



**SPECIAL MEETING**  
**IMPORTED WATER COMMITTEE**

**Board Room**

**JANUARY 9, 2014**

**3:30 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. Presentation on Bay-Delta Conservation Plan – Infrastructure Review. (Discussion) Bill Rose/  
Gary Bousquet
2. Bay-Delta Conservation Plan Supply and Demand Risk Assessment. (Discussion) Ken Weinberg

**III. INFORMATION**

**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.



January 2, 2014

**Attention: Imported Water Committee**

**Bay Delta Conservation Plan Supply and Demand Risk Assessment (Discussion)**

**Purpose**

The purpose of this memo is to evaluate the four proposed approaches to a Bay-Delta fix that staff has been analyzing from the perspective of the relative risk of each option achieving the water supply reliability and diversification goals identified in the Water Authority's 2010 Urban Water Management Plan (UWMP).

**Background**

Over the past several months, staff has been providing the Imported Water Committee (Committee) with background information and analysis on the Bay Delta Conservation Plan (BDCP) Proposed Action and other Delta solutions being proposed by stakeholders to meet the co-equal goals of water supply reliability and Delta ecosystem restoration. The Water Authority has not endorsed a preferred solution to fixing the Delta, but is conducting an independent evaluation to more thoroughly understand the options and the supply reliability risks to the San Diego region with each option. In addition to the reliability risk, staff will also be providing the Board an analysis on the costs and financing risks of the proposals at future Board meetings.

The information previously used in the staff evaluation was primarily from the administrative drafts of the BDCP and Environmental Impact Report/Environmental Impact Statement (EIR/EIS). On December 13, 2013, public review drafts of these two documents were officially released, with a 120-day comment period. The projected export yields of the conveyance alternatives included in the public review draft are the same as the modeled results in the administrative draft documents. Staff is currently evaluating these documents and will discuss any substantive changes from the administrative drafts with the Board in February.

The staff evaluation of the BDCP has been a comparative analysis of proposals to address water supply reliability for water agencies dependent on Bay-Delta supply exports. These options 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) Natural Resource Defense Council (NRDC) Portfolio proposal (3,000 cfs conveyance)<sup>1</sup>
- 4) Delta Vision Foundation (DVF) BDCP Plus proposal (6,000 cfs conveyance)<sup>2</sup>

As part of the BDCP supply and demand comparative reliability analyses, staff is evaluating the

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<sup>1</sup> 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.

<sup>2</sup> 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.

proposals in context of the Board's February 2012 Delta Policy Principles that pertain to water supply reliability. While there are several policies related to supply reliability, financing and other topics, the guiding statement contained in the document is that: *"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 last report to the Committee on BDCP water supply reliability was provided at the November 14, 2013 Special Committee meeting. At that meeting, staff presented a reliability analysis on projected Metropolitan Water District (MWD) State Water Project (SWP) deliveries and the Water Authority's 2010 Urban Water Management Plan (2010 UWMP) projected water resources mix. The analysis was conducted in the context of the Board's policy principle 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."*

As discussed at the November 14 Committee meeting, the reliability of SWP supplies in a dry-year is associated not only with the amount of deliveries from the project, but more importantly the capability and willingness of the exporters to store the SWP supplies that are made available during wet-years for use in the dry-years. This is often termed the "big gulp, little sip" approach to supply reliability. Key to having storage reserves available in dry-years, when SWP deliveries are reduced ("little sip"), is the ability and willingness to take excess SWP supplies when available in wet years ("big gulp"). Storage facilities, such as the joint state and federal storage at San Luis Reservoir, Central Valley groundwater banks, MWD's Diamond Valley Lake and Water Authority's San Vicente Carryover Storage Program, are designed for such purposes.

Based on the "big gulp, little sip" analysis presented at the November 14 Committee meeting, a north Delta diversion conveyance facility, compared to the existing conveyance system, improves the ability of MWD's service area to take delivery of wet-year SWP supplies to put into storage for use during dry-periods. A key finding from the "big gulp, little sip" analysis is that assuming that the water supply is available, the greater the facility size or "getaway" capacity of the diversion, the greater the quantity of water that may be placed into storage more frequently (if adequate storage is available) for use in meeting dry-year reliability. Since the 1990s, MWD has implemented projects and programs and now has access to nearly 6 million acre-feet (MAF) of storage capacity. Like other water systems, MWD's storage is limited to the take and put capacity of individual storage programs. MWD's service area also enjoys access to vast groundwater basins, which can also be used conjunctively to take advantage of the excess wet-year SWP supplies if the operators of those basins choose to purchase and store that water. As noted at the November 14 Committee meeting, MWD's approach to dry year reliability relies predominantly on supplementing its core Colorado River and SWP supplies with stored water and to a lesser extent spot water transfers. The ability to store SWP water in wet years for use in dry years is critical to that strategy.

The Water Authority’s ability to put water in storage for the additional 200,000 acre feet of capacity available to the region with completion of the Emergency Storage Program/Carryover Storage Program (ESP/CSP) is also reliant on imported water supply availability during wet and average weather years. Because it has the largest getaway capacity of the four proposals, the larger 9,000 cfs facility provides more opportunities to quickly convey SWP supplies into storage. The more water in storage and the more frequently water taken out of storage can be replaced, the less the risk to dry-year reliability.

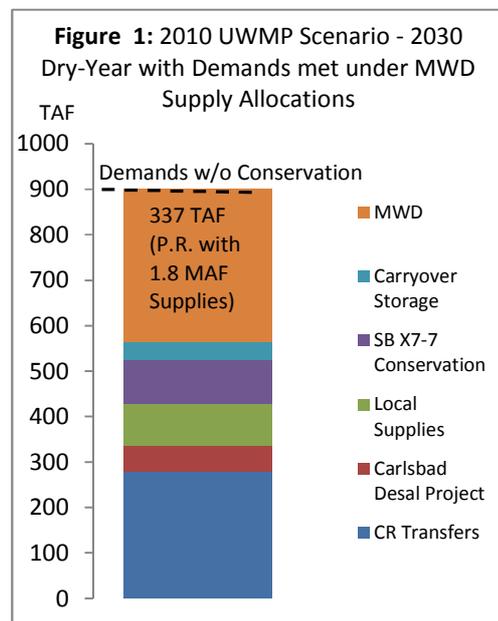
Figure 1 shows the supply reliability of the Water Authority’s 2010 UWMP projected water resource mix in the dry-year scenario from the 2010 UWMP scenario planning process. In this multiple dry-year scenario, if MWD has 1.8 MAF of core and flexible dry-year supplies in 2030, then the Water Authority’s preferential right allocation would be approximately 337,000 AF and demands would be met. The more water MWD has in storage, the less risk of there not being 1.8 MAF of available MWD supplies. This is especially true during multi-year droughts and shortages.

As presented at the November 14 meeting, Table 1 shows the approximate amount of flexible dry-year supplies MWD would require in this scenario to have 1.8 MAF of supplies to allocate. The flexible supplies consist of predominantly storage supplies supplemented by short-term transfers. During multi-year droughts and shortages, the availability of these flexible supplies would be critical to reliability.

**Discussion**

While previous reports to the Committee have focused on the reliability of imported supplies from the BDCP alternatives, this report brings in an evaluation of new local projects and potential south of Delta storage. Both the NRDC and DVF proposals advocate for a smaller north Delta conveyance capacity and rely on a combination of south of Delta storage and new local supplies to make up the difference in Delta exports.

Although this memo evaluates the supply risk and benefits of the different alternatives, it does not take into account the cost of implementation or the financial impacts of the alternatives on the Water Authority and its member agencies. The amount of water produced by an alternative



**Table 1: Estimated Amount of MWD Dry-Year Supplies Needed to Allocate 1.8 MAF**

	Supplies (AF)
MWD Total Dry-Year Supplies	1,800,000
Projected MWD Core Supplies	1,450,000
Colorado River Aqueduct <sup>1</sup>	900,000
Estimated SWP	550,000
MWD Flexible (Dry-Year Supplies)	350,000

<sup>1</sup>Excludes Water Authority’s Colorado River transfers

should not be the sole factor in determining whether that alternative should be endorsed. Once water supply benefits and risks are identified staff will conduct the economic and financial analysis critical to determining whether the cost of any of the Delta fix alternatives is beneficial to the Water Authority.

Improvement in SWP reliability through implementation of the BDCP is a function of successful habitat restoration along with the ability to export water under a stable regulatory environment. There are two questions being addressed in this analysis. First, can overall water reliability for recipients of SWP water, including the Water Authority, be improved to an equivalent or higher level than the BDCP proposed action through the addition of new local supplies and south of Delta storage? Secondly, what are the risks to the Water Authority and other users of SWP water in relying on any of these strategies to improve water supply reliability?

#### Identifying Supply and Demand Risk

In evaluating the risk associated with a Delta fix and the likelihood of the Water Authority achieving its UWMP reliability and diversification goals, a first step is to examine and compare each proposal and its corresponding supply components. In the context of this analysis, it is typical to compare alternatives using the following generalized risks:

- *Permitting Risk*-- A proposal's ability to obtain the major permits to construct and operate all components necessary to provide water supply
- *Schedule Risk*-- The probability that a proposal does not increase the likelihood of supply shortages by 2025-2030 as identified in the Draft Regional Water Facilities Optimization and Master Plan Update (November 2013)
- *Implementation Risk*-- The complexity and difficulty of physically, institutionally, legally, financially and politically implementing the supply and environmental components of a proposal
- *Supply Risk*-- The likelihood of a proposal, if implemented, achieving the desired yield of water supply
- *Demand Risk*-- The likelihood that there is insufficient demand to take the yield identified in each proposal

The NRDC and the DVF options have been proposed by proponents to be evaluated as a stand-alone alternative in the BDCP process, including the CEQA/NEPA analyses. As discussed at length in previous Committee meetings, the BDCP is an Endangered Species Act permitting process under the state and federal Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) laws. It is unclear if the NRDC and DVF are proposing that all components of their proposals be comprehensively evaluated under a single environmental document and permitted through the NCCP/HCP process. An assessment as to how best to complete the environmental process on the various components included in the NRDC and DVF proposals would be necessary and would take a significant amount of time to complete.

Although both the NRDC and DVF proposals have been offered as alternatives to the Proposed Action in the formal BDCP process, they also represent an effort to have a broader, more integrated approach to producing water supply for the state by adding storage and local supply

projects to the discussion. For purposes of this analysis, staff believes the best approach to assessing risk of these additional supply components is to evaluate development of additional local supplies from the perspective of the Water Authority and its member agencies, rather than relying on enhanced local supply development statewide. This perspective acknowledges that it is more risky for the Water Authority to rely on other MWD member agencies or other water agencies across the state to develop local supplies that would reduce dependence on SWP deliveries. In addition, the NRDC and DVF proposals do not specifically identify the local projects to be developed. While water agencies throughout the state have identified potential local projects in their UWMPs, there are no commitments contained in the plans to implement these projects. Likewise, while state and federal water contractors have committed approximately \$250 million to date on the BDCP planning effort, none has made any commitments to fund construction of any of the BDCP project alternatives.

Table 2 provides examples of potential additional planned projects within the Water Authority’s service area based on yields in the 2010 UWMP, with updated numbers for the City of San Diego and Otay Water District proposed projects. Developing these additional planned projects will potentially reduce the region’s dependence on SWP exports and specifically MWD’s stored water during dry periods.

<b>Table 2: Examples of Potential Supply Strategies to Manage Uncertainty Scenarios (2030)</b>	
<b>Potential Strategy</b>	<b>Minimum Estimated Yield (AF)</b>
<b>Member Agency Potential Additional Planned Local Projects<sup>1</sup></b>	
Additional Planned Recycled Water and Brackish Groundwater	14,000
City of San Diego Indirect Potable Reuse <sup>2</sup>	34,000
Otay Water District Rosarito Beach Desalination Project <sup>3</sup>	<u>20,000</u>
Total Member Agency Additional Planned	68,000
<b>Water Authority Potential Strategies</b>	
Potential Regional Seawater Desalination Facility (Camp Pendleton)	<u>56,000-165,000</u>
Total Estimated Yield from Potential Strategies	<b>124,000 -233,000</b>
<sup>1</sup> The estimated yields from the additional planned local supply projects are from the member agencies and the development and implementation of these supplies rests with the member agencies. <sup>2</sup> Estimated yield for potential potable reuse project derived from the City of San Diego’s 2012 Long-Range Water Resources Plan. The figure doesn’t include Phase 3, Harbor Drive Facility, which if built would be beyond 2030. (Phase 3 is an additional estimated 56,000 acre-feet) <sup>3</sup> Estimated yield for a potential seawater desalination project in Rosarito Beach is from Otay’s 2010 UWMP and is identified as a conceptual project in its plan.	

In regard to evaluating risks associated with south of Delta storage, because of the lack of specific proposals in the NRDC and DVF options, staff will address storage in a general way with specific emphasis on how much benefit new storage can provide in enhancing the yield of Delta exports.

Based on the results of the reliability analyses presented at the September 26 and November 14 Committee meetings, the existing conveyance option was not incorporated into this risk analysis. It was clear from the staff analysis of BDCP documents and discussions with BDCP technical

staff that the existing through-Delta conveyance on its own does not meet the Board's Policy Principles on water supply reliability, primarily due to exports continuing to be made solely through the south Delta diversion point. The existing conveyance option does not provide regulatory certainty and predictable supplies, is unable to improve the ability to divert water from the Delta during wet periods, and fundamentally does not achieve the co-equal goals of water supply reliability and ecosystem restoration.

**Permitting Risks.** Obtaining the major permits to construct and operate water supply facilities is a critical element for any of the options to be developed. These include, but are not limited to: CEQA and NEPA compliance, federal and state Endangered Species Act (ESA), Clean Water Act and state water quality law. As noted previously and discussed in detail at the September 26 Committee meeting, the BDCP is an effective permitting process because the regulatory agencies that issue ESA permits are involved and developing the science-based criteria that would allow permits to be issued.

In an April 2012 "Staff Red Flag Issues" memo, permitting agencies identified a significant number of items that would need to be addressed for them to consider approval of the BDCP as a NCCP/HCP. An April 2013 follow up memo from the US Fish & Wildlife Service (USFWS), in coordination with other resource agencies, assessed the progress of the state's response to the April 2012 Red Flag memo. In that memo, USFWS acknowledges the "very significant improvements and progress that have been made over the past year." It specifically cited the reduction in the number of intakes associated with the proposed 9,000 cfs conveyance, rather than 15,000 cfs, and the changes to high outflow operating criteria as "critically important to providing for covered species." They also note that the BDCP Administrative Draft is not perfect, "but in general the goals and objectives articulated in the plan are conceptually sound and appropriate for an HCP of this magnitude and duration." It also stated they (the fishery agencies) "will continue to work collaboratively with all parties towards timely completion of this ambitious plan."

Because the federal and state permitting agencies are involved in the development of the BDCP, and specifically the formulation of the Decision-Tree process, operating criteria and the identification of required habitat restoration, there is a likelihood of permit issuance if the process is completed. The main reason the NCCP/HCP process was selected is that it provided the best path for an acceptable long-term and stable outcome. Although ESA permitting is addressed through the current BDCP process, permits to be issued by the State Water Resources Control Board (SWRCB) and other regulatory agencies, and the conditions they will impose, is not yet known. However a path to permitting is clear since the major environmental issues will be addressed in the environmental documentation.

In evaluating the permitting risks associated with the NRDC and DVF proposals, it is necessary to separate the components into in-Delta and outside-of-Delta. In general, the in-Delta components are a north Delta diversion and the habitat restoration requirements. In respect to conveyance, the smaller conveyance capacities would have similar permitting risk as the BDCP Proposed Action. In regard to meeting the habitat restoration requirements outlined in the BDCP documents, the NRDC Portfolio concept proposes a much smaller amount of acreage and a very

different approach to restoration in the BDCP. The NRDC proposes 40,000 acres of habitat restoration, while the DVF option did not provide a specific habitat restoration acreage amount. When compared with the 153,000 acres in the BDCP Proposed Action, which was developed in coordination with the permitting agencies, it is unclear if the NRDC (or DVF) approach will satisfy the habitat restoration requirements that would allow issuance of the NCCP/HCP permits. As discussed in detail at the September 26 Committee meeting, the majority of habitat restoration is specifically designed to “contribute to species recovery” and is independent of the impacts associated with north Delta diversion. Accepting the NRDC approach to restoration and species recovery would require a major shift in approach by the wildlife agencies.

The BDCP Proposed Action does not include any additional storage and therefore the permitting risk analysis of storage related to this option was not considered. There have been numerous studies by state and federal agencies on potential storage south of the Delta. A path to permitting would be clear for any storage project and large surface water storage projects have been permitted by the Water Authority, Contra Costa Water District, and MWD. Because no specific sites were identified in either the NRDC or DVF alternatives, staff is unable to make a more specific evaluation and will address the addition of storage in more detail in the supply risk section.

As discussed above, the most meaningful assessment of the ability to better integrate local supplies and offset the need for higher Delta exports is from a regional perspective, that is, the local projects that the Water Authority or its member agencies can control. Relying on others in the state to improve San Diego County’s reliability is an inherently more risky strategy simply because the number and types of permits are greatly increased due to the additional local facilities statewide that would need to be built. Each local supply project requires environmental review and different permits. However, the projects under consideration in San Diego County are in a state of planning and development where they are defined to the point where permitting can be contemplated. Water recycling, seawater desalination and indirect potable reuse are supply projects that have either been permitted or are in the process of developing permit conditions so that permissibility is considered achievable. However, for those projects being contemplated in the Water Authority’s service area, ESA related issues are not considered to be of the same complexity as the BDCP. Therefore, it is expected that ESA permitting would not be as difficult to obtain.

**Schedule Risks.** Population and economic growth are forecast to increase throughout California and within the San Diego region. As noted at the November 14 Committee meeting, a 2012 survey of California Urban Water Agencies (CUWA) members showed significant increases in local supply development, conservation, and transfers to make up for growing demands, along with a continued reliance on imported supplies as a core source of supply, with the projected volume required to remain at about the same level in 2030 as it was in 1990. Demand growth is a main driver for additional supplies statewide and within the Water Authority’s service area. The Water Authority’s Draft Regional Water Facilities Optimization and Master Plan Update (November 2013) noted the possibility of increasing supply shortages beginning in 2025 that would be exacerbated with less imported water availability.

Schedule risk is apparent in all the options and each has the potential to slip beyond 2025. For the BDCP Proposed Action or any of the conveyance options selected, litigation poses perhaps the greatest challenge to maintaining the schedule as well as the scope of the construction contemplated. For the additional local supply components in San Diego county, projects are still at the planning stage and the challenges and constraints associated with planning, developing, and permitting specific local supply projects can often delay implementation. The experience of the Carlsbad Desalination Project is one example of an extensive permitting process taking years to complete. The scheduling risk in regard to the north Delta conveyance component may be comparable for all the alternative conveyance options, although completion of a single 3,000 cfs tunnel would require less construction time than the dual-tunnel alternatives. Advancement of local supply components in San Diego County would mean greater local control over schedule risk. However, schedule risk for planned projects remains an issue since the implementation process has not been initiated and many remain at a feasibility level of analysis.

**Implementation Risks.** Development of supply and storage projects is a complex process with numerous steps that must be accomplished and constraints satisfied. These items include, but are not limited to, feasibility evaluation, design, permitting, financing, construction, along with overcoming political, legal and institutional issues. Because of the inclusion of both additional storage and local supply projects, the overall implementation of the NRDC and DVF proposals may generate more implementation risk due to the potential obstacles that would need to be overcome with each specific local supply and storage project. The greater the number of local supply projects, even from the perspective of the Water Authority's service area implementing its own local projects, the greater the risk of failure to fully implement, but also may produce greater reliability through additional supply diversification.

In regard to comparing implementation of the north Delta conveyance options, a smaller conveyance facility would cost less and be more politically acceptable to in-Delta users and some other stakeholders; however, due to the reduced yield in wet-years and increased supply reliability risk with a smaller north Delta conveyance, it may be less politically acceptable to project exporters that have cost responsibility. As noted in the evaluation of permitting risk, the ultimate yield of any north Delta conveyance is predicated on the success of habitat restoration contributing to species recovery. Habitat restoration to meet BDCP biological objectives is a large and complex undertaking. Although a tremendous amount of science has gone into the BDCP analysis, there remains an element of uncertainty as to how successful the restoration efforts will be in contributing to species recovery and allowing the achievement of the expected supply yields. That uncertainty is equal for all BDCP conveyance alternatives.

There still remains significant financing issues around who and how much each BDCP participant will pay for the new conveyance and the longevity of those commitments, even at this late date in the process. The NRDC proposal suggests that the cost savings from smaller conveyance and habitat restoration can be utilized by local agencies to invest in local supply and storage development. From the perspective of the Water Authority, this would entail cost savings through a potentially lower price of MWD water that could be used to develop new local supplies beyond what is currently contemplated in the 2010 UWMP. NRDC also identifies IRWM grants as a funding source. Reliance on state grant funds for implementing local supply projects is a function of the passage of statewide

bond measures, which has an element of risk. Whether the savings from lower cost for conveyance equates to the cost of local supplies will be addressed in a subsequent analysis by Water Authority staff. How responsibility for new costs for south of Delta storage would be distributed among the stakeholders is also unknown, although NRDC proposed a combination of exporters and local supply agencies. For purposes of this analysis, funding uncertainty is a key implementation risk for all alternatives.

**Supply Risks.** There are two elements associated with analyzing supply risks. The first pertains to the expected imported supply reliability from the differing north Delta conveyance capacities included in the proposals. The analysis presented at the September 26 Committee meeting focused on comparing the reliability of imported SWP supplies and discussed how the 9,000 cfs and 6,000 cfs BDCP alternatives, with larger conveyance capacities, provide greater SWP yield in wet and average weather years. This additional yield is critical in wet periods in order to adequately replenish storage for use in dry-periods. In addition, the BDCP alternatives that divert a greater portion of deliveries north of the Delta through a conveyance facility could provide better overall water quality in normal and wet periods in terms of salinity and other constituents. As summarized at the September 26 meeting, BDCP alternatives that rely primarily on south Delta diversions result in more supply risks in regard to further reductions in south Delta diversions due to potential additional fish protection measures and potential Delta levee failures that could jeopardize Delta water quality and limit future south Delta diversions.

For each of the conveyance alternatives, there are uncertainties and supply risks associated with the initial yield from the project due to reliance on a Decision-Tree Process to set the initial operating criteria. The starting operating yield is estimated to be between 4.7 and 5.6 MAF. The outcome of the Decision-Tree Process and selection of the starting operating yield will be based on data to be developed prior to initial operations of new conveyance. After the initial start of operation, the Decision-Tree Process will end and an adaptive management program will be initiated. Under the adaptive management program, the conservation measures may be modified or adjusted to achieve the biological objectives. This could include adjustments to water operations criteria established under *CM1 Water Facilities and Operation*, which could reduce or increase the export yield. BDCP Section 3.4.23, added to the public review draft, outlines the potential resources available to support an adaptive management change to CM1 that could lessen or eliminate any water supply impact. Six sources of resources are identified and prioritized in the BDCP with the first being inter-annual adjustments in water facility operations and the last through a supplemental adaptive management fund. If, for example, additional outflow was determined necessary, supplemental water could be acquired from voluntary sellers to meet this requirement through the supplemental adaptive management fund. The BDCP states that funding for these supplemental environmental water purchases would be jointly provided by the state and federal governments and certain SWP/CVP contractors.

Operationally comparing the supply risk of the in-Delta components of the NRDC, DVF, and BDCP proposed action, the single conveyance tunnel would, by definition, be less reliable than a dual tunnel project simply because of the redundancy benefits of two tunnels for operational purposes. During shutdowns for maintenance or operational issues, taking the single tunnel out of service will temporarily require increased dependence on the existing, less reliable south Delta conveyance. The reliability benefits of redundancy have to be balanced with the cost of that

redundancy and the potential economic and other impacts of not having a redundant system at the source of supply

*Figure 1* on page 3, shows the scenario where the region’s resource mix is able to meet demands even under supply allocations from MWD. This assumes MWD has both core and flexible dry-year supplies to allocate under preferential rights and the Water Authority has utilized its own carry-over supplies. As mentioned previously, dry-year SWP reliability is based not only on the amount of deliveries, but also the SWP supplies that have been stored in wet-years and are now available in dry-years.

In this analysis, it is not possible to estimate how much water MWD has stored at the beginning of an extended dry period or how much water it takes out of storage during a shortage to help meet demand. That would require knowledge and modeling of MWD storage operations beyond the scope of this analysis. In evaluating supply risk and reliability, the frequency and magnitude of puts to storage during wet and average years equate to the likelihood of sufficient supplies being available and therefore less supply risk. As noted at the November 14 Committee meeting, the larger capacity north Delta conveyance has greater opportunity to quickly put larger water amounts into storage for use in dry years and more opportunities to replace the stored water after it is used. Therefore, of those options that incorporate a north Delta conveyance, the largest conveyance capacity (9,000 cfs)

poses the least risk to imported water dry-year reliability and the smallest capacity (3,000cfs) poses the greatest risk simply because MWD and the Water Authority would not be able to put large volumes of water into storage as frequently. The

<b>Alternative</b>	<b>Frequency</b>
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)

existing conveyance would have the greatest supply risk. *Table 3* summarizes the frequency of large deliveries of SWP water to storage for each of the BDCP conveyance alternatives.

Mitigating Supply Risk through New Local Supplies

The second element to analyze is whether the lesser amount of yield associated with a smaller north Delta conveyance facility can be supplemented by new local supply and storage projects to maintain the same level of reliability as the BDCP Proposed Action. If a 3,000 cfs single tunnel conveyance facility is implemented consistent with the NRDC proposal, the Water Authority and its member agencies can improve supply reliability by developing additional local projects in San Diego County. Additional core supply local projects would reduce dependence on MWD supplies and SWP exports in all years.

The smaller 3,000 cfs Delta conveyance facility in the NRDC proposal would limit wet-year deliveries to replenish MWD storage compared with the BDCP Proposed Action. Most importantly, additional local supplies in San Diego county decrease reliance on MWD’s stored water in dry or shortage years and offset the lost yield due to the smaller conveyance options. Consistent with the 2010 UWMP, these replacement supplies could come from additional planned projects being considered by the Water Authority or member agencies, and can be considered potential risk

mitigation strategies. As shown in Table 2 on page 5, these include potential planned projects such as the Water Authority's Camp Pendleton seawater desalination facility and City of San Diego's potable reuse facilities. The total potential yield is estimated to be between 124,000 and 233,000 AF. This analysis shows that there are additional local projects that could potentially be developed by the Water Authority and its member agencies to offset reduced SWP supplies from MWD in multiple dry-year scenarios under the lower conveyance capacities in the NRDC and DVF proposals. Where the Water Authority's 2010 UWMP contemplated MWD having 1.8 MAF in available dry year supplies to meet Water Authority demand, the development of additional local supplies within San Diego County would require a lesser amount of MWD supply availability. It should be noted that there are substantial remaining challenges that must be overcome to implement these projects. Most of these projects are in the initial planning stages and have not completed preliminary design, environmental compliance, financing, or acquired permits. There are also institutional issues that must be resolved in working with the Federal Government on both the potential Camp Pendleton Desalination Project and Rosarito Beach Desalination Project. Those unknowns create additional risk to achieving the reliability goals stated in the UWMP.

#### Mitigating Supply Risk by Adding New South of Delta Storage

In regard to increased storage south of Delta as proposed in the NRDC and DVF proposals, the BDCP EIR/EIS includes an appendix (Appendix 1B) with a brief discussion on potential increases in total exports with a combined new Delta conveyance and south of Delta storage. By adding new reservoir storage outside the Delta, additional SWP water could be stored after environmental and contractual obligations have been met, effectively increasing the potential yield of all alternatives. Based on preliminary modeling, Appendix 1B states that the addition of 1 MAF of new south of Delta storage could increase the average total SWP and CVP Delta water exports under the Proposed Action's 9,000 cfs conveyance by approximately 150,000 acre-feet per year. The new storage could be surface storage, groundwater storage and/or re-management of existing storage. Virtually all of the increase would occur in very wet-years. It should be noted that neither the BDCP nor related EIR/EIS documents include additional storage in the proposal.

Because of the linkage between conveyance getaway capacity with SWP yield, the smaller 3,000 cfs conveyance would be significantly limited in how much more wet-weather water could be transported to storage. In other words, a 3,000 cfs conveyance is limited in how much of a big gulp it can take in a wet year. According to BDCP technical staff, preliminary computer modeling results of a hypothetical additional 1 MAF storage reservoir south of the Delta showed that the increase to the average yield for the 3,000 cfs conveyance is approximately 50,000 acre feet per year. The estimated difference in average yield between the 3,000 cfs conveyance without new storage and the proposed 9,000 cfs without new storage is a minimum 500,000 acre feet per year. The NRDC proposal would provide little additional conveyance capacity to take advantage of the very wettest years to store water if there was new available storage and new storage would do little in itself to increase the average yield and close the 500,000 acre-feet average yield gap. This result reinforces that the best way for the Water Authority to manage supply risk from reduced capacity conveyance would be to focus on local supply development in its service area.

As noted previously, Delta operating criteria is crucial to SWP yield, even in wet years. With high Delta outflow criteria requiring more water flowing out to San Francisco Bay in wet years, the

ability to store water will always be limited by how much water stays in the Delta and how much conveyance or getaway capacity is available to export the remaining water. According to BDCP technical staff, the maximum hypothetical 1 MAF of new south of Delta storage was recognition that the relationship between operating criteria (especially the high outflow criteria) and conveyance capacity limited how much additional yield could be available by adding storage. The 1 MAF in new storage was also identified in the NRDC proposal as the volume of new storage. That amount of storage supplementing dry year deliveries to both state and federal contractors would have limited reliability benefits over a multi-year drought event. Potentially, if BDCP habitat restoration efforts are successful in contributing to species recovery and the high Delta outflow requirements are lessened, south of Delta storage with greater capacities can be considered, which would, in turn provide greater dry year benefits.

**Demand Risks.** This risk refers to export yields from the BDCP alternative conveyance options and the likelihood that there is insufficient demand to take delivery of the projected yields. Insufficient demands could occur if agencies' demands on the SWP and CVP are reduced due to increased water use efficiency and local supply development.

It should be noted that state officials confirmed that projected water demands of the contractors were not the driving force behind selection of the conveyance capacities of the BDCP alternatives. Development of the conveyance capacities alternatives and operating criteria scenarios went through an extensive stakeholder-driven screening process where numerous evaluation criteria focused on improving and protecting the ecological health of the Delta while still protecting water supplies. As mentioned during previous Committee meetings, the operating criteria can matter more in determining the export yield than the size of the facility.

As discussed at the November 14 Committee meeting, the differing export yields from the conveyance options occurs in the wet and average weather years. In dry years, the deliveries are similar between the BDCP alternatives, because of minimal inflows due to dry weather and Delta export operating criteria. Therefore, any demand risk would occur primarily in average and wet periods, when agencies would generally be putting supplies into storage.

In average years, the BDCP documents show that the yield from the BDCP Proposed Action could be in the range of 4.7 to 5.6 million acre-feet (MAF). The current average export yields are 4.7 MAF. As mentioned by DWR staff, the proposed BDCP is not necessarily providing significant new water, but improving the reliability of current supplies.

BDCP EIR/EIS, Appendix 30B, Water Contractor Profiles, contains a comparison of the projected deliveries from the BDCP Proposed Action and the SWP supply targets included in the contractor's planning documents. For MWD, the comparison showed that in 2035, the average estimated deliveries from the BDCP Proposed Action would be approximately 400,000 AF less than the projected SWP supply target in MWD 2010 Regional Urban Water Management Plan (RUWMP). Staff analysis of MWD's RUWMP has shown that MWD's forecasted demands are likely lower based on updated growth forecasts, which, in turn, would lower their future SWP supply demands. In addition, an analysis performed by Gordon Hess and Associates, Inc. (GHA) showed that there are at least 165,000 AF in additional verifiable local supply projects not captured in MWD's

RUWMP that would also decrease MWD's SWP supply target. The Water Authority has shown that there is even a much greater overall potential for local supply development within the MWD service area than the 165,000 AF of verifiable supplies identified in the GHA study. That potential amount is estimated at 1 MAF and, if developed, would significantly lessen MWD's need for additional SWP supplies associated with the larger conveyance capacity. Should MWD's SWP supply target decrease in the next RUWMP update based on a drop in demand and an increase in local project development, the target could potentially be lower than the estimated BDCP Proposed Action SWP delivery amount.

If MWD demands were not sufficient to absorb delivery of the SWP yield in wet years, additional water could be placed into MWD and local agency storage, including the Water Authority's San Vicente Carryover Storage or Central Valley storage program. However, if additional local supplies are developed beyond what MWD is anticipating, as noted in the GHA study, and what the Water Authority has identified as overall local supply potential it may have a significant financial impact on the cost of imported water provided by MWD in the future.

#### Observations on Assessing Risk of Bay Delta Fixes

This risk assessment was conducted from a solely water resources perspective, focusing on water supply reliability for California and the San Diego region. A separate analysis will be conducted evaluating the costs and financial risks associated with these proposals, whether the cost equates to the benefit, and whether sufficient firm financial commitments have been obtained.

In summary, an NCCP/HCP permitting approach, such as the BDCP, is an effective permitting process. In terms of the NRDC and DVF concepts of more broadly integrating local supplies and new storage into a Delta fix strategy, at this point it would take a significant re-shaping of the BDCP effort at a substantial time and resource cost to see those options in their entirety being incorporated into the current BDCP process. An assessment as to how best to complete the environmental process on the various components included in the NRDC and DVF proposals would be necessary and take a significant amount of time to complete. There are scheduling and implementation risks inherent in all the proposals, but, in general, the more individual projects that must be implemented, the greater the risk.

As outlined in the NRDC proposal, if a smaller 3,000 cfs conveyance capacity were selected, the shortfall in expected yield would need to be offset by other supplies to more reliably meet the Water Authority's 2010 UWMP reliability goals. Overall there is greater risk to the Water Authority in relying on MWD or other water agencies statewide to develop local supplies and reduce demand for Delta exports that would offset the smaller conveyance capacities in the NRDC and DVF proposals. The Water Authority and its member agencies are better positioned to manage the risk of less Delta exports by developing local supplies on their own and reducing dependence on MWD stored water supplies. The decision on whether to pursue that course would be mostly influenced by the cost of those projects when compared to the actual costs of MWD supplies, and taking into account differing levels of supply reliability.

A key finding of this analysis is the benefits of new storage south of the Delta are constrained because there is simply not enough water to export even in wet years. The constraints of Delta

outflow operating criteria along with finite conveyance capacity limits the benefits of new south of delta storage and how much additional yield can be realized by adding new storage to any of the alternatives. The constrained size of the NRDC's proposed 3,000 cfs conveyance limits the benefit of new storage in wet years more than the other two north Delta conveyance options. Local supply development is the most effective mitigation to the risk of less than anticipated Delta exports and its effect on MWD's stored water reserves.

The next step in the staff's technical evaluation of the Delta fix solutions is to conduct a cost comparison of the proposals and the financial risks to the Water Authority.

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