San Diego County Water Authority

SPECIAL MEETING
IMPORTED WATER COMMITTEE

Board Room

NOVEMBER 14, 2013

1:30 p.m.

Elsa Saxod – Chair
Mark Muir – Vice Chair
Ken Williams – Vice Chair
Gary Arant
Gary Croucher
Betty Evans
Michael Hogan
Keith Lewinger
John Linden
Ken Olson
Bud Pocklington
Fern Steiner
Ronald Watkins
Doug Wilson
Tom Wornham

1. Call to order.

2. Roll call – determination of quorum.

3. Public comment – opportunities for members of the public to address the Committee on matters within the Committee's jurisdiction.

4. Chair's report.

I. CONSENT CALENDAR

II. ACTION/DISCUSSION

1. Bay Delta.
   - 1-A Update on Bay Delta Conservation Plan. — Dennis Cushman
   - 1-B Presentation by Secretary Laird of the Natural Resources Agency.
   - 1-C Bay Delta Conservation Plan Supply and Demand Reliability Analysis. (Discussion) — Ken Weinberg

III. INFORMATION

San Diego County Water Authority

IV. CLOSED SESSION

V. ADJOURNMENT

Doria F. Lore
Clerk of the Board

NOTE: This meeting is also called and noticed as a meeting of the Board, but will be conducted as a meeting of the Imported Water Committee. Members of the Board who are not members of the Committee may participate in the meeting pursuant to Section 2.00.060(g) of the Water Authority Administrative Code. All items on the agenda, including information items, may be deliberated and become subject to Committee action. All public documents provided to the Committee or Board for this meeting including materials related to an item on this agenda and submitted to the Board of Directors within 72 hours prior to this meeting may be reviewed at the San Diego County Water Authority headquarters located at 4677 Overland Avenue, San Diego, CA 92123 at the reception desk during normal business hours.

San Diego County Water Authority

November 7, 2013

Attention: Imported Water Committee

Bay Delta Conservation Plan Supply and Demand Reliability Analysis (Discussion)

Purpose
The purpose of this report is to present a supply and demand analysis associated with the Bay Delta Conservation Plan (BDCP) alternatives, focusing on wet-year deliveries and the ability to provide the "big gulp, little sip" approach to water reliability.

Background
Over the past several months staff has been providing the Board with background information concerning key environmental and water resources issues, the environmental permitting process, and other foundational information required to evaluate the proposed BDCP. The background information being evaluated is primarily from the administrative draft planning and environmental documents produced by state and federal agencies as part of the BDCP process and released last spring. These documents are preliminary and subject to change, but provide a good preview of what the state and federal agencies are proposing in terms of a Delta solution. The administration expects to release the final public draft of the environmental documents and BDCP on December 13, 2013. The latest delay in release of the documents was attributed to the partial shutdown of the federal government.

One of the primary tasks associated with the staff evaluation of the BDCP has been a comparative analysis of alternative proposals to address water supply reliability for water agencies reliant on Bay-Delta supply exports. These alternatives include:

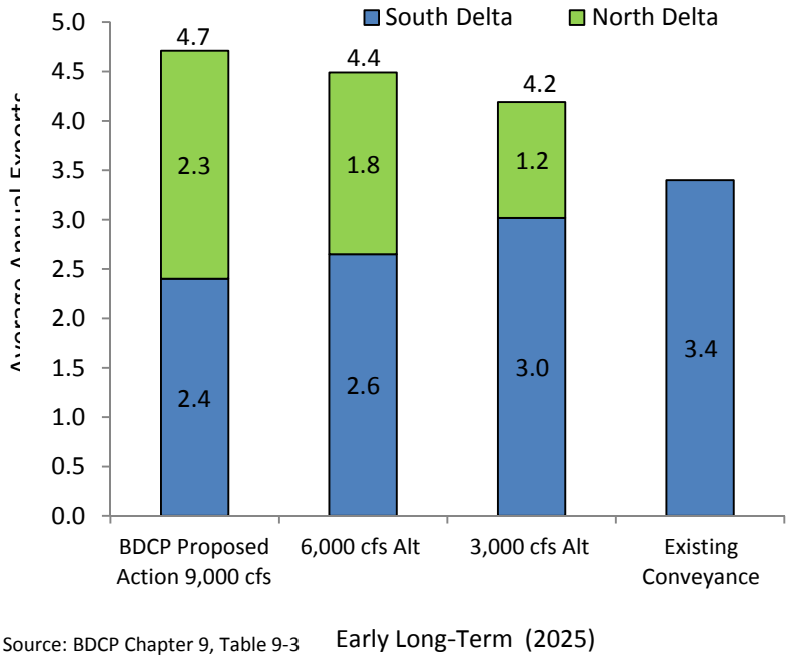
1) No action alternative (included in BDCP administrative draft)
2) BDCP Proposed Action (9,000 cubic feet per second (cfs) conveyance) (included in BDCP administrative draft)
3) NRDC Portfolio proposal (3,000 cfs conveyance)[1]
4) Delta Vision BDCP Plus proposal (6,000 cfs conveyance)[2]

At the September 26, 2013 Imported Water Committee meeting, staff provided a report on the estimated export yields from the proposed BDCP alternatives. The report also discussed how the operating scenarios influence the export yields and the uncertainties surrounding the decision-tree process. This was the first step in comparing the water supply reliability of the different conveyance options. As discussed at both the September 26th and October 24th Imported Water Committee meetings, operating criteria developed by the state and federal fishery agencies, who issue

[1] NRDC Portfolio suggests a north Delta conveyance facility of at least 3,000 cfs; for ease of comparison in staff's analysis, 3,000 cfs is utilized as a proxy. The reduced conveyance is intended to be coupled with a portfolio of local supply and south of delta storage projects to augment the reduced export capacity.
[2] BDCP Plus suggests a north Delta conveyance facility of 5,000 cfs – 6,000 cfs; for ease of comparison, 6,000 cfs is utilized. Similar to NRDC Portfolio, the reduced conveyance is to be coupled with a portfolio of projects to augment the reduced export capacity.

Endangered Species Act (ESA) permits, will be the single most important factor controlling the amount of water that can be exported from the Delta for water supply purposes.[3] As discussed at previous Committee meetings, high Delta outflow criteria reduce the amount of water that can be exported for water supply, while low Delta outflow criteria result in higher levels of water supply exports. *Figure 1* shows the resulting State Water Project (SWP) and Central Valley Project (CVP) export yields of the different conveyance alternatives under similar high Delta outflow operating criteria so as to compare the alternatives on an "apples to apples basis."[4] As stated in the BDCP, the "early long-term" is the implementation period that extends 11 to 15 years after the BDCP permit term is initiated. The "late long-term" refers to the BDCP implementation period that extends 16 to 50 years after the BDCP permit term is initiated.

Figure 1: BDCP Alternatives and Scenarios - Estimated Export Yields under the High Outlfow Operating Criteria



Source: BDCP Chapter 9, Table 9-3

From a strictly conveyance capacity standpoint, the BDCP Proposed Action provides the greatest amount of Delta exports when compared to the two other alternatives with a north Delta diversion and the existing conveyance with no new north Delta diversion. It should be noted that additional local projects or enhanced yield from south of Delta storage was not factored into the total supply yield of the conveyance capacities of the NRDC or the DVF proposals. The comparison also does not consider cost, or the question of whether investments made in more local supply development and storage would provide superior water supply reliability to agencies that rely upon Delta exports.

As was also discussed in detail at the September 26th Imported Water Committee, BDCP permitting relies upon a decision-tree process to determine Delta outflow and initial Delta exports. As such, regardless of the conveyance alternative selected, the decision-tree process will be required as part of the permit. The decision tree process is supported by the fishery agencies, which will issue the

[3] As discussed in the October 24th Imported Water Committee meeting, the State Water Resources Control Board also has a role in the determination of Delta flow, and is undergoing its own process to revise the Water Quality Control Plan for the Delta, which will set new flow standards in the Delta and will use that as the basis for issuing the permit for a change in the point of diversion and operation of the state and federal projects to accommodate a new BDCP conveyance facility.

[4] For the purpose of comparing project yields based on conveyance size only; additional potential supplies from other programs as suggested in NRDC Portfolio and DVF Plus are not included, as noted in the memo.

federal and state permits that allow export operations. The decision tree addresses two key uncertainties associated with Delta outflow criteria:

- The importance of Delta outflow in the fall months (fall outflow) in achieving abundance and habitat objectives for Delta smelt, and
- The importance of Delta outflow in the spring months (spring outflow) in achieving the longfin smelt abundance objective.

The decision-tree process combines differing spring and fall outflow criteria to derive four possible outcomes that would all be covered under the permit. Table 1 shows the criteria to be tested as part of the process.

Table 1: Four Potential Operating Outcomes As Identified in the BDCP EIR/EIS Associated with Fall and Spring Delta Outflow (Decision-Tree Process)

Delta Outflow	**Low Outflow** (H1)	H2	H3	**High Outflow** (H4)
Spring	D-1641	D-1641, plus enhanced spring outflow	D-1641	D-1641, plus enhanced spring outflow
Fall	D1641	D-1641	USFWS BO (Dec 2008)	USFWS BO (Dec 2008)

D-1641: State Water Resources Control Board Decision 1641 issued in December 1999 and updated in March 2000. D-1641 sets objectives for minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity levels.
USFWS BO (Dec 2008): US Fish and Wildlife Service's Biological Opinion that covers effects of the projects on Delta Smelt and includes additional requirements including an additional fall salinity requirement in the Delta, that requires increased releases from SWP and CVP reservoirs to reduce salinity.

The September 18th board memo was the first step in describing the water supply reliability of the different conveyance options. At the October 24th Imported Water Committee meeting, staff described how BDCP determined the expected amount of water supply from the existing through-Delta conveyance system, absent implementation of the BDCP. Staff understands that use of the high outflow criteria was proposed by the state and federal fishery agencies that issue the operating permits for the SWP and CVP. BDCP Chapter 9 stated the high outflow criteria would be the method fisheries agencies would likely use to regulate exports under the existing conveyance system. Because that scenario attempts to provide the most restrictive of future regulations affecting continued operation of the existing through Delta conveyance only, staff believes it is appropriate to use the supply yield from the high outflow criteria as shown in *Figure 1* above as a baseline to compare the other alternatives when assessing supply reliability.

This report analyzes the export yields identified in the September and October 2013 board memos for the four alternatives and compares them to forecasted demands to evaluate the supply reliability of the alternatives and potential impact on reliability in San Diego County.

Discussion

As stated in the Water Authority's Delta Policy Principles, adopted by the Board in February 2012: *"The Water Authority Board of Directors supports a Bay-Delta solution that will meet the co-equal*

goals and provide San Diego County with a reliable, high-quality supply of affordable, imported water consistent with the Water Authority's Urban Water Management Plan and Regional Facilities Optimization and Master Plan." The set of policy principles was adopted to guide staff in evaluating projects and actions concerning the Bay-Delta, as well as to guide the board's evaluation and future policy decisions. As part of this report, staff will utilize the policy principles associated with water supply reliability to further evaluate the BDCP alternatives.

Water Authority's 2010 Urban Water Management Plan (UWMP) Verifiable Supplies

The Water Authority's 2010 UWMP identifies the projected regional mix of resources to meet existing and forecasted water demands to ensure a reliable water supply for San Diego County's economy and quality of life. The UWMP resource mix and supporting documentation is also utilized by member agencies in compliance with California laws linking water supply availability and approval of large land-use projects that were enacted with the passage of SB 610 and SB 221. The assessments and verifications prepared by the member agencies under these laws rely on UWMPs to provide adequate documentation and substantive evidence on the supplies identified to meet existing and future demands. Local land use jurisdictions, cities and counties, rely on this information when considering specific approvals for new development. For this reason, the Water Authority worked closely with its member agencies to identify those projects that would be considered verifiable to include in the Water Authority's UWMP reliability assessment to help ensure compliance with state law.

To comply with the growth and water legislation, the Water Authority's 2010 UWMP categorizes regional and local supply projects into three categories: verifiable; additional planned projects; and, conceptual projects. Verifiable projects are generally those with adequate documentation regarding implementation and supply utilization, and are used in the identified resource mix and reliability assessment contained in the plan. The Carlsbad Desalination Project was a verifiable project in the 2010 UWMP. Additional planning projects are those that the Water Authority or member agencies are actively pursuing and currently funding, but do not rise to the level of verifiable for implementation. The Camp Pendleton seawater desalination proposal was considered an additional planned project in the 2010 UWMP. Conceptual projects are those considered to be in the pre-planning phase with very little documentation beyond concept studies. As an example, a conceptual project submitted by the City of San Diego for inclusion in the 2010 UWMP is the San Pasqual basin groundwater proposal.

For its supply, facilities, environmental and financial planning, the Water Authority uses verifiable supplies rather than planned or conceptual. The use of the verifiable numbers in planning documents reduces the implementation risks that could jeopardize future supply reliability or adversely affect other planning efforts. For this reason and consistent with the reliability assessment contained in the Water Authority's 2010 UWMP, the evaluation of supply options and alternatives to fix the Delta will focus on regional and local supplies that are considered verifiable and more predictable.

California Water Resources Simulation Model II (CALSIM II)

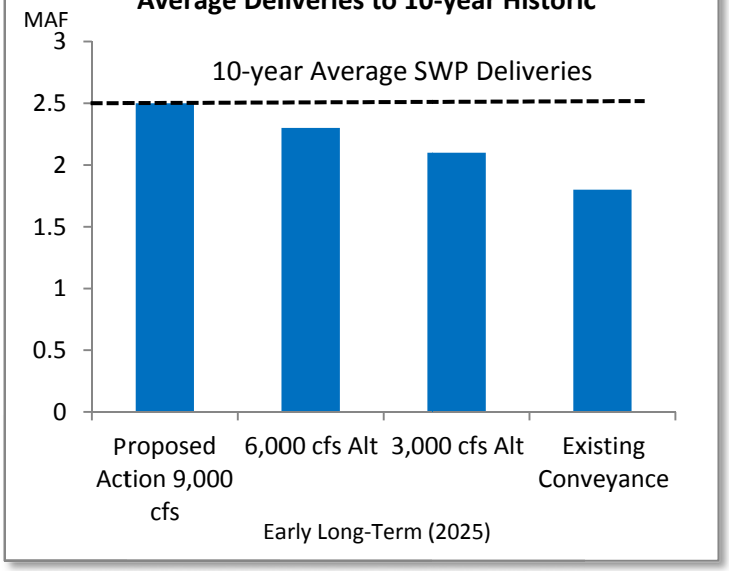
It is also important to understand how the estimated supply yields from the BDCP alternatives are determined. The Department of Water Resources and U.S. Bureau of Reclamation developed

CALSIM II, which simulates the operations of the major SWP and CVP facilities based on an 83-year monthly historic hydrology and generates estimates of river flows, reservoir storage, Delta inflow and outflow, deliveries to project and non-project users and controls on project operation. On a much less complex basis, the current update of the Water Authority's Facilities Master Plan relied on a similar model using historic hydrology to determine local and imported supply availability.

CALSIM II Results – State Water Project

The estimated CVP and SWP export yields from the BDCP alternatives were presented in the September 18th board memo. The figures are based on modeling results that were used as part of BDCP Chapter 9. As mentioned previously, the operating scenarios are consistent, based on high Delta outflow criteria. *Figure 2* provides a comparison of estimated SWP average deliveries of the BDCP alternatives[5] and the 10-year average deliveries (2001-2010) from the most recent SWP Water Reliability Report (June 2012). It is important to note that the 10-year historic average includes mostly years prior to Judge Wanger's decision to limit Delta exports to protect the Delta Smelt and the subsequent 2008 BiOp that made those limitations and protection measures more permanent. The historic 10-year average, therefore, provides a less restrictive scenario, and therefore higher yield for the existing conveyance than is contemplated under the BDCP analysis. Because the 10-year average is heavily weighted to the pre-Wanger decision period when there were less export restrictions it is a useful tool to benchmark how the different alternatives perform compared to the period when MWD was able to operate its storage programs as planned. From a wider perspective, it is helpful in assessing whether any Delta Fix alternative provides at least a return to past export levels as a measure of improved reliability to current and future conditions.

Figure 2: Alternative Comparison of SWP Estimated Average Deliveries to 10-year Historic



As shown in *Figure 2*, under the conservative high Delta outflow scenario, the BDCP Proposed Action will provide estimated deliveries closest to historic deliveries, with decreasing delivery capabilities provided by 6,000 cfs, 3,000 cfs and existing through-Delta alternative. As discussed in the September 26th board memo, deliveries though north Delta conveyance facilities can provide improved water quality and more yield compared to the existing conveyance system. The higher percent of the deliveries from the north Delta diversion will result in higher water quality and provide more yield than alternatives with smaller conveyance capacity.

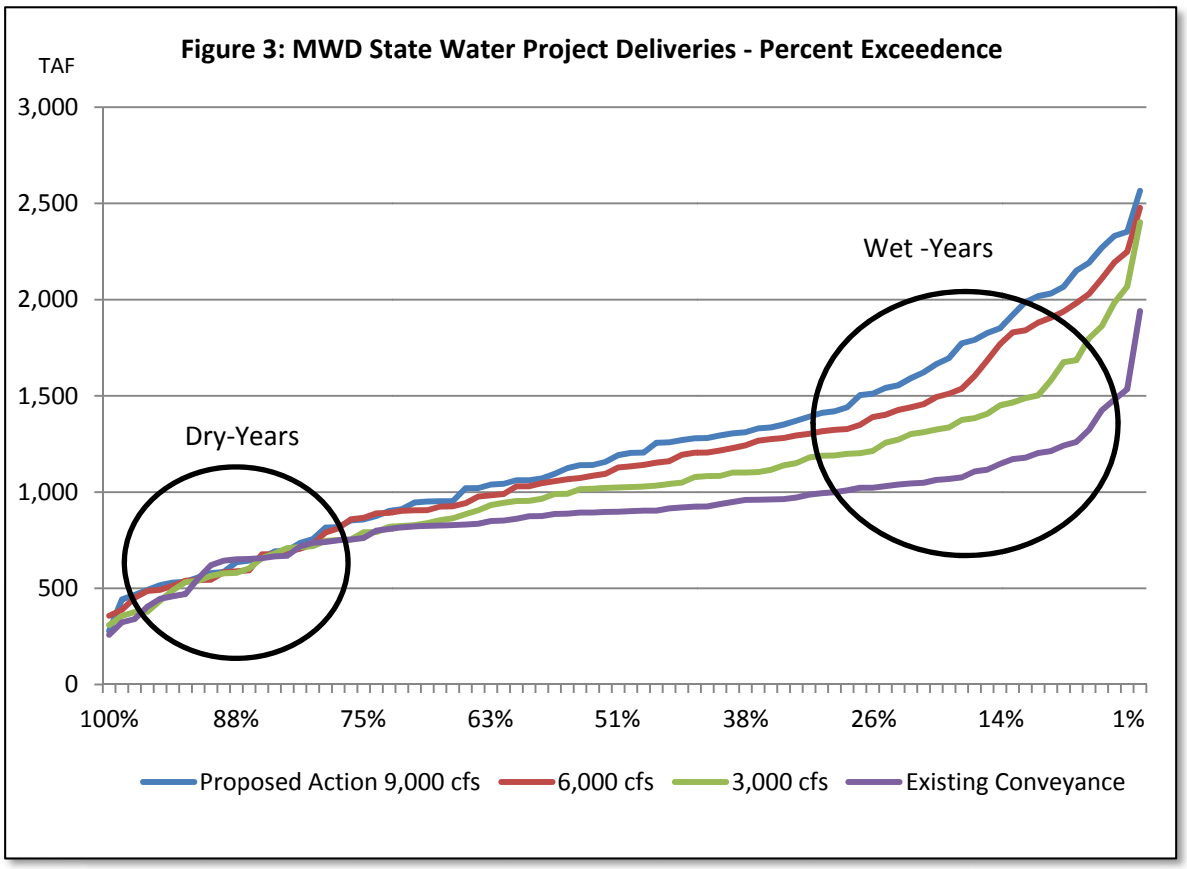
[6]Modeling results were provided by BDCP.

In regard to projected water demands of the SWP Contractors, the BDCP Chapter 9 economic benefits analysis developed a specific model to analyze supply and demand balances (SDBSIM) to estimate the future demand for water of 36 urban agencies and used an existing model (SWAP) developed by UC Davis to forecast agricultural water demand in the light of differing supply and economic conditions. The purpose of analyzing supply and demand balances among the contractors was to identify supply shortages and then value the benefit of avoiding those shortages. Urban contractor demand was forecasted using econometric data, employment, housing, income, population, and historic hydrology. That approach is similar to the CWA-MAIN model the Water Authority uses for its long range demand forecast included in the Urban Water Management Plan (UWMP). The SDBSIM Model also included UWMP projections for local supply and storage capacity where that information was available. Accounting for conservation and normal economic conditions, BDCP analysis projected the total water demand across the 36 urban agencies to grow 20 percent over the forecast period (2050). A recent survey conducted by the California Urban Water Agencies (CUWA) of its members showed that those agencies that relied on Delta exports, who are also state water contractors, showed increasing demands and increased imported water amounts in 2030 compared to 2010. A majority of the CUWA agencies surveyed also showed an increase in local supply development over the same period. This is consistent with the analysis conducted by BDCP in the Chapter 9 evaluation of take alternatives.

Reliability Analysis of MWD SWP Deliveries ("Big Gulp, Little Sip" Analysis)

The next step in the staff reliability analysis is to compare the different alternatives in regard to MWD deliveries from the SWP. In this evaluation, consistent with Board policy principles, the Delta solution should improve the ability of water users to maximize water diversions from the Delta during wet periods for use in dry periods. This is often referred to as the "big gulp, little sip" approach. This is consistent with MWD's approach to resources reliability planning, which combines the use of core water supplies and flexible (or variable) supplies that enhance dry year reliability during a prolonged drought. This is similar to the Water Authority's planning approach to develop core supplies, such as the Quantification Settlement Agreement (QSA) transfers and Carlsbad Desalination Project, and flexible supplies, such as the San Vicente Dam Raise Carryover Storage Project and use of dry-year transfers.

To determine which alternative best satisfies the objective of delivering the big wet-year gulp and little dry-year sip, the reliability analysis of MWD SWP deliveries primarily focuses on the reliability of deliveries in wet-years, in order to approximate reliability in dry-years. In determining the availability and reliability of wet-year deliveries, it is important to look at both the volume of water available and the frequency, or how often the water is available. The frequency of available deliveries is expressed as a percentage of the time or as a specific number of years out of a 10-year period. The modeling results conducted for BDCP Chapter 9 provide the amount and frequency of total SWP deliveries, simulated based on the 83-year observed hydrology, for each of the BDCP alternatives. For this board memo, 50 percent of the modeled deliveries were taken to determine MWD's SWP deliveries, which approximates MWD's SWP Table A amount (MWD's allocation of water under its contract with DWR for SWP water). *Figure 3* shows the range of MWD deliveries for the alternatives.



As shown in *Figure 3*, the simulated frequency of dry year deliveries is similar to all the alternatives, due to the minimal inflows due to dry weather and Delta export operating criteria. This is the "little sip" available in a dry year. This equals approximately 550,000AF at a 90 percent exceedence level. This means that 90 percent of the time it will be greater than that amount. It also means that 10 percent of the time, or 1 in 10 years, it will be at 550,000 AF or less. The SWP deliveries in wet years, when the projects need to take a "big gulp," are shown on the graph and will have greater variability between the alternatives because more water is available for export in those years and larger conveyance capacity will yield larger amounts of supply. At a 30 percent exceedence, or 3 out of 10 years, the range is between 1.0 MAF and 1.4 MAF.

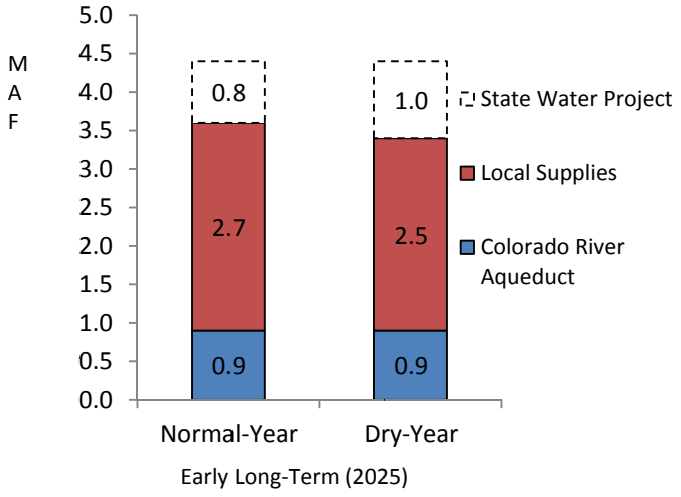
Imported water supply reliability is heavily dependent on the relationship of puts into, and takes out of storage to manage the hydrologic cycle. Storage is the balancing account that seeks to better match the variability of weather with the more static, but still variable, amount of water demand. In dry years, when demand for water typically increases, water is pulled from storage to meet that demand because core supplies have dwindled. In wet years, demand is suppressed and core water supplies are more abundant and can be placed into storage. As discussed above, MWD's approach to dry year reliability is heavily dependent on using variable supplies from storage to meet increased member agency demand for imported water. That demand for imported water is directly related to member agency local supplies that would be available in a dry year.

Determining MWD Regional Demands and Local Supplies

Staff utilized regional water demand[6] projections and proposed local supply numbers from MWD's 2010 Regional Urban Water Management Plan (RUWMP), but also included additional local supplies that were contained in MWD member agencies' UWMPs, but not in MWD's plan, that would meet the Water Authority's criteria of what would constitute verifiable projects. The adjustment also included the discrepancies of the Los Angeles Aqueduct yield reported between MWD's RUWMP and Los Angeles Department of Water and Power's UWMP. The additional projects that MWD excluded from its RUWMP, but which would meet the Water Authority's criteria for verifiable projects, were quantified in a December 2011 report prepared by Gordon Hess and Associates, Inc., (GHA) and total 165,000 AF in a normal water year and 136,886AF[7] in a dry-year. MWD's and the MWD member agencies' Urban Water Management Plans identified dozens of additional potential local water supply projects that may or may not be developed in the 25-year planning horizon of their 2010 plans. In all, these agencies' plans identified a much greater amount of potential local supply development in MWD's service area, than the amount identified in the GHA report. However, only those projects that meet the Water Authority's criteria of verifiable were factored into this memo's analysis.

Figure 4 shows MWD's estimated Colorado River supplies, MWD member agencies local projects (which include the Water Authority Colorado River transfers) and the estimated SWP deliveries required to meet projected regional demands in a normal and dry-year. If SWP deliveries to MWD are less than the amount shown in *Figure 4*, MWD would need storage and short-term transfer supplies to meet demands. The estimated SWP deliveries assume that MWD and its member agencies develop verifiable supplies as planned, along with achievement of water conservation targets. There are always uncertainties and risks in implementation of either imported or local resource projects. If they are not developed as planned, there could be a shortfall between demand and available local and imported supplies.

Figure 4: Normal and Dry-Year Scenarios - Required SWP Yield to meet Regional Demands w/o Storage or Short-Term Transfer Supplies



[6] The regional demand projections included in MWD's RUWMP were based on the most recent SCAG and SANDAG growth forecasts available at that time. Since then the forecasts have been updated showing lower growth, which in turn lowers projected demands. The regional demand projections also include member agencies' replenishment demands of about 104 TAF on MWD. MWD currently does not provide discounted replenishment water rates, which may modify member agencies' replenishment demands on MWD. This analysis does not adjust potential MWD demand changes as a result of MWD's lack of published discounted replenishment water rates.

[7] The variation between the two numbers is largely attributed to LADWP's LAA supplies. For example, MWD's RUWMP under-reported LADWP's LAA supplies in 2025 by 22TAF if the year turns out to be "normal," but over-reported the same supply by 18.3TAF if it turned out to be a "single dry-year."

Frequency of Storage Takes and Puts

As mentioned above, MWD's approach to resources reliability planning combines the use of core water supplies and flexible supplies to meet existing and projected demands. The flexible supplies generally consist of short-term transfers and storage supplies. With the construction of Diamond Valley Lake and development of Central Valley groundwater storage programs, MWD's storage supplies are the predominant flexible resource and the focus of this analysis.

Based on *Figure 4* and the modeling performed for BDCP Chapter 9, as shown in *Figure 3*, the frequency of MWD receiving less SWP water than required to meet normal year demand is approximately 20% of the time or 2 out of 10 years for the BDCP Proposed Action and the two alternatives with north Delta conveyance. It is approximately 3 out of 10 years for the existing conveyance system. In other words, 2-3 years out of 10 core supplies from SWP deliveries would not be sufficient to meet a normal demand of 1.7 MAF[8] in the MWD service area. When core supplies are not sufficient to meet member agency demand, MWD must rely on its storage reserves and/or dry-year transfers to either reduce or eliminate shortages. As noted above in *Figure 4*, in dry years MWD's draw on storage increases as local supplies decrease and demands can increase.

Table 3: MWD Puts to Storage > =250 TAF	
Alternative	**Frequency**
Proposed Action (9,000cfs)	7 out of 10 years
6,000 cfs	6 out of 10 years
3,000 cfs	5 out of 10 years
Existing Conveyance	3 out of 10 years

Because imported water supplies work in tandem with MWD storage and the frequency and magnitude of takes from storage have increased with restrictions on Delta exports, the relationship between puts and takes from storage and imported supply reliability has only increased in importance. The focus on reliability improvements in SWP deliveries is therefore not on the yield that can be expected in a dry year (as noted above it is comparable for all alternatives) but how storage can be replenished in the normal and wet years, the "Big Gulp." Over the 10-year period of 2001-2010, MWD was able to take between 1.5 MAF and 1.7 MAF in wet years to meet demands and replenish storage[9]. Based on the modeling performed for BDCP Chapter 9, as shown in *Figure 3*, the frequency of MWD being able to get this amount of water from the SWP is shown for each alternative in *Table 2*.

Table 2: Approximate Frequency of 1.5 MAF of SWP Deliveries to MWD (Wet-Year "Big Gulp")	
Alternative	**Frequency**
Proposed Action (9,000cfs)	30% (3 out of 10 years)
6,000 cfs	20% (2 out of 10 years)
3,000 cfs	10% (1 out of 10 years)
Existing Conveyance	1% (1 out of 100 years)

[8] The 1.7 MAF of MWD demands excludes the Water Authority's QSA transfers. The transfers are included in the local projects number in *Figure 4*. The numbers have also been rounded in the figures.

[9] MWD's lack of proper rates to correctly allocate costs associated with dry-year resources (water and facility needed to store and convey water) to those who cause the costs is one of the issues that is a component of the Water Authority's rate litigation and is not addressed here.

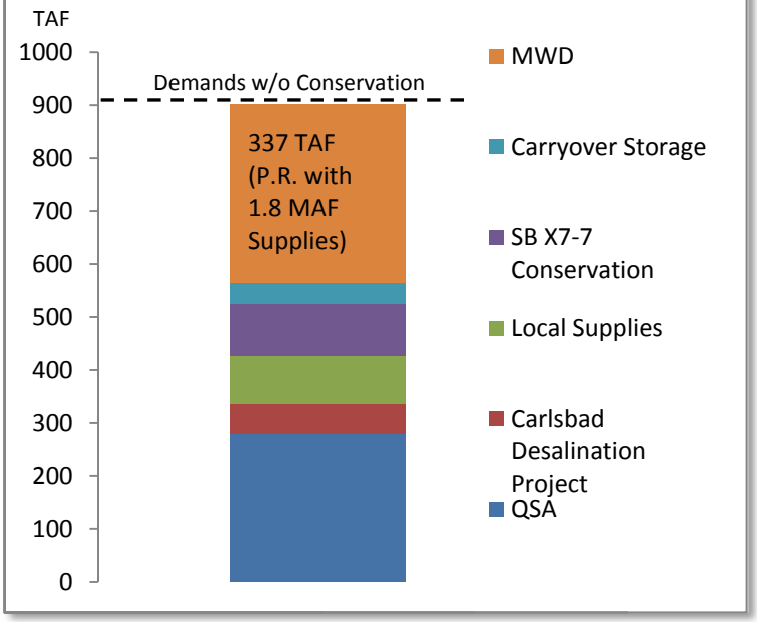
Prior to Judge Wanger's 2007 decision, MWD estimated takes from storage at 3 out of 10 years, which roughly translated into potential puts into storage 7 out of 10 years. Immediately post-Wanger's decision, the estimate of puts to storage changed to 3 out of 10 years and substantially increased the risk that storage supplies may not be available to assist in meeting demands in dry-years. This ratio has improved recently due to improved understanding of Delta pumping restrictions and MWD member agencies' reduced demand on MWD; nonetheless, to optimize SWP yields, MWD will rely mostly on storage to make up the difference. Based on the modeling performed for BDCP Chapter 9, the frequency of MWD being able to meet normal-year demands and put approximately 250,000 AF of SWP supplies in storage for each alternative is shown in *Table 3*.

One of the Board's water reliability policy principles, states that a BDCP solution should, *"Improve the ability of water-users to divert water from the Delta during wet periods, when impacts on fish ecosystem are lower and water quality is higher."* In evaluating the magnitude of puts to storage in *Table 2* and the frequency of puts to storage in *Table 3*, a more complete picture is available of each alternative on how they address that principle. This demonstrates that all alternatives with north Delta conveyance provide a more reliable yield, overall, that is available to put into storage than the existing conveyance. Although each alternative with north delta conveyance outperforms the existing conveyance, the question of which one best correlates to demand is subject to how MWD operates its storage, the magnitude and duration of shortages and how much water is required to be placed into storage. *Tables 2 and 3* illustrate that the larger conveyance capacity alternatives provide the ability to more frequently place water into storage.

<u>Reliability Analysis of Water Authority Projected Water Resource Mix</u>

The Water Authority's Bay-Delta Policy Principles states that the Delta solution should *"…provide San Diego County with a reliable, high-quality supply of affordable, imported water consistent with the Water Authority's Urban Water Management Plan."* The first step in this analysis is to determine the MWD imported water supplies available to meet demands in a dry-year scenario.[10] Consistent with the Water Authority's 2010 UWMP scenario planning process, under this dry-year scenario MWD would be allocating supplies based on preferential rights. Currently MWD allocates supplies through its Water

Figure 5: 2010 UWMP Scenario Planning - 2030 Dry-Year with Demands met under MWD Allocations



[10] This analysis only addresses supply reliability on its own. A separate analysis will be conducted by staff to evaluate the affordability and cost/benefit of improvements in reliability. Affordability of a Bay-Delta fix is an important Policy Principle adopted by the Board and will be the subject of a future Imported Water Committee meeting.

Supply Allocation Plan, but because it is uncertain in the future how MWD will allocate supplies, the analysis assumes allocation based on MWD Act Section 135, Preferential Right to Purchase Water.

Based on the 2010 UWMP scenario planning process (Scenario 1, Figure 10-2), if MWD has 1.8 MAF of core and variable dry-year supplies in 2030, then the Water Authority's preferential right allocation would be approximately 337,000AF and demands would be met. As shown in *Figure 5*, this assumes implementation of the Water Authority and member agencies verifiable supplies and use of Water Authority carryover storage supplies as identified in the 2010 UWMP.

In a dry-year, MWD's estimated core supplies available are assumed to consist of approximately 900,000 AF of Colorado River water (excluding the Water Authority's QSA supplies) and 550,000 of SWP supplies, based on the data from *Figure 3*. The remainder of available MWD supplies must come from storage or dry-year transfers. Based on needing to have at least 1.8 MAF to allocate under preferential rights for the Water Authority to meet demands, approximately 350,000 AF or more would need to come from storage (or dry-year transfers, or a mix of both) each year of a dry-year period. Having to take this amount of storage supplies annually over a number of years, similar to the last 2007-2011 shortage period, without adequate puts to storage, could lead to shortages. This highlights the importance to the Water Authority and other MWD member agencies that MWD has the ability to store adequate supplies during wet periods in order to have stored supplies available during dry-periods.

Based on the "big gulp, little sip" analysis and *Table 2 and 3* above, compared to existing conveyance system, a north Delta diversion conveyance facility improves the ability to provide MWD the wet-year supplies to put into its storage for use during dry-periods. This is consistent with the Water Authority's Delta policy principles. Regarding the size of the facility, the larger 9,000 cfs facility provides more opportunities to put SWP supplies into storage.

Other ways to reduce the amount of water needed from MWD during a dry year is for member agencies to improve water use efficiency and to develop additional core local supplies, such as water recycling and desalinated water. The Water Authority's Bay-Delta Policy Principles directly address the issue that a Delta solution should " *…[e]ncourage a Bay Delta solution that acknowledges, integrates and supports the development of water resources at the local level including water use efficiency, seawater and brackish water desalination, groundwater storage and conjunctive use, and recycled water including direct and indirect potable reuse.*" More local supply development will reduce the amount of water MWD must draw from storage or acquire through dry-year transfers to meet dry year demands. The NRDC Portfolio and DVF Plus proposals incorporate local supply development as a way to lessen the need for increased yield from Delta exports. Additionally, both NRDC Portfolio and DVF Plus proposals recommended outside-the-Delta storage as a means to increase yield while building smaller-capacity conveyance. An analysis that considers these other elements will be conducted by staff and presented to the Board in early 2014.

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Prepared and Reviewed by: Ken Weinberg, Director of Water Resources
Reviewed by: Glenn A. Farrel, Government Relations Manager
Approved by: Dennis A. Cushman, Assistant General Manager