will gain with the tunnels due to climate change and the (inadequate but) still ongoing responsibility to remedy Delta water quality and save Delta species that are hanging on by a thread. Ratepayers in your service area will not be happy when they fully realize the steep price they are committed to paying for a stranded asset infrastructure project. MWD and San Joaquin agricultural interests will have far greater say in any JPA, therefore SCVWD agency and customer interests will likely always be at risk. The cost/risk to hoped-for benefit ratio of the WaterFix tunnels is way too high! PLEASE SAY NO TO THIS HORRIBLY BAD PROJECT! Respectfully yours, Sonia Diermayer Sierra Club member</p>