
From: JoAnne Stewart <joanne.stewart@laedc.org>
Sent: Monday, July 07, 2014 9:29 AM
To: BDCP.comments@noaa.gov
Cc: Casey, Ed; Billie Greer; David Flaks
Subject: LAEDC & Southern California Leadership Council Issue Comments on BDCP
Attachments: FINAL LAEDC SCLC BDCP Letter with Report Attached, 7.7.2014.pdf

July 7, 2014

Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Re: **Bay Delta Conservation Plan - SUPPORT**

Dear Mr. Wulff:

On behalf of the Los Angeles County Economic Development Corporation (LAEDC), an organization dedicated to promoting job growth, economic expansion, and increasing the overall global competitiveness of California and Los Angeles County, and the Southern California Leadership Council, an organization comprised of three former California Governors and several dozen business and community leaders to provide leadership on major public policies critical to economic vitality, job growth and quality of life in the Southern California region, we are writing to submit our support for and urge our state's leaders to move ahead with the Bay Delta Conservation Plan process.

The LAEDC and the Leadership Council have been long-time supporters of developing a portfolio of solutions to address our water needs within the Los Angeles County region. Top on this list has been the development of additional locally driven water supplies (such as stormwater capture, groundwater replenishment, water recycling, and storage) to reduce our overall reliance on imported water. Diversifying our portfolio locally—as well as statewide—is critical to maintaining and growing a robust economy. And with over 25% of LA County's water supply coming from the Delta, we must embrace a twofold solution: security the Delta water supply and also developing additional local water supplies.

The Bay Delta Conservation Plan provides a real opportunity to improve the system, ensuring reliable and safe supply of water to our homes and businesses for the years to come, while also restoring the damaged ecosystem of the Delta.

Here in the Southern California region, we continue to work on the development of local water solutions, but we remain overly reliant on volatile imported water supplies that are outside of our control. This imported water supply is and continues to be vulnerable to disruption. To better understand how prepared we are as a region for a disruption and what it would mean to our local economy, we released a report in November 2012, titled *Total Regional Economic Losses from Water Supply Disruptions to the Los Angeles County Economy*. The report, conducted by a team of University of Southern California economists led by Professor Adam Rose, one of the nation's leading economic risk analysis experts of terrorism and other major disasters, found that Los Angeles County could suffer startling job and gross domestic product (GDP) losses if a major disruption to the region's imported water supplies were to occur from a major shutdown of the California Aqueduct due to a man-made or natural disaster such as an earthquake.

The report showed that Los Angeles County could face severely negative economic impacts resulting from a 12-month and 24-month shutdown of the California Aqueduct, for example:


- During an "adverse hydrologic" (i.e., drought) year (such as our current experience), a 12-month shutdown would amount to economic losses of as much as 550,000 jobs and \$55.6 billion in GDP if resilience, such as accelerated conservation and diversion of replenishment water to other uses, is minimal.

- Under “normal hydrologic” (e.g., rainfall) conditions, a 24-month California Aqueduct shutdown would lead to as much as 740,000 in lost job-years, \$75 billion lost in GDP and \$135 billion in lost total sales revenue for businesses if resilience is minimal.

The report (attached herein) demonstrates the importance of protecting imported water sources that are vulnerable to natural disasters (through efforts like the Bay Delta Conservation Plan) while also working on developing local water supplies, maximizing groundwater storage, and implementing locally driven strategies to expedite the development and delivery of critical water infrastructure projects.

At the LAEDC and the Leadership Council, we strongly believe that we may only get one chance in our lifetimes to do this project right and improve water security for generations. With seven-plus years of planning already spent on the BDCP, it is critically important that we get to the ‘doing’ phase of this long-term planning exercise. We can’t afford to accept the status quo and we should not settle for a scaled down project that only solves part of the problem. We urge you to not wait for that impending catastrophe to strike in order to incite action. Instead, let’s move forward now. Should you have any questions, please do not hesitate to contact JoAnne Golden-Stewart, Director of Public Policy for the LAEDC, at 213-236-4837 or via email at joanne.stewart@laedc.org. Billie Greer, President, Southern California Leadership Council can be reached at 213-236-4846 or billie.greer@socalc.org.

Sincerely,



David Flaks, Chief Operating Officer
LAEDC



Ed Casey, Partner, Alston & Bird
Chair, LAEDC Water Subgroup



Billie C. Greer, President
Southern California Leadership
Council



LOS ANGELES COUNTY
ECONOMIC DEVELOPMENT CORPORATION



SOUTHERN CALIFORNIA
LEADERSHIP COUNCIL

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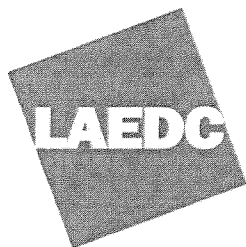
**TOTAL REGIONAL ECONOMIC LOSSES FROM WATER SUPPLY DISRUPTIONS
TO THE LOS ANGELES COUNTY ECONOMY**

by

Adam Rose, Ian Sue Wing, Dan Wei, and Misak Avetisyan

Price School of Public Policy and
Center for Risk and Economic Analysis of Terrorism Events
University of Southern California
Los Angeles, CA 90089

Final Report to:



LOS ANGELES COUNTY
ECONOMIC DEVELOPMENT CORPORATION

Minor Changes Made on July 23, 2013
Original Report Delivered on November 29, 2012

Adam Rose is Research Professor in the Price School of Public Policy (Price) and Coordinator for Economics in the Center for Risk and Economic Analysis of Terrorism Events (CREATE), University of Southern California (USC); Ian Sue Wing is Associate Professor in the Department of Geography, Boston University; Dan Wei is Research Assistant Professor in Price, USC; and Misak Avetisyan is Postdoctoral Research Associate in CREATE, USC.

Financial support for this study was provided by the Metropolitan Water District, Los Angeles Department of Water and Power, Water Replenishment District and Veolia Corporation through Woodbury University. We wish to thank several members of these organizations for providing us with data, helping to specify the disruption scenarios, and commenting on our study. We are also grateful to the Los Angeles Economic Development Corporation Water Subgroup, our Project Advisory Board, and Ryan Merrill for feedback on earlier versions of this report. However, any errors or omissions are solely those of the authors.

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by

Adam Rose, Ian Sue Wing, Dan Wei, and Misak Avetisyan
University of Southern California

EXECUTIVE SUMMARY

I. INTRODUCTION

Water is the lifeblood of the Los Angeles economy. It is a necessary input to every producing sector, is a key ingredient to sustaining life for its population, and is indispensable to fire protection and other specialized uses. The reality is that Southern California is far from self-sufficient in its fresh water supplies. Moreover, the aqueducts that import water into the region are vulnerable to natural disasters, terrorist attacks, technological accidents, and regulatory changes. A major disruption of these external water supplies could potentially have devastating effects on the LA County Economy and the quality of life of its people.

This study estimates the total regional economic impacts of one major set of disruption scenarios stemming from a Bay Delta earthquake that would cause the closure of the California Aqueduct (State Water Project) for 6, 24, or 36 months. The results can be generalized to any event that would reduce fresh water imports through any of the three major aqueducts serving Los Angeles County, including a regulatory decree stipulating a sizeable reduction in its allocation of Colorado River water.

The study is based on the use of a computable general equilibrium (CGE) model, the state-of-the-art approach to regional macroeconomic impact analysis of severe shocks to a system. Essentially, CGE models the economy as a set of integrated supply chains in relation to behavioral responses of businesses and consumers to market price signals and resource constraints. The LA County CGE Model is specifically designed to focus on water production and use. Moreover, it is constructed using primary data from wholesale and retail water providers in LA County. The model is used to estimate the impacts of potential water supply disruptions on output, employment, and prices.

A novel feature of the study is the incorporation of resilience, or tactics that households and businesses use to cushion the blow of a disruption. That is, water customers do not just react passively or in a business as usual manner, but act first by invoking a set of coping strategies inherent in the water delivery and use system, such as storage and diversion of replenishment water. Moreover, they can adapt to the crisis with various forms of ingenuity, such as undertaking extra levels of conservation and recycling, and implementing technological innovations.

II. DATA AND METHODS

Water is a necessary input into every major production process of the Los Angeles County economy. Moreover, it is critical to sustaining a high quality of life in the area. It also has indispensable uses such as fire protection. The supply and demand for fresh water in LA County is presented in Tables ES-1 and ES-2. These tables provide both historical data and projected data utilized in our analysis, which is pegged to the 2013 calendar year. Hydrologic factors are included in our analysis through the water supply demand forecast provided by MWD. The factors include projected rainfall and ground water recharging. All water-related data used in this study were obtained from water service agencies operating in the County.

Computable general equilibrium (CGE) analysis is the state-of-the-art in regional economic modeling, especially for impact and policy analysis. CGE is defined as a multi-market simulation model based on the simultaneous optimizing behavior of individual businesses and consumers, subject to economic account balances and resource constraints. The CGE formulation incorporates many of the best features of other popular model forms, but without many of their limitations. For example, CGE models retain the major strengths of input-output models (full accounting of all inputs, multi-sector detail, and ability to capture interdependencies), but overcome the limitations of linearity, lack of behavioral content, and difficulty of incorporating resource constraints. This modeling approach has been shown to represent an excellent framework for analyzing natural and man-made hazard impacts and policy responses, including disruptions of utility lifeline services (see, e.g., Rose and Liao, 2005; Rose et al., 2007). The CGE model used in this study is a combination of similar models used successfully for water service disruptions in Southern California (Rose et al., 2011a; Sue Wing, 2011).

For this study, we constructed a static, regional CGE model of the LA County economy consisting of 29 producing sectors. The sector classification was designed to highlight the sensitivity of production processes to water availability. Institutions in the model are households, government, and external agents. There are nine household income groups and two categories each of government (State/Local and Federal) and external agents (Rest of the U.S. and Rest of the World).

The major source of the data for the model is a detailed Social Accounting Matrix for LA County, derived from the Impact Planning and Analysis (IMPLAN) database (MIG, 2012). The IMPLAN system consists of an extensive set of economic data, algorithms for generating regional input-output (I-O) tables and social accounting matrices (SAM), and algorithms for performing impact analysis. IMPLAN is the most widely used database for generating regional I-O models and SAMs in the U.S. Because the IMPLAN system uses a non-survey approach to down-scale national and state economy indicators to the county level, it is important to verify the IMPLAN figures in key sectors for small area I-O tables. That is the reason we have been so careful in specifying water account balances for LA County.

III. SIMULATION SCENARIOS

In this study, we examine several major scenarios related to the timing of the disruption, hydrologic conditions, resilience, rationing and pricing. Although the specific cause on which we focus would be a Bay Delta earthquake that causes a shutdown of the California Aqueduct due to the threat or actuality of saltwater intrusion, a similar disruption could be caused by several other actions, including a terrorist attack, technological accident, or some other natural hazard such as an ocean storm surge. In addition, our disruption analysis methodology and results would be applicable to other actions, such as a regulatory decree reducing Los Angeles County's allocation of Colorado River water. The disruption levels for our 24-month Reference Case Scenario under three different hydrologic conditions and various types of resilience are presented in Table ES-3.

**Table ES-1. LA County Sources of Water (Acre Feet)
(Forecast Year 2013)**

	City of LA	All Other	Total
Groundwater Production	78,500	515,190	593,690
Surface Water Production	0	16,070	16,070
Los Angeles Aqueduct Supply	222,872	0	222,872
Recycled Water Production	7,658	125,487	133,145
Groundwater Recovery	0	26,423	26,423
Imported MWD Deliveries	355,785	469,507	825,292
Total Wholesale Supply	664,815	1,152,677	1,817,492

*Data source: MWD.

**Table ES-2. LA County Demand of Water (Acre Feet)
(Forecast Year 2013)**

	City of LA	All Other	Total
Single-Family Retail	251,536	529,316	780,852
Multi-Family Retail	165,484	166,721	332,205
Commercial, Industrial, Institutional	191,962	239,981	431,943
Non-Metered Uses	52,955	78,924	131,879
Retail Agricultural	0	399	399
Retail Seawater Barrier	2,878	33,161	36,039
Retail Replenishment	0	104,175	104,175
Total Retail Demand after Conservation	664,815	1,152,677	1,817,492

*Data source: MWD.

Hydrologic Conditions:

The characteristics of our “Reference Case” were developed by MWD, LADWP and others. They are based on a distribution of historical weather/hydrologic conditions and use actual estimated water storage levels for January 1, 2012. In addition to the Reference Case, we will also run simulations for extreme dry weather conditions and simulations excluding storage. Comparing the impact results of the Reference Case and the case excluding storage use enables us to evaluate storage as a resilience tactic and to expressly measure the value of storage capacity.

Time Periods:

The time periods for water supply disruptions from the California Aqueduct are 6, 24, and 36 months. We run the model for the appropriate time periods, and report the results on an annual basis. The 24-month disruption is our Reference Case.

Table ES-3. Water Constraints for Alternative Hydrologic Condition Cases, with and without Resilience, 24-month Disruption Scenario

Case Description	Water Constraint Level (%)					
	Normal-Year Case		Moderately Unfavorable Hydrologic Condition Case		Severe Hydrologic Condition Case	
	2013	2014	2013	2014	2013	2014
No Water Storage	18.2	18.2	24.6	23.2	27.8	29.8
Storage (Reference Case)	4.9	10.9	10.6	16.0	11.4	21.2
Phase II Conservation	0	5.3	5.2	10.4	6.1	15.8
Phase II Conservation Plus	0	0.2	0.2	5.3	1.1	10.8
Water Unimportance	1.9	4.2	4.1	6.1	4.4	8.1
Diversion of Replenishment Use	2.7	8.8	8.4	13.9	9.3	19.3
Production Recapture	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Simultaneous Resilience	0	0	0	1.4	0	3.5

Customers Affected:

- All customers (Reference Case)
- Residential customers only

Pricing:

- Price of water free to find its market equilibrium (Reference Case). This allocates water to highest value uses.
- Price of water held constant

Rationing:

- Rationing through pricing. A constraint is placed on overall water use and market responses determine water use (Reference Case)
- Rationing through decree either across the board or for household customers only

Resilience Analysis:

- Storage
- Conservation
- Water unimportance (portions of business operation not dependent on water)
- Diversion of replenishment use
- Production recapture (making up lost production once water service is restored)

Reconstruction Paths:

- Discrete jump, i.e., the entirety of the Bay Delta damage must be repaired before water is allowed to flow through the California Aqueduct (Reference Case)
- Linear resumption of service

IV. MACROECONOMIC IMPACT ANALYSIS

We examine the effects of the water supply disruption on major macroeconomic indicators: net output (Gross Domestic Product for the County), gross output (sales revenue), employment and prices. Note that these are market-based economic indicators of most interest to policymakers. They include impacts on businesses (gross and net output and their share of income) and on households (employment and their share of income). We also compute measures of lost economic welfare (well-being) of households from the loss of utility of decreases in water use, and the reallocation of their spending. This computation is distinct from the formal GDP accounts and provides a separate perspective from that of households' lost income and employment.

Macroeconomic impacts can be very complex. First, water used by businesses is extensive and goes far beyond the obvious uses in food processing, restaurant drinking and dishwater, and various purification processes. Many businesses use water for cooling and vacuum pumps. Additionally, production creates extensive indirect demands for water upward along successive stages of supply chains. If a firm has to cut back its production because of disruption of its water supply, it will demand fewer inputs. This in turn reduces the production of all of its suppliers, who in turn reduce their orders through a successive round of upstream demands. Moreover, lower production levels at each round translate into lower income payments, which then translate into a further dampening of economic activity from decreases in consumer and investment spending.

Water disruptions also magnify themselves downstream along successive supply chain stages in a similar manner. The lack of availability of an input will cause its users to reduce their output, even if they have a very low demand for water in the first place and can make up for the entire shortfall through various resilience tactics. The sum total of all these chain reactions is referred to as multiplier effects when only considering output quantities, as in an I-O model, and general equilibrium effects when both price and quantity responses are taken into account, as in a CGE model.

V. SUMMARY OF RESULTS

Some results of our simulations are presented in Tables ES-4 to ES-8. They are a snapshot of the many tables in the text, which include various sensitivity tests. The Reference Case is consistent with the following conditions:

- flexible water pricing in the face of market conditions
- aggregate water constraint (no sectoral rationing)
- 24-month disruption period
- water storage included, but no other resilience

For disruptions lasting more than one year, we present results for each applicable year, as well as a summary total. Note that the Reference Case results are presented for a recovery path that assumes no incremental repair and reconstruction of the infrastructure damage affecting the flow of water through the California Aqueduct, so that the full outage is felt during the relevant time period, and then the water flow returns to normal at the end of the period. If a linear recovery path is assumed, the impacts would be one-half the size of those reported below.

This study provides a range of estimates for the economic impacts of a disruption of the California Aqueduct on the Los Angeles County economy. A range is needed to account for the variability and the key assumptions and parameters related to weather, hydrology, recovery patterns and the effectiveness of resilience.

Table ES-4. Total Two-Year Impacts of Water Supply Disruptions on the LA County Economy without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2013-14 (percentage changes)

Case Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
Storage (Reference Case): Year 2013	4.9	-4.19	-4.03	12.39	-3.83
Storage (Reference Case): Year 2014	10.9	-9.44	-9.08	29.89	-8.63
Storage (Reference Case): Weighted Avg	n.a.	-6.84	-6.57	n.a.	n.a.

Table ES-5. Total Two-Year Impacts of Water Supply Disruptions on the LA County Economy without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2013-14 (changes in levels)

Case Description	Disruption Level (% change)	GDP change (B 2013\$)	Employment change (job-years)	Water Price (% change)	Welfare (B 2013\$)
Storage (Reference Case): Year 2013	4.9	-23.08	-228,125	12.39	-17.83
Storage (Reference Case): Year 2014	10.9	-51.99	-513,910	29.89	-40.18
Storage (Reference Case): Total	n.a.	-75.07	-742,035	n.a.	n.a.

Table ES-6. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, with and without Storage (Reference Case: Flexible Price and Economy-Wide Rationing), 2013

Case Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
No Storage (6-month)	4.35	-3.79	-3.64	10.92	-3.40
Storage (6-month)	0.24	-0.20	-0.19	0.57	-0.19
No Storage (24-month)	18.2	-16.10	-15.48	55.91	-14.72
Storage (24-month)	4.9	-4.19	-4.03	12.39	-3.83
No Storage (36-month)	18.2	-16.10	-15.48	55.91	-14.72
Storage (36-month)	4.9	-4.19	-4.03	12.39	-3.83

Table ES-7. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, Alternative Hydrological Conditions (level change), 2013

Scenario Description	Disruption Level (% change)	GDP (B 2013\$)	Employment (job-years)	Water Price (% change)
Normal-year hydrologic condition (Reference Case) flexible price/general constraint	4.9	-23.08	-228,125	12.39
Moderately unfavorable hydrologic condition (Reference Case) flexible price/general constraint	10.6	-51.61	-510,549	29.03
Severe hydrologic condition (Reference Case) flexible price/general constraint	11.4	-55.62	-550,197	31.59

Table ES-8. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, Alternative Hydrological Conditions (level change), 2014

Scenario Description	Disruption Level (% change)	GDP (B 2013\$)	Employment (job-years)	Water Price (% change)
Normal-year hydrologic condition (Reference Case) flexible price/general constraint	10.9	-51.99	-513,910	29.89
Moderately unfavorable hydrologic condition (Reference Case) flexible price/general constraint	16.0	-78.71	-778,703	47.31
Severe hydrologic condition (Reference Case) flexible price/general constraint	21.2	-106.14	-1,050,233	68.50

For a 24-month total disruption of the California Aqueduct, Los Angeles County would have an expected shortage of 4.9 percent in 2013 and 10.9 percent in 2014 given current levels in storage and a historical range of potential hydrologic and climatic conditions. This shortage would increase to 10.6 and 16.0 percent under moderately unfavorable hydrologic and climatic conditions and to 11.4 and 21.2 percent under severe hydrologic and climatic conditions. The absence of storage would increase the shortage to nearly 30 percent by 2014 under the worst case scenario.

The basic conclusions of the study are:

- The 6-month shutdown of the California Aqueduct in normal years relating to weather and hydrology conditions and reasonable levels of resilience, primarily conservation and production recapture, will result in no negative economic impacts.
- For the Reference Case (flexible water pricing, economy-wide constraint and use of storage water), a 24-month shutdown of the California Aqueduct could lead to a total two-year loss of 742,000 job-years of employment, \$75 billion of GDP, and \$135 billion of sales revenue for businesses in LA County. Reasonable levels of several types of resilience could reduce this outcome significantly.
- Under the most adverse hydrological conditions, the negative impacts for a 24-month shutdown could be as large as \$160 billion of GDP and 1.6 million job-years of employment.
- For the Reference Case, a 36-month shutdown of the California Aqueduct could lead to employment losses of 1,315,000 job-years, GDP losses of \$133 billion, and total revenue losses of \$240 billion over the three years. Even with a major resilience effort, the losses would likely be in the tens of thousands of job-years and tens of billions of losses in GDP and sales revenue.
- The negative impacts of the supply disruptions analyzed would be half the size of those noted above if the restoration of California Aqueduct supplies were to proceed incrementally in a linear fashion, rather than the Reference Case assumption that no water would flow from it to LA County until the Bay Area levee system was completely repaired.
- The negative impacts of the supply disruptions could be reduced significantly if water prices were held constant during the disruption.
- The results of the study are sensitive to water pricing policies. For the Reference Case, losses in GDP and employment can be reduced by more than 40 percent if the price of water is held constant at its pre-disaster level, as opposed to allowing it to reach its market equilibrium of a 12.39 percent increase.
- Existing water storage is able to mute the potential impacts considerably. Maximum potential losses would be doubled for the 24-month and 36-month scenarios with zero storage, and even more in the cases of adverse hydrological conditions, such as extreme dry years.
- Resilience tactics other than water storage can reduce losses considerably if implemented close to their maximum potential. This includes conservation, water unimportance, diversion of replenishment water for other uses, and production recapture. Under adverse hydrological conditions, however, even the full implementation of these tactics would still result in GDP losses in the tens of billions of dollars and employment losses in the tens of thousands of job-years. Moreover, these factors have limited capability to deal with the consequences of a catastrophic scenario during an extended drought period.

- The results of the study are sensitive to the applicability of water restrictions. For the Reference Case, including allowing the price of water to reach its market equilibrium value, losses in GDP and employment can be decreased by more than 90 percent if water use restrictions are imposed on residential customers alone, as opposed to being spread across a combination of businesses and households. For the case where the price of water is held constant at its pre-disaster level, this reduction in losses is around 70 percent.
- Los Angeles County can become less vulnerable to water disruptions in two major ways. One is to have the major federal-state initiative to improve the Bay Area conveyance system to make it more capable of withstanding a major earthquake. The ongoing Bay Delta Conservation Plan is proposing such an improvement. The other way is to continue to invest in storage and alternative water supply systems. For example, Orange County recently commissioned the building of a small desalination plant. In addition to existing approaches to the problem, and the potential of both inherent and adaptive resilience, LA County also needs to consider a broad range of alternatives. At the same time, water agencies in LA County should continue to be vigilant in protecting their groundwater and reservoir supplies. Overall, the key to maintaining water reliability is a diverse portfolio of water supply sources.

TOTAL REGIONAL ECONOMIC LOSSES FROM WATER SUPPLY DISRUPTIONS TO THE LOS ANGELES COUNTY ECONOMY

by

Adam Rose, Ian Sue Wing, Dan Wei, and Misak Avetisyan*
University of Southern California

I. INTRODUCTION

Water is the lifeblood of the Los Angeles economy. It is a necessary input to every producing sector, is a key ingredient to sustaining life for its population, and is indispensable to fire protection and other specialized uses. The reality is that Southern California is far from self-sufficient in its fresh water supplies. Moreover, the aqueducts that import water into the region are vulnerable to natural disasters, terrorist attacks, technological accidents, and regulatory changes. A major disruption of these external water supplies could potentially have devastating effects on the LA County Economy and the quality of life of its people.

This study estimates the total regional economic impacts of one major set of disruption scenarios stemming from a Bay Delta earthquake that would cause the closure of the California Aqueduct (State Water Project) for 6, 24, or 36 months. The results can be generalized to any event that would reduce fresh water imports through any of the three major aqueducts serving LA County, including a regulatory decree stipulating a sizeable reduction in its allocation of Colorado River water.

The study is based on the use of a computable general equilibrium (CGE) model, the state-of-the-art approach to regional macroeconomic impact analysis of severe shocks to a system. Essentially, CGE models the economy as a set of integrated supply chains in relation to behavioral responses of businesses and consumers to market price signals and resource constraints. The LA County CGE Model is specifically designed to focus on water production and use. Moreover, it is constructed using primary data from wholesale and retail water providers operating in LA County. The model is used to estimate the impacts of water supply disruptions on output, employment, and prices.

A novel feature of the study is the incorporation of resilience, or tactics that households and businesses use to cushion the blow of a disruption. That is, water customers do not just react passively or in a business as usual manner, but act first by invoking a set of coping strategies inherent in the water delivery and use system, such as storage and diversion of replenishment water. Moreover, they can adapt to the crisis with various forms of ingenuity, such as undertaking extra levels of conservation and recycling, and implementing technological innovations.

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Not only is resilience operative at the microeconomic level, but it is also effective at the market level. Prices reflect the value of resources, and hence water price changes stemming from a disruption represent an alternative rationing mechanism that can allocate water to its highest value use and thereby further reduce the impacts of the shock to the system. Overall, the analysis of resilience helps to avoid overstating the disruptive impacts and offers useful insights into how society can best cope with any serious disruption of fresh water supplies.

II. WATER AND THE LOS ANGELES COUNTY ECONOMY

A. Water Supply and Demand Accounts.

Water is a necessary input into every major production process of the Los Angeles County economy. Moreover, it is critical to sustaining a high quality of life in the area. It also has indispensable uses such as fire protection.

The supply and demand for fresh water in LA Country is presented in Tables 1 through 4. These tables provide both historical data and projected data utilized in our analysis, which is pegged to the 2013 calendar year (see also Appendix A). Table 0 provides the major data sources.

Table 0. Data Sources

Variable	Source	Date
Source of Supply (Historical)	MWD	2009/10
Source of Supply (Projected)	MWD	2013, 2014, 2015
Wholesale Prices (Historical)	MWD	2009, 2010, 2011
Wholesale Prices (Projected)	MWD	2012, 2013, 2014, 2015
Sources of Demand (both LA City and non-LA)	MWD	2009/10
Sources of Demand (LA City)	LADWP	2009/10, 2010/11, & 2011/12
Sources of Supply (LA City)	LADWP	2009/10, 2010/11, 2011/12 & 2012/13
Retail Prices (LA City)	LADWP	2009/10 & 2010/11
SIC Decomposition of Demand (LA City)	LADWP	2009/10 & 2010/11

* I-O Table is 2010 base year.

**Table 1a. LA County Sources of Water (Acre Feet)
(Forecast Year 2013)**

	City of LA	All Other	Total
Groundwater Production	78,500	515,190	593,690
Surface Water Production	0	16,070	16,070
Los Angeles Aqueduct Supply	222,872	0	222,872
Recycled Water Production	7,658	125,487	133,145
Groundwater Recovery	0	26,423	26,423
Imported MWD Deliveries	355,785	469,507	825,292
Total Wholesale Supply	664,815	1,152,677	1,817,492

*Data source: MWD.

**Table 1b. LA County Sources of Water (Percent)
(Forecast Year 2013)**

	City of LA	All Other	Total
Groundwater Production	12%	45%	33%
Surface Water Production	0%	1%	1%
Los Angeles Aqueduct Supply	34%	0%	12%
Recycled Water Production	1%	11%	7%
Groundwater Recovery	0%	2%	1%
Imported MWD Deliveries	54%	41%	45%
Total Wholesale Supply	100%	100%	100%

*Data source: MWD.

**Table 1c. LA County Sources of Water (Million \$)
(Forecast Year 2013)**

	City of LA	All Other	Total
Groundwater Production	66	436	503
Surface Water Production	0	14	14
Los Angeles Aqueduct Supply	189	0	189
Recycled Water Production	6	106	113
Groundwater Recovery	0	22	22
Imported MWD Deliveries	301	398	699
Total Wholesale Supply	563	976	1,539

*The MWD forecasted 2013 water rate (\$847/AF) is used to convert the quantity data in Table 1a to dollar values in this table.

Table 2a. LA County Demand for Water (Acre Feet)
(Forecast Year 2013)

	City of LA	All Other	Total
Single-Family Residential Retail	251,536	529,316	780,852
Multi-Family Residential Retail	165,484	166,721	332,205
Commercial, Industrial, Institutional	191,962	239,981	431,943
Non-Metered Uses	52,955	78,924	131,879
Retail Agricultural	0	399	399
Retail Seawater Barrier	2,878	33,161	36,039
Retail Replenishment	0	104,175	104,175
Total Retail Demand after Conservation¹	664,815	1,152,677	1,817,492

*Data source: MWD.

¹ Conservation here refers to efforts towards the goal of 20x2020 Water Use Efficiency. Shortage year mandated water conservation, such as LADWP Phase II Conservation, is not included.

Table 2b. LA County Demand for Water (Percent)
(Forecast Year 2013)

	City of LA	All Other	Total
Single-Family Residential Retail	38%	46%	43%
Multi-Family Residential Retail	25%	14%	18%
Commercial, Industrial, Institutional	29%	21%	24%
Non-Metered Uses	8%	7%	7%
Retail Agricultural	0%	0%	0%
Retail Seawater Barrier	0%	3%	2%
Retail Replenishment	0%	9%	6%
Total Retail Demand after Conservation	100%	100%	100%

*Data source: MWD.

Table 2c. LA County Demand for Water (Million \$)
(Forecast Year 2013)

	City of LA	All Other	Total
Single-Family Residential Retail	437	920	1,357
Multi-Family Residential Retail	272	274	545
Commercial, Industrial, Institutional	346	433	779
Non-Metered Uses	95	142	238
Retail Agricultural	0	1	1
Retail Seawater Barrier	4	44	48
Retail Replenishment	0	139	139
Total Retail Demand after Conservation	1,154	1,953	3,107

*Projected LADWP Year 2013 retail rates are used to convert the quantity data in Table 2a to dollar values in this table.

Table 3. Wholesale Water Rates (Effective January 1)

	2009	2010	2011	2012	2013	2014
Full Service Treated Volumetric Cost (\$/AF)	\$579	\$701	\$744	\$794	\$847	\$890

*Data source: MWD.

Table 4. Retail Water Rates

	2009/10 (\$/HCF)	Price Increase from 2009/10 to 2012/13*	2012/13 (\$/HCF)	2012/13 (\$/AF)
Single-Family Residential	\$3.76	6.09%	\$3.99	\$1,737.46
Multi-Family Residential	\$3.55	6.07%	\$3.77	\$1,641.56
Commercial	\$3.90	5.92%	\$4.13	\$1,797.69
Industrial	\$3.96	5.92%	\$4.19	\$1,826.09
Governmental	\$2.93	4.43%	\$3.06	\$1,333.40

*The 3-year water rate increases between FY09/10 and FY12/13 are calculated as the average percentage increase of the 1st quarter & 2nd quarter water rates from FY09/10 to the same periods FY12/13.

Water use (in 2013 dollars) for individual producing sectors can be read from row 6 of the Input-Output Table accounts presented in Table A2 in Appendix A. These figures are consistent with totals by major customer class obtained from the Metropolitan Water District (MWD), with sectoral detail calculated from a separate Los Angeles Department of Water and Power (LADWP) file that provides sectoral water use details at 4-digit Standard Industrial Classification (SIC) level. Total production/sales of LA County retail water deliveries is \$3.107 billion (row sum). This matches the total production costs of delivering the water, including wholesale water purchases, imputed value of stored water, and mark-up related to delivery costs by LA County retail suppliers (column sum). When we construct the water accounts in the I-O table, we consider water delivered by MWD and related sources to be domestic imports (from elsewhere in California and the rest of the U.S.) into the County equal to \$1.539 billion. This is the vast majority of the \$1.551 billion of all imported inputs to Water Services Sector, Sector 6, which also includes non-water inputs.

We use the Full Service Treated wholesale price obtained from MWD to compute the total value of imported water for LA County. We use retail prices differentiated according to customer class obtained from LADWP to represent the retail prices for LA County as a whole.¹

¹ The LADWP average retail water rates by customer class data are used for LA County as a whole because we were not able to obtain compatible rate data (weighted average water rates across various tiered uses for individual customer classes) for other municipalities. Note that LADWP retail water sales accounts for more than one-third of the county total.

Note some abstractions from reality in our methodology. Within each customer class there are differential block rates for varying quantities, typically increasing with demand. Note that most studies also abstract from this consideration (see, e.g., BEC, 2010). Also, we only calculate limited water supply cost changes from the disruption. However, lower delivery volumes can result in lower per unit delivery costs, assuming an upward sloping supply and the underlying marginal cost curve. We factor in cost changes in water supply in relation to the constant elasticity of substitution (CES) production function choice of input in response to relative price changes. Note, that the delivery costs represent only a very small percentage of total costs other than wholesale water imports and fixed charges associated with pipeline infrastructure.

Section I of Appendix A presents the data and assumptions we used to construct the water supply and demand accounts.

The price elasticity of demand for water reflects how sensitive water demand is to a change in its price. Estimates used in MWD's Econometric Water Demand Model and in LADWP's water demand forecast are presented below:

- Single-Family = -0.131
- Multifamily = -0.109
- Commercial/Government = -0.107
- Industrial = -0.107

The values in the area of 0.1 reflect the fact that water is a dire necessity and that even large increases in price will result in a minimal cutback in demand. These price elasticities are also translated into the CGE model's elasticities of substitution, or the ease at which businesses can substitute other inputs for water. These substitution elasticity values are thus very low as well.

Hydrologic factors are included in our analysis through the water supply demand forecast provided by MWD. The factors include projected rainfall and ground water recharging. Some added costs are associated with hydrologic-related actions. For example, BEC (2010) explicitly calculated increased extraction costs from existing storage (essentially the value of storage loss), and also calculated the difference in replenishment water deliveries which is also translated into a decrease in storage value. We implicitly include these costs in relation to scenario data provided by MWD, which factors in changes in storage in relation to future deliveries. This is a more indirect approach but adequate for our purposes.

B. The LA County Input-Output Table

A useful tool for collecting and tabulating data on water delivery and its uses is an input-output (I-O) table. This is a double-entry set of accounts of all purchases and sales within a regional economy. The concept of an I-O table was developed by Nobel Laureate Wassily Leontief, and served as the basis for both simple I-O models, and more sophisticated models such as the one being used in this study (see Rose and Miernyk, 1989; Rose, 1995).

The LA County I-O table is presented in Table A2 in Appendix A.² Each row in the table represents the dollar value of sales of the sector listed at the left (row labels) to the sectors of the economy listed at the top (column labels), including government, households, and the production of goods for capital formation.

² The basic I-O accounts for the model are for Year 2010. They are updated to 2013 by applying historical and short-term projected economic growth rates from Kleinhenz (2012). We assume the 2012 to 2013 growth rate will continue for simulations for 2014 and 2015. Growth rates are applied to adjust water availability constraints in the model for their effect in those years and to scale its results for them as well.

Each column represents the dollar value of purchases of inputs used to produce the output of each sector in the economy. The row and columns labels are identically labeled and ordered, and the total uses of each good and service equals the total production of each in the economy, with the designation "Total Gross Output."

The LA I-O table clearly displays how much water is used in each sector of the LA economy. It also presents a stylized picture of water production, i.e., delivery. In effect, we have modeled all water flows from the three major California aqueducts as imports of water (the lion's share of the value import row in the water sector column -- Sector #6). In the table we have also included groundwater and all other local sources in the import row for purpose of simplification. Essentially, the import row represents water at wholesale prices, while the sum of all the elements in the water production column represents the value of retail sales. In effect, water deliveries into the various retail providers is entered at wholesale prices and the various costs of production listed in the Sector 6 column provide information on other costs that are incurred in establishing an average retail price of water. Note that these prices are implicit in these sets of accounts, since each entry in the table represents a value (price times quantity) figure.

Note also that the I-O table is a major component of the CGE model that we describe below. The table presented above is a modified version of the set of I-O accounts obtained from the IMPLAN System, the major provider of such accounts in the U.S. (IMPLAN, 2012). It should be mentioned that while the entries for the water sectors is based on primary data, the other entries in the table, except for total gross outputs, are based on a data-reduction methodology (secondary data from downscaling national and state data to the county level). Still, IMPLAN tables are considered reasonably accurate, and have been used in literally thousands of major economic impact studies (see, Sue Wing et al. 2010; Rose et al., 2011; Rose and Wei, 2011).

Appendix A Section II presents in detail how we adjust the water sector row and column in the IMPLAN I-O table using the water supply and demand accounts we established based on primary water data from water service providers in LA County.

III. THE LA COUNTY COMPUTABLE GENERAL EQUILIBRIUM MODEL

Computable general equilibrium (CGE) analysis is the state-of-the-art in regional economic modeling, especially for impact and policy analysis (Partridge and Rickman, 2010). CGE is defined as a multi-market simulation model based on the simultaneous optimizing behavior of individual businesses and consumers, subject to economic account balances and resource constraints (see, e.g., Shoven and Whalley, 1992). The CGE formulation incorporates many of the best features of other popular model forms, but without many of their limitations (Rose, 2005). For example, CGE models retain the major strengths of input-output models (full accounting of all inputs, multi-sector detail, and ability to capture interdependencies), but overcome the limitations of linearity, lack of behavioral content, and difficulty of incorporating resource constraints. This modeling approach has been shown to represent an excellent framework for analyzing natural and man-made hazard impacts and policy responses, including disruptions of utility lifeline services (see, e.g., Rose and Liao, 2005; Rose et al., 2007). The CGE model used in this study is a combination of models used successfully for water service disruptions in Southern California (Rose et al., 2011a; Sue Wing, 2011).

For this study, we constructed a static, regional CGE model of the LA County economy consisting of 29 producing sectors. The sector classification was designed to highlight the sensitivity of production processes to water availability. Institutions in the model are households, government, and external agents. There are nine household income groups and two categories each of government (State/Local and Federal) and external agents (Rest of the U.S. and Rest of the World).

The major source of the data for the model is a detailed Social Accounting Matrix (SAM) for LA County, derived from the Impact Planning and Analysis (IMPLAN) database (MIG, 2012). The IMPLAN system consists of an extensive set of economic data, algorithms for generating regional input-output tables and social accounting matrices, and algorithms for performing impact analysis. IMPLAN is the most widely used database for generating regional I-O models and SAMs in the U.S. Because the IMPLAN system uses a non-survey approach to down-scale national and state economy indicators (output, income, employment) to the county level, it is important to verify the IMPLAN figures in key sectors for small area I-O tables. That is the reason we have been so careful in specifying water account balances for LA County.

The I-O table provides the basic data for sectoral production functions in terms of input coefficients or shares. However, flexibility in the production process (e.g., input substitution) requires the specification of a set of elasticities of substitution. These parameters for regionally produced inputs and for imports, other than water, were based on a synthesis of the literature (see, e.g., Rose et al., 2011a), and other major parameters were specified during the model calibration process. Note that the various types of resilience can be incorporated into the model by modifying key production function parameters.

IV. DISRUPTION SCENARIOS

In this study, we examine three major scenarios related to the timing of the disruption of the California Aqueduct. Although the specific cause on which we focus would be a Bay Delta earthquake that causes a shutdown due to the threat or actuality of saltwater intrusion, this disruption could be caused by many other actions, including a terrorist attack, technological accident, or some other natural hazard such as an ocean storm surge. In addition, our disruption analysis methodology and results would be applicable to other actions, such as a regulatory decree altering Los Angeles County's allocation of Colorado River water.

Table 5 presents the assumptions of the 24-month scenario, which we refer to as our "Reference Case." The details are the same for the 6-and 36-month scenarios, except for the durations. The varying lengths depend primarily on the extent and timing of repair and reconstruction activities. Various sub-cases distinguished in Section VI are also simulated. These pertain to the effectiveness of various resilience tactics, alternative policies regarding price and non-price rationing, and differences in the shape of the reconstruction paths.

A major timing consideration in the scenarios is the repair/reconstruction schedule. We analyze two alternatives: 1) a schedule where resumption of California Aqueduct does not take place until all repair/reconstruction has been completed (i.e., at the end of the disruption period), and 2) a linear continuous resumption of service. Needless to say, the latter decreases the disruption, and thereby the impacts, over time.

V. RESILIENCE TO WATER SERVICE DISRUPTIONS

Individuals and communities facing water shortages do not just react passively. Instead, they make various types of adjustments to mute the potential losses. This behavior is known as "resilience," and it has been documented as being effective in reducing losses from natural disasters and other types of disruptions to water systems (see, e.g. Tierney, 1997; Kajitani and Tatano, 2007). Static economic

Table 5. MWD 24-Month Catastrophic Bay Delta Failure Analysis

This scenario is consistent with Metropolitan's IRP planning approach and includes the following assumptions:

Assumes a catastrophic failure beginning January 1, 2013 that interrupts all supplies that rely on the Delta for a period of 24 months

Scenario begins in 2012 and runs through 2035, uses actual estimated storage levels for January 1, 2012

Applies historical hydrologic impacts from 1922-2004 to supplies and demands

Full use of Metropolitan's storage portfolio is available to manage water supplies

Full use of CRA supplies, programs, and transfers as needed and available

SWP supplies, programs, and transfers are reduced to 0 during the catastrophic delta failure

resilience refers to the ability of an entity or system to maintain function in the aftermath of a disaster through the efficient allocation of resources, which is exacerbated in the context of disasters. Dynamic resilience refers to the speed at which an entity or system recovers from a disaster and involves investment associated with repair and reconstruction. Resilience can be inherent, or already in place to be used when needed, or adaptive, or inspired by the crisis. Finally, resilience can take place at the micro, mesa (industry or market), or macroeconomic levels (Rose, 2009).

Below we summarize the various types of resilience relevant to our study at the micro level and explain briefly how we intend to model them:

1. Conservation. This refers to actions to reduce water use per person or per unit of economic activity beyond baseline trends (e.g., beyond normal progress on mandated “20x2020” water use efficiency). There are two ways to model conservation. The first is to consider existing and back-up conservation programs of various municipalities, such as the City of Los Angeles, and simply adjust water availability to account for them. The second pertains to adaptive behavior that may extend to Draconian measures not otherwise thought possible during normal circumstances. This type of conservation is likely to vary by type of user. For this type, one would adjust the productivity term related to water in the sectoral constant elasticity of substitution (CES) production functions (Rose and Liao, 2005) by an estimate of a reasonable potential level of adaptive conservation. Some Draconian measures may be difficult to sustain over a longer period of time, but there is also the likelihood that new ways will be found to maintain this momentum in a less onerous fashion. However, because adaptive conservation possibilities are extremely limited, and because we lack information on them, we do not explicitly model this type of resilience.³ See more detailed assumptions on Conservation in Table 6.

2. Storage. This refers both to underground and surface reservoirs. The underground resources are deemed to include groundwater that might be used in an emergency situation. These alternatives can be modeled as loosening the water availability constraints. They are measured in terms of data on actual storage volume availabilities in LA County.

³ A study by Rose and Liao (2005), based on survey results from Tierney (1997), found that adaptive conservation was rather minor for a disruption to the water supplies following an earthquake.

3. Water Unimportance. This refers to an inherent form of resilience operative in most sectors in terms of what portion of production does not require water. It pertains to those aspects of the production process that are separable from water use. Examples would be many aspects of construction company activity or mining. It should be noted, however, that many companies require water to operate in more subtle ways. For example, high-rise office buildings may have to be closed if water is not available for fire-protection sprinkler systems. The first major study of this type of resilience assumed that a disruption of up to 5% would not have any effect on the business and also that there was an upper threshold of water loss that would force the business to shut down (ATC, 1991). We will use the ATC importance factors, but not include the lower or upper thresholds. The lower one is subsumed into Conservation, and the upper one (typically above 45%) is irrelevant to this study because it exceeds the likely percentage water disruption.

4. Input Substitution. This refers to utilizing other products in place of water obtained from municipal delivery systems. This would include bottled and trucked water, various beverages, and possibly even chemicals. Some of the substitution is inherent in the economy, but under stressful conditions there is the potential to find additional substitutes or ease the ability use any substitutes. The latter represents a type of adaptive input substitution. We model the inherent aspect of this resilience tactic through the ordinary elasticities substitution between water and other inputs in the CES production functions; these parameters are related to the price elasticities of demand, provided by the water service agencies, which we use in this report. However, because enhanced substitution possibilities are extremely limited, and because we lack information on them, we do not explicitly model adaptive substitution.⁴

5. Import Substitution. If water cannot be delivered by local suppliers, there is a possibility of increasing supplies from providers elsewhere. This can be modeled by simply relaxing the water availability constraint. In our study, we deem these possibilities to be negligible given the strong demand for water throughout the state of California, which is unlikely to lead to water being diverted to Southern California from other aqueducts.

6. Recycling. As in the case of conservation, this pertains only to amounts of recycling over and above normal levels. It might be achieved in a number of ways, and it is also likely to differ by user. If the recycling is done internal to the production process, it can be modeled like conservation—an adjustment of the productivity term of the CES production functions; however, this is beyond the scope of this study. If it pertains to water delivery systems, it can be modeled by a relaxation of the general water availability constraint if recycling does not differ by user. Otherwise, sectoral constraints must be entered into the model and adjusted for this resilience tactic.

7. Water Replenishment Diversion. Water replenishment refers to injecting water into the ground for the purpose of natural purification. This resilience tactic pertains to reducing replenishment levels below normal conditions, and diverting water intended for replenishment use (including both groundwater spreading and seawater barrier uses) to other non-potable uses. Again, this can be modeled by changing the overall water availability constraint. Note that our study does not account for any harm to existing groundwater rights that may arise from reduced replenishment activities.

8. Technological Change. This refers to tactics separate from input (technical) substitution and conservation. Examples would be altering production processes to utilize less water or increasing the availability of the desalination plants. Changes in the production process of water users would be modeled as changes in the productivity term of the CES production function (a general productivity term if the technological change is factor neutral, or productivity terms associated with individual inputs if

⁴ The Rose and Liao (2005) and Tierney (1997) studies also found that adaptive input substitution was rather minor for a major disruption to the water supplies following an earthquake.

there is factor bias). These are especially difficult to evaluate and to model. In the case of a desalination plant, the production of fresh water would be modeled as changes in the water availability constraint. There is little information on the former, and it is unlikely that major desalination plants will be in place in the near term. Therefore, we have not modeled this resilience factor.

9. Business Relocation. This refers to two possibilities. First is the explicit geographic move of existing businesses to avoid having to cope with a water shortage. It is likely to be minimal because a disruption to the California Aqueduct would affect not only LA County but the entire Southern California region, so businesses would have to move beyond that area, and thus incur some significant costs. The second interpretation of business relocation is a change in geographic preferences of water users to avoid the disruption. For example, this would pertain to restaurant customers going to areas other than LA County to avoid being charged for drinking water in the County. Again, there is unlikely to be any nearby geographic relief. Hence, we do not explicitly model this tactic.

10. Production Recapture. This refers to the ability to defer production to a date following the water service disruption. It would involve running production lines overtime or extra shifts. The potential of this resilience tactic is strong for short periods of time following a disruption, because customers are unlikely to abandon their established suppliers or may not be able to use the water in any case because of their own disruption-related slow-downs in production activity. This can be modeled a number of ways. The most straightforward is to increase production activity after the disruption period, thereby extending the time horizon for the study. We utilize recapture factors found in FEMA's (2012) hazard loss estimation tool, HAZUS, and modified in Rose and Lim (2002). Note, however, that these recapture factors are intended for use only up to three months, after which there is likely to be an increasing number of cancelled orders over time. We therefore reduce the recapture factors by 25 percent for each of the subsequent three-month periods. Thus, after the first year, there is no production recapture. Effectively, this means that the recapture factor is only relevant to the 6-month disruption scenario. In the two longer disruption scenarios, recapture cannot be implemented until after the recapture factors have dropped to zero.

Note that most of these various resilience tactics are potentially cost-effective. Conservation more than pays for itself, input substitution is likely to take place under only a limited cost penalty, and production recapture involves only the payment of overtime to workers.

Note also that resilience at the meso and macro levels is exemplified by the workings of markets. Prices reflect the value of goods and services, and increased scarcity drives prices up. Not all price increases represent gouging, as some are justified by such changes in market conditions. The ability of the market to reallocate water to its highest value use is an inherent source of resilience.

The major assumptions and data sources of resilience tactics operative in the case of the Bay Delta disruption are presented in Table 6. The figures are a combination of those computed by water service providers, refinement of water provider data, and data and parameters used successfully in other studies and adapted to this one. Each row in the table represents scenarios with one of the three disruption periods. The first column presents the retail level water shortage assuming that MWD storage was not used. The second column presents the retail level shortage after taking MWD storage and LADWP storage use into consideration.⁵ The next five columns present the major assumptions and data sources

⁵ The retail level water shortage data we obtained from MWD does not account for economic growth. We have therefore adjusted water demand, and hence the water constraint percentage upward by 1.6 percent to account for economic growth in Year 2014 in the tables and simulations. For Year 2015, we applied 1.6 percent compounded over two years to adjust for economic growth. Note that these adjustments reflect only a tightening of the water constraints relative to demand; the supply of water in acre feet and dollars remains unaffected.

Table 6. Major Assumptions and Data Sources for Calculating LA County Water Availability with and without Resilience

Disruption Period	CA Aqueduct Disruption (no MWD storage water use) ¹	CA Aqueduct Disruption (with MWD and LADWP storage water use) ^{2,3,4}	Conservation I	Conservation II	Water Unimportance	Water Replenishment	Production Recapture
6-month	Retail Level Shortage (without use of MWD storage): 2013: 79,111 AF (4.35%)	Retail Level Shortage (including use of MWD storage): 2013: 4,410 AF (0.24%)	Analyze effect of LADWP Phase II Conservation (15% conservation) on reducing the demand shortages under the three SWP disruption scenarios. ⁵	In addition to LADWP Phase II Conservation, for the 24-month and 36-month disruption scenarios, we assume that 5% additional conservation efforts can be anticipated to further cope with the water supply shortage. The additional conservation effort under the SWP disruption scenarios is calculated as the difference of the conservation levels between LADWP Phase III and Phase II Conservation. ⁶	Use ATC-25 water importance factors by sector	Assume that all imported water used for replenishment can be diverted to other uses in the disruption period. ⁷	Use recapture factors from HAZUS and Rose and Lim (2002) ⁸
24-month	2013: 330,158 AF (18.2%) 2014: 325,634 AF (18.2%)	2013: 88,516 AF (4.9%) 2014: 194,165 AF (10.9%)					
36-month	2013: 330,158 AF (18.2%) 2014: 325,634 AF (18.2%) 2015: 326,223 (18.5%)	2013: 88,516 AF (4.9%) 2014: 194,165 AF (10.9%) 2015: 213,510 (12.1%)					

¹ MWD storage water uses are excluded in this column but included under the separate Storage column.

² This column show water constraints taking MWD and LADWP storage water uses in each outage year into account. The MWD storage includes both the water that is drawn from storage and the water that would have been recharged into storage in the Base Case.

³ LADWP reservoir storage, in addition to MWD storage, can provide 12,000 AF potable and 5,000 AF non-potable water. In addition, we assume that in the 24-month and 36-month disruption scenarios, the reservoir storage is not resumable in the second and third years of disruption after the depletion of the storage in the first year.

- ⁴ LADWP groundwater production cannot be increased even in water supply shortage conditions. This is mainly because 50% of LADWP's wells have been inactivated due to contamination and the remaining active wells are not operated at their full capacity due to the regional contamination issues.
- ⁵ According to the LADWP Emergency Water Conservation Plan (EWCP), City of LA has different conservation phases or stages of actions that can be implemented in response to shortages in water supply (LADWP, 2010). Phase II Conservation, which is implemented with Moderate Water Supply Shortage (roughly corresponding from zero to 15 percent), has been in effect in the City of LA since 2009. Phase II actions can achieve up to 15% conservation (LADWP, 2010). In this resilience analysis case, the 15% conservation is only applied to the total water demand of the LA City.
- ⁶ According to LADWP EWCP, Phase III Conservation measures, which would be implemented with Severe Water Shortage (corresponding from 15 to 20 percent), can achieve up to 20% conservation (LADWP, 2010). Therefore, we assume that in addition to the LADWP Phase II Conservation, the additional conservation potential under the SWP disruption is 5% for both the 24-month and 36-month disruption scenarios. In addition, we assume that the current water rates will be increased by 5% in association with the incremental conservation level based on the assumption of revenue neutral for the water retail suppliers. Different from the resilience case presented in the previous column, we assume that the 5% incremental conservation and the 5% water rates increase are applied to the entire County.
- ⁷ Currently both imported water and recycled water are used by WRD for water recharge purposes. According to WRD, 100% of imported water that is used for water recharge can be diverted for other uses in emergency cases. For recycled water used in groundwater replenishment, it is unlikely that this could be diverted to other non-potable use. Customers using non-potable recycled water typically require designated distribution pipeline (purple pipe) and already have a surplus of treated wastewater supply. Currently, 71,000 AF of water is used by WRD for groundwater spreading, of which 21,000 AF is imported water and 50,000 AF is recycled water. Therefore, we calculated that $21,000\text{AF}/71,000\text{AF} = 29.6\%$ of the water used for groundwater spreading can be diverted to other uses in the outage scenarios based on the WRD data. For seawater barrier, 30,000 AF of water is used by WRD, of which 11,000 AF is imported water and 19,000 AF is recycled water. Therefore, we calculated that $11,000\text{AF}/30,000\text{AF} = 36.7\%$ of the water used for seawater barrier can be diverted to other uses in the outage scenarios. Note that we assume there are no permitting or other regulatory barriers to diverting imported water away from described replenishment activities while still using recycled water in those replenishment activities.
- The following example shows in detail how we derived the amount of water recharge use that can be diverted to other uses in Year 2013 in the 24-month disruption case: According to MWD data, the total replenishment demand in LA County in 2013 is 108,382AF. Applying the % of imported water use in groundwater spreading by WRD, $108,382 \times 29.6\% = 32,057\text{AF}$ imported water is used in the Base Case for water replenishment. In the 24-month disruption case, the shortage of imported water is 12.8% in Year 2013 (this is calculated by dividing the retail level shortage of 105,516 AF by the total demand for imported supply of 825,292 in this year). Therefore, the total imported water that can be diverted from water replenishment use to other uses is: $32,057 \times (1-12.8\%) = 27,958\text{AF}$. In addition, according to MWD data, in 2013, seawater barrier demand in LA County in the Base Case is 37,494AF. A similar calculation indicates that in Year 2013 of the 24-month disruption case, with the 12.8% import water shortage, $37,494 \times 36.7\% \times (1-12.8\%) = 11,990\text{AF}$ imported water can be diverted from seawater barrier use to other uses.
- ⁸ The recapture factors from these data sources are intended for use only up to three months. We reduce the recapture factors by 25 percent for each of the subsequent three-month periods. In other words, after the first year, there is no production recapture potential.

Table 7. Summary of Water Constraints for Scenarios and Sub-Cases

Disruption Period	No Storage	w/ Storage (Reference Case) ¹	LADWP Phase II Conservation	LADWP Phase II Conservation Plus Incremental Conservation	Water Unimportance	Diversion of Water Replenishment	Production Recapture ²	Simultaneous Resilience ³
6-month	2013: 4.35%	2013: 0.24%	2013: 0.00%	2013: 0.00%	2013: 0.00%	2013: 0.00%		2013: 0.00%
24-month	2013: 18.2% 2014: 18.2%	2013: 4.9% 2014: 10.9%	2013: 0.0% 2014: 5.3%	2013: 0.0% 2014: 0.2% (5% water rate increase in 2014)	2013: 1.9% 2014: 4.2%	2013: 2.7% 2014: 8.9%	Adjust results rather than input constraints	2013: 0.0% 2014: 0.0% (5% water rate increase in 2014)
36-month	2013: 18.2% 2014: 18.2% 2015: 18.5%	2013: 4.9% 2014: 10.9% 2015: 12.1%	2013: 0.0% 2014: 5.3% 2015: 6.4%	2013: 0.0% 2014: 0.2% 2015: 1.3% (5% water rate increase in 2014 and 2015)	2013: 1.9% 2014: 4.2% 2015: 4.7%	2013: 2.7% 2014: 8.9% 2015: 10.1%		2013: 0.0% 2014: 0.0% 2015: 0.0% (5% water rate increase in 2014 and 2015)

¹ All the other resilience tactics presented in the following columns are assumed to be implemented after the use of storage).

² See Appendix Table B11 for sectoral levels.

³ Note that all the resilience adjustments in the previous columns are not additive. When we evaluate the simultaneous effects of implementing all these resilience tactics together, LADWP Phase II Conservation and the 5% additional conservation under the Bay Delta disruptions are first considered to reduce the water constraints after storage use. Next we further reduce the water constraints by taking into consideration the diversion of replenishment water use to other uses. If there are any remaining demand shortages after conservation and replenishment water diversion, water importance factors and production recapture would be applied. However, the calculation indicates that after the use of storage water, conservation, and replenishment water division, there would be zero water constraints. Therefore, the only effect we simulate for the simultaneous case is the 5% water rate increase associated with the 5% incremental conservation.

we use to compute the direct effect of alleviating the disruption by the relevant resilience tactics: conservation, water unimportance, input substitution, recycling, water replenishment and production recapture factors. Table 7 presents the water constraints for all scenarios and sub-cases with the assumption of normal-year hydrological and weather conditions. Extreme year constraint values are presented below.

VI. SIMULATIONS

A. Scenarios

In this study, we examine several major scenarios related to the timing of the disruption, hydrologic conditions, resilience, rationing, pricing, and restoration of service.

Hydrologic Conditions:

The characteristics of our “Reference Case” were developed by MWD, LADWP and others. They are based on a distribution of historical weather/hydrologic conditions and use actual estimated storage levels for January 1, 2012. In addition to the Reference Case, we will also run simulations for extreme dry weather conditions and simulations excluding storage. Comparing the impact results of the Reference Case and the case excluding storage use enables us to evaluate storage as a resilience tactic and to expressly measure the value of storage capacity.

Time Periods:

The time periods for water supply disruptions from the California Aqueduct are 6, 24, and 36 months. We run the model for the appropriate time periods, and report the results on an annual basis. The 24-month disruption is our Reference Case.

Customers Affected:

- All customers (Reference Case)
- Residential customers only

Pricing:

- Price of water free to find its market equilibrium (Reference Case). This allocates water to highest value uses.
- Price of water held constant

Rationing:

- Rationing through pricing. A constraint is placed on overall water use and market responses determine water use (Reference Case)
- Rationing through decree either across the board or for household customers only

Resilience Analysis:

Each of the five operative resilience factors identified in Section IV are simulated individually and together. Note that there are some overlaps between the resilience factors, so that the sum of the

individuals is not equal to them all being implemented at the same time. Our Reference Case includes water storage.

Reconstruction Paths:

- Discrete jump, i.e., the entirety of the Bay Delta damage must be repaired before water is allowed to flow through the California Aqueduct (Reference Case)
- Linear resumption of service

Other Assumptions:

- Limited technological change
- Current water utilization levels
- Current water prices (except in scenarios where the price of water is allowed to vary)
- Use of average rather than marginal water rates (since we are analyzing a major rather than a marginal disruption)
- Absence of dynamic considerations relating to productivity improvements associated with investment losses (due to the disruption) or investment gains (associated with repair and reconstruction)

B. Water Constraint Levels for Various Scenarios

Appendix B presents how we compute the water constraint levels for the Reference Case (the case that includes storage water use) and for the various resilience cases for the three disruption scenarios. In Appendix B tables, we present the retail water shortage in both quantity terms and percentage terms for different scenarios and subcases. The water constraint percentages are summarized in Table 7.

C. Macroeconomic Impact Analysis

We examine the effects of the water supply disruption on major macroeconomic indicators: Net output (Gross Domestic Product for the County), gross output (sales revenue), employment and prices. Note that these are market-based economic indicators of most interest to policymakers. They include impacts on businesses (gross and net output and their share of income) and on households (employment and their share of income). We also compute measures of lost economic welfare (well-being) of households from the loss of utility of decreases in water use, and the reallocation of their spending. This is distinct from the formal GDP accounts and provides a separate perspective from that of households' lost income and employment.

Macroeconomic impacts can be very complex. First, water used by businesses is extensive and goes far beyond the obvious uses in food processing, restaurant drinking and dishwater, and various purification processes. Many businesses use water for cooling and vacuum pumps. Additionally, production creates extensive indirect demands for water upward along successive stages of supply chains. If a firm has to cut back its production because of disruption of its water supply, it will demand fewer inputs. This in turn reduces the production of all of its suppliers, who in turn reduce their orders through a successive round of upstream demands. Moreover, lower production levels at each round translate into lower income payments, which then translate into a further dampening of economic activity from a decrease in consumer and investment spending.

Water disruptions also magnify themselves downstream along successive supply chain stages in a similar manner. The lack of availability of an input will cause its users to reduce their output, even if they have a

very low demand for water in the first place and can make up for the entire shortfall through various resilience tactics. The sum total of all these chain reactions is referred to as multiplier effects when only considering output quantities, as in an I-O model, and general equilibrium effects when both price and quantity responses are taken into account, as in a CGE model (Rose, 1995; Dixon and Rimmer, 2001).

VII. RESULTS

The results of our simulations are contained in the text, tables and figures below, as well in Appendix C. We present them in three groupings: 6-, 24-, and 36-month disruption cases. In each, we present “Reference Case” results and results that include various types of resilience individually and together (see Appendix B for details on resilience adjustments). We also present results of sensitivity tests relating to assumptions about water prices (flexible vs. fixed) and applicability of restrictions on water availability (all sectors vs. residential only). A summary of the characteristics of these alternative scenarios is presented in Table 8. Note that our Reference Case is consistent with Scenario S1A:

- flexible water pricing in the context of market conditions
- aggregate water constraint (no sectoral rationing)
- 24-month disruption
- water storage included, but no other resilience

For disruptions lasting more than one year, we present results for each applicable year, as well as a summary total. Note that the Reference Case results are presented for a recovery path that assumes no incremental repair and reconstruction of the infrastructure damage affecting the flow of water through the California Aqueduct, so that the full outage is felt during the relevant time period, and then the water flow returns to normal at the end of the period. If a linear recovery path is assumed, the impacts would be one-half the size of those reported below.⁶

TABLE 8. LA WATER VULNERABILITY STUDY SIMULATION SCENARIOS

Scenario	Pricing	Rationing
1A	flexible	aggregate; not sectoral
1B*	flexible	household sector only
2A	fixed	aggregate; not sectoral
2B*	fixed	household sector only
3	fixed	equiproportional across sectors
4	fixed	sector constraints mimic S1A water demand

*B refers to the variant where the constraint only applies to households (residential customers).

⁶ The “one-half” adjustment stems from the geometry of comparing the rectangular shape of the “full outage until repaired” path with the triangular path of the linear resumption of services path.

A. Reference Case

1. 24-Month Disruption Reference Case

Our main case is the 24-Month Disruption. In this disruption scenario, LA County would lose over 300,000 AF of imported water from the State Water Project each of 2013 and 2014. Aggregate results for Year 2013 are presented in Table S1A/'13,⁷ and sectoral results presented in Appendix C. The results in each table pertain to impacts on Gross Domestic Product (GDP), employment, welfare (well-being), and prices.

The first case presented in Table S1A/'13 is for a 24-month Bay Delta Disruption of California Aqueduct Water supplies if there were *no water storage*. The disruption level for this case would be a reduction of water availability of 18.2 percent. Of course, this is a stylized case because stored water (both surface reservoirs and underground), does exist and is available whether there is a disruption or not. We run this simulation to compare to the Reference Case below to gauge the value of ground water and reservoir water holdings in LA County. In effect, they are a source of inherent resilience, i.e., they are already built into the system.

Our Reference Case results for the 24-Month Disruption are presented in the second row of Table S1A/'13. Allowing for *storage* reduces the water supply disruption level to 4.9 percent in the Year 2013. Running this simulation through our computable general equilibrium (CGE) model yields estimates of a 4.19 percent decrease in GDP and a 4.03 percent decrease in employment. This represents a loss of \$23.1 billion in GDP and 228.1 thousand jobs in 2013. The change in the market equilibrium price of water is projected to be 12.39 percent, stemming from the increased water scarcity. The change in the overall price level in the economy, however, would be only 0.04 percent (see Appendix C tables), owing to the fact that water is only a small proportion of production costs in most sectors and because the decline in overall economic activity places downward pressure on prices. Note that if we do not include the 12.39% increase in the price of water, the economy-wide price increase averages only 0.01 percent.

We can now compare the results in rows 1 and 2 of Table S1A/'13 to gauge the value of stored water, which is essentially the difference in the results of the two scenarios. First, the existence of groundwater and reservoir water reduces the potential disruption level from 18.2 to 4.9 percent. This has the effect of reducing the estimated decline in GDP from \$88.6 billion to \$23.1 billion, or a saving of \$65.5 billion due to water storage. On the employment side, the existence of storage reduces the potential loss from 876.2 thousand jobs to 228.1 thousand jobs, or a savings of 648.1 thousand jobs. Thus, overall water storage is the major source of resilience in the LA County water system.

Table S1A/'13 does not list *conservation* as a resilience option. Due to recent drought conditions Phase II conservation is already in place. There are also more intense phases of conservation in case of emergency such as the Bay Delta disruption of the California Aqueduct supply. Both of these cases would reduce demand for water sufficiently to offset the potential supply disruption. This means that there are no negative economic impacts if conservation practices are put into place in 2013 for our Reference Case. We should note, however, that this overall economic finding is based on the assumption that water conservation pays for itself. For example, any increase in expense from using less water is offset entirely from the reduced expenditure of water. If conservation involves some net expense, then there will be a negative impact, though likely far smaller than those presented for our Reference Case. Also, going to the enhanced version of Phase II conservation assumes a 5% increase in water prices.

⁷ The notation refers to Scenario number/year.

Taking into consideration *water unimportance*, the fact that certain sectors can operate to some extent without water, the water supply disruption level is reduced to 1.9 percent. This yields a projected decline in GDP of only 1.64 percent and the decline of employment of only 1.58 percent. The projected water price increase would be only 4.62 percent.

Diversion of replenishment use of water as a resilience tactic would decrease the Reference Case water supply constraint from 4.9 percent to 2.7 percent. This would result in a GDP percentage change of 2.3 percent and an employment change of 2.2 percent. The water price change would be 6.63 percent.

Note that *production recapture* is not relevant in the 24-month disruption because, by the time water is restored customers for the goods that could not be delivered have shifted to other suppliers. This tactic is only relevant to the 6-month disruption.

The simultaneous application of all applicable forms of resilience would also overcome the disruption.

The water price changes are presented in Figures S1A/'13 and '14. Results indicate the beginning of an exponential trend in water prices and hence value, as the severity of the disruption increases. The 55.91 percent increase in prices associated with the no water storage case might be an untenable outcome. This might warrant some capping of price increases or even keeping water prices at a pre-disruption level. Of course, such interference with the market can lead to inefficiencies and cause even greater declines in GDP and employment. Here, policymakers are faced with an important equity-efficiency tradeoff. The preferred solution to most economists is to let prices adjust freely in order to represent the value of scarce water and hence provide the best signal for their efficient allocation, and then taking any concerns for the well-being of lower income groups into account by providing them with subsidies or rebates. However, this equity-efficiency tradeoffs are likely to be moot from the results of our analysis, because the fixed-price policies would yield lower negative impacts than the flexible-price policies.

Sectoral impacts of the Reference Case for Year 2013 are presented in Appendix C, Table S1A2/'13/Sectoral. First, water demand levels are projected to vary by sector. They are not exactly 4.9 percent for all but the Water Utilities sector. Some sectors decrease their demand for water even more than 4.9 percent due to a combination of decreases in the demand for their products and the ability to substitute away from higher priced water without a great cost penalty in doing so. The sectors with the greatest percentage changes in water use are Agriculture, Mineral/Metal Processing, Motion Picture and Manufacturing. The sectors with the lowest percentage reductions are Schools, Government, Colleges/Universities, and three Medical sectors. Similarly, GDP and employment impacts vary by sector. Sectors that have a relatively high demand for water per unit of output and for which it is difficult to substitute away from water will tend to suffer greater production declines than other sectors. Thus, the sectors with the largest economic losses are the ones mentioned above that decrease their water use the most. The final column of Appendix C, Table S1A2/'13/Sectoral includes sectoral price changes. The output price change for the Water sector is 12.39 percent. Price changes in the various sectors vary, again depending on the relative water intensity of production and changes in demand for their output. The sectoral price changes range from -0.02 to 0.08 percent. Again, the aggregate price level in the economy is estimated to change at a level of only 0.04 percent.

Simulations similar to those for Year 2013 are performed for 2014 as well and are presented in Table S1A/'14. The main distinction is that the reduction of water availability for the Reference Case rises from 4.9 to 10.87 percent, owing to the reduction in stored water, which now makes additional conservation operative. The impacts for this and other cases in the table increase accordingly. With respect to GDP and employment impacts, they increase linearly, in aggregate and sectoral terms, with the increase in the severity of the constraint. However, the price increase begins a slightly exponential trend. The sectoral impacts for Year 2014 are presented in Appendix C, Table S1A2/'14/Sectoral.

Table S1A/13. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, with and without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2013

Case Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
No Water Storage	18.2	-16.10	-15.48	55.91	-14.72
Storage (Reference Case)	4.9	-4.19	-4.03	12.39	-3.83
Water Unimportance	1.9	-1.64	-1.58	4.62	-1.47
Diversion of Replenishment Use	2.7	-2.30	-2.21	6.63	-2.10
Production Recapture	n.a.	n.a.	n.a.	n.a.	n.a.
Simultaneous Resilience	0	0	0	0	0

Table S1A/14. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, with and without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2014

Case Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
No Water Storage	18.2	-16.09	-15.46	55.85	-14.71
Storage (Reference Case)	10.9	-9.44	-9.08	29.89	-8.63
Phase II Conservation	5.3	-4.52	-4.35	13.43	-4.14
Phase II Conservation Plus	0.2	-0.17	-0.17	0.48	-0.15
Water Unimportance	4.2	-3.62	-3.49	10.43	-3.25
Diversion of Replenishment Use	8.8	-7.64	-7.34	23.61	-6.98
Production Recapture	n.a.	n.a.	n.a.	n.a.	n.a.
Simultaneous Resilience	0	0	0	0	0

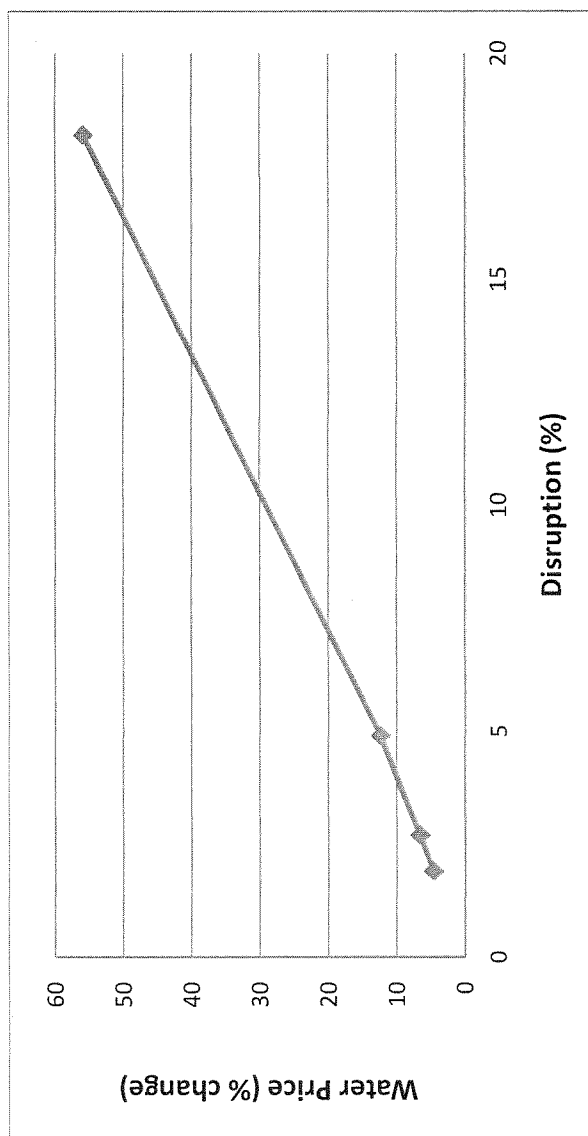


Figure S1A/13. Price Impacts of Water Supply Disruptions
on the LA County Economy (flexible price), 2013

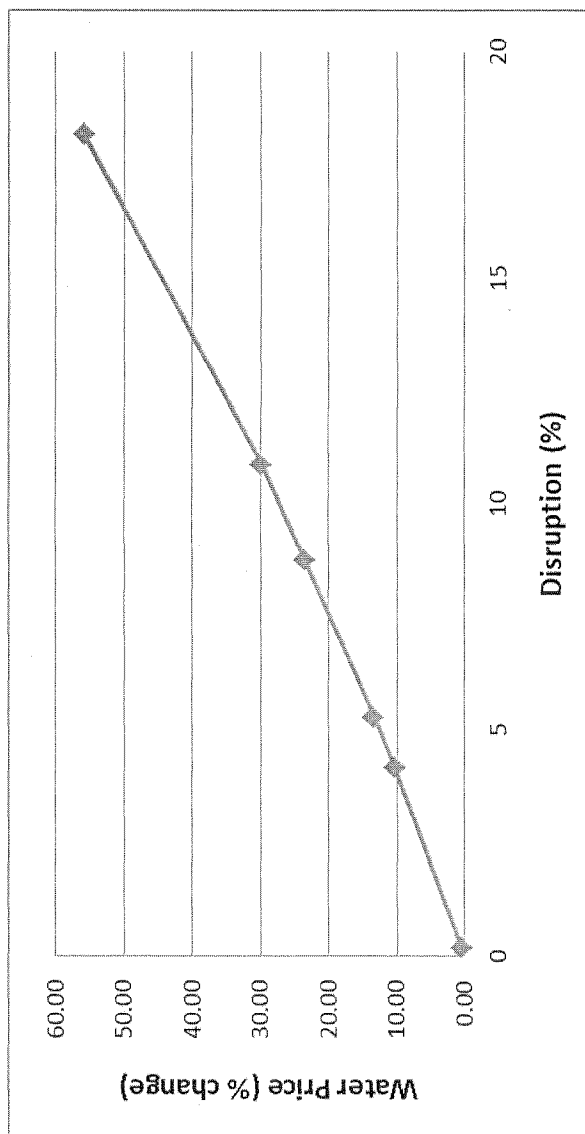


Figure S1A/'14. Price Impacts of Water Supply Disruptions
on the LA County Economy (flexible price), 2014

Totals for the 24-month case are presented in Table S1A/'13 & '14 in percentage terms and Table S1AL/'13 & '14 in terms of levels of change. The negative impacts for a 24-month shutdown could be as large as \$75 billion in GDP and nearly 750 thousand job-years of employment.

Note that these results represent an upper bound on the impacts because they do not take resilience into account aside from the built-in resilience of water storage. On the other hand, the sum total of all possible resilience factors could possibly reduce losses to zero in Year 2013 and to very small amounts in 2014.⁸ However, this assumes all resilience tactics will be implemented to their maximum extent. The likely impact will fall somewhere in-between, depending on the effectiveness of resilience.

2. 6-Month Disruption Case

For the 6-Month Case, the Reference Case water disruption level is at a much smaller constraint level of 0.24 percent, owing to the greater ability of the water system to adjust and for the fact that the disruption covers only half of one year (see Table B3). Any minimal amount of resilience is likely to bring the economic impacts to zero. At the same time, if stored water were not available, the negative impacts would be almost as high as those for the 24-month Reference Case (with storage) for 2013.

3. 36-Month Disruption Case

The first two years of this case are essentially the same as for the 24-Month Case. The third year, however, is likely to yield more negative impacts since the constraint increases from 10.9 to 12.1 percent and because most types of resilience will not be as effective because of the longer duration. The results of this case are presented in Table S1A/'13 & '14 & '15 in percentage terms and Table S1AL/'13 & '14 & '15 in terms of levels of change. The negative impacts for a 36-month shutdown could be as large as \$133 billion in GDP and over 1.3 million job-years of employment.

B. Alternative Rationing and Pricing Strategies

In coping with the disruption, water service agencies have some policy tools they can use to attain alternative objectives such as keeping regional economic losses to a minimum, easing the administrative burden, or promoting fairness. For example, the price of water can be held constant or allowed to reach its market equilibrium, where prices are considered to reflect the true value of this key resource that has now become even more scarce. Holding the price constant is administratively easier and will help avoid significant market price increases that will have disproportionately greater impacts on small businesses and lower income groups. On the other hand, letting the price of water achieve its market equilibrium will lead to a more efficient allocation of water resources, as well as other resources in a general equilibrium sense, and will likely reduce overall negative economic impacts, all other things being equal.

Similarly, the manner of water rationing can attain alternative objectives. Confining the disruption to residential household demand is likely to minimize the negative impacts on typical economic indicators such as GDP and employment. Otherwise, requiring equaproportional cutbacks in water demand is considered to be more fair, but, all other things equal, more likely to lead to more negative impacts than if

⁸ In the simultaneous resilience simulation, although the water disruption is potentially zero, moving to the enhanced version of Phase II conservation assumes a 5% increase in water prices. However, since in the Reference Case, it is assumed that the water price is free to find its market equilibrium, a 5% water rate increase on the input side would not result in any impacts on the equilibrium water price on the output side, and thus does not have any impacts on the economy. Note that an increase in the water rate will affect its equilibrium price if it is applied to cases where the price of water is assumed to be fixed.

Table S1A/'13 & '14. Total Two-Year Impacts of Water Supply Disruptions on the LA County Economy without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2013-14 (percentage changes)

Case Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
Storage (Reference Case): Year 2013	4.9	-4.19	-4.03	12.39	-3.83
Storage (Reference Case): Year 2014	10.9	-9.44	-9.08	29.89	-8.63
Storage (Reference Case): Weighted Avg	n.a.	-6.84	-6.57	n.a.	n.a.

Table S1AL/'13 & '14. Total Two-Year Impacts of Water Supply Disruptions on the LA County Economy without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2013-14 (changes in levels)

Case Description	Disruption Level (% change)	GDP (change) (B 2013\$)	Employment (change) (job-years)	Water Price (% change)	Welfare (B 2013\$)
Storage (Reference Case): Year 2013	4.9	-23.08	-228,125	12.39	-17.83
Storage (Reference Case): Year 2014	10.9	-51.99	-513,910	29.89	-40.18
Storage (Reference Case): Total	n.a.	-75.07	-742,035	n.a.	n.a.

Table S1A/'13 & '14 & '15. Total Annual Impacts of Water Supply Disruptions on the LA County Economy without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2013-15 (percentage changes)

Case Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
Storage (Reference Case): Year 2013	4.9	-4.19	-4.03	12.39	-3.83
Storage (Reference Case): Year 2014	10.9	-9.44	-9.08	29.89	-8.63
Storage (Reference Case): Year 2015	12.1	-10.52	-10.11	33.80	-9.62
Storage (Reference Case): Weighted Avg	n.a.	-8.09	-7.77	n.a.	n.a.

Table S1A/'13 & '14 & '15. Total Annual Impacts of Water Supply Disruptions on the LA County Economy without Resilience (Reference Case: Flexible Price and Economy-Wide Rationing), 2013-15 (changes in levels)

Case Description	Disruption Level (% change)	GDP (B 2013\$)	Employment (job-years)	Water Price (% change)	Welfare (B 2013\$)
Storage (Reference Case): Year 2013	4.9	-23.08	-228,125	12.39	-17.83
Storage (Reference Case): Year 2014	10.9	-51.99	-513,910	29.89	-40.18
Storage (Reference Case): Year 2015	12.1	-57.93	-572,669	33.80	-44.77
Storage (Reference Case): Total	n.a.	-133.00	-1,314,704	n.a.	n.a.

the market rations the disruption through pricing in response to an overall constraint on water availability. In this analysis we simulate the various combinations of water pricing and rationing presented in Table 8.

The results of our alternative pricing/constraint simulations are presented in Tables 9 and 10 for the Year 2013. We present eight simulations, but with each referring to the Reference Case (water disruption with access to MWD and LADWP water storage) for the 24-month scenario.

The initial Scenario S1A consists of a flexible (market) price and general supply-side constraint, with no sector-specific rationing. It is presented in the first row of Table 9, and simply repeats our previous Reference Case for the Year 2013. In comparison Scenario S2A keeps the price of water constant with the general constraint. The reader will note that the GDP and employment impacts for this scenario are actually lower than those for Scenario S1A, owing primarily to the direct and indirect stimulus effect of muting any price increase outweighing the resource misallocation effect of not letting the water price attain its market equilibrium. From Table 10, we see that this can translate into a saving of nearly \$10 billion in GDP and 90,000 jobs in the Year 2013 in comparison with Scenario S1A.

The greatest reduction in losses can be attained if the disruption is limited to the residential (household) sector only. In this instance, Scenario 1B (flexible price) outperforms Scenario 2B (fixed price), though in both cases, the overall GDP and employment changes are less than one percent. Scenario 1B represents more than a ninety percent improvement over the negative impacts of our Reference Case Scenario (1A). Note, however, that the results measure only market economic indicators, and do not include the fact that a large amount of inconvenience is shifted to the residential sector.

Aside from a general overall constraint, there are two other possibilities. Scenario S3 presents the results for equaproportional, or across-the-board, rationing among all sectors (including government and households), and yields a percentage decline in GDP of 2.20 percent and a decline in employment of 2.11 percent in the Year 2013. Both of these are just slightly more than half of their values for the Reference Case Scenario (1A). Another popular alternative is to keep the price of water constant, but to mimic the rationing of the market solution in S1A. This simulation is presented as S4, and yields slightly more negative results than S3. The reason is that the equaproportional case shifts more of the burden to government and households, where the latter does not show up in the economic accounts.

Counterparts to S3 and S4 for the case of flexible water pricing are not presented. The case of flexible pricing and rationing that mimics the market solution of S1A, of course, yields identical results to S1A. The case of equaproportional rationing and flexible water pricing constrains our model to the point that it cannot yield a unique solution. However, this is not likely to be a serious case for policy discussion, because equaproportional rationing defeats the purpose of allowing prices to reach their market equilibrium.

Note that the policy combination of fixed water price and general constraint of S2A makes it very attractive, in that it provides a lower negative economic impact, while likely being more equitable than S1A. Scenarios S1B and S2B are also relatively more attractive on the surface because they are projected to result in the lowest negative impacts on GDP and employment. However, this must be balanced against potential complaints from residential customers on whom the entire burden is imposed.

C. Alternative Hydrological Conditions

We also evaluate the effects of alternative hydrological conditions over the 2013-2015 simulation periods on the impacts of water supply disruption. For the normal-year cases presented in Section VII.A., MWD model runs are performed for 83 individual hydrological sequences extracted from the historical

Table 9. Total Annual Impacts of Water Supply Disruptions on the LA County Economy for Alternative Water Pricing and Rationing Scenarios (percentage changes), 2013

Scenario Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
S1A - Storage (Reference Case) flexible price/general constraint	4.9	-4.19	-4.03	12.39	-3.83
S2A - Storage (Reference Case) fixed price/general constraint	4.9	-2.44	-2.34	0.00	-2.23
S1B - Storage (Reference Case) flexible price/HH only constraint	4.9	-0.39	-0.40	-1.14	-0.32
S2B - Storage (Reference Case) fixed price/HH only constraint	4.9	-0.73	-0.72	0.00	-0.62
S3 - Storage (Reference Case) fixed price/equaproportional	4.9	-2.20	-2.11	0.00	-2.02
S4 - Storage (Reference Case) fixed price/mimic S1A	4.9	-2.72	-2.61	0.00	-2.44

Table 10. Total Annual Impacts of Water Supply Disruptions on the LA County Economy for Alternative Water Pricing and Rationing Scenarios (changes in levels), 2013

Scenario Description	Disruption Level (% change)	GDP (B 2013\$)	Employment (job-years)	Welfare (B 2013\$)
S1A - Storage (Reference Case) flexible price/general constraint	4.9	-23.08	-228,125	-17.83
S2A - Storage (Reference Case) fixed price/general constraint	4.9	-13.43	-132,529	-10.38
S1B - Storage (Reference Case) flexible price/HH only constraint	4.9	-2.17	-22,649	-1.48
S2B - Storage (Reference Case) fixed price/HH only constraint	4.9	-4.02	-40,877	-2.90
S3 - Storage (Reference Case) fixed price/equaproportional	4.9	-12.12	-119,691	-9.39
S4 - Storage (Reference Case) fixed price/mimic S1A	4.9	-14.98	-147,925	-11.37

hydrological data for the period 1922-2004. Then the average water constraint levels during the disruption years are computed based on the results of the 83 individual runs. For the sensitivity analysis on hydrological conditions, MWD model results for two runs assuming extended dry periods for 2013-2015 are used: 1) severe hydrologic condition case, which assumes 1989-1991 hydrological conditions (the single worst 3-year hydrology trace or sequence) applies to 2013-2015; and 2) moderately unfavorable hydrologic condition, which assumes 1976-1978 hydrological conditions, representing a tenth percentile worst hydrology trace or sequence, apply to 2013-2015.

These alternative hydrological conditions are translated into water disruption constraints for our model in Table 11. Effectively they more than double the previous 4.9 percent Reference Case constraint for Year 2013. Their economic impacts are presented in Tables 13 to 16. For the Year 2013, the moderate and severe cases result in price increases of 29 and 32 percent, respectively. The GDP declines are projected at 9.37 percent and 10.10 percent, respectively, and the employment declines only slightly lower. However, it is very important to note that at these higher water constraint levels, even the application of all resilience tactics will not eliminate the disruption. Referring to Table 11, the constraint in Year 2014 would still be 1.4 percent for the moderately severe case and 3.5 percent for the severe case. This means that for the latter, the negative impacts will be more than two-thirds of the Reference Case impacts, or a loss of \$35 billion of GDP and 350,000 job-years.

In addition, all of the scenarios we analyze (both those presented in Section VII.A. and the ones with alternative assumptions on hydrological conditions) use the actual level of 2012 MWD storage in the Reference Case analysis. The actual 2012 storage levels could be described as “good,” but definitely not full (maximum). With full initial storage conditions, it is likely that all of the shortage impacts would be eliminated for the Reference Case for the assumption of normal-year hydrological conditions. On the other hand, the additional scenarios that did not include the use of storage water, are effectively the same as having zero storage in the event of the disruption. A scenario with “low” initial storage levels would fall somewhere between these two cases—the Reference Case and the case of zero storage. A comparison of cases of zero water storage and our Reference Case for 6-, 24- and 36-month scenarios are presented in Table 12 for the Year 2013. Looking at the 24-month case, the disruption level for no storage, and no other types of resilience, are nearly four times greater than the storage case and thus so are the results for the GDP and employment. If stored water were not available, the negative impacts for even the 6-month disruption would be almost as high as those for the Reference Case (with storage) for 2013. For the 24-month case, the price increase is projected to be more than four times as great, at a level of 55.91 percent. Even if water rates are held constant this price still provides an indication of the value of water under extreme scarcity.

Again, overall the results for our model show a roughly linear relationship between water disruption levels and impacts on GDP, employment and welfare over the relevant range of our analysis. Hence the reader can readily use our Reference Case results as a base and make some quick calculations of impacts for disruption levels deemed to be appropriate for other types of considerations.

Table 11. Water Constraints for Alternative Hydrologic Condition Cases, with and without Resilience, 24-month Disruption Scenario, 2013 and 2014

Case Description	Water Constraint (%)					
	Normal-Year Case		Moderately Unfavorable Hydrologic Condition Case		Severe Hydrologic Condition Case	
	2013	2014	2013	2014	2013	2014
No Water Storage	18.2	18.2	24.6	23.2	27.8	29.8
Storage (Reference Case)	4.9	10.9	10.6	16.0	11.4	21.2
Phase II Conservation	0	5.3	5.2	10.4	6.1	15.8
Phase II Conservation Plus	0	0.2	0.2	5.3	1.1	10.8
Water Unimportance	1.9	4.2	4.1	6.1	4.4	8.1
Diversion of Replenishment Use	2.7	8.8	8.4	13.9	9.3	19.3
Production Recapture	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Simultaneous Resilience	0	0	0	1.4	0	3.5

Table 12. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, with and without Storage (Reference Case: Flexible Price and Economy-Wide Rationing), 2013

Case Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)	Welfare (% change)
No Storage (6-month)	4.35	-3.79	-3.64	10.92	-3.40
Storage (6-month)	0.24	-0.20	-0.19	0.57	-0.19
No Storage (24-month)	18.2	-16.10	-15.48	55.91	-14.72
Storage (24-month)	4.9	-4.19	-4.03	12.39	-3.83
No Storage (36-month)	18.2	-16.10	-15.48	55.91	-14.72
Storage (36-month)	4.9	-4.19	-4.03	12.39	-3.83

Table 13. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, Alternative Hydrological Conditions (percentage changes), 2013

Scenario Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)
Normal-year hydrologic condition (Reference Case) flexible price/general constraint	4.9	-4.19	-4.03	12.39
Moderately unfavorable hydrologic condition (Reference Case) flexible price/general constraint	10.6	-9.37	-9.02	29.03
Severe hydrologic condition (Reference Case) flexible price/general constraint	11.4	-10.10	-9.72	31.59

Table 14. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, Alternative Hydrological Conditions (percentage changes), 2014

Scenario Description	Disruption Level (% change)	GDP (% change)	Employment (% change)	Water Price (% change)
Normal-year hydrologic condition (Reference Case) flexible price/general constraint	10.9	-9.44	-9.08	29.89
Moderately unfavorable hydrologic condition (Reference Case) flexible price/general constraint	16.0	-14.30	-13.75	47.31
Severe hydrologic condition (Reference Case) flexible price/general constraint	21.2	-19.28	-18.55	68.50

Table 15. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, Alternative Hydrological Conditions (level change), 2013

Scenario Description	Disruption Level (% change)	GDP (B 2013\$)	Employment (job-years)	Water Price (% change)
Normal-year hydrologic condition (Reference Case) flexible price/general constraint	4.9	-23.08	-228,125	12.39
Moderately unfavorable hydrologic condition (Reference Case) flexible price/general constraint	10.6	-51.61	-510,549	29.03
Severe hydrologic condition (Reference Case) flexible price/general constraint	11.4	-55.62	-550,197	31.59

Table 16. Total Annual Impacts of Water Supply Disruptions on the LA County Economy, Alternative Hydrological Conditions (level change), 2014

Scenario Description	Disruption Level (% change)	GDP (B 2013\$)	Employment (job-years)	Water Price (% change)
Normal-year hydrologic condition (Reference Case) flexible price/general constraint	10.9	-51.99	-513,910	29.89
Moderately unfavorable hydrologic condition (Reference Case) flexible price/general constraint	16.0	-78.71	-778,703	47.31
Severe hydrologic condition (Reference Case) flexible price/general constraint	21.2	-106.14	-1,050,233	68.50

VIII. CONCLUSIONS

This study provides a range of estimates for the economic impacts of a disruption of the California Aqueduct on the Los Angeles County economy. A range is needed to account for the variability and the key assumptions and parameters related to weather, hydrology, recovery patterns and the effectiveness of resilience.

For a 24-month total disruption of the California Aqueduct, Los Angeles County would have an expected shortage of 4.9 percent in 2013 and a 10.9 percent in 2014 given current levels in storage and a historical range of potential hydrologic and climatic conditions. This shortage would increase to 10.6 and 16.0 percent under moderately unfavorable hydrologic and climatic conditions and to 11.4 and 21.2 percent under severe hydrologic and climatic conditions. The absence of storage would increase the shortage to nearly 30 percent by 2014 under the worst case scenario.

The basic conclusions of the study are:

- The 6-month shutdown of the California Aqueduct in normal years relating to weather and hydrology conditions and reasonable levels of resilience, primarily conservation and production recapture, will result in no negative economic impacts.
- For the Reference Case (flexible water pricing, economy-wide constraint and use of storage water), a 24-month shutdown of the California Aqueduct could lead to a total two-year loss of 742,000 job-years of employment, \$75 billion of GDP, and \$135 billion of sales revenue for businesses in LA County. Reasonable levels of several types of resilience could reduce this outcome significantly.
- Under the most adverse hydrological conditions, the negative impacts for a 24-month shutdown could be as large as \$160 billion of GDP and 1.6 million job-years of employment.
- For the Reference Case, a 36-month shutdown of the California Aqueduct could lead to employment losses of 1,315,000 job-years, GDP losses of \$133 billion, and total revenue losses of \$240 billion over the three years. Even with a major resilience effort, the losses would likely be in the tens of thousands of job-years and tens of billions of losses in GDP and sales revenue.
- The negative impacts of the supply disruptions analyzed would be half the size of those noted above if the restoration of California Aqueduct supplies were to proceed incrementally in a linear fashion, rather than the Reference Case assumption that no water would flow from it to LA County until the Bay Area levee system was repaired.
- The negative impacts of the supply disruptions could be reduced significantly if water prices were held constant during the disruption.
- The results of the study are sensitive to water pricing policies. For the Reference Case, losses in GDP and employment can be reduced by more than 40 percent if the price of water is held constant at its pre-disaster level, as opposed to allowing it to reach its market equilibrium of a 12.39 percent increase.
- Existing water storage is able to mute the potential impacts considerably. Maximum potential losses would be doubled for the 24-month and 36-month scenarios with zero storage, and even more in the cases of adverse hydrological conditions, such as extreme dry years.
- Resilience tactics other than water storage can reduce losses considerably if implemented close to their maximum potential. This includes conservation, water unimportance, diversion of replenishment water for other uses, and production recapture. Under adverse hydrological

conditions, however, even the full implementation of these tactics would still result in GDP losses in the tens of billions of dollars and employment losses in the tens of thousands of job-years. Moreover, these factors have limited capability to deal with the consequences of a catastrophic scenario during an extended drought period.

- The results of the study are sensitive to the applicability of water restrictions. For the Reference Case, including allowing the price of water to reach its market equilibrium value, losses in GDP and employment can be decreased by more than 90 percent if water use restrictions are imposed on residential customers alone, as opposed to being spread across a combination of businesses and households. For the case where the price of water is held constant at its pre-disaster level, this reduction in losses is around 70 percent.
- Los Angeles County can become less vulnerable to water disruptions in two major ways. One is to have the major federal-state initiative to improve the Bay Area conveyance system to make it more capable of withstanding a major earthquake. The ongoing Bay Delta Conservation Plan process is proposing such an improvement. The other way is to continue to invest in storage and alternative water supply systems. For example, Orange County recently commissioned the building of a small desalination plant. In addition to existing approaches to the problem, and the potential of both inherent and adaptive resilience, LA County also needs to consider a broad range of alternatives. At the same time, water agencies in LA County should continue to be vigilant in protecting their groundwater and reservoir supplies. Overall, the key to maintaining water reliability is a diverse portfolio of water supply sources.

REFERENCES

- Berkeley Economic Consulting (BEC). 2010. *Urban Losses from Earthquake-Induced Water Supply Disruption in the San Francisco Bay/Sacramento- San Joaquin Delta Estuary*. Berkeley, CA.
- Dixon, P., and M. Rimmer. 2002. *Dynamic General Equilibrium Modelling for Forecasting and Policy: a Practical Guide and Documentation of MONASH*. Amsterdam: North-Holland.
- Federal Emergency Management Agency (FEMA). 2012. *Earthquake Loss Estimation Methodology (HAZUS)*. Washington, DC: National Institute of Building Sciences.
- Kajatani, Y., and H., Tatano, . 2007. "Estimation of Lifeline Resilience Factors Based on Empirical Surveys of Japanese Industries." *Earthquake Spectra* 25(4): 755-76.
- Kleinhenz, R., K. Ritter-Martinez, F. Guerra, and R. De Anda. 2012. *2012-2013 Mid-Year Economic Forecast and Industry Outlook: California and Southern California Including the National and International Setting*. Kyser Center for Economic Research, Los Angeles County Economic Development Corporation.
- Minnesota IMPLAN Group (MIG). 2012. "California Economic Accounts Data," Stillwater, MN.
- Orange County Business Council (OCBC). 2003. *Determining the Value of Water Supply Reliability in Orange County, California*, Irvine, CA.
- Partridge, M., and D. Rickman, 2010. "CGE Modelling for Regional Economic Development Analysis," *Regional Studies* 44: 1311–1328.
- Rose, A. 1995. "Input-Output Economics and Computable General Equilibrium Models," *Structural Change and Economic Dynamics* 6: 295–304.
- Rose, A., 2005. Analyzing Terrorist Threats to the Economy: A Computable General Equilibrium Approach, in P. Gordon, J. Moore, and H. Richardson (eds.), *Economic Impacts of a Terrorist Attack*, Cheltenham, UK: Edward Elgar Publishing Company.
- Rose, A. 2009. *Economic Resilience to Disasters*, Community and Regional Resilience Institute Report No. 8, Oak Ridge, TN.
- Rose, A., and D. Lim, 2002. Business Interruption Losses from Natural Hazards: Conceptual and Methodology Issues in the Case of the Northridge Earthquake, *Environmental Hazards* 4: 1-14.
- Rose, A. and S. Liao. 2005. "Modeling Resilience to Disasters: Computable General Equilibrium Analysis of a Water Service Disruption," *Journal of Regional Science* 45(1): 75–112.
- Rose, A., G. Oladosu, , and S. Liao, 2007. "Business Interruption Impacts of a Terrorist Attack on the Electric Power System of Los Angeles: Customer Resilience to a Total Blackout," *Risk Analysis* 27: 513-31.
- Rose, A., S. Liao and A. Bonneau. 2011a. "Regional Economic Impacts of a Verdugo Earthquake Disruption of Los Angeles Water Supplies: A Computable General Equilibrium Analysis," *Earthquake Spectra* 27(3): 881-906.
- Rose, A., D. Wei, and A. Wein. 2011b. "Economic Impacts of the ShakeOut Scenario," *Earthquake Spectra: Special Issue on the ShakeOut Earthquake Scenario* 27(2): 539-57.
- Sue Wing, I., A. Rose and A. Wein. 2011. *Economic Impacts of the ARkStorm Scenario*. Final Report to the U.S. Geological Survey.
- Tierney, K. 1997. "Impacts of Recent Disasters on Businesses: The 1993 Midwest Floods and the 1994 Northridge Earthquake," in B. Jones (ed.), *Economic Consequences of Earthquakes: Preparing for the Unexpected*. Buffalo, NY: National Center for Earthquake Engineering Research.

Appendix A. LA County Water Account and I-O Table Modification

I. Construction of LA County Water Account

We have obtained water supply and demand data from Metropolitan Water District (MWD) and Los Angeles Department of Water and Power (LADWP). Data on water storage, ground water, and conservation (from MWD for the baseline condition) are incorporated as well.

The following steps and assumptions are used to put together the water service account (please refer to Table A1 for more details):

- a. LADWP Water Service Account:
 - i. A sample of FY 2010/2011 water demand data (in Acre Feet, AF) by 4-digit SIC sector for Los Angeles City are obtained from LADWP. These 4-digit SIC data are translated to the 29 CGE sectors.
 - ii. Sectoral weights for LA City for the 29 CGE model sectors are computed based on the data in step a.i. Weights are calculated separately for the Industrial sector and the Commercial sector based on the step a.i. data.
 - iii. We applied the weights calculated in Step a.ii to the MWD forecast data on sectoral water demand (our control totals) for Year 2013 for City of LA to get the Acre Feet water demand for each CGE sector.
 - iv. Projected retail water rates (prices) for 2012/13 (see the detailed calculation in Table 4)) are used to convert the demand in Acre Feet to million dollars. For Ag sectors, the Industrial water rate is used.
- b. MWD (excluding LADWP) Water Service Account:
 - i. The 2013 Base Case projected non-residential water demand (in Acre Feet) is disaggregated among CGE producing sectors using the weights computed based on the LADWP SIC data.
 - ii. Sectoral water demand calculated in step b.i is adjusted for water efficiency (i.e., baseline water use efficiency to achieve 20x2020) based on the data provided by MWD.
 - iii. Projected LADWP water rates (prices) data for 2012/13 are used to convert water demand by sector in Acre Feet to million dollar values. For Ag sectors, the Industrial water rate is used again.
- c. LA County Total Water Service Account (total retail sales):
 - i. County totals are derived as the sum of LADWP and residual MWD (excluding LADWP) Demand. The Water sector control total is \$3.106 billion, which represents the total production/sales of LA County retail water deliveries.
- d. Domestic import of water:
 - i. We consider water delivered by MWD and related sources to be domestic imports (from elsewhere in California and the rest of the U.S.) into the County. The value of domestic water import is calculated to be \$1.54 billion using the projected Full Service Treated wholesale price for Year 2013 obtained from MWD.

Table A1. Calculation of the LA County Water Service Account (Year 2013)

#	CGE Sector	IMPLAN Sector	LADWP		Demand (M\$) ³	Weights for MWD ⁴	MWD (Excluding LADWP)		Demand After Conservation (M\$) ⁷	County Total
			Water Demand (AF) ¹	Weights for LADWP ²			Demand (AF) ⁵	Conservation (AF) ⁶		
1	ag	agriculture--annual crops	23.41	0%	\$0.06	4%	15.83	15.21	\$0.03	\$0.08
2	ag	agriculture--perennial crops	47.77	0%	\$0.11	8%	32.29	31.04	\$0.06	\$0.17
3	ag	agriculture--other	543.55	2%	\$1.28	88%	367.42	353.16	\$0.64	\$1.92
4	mp	metals + minerals processing (incl mining)	1,253.66	4%	\$2.95	1%	3,402.92	3,270.83	\$5.97	\$8.92
5	ele	electric power	1,222.28	4%	\$2.88	1%	3,317.74	3,188.95	\$5.82	\$8.70
6	wat	water and wastewater utilities	867.98	3%	\$2.04	1%	2,356.03	2,264.57	\$4.14	\$6.18
7	cons	construction	1,342.56	5%	\$3.16	1%	3,644.24	3,502.78	\$6.40	\$9.56
8	fdc	food + drugs + chemicals	18,095.39	62%	\$42.59	15%	49,118.05	47,211.38	\$86.21	\$128.80
9	lin	light industry	3,684.12	13%	\$8.67	3%	10,000.15	9,611.96	\$17.55	\$26.22
10	hin	heavy industry	1,196.97	4%	\$2.82	1%	3,249.05	3,122.93	\$5.70	\$8.52
11	hlt	high tech industry	1,090.53	4%	\$2.57	1%	2,960.14	2,845.23	\$5.20	\$7.76
12	wst	wholesale trade	2,386.60	3%	\$9.50	2%	6,478.18	6,226.70	\$11.19	\$20.70
13	ret	retail trade	14,932.22	16%	\$59.46	12%	40,531.94	38,958.56	\$70.04	\$129.50
14	pts	professional + technical services	8,362.61	9%	\$33.30	7%	22,699.42	21,818.27	\$39.22	\$72.52
15	mpv	motion picture + video	2,011.47	2%	\$8.01	2%	5,459.93	5,247.99	\$9.43	\$17.44
16	enr	entertainment + recreation	9,570.33	10%	\$38.11	8%	25,977.66	24,969.25	\$44.89	\$83.00
17	teo	telecommunications	419.49	0%	\$1.67	0%	1,138.67	1,094.47	\$1.97	\$3.64
18	bfi	banking + finance	1,495.70	2%	\$5.96	1%	4,059.91	3,902.31	\$7.02	\$12.97
19	res	real estate	15,012.39	16%	\$59.78	12%	40,749.55	39,167.73	\$70.41	\$130.19
20	sch	schools + libraries	5,834.57	6%	\$23.23	5%	15,837.32	15,222.55	\$27.37	\$50.60
21	uni	colleges + universities	4,925.43	5%	\$19.61	4%	13,369.56	12,850.57	\$23.10	\$42.72
22	med	medical	1,511.96	2%	\$6.02	1%	4,104.05	3,944.73	\$7.09	\$13.11
23	hsp	hospitals	3,874.82	4%	\$15.43	3%	10,517.79	10,109.51	\$18.17	\$33.60
24	nrs	nursing homes	2,544.73	3%	\$10.13	2%	6,907.41	6,639.27	\$11.94	\$22.07
25	prs	personal + repair services	9,064.58	10%	\$36.10	7%	24,604.85	23,649.73	\$42.51	\$78.61
26	prk	parking services	1,790.19	2%	\$7.13	1%	4,859.29	4,670.66	\$8.40	\$15.53
27	mp	religious activities	3,356.64	4%	\$13.37	3%	9,111.24	8,757.56	\$15.74	\$29.11
28	gvt	government industry	6,373.72	7%	\$25.38	5%	17,300.79	16,629.21	\$29.89	\$55.28
29	crs	community food + housing + relief services (incl food)	10.46	0%	\$0.04	0%	28.40	27.29	\$0.05	\$0.09
	Residential				\$708.69		724,147.03	696,036.94	\$1,193.35	\$1,902.03
	Gov Final Demand				\$3.84		142,882	137,335.58	\$183.12	\$186.96
	Total				\$1,153.88		1,199,228.83	1,152,676.93	\$1,952.62	\$3,106.51

¹ FY 2010/2011 4-digit SIC water demand data provided by LADWP are used to disaggregate the figures aggregate sector (Ag, Industrial, and Commercial)

demand to the 29 CGE sub-sectors.

² Sectoral weights are computed based on the Acre Feet number in the previous column. Weights are calculated separately for Industrial sector and Commercial sector.

³ Projected water rates (prices) data for 2012/13 are used to convert the demand in Acre Feet to million dollars. For Ag sectors, the Industrial water rate is used.

⁴ Data in the "LADWP Water Demand" column is used to compute the weights for MWD demand. Since for MWD total water demand by Industrial and Commercial users is aggregated into a single sector, consumption weights in this column are also computed with Industrial and Commercial uses combined.

⁵ The 2013 Base Case projected non-residential water demand (in Acre Feet) is distributed among CGE producing sectors using the weights computed in the previous column; Gov Final Demand includes "Seawater Barrier Demand" and "Replenishment Demand".

⁶ Demand is adjusted for water efficiency based on the data provided by MWD.

⁷ Projected LADWP water rates (prices) data for 2012/13 are used to convert water demand by sector in Acre Feet to million dollar values. For Ag sectors, the Industrial water rate is used.

⁸ County totals are derived as the sum of LADWP and residual MWD (excluding LADWP) Demand.

II. I-O Table Modification

1. The following steps are adopted to revise the 2010 IMPLAN LA county I-O table with primary data on water
 - a. Overwrite the original Water row and column (CGE Sector #6) with the numbers computed from the primary data on water. This sector now represents all retail water services.
 - b. Wastewater treatment in LA County is performed by the Sanitation Districts of Los Angeles County (LACSD). It is assumed that this is subsumed in the Government Industry row and column in the I-O Table.
 - c. Revisions to the Rows of the IMPLAN I-O Table:
 - i. Use the LA County water demand by sector numbers calculated in the last column of Table A1 to adjust the numbers in the original water row of the I-O table. The total residential water use is divided among the 9 household groups based on the weights in the original water row. The total government water use is divided among the 6 government categories based on the weights in the original water row.
 - ii. The difference between each entry in the adjusted water row and the original water row is calculated. The difference in each column is then subtracted from the corresponding number in the Government (gov't enterprises) row.
 - iii. Any negative number resulting from the calculation in Step 1c.ii is set to zero in the adjusted Government row. The Inventory row is next adjusted to make up the difference.
 - iv. Any negative number resulting from the calculation in Step 1c.iii is set to zero in the adjusted Inventory row. The Foreign Trade row is next adjusted to make up the difference.
 - v. Aggregate the institution rows including the 9 household rows, 6 government rows, and the capital row into the new "Errors/Omissions" row (all are small numbers). The institutional transfers from households to government (i.e., taxes) are included in the "Indirect Business Taxes" row of the household columns.
 - d. Revisions to the Columns of the IMPLAN I-O Table:
 - i. We consider all water supply to be domestic imports into the County in the I-O table. Based on the MWD Year 2013 wholesale water rate, the total dollar value of water import is \$1.539 billion.
 - ii. In the adjusted water column, set the amount of purchases by Sector 6 from Sector 6 (i.e., own uses of water that is available from within LA County) to zero, and set the domestic import to \$1,539 million. Distribute the value difference between the retail water and wholesale water $((3,106.51 - 1,539.42) = \$1,567.09$ million) among all the other elements in the column based on the weights calculated from the technical coefficient in the original IMPLAN water column. We have considered adjusting the accounts so that the non-MWD groundwater and storage within LA County are subtracted from imports and entered into the in-region portion of the I-O table. Locally produced water is generally less costly than the wholesale MWD water. However, when any of these local sources are decreased, additional MWD water need to be purchased at the wholesale price.

Therefore, in this analysis, it is reasonable to assume that the retail water suppliers value the locally produced water at the same price as the MWD wholesale water (based on our conversation with LADWP staff), and thus we decided to maintain the distinction between retail and wholesale water transactions. This also avoids us having to further adjust other non-water purchases in the Water Services Sector column.

- iii. The difference between each entry in the adjusted water column and original water column is calculated. The difference in each row is then subtracted from the corresponding number in the Government (enterprises) column.
2. Scale up the 2010 LA County I-O table to 2013 I-O table.
 - a. The 2010 historical and 2013 projected Total Personal Income data for the LA County are collected from the LAEDC 2012-2013 Mid-Year Economic Forecast and Industry Outlook Report. Since the Total Personal Income numbers from the LAEDC Report are in nominal dollars, we compute that the 3-year growth rate between 2010 and 2013 is 11.7%, without the adjustment of inflation.
 - b. We apply the 11.7% 3-year growth rate to every number (except for the numbers in the Water Row and Water Column, which are already computed for Year 2013 and are in 2013\$) in the 2010 I-O table (which is in 2010 dollars) to get the 2013 I-O table (which is in 2013 dollars).
3. Calculate the economic growth rate between 2013 and 2014
 - a. Based on the LAEDC Forecast Report, the economic growth rate between 2012 and 2013, after the adjustment of inflation using the BLS Producer Price Indices, is 1.6%.
 - b. We assume that the economic growth rate between 2013 and 2014 is same as the growth rate between 2012 and 2013.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
1.aug agriculture - annual crops	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2.pae agriculture - perennial crops	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3.aag agriculture - other	0.2	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4.mmp metals & minerals processing (ref)	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
5.ele electric power	0.1	1.8	1.1	66.6	1.9	1.4	54.6	2,498.2	218.9	351.1	238.8	9.9	11.1	462.1	6.4	54.7	7.5	1.0	16.7	2.3	1.2	16.6	6.1	2.0	18.0	1.7	3.0	105.5	1.2	
6.wat water services	0.7	0.2	1.9	8.7	0.0	0.0	9.6	128.8	26.2	8.5	7.8	20.7	129.5	72.5	17.4	83.0	3.6	13.0	130.2	50.6	42.7	1.1	50.9	38.7	27.4	71.3	16.5	24.9	56.1	3.4
7.con construction	0.8	1.3	0.8	148.4	117.9	132.6	34.7	329.8	170.6	60.1	130.9	61.3	219.5	600.6	86.1	203.3	216.7	528.4	1,060.7	19.2	0.1	69.6	44.3	22.2	63.3	6.4	104.9	603.8	4.1	
8.fcs food & drugs + chemicals	7.1	8.7	17.6	80.9	35.7	3.5	683.0	1,796.0	1,796.0	347.5	468.3	12.7	151.8	600.6	86.1	203.3	216.7	528.4	1,060.7	19.2	0.1	69.6	44.3	22.2	63.3	6.4	104.9	603.8	4.1	
9.lin light industry	0.3	1.1	0.5	48.9	7.4	2.4	70.5	70.5	1,511.7	251.7	498.0	200.7	250.5	643.5	292.5	341.6	74.4	208.2	172.8	28.6	34.9	14.5	93.2	0.5	27.7	177.3	31.4	69.4	152.5	8.0
10.hin heavy industry	0.2	0.1	0.5	52.0	8.0	4.0	380.9	196.1	1,700.0	810.6	240.5	41.0	74.3	262.7	2.5	71.3	21.2	3.4	19.4	4.6	32.2	31.6	15.0	13.8	21.2	15.3	21.6	36.1	2.3	
11.bst high tech industry	0.1	0.1	0.1	29.4	4.3	3.0	83.7	209.3	240.2	144.6	340.4	96.4	388.4	485.0	97.3	92.9	12.2	15.1	41.6	32.2	31.6	15.0	13.8	21.2	15.3	21.6	36.1	2.3		
12.whi wholesale trade	1.4	2.4	3.4	115.3	6.9	1.2	415.9	1,604.4	763.6	396.4	1,160.1	512.3	288.2	485.0	97.3	92.9	12.2	15.1	41.6	32.2	31.6	15.0	13.8	21.2	15.3	21.6	36.1	2.3		
13.rta retail trade	0.6	0.6	0.5	24.6	0.3	0.7	87.9	317.0	317.0	290.1	180.6	38.5	612.4	183.7	612.4	183.7	612.4	183.7	612.4	183.7	612.4	183.7	612.4	183.7	612.4	183.7	612.4	183.7	612.4	
14.pro professional + technical services	3.4	6.1	7.1	944.7	286.5	307.2	3,231.0	9,570.7	3,472.4	1,290.1	6,965.9	4,055.1	4,888.9	17,455.1	3,403.3	5,609.8	1,683.1	2,193.6	2,193.6	401.9	588.4	2,780.4	1,254.2	352.3	1,640.5	269.4	847.7	1,654.1	76.6	
15.mot motion picture + video	0.0	0.0	0.0	0.0																										

Table A2. LA County I-O Table (cont'd)

	10001	10002	10003	10004	10005	10006	10007	10008	10009	11001	11002	11003	12001	12002	12003	14001	14002	25001	28001	Errors/ Omissions	Gross Output
1. ag. agriculture--annual crops	0.2	0.2	0.4	0.5	0.7	0.8	0.8	0.8	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	122.3
2. ag. agriculture--perennial crops	1.9	1.4	2.9	3.8	5.9	8.3	6.7	6.7	11.6	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	288.1
3. ag. agriculture--other	0.4	0.3	0.7	0.9	1.4	2.1	1.5	1.7	2.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	283.8
4. mining	6.0	4.6	10.7	12.1	18.3	26.2	20.4	22.5	32.0	4.0	1.0	0.1	9.0	0.2	0.1	90.4	12.4	77.1	3,342.1	0.1	9,163.0
5. elec. electric power	97.5	86.2	180.5	207.0	279.9	390.9	259.3	278.0	346.3	13.6	14.1	0.3	48.3	3.3	0.1	7.6	0.0	30.1	1,330.4	0.2	6,321.3
6. wat. water services	77.1	50.0	142.1	168.3	237.7	341.3	236.9	266.9	376.6	28.1	18.9	0.0	137.5	2.1	0.0	0.1	0.0	0.0	0.0	0.0	3,106.5
7. cons. construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	126.6	63.7	40.3	357.2	0.0	2,171.1	18,095.7	0.0	1.8	4,987.5	15.5	31,755.7
8. fdc. food + drugs + chemicals	662.3	577.8	1,276.0	1,565.6	2,121.9	2,964.5	2,134.0	2,188.4	2,860.8	52.8	43.3	0.3	337.6	16.3	0.1	20.3	1,727.7	6,831.5	34,160.1	0.4	76,250.2
9. lin. light industry	146.6	98.2	213.7	249.7	420.7	648.2	500.4	577.2	974.8	58.5	31.9	13.9	179.6	12.1	16.0	498.7	211.9	3,673.7	21,402.4	0.3	36,621.0
10. hin. heavy industry	11.5	22.1	48.0	59.8	124.2	201.8	171.5	185.4	319.3	6.0	24.5	63.4	21.9	1.2	28.5	589.6	36.8	2,519.6	12,275.4	0.0	39,332.4
11. hlt. high tech industry	75.8	48.1	119.4	123.1	227.4	344.8	315.0	335.7	475.9	52.9	148.0	196.7	79.3	46.9	31.9	3,105.5	636.4	9,509.3	36,826.0	0.3	58,886.8
12. wst. wholesale trade	207.7	112.8	220.7	352.4	1,098.8	2,061.0	1,527.6	1,618.4	1,397.9	44.3	25.5	44.5	136.7	10.5	35.5	2,890.8	0.2	7,369.5	19,268.8	0.1	46,950.9
13. ret. retail trade	1,187.1	609.7	1,821.2	1,707.3	3,627.2	5,507.0	5,294.0	6,519.2	10,092.2	4.9	4.0	0.0	27.0	1.6	0.0	764.5	0.0	444.3	4,279.8	0.1	45,890.7
14. pss. professional + technical services	532.5	269.5	816.3	919.0	1,421.9	2,101.3	1,456.9	1,778.0	3,248.3	1,306.5	1,046.1	269.7	1,591.2	119.8	49.0	5,831.6	0.4	14,231.6	47,006.2	12.6	164,129.0
15. mpv. motion picture + video	31.3	16.8	27.6	40.5	67.9	111.9	84.6	101.4	187.1	3.2	21.6	0.0	3.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	48,037.8
16. enr. entertainment + recreation	971.3	514.5	1,142.6	1,511.8	2,530.9	4,365.4	3,289.8	3,747.0	6,776.6	62.0	52.5	6.0	295.4	4.7	1.2	140.7	0.0	650.1	20,333.9	0.5	57,338.8
17. too. telecommunications	218.4	166.9	328.3	369.7	519.6	840.3	562.9	599.0	810.6	166.8	54.4	2.7	263.8	24.6	0.4	159.1	7.8	449.5	1,511.9	1.0	18,613.9
18. hfi. banking + finance	721.5	824.7	1,354.9	2,137.2	3,693.7	6,011.8	5,026.6	5,380.6	8,066.4	81.6	1.6	0.3	194.5	0.6	0.1	55.7	0.0	2,297.0	6,388.5	2.5	81,215.5
19. res. real estate	2,474.8	1,432.9	3,544.9	3,955.9	5,856.9	10,519.7	7,603.5	9,693.3	16,021.1	181.2	28.1	0.0	311.7	3.9	0.0	0.0	0.0	67.1	21,590.2	1.4	105,484.3
20. sch. colleges + libraries	95.3	43.5	91.1	125.9	304.3	807.5	396.7	662.7	1,632.2	4.3	4.9	0.0	28.0	23,451.7	0.0	0.0	0.0	0.0	0.0	0.0	28,357.3
21. uni. colleges + universities	954.4	277.9	306.6	436.8	464.8	804.9	504.8	799.8	1,862.2	132.3	0.0	0.0	93.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7,047.5
22. med. medical	980.9	871.7	2,118.0	2,082.2	3,219.4	4,861.2	3,956.9	5,995.9	6,599.9	9.8	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30,029.1
23. hsp. hospitals	500.3	501.9	1,591.3	1,578.3	1,928.7	3,613.0	1,904.5	2,231.2	4,122.5	3.2	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18,011.4
24. nrs. nursing homes	150.0	79.4	315.1	519.0	683.5	813.0	367.0	612.6	1,230.7	4.7	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,785.4
25. pss. personal + repair services	371.2	210.4	520.7	686.7	1,130.5	1,541.0	962.7	1,210.9	2,692.2	26.4	56.4	0.0	217.3	13.4	0.0	0.0	0.0	0.0	0.0	0.0	16,416.5
26. ptk. parking services	96.0	49.6	124.5	141.6	233.3	397.2	295.3	334.1	658.2	6.4	0.4	0.0	28.6	3.0	0.0	0.0	0.0	0.0	0.0	0.0	4,731.3
27. rpk. religious activities	204.0	120.7	258.3	548.8	898.0	1,243.6	735.6	884.5	2,154.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8,477.7
28. gnt. government industry	161.7	135.5	316.3	386.9	589.3	1,049.6	766.9	768.7	1,173.1	2,754.0	2,152.4	1.8	13,803.5	3.4	19.8	86.7	-461.7	4,792.8	3,748.8	-363.4	38,384.8
29. svs. community food + housing + relief	26.0	11.0	31.2	83.4	134.6	164.2	91.9	114.0	303.1	0.0	0.0	0.0	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	971.7
5001. Employee Compensation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7001. Proprietary Income	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8001. Other Property Income	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14002. Indirect Business Taxes	271.5	-69.7	487.6	1,469.7	3,454.3	8,591.3	7,734.1	11,297.4	23,593.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25001. Inventory Additions/Deletions	8.8	6.5	14.3	16.6	27.5	41.8	33.1	36.8	58.2	2.4	3.5	4.8	6.1	0.5	1.6	5,417.2	-18.0	366.4	1,782.6	0.0	8,205.8
28001. Foreign Trade	1,316.2	1,059.2	2,282.0	2,857.6	4,523.7	7,022.9	5,393.9	5,804.2	9,029.4	3,970.7	3,290.5	502.0	18,540.5	64.3	173.0	8,287.9	2,365.0	0.0	0.0	0.0	117,815.3
28001. Domestic Trade	1,951.2	1,448.9	3,408.0	4,088.2	6,321.3	9,771.3	6,999.2	7,869.0	11,955.6	-2,229.7	-1,546.5	638.2	-11,613.3	514.9	256.2	123,273.7	3,291.2	0.0	0.0	0.0	279,197.5
Errors/Omissions	236.5	128.8	251.0	346.5	531.0	966.0	1,076.0	1,605.0	14,645.1	86,649.2	495.5	0.4	41,131.7	100.6	4.6	80,950.6	0.2	55,592.3	884.9	31,428.8	0.0
Gross Output	14,747.8	9,712.9	23,456.8	28,752.5	46,695.1	78,144.2	59,710.3	70,886.9	133,216.4	93,540.7	6,036.3	2,132.5	66,291.4	24,406.7	2,745.2	250,306.1	8,205.8	117,815.3	279,197.5	-363.4	0.0

Appendix B. Calculation of Water Constraint Levels

No Storage Case

Table B1 presents the retail water shortage in both quantity terms and percentage terms for the three disruption periods in the case without MWD storage water use. These results are provided by MWD through the simulations run in MWD “Sales Model 20a2”.

Table B1. Water Constraint Levels – without Storage Water Use

	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
Retail Level Shortage (acre feet)	79,111	330,158	325,634	330,158	325,634	326,223
Percent Retail Shortage	4.35%	18.2%	18.2%	18.2%	18.2%	18.5%

Storage Water Use — Reference Case

Table B2 presents the retail water shortage after the use of MWD storage. Again, these results are provided directly by MWD through the simulations run in MWD “Sales Model 20a2”. Table B3 presents the retail water shortage after the use of both MWD storage water and LADWP storage water. The total level of LADWP reservoir storage water is 17,000 AF. It is assumed that the LADWP reservoir water is not resumable. In other words, in the 24-month and 36-month disruption scenarios, it is assumed that after the depletion of reservoir water in the first year to alleviate the water shortage, no LADWP reservoir storage water would be available in the second and third years of water disruption. In the 6-month disruption scenario, since the water shortage level is only 6,954 AF after the use of MWD storage water, we assume that LADWP reservoir storage can only further reduce the supply shortage by 36.6%, which equals the percentage water demand of LADWP with respect to the total water demand of the County. In other words, we assume no inter-jurisdictional sharing of the reservoir storage water.

In our following analyses of various resilience cases, the “with Storage Use” results shown in Table B3 will be used as the Reference Case. In other words, the effects of various resilience measures on reducing the water demand shortages are computed based on the assumption of MWD and LADWP storage water use.

Table B2. Water Constraint Levels – with MWD Storage Water Use

	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
Retail Level Shortage (acre feet)	6,954	105,516	194,165	105,516	194,165	213,510
Percent Retail Shortage	0.38%	5.8%	10.9%	5.8%	10.9%	12.1%

Table B3. Water Constraint Levels – with MWD and LADWP Storage Water Use

	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
Retail Level Shortage (acre feet)	4,410	88,516	194,165	88,516	194,165	213,510
Percent Retail Shortage	0.24%	4.9%	10.9%	4.9%	10.9%	12.1%

Conservation

1. LADWP Phase II Conservation

Table B4 presents the water constraint levels after the implementation of LADWP Phase II Conservation. According to the LADWP Emergency Water Conservation Plan (EWCP), City of LA has different conservation phases or stages of actions that can be implemented in response to shortages in water supply (LADWP, 2010). Phase II Conservation, which is implemented with Moderate Water Supply Shortage (roughly corresponding from zero to 15 percent), has been in effect in the City of LA since 2009. Phase II actions can achieve up to 15% conservation (LADWP, 2010). In this resilience analysis case, we apply the 15% conservation to the total water demand of the LA City to get the water constraints under the Bay Delta disruption scenarios after taking Phase II Conservation of the City of LA into consideration.

2. LADWP Phase II Conservation Plus Incremental Conservation

In addition to the Phase II Conservation of LADWP, in this conservation resilience case, we assume that for both the 24-month and 36-month disruption scenarios, additional conservation efforts can be anticipated to further cope with the shortage of water supply. We calculate the effect of the additional conservation efforts under the Bay Delta disruption scenarios as the potential conservation level difference between LADWP Phase III Conservation and Phase II Conservation. According to LADWP EWCP, Phase III Conservation measures, which would be implemented with Severe Water Shortage (corresponding from 15 to 20 percent), can achieve up to 20% conservation (LADWP, 2010). Therefore, compared with the Phase II Conservation, Phase III Conservation can achieve 5% incremental conservation. In addition, we assume that the current water rates will be increased by 5% in association with the incremental conservation level based on the assumption of revenue neutral for the water retail suppliers. In this resilience analysis case, above and beyond the 15% conservation that is applied to the total water demand of the LA City, we assumed that the 5% incremental conservation and the 5% water rates increase are applied to the entire County. Table B5 presents the water constraint results for this resilience analysis case.

Table B4. Water Constraint Levels with LADWP Phase II Conservation

	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
Retail Level Shortage (acre feet)	0	0	94,423	0	94,423	113,719
Percent Retail Shortage	0.00%	0.0%	5.3%	0.0%	5.3%	6.4%

Table B5. Water Constraint Levels with LADWP Phase II Conservation Plus 5% Incremental Conservation

	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
Retail Level Shortage (acre feet)	0	0	3,561	0	3,561	22,684
Percent Retail Shortage	0.00%	0.0%	0.2%	0.0%	0.2%	1.3%

Water Importance

Table B6 presents the Water Importance Factor by sector (ATC, 1991). The percentage values in the table indicate the percentage of production of each sector affected by the disruption of water. For example, the Water Importance Factor for Sector 10 (Heavy Industry) is 60 percent. That means that 60 percent of the production of this sector is dependent on water, and the remaining production of this sector is separable from water use. The weighted average Water Importance Factor is computed for the economy using sectoral water demands as weights.

Table B7 presents the retail water shortage levels for the with storage case after we take water importance into consideration.

Table B6. Water Importance Factors

Sector	
1. aag agriculture--annual crops	70.00%
2. pag agriculture--perennial crops	70.00%
3. oag agriculture--other	45.00%
4. mmp metals + minerals processing (incl mining)	61.67%
5. ele electric power	40.00%
6. wat water services	40.00%
7. cns construction	50.00%
8. fdc food + drugs + chemicals	62.50%
9. lin light industry	53.75%
10. hin heavy industry	60.00%
11. hti high tech industry	90.00%
12. wst wholesale trade	20.00%
13. ret retail trade	20.00%
14. pts professional + technical services	20.00%
15. mpv motion picture + video	80.00%
16. enr entertainment + recreation	80.00%
17. tco telecommunications	30.00%

18. bfi	banking + finance	20.00%
19. res	real estate	20.00%
20. scl	schools + libraries	40.00%
21. uni	colleges + universities	40.00%
22. med	medical	40.00%
23. hsp	hospitals	40.00%
24. nrs	nursing homes	40.00%
25. prs	personal + repair services	23.33%
26. prk	parking services	10.00%
27. rnp	religious activities	40.00%
28. gvt	government industry	25.00%
29. crs	community food + housing + relief services	40.00%
Weighted Average		38.47%

Table B7. Water Constraint Levels with Water Unimportance Adjustment

	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
Retail Level Shortage (acre feet)	893	34,054	74,700	34,054	74,700	82,143
Percent Retail Shortage	0.0%	1.9%	4.1%	1.9%	4.2%	4.7%

Diversion of Replenishment Water Use

Table B8 presents the projected amount of water that will be used for Groundwater Replenishment and Seawater Barrier in LA County in the Base Case for Years 2013 to 2015. Both imported water and recycled water are used for water replenishment purpose. According to WRD, all imported water originally used for water replenishment can be diverted to other uses in the emergency of water supply shortage. If we apply the percentage of WRD total water replenishment use that come from imported water (29.6% for Groundwater Spreading and 36.7% for Seawater Barrier) to the total replenishment water use of the County, we obtain the amount of water that can be diverted to other uses in our water disruption scenarios. These numbers are presented in Table B9.

Table B8. Replenishment Water Use (acre feet)

	6-mon Disruption	24-mon Disruption	36-mon Disruption
Groundwater Spreading Use			
2013	108,382	108,382	108,382
2014		109,575	109,575
2015			113,968
Seawater Barrier Use			
2013	37,494	37,494	37,494
2014		37,571	37,571
2015			37,648
Total Replenishment Water Use			
2013	145,876	145,876	145,876
2014		147,146	147,146
2015			151,616

Table B9. Diversion from Replenishment Water Use (acre feet)

	6-mon Disruption	24-mon Disruption	36-mon Disruption
Diversion from Groundwater Spreading Use			
2013	28,984	19,232	19,232
2014		19,511	19,511
2015			20,261
Diversion from Seawater Barrier Use			
2013	12,430	8,248	8,248
2014		8,293	8,293
2015			8,297
Total Diversion			
2013	41,414	27,480	27,480
2014		27,804	27,804
2015			28,558

Table B10 presents the retail water shortage levels for the with storage case after the diversion of replenishment water use to other uses.

Table B10. Water Constraint Levels with Replenishment Water Use Diversion

	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
Retail Level Shortage (acre feet)	0	48,567	158,940	48,567	158,940	178,402
Percent Retail Shortage	0.00%	2.7%	8.9%	2.7%	8.9%	10.1%

Production Recapture

Table B11 presents the Production Recapture factor by sector. The Recapture factors for the 3-month period are obtained from FEMA's (2012) hazard loss estimation tool, HAZUS, and Rose and Lim (2002). For example, the Production Recapture Factor for Sector 9 (Light Industry) for 3months is 95. That means if the water disruption lasts for three months, Production Recapture for Sector 9 can potentially reduce 95 percent of total output losses of this sector if the water supply disruption is ended within three months. We then reduce the Recapture Factors by 25 percent for each of the subsequent three-month periods, since, as the disruption period becomes longer, there will be an increasing number of cancelled orders. Therefore, after the first year, there is no Recapture. Note that in contrast to the analysis of other resilience tactics, the Production Recapture factors are not applied on the input side (i.e., water supply constraints), rather they are applied directly to the economic impact results of the Reference Case. Table B12 presents sectoral Production Recapture factors adjusted for different time periods and expressed in terms of the proportion of production that can be retained by rescheduling production to a later date. Note that after the first year, there is no production recapture. Effectively, this means that the recapture factor is only relevant to the 6-month disruption scenario. In the two longer scenarios, Recapture cannot be implemented until after the Recapture Factors have dropped to zero.

Table B11. Production Recapture Factors

Sector	3-mon	6-mon	9-mon	12-mon	After First Year
1. aag agriculture--annual crops	75	56	38	19	0
2. pag agriculture--perennial crops	75	56	38	19	0
3. oag agriculture--other	75	56	38	19	0
4. mmp metals + minerals processing (incl mining)	99	74	50	25	0
5. ele electric power	75	56	38	19	0
6. wat water services	90	68	45	23	0
7. cns construction	95	71	48	24	0
8. fdc food + drugs + chemicals	95	71	48	24	0
9. lin light industry	95	71	48	24	0
10. hin heavy industry	99	74	50	25	0
11. hti high tech industry	97	73	49	24	0
12. wst wholesale trade	99	74	50	25	0
13. ret retail trade	80	60	40	20	0
14. pts professional + technical services	70	53	35	18	0
15. mpv motion picture + video	95	71	48	24	0
16. enr entertainment + recreation	30	23	15	8	0
17. tco telecommunications	40	30	20	10	0
18. bfi banking + finance	90	68	45	23	0
19. res real estate	90	68	45	23	0
20. scl schools + libraries	99	74	50	25	0
21. uni colleges + universities	99	74	50	25	0

22. med	medical	50	38	25	13	0
23. hsp	hospitals	50	38	25	13	0
24. nrs	nursing homes	50	38	25	13	0
25. prs	personal + repair services	60	45	30	15	0
26. prk	parking services	70	53	35	18	0
27. rmp	religious activities	50	38	25	13	0
28. gvt	government industry	80	60	40	20	0
29. crs	community food + housing + relief services	50	38	25	13	0

Table B12. Sectoral -Production Recapture Impact Adjustment Factor*

Sector	6-Mon Disruption	24-Mon Disruption		36-Mon Disruption		
	2013	2013	2014	2013	2014	2015
1. aag	agriculture--annual crops	34.38%	100.00%	100.00%	100.00%	100.00%
2. pag	agriculture--perennial crops	34.38%	100.00%	100.00%	100.00%	100.00%
3. oag	agriculture--other	34.38%	100.00%	100.00%	100.00%	100.00%
4. mmp	metals + minerals processing	13.38%	100.00%	100.00%	100.00%	100.00%
5. ele	electric power	34.38%	100.00%	100.00%	100.00%	100.00%
6. wat	water services	21.25%	100.00%	100.00%	100.00%	100.00%
7. cns	construction	16.88%	100.00%	100.00%	100.00%	100.00%
8. fdc	food + drugs + chemicals	16.88%	100.00%	100.00%	100.00%	100.00%
9. lin	light industry	16.88%	100.00%	100.00%	100.00%	100.00%
10. hin	heavy industry	13.38%	100.00%	100.00%	100.00%	100.00%
11. hti	high tech industry	15.13%	100.00%	100.00%	100.00%	100.00%
12. wst	wholesale trade	13.38%	100.00%	100.00%	100.00%	100.00%
13. ret	retail trade	30.00%	100.00%	100.00%	100.00%	100.00%
14. pts	professional + technical services	38.75%	100.00%	100.00%	100.00%	100.00%
15. mpv	motion picture + video	16.88%	100.00%	100.00%	100.00%	100.00%
16. enr	entertainment + recreation	73.75%	100.00%	100.00%	100.00%	100.00%
17. tco	telecommunications	65.00%	100.00%	100.00%	100.00%	100.00%
18. bfi	banking + finance	21.25%	100.00%	100.00%	100.00%	100.00%
19. res	real estate	21.25%	100.00%	100.00%	100.00%	100.00%
20. scl	schools + libraries	13.38%	100.00%	100.00%	100.00%	100.00%
21. uni	colleges + universities	13.38%	100.00%	100.00%	100.00%	100.00%
22. med	medical	56.25%	100.00%	100.00%	100.00%	100.00%
23. hsp	hospitals	56.25%	100.00%	100.00%	100.00%	100.00%
24. nrs	nursing homes	56.25%	100.00%	100.00%	100.00%	100.00%
25. prs	personal + repair services	47.50%	100.00%	100.00%	100.00%	100.00%
26. prk	parking services	38.75%	100.00%	100.00%	100.00%	100.00%
27. rmp	religious activities	56.25%	100.00%	100.00%	100.00%	100.00%
28. gvt	government industry	30.00%	100.00%	100.00%	100.00%	100.00%
29. crs	community food + housing +	56.25%	100.00%	100.00%	100.00%	100.00%

* Multiply the economic impact results of the Reference Case with the adjustment factors in this table to obtain the impacts after production recapturing.

Simultaneous Resilience Case

In addition to the analysis of the effect of the resilience tactics individually, we also evaluate the simultaneous effects of all these resilience tactics implementing together. However, note that the various resilience adjustments are not additive. The LADWP Phase II Conservation and the 5% additional conservation under the Bay Delta disruptions are first considered to reduce the water constraints after storage use. Next we further reduce the water constraints by taking into consideration the diversion of replenishment water use to other uses. If there is any remaining demand shortages after conservation and replenishment water diversion, water importance factors and production recapture would be applied.

For the Reference Case, the calculation indicates that after the inclusion of storage water, conservation, and replenishment water diversion, the water constraint would be eliminated. Therefore, the only effect we simulate for the simultaneous case is the 5% water rate increase associated with the 5% incremental conservation. The utilization of all resilience tactics would be applicable to the case of extreme hydrological conditions, as specified in Table 11. In these cases, even the simultaneous use of all resilience tactics would not eliminate the water constraint.

Appendix C. Sectoral Results for the Free Market Scenario (S1A)

Table S1A2/13/Sectoral. Impacts of Water Supply Disruptions on the LA County Economy: 4.9% Reduction Scenario (flexible price)

Sector	Water Demand			GDP			Employment			Price Change (%)
	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (jobs)	Post-Disruption (jobs)	Change (%)	
Agriculture (Annual Crops)	0.000	0.000	-6.49	0.06	0.05	-5.31	768	727	-5.31	-0.02
Agriculture (Perennial Crops)	0.000	0.000	-6.25	0.19	0.18	-5.07	2,208	2,096	-5.07	-0.02
Agriculture (Other)	0.002	0.002	-6.62	0.14	0.13	-5.43	4,004	3,786	-5.43	0.04
Metals & Minerals Processing	0.009	0.008	-6.38	4.32	4.10	-5.20	26,253	24,889	-5.20	-0.02
Electric Power	0.009	0.008	-5.59	4.09	3.91	-4.40	8,974	8,579	-4.40	-0.01
Water Utilities	0.000	0.000	0.00	1.13	1.07	-4.90	5,621	5,346	-4.90	12.39
Construction	0.010	0.009	-4.96	15.11	14.54	-3.77	207,304	199,499	-3.77	-0.01
Food, Drugs, & Chemicals	0.129	0.121	-6.00	17.08	16.26	-4.81	75,799	72,155	-4.81	-0.04
Light Industry	0.026	0.025	-6.24	13.83	13.13	-5.05	177,207	168,251	-5.05	-0.01
Heavy Industry	0.009	0.008	-6.31	7.40	7.02	-5.13	73,191	69,438	-5.13	-0.02
High Tech Industry	0.008	0.007	-6.36	24.20	22.94	-5.18	129,192	122,494	-5.18	-0.01
Wholesale Trade	0.021	0.019	-6.09	28.05	26.67	-4.91	213,337	202,872	-4.91	0.01
Retail Trade	0.129	0.123	-5.24	23.65	22.69	-4.04	444,176	426,217	-4.04	0.04
Professional & Tech. Services	0.073	0.068	-5.86	108.58	103.50	-4.68	1,132,653	1,079,645	-4.68	0.01
Motion Picture & Video	0.017	0.016	-6.57	31.23	29.55	-5.40	145,454	137,606	-5.40	0.01
Entertainment & Recreation	0.083	0.078	-5.72	30.71	29.32	-4.54	549,210	524,292	-4.54	0.02
Telecommunications	0.004	0.003	-5.43	9.42	9.02	-4.24	32,450	31,073	-4.24	0.01
Banking & Finance	0.013	0.012	-5.37	38.55	36.94	-4.18	373,243	357,630	-4.18	0.01
Real Estate	0.130	0.123	-5.43	78.79	75.45	-4.24	427,688	409,568	-4.24	0.02
Schools & Libraries	0.051	0.050	-1.97	26.55	26.35	-0.74	398,695	395,758	-0.74	0.02
Colleges & Universities	0.043	0.041	-4.98	4.07	3.91	-3.78	66,587	64,072	-3.78	0.08
Medical	0.013	0.012	-5.03	18.92	18.19	-3.84	248,660	239,116	-3.84	0.01
Hospitals	0.034	0.032	-4.98	10.64	10.24	-3.78	121,155	116,571	-3.78	0.03
Nursing Homes	0.022	0.021	-5.00	3.09	2.97	-3.80	76,838	73,921	-3.80	0.06
Personal & Repair Services	0.079	0.074	-5.47	8.94	8.55	-4.27	206,868	198,029	-4.27	0.06
Parking Services	0.016	0.015	-5.47	2.50	2.39	-4.28	54,488	52,156	-4.28	0.04
Religious Activities	0.029	0.028	-5.09	3.98	3.83	-3.89	79,928	76,815	-3.89	0.05
Government Industry	0.061	0.059	-3.43	34.72	33.95	-2.22	357,573	349,645	-2.22	0.02
Community Services	0.000	0.000	-4.94	0.64	0.61	-3.74	22,618	21,771	-3.74	0.00
Households	1.902	1.806	-5.06	-	-	-	-	-	-	0.08
Other	0.187	0.184	-1.35	-	-	-	-	-	-	-
Total	3.107	2.954	-4.90	550.59	527.51	-4.19	5,662,140	5,434,015	-4.03	0.04

Table S1A5/'13/Sectoral. Impacts of Water Supply Disruptions on the LA County Economy: 1.9% Reduction Scenario
(flexible price)

Sector	Water Demand			GDP			Employment		Price Change (%)
	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (jobs)	Post-Disruption (jobs)	
Agriculture (Annual Crops)	0.000	0.000	-2.51	0.06	0.06	-2.07	768	752	-0.01
Agriculture (Perennial Crops)	0.000	0.000	-2.42	0.19	0.19	-1.98	2,208	2,164	-0.01
Agriculture (Other)	0.002	0.002	-2.57	0.14	0.14	-2.12	4,004	3,919	0.01
Metals & Minerals Processing	0.009	0.009	-2.47	4.32	4.23	-2.03	26,253	25,720	-0.01
Electric Power	0.009	0.009	-2.17	4.09	4.02	-1.72	8,974	8,819	0.00
Water Utilities	0.000	0.000	0.00	1.13	1.11	-1.93	5,621	5,513	4.62
Construction	0.01	0.01	-1.92	15.11	14.89	-1.48	207,304	204,239	0.00
Food, Drugs, & Chemicals	0.129	0.126	-2.33	17.08	16.76	-1.88	75,799	74,374	-0.01
Light Industry	0.026	0.026	-2.42	13.83	13.56	-1.97	177,207	173,708	0.00
Heavy Industry	0.009	0.008	-2.45	7.40	7.25	-2.00	73,191	71,725	-0.01
High Tech Industry	0.008	0.008	-2.47	24.20	23.71	-2.02	129,192	126,576	0.00
Wholesale Trade	0.021	0.020	-2.36	28.05	27.51	-1.92	213,337	209,246	0.00
Retail Trade	0.129	0.127	-2.03	23.65	23.27	-1.59	444,176	437,132	0.02
Professional & Tech. Services	0.073	0.071	-2.27	108.58	106.60	-1.83	1,132,653	1,111,918	0.00
Motion Picture & Video	0.017	0.017	-2.55	31.23	30.58	-2.11	145,454	142,391	0.00
Entertainment & Recreation	0.083	0.081	-2.22	30.71	30.17	-1.78	549,210	539,458	0.01
Telecommunications	0.004	0.004	-2.11	9.42	9.27	-1.66	32,450	31,910	0.00
Banking & Finance	0.013	0.013	-2.08	38.55	37.92	-1.64	373,243	367,123	0.00
Real Estate	0.130	0.127	-2.10	78.79	77.48	-1.66	427,688	420,587	0.01
Schools & Libraries	0.051	0.050	-0.76	26.55	26.47	-0.31	398,695	397,445	0.01
Colleges & Universities	0.043	0.042	-1.93	4.07	4.01	-1.48	66,587	65,599	0.03
Medical	0.013	0.013	-1.95	18.92	18.63	-1.51	248,660	244,913	0.00
Hospitals	0.034	0.033	-1.93	10.64	10.48	-1.49	121,155	119,354	0.01
Nursing Homes	0.022	0.022	-1.94	3.09	3.04	-1.49	76,838	75,693	0.02
Personal & Repair Services	0.079	0.077	-2.12	8.94	8.79	-1.67	206,868	203,405	0.02
Parking Services	0.016	0.015	-2.12	2.50	2.46	-1.68	54,488	53,574	0.02
Religious Activities	0.029	0.029	-1.97	3.98	3.92	-1.53	79,928	78,706	0.02
Government Industry	0.061	0.061	-1.33	34.72	34.42	-0.88	357,573	354,413	0.01
Community Services	0.000	0.000	-1.92	0.64	0.63	-1.47	22,618	22,285	0.00
Households	1.902	1.865	-1.96	-	-	-	-	-	0.03
Other	0.187	0.186	-0.52	-	-	-	-	-	-
Total	3.107	3.047	-1.90	550.59	541.54	-1.64	5,662,140	5,572,663	-1.58
									0.01

Table S1A6/13/Sectoral. Impacts of Water Supply Disruptions on the LA County Economy: 2.7% Reduction Scenario (flexible price)

Sector	Water Demand			GDP			Employment		Price Change (%)
	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (jobs)	Post-Disruption (jobs)	
Agriculture (Annual Crops)	0.000	0.000	-3.57	0.06	0.05	-2.91	768	746	-2.91
Agriculture (Perennial Crops)	0.000	0.000	-3.45	0.19	0.19	-2.78	2,208	2,146	-2.78
Agriculture (Other)	0.002	0.002	-3.65	0.14	0.14	-2.98	4,004	3,884	-2.98
Metals & Minerals Processing	0.009	0.009	-3.51	4.32	4.20	-2.85	26,253	25,505	-2.85
Electric Power	0.009	0.008	-3.08	4.09	3.99	-2.41	8,974	8,758	-2.41
Water Utilities	0.000	0.000	0.00	1.13	1.10	-2.70	5,621	5,469	-2.70
Construction	0.010	0.009	-2.73	15.11	14.80	-2.06	207,304	203,028	-2.06
Food, Drugs, & Chemicals	0.129	0.125	-3.30	17.08	16.63	-2.63	75,799	73,803	-2.63
Light Industry	0.026	0.025	-3.44	13.83	13.45	-2.77	177,207	172,300	-2.77
Heavy Industry	0.009	0.008	-3.48	7.40	7.19	-2.81	73,191	71,135	-2.81
High Tech Industry	0.008	0.007	-3.51	24.20	23.51	-2.84	129,192	125,523	-2.84
Wholesale Trade	0.021	0.020	-3.35	28.05	27.29	-2.69	213,337	207,603	-2.69
Retail Trade	0.129	0.126	-2.89	23.65	23.12	-2.22	444,176	434,337	-2.22
Professional & Tech. Services	0.073	0.070	-3.23	108.58	105.80	-2.56	1,132,653	1,103,611	-2.56
Motion Picture & Video	0.017	0.017	-3.62	31.23	30.31	-2.96	145,454	141,154	-2.96
Entertainment & Recreation	0.083	0.080	-3.15	30.71	29.95	-2.49	549,210	535,558	-2.49
Telecommunications	0.004	0.004	-2.99	9.42	9.20	-2.32	32,450	31,695	-2.32
Banking & Finance	0.013	0.013	-2.96	38.55	37.67	-2.29	373,243	364,689	-2.29
Real Estate	0.130	0.126	-2.99	78.79	76.96	-2.32	427,688	417,760	-2.32
Schools & Libraries	0.051	0.050	-1.09	26.55	26.44	-0.40	398,695	397,088	-0.40
Colleges & Universities	0.043	0.042	-2.74	4.07	3.98	-2.07	66,587	65,209	-2.07
Medical	0.013	0.013	-2.77	18.92	18.52	-2.10	248,660	243,431	-2.10
Hospitals	0.034	0.033	-2.74	10.64	10.42	-2.07	121,155	118,643	-2.07
Nursing Homes	0.022	0.021	-2.75	3.09	3.02	-2.08	76,838	75,240	-2.08
Personal & Repair Services	0.079	0.076	-3.01	8.94	8.73	-2.34	206,868	202,025	-2.34
Parking Services	0.016	0.015	-3.01	2.50	2.44	-2.34	54,488	53,210	-2.34
Religious Activities	0.029	0.028	-2.81	3.98	3.90	-2.13	79,928	78,222	-2.13
Government Industry	0.061	0.060	-1.89	34.72	34.30	-1.22	357,573	353,229	-1.22
Community Services	0.000	0.000	-2.72	0.64	0.62	-2.05	22,618	22,154	-2.05
Households	1.902	1.849	-2.79	-	-	-	-	-	-
Other	0.187	0.186	-0.74	-	-	-	-	-	-
Total	3.107	3.023	-2.70	550.59	537.95	-2.30	5,662,140	5,537,157	-2.21
									0.02

Table S1A2/14. Impacts of Water Supply Disruptions on the L.A County Economy: 10.87% Reduction Scenario (flexible price)

Sector	Water Demand			GDP			Employment			Price Change (%)
	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (jobs)	Post-Disruption (jobs)	Change (%)	
Agriculture (Annual Crops)	0.000	0.000	-14.39	0.06	0.05	-11.95	768	676	-11.95	-0.05
Agriculture (Perennial Crops)	0.000	0.000	-13.88	0.19	0.17	-11.43	2,208	1,955	-11.43	-0.04
Agriculture (Other)	0.002	0.002	-14.68	0.14	0.12	-12.23	4,004	3,514	-12.23	0.09
Metals & Minerals Processing	0.009	0.008	-14.15	4.32	3.82	-11.70	26,253	23,181	-11.70	-0.05
Electric Power	0.009	0.008	-12.40	4.09	3.69	-9.90	8,974	8,085	-9.90	-0.02
Water Utilities	0.000	0.000	0.00	1.13	1.01	-10.87	5,621	5,010	-10.87	29.89
Construction	0.01	0.01	-11.01	15.11	13.83	-8.48	207,304	189,719	-8.48	-0.02
Food, Drugs, & Chemicals	0.129	0.112	-13.31	17.08	15.23	-10.83	75,799	67,590	-10.83	-0.09
Light Industry	0.026	0.023	-13.84	13.83	12.26	-11.38	177,207	157,032	-11.38	-0.02
Heavy Industry	0.009	0.007	-14.00	7.40	6.55	-11.55	73,191	64,735	-11.55	-0.05
High Tech Industry	0.008	0.007	-14.12	24.20	21.37	-11.68	129,192	114,104	-11.68	-0.01
Wholesale Trade	0.021	0.018	-13.50	28.05	24.95	-11.05	213,337	189,764	-11.05	0.02
Retail Trade	0.129	0.114	-11.62	23.65	21.49	-9.11	444,176	403,717	-9.11	0.11
Professional & Tech. Services	0.073	0.063	-13.01	108.58	97.14	-10.54	1,132,653	1,013,243	-10.54	0.01
Motion Picture & Video	0.017	0.015	-14.58	31.23	27.44	-12.15	145,454	127,775	-12.15	0.02
Entertainment & Recreation	0.083	0.072	-12.70	30.71	27.58	-10.22	549,210	493,080	-10.22	0.04
Telecommunications	0.004	0.003	-12.05	9.42	8.52	-9.56	32,450	29,348	-9.56	0.02
Banking & Finance	0.013	0.011	-11.92	38.55	34.92	-9.42	373,243	338,072	-9.42	0.03
Real Estate	0.130	0.115	-12.04	78.79	71.27	-9.54	427,688	386,868	-9.54	0.04
Schools & Libraries	0.051	0.048	-4.38	26.55	26.11	-1.67	398,695	392,050	-1.67	0.05
Colleges & Universities	0.043	0.038	-11.05	4.07	3.72	-8.51	66,587	60,920	-8.51	0.20
Medical	0.013	0.012	-11.17	18.92	17.28	-8.65	248,660	227,159	-8.65	0.02
Hospitals	0.034	0.030	-11.05	10.64	9.73	-8.52	121,155	110,828	-8.52	0.06
Nursing Homes	0.022	0.020	-11.09	3.09	2.82	-8.55	76,838	70,266	-8.55	0.15
Personal & Repair Services	0.079	0.069	-12.13	8.94	8.08	-9.62	206,868	186,959	-9.62	0.15
Parking Services	0.016	0.014	-12.14	2.50	2.26	-9.64	54,488	49,236	-9.64	0.10
Religious Activities	0.029	0.026	-11.30	3.98	3.63	-8.77	79,928	72,916	-8.77	0.12
Government Industry	0.061	0.057	-7.62	34.72	32.99	-4.99	357,573	339,720	-4.99	0.05
Community Services	0.000	0.000	-10.96	0.64	0.58	-8.44	22,618	20,710	-8.44	0.01
Households	1.902	1.689	-11.22	-	-	-	-	-	-	0.1958
Other	0.187	0.181	-3.00	-	-	-	-	-	-	-
Total	3.107	2.769	-10.87	550.59	498.60	-9.44	5,662,140	5,148,230	-9.08	0.089

Table S1A2/15. Impacts of Water Supply Disruptions on the LA County Economy: 12.08% Reduction Scenario (flexible price)

Sector	Water Demand			GDP			Employment		Price Change (%)
	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (B 2013\$)	Post-Disruption (B 2013\$)	Change (%)	Reference Case (jobs)	Post-Disruption (jobs)	
Agriculture (Annual Crops)	0.000	0.000	-15.99	0.06	0.05	-13.32	768	666	-13.32
Agriculture (Perennial Crops)	0.000	0.000	-15.42	0.19	0.17	-12.73	2,208	1,926	-12.73
Agriculture (Other)	0.002	0.002	-16.31	0.14	0.12	-13.63	4,004	3,458	-13.63
Metals & Minerals Processing	0.009	0.008	-15.72	4.32	3.76	-13.04	26,253	22,829	-13.04
Electric Power	0.009	0.008	-13.78	4.09	3.64	-11.04	8,974	7,984	-11.04
Water Utilities				1.13	0.99	-12.08	5,621	4,942	-12.08
Construction	0.01	0.01	-12.23	15.11	13.68	-9.45	207,304	187,708	-9.45
Food, Drugs, & Chemicals	0.129	0.110	-14.78	17.08	15.02	-12.07	75,799	66,651	-12.07
Light Industry	0.026	0.022	-15.37	13.83	12.08	-12.69	177,207	154,725	-12.69
Heavy Industry	0.009	0.007	-15.56	7.40	6.45	-12.87	73,191	63,768	-12.87
High Tech Industry	0.008	0.007	-15.68	24.20	21.05	-13.01	129,192	112,379	-13.01
Wholesale Trade	0.021	0.018	-15.00	28.05	24.59	-12.31	213,337	187,069	-12.31
Retail Trade	0.129	0.113	-12.91	23.65	21.25	-10.15	444,176	399,091	-10.15
Professional & Tech. Services	0.073	0.062	-14.46	108.58	95.83	-11.75	1,132,653	999,592	-11.75
Motion Picture & Video	0.017	0.015	-16.20	31.23	27.00	-13.54	145,454	125,755	-13.54
Entertainment & Recreation	0.083	0.071	-14.11	30.71	27.22	-11.39	549,210	486,663	-11.39
Telecommunications	0.004	0.003	-13.39	9.42	8.42	-10.65	32,450	28,993	-10.65
Banking & Finance	0.013	0.011	-13.24	38.55	34.50	-10.50	373,243	334,050	-10.50
Real Estate	0.130	0.113	-13.38	78.79	70.41	-10.64	427,688	382,201	-10.64
Schools & Libraries	0.051	0.048	-4.87	26.55	26.06	-1.86	398,695	391,283	-1.86
Colleges & Universities	0.043	0.037	-12.27	4.07	3.68	-9.48	66,587	60,272	-9.48
Medical	0.013	0.011	-12.41	18.92	17.10	-9.64	248,660	224,700	-9.64
Hospitals	0.034	0.029	-12.28	10.64	9.63	-9.50	121,155	109,647	-9.50
Nursing Homes	0.022	0.019	-12.32	3.09	2.79	-9.53	76,838	69,514	-9.53
Personal & Repair Services	0.079	0.068	-13.47	8.94	7.98	-10.72	206,868	184,683	-10.72
Parking Services	0.016	0.013	-13.49	2.50	2.23	-10.74	54,488	48,635	-10.74
Religious Activities	0.029	0.025	-12.55	3.98	3.59	-9.78	79,928	72,114	-9.78
Government Industry	0.061	0.056	-8.46	34.72	32.79	-5.56	357,573	337,680	-5.56
Community Services	0.000	0.000	-12.18	0.64	0.58	-9.40	22,618	20,492	-9.40
Households	1.902	1.665	-12.46	-	-	-	-	-	-
Other	0.187	0.181	-3.34	-	-	-	-	-	-
Total	3.107	2.731	-12.08	550.59	492.66	-10.52	5,662,140	5,089,471	-10.11
									0.10

From: Christine Costello <Christine.Costello@lvvwd.com>
Sent: Monday, July 07, 2014 10:54 AM
To: bdcg.comments@noaa.gov
Cc: Colby Pellegrino
Subject: Statement of Support
Attachments: Sexecm214070710430.pdf



SOUTHERN NEVADA WATER AUTHORITY

1001 South Valley View Boulevard • Las Vegas, NV 89153
(702) 258-3939 • snwa.com

Via email to bdcg.comments@noaa.gov

July 7, 2014

BDCP Comments
Ryan Wulff
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, California 95814

Re: STATEMENT OF SUPPORT FOR THE DRAFT BAY DELTA CONSERVATION PLAN AND ASSOCIATED
DRAFT ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. Wulff:

The Southern Nevada Water Authority (SNWA) appreciates the opportunity to comment on the Draft Bay Delta Conservation Plan and associated Draft Environmental Impact Report and Environmental Impact Statement (Draft Plan). While SNWA does not obtain any water from the California Bay Delta, SNWA shares a portion of the Colorado River with the Metropolitan Water District of Southern California (Metropolitan), an Authorized Entity in the Draft Plan. Therefore, SNWA is acutely aware of how the actions contemplated in the Draft Plan could have water supply consequences to the Colorado River.

SNWA and Metropolitan both rely upon a portfolio of water resources with contingency plans for unfavorable resource conditions. The uncertainty of supply coming from the Bay Delta in California forces heavier reliance on Colorado River resources. More than a decade of drought on the Colorado River and expected long-term supply and demand imbalance have resulted in drastically reduced reservoir storage and significant near-term probability of the first ever shortage declaration on the Colorado River. The droughts in both California and on the Colorado River have exacerbated the importance of collaborative and durable solutions. SNWA supports the Draft Plan and the steps taken by Metropolitan to secure a sustainable supply of water for southern California's communities. The Draft Plan represents a significant milestone toward achieving long-term water security through a comprehensive conservation strategy for the Sacramento-San Joaquin Delta.

The western United States face substantial water resource challenges. Innovative and sustainable solutions are needed to address these challenges. SNWA encourages timely adoption and implementation of the Draft Plan in order to provide future water supply reliability. River drainages and the actions of the communities that rely upon them are increasingly interconnected as is the case between the Sacramento-San Joaquin Delta and the Colorado River.

Sincerely,

Colby N. Pellegrino
Colorado River Program Manager

CNP:cmc

SNWA MEMBER AGENCIES

Big Bend Water District • Boulder City • Clark County Water Reclamation District • City of Henderson • City of Las Vegas • City of North Las Vegas • Las Vegas Valley Water District

From: Food & Water Watch <act@fwwatch.org> on behalf of Richard Naranjo
<act@fwwatch.org>
Sent: Sunday, July 06, 2014 5:48 PM
To: BDCP.comments@noaa.gov
Subject: I Oppose the BDCP

Jul 6, 2014

Ryan Wulff
650 Capitol Mall. Suite 5-100
Sacramento, CA 95814

Dear Wulff,

I am concerned and alarmed by the proposal for the new tunnel project to redirect water from the Sacramento River.

Mr. Brown California is already short in water, and as you well know most of the water is being carried in from several other states.

California DOESN'T have water for its own, how can be possible just think to give our limited supply of water to few people who are not really helping at all the state nether the nature and people...???

May be you and some of your friends will become richer, but if you do not have water and food, what will you do with that money? you have to live, survive, eat and drink first then you will think in home or place where live. What will you do when there is nothing you can buy with money? Water is everything, water is the future money exchanging.... But with these tunnels plans either you will have water to survive...

This project will cost billions of taxpayer dollars at a time when our state cannot afford it. An entire river should not be redirected for the sake of large-scale, unmetered agriculture and the oil industry.

The proposed tunnels have already been rejected by voters in 1982, and similar tunnel projects in places like Santa Barbara County have not been cost effective and have provided little benefit to taxpayers.

Overall, the tunnels are unnecessary and fiscally irresponsible. The existing aquaduct could be reinforced and other local water projects like rainwater collection could be implemented instead, providing a much greater benefit at a lower cost.

Sincerely,

Mr. Richard Naranjo
1950 Tamarind Ave
Los Angeles, CA 90068-3557

From: Food & Water Watch <act@fwwatch.org> on behalf of Bruce and Wendla Duncan <act@fwwatch.org>
Sent: Monday, July 07, 2014 9:50 AM
To: BDCP.comments@noaa.gov
Subject: I Oppose the BDCP

Jul 7, 2014

Ryan Wulff
650 Capitol Mall. Suite 5-100
Sacramento, CA 95814

Dear Wulff,

I am concerned and alarmed by the proposal for the new tunnel project to redirect water from the Sacramento River.

This project will cost billions of taxpayer dollars at a time when our state cannot afford it. An entire river should not be redirected for the sake of large-scale, unmetered agriculture and the oil industry.

The proposed tunnels have already been rejected by voters in 1982, and similar tunnel projects in places like Santa Barbara County have not been cost effective and have provided little benefit to taxpayers.

You have done your best to shield this project from the voters' will.

It would seem you are not doing this for the voters, but for wealthy interests. We suspect this is a quid pro quo deal. You should be ashamed. Back when you were being derided as "Governor Moonbeam" you had higher aspirations.

Overall, the tunnels are unnecessary and fiscally irresponsible. The existing aquaduct could be reinforced and other local water projects like rainwater collection could be implemented instead, providing a much greater benefit at a lower cost.

Sincerely,

Mr. Bruce and Wendla Duncan
7248 Saffron Way
Citrus Heights, CA 95621-7359

From: Sharon and Jonathan Dunn <dunndeals@hotmail.com>
Sent: Saturday, July 05, 2014 6:39 PM
To: bdcg.comments@noaa.gov
Subject: Delta tunnels

I vehemently oppose the construction of the tunnels. it will eventually destroy the ecosystem of the Delta.

Jonathan Dunn
2499 Rawson St
Oakland CA 94601
510-533-1492

From: Leslie, Heather <leslie2015@lawnet.ucla.edu>
Sent: Monday, July 07, 2014 11:21 AM
To: BDCP.comments@noaa.gov
Subject: Comment re: BDCP from Heather Leslie, Law Student
Attachments: Letter of Opposition – Inadequate Incidental Take Permit Alternatives in Bay Delta Conservation Plan.docx; Letter of Opposition – Inadequate Incidental Take Permit Alternatives in Bay Delta Conservation Plan.pdf

Attached please find a comment regarding the BDCP that is meant to explain the legal authority for the argument that alternative durations for the take permits are necessary in an EIR/EIS and the policy rationale behind examining alternative durations. I look forward to your response.

Best Regards,
Heather Leslie
UCLA School of Law
J.D. Candidate, Class of 2015

July 7, 2014

BDCP Comments
Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
bdcpc.comments@noaa.gov

Re: Letter of Opposition – Inadequate Incidental Take Permit Alternatives in Bay Delta Conservation Plan

Dear Mr. Wulff.

I am a student at the University of California, Los Angeles School of Law studying environmental law writing on my own behalf to highlight the inadequate incidental take permit alternatives evaluated in the Draft Environmental Impact Report /Environmental Impact Statement (DEIR/DEIS) for the Bay Delta Conservation Plan (BDCP). The BDCP is described as a “comprehensive conservation strategy to advance the planning goal of restoring ecological functions of the Sacramento-San Joaquin Delta (Delta) and improving water supply reliability in the state of California.”¹ The Delta Blue Ribbon Task Force referred to these planning goals as “co-equal”² but the failure of the DEIR/DEIS to analyze alternatives to the proposed take clearly prioritizes water supply over ecological functions and fails to comply with the requirements of the California Environmental Quality Act (CEQA).

The issue of take alternatives has already been brought to the attention of the proponents of the BDCP. The National Marine Fisheries Service (NMFS) comment on the DEIR/DEIS highlights that since the proposed action is the issuance of an incidental take permit, the alternatives section of the DEIR/DEIS must examine alternatives specifically to the incidental

¹ THE U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION, THE U.S. DEPARTMENT OF FISH AND WILDLIFE, THE U.S. DEPARTMENT OF COMMERCE, THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, THE NATIONAL MARINE FISHERIES SERVICE, AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, DRAFT ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT FOR THE BAY DELTA CONSERVATION PLAN [hereinafter DEIR/DEIS] 1-1 (November 2013) available at <http://baydeltaconservationplan.com/PublicReview/PublicReviewDraftEIR-EIS.aspx>.

² *Id.*

take permit.³ The NMFS explained that the alternatives section is supposed to “provide a clear basis for choice among options” but the current DEIR/DEIS is inadequate to allow the decision maker to approve a take permit because “none of the alternatives describe the... proposed action.”⁴ The NMFS suggested that the final EIR/EIS include alternatives to the proposed 50-year duration of all issued take permits such as a 25-year permit as is standard in other applications for take permits.⁵ **This comment is meant to explain the legal authority for the argument that alternative durations for the take permits are necessary in an EIR/EIS and the policy rationale behind examining alternative durations.**

An examination of the requirements for CEQA alternatives analysis reveals that the purpose of the project is essential to determining the scope of the alternatives.⁶ The first stated purpose of the BDCP is to support the applications for take permits under the federal Endangered Species Act (ESA) and the California Natural Community Conservation Planning Act of 2003 (NCCPA).⁷ However, every alternative in the BDCP includes the same 50-year take permit.⁸ This is problematic given the provision of the NCCPA akin to the ‘No Surprises Rule’ in the Federal ESA.⁹ While mitigation and changes to the incidental take permit may be possible for some of the effects likely to result from climate change, the BDCP claims to have incorporated planning for climate change into the conservation measures and other effects of climate change may be considered unforeseen circumstances that the project proponents would not be forced to

³ National Marine Fisheries Service, *NMFS "Big Picture" Issues for 2013 Admin Draft BDCP EIR/EIS*, 2013 FED. AGENCY COMMENTS RECEIVED ON THE BAY DELTA CONSERVATION PLAN (BDCP) SECOND ADMIN. DRAFT ENVTL. IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT (EIR/EIS) (2013) available at http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Federal_Agency_Comments_on_Consultant_Administrative_Draft_EIR-EIS_7-18-13.sflb.ashx.

⁴ *Id.* at 1.

⁵ *Id.*

⁶ See Section III.B.i. of this comment for discussion on this topic.

⁷ DEIR/DEIS, 2-3.

⁸ *Id.* at 3-2.

⁹ Cal. Fish & Game Code Ann. § 2823 (West).

mitigate once the BDCP is approved as a natural community conservation plan under the NCCPA.¹⁰

The various species covered under the BDCP are important to the California economy, the health of the Delta ecosystem as a whole, and biodiversity in general. The BDCP EIR/EIS is the only opportunity to examine the environmental consequences of permits authorizing the take of these species. The BDCP project proponents need to take their commitment to restoring the Delta ecology seriously and include analysis of take alternatives in the EIR/EIS as required for sufficient information for those agencies deciding on the take permits to make a clear choice between meaningfully different options.¹¹ The take alternatives should be discussed in the EIR/EIS, instead of just the BDCP. Additionally, for meaningful analysis of the alternatives it is suggested that the alternatives be examined in light of the varying degrees of certainty in regards to California's climate over various lengths of time. This would enable the CDFW to compare the certainty and stability provided to the project proponents with a longer permit durations with the uncertainty about the state of the Delta's ecology due to climate change over longer periods of time.

I. Scope of the Comment

The DEIR/DEIS was written to support the "issuance of incidental take permits for restoration activities and operational changes in the State Water Project (SWP) and authorizations related to operational changes in the federal Central Water Project (CWP)."¹² The DEIR/DEIS supplements the BDCP, which is both a habitat conservation plan pursuant to the federal ESA and a natural community conservation plan pursuant to the NCCPA.¹³ The

¹⁰ See

¹¹ National Marine Fisheries Service, *supra* note 3.

¹² DEIR/DEIS at 1-2.

¹³ *Id.*

DEIR/DIES was prepared for compliance with the National Environmental Policy Act and CEQA.¹⁴ **However, the discussion of alternatives to the proposed incidental take in this comment is limited to analysis under CEQA and thus the relevant action is limited to permitting under the NCCPA.** For the purposes of this comment letter, the relevant lead agency is the California Department of Water Resources (CDWR) and the relevant permitting agency is the California Department of Fish and Wildlife (CDFW).

II. Background Material

A. Facts from the BDCP

i. The Proposed Take

While one of the goals of the BDCP is “restore and protect ecosystem health”, other goals such as the restoration of water supply and water quality mean that the proposed development in the BDCP such as the new water conveyance facilities will result in the take of multiple species.¹⁵ The ‘take’ of a species includes to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” a species.¹⁶ Take will result from the BDCP in a variety of ways including entrainment of important fish species on water intake facilities.¹⁷ The California Endangered Species Act prohibits the take of an endangered or threatened species without an incidental take permit.¹⁸ The NCCPA process is one way in which an agency may receive that permit.¹⁹

¹⁴ *Id.*

¹⁵ CAL. DEP'T OF WATER RES., PUBLIC DRAFT BAY DELTA CONSERVATION PLAN [hereinafter BDCP] 1-1, ES-16 (ICF Int'l 2013), *available at* <http://baydeltaconservationplan.com/PublicReview/PublicReviewDraftBDCP.aspx>.

¹⁶ Cal. Fish & Game Code Ann. § 86 (West).

¹⁷ BDCP, 5.B-i.

¹⁸ Cal. Fish & Game Code Ann. § 2080.1 (West)

¹⁹ Cal. Fish & Game Code Ann. § 2835 (West).

The NCCPA is a “mechanism for compliance with state endangered species regulatory requirements through the development of comprehensive, broad-scale conservation plans...”²⁰ Under the NCCPA, the permitting agency, here the DWF, may “authorize by permit the taking of any covered species... whose conservation and management is provided for in a natural community conservation plan approved by the department.”²¹ In this case, the BDCP is the natural community conservation plan required by the NCCPA. The purpose of the BDCP is to supplement the application for a permit under NCCPA authorizing the take of BDCP’s “covered species” which include 11 fish, 5 mammal, 11 bird, 2 reptile, 2 amphibian, 7 invertebrate, and 18 plant species.²² There are many specific permit requirements that the CDWR and its subsidiaries will have to comply with if the NCCPA permit is issued but of particular interest is that the permit would allow for the take of 56 different plant and animal species over the course of 50 years.²³

ii. The Project Alternatives in the DEIR/DEIS

There are 15 action alternatives and one “No Action” alternative to the BDCP as proposed.²⁴ Every alternative involves a dual conveyance water delivery system, diversion of water from the north Delta, and some “Conservation Components”.²⁵ There are differences in terms of location, design, conveyance capacity, and other features in the various alternatives.²⁶ However, the “Associated NMFS and USFWS Action” is always the same, as “[i]ssuance of 50-year ITPs and an NCCP permit is common to all of the alternatives, with the exception of the No

²⁰ BDCP, 1-10.

²¹ Cal. Fish & Game Code Ann. § 2835 (West).

²² DEIR/DEIS, 1-16-17.

²³ BDCP, 1-25-26.

²⁴ DEIR/DEIS 3-2.

²⁵ *Id.* at 3-15-16.

²⁶ *Id.* at 3-2.

Action Alternative.”²⁷ This lack of alternatives to the take permit is what is at issue in this comment letter and is further discussed in Sections III and IV.

iii. Take Alternatives in the BDCP

The BDCP itself, not the DEIR/DEIS, does claim to provide analysis of alternatives to the take permits, including the permit required by the NCCPA.²⁸ The take alternatives listed in the BDCP each have an “equivalent or similar EIR/EIS alternative” and were created based on the DEIR/DEIS alternatives.²⁹ As a result, the take alternatives are similar to the EIR/EIS alternatives with small changes such as increased natural community restoration or decreased tidal restoration.³⁰ Just like the DEIR/DEIS alternatives, there is no mention of alternatives to the issuance of a 50-year incidental take permit. The alternatives differ in the amount of take (characterized as increased or decreased take and % change in permanent effects on natural communities) but not in whether or not a take permit is required and how long such a permit would last.³¹ As such even if this “take alternative” analysis in the BDCP were incorporated into the DEIR/DEIS the legal and policy arguments discussed below regarding the inadequacy of take alternatives analysis would not be resolved.

B. Importance of the Listed Species in the BDCP

While the NCCPA is meant to incorporate ecosystem planning and be broader than the California Endangered Species Act by covering even non-listed species³², many of the species for which a take permit would be granted by approval of the BDCP are endangered or threatened.³³ For example, the delta smelt is threatened and one species of Chinook salmon is

²⁷ *Id.*

²⁸ BDCP, Chapter 9.

²⁹ *Id.* at 9-8-9.

³⁰ *Id.* at 9-9.

³¹ *Id.* at 9-20.

³² Cal. Fish & Game Code Ann. § 2810 (West).

³³ BDCP, 1-25-26.

endangered under both federal and state endangered species laws.³⁴ The California Endangered Species Act clearly states California's intent to protect such species, citing that "these species of fish, wildlife, and plants are of ecological, educational, historical, recreational, esthetic, economic, and scientific value to the people of this state, and the conservation, protection, and enhancement of these species and their habitat is of statewide concern."³⁵ Yet the BDCP will allow for take resulting in the death of many members of these already declining species and as such it is even more crucial that the only method of evaluating alternatives to such take, the DEIR/DEIS, be completed properly and in keeping with its own proclamation of species conservation and restoration.³⁶

The Chinook salmon in particular highlights the importance of species within the Bay Delta to all Californians. Overall, the BDCP would allow for the take of three different species of Chinook salmon.³⁷ According to the Golden Gate Salmon Association, "the state's own analysis shows the tunnel and diversions could literally cook young salmon by causing upstream river temperatures to rise to lethal levels."³⁸ Historically, an average of 1.5 to 2 million Chinook salmon spawned in the Delta each year.³⁹ In contrast, none of the spring-run Chinook salmon, an endangered species covered by the BDCP, spawned in the Sacramento River in 2003 and 2005.⁴⁰ The loss of these species has tangible, economic impacts on the state of California. The closure of a single salmon run in 2008 was estimated to result a loss in \$255 million and 2,263 California

³⁴ *Id.*

³⁵ Cal. Fish & Game Code Ann. § 2051 (West).

³⁶ DEIR/DEIS, 1-1.

³⁷ BDCP, 1-25-26.

³⁸ Chris Clarke, *An Introduction to California's Delta Tunnel and Salmon Controversy*, KCET: REWILD, (Dec. 10, 2013), <http://www.kcet.org/news/redefine/rewild/fish/delta-tunnels-could-wipe-out-salmon-group-says.html>.

³⁹ Doug Obegi, *How Water Management in the Bay-Delta Threatens the Future of California's Salmon Fishery*, in NATURAL RES. DEF. COUNCIL, NRDC ISSUE PAPER JULY 2008, 9 (2008), *available at* <http://www.nrdc.org/water/conservation/salmon/salmon.pdf>.

⁴⁰ *Id.* at 11.

jobs.⁴¹ Salmon are also a vital part of the Delta ecosystem. Salmon carcasses provide much needed nutrients for various plants and animals in the delta, as well as nearby agricultural uses that thrive on nitrogen in the water released by decaying salmon.⁴²

There are also reasons to care about the protection of endangered and threatened species in general. Two categories of rationales exist for saving species: anthropocentric (focusing on ways in which species have instrumental value to humans) and intrinsic (focusing on protecting species for ethical or other non-utilitarian purposes).⁴³ Part of endangered and threatened species instrumental value to humans is the importance of a vast number and diverse range of species to biodiversity.⁴⁴ Biodiversity is a broad term that can encompass genetic, species, and ecosystem diversity.⁴⁵ Biodiversity is important for the complex ecological services that depend on many species in a health ecosystem.⁴⁶ Land covered by the BDCP includes estuarine habitats, a specific category of wetland habitat.⁴⁷ Wetlands serve a variety of important functions that humans rely on such as climate regulation, storage of surface water, flood control, aquifer replenishment, nutrient cycling and more.⁴⁸ These services may be at risk if biodiversity in the Delta is not maintained.

⁴¹ *Id.*

⁴² *Id.* at 13.

⁴³ Holmes Rolston III, *Duties to Endangered Species*, I *ENCYCLOPEDIA OF ENVIRONMENTAL BIOLOGY* 517 (Academic Press, 1995), available at <http://lamar.colostate.edu/~hrolston/duties-end-sp-Enc-Env-B-rev.pdf>.

⁴⁴ *Id.*

⁴⁵ Jason M. Patlis, *Biodiversity, Ecosystems and Species: Where Does the Endangered Species Act Fit In?*, 8 *TUL. ENVTL. L.J.* 33, 36 (1994).

⁴⁶ NATIONAL WILDLIFE FEDERATION, WHAT IS BIODIVERSITY?, <http://www.nwf.org/Wildlife/Wildlife-Conservation/Biodiversity.aspx> (last visited May 15, 2014).

⁴⁷ BDCP, 1-26.

⁴⁸ CALIFORNIA NATURAL RESOURCES AGENCY, *STATE OF THE STATE'S WETLANDS: 10 YEARS OF CHALLENGES AND PROGRESS* (2010), available at http://resources.ca.gov/ocean/SOSW_report.pdf.

C. Relevant Statutes

The purposes of and specifics of the NCCPA and CEQA are also very important for understanding why the BDCP DEIR/DEIS must consider alternative durations for the incidental take permits.

i. NCCPA

The California Endangered Species Act prohibits the “incidental taking of any endangered, threatened, or candidate species” unless authorized by the CDFW through a permit, memorandum of understanding, or natural communities conservation plan pursuant to the NCCPA.⁴⁹ The NCCPA was enacted at a time when both the California and Federal Endangered Species Acts were seen as failing to prevent the decline of wildlife populations despite costly efforts at compliance.⁵⁰ Legislators were concerned that the single species approach of the past was failing to protect species by failing to protect ecosystems as a whole.⁵¹ The NCCPA was meant to address the fact that “functioning ecosystems depend on the interactions of a wide variety of plant and animal species, not just those that happen to be listed.”⁵² Under the NCCPA, the CDFW may enter into an agreement with any person or public entity to create a plan that provides for “comprehensive management and conservation of multiple wildlife species.”⁵³ Such plans can only be approved if the CDFW finds that the plan meets various criteria such as providing for “protection of habitat, natural communities, and species diversity”, conservation measures, and monitoring programs.⁵⁴

⁴⁹ Cal. Fish & Game Code Ann. § 2080.1 (West).

⁵⁰ DANIEL POLLACK, NATURAL COMMUNITY CONSERVATION PLANNING (NCCP): THE ORIGINS OF AN AMBITIOUS EXPERIMENT TO PROTECT ECOSYSTEMS (PART 1 OF A SERIES), (Cal. Research Bureau 2001), <https://www.library.ca.gov/crb/01/02/01-002.pdf>.

⁵¹ *Id.* at 8.

⁵² *Id.*

⁵³ Cal. Fish & Game Code Ann. § 2810 (West).

⁵⁴ Cal. Fish & Game Code Ann. § 2820 (West).

In regards to the take of species, “at the time of plan approval, the [CDFW] may authorize by permit the taking of any covered species.”⁵⁵ The plan will include specific terms and conditions which if violated would result in suspension or revocation of the permit, in whole or in part and must specifically address what will happen if “plan participant does not maintain the proportionality between the take and conservation measures”.⁵⁶ Also, “the department shall suspend or revoke any permit, in whole or in part, issued for the take of a species... if the continued take of the species would result in jeopardizing the continued existence of species.”⁵⁷ Finally, the NCCPA includes a provision akin to the ‘No Surprises Rule’ of the federal ESA.⁵⁸ §2820(f)(2) of the NCCPA states that “If there are unforeseen circumstances, additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources shall not be required without the consent of plan participants...”⁵⁹

ii. CEQA

The DEIR/DEIS is intended in part to provide compliance with CEQA for the approval of the BDCP as a conservation plan under the NCCPA.⁶⁰ The legislative intent behind CEQA was for “all agencies of the state government which regulate activities of private individuals, corporations, and public agencies which are found to affect the quality of the environment” give major consideration “to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian.”⁶¹ CEQA is an “environmental full-

⁵⁵ Cal. Fish & Game Code Ann. § 2835 (West).

⁵⁶ Cal. Fish & Game Code Ann. § 2820(c) (West).

⁵⁷ Cal. Fish & Game Code Ann. § 2823 (West).

⁵⁸ The No Surprises Rule of the Federal Endangered Species Act states that: “If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the plan’s operating conservation program, the Director will not require any conservation and mitigation measures in addition to those provided for in the plan without the consent of the permittee, provided the plan is being properly implemented. 50 C.F.R. § 17.22.

⁵⁹ Cal. Fish & Game Code Ann. § 2820(f)(2) (West).

⁶⁰ DEIR/DEIS, 1-12.

⁶¹ Cal. Pub. Res. Code § 21000(g).

disclosure statute” that requires government agencies to report all of the environmental consequences of projects the agency permits or undertakes.⁶² In an environmental impact report, an agency discloses all of the environmental impacts of the proposed project and explains why such a project is necessary.⁶³ CEQA also includes substantive mandates as well.⁶⁴ Public agencies “should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects”.⁶⁵ To ensure this substantive requirement is met, an EIR must include “a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.”⁶⁶ While an EIR “need not consider every conceivable alternative to a project” there must be a “reasonable range of potentially feasible alternatives that will foster informed decision making and public participation.”⁶⁷

III. Failing to Consider Alternative Durations for Incidental Take Permits Thwarts the Purposes of CEQA

A. The No Surprises Rule Provides Project Proponents with a Safe-Harbor Against Further Mitigation Measures For the Duration of the Permit

As previously stated (*see Section II.C.I.*), the NCCPA includes a provision similar to the ‘No Surprises Rule’ under the federal ESA.⁶⁸ The problem with such a long duration for a take permit is illustrated by criticisms of the federal ‘No Surprises Rule’. The federal ESA states that after the issuance of an incidental take permit, equivalent to the take permit that may associate a natural community conservation plan under the NCCPA, in unforeseen circumstances arise, a

⁶² 9 Cal. Real Est. § 25A:1 (3d ed.).

⁶³ 9 Cal. Real Est. § 25A:1 (3d ed.).

⁶⁴ *Id.*

⁶⁵ Cal. Pub. Res. Code § 21002.

⁶⁶ Cal. Code Regs. tit. 14, § 15126.6.

⁶⁷ Cal. Code Regs. tit. 14, § 15126.6.

⁶⁸ Cal. Fish & Game Code Ann. § 2820(f)(2) (West).

permittee will not be forced to commit more or place more restrictions on “additional land, water, or financial compensation... beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the permittee.”⁶⁹ In Environmental Protection Information Center v. California Dept. of Forestry and Fire Protection, the Supreme Court of California held that the California Endangered Species Act does not contain a ‘No Surprises Rule’ but that the Legislature explicitly authorized such a rule in the NCCPA.⁷⁰

The purpose of the rule is to provide economic and regulatory certainty⁷¹ but it has undermined species conservation in the past and if take is permitted without requiring another permit application for the next 50 years, the NCCPA equivalent may similarly undermine conservation of species in the Bay Delta. The ‘No Surprises’ rule has been controversial since before its enactment. When the rule was under consideration, a group of 167 scientists sent a letter to Congress arguing that the rule would prevent adaptive land management and thus did not reflect ecological reality and [rejected] the best scientific knowledge and judgment.”⁷² Part of the problem is that the relationship between species and their environment is constantly changing as is scientific knowledge about that relationship.⁷³ The rule diminish the ability of habitat conservation plans (or natural community conservation plans as in the case of the NCCPA) to be adapted to ecological needs as they become evident over time.⁷⁴ Noted ESA scholar Holly Doremus has criticized the ‘No Surprises Rule’ for limiting the flexibility of

⁶⁹ 50 C.F.R. § 17.32(b)(5)(iii)(B).

⁷⁰ Env'tl. Prot. Info. Ctr. v. California Dep't of Forestry & Fire Prot., 44 Cal. 4th 459, 508 (2008).

⁷¹ Habitat Conservation Plan Assurances (“No Surprises”) Rule, 63 Fed Reg. 8859, 8860 (Feb. 23, 1998) (codified in 50 C.F.R. pt. 17).

⁷² Steve Vanderheiden, *Habitat Conservation Plans and the Promise of Deliberative Democracy*, PUBLIC INTEGRITY 205, 214-215 (2001).

⁷³ *Id.* at 214.

⁷⁴ *Id.* at 213.

habitat conservation plans that are meant to provide for adaptive management.⁷⁵ With such a rule, agencies that are supposed to ensure species protection cannot require “reductions in allowable take or increases in required mitigation if monitoring shows that the initial scheme is not working well for the species.”

The biggest potential threat that may alter the ecosystem and thus the potential existence of many plant and animal species in the region is climate change. The Intergovernmental Panel on Climate Change recently released a report stating that due to climate change “it is virtually certain that there will be more frequent hot and fewer cold temperature extremes over most land areas on daily and seasonal timescales as global mean temperatures increase.”⁷⁶ California in particular should expect hotter and drier conditions as the global temperature rises.⁷⁷ Of particular concern for the Delta and the endangered and threatened species that rely on a vibrant Delta ecosystem, climate change is expected to result in a 12 to 35% decrease in precipitation levels by 2050.⁷⁸ This may have catastrophic effects on BDCP covered species such as the delta smelt.⁷⁹ A study by the United States Geological Survey found that due to climate change “the persistence of the delta smelt in much of its current habitat into the next century appears to be uncertain.”⁸⁰ Climate change may bring about changes in salinity and water temperature which

⁷⁵ Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of "New Age" Environmental Protection*, 41 WASHBURN L.J. 50, 72 (2001)

⁷⁶ IPCC, 2013: Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2013), available at http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf.

⁷⁷ CALIFORNIA NATURAL RESOURCES AGENCY, 2009 CALIFORNIA CLIMATE ADAPTATION STRATEGY: A REPORT TO THE GOVERNOR OF THE STATE OF CALIFORNIA IN RESPONSE TO EXECUTIVE ORDER S-13-2008, 15 (2009), available at http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf.

⁷⁸ *Id.* at 17.

⁷⁹ DEIR/DEIS, 1-16-17.

⁸⁰ BROWN ET. AL., IMPLICATIONS FOR FUTURE SURVIVAL OF DELTA SMELT FROM FOUR CLIMATE CHANGE SCENARIOS FOR THE SACRAMENTO–SAN JOAQUIN DELTA, CALIFORNIA (United States Geological Service, 2013), available at <http://ca.water.usgs.gov/pubs/BrownEtAl2013.pdf>.

would effect the sustainability of delta smelt populations in the Delta.⁸¹ If projected higher water temperatures were reached, habitat near the Sacramento and San Joaquin rivers would become largely uninhabitable to the delta smelt.⁸²

The BDCP at least acknowledges climate change as a “changed circumstance” rather than an unforeseen circumstance, meaning that some of the impacts of future climate change could be mitigated in spite of the ‘No Surprises Rule’.⁸³ This is because the NCCPA distinguishes between changed and unforeseen circumstances and only applies the provision that is equivalent to the ‘No Surprises Rule’ to unforeseen circumstances.⁸⁴ However, if climate change were to effect Delta hydrology more quickly or more severely than the BDCP estimates in Appendix 2.C, the ability of federal and state agencies to require management changes or changes to the take permits is questionable. The BDCP states that the effects of climate change have already been anticipated by the plan.⁸⁵ In fact, the main construction project, the water diversion tunnels, of the plan are “proposed because of climate change”.⁸⁶ However, changes from the plan as it currently is due to climate change appear to be limited. The BDCP allows for “identifying alternative locations for implementing natural community restoration or protection actions”. However, the BDCP explicitly states that anything beyond what is already anticipated by the plan would constitute an unforeseen circumstance and thus no remedial action could be required.⁸⁷

⁸¹ *Id.*

⁸² *Id.*

⁸³ BDCP, 6-32.

⁸⁴ Cal. Code Regs. tit. 14, § 15126.6.

⁸⁵ BDCP at 6-44.

⁸⁶ *Id.*

⁸⁷ *Id.*

B. The Purpose of the BDCP is to Support NCCPA Authorization and the Application for a Take Permit, Thus a Reasonable Range of Alternatives Must Include Varying Permit Durations

i. A Range of Reasonable Alternatives is Defined by the Project Objectives

The range of project alternatives discussed in an EIR pursuant to CEQA is subject to the rule of reason.⁸⁸ While there is no “categorical legal imperative as to the scope of alternatives”⁸⁹ nor a hard rule about the number of alternatives to be considered, in a previous case also concerning conservation efforts in the Bay-Delta region, the Supreme Court of California instructed that “The process of selecting the alternatives to be included in the EIR begins with the establishment of project objectives by the lead agency.”⁹⁰ Further, the CEQA Guidelines advise that “a clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR.”⁹¹

In the DEIR/DEIS, the project objectives specifically address incidental take permits.⁹² The first objective listed is to “respond to the applications for incidental take permits for the covered species.”⁹³ The other two objectives reflect the two co-equal goals to be achieved by the BDCP: improvement of the ecosystem and greater, more reliable water supply delivery.⁹⁴ The DEIR goes on to state “additional project objectives that guide the development of the proposed project and alternatives.”⁹⁵ The very first objective listed here is to ensure the BDCP meets the standards for a natural community conservation plan.⁹⁶ However, it is unclear how this objective

⁸⁸ City of Maywood v. Los Angeles Unified School District, 208 Cal. App. 4th 362, 414 (Dist. Ct. App. 2nd 2012) citing Cal. Code Regs. tit. 14, § 15126.6.

⁸⁹ Sierra Club v. Tahoe Regional Planning Agency, 916 F.Supp.2d 1098, 1121-22 (E.D. Cal 2013).

⁹⁰ In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings, 43 Cal.4th 1143, 1163 (2008).

⁹¹ Cal. Code Regs. tit. 14, § 15124(b).

⁹² DEIR/DEIS, 2-3.

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

aided the development of alternatives to the project. Every single alternative listed in the DEIR/DEIS with the exception of the no project alternative, result in the exact same 50-year incidental take permit.⁹⁷

ii. The Agency Bears the Burden of Identifying Feasible Alternatives

CEQA prohibits agencies from approving projects for which there are feasible alternatives that would substantially lessen the environmental effects.⁹⁸ In order to help the agency avoid approving projects with such alternatives, the CEQA Guidelines instruct an agency to consider a “range of potentially feasible alternatives”.⁹⁹ Feasible is defined as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.”¹⁰⁰ The agency, in this case CDWR, is responsible for establishing the range of feasible alternatives but does not need to include alternatives that were determined to be infeasible during the scoping process.¹⁰¹ However, nothing in the DEIR/DEIS suggests that alternatives to the incidental take permit were not discussed because the agency determined such alternatives to be infeasible.

The alternatives analysis in the BDCP DEIR/DEIS is distinguishable from the appropriate alternatives analysis reviewed in Mt. Shasta Bioregional Ecology Ctr. V. County of Siskiyou.¹⁰² While the court rejected the plaintiff’s argument that the EIR failed to include adequate alternatives analysis, the court’s reasoning reinforces the importance of the project objectives to the scope of alternatives discussed. In Mt. Shasta, a wood veneer manufacturing facility sought approval of expansion to accommodate a biomass-fueled power plant.¹⁰³ There

⁹⁷ *Id.* at 3-2.

⁹⁸ Cal. Pub. Res. Code § 21002.

⁹⁹ Cal. Code Regs. tit. 14, § 15126.6.

¹⁰⁰ Cal. Pub. Res. Code § 21061.1.

¹⁰¹ *Citizens of Goleta Valley v. Board of Supervisors of the County of Santa Barbara*, 52 Cal.3d 553 (1990).

¹⁰² *Mt. Shasta Bioregional Ecology Ctr. V. County of Siskiyou*, 210 Cal.App4th 184 (Dist. Ct. App. 3d 2012).

¹⁰³ *Id.* at 189-90.

were numerous project objectives including renewable energy generation, helping prevent regional energy shortfalls, and offsetting the need for energy from fossil fuels.¹⁰⁴ Four alternatives were analyzed in the DEIR including a no project alternative, a reduced capacity alternative, and two alternative locations.¹⁰⁵ However, the discussion of all but the no project alternative was limited due to infeasibility of the other options.¹⁰⁶ The plaintiffs argued that a no project alternative was an insufficient alternatives analysis but the court disagreed primarily because the plaintiffs failed to meet their burden of proof of showing that there were feasible alternatives in contrast to the assertions of the lead agency.¹⁰⁷ The court pointed out that the plaintiffs bore the burden because they were challenging certification of the EIR.¹⁰⁸ In contrast though, there is a “general obligation on the lead agency to identify alternatives and mitigation measures during the CEQA process.”¹⁰⁹ The BDCP DEIR/DEIS is currently in the midst of the CEQA process and as such the burden is currently on the agency to show that all feasible alternatives were considered. There is nothing in the DEIR/DEIS to suggest that analysis of alternatives to the incidental take permit such a shorter duration would make the proposed conservation measures infeasible. If the CDWR wishes to use such an argument, it would need to be explicit in the DEIR/DEIS and supported by evidence.¹¹⁰

IV. Suggestions for the Final EIR/EIS

The discussion above shows that legal and policy arguments support the NMFS’s suggestion that the final EIR/EIS include alternatives to the proposed 50-year duration of all

¹⁰⁴ *Id.* at 197.

¹⁰⁵ *Id.* at 197-98.

¹⁰⁶ *Id.* at 197.

¹⁰⁷ *Id.*

¹⁰⁸ *Id.* at 199.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

issued take permits such as a 25-year permit.¹¹¹ These alternatives should be discussed in the EIR/EIS, not just the BDCP. Additionally, the analysis of each alternative should be conducted so that the CDFW can evaluate the impacts of permits of various durations. An analysis of the increasing uncertainty about the state of climate change over longer and longer periods of time is one suggestion for analysis of alternatives to the proposed take permit with various durations.

A. Discuss Take Alternatives in the DEIR/DEIS, Not Just the BDCP

While even the take alternatives discussed in the BDCP are insufficient to meet the purposes of CEQA alternatives analysis, the revised take alternatives should be included in the Final EIR/EIS, not just the BDCP. Currently, the BDCP itself, not the DEIR/DEIS, claims to provide analysis of alternatives to the take permits, including the permit required by the NCCPA.¹¹² However, to fully ensure that analysis of alternatives to the take permits is done correct, the alternatives should be in the EIR/EIS. In Citizens of Goleta Valley, the California Supreme Court held that it is “only the EIR that can effectively disclose to the public the analytic route... the agency traveled from evidence to action”.¹¹³ Further, “agency consideration of otherwise reasonable alternatives in the administrative record cannot replace the CEQA mandated discussion of alternatives in the EIR”.¹¹⁴ While the BDCP is undoubtedly part of the administrative record, the EIR is what the approving agency, in this case the CDFW, is supposed to use to determine which alternatives “offer substantial environmental advantages over the project proposal” and may be “feasibly accomplished in a successful manner considering the economic, environmental, social and technological factors involved”.¹¹⁵ The “administrative record can be studied to determine the degree of discussion any particular alternative deserves”

¹¹¹ *Id.*

¹¹² BDCP, Chapter 9.

¹¹³ Citizens of Goleta Valley v. Bd. of Supervisors, 52 Cal. 3d 553, 568 (1990).

¹¹⁴ *Id.*

¹¹⁵ *Id.* at 566.

but the actual discussion of those alternatives must be in the EIR. Thus, as part of improving the analysis of the alternatives to the take permits in the BDCP, the new alternatives should be analyzed in the EIR/EIS, not just the BDCP where the only mention of “take alternatives” is currently.¹¹⁶

B. Comparing Impacts of Take Permits with Varying Durations

According to CEQA Guidelines, an “EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.”¹¹⁷ The purpose of many projects for which CEQA applies is often construction of a building, residential development or project. When this is the case, CEQA alternatives often include various project locations and then the alternatives are assessed based on the environmental conditions of the various locations.¹¹⁸ Analyzing the differences between various alternatives is thus perhaps more difficult when the project is agency approval of a permit and the meaningful alternatives are various lengths of the duration of that permit. However, the EIR/EIS can still provide information to help the CDFW compare the environmental consequences of the various alternatives. One suggestion is to evaluate each alternative in light of the compare the increasing uncertainty about the climate change over longer and longer periods of time. Balancing the increasing uncertainty about climate change the longer the permit lasts for with the certainty that project proponents like the CDWR gain from permits of longer durations may help the CDFW determine which permit duration will be most protective of the environment while still being feasible.¹¹⁹

¹¹⁶ BDCP Chapter 9.

¹¹⁷ Cal. Code Regs. tit. 14, § 15126.6

¹¹⁸ Cal. Code Regs. tit. 14, § 15126.6(f)(2).

¹¹⁹ Note that “Specific economic, legal, social, technological, or other considerations” may make mitigation measures or project alternatives identified in the EIR infeasible. Cal. Code Regs. tit. 14, § 15091.

Climate modeling is has greater certainty the closer to the present time that the models are being used to predict.¹²⁰ Concentrations of carbon dioxide depend on factors such as economics, technology, and population control that are harder to predict father out.¹²¹ In the Intergovernmental Panel on Climate Change models, the range of potential degrees Celsius change in global temperature becomes increasingly large as analysis continues through the next decades.¹²²

Greater uncertainty is more problematic for species protection given the provisions of the NCCPA akin to the federal ESA 'No Surprises Rule'.¹²³ Greater uncertainty makes it more likely that unforeseen circumstances not planned for in BDCP may arise and yet in such a situation the CDFW would not be able to force mitigation measures to ensure that the take of species does not exceed what was originally planned. This uncertainty and potential for diminished protection of species should be examined against the stability that a longer-range permit would provide for project proponents such as the CDWR. While the permitting agencies still may decide that a shorter permit is infeasible (for example it probably would not make sense to have a take permit so short as to stop before funding is received and construction and implementation of the conservation measures of the BDCP actually begins), these alternatives should be included in the EIR/EIS so that CDFW can make an informed choice either way.

V. Conclusion

The current alternatives analysis in the BDCP DEIR/DEIS is inadequate. Just as the NMFS suggested, take permits of alternative durations should be analyzed.¹²⁴ CEQA is an

¹²⁰ Gavin Schmidt, *The Uncertainty in Climate Modeling*, BULLETIN OF ATOMIC SCIENTISTS (Nov. 26, 2007), available at <http://thebulletin.org/uncertainty-climate-modeling>.

¹²¹ *Id.*

¹²² IPCC, *supra* note 76 at 14 (see figure entitled: Multi-Model Averages and Assessed Ranges for Surface Warming").

¹²³ Cal. Fish & Game Code Ann. § 2820(f)(2) (West).

¹²⁴ National Marine Fisheries Service, *supra* note 3.

“environmental full-disclosure statute” that requires government agencies to report all of the environmental consequences of projects the agency permits or undertakes and to consider alternatives relevant to the purpose of the project.¹²⁵ The first stated purpose of the BDCP is to support the application for take permits under the federal ESA and the NCCPA.¹²⁶ As such, the alternatives analyzed need to provide meaningful differences in the take permits. Such analysis would help protect the commercial, intrinsic, and biodiversity value of species in the Delta such as the Chinook salmon and the delta smelt.

With Regards,



Heather Leslie
UCLA School of Law
J.D. Candidate Class of 2015

¹²⁵ 9 Cal. Real Est. § 25A:1 (3d ed.).

¹²⁶ DEIR/DEIS, 2-3.

From: Wolfgang Rougle <springfedfarm@yahoo.com>
Sent: Monday, July 07, 2014 2:06 PM
To: BDCP.Comments@noaa.gov
Subject: Public comment on BDCP

Dear BDCP team,

This is my public comment on the BDCP. I am a farmer in Tehama County, California. I beseech you not to implement the BDCP as currently envisioned. Instead, you should restore the Delta by reducing the stress on it: buy and retire ag lands that should never have been farmed; restore marshland (as the BDCP rightly calls for); and cap urban and ag water use at levels that ensure adequate flows to the Bay even in a dry year, then enforce the cap.

I respect that the "Twin Tunnels" project was born out of a long-overdue acknowledgement of some of the needs fish have. The BDCP seems to recognize that fish need to not be sucked off course during their migration, and they need to not be ground to pieces in pumps. But the BDCP does not seem to recognize the most fundamental fact of an estuarine system and the most important consideration for anyone who wants to restore the Delta:

Fish need water.

While a Twin Tunnels regime may prove marginally better for some species than the existing south Delta pumping regime, and while the BDCP may forestall further deterioration in species abundance, the BDCP/Twin Tunnels scheme will not restore the Delta. The only way to restore the Delta is to leave more water in it. And the only way to do that is to reduce water consumption south of the Delta.

The \$40,000,000,000 price tag of the BDCP would be better applied to buying up farmland in the thirstiest irrigation districts, and permanently retiring it. There is no reason why water should be moved hundreds of miles so that crops can be planted on land which gets six inches of rain a year.

Sincerely,
-Wolfgang Rougle
16395 Ridgewood Rd
Cottonwood, CA 96022

From: lavmazz@comcast.net
Sent: Tuesday, July 08, 2014 2:15 PM
To: BDCP.Comments@noaa.gov
Subject: TwinTunnels Impact.

Please do not proceed with the Twin Tunnels project. It will destroy the Delta & ruin all of the San Joaquin Delta farms.

Gov. Jerry Brown I have supported you during the years & had admiration for many of your ideas. The Twin Tunnel idea is over the top. Why would you wish to turn off the water supply to Delta farmers & destroy their farms to satisfy the wealthy corporate farms in the south. I absolutely will not vote for you again if you keep supporting the tunnels. Though I have only one vote I will do everything in my power to promote the "Save the Delta campaign".

Sincerely LaVerne Wauhab Mazzilli

Members of my family have had farms & cattle ranches since 1855!!

From: Lane, Cindy <CINDYL@smwd.com>
Sent: Tuesday, July 08, 2014 3:49 PM
To: BDCP.comments@noaa.gov
Cc: Crosthwaite, Joyce; Ferons, Dan
Subject: SMWD Draft Bay Delta Conserv Plan Comment Ltr
Attachments: Bay Delta Conservation Plan Board Appvd Ltr.pdf

Dear Mr. Wulff,

Attached is the Board-approved comment letter from the Santa Margarita Water District concerning the Draft Bay Delta Conservation Plan (BDCP).

The original wet-signature letter will be mailed to your attention.

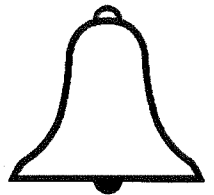
Regards,

Cindy Lane
Administrative Analyst
Santa Margarita Water District
Phone: 949-459-6589
Fax: (949) 459-6463



BOARD OF DIRECTORS
BETTY H. OLSON, PH.D
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GENERAL MANAGER

BDCP 1459



Santa Margarita Water District

July 2, 2014

BDCP Comments
c/o Mr. Ryan Wulff
National Marine Fisheries Services
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Dear Mr. Wulff:

The Santa Margarita Water District (SMWD) is pleased to submit comments on the Draft Bay Delta Conservation Plan (BDCP) and Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS). Please note that our comments on the BDCP and Draft EIR/EIS interchangeably use the terminology "BDCP," "BDCP process," "the Bay-Delta Fix" and the "decision-making process" to reflect the entire suite of efforts and decisions in a comprehensive manner.

1. BDCP Preferred Alternative (No. 4): SMWD supports the BDCP Preferred Alternative (No. 4) provided reasonable assurances are included regarding governance and future decision-making in the process. It is critical to the state's economy and environment that both the State and federal government expeditiously follow through with the decision for adopting and implementing the BDCP.

We also strongly advocate for a seat at the table for the water Permittees in the various oversight groups. The investment and decision-making must be structured to achieve a positive outcome for both the State Water Project (SWP) and Permittees and the ecosystem restoration in a collaborative, partnership manner.

We oppose the No Action Alternative.

2. Co-Equal Goals: The BDCP must be implemented in a manner consistent with the Delta Reform Act of 2009's co-equal goals adopted by the State. Preferred Alternative (No. 4) is consistent with those goals.
3. New Facilities and In-Delta Operational Flexibility: The modernization of the Delta conveyance system is essential in order for habitat restoration and conservation to have its intended effect. Preferred Alternative (No. 4) provides the best balance between operational flexibility and modernizing the conveyance system for environmental benefit and water supply reliability.

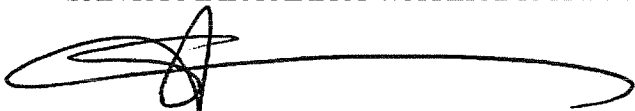
4. Plan Implementation and Regulatory Assurance: The BDCP must provide the needed implementation and regulatory structure and assurances to help achieve the co-equal goals. To us, this means that it is virtually impossible to predict the outcome of the BDCP habitat restoration efforts and endangered species population dynamics, and such a standard should not be required in the DEIR/DEIS. Furthermore, this means that changed circumstances under the operation of the BDCP, including the potential for new species listing, be incorporated in such a manner so as to result in a minimum impact on future water supply exports.
5. Further comments on the BDCP Draft Implementing Agreement:
 - Shortfall in Funding – The Implementing Agreement provides that in the event of a shortfall in state or federal funding, the permits will not be suspended or revoked provided the “shortfall in funding is determined to have no more than a minimal effect on the capacity of the plan to advance the biological goals and objectives.” What is meant by “minimal effect” needs to be defined in order to protect the ‘Permittees’ from backstopping the obligations of the State and Federal government.
 - Neutrality of Permitting Decision Tree Outcomes – All Decision Tree outcomes should be described equally and fully evaluated before a decision is made.
 - Real-Time Operations – Real time operations short-term adjustments should be water supply neutral within a specified time frame and should not compromise the discretion of the Project Operations for purposes of maximizing conservation benefits to covered species and maximizing water supplies as described in section 10.2.2.
 - Signatories: It is not clear who will be obligating the commitments of the United States and the State of California that are beyond those of the Authorized Entities. It is recommended that the Secretary of the Interior and the Governor sign the agreement to help ensure that those commitments will be met.
6. Cost Allocation: SMWD supports the “beneficiary pays principle” in cost allocation for all responsible parties and beneficiaries.
7. Economy, Environment and Water Management: The SWP is critically important to the Orange County economy, environment and water management. Implementation of the BDCP is critical to Orange County’s future. We have invested heavily to diversify our water portfolio but the SWP remains a critical source of low salinity water supply that is currently unacceptably jeopardized by the unsustainability of the current Bay-Delta system. At the same time, Orange County relies on the SWP to support groundwater conjunctive use programs and water recycling programs. It is an essential part of our water reliability strategy that sustains our citizens and businesses.

8. Reduced Future Reliance: The 2009 Delta legislation called for water agencies to reduce future reliance on the Delta. While strides in this area will continue to be made it is important to note that "reduced reliance" does not equate to and was never intended to require a move to 100 percent "self-reliance." The thinking behind the co-equal goals was never meant to result in a future with significant reduction in exports from levels achieved before the 2008 bio-opinions.
9. Natural Community Conservation Plans and Habitat Conservation Plans: As a landowner participant in the South Orange County Sub-region Habitat Conservation Plan, the District is a firm supporter of efforts and commends the effort to develop a long-term plan to address the co-equal goals. The planning efforts in Orange County have shown that thoughtful plans can successfully meet multiple goals to the benefit of the environment.

Thank you for your time and thoughtful consideration of these comments.

Sincerely,

SANTA MARGARITA WATER DISTRICT



Saundra F. Jacobs
President

c: Karl Seckel, MWDOC
Steve Arakawa, MWDSC

From: Food & Water Watch <act@fwwatch.org> on behalf of Judith Rudnicki
<act@fwwatch.org>
Sent: Tuesday, July 08, 2014 2:53 PM
To: BDCP.comments@noaa.gov
Subject: I Oppose the BDCP

Jul 8, 2014

Ryan Wulff
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Dear Wulff,

I am concerned and alarmed by the proposal for the new tunnel project to redirect water from the Sacramento River.

This project will cost billions of taxpayer dollars at a time when our state cannot afford it. An entire river should not be redirected for the sake of large-scale, unmetered agriculture and the oil industry.

The proposed tunnels have already been rejected by voters in 1982, and similar tunnel projects in places like Santa Barbara County have not been cost effective and have provided little benefit to taxpayers.

I absolutely oppose the construction of these or any other tunnels.

And I suggest that we begin to remove from production much of the farmland that should never have been planted with water-intensive crops like nut trees. It takes 5 to 9 gal of water to grow one walnut, and 1.1 gal of water to grow one almond.

We cannot throw money --- that we do not have --- at this drought. We cannot spend money -- that we do not have -- to move water -- that we are almost out of --- to land that has been planted in crops that we cannot support.

Overall, the tunnels are unnecessary and fiscally irresponsible. The existing aquaduct could be reinforced and other local water projects like rainwater collection could be implemented instead, providing a much greater benefit at a lower cost.

Sincerely,

Ms. Judith Rudnicki
1532 N Hayworth Ave Apt 12a
Los Angeles, CA 90046-3314

From: Kids Experience <jvs5253@comcast.net>
Sent: Wednesday, July 09, 2014 8:26 AM
To: BDCP.comments@noaa.gov
Subject: Bay Delta Conservation Plan

I do not need to even read all the political/scientific arguments on either side to understand what has been happening to our state water supply. Regardless of how much water is available (in any given year), too many people are trying to profit from its existence. The business/ political interest have somehow superseded the real need for the balanced approach of economy vs environmental balance.

When the San Joaquin-Sacramento Delta was first settled, the actions taken for best overall use was to;

- Dredge the exiting water channels and build levies to stop annual flooding to cities, towns, and settlements, promote profitable farming, create a man-made barrier to salt water intrusion and (as added benefit) reduce the mosquito population. Everything was in balance for a while.
- As our state population grew, we came to a point after WWII where competing interest for water between the central valley and major population areas gave us dams, reservoirs, and by the fifties the water transportation system to the south valley.
- As soon as this water became available, the south valley farmers reaped great profits (and political influence) from tomato, cotton and various seasonal crops.
- Then Southern California municipalities (backed by millionaire developers) join in to politicize their water interests.
- By this time corporate farming has gained control of the south valley and decided to grow fruit and nut orchards. These are high-profit, long term operations that require massive amounts of year round water.
- These competing natural resource demands then caused politically motivated gerrymandering of San Joaquin County (where the water is). This left San Joaquin County (by design), with no collective voting power as it was split into four parts, each able to be out-voted by their added constituents.
- The last re-alignment is still a partisan divide for political party gain and continues to divide our collective interests.
- To support a false ecological narrative, the politicians/bureaucracy then decided to stop the long-accepted practice of re-dredging the San Joaquin-Sacramento Delta (except for the shipping lanes required by federal law). Dredging also helps keep pressure off the levies during high tides and seasonal run-off.

I refuse to take the bait and get into another distraction brought to us by people who think if you can have a contest to rename the San Joaquin- Sacramento Delta, it can re-brand this ridiculous natural resource grab. If the state politicians were truly accountable to their constituents, there would be logical efforts to increase our fresh water potential through alternate technologies other countries currently use.

- Desalinization
- Additional storage for wet years and to help keep pressure off the levies during seasonal run-off.
- re-dredging the San Joaquin-Sacramento Delta
- governmental oversight of agricultural land use and urban development as related to current water resources available

This water project in its so wrong, on so many levels, it is hard to know where to start (also probably by design). The science is not logical and everything is either being hidden, forced, or agenzied, for profit by our state government that is no longer able to divert our attention from its true nature; resources for profit.

Shannon

From: Ray Peterson <hogback0@gmail.com>
Sent: Wednesday, July 09, 2014 8:35 PM
To: bdc.comments@noaa.gov
Subject: BDCP EIR/EIS

I am writing on behalf of the Simpson Tract Property Owners Association, a 50 year old property owners association on Steamboat Slough. Our questions, concerns, and comments are as follows.

1. Chapter 8. Water Quality

Please explain what mitigation WQ11 does. It concludes the increase in EC levels is "significant and unavoidable". There are 38 other significant and unavoidable impacts under Alternative 4 according to table 31-1. Many of them pertain to water quality and quantity for above and underground water.

2. Chapter 7. Groundwater section 7.3.3.9 dewatering

Will any wells more than 2600 feet from the sites be monitored and if so when and where will they be monitored? Will the monitoring be all along the route? If there is no additional monitoring are we assured our wells will not be affected?

3. Channel Margin Enhancement. CM6

Where are the specific projects and when will the affected property owners be notified? There are many properties along the Sacramento River, Sutter Slough and Steamboat Slough in addition to Simpson Tract. We owners have no idea of the future of our properties and have been in this same state for several years with no answers to our questions. How will we be compensated for this extended period of uncertainty? Do we proceed with an improvement or project? Do we make repairs, complete a home already started, plant trees etc. This is detrimental to our property values. In the event a owner needs or wants to sell this information must be disclosed. Who wants to buy property that may be underwater in the next 5 or 10 years?

4. As an alternative to the down stream tunnels consider desalination.

5. How is the habitat conservation plan being funded?

We are opposed to including any mitigation using our properties based on the fact there is no proven science showing a net benefit to the project. All that is shown is a negative recreation impact and a cloud on the titles of the affected properties.

After all of this expense there would still be no increase in total available water. There have been no new federal or state water storage facilities since the water project in the 60's. Additional water storage up and down the state, although it would not add to the total amount of fresh water, would increase the capture rate of fresh water before runoff. The state needs to require more recycling of water, conservation, and invest in new water storage and desalination.

Betty Peterson
President, Simpson Tract Property Owners Association
13954 Grand Island Rd
Walnut Grove CA

BDCP1462

Mailing Address
1884 Carl Rd
Rescue CA 95672

From: barbaraleary@comcast.net
Sent: Wednesday, July 09, 2014 8:34 PM
To: BDCP comments
Subject: Comments regarding BDCP
Attachments: BDCP submitted Comments 7.2014.pdf

Please find my comments to be included in the public records regarding the BDCP.

Barbara Leary
128 Yankton St.
Folsom, CA 95630
916 985-7948 (h)
916 947-9270 (c)



July 9, 2014

BDCP Comments
Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
Dear Mr. Wulff:

After reviewing the documents available for the BDCP I discovered funding must be shown to be sufficient for all planned activities, and all financial contributors and planned allocation of funds must be identified. To this date no formal funding proposals for the entire project have been made available to the public, nor is there an accurate projected cost for the entire project. In fact, as of this writing, the legislature continues to work on proposals for a state water bond without successfully identifying a specific dollar amount or identified areas for the money that "might" be raised will be spent. "Delta restoration" is a very vague term; I propose that it is unlikely the voters will support such a bond. In fact, many legislators have noted that any bond should be "tunnel neutral" further confounding the issue of what monies would be available for the BDCP as proposed. Given this lack of real vision or planning for the funding of the BDCP it is entirely unacceptable that this plan should be adopted; any permits to do so should be withheld.

I also find the plan entirely unbalanced in it's water delivery proposal, requiring the overlooking or changing existing water rights in order to unfairly benefit users in the western portion of the central valley, and leaving much of the Northern part of the state with frequent "dead pools" in place of our recreational lakes and basic day to day water supplies.

Finally, the documents provided for this plan are entirely unwieldy, over 40,000 pages, making it nearly impossible for a well educated person to review and address, say nothing about the average voter. Additionally, revisions and changes are being submitted to this date, making it absolutely impossible for anyone but a paid attorney to keep up with.

I am requesting that the BDCP document be deemed unacceptable for adoption.

Sincerely,

Barbara Leary
128 Yankton Street
Folsom, CA 95630

From: laverne <lavernegondry@comcast.net>
Sent: Wednesday, July 09, 2014 12:24 PM
To: BDCP.comments@noaa.gov
Subject: Tunnels

Please don't spend money on these tunnels.

Why not spend the money on desalinating the ocean waters? They do that for the ships and they do it in Arabia.

Makes more sense!!!!

From: Friends of the River <info@friendsoftheriver.org> on behalf of Jeff Martin
<info@friendsoftheriver.org>
Sent: Wednesday, July 09, 2014 8:51 AM
To: BDCP.Comments@noaa.gov
Subject: I oppose all alternatives in the BDCP that propose construction of new diversions and tunnels under the Delta

Jul 9, 2014

Mr. Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Dear Mr. Wulff, NMFS,

Thank you for receiving public comments in response to the Draft BDCP Plan and Draft EIR/EIS.

I oppose all alternatives in the BDCP that propose construction of new diversions and tunnels under the Delta. I oppose the project because:

It is too costly (up to \$54 billion with interest and other hidden costs) and the general public should not have to cover any of this outrageous, including habitat restoration costs. These should be paid by those who receive the water (since the Delta diversions degraded the habitat in the first place).


Operation of the diversions and tunnels threaten to dewater major upstream reservoirs in northern California and reduce downstream river flows, to the detriment of fish, wildlife, recreation, and other public trust values.

Diversion and tunnel facilities would adversely impact too much Delta farmland and habitat, harm Brannan Island State Park, infringe on the Stone Lakes National Wildlife Refuge, and degrade other essential conservation lands.

You cannot restore Delta habitat without first determining how much fresh water the Delta needs to survive and thrive. Restoration of fresh water flows from the San Joaquin River in the south Delta are particularly important.

The tunnels will need more upstream storage facilities to feed fresh water into them. These include raising Shasta Dam, building the Sites Reservoir, and possibly reviving the Auburn Dam on the American River and the Dos Rios Dam on the Eel. The environmental, cultural, and financial impacts of these controversial projects are a significant foreseeable but ignored impact of the BDCP.

I don't understand why we are spending billions of dollars building tunnels and diverting water when we can spend that money on de-salinization plants for the cities of San Diego, Los Angeles, and San Francisco. California continues to divert water when what we need is a source of new water where it is used. All of the major coastal cities have all the water they need right at their beaches. How do you think that they built Dubai? The California water system will never be fixed until we de-salinate water for the major coastal cities. I challenge our Governor to respond to this e-mail about this concept.

Thanks, Jeff. 

I believe that the BDCP should include, and I would support, an alternative that significantly reduces Delta exports and focuses instead on restoring habitat and threatened and endangered species in the Delta, improves Delta water quality by providing sufficient fresh water inflow from both the Sacramento and San Joaquin Rivers, and that includes a

BDCP1465

pragmatic plan to sustainably meeting California's water needs. This can be done by increasing agricultural and urban water use efficiency, capturing and treating storm water, recycling urban waste water, cleaning up polluted groundwater, and reducing irrigation of desert lands in the southern Central Valley with severe drainage problems. We don't need to build more dams or tunnels.

Thank you for considering my comments.

Sincerely,

Mr. Jeff Martin
3913 El Portal Pl
Modesto, CA 95357-0413
(209) 204-8227

From: Kevin Shaw <kwshaw1@gmail.com>
Sent: Thursday, July 10, 2014 9:51 AM
To: BDCP.Comments@noaa.gov
Subject: Fatal flaw in the EIS - no serious alternatives to the concept of a new conveyance system

The entire BDCP proposal (especially EIS section ES.5) is fatally flawed because it doesn't even attempt to consider real alternatives to the concept of building a new conveyance structure through the delta. The proposal starts with the assumption that some new conveyance is required and proceeds from there, but that isn't actually offering any meaningful alternatives. It's probably too late in the process to fix this huge oversight unless the entire project gets scrapped by the voters, so I'm mainly offering these comments for the historical record. When future generations are ready to actually solve our state's water problems, here are some obvious alternatives to consider - ones that should have been addressed in the BDCP:

- (1) Raise water rates across the board for all users. That is the single most effective way to encourage conservation, and could also help pay for conservation efforts.
- (2) Build conservation and water reuse projects, not new conveyances. Start by covering all existing water conveyance canals to reduce evaporation, for example by building rows of solar panels over the canals like they've been doing recently in India. How much water could we save annually if we spent \$20-30 billion on conservation measures instead of a new conveyance? It would have been helpful to see this calculation put in the BDCP EIS.
- (3) Start building large-scale water desalination plants along the California coast, and keep doing that until we have enough water supply from desalination to meet most urban water needs from San Diego to San Francisco. There are downsides to desalination and that's something which could have been documented in the BDCP EIS, but desalination is the obvious best way to ensure a reliable water supply for California in the future.
- (4) Once we have the desalination plants built, turn off the pumps sending water over the mountains into LA and San Diego, and allocate that water to central valley farmers. That ought to be enough water to eliminate the need for a new bay-delta conveyance, which would be a REAL alternative to the current proposal. This alternative approach would both increase California's total water supply and make us better prepared to deal with droughts, which the new conveyance does not do. (What good is a new conveyance if there's not enough rainfall to supply it?)

The current BDCP proposal is ridiculous. Does anyone really think that pumping water out of the north delta will have fewer environmental impacts than pumping water out of the south delta? That would be funny if it wasn't so expensive and such a monumental waste of time and effort. The real goal here should be to eliminate the need for pumping that much water out of the delta, and the EIS should have started from that assumption.

Kevin Shaw
Sacramento, CA

From: Thomas Dias <thom@emshq.net>
Sent: Thursday, July 10, 2014 7:18 PM
To: BDCP.comments@noaa.gov
Subject: comments

Dear BDCP: I cannot find one positive thing to say about the plan to take the fresh water from our beautiful delta, and allow the salt water to intrude and kill the natural flora and fauna. This multi-billion dollar project is funded by whom? Yep, us taxpayers, and who does it benefit, Yep, the large water re-sellers, and land developers. There are so many flat out lies, and half-truths that are being touted to try and get the public to agree to this boondoggle it is ridiculous. All you need to do is drive from Tracy to LA and read the signs, "orchards are dying because of lack of water" really!!!, what about all of the newly planted orchards? How dumb do you think the public is? Just a few bullets on the NO side of this issue.

- 1) Way too expensive for tax payers with little direct benefit
- 2) The delta will be destroyed as we know it
- 3) Remember mono lake, and the movie China Town...the destruction of the delta is going to be reality if this is allowed to go forward
- 4) It is Governor Moon Beams wet dream.....how much money will he, and his cronies
- 5) My biggest fear is that it is already too late.....too much big money behind it.

There are 5 registered voters in my household who do not want to see the tunnels built, please register 5 votes against it.

Thanks

Thom

Thomas J. Dias

Environmental Management Services, Inc.
150 North Wiget Lane, Suite 101
Walnut Creek, CA 94598
Telephone: (510) 828-4962
Fax: (925) 938-0105
E-mail: thom@emshq.net

From: Thomas Dias <thom@emshq.net>
Sent: Thursday, July 10, 2014 7:30 PM
To: BDCP.comments@noaa.gov
Subject: DVD draft EIR/EIS

Please send me a DVD copy of the above referenced documents.

To: Thomas Dias
3706 Christensen Lane
Castro Valley, CA 94546

Thanks

Thomas J. Dias

Environmental Management Services, Inc.
150 North Wiget Lane, Suite 101
Walnut Creek, CA 94598
Telephone: (510) 828-4962
Fax: (925) 938-0105
E-mail: thom@emshq.net

From: Justin Williams <jwill030@ucr.edu>
Sent: Thursday, July 10, 2014 5:28 PM
To: bdcg.comments@noaa.gov
Subject: bay delta conservation plan

Good evening,

I'm writing this email to express deep concern of the bay delta conservation plan. I feel as a Sacramentan my every day life will be negatively impacted if this plan is implemented.

Also, I would like to learn more about the plan and I am interested in reviewing the DVD copy.

Best Regards,

Justin Williams

--

Justin Williams

Office: (916) 447-8862

Cell: (916) 850-5174

Fax: (916) 447-8869

Email: jwill030@ucr.edu

From: Bryan Montgomery <Montgomery@ci.oakley.ca.us>
Sent: Friday, July 11, 2014 8:28 AM
To: 'BDCP.comments@noaa.gov'
Subject: Comment Letter
Attachments: 20140711080255352.pdf

Please find attached the Comment Letter from the City of Oakley.

Bryan H. Montgomery

CITY MANAGER
3231 MAIN STREET
OAKLEY, CA 94561
PHONE 925-625-7025
montgomery@ci.oakley.ca.us



3231 Main Street
Oakley, CA 94561
925 625 7000 tel
925 625 9859 fax
www.ci.oakley.ca.us

July 10, 2014

MAYOR
Randy Pope

VICE MAYOR
Doug Hardcastle

COUNCILMEMBERS
Diane Burgis
Kevin Romick
Carol Rios

Bay Delta Conservation Plan Comments
Ryan Wulff, NMFS
650 Capital Mall, Suite 5-100
Sacramento, CA 95814

RE: Comments on the Draft EIR/EIS for the Bay Delta Conservation Plan

Dear Mr. Wulff:

The Oakley City Council appreciates the opportunity to comment on the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Bay Delta Conservation Plan (BDCP).

As a community literally in the "heart" of the Delta, we are understandably very concerned with any proposed activities that could adversely affect the ecosystem of the Delta. We assert, and you well know, that that the overall health and vitality of the Delta is critical to millions of Californians.

The Oakley City Council has concluded that the BDCP is fundamentally flawed and the Plan should be revised substantially to address these flaws before it is further pursued. Just some of the critical defects include:

- Failing to establish operational rules and in-Delta flow criteria, necessary for a reliable water supply and protection of water quality, while accepting as "unavoidable" over 50 significant and unmitigated adverse environmental impacts;
- Proposing to extract water from the Delta during relatively wet periods yet ignoring the lack of adequate storage to retain that water for use in dry periods; and
- Proposing to obligate billions of dollars of ratepayer and public monies before evaluating whether a smaller and less costly facility could achieve the same or better result.

- The lack of representation from elected officials of Delta communities in the development of the Plan.

The Oakley City Council strongly supports the "balancing act" efforts of developing a reliable water supply and protection, restoration, and enhancement of the Delta ecosystem, but these flaws in the BDCP cannot be ignored and must be addressed. The State needs a cohesive, long-term, sustainable water plan that includes at least the following:

- Science-based analysis;
- Protections for the critical infrastructure, economic activity and recreation in the Delta;
- Effective habitat preservation and restoration;
- Clear operational rules for any water transfer activities;
- Expanded analysis of the need for additional water storage;
- Further studies of the opportunities for development of additional water resources such as conservation, re-use and desalination; and
- A sound benefit-cost scenario
- Representation of elected officials from Delta communities in the development of the Plan.

We are convinced that the continued pursuit of the flawed BDCP will simply mire the BDCP in protracted litigation, wasting critical years and diverting energy and resources from development of a solution that would truly meet California's water needs and protect the ecosystem of the Delta. Of the many BDCP flaws, we explain the following:

- 1) The BDCP fails to include operational rules and flow-criteria, while dismissing dozens of significant environmental impacts as "unavoidable," which is completely unacceptable**

The BDCP's makes some claim to be a "Habitat Conservation Plan." Habitat Conservation Plans, generally, have been a successful way of providing certainty for those pursuing economic development while protecting and preserving the environment. The BDCP does neither of these. The BDCP includes no operational rules or through-Delta flow criteria, so it provides no certainty for those intending to rely on that facility as a dependable water supply. Simultaneously, the BDCP EIR/EIS identifies over fifty significant and unmitigated adverse environmental impacts and concludes these are "unavoidable." From a public policy standpoint, either of these results,

water supply uncertainty or significant environmental harm, is unacceptable. Together, they clearly indicate the BDCP is the wrong path to achieving the co-equal goals of providing a reliable water supply *and* preserving and enhancing the Delta's ecosystem.

2) The BDCP ignores the need for additional storage

The underlying premise of the BDCP's North Delta Diversion (the "Preferred Project") is that it will draw "excess" water from the Delta during wet periods, which can be used during dry periods. For such a strategy to succeed, the water extracted during wet periods must be stored to buffer the dry periods, yet the BDCP ignores the lack of storage facilities necessary to store the extracted water. Increased storage is essential if *any* water transfer facility is to provide a stable and reliable water supply. The EIR/EIS does not evaluate the necessary integration of these major components. By ignoring the need for additional storage, the BDCP EIR/EIS is incomplete, at best.

3) The BDCP does not justify its selection of a 9,000 cfs facility as the Preferred Project

The Preferred Project is sized to convey 9,000 cfs; however, the analytical rationale for the selection of a 9,000 cfs transfer facility is absent. Chapter 5 of the EIR/EIS contains results of various alternative-sizing scenarios. Modeling results present the combined export annual flows using both through-Delta conveyance and North Delta diversion systems. Examination of that data indicates that the combined annual export volumes could be greater for 3,000 cfs and 6,000 cfs capacity North Delta Diversion systems than for the Preferred Project (Chapter 5, Figures 5-17, 5-18 & 5-19).

If a major objective of the BDCP is to achieve water system reliability, it would seem that the optimum-sized North Delta Diversion facility would be that which, when combined with through-Delta conveyance, maximizes the opportunity to supply water to those relying on the system. At the very least, these results compel a closer examination of those smaller-sized alternatives with their resultant costs and environmental impacts before billions of dollars of ratepayer and public funds are committed to an effort with acknowledged, significant adverse environmental consequences.

4) Prevailing studies show that the Preferred Project does not meet any reasonable "benefit vs. cost" standard.

Perhaps best explained by Dr. Jeff Michaels of the University of the Pacific,


http://forecast.pacific.edu/articles/BenefitCostDeltaTunnel_Web.pdf, the Preferred Project (using the results of the BDCP's own economic benefit and cost studies) has a cost of anywhere between \$1.90 and \$3.36 for every \$1 in economic benefits. Dr. Michaels explains, "this benefit-cost ratio is 80% lower than those estimated for the State's high-speed rail project."

5) Representation of elected officials from Delta communities in the development of the Plan.

Local leaders should be at the table to help promote local input and representation on a plan so far reaching as the BDCP. A lack of local input and representation undermines the credibility of the Plan.

The Oakley City Council understands the critical importance to the State's economy of improved water infrastructure and a reliable water supply. It also very much understands the critical importance of preserving and enhancing the Delta's ecosystem. The BDCP, as proposed, is fundamentally flawed and does not represent a step towards solving to either of these significant goals. We further believe that the costs of the BDCP's Preferred Project is not in the best interests of the State's taxpayers.

Respectfully submitted,



Randy Pope
Mayor

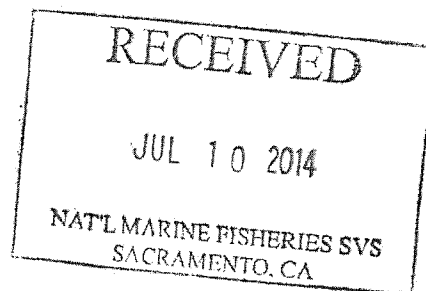
cc: Congressman Jerry McNerney
Congressman John Garamendi
Governor Jerry Brown
California Secretary of Natural Resources - John Laird
Senator Mark DeSaulnier
Assemblymember Jim Frazier
Contra Costa County Board of Supervisors
Oakley City Council
Brentwood Mayor & City Council
Antioch Mayor & City Council
Stockton Mayor & City Council
Delta Protection Commission
Contra Costa Water District
Diablo Water District



SAN
FRANCISCO
CHAMBER OF
COMMERCE

July 8, 2014

Ryan Wulff, National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814



RE: Bay Delta Conservation Plan Comments

Dear Mr. Wulff,

On behalf of the San Francisco Chamber of Commerce, representing over 1,500 local businesses, we are pleased to express our support for the Bay Delta Conservation Plan (BDCP) as a solution to California's water challenges.

The San Francisco Bay Area depends on the Delta for a significant portion of its drinking water supply. Ensuring a system exists to maintain water for our urban and agricultural areas is key to maintaining a secure water transport system while protecting the sensitive ecosystem. The Bay Delta Conservation Plan will provide California with much needed reliability for our water sources, stabilizing supplies while responding to climate change and protecting against natural disasters.

Shoring up the reliability of imported water supplies recognizes the role water plays in supporting the health of our state and businesses. The current plan is expected to provide, on average, reliable water supplies for residents, businesses and agriculture throughout the state for about \$5 a month. Urban water supply alternatives are much more expensive than the current plan, and do not provide the same amount.

The BDCP calls for the construction of two tunnels to carry water under the Sacramento-San Joaquin River Delta. These twin conveyance systems will not only protect our public water supplies if a seismic event were to occur, but will also contribute to the creation of more than 1 million full-time equivalent jobs over the BCDC's 50 year implementation period. In the counties of Sacramento, San Joaquin and Contra Costa alone, nearly 20,000 jobs will be created from the construction of the new water facility.

Without an effective conservation and renewal strategy, the Delta's sensitive ecosystem will continue to be pushed to a breaking point. The loss of a reliable water supply system threatens the millions of residents served and will have significant negative impacts on conservation efforts in the area. As currently drafted, the Bay Delta Conservation Plan is the best and most comprehensive approach to maintaining this vitally important ecosystem for California. On behalf of the San Francisco Chamber of Commerce, we appreciate the opportunity to submit our comments of support for this important project.

Sincerely,

Jim Lazarus
Senior Vice President for Public Policy

From: Ryan Wulff - NOAA Federal <ryan.wulff@noaa.gov>
Sent: Friday, July 11, 2014 7:46 AM
To: bdcpc comments - NOAA Service Account
Subject: Fwd: BDCP COMMENTS
Attachments: 20140707 - City of Ventura.pdf; 20140707 - California Conference of Carpenters.pdf; 20140707 - Los Angeles Department of Water & Power.pdf; 20140709 - Ironhouse Sanitary District.pdf; 20140709 - Peggy Aldridge, Stockton CA.pdf; 20140709 - Roger Mariani, Stockton, CA.pdf; 20140709 - Sun City Roseville Community Association, Inc..pdf; 20140710 - City of Garden Grove.pdf; 20140710 - Roger S. Mammon - Oakley, CA.pdf; 20140710 - San Francisco Chamber of Commerce.pdf; 20140710 - Santa Margarita Water District.pdf; 20140710 - Southern Nevada Water Authority.pdf

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Subject: BDCP COMMENTS
To: Ryan Wulff - NOAA Federal <ryan.wulff@noaa.gov>

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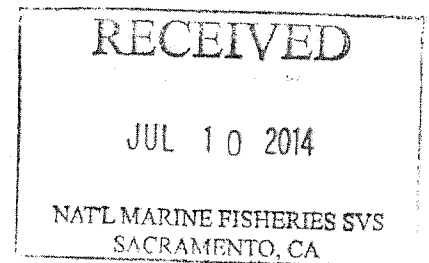
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Anita deGuzman  
*Administrative Assistant*  
NOAA Fisheries \* West Coast Region  
U.S. Department of Commerce  
650 Capitol Mall, Suite 5-100  
Sacramento, CA 95814  
916-930-3600 - main  
916-930-3629 - fax  
[Anita.deGuzman@noaa.gov](mailto:Anita.deGuzman@noaa.gov)

July 7, 2014

BDCP Comments  
 Ryan Wulff, NMFS  
 650 /Capitol Mall, Suite 5-100  
 Sacramento, CA 95814



Re: Comments on the BDCP and Associated EIR/EIS

Dear Mr. Wulff:

Thank you for allowing me to comment on the referenced matter. I am a 30 year Delta resident and concerned citizen. Through personal observation I have watched the Delta slowly deteriorate over time.

The BDCP which advocates for a northern diversion will only worsen the problems. BDCP is not a Habitat Conservation Plan. The diversion through the proposed Twin Tunnels will be removing habitat from the Delta. Fish need flows to survive. Shipping water under the Delta will deprive it of needed habitat and the nutrients needed for the survival of aquatic species. As explained last year by the U.S. Fish and Wildlife Service (USFWS) "There is clear evidence that most of the covered fish species have been trending downward." (USFWS Staff BDCP Progress assessment, Section 1.2, p. 4, April 3, 2013). The National Marine Fisheries Service (NMFS) has pointed out that the Water Tunnels threaten the "potential extirpation of mainstem Sacramento River Populations of winter-run and spring-run Chinook salmon over the term of the permit. . ." (NMFS Progress Assessment, Section 1.17, 12, April 4, 2013). As explained by EPA in its 2013 letter to the SWRCB, "The State Board. . . has recognized that increasing freshwater flows is essential for protecting resident and migratory fish populations." (EPA letter to SWRCB re: EPA's comments on the Bay-Delta Water Quality Control Plan; Phase 1; SED, pp. 1-2, March 28, 2013). The EPA has also explained with respect to Administrative Drafts of the BDCP documents that "many of these scenarios of the Preferred Alternative 'range' appear to decrease Delta outflow (p. 5-52), despite the fact that several key scientific evaluations by federal and State agencies indicate that more outflow is necessary to protect aquatic resources and fish populations." (EPA Comments on Administrative Draft EIR/EIS, III Aquatic Species and Scientific Uncertainty, Federal Agency Release, July 18, 2013). BDCP lacks having flow criteria.

The SWRCB did develop flow criteria, published at:  
[www.swrcb.ca.gov/waterrights/water\\_issues/bay\\_delta/flow](http://www.swrcb.ca.gov/waterrights/water_issues/bay_delta/flow) on August 3, 2010, p. 5.  
 The criteria include:

75% of unimpaired Delta outflow from January through June;

75% of unimpaired Sacramento River inflow from November through June; and

60% of unimpaired San Joaquin River inflow from February through June.



The BDCP EIR/EIS fails to include the San Francisco Bay and Pacific Ocean in its analysis. They too are part of the San Francisco Bay/Sacramento-San Joaquin Delta.

The Delta Reform Act of 2009 mandated that, "The co-equal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place". This is at odds to Table 31-1, Summary of Significant and Unavoidable Adverse Impacts in the BDCP reveal 52 items including cancer risk. The Significant and Unavoidable Adverse Impacts are not a short period of time as construction of the tunnels is estimated to be 9 to 10 years.

The EIR/EIS fall short. Reference is made to the reports submitted on May 13, 2014 by Geraldine Knatz, Professor of Practice, Schools of Engineering and Public Policy. 3620 South Vermont Avenue, KAP 268A, Los Angeles, California 90089-2531. The comments were sent to [BDCP.Comments@noaa.gov](mailto:BDCP.Comments@noaa.gov). The report can also be found on the Friends of the River-Sacramento website:

<http://www.friendsoftheriver.org/site/PageServer?pagename=bdcpccomments>

Governance, is the fix in? The following report in the Public Water News is an eye opener.

*Burt Wilson, Editor*  
*bwilson5404@sbcglobal.net*  
 7/7/14

Last Thursday evening, **Chelsea Tu**, a charming and brilliant environmental attorney with the Center for Biological Diversity spoke at the weekly meeting of the North Delta Cares Committee in Clarksburg. Using a dynamic slide presentation she cleanly picked apart the Implementation Agreement (IA) of the Bay Delta Conservation Plan (BDCP), showing everyone just why the fix is "in" when it comes to the Bay Delta Conservation Plan!

It's tantamount to discovering that the "wheel" in "Wheel of Fortune" has been rigged!

**The IA is perhaps the most important document in the whole BDCP arsenal** as it controls how the BDCP will be implemented after a permit to build is issued (if ever). Tu writes, "It is the governance structure of the BDCP, a contract among the Department of Water Resources (DWR), the participating water contractors of the State Water Project (SWP) and the Central Valley Project (CVP), plus state and federal fish and wildlife agencies. It details the parties' authorities and responsibilities in carrying out the various elements of the BDCP."

Ms. Tu pointed out that although the Implementation Office (IO) will administer the funding, manage water operations and implement conservation measures, it is actually the Authorized Entity Group (AEG) which will oversee and direct the IO. And who do you suppose the AEG is made up of? its four members are the DWR, Reclamation and the SWP and CVP water contractors! Yes, the wolves have been put in charge of the sheep's corral! This is the "fix" that is "in."

Ms. Tu also showed there is a Permit Oversight Group (POG) to see that environmental regulations are followed. It has three members--the National Marine Fisheries Service, Fish and

Wildlife Services and the California Fish and Wildlife Department. There is also a Stakeholder Council (SC) which allows other interested parties to make recommendations. This is the BDCP's token outreach to the people.

It's important to understand that, as Tu writes, **"the IA does not provide funding assurances for habitat conservation**, restoration and management. The AEG will not be required to provide land, water or monetary resources beyond their commitments in the Plan in the event of a shortfall in state or federal funding."

**This is where we find the connection to the proposed Water Bond for this November's ballot.** Many environmental groups show that the language in the Water Bond actually includes money for habitat and land acquisitions that will help the BDCP. This is illegal. **It should be BDCP money that provides the financial basis for BDCP projects.** When the legislators putting together the Water Bond write that it's "Tunnel Neutral," i.e., will not help the BDCP tunnels, that's usually an indication that it is not neutral. If a piece of legislation is really neutral, you do not have to go to great lengths to proclaim it isn't.

The Water Bond is a General Obligation Bond which requires a vote of the people. Thus, if it passes, you and I will be paying for a defacto boost to the BDCP. Please vote "NO" on any Water Bond.

Tu writes that the "Draft IA undermines species protection by:

1. The Decision Tree process only requires outflow criteria to satisfy biological objectives for Longfin and Delta smelt.
2. Water contractors will have a say in final outflow criteria.
3. Fish and Wildlife agencies will not suspend take permits even if the Permittees fail to achieve biological objectives for covered species.
4. Agencies will not impose additional obligations or resource commitments to avoid or mitigate adverse effects on covered species without permittees' consent.
5. The Adaptive management team (AMT) will be able to make changes to CMs and biological objectives, including adding and eliminating them.
6. Water Contractor reps will be voting members of the AMT.

Tu also says that the IA now gives water contractors control of the implementation of the BDCP.

1. Real-time Operations Team (RTOT) will consist of Reclamation, DWR, FWS, NMFS and CDFW as voting members and SWP and CVP reps as non-voting members. **However, RTOT could add new voting members through consensus**
2. The RTOT will make day-to-day Delta outflow decisions

Tu's conclusions are dynamic in their targeted simplicity: **The BDCP is a self-serving project of the state's water contractors with the federal water contractors going along for the ride.** It is totally undemocratic and rips money off of the general public through higher water rates. If ever there was a piece of legislation that benefits the few by masquerading as benefiting the whole state, this is it. If the BDCP is allowed to go forward, it will be a black mark on the state of California.

What assurances do the people in the Delta have that export operations will comply with the Delta Reform Act of 2009? The people of the Delta will have no voice or authority over how the project is operated. This does not appear to be a co-equal goal.

Why is there no Cost – Benefit Analysis which is required for a "public works" project? Dr. Jeff Michaels of the Eberhardt Scholl of Business at the University of the Pacific has been critical of

the analysis presented by the BDCP. His Blog certainly clarifies misleading information. It can be found at: <http://valleyecon.blogspot.com/2013/08/the-bdcp-economic-impact-study.html>.

Finances, it is still unclear who will be paying for BDCP. The water contractors have made no firm commitment. If construction is started and they stop paying will taxpayers be on the hook for up to \$67 billion? It appears they feel the Habitat Conservation portion of BDCP is a public benefit and thus that portion should be paid by taxpayers funding a bond.

The entire 40,000 pages of the BDCP EIR/EIS is too much for one person to analyze and understand.

I object to the BDCP EIR/EIS as it appears to be a water grab of monumental proportions and will no doubt destroy the Sacramento/San Joaquin Delta which is my home.

Respectfully Submitted,



Roger S. Mammion  
4720 Oak Forest Avenue  
Oakley, CA 94561  
925-625-0590

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**Sent:** Friday, July 11, 2014 7:46 AM  
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[916-930-3600](tel:916-930-3600) - main
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Anita.deGuzman@noaa.gov

California Conference of Carpenters

1215 K St., 17th fl., Sacramento, CA 95814
916-554-5468 FAX 916-554-5466

Robert Alvarado
Ex. Sec. Treasurer

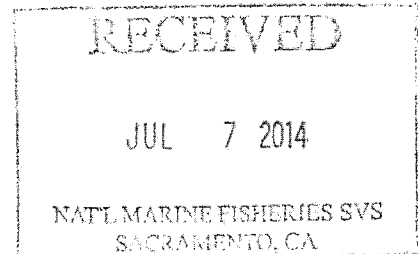
Douglas J. McCarron
President

Mike McCarron
Vice-President

Daniel M. Curtin
Director

July 2, 2014

Ryan Wulff, National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814



Dear Mr. Wulff:

On behalf of the California Conference of Carpenters which represents tens of thousands of working and retired union Carpenters throughout the state of California I am writing to indicate our support for the goals of the Bay Delta Conservation Plan (BDCP).

We are in full agreement with the dual goals of restoring the Sacramento-San Joaquin Delta ecosystem and securing reliable water supplies through a new Delta conveyance system.

The ecological health of the Delta is fundamental to the future of California. The largest watershed on the west coast of North America, the Delta supplies 25 million Californians fresh water, irrigates millions of acres of farmland in the Central Valley and supplies water to drive much of California's economy.

Please approve this plan so that work can start as soon as possible. Our future rests on the success of this effort. Thank you.

Sincerely,

A handwritten signature in dark ink, appearing to read "Daniel M. Curtin". The signature is fluid and cursive, with a large, sweeping "D" and "C".

Daniel M. Curtin
Director

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Anita.deGuzman@noaa.gov

RECEIVED

BDCP 1474

JUL 9 2014

July 8, 2014

NAT'L MARINE FISHERIES SVS
SACRAMENTO, CA

Dear Sir:

I am writing to you to voice my concern over the "twin tunnels".

I have lived in Stockton since 1967. Other parts of the state have made many attempts to get our Delta water.

When my grown children were growing up here, one of the "goutes" that was going around was "flush the toilets kids - L.A. needs the water".

Two 40 foot tunnels is a very real problem for the Delta, and our part of this great state of California. If you could get through the 34,000 page analysis, and read the fine print, it is a big mess that involves a land + water grab.

We voted the peripheral canal down in 1982. This crap does not fly. The powers that be can not be this dumb!, or be so ignorant that they think we the people are going to go along with this. Thanks for the opportunity to voice my opinion.

Sincerely Peggy Aldridge

708 Clinton Dr.

Stockton Calif. 95210



Sun City Roseville Community Association, Inc.

June 27, 2014

The Honorable Edmund G. Brown Jr.

Governor, the State of California
State Capitol Building, Suite 1173
Sacramento, CA 95814

Mr. Ryan Wulff

National Marine Fisheries Services
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

RECEIVED

JUL 9 2014

NATL MARINE FISHERIES SVS
SACRAMENTO, CA

RE: Concerns over proposed Delta plans

Dear Governor Brown and Mr. Wulff,

I'm writing to you today, on behalf of Sun City Roseville Community Association with 3,110 homes representing over 5,000 residents, to ask that any Delta solution that is developed by the State of California does not come at the expense of those who live and work in the Sacramento region. The proposed solutions in the Bay Delta Conservation Plan (BDCP) focus on solving the Delta's environmental problems and Central and Southern California's water supply needs. However, the current draft of the BDCP continues to ignore the needs of Northern California -- upstream of the Delta-- posing serious risks to our economy, environment and quality of life.

Please note that many residents of Sun City made a deliberate decision to settle and invest in a home in Roseville, most in retirement, for the quality of living which includes a reliable water supply. Without a reliable water supply, the existence of our lifestyle and economy come into question. Because there are so many unanswered questions, bad assumptions, faulty data and no operational plan, the BDCP reduces the ability of Northern California communities like Sun City to rely on water rights and contracts that ultimately serve our residents:

In the ongoing drought, we have been dismayed by the operation of the state and federal water projects, particularly Folsom Lake and the Lower American River. The lake and river are key to the Sacramento region's economy, lifestyle and environment and are crucial in providing water for California's water system and to the Sacramento-San Joaquin Delta. The over-drafting of Folsom Lake in 2014 to dangerously low levels in the hope that the drought was over was extremely short-sighted, and requires that a new operating plan be developed that always keeps Folsom Lake and the lower American River healthy. Today's current drought also illustrates the type of potential threats that are illustrated in the BDCP's modeling projections.

The current draft of the BDCP's Environmental Impact Statement/Environmental Impact report states that Folsom Reservoir could go to "dead pool" approximately once every ten years under future climate scenarios. BDCP acknowledges the possibility of Folsom Lake going dry, but while addressing the climate change issue for their export customers. However, it is clear that the reliability of our region's water supply is not being addressed as it should.

In this "dead pool" scenario, significant urban populations in Sacramento, Placer and El Dorado counties -- including Granite Bay and the cities of Folsom and Roseville -- would be essentially cut off from critical surface water supplies for several months. This would devastate the region's economy; devalue property and likely lead to depopulation of cities. It would also ultimately devastate the same environment that the BDCP is looking to restore -- the San Francisco- San Joaquin Bay Delta. These economic and environmental impacts would not only harm the Sacramento Region, but would harm the entire state.

The Honorable Edmund G. Brown Jr.

Mr. Ryan Wulff

June 27, 2014

Page Two

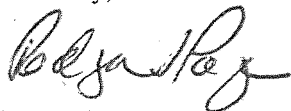
The Sacramento region's water agencies, cities and counties have worked together on a comprehensive review of the current draft of the BDCP and its related documents, shared their findings with the public and have identified fatal flaws in the current draft of the BDCP.

As concerned citizens of California, we wanted to reiterate the fatal flaws in the current draft of the BDCP below:

- **The current draft of the BDCP is fundamentally inconsistent with existing water rights and contracts held by diverters from Folsom Reservoir** (cities of Roseville and Folsom; and the San Juan Water District). These longstanding water rights and contracts must be observed because they provide a level of certainty that is critical to our region's water supply and economy;
- **The current plan does not meet the basic federal and state criteria to be considered complete.** Among other omissions, it does not address any impacts to the region's lifestyle and livelihood, even though it is required by state and federal law.
- **The BDCP lacks an operational plan for the proposed twin tunnels, and the overall governance of the twin tunnels is unclear.** Without clarity in the BDCP about the operation of the twin tunnels and the participation in the Plan by the federal government, the impacts to Folsom Reservoir remain unclear and our region continues to face the potential of "dead pool" with no clear solutions.

For the reasons stated above, we believe that the current draft of the BDCP should be considered incomplete at this point. With too many unanswered questions, errors and questionable assumptions, we ask that you direct the Department of Water Resources to do a better and more complete job and provide the public with a document that clearly defines a solution to the Delta and also supports a good, comprehensive water plan for all of California.

Sincerely,



Rodger Page
Sun City Roseville Community Association
Board President 2013/2014

cc: *Sun City Roseville Community Association Board Members:* Roberta Daley, Mary Ann Chittick, Cora Rose, Ginny Taylor, Don Treichler, Dan Arriola

Senator Barbara Boxer
Senator Dianne Feinstein
Congressman Tom McClintock
Senator Jim Neilson
Assemblywoman Beth Gaines
Placer County Supervisor Jack Duran
City of Roseville Mayor Susan Rohan
City of Roseville Councilmembers: Carol Garcia, Bonnie Gore, Tim Herman, Pauline Roccucci

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NOAA Fisheries * West Coast Region
U.S. Department of Commerce
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
[916-930-3600](tel:916-930-3600) - main
[916-930-3629](tel:916-930-3629) - fax
Anita.deGuzman@noaa.gov

RECEIVED MODEL LOCAL AGENCY DRAFT BDCP COMMENT LETTER

JUL 10 2014
NAT'L MARINE FISHERIES SVS
SACRAMENTO, CA

Comments of the City of Garden Grove on
the Draft Public Review Bay-Delta Conservation Plan (BDCP), Draft Environmental
Impact Report/Environmental Impact Statement and Draft BDCP Implementing
Agreement

The City of Garden Grove is pleased to submit comments on the Draft Bay Delta Conservation Plan (BDCP), Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) and Draft BDCP Implementing Agreement.

The City of Garden Grove is a retail water supplier in Orange County that is governed by a publicly elected Board of Directors/City Council.

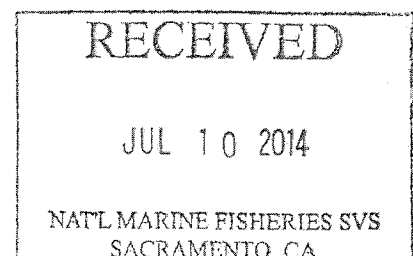
In spite of the world-class efforts of Orange County to provide greater water supply certainty for eight percent of California's population and the \$200 billion economy they represent, Orange County remains dependent on imported water to meet approximately 45 percent of its average annual demand, with the SWP deliveries from the Delta meeting approximately half of those needs. The Delta ecosystem and water supply conveyance problems have long been recognized, and have remained in a continuing state of degradation, conflict, and stalemate.

Many years and hundreds of millions of dollars have been spent on study efforts while the delta system continues to be used for water conveyance in a manner for which it was not intended. The longer it takes to begin the resolution, the more expensive it will become. This stalemate has been punctuated by droughts, floods, economic losses, environmental degradation and litigation every decade since the construction of the SWP in the 1960's. We can no longer delay action in the Delta, and urge the State and federal government to quickly move forward with the Preferred Alternative. Failing to act and move forward is not an acceptable alternative.

In recent years the endangered species biological opinions for protection of Delta and Longfin Smelt and Chinook Salmon have resulted in massive cutbacks in exports by over 1.5 million acre-feet per year and without the BDCP further cuts of another 1.0 million acre-feet per year could occur with new endangered species listings according to the BDCP briefing documents. This situation is untenable and a solution must be found to stop this hemorrhaging of this critical foundational water supply to southern California. The BDCP is the best hope we have and it must be approved and implemented in a timely and cost-effective manner.

We offer the following specific comments on the BDCP:

1. We strongly support the BDCP Preferred Alternative (No. 4) and oppose the No Action Alternative: It is critical to the state's economy and environment that both the State and federal government expeditiously follow through with the decision for adopting and implementing the BDCP.



2. Co-Equal Goals: The BDCP must be implemented in a manner consistent with the co-equal goals adopted by the State. Preferred Alternative (No. 4) is consistent with the Delta Reform Act of 2009's co-equal goals.
3. New Facilities and In-Delta Operational Flexibility: The modernization of the Delta conveyance system is essential in order for habitat restoration and conservation to have its intended effect; Preferred Alternative (No. 4), which incorporates the 9,000 cubic feet per second (cfs) three intake, twin tunnel conveyance system, provides the best balance between operational flexibility and modernizing the conveyance system for environmental benefit and water supply reliability.
4. Reduced Future Reliance: The 2009 Delta legislation called for water agencies to reduce future reliance on the Delta, not to become 100 percent "self-reliant". While our major efforts in these areas will continue, it is important to note that "reduced reliance" does not equate to and was never intended to require a move to 100 percent "self-reliance" and the notion of co-equal goals was never intended to result in a future with significant reduction in exports from levels achieved before the 2008 bio-opinions.
5. Plan Implementation and Regulatory Assurance: The BDCP must provide the needed implementation and regulatory structure and assurances to help achieve the co-equal goals.
 - a. To us, this means that it is virtually impossible to predict the outcome of the BDCP habitat restoration efforts and endangered species population dynamics, and such a standard should not be required in the DEIR/DEIS.
 - b. Furthermore, this means that changed circumstances under the operation of the BDCP, including the potential for new species listing, be incorporated in such a manner to result in a minimum impact on future water supply exports.
6. Sound Science. It is critical that sound science is provided in order to assure the long-term success of the BDCP. We strongly support the inclusion of independent scientific investigation and research to be included in the BDCP process.
7. Cost Allocation: We support the "beneficiary pays principle" in cost allocation for all responsible parties and beneficiaries.
8. Implementing Agreement: The Implementing Agreement is a contractual, legally-binding agreement that spells out the commitments and assurances as well as the terms and conditions for on-going implementation of the BDCP. Clarity in this

agreement is essential as well as the balance in implementation of the co-equal goals.


9. Economy, Environment and Water Management: The State Water Project (SWP) is critically important to the Orange County economy, environment and water management. Implementation of the BDCP is critical to Orange County's future.
- a. Orange County and our agency have invested heavily to diversify our water portfolio but the SWP remains a critical source of low salinity water supply that is currently unacceptably jeopardized by the unsustainability of the current Bay-Delta system.
 - b. Orange County relies on the SWP to support groundwater conjunctive use programs and water recycling programs - it is an essential part of our water reliability strategy that sustains our citizens and businesses.
 - c. We support the 9,000 cfs twin tunnel Preferred Alternative (No. 4) provided reasonable assurances are included regarding governance and future decision-making in the process. We strongly advocate for a seat at the table for the water Permittees in the various oversight groups. The investment and decision-making must be structured to achieve a positive outcome for both the SWP and Permittees and the ecosystem restoration in a collaborative, partnership manner.

Orange County has invested heavily to diversify our water portfolio but the SWP is a critical source of low salinity water supply that is currently unacceptably jeopardized by the unsustainability of the current Bay-Delta system.

It is now time for the State and Federal government to adopt and move the BDCP to implementation in order that we can achieve the 2009 legislation's co-equal goals of improving water supply reliability and ecosystem restoration and improved function by implementing the BDCP Preferred Alternative (4).

Thank you for your time and consideration of these comments.

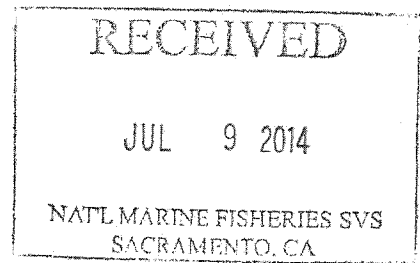
Sincerely,



WILLIAM E. MURRAY
Public Works Director

Roger Mariani
(209) 464-0848

Date JULY 8/14



Dear Concerned Citizen of San Joaquin Co. & the State of California

TO SUPERVISORS OF S.J.C.

This is a proposal I have been thinking about and working on for a long time now. I have written my idea down it's true but I do not know how to go about sharing my ideas for a better way to solve California's water problems. We need this plan because it will solve our water problems for a very long time to come. It is not a QUICK fix. It will not take water away with out a plan to return the water back to where it was taken from. I am asking you to help me get these ideas out to the people. Perhaps you may know other people like yourself who are actively working to better our state, or maybe legislators who are on committees to solve our problems of the state or people who know lots of influential people who may be in a position to help. If enough people become versed in the real problems of managing and supplying a large state like ours with fresh quality water with out doing real harm to any part of the state like that done to places like Owens Valley, California. We can have a World Class system. One we can be most proud of because we did it for the whole state with out sacrificing even the smallest part of our state.

Cordially Yours

Roger Mariani

***2625 N CENTER ST
STOCKTON CA.
95204
209-464-0848***

CALL ME FOR MORE INFO

**The New Sacramento Co. and San Joaquin Co.
Water Project Proposal
2014**

My name is Roger Mariani. I am a life long resident of Stockton. I have spent innumerable weekends hunting and fishing on the Delta. Pheasant, ducks, fish, mushrooms and frogs were abundant when I was young. Talk about your "Silent Spring".

I was a businessman and owner/operator of ABC Cabinet Shop for 32 years and then I retired because of health reasons. I enjoyed volunteering for the St. Mary's Interfaith Dining Room. In those days of the old kitchen under the freeway I took charge of preparing the meals, keeping the storeroom orderly and I completely remodeled the kitchen. I also designed and made a break room for the staff. I was involved with the designing of the new kitchen and Dining room. Those years were very good years. I enjoyed the afternoon talks with David Brewer then Director of St. Mary's Interfaith Dining Room .

Most California residents know the name Edmond G. Brown perhaps that is the driving force for our current Governor Brown wanting a peripheral canal all be it tunnels under and over ground. Today's newspaper said 24.7Billion however some experts are saying 67Billion. I had not realized how far back our water problems reach. You might find it of interest to check this out for yourself. At least you'll see how things tend to go. Their plan to send Northern California water south whatever the cost will not solve California's water problems. Yes

they can take the water at Hood and send it south. It is doable. If they keep doing this what are the long term affects? Do they plan on the water all ways being there? Is rainfall the only means of replenishing the water levels in the Delta? Look at the current and previous rain amounts. Compare them to current and previous rain and snow amounts. O.K. Governor Brown what is you plan? Suppose it's a drought year. The Sacramento has been heavily effected by no rain in Northern California the contributories are hurting themselves. Now What? Governor. You got yourself a new Owens Valley? If you do not know Owens Valley, please Goggle it. You may find this interesting. How about the court granting ownership to L. A. Water District of all the snow that falls on the mountains and hills above OwensValley? If you have no viable, workable plan then those who designed it are short sighted and narrow minded?

My proposal to end California's water problem is to build a **Dam** across the narrowest point of the Delta at some point along the Carquinez Straits or perhaps from Vallejo to Martinez. See the map, one is provided at the end of this paper. The Dam should have good fish ladders, ship locks, and spillways. Over the course of several good wet years the Delta because of the Dam's prevention of saltwater intrusion from San Pablo Bay should rise and the Delta will become a **fresh water lake**. The Dam will make it possible to control the water depth in the Delta. Fresh water means better health for fish and wild life and better water for the people to drink as well as much needed quality water for agricultural needs of the farmers for all the people both north and south.

We need to build small ponds and lakes 10 to 50 acres in size all up and down the valley from the northern most point to the southern most point of the valley. The ponds and lakes shall be filled by water collected in northern California during wet years. There will be some natural water seepage that will contribute to the underground aquifers. Over usage of wells to supply cities and rural areas with needed water has depleted much of our underground water supply. We need to replenish the aquifers. If we can restore the underground water levels all up and down the state we will have good water we can pump for our crops and for people's needs during really bad dry years.

When we are able to raise the water levels in the Delta some of the rivers like the Mokelumne River, Calaveras River, and the Mormon slough may receive more water again.

We need to have smaller pumps all around the Delta fitted with smaller screens to keep fish safe as they migrate up to or through the Delta to spawn. These smaller pumps located around the Delta in place of huge pumps will do less harm to the fish and keep the water from going stagnant by increasing the water's circulation. As we begin to accumulate more fresh water we can use the pumps, which we will have located around the Delta to send water to lakes and reservoirs or send water south to raise the level of ponds, and small lakes. we need to supply fresh water to new and larger lakes for storage as well.

There is something else to consider. This Dam might well be built with Hydroelectric generators. This Dam by preventing salt waters from entering the Delta by way of the San Pablo Bay may one day help prevent some people from

loosing their home by floodwaters. Most little towns and small cities along the Delta are located at or below Sea Level. We all must have heard the term Global Warming by now. What we do know is that the North Pole is seeing continued loss of glaciers, which is thought to be the result of Global Warming. What will be the results or how long this trend will continue no one seems to know. They can't say how high the oceans will rise if it does continue. We should all by now admit that the weather patterns are changing.

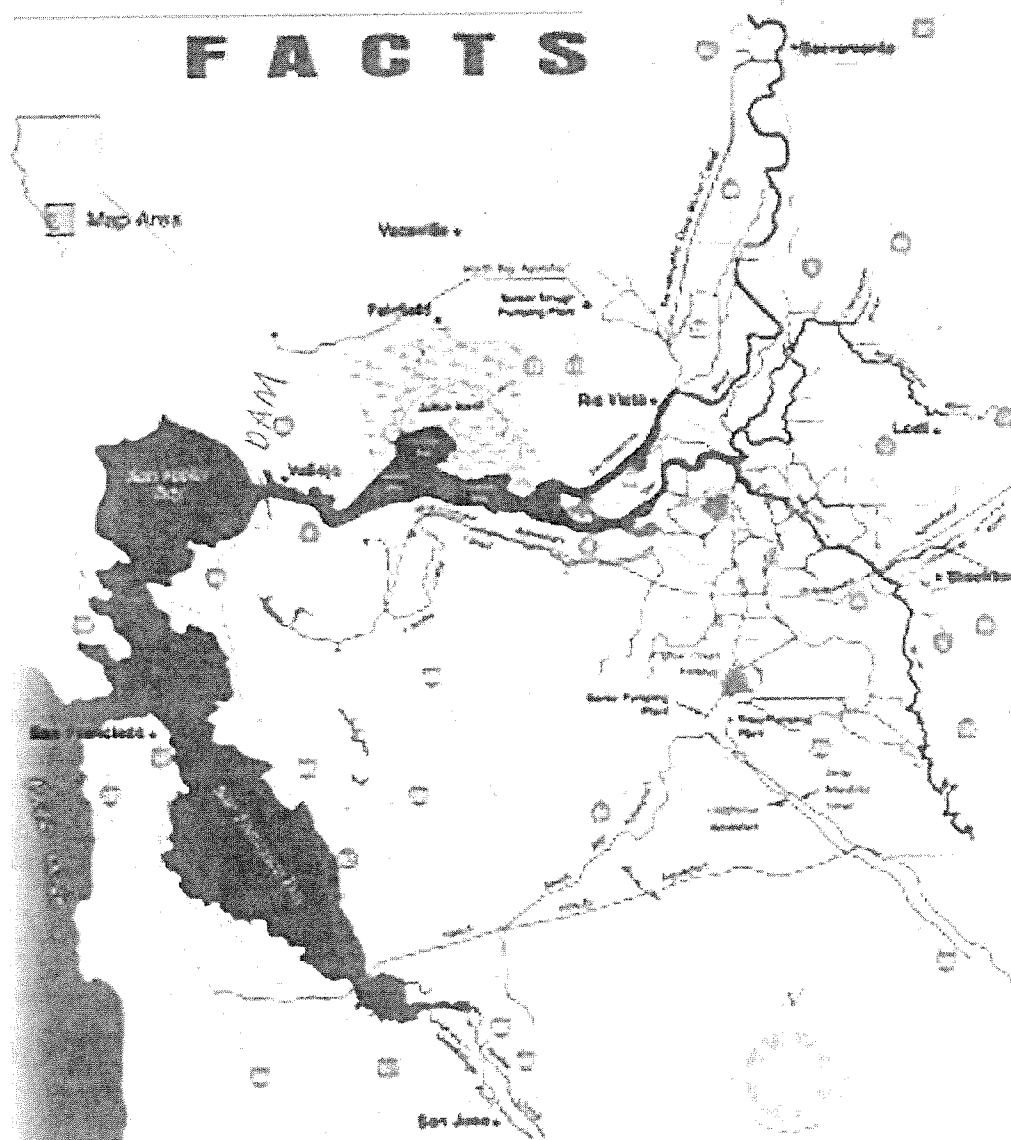
Please encourage the people you know to question what is happening in our own state. It did indeed start a century ago and continues even now. Even the Delta Mendota and California Aqueducts have not solved our water problems. We do need large yields of grains and produce. We need a good plan for the whole state. We need to stop Governor Brown from employing another quick fix. "You can't tunnel your way out of this one Governor Brown".

Thank you for reading this letter. Please pass it on. Help where you can. We need this Dam, for tomorrow's sake. In my opinion this plan that Governor Brown has been pushing and has already started spending tax payer money on is so very wrong and bad for California's future.

Roger Mariani
(209) 464-0848

Delta

FACTS



From: Ryan Wulff - NOAA Federal <ryan.wulff@noaa.gov>
Sent: Friday, July 11, 2014 7:46 AM
To: bdcpr comments - NOAA Service Account
Subject: Fwd: BDCP COMMENTS
Attachments: 20140707 - City of Ventura.pdf; 20140707 - California Conference of Carpenters.pdf; 20140707 - Los Angeles Department of Water & Power.pdf; 20140709 - Ironhouse Sanitary District.pdf; 20140709 - Peggy Aldridge, Stockton CA.pdf; 20140709 - Roger Mariani, Stockton, CA.pdf; 20140709 - Sun City Roseville Community Association, Inc..pdf; 20140710 - City of Garden Grove.pdf; 20140710 - Roger S. Mammon - Oakley, CA.pdf; 20140710 - San Francisco Chamber of Commerce.pdf; 20140710 - Santa Margarita Water District.pdf; 20140710 - Southern Nevada Water Authority.pdf

----- Forwarded message -----

From: Anita Deguzman - NOAA Affiliate <anita.deguzman@noaa.gov>
Date: Thu, Jul 10, 2014 at 3:11 PM
Subject: BDCP COMMENTS
To: Ryan Wulff - NOAA Federal <ryan.wulff@noaa.gov>

I have attached the following comments for your files.

Copies have been made and are in your mailbox - original letters are up front at the reception desk.

--

~~~~~  
Anita deGuzman  
*Administrative Assistant*  
NOAA Fisheries \* West Coast Region  
U.S. Department of Commerce  
650 Capitol Mall, Suite 5-100  
Sacramento, CA 95814  
[916-930-3600](tel:916-930-3600) - main  
[916-930-3629](tel:916-930-3629) - fax  
[Anita.deGuzman@noaa.gov](mailto:Anita.deGuzman@noaa.gov)

**From:** Jodi Sabatino <jopoyo@gmail.com>  
**Sent:** Monday, July 14, 2014 8:28 AM  
**To:** BDCP.comments@noaa.gov  
**Subject:** Highlights of the BDCP brochure

I'm trying to download the highlights brochure (Highlights of the BDCP brochure) and the link in several places leads to a corrupted PDF file. Can you please email it to me or fix on the website, thank you!!

**From:** Roderic Ward <roderic.ward@gmail.com>  
**Sent:** Sunday, July 13, 2014 9:09 AM  
**To:** bdcg.comments@noaa.gov  
**Cc:** Roderic Charles Ward Jr  
**Subject:** Tunnels EIR comment

Provide an alternate analysis to the computer generated model. Please use analysis similar to Corps of Engineers Bay Model to graphically demonstrate maximum quantity of salt water intrusion into the Delta and Sacramento River due to planned Tunnels operations.

Thank you,

Roderic C. Ward, Sr. Capt, CEC, USNR-Ret



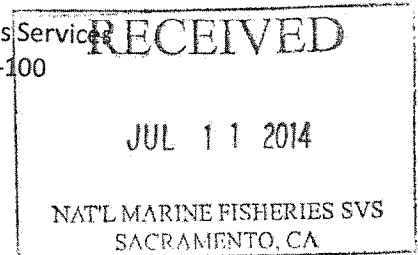
**From:** Luke Asbury <luke.asbury@gmail.com>  
**Sent:** Friday, July 11, 2014 8:03 PM  
**To:** BDCP.comments@noaa.gov  
**Subject:** Delta Tunnels

Do NOT destroy the Delta! Do not allow the tunnels.

Luke Asbury  
Ventura, CA

The Honorable Edmund G. Brown Jr.  
Governor, the State of California  
State Capitol Building, Suite 1173  
Sacramento, CA 95814

Mr. Ryan Wulff  
National Marine Fisheries Services  
650 Capitol Mall, Suite 5-100  
Sacramento, CA 95814



RE: Concerns over proposed Delta plans

Dear Governor Brown and Mr. Wulff,

I'm writing you today, as a concerned citizen, to ask that any Delta solution developed by the state does not come at the expense of those who live and work in the Sacramento region. The proposed solutions in the Bay Delta Conservation Plan focus on solving the Delta's environmental problems and Central and Southern California's water supply needs. However, it continues to ignore the needs of Northern California upstream of the Delta. This poses serious risks to our economy, environment and quality of life.

In early 2014, I was shocked and saddened by the drought's impacts upon Folsom Lake and the lower American River. The lake and river are key to the Sacramento region's economy, lifestyle and environment and are crucial in providing water for California's water system and the Sacramento-San Joaquin Delta.

The current draft of the BDCP's Environmental Impact Statement/Environmental Impact report states that as the BDCP is implemented, Folsom Reservoir could go to "dead pool" approximately once every ten years. Folsom Lake is crucial not only to our water supplies, but for the entire state. The BDCP acknowledges the possibility of Folsom Lake going dry, but the state is not proactively working toward solving this critical issue.

In this "dead pool" scenario, significant urban populations in Sacramento, Placer and El Dorado counties -- including Granite Bay and the cities of Folsom and Roseville -- would be essentially cut off from critical surface water supplies for several months. This would devastate the region's economy, devalue property and likely lead to depopulation of cities. It would also ultimately devastate the same environment that the BDCP is looking to restore -- the San Francisco- San Joaquin Bay Delta. These economic and environmental impacts would not only harm the Sacramento Region, but also harm the entire state.

The Sacramento region's water agencies, cities and counties have worked together on a comprehensive review of the current draft of the BDCP and its related documents and have identified fatal flaws. As a concerned citizen of California, I feel it is critical to reiterate the fatal flaws in the current draft of the BDCP.

The current draft of the BDCP is fundamentally inconsistent with existing water rights and contracts held by diverters from Folsom Reservoir (cities of Roseville and Folsom and San Juan Water District). The current plan does not meet the basic federal and state criteria to be considered complete. The BDCP lacks an operational plan for the proposed twin tunnels, and the overall governance of the twin tunnels is unclear. Without clarity in the BDCP about the operation of the twin tunnels, the impacts to Folsom

Reservoir remain unclear and our region continues to face the potential of "dead pool" with no clear solutions.

With too many unanswered questions, errors and questionable assumptions, I strongly feel that the current draft of the BDCP should be considered incomplete. I ask that you direct the Department of Water Resources to do a better and more complete job and provide the public with a document that clearly defines a solution to the Delta and also supports a good, comprehensive water plan for all of California.

Sincerely,



Jeff Olberding

8000 Macargo Court

Granite Bay, Ca, 95746

**From:** Ryan Wulff - NOAA Federal <ryan.wulff@noaa.gov>  
**Sent:** Friday, July 11, 2014 2:50 PM  
**To:** bdcg comments - NOAA Service Account  
**Subject:** Fwd: BDCP COMMENTS  
**Attachments:** 20140709 - Los Angeles County - Southern California Leadership Council.docx;  
20140711 - Laura Sancic.pdf; 20140711 - Jeff Olberding, Granite Bay.pdf

----- Forwarded message -----

**From:** Anita Deguzman - NOAA Affiliate <[anita.deguzman@noaa.gov](mailto:anita.deguzman@noaa.gov)>  
**Date:** Fri, Jul 11, 2014 at 1:49 PM  
**Subject:** BDCP COMMENTS  
**To:** Ryan Wulff - NOAA Federal <[ryan.wulff@noaa.gov](mailto:ryan.wulff@noaa.gov)>

I have attached the following comments for your files.

Copies have been made and are in your mailbox - original letters are up front at the reception desk.

--

~~~~~  
Anita deGuzman
Administrative Assistant
NOAA Fisheries * West Coast Region
U.S. Department of Commerce
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
[916-930-3600](tel:916-930-3600) - main
[916-930-3629](tel:916-930-3629) - fax
Anita.deGuzman@noaa.gov

BDCP1482.

From: Henry Go <henrygodoc@gmail.com>
Sent: Sunday, July 13, 2014 9:37 PM
To: BDCP.Comments@noaa.gov
Cc: Henry Go
Subject: Delta Comment from Henry Go M.D.
Attachments: California Water Board.docx

DEAR RYAN WULFF:

Thank you for your work.

Henry Go M.D.

To: BDCP Comments c/o Ryan Wulff, NMFS; 650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Saturday, July 12, 2014

Regards the water tunnels:

My parcel is only 17 acres, a pittance in terms of other larger properties threatened by the Delta Tunnel project, but it is my piece of the American Dream that I have worked hard for, paying off the mortgage after 40 years as in the spirit that drove the Western Expansion of this nation: the Kincaide Act and the Homestead Act. Same thing. If you worked for it, it is yours. Now it seems maybe not. I am devastated. I am now 80 years old, a bad time to lose all that I have worked for. It is **Holy Ground** here in these plowlands. My wife died here, my daughter died nearby in an accident. This was to be my estate to pass on to my children and their children. I won't have much else to give them. This has become a place of gathering, like birds they come back to restore their spirits in a place called the family home. It will be lost to all my future generations.

It's on Scribner Road, a little orphan County Road near Highway 160 that goes past half a dozen or so homes. One of them mine. Nearby would be where the Highway would be cut and intakes put in. They road will be closed and this State Scenic Highway will be move across my property, across my shop, my domestic well, my septic system and across my front yard. My neighbors would be similarly affected; agriculture will be disturbed. This land is one of the most fertile area in the planet. We produce food and fiber hear that feed humanity world wide. This was once swamp land, nurtured by generations of American Farmers who gave their work lives make it productive. We have a sense of duty that this was not all in vain.

Because the aquifer will be pumped out to allow tunneling, our domestic supply would be in jeopardy. This is ancient water, formed over eons, not easily replaced, if ever. Thousands of acres of tunnel muck plan to be stored nearby and creation of buffer lakes will cover more land and create habitat for mosquitos in an age where we saw the last of malaria, and face the current challenge of West Nile Virus.

In terms of the American Experience, it would be a dark chapter where the needs of the Common Good are not well defined and land be taken away. Land ownership is one of the centerpieces of what has made America different in a unique way compared to the days of the Domesday Book in England. I am the son of immigrants, as many here are, but within the last century, my group was not allowed to own land at one time so it has special meaning to me. We have a history and a place of belonging, things hard to measure, and certainly cannot be bought with a bag of silver. Home and land ownership has been one of the bright spots of this, the American Century; these human values should be valued.

Henry Go

From: Tom Belcher <tblcher@underwater-resources.com>
Sent: Monday, July 14, 2014 11:19 AM
To: BDCP.comments@noaa.gov
Subject: Request for DVD of Draft Bay Delta Conservation Plan

To Whom It May Concern:

Please mail to me a copy of the Draft BDCP so I may review and comment. Thank you.

Regards,

Thomas R. Belcher, President



Underwater Resources, Inc.
Pier 26, Ste 14 | San Francisco, CA 94105
(415) 974-5464 - Office
(415) 974-1749 - Fax
(415) 850-1877 - Cell
www.underwater-resources.com

From: Lynette Moreno <Lynette@carmichaelwd.org>
Sent: Monday, July 14, 2014 12:05 PM
To: BDCP.comments@noaa.gov
Subject: Carmichael Water District's Comments
Attachments: BDCP Concerns letter.pdf

Dear Mr. Wulff:

Attached, please find Carmichael Water District's comments letter to the BDCP and associated EIR/EIS.
If you have questions or need further assistance feel free to contact me at (916) 483-2452.

Regards,

Lynette S. Moreno

Carmichael Water District
Assistant General Manager
7837 Fair Oaks Blvd
Carmichael, CA 95608
(916) 483-2452
(916) 869-1971 Cell
www.carmichaelwd.org



Roy Leidy
Director Division 1

Mark R. Emmerson
Director Division 2

John A. Wallace
Director Division 3

July 14, 2014

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA 95608
TELEPHONE: (916) 483-2452
FAX: (916) 483-5509

Ron Greenwood
Director Division 4

Paul Selsky
Director Division 5

Steve M. Nugent
General Manager

BDCP Comments

Ryan Wulff, National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Regarding: BDCP and associated EIR/EIS

Dear Mr. Wulff:

The Sacramento-San Joaquin Delta (Delta) is the heart of California's water supply system. The Delta is in a state of environmental decline from various stressors that threaten the ecosystem health of this unique environment. The Bay Delta Conservation Plan (BDCP) is intended to provide a blueprint to address and resolve water supply reliability and ecosystem health issues while addressing the requirements of the federal Endangered Species Act and state Endangered Species Act.

The Carmichael Water District (CWD) supports the goals of the BDCP. CWD is located outside the boundaries of the legal Delta and obtains its surface water from the American River in conjunction with seasonal groundwater extraction. The implementation of the BDCP raises issues of substantial concerns to the CWD with regard to how Other Regulatory Agencies could influence the implementation of actions of Authorized Entities, the issues of concern being:

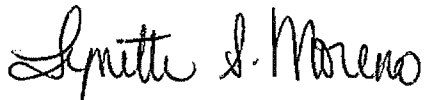
1. Safeguards protecting the water rights of senior water right permittees and licensees located upstream from the legal Delta; and
2. New fees in the form of a public goods charge (tax) for water. CWD subscribes to the concept of direct beneficiary pays for the benefit received; and
3. Clarity as to how the State Water Resources Control Board (SWRCB) intends to manage the United States Bureau of Reclamation's operation of Folsom Reservoir to meet Delta needs. Other BDCP-related regulatory requirements could result in the operation of Folsom Reservoir in a way that could reduce the CWD's ability to divert water from the lower American River; and
4. The impacts of climate change have not been fully vetted in the BDCP, and that the Permit Oversight Group controlling the BDCP permit may not fully understand how to

operate the water system under these new conditions which could lead to reduced water supply reliability for the CWD.

The Board of Directors of the Carmichael Water District that the CWD cannot endorse the Bay Delta Conservation Plan unless and until there is adequate disclosure of long-term impacts to the CWD from linked BDCP activities noted herein, and there is an inclusion of a clear and unambiguous statement of assurance and protections for senior upstream water rights users from various permit controlling agencies.

The Directors of the Carmichael Water District conclude that ambiguities contained in the BDCP must be eliminated. For example, Chapter 7 of the BDCP contains ambiguities that do not firmly assure the CWD and other agencies in the source water areas that our water rights and supply will not be impaired, or that costs will not be placed on our ratepayers for which they receive no benefits. Clarity of authorities and actions to those receiving the permits and government agencies supporting the permits is necessary before the BDCP can be endorsed as beneficial to the people we serve and to the State of California.

Sincerely,

A handwritten signature in black ink, reading "Lynette S. Moreno". The signature is fluid and cursive, with the first name "Lynette" and last name "Moreno" clearly distinguishable.

Lynette S. Moreno
Assistant General Manager

From: gad@swcaladvocacy.com
Sent: Monday, July 14, 2014 4:10 PM
To: BDCP.Comments@noaa.gov
Subject: Bay Delta Conservation Plan EIR/EIS Alternative #4 SUPPORT
Attachments: BDCP EIR SUPPORT.docx; gad@swcaladvocacy.com.vcf

Please accept our letter of SUPPORT for the BDCP EIR, Alternate #4.

Gene Wunderlich
Legislative Liaison
Southwest California Legislative Council
<http://southwestca.biz/>

SWCLC

Southwest California Legislative Council

A coalition of the
Temecula Valley, Murrieta, Lake Elsinore Valley, Wildomar & Menifee
Chambers of Commerce

26790 Ynez Ct. Temecula CA 92591 | (951) 676-5090

www.SouthwestCa.biz

July 14, 2014

Ryan Wulff, NMFS

650 Capitol Mall, Suite 5-100

Sacramento, CA 95814

SUBJECT: Bay Delta Conservation Plan EIR/EIS Alternative #4

Position: SUPPORT

The *Southwest California Legislative Council* is an advocacy coalition of the *Temecula Valley, Murrieta, Wildomar, Menifee Valley and Lake Elsinore Valley Chambers of Commerce* representing more than 2,800 employers dedicated to promoting job growth, economic expansion, and preserving the overall global competitiveness of California.

The *SWCLC* is pleased to SUPPORT the Bay Delta Conservation Plan (BDCP) and specifically Alternative #4 as outlined in the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

Following the passage of California's comprehensive water package in 2009, our organization has closely watched the BDCP process. We are encouraged by the release of the public draft of the plan and environmental documents. The outcome of this multi-year effort reflects collaboration of public water agencies, state and federal fish and wildlife agencies, business and agricultural stakeholders, local governments and the public.

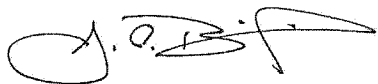
The draft plan and accompanying environmental documents identify several options for addressing the current challenges with California's water supply delivery system and the Delta ecosystem. We believe that Alternative #4, which provides for three new intakes on the Sacramento River in the northern Delta and a 9,000 cfs tunnel system to convey that water to the existing aqueduct system, coupled with a comprehensive habitat conservation plan for the Delta, is the best alternative to meet California's co-equal goals of water supply reliability and Delta ecosystem restoration.

The construction of new water intakes and related conveyance is an essential element of the BDCP. The proposed twin tunnel system will protect public water supplies if a seismic event were to trigger levee breaks and cause saltwater to intrude from San Francisco Bay. The new intakes in the northern Delta will reduce conflicts between water systems and migrating fish species such as salmon. Habitat improvements will provide native species with the healthy ecosystems they need to survive. 50 years of regulatory stability will protect an estimated 1.1 million jobs throughout the state and create more than 177,000 jobs from construction projects and environmental restoration.

Southern California is rebuilding its aging infrastructure to ensure its water supplies are reliable. We need the same kind of investment in the State Water Project to safeguard our imported supplies. A project of such magnitude will require some difficult decisions and compromise between stakeholders with varying priorities. However, California cannot sit idly by and wait for disaster.

The *Southwest California Legislative Council* is pleased to SUPPORT the BDCP, and specifically Alternative #4, as a workable draft proposal that can lead to a final successful plan of action because it offers the best solution to minimize seismic risk to our state's water supply infrastructure while restoring the Delta's ecosystem.

Respectfully,



Alex Braicovich, Chair
alexb@crmail.com



Gene Wunderlich, Legislative Liaison
gad@swcaladvocacy.com

Cc:

Governor Jerry Brown
Senator Dianne Feinstein

916.558.3160
202.224.2501

Senator Barbara Boxer	202.228.3865	
Congressman Ken Calvert	202.225.2004	951.277.0420
Congressman Duncan Hunter	202.225.0235	
Senator Joel Anderson	916.651.4936	951.676.1030
Senator Richard Roth	916.651.4931	
Assemblymember Melissa Melendez	916.319.2167	951.894.5053
Assemblymember Marie Waldron	916.319.2175	760.480.7516
Assemblymember Brian Jones	916 319 2171	619.441.2327
Assemblymember Eric Linder	916.319.2160	
California Chamber of Commerce	916.325.1272	

From: Bryan Starr <BStarr@ocbc.org>
Sent: Monday, July 14, 2014 4:58 PM
To: BDCP.comments@noaa.gov
Subject: BDCP Comments
Attachments: BDCP Alt 4 OCBC Support.pdf

Please accept the attached comment letter. Thank you.

Bryan Starr

Sr. Vice President, Government Affairs
Orange County Business Council

2 Park Plaza, Suite 100 | Irvine, CA 92614
Tel: 949.476.2242 | bstarr@ocbc.org



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July 14, 2014

Mr. Ryan Wulff, Senior Policy Advisor
National Marine Fisheries Service, Southwest Regional Office
650 Capitol Mall, Suite 5-100
Sacramento, California 95814

**RE: SUPPORT OF THE BAY DELTA CONSERVATION PLAN ENVIRONMENTAL
IMPACT REPORT AND ENVIRONMENTAL IMPACT STATEMENT (EIR/EIS) –
SUPPORT OF ALTERNATIVE #4**

Dear Mr. Wulff,

On behalf of Orange County Business Council (OCBC), I am writing to express our organization's continued support for the Bay Delta Conservation Plan (BDCP) and specifically Alternative #4 as outlined in the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

Following the passage of California's comprehensive water package in 2009, OCBC has been engaged in the BDCP process. We are encouraged by the release of the public draft of the plan and environmental documents. The outcome of this multi-year effort reflects collaboration of public water agencies, state and federal fish and wildlife agencies, business and agricultural stakeholders, local governments and the public.

The above referenced EIR/EIS identify several options for addressing the current challenges with California's water supply delivery system and the Delta ecosystem. We believe that Alternative #4, which provides for three new intakes on the Sacramento River in the northern Delta and a 9,000 cfs tunnel system to convey that water to the existing aqueduct system, coupled with a comprehensive habitat conservation plan for the Delta, is the best alternative to meet California's co-equal goals of water supply reliability and Delta ecosystem restoration.

The development of new water intakes and related conveyance is an essential element of the BDCP. The proposed twin tunnel system will protect public water supplies if a seismic event were to trigger levee breaks and cause saltwater to intrude from San Francisco Bay. The new intakes in the northern Delta will reduce conflicts between water systems and migrating fish species such as salmon. Habitat improvements will provide native species with the healthy ecosystems they need to survive. 50 years of regulatory stability will protect an estimated 1.1 million jobs throughout the state and create more than 177,000 jobs from construction projects and environmental restoration.



BDCP1486

**ORANGE COUNTY
BUSINESS COUNCIL**

2 Park Plaza, Suit 100 | Irvine, CA 92614 | P 949.476.2242 | F 949.476.0043 | www.ocbc.org

Southern California is rebuilding its aging infrastructure to ensure its water supplies are reliable. We need the same kind of investment in the State Water Project to safeguard our imported supplies. A project of such magnitude will require some difficult decisions and compromise between stakeholders with varying priorities. However, California cannot sit idly by and wait for disaster.

Thank you for your consideration of OCBC's support for BDCP Alternative #4.

Respectfully,

Bryan Starr
Senior Vice President Government Affairs

From: Daun St. Amand <DStamand@RTKL.com>
Sent: Tuesday, July 15, 2014 1:34 PM
To: BDCP.comments@noaa.gov
Subject: Support for the BDCP

This is a necessary and vital project for the state of California and I urge that this be expedited. Without it, our economy is headed for a disaster.

DAUN
PAUL ST. AMAND

AIA | LEED AP BD+C
Senior Vice President
213 633 1200 Direct | 213 631 9303 Cell

The information contained in this communication is confidential, may be privileged and is intended for the exclusive use of the above named addressee(s). If you are not the intended recipient(s), you are expressly prohibited from copying, distributing, disseminating, or in any other way using any of the information contained within this communication. If you have received this communication in error, please contact the sender by response via email and permanently delete the original email and any copies.

From: Wolinski, Mark <mwolinski@roseville.ca.us>
Sent: Tuesday, July 15, 2014 4:34 PM
To: 'BDCP.Comments@noaa.gov'
Cc: Bigley, Sean
Subject: City of Roseville BDCP comment letter
Attachments: COR_BDCP Comment Letter (FnI)_July 7_2014.pdf

Good Afternoon,

The attached file contains the City of Roseville's comments on the draft Bay Delta Conservation Plan (BDCP) and the BDCP draft Environmental Impact Report/Environmental Impact Statement. Please accept the email as receipt of the City's comments provided within the timeframe defined for comment submittals.

Thank you,
Mark Wolinski, Government Relations Administrator
Public Affairs & Communication Department,
Office of the City Manager
City of Roseville
Phone: 916.774.5179
Cell: 916.532.0611
http://www.roseville.ca.us/government_relations/



City Manager
311 Vernon Street
Roseville, California 95678

July 14, 2014

Ryan Wulff
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

[Submitted by e-mail to BDCP.Comments@noaa.gov]

Re: Comment letter from the City of Roseville on the Draft Bay Delta Conservation Plan (BDCP) and the BDCP Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) dated December 13, 2013

Dear Mr. Wulff,

The City of Roseville submits the following comments on the Draft Bay Delta Conservation Plan (BDCP) and the BDCP Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) dated December 13, 2013 (hereafter referred to as BDCP and related documents).

The City of Roseville's water supply comes from Folsom Reservoir, a Central Valley Project (CVP) facility that is operated by the U.S. Bureau of Reclamation (Reclamation). The cities of Roseville and Folsom and the San Juan Water District collectively serve more than a half million people in the Sacramento region and divert their primary water supplies directly from Folsom Reservoir. The City of Roseville is also a Preference Customer of the Western Area Power Administration-Sierra Nevada Region (Western), which markets federal power from CVP facilities. As a Preference Customer of Western, the City of Roseville receives an allocation of preference power generated from the CVP facilities to help serve electric customers in the City of Roseville.

Although the proposed project area of the BDCP does not cover Folsom Reservoir, the BDCP would ultimately rely on CVP facilities including Folsom Reservoir in its operation. As such, the City of Roseville has a significant interest in fully understanding the BDCP and related documents and how the operation of the proposed twin tunnel alternative will impact our water supplies at Folsom Reservoir.

The City of Roseville has invested significant time and resources to review the current draft of the BDCP and related documents including a thorough legal review, an independent fisheries impact analysis and a review of the modeling assumptions that were used to construct the BDCP and its related documents.

In addition to the comments that were provided in the letters from the North State Water Alliance and the American River Water Users, both of which the City of Roseville agrees with and incorporates as part of this letter, we are providing additional comments specific to the City of Roseville which need to be examined and addressed as follows:

Comment 1 – Operating Folsom Reservoir to “dead pool” 10 percent of years violates existing water rights and contracts

The City of Roseville diverts its primary water supplies using an intake within Folsom Reservoir. That intake would be dry if the level of the reservoir were to drop below the top of the intake. This "dead pool" condition has never occurred previously, but probably would occur when the reservoir has

approximately 100,000 or fewer acre-feet of water in storage. Such a "dead pool" condition would have a severe detrimental impact on the City's residents, businesses and economic health.

The BDCP inappropriately assumes that the U.S. Bureau of Reclamation could operate Folsom Reservoir so that it would drop below the water-supply intake that supplies the City – to "dead pool" – in 10 percent of years and to levels that would create serious water-supply and fishery problems even more frequently.

Operational scenarios in the BDCP assume that Reclamation would operate, and would be allowed to operate, Folsom Reservoir to eliminate deliveries through the reservoir's water-supply intake for at least three months in 10 percent of years. This indicates that BDCP implicitly assumes that Reclamation would operate, and would be allowed to operate, Folsom Reservoir so that the approximately 500,000 people that currently rely on the reservoir as their primary water supply would be denied that water supply for those three months in 10 percent of years. Notwithstanding the numerous other flaws, inaccuracies and faulty assumptions that pervade the BDCP and its Draft EIR/EIS, this assumption in the BDCP is extremely troubling for the City of Roseville, would violate numerous laws and by itself underscores the City of Roseville's conclusion that this document is fundamentally flawed.

The assumed future operation in the BDCP's No Action Alternative and the proposed project would violate contracts for diversions from Folsom Reservoir and the terms of Reclamation's water-right permits for Folsom Reservoir. In particular, in 1958's Decision 893, the State Water Rights Board imposed a term on Reclamation's water-right permits for Folsom Reservoir to protect, among others, the City of Roseville, which, at that time, was pursuing a competing water-right application that would have priority under California's area-of-origin laws. (See Decision 893, p. 72 (Term 14).) Decision 893 explained that term's effect as follows:

Permits are being issued to the United States to appropriate enough American River water to adequately supply the applicants naturally dependent on that source and *availability of water to such applicant is reasonably assured by the terms to be contained in the permits to be issued to the United States restricting exportation of water under those permits insofar as exportation interferes with fulfillment of needs within Placer, Sacramento and San Joaquin Counties.* Other applicants in more remote areas must if necessary seek water from other sources.

(Decision 893, p. 54 (emphasis added).)

The impacts of BDCP's No Action Alternative and its proposed project on the City of Roseville and other diverters from Folsom Reservoir would prevent approving the BDCP's proposed north Delta diversion because operations assumed by the BDCP would injure legal users of water including the City of Roseville.

Any notion that would require the City of Roseville to forego CVP contract water diversions to make the BDCP a success is not only inconsistent with California law, but contradicts statements made by the Governor and his Secretaries, meant to assuage communities, like Roseville, by stating that, "*State and U.S. governments will make sure implementation of BDCP will not result in adverse effects on the water rights of those in the watershed of the Delta, nor will it impose any obligations on water users upstream of the Delta to supplement flows in and through the Delta.*" (July 25, 2012) The City of Roseville is neither a party to nor a direct beneficiary of the BDCP, thus there must be no resultant impacts, by the activities and projects proposed in the BDCP, to Roseville water supplies, economy or environment.

In addition, it is important to recognize that the operation of Folsom Reservoir, from an electric generation perspective, serves an important role in the region during certain electric system emergency

conditions. As operations of the Folsom Reservoir may change in the future due to the BDCP, it is essential that the corresponding implications on electric generation be clearly understood as not to jeopardize the ability for Western to address electric system emergency conditions in the region, if necessary.

Comment 2 – Lack of an operational plan within the BDCP creates uncertainty for CVP contractors

The proposed BDCP and its Draft EIR/EIS creates a significant risk to water users who are not BDCP proponents in that their water uses will be affected by events that would be within what the draft BDCP defines as “unforeseen circumstances.” (See draft BDCP, pp. 6-45 to 6-46.) Under the proposed BDCP, BDCP proponents presumably would be immune from most impacts of these “unforeseen circumstances,” but BDCP contains no explanation of how the existence of those assurances could affect other water users, and especially CVP contractors who are not BDCP proponents.

If the draft BDCP had contained an operations plan demonstrating how Reclamation would operate in conjunction with BDCP to address the needs of those non-BDCP CVP contractors, it might have been possible for the EIR/EIS to explain how granting BDCP proponents’ desired assurances might affect those other water users.

Unfortunately, no such operations plan exists within the draft BDCP and its draft EIR/EIS. Instead, as discussed elsewhere in these comments, BDCP’s hydrologic modeling assumes that, in the case of climate change, Reclamation generally would operate upstream reservoirs so that they would go dry in 10 percent of years, which would cut off supplies to many CVP contractors. Without a well-described operations plan that explains how the BDCP’s terms would be integrated with CVP operations outside the scope of BDCP, especially the regulatory assurances its proponents would receive, the draft BDCP and its EIR/EIS are too vague to support the necessary findings or provide adequate environmental analysis under NEPA and CEQA. For the City of Roseville, this vagueness underscores the inadequacy of the draft BDCP and its EIR/EIS and does not provide upstream water diverters, like the City of Roseville, the level of information and sound analysis that we should reasonably and legally expect as part of this public review process.

Comment 3 - City of Roseville water demands are incorrect in the BDCP’s modeling

The draft BDCP’s hydrologic modeling assumes future demands by the City of Roseville that are substantially too low and therefore does not accurately depict the impacts of the No Action Alternative and the proposed project on the city. The city’s two primary water supplies are a CVP water-service contract with Reclamation for 32,000 acre-feet per year and a contract with Placer County Water Agency (PCWA) for up to 30,000 acre-feet per year of water that PCWA appropriates under its own water rights for its Middle Fork Project. While the assumptions for BDCP’s hydrologic modeling correctly assume that the City has a demand for 32,000 acre-feet of CVP contract water per year, now and in the future, those assumptions incorrectly state that the city’s demand for water under its PCWA contract will be only 5,000 acre-feet per year in the No Action Alternative. (BDCP EIR/EIS Appendix 5B, p. 5A-B135, Table B19 (depicting the City’s demand for “Water Rights” water).) In fact, the City anticipates using its full 30,000 acre-feet per year allotment under its contract with PCWA in the future.

As discussed in Table 3.13 of the City of Roseville’s 2010 Urban Water Management Plan, the City anticipates having a demand for the full amount of the PCWA contractual supply by 2025. The BDCP draft documents’ contrary assumption causes those documents to inadequately disclose project impacts on the City of Roseville, Folsom Reservoir and all resources that depend on that reservoir.

Comment 4 – Stormwater impacts: Insufficient justification for Conservation Measure (CM) 19

CM19 is described in seven pages of the BDCP with little detail, numerous inaccuracies on urban runoff contaminants and water quality regulations, and without any evidence that CM19 control measures

could provide any measurable benefits to the covered species. CM 19 (CM19, BDCP Section 3.4.19) intends to decrease urban runoff contaminant discharge to support Objective L2.4 to provide water quality to “help restore native fish habitat”. However, there is no technical analysis demonstrating the potential benefits of CM19 aside from incomplete descriptions of pyrethroid research in upstream urban tributaries; this research has not demonstrated relevance to impacts on covered species in the Delta. No technical justification is provided for the primary inclusion of urban runoff sources as a Conservation Measure over all other contaminant stressor sources that are described throughout the BDCP and EIR/EIS but are absent as Conservation Measures. As proposed, CM19 provides no new benefits to downstream covered species. Furthermore, CM19 proposes measures that are already generally implemented by stormwater management programs and local planning departments with new development requirements.

The City of Roseville echoes and incorporates the request, made by the Sacramento Stormwater Quality Partnership, in their comment letter on the BDCP that CM19 be removed because it is not justified as an action that would reasonably improve the covered species populations in the Delta.

Comment 5 - Inadequate financing

A habitat conservation plan must ensure that there is adequate funding to implement its conservation actions. The draft BDCP does not meet this standard. It depends not only on funding from the current proposed bond – which is subject to amendment and general election vote, and has already been delayed four years – but also a second, as yet undefined, bond and equally vague federal funding.

Moreover, the draft BDCP does not contain adequate assurances that the water agencies that would receive regulatory coverage under the federal Endangered Species Act and the state Natural Community Conservation Planning Act are the only agencies that would be asked to contribute funding to the project.

The City of Roseville needs strong assurances that implementation of any BDCP will adhere to the principle that the beneficiary must pay for financing the activities that would be required for BDCP proponents to receive their desired regulatory coverage. The current draft of the BDCP does not provide those assurances or a level of confidence that financing assumptions are more than just speculative.

Comment 6 – The current draft of the BDCP is fundamentally flawed and needs more work – to allow the public and agencies to assess the true impacts

As was pointed out specifically in the comment letters from the North State Water Alliance and the American River Water Users, the current draft BDCP and its Draft EIR/EIS are based on flawed hydrologic modeling and a flawed scientific analysis. Significant errors in the underlying hydrologic model, from which all effects were analyzed, call into question the analyses and conclusions throughout the entire draft BDCP and its related documents.

Given these shortfalls, the draft BDCP and its EIR/EIS fail to adequately provide the environmental documentation necessary for our community and public decision makers to reach an informed and thoughtful assessment as to how the BDCP will impact our water supply from Folsom Reservoir. As pointed out in the American River Water Users comment letter, this lack of clarity in the BDCP’s EIR/EIS violates NEPA’s readability requirement and violates CEQA’s requirement that the document adequately inform the public of the scope and potential impacts of a proposed project.

It is well-established that an EIR must be "prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences." CEQA Guidelines §15151.

As the Supreme Court has said, an EIR must disclose to the public the "analytic route the agency travelled from evidence to action" and in doing so, the EIR "must contain facts and analysis, not just the agency's bare conclusions or opinions." *Citizens of Goleta Valley v. Board of Supervisors*, (1990) 52 Cal.3d 553, 568. CEQA Guidelines Section 15151 recognizes that the evaluation of the effects of a project "need not be exhaustive" and that the courts have "looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure."

The draft BDCP and its EIR/EIS fails this good faith effort test because it leaves the City of Roseville with many unanswered questions as to how the proposed activities and projects will impact its future water supply reliability.

As a result, the current draft BDCP documents are incomplete and inadequate to inform the public of the consequences of implementing the BDCP. The City of Roseville expects that the State of California will address these shortcomings outlined in this and the other referenced comment letters, if the State of California wishes to continue with this process. This would require that another draft of the BDCP be released to the public with another public comment period that provides sufficient time to assess the impact of the BDCP and its related documents.

Conclusion

The City of Roseville is committed to working towards developing comprehensive water supply and environmental solutions for all of California. A properly developed and analyzed BDCP as part of a more comprehensive California Water Action Plan could be part of those solutions. The current documents are not. We urge you to recirculate the BDCP documents after the various shortcomings are addressed in a cooperative and collaborative process and they can provide enough information for interested parties to determine whether a BDCP can contribute to meet the pressing water and environmental needs of the state, without driving upstream reservoirs to "dead pool," harming our region's environment and devastating our regional economy.

If you have any questions or wish to discuss this comment letter in more detail, please call Sean Bigley, City of Roseville Government Relations Analyst, at (916) 774-5513.

Sincerely,



Ray Kerridge,
City Manager

cc:

Congressman Tom McClintock
Senator Dianne Feinstein
State Senator Jim Nielsen
Assemblywoman Beth Gaines
Roseville Mayor Susan Rohan
Roseville Vice Mayor Carol Garcia

Roseville Councilmember Bonnie Gore
Roseville Councilmember Tim Herman
Roseville Councilmember Pauline Roccucci
The Honorable Sally Jewell, Secretary, U.S. Department of the Interior
The Honorable John Laird, Secretary, California Natural Resources Agency
Shauna Lorange, General Manager, San Juan Water District
Evert Palmer, City Manager, City of Folsom
David Breninger, General Manager, Placer County Water Agency
Michelle Bertolino, Director, Roseville Electric, City of Roseville
Ed Kriz, Director, Environmental Utilities, City of Roseville

From: Paul Little <Paul@pasadena-chamber.org>
Sent: Tuesday, July 15, 2014 4:42 PM
To: BDCP.comments@noaa.gov
Subject: Pasadena Chamber comments on BDCP
Attachments: BDCP EIR EIS Comments 7-14.pdf

Good afternoon,

Attached is a letter from the Pasadena Chamber of Commerce related to the Bay Delta Conservation Plan Draft EIR/EIS.

I have also mailed a hard copy.

Thank you for placing this on the record.

Paul

Paul Little

Paul Little
President and Chief Executive Officer
Pasadena Chamber of Commerce
844 East Green Street, Suite 208
Pasadena, CA 91101
626-795-3355
www.pasadena-chamber.org

ExchangeDefender Message Security: [Check Authenticity](#)

July 15, 2014

BDCP Comments
Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Dear Mr. Wulff,

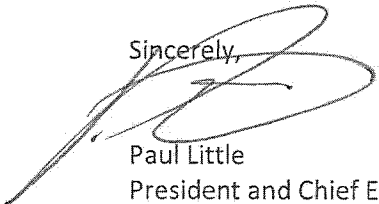
The Board of Directors of the Pasadena Chamber of Commerce would like to see a permanent resolution to the challenges facing water delivery systems and the environment in California. A safe, reliable and environmentally supportive water conveyance system for California is essential to our growth, economy and quality of life.

The Pasadena Chamber Board is supportive of the Bay Delta Conservation Plan. The Board favors an approach, such as Alternative 4, which provides for appropriate water conveyance and still preserves habitat and protects the ecosystem. The proposal also provides for seismic and other safety measures which will help protect citizens, habitat and the economy of California in the event of a disaster.

We certainly anticipate that the Bay Delta Conservation Plan can provide the resolution to California's water challenges and support approval of Alternative 4.

Thank you for your consideration.

Sincerely,



Paul Little
President and Chief Executive Officer

From: Paul Kibel <pkibel@ggu.edu>
Sent: Tuesday, July 15, 2014 3:54 PM
To: BDCP.comments@noaa.gov
Subject: CUEL Comments on December 2013 Draft BDCP EIR-EIS
Attachments: CUEL Comments on December 2013 Draft BDCP EIR-EIS.pdf

To Mr. Ryan Wulff, National Marine Fisheries Services (NMFS):

On behalf of the Center on Urban Environmental Law (CUEL) at Golden Gate University School of Law, attached is a comment letter on the December 2003 draft of the Environmental Impact Report and Environmental Impact Statement for the proposed Bay Delta Conservation Program (BDCP). A hard copy of CUEL's comments have also been submitted. Thank you.

Yours,

Paul Stanton Kibel, Professor
Golden Gate University School of Law
536 Mission Street
San Francisco, California 94105-2968
phone: 415.442.6685
email: pkibel@ggu.edu
http://works.bepress.com/paul_kibel/
Center on Urban Environmental Law (CUEL) www.ggucuel.org

July 15, 2014

Via United States Mail and Electronic Mail

BDCP Comments
Ryan Wulff, National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, California 95814

BDCP.comments@noaa.gov

**Re: CUEL Comments on *December 2013 Draft EIR/EIS* for Proposed Bay
Delta Conservation Program (BDCP)**

Dear Mr. Wulff:

The following comments are submitted by the Center on Urban Environmental Law (CUEL) at Golden Gate University School of Law. The focus of CUEL's comments is on Chapter 11 (Fish and Aquatic Resources) of the December 2013 Draft Environmental Impact Report/Environmental Impact Statement for the proposed Bay Delta Conservation Program (*December 2013 Draft EIR/EIS*). The *December 2013 Draft EIR/EIS* was prepared and circulated for public review pursuant to the California Environmental Quality (CEQA) and the National Environmental Policy Act (NEPA). CUEL's comments address the relationship between the proposed BDCP and the authority of the State Water Resources Control Board (State Water Board), the relationship between the proposed BDCP and the Ninth Circuit Court of Appeal's April 2014 decision on federal Endangered Species Act (ESA) compliance in *San Luis v. Jewell*, and CEQA/NEPA

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PHIL STEVENS

compliance issues pertaining to information on baseline conditions in the *December 2013 Draft EIR/EIS*.

I. Approach to Fisheries in Current BDCP and *December 2013 Draft EIR/EIS*

There are several fisheries listed under the federal ESA present in the waters of the San Francisco Bay-Sacramento River-San Joaquin River Delta (Bay Delta), including species of smelt and salmon and steelhead trout. In connection with proposed activities that may adversely impact species protected species, the ESA contains provisions that allow parties who would conduct such activities to propose "habitat conservation plans/habitat conservation programs" (HCPs) to the federal wildlife agencies, the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Services (NMFS). Pursuant to Section 10 of the ESA, the federal wildlife agencies may only approve an HCP if the plan/program and underlying project activities "will not appreciably reduce the likelihood of the survival and recovery of the species in the wild."

There are two large water infrastructure projects that operate diversion facilities in the Bay Delta specifically and water diversion/storage facilities in the Sacramento River-San Joaquin River watershed more generally – the federal Central Valley Project (CVP) and California's State Water Project (SWP). The CVP is operated by the United States Bureau of Reclamation (Bureau of Reclamation) and the SWP is operated by the California Department of Water Resources (DWR). In addition to the CVP and the SWP, there are also many other non-CVP/non-SWP diverters of water and operators of water storage facilities in the Sacramento River-San Joaquin River watershed.

The BDCP process has been underway for many years and to date has focused on the relationship between the impacts of the water diversion/storage operations of the CVP and SWP on fish species listed under the ESA. More specifically, the Bureau of Reclamation and DWR have initiated development of the BDCP as a multi-species HCP pursuant to Section 10 of the ESA, with the goal of creating a plan/program that would enable the CVP/SWP to operate

going forward in a manner that would “not appreciably reduce the likelihood of the survival and recovery” of the endangered smelt, salmon and steelhead fisheries in the Bay Delta watershed.

There are several stressors that have contributed and are contributing to the decline of the smelt, salmon and steelhead fisheries that pass through the Bay Delta, but three in particular that are pertinent to evaluating the BDCP. The first stressor on these fisheries is the significant reduction in fresh water flows moving through the Bay Delta which has resulted in seawater intrusion and elevated salinity levels in the Sacramento River-San Joaquin River Delta. The second stressor on these fisheries is the problem of entrainment of fish in the CVP/SWP diversion pumps that pull water from the south Delta. The third stressor on these fisheries is the reduction in the amount and quality of habitat (particularly spawning habitat) due to changes in land uses (levees, development, fill) along waterways.

Of these three noted stressors, the multi-species HCP proposed as the BDCP has so far paid little attention to the first stressor (inadequate fresh water flows into and through the Delta) and in fact anticipates increased fresh water diversions (meaning a further reduction in fresh water flows). Instead of focusing on this first stressor, to date the BDCP has instead focused on the second stressor (entrainment in the south Delta CVP/SWP pumps) and the third stressor (reduced fishery habitat). To address the second stressor (entrainment of endangered fisheries in the south Delta CVP/SWP pumps) the BDCP has proposed shifting the main point of CVP/SWP diversion upstream from the south Delta to the north Delta, and then transporting this diverted water south in two tunnels. To address the third stressor (reduced fishery habitat) the BDCP has proposed a set of projects in the watershed to increase and improve spawning habitat.

The current BDCP approach to fisheries restoration and recovery aligns with the water supply interests of recipients of CVP water (mostly Central Valley farms) and SWP water (mostly cities) in that this approach does not call for curtailing CVP/SWP diversions of water. Equally important to recipients of CVP and SWP water, moving the point of diversion to the north Delta will place the CVP/SWP pumps in a location further upstream from the intruding seawater and rising salinity levels. Water with high salinity levels is not suitable for either irrigation or drinking water supplies. If the CVP and SWP are able to divert water further upstream as the

BDCP now proposes, then CVP and SWP water is not likely to be affected by the rising salinity levels/seawater intrusion further downstream in the Delta. The BDCP's proposed north Delta point of diversion would therefore help insulate the CVP and SWP (and the recipients of CVP/SWP water) from the adverse water quality impacts of their own diversions – impacts which are getting ever closer to the existing CVP/SWP diversion pumps in the south Delta.

The *December 2013 Draft EIR/EIS* contains analysis presented in support of the BDCP's approach to fisheries, which in essence is the proposition that the endangered smelt, salmon and steelhead in the Bay Delta will be able survive and recover even if additional fresh water is diverted for the CVP and SWP because the benefits of BDCP-proposals for reduced entrainment and improved fishery habitat will outweigh the adverse impacts of reduced fresh water flows.

II. Relationship Between Proposed BDCP and State Water Board Authority

A. State Water Board 2010 Public Trust Delta Flow Proceedings and Criteria

California's 2009 Delta Reform Act was enacted after preparation of the BDCP had already begun. Among other things, the 2009 Delta Reform Act required the State Water Board (by September 2010) to establish quantitative criteria for what instream fresh water flow was needed to protect public trust resources in the Delta. The purpose of requiring the State Water Board to develop these flow criteria was to establish a solid scientific foundation for the levels of fresh water flow needed to sustain the Delta's fisheries.

Section 85086 of the 2009 Delta Reform Act explained the relationship between the State Water Board and the BDCP, noting that the State Water Board public trust flow criteria adopted for the Delta were "for the purpose of informing the planning decisions for the Bay Delta Conservation Plan." That is, the public trust Delta flow criteria established by the State Water Board were intended to serve as a reliable objective benchmark to help evaluate the extent to which a proposed BDCP would effectively achieve fishery restoration.

In terms of the State Water Board public trust Delta flow criteria process set forth in the 2009 Delta Reform Act, California public trust law provides that the State of California has a continuing trustee obligation to preserve instream uses of water (e.g. fisheries) for the public's

benefit whenever feasible. Pursuant to previous decisions by the California Supreme Court and the State Water Board, the starting point for public trust determinations is to first identify the level of protection required to fully protect the public trust resources at issue, and to then evaluate whether such levels of full protection are economically and technically feasible.¹ Section 85086 of the Delta Reform Act directed the State Water Board to only make the initial public trust determination, that is to identify what level of instream flow was needed to fully protect Delta fisheries.²

After nine months of public comments and hearings, the State Water Board issued its public trust *Delta Flow Criteria Report* in August 2010. In this report, the State Water Board adopted the following criteria: 75% of the unimpaired Delta outflow from January through June; 75% of the unimpaired Sacramento River inflow from November through June; 60% of unimpaired San Joaquin River inflow from February through June. The August 2010 *Delta Flow Criteria Report* also compared its public trust flow criteria with historic flows over the past two decades, noting that during this period Delta outflows were 30% of unimpaired flow in drier years, Sacramento River inflows were 50% of unimpaired flow from April to June, and that San Joaquin River inflows were 20% of unimpaired flows in drier years and 50% of unimpaired flows in wetter years. This comparison made clear the State Water Board's scientific finding that, to fully protect the public trust fisheries in the Delta, there would need to be significant reductions in the amount of water diverted upstream of and from the Delta to increase the amount of instream flow going through the Delta.

The 2010 *Delta Flow Criteria Report* issued by the State Water Board was endorsed by NMFS (the lead federal agency responsible for salmon and steelhead fisheries listed under the Endangered Species Act). As noted above, along with the USFWS, NMFS is one of the federal wildlife agencies with responsibility for approving the proposed BDCP to ensure compliance with the ESA. In its July 2010 comment letter to the State Water Board, NMFS stated:

¹ See *National Audubon Society v. Superior Court of Alpine County*, 658 P.2d 709 (1983) and *Mono Lake Basin Water Right Decision No. 1631* of State Water Board.

² Paul Stanton Kibel, *The Public Trust Navigates California's Bay Delta*, 51 *Natural Resource Journal* 35 (2011).

The purpose of the flow criteria is to inform both the Bay Delta Conservation Plan process and the Delta Stewardship Council in their development of a comprehensive long-term Delta management plan. The State Water Board was successful in fulfilling this purpose by developing flow criteria through a public process, applying the best available science, and considering the broad goals of the planning efforts the criteria are intended to inform...The Delta flow criteria provide a solid foundation for considering how to manage Delta flows in a manner that is more beneficial to native aquatic species."³

The State Water Board's public trust Delta flow criteria were also praised in a July 2010 comment letter submitted jointly by the Bay Institute, the California Coastkeeper Alliance, California Sportfishing Alliance, California Water Impact Network, Defenders of Wildlife, Environmental Defense Fund, Natural Resources Defense Council, Planning and Conservation League, and Sierra Club California. This letter to the State Water Board stated:

Our organizations collectively represent hundreds of thousands of Californians concerned about keeping the Bay Delta Estuary alive and healthy and restoring our dwindling salmon and other aquatic species. We applaud the draft [of the public trust Delta flow criteria] that you have prepared identifying the flow needs of the Estuary's public trust resources, and particularly commend your careful analysis of the overwhelming scientific support that has demonstrated for many years that we are, and have been, extracting too much water from the Estuary and its watershed to support those trust resources sustainably."⁴

While acknowledging that there are other non-flow stressors (such as entrainment in the south Delta pumps and reduced spawning habitat) that may also be contributing to the decline of the smelt, salmon and steelhead that pass through the Delta, the State Water Board's conclusion was that significant additional fresh water flows are an essential prerequisite to restore and sustain these fisheries.

B. State Water Board Review of BDCP Proposal to Change Delta Point of Diversion for CVP and SWP

As discussed above, to address the problem of fish entrainment, a central component of the proposed BDCP is to change to main point of diversion for the CVP and SWP from the south Delta to the north Delta (and to then convey this water south in two new proposed tunnels).

³ NMFS July 29, 2010 Comment Letter to State Water Board.

⁴ Joint July 29, 2010 Comment Letter to State Water Board.

The entitlement of the CVP and the SWP to divert water from their current south Delta pumps is set forth in the terms in a series of appropriate water licenses issued to the Bureau of Reclamation and DWR by the State Water Board. These appropriate water licenses specify the "point of diversion" so to implement the BDCP (or at least the components of the BDCP involving the proposed new north Delta point diversion which would then deliver water into the proposed new tunnels) the Bureau of Reclamation and DWR would first need to petition the State Water Board to approve the proposed new north Delta point of diversion. In its review of a petition to modify the appropriate water licenses of the Bureau of Reclamation and DWR to change the point of diversion, California Water Code § 1257 provides that the State Water Board must determine the benefit of the proposed change to the "preservation and enhancement of fish and wildlife." If the State Water Board determines that the BDCP proposed north Delta diversion will not benefit the fisheries that pass through the Delta (because this change is expected to reduce rather than increase fresh water flows) then the State Water Board would have discretionary authority to deny the petition.

With this context in mind, in July 2013 the State Water Board submitted comments on the draft of the BDCP EIR/EIS. In its comments, the State Water Board criticized the draft BDCP and the draft BDCP EIR/EIS for failing to propose or evaluate an alternative for CVP/SWP operations that would reduce diversions and increase fresh water flow into the Delta, for overestimating the likely effectiveness of proposed fishery habitat projects, and highlighted that the proposed north Delta point of diversion constitutes a change in water rights subject to the review of the State Water Board.

In terms of the lack of BDCP proposals to increase fresh water flow into the Delta, the July 2013 State Water Board comments on the BDCP Draft EIR/EIS stated:

"The decision tree for the Delta outflow include four operational scenarios. Compared to the no project alternative (which appears to be appropriate comparison point for long-term effects) it appears that all of these operational scenarios decrease Delta outflow scenarios in the late long-term. The justification for this limited range of Delta outflow scenarios is not clear given that there is strong information on the possible need for more Delta outflow for

the protection of aquatic resources and the uncertainty that other conservation measures will be effective in reducing the need for flow.”⁵

The “strong information” referenced in the State Water Board’s July 2013 comments on the BDCP Draft EIR/EIS would include the comprehensive body of scientific data and analysis submitted to the State Water Board in 2010 in conjunction with the proceedings that culminated in the August 2010 *Delta Flow Criteria Report*.

In terms of overestimating the likely effectiveness of the BDCP’s proposed habitat conservation project, the July 2013 State Water Board comments on the BDCP Draft EIR/EIS stated:

“The fishery and aquatic resource impact analysis does not appear to analyze scenarios in which conservation measures are not 100% successful...the EIR/EIS appears to assume that all of the conservation measures will be successful in meeting biological goals and objectives. The lack of certainty regarding the success of the conservation measures should be a consideration in the impact analysis and significance determinations reported in the EIR/EIS.”⁶

Here and other places in the document, aquatic natural community restoration appears to assume 100% success. Is there an assumption of success for any of the restoration projects? If so, it would be helpful to disclose that assumption and detail support for it.”⁷

In terms of State Water Board role in reviewing and approving the BDCP’s proposed change of diversion (to the north Delta) in CVP and SWP appropriative water licenses, the July 2013 State Water Board comments on the BDCP Draft EIR/EIS noted:

“Before the State Water Board may approve a change in a water right permit or license needed to implement the BDCP, including a change to the point of diversion specified in the permit or licenses, the Board must find that the change will not injure any legal user of water (Wat. Code §1702). Information concerning the extent, if any, to which fish and wildlife would be affected by the change shall also be considered. (Wat. Code §1701.2). The State Water Board has an independent obligation to consider the effect of the BDCP on public trust resources and to protect those resources when feasible.”⁸

...

⁵ July 2013 State Water Board Comment Letter on BDCP, page 4.

⁶ July 2013 State Water Board Comment Letter on BDCP, pages 32-33.

⁷ July 2013 State Water Board Comment Letter on BDCP, page 35.

⁸ July 2013 State Water Board Comment Letter on BDCP, page 2.

The Executive Summary (in the draft EIR/EIS) indicates the project proponents anticipate approval from the State Water Board for new SWP points of diversion in the Delta...It further states that such changes 'would not include changes in water rights; however, there are concerns that the BDCP could result in the potential for increased exports of water.' This statement is incorrect. Implementation of the BDCP will require changes to water rights and water rights requirements.⁹

...

Similar to the executive summary, the EIR/EIS states that the project proponents anticipate approval from the State Water Board for new points of diversion in the Delta for the proposed project. The EIR/EIS further states that such changes would not include changes in water rights, but there are concerns that the BDCP could result in the potential for increased exports of water. These statements are unclear and contradictory and should be clarified. The proposed project would result in changes to water rights and could potentially affect other legal uses of water. As explained above, these issues should be fully described and analyzed in the EIR/EIS."¹⁰

From a legal standpoint, the viability of the BDCP's current approach appears contingent on the State Water Board's discretionary approval of modifications to CVP/SWP appropriate water licenses to authorize the new proposed north Delta point of diversion. Yet, in its comments on the Draft BDCP and Draft BDCP EIR/EIS, the State Water Board has indicated its view that the current BDCP approach takes insufficient account of the need for additional fresh water flows into the Delta and that the current BDCP approach places unwarranted reliance on the anticipated effectiveness of the proposed habitat conservation projects. Moreover, the current BDCP approach does not take into account the findings and recommendations in the State Water Board's 201 *Delta Flow Criteria Report*.

Under these circumstances, it is unclear why the Bureau of Reclamation and DWR are confident and assume that the State Water Board will approve the water rights changes that are a prerequisite for the current BDCP to move forward.

⁹ July 2013 State Water Board Comment Letter on BDCP, page 8.

¹⁰ July 2013 State Water Board Comment Letter on BDCP, page 9.

III. Relationship Between Proposed BDCP and April 2014 Ninth Circuit Court of Appeal's Decision on ESA in *San Luis v. Jewell*

As noted above, the BDCP is being proposed as a multi-species HCP pursuant to Section 10 of the ESA, and the USFWS and NMFS may only approve the BDCP if these federal wildlife agencies determine that the plan and underlying project activities "will not appreciably reduce the likelihood of the survival and recovery of the species in the wild." With this standard in mind, it is pertinent to examine the previous ESA- compliance approach taken by the USFWS in regard to endangered smelt fisheries in the Delta (which was upheld in April 2014 by the Ninth Circuit Court of Appeals in *San Luis v. Jewell*).¹¹

The *San Luis v. Jewell* litigation involved a challenge by recipients of CVP/SWP water to the terms of an "incidental take permit" issued by the USFWS to the Bureau of Reclamation and DWR pursuant to the ESA. The basis for the inclusion of these USFWS terms in the incidental take permit was the analysis in the 2008 USFWS Biological Opinion (2008 BiOp) concerning the anticipated impacts of CVP/SWP south Delta pumping on the delta smelt. The purpose of the terms the USFWS included in this incidental take permit was to prevent CVP/SWP operations from resulting in a "take" of the endangered delta smelt. Under ESA regulations, a "take" is defined as "an act which kills or injures wildlife...Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding and sheltering."¹² Section 9 of the ESA prohibits the "take" of a species listed under the ESA unless the party undertaking the proposed action first obtains a lawful incidental take permit from the appropriate federal wildlife agency.

In the *San Luis v. Jewell* litigation, recipients of CVP/SWP water took aim at analysis in the 2008 BiOp and subsequent incidental take permit in which USFWS determined that, to protect and restore endangered delta smelt, CVP/SWP operations would need to be managed to ensure enhanced fresh water outflow to prevent rising salinity levels due to seawater intrusion. In its April 2014 ruling, the Ninth Circuit Court of Appeal rejected this challenge and upheld the

¹¹ No. 11-15871 (issued in April 2014).

¹² 50 CFR § 17.3.

USFWS determination that additional fresh water flow was needed to protect and restore delta smelt, explaining:

"The FWS found that Reclamation and DWR's proposed operation 'are likely to negatively affect the abundance of delta smelt' by 'substantially decreasing the amount of suitable abiotic habitat for delta smelt.'" BiOp at 236-37. To address the loss of habitat, the FWS proposed...that Reclamation and the DWR must provide sufficient Delta outflow to maintain a monthly average X2 no more eastward than 74 km from the Golden Gate in wet years and 81 km in 'above normal' immediate water years. BiOp at 272, 369. The FWS has previously found that the amount and quality of spawning habitat available to delta smelt is linked to the location of X2. BiOp at 239,240. As we previously discussed, X2 is the point in the Bay-Delta estuary where the salinity is two parts per thousand...which is considered suitable spawning habitat for the smelt. X2 in turn, depends on Delta outflow, which is largely determined by the difference between the total inflow from the Sacramento and San Joaquin River and the total amount of water exported through the pumping station. BiOp at 236....As the BiOp found, 'CVP/SWP operations control the position of X2 and therefore are a primary driver of delta smelt habitat suitability.' BiOp at 234."¹³

...

"The BiOp, in analyzing the predicted location of X2, estimated that median X2 would move 10 to 15 percent farther upstream under the proposed action relative to the historic median X2 baseline. BiOp at 265."¹⁴

...

"As we have previously explained, as the combined pumping operations of the SWP/CVP removed hundreds of gallons of fresh water from the Bay-Delta, X2 – the salinity-defined location of the smelt's primary spawning habitat – shifts eastward towards the delta. BiOp at 373...The BiOp determined that the 'long-term upstream shift in X2 during fall has caused a long-term decrease in habitat area availability for delta smelt,' and it set forth an adaptive management program to minimize the effect of Project pumping on X2."¹⁵

In the *San Luis v. Jewell* litigation, the Ninth Circuit upheld the determination by the USFWS (in its 2008 BiOp) that additional fresh water flows into the Delta were necessary under the ESA to protect and restore delta smelt. In the currently proposed BDCP and *December 2013 Draft EIR/EIS*, however, the Bureau of Reclamation and DWR have presented a HCP that does not

¹³ No. 11-15871 at pp. 74-75 (issued in April 2014).

¹⁴ No. 11-15871 at p. 76 (issued in April 2014).

¹⁵ No. 11-15871 at p. 86 (issued in April 2014).

provide additional fresh water flows and actually anticipates reduced fresh water flows. Yet, it is the USFWS (and its sister federal wildlife agency NMFS, which is responsible for endangered salmon and steelhead fisheries) that will ultimately determine whether the BDCP complies with the standards for HCP issuance pursuant to Section 10 of the ESA. If the 2008 USFWS BiOp found that increased fresh water flows into the Delta was needed (was a "primary driver") to protect delta smelt, it would follow that the USFWS would also be inclined to reject a BDCP (which is a multi-species HCP that covers the delta smelt) that disregarded the need for additional fresh water flows into the Delta and proposed to further reduce such flows.

Beyond the 2008 USFWS BiOp and the Ninth Circuit's April 2014 ruling in *San Luis v. Jewell*, there are additional reasons why the USFWS (and NMFS) may not be receptive to the current BDCP approach to fisheries restoration.

First, in March 2012, the USFWS prepared a draft "red flag" memo on the BDCP which found that that the BDCP's approach to fisheries "continues to downplay Bay Delta hydrodynamics as system-wide drivers of ecosystem services to the San Francisco Estuary...It is critical that the BDCP effects analysis forthrightly address the many important aspects of the dependency and its constituent species on flow...Until the roles of flows and flow alteration are properly developed in the effects analysis, the analysis will remain inadequate and potentially misleading."

Second, in November 2010 the California Department of Fish and Game (CDFG, a state wildlife agency) released a report titled *Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta (2010 CDFG Flow Report)*. The 2010 CDFG Flow Report (whose preparation was mandated under California's 2009 Delta Reform Act) began by explaining the agency's particular regulatory responsibilities in the arena of water resources: "As a trustee agency for the fishery resources in the State, the Department of Fish and Game has an interest in assuring that water flow into and out of the Delta is maintained at levels which are adequate for long-term viability of native fish and the aquatic resources they depend on."

The background section of the 2010 CDFG Flow Report then noted:

Fish declines coupled with hydrological and physical changes in the Delta suggest that the current water flow available for environmental resources is not adequate to maintain, recover, or restore the functions and processes that support native Delta fishes. Salmon in the Central Valley are also in decline. Two of the four runs of Chinook salmon are listed under the State and federal Endangered Species Act and fall-run Chinook salmon is at historic low abundance. Delta smelt is both State and federally listed as threatened and longfin smelt is listed under the California Endangered Species Act, reflecting their precipitous declines in abundance.

Water flow through the Delta is one of the primary drivers of ecosystem function. The timing, magnitude, and quality of flows all influence habitat features such as temperature, turbidity, transport, residence time, nutrient loadings, pollutant dispersal and other factors.

The *2010 CDFG Flow Report* acknowledged that although the direct entrainment of fish in the Delta pumps has contributed in the declines of Delta fisheries, a "more important" effect may be the indirect effects caused by reduced instream flow caused by water diversion operations. The *2010 CDFG Flow Report* concluded: "[r]ecent Delta flows are insufficient to support native Delta fishes in habitats that now exist in the Delta and that "[f]low is the critical factor in maintaining suitable habitat conditions that support all or some of the life stages (spawning, rearing, and adult) of native fish species that depend on the Delta and its tributaries." Table 15 of the *2010 CDFG Flow Report* then went on to recommend specific numerical Delta outflow criteria, San Joaquin River base and pulse flows, and Sacramento base and pulse flows that were significantly higher than current flows.

Much like the State Water Board's *2010 Delta Flow Criteria Report*, the *2010 CDFG Flow Report* found that the best available science established that significant increases in fresh water flow through the Delta and its two main contributing rivers were a prerequisite to restoring the Delta's fisheries. Although CDFG (renamed the California Department of Fish and Wildlife in 2013) does not have direct authority to approve HCPs under the ESA, it is foreseeable and likely that the USFWS and NMFS will take into account the finding of the *2010 CDFG Flow Report* in terms of evaluating whether the BDCP proposed by the Bureau of Reclamation and DWR complies with ESA requirements.

Third, in February 2014 the California Advisory Committee on Salmon and Steelhead Trout submitted comments on the BDCP.¹⁶ The California Advisory Committee on Salmon and Steelhead Trout was established pursuant § 6920 of the California Fish and Game Code to advise CDFG on the protection of these fisheries. In its February 2014 comment letter to the Director of CDFG, this Committee stated:

“BDCP promotes the unproven scientific hypothesis that habitat restoration can substitute for flow. However, the State Water Resources Control Board has already indicated that Delta inflows and outflows are presently insufficient to help listed species recover their former abundance. BDCP would reduce Delta outflow, which contributed to the decrease to salmon smolt survival rates modeled by the BDCP.

The concept of improving riparian and subtidal habitat to create an aquatic food supply for the Delta to make up for too water diverted is an unproven theory that has been criticized extensively by federal agencies in their ‘red flag’ comments on the BDCP/

...

None of the alternatives considered in the BDCP Draft Environmental Impact Statement and report would lead to the recovery of Sacramento River Winter Run and Spring Run Chinook salmon. None of the alternatives analyzed reduces the amount of water diverted upstream of or within the Delta. None of the alternatives analyzed considers meeting or moving towards meeting the State Water Resource Control Board’s Delta Outflow Criteria of 2010 that was specifically required by the legislature in 2009 to ‘inform planning decisions for the...BDCP.’”

Fourth, in 2009, pursuant to the ESA the NMFS issued a BiOp for CVP/SWP operation impacts on endangered salmon/steelhead. Much like the 2008 USFWS BiOp for CVP/SWP operation impacts on delta smelt, the 2009 NMFS Bi-Op found that CVP/SWP operations would destroy or adversely modify the critical habitat of these fisheries, and therefore proposed increased flow requirements and curtailment of CVP/SWP diversions on the San Joaquin River.

¹⁶ February 26, 2104 Letter from California Advisory Committee on Salmon and Steelhead Trout to Charlton Bonham, Director of California Department of Fish and Wildlife.

Under these circumstances, again it is difficult to understand why the Bureau of Reclamation and DWR believe that the USFWS and NMFS are likely to determine that the current BDCP approach satisfies the HCP requirements of Section 10 of the ESA. To make this determination, the USFWS would need to disavow the findings of its 2008 USFWS BiOp for smelt, NMFS would need to disavow the findings of its 2009 BiOp for salmon and steelhead, and USFWS and NMFS would both need to disregard the findings and recommendations in the *2010 CDFG Flow Report* and the State Water Board's *2010 Delta Flow Criteria Report*.

IV. CEQA/NEPA Compliance and Information on Baseline Conditions in *December 2013* Draft EIR/EIS

A starting point for environmental impact analysis under both CEQA and NEPA is the information provided regarding "baseline conditions" (sometime also referred to as the environmental and regulatory "setting"). If the baseline conditions of the project are not accurately described, then the analysis in an EIR/EIS of a proposed project's impacts and effects on such baseline conditions will necessarily be flawed.

A leading case on CEQA baseline conditions is the California Court of Appeal's 2003 decision in *Friends of the Eel River v. Sonoma County Water Agency (Friends of the Eel River)*.¹⁷ This case involved a water agency project that would increase diversions of water from the Eel River, in which the petitioner alleged that the CEQA EIR section pertaining to impacts on Eel River salmon and steelhead species did not adequately describe baseline conditions. More specifically, the petitioner in *Friends of the Eel River* maintained that the EIR in question failed to disclose the previously documented impacts of diversions on salmon/steelhead fisheries and failed to disclose proposals from other agencies to curtail such diversions to protect these fisheries. In its decision, the California Court of Appeal agreed with the petitioner, finding that EIR's inadequate discussion of baseline conditions failed to properly set the stage for the project impact analysis that followed.

In terms of CEQA compliance, the facts and holding in *Friends of the Eel River* are particularly on point with respect to the BDCP's fisheries analysis. In both instances, the proposed projects

¹⁷ 108 Cal.App.4th 859 (2003).

involved additional out of stream diversions that would reduce instream fresh water flow. In both instances, the waterways where the additional diversions were to take place involved declining salmon and steelhead fisheries where there had been detailed findings by other agencies that additional instream flow was needed to protect these fisheries. In *Friends of the Eel River* the California Court of Appeal ruled that the EIR's disregard and non-disclosure of the previous regulatory findings linking reduced fresh water flow to fisheries decline was inconsistent with CEQA's requirements concerning baseline conditions.

With these CEQA/NEPA standards in mind, and for reasons detailed earlier in this letter, the following portions of Chapter 11 of the *December 2013 Draft EIR/EIS* on baseline conditions appear vulnerable to challenge along the lines in *Friends of the Eel River*. Collectively, these portions of Chapter 11 of the *December 2013 Draft EIR/EIS* misrepresent the baseline conditions for fisheries through disregard and non-recognition of the critical role that reduced fresh water flows and rising salinity levels have played and are playing in the decline of smelt, salmon and steelhead in the Delta.

A. 11.1.5.1

This section is titled "Water Development and Conveyance" and contains a 4-page subsection under the heading "Water Diversions." In the subsection on "Water Diversions" there are 3 pages of discussion regarding the problem of entrainment of fish in the CVP/SWP south Delta pumps but no disclosure or discussion about well-established body of scientific evidence regarding the effects of CVP/SWP diversions on reduced fresh water flow, seawater intrusion and salinity (and how this salinity impacts smelt, salmon and steelhead).

B. 11.1.5.2

This section is titled "Hydrograph and Hydrodynamics Alterations" and contains an 8-page section on "Water Quality." In the subsection on "Water Quality" there is discussion of water quality impacts (on fisheries) related to nutrient input, ammonia, sediments, mercury, selenium, agricultural runoff, herbicides and pesticides. In the subsection on "Water Quality" there is no disclosure or discussion of water quality impacts (on fisheries) of salt/salinity resulting from seawater intrusion.

C. 11.2.1.2

Section 11.2.1.2 is titled “Long-Term Central Valley 2008 and 2009 USFWS and NMFS Biological Opinions.” In Section 12.1.1.2, the *December 2013 Draft EIR/EIS* stated that the USFWS 2008 BiOp and incidental take permit included actions to “provide suitable habitat conditions” for delta smelt but made no mention of and did not disclose that these actions were specifically related to seawater/intrusion and salinity concerns and called for reduced CVP/SWP diversions to allow additional instream flow.

In Section 12.1.1.2, the *December 2013 Draft EIR/EIS* reported that a 2011 federal district court decision (issued by now retired Judge Oliver Wanger) had found the 2008 USFWS BiOp flawed and that the USFWS had been ordered issue a revised BiOp (suggesting that the conditions in the 2008 BiOp were no longer binding). As discussed above in this comment letter, in April 2014 the Ninth Circuit Court of Appeals (in *San Luis v. Jewell*) overturned and reversed the 2011 federal district court decision, and upheld the 2008 USFWS BiOp.

D. 11.2.1.8

Section 11.2.1.8 is titled “Clean Water Act” and notes that (pursuant to Section 401 of the Clean Water Act) the California State Water Board must certify that any activity subject to a permit issued by a federal agency meets all state water quality standards. This section does not disclose that the issuance of an ESA incidental take permit for the proposed BDCP would be subject to State Water Board water quality certification, and that such water quality certification would address salinity levels (affected by seawater intrusions and CVP/SWP fresh water diversions). It should be noted that in its July 2013 comments on the BDCP, the State Water Board highlighted that the BDCP project proponents “should note that there are no waivers for Clean Water Act Section 401 Water Quality Certifications in the state of California.”¹⁸

¹⁸ July 2013 State Water Board Comment Letter on BDCP, page 30.

E. 11.2.2.4

Section 11.2.2.4 is titled "The Salmon, Steelhead Trout and Anadromous Fisheries Program Act" and explains that in 1988 this legislation was enacted in response to reports that the natural production of salmon and steelhead in California had declined dramatically. Section 11.2.2.4 did not disclose that this 1998 legislation created the California Advisory Committee on Salmon and Steelhead Trout, and that (as discussed above in this letter) the California Advisory Committee on Salmon and Steelhead Trout submitted a letter to the director of the California Department of Fish and Wildlife that criticized the proposed BDCP for failing to address the need for additional fresh water flows into the Delta to restore salmon and steelhead fisheries.

F. Section 11.2 and Section 11.2.2.9

Section 11.2 is titled "Regulatory Setting" and its introduction states that "This section provides the regulatory setting for aquatic resources, including potentially relevant federal, state and local requirements applicable to the BDCP." Section 11.2.2.9 is titled "Sacramento-San Joaquin Delta Reform Act of 2009." Although the proceedings leading to the State Water Board's 2010 *Delta Flow Criteria Report* and the 2010 *CDFG Flow Report* were explicitly required pursuant to the 2009 Delta Reform Act, there is no mention or disclosure of these proceedings or (or the findings/recommendations that resulted from these proceedings) in this section of the *December 2013 Draft EIR/EIS*. In Section 11.2.2.9 there is also no disclosure of provisions in the 2009 Delta Reform Act providing that the State Water Board's 2010 *Delta Flow Criteria Report* shall inform the planning decisions for the BDCP.

G. Section 11.4.1

This section is titled "Printed References" and lists all of the reports/written materials referenced and relied upon in the *December 2013 Draft EIR/EIS*. The State Water Board's 2010 *Delta Flow Criteria Report* and the 2010 *CDFG Flow Report* are not listed in this section (nor are they mentioned or discussed anywhere in the text of the *December 2013 Draft EIR/EIS*).

V. Current BDCP Approach to Fisheries – Watching a Train Wreck in Slow Motion

There are politically and economically practical reasons that explain why the BDCP process has so far tried to avoid the issues of fresh water flow, seawater intrusion and salinity. CVP/SWP diversions in the Delta account for less than half of the total diversion in the Sacramento River-San Joaquin River watershed, with the majority of diversions occurring upstream of the Delta CVP/SWP pumps. Given this circumstance, the Bureau of Reclamation and DWR (and recipients of water from the CVP/SWP) have been understandably reluctant to assume the role of “sole guarantor” for ensuring fresh water flows in the Delta because from their perspective it seems that, equitably, upstream diversions should be curtailed as well.

These upstream diverters, however, are not formally a part of the BDCP (which focuses on CVP/SWP operations), and efforts to press for curtailment of upstream diversion are complicated by California’s appropriative water rights system which generally provides that in times of water shortage/reduced supply “senior” appropriative water rights holders can take their full share before “junior” appropriators. Since most of the upstream diverters in the Sacramento River-San Joaquin River watershed hold appropriative water rights senior to appropriative water rights held by the Bureau of Reclamation and DWR for the CVP/SWP, under traditional California appropriative water rights principles these upstream diverters are likely to resist efforts to “equitably” share in the curtailment of diversions.

To be sure, the issues of fairness, equity and California appropriative water rights noted above are complex when it comes to allocating responsibility between the CVP/SWP and upstream diverters for ensuring there is adequate fresh water flow into the Delta. However, instead of acknowledging these complex issues head-on and trying to craft a feasible solution to navigate through them, with the BDCP process the Bureau of Reclamation and DWR have instead unfortunately attempted to dodge these issues altogether by adopting a fisheries restoration approach that simply ignores altogether the critical role of fresh water flow.

While one can appreciate why this approach was tempting to the Bureau of Reclamation and DWR (and the recipients of CVP/SWP water), it is an approach that is likely to fail because it

lacks scientific credibility. As explained above, the current BDCP approach is contingent on the State Water Board approving the proposal to change the CVP/SWP point of diversion to the north Delta and on the State Water Board issuing a Clean Water Act Section 401 water quality certification for the ESA incidental take permit, and on USFWS and NMFS approving the BDCP as an HCP that complies with Section 10 of the ESA. In light of the previous and repeated scientific determinations by the State Water Board, USFWS and NMFS regarding the need for additional fresh water flows to restore declining fisheries, however, it is questionable whether such agency approvals will be forthcoming. As also noted above, it is also questionable whether the non-disclosure of the well-documented scientific link between reduced fresh water flows and declining fisheries in the *December 2013 Draft EIR/EIS* is consistent with CEQA/NEPA requirements concerning disclosure of baseline conditions. Without these agency approvals, and without CEQA/NEPA compliance, the BDCP cannot move forward.

At this point, watching the BDCP process unfold is much like watching a train wreck in slow motion. Although many initially hoped the BDCP process would be grounded in credible science and would serve as a mechanism to address the hard political, legal and economic questions of how to reduce fresh water diversions in a manner that is fair and takes proper account of appropriative water rights principles, the BDCP has fallen short in both respects by opting to disregard entirely the question of fresh water flow. In doing so, the BDCP is likely to be rejected by the State Water Board, USFWS and NMFS, and has little chance of satisfying CEQA/NEPA requirements for disclosure of baseline conditions. The question (to strain the railroad metaphor) is whether the BDCP is too far down the track to halt its current course.

Yours,



Paul Stanton Kibel
Professor of Water Law and CUEL Co-Director

From: Pamela Coburn <pamelacoburn@att.net>
Sent: Tuesday, July 15, 2014 8:07 PM
To: bdcg.comments@noaa.gov
Subject: The twin tunnels

Please share my concern about these tunnels. My daughters and sister and I moved to the valley 30 years ago from Iowa. We are proud to call ourselves Californians. But these tunnels would absolutely ruin our delta and drastically change the northern valley. You cannot sacrifice our environment to help those in the south. They need to conserve much more and do de-salinization plants. We are struggling enough here in northern CA. Please help us.

From: makeshen.ca <makeshen.ca@gmail.com>
Sent: Tuesday, July 15, 2014 8:39 PM
To: BDCP.comments@noaa.gov
Subject: This project needs approval

The economies and welfare of millions of CA residents are at risk if we don't have sufficient water to meet our long term needs.

It is an imperative that we move this project forward on a timely basis.

Please consider the needs and welfare of millions of Californians.

Act now in favor of our resilient future.

Thank you.

From: Mike Mielke <mmielke@svlg.org>
Sent: Wednesday, July 16, 2014 10:01 AM
To: BDCP.comments@noaa.gov
Cc: Kris Rosa; Francesca Wahl; Yasmin Fitts; Tim McRae
Subject: Silicon Valley Leadership Group Draft BDCP Comment Letter -- Support
Attachments: July_2014_SVLG_BDCP_Comment_Letter--Support.pdf

Importance: High

To Whom it May Concern,

I am writing on behalf of the Silicon Valley Leadership Group to express our support for the draft Bay Delta Conservation Plan (BDCP) and its continuing evolution toward a final permitted project.

Our official comment letter, in support of the continuing evolution of the final project is attached.

Please acknowledge receipt at your earliest opportunity.

Sincerely,

Mike Mielke
Vice President, Environmental Programs & Policy
Silicon Valley Leadership Group
2001 Gateway Place, Suite 101E, San Jose, CA 95110
W: 408-501-7858
<http://svlg.org/> | [Fan us on Facebook](#)



July 16, 2014

Ryan Wulff, National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Re: Draft Bay Delta Conservation Plan and Associated EIR/EIS

To Whom it May Concern,

I am writing on behalf of the Silicon Valley Leadership Group to express our support for the draft Bay Delta Conservation Plan (BDCP) and its continuing evolution toward a final permitted project.

The Silicon Valley Leadership Group, founded in 1978 by David Packard of Hewlett-Packard, represents more than 390 of Silicon Valley's most respected employers on issues, programs and campaigns that affect the economic health and quality of life in Silicon Valley, including energy, transportation, education, housing, health care, tax policies, economic vitality and the environment

We believe that the BDCP draft represents a valuable step towards solutions for the Delta's long-term viability and health. The BDCP will restore the Sacramento-San Joaquin Delta habitat and, with the construction of two new tunnels, put in place a dual-conveyance water delivery system that will help secure water supplies.

The issue is important to Silicon Valley, as we rely on the Delta to meet about half of our annual water needs, and our members have prioritized working with the administrations in both Sacramento and Washington to insure the BDCP is backed by robust environmental and economic data and appropriate management structures. We are supportive of the current direction of the draft.

The construction of a new water conveyance is an essential element of the BDCP. The proposed project will provide substantial benefits by stabilizing the Delta and helping guarantee supplies. The amount of water Silicon Valley and other parts of the state will receive will not be much different than what is available today, but it will be dependable. The plan, developed through extensive scientific and economic research and hundreds of public meetings, meets the co-equal goals of water supply reliability and ecological restoration.

We applaud the plan's innovative adaptive management strategy, as illustrated in the plan and its implementing agreement, which helps assure that the biologic restoration goals of the conservation measures are met.

We are confident that the BDCP is a step in the right direction towards giving California a healthier environment, a stronger economy and a higher quality of life.

Sincerely,



Mike Mielke
Vice President of Environmental Programs and Policy
Silicon Valley Leadership Group
mmielke@svlg.org
408-501-7858

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KLA Tencor
DAN WARMENHOVEN
NetApp, Inc.
JED YORK
San Francisco 49ers

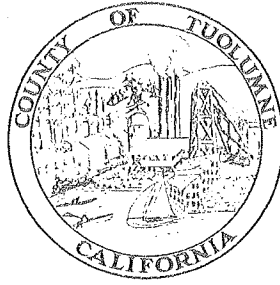
From: Alicia Jamar <AJamar@co.tuolumne.ca.us>
Sent: Wednesday, July 16, 2014 9:58 AM
To: 'NMFS Ryan Wulff (BDCP.Comments@noaa.gov)'
Cc: Dianne Feinstein (Shelly_Abajian@feinstein.senate.gov); 'Tom McClintock'; 'Tom Berryhill'; Frank Bigelow (frank@frankbigelow.com); RCRC (info@rcrcnet.org)
Subject: Comments on the Bay Delta Conservation Plan, EIR/EIS and Implementing Agreement
Attachments: BayDeltaLtr.pdf

Attached is correspondence commenting on the Bay Delta Conservation Plan, EIR/EIS and Implementing Agreement that was approved by the Tuolumne County Board of Supervisors on July 15, 2014.

Alicia L. Jamar

*Chief Deputy Clerk of the Board of
Supervisors of Tuolumne County
(209) 533-5521*

Tuolumne County
Administration Center
2 South Green Street
Sonora, California 95370



BDCP1494
Alicia L. Jamar, *Chief Deputy*
Clerk of the Board of Supervisors

Telephone: (209) 533-5521
Facsimile: (209) 533-6549
www.tuolumnecounty.ca.gov

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July 15, 2014

Ryan Wulff, NMFS
650 Capitol Mall - Suite 5-100
Sacramento CA 95814

Re: Comments on Bay Delta Conservation Plan, EIR/EIS, and Implementing Agreement

Dear Mr. Wulff:

Thank you for accepting these comments from Tuolumne County on the Bay Delta Conservation Plan (BDCP, or the Plan), the related Environmental Impact Report/Environmental Impact Statement (EIR/EIS), and the related and recently released draft Implementing Agreement. Our comments will be divided into three parts, first on the Plan itself; second, on the EIR/EIS; and third on the draft Implementing Agreement. With the recent release of the Implementing Agreement, Tuolumne County is sending this follow up comment letter. The County's comments are not intended to be exhaustive and do not touch on all aspects of the Plan or EIR/EIS but, rather, are limited to fundamental points of primary concern to residents of Tuolumne County.

THE PLAN

Costs and Funding Sources

Chapter 8.2.7.1 estimates the total capital cost of the BDCP to be \$24.9 billion, and we note parenthetically that this does not include interest on related debt and truly must be considered an estimate, as we understand that the engineering work for BDCP is only at the 10% level. Table 8-37 breaks down projected funding sources as being 68.4% from water contractors, 16.6% from State sources (primarily General Obligation bonds yet to be approved by the voters), and 14.3% from various Federal sources. Thus, it would appear that about \$8 billion of the estimated pre-interest capital cost is to be borne by the taxpayers of California and the United States.

Ryan Wulff, NMFS
July 15, 2014
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Tuolumne County residents pay both State and Federal taxes. Yet, we find nothing in BDCP that is of any benefit to Tuolumne County whatsoever. To the contrary, as is discussed below, it is likely that implementation of BDCP will result in the State Water Resources Control Board (SWRCB) looking at sources in Tuolumne County to provide replacement fresh water for the Delta to make up for the Sacramento River water that the Tunnels component of BDCP will route under the Delta. It is simply inequitable to ask residents of Tuolumne, or any other County that gets no benefit from BDCP, to shoulder any portion of the State and Federal funding sources of BDCP.

The Plan Fails to Acknowledge the Important Role of Storage

The Executive Summary of the Plan describes the Plan as a "comprehensive conservation strategy" and goes on to emphasize the importance of the Delta as a source of water for parts of the State ranging from Alameda County to urban Southern California to Kern County, and in between. Yet when one searches the 114 page Executive Summary looking for the word "storage" it is only found once; in a sidebar describing the functional and geographical areas of responsibility of the Department of Water Resources.

We understand that point 6 of Governor Brown's 10 Part California Water Action Plan calls for expanded water storage in the State (with an emphasis on groundwater storage), but that plan is short on specifics, either in terms of amount and location of new storage, or in terms of sources of funding. The BDCP Plan does not include any provision of new storage, yet has an estimated capital price tag of \$24.9 million with a portion of that cost presumably being paid by the major water contractors in the State. Our concern is simply that the essential element of new storage, whether surface or underground, will not receive the attention or funding that is needed. Stated otherwise, an expensive and untested new water conveyance system for California, with no corresponding provision for related storage needs may prove to be money not wisely spent.

THE EIR/EIS

The Failure to acknowledge that the Tunnels will increase the pressure to take further Foothill and Sierra water supplies for the Delta

Commenting on the EIR/EIS from the point of view of Tuolumne County is somewhat like attempting to do what many say can't be done --- proving a negative. That is the case because in none of the chapters of the EIR/EIS where we would expect to see our concerns addressed is there any explicit acknowledgement of what we believe to be a serious issue. A review of chapters 5 (Water Supply), 6 (Surface Water), 8 (Water Quality) and 15 (Recreation) does not result in finding any mention of the likelihood that new sources of fresh water will be sought to replace the water that the Tunnels called for by BDCP will convey underground rather than through the Delta.

Ryan Wulff, NMFS
July 15, 2014
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The SWRCB on August 3, 2010 by Resolution 2010-0039 found that from a fishery protection perspective significantly greater flows of fresh water are needed in the Delta. See http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf

Yet the Tunnels proposed in BDCP would further reduce fresh water flows in the Delta. It is likely, if not inevitable, that SWRCB would look for new sources of flows into the Delta. One obvious source would be up-river reservoirs in the foothills and high Sierra; specifically Don Pedro on the Tuolumne River and New Melones on the Stanislaus. Both rivers have their origins in Tuolumne County. This could amount to one of the greatest diversions of water supply and encroachment on established water rights in the State's history. Further, it would have a severe negative impact, not just on water supply and water quality in our county, but also on local recreation and tourism activities and future growth potential.

The Failure to Consider Improved Forestry Management Practices as an Alternative

We find the alternatives included in Chapter 3 of the EIR/EIS to be little more than modest variations of the Preferred Alternative of the Tunnels. We suggest that more imaginative alternatives to the Tunnels exist for dealing with California's chronic water shortages.

It is no secret that 60% of California's developed water supply and 50% of the flow into the Delta comes from the Sierra (<http://www.sierranevadaconservancy.ca.gov/our-region/sierra-water-supply-connection/sierra-delta-connection>). And there is a growing body of research that indicates that improved forestry management practices can materially increase water yields from our forests (for example, see <https://eng.ucmerced.edu/people/rbales/CV/Talks/1204.1>

We believe that a thorough analysis of the potential for significantly increasing the water yield from the Sierra should be considered and included as an alternative to the exceptionally expensive and equally controversial Preferred Alternative of the Tunnels.

THE DRAFT IMPLEMENTATION AGREEMENT

Lack of Specifics

The draft Implementation Agreement is lacking in specifics in numerous critical areas, not the least being that it fails to identify by name the State Water Project and Central Valley Project contractors who are expected to pay their share (68.4% according to the Plan) of the estimated \$24.9 billion capital cost of BDCP. The draft

Ryan Wulff, NMFS

July 15, 2014

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Implementation Agreement contemplates a list of Exhibits, with Exhibit H being a list of contractors. But no exhibits are attached to the draft Implementation Agreement. Another significant omission in the list of intended Exhibits is Exhibit D, which is supposed to be the all-important Implementation Schedule. In our comments above we expressed concern that State and Federal taxpayers may already be in line to pay a substantial portion of the cost of BDCP. Without there being identification of the contractors expected to pay the difference, or an Implementation Schedule showing when contractor commitments will become legally binding, our concerns about the exposure of taxpayers is magnified.

Our concerns about the identification and allocation of BDCP funding sources are further heightened by the fact that the draft Implementation Agreement is either silent or vague on these related questions:

- o How many and which of the State and CVP contractors will make enforceable commitments?
- o When will those commitments be made?
- o What remedies will exist if the contractors default on enforceable commitments that they presumably will make?
- o How will the costs to be funded by the contractors be allocated among the contractors and when will this be known?

Misleading Statement on Critical Issue

We recognize that this is a draft of a proposed Implementation Agreement. Yet we are disturbed by the provision of Section 8 which unqualifiedly asserts that the fish and wildlife agencies "have found" that BDCP "fulfills the requirements" of both Federal and State endangered species laws. We appreciate that both the May 30 Resources Agency press release and California Fish & Wildlife Director Bonham's comments at a related press conference clarify that this provision is anticipating future decisions, that may or may not materialize. We believe that a similar statement should have been included in the draft Implementation Agreement as a highlighted "Note to Reviewers" making it abundantly clear that the provision assumes a future state of affairs, which may or may not ever become reality.

Sierra Resources will likely be tapped for Additional Delta Outflow

Finally, and probably most importantly, we repeat our concern expressed above ("The Failure to acknowledge that the Tunnels will increase the pressure to take further Foothill and Sierra water supplies for the Delta") and point out that the provisions of Section 10 of the draft Implementation Agreement, particularly the last paragraph of Section 10.3.7.3.2, do nothing to alleviate our concern that waters of the foothill rivers, including the Stanislaus and Tuolumne, will be targeted to replace the fresh water that

Ryan Wulff, NMFS

July 15, 2014

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the Tunnels will divert from the Delta. Suffice it to say that this sentence in Section 10.3.7.3.2 is disconcerting, "In the event that additional outflow was determined to be necessary, supplemental water may be acquired from voluntary sellers." And what if there are no voluntary sellers (or if the Supplemental Adaptive Management Fund has been depleted)? At that point it would appear that the SWRCB would have no alternative but to exercise its considerable authority and require additional foothill and Sierra river flows into the Delta.

Sincerely,



EVAN ROYCE
Chairman

cc. BDCP.Comments@noaa.gov
Senator Dianne Feinstein
Congressman Tom McClintock
Senator Tom Berryhill
Assemblyman Frank Bigelow
Rural County Representatives of California

I hereby certify that according to the provisions of Government Code Section 25103, delivery of this document has been made.

ALICIA L. JAMAR
Clerk of the Board

By: 

From: Home <dlcarey2@verizon.net>
Sent: Wednesday, July 16, 2014 10:57 AM
To: BDCP.comments@noaa.gov
Subject: Delta Bay Plan

I agree that restoration and protection of area species is important to maintain our fishing and recreational industries. Sea water Incursion protection is of paramount importance. As a Southern Californian, our area has been more focused on conservation and reclamation for a much longer time period. I am concerned that there dose not appear to be a consideration of underground storage, or the restricting farming methods that clearly are wasting water resources. For example, I was in Sacramento recently, and observed huge agricultural sprinkler systems operating in the middle of the day in 90+ degree heat. This is an unacceptable practice, that I believe leads some areas/crops to be left fallow, due to the irresponsible overuse by others. California provides a significant portion of the Nations food, we need a balanced approach, which includes the restructuring of 100 year old water agreements.

Diana Lee Carey
Councilwoman, City of Westminster
8200 Westminster Blvd.
Westminster, CA 92683

Sent from my iPad

From: Jaan Carter <diggitydog9@yahoo.com>
Sent: Wednesday, July 16, 2014 4:34 PM
To: BDCP.comments@noaa.gov

It's bad enough that Nestle is in CA, carting off a zillion gallons of water to then sell back to us, and it's beyond comprehension that there is fracking going on anywhere, much less in California, during a severe drought and in earthquake country, but now you'd like to screw our lands, our animals and fish, and the People of California in yet another vile and hopelessly unethical boondoggle??

HELL, NO.

Let me just be clear about what I think of the plan for the BDCP: HELL, NO.

Now please go and do something that actually helps someone besides the filthy rich.

Thanks very much, have a nice day.

J. Carter
Alameda, CA

From: Mishwa Lee <mishwalee@gmail.com>
Sent: Wednesday, July 16, 2014 11:26 PM
To: BDCP.comments@noaa.gov
Subject: Protect our children and Grandchildren

I urge you to stand against the Bay Delta Conservation Plan. The plan if built would destroy the Bay Delta and all the ecosystems it supports. My great grandmother rode horseback from Oregon to Stockton in the early 1900s. When I was young she told me many stories of the tall grasses, clouds of birds, streams filled with salmon, rivers filled with sturgeon and the vitality of the Bay Delta. I have never seen such wondrous sites in all my life. Much has already been lost. Let's not deny our children and grandchildren the opportunity to live in a rich and healthy environment that honors the natural processes. The ability of the delta to be the cleanser of the Bay is critical to maintaining water quality and healthy habitats among other functions. There are many ways to conserve in times of drought. These tunnels are not among those sane ways.. Let's protect the Bay Delta for all the future generations. Use our resources wisely!!

Sincerely, Mishwa Lee
California Native, 3rd generation
Environmental Educator and Community Garden Coordinator
3 Ardath Ct., San Francisco, CA 94124

From: Brian Johnson <bjsax@comcast.net>
Sent: Wednesday, July 16, 2014 6:57 PM
To: BDCP.comments@noaa.gov
Subject: The Tunnels, the math is mind-blowing.

The cross-section of the two tunnels = 2,513 square feet. In other terms, a river 100 feet wide by 25 feet deep.

A one foot section of the two tunnels – 2,513 cubic feet x 7.5 gallons/cubic ft = 18,847 gallons.

At thirty five miles long, the math pencils out at, 35 (miles) x 5280 (feet in a mile) x 18,847 (gallons) = 3,482,925,600 gallons. That's just short of three and a half billion gallons.

Let's say the tunnels are only half full. We get 1 billion, 741 million, 462 thousand, 800 gallons.

Using a flow of 15,000 c.f.s., water would need to move at a little over 4 miles per hour .

So every hour, with the two tunnels half full, some 7 billion gallons would be delivered to the forebay south of the intakes.

Submitted by:

Brian Johnson, Davis, CA

From: Rebecca Secor <rebecca.secor@icloud.com>
Sent: Wednesday, July 16, 2014 4:53 PM
To: BDCP.comments@noaa.gov
Subject: Twin Tunnels

I am opposed to the tunnels. It is sacrificing the needs of the many for the politically strong. I cannot believe that Gov. Brown's ethics will allow this. There are more sustainable ways to solve California's water shortage. Rewarding the most wasteful is not the solution.

Rebecca Secor

From: Mishwa Lee <mishwalee@gmail.com>
Sent: Wednesday, July 16, 2014 11:12 PM
To: BDCP.comments@noaa.gov
Subject: Protect our children and grandchildren