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STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

Hearing in the Matter of California Department of Water Resources and United States Department of the Interior, Bureau of Reclamation Request for a Change in Point of Diversion for California Water Fix

DR. JEFFREY MICHAEL'S WRITTEN SUMMARY OF TESTIMONY, PART 2 CASE IN CHIEF

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I. Introduction

I am Executive Director of the Center for Business and Policy Research and Professor of Public Policy at the University of the Pacific. Economic and policy issues in the Delta have been a major focus of my research and the Center's work since I came to Pacific in 2008, both because of its importance to the regional economy that is the Center's focus and its fit with my own educational and research background in agricultural and resource economics and economic development. I received my Ph.D. in Economics from North Carolina State University in 1999, where I received a National Needs Fellowship from the U.S. Department of Agriculture to support my Ph.D. studies in the economics of natural resource management. My dissertation was one of the first empirical studies of the economic effects of the Endangered Species Act on rural economies and resource management decisions by private landowners. I have published in scholarly journals economics, law, and environmental science on relevant topics including the economic impacts of sea-level rise and habitat conservation. My Delta research experience includes being Principal Investigator of the Delta Protection Commission's Economic Sustainability Plan in 2011-12, and benefit-cost studies of the Bay Delta Conservation Plan ("BDCP") tunnels in 2012, and the WaterFix in 2016.

In Part 1 of this hearing, I testified about the economic impacts of WaterFix on Delta agriculture as a result of degraded water quality and land loss. In Part 1, I also discussed how building WaterFix would negatively affect investment in Delta levees, and the economic effects of increased flood risk on aspects of the Delta economy such as transportation. While several aspects of these topics cross-over into Part 2 issues, I will not add any further testimony on these topics. Part 2 of the hearing includes the questions of whether the proposed WaterFix project is in the public interest, and whether WaterFix operations will have an unreasonable effect on environmental resources. Economic and financial analysis is fundamental to evaluating both of these questions, and my comments will focus on three primary issues. First, I will discuss some negative local economic impacts from the environmental effects of constructing and operating the WaterFix with a focus on small businesses that serve the Delta

recreation economy and shape community character. The second topic is benefit-cost analysis, a long established professional standard that plays a critical role in determining whether public investments in infrastructure, including water infrastructure, are in the public interest. The third topic, financial feasibility analysis, is closely related to benefit-cost analysis, but is more narrowly focused on the benefits and costs to project beneficiaries, and the specifics of a financial plan such as the allocation of costs across beneficiaries. In the case of the California Department of Water Resources (DWR) and United States Bureau of Reclamation's (collectively, Petitioners) petition to change and add the points of diversion in their water rights (Petition), financial analysis is critical to determining the feasibility of any constraints to project operations that are proposed.

Despite the fundamental role of benefit-cost and financial feasibility analysis to evaluating WaterFix, Petitioners have not completed these analyses and have not submitted any economic and financial evidence in support of their Petition. The absence of this information violates the agencies' own planning guidelines, and their Petition is clearly incomplete without it. My testimony will demonstrate that the WaterFix project, as proposed in this petition and described in the EIR, badly fails the tests of benefit-cost analysis and financial feasibility.

II. Waterfix Will Adversely Impact Small Businesses In The Delta That Serve The Recreation Economy And Local Residents.

The Delta Protection Commission Economic Sustainability Plan estimated that the Delta attracted 12 million visitor days per year, directly or indirectly supporting 3,000 jobs and $329 million in annual economic activity in the five Delta counties. Water based recreation is the primary attraction, but scenic drives and land based visits to historic, natural and cultural attractions is also important – especially along the highway 160 corridor which will be severely impacted by construction of the WaterFix intakes. Construction of the WaterFix will include significant disruptions to popular waterways through barge traffic and loading zones, construction of intakes, and disrupt traffic and tourist attractions along highway 160, 4, 12 and local roads. Three characteristics of the WaterFix construction will result in more serious and

long-term economic losses than those resulting from a typical construction project. First, the construction period is exceptionally long with active construction disrupting traffic and business for more than a decade. Second, Delta recreation businesses are predominantly small independent enterprises that typically have limited resources to endure an extended loss in business. Third, the multi-layered regulatory environment in the Delta, described in Chapter 10 of the ESP, makes new business investment after construction is over extremely challenging, if not prohibitively costly. For example, in addition to California's typically burdensome entitlement process, business development in the Delta is subject to additional layers of review by the Delta Protection Commission and Delta Stewardship Council as a covered action and could trigger reviews from additional federal agencies. Thus, the economy in the primary zone of the Delta is less resilient to construction-related disruption than most areas.

All of these factors combine to make permanent economic damage from WaterFix construction much more likely than in most public works projects. Additional long-run damage to the recreation economy would occur if WaterFix has negative environmental impacts, such as degraded water quality, reduced fish populations, and increased algal blooms.

The WaterFix is an enormous construction project estimated to cost $17 billion. A construction project of this size will undoubtedly stimulate economic activity and create many jobs in areas nearby the construction project. Petitioners have emphasized these positive economic impacts that would occur in Delta counties during an estimated 15 year construction period.[1] However, it is important to recognize that these positive effects may not accrue to the small businesses that predominate in the primary zone of the Delta which primarily serves the local agriculture and recreation industries. While a retail or restaurant business might be able to offset some lost sales to recreationists and tourists through new sales to WaterFix workers,

[1] http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Final_EIR-EIS_Appendix_16A_-_Regional_Economic_Impacts_of_Water_Conveyance_Facility_Construction.sflb.ashx

this is highly uncertain, and will certainly not be the case for other recreation oriented businesses like a marina. In fact, the Final Environmental Impact Report states, "recreation-dependent businesses including marinas and recreational supply retailers may not be able to economically weather the effects of multiyear construction activities and may be forced to close as a result." [2]

As discussed earlier, the economy of the primary zone faces many challenges that make it vulnerable to disruption from WaterFix, and it is important to ensure these businesses can survive a decade or more of construction. It is not unusual for large infrastructure projects to negatively impact local businesses in the construction zone, and for those businesses to receive compensation for those impacts even when those businesses could benefit from the project in the long-run. At this time, the WaterFix does not include any such fund even though the project will have extended, and likely permanent, negative effects to the region without any offsetting long-run benefit from the infrastructure.

A highly-relevant current precedent is in Los Angeles, where businesses impacted by Metro Rail's tunneling and other construction activities as it expands its transit network are eligible for compensation for lost business from Metro's Business Interruption Fund (BIF).[3] Metro describes BIF as follows:

> "Metro's Business Interruption Fund (BIF) provides financial assistance to small "mom and pop" businesses located along the Crenshaw/LAX Transit Project, the Little Tokyo area and the 2nd/Broadway segment of the Regional Connector, and Section 1 and Section 2 of the Purple Line Extension that are impacted by transit rail construction.
>
> Transit rail construction can mean growth opportunities for small "mom and pop" businesses located along transit corridors; however, transit construction also can be challenging for them. Metro wants small businesses to continue to thrive throughout construction and post construction. Through the establishment of

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[2] Page 16-168, Final EIR. http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Final_EIR-EIS_Chapter_16_-_Socioeconomics.sflb.ashx

[3] http://media.metro.net/projects_studies/bif/images/factsheet_bif.pdf, http://media.metro.net/projects_studies/bif/images/bif_faqs.pdf

> the BIF, Metro can provide financial assistance to directly impacted small businesses through grants to cover certain fixed operating expenses."

Metro provides $10 million annually to BIF which makes payments to small businesses (fewer than 25 employees) affected by certain construction projects. Eligible businesses can receive compensation equal to 60% of demonstrated lost sales, up to $50,000 annually, from BIF. In my opinion, the Project should provide a similar fund for Delta businesses, although higher compensation thresholds would be appropriate given the length of the construction period, vulnerability of Delta businesses, and the fact that Delta businesses will not receive any long-run benefits from the WaterFix after construction is complete. The economy and community character of the Delta is at risk of permanent harm from business interruptions due to the WaterFix, and the failure of the WaterFix to include a business interruption fund as is currently part of large transportation tunneling projects in Los Angeles, greatly increases the risk.

III. By Failing to Submit a Benefit-Cost Analysis of the WaterFix, Petitioners Have Failed to Follow Their Own Guidelines for Determining Whether a Project is In the Public Interest.

Benefit-cost analysis is well-established as a key part of determining if water resource infrastructure investments are in the public interest. As WaterFix is estimated to be the most expensive water infrastructure project ever proposed by the state of California, it is surprising that DWR has not completed such an analysis, and does not appear to be submitting any benefit-cost analysis in support of its Petition.

The Department of Water Resources' *Economic Analysis Guidebook*[4] provides clear definitions and guidelines for benefit-cost analysis, and clearly identifies its role in determining whether a project is in the public interest. Page 5 of the *Guidebook* states:

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[4] http://www.water.ca.gov/pubs/planning/economic_analysis_guidebook/econguidebook.pdf

> "The objective of economic analysis is to determine if a project represents the best use of resources over the analysis period (that is, the project is economically justified)"
>
> "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?"

In an October 2017 report, the California State Auditor found that DWR, by failing to complete a benefit-cost analysis, was not following its own guidelines.[5] The Auditor's report also includes the following explanation (see page 34) for the failure by DWR: "According to DWR officials, the economic analysis could not be finalized because DWR determined it was not possible to complete an accurate cost benefit analysis until understanding which agencies will be participating in and funding the project and at what level." This explanation is inconsistent with DWR's own guidelines, which state that a benefit-cost analysis determines whether a project has "a net social value for Californians irrespective of to whom the costs and benefits accrue" and how the project is financed. In fact, DWR and Reclamation have a long history of producing benefit-cost analysis before project financing is finalized, because a major benefit of the analysis is to inform the development of financial plans and the decisions of stakeholders about whether to participate in a project.

IV. Benefit-Cost Analysis of the WaterFix Demonstrates That the Project Is Not Economically Justified.

In "Benefit-Cost Analysis of the California WaterFix,"[6] I estimated benefits and costs for the operations described in the draft Biological Assessment, which assumed that the WaterFix would generate an average annual water yield of 225,000 acre feet. The results of my analysis are summarized below in Table 1. The base scenario estimates the value of water

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[5] https://www.bsa.ca.gov/pdfs/reports/2016-132.pdf
[6] https://www.bsa.ca.gov/pdfs/reports/2016-132.pdf

to urban agencies by the cost of alternative supplies as most recently estimated by DWR, and estimates the value of water to agricultural users by comparing market data on the rental value of irrigated and unirrigated farmland in 2014, a year where farm profits were near record high, water was relatively scarce, and irrigated land rents were at record levels. These values are then increased by 20% to account for the possibility that the value of water at the margin could increase faster than general inflation, and the value of urban water from the tunnels was not adjusted for pumping and treatment costs. Thus, even the base scenario could be seen as favorable to the tunnels. The "optimistic" scenario derives the value of water from earlier work to support the BDCP that exaggerated the future scarcity value of water by using out-of-date, high growth forecasts and assuming there would be no additional development of alternative water supplies, no increase in conservation, and no development of new technology for alternative water supplies. While the demand assumptions in the optimistic scenario are unrealistic and biased to favor the tunnels, it results in an average value of all incremental water from WaterFix that is very similar to the urban value of water in the base scenario. Thus, the optimistic scenario could be seen through another lens where the WaterFix is an urban-only project and the urban agencies pay all costs and receive all the incremental water supply benefits from the WaterFix.

Table 1. 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**

The benefits of the tunnels include export water supply, export water quality, and risk reduction from a catastrophic flood from an earthquake or other source that could interrupt water exports. Costs include construction, mitigation and operation costs that would be paid by exporters and impacts to third-parties such as environmental cost, in-Delta municipal, agriculture and transportation impacts. As shown in Table 1, the results of the benefit-cost analysis show the net benefit is negative $10 billion and benefit-cost ratio is 0.23 for the base scenario. Using optimistic values, the net benefit is negative $7.8 billion and benefit-cost ratio is 0.39. The WaterFix is clearly not economically justified with the water supply yields in the Biological Assessment.

It should also be noted that the negative benefit-cost results presented above incorporate many assumptions that favor the WaterFix tunnels. These favorable assumptions include:

- The assumed annual average water yield of 225,000 af is higher than the estimated water yield in the final EIR, 172,000 af. [7]
- Did not include any environmental costs despite the fact that final biological assessments showed negative impacts on endangered and threatened species relative to no project.
- It assumes no advances in alternative water supply technology for a century.
- It does not consider the risk of cost overruns.
- Excludes some areas of potential social costs, including impacts to upstream water users and recreation.
- Uses a discount rate below the recommendation in DWR's Economic Analysis Guidebook.

The results can be used to consider how much additional export water yield would be needed for the WaterFix to be economically justified, if export water yield could be increased without causing significant environmental harm or damage to 3rd-parties. The results show that a break-even benefit-cost ratio of 1 would require annual average export water yields of about 2 million acre feet (maf) in the base scenario, and nearly 1 maf annually in the optimistic scenario. The highest water yield estimated in the Petition is the Boundary 1 (B1) scenario. According to Thomas Burke, DSM2 modeling of B1 estimates an annual average water yield of 812,000 acre feet. Thus, even the highest water supply scenario considered in the petition falls short of a benefit-cost ratio of 1 when using the most optimistic approach to valuing the benefits of the project.

The benefit-cost analysis clearly shows that the WaterFix petition is not economically justified, and therefore, is not in the public interest.

V. Petitioners have provided no evidence that the project is financially feasible, ignoring their own guidelines and direction provided by the Board.

[7] From Table 5-12 of the Final EIR/EIS. http://baydeltaconservationplan.com/FinalEIREIS.aspx

Financial feasibility analysis is closely related to benefit-cost analysis. Feasibility studies are a normal and well-established part of planning water resources projects. Agencies, including the Petitioners, have well established guidelines for investigating and establishing project feasibility. Other large water storage and conveyance proposals by Petitioners, including Sites and Temperance Flat reservoirs and a proposed raise to Shasta dam, are informed by feasibility studies that include significant economic and financial analysis. WaterFix stands alone among the largest water infrastructure proposals in California for not including economic or financial feasibility analyses, despite having the highest cost by far.

In addition to being a normal part of evidence presented to support a water resource infrastructure project, the State Water Resources Control Board (State Water Board) Hearing Team specifically requested evidence of feasibility in a March 4, 2016 ruling wherein the Hearing Team stated "[t]he petitioners should also show that there are feasible operations available to meet any performance standards."[8] Economic feasibility is essential to the concept of operational feasibility, but Petitioners have provided no evidence to support economic feasibility.

The California Environmental Quality Act (CEQA) defines "Feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."[9] The CEQA definition of feasibility is the common meaning of the term applied in many legal and planning settings throughout California. The definition explicitly lists economic factors among four areas of consideration.

Economic and financial issues play a central role in the concept of feasibility in water resources infrastructure planning." In 2016, the California Water Commission identified the following factors that inform project feasibility:[10]

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[8] Revised Hearing Schedule, Revised Notices of Intent to Appear, Electronic Service and Submissions, and Other Procedural Issues Concerning the California WaterFix Water Right Change Petition Hearing, March 4, 2016, p. 2

[9] Public Resources Code, § 21061.1.

[10] https://cwc.ca.gov/Documents/2016/02_February/February2016_Agenda_Item_10_Attach_1_ModelingPresentation_final.pdf

- Project Description and Operations
- Feasibility Studies and Engineering
- Environmental Documentation, Mitigation Requirements, and Permit Status
- Cost Estimate
- Benefit/Cost Analysis
- Cost Allocation and Requested Amount
- Finance and Construction Planning
- Monitoring and Management Planning

As of this date, Petitioners have failed to provide any evidence regarding four of these eight components of feasibility identified by the California Water Commission.

In 2014, DWR published "Guidance for Development of a State-Led Feasibility Study." [11] On page 1, the DWR guidance document identifies the three most important factors to feasibility as follows:

- "Financing: feasibility studies must be accompanied with a reasonable and implementable financing plan
- Agency Alignment: many water resource projects require permitting. Proper environmental documentations and alignment of the agencies during the planning process is needed to ensure support by permitting agencies
- Value assessment: it is critically important to our decision makers and the public to understand the value of a proposed projects, how it helps the wellbeing of the society, its health and safety, its environment and its economy"

Petitioners have presented no financing plan and no assessment of the economic value of the WaterFix and thus are ignoring their own standards for determining project feasibility.

[11] http://www.water.ca.gov/floodmgmt/funding/docs/Final-Draft-Feasibility-Study-Guidance-wAppendices-2014.pdf

Finally, the Department of Water Resources' *Economic Analysis Guidebook*,[12] provides clear definitions and guidelines for financial feasibility analysis, and how these should be conducted by the Department.

> "The objective of financial analysis is to determine financial feasibility (that is, whether someone is willing to pay for a project and has the capability to raise the necessary funds). The test of financial feasibility is passed if (a) beneficiaries are able to pay reimbursable costs for project outputs over the project's repayment period, (b) sufficient capital is authorized and available to finance construction to completion, and (c) estimated revenues are sufficient to cover allocated costs over the repayment period. Thus, a financial analysis answers questions, such as, Who benefits from a project? Who will repay the project costs? Are they able to meet repayment obligations? Will the beneficiaries be financially better off compared to what they will be obligated to pay? Within DWR, the State Water Project Analysis Office performs financial feasibility analyses for proposed SWP facilities."

There are more examples, but the point should be clear. Evidence of feasibility requires evidence of economic and financial feasibility including benefit-cost analysis, and a cost allocation with a financial plan. Economic and financial analysis is critically linked to operational, engineering, and environmental feasibility. Petitioners have provided no evidence of economic or financial feasibility consistent with long established professional standards, including their own agency guidelines.

Permitting a financially infeasible project creates serious risk for the environment and the public interest, particularly for a project such as WaterFix that has vast physical capacity and enormous costs. These risks include a) the loss of funding for other critical public needs if backing or subsidy from general tax revenues are required, b) funding diverted from other environmental programs , c) failure to adequately fund mitigation actions, d) increased economic, financial and political pressure on the State Water Board to approve Temporary Urgency Change Petitions (TUCPs), and e) increased economic considerations and political

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[12] http://www.water.ca.gov/pubs/planning/economic_analysis_guidebook/econguidebook.pdf

opposition to implementing future environmental regulations, including the ESA and the Bay-Delta Water Quality Control Plan. These latter risks are of particular interest to the State Water Board since Petitioners have frequently requested and received TUCPs from the State Water Board due to economic considerations, especially in drought conditions. Debt service for WaterFix is estimated to impose over $1 billion in new annual costs on Petitioners, and would further increase economic and political pressure for TUCPs in dry years since these large debt payments are still required during years where water exports, and thus revenues from water sales and agricultural production are low. Financial feasibility requires provisions to ensure debt payments can still be made during these dry years while maintaining environmental requirements. Furthermore, the State Water Board is considering new regulations as it updates the Bay-Delta Water Quality Control Plan and should ensure that the WaterFix is financially feasible under any new regulations that could result from the Bay-Delta Plan update since economic considerations are considered in water quality control plans according to Water Code section 13241. Given the linkage between the Bay-Delta Water Quality Control Plan and the WaterFix, it is important to demonstrate that WaterFix is economically justified and that its proposed operations are financially feasible so that these issues do not become a barrier to achieving environmental objectives of the Bay-Delta Plan.

VI. There is considerable evidence that the WaterFix is not financially feasible.

In summer and fall of 2017, state and federal customers were asked by DWR to vote on whether they would fund their share of construction costs, defined as the share of water exported from the Delta that they receive. In September 2017, the largest potential agricultural water contractor voted 7-1 not to participate in the WaterFix, and afterwards stated, "from Westlands' perspective, the project is not financially viable."[13] Subsequent to this, Reclamation stated that it would not be funding the WaterFix, and DWR had assumed Reclamation would pay 45% of the project costs. The WaterFix did not fare much better on

[13] https://mavensnotebook.com/2017/09/20/this-just-in-westlands-water-district-statement-on-california-waterfix/

the State Water Project side as Kern County Water Agency only approved funding about one-half of their share, and Santa Clara Valley Water District did not approve the project described in the Petition, and instead voted to conditionally approve a single-tunnel with conditions on cost and environmental impacts that seem unlikely to be met.

Metropolitan Water District was the only major water agency to approve its full share of the WaterFix, approximately 26% of the cost. However, it is important to note that Metropolitan Water District staff described the project to its board in a way that is inconsistent with the Petition. Specifically, Metropolitan Water District staff did not compare the WaterFix to the No Action alternative as is done in the Environmental Impact Report, Biological Assessment and this Petition. Instead, Metropolitan staff created an alternative no-tunnel scenario that reduces water exports by more than 1 maf compared to the EIR No-Action alternative, and thus is much more protective of the environment. This change to the no-tunnel assumption increases the project's water yield to 1.3 maf per year, which is 7.5 times larger than the 172,000 acre feet of yield in the final EIR. This assumption makes the project appear to have much lower unit costs, but it implicitly assumes that the WaterFix has a level of protection from future environmental regulations and a level of environmental performance that is not supported by the Petition or any of the environmental documents supporting the Petition. Specifically, the Metropolitan Water District white paper states,

> "Without California WaterFix, it is estimated that combined future SWP and CVP average annual exports could potentially decrease to 3.5 to 3.9 million acre-feet (MAF) from the current average annual supply of 4.9 MAF. With California WaterFix, the range of combined annual exports in future years is projected to be 4.7 to 5.3 MAF. " (page 4)
>
> "The estimated future supply without California WaterFix assumes increasing future regulatory constraints. Since the long-term trend has been toward increased regulation and reduced supply of the SWP and CVP, it is assumed that this trend would continue into the future." (page 10)[14]

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[14] http://www.mwdh2o.com/DOCSVCsPubs/WaterFix/assets/cawaterfix_operations_whitepaper_factsheet.pdf

Thus, the Metropolitan white paper is based on an assumption that regulatory constraints will not increase with WaterFix beyond what is described in the initial operating criteria in the EIR, but much more stringent regulatory constraints will occur without WaterFix. This is the only scenario it uses to evaluate the proposal. The assumption that increasing regulatory constraints brought on by poor environmental performance is more likely without WaterFix than with it is simply contrary to the findings of the Biological Opinions that found Winter-run Chinook salmon and other species would fair more poorly with WaterFix than without, and only assessed species impacts at the programmatic level making it likely that future consultations could further restrict the water yield from the project. Also, these future supply assumptions ignore potential limitations resulting from imposition of Delta Flow Criteria by the State Water Board in this proceeding. The State Water Board, in a ruling dated February 11, 2016, stated that "[t]he appropriate Delta flow criteria will be more stringent than petitioners' current obligations and may well be more stringent than the petitioners' preferred project."[15] Thus, even Metropolitan Water District's board approval was based on a project description that is inconsistent with the EIR and the analysis that supports this petition to the Board.

A key issue for financial feasibility of the project is that the cost per acre foot varies dramatically with the project yield. Noted water economist and consultant Dr. Rodney Smith provided me with a brief report that calculates the cost per acre foot for the delta tunnels at various levels of project yield.[16] The table below shows his results and clearly illustrates the important relationship between the project's operations and its financial requirements. Dr. Smith advises that a risk premium of between 1% and 2% over a risk-free U.S. Treasury Bond is appropriate for the WaterFix given historic borrowing rates of California utilities and the environmental and cost risk profile of the WaterFix. Thus, Dr. Smith estimates the cost of the

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[15] https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/docs/021116phc_ruling.pdf, p. 4.

[16] SDWA 148.

Waterfix incremental water yield would be in excess of $6,000 per acre foot for most of the scenarios described in the Petition because yields are generally 200,000 acre feet or less. Even using the more generous yield assumptions from the Metropolitan Water District operations white paper, the cost of incremental water supplies would exceed $1,000 af. Dr. Smith notes that these costs are for a non-firm supply of untreated water in Tracy and thus pumping, treatment and reliability would need to be considered, and would increase the cost over those reflected in the table.

Annualized Cost of Twin Tunnels Water (2014$) by Incremental Yield of Tunnels

Annual Yield		Risk Premium	
(acre feet)	0%	1%	2%
100,000	$9,590	$12,817	$16,926
200,000	$4,795	$6,408	$8,463
300,000	$3,197	$4,272	$5,642
400,000	$2,397	$3,204	$4,231
500,000	$1,918	$2,563	$3,385
600,000	$1,598	$2,136	$2,821
700,000	$1,370	$1,831	$2,418
800,000	$1,199	$1,602	$2,116
900,000	$1,066	$1,424	$1,881
1,000,000	$959	$1,282	$1,693
1,100,000	$872	$1,165	$1,539
1,200,000	$799	$1,068	$1,410

1,300,000	$738	$986	$1,302
1,400,000	$685	$915	$1,209
1,500,000	$639	$854	$1,128
1,600,000	$599	$801	$1,058
1,700,000	$564	$754	$996
1,800,000	$533	$712	$940
1,900,000	$505	$675	$891
2,000,000	$479	$641	$846

Given proportional cost allocation, where all water users are paying the same cost per unit of water received through the tunnels, financial feasibility is going to be determined by comparing the cost of the project to the participants with the lowest ability and willingness to pay. Thus, the feasibility should be determined by comparing the values to the willingness and ability to pay of agricultural users who also receive the majority of water exported from the Delta. Currently, most studies place the value of agricultural water in California at around $150-$200 per acre foot. The highest estimated value I have ever seen estimated for agricultural water south of the Delta is a recent estimate by the California Water Commission that considers the effects of fully implementing the Sustainable Groundwater Act which will increase water scarcity in the valley. This modeling places the value of agricultural water in an average year at about $600 af after full SGMA implementation after 2045. Even if we consider that agricultural water could be worth $600 af in the future, Dr. Smith's table shows the cost per acre foot exceeds $600 per acre foot at 2.0 maf of average annual yield, which is far outside the range of plausible water yields even under the most favorable assumptions for water exports.

Feasibility of the project would increase if a finance plan were developed such that all of the incremental water went to urban contractors such as the Metropolitan Water District. At about 700,000 acre feet of annual yield, the tunnels would have similar average cost as the desalination plant recently opened in Carlsbad. However, a desalination plant in Southern California is a superior water supply source to the tunnels because it is reliable in droughts and provides purified water close to the point of consumption rather than untreated water in Tracy. WaterFix yield needs to be in excess of 1 maf per year before it is competitive with most relevant urban alternatives such as water recycling plants. This yield is far outside the range considered in the Petition and thus WaterFix as described in this Petition may not be feasible even as an urban-only project.

VII. Conclusion

In conclusion, the WaterFix petition fails to include any evidence that the WaterFix is economically justified or financially feasible even though such information is critically linked to engineering and environmental feasibility and a normal part of project evaluation. While Petitioners provided no evidence on these subjects, there is ample evidence from other benefit-cost analyses of the project, calculations of cost per acre foot, and recent votes by potential WaterFix beneficiaries on whether to participate in WaterFix that shows very clearly that the project is neither economically justified or financially feasible as described in the Petition. In addition, the WaterFix is likely to cause permanent damage to small businesses in the Delta that serve recreational users and the local community and WaterFix.

Dated: November 29, 2017

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