



● **Board of Directors**
Water Planning and Stewardship Committee

6/8/2010 Board Meeting

9-1

Subject

Review of Storage Management Strategy Implementation

Description

This board letter describes the operating principles that currently guide the management of regional storage under varied hydrologic conditions and State Water Project pumping restrictions imposed to protect endangered and threatened fish species. The operating principles are based on the board-approved policies established in the Water Surplus and Drought Management Plan and the Water Supply Allocation Plan.

Executive Summary

The Water Surplus and Drought Management (WSDM) Plan provides policy guidance for the management of storage during periods of surplus and shortage. This plan, adopted by the Board in 1999 and in use for more than a decade, provides a framework under which Metropolitan's resource portfolio is managed. The WSDM Plan also provides a flexible framework that can be used in conjunction with other important considerations that influence storage management decisions, including operational and water quality considerations, contractual requirements for storage programs, and system reliability through the coordinated use of the multiple groundwater and surface reservoir resources in the storage portfolio. Currently, Metropolitan manages approximately 30 individual storage accounts and resources to meet delivery requirements. These storage accounts include groundwater and surface storage programs and facilities, both inside and outside of Metropolitan's service area, such as Diamond Valley Lake, Flexible Storage in Castaic Lake, storage in Lake Mead, in-basin groundwater Conjunctive Use Programs, and groundwater storage in the Central Valley.

In April 2009, the Water Supply Allocation Plan (WSAP) was approved by the Board to set a formula for allocating supplies to the member agencies during times of shortage. The major consideration in setting the WSAP level for 2010/11 is the amount of State Water Project (SWP) Table A allocation that Metropolitan would receive in 2010. This amount is primarily driven by hydrologic conditions, and is also greatly affected by the pumping restrictions imposed to protect Delta smelt and Chinook salmon under their respective Biological Opinions. The pumping constraints significantly reduce the frequency and availability of SWP deliveries for replenishment of regional and local storage. In the first year of the WSAP implementation and with a region-wide call for conservation by member agencies, regional demands are tracking below the WSAP target as the member agencies reduced demands through a variety of methods, including greater water use efficiencies through enhanced conservation and use of local supplies. Supplies were also better than expected due to the development of water transfers and exchanges in the Colorado River and SWP systems. It is expected that there will be available supplies to increase regional storage under the WSAP allocation and WSDM Plan actions taken in 2010. The coordinated implementation of the WSDM Plan and the WSAP has proven the importance of these policy guidelines in managing demands, supplies, and storage.

The operating principles that guide the management of regional storage over the next several years are based on the board-approved policies established in the WSDM Plan and WSAP. One of the fundamental trade-offs in dealing with potential supply shortages and allocations is the need to maintain operational flexibility to meet critical system and demand requirements of the member agencies. To address this issue, the operating principles are as follows:

- **Operational Flexibility:** All storage programs and facilities must be managed as a whole, integrated set of regional resources, not by individual storage accounts. The availability and quality of water deliveries on the SWP and Colorado River Aqueduct (CRA) vary depending on hydrology, regulatory constraints and system operations. In addition, annual water demands on Metropolitan have fluctuated historically up to 35 percent. In order to manage these changing conditions, operational flexibility to coordinate the withdrawal and filling of storage amongst various reservoir and groundwater programs must be maintained and the Water Supply Allocation levels and WSDM actions, including conservation, local supplies and water transfers, should not be triggered by prescribed storage levels in individual accounts and facilities.
- **System Reliability:** Storage will be managed to meet the demands of the entire service area, including exclusive SWP and CRA service areas. For example, there are portions of Metropolitan's service area that can only be served by the deliveries from the SWP system. These exclusive SWP areas are located in Ventura, Los Angeles, Riverside, and San Bernardino Counties.
- **Invasive Species Protection:** Regional storage will be managed to minimize the risk of infestation by invasive species. Currently, the Colorado River system has been infested with quagga mussels, while the SWP system still remains free of this invasive species. As a result, the current objective is for Diamond Valley Lake (DVL) to be filled exclusively with SWP supplies and receive no Colorado River deliveries.
- **Water Quality:** The blend of supplies from the SWP, Colorado River, and storage programs will be considered in meeting salinity objectives whenever practical and reasonable.
- **Emergency Storage:** Emergency storage in in-basin reservoirs will be reserved to meet critical demands during catastrophic events.
- **Minimizing Extreme and Volatile Supply Allocations:** Regional storage will be managed to avoid or reduce the frequency of severe water supply allocations and to avoid large increases in WSAP levels from year-to-year, to the extent practicable.

These operating principles provide a framework for managing storage to increase the frequency of storage recovery following periods of storage reductions. To accomplish this goal, Metropolitan staff could recommend to the Board a Water Supply Allocation level that allows for some storage recovery following periods of storage reduction. Although avoidance of deep shortages cannot be guaranteed, it is expected that such an approach would help reduce the frequency and magnitude of deep shortages, and avoid dramatic swings in Water Supply Allocation levels from year-to-year, since storage has a greater chance of recovery over time.

Detailed Report

Metropolitan manages regional storage according to the board-approved policies established in the WSDM Plan and the WSAP, as well as to meet operational needs.

Water Surplus and Drought Management Plan

Policies

The WSDM Plan was adopted by the Board in 1999 to establish policy guidance for the management of storage, as well as water supplies and water programs in periods of surplus and shortage. A Board Information Letter providing a Water Surplus and Drought Management Plan Overview was provided to the Board at the November 10, 2009, Board Meeting. The WSDM plan can be found on Metropolitan's website through the following link:

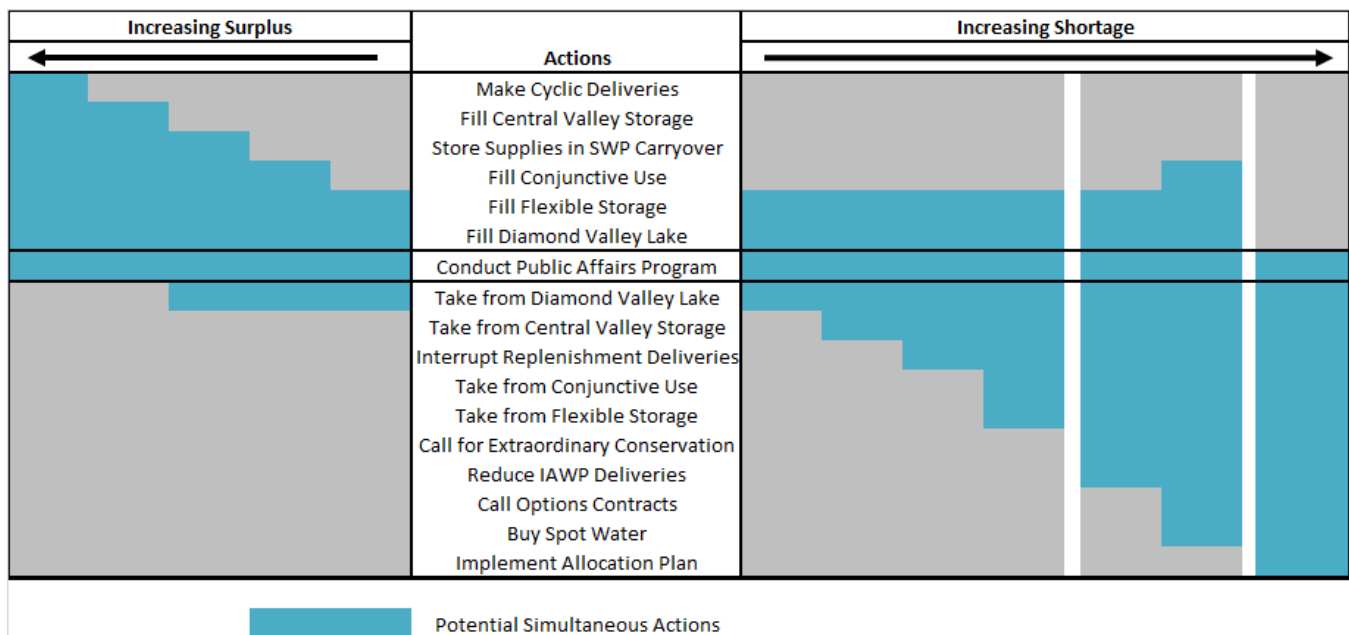
http://www.mwdh2o.com/mwdh2o/pages/yourwater/WSDM_Report1150.pdf

The WSDM Plan Implementation Goals are:

1. Avoid mandatory imported water allocations to the extent practicable
2. Equitably allocate water on the basis of agencies’ needs
3. Store surplus supplies to mitigate shortages and improve water quality

These implementation goals outline the fundamental policies for dealing with surplus and shortage in an equitable and efficient manner within a calendar year. Through analysis of supplies and demands, the degree of surplus or shortage for various times throughout the calendar year is estimated, and different actions under the WSDM Plan for each surplus or storage stage are considered for implementation. The following Figure 1 “WSDM Plan Resource Stages and Actions Matrix” provides a graphical representation of the WSDM actions to be taken under each stage. This matrix is commonly, yet erroneously, referred to as the stairstep of prioritized actions that must be taken in a specified order during conditions of surplus and shortage. The intended purpose is to provide a framework of preferred actions and considerations that fulfill the primary implementation strategy inherent in the WSDM Plan, which is to manage Metropolitan’s storage resources in a way that minimizes risk and maximizes the use of those resources.

Figure 1: WSDM Plan Resource Stages and Actions Matrix (updated)



Since the introduction of the WSDM Plan, Metropolitan’s storage has been managed to meet the region’s needs during critical droughts. Additionally, Metropolitan has continued to increase its storage potential to further diversify its options and to provide enhanced operational and resource management flexibility during times of surplus and shortage. Metropolitan’s dry-year storage portfolio has the potential to store more than five million acre-feet using a variety of methods.



The WSDM Plan principles for the utilization of storage have proven to be robust and provide the flexibility to increase dry-year reliability with a portfolio of storage options. The Plan also acknowledges that there are other important factors that influence the management of the water resources in Metropolitan’s storage portfolio. An excerpt from the WSDM Plan states:

“The resource management framework does not dictate a scripted response to shortage or surplus. The framework recognizes the complexity and variety of conditions that require action.”

Implementation Actions

In the last four years, WSDM actions have been implemented to manage operating storage and supply limitations in response to the extended drought on the Colorado River system and the pumping restrictions on the SWP imposed to protect endangered and threatened fish species. The WSDM actions taken over the past several years have been in accordance with the priorities for various depths of shortage envisioned with the WSDM Plan as illustrated in Table 1.

Table 1: WSDM Action Implementation Timeline

Date	WSDM Action	Event	
September 2006	Initiated withdrawals from Diamond Valley Lake	 <p>Colorado River: Driest 11 years on record (2000 – 2010)</p>	
March 2007	Initiated delivery requests from Central Valley groundwater storage		 <p>State Water Project: Additional pumping restrictions</p>
May 2007	Interrupted Replenishment Program deliveries		
June 2007	Initiated withdrawals from in-basin groundwater conjunctive use programs		
December 2007	Withdrew water from Flexible Storage account in Castaic Lake		
January 2008	Implemented a 30% reduction in Interim Agricultural Water Program (IAWP) deliveries		
June 2008	Board adopted a Water Supply Alert Resolution; conservation messaging increased		
June 2009	Extraordinary Conservation implemented (Condition 2: Water Supply Alert)		
April 2008 and 2009	Purchased North of Delta transfer supplies		
July 2009	Implemented a Water Supply Allocation Level 2 Shortage		

Water Supply Allocation Plan

Policies

The WSAP was developed and approved by the Board in April 2009 to set a formula for allocating supplies to the member agencies in times of shortage. The WSDM Plan calls for the implementation of an allocation plan as the potential supply shortages become more severe. The WSAP has been developed and implemented in accordance with a fundamental guiding principle.

“Metropolitan will encourage storage of water during periods of surplus and work jointly with its Member Agencies to minimize the impacts of water shortages on the region’s retail consumers and economy during period of shortage.”

The guiding principle provides the direction that the WSAP, developed and implemented by Metropolitan, must address disparate impacts at the retail water use level across Metropolitan’s service area. In addition, the WSDM Plan also included considerations to accomplish an equitable regional allocation of Metropolitan supplies during times of shortage. These considerations include impact on retail customers and the economy, allowance for population and growth, change and/or loss of local supply, reclamation/recycling, conservation, investment in local resources, participation in Metropolitan’s non-firm (interruptible) programs, and investment in Metropolitan’s facilities.

Implementation Actions

The major consideration in setting the WSAP level for 2010/11 is the amount of SWP Table A allocation that Metropolitan would receive in 2010. This amount is primarily driven by hydrologic conditions, and is also

greatly affected by the pumping restrictions imposed to protect Delta smelt and Chinook salmon under their respective Biological Opinions. The pumping constraints significantly reduce the frequency and availability of SWP deliveries for replenishment of regional and local storage. In the first year of the WSAP implementation and with a region-wide call for conservation by member agencies, regional demands are tracking below the WSAP target as Metropolitan and the member agencies gained greater water use efficiencies through enhanced conservation, use of local supplies, and the development of water transfers and exchanges in the Colorado River and SWP systems. It is expected that there will be available supplies to increase regional storage under the WSAP allocation and WSDM Plan actions taken in 2010. The coordinated implementation of the WSDM Plan and the WSAP has proven to be important policy guidelines in managing demands, supplies, and storage.

Operational Considerations

There are many significant operational considerations in the management of regional storage in times of surplus and shortage. The WSDM Plan and WSAP allow for operational flexibility to meet critical system and supply needs.

System Needs

One key operational objective is to maintain storage to provide deliveries to areas served exclusively by a specific resource, such as areas of Metropolitan's system served exclusively by the SWP, which comprise approximately one-third of annual system demands, on average. Storage along the SWP system is maintained to help ensure that demands in these exclusive areas can be met under low SWP allocations. As an example, in 2009, storage was managed to place an emphasis on expanding SWP carryover supplies and refilling storage in Metropolitan's Flexible Storage account in Castaic Lake for use in 2010, if needed, to meet exclusive SWP demands under a low SWP allocation, despite a reduction in total WSDM storage for 2009. The initial SWP allocation of 5 percent for 2010 turned out to be the lowest in the history of the SWP, due to depleted SWP storage and the impacts of new and existing export restrictions to protect endangered fish species in the Delta. In spite of the low initial SWP allocation, exclusive SWP demands could be met in 2010 because of the available carryover and Flexible Storage, in addition to remaining amounts of storage available in the Central Valley groundwater programs. It is important to note that in the event SWP supplies in a given year are greater than the amount necessary to meet exclusive area demands, water stored in SWP related programs and reservoirs can also be used to meet demands in the non-exclusive SWP portions of the service area.

Other operational constraints include the limitations in delivering untreated surface water containing quagga mussels into bodies of water that do not already include quaggas. This currently limits the storage of Colorado River water (CRW) into DVL unless a quagga mussel control plan is approved by the Department of Fish and Game and a project is developed to fund and implement a quagga control program at DVL.

Contractual Requirements

Contractual issues generally have to do with timing. A contracted storage program will often require an early-season call on storage or have available capacity at a time when the water supply balance for the year remains uncertain. If the storage is called during a time when return capacity is available, and then demands drop and other supplies (such as the SWP allocation) increase, the call turns out to have not been necessary. In this case, the water is typically moved to in-region surface storage so that it is readily available during a future drought.

Other Factors

When storage decisions are made, they are made first with respect to the total amount in storage, to evaluate whether there is sufficient storage to meet a shortfall in projected imported supplies. Then the individual reservoir, storage program, and actions are evaluated with respect to each other. For example, when DVL is reasonably full, use of its storage to meet shortages is typically more aggressive, since it is readily available and can be pulled at a reasonable cost. However, as DVL becomes depleted, it is operated more conservatively and other storage programs are more readily activated because the remaining storage in DVL represents a supply that can be used to meet system demand limitations, and serves as a backstop for the unavailability or implementation risk that can be associated with other supply or storage actions, such as Drought Water Bank supplies or groundwater storage program capacity constraints.

Operating Principles for Managing Regional Storage

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Managing regional storage according to the WSDM Plan, WSAP and operating principles is an iterative process that accounts for changing supplies, demands, and operational requirements throughout the year, and results in board approval for the setting of a water supply allocation level annually. As an example, the supply assessments and scheduling of storage withdrawals for a potential water shortage usually begin prior to the initial low SWP allocation issued in December. Early in the calendar year, storage and supply actions are evaluated in the order of DVL withdrawals, Central Valley storage withdrawals, interruption of replenishment deliveries, call on groundwater conjunctive use programs, call for extraordinary conservation, reduction in IAWP deliveries, and water purchases in accordance with the WSDM Plan as shown in Figure 1. The timing and extent of these actions are determined according to the operating principles, including system needs and impacts on the water supply allocation levels. These storage withdrawals, supply actions, and WSAP actions are adjusted as precipitation and snowpack conditions change during the winter months of January through April. Metropolitan provides WSDM and WSAP updates to the Board for review and discussion on a monthly basis during this time period. These updates provide information on the forecasted local and imported water supplies, total amount of water in storage, estimated storage withdrawals and water supply allocation levels under a range of shortage conditions. The expected condition of local, SWP, and CRA supplies are better known by late spring. At the time, storage and supply actions are established and a recommendation to set a water supply allocation level is provided to the Board for consideration and approval in April.

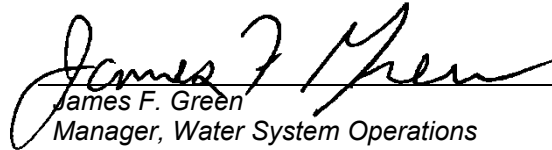
Policy

By Minute Item 43189, dated September 15, 1998, the Board approved the Water Surplus and Drought Management (WSDM) Plan Principles as guidelines for development of the WSDM Plan.

By Minute Item 47393, dated February 12, 2008, the Board adopted the Water Supply Allocation Plan.

Fiscal Impact

None


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5/26/2010
Date


Jeffrey Nightlinger
General Manager

5/27/2010
Date