THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Report

Water Resource Management

- **Metropolitan's emergency storage requirement**

Summary

This report is being submitted in response to a request by the Board of Directors for clarification of the methodology and components of Metropolitan's emergency storage requirement calculation. The primary purpose of the emergency storage requirement is to estimate a quantity of storage to reserve for emergency purposes. The table below shows the estimated emergency storage requirement by reservoir for 2010.

Reservoir	2010 Forecast
Pyramid Lake	158,300
Castaic Lake	139,500
Elderberry Forebay	31,100
Lake Perris	5,400
Lake Mathews	78,500
Lake Skinner	33,800
Diamond Valley Lake	179,800
Total Emergency Storage Requirement	**626,400**

Detailed Report

Overview

The calculation methodology for Metropolitan's emergency storage requirement is based on the potential for major earthquake damage to the Colorado River, California, and Los Angeles Aqueducts that could isolate Southern California from its essential imported water supplies. The adopted criteria assume that damage from such a catastrophic event could render the aqueducts that transport imported water supplies to Southern California out of service for six months. Metropolitan's objective is to provide emergency storage that will allow for reserve supplies to be available within the service area. The emergency storage would supplement local supplies to help avoid severe water shortages during periods when aqueducts are out of service.

Metropolitan's planning criteria is to provide a six-month water supply at 75 percent of member agencies' retail demand under normal hydrologic conditions. Metropolitan's emergency plan outlines that under catastrophic loss of water supply the following actions will be implemented:

1. any existing interruptible water deliveries would be suspended,
2. firm supplies to member agencies would be restricted by a mandatory cutback of 25 percent from normal year retail demand levels,
3. water stored in the surface reservoirs and groundwater basins under Metropolitan's interruptible program would be made available,
4. full local groundwater production, recycled water, and local surface emergency storage reserve production would be sustained, and
5. Metropolitan would draw on its emergency storage as well as other available storage.

Date of Report: 5/11/2010

Background

Metropolitan's emergency storage planning criteria was established and reported in the following documents:

1. Final Environmental Impact Report for the Eastside Reservoir (now named the Diamond Valley Lake) dated October 1991, which was adopted by the Board on September 24, 1991;
2. Southern California's 1996 Integrated Water Resources Plan, which was adopted by the Board on January 9, 1996;
3. Reports on Metropolitan Water Supplies dated February 2002 and March 2003;
4. The Regional Urban Water Management Plan dated November 2005, which was adopted by the Board on November 7, 2007; and
5. 2006 IRP Implementation Plan, which was presented to the Board on September 11, 2006 and transmitted on October 9, 2006.

Emergency Storage Requirement Calculation

Demand Projection

The first step in calculating the emergency storage requirement is to determine the total amount of emergency demand for each member agency given the criteria set forth by the Board in the Diamond Valley Lake EIR (1991). The emergency storage requirement is intended to meet six months of demands given the suspension of all interruptible deliveries. Table 1 below shows the firm demands remaining after interruptible deliveries are discontinued. The demands in Table 1 were calculated at the Member Agency level, the figures shown in this table represent the aggregate total, including agricultural, replenishment and seawater barrier demands. The retail demands are currently based on forecasts from the Southern California Association of Government's 2007 Regional Transportation Plan and from the San Diego County Association of Government's Series 11 forecast.

Table 1
Firm Retail Demands
(Acre-Feet)

Demands for Six-Months	2010
Total Retail Demand	2,284,744
Replenishment Interruption	(95,651)
Seawater Barrier Interruption	(31,127)
Firm Retail Demand	**2,157,966**

Retail Level Emergency Demands

The next step in calculating the emergency storage demand is to subtract the mandatory 25 percent reduction in water use from normal-year retail demands. The emergency storage requirement also assumes a 100 percent reduction in deliveries to IAWP demands. Table 2 below shows the retail level emergency demands after mandatory demand reductions are implemented. The demands in Table 2 were calculated at the Member Agency level, the figures shown in this table represent the aggregate total.

Table 2
Retail Level Emergency Demands
(Acre-Feet)

Demands for Six-Months	2010
Firm Retail Demand	2,157,966
25 percent Mandatory Reduction	(539,492)
100 percent IAWP Reduction	(37,046)
Retail Level Emergency Demand	**1,581,429**

Local Supplies

The next step in the emergency storage calculation is to determine the amount of local supplies available to meet demands at the member agency level. According to the criteria set forth by the board, the calculation assumes full local supply production and full use of local emergency storage. Los Angeles Aqueduct production is excluded from this calculation because the emergency storage requirement also assumes the loss of all imported water supplies. The sum of an agency's locally produced supplies and local emergency storage represents the total amount of local supplies available to them. Table 3 shows the aggregate level calculation of local supplies, when shown at the aggregate level unusable local supplies must be subtracted from the total to get the amount of local supplies that are available in an emergency. Unusable local supplies represent production by an individual member agency above what is needed to meet their demands. This analysis assumes that these supplies would not be used to meet the demands of other member agencies.

Table 3
Local Production and Local Emergency Storage
(Acre-Feet)

Local Production for Six-Months	2010
Groundwater	730,720
Surface Water	44,061
Recycling	196,979
Seawater Desalination	981
Los Angeles Aqueduct	0
Other	3,363
Local Emergency Storage	18,000
Subtotal Local Production	*994,103*
Unused Local Production	(39,074)
Available Local Production	**955,029**

Emergency Demands on Metropolitan

The final step in calculating the emergency storage requirement is to subtract the available local production from the retail level emergency demands for each member agency; the results of this calculation represent the total emergency demand on Metropolitan. Table 4 shows the aggregate calculations for 2010.

Table 4
Emergency Demands on Metropolitan
(Acre-Feet)

Emergency Demands Six-Months	2010
Retail Level Emergency Demand	1,581,429
Available Local Supply	(955,029)
Metropolitan Emergency Demand	**626,400**

Allocation of Emergency Storage in Regional Reservoirs

Once the total demand for emergency storage is determined, the emergency storage requirement can then be allocated to the various surface reservoirs in and around Metropolitan's service area. The total storage capacity of existing DWR and Metropolitan surface reservoirs and the allocation to emergency storage, seasonal/regulatory, and drought carryover needs are shown in Tables 4 and 5 below. On a short-term basis for operational purposes, storage at any specific reservoir may be below these planning levels. When this happens, the emergency storage requirement is shifted temporarily to the other existing reservoirs.

Department of Water Resources Surface Reservoirs

Table 5 below shows the five major reservoirs owned and operated by DWR in or near Metropolitan's service area. Castaic Lake, Elderberry Forebay, and Pyramid Lake are located on the West Branch of the California Aqueduct. Silverwood Lake and Lake Perris are on the East Branch of the California Aqueduct. The total storage capacity of the five reservoirs is almost 680,000 acre-feet, Metropolitan pays for approximately 590,000 acre-feet of the total storage in the listed reservoirs.

Table 5
Allocation of Storage Capacities in DWR Reservoirs
(Acre-Feet)

Reservoir	Total Storage Capacity	Dead Storage	Storage Paid by Others	Storage Paid by Metropolitan
Pyramid Lake	171,200	4,800	8,100	158,300
Castaic Lake	323,700	18,600	11,600	293,500
Elderberry Forebay	32,500	200	1,200	31,100
Silverwood Lake	75,000	20,000	18,400	36,600
Lake Perris	74,500	4,100	0	70,400
Total	**676,900**	**47,700**	**39,300**	**589,900**

In July 2005, DWR announced that, because of seismic safety issues, it would temporarily lower the maximum storage elevation in Lake Perris. This elevation change would result in a reduction of storage available to Metropolitan in Lake Perris from 127,400 acre-feet to about 70,400 acre-feet. For purposes of the emergency storage analysis provided herein, it is assumed that only 70,400 acre-feet would be available to Metropolitan from Lake Perris. Furthermore, the Monterey Amendment, executed by the Department of Water Resources (DWR) and most of the State Water Contractors in 1995 and 1996, addresses the allocation of SWP water in times of shortage and deals with a number of other issues that facilitate more water management flexibility for Contractors.

Of the total 590,000 acre-feet of storage in DWR Reservoirs that is for Metropolitan use, 334,000 acre-feet of this amount is allocated to emergency storage and the remaining 256,000 acre-feet is for seasonal, regulatory, and drought storage. Table 6 shows the distribution of Metropolitan's emergency storage in DWR reservoirs. Silverwood Lake capacity does not add to the total Emergency Storage Capacity because of its location outside of major earthquake faults assumed for the emergency storage calculation methodology.

Table 6
Allocation of Emergency Storage in DWR Reservoirs
(Acre-Feet)

Reservoir	Metropolitan Storage Capacity	Seasonal, Regulatory and Drought Storage	Emergency Storage Capacity
Pyramid Lake	158,300	0	158,300
Castaic Lake	293,500	154,000	139,500
Elderberry Forebay	31,100	0	31,100
Silverwood Lake	36,600	36,600	0
Lake Perris	70,400	65,000	5,400
Total	**589,900**	**255,600**	**334,300**

Metropolitan Surface Reservoirs

Table 7 below shows the allocation of storage resources in Metropolitan's three major surface reservoirs, Lake Mathews, Lake Skinner, and Diamond Valley Lake. The three reservoirs provide just over 1,000,000 acre-feet of total useable storage capacity to Metropolitan's service area.

Storage available in Lake Mathews is approximately 178,500 acre-feet; Lake Mathews distributes Colorado River water to Riverside, Orange, Los Angeles, and San Bernardino counties. Lake Skinner has approximately 43,800 acre-feet of available storage and receives Colorado River and State Project water for distribution to Riverside and San Diego counties. Diamond Valley Lake is Southern California's largest reservoir with approximately 810,000 acre-feet of total capacity, 798,500 acre-feet of the total capacity is available to meet demands and provide emergency water supplies.

Table 7
Allocation of Storage Capacities in Metropolitan Reservoirs
(Acre-Feet)

Reservoir	Total Storage Capacity	Dead Storage	Available Capacity
Lake Mathews	182,000	3,500	178,500
Lake Skinner	44,000	200	43,800
Diamond Valley Lake	810,000	11,500	798,500
Total	**1,036,000**	**15,200**	**1,020,800**

Of the roughly 1,000,000 acre-feet of available Metropolitan storage capacity approximately 292,000 acre-feet are reserved for emergency storage, the remaining 729,000 acre-feet are used for seasonal, regulatory, and drought storage. Table 8 shows the distribution of emergency storage in Metropolitan's reservoirs.

Table 8
Allocation of Emergency Storage in Metropolitan Reservoirs
(Acre-Feet)

Reservoir	Available Capacity	Seasonal, Regulatory and Drought Storage	Emergency Storage
Lake Mathews	178,500	100,000	78,500
Lake Skinner	43,800	10,000	33,800
Diamond Valley Lake	798,500	618,700	179,800
Total	**1,020,800**	**728,700**	**292,100**

2010 Emergency Storage Requirement

Based on the emergency storage requirement methodology, the emergency requirements in DWR Reservoirs, Lake Mathews, and Lake Skinner are fixed quantities with any remaining need reflected as changes in Diamond Valley Lake's emergency storage allocation.

Table 9
Emergency Storage Capacities
(Acre-Feet)

Reservoir	2010
Pyramid Lake	158,300
Castaic Lake	139,500
Elderberry Forebay	31,100
Lake Perris	5,400
Lake Mathews	78,500
Lake Skinner	33,800
Diamond Valley Lake	179,800
Total	**626,400**