Proposition 1E Stormwater Flood Management Grant Proposal

Lake Wohlford Dam Replacement Project

Attachment 8: Economic Analysis – Water Supply Costs and Benefits

Attachment 8 consists of the following items:

- ✓ **Water Supply Background.** This attachment provides an overview of water supply in the region and within the City of Escondido.
- ✓ **Project Costs.** The total costs associated with the project are presented.
- ✓ **Water Supply Benefits**. The body of this attachment provides a description of the water supply benefits associated with implementation of the proposed project.

This attachment contains estimations of the water supply benefits, as well as the total costs associated with the *Lake Wohlford Dam Replacement Project.* Section 1 provides a summary of the local and regional water supply background with respect to the San Diego IRWM Region and the project area. Section 2 contains a narrative description of the expected costs that would be incurred to implement and operate the project over the project's lifetime (through 2060). Section 3 contains a narrative description of the expected water supply benefits of the *Lake Wohlford Dam Replacement Project,* which are equivalent to the water supply benefits associated with this grant proposal. Where possible, each benefit was quantified and presented in physical or economic terms. In cases where quantitative analyses were not feasible, this attachment provides complimentary qualitative analyses. In addition, this attachment provides a description of economic factors that may affect or qualify the amount of economic benefits to be realized. This attachment also includes a discussion regarding uncertainties about the future that might affect the level of benefit received.

Water Supply Background

Regional

The San Diego region comprises eleven parallel and similar hydrologic units that discharge to coastal bays, estuaries, or lagoons. Due to low and unreliable quantities of precipitation, the region has a limited local water supply and has therefore depended largely on imported water from Northern California rivers, the Bay Delta, and the Colorado River for over sixty years. The adopted San Diego IRWM Plan recognizes that it is important to increase the local water supply, which is reflected in Goal 1 of the IRWM Plan: *optimize local water supply reliability*.

The San Diego County Water Authority (SDCWA) purchases the majority of the region's imported water (sourced from the State Water Project (SWP) and the Colorado River Aqueduct (CRA)) from the Metropolitan Water District of Southern California (MWD), and receives additional imported supplies from the Colorado River through a conservation and transfer agreement with the Imperial Irrigation District (IID). SDCWA, as the only water wholesaler within the Region, distributes the aforementioned supply to its 24 member agencies, which include all major water agencies in the San Diego region. The amount of water imported into the region varies depending on hydrologic conditions, but in general the region's water supply consists of 70 to 90 percent imported water. In 2008, approximately 88 percent of the region's water supply was imported, 76 percent of this water was purchased by SDCWA from MWD, and the remaining 12 percent came from the Colorado River (through the IID transfer). The remaining water supply in the region consists of conservation, recycled water, local surface water, and groundwater, with approximately 10 to 30 percent coming from these sources. It is anticipated that future water supplies may also consist of desalinated water, although this water source is not currently available for the region.

One of the most significant issues for the region is the availability and reliability of its imported water supplies. The SWP is the major source of imported supply, followed by water from the CRA. Recent legal decisions to protect the endangered Delta smelt have drastically reduced the amount of Delta pumping that can be conducted, cutting back on the volume of SWP water that can be delivered. This situation, coupled with the recent droughts affecting both the SWP and CRA are further reducing available supplies, serves as a reminder that the region's water supply is vulnerable to events outside the region. The region faces a critical need for improved local supplies, and local water agencies have identified the need to increase local supplies as a key element in meeting future regional water demands.

Absent increased conservation efforts, as well as cultivation of local surface water, groundwater, desalinated water, and recycled water supplies, the region will continue to be vulnerable to unreliable imported supplies, and will continue to suffer the economic consequences of additional cutbacks in imported supplies. This trend will continue until the region develops reliable local supplies.

Local

The full capacity of Lake Wohlford is approximately 6,500 AF. Due to seismic instability, however, the City has kept Lake Wohlford at approximately 43% of its 6,500 AF capacity (2,800 AF) (ICF Jones and Stokes 2008). During the course of an average year, the water volume removed from Lake Wohlford for urban use is approximately 16,800 AF or the equivalent of filling and draining the entire reservoir approximately three times. Recent inflow-outflow volume, however, has averaged only half that of an average year due to required discharges (Jones and Stokes 2008).

The City of Escondido, who diverts water from Lake Wohlford through the Escondido Canal, supplements their annual water supplies with imported water purchased from SDCWA (City of Escondido 2005). Despite local supplies within Lake Wohlford, the City of Escondido receives an estimated 82% of their annual water supply from imported supplies (City of Escondido 2005). Historically, Lake Wohlford has reached its full 6,500 AF capacity in the spring following winter rains (ICF Jones and Stokes 2008).

Cost of Imported Water

As described above, imported water supply in the San Diego region constitutes approximately 70 to 90 percent of the region's water supply. Water produced by conservation, recycling, groundwater extraction, and other local sources will offset the need to use imported water supply. The value of adding new local supplies can thus be estimated based on the costs avoided by reducing local demands for imported water. For the *Lake Wohlford Dam Replacement Project*, the project benefits associated with avoidance of imported water are based on the assumptions below.

The avoided cost of purchasing imported water from SDCWA are calculated based on MWD's Tier 1 water rates and include additional SDCWA and MWD fixed charges. Table 8-1 shows the total "all in" rates for imported water supply from SDCWA in 2010 dollars to illustrate the high cost of imported water supply and associated need to protect and enhance local supplies. The total "all in" water rates for M&I supplies purchased from SDCWA are $864 for untreated water and $1,079 for treated water (in 2010 dollars).

Table 8-1: San Diego Region Water Rates Effective January 1, 2011 ($2010)

	Untreated ($/AF)	Treated ($/AF)
Volumetric Charges[1]		
Melded Supply Rate	$597	$812
Transportation	$75	$75
Melded Tier 1	$672	$887
Fixed Charges (in Volumetric Terms)[1]		
Storage	$95	$95
Customer Service	$44	$44
Total Fixed Charges	$139	$139
Total SDCWA Costs for M&I Water	**$811**	**$1,026**
Additional MWD Fixed Charges[2]		
Capacity Charge	$14	$14
Readiness to Serve Charge	$39	$39
Total "All In" Costs for M&I Water	**$864**	**$1,079**

Sources:
1 San Diego County Water Authority. June 24, 2010. Public Hearing: Recommended CY 2011 Rates and Charges.
2 City of San Diego. October 27, 2010. CY 2011 Rate Fact Sheet: SDCWA Water Rates for the City of San Diego Effective January 1, 2011.

Project Costs

As detailed within Attachment 7, the total estimated budget for the *Lake Wohlford Dam Replacement Project* is $30,698,100, for a total present value $23,491,081 (in 2009 dollars). The latter value reflects discounting, and does not include any additional costs that are not included within the project budget (Attachment 4). The City of Escondido currently conducts ongoing operations and maintenance for Lake Wohlford and the existing Lake Wohlford Dam, which includes daily inspections, telemetry readings, and erosion control. The City will continue to conduct these efforts with or without implementation of the *Lake Wohlford Dam Replacement Project.* Therefore, these costs are not considered necessary to accrue the benefits associated with this project, and were not included within Table 8-2 below.

The annual costs of the *Lake Wohlford Dam Replacement Project* are equivalent for flood damage reduction, water supply, water quality, and other water-related benefits. This is because the capital costs for this project will work to provide a suite of benefits, and are not segmented by benefit type. Table 8-2 below provides information regarding the total project costs, which are the same as those presented within Attachment 7. Refer to Attachment 7 for further detail regarding how these costs were reached.

Table 8-2: Total Project Costs

Table 14 - Annual Cost of Water Supply Project (All costs in 2009 dollars)									
	Initial Costs	Operations and Maintenance Costs						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Year	Grand Total Cost from Table 7	Admin	Operation[1]	Maintenance[1]	Replacement	Other	Total Costs (a)+…+(f)	Discount Factor	Discounted Costs (g) x (h)
2009	$959,620	$0	$0	$0	$0	$0	$959,620	1.00	$959,620
2010	$959,620	$0	$0	$0	$0	$0	$959,620	0.94	$905,302
2011	$1,109,620	$0	$0	$0	$0	$0	$1,109,620	0.89	$987,558
2012	$1,109,620	$0	$0	$0	$0	$0	$1,109,620	0.84	$931,658
2013	$7,776,287	$0	$0	$0	$0	$0	$7,776,287	0.79	$6,159,547
2014	$8,316,667	$0	$0	$0	$0	$0	$8,316,667	0.75	$6,214,697
2015	$9,316,667	$0	$0	$0	$0	$0	$9,316,667	0.70	$6,567,882
2016	$1,150,000	$0	$0	$0	$0	$0	$1,150,000	0.67	$764,816
2017-2060	$0	$0	$0	$0	$0	$0	$0	--	$0
Project Life	**$30,698,100**	**$0**	**$0**	**$0**	**$0**	**$0**	**$30,698,100**	**--**	**$23,491,081**
							Total Present Value of Discounted Costs (Sum of Column (i))		**23,491,081**

1 O&M costs are incurred during management of the existing Lake Wohlford Dam; those existing O&M costs would continue and no new or additional O&M costs are anticipated from the proposed replacement.

Water Supply Benefits

The water supply benefits that are anticipated to result from implementation of the *Lake Wohlford Dam Replacement Project* are summarized below in Table 8-3, and the cost-benefit overview is summarized in Table 8-4. This project would result in monetized water supply benefits associated with avoided water imports and quantified benefits associated with increased water supply reliability.

Table 8-3: Benefits Summary

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Imports	Monetized	Local and Regional
Water Supply Reliability	Qualitative	Local and Regional

Table 8-4: Benefit-Cost Analysis Overview

	Present Value ($2009)
Costs – Total Capital and O&M	**$23,491,081**
Monetizable Benefits	
Avoided Water Imports	$52,620,972
Qualitative Benefits	**Qualitative Indicator***
Water Supply Reliability	+

* Magnitude of effect on net benefits:
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

The "Without Project" Baseline

If Lake Wohlford Dam were to be reconstructed such that the lake could safely hold its entire 6,500 AF design capacity, this would substantially increase the amount of local water supply available to the City of Escondido. Without this project, the capacity of Lake Wohlford would remain at 2,800 AF, and the City of Escondido would continue to rely on imported water for approximately 80% of their water supply.

Benefits Analysis

Avoided Water Imports

The *Lake Wohlford Dam Replacement Project* would increase the capacity of Lake Wohlford from its current value of 2,800 AF to a total capacity of 6,500 AF. This increase in capacity would result in water supply benefits due to operational changes that the City of Escondido could implement if the dam were allowed to reach its maximum design level. Currently, if Lake Wohlford reaches levels that exceed its maximum allowable capacity, excess supply is generally diverted to the local water supply system. Conversely, if the lake reaches its minimum allowable limit, water levels are supplemented with imported water supplies from SDCWA.

Historically, the City of Escondido maintained Lake Wohlford at just below the 95-foot contour. Currently, however, the City must maintain the lake at the 70- to 75-foot contour, which corresponds to the maximum allowable level water surface elevation established by FERC for seismic safety purposes. In addition, the City of Escondido must maintain Lake Wohlford at a minimum allowable level that is set by operation of other facilities, such as boat docking and fishing. In previous years when Lake Wohlford could reach its 6,500 AF capacity, the City of Escondido had a larger operational buffer, and could often maintain the lake with local supplies through the winter months before requiring offsets from imported water sources. Therefore, seismic-related safety conditions have restricted the operational buffer within Lake Wohlford such that the City of Escondido must use more imported water to maintain Lake Wohlford at an appropriate level.

Table 8-5 below demonstrates water use values for the City of Escondido from 1980 to 2007 and from 2007 to 2010. These values correspond to water uses before and after implementation of FERC restrictions on surface elevation within Lake Wohlford. This table demonstrates that on average, since implementation of the FERC restrictions, the City of Escondido has purchased an additional 3,866 AFY of imported water from SDCWA to maintain appropriate levels within Lake Wohlford.

In accordance with Table 8-5, this analysis assumes that approximately 3,866 AFY of local water would be offset by purchase of imported water supply. By addressing the dam's current seismic-safety issues, this proposal would allow the City of Escondido to reduce purchases of imported water supplies by 3,866 AFY, beginning in 2015 when improvements to Lake Wohlford Dam are complete.

Table 8-5: City of Escondido Water Supply Summary

Year	Local Supply from Lake Wohlford (acre-feet)	Imported Supply from SDCWA (acre-feet)	Total (acre-feet)
80-81	12,922	13,133	26,055
81-82	6,248	16,975	23,223
82-83	11,750	8,397	20,147
83-84	10,689	14,332	25,021
84-85	10,272	13,562	23,834
85-86	9,921	14,353	24,274
86-87	8,833	16,830	25,663
87-88	5,581	19,948	25,529
88-89	6,502	21,284	27,786
89-90	4,091	25,677	29,768
90-91	3,971	22,958	26,929
91-92	7,519	14,727	22,246
92-93	14,037	10,864	24,901
93-94	8,648	16,227	24,875
94-95	9,213	15,287	24,500
95-96	9,568	15,957	25,525
99-00	9,023	18,775	27,798
00-01	9,078	14,926	24,004
01-02	10,090	17,293	27,383
02-03	4,547	26,020	30,567
03-04	5,746	23,650	29,396
04-05	3,637	28,527	32,164
05-06	2,950	27,381	30,331
06-07	3,857	30,158	34,015
Pre-Restriction Average	**7,616**	**19,305**	**26,922**
07-08	2,669	25,953	28,622
08-09	4,492	22,474	26,966
09-10	1,596	21,087	22,683
Post-Restriction Average	**2,919**	**23,171**	**26,090**
Difference	**-4,697**	**3,866**	**832**

In total, from 2015 to 2060, this proposal would potentially result in 177,836 AF of water savings. These water savings were monetized using the SDCWA treated water rates over the lifetime of the project (until 2060), which was calculated at a total value of $52,620,972 after discounting. Table 8-6 provides a summary of avoided water import costs. Table 8-7 provides detailed information regarding the annual water supply benefits, which are presented in 2009 dollars. Please note that these benefits have been measured through 2060, in accordance with DWR's Stormwater Flood Management Grant Proposal Solicitation Package. However, the newly constructed Lake Wohlford Dam is anticipated to accrue benefits over a longer lifetime, as this structure will likely remain in place for 100 years or more.

Table 8-6: Avoided Imported Water Costs

	Units	Average Unit Cost	Years	Total Cost
Avoided Water Imports	3,866	$1,302	46	$231,550,330
Total Avoided Costs after Discounting ($2009)				**$52,620,972**

Notes: The unit cost of imported water is presented in this table as the average value over the lifetime of the project. For further information regarding how these numbers were calculated, please refer to Table 8-5 above.

Table 8-7: Annual Water Supply Benefits

Table 15 - Annual Water Supply Benefits (All benefits in 2009 dollars)								
	(b) Type of Benefit: Avoided Water Imports					Discounting Calculations for Economic Benefits		
	(c) Measure of Benefit [Unit]: AFY							
(a) Year	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit $ Value	(h) Annual $ Value [f x g]	(h) Total Annual Benefits ($)	(i) Discount Factor	(j) Discounted Benefits [h x i]
2009	--	--	--	--	--	--	1.000	--
2010	--	--	--	--	--	--	0.943	--
2011	--	--	--	--	--	--	0.890	--
2012	--	--	--	--	--	--	0.840	--
2013	--	--	--	--	--	--	0.792	--
2014	--	--	--	--	--	--	0.747	--
2015	-3,866	0	3,866	$917	$7,299,877	$3,546,283	0.705	$2,500,130
2016	-3,866	0	3,866	$950	$7,563,897	$3,674,544	0.665	$2,443,572
2017	-3,866	0	3,866	$985	$7,837,480	$3,807,451	0.627	$2,387,272
2018	-3,866	0	3,866	$1,020	$8,120,952	$3,945,162	0.592	$2,335,536
2019	-3,866	0	3,866	$1,057	$8,414,679	$4,087,855	0.558	$2,281,023
2020	-3,866	0	3,866	$1,096	$8,719,016	$4,235,702	0.527	$2,232,215
2021	-3,866	0	3,866	$1,106	$8,804,484	$4,277,222	0.497	$2,125,780
2022	-3,866	0	3,866	$1,117	$8,890,816	$4,319,163	0.469	$2,025,687
2023	-3,866	0	3,866	$1,128	$8,977,975	$4,361,504	0.442	$1,927,785
2024	-3,866	0	3,866	$1,139	$9,065,980	$4,404,257	0.417	$1,836,575
2025	-3,866	0	3,866	$1,150	$9,154,855	$4,447,433	0.390	$1,734,499
2026	-3,866	0	3,866	$1,162	$9,244,595	$4,491,029	0.371	$1,666,172
2027	-3,866	0	3,866	$1,173	$9,335,226	$4,535,057	0.350	$1,587,270
2028	-3,866	0	3,866	$1,185	$9,426,746	$4,579,517	0.331	$1,515,820
2029	-3,866	0	3,866	$1,196	$9,519,155	$4,624,410	0.312	$1,442,816
2030	-3,866	0	3,866	$1,208	$9,612,483	$4,669,749	0.294	$1,372,906
2031	-3,866	0	3,866	$1,220	$9,706,734	$4,715,536	0.278	$1,310,919
2032	-3,866	0	3,866	$1,232	$9,801,886	$4,761,761	0.262	$1,247,581
2033	-3,866	0	3,866	$1,244	$9,897,973	$4,808,440	0.247	$1,187,685
2034	-3,866	0	3,866	$1,256	$9,995,004	$4,855,577	0.233	$1,131,350
2035	-3,866	0	3,866	$1,268	$10,092,989	$4,903,178	0.220	$1,078,699
2036	-3,866	0	3,866	$1,281	$10,191,939	$4,951,249	0.207	$1,024,908
2037	-3,866	0	3,866	$1,293	$10,291,868	$4,999,794	0.196	$979,960
2038	-3,866	0	3,866	$1,306	$10,392,767	$5,048,811	0.185	$934,030
2039	-3,866	0	3,866	$1,319	$10,494,652	$5,098,307	0.174	$887,105
2040	-3,866	0	3,866	$1,332	$10,597,542	$5,148,291	0.164	$844,320

Table 15 - Annual Water Supply Benefits (All benefits in 2009 dollars)								
	(b) Type of Benefit: Avoided Water Imports					Discounting Calculations for Economic Benefits		
	(c) Measure of Benefit [Unit]: AFY							
(a) Year	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit $ Value	(h) Annual $ Value [f x g]	(h) Total Annual Benefits ($)	(i) Discount Factor	(j) Discounted Benefits [h x i]
2041	-3,866	0	3,866	$1,345	$10,701,432	$5,198,761	0.155	$805,808
2042	-3,866	0	3,866	$1,358	$10,806,345	$5,249,727	0.146	$766,460
2043	-3,866	0	3,866	$1,371	$10,912,280	$5,301,190	0.138	$731,564
2044	-3,866	0	3,866	$1,385	$11,019,262	$5,353,162	0.130	$695,911
2045	-3,866	0	3,866	$1,398	$11,127,294	$5,405,644	0.123	$664,894
2046	-3,866	0	3,866	$1,412	$11,236,381	$5,458,639	0.116	$633,202
2047	-3,866	0	3,866	$1,426	$11,346,532	$5,512,150	0.109	$600,824
2048	-3,866	0	3,866	$1,440	$11,457,776	$5,566,193	0.103	$573,318
2049	-3,866	0	3,866	$1,454	$11,570,103	$5,620,761	0.097	$545,214
2050	-3,866	0	3,866	$1,468	$11,683,526	$5,675,862	0.092	$522,179
2051	-3,866	0	3,866	$1,483	$11,798,081	$5,731,513	0.087	$498,642
2052	-3,866	0	3,866	$1,497	$11,913,741	$5,787,701	0.082	$474,591
2053	-3,866	0	3,866	$1,512	$12,030,545	$5,844,444	0.077	$450,022
2054	-3,866	0	3,866	$1,527	$12,148,494	$5,901,744	0.073	$430,827
2055	-3,866	0	3,866	$1,542	$12,267,588	$5,959,600	0.069	$411,212
2056	-3,866	0	3,866	$1,557	$12,387,851	$6,018,024	0.065	$391,172
2057	-3,866	0	3,866	$1,572	$12,509,309	$6,077,028	0.061	$370,699
2058	-3,866	0	3,866	$1,587	$12,631,949	$6,136,606	0.058	$355,923
2059	-3,866	0	3,866	$1,603	$12,755,800	$6,196,773	0.054	$336,413
2060	-3,866	0	3,866	$1,619	$12,880,855	$6,257,525	0.051	$320,482
Total Present Value of Discounted Benefits Based on Unit Value								**$52,620,972**

Water Supply Reliability

The reliability of a water supply refers to the ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. This proposal would increase the local water supply by 3,866 AF per year, which increases the amount of local water available, and reduces future potential imported water demands. Due to the supply sources for current users of Lake Wohlford (City of Escondido), increasing the local supply within Lake Wohlford would directly reduce use of imported water supplied through SDCWA. In addition, by increasing the operational buffer of Lake Wohlford, this project would increase supply reliability by allowing for an increase in the amount of local supply maintained within Lake Wohlford.

Although interest in water supply reliability is increasing, only a few studies have directly attempted to quantify its value. The results from these studies indicate that residential and industrial (i.e., urban) customers seem to value supply reliability quite highly. Stated preference studies find that the annual value of reliability ranged from $93 to $489 per household (updated to 2009 dollars) for total reliability (i.e., a 0% probability of their water supply being interrupted in times of drought) (San Diego County Water Authority 2008).

The challenge for use of these values to determine a value of the proposal is recognizing how to reasonably interpret these survey-based household monetary values. The values noted above reflect a willingness-to-pay to ensure complete reliability (zero drought-related use restrictions in the future), whereas the proposal would increase overall reliability, but would not guarantee 100% reliability. Thus, the dollar values from the studies will probably overstate the reliability value provided by the project.

Reducing the demand for SDCWA imported water would also reduce the demand for the sources of SDCWA imported water, SWP and CRA supplies. Reducing the demand of these statewide water resources would benefit California residents and state and local government agencies involved in water management in preparing for drought years by reducing uncertainty about demand for water supplies. SWP and CRA water users will benefit from increased supply reliability, including but not limited to other Southern California municipal water users, Central Valley agricultural, municipal, and industrial water users, and Imperial Valley agricultural water users.

Studies have shown municipal water users throughout California are willing to pay in order to avoid water shortages and reduce water scarcity. Jenkins, Lund, and Howitt (2001) estimated that San Diego County area residents would be willing to pay between $5 and $10 (constant $1995) per person on average (at projected 2020 population levels) to avoid costs associated with water scarcity. (Jenkins et al 2001) Expressed in real 2009 dollar values, these willingness-to-pay estimates range from $8 to $15 per person at projected 2020 population levels (Jenkins et al 2001). Project specific benefits are not monetized herein.

Distribution of Project Benefits and Identification of Beneficiaries

Table 8-7 summarizes beneficiaries of the *Lake Wohlford Dam Replacement Project*, which include local and regional beneficiaries. Local beneficiaries would include project partners (VID), as well as local residents and rate payers. This project would increase local supplies coming from stormwater runoff and precipitation. This local water supply source would be substantially less costly when compared to imported water costs. Therefore, benefits associated with reduced water imports would be directly received by local residents and rate payers. In addition, VID, who utilizes Lake Wohlford as a conduit for transporting their water from Lake Henshaw, would benefit from increased operational reliability of Lake Wohlford and Lake Wohlford Dam.

Regional beneficiaries would include SDCWA member agencies, SWP customers, and residents within the San Diego region. As stated in the benefits analysis, increasing the local water supply within Lake Wohlford reduces demand for SDCWA water by the City of Escondido. In turn, more SDCWA imported water supplies would be available for other member agencies that continue to rely on imported water source through SDCWA. By increasing water supplies available for other SDCWA agencies, this would potentially benefit regional residents and rate payers by reducing demands and therefore costs for SDCWA imported water supplies.

Table 8-7: Project Beneficiaries Summary

Local	Regional	Statewide
Project partners (VID) and residents/rate payers	SDCWA member agencies and residents/rate payers	Not applicable

Project Benefits Timeline Description

This project would provide water supply benefits following project construction in 2015 and through the project's lifetime (until 2060).

Potential Adverse Effects from the Project

Any potential short-term impacts associated with project construction will be mitigated through the environmental documentation, compliance/mitigation, and permitting processes. No long-term adverse effects are expected as a result of the proposed project.

Uncertainty of Benefits

Uncertainties relating to the water supply benefits of this project are summarized below in Table 8-8. Uncertainties regarding the benefits associated with the avoided cost of imported water are due to uncertainties regarding climate, regulatory/legal issues, water demands, and SDCWA water rates. In addition, uncertainties regarding water supply reliability would occur because these benefits were not monetized.

Table 8-8: Omissions, Biases, and Uncertainties and their Effect on the Project

Benefit Category	Uncertainty Category	Likely Impact on Net Benefits*	Comment
Avoided Water Imports	Climate	+/-	Projected SDCWA real water prices are based on projected MWD prices. Projected water rates are based on "normal year" expectations, whereas dry year conditions will add additional cost pressures (and may move some water to higher cost Tier 2 levels). Increasing concerns about climate change, which may increase evaporation and transpiration resulting in reduced water supplies and putting upward pressure on water prices (holding demand constant). The future price of MWD, and therefore SDCWA, water may be understated and thus net benefits associated with this project would likely increase. Despite the potential positive benefit that would be associated with climate issues, the precise impact that this would have on project benefits is unknown at this time.
	Regulatory/ Legal	+	Recent regulatory/legal issues, specifically those surrounding the Bay-Delta ecosystem with respect to operation of the SWP, increase the likelihood that SDCWA surface water supplies from the SWP will be reduced in the future, even at existing demand levels. As a result, prices may increase at higher rates than experienced in the recent past. The future price of MWD, and therefore SDCWA, water may be understated and thus net benefits associated with this project would likely increase.
	Increased Water Demands	+/-	SWP and CRA water users may increase demand, which may result in higher rates (holding supply constant). Population projections are forecasted based on a host of assumptions, that when violated, will result in uncertainty about actual future demand for California water.
	SDCWA Water Rate	+/-	Net benefits of avoided water imports are computed using the currently projected treated SDCWA water rate as the cost of avoided water supply. Considering that water rates have increased in recent years, this value is notably conservative. However, because future rate changes are not known at this time, potential changes to water rates could have a positive or negative impact on project benefits.
	Volume of Dam Releases	+/-	Data for post-restriction imported water purchases are based on a 3-year average from 2007 to 2010, and this analysis assumes that future rainfall is representative of this sampling time. Dependent on future rainfall and climatic conditions, the economic benefits assumed in this analysis could vary both positively and negatively.
Water Supply Reliability	Water Supply Reliability	+	The monetized value of added reliability is not included within this water supply benefit analysis. Adding the present value benefit of improved water supply reliability into the overall benefit-cost analysis would increase the net benefits associated with this project.

* Magnitude of effect on net benefits

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

References

City of Escondido. 2005. *2005 Urban Water Management Plan.* Available: http://www.escondido.org/Data/Sites/1/pdfs/Utilities/UrbanWaterManagementPlan.pdf

ICF Jones and Stokes. 2008. *Lake Wohlford Dam Environmental Opinion.* Prepared for the City of Escondido. December 2008.

Jenkins, M.W., J.R. Lund, and R.E. Howitt. 2001. *Use Programming Methods To Measure The Per Capita Value Of Urban Water Scarcity By Detailed Analysis Unit (DAU) Throughout California At Projected Population Levels In The Year 2020.*

San Diego County Water Authority on behalf of the San Diego Regional Water Management Group. 2008. *San Diego Integrated Regional Water Management Grant Application, IRWM Implementation Grant, Round 2, Step 2 Program.*

Vista Irrigation District (VID). 2005. *2005 Urban Water Management Plan.* Available: http://www.vid-h2o.org/pdf/publication/2005_Urban_Water_Management_Plan__12-7-2005.pdf