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The Metropolitan Water District
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MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Debra C. Man 9-9
EXECUTIVE SECRETARY

September 26, 1995

To: Board of Directors (Water Planning and Resources Committee—Information)
(Executive Committee—Information)

From: General Manager

Subject: Development of a Shortage Allocation Methodology of Imported Supplies to be included in the *Water Supply and Drought Management Plan*

RECOMMENDATION:

For information only.

John R. Wodraska
General Manager

Submitted by:

Debra C. Man
Debra C. Man, Chief
Planning and Resources

Concur:

John R. Wodraska
John R. Wodraska
General Manager

DR:arb

Attachments

DRDMPBD/BOARD

EXECUTIVE SUMMARY:

During the past two years, Metropolitan, its member agencies, and other retail and groundwater agencies have been developing an Integrated Resources Plan (IRP) in order to meet the supply reliability and water quality needs of Metropolitan's service area. A Preferred Resource Mix was developed, diversifying Metropolitan's resource investments for local water management programs, conservation, improvements to imported water supplies, and capital infrastructure required to treat, distribute and store water. In June 1995, your Board approved the approach of the IRP Preferred Resource Mix in order to meet Metropolitan's adopted supply reliability goal. Your Board also approved water management guidelines (see Attachment 1) that define how regional benefits should be measured and how water management programs should be implemented.

The purpose of this Board Letter is to discuss the framework for Metropolitan's forthcoming *Water Supply and Drought Management (WSDM) Plan*, and more specifically, to describe a shortage allocation methodology which can be used to allocate imported supplies during a severe drought. This shortage contingency plan will be included as part of the WSDM Plan. This Plan will describe the supply management and operating principles used to best manage imported supplies during periods of surplus, and provide a detailed plan for mitigation against supply shortages. The WSDM Plan will focus on the integration of local supply management and conjunctive use of imported supplies in order to meet Metropolitan's supply reliability goal. Metropolitan's reliability goal is to avoid shortages in all but the most severe drought, which is expected to occur in only 1 in 50 years (or 2 percent of the time). Metropolitan will continue, through the implementation of the IRP, to meet 100 percent of its firm wholesale demands in all other years. Firm wholesale demands include basic and seasonal shift deliveries. All other deliveries are defined as non-firm, which include direct groundwater replenishment and long-term storage, and are subject to interruptions based on supply availability. Based on 70 years of hydrology, it is estimated that supply conditions will allow Metropolitan to make these non-firm deliveries or 80 percent of the time.

However, in light of the 1991 drought event and the possibility that local and imported supply development may not occur as outlined in the IRP Preferred Resource Mix, a shortage contingency plan has been developed to allocate Metropolitan's imported supplies to its member agencies during the most severe drought.

Based on discussions with the member agencies during the IRP, several objectives were identified with regard to an allocation of Metropolitan's imported supplies:

1. the shortage allocation should ensure that local supplies which are developed with Metropolitan's financial assistance should be shared equitably during droughts.
2. the methodology for the shortage allocation should be as simple as possible.
3. the shortage allocation should not penalize agencies for increasing their own supply reliability using their own investments.
4. the shortage allocation should encourage cost-effective development of alternative supplies, including conservation.

With these objectives in mind, staff is proposing that the shortage allocation for imported water supplies be developed as a contingency against severe droughts. The proposed shortage allocation will initially be based on the average of FY 1989/90, 1990/91, and 1991/92 Metropolitan water demands. After that, as demands grow, the base will include the rolling four-year average of demands (similar to the New Demand Charge base). However, the four-year average base for any member agency cannot be less than its original base (in terms of acre-feet) – it can only be higher. This base calculation was selected because it eliminates the need to make adjustments for future growth. The categories of Metropolitan deliveries that would be included in the base period are: basic and estimated of seasonal shift deliveries. All long-term storage and direct groundwater replenishment will not be included in base demands. Actual demands (acre-feet) will not be used, rather each agency's percentage of the total Metropolitan demands will be used to allocate available imported supplies. Agricultural deliveries for the base demand period will be scaled back based on a staged plan. The agricultural base will start with a 30 percent reduction (for all water sold under the Interim Agricultural Water Program or future agricultural program). This reduction will increase depending on the severity of the drought and will be based on the number of years that the allocation plan is in effect:

Agricultural Cuts in Base Demands:		
Stage 1	one year of allocation	30%
Stage 2	two years of allocation	75%
Stage 3	three years of allocation	90%

Again, it is important to note that this is an allocation based on each agency's percentage of total deliveries and not acre-feet. In other words, if an agency used 15 percent of Metropolitan's demands during the base period, then that agency's allocation for future droughts would be 15 percent of the total available supplies from Metropolitan (assuming that no adjustments were made). It is also proposed that the following adjustments be made to the base allocation:

1. future Metropolitan funded local resource projects (reclamation, groundwater recovery, and contractual storage programs) based on the additional supply yield multiplied by Metropolitan's financial share of the projects' total costs, and
2. loss of local supply that occurs and is beyond the control of the member agency.

After all adjustments are made, an agency that purchases more than its allocation will be charged 150% of the basic rate for all deliveries purchased above the allocation. Agricultural deliveries sold under the Interim Agricultural Water Program (IAWP), or future agricultural program, will be cut up to 30 percent before any firm deliveries of Metropolitan water are reduced.

DETAILED REPORT:

During the past two years, Metropolitan, its member agencies, and other retail and groundwater agencies have been developing an Integrated Resources Plan (IRP) in order to meet the supply reliability and water quality needs of Metropolitan's service area. A Preferred Resource Mix was developed, diversifying Metropolitan's investments for local water management programs (including groundwater storage, reclamation, groundwater recovery projects, and conservation), imported water supplies (including water transfers and storage programs), and capital infrastructure required to treat, distribute and store water. In June 1995, your Board approved the approach of the IRP Preferred Resource Mix in order to meet Metropolitan's adopted supply reliability goal. Your Board also approved water management guidelines (see Attachment 1) that define how regional benefits should be measured and explains how water management programs should be implemented.

Staff is currently drafting a long-term comprehensive *Water Supply and Drought Management (WSDM) Plan*. The purpose of this plan is to describe the supply management and operating principles that Metropolitan will use to best manage imported supplies during periods of surplus. The *WSDM Plan* will also provide a detailed plan for mitigation against supply shortages, including a shortage allocation of imported supplies as a contingency. The WSDM Plan will focus on the integration of local supply management and conjunctive use of imported supplies in order to meet Metropolitan's supply reliability goal. Metropolitan's reliability goal is to avoid shortages in all but the most severe drought, which is expected to occur in only 1 in 50 years (or 2 percent of the time). Metropolitan will continue, through the implementation of the IRP, to meet 100 percent of its firm wholesale demands in all other years. Firm wholesale demands include basic and seasonal shift deliveries. All other deliveries are defined as non-firm, which include direct groundwater replenishment, agricultural deliveries (under the IAWP) and long-term storage, and are subject to interruptions based on supply availability. Based on 70 years of hydrology, it is estimated that supply conditions will allow Metropolitan to make these non-firm deliveries (80 percent of the time).

Simulations of projected demands and supplies were done for the next five and ten years under differing assumptions regarding SWP operations, availability of storage, and IRP resource targets for reclamation. Even under extremely dry hydrologic conditions and conservative assumptions for local resource development, Metropolitan could meet all of its basic and agricultural deliveries to its member agencies with water transfers that are already established or well into negotiations. However, in light of the 1991 drought event and the possibility that local and imported supply development may not occur as outlined in the IRP Preferred Resource Mix, a shortage allocation of Metropolitan's imported supplies has been developed as a contingency.

This Board Letter will concentrate on the proposed allocation methodology for Metropolitan's imported supplies. Based on discussions with the member agencies and sub-agencies during the IRP, several objectives were identified with regard to allocating Metropolitan's imported supplies during a severe shortage:

1. The shortage allocation should ensure that local supplies that are developed with Metropolitan's financial assistance should be shared equitably during droughts.

2. The methodology for the shortage allocation should be as simple as possible.
3. The shortage allocation should not penalize agencies for increasing their own supply reliability using their own investments.
4. The shortage allocation should encourage cost-effective development of alternative supplies, including conservation.

With these objectives in mind, staff has reviewed the existing and past drought management plans and allocation principles in order to evaluate the potential for improvements. The current 1995 drought management plan (DMP) and the 1990 incremental and interruptible conservation plan (IICP) developed a base demand using acre-feet deliveries. Stages of shortages or reductions were developed for firm and interruptible water and subtracted from the base acre-feet in order to get each agency's target. If an agency purchased more than its target, then they were assessed a much greater water rate as a disincentive. This approach does not include an explicit link between the targeted reductions and the supply conditions. The current proposal ties the stages of the allocation plan to the hydrologic conditions of the SWP supply. It is also proposed that the base allocation be calculated as a percent of each agency's demand to the total demand for Metropolitan. For each stage of the shortage, Metropolitan would estimate each member agency's monthly target allocation based on Metropolitan's anticipated supplies and the agency's base allocation percentage. If an agency used 15 percent of Metropolitan's supply during the base period, then that agency would receive 15 percent of the available supplies during the shortage. Basing the allocation on percent of total deliveries ties the shortages to the anticipated supply conditions. It also does not penalize agencies for developing local supplies using their own investments.

To illustrate how this allocation plan would be developed, a hypothetical example has been prepared. Table 1 presents a scenario in which there are three agencies: (1) an aggressive participant in MWD's local resource program, (2) a moderate participant in MWD's local resource program, and (3) a non-participant. The base condition is set, and the base demands are estimated. During the base period 2,200 units of MWD water were sold. Each agency's percent of that "base" water is calculated. A drought occurs in the future, and the available imported supplies decreases to 1,800 units (or an 18 percent reduction from the base period).

In Scenario 1, no future local supplies are developed. The 1,800 units of imported supply are allocated to each agency based on the percentage share of demands that each agency purchased during the base period. In this scenario, every agency experiences a supply shortage. The total regional supply shortage is 270 units.

In Scenario 2, local supplies are increased for two agencies without financial assistance by Metropolitan. The available imported supplies of 1,800 units are allocated by the same percentage as in Scenario 1. The aggressive participating agency has created a surplus condition (more supplies than demand). The moderate participating agency has reduced its shortage from 227 units (without additional supply) to 197 units. The non-participating agency's shortage remains the same, at 97 units. In this scenario, only those agencies that invest their own money to increase local supplies have better drought protection.

In Scenario 3, local supplies are increased using Metropolitan's financial support (e.g., Local Resource Program). The regional supply that is created under Metropolitan's

financial assistance program is estimated by taking the additional supply created by the local projects and multiplying it by the proportion of Metropolitan's financial support to the total local project's cost. In this example, 35 percent of the aggressive participating agency's local projects were funded by Metropolitan. Therefore, 35 percent of the additional supply units are re-allocated to the region and 65 percent of the supply stays with the agency. In total, 41 units of additional local supply were created for use by the region. Therefore, the total available regional supply is the 1,800 units of imported supply plus the 41 units of regional local supply, or 1,841 units. This regional supply is then allocated based on the original base period percentage allocation. Each agency's regional local supply is subtracted from the total regional supply in order to get the allocation of Metropolitan's imported supply. The adjustment made for local supplies developed with Metropolitan's financial support resulted in a reduction of the aggressive participating agency's allocation of imported supplies from 20.4 percent to 19.0 percent. This 1.4 percent of imported supplies was reallocated to the other agencies, creating additional supplies for agencies that do not participate in the program.

The results indicate that under Scenario 3 all agencies are better off in terms of overall reliability when compared to Scenario 1. The main difference between Scenarios 2 and 3 is that agencies that participate in the local resources programs offered by Metropolitan will decrease their reliability somewhat, but also reduce their costs. The choice is an economic and risk assessment question.

The examples discussed above lay the foundation for staff's recommendation for an allocation plan that is calculated using a base percent of total deliveries rather than a base using acre-feet. The proposed shortage allocation will initially be based on the average of FY 1989/90, 1990/91, and 1991/92 Metropolitan water demands. After that, as demands grow, the base will include the rolling four-year average of demands (similar to the New Demand Charge base). However, the four-year average base for any member agency cannot be less than its original base (in terms of acre-feet) – it can only be higher. This base calculation was selected because it eliminates the need to make adjustments for future growth. The categories of Metropolitan deliveries that would be included in the base period are: basic and an estimate of seasonal deliveries used for shift purposes. Long-term storage and direct groundwater replenishment will not be included in the base demands. Agricultural deliveries for the base demand period will be scaled back based on a staged plan. The agricultural base will start with a 30 percent reduction (for all water sold under the Interim Agricultural Water Program or future agricultural program). This reduction will increase depending on the severity of the drought and will be based on the number of years that the allocation plan is in effect:

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1. future Metropolitan funded local resource projects (reclamation, groundwater recovery, and contractual storage programs) based on the additional supply

yield multiplied by Metropolitan's financial share of the projects' total costs, and

2. loss of local supply that occurs beyond the control of the member agency.

After all adjustments are made, an agency that purchases more than its allocation will be charged 150 percent of the basic rate for all deliveries purchased above the allocation. Agricultural deliveries sold under the Interim Agricultural Water Program, or future agricultural program, may be cut up to 30 percent before any firm deliveries of Metropolitan water are reduced. In addition, it is proposed that if an agency's allocation of Metropolitan deliveries are greater than the agency's retail consumptive demands, then the surplus amount will be reallocated to the rest of the member agencies. This principle would allow agencies to increase their local reliability with local investments while not harming other member agencies.

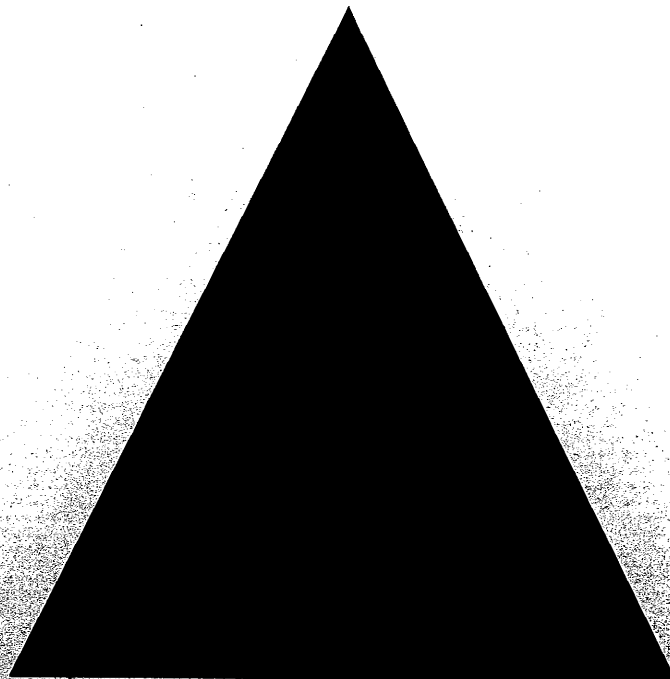
During the next two weeks, staff will develop the final details of the allocation plan and complete the draft *Water Supply and Drought Management Plan* for Board review.

Water Management Implementation Guidelines

1. Regional benefits of both local storage and local projects programs should be measured by: (1) the reduction in capital investments due to deferral and/or down-sizing of regional infrastructure; (2) the reduction of O&M expenditures needed for treatment and distribution of imported water; and (3) the reduction in expenditures associated with developing alternative regional supplies.
2. Metropolitan's investments for local storage and local projects programs should not exceed the regional benefits over the life of the project(s).
3. Metropolitan's investments for local storage and local projects programs should be sufficient to encourage the implementation of projects identified in the Preferred Resource Mix. Such investments and their associated payment schedules should also be flexible enough to meet the needs of each project.
4. Metropolitan's participation in local storage and local projects programs should not cause large fluctuations in Metropolitan's water rates.
5. Local storage must increase regional supplies during time of need. Specifically, water placed in local storage programs must be utilized during time of need without displacing dependable local supplies. The amount of water involved should be agreed to in advance when each storage and local projects program is established.
6. Local projects programs must increase regional supplies and provide measurable regional benefits.
7. Performance of local storage and local projects programs should be verifiable (e.g., deliveries into and withdrawals out of local storage should be accounted for by either direct measurement or by incorporation into a shortage management plan)

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