A PORTFOLIO-BASED BDCP CONCEPTUAL ALTERNATIVE

APPENDIX A: ALTERNATIVE WATER SUPPLY COST AND YIELD ESTIMATES

This conceptual alternative proposes a smaller capital investment in a Delta facility, in comparison with the current BDCP preliminary project, and an investment of some of the savings in regional water supply tools. This analysis includes estimates of the capital cost and water supply benefits of regional investments. The capital costs associated with water recycling are well established. In state-wide projects, these costs are estimated to range between $6,430 and $6,470 per acre-feet ("AF") of permanent water recycling capacity. Capital, or initial/one-time costs for urban water use efficiency are less well established, as these costs are usually expressed in total annual costs and the costs of efficiency programs can vary widely. Due to the variation of cost estimates, this analysis focuses on the cost estimates provided in the California Water Plans of 2009 and the 2013 update in order to present a consistent source and methodology. The $3,230/AF to $4,860/AF capital cost for urban water efficiency programs is explained in greater detail below. Other alternative water supply investments are also promising, such as improvements in agricultural water use efficiency, improved groundwater management and stormwater capture and reuse. Our analysis has not focused on these types of investments because cost and yield information vary widely. However, our analysis is not meant to exclude investments in these types of supplies, which will be cost-effective investments in many localities.

The cost estimates presented are to generate an acre-foot of permanent water yield capacity. Typically, recycling and efficiency cost estimates in the water industry are presented as annualized unit costs. In order to present the data in a similar format to the BDCP project, and to represent the yield that could be generated with a specific level of investment, the units of a permanent acre-foot of capacity have been used. The goal of this analysis is for stakeholders to be able to compare a range of water investment opportunities, and design optimal investments based on the full range of available water supply options including water recycling and urban efficiency programs. Further analysis should be conducted to determine actual yields from planned programs in specific timeframes. Table 1 presents the range of cost estimates for recycling and urban efficiency estimates.

Table 1: Comparison of Different Units for Recycling and Efficiency Estimates using California Water Plan Data

	Permanent Capacity/Capitalized Cost	**Annualized capital cost/unit cost**	
	Cost of constructing a permanent AF of capacity. To calculate efficiency estimates, took present value of annualized unit cost over 15 years, at a rate of 6.00%	Annualized cost to construct an AF of yield, generally calculated by taking present value of cost divided by present value of total yield.	Source
Recycling cost estimate ($/af) - low end	6,430	not identified	California Water Plan Update 2009
Recycling cost estimate ($/af) - high end	6,470	not identified	Ibid.
Urban Efficiency cost estimate ($/af) - low end	3,230	333	California Water Plan Update 2013, early draft
Urban Efficiency cost estimate ($/af) - high end	4,860	500	Ibid.

Note: data has been rounded to 3 significant figures.

At these costs, a five billion dollar investment would generate 926,403 to 1,239,834 AF of permanent capacity. Table 2 presents the yield that would be generated with this investment.

Table 2: Permanent Water Yield Production with $5 Billion Investment

	Investment Amount ($)	Cost estimate ($/af)	Water yield (af)
Recycled water	2,000,000,000	6,430 - 6,470	309,119.01 - 311,041.99
Urban Efficiency	3,000,000,000	3,230 - 4,860	617,283.95 - 928,792.57
		Total	**926,402.96 - 1,239,834.56**

It is important to note that an investment in a Delta facility would result in significant additional ongoing operations and maintenance (O&M) costs (e.g. maintenance of Delta tunnels and screens[1]). Some investments in regional supplies would also result in ongoing O&M costs. For instance, a recycling plant in Orange County[2] has an all-in annual cost of water of $1,000 per acre-foot, which includes capital and operating costs. The annualized capital cost is calculated to be $429.46/AF, which indicates that the annualized operating costs are $570.54 per acre-foot.[3] In contrast, urban water efficiency programs generally have no to minimal operating costs after the initial program investment. Efficiency programs are even more cost-effective in comparison to infrastructure projects when the operating costs of infrastructure projects are considered. In order to compare the benefits of capital investments in a large Delta facility with the portfolio approach contemplated in this alternative, this analysis excludes the O&M costs of all of these investments and thus likely undervalues the true long-term benefits of efficiency investments as compared to other types of investments. A comprehensive BDCP cost-benefit analysis should include capital and O&M costs for all investment alternatives.

As indicated below, an analysis by the San Diego County Water Authority of existing Southern California UWMPs reveals that agencies are already planning to develop more than 1.2 MAF of new local water supplies.[4] This analysis shows the large scale of currently planned investments to reduce reliance on Bay-Delta supplies, as required by the Delta Reform Act.

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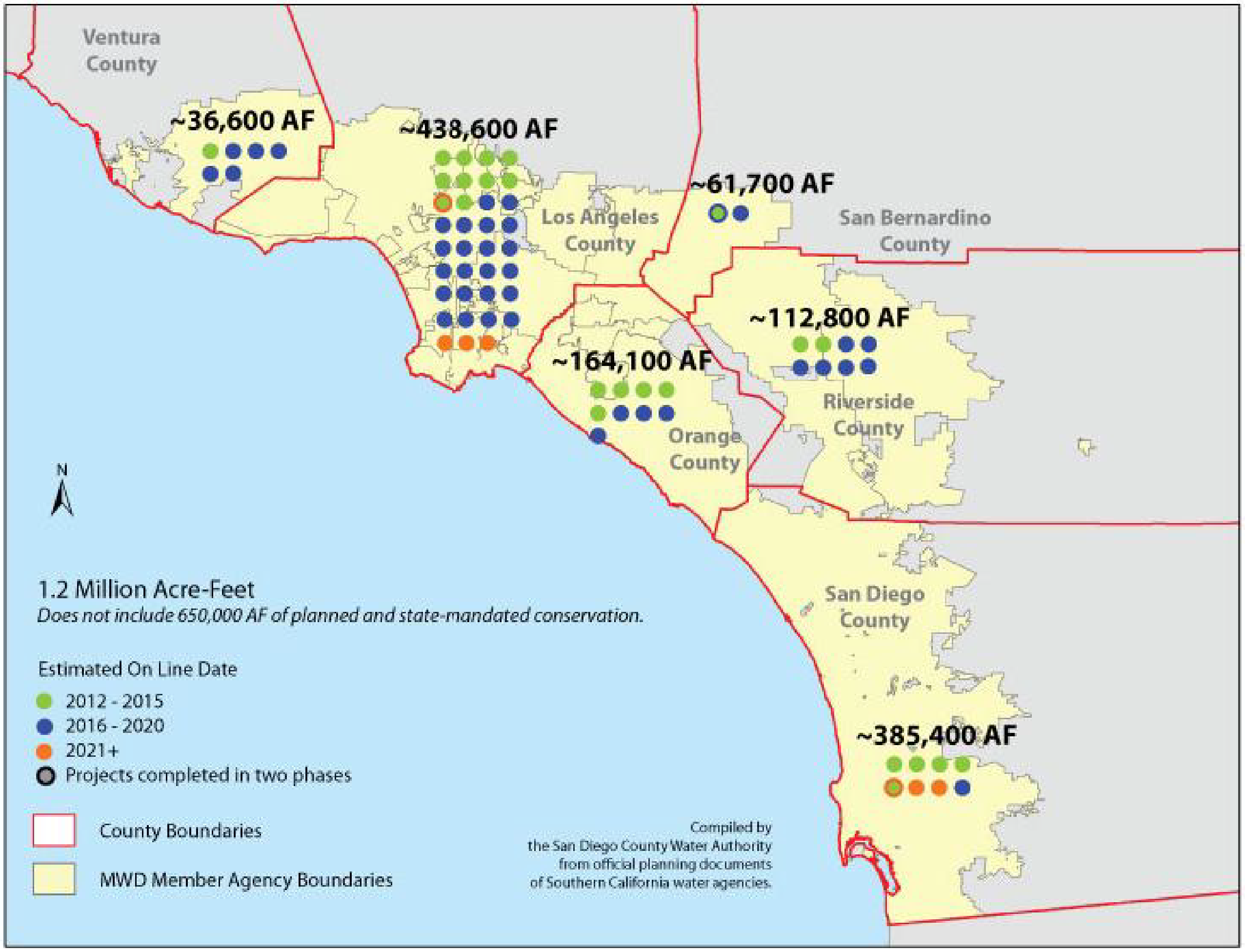
[1] BDCP Draft Chapter 8 estimates the O and M cost for a large Delta facility at $84.5 million per year. Table 8.7 - http://baydeltaconservationplan.com/Library/DocumentsLandingPage/BDCPPlanDocuments.aspx

[2] Los Angeles County Economic Development Corporation Report, "Where Will We Get the Water? Assessing Southern California's Future Water Strategies, Draft, August, 2008, http://www.laedc.org/sclc/documents/Water_SoCalWaterStrategies.pdf

[3] Project data presented on pages 3 and 13: amortized capital debt of $470 million over 30-year period at a rate of 5.00%. Then, divided by annual yield of 72,000 acre-feet.

[4]Southern California's Local Water Supply Plans. Analysis prepared by San Diego County Water Authority, Dec. 2012

Southern California's Local Water Supply Development Plans (2012 - 2035)



Urban stormwater capture and groundwater cleanup and conjunctive use are two alternative water supply sources that present reliable and potentially cost-effective methods for generating new sources of water. These sources would result in many of the additional benefits noted above as well as further benefits such as reducing stormwater runoff and complying with the Clean Water Act requirements. Extensive research into published cost and benefit analysis have revealed that there is a limited amount of state-wide cost and benefit data available for both urban stormwater capture and groundwater cleanup and conjunctive use. There is also a large range in the cost of these projects due to site specific components, such as the groundwater level, amount of energy required to pump the recharged storm and groundwater, and treatment costs. Therefore, we have not included these two sources for generating specific water yields, but strongly promote the implementation of these programs. Likewise, agricultural water use efficiency investments should be part of a final BDCP plan, however, because of the broad range of potential costs, as indicated in Bulletin 160, cost and yield investments in agricultural water use efficiency are excluded from this conceptual proposal.

SECTION 1: THE STATEWIDE POTENTIAL FOR ALTERNATIVE WATER SUPPLIES

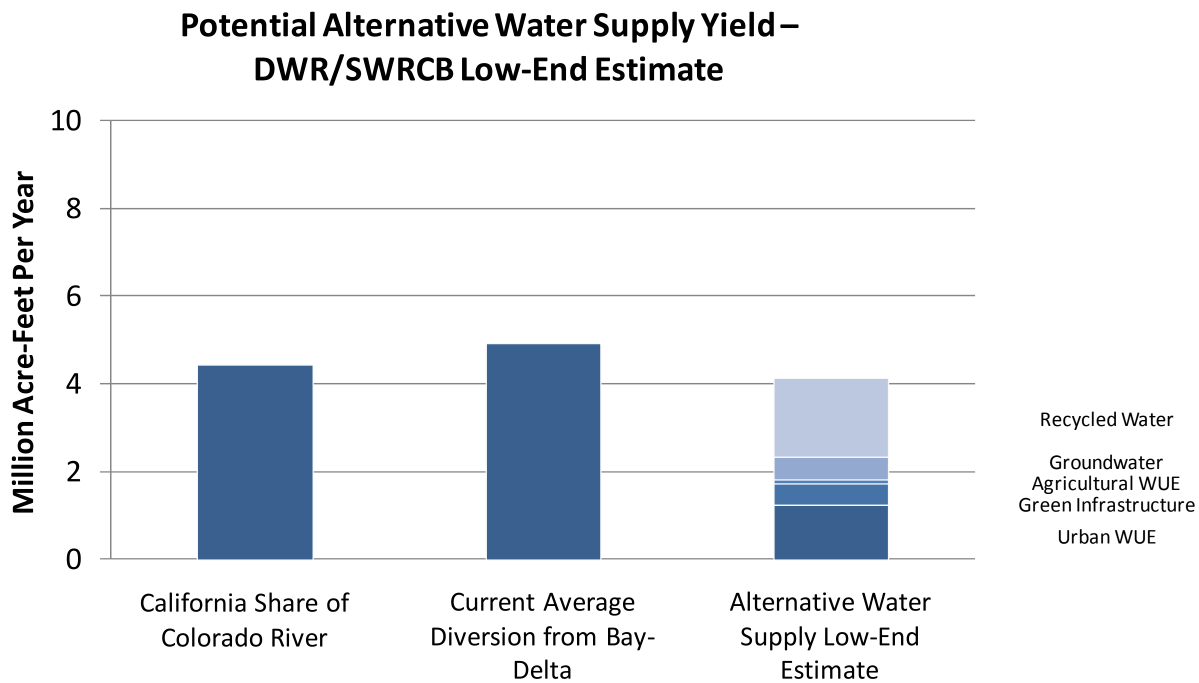
Future Potential Amount of Alternative Water Supplies

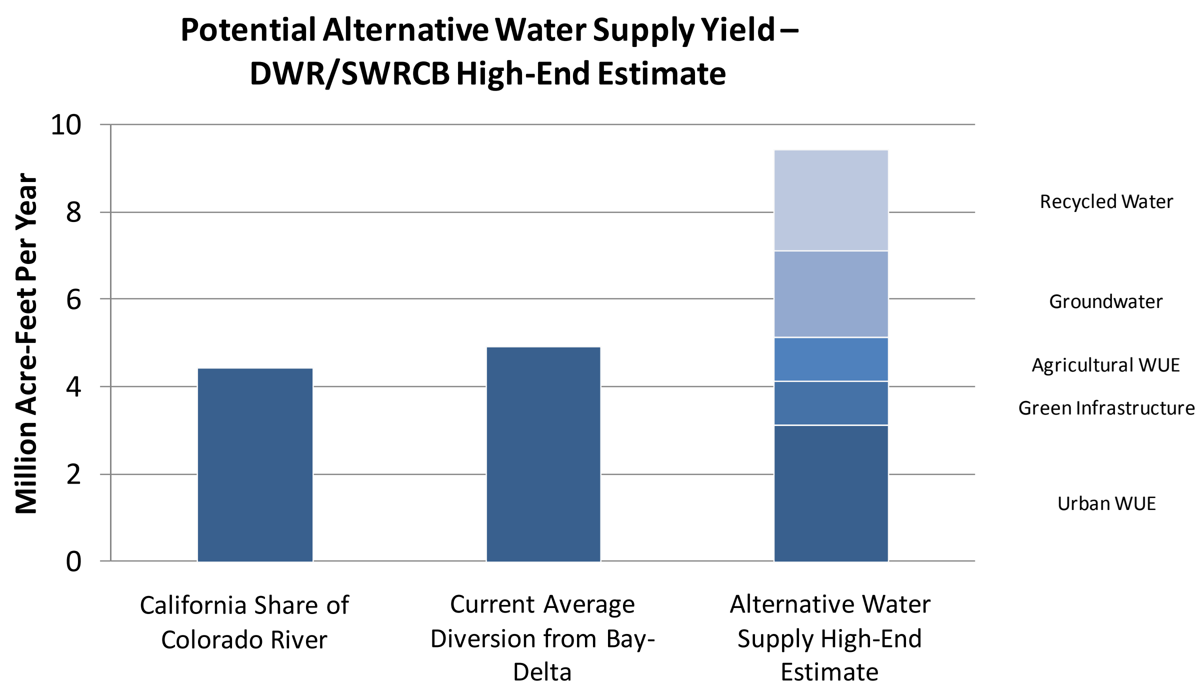
Bob Fisher and Lester Snow, in an opinion piece in the Sacramento Bee entitled "Water Technology Can Shield State from Drought" [5] expressed the potential of alternative water sources:

> The good news is that significant opportunity exists to address California's water issues, but it will take a different approach and a new way of thinking. Much time and effort is spent fighting the same fights over water that have been fought for years. **Instead we could focus on investments that will generate at least 6 million acre-feet of water each year such as multi-benefit projects that advance water use efficiency, new local supplies such as stormwater capture and improved management of groundwater supplies**.

The figures below, prepared using data from the Department of Water Resources and State Water Resources Control Board, identify a similar range of the considerable potential for alternative water supplies to provide an equal amount of water to that currently provided by California's share of the Colorado River or by current average CVP and SWP exports from the Bay Delta.

[5] Bob Fisher and Lester Snow, Water Technology Can Shield State from Drought, Sacramento Bee Opinion Piece, July 29, 2012, http://www.sacbee.com/2012/07/29/4668356/water-technology-can-shield-state.html





Future Potential Amount of Recycled Water

The Recycled Water Task Force Report notes that multiple studies and surveys have been performed to estimate the future potential amount of recycled water across California. In 2002, approximately 10 percent of the treated municipal wastewater produced (estimated to have been 5 million acre-feet (MAF) per year) was being recycled (approximately 500,000 AF per year). The population of California is projected to increase by 50 percent by 2030, which would increase the amount of wastewater available to be recycled to approximately 6.5

MAF per year. The Task Force estimates that the potential use of recycled water in California in 2030, taking into account elements of uncertainty, ranges from 1.85 – 2.25 MAF.[6]

The Los Angeles County Economic Development Corporation, in their report "Where Will We Get the Water?"[7] identifies that there were more than thirty recycling projects in Los Angeles, Orange County, San Diego and the Inland Empire. The potential of these projects is to generate 450,000 AF or more of recycled water within five years.

Based upon these data sources, 309,119 AF to 311,042 AF of recycled water is well within the potential yield of potential recycled water in California.

Future Potential Amount of Water Conserved from Urban Water Efficiency Programs

The Pacific Institute, in their report California's Next Million Acre-Feet: Saving Water, Energy and Money[8] calculate that more than 320,000 AF per year could be saved by the following conservation measures:

- Replacing 3.5 million toilets with high-efficiency models
- Installing faucet aerators and showerheads in 3.5 million homes
- Installing 425,000 high-efficiency clothes washers
- Installing efficient devices in commercial and industrial kitchens, bathrooms, and laundries
- Upgrading cooling towers
- Using pressurized water brooms to clean sidewalks rather than hoses
- Replacing 2,000 acres of lawn with low-water-use plants in each of San Diego, Orange, Riverside, Ventura, Fresno and Sacramento counties

These specific efforts illustrate the water savings yield of water efficiency programs through smaller programs. In the report "Waste Not, Want Not," [9] the Pacific Institute determined that more than 2.3 MAF of urban water could be saved through efficiency programs.

In addition, the 2009 California Water Plan[10] developed projections for the potential amount of water savings in 2030, and determined that the technical potential, assuming 100% adoption of water efficiency programs statewide, would be 3.1 MAF. This amount could potentially be higher with advances in water-saving technology.

The Los Angeles County Economic Development Corporation report[11] determined the regional potential for water savings through urban water efficiency programs in Southern California alone in 2025 to be 1.1 MAF or more.

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[6] Water Recycling 2030: Recommendations of California's Recycled Water Task Force, June 2003, pages 12-14, http://www.water.ca.gov/pubs/use/water_recycling_2030/recycled_water_tf_report_2003.pdf.

[7] Los Angeles County Economic Development Corporation, "Where Will We Get the Water? Assessing Southern California's Future Water Strategies", Draft, revised August 14, 2008, http://www.laedc.org/sclc/documents/Water_SoCalWaterStrategies.pdf

[8] Pacific Institute, "California's Next Million Acre-Feet: Saving Water, Energy, and Money", September, 2010, http://www.pacinst.org/reports/next_million_acre_feet/next_million_acre_feet.pdf

[9] Pacific Institute, "Waste Not, Want Not: The Potential For Urban Water Conservation in California", November, 2003, http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf

[10] California Water Plan, 2009 update, Volume 2 – Resource Management Strategies, Chapter 3 – Urban Water Use Efficiency, http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c03_urbwtruse_cwp2009.pdf

[11] Los Angeles County Economic Development Corporation, "Where Will We Get the Water? Assessing Southern California's Future Water Strategies", Draft, revised August 14, 2008, http://www.laedc.org/sclc/documents/Water_SoCalWaterStrategies.pdf

In the context of the variety of potential projections, an estimate of 617,284 AF – 928,793 AF of water saved through urban efficiency programs is a reasonable potential estimate.

SECTION 2: RECYCLED WATER CAPITAL COSTS

Many recycled water projects have been built across California over the last decade, and the costs of some of these projects have been published. As noted above, in order to present cost data consistent with the cost presentation of the BDCP project, the recycled cost estimates in this proposal represent the costs to construct a permanent acre-foot of capacity. This calculation can be made by taking the total capital cost of a recycling project and dividing by the annual yield of the project. Table 3 provides a summary of the capital costs published for recycled water projects built across California.

Table 3: Recycled Water Project Capital Costs

Capital Costs ($/af)	Cost category	Project Location	Cost time-frame	Source	Page #	Source Document Location
Costs for statewide programs						
6,800	Average recycled water cost for indirect potable reuselooked at over the life of a project	Cited studies done in Bay Area and Southern California	Study done for 2003 - 2030	Water Recycling 2030: Recommendations of California's Recycled Water Task Force, June 2003	14	http://www.water.ca.gov/pubs/use/water_recycling_2030/recycled_water_tf_report_2003.pdf
6,430-6,470	Estimated range of capital costs, determined by taking $11B / 1.7MAF and $9B / 1.4MAF	Statewide	2030	California Water Plan Update 2009	11-10	http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c11_recycmuniwtr_cwp2009.pdf
Costs for Southern California Projects						
6,700	Recycled water meeting drinking water standards. Includes capital cost (before recharging underground storage) and treatment (after water is pumped back up to the surface)	Costs for plant built by Orange County	30 year treated cost	LA County Economic Development Corporation, "Where Will We Get the Water? Assessing Southern California's Future Water Strategies", Aug 2008	13-14	http://www.laedc.org/sclc/documents/Water_SoCalWaterStrategies.pdf
Costs for Northern California programs						
5,650	Average capital cost for treatment plant and distribution pipelines for 5 plants	Bay Area	~2008-2012	Bay Area Recycled Water Coalition	n/a	http://www.barwc.org/projects.html

The average cost of recycled water based upon the cost estimates in Table 3 is $6,200/AF. However, the costs for recycled projects can vary due to the specific requirements of each project, and include the level of wastewater treatment. As noted above, this proposal uses the California Water Plan Update estimates of $6,430/AF - $6,470/AF.

The costs include the cost of capital, the building of the treatment facility, and the building of the distribution facilities, including pipelines and pump stations. The variance among the costs can occur due to the specific requirements of each project, and include the level of wastewater treatment required, distance to deliver the recycled water to the intended users, and whether a storage facility is built for the project.

SECTION 3: URBAN WATER EFFICIENCY PROGRAM CAPITAL COSTS

There are a variety of urban water efficiency programs across the residential, commercial, industrial and institutional sectors. The most typical programs involve educational programs, rebates or incentives for water saving models of devices such as toilets, showerheads, dishwashers, clothes washers, and landscaping. There are also additional programs that result in water conservation such as building code design, landscape ordinances, tiered water rates, and smart meters. To reduce the complexity of the analysis for this proposal, as well as represent the types of urban water efficiency programs that a typical water agency would implement, this analysis has focused on rebate and incentive water efficiency programs. In addition, the limited amount of water efficiency program cost data that has been published is for rebate and incentive urban water efficiency programs.

Much of the water savings that has been already achieved through urban water efficiency measures has been due to efficient plumbing fixture replacements due to building codes. When a fixture fails and needs to be replaced, or there is a bathroom remodel or new construction, current building codes dictate that efficient fixtures are used. This cost is fully borne by the consumer, and the water agency benefits through lower resulting water usage.

The greatest opportunity for water savings created by active conservation programs is in areas not currently covered by building codes. Although roughly half of urban water use is for landscaping, building codes do not fully address efficiency opportunities. Some water agencies have implemented programs for incenting their customers to convert lawns to water efficient landscaping or to water efficient irrigation technology updates. There is greater potential for additional programs at additional water agencies for landscaping efficiency measures.

The analysis in this proposal focuses on water savings generated through active conservation programs in order to compare investments in a large infrastructure project with investments in alternative programs, such as urban water efficiency programs. Therefore, the expected water savings yield from water efficiency programs is focused on programs that the water agency actively implements, and invests in. We acknowledge that the total water savings generated by urban efficiency efforts will be greater than a potential of 928,793 AF when including savings generated by code-driven replacements.

Urban water efficiency program costs are typically represented as annual costs. The costs to run rebate and incentive programs, however, can also be represented as capital costs. These programs involve a fixed, one-time expense in the form of a rebate for a tangible asset that produces benefits over the life of the asset, plus the administrative and potential educational costs to start the program. Once the program has begun, many urban water efficiency programs have little to no operating costs to keep the program running. A small number of programs continue to have costs to monitor the program implementation, such as with site visits for large commercial and industrial programs. Therefore, in order to portray a useful comparison between the costs for an infrastructure project and urban water efficiency programs, this analysis represents urban water efficiency program costs as capital costs. Table 4 provides a summary of the unit capital costs published for urban water efficiency programs.

Table 4: Urban Water Efficiency Program Capital Costs

Cost Ranges ($/af)	Inflation adjusted range to 2012 dollars*	Cost description	Project Location	Cost time-frame	Source	Page #	Source Document Location
Costs for Northern California Projects							
845	845	Cost of 45 water efficiency measures plus plumbing code	East Bay	2010 - 2040	East Bay MUD 2011 Conservation Master Plan	App. C-1	http://www.ebmud.com/sites/default/files/pdfs/EBMUD_WCMP%202011.pdf
860	860	Average unit cost of water savings across 33 measures	San Francisco	2005 - 2035	SFPUC 2011 Conservation Plan Update	42	http://www.sfwater.org/modules/showdocument.aspx?documentid=188
Costs for Southern California Projects							
75-900	79 - 950	Range of costs for current conservation programs, including conservation rebates, incentives, and hardware installation programs	Los Angeles	2010	Los Angeles Department of Water and Power, Urban Water Management Plan, 2010	79	https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-sourcesofsupply?_adf.ctrl-state=19t7dv11v5_4&_afrLoop=573834530616927
69 - 1,343	92-1,796	Levelized costs of water savings for conservation measures such as toilets, landscaping, showerheads, dishwashers, medical sterilizers and other washers.	South Coast region Water Supplier	2000	CALFED Water Use Efficiency Comprehensive Evaluation, 2006	App 2D, costs noted on page 142	http://www.calwater.ca.gov/content/Documents/library/WUE/2006_WUE_Public_Final.pdf
150-1000	158-1056	Marginal cost range, representing estimated expenditures on educational initiatives or subsidies to promote conservation divided by cumulative water savings of program	San Diego	2010 estimates	San Diego's Water Sources: Assessing the Options, July, 2010	12	http://www.equinoxcenter.org/assets/files/pdf/AssessingtheOptionsfinal.pdf
Costs for statewide programs							
223 - 522	272-636	Average unit cost of water savings, includes capital and ongoing project costs	Statewide average	2004	CALFED Water Use Efficiency Comprehensive Evaluation, 2006 as cited in the California Water Plan Update, 2009	Table 3-3, page 3-25	-California water Plan Update, v. 2, Urban Water use efficiency: http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c03_urbwtruse_cwp2009.pdf
333-500	333-500	Average cost for water conservation programs	Statewide average	2013	California Water Plan Update 2013, early draft	3-3	http://www.waterplan.water.ca.gov/docs/cwpu2013/2012-ac-draft/Vol3_Ch03_UrbanWUE_AdvisoryCommitteeDraft_ss.pdf
0-1,680	0-1,774	Cost of conserved water for range of urban efficiency programs that require installation of product, including residential indoor and outdoor, and CII from consumer perspective	Statewide	2010	Pacific Institute, California's Next Million Acre-Feet: Saving Water, Energy and Money, 2010	21, water savings in App. A, pg. 16	Main report: http://www.pacinst.org/reports/next_million_acre_feet/next_million_acre_feet.pdf; Appendix A: http://www.pacinst.org/reports/next_million_acre_feet/Technical%20Documentation.pdf

**If costs presented were from a time period prior to 2012, then adjusted to 2012 dollars through using US Inflation Calculator, http://www.usinflationcalculator.com/.*

The range of costs for urban efficiency projects (in 2012 dollars) is from $0/AF to $1,796/AF, with a mid-point of $940/AF. As noted above, this proposal uses the California Water Plan Update estimates of $333/AF - $500/AF. The costs were brought to a dollar value of 2012 dollars to accurately compare and analyze costs. In addition to the time value of money, another factor to be involved in future analyses is the amount of water savings decay that occurs as an urban efficiency program matures. Water agencies have experienced that after a water efficient product is installed, there is decay in the water savings generated by that product over time. Consumers might not maintain their good water saving habits, or with the savings on their water bills, they might expand their water usage through actions such as expanding their landscaped area or installing high water use items. While decay is an influencing factor on total water savings, the amount of water saving decay will vary based upon the type of program being installed. Due to this variability, and the lack of background detail about the urban water efficiency estimates, we expect that a decay factor has not been included in all of the estimates above, but recommend that water savings decay be taken into account when determining the yield for specific urban water efficiency program implementation.

From this range of cost estimates, the permanent acre-foot of capacity was calculated by taking the present value of making investments of $333/AF to $500/AF a year for 15 years (the average lifetime of efficiency programs) using a discount rate of 6.00%, which is the discount rate used by the Department of Water Resources for planning purposes. The present value of $333/AF is $3,230 to generate an acre-foot of permanent capacity and the present value of $500/AF is $4,860 to generate an acre-foot of permanent capacity.

In addition to lessening the amount of water that a water agency needs to purchase, urban water conservation programs can provide additional co-benefits to a water agency. Co-benefits can include:

- reducing the volume of stormwater run-off and subsequent reductions in energy demand and chemical costs of wastewater treatment
- reducing the volume of wastewater in general to treat and the resulting reductions in energy demand and chemical costs
- avoided costs of building additional treatment facilities
- savings from downsizing existing water supply and treatment facilities

The analysis performed in the Pacific Institute Report "California's Next Million Acre-Feet" that would conserve 320,000 AF per year of water through installing different urban conservation measures would also reduce electricity demand in California by 2,300 gigawatt-hours and natural gas demand of 87 million therms per year. This amount of electricity savings is equivalent to the electrical demand of 309,000 homes in California.[12] Quantifying co-benefits to a water agency is difficult, and there is limited published data. Not all water agencies calculate the co-benefits received by their programs. Due to the lack of available data, the urban water efficiency program cost estimates that are used in this analysis mostly do not include any co-benefits from a water agency perspective.[13] Therefore, to a water agency, the total costs of water saved from urban water efficiency programs would be less than the costs indicated.

[12] California's Next Million Acre-Feet: Saving Water, Energy, and Money, September, 2010, pages 10-11, http://www.pacinst.org/reports/next_million_acre_feet/next_million_acre_feet.pdf

[13] The Pacific Institute Report, California's Next Million-Acre Feet does indicate co-benefit savings from urban water efficiency programs for end users. Since this analysis focuses on the costs from the perspective of water distributors, these benefits were not included in the range of costs, and a cost of $0 A/F was used in the cost analysis to represent the minimum costs of a program.

APPENDIX B: SOUTH OF DELTA STORAGE COST ESTIMATE

The cost of new storage is highly variable and dependent on a variety of factors. There is no current estimate for the most cost-effective South of Delta regional investment in storage. However, Diamond Valley, a Southern California surface storage facility with a capacity of 800,000 AF, was completed by MWD in 2002 at a cost of $1.9 billion.[14] Developing 1 MAF of new South of Delta storage, with a focus on groundwater storage, would be significantly less expensive than an effort focused exclusively on new surface storage. For example, the Kern Water Bank has indicated that the facility has a capacity of approximately 1.5 million acre feet and cost $200 million for the property and $35 million for capital improvements.[15] In addition, in 2008, the Irvine Ranch Water District purchased 50,000 AF of groundwater storage capacity from the Rosedale Rio Bravo Water Storage District at a cost of $19.2 million.[16] At the cost of the Irvine Ranch Water District project, creating or purchasing 1 MAF of new groundwater storage would cost approximately $400 million. The cost estimate in this conceptual alternative is at the mid-point between the cost of the Diamond Valley project and the per acre-foot Irvine Ranch Water District project. The yield from this new storage is included in the initial estimate in Section 2, although additional modeling is required. Further analysis by BDCP should include the identification of the most cost-effective potential South of Delta storage options, including a refinement of the initial cost estimates included here.

APPENDIX C: LEVEE MAINTENANCE AND IMPROVEMENT COST ESTIMATES

This cost estimate is based upon data provided in the Economic Sustainability Plan prepared by the Delta Protection Commission.[17] The goal of this investment is to improve levees within the Delta to a recognized standard, such as the PL 84-99 standard. The discussion on pages 68 and 69 estimates that of the total 980 miles of levees that are being maintained within the Legal Delta, there are 537 miles that "need to be maintained and perhaps improved primarily by the state and reclamation districts."[18] Of the total 980 miles of levees, the Economic Sustainability Plan identifies 613 miles of "lowland" levees. Of these 613 miles of levees, some levees already exceed the PL 84-99 standard, and some levees are project levees built by the U.S. Army Corps of Engineers that also exceed the PL 84-99 criteria. This leaves approximately 350 miles of levees that need improvement to reach the PL 84-99 standard. These 350 miles of levees includes the levees of the 8 western islands, which are critical areas of improvement from the perspective of South Delta water export reliability.

During the March 15 and March 16, 2012 meeting of the Delta Stewardship Council, there was a presentation of levee programs and a recent effort by the Department of Water Resources ("DWR") to determine how many of the Delta levees meet the PL 84-99 standard, as well as a lower standard. DWR determined that of the 534.6 miles of non-project levees (the levees that need to be maintained by the state and reclamation districts; note this figure is slightly different than the 537 miles noted in the Economic Sustainability Plan), 250.32 of them presently meet or exceed the PL 84-99 standard. This results in 284.28 miles needing improvement to the PL 84-99 standard, and this total also includes the levees of the 8 western islands. Therefore, the figure of 284 miles that need to be brought to the PL 84-99 standard is more recent than the data presented in the Economic Sustainability Plan, and can be used as the current estimate of levees needing improvement.

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[14] http://www.water-technology.net/projects/eastside_res/
[15] http://www.kwb.org/index.cfm/fuseaction/Pages.Page/id/352#faq_15. Some NGOs have questioned the value of the Table A entitlements that were exchanged for the Kern Water Bank property.
[16] http://www.irwd.com/your-water/water-supply/water-banking.html
[17] Economic Sustainability Plan for the Sacramento-San Joaquin Delta, January, 2012, ES http://www.delta.ca.gov/res/docs/ESP_P2_FINAL.pdf
[18] Economic Sustainability Plan for the Sacramento-San Joaquin Delta, January, 2012, pg 68.

The cost to bring a levee to the PL 84-99 standard is estimated to be between one to two million dollars per mile. To bring the 250 miles up to the PL 84-99 standard would cost between $284 million and $569 million.

The Delta Sustainability Plan goes on to suggest on page 97 that lowland levees, which are most at risk of possible sea-level rise and provide salinity intrusion benefits, should be improved to a higher Delta standard than PL 84-99 "that will provide 200-year plus protection for floods, earthquakes and sea-level rise and that will incorporate ecologically friendly vegetation on the water side". The cost to bring a levee to the higher Delta standard is an additional cost of two to three million dollars per mile. The cost to bring 284 miles from the PL 84-99 standard to the higher Delta standard would be between $569 million and $852 million. The total cost, therefore, to bring the 284 miles to the higher Delta standard would be between $853 million and $1,421 million.

There are some existing sources of funding to support Delta levee maintenance. Propositions 84 and 1E provide funds to improve levees within the Delta system. Some of these funds have been spent. Assuming that a minimal amount of funds are currently available for levee improvement, the investment of $1 billion included in this alternative could be large enough to bring all 284 miles to the higher Delta standard, especially with the benefit of the remaining funding from Propositions 84 and 1E.

This estimate does not represent a specific proposal regarding appropriate levee standards. Rather, it is intended as a starting point to evaluate possible investments to ensure that all Delta levees meet a minimum standard and that the levees protecting the Western Delta islands are brought up to a higher standard, given their importance for export reliability.

It is likely that a Delta facility will take at least 15 years to construct. As discussed in the alternative, even after construction of a facility, export agencies plan to continue dual conveyance operations, suggesting that the export community would benefit from the continued maintenance of levees after the construction of a new Delta facility.

APPENDIX D: HABITAT RESTORATION COST ESTIMATES

At the moment BDCP anticipates the restoration of more than 80,000 acres of habitat, including tidal, seasonal and transitional habitat.[19] The cost of this restoration program is estimated at $2.96-$3.85 billion.[20] The scale and estimated cost of this alternative is 50% of the midpoint of this cost range.

[19] BDCP draft Chapter 3.1, page 3.14.
http://baydeltaconservationplan.com/Library/DocumentsLandingPage/BDCPPlanDocuments.aspx

[20] BDCP draft Chapter 8, table 8-50.
http://baydeltaconservationplan.com/Library/DocumentsLandingPage/BDCPPlanDocuments.aspx