Committee:	Bay Delta Conservation Plan (BDCP) Ad Hoc Committee
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Agenda Item No.:	4.2
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COMMITTEE AGENDA MEMO

SUBJECT: Update on California WaterFix

RECOMMENDED ACTION:

A. Receive an update on and discuss the California WaterFix Business Case

B. Receive an update on and discuss the status of the Design Construction Enterprise (DCE) and Related Agreements

C. Receive and discuss draft policy statement for State Water Resources Control Board Proceedings

SUMMARY:

This item provides an opportunity for the Bay Delta Conservation Plan (BDCP) Ad Hoc Committee and the public to receive information and discuss ongoing Delta planning efforts that are critical both to restore the health of the Delta ecosystem, and to ensure the long-term reliability of water supplies conveyed through the Delta.

On November 24, 2015, staff presented an approach to evaluating the costs and benefits of the California WaterFix (WaterFix) for Santa Clara County to the BDCP Ad Hoc Committee. This agenda item provides an update on staff's cost-benefit analysis. It also describes several draft agreements related to the design and construction of the California WaterFix, as well as a draft policy statement for the State Water Resources Control Board (State Water Board) proceeding on the change in point of diversion for the State Water Project (SWP) and Central Valley Project (CVP) to the Sacramento River for the California WaterFix.

BACKGROUND:

Santa Clara County relies on imported water to meet, on average, 55 percent of its water needs, with 40 percent conveyed through the Sacramento-San Joaquin Delta by the State Water Project (SWP) and Central Valley Project (CVP), and 15% diverted upstream of the Delta by the San Francisco Public Utility Commission's Hetch-Hetchy project.

The District's SWP and CVP water supplies, together, are a critical component of the District's water supply portfolio, providing the majority of water supply to the District's three drinking water treatment plants, serving to recharge the county's local groundwater basin to help meet pumping demands while minimizing risk of permanent land subsidence, and protecting local surface and groundwater reserves. The District's SWP and CVP supplies offer additional flexibility in that these supplies may be stored in facilities outside of the county, including the Semitropic Groundwater Bank (Semitropic), for withdrawal during dry periods. Semitropic has proven to be a valuable resource, providing over 120,000 acre-feet (AF) of critical dry year supply to the county over the past three drought years; however, supplies from Semitropic are conveyed to the District through the Delta, and the reliability of the bank is linked to the reliability of the Delta.

The Delta ecosystem is impacted by several factors including loss of native habitat, proliferation of invasive species, and the operation of upstream reservoirs to protect against flooding and provide water supply. Diversion of water upstream of the Delta and within the Delta, as well as exports from the Delta, contribute to unnatural flow patterns, reduced outflow, changes to water quality, and entrainment of fish in pumping facilities. Delta water quality is also impacted by wastewater discharges, urban and agricultural runoff, and legacy contaminants. The combination of these factors has resulted in population declines of several native fish species and a history of increasing regulatory restrictions that have decreased Delta exports over the past several decades to protect fish and water quality. Delta water supplies are also at risk from increased salinity intrusion due to climate change, including sea level rise, and seismic threats to its fragile levee system. To reduce these risks, the District joined other public water agencies[1] since 2006 to support the State's planning efforts for the BDCP, and is now evaluating the potential benefits and costs of the California WaterFix consistent with Board Policy and CEO direction (Attachment 1).

The California WaterFix consists of upgrades to the water conveyance facilities in the Delta and new operational criteria for the SWP and CVP. The conveyance upgrades include 3 new intakes on the Sacramento River, each with a capacity of 3,000 cfs, and each equipped with state-of-the-art fish screens. These new fish screens would be designed to minimize entrainment and would be more effective at protecting fish than the existing South Delta pumping plants. Two forty-foot diameter tunnels up to 150 feet below ground would convey the water from the Sacramento River to a new pumping plant in the south Delta that would lift the water from the tunnels into a newly configured Clifton Court Forebay. The existing SWP and CVP pumping plants would then pump the water to meet immediate demands or to storage south of the Delta. Bypass flow criteria would be imposed on diversions from the Sacramento River into the tunnels to ensure adequate flows remain in the river to protect fish; consequently, diversions into the tunnels primarily occur during higher river flow periods on the Sacramento River. Outflow and water quality criteria and south Delta pumping restrictions would further protect fisheries and in-Delta users. Diversions into the tunnels may take place at different or the same times that water is pumped directly from the Delta channels in the south Delta, but all water pumped through both the tunnels and from the Delta channels must flow through the existing SWP and CVP

[1] Public water agencies are State Water Project and Central Valley Project water contractors, including Alameda County-Zone 7 Water Agency, Kern County Water Agency, Metropolitan Water District of Southern California, Santa Clara Valley Water District, San Luis & Delta-Mendota Water Authority, and Westlands Water District.

pumping plants, which are not being altered by the WaterFix; the total existing pumping capacity of the SWP and CVP will not change. Therefore, the WaterFix will not increase the physical capacity of the SWP and CVP to divert water from the Delta. The proposed new operational criteria will provide more natural flow patterns in the south Delta, ensure sufficient river flows to protect fish below the intakes on the Sacramento River, and provide additional outflow to the Bay and ocean in the spring.

A. Update on California WaterFix Business Case

The BDCP Ad Hoc Committee discussed an approach to evaluating costs and benefits of the WaterFix at its November 24, 2015 meeting. This agenda item provides an update on staff's cost and benefit analysis that is divided into two main sections: (1) presentation of a range of potential cost allocation to the District for the WaterFix; and (2) comparison of the costs and benefits of three alternatives to the WaterFix.

A.1 WaterFix Financial Analysis

The estimated design and construction costs of the proposed north Delta diversion and conveyance facilities are $14.9 billion in constant 2014 dollars. Several additional plan components, including local government revenue replacement, monitoring, program administration, and mitigation would add another $557 million to $817 million in costs for a total of $15.5 billion to $15.8 billion in constant 2014 dollars[1]. Capital costs as well as operation and maintenance (O&M) costs for both the conveyance facilities and the mitigation facilities are summarized in Table 1 below.

Table 1. WaterFix capital and O&M costs in 2014 dollars

WaterFix Component	Capital Costs ($ millions)	O&M Costs (a) ($ millions)	TOTAL ($ millions)
New facilities	**$14,943**	**$1,456**	**$16,399**
Mitigation and monitoring (over 50 years)	**$557 - $817**	**$220**	**$777 - $1,037**
TOTAL	**$15,500 - $15,760**	**$1,676**	**$17,176 - $17,436**

(a) O&M costs are estimated to be incurred over 50 years for mitigation and monitoring; O&M costs for operation and maintenance of the new conveyance facilities is estimated to be incurred for 40 years after the 10 year construction period is completed.

Cost allocation for the WaterFix will depend on negotiations to determine the split of costs between the SWP and CVP, as well as the further allocation of costs among the participating SWP contractors and among the participating CVP contractors. Negotiations are still ongoing, and key decisions have yet to be made. However, staff has evaluated several possible

[1] "Constant 2014 dollars" are project costs that have not been adjusted for inflation nor discounted to present value. It's the cost of the project expressed in 2014 dollars, regardless of when the cost is expected to be incurred.

approaches for cost allocation and has determined a range of costs for the WaterFix that the District might be requested to pay. Water and cost allocations are estimated based on the State's current water supply modeling of long-term average deliveries to the SWP and CVP.

A critical assumption in the estimation of incremental water supplies, as described in staff's presentation in the November 24, 2015 meeting, is that with or without the WaterFix, the application of key operational measures proposed by the resource agencies for environmental purposes, including higher outflow to the Bay/ocean, will be roughly the same. This represents a plausible "worst case" scenario for future SWP and CVP supplies as these additional regulatory restrictions may not be imposed without the WaterFix and, if imposed, the SWP and CVP may not be the only entities responsible for meeting the requirements.

A low and a high cost allocation estimate as well as an intermediate approach are described below.

a. Low cost allocation estimate: Costs are split 60/40 between the SWP and CVP, with the District allocated 2.5% of costs on the SWP side. On the CVP side, it is assumed that 10% of the incremental water supply produced by the WaterFix for the CVP is delivered to senior water right holders on the San Joaquin River and federal wildlife refuges, while 90% of CVP water supply increment is delivered to south-of-Delta water service contractors, which includes the District. Costs are allocated based solely on the proportion of *incremental* supply received.

b. High cost allocation estimate: Costs are split 50/50 between the SWP and CVP, with the District allocated 2.5% of costs on the SWP side. On the CVP side, it is assumed that senior water rights holders and federal wildlife refuges are not allocated any WaterFix costs; the entire CVP cost share is borne by south-of-Delta water service contractors, with costs allocated to the District based on its proportion of total deliveries to south-of-Delta water service contractors.

c. Conveyance pumping cost allocation estimate: Costs are split 60/40 between the SWP and CVP, with the District allocated 2.5% of costs on the SWP side. On the CVP side, it is assumed that costs are allocated in proportion to total deliveries through Jones pumping plant ("conveyance pumping" approach). This approach assumes that all south-of-Delta CVP participants that receive water, including senior water rights holders and refuges, will pay their proportional share of costs.

The process that will determine which cost-allocation method is ultimately available to the District will, as mentioned above, involve challenging negotiations with other prospective participating contractors, facilitated perhaps by the Department of Water Resources (DWR) and the Bureau of Reclamation (Reclamation). Given that WaterFix benefits will entail not only incremental water supply but also other benefits including improved reliability for all Delta supplies, protection against sea level rise, protection against Delta levee failure events, and improved water quality, the District may be asked to accept a cost allocation above the low cost estimate detailed above. The conveyance pumping approach appears to be a plausible outcome; however, to make this approach work, sources of funding must be identified to accept the proportion allocated to refuges and the senior water rights holders. Currently, no entities have indicated willingness to pay these costs. In the high cost allocation approach, the District's cost share would be significantly greater than the amount that would be based on the incremental water supply received (i.e., the low cost allocation approach) and would have to be justified by the other benefits mentioned above.

Table 2 summarizes the District's rough estimate of its percent cost share of the WaterFix under these scenarios, given available information to date. For comparison purposes, the table also includes the cost allocation to the District consistent with the scenario provided to the BDCP Ad Hoc Committee on November 24, 2015, but because subsequent analysis indicates the conveyance pumping alternative is a more realistic cost estimate, the November 24 scenario is not carried forward into the water supply alternatives analysis.

Table 2. Estimated Range of Percent Share of WaterFix Costs Allocated to the District

Cost Allocation Scenario	SWP/CVP Split	SCVWD Percent Share of CWF Cost		
		SWP	CVP	Total
Low Cost Allocation	60/40	2.5%	3.0%	2.7%
High Cost Allocation	50/50	2.5%	12.5%	7.5%
Conveyance Pumping	60/40	2.5%	6.5%	4.1%
Nov. 24, 2015 Estimate	50/50	2.5%	4.5%	3.5%

Tables 3a and 3b show the fully financed cost and O&M cost of the WaterFix and the District's potential share under the scenarios described in Table 2. Undiscounted as well as present value[1] calculations of costs are provided, as well as the District's share of O&M costs. Consistent with assumptions presented to the BDCP Ad Hoc Committee on November 24, 2015, capital costs are assumed to include an inflation factor of 2% and be financed through six series of fixed-rate, tax-exempt bonds to be issued from 2016 through 2031; each series of bonds is assumed to be amortized over a 35 year period. The fixed rate assumption is based on the AAA MMD[2] scale as of August 26, 2015, plus an additional spread of 0.60% for bonds issued in 2016, 1.00% for 2019 and 1.40% for 2022 and thereafter.

Table 3a. Estimated Range of Undiscounted WaterFix Capital and O&M Costs Allocated to District

	Capital Costs in Constant 2014 Dollars ($ millions)	Fully Financed Capital Cost, Undiscounted ($ millions)	Undiscounted O&M ($millions) (a)	Total Undiscounted Cost ($ millions)
Total WaterFix Costs	15,760	39,417	4,440	43,857
Estimated District Share				0
Low	425	1,065	425	1,490
High	1,180	2,955	640	3,595
Conveyance Pumping	645	1,615	485	2,100
Nov 24, 2015 Estimate	550	1,380	445	1,825

[1] "Present value" represents the amount of money that would need to be invested today at a specific rate of return in order to meet future cash flow requirements.

[2] Thomson Reuters Municipal Market Data AAA yield curve (AAA MMD) represents the market benchmark yield for AAA rated state general obligation bonds.

Table 3b. Estimated Range of Present Value WaterFix Capital and O&M Costs Allocated to District

	Present Value Costs ($ millions)		
	Fully Financed Capital Costs 4.5% Discount Rate	O&M Costs incurred over 50 yrs (a)	Total PV Costs
Total WaterFix Costs	14,405	880	15,285
Estimated District Share			
Low	390	80	470
High	1,080	125	1,205
Conveyance Pumping	590	95	685
Nov 24, 2015 Estimate	505	90	595

(a) O&M is not financed but instead is paid as incurred. O&M includes both WaterFix O&M as well as additional variable costs estimated at $71/AF (corresponding to a high estimate of energy costs to convey water from the Delta to Santa Clara County) for 40 thousand acre-feet (TAF) per year of additional supply over 40 years of WaterFix operations.

(b) The present value analysis of capital costs assumes a discount rate of 4.5%, which is comprised of the State's estimated inflation rate of 2% for the WaterFix and the District's standard assumption for the real rate of interest, or cost of money, of 2.5%. The present value analysis of O&M costs assumes a larger inflation rate of 3%, consistent with the District's standard cost assumptions, as well as a real rate of interest of 2.5%, for a total discount rate of 5.5%.

In this example, the District's share of fully financed WaterFix costs, in present value dollars, is estimated to range from $470 million to $1.2 billion, depending on the ultimate cost allocation approach negotiated. These estimates will differ significantly with different assumptions regarding bond structure, inflation rates, and interest rates.

For the purposes of this exercise, staff assumes that the portion of the District's costs associated with its CVP supplies would be paid through the District groundwater production charges and the portion associated with its SWP supplies would be paid through the existing SWP ad valorem property tax. Analysis of these components shows the District's costs increasing steadily until fiscal year 2028-29 levels shown in Table 4 for each of the scenarios.

Table 4. Groundwater charge and SWP tax increase for WaterFix scenarios

	Incremental Cost Increase (FY 2028-29)			
	WaterFix			
	Low	High	Conveyance Pumping	Nov 24, 2015 Estimate (a)
M&I groundwater charge increase ($/AF)				
north county	66	316	137	113
south county	3	229	64	59
SWP tax increase, Ave single family ($/yr)				
north county	28	22	27	22
south county	22	17	21	17
Total increase per average household ($/month)				
north county	5	13	7	6
south county	2	9	4	3

(a) The original November 24, 2015 estimate has been adjusted to include the O&M costs for the WaterFix.

A.2 Alternatives Analysis

Staff compared the costs and water supply benefits of the WaterFix and three other potential options for the District in the context of the District's Water Supply and Infrastructure Master Plan (Water Master Plan) that the Board adopted in 2012.

Option 1. California WaterFix: The WaterFix consists of upgrades to the water conveyance facilities in the Delta and new operational criteria for the SWP and CVP, as described above. Information available in the BDCP draft Environmental Impact Report and Environmental Impact Statement (EIR/EIS) and recirculated draft EIR/EIS indicates the WaterFix will provide exports in the approximate range of 4.7 million acre-feet (MAF) to 5.3 MAF in year 2025 for the SWP and CVP combined. The lower end of this range, 4.7 MAF, corresponds to a scenario in which more stringent outflow and export restrictions are imposed (i.e., "High Outflow Scenario", or HOS). If the WaterFix were not implemented under this scenario, total exports are estimated to be about 3.5 MAF in 2025. For this analysis, staff assumed the District's estimated average annual SWP and CVP supplies with the WaterFix are consistent with a 50/50 split of incremental supply between the SWP and CVP under the High Outflow Scenario. Under this scenario, the WaterFix would provide the District with an incremental SWP and CVP supply of 40,000 acre-feet per year (AFY).

Option 2. Potable Reuse: This option includes up to 25,000 AFY of additional potable reuse capacity on top of the 20,000 AFY in the 2012 Water Master Plan for a total of 45,000 AFY of potable reuse capacity. The potable reuse components are the same as those in the Expedited Purified Water Program presented to the Board on March 12, 2015. The new capacity would come from three potential sources: a) a further expansion of the Silicon Valley Water Purification Center, b) the Ford Pond satellite facility treating water from South Bay Water Recycling and c) the Sunnyvale Water Pollution Control

Facility. Most of this water would be injected into the groundwater basin rather than percolated.

Option 3. Water Conservation: This option includes 32,000 AFY of additional water conservation savings in 2035 on top of the 99,000 AFY of savings assumed in the 2012 Water Master Plan for a total of 131,000 AFY of water conservation savings. The additional savings would ramp up over time and peak in 2035. The additional water savings would be from increased irrigation equipment rebates, landscape conversion rebates, sub-meter installations, home water use reports, large landscape water budgets, and advanced metering infrastructure.

Option 4. Transfers: This alternative assumes that 31,000 AF of transfers in critical years and 38,000 AF of transfers in dry years can be secured, on top of the 12,000 AFY of transfers in critical years assumed in the 2012 Water Master Plan. Transfer supplies would primarily be purchased from willing sellers north of the Delta, conveyed through the Delta, and pumped at the existing SWP and CVP pumping plants for delivery to the county. For reference, staff obtained about 20,000 AF of transfers in Calendar Year 2015.

The alternatives were assessed relative to a future baseline using the set of criteria described in Attachment 2. Discounted and undiscounted capital and operations costs as well as unit costs per AF of water and impacts to water rates were also evaluated.

A.2.1 Water Supply Analysis

The WaterFix and the three alternatives were evaluated in the context of the 2012 Water Master Plan based on their ability to meet water supply reliability targets and improve supply reliability, protect reserves, improve water quality, and provide benefits to the environment, as well as other considerations. The reliability of the various alternatives was assessed relative to a future baseline that includes implementation of key elements of the 2012 Water Master Plan, including planned improvements to the existing system (e.g., dam seismic retrofits, Rinconada Water Treatment Plant improvements, 30,000 AFY of non-potable recycling, and 99,000 AFY of water conservation savings) and the following projects and programs:

- 20,000 acre-feet per year of potable reuse capacity,
- A pipeline connecting Lexington Reservoir to the raw water system at Vasona Pumping Plant,
- Additional North County recharge capacity of 4,000 acre-feet per year, and
- Transfers/dry year options of 12,000 acre-feet in critical dry years.

The Future Baseline scenario models the District's projected future water supply and operations if no additional projects are implemented beyond what is currently included in the 2012 Water Master Plan. The Future Baseline scenario is also consistent with the State's High Outflow Scenario ("HOS") analyzed in the environmental documentation for the BDCP and assumes that SWP and CVP exports without the WaterFix are reduced over time as new export constraints currently contemplated by regulatory agencies are implemented in the future. Each option is integrated into the Future Baseline to evaluate its performance relative to other options as well as to the baseline. Using the HOS scenario provides a conservative, lower estimate of total

supplies provided by the WaterFix; however, this approach results in greater yield from all alternatives considered, including the WaterFix, relative to the Future Baseline.

The modeling approach for each alternative to the WaterFix attempts to optimize the county's water supply portfolio to reduce costs and produce only the amount of supplies needed to meet annual water supply targets (criterion 1). This results in less water supply utilized by the options in wet years relative to what could potentially be produced. For example, the amount of Potable Reuse supplies utilized is greater in dry years and reduced in wetter years. During this stage of staff's alternatives evaluation, the alternatives are not optimized to increase Semitropic storage, as this would require expansion of the projects beyond what may be feasible and could increase costs significantly. Future work may include evaluating a combination of alternatives to better meet a broader range of water supply criteria.

Under the High Outflow Scenario, the WaterFix provides an additional 40,000 AF of SWP and CVP supplies to the District above the Future Baseline scenario. The modeling approach for the WaterFix utilizes this water supply to meet water supply criterion 1 as well as augment Semitropic storage and offset the need for more expensive supplies such as potable reuse or transfers. If a less conservative baseline is used, then the incremental water supply produced by the WaterFix as well as the alternatives would be reduced.

Sensitivity to choice of outflow scenario

It is very important to recognize that the results presented in the agenda memorandum would be different with a lower outflow scenario than under the HOS. In particular, WaterFix incremental supplies would be somewhat reduced and, because the Future Baseline result would reflect a greater supply of imported water, the benefits of the other alternatives (Potable Reuse, Conservation, and Transfers) would be significantly reduced. The HOS has been selected for this analysis because it is plausible, has been analyzed in the NEPA and CEQA documents for the BDCP, and may well be adopted by the resource agencies as an operating objective for the state and federal projects within the planning horizon, with or without the WaterFix.

Water Supply Criteria

Water supply criteria used to evaluate the alternatives were based on strategies and objectives described in the 2012 Water Master Plan, current Board policies, and other considerations. The 13 criteria are listed below and described in detail in Attachment 2. Not all criteria are equally important; however, staff did not attempt to provide any weighting for this analysis.

1. Meets annual water supply targets
2. Maintains groundwater storage
3. Maintains Semitropic Groundwater Bank storage
4. Secures existing imported water supplies
5. Provides locally controlled drought supplies
6. Adapts to climate change
7. Improves water quality
8. Improves the environment
9. Reduces reliance on the Delta
10. Provides statewide benefits
11. Reduces greenhouse gas emissions
12. Allows for phased implementation
13. Cost per acre-foot, as determined in Section A.2.2.

Results

Results of the alternatives analysis are summarized below and in Attachment 3. Figures 1 through 4 summarize the modeling results used to evaluate the ability of the alternatives to meet criteria 1 through 3. As illustrated in Figures 1 and 2, all water supply options except the Future Baseline satisfy water supply criterion 1, while Figure 3 shows that groundwater (criterion 2) is best protected by the WaterFix, the Potable Reuse project, and additional conservation. Figure 4 indicates that only the WaterFix effectively protects Semitropic Groundwater Bank storage levels (criterion 3). Additional analysis of criteria and advantages, disadvantages, and risk factors for the WaterFix and alternatives are discussed below.

a. Future Baseline

Under the Future Baseline scenario, annual water supply targets are not satisfied, and local groundwater and Semitropic storage levels are depleted. If no additional action is taken to augment water supplies beyond those projects already planned to be implemented in the 2012 Water Master Plan, groundwater storage levels are projected to drop below the "severe" stage in the District's water shortage contingency plan in 12% of the years modeled and are projected to be in the "critical" or "emergency" stage in 5% of the years modeled. The District would be unable to provide a reliable supply for the community and environment, and there would be increased risk of permanent land subsidence.

b. WaterFix

Criteria Evaluation: The WaterFix is the most successful at maintaining storage levels in the Semitropic Groundwater Bank (criterion 3) and provides additional imported water that can offset demands on local supplies, potentially improving the availability of local water supplies for environmental needs within the county (criterion 8). It is the only option that secures existing imported supplies (criterion 4), provides potential benefits to the Delta ecosystem (criterion 8), and provides Statewide benefits (criterion 10). The WaterFix is also the only option that improves water quality for the District's treatment plants (drinking water and purified water plants) as well as for groundwater supplies (criterion 7). The WaterFix does not provide locally controlled, predictable drought year supplies, nor does it reduce reliance on the Delta.

Other Considerations: The WaterFix is a large, controversial project that is opposed by a number of individuals and organizations. Costly and lengthy litigation may delay the project and drive up project costs. While the project costs include a 36% contingency, which is considered reasonable for a tunneling project at this stage of design, unforeseen circumstances could result in cost overruns. Operational criteria proposed for the WaterFix may change over time in response to new scientific analysis regarding the flow regimes needed to protect endangered and threatened fish species and decisions of the State Water Board regarding outflow needs. While the operational criteria proposed for the WaterFix are based on what the fish and wildlife agencies believe are protective of species, new science in the future may support more stringent operational criteria that could reduce future water supplies below what has been modeled. The possibility exists that water supplies may increase as well. An advantage of the WaterFix over local alternatives is the spread of risks and costs over multiple water agencies serving 25 million people and over 3 million acres of agricultural lands that will also be relying on the project. The economic benefits and water supply security

for the state of California as a whole could bolster political support to ensure success of the project if it is approved and constructed.

c. *Potable Reuse*:

Criteria Evaluation: The Potable Reuse option is superior to the WaterFix in three areas: providing locally controlled drought supplies, reducing reliance on the Delta, and allowing for phased implementation (criterion 12). In other areas, Potable Reuse does not perform as well or is equally effective as the WaterFix. This option does not secure existing imported water supplies or maintain storage levels in the Semitropic Groundwater Bank. Potable Reuse would provide some improved water quality for local groundwater supplies, but not for the District's conventional treatment plants, except to the extent that the configuration of Potable Reuse ultimately adopted includes "direct potable reuse," in which purified water is blended with the District's untreated water supplies prior to treatment at the drinking water treatment plants. This option may also offset demands on local surface water supplies and provide for greater environmental flows for local fisheries.

Other Considerations: Public perception, regulatory permitting, environmental discharge, storage capacity and partnerships with other agencies will need to be addressed during development of the baseline and expanded potable reuse program. From an environmental standpoint, disposal of reverse osmosis (RO) concentrate would be accommodated under the existing National Pollutant Discharge Elimination System (NPDES) permit for the San Jose/Santa Clara Regional Water Facility. Testing is required to ascertain how much RO concentrate can be accommodated under the current discharge permit. This will be one factor determining the upper limit of the reuse facilities. From a storage capacity standpoint, the degree to which the capacity of the facilities can be fully utilized is determined by the amount of water that can be placed into the groundwater basin through recharge or injection. Partnerships will be sought, not only with the wastewater effluent providers, but also with potential users outside the County that might purchase surplus water. The expanded potable reuse program would rely primarily on groundwater injection, which requires acquiring land and easements for dozens of injection wells and pipeline laterals and includes additional regulatory requirements compared to groundwater recharge. The regulatory requirements for distance between injection locations and groundwater extraction wells, neighborhood concerns, and natural hydrologic conditions could limit the availability of suitable injection sites. Costs of construction may be influenced by local jurisdictional requirements.

As noted in the criteria evaluation, however, potable reuse does allow for phased implementation, so some of these considerations could be addressed over time, and this would be locally controlled drought supply once the facilities are constructed and operating.

d. *Conservation*:

Criteria Evaluation: The Conservation option is superior to the WaterFix in four areas: providing locally controlled drought supplies, reducing reliance on the Delta, allowing for phased implementation, and reducing greenhouse gas emissions. In other areas, this option does not perform as well or is equally effective as the Water Fix. This option does not secure existing imported water supplies or maintain storage levels in the Semitropic

Groundwater Bank. Conservation programs may offset demands on local water supplies and improve the availability of local water supplies for environmental needs, as well as provide additional habitat benefits through landscape conversion.

Other Considerations: The District has an aggressive water conservation goal of 99,000 AFY of savings by 2030, which is equivalent to about 25 percent of the projected water demand. To achieve additional conservation savings of 32,000 AFY will require the District to tap into a hard-to-reach tier of customers that are not easily motivated by rebates. Further, the additional savings would require significant collaboration with retailers and land use agencies. Home water use reports and large landscape water budgets require retailers to provide monthly/bi-monthly water use data for all residential accounts and the majority of large landscape customers. Advanced metering infrastructure requires retailers to convert their entire service to new meters at some cost to them. Sub-meters for apartments, mobile homes, and similar multi-family complexes would likely require some land use agency mandates. All the rebate programs would need extensive outreach to achieve the necessary participation levels, including a countywide culture shift in what is an appropriate or attractive landscape. Achieving this culture shift could require city/county code changes, which are difficult to implement. By increasing long-term conservation savings, the amount of short-term behavior changes that can be achieved during shortages is reduced. Lastly, conservation can result in significant revenue loss to the District from reduced water sales.

e. *Additional Transfer Supplies*:

Criteria Evaluation: This option is the least effective of the options, fully satisfying only criteria 1 and 12.

Other Considerations: The Additional Transfers option assumes the District is able to secure 38,000 AF of supplies in dry years and 31,000 AF in critically dry years. In critically dry years, such as 2015, available supplies are limited and competition for those supplies is great, driving the cost up. Local alliances and political issues have prevented and will likely continue to prevent many potential sellers from making water supplies available for transfer during drought periods. In addition, there is a limited window of time (typically July through September) in which transfers are allowed to be conveyed, limited conveyance capacity, and often large "carriage" losses associated with conveying the water to and through the Delta. Transfers require approvals from the Reclamation, DWR, and potentially the State Water Board, which can be challenging to secure and can entail "contributions" of some of the water to compensate for impacts in the seller's area, for example in the case of groundwater substitution[1]. Whereas one-year transfer arrangements involving the Delta are exempt from the review and approval of the Delta Stewardship Council, multi-year transfer deals are not. For example, if the District secured a multi-year dry-year option agreement with a Sacramento River or American River basin seller, the agreement would have to be approved by the Delta Stewardship Council, which would review the agreement against a set of criteria including one in which the buyer must demonstrate that it is taking water supply actions to reduce its impact on the Delta. Also, long-term transfers via the Delta could be

[1] Groundwater substitution involves the seller pumping groundwater supplies for their use and selling/transferring a proportionate amount of their surface water rights to the buyer. It is not yet known how enactment of the 2014 Sustainable Groundwater Management Act may impact the availability of some of the supplies available through groundwater substitution.

subject to biological opinions specific to those transfers developed by the federal resource agencies and would also be subject to more elaborate NEPA documentation than that required for one-year transfers. Biological opinions may include explicit restrictions that apply if certain adverse biological conditions exist at the time the transfer is desired. All of these hurdles translate to significant, continuing uncertainty associated with securing long-term transfers.

To meet the large targets of this alternative, the District may need to pay prices greater than seen in the past. Payments for dry-year transfers can produce significant rate volatility, with spikes at the very time that the District incurs reduced water sales through voluntary or state-mandated water use reductions. To minimize rate spikes associated with a dedicated dry-year transfer element in the supply portfolio, the District may be advised to increase its drought reserves, with sufficient scale to address multi-year droughts.

A.2.2 Cost Comparison

Capital and O&M costs, and costs per acre-foot of yield for the various alternatives are compared in the tables below. An estimate of incremental cost increases to the District's M&I groundwater charges, SWP tax, and average household costs are also provided for each option for fiscal year 2029.

The total capital and O&M costs for each alternative are shown in Table 5 below. O&M costs assume full utilization of each alternative, corresponding to delivery of the maximum amount of water that can be produced by the Potable Reuse, Conservation, and Transfers options, while O&M costs for the WaterFix include delivery to the county of the full 40 TAF of average annual incremental imported supplies consistent with the High Outflow Scenario. It is not appropriate to compare total undiscounted costs of the options because these costs are summed over different time frames; however, the present value calculation discounts each option to 2016 and results in cost estimates that can be compared. Both the undiscounted cost and present value costs for each of the alternatives are presented in Tables 5, 6, and 7 below.

Table 5. Fully financed capital and O&M costs for WaterFix and Alternatives

Option	Undiscounted Cost ($ millions)			Present Value Cost ($ millions)(c)		
	Total Capital	Total O&M	Total Cost	Total Capital	Total O&M	Total PV Cost
WaterFix - SCVWD share						
Low cost allocation	**1,065**	**425**	**1,490**	**390**	**80**	**470**
High cost allocation	**2,955**	**640**	**3,595**	**1,080**	**125**	**1,205**
Conveyance pumping allocation	**1,615**	**485**	**2,100**	**590**	**95**	**685**
Potable Reuse (a)	**1,100**	**905**	**2,005**	**520**	**295**	**815**
Conservation (b)	**0**	**1,545**	**1,545**	**0**	**615**	**615**
Transfers (b)	**0**	**1,825**	**1,825**	**0**	**450**	**450**

(a) Costs for the Potable Reuse option assume the following:
1) The total capital costs to provide 45,000 AFY of potable reuse is $945 million. Approximately two-thirds of the fully financed costs are shown in Table 5, which represents the costs allocated to provide 25,000 AFY of additional

potable reuse capacity on top of the 20,000 AFY in the 2012 Water Master Plan;

2) The financing plan assumes that 70% of capital costs will be financed through three series of tax-exempt, fixed-rate long term bond issuances in 2017, 2020, and 2022, and the remaining 30% of capital costs, as well as the annual O&M costs, will be paid as incurred from water utility revenues;
3) Each series of bonds is assumed to be amortized over 30 years at interest rates ranging from 3.9% to 5.5% which is consistent with the interest rate assumptions used for developing the FY 2016-17 long-term forecast and budget for debt service for the Water Utility fund.

(b) The costs of the Conservation and Transfers options are considered O&M costs and are not financed

(c) In order to ensure comparable costs in present value, a discount rate of 4.5% is used for the WaterFix to reflect the project's assumed 2% rate of inflation, while a discount rate of 5.5% is used for the other options consistent with the District's standard assumption of a 3% rate of inflation for local projects. It is not appropriate to compare total undiscounted costs because these costs are summed over different time frames; however, the present value calculation discounts each option to 2016 and results in cost estimates that can be compared.

Costs are affected by the degree to which each option is actually utilized. Each option is integrated into the Future Baseline scenario, and the model attempts to optimize the entire portfolio of supplies to reduce costs and minimize the amount of supplies needed to meet criterion 1, which describes the District's annual water supply targets. As a result, the amount of potable reuse supplies utilized is reduced in wetter years and years when groundwater levels are high in the Potable Reuse option, while implementation of the WaterFix, Conservation, and Transfers options offset the need for baseline indirect potable water use in the model. The resulting decrease in O&M costs in the modeling scenarios evaluated are shown in Table 6, along with the resulting adjusted total cost of the options.

Table 6. Total costs adjusted to reflect cost savings from partial optimization of water supplies (a)

Option	Undiscounted Costs (f)			Present Value (f)		
	Total Cost ($millions)	Reduction in O&M ($ millions)	Adjusted Cost ($ millions)	Total Cost ($millions)	Reduction in O&M ($ millions)	Adjusted Cost ($ millions)
WaterFix - SCVWD share (b)						
Low cost allocation	1,490	(435)	1,055	470	(80)	390
High cost allocation	3,595	(435)	3,160	1,205	(80)	1,125
Conveyance pumping allocation	2,100	(435)	1,665	685	(80)	605
Potable Reuse (c)	2,005	(120)	1,885	815	(50)	765
Conservation (d)	1,545	(315)	1,230	615	(110)	505
Transfers (e)	1,825	(135)	1,690	450	(35)	415

(a) The model achieves partial optimization of the county's water supply portfolio and costs, but further refinement is needed to fully optimize costs and yields.

(b) The WaterFix provides additional imported supplies under the High Outflow Scenario that reduce the

need for indirect potable reuse in the model. The resulting reduction in indirect potable O&M expense offsets the O&M cost of the WaterFix option by roughly $435 million, undiscounted.

(c) The Potable Reuse option is not fully utilized because less water is needed in wetter years and when groundwater levels are high. Therefore, the total cost that reflects maximum water production is reduced accordingly.

(d) Conservation results in a reduced need for indirect potable reuse in the model, with corresponding reductions in operating costs of roughly $315 million, undiscounted.

(e) Transfers reduce the need for indirect potable reuse in the model, with corresponding reductions in operating costs of $135 million, undiscounted.

(f) It is not appropriate to compare the undiscounted total costs because these costs are summed over different time frames; however, the present value calculation discounts each option to 2016 and results in cost estimates that can be compared. Costs are rounded to the nearest $5 million.

Table 7 shows the average annual deliveries available from the WaterFix under the High Outflow Scenario and the maximum project yield provided by the three alternatives. Costs per acre-foot of water supply are expressed in two ways: (1) in terms of potential project yield, and (2) in terms of the average incremental portfolio yield, or the modeled increase in the county's overall water supplies with partially optimized water operations.

Table 7. Estimated cost per acre-foot of water supply for WaterFix and alternatives

Option	Potential Average Project Yield (AF per year)	Average Incremental Portfolio Yield (HOS) (AF per year)	Total Cost per AF Potential Project Yield ($/AF)		Adjusted Cost per AF Portfolio Yield ($/AF)	
			Undiscounted (e)	Present Value (e)	Undiscounted (e)	Present Value (e)
WaterFix - SCVWD share						
Low cost allocation			**930**	**295**	**940**	**350**
High cost allocation	**40,000**	**28,000** (a)	**2,245**	**755**	**2,820**	**1,005**
Conveyance pumping allocation			**1,315**	**430**	**1,485**	**540**
Potable Reuse	**25,000**	**15,000** (b)	**2,675**	**1,085**	**4,190**	**1,700**
Conservation	**14,000**	**14,000** (c)	**3,245**	**1,290**	**2,585**	**1,060**
Transfers	**13,000**	**11,000** (d)	**2,810**	**690**	**3,075**	**755**

(a) Water Fix deliveries are offset by a roughly 12,000 AF reduction in baseline indirect potable reuse and other local supplies such that the overall water supply portfolio is increased by 28,000 AF instead of 40,000 AF above the Future Baseline. The portfolio yield is larger than that of the other options because the WaterFix produces additional supplies that can be stored in the Semitropic groundwater bank. Other options were designed to produce enough water to only meet water supply criterion 1 (see Attachment 2). Expanding or combining the alternatives to the WaterFix would be needed in order to produce additional supplies to maintain storage in the Semitropic groundwater bank without the WaterFix.

(b) The model reduces Potable Reuse production in wetter years when local surface supplies are available and in years when groundwater levels are high to minimize costs and avoid "wasting" water through unnecessary operations, resulting in a lower overall water supply portfolio increase relative to the Future Baseline than in the WaterFix option. This scenario was partially optimized; additional modeling is being conducted as part of the Expedited Purified Water Program to evaluate methods of increasing the incremental portfolio yield. In addition, potential partnerships with regional agencies are being evaluated.

(c) The Conservation option is designed to increase the amount of conservation gradually over 20 years to achieve 32,000 AF by year 2035, and maintaining that level of conservation for the next 15 years. The average annual yield of the Conservation option is (14,000 AF) over the 35 year period. Note that while the potential project yield and average portfolio yields are the same, the costs per AF differ because the adjusted total costs which are used to determine partially

optimized unit costs are less than the total project costs, as shown in Table 6.

(d) Transfers are secured only in dry and critically dry years, resulting in a lower average annual yield. This option assumes that 38,000 AF of transfers is secured in dry years and 31,000 AF in critically dry years.

(e) Both undiscounted and present value costs are normalized by the total amount of water produced during the project time period. Time periods for the options are as follows: WaterFix - 50 years (10 years construction, 40 years operation); Potable Reuse - 35 years (5 years construction, 30 years operation), Conservation - 35 years, Transfers - 50 years. Unit costs are rounded to the nearest $5/AF.

Table 8 below shows the estimated increase in groundwater charge, average SWP tax, and average cost per household per month for each option for FY29.

Table 8. Groundwater charge and SWP tax increase for WaterFix and alternatives

	Incremental Cost Increase (FY 2028-29)(a)					
	WaterFix Cost Scenario			**Potable Reuse**	**Conservation** (b)	**Transfers** (c)
	Low	**High**	**Conveyance Pumping**	**Incremental to Baseline**		
M&I groundwater charge increase ($/AF)						
north county	**66**	**316**	**137**	**436**	**306**	**144**
south county	**3**	**229**	**64**	**0**	**60**	**76**
SWP tax increase, average single family ($/yr)						
north county	**28**	**22**	**27**	**0**	**0**	**0**
south county	**22**	**17**	**21**	**0**	**0**	**0**
Total increase per average household ($/month)						
north county	**5**	**13**	**7**	**15**	**11**	**5**
south county	**2**	**9**	**4**	**0**	**2**	**3**

(a) Analysis of all options assumes maximum O&M costs associated with 100% utilization.

(b) Conservation option is projected to result in 9,600 AF of water use reduction by FY 2028-29.

(c) Transfers option would require large spikes in operations expenditures in a given year that could lead to water rate volatility.

A.3. Other Water Supply Options

Board members and stakeholders have expressed interest in additional water supply options including desalination, land fallowing, stormwater capture and reuse, and new water quality treatment or blending approaches. Staff did not include these options in this first phase of evaluation because a qualitative analysis indicates they are less effective than the options discussed above. Staff will provide a more detailed analysis of these options in the future.

B. Design and Construction Enterprise (DCE) and Related Agreements

B.1 Design and Construction Enterprise (DCE) Agreement

If the California WaterFix is approved, DWR and a Joint Powers Authority (JPA) made up of public water agencies will collaborate on the design and construction of the project. The DCE Agreement creates a special purpose enterprise within DWR dedicated to design, construction and implementation of the conveyance project. The parties to the agreement will be DWR and the JPA. A tentative DCE Agreement was released to the public in January 2016 and can be downloaded from the following site:
https://s3.amazonaws.com/californiawater/pdfs/Draft_Final_DCE_Agreement_Combined.pdf

According to the tentative agreement, the DCE will be managed by a Program Director hired specifically for this project and will be staffed by qualified people from DWR, other public water agencies, or private industry, as needed. The tentative agreement specifies that the Director of DWR will have final decision making authority on all aspects of the design, construction, and implementation of the conveyance project. However, the Board of the JPA must concur with any matters that materially affect the conveyance project such as actions that increase the cost more than $10 million or more than a 5% increase in budgeted costs, delay the schedule by 60 days or more, or impact the water delivery capacity, project life, or operations and maintenance costs. See Attachment 4 for more details.

If the District Board decides that the District will participate in the WaterFix, the Board will also have to decide whether to join the JPA and, as a voting member of the JPA, will vote on whether to execute the DCE Agreement with DWR. The DCE Agreement and related JPA Agreement (see below) will not be executed until after the Record of Decision (ROD) and Notice of Determination (NOD) are filed by Reclamation and DWR, respectively, which is currently scheduled for mid-summer 2016. Staff plans to include a fuller description and discussion of the DCE and related Agreements in a future meeting of this Committee.

B.2 Joint Powers Authority (JPA) Agreement

The purpose of the Joint Powers Authority is to create the Conveyance Project Coordination Agency, a public entity pursuant to the Joint Exercise of Powers Act, to assist DWR with completion of the conveyance project. The JPA will be the public water agencies' oversight entity for the DCE and related budget and schedule. The parties to the JPA will be the public water agencies who execute the agreement.

The District Board will have to decide whether to join this Joint Powers Authority after the ROD and NOD are filed by Reclamation and DWR, respectively. A more complete description of this Agreement will be provided at a future meeting of this Committee.

B.3 Preconstruction Funding Agreements

So far, funding of BDCP/CA WaterFix planning costs has been provided to DWR on a pay-as-you-go basis by participating SWP contractors, including the District, and by a combination of pay-as-you-go and debt issuance (financing) by participating CVP contractors, including the District. If the WaterFix proceeds, the next round of funding for preconstruction costs, currently estimated to be $1.2 billion, will likely require debt issuance by both SWP and CVP contractors to cover expenses until DWR is able to issue bonds. It is also possible that participating SWP and CVP contractors will be asked to fund the DCE's start-up costs which are currently

estimated to be roughly $40 million. The preconstruction funding and DCE start-up costs could come from individual agencies issuing bonds or from one or two entities issuing bonds, such as a JPA made up of several public water agencies. Depending on the rate of expenditure, there is a possibility of funding these interim costs through a pay-go method (i.e., pay as incurred). These funding commitments will require separate funding agreements which, as they are developed, will be brought to this Committee for discussion and to the District Board for approval after the ROD and NOD are filed.

C. Draft Policy Statement for State Water Resources Control Board Proceedings

In order to divert water from the WaterFix proposed intakes on the Sacramento River, DWR and Reclamation must obtain a change in their water rights permits with the State Water Board. DWR and Reclamation submitted a petition for change in point of diversion on August 26, 2015, which launched a lengthy and complex review process by the State Water Board. All parties wishing to participate in the hearings, which are scheduled to start on April 7, were required to submit a notice of intent by January 5, 2016. The District submitted a notice of intent to make a policy statement at the hearing along with 45 other individuals or entities. Approximately 87 additional individuals or entities submitted notices of intent to participate in the evidentiary portion of the hearing through direct testimony, cross-examination or rebuttal; of the 87, 60 are protesting the petition. Because the District Board has not taken a position on the proposed project, staffs' intent is to prepare a policy statement that describes the importance of the Delta to Santa Clara County, our concerns with the current status, and why the status quo is unsustainable. A draft of that policy statement is provided in Attachment 5.

In order for the State Water Board to approve a change petition, DWR and Reclamation must demonstrate that the change will not injure any legal user of the water, provide information concerning the extent to which fish and wildlife would be affected by the change, and identify proposed measures to protect fish and wildlife from any unreasonable impacts of the change. In addition, the Delta Reform Act imposes unique requirements on the processing of a water right change petition for the WaterFix. The Delta Reform Act requires that any State Water Board order approving the petition include "appropriate Delta flow criteria," and the State Water Board's decision must be informed by flow criteria to protect the Delta ecosystem, which the State Water Board was required to develop in 2010.The State Water Board plans to conduct the hearing in two parts, with the first part focused on effects of the project on legal users of water and the second part addressing effects of the project on fish and wildlife, including appropriate Delta flow criteria.

Concurrent with the State Water Board's consideration of the change petition, the State Water Board is engaged in a process to update the Bay-Delta Water Quality Control Plan (WQCP) which designates beneficial uses of waters, establishes water quality objectives to protect those uses, and adopts a program of implementation for achieving the objectives. This WQCP includes the water quality objectives that the SWP and CVP must currently meet.

Because the WQCP review process is expected to take several years, the State Water Board anticipates that any flow criteria included in a WaterFix change petition approval may be adjusted consistent with any changes that come out of the WQCP update process.

ATTACHMENT(S):

Attachment 1: Board Policy & CEO Interpretations Related to a Long-Term Delta Solution
Attachment 2: Criteria for Evaluating the Water Supply Alternatives
Attachment 3: Summary of Alternatives Analysis
Attachment 4: California WaterFix Fact Sheet: Design & Construction Enterprise Tentative Agreement
Attachment 5: Draft Policy Statement for State Water Resources Control Board Hearing on the DWR/Reclamation Petition for a Change in Point of Diversion
Attachment 6: Staff PowerPoint Presentation

Figure 1a. Average Annual Water Supplies (High Outflow Scenario)

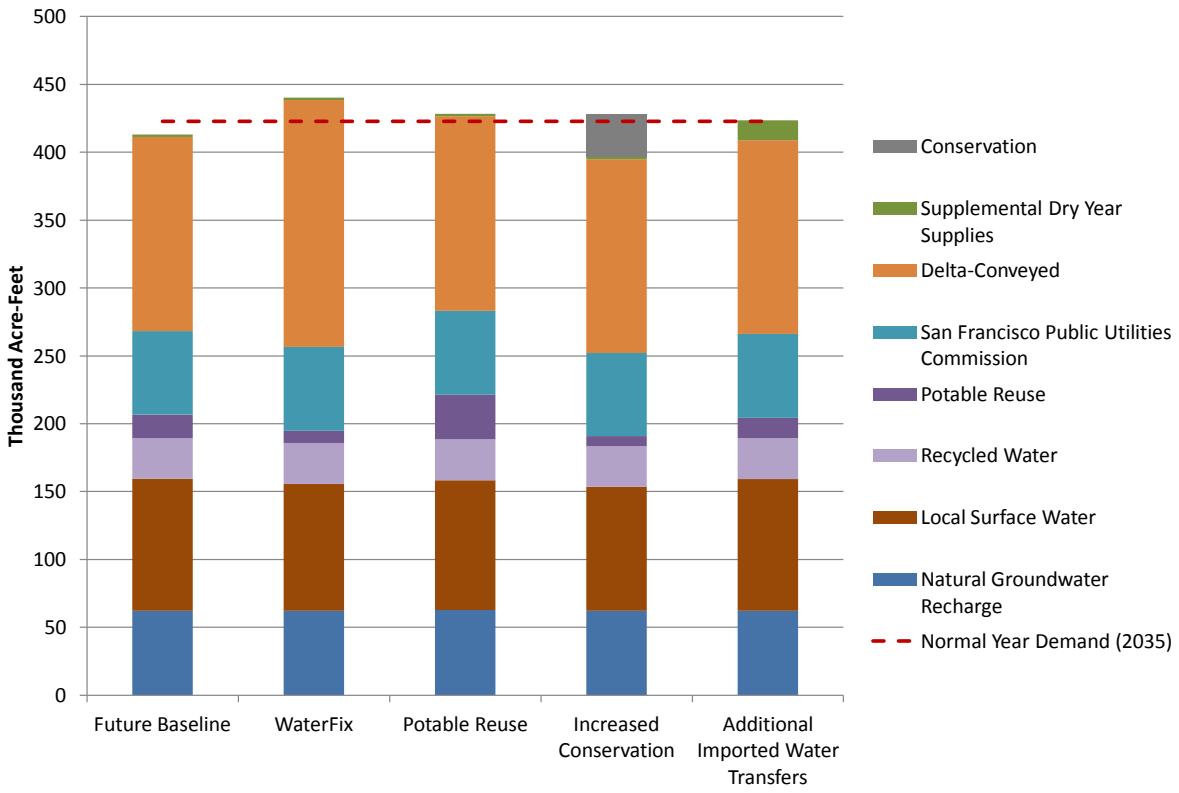
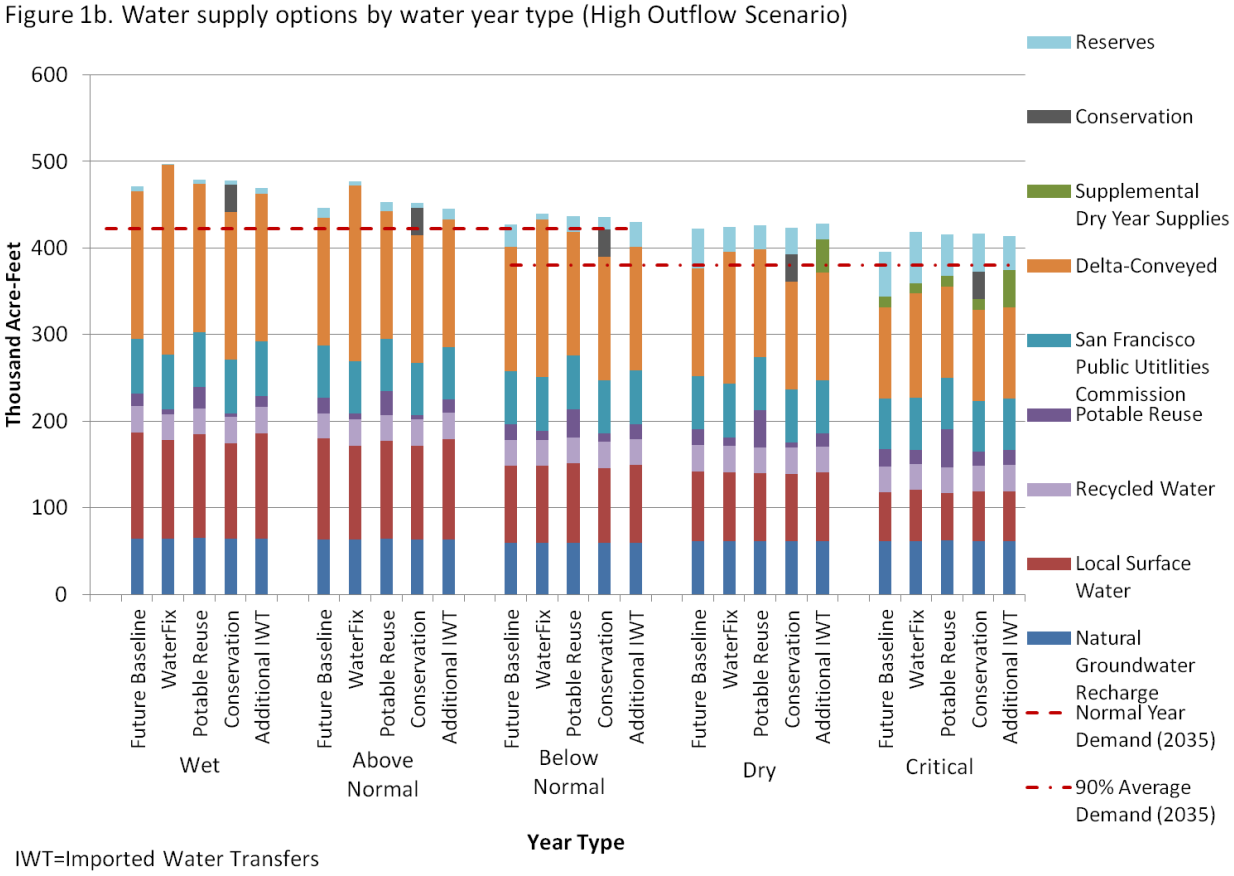


Figure 1b. Water supply options by water year type (High Outflow Scenario)



IWT=Imported Water Transfers

Figure 2. Drought Year Water Supply Options (High Outflow Scenario)

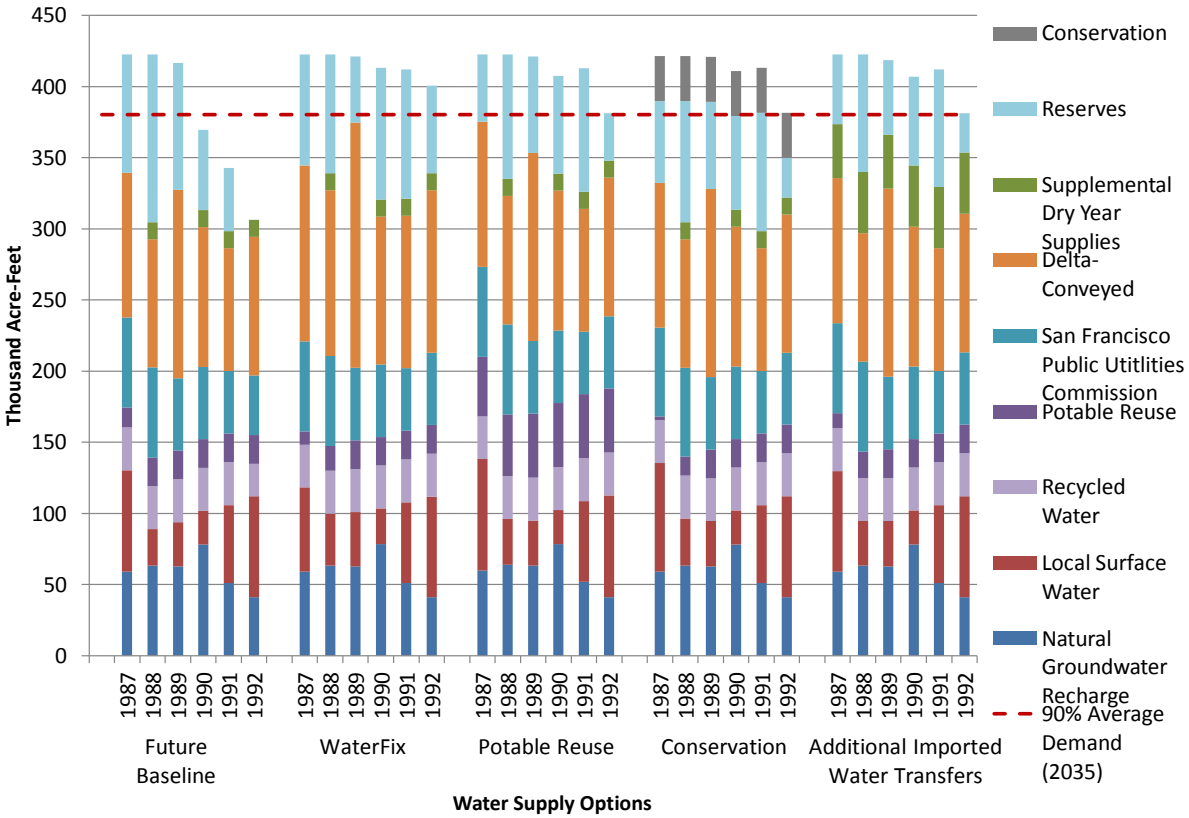


Figure 3. Local groundwater supplies (High Outflow Scenario)

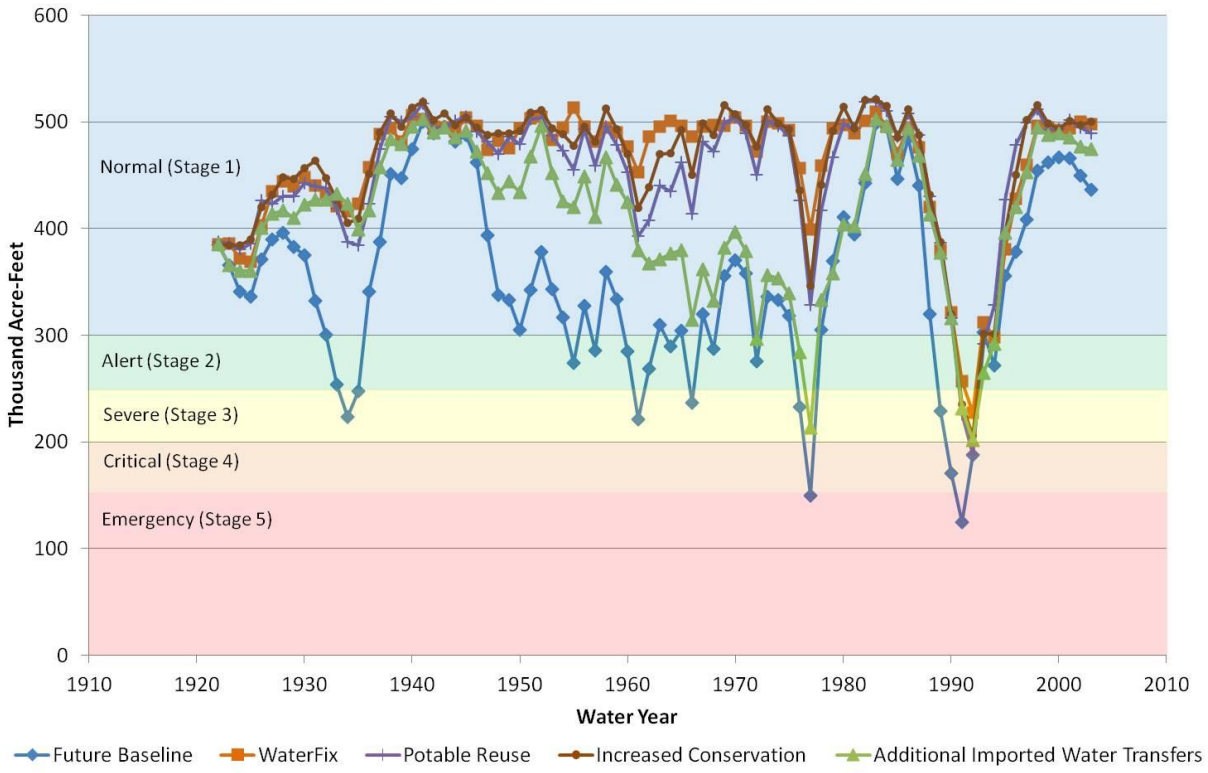


Figure 4. Semitropic Groundwater Bank storage levels (High Outflow Scenario)