MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

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

November 20, 2007 Board Meeting

9-2

Subject

Draft Shortage Allocation Plan

Description

Background

Throughout 2007, the Board has been kept apprised of the dry conditions affecting Metropolitan's service area and main supply sources, as well as the uncertainty about future pumping operations from the State Water Project due to fishery protection measures in the Sacramento-San Joaquin Bay-Delta. This uncertainty has raised the possibility that Metropolitan may not have access to the supplies necessary to meet total firm demands at some point in the future and may have to allocate shortages in supplies to the member agencies.

In preparing for this possibility, Metropolitan staff has jointly worked with the member agency managers and their staff to develop a shortage allocation plan. This letter includes a draft proposal for an allocation plan, which addresses the principles adopted by the Board in the 1999 *Water Surplus and Drought Management Plan* (WSDM Plan).[1] To date, elements of the proposed plan have been discussed at four Member Agency Manager workgroups. Staff also met with individual member agencies for detailed discussions of the proposal; 15 agencies have engaged staff in this process, either through direct meetings or through member agency caucuses. The draft Proposed Shortage Allocation Plan (Proposal) described in this board letter incorporates suggestions and comments expressed during these meetings.

Principles and considerations for Allocation

The 1996 Integrated Resources Plan (IRP) and the 1999 WSDM Plan had supply development and resource management as the primary objective for maintaining regional reliability. Even though no shortage allocation plan was approved by the Board, the WSDM Plan incorporated a guiding principle to be followed in the development of an allocation:

> *"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 periods of shortage."*[2]

The guiding principle reflects the direction for an equitable allocation plan that minimizes regional hardship and disparate impacts across Metropolitan's service area.

The specific considerations included in the WSDM Plan to accomplish an equitable regional allocation of Metropolitan supplies during times of shortage included the following:[3]

- The impact on retail customers and the economy
- Allowance for population and growth
- Change and/or loss of local supply
- Reclamation/Recycling
- Conservation

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[1] The Metropolitan Water District of Southern California. *Water Supply and Drought Management Plan*, Report No. 1150. August 1999.
[2] WSDM Plan, p. 1. Emphasis added.
[3] WSDM Plan, p. 2.

- Investment in local resources
- Participation in Metropolitan's non-firm (interruptible) programs
- Investment in Metropolitan's facilities

These considerations and principles have guided the process to develop this proposed allocation plan.

Developing the Proposal

A specific allocation proposal has been developed that addresses the Principles for Allocation noted above. As directed by the Board, this proposal seeks to strike a workable balance among the various considerations and principles set forth through the WSDM Plan. The Proposal directly addresses impacts at the retail level and seeks to address the issue of agencies experiencing shortages that are significantly more severe than other parts of the service area. The Proposal also accounts for the considerations of growth, local investment, changes in supply conditions, and the demand hardening aspects of recycling and conservation. All elements of the Proposal have been presented to, and discussed by, the member agency managers and staff, through a series of large-group meetings and through staff-to-staff meetings. The Proposal reflects comments and suggestions offered during these meetings. In some cases, issues were either resolved during the meetings or formally classified as issues remaining to be resolved at a later time.

Some of the key elements of the Proposal are described below. The detailed operational elements of these objectives, and all calculations used in the Proposal (including a numerical example), are discussed in **Attachment 1**.

- **Base Period** – Use of historical data is needed to estimate retail demands, local supplies, and wholesale water needs. The Proposal uses a three-year average historical period as its base, with the initial period being 2004 through 2006. It is understood that this base period will be updated or adjusted as time progresses.

- **Growth Adjustment** – Estimates of retail demands need to be adjusted for growth that occurred between an allocation year and the base period. The Proposal uses county-level estimates of average annual growth in population as a proxy for member agency growth. Agencies will also have a choice to use a weighted average of population and job growth instead of just population.

- **Local Supply Adjustment** – Estimates of local supply need to be adjusted for gains, losses, and extraordinary increases. These adjustments are critical to having reasonable estimates of total retail water needs.

- **Demand hardening** – The Proposal recognizes that significant increases in non-potable recycling and conservation savings devices can harden demands, and make additional reductions in water use more difficult to achieve. To address hardening due to non-potable recycling, non-potable recycling deliveries and the associated demands are not included in the allocation formula, thereby making all of the elements of the Proposal applicable to potable water uses only. To address hardening due to conservation, the Proposal provides a credit based on the amount of conservation savings within a member agency and the regional shortage level declared by Metropolitan.

- **Depth of shortage** – The Proposal treats shallow shortages, defined as regional shortages up to ten percent, differently than deeper shortages. In shallow shortages, reductions in Metropolitan supplies will be done on an across-the-board basis, with adjustments for conservation demand hardening. This means that addressing severely disparate impacts at the retail level is not addressed until regional shortages are greater than ten percent. At that point, the Proposal employs an allocation formula that is equitable on the wholesale level while helping to minimize impacts to the regional economy from disparate shortages at the retail level.

Addressing the Principles for Allocation

There are many considerations in addressing the Principles for Allocation. Some of those considerations, like adjusting for growth and demand hardening, are dealt with up front. Addressing the remaining principles can best

be summarized as balancing between three major areas. First, the plan needs to recognize imported demand and the ongoing investments that member agencies make in the Metropolitan system. Second, the plan needs to address impacts at the retail level across the service area. Third, the plan needs to recognize local supply development. It is important to reiterate that, as a result of discussions at the member agency workgroup sessions, the Proposal only includes adjustments that address impacts at the retail level in deeper regional shortages. Shallower shortages, defined as five percent and ten percent shortages, do not include any adjustments to balance retail level impacts.

Recognize Imported Water Need

Recognize Resource Development

Limit Regional Economic Impact
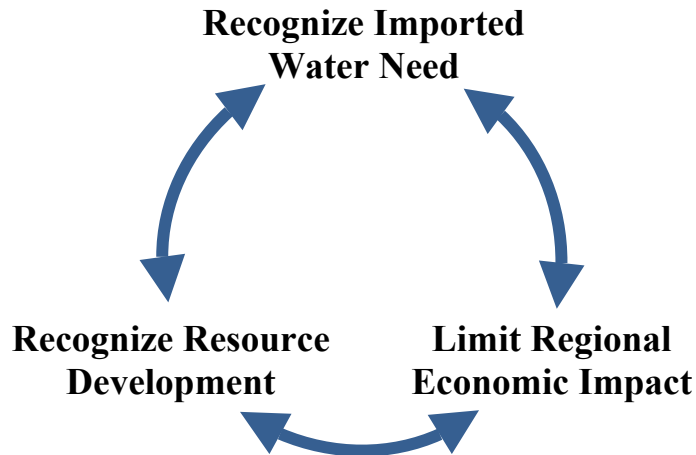
Recognizing wholesale imported supply needs and investment in Metropolitan

The Proposal provides for a minimum allocation of Metropolitan supplies to ensure that, at the member agency level, needs for Metropolitan supplies are not experiencing shortages greater than 1.5 times the regional shortage. Establishing a minimum level of wholesale water service at the member agency level recognizes a member agency's need for wholesale water, as well as their ongoing investment in Metropolitan's system.

Addressing impacts at the retail level

The Proposal provides for a minimum allocation of Metropolitan supplies to ensure that, at the member agency level, retail needs are not experiencing shortages at a level that is greater than the regional shortage percentage. As an example, if Metropolitan is declaring a 15 percent shortage at the regional level, each member agency will be allocated enough Metropolitan supply that, when added to their locally supplied water, results in no greater than a 15 percent shortage at the retail consumer level.

To ensure that agencies do not experience significantly unbalanced impacts on the retail level when faced with a reduction in wholesale water supplies, the Proposal includes an Economic Adjustment Factor. This factor is the mechanism that provides agencies with additional allocations of Metropolitan supply based on their dependence on Metropolitan supplies at the retail level. The Economic Adjustment Factor works with the minimum wholesale allocation (described above) and ensures that, as agencies are increasingly more dependent on Metropolitan to meet their retail needs, additional allocation is provided to address disparate shortages in their service area.

Recognizing local resource development

The Proposal ensures that agencies that have developed local supplies are not penalized for having done so. The Proposal accomplishes this in three ways.

- The formula always results in agencies with more local supply development being more reliable at the retail level than agencies that have less.

- The formula excludes from its calculations all non-potable recycling. Although this does not directly address demand hardening, it has the effect of making non-potable demands 100 percent reliable.

- The formula ensures that extraordinary efforts to secure additional water through water transfers or other programs are not offset by direct decreases in allocation from Metropolitan. The yield from these supplies would not be included in the allocation formula in shallow shortages, and in shortages greater than ten percent, the yield from these efforts would only be included in the allocation calculation at the same rate as the Metropolitan shortage percentage. For example, in a 15 percent shortage only 15 percent of the yield from extraordinary efforts would be recognized as local supply, leaving the remaining 85 percent for the sole use of the member agency.

Shortage Levels

The Proposal contains allocation elements over ten shortage levels. These levels cover regional water shortages from 5 to 50 percent, in five percent increments. The following table shows Shortage Levels 1 through 6, which corresponds to regional water shortages from 0 to 30 percent. A full table of allocation elements over all 21 shortage levels can be found in **Attachment 1**. The descriptions of the columns are:

- Shortage Level: The declared regional shortage level

- Shortage Percentage: The percentage of regional shortage corresponding to the declared regional shortage level

- Wholesale Minimum Allocation: The minimum allocation of wholesale MWD supplies, as a percentage of wholesale MWD demand, corresponding to the declared regional shortage level

- Economic Adjustment Maximum: The maximum additional allocation, as a percentage of wholesale MWD demand, that can be allocated to an agency based on their percentage dependence on MWD

- IAWP Reduction: The Interim Agricultural Water Program reduction corresponding to the declared regional shortage level

| Shortage Level	Shortage Percentage	Wholesale Minimum Allocation	Economic Adjustment Maximum	IAWP Reduction
1	5%	92.5%	0.0%	30%
2	10%	85.0%	0.0%	30%
3	15%	77.5%	7.5%	40%
4	20%	70.0%	10.0%	50%
5	25%	62.5%	12.5%	75%
6	30%	55.0%	15.0%	90%

**Allocation Procedure Outline**

The following is a simplified outline of the steps that are taken to calculate an agency's supply allocation. A detailed example can be found in **Attachment 1.**

> Step 1: Calculate base period MWD demand, local supply, retail demand, conservation
>
> Step 2: Adjust base period retail demand for growth
>
> Step 3: Adjust base period local supply for gains/losses and extraordinary increases
>
> Step 4: Calculate allocation year MWD demand using adjusted Retail Demand and Local Supply
>
> Step 5: Calculate Wholesale Minimum Allocation
>
> Step 6: Calculate Economic Adjustment Allocation
>
> Step 7: Calculate Conservation Hardening Credit
>
> Step 8: Final agency allocation is the sum of the calculations in Steps 5, 6, and 7

Member Agency Shortage Impacts

The following graphs show an estimate of the impacts for each of the member agencies in a Shortage Level Three (15 percent regional shortage). The first graph shows reliability at the retail level. This is the percentage of total water supplies (MWD supplies and local supplies) to total retail demand. The second graph shows reliability at the wholesale level. This is the percentage of MWD supplies to wholesale MWD demand. Additional shortage impacts to the member agencies using three shortage scenarios (5, 15, and 30 percent) can be found in **Attachment 2.**

Retail Reliability

Wholesale Reliability
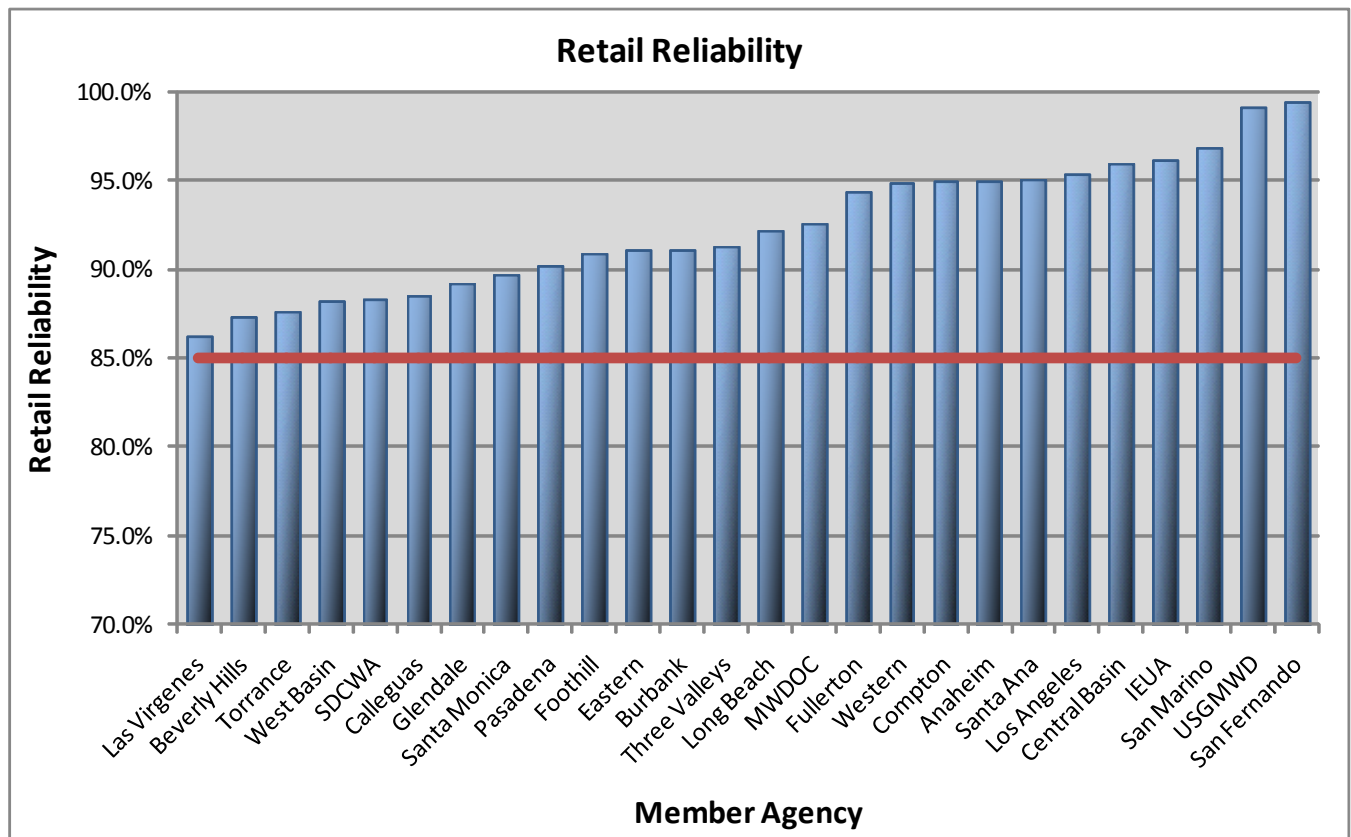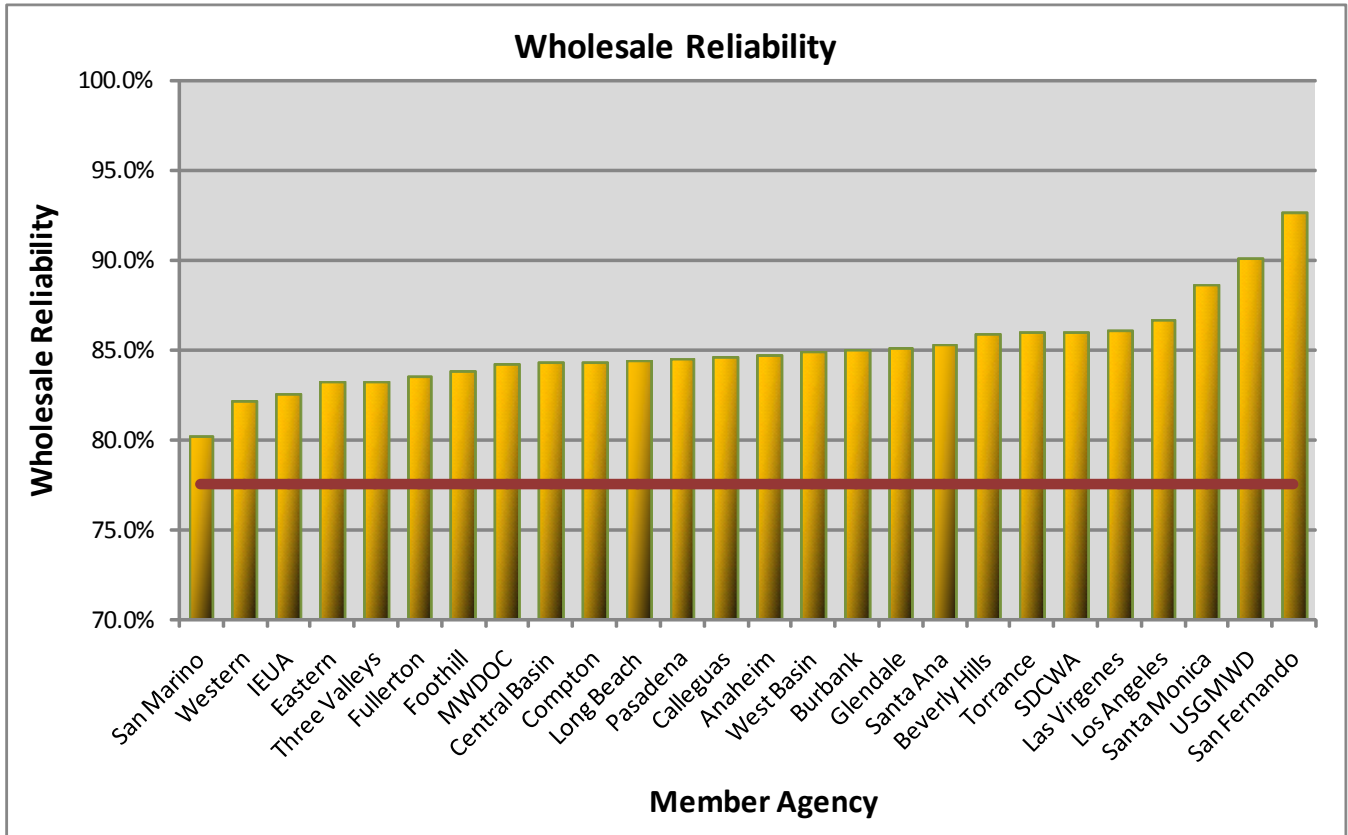
Outstanding Issues

The following issues, raised at the Member Agency Manager Meetings, remain to be resolved.

- A credit for partnering in the development of regional conjunctive use programs.
- A credit for successfully implementing active conservation programs.
- Developing an alternative approach for extreme shortages (greater than 50 percent).

Next Steps

Staff is continuing to meet with the member agencies to finalize the components of the proposal. In addition, implementation steps are being developed, including proposed penalty rates, time periods, communications and appeals processes, and accounting schedules. Upon further feedback from the Board, staff expects to bring an action to adopt an allocation plan to the Board in January 2008.

Policy

By Minute Item 45841, dated July 13, 2004, the Board adopted the Integrated Water Resources Program Update.
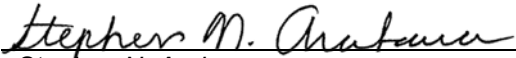
By Minute Item 43514, dated April 13, 1999, the Board adopted the Water Surplus and Drought Management Plan.

By Minute Item 44005, dated June 17, 2000, the General Manager has the authority to reduce Interim Agriculture Water Program deliveries up to 30 percent prior to imposing any mandatory allocation.

Fiscal Impact

None

Stephen N. Arakawa   11/8/2007
Stephen N. Arakawa   *Date*
Manager, Water Resource Management

Jeffrey Kightlinger   11/8/2007
Jeffrey Kightlinger   *Date*
General Manager

Attachment 1 – Draft: Metropolitan Proposed Shortage Allocation Plan

Attachment 2 – Reliability Under Metropolitan's Draft Shortage Allocation Proposal

BLA #5569

DRAFT: Metropolitan Proposed Shortage Allocation Plan

The central objectives of Metropolitan's Proposed Shortage Allocation Plan (Proposal) are to (1) address retail demands and wholesale water needs in the allocation year; (2) adjust for factors such as population or economic growth, demand hardening, conservation savings, local investment, and need for wholesale imported water; and (3) employ an allocation formula that is as equitable as possible on the wholesale level while helping minimize hardships experienced by individuals and by the regional economy at the retail level. This attachment provides an overview of the elements that are essential to accomplishing the central objectives of this Proposal. Following the overview, an example is provided showing how these key objectives are implemented in calculating an allocation.

Base Period Calculations

The first phase in estimating retail demands and wholesale water needs in the allocation year is to establish a base period. The 1999 WSDM Plan introduced the concept of the base period as a foundation for estimating water needs under an allocation scenario. The base period for each of the different categories of demands and supplies is calculated using data from the three most recent non-shortage years; exceptions to this methodology are noted in the following descriptions of base period calculations.

Base Period Demands on Metropolitan: Firm demands on Metropolitan for the base period are calculated using a three year average of full-service, seawater barrier, seasonal shift, and surface storage operating agreement demands.

Base Period Local Supplies: Local supplies for the base period are calculated using a three-year average of groundwater production, groundwater recovery, Los Angeles Aqueduct supply, surface-water production, and other imported supplies. Non-potable recycling production is not included in this calculation. (This is to reflect the impact of demand hardening due to recycled water use. See section below on demand hardening for further discussion).

Base Period Retail Demands: Total retail municipal and industrial (M&I) demands for the base period are calculated by adding the Base Period Demands on Metropolitan, and the Base Period Local Supplies.

Base Period In-lieu Deliveries: Base period in-lieu deliveries to member agency storage are calculated using a three-year average of in-lieu deliveries to long-term groundwater replenishment, conjunctive use, cyclic, and supplemental storage programs.

Base Period IAWP Deliveries: Through discussions with the member agencies, fiscal year 2003/04 was established as the base period for IAWP deliveries. This baseline will remain in place for the period in which the IAWP reduction is in effect, and for droughts continuing into successive years.

Base Period Conservation: Conservation savings for the base period are calculated using modeled estimates of the most recent year's savings from active, passive, and system losses. Modeled estimates are generated using device-based savings and decay rates provided by California Urban Water Conservation Council, and other recognized sources. These estimates only include savings accumulated from Metropolitan funded programs. Agencies with verified conservation device installations from conservation efforts funded without Metropolitan assistance will be added through an appeals process.

Allocation Year Calculations

The next phase in estimating water needs in the allocation year is to adjust the base period estimates of retail demand for population or economic growth.

Allocation Year Retail Demands: Total retail M&I demands for the allocation year are calculated by adjusting the Base Period Retail Demands for growth.

Growth Adjustment: The growth adjustment is calculated using the average annual rate of population growth over the three-year base period. The population growth rate is calculated using county level data generated by the California Department of Finance. On an appeals basis, Member Agencies may request that their adjustment be calculated using a weighted combination of population and employment growth rates.

Starting with the estimate of allocation year retail demand, the need for wholesale imported water from Metropolitan in the allocation year can be calculated. To do this, an estimate of local supply production in the allocation year is needed.

Allocation Year Local Supplies: Allocation year local supplies are estimated using the base year local supplies, plus Base Period In-Lieu Deliveries. In-lieu deliveries are added to reflect the corresponding reduction in base year local production that was required to take in-lieu deliveries. Adjustments are also made for gains and losses of local supply, and extraordinary increases in production over the base year. These adjustments are made to give a more accurate estimate of actual supplies in the allocation year, and in turn more accurately reflect an agency's demand for Metropolitan supplies.

> Gain of Local Supply Adjustment: This adjustment accounts for planned or scheduled gains in local supply production above the base period, which are not due to extraordinary actions to increase water supply in the allocation year. These previously scheduled increases in supply programs or local production are added to the base period local supplies.

> Loss of Local Supply Adjustment: This adjustment accounts for losses of local supply production from the base period. Losses of local supply, due to such things as hydrology or water quality, are subtracted from the Base Period Local Supplies. Losses of local supply that are not covered by this adjustment include groundwater losses that are less than or equal to base period replenishment deliveries and supplies that were used to cover IAWP shortages, and are no longer available to meet firm demands.

> Increased Production Adjustment: This adjustment accounts for extraordinary increases in local supplies above the base period. Extraordinary increases in production include such efforts as purchasing spot transfers or over-pumping groundwater basins. In order not to discourage such extraordinary efforts, the yield from these supplies would not be included in the allocation formula until the Metropolitan shortage exceeds ten percent. In shortages greater than ten percent, the yield from these efforts would be added to the Base Period Local Supplies at the same percentage rate as the Metropolitan shortage. For example, in a 15 percent shortage, only 15 percent of the yield from extraordinary efforts would be counted, leaving the remaining 85 percent for the sole use of the Member Agency.

Allocation Year Demands on Metropolitan: Demands on Metropolitan for the allocation year are calculated by subtracting the Allocation Year Local Supplies from the Allocation Year Retail Demands.

Credits

In order to address the effects of demand hardening, and recognize efforts in conservation and local investments, the allocation formula provides an additional allocation in the form of credits for agencies that participate in these actions.

Hardening Credits: Demand hardening credits are included in the allocation formula to help mitigate for the effects of activities that make it more difficult to reduce water use.

> Conservation Hardening Credit: The conservation hardening credit is intended to address the demand hardening that results from the successful implementation of conservation devices and plumbing codes. This credit is calculated by multiplying the Base Period Conservation Savings by the Metropolitan shortage percentage.

> Non-Potable Recycling: Non-potable recycling is another activity that creates a demand hardening issue. Because non-potable water supplies produced by recycling are not transferable to potable uses, potable water customers will bear the entire burden of a cutback during a shortage. To address this issue, non-potable recycling production is excluded from the Base Period Local Supplies, and consequently, from the Base Period Retail Demand. This approach effectively creates an allocation based solely on potable water demands.

Reward and Incentive Credits: These credits would be included in the allocation formula to provide additional water supply allocations to reward those agencies who have successfully developed additional supplies and programs. These credits essentially reward those who have undertaken significant effort or expense to add to regional reliability.

Local Supply Development Credit: The proposed allocation plan implicitly provides agencies that have higher local supply development with higher reliability on the retail level. There is general agreement with member agency staff that the implied credit is sufficient to recognize growth in local supplies, and that an additional explicit credit is not required in order to address the principles for allocation implementation.

Conjunctive Use Partnering Credit: At the present time, additional credits for conjunctive use development are "parked" for later discussion.

Conserving Rate Structure Credit: At the present time, a proposal for additional credits for conserving rate structure has been discussed. In that proposal, agencies with a qualifying rate structure (to be determined) would add to their base period conservation an amount equal to 0.5 percent of their adjusted retail demand, effectively increasing their conservation hardening credit. Because a qualifying criteria for a rate structure has not yet been determined, this additional credit has not been included in this draft proposal. For reference purposes, the total regional adjusted retail demand is approximately 4,000,000 acre-feet, making the maximum total credit under this method approximately 20,000 acre-feet.

Active Conservation Credit: At the present time a credit for successfully implementing active conservation programs is being considered.

Allocation Formula and Accounting

The following elements of the allocation formula are designed to develop an allocation formula that is equitable on the wholesale level, while helping to minimize hardships experienced by individuals and by the regional economy at the retail level.

Shortage Levels: Metropolitan's plan proposes a formula that allocates shortages of Metropolitan supplies over ten levels: from 5 to 50 percent, in five percent increments. The following table illustrates the relationships between the various elements of the allocation formula discussed below.

Shortage Level	Shortage Percentage	Wholesale Minimum Allocation	Economic Adjustment Maximum	IAWP Reduction
1	5%	92.5%	0.0%	30%
2	10%	85.0%	0.0%	30%
3	15%	77.5%	7.5%	40%
4	20%	70.0%	10.0%	50%
5	25%	62.5%	12.5%	75%
6	30%	55.0%	15.0%	90%
7	35%	47.5%	17.5%	100%
8	40%	40.0%	20.0%	100%
9	45%	32.5%	22.5%	100%
10	50%	25.0%	25.0%	100%

Shortage Percentage: The total regional shortage of Metropolitan's available supplies when compared to the sum of the demands

Minimum Allocation: The Wholesale Minimum Allocation is established to ensure a minimum level of wholesale water service (Metropolitan supplies) at the member agency level, and sets the target for recognizing a member agency's ongoing investment in Metropolitan's system. The Wholesale Minimum Allocation ensures that Member Agencies will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of Metropolitan regional water supplies. The Wholesale Minimum Allocation is equal to 100 percent minus one-and-a-half times the shortage level.

Economic Adjustment Maximum: The Economic Adjustment Maximum is the factor used to address major differences in retail level shortages associated with across-the-board cuts. The purpose of this adjustment is to ensure that agencies with a high level of dependence on Metropolitan do not experience highly disparate shortages compared to other agencies when faced with a reduction in wholesale water supplies. The Economic Adjustment Maximum factor is the difference between the regional Shortage Percentage and the Wholesale Minimum. The amount of the adjustment for each member agency is prorated on a linear scale, based on its dependence on Metropolitan at the retail level. The prorated amount of allocation is referred to as the Economic Adjustment Allocation. For agencies that are 100 percent dependent on Metropolitan, this method will result in an allocation of Metropolitan supplies that, at the retail level, will result in a shortage equal to the regional shortage percentage. In other words, through this allocation, no agency will experience a greater percentage shortage than the regional shortage percentage. This adjustment is only applied when Metropolitan shortage levels are three or greater.

Conservation Demand Hardening Credit: The Conservation Demand Hardening Credit is the method to address the increased difficulty in achieving additional water savings at the retail level as a result of the implementation of water conserving devices. The credit is calculated by multiplying an agency's quantified conservation savings (in acre-feet) and multiplying by the regional shortage percentage.

M&I Allocation: The allocation of Metropolitan supplies to an agency for its Municipal and Industrial retail demand is the sum of the Wholesale Minimum Allocation, the Economic Adjustment, and the Conservation Demand Hardening Credit.

IAWP Allocation: The IAWP allocation is calculated by decreasing the base year IAWP deliveries by the percent IAWP reduction.

Total Allocation: The total allocation of Metropolitan supplies to an agency is calculated by adding together the M&I Allocation and the IAWP Allocation.

Allocation Example

The following example gives a step-by-step description of how the proposed formula would be used to calculate an allocation of Metropolitan supplies for a hypothetical member agency.
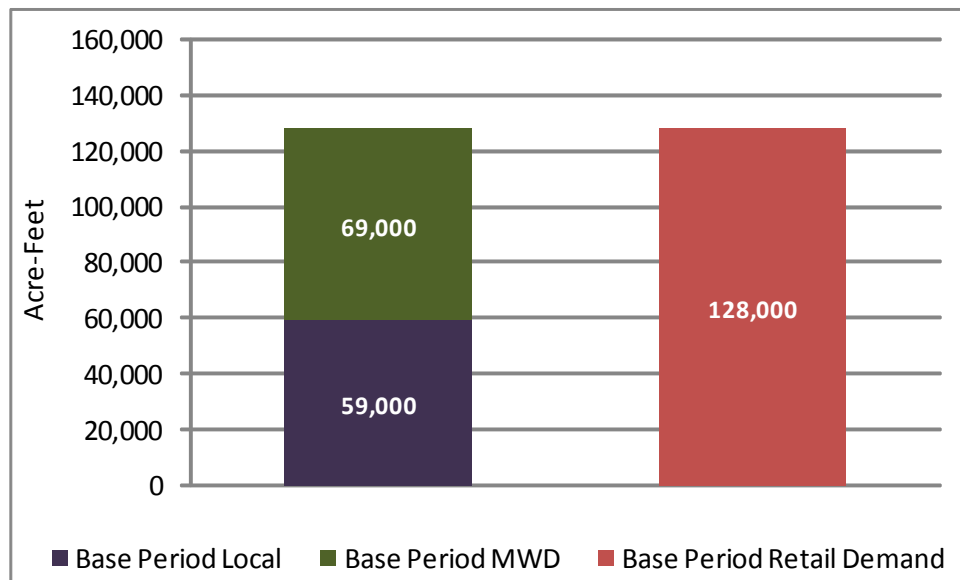
Step 1: Calculate Base Period Retail Demand

The first step in developing an agency's allocation is to estimate the agency's retail level water needs. Two pieces of information are required to calculate retail level water needs: (1) The amount of local supplies that were produced in the base period, and (2) The amount of MWD demands in the base period. The Base Period Local Supplies are calculated using a three-year average of groundwater, groundwater recovery, Los Angeles Aqueduct supply, surface water, and other non-Metropolitan imported supplies. The following chart illustrates how the Base Year Local Supplies are calculated for this agency.
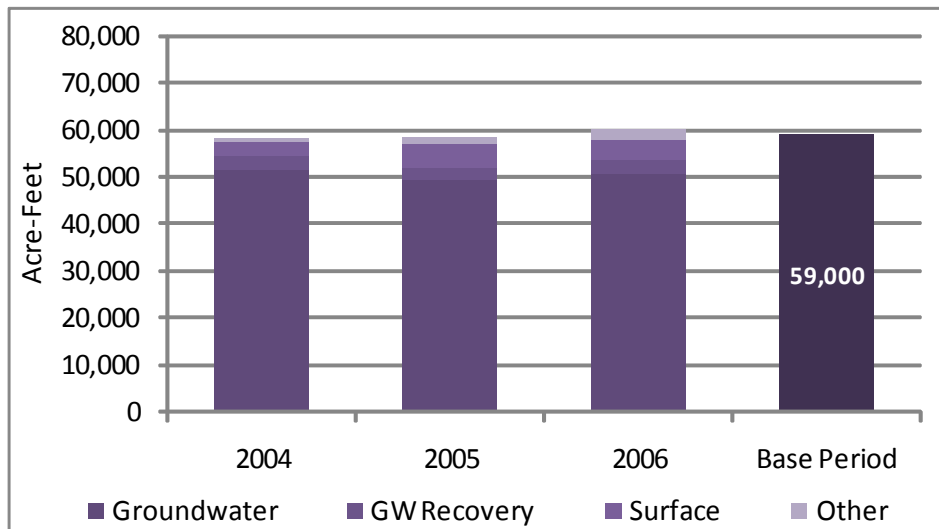
Base Period Demands on Metropolitan are calculated using the same three-year time period as the Base Period Local Supplies. The Base Period Demands on Metropolitan include full-service, seawater barrier, seasonal shift, and surface storage operating agreement; as shown in the chart below.
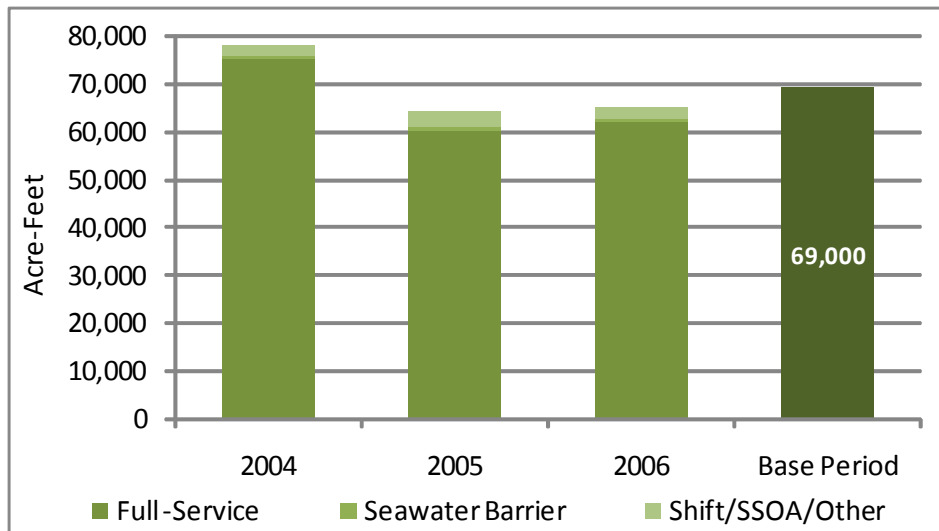

Once the two pieces of information described above have been calculated, they can be added together to get the total of an agency's water use in the base period. This is the Base Period Retail Demand.


Step 2: Adjust Base Period Retail Demand for Growth

The second step in the allocation formula is to adjust the Base Period Retail Demands for growth that occurred since the base period. The growth adjustment is calculated using the average annual rate of population growth over the three-year base period, or using a weighted combination of population and employment growth rates if an agency so requests through the appeals process.
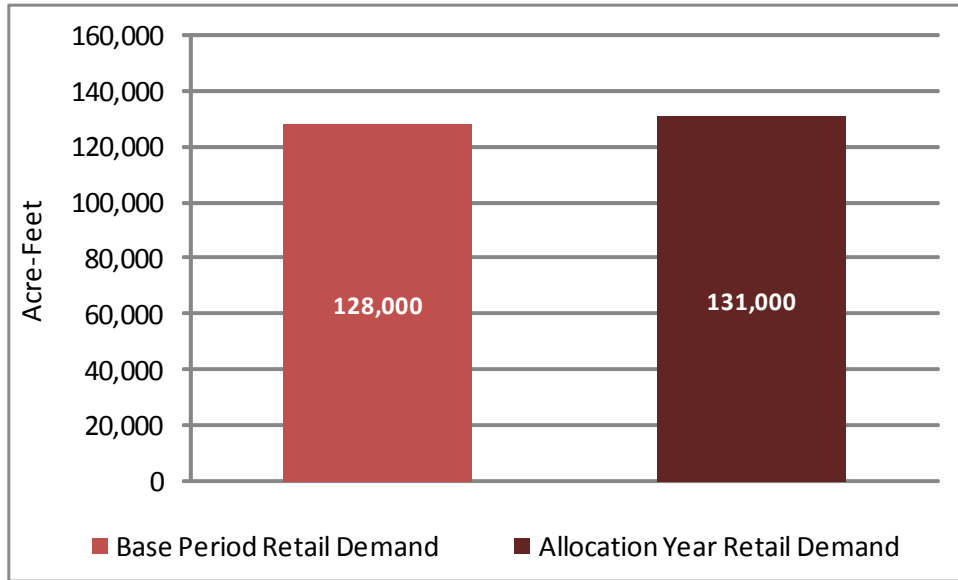
Step 3: Adjustment for changes in local supply from the Base Period

The third step in calculating this agency's allocation is to calculate the agency's local supply production in the year of the allocation. This is done by using Base Period Local Supplies that were calculated in Step One, and adding back base period in-lieu deliveries and any gains or losses. Base Period In-Lieu Deliveries are calculated by averaging in-lieu deliveries from the same three-year period that was used to calculate the Base Period Local Supplies and Demands.
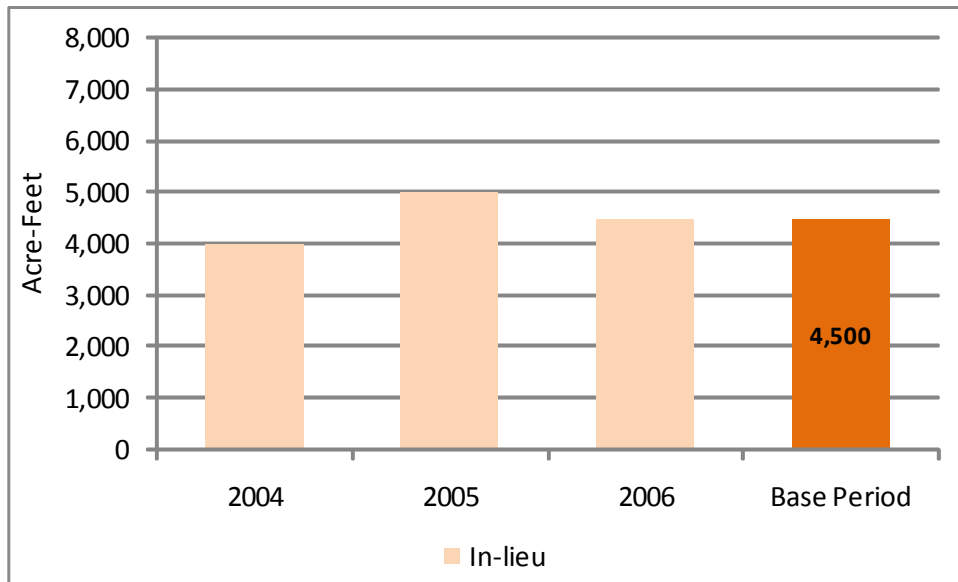
In addition to adding in base period in-lieu deliveries, the Base Period Local Supplies are adjusted for gains and/or losses of supply that are occurring in the allocation year. If this agency had undertaken extraordinary efforts to secure alternative supplies, this Increased Production would also be added here. The following chart shows how Base Year Local Supplies, Base Year In-Lieu Deliveries, and adjustments for gains or losses of supply are added together to produce an estimate of the Allocation Year Local Supplies.
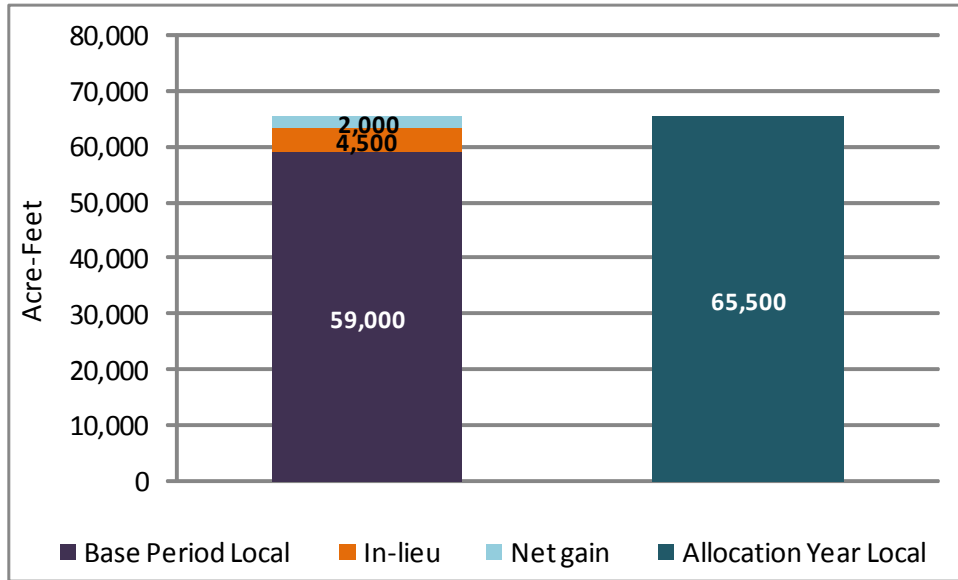
Step 4: Calculate Wholesale Water Needs in the allocation year

Now that both the retail demands and the local supplies for the allocation year have been estimated, the agency's demand for wholesale Metropolitan supplies can be calculated. The Allocation Year Firm Demands on Metropolitan are calculated by subtracting the Allocation Year Local Supplies from the Allocation Year Retail Demands. Any demand that is remaining after the agency's local supplies are accounted for represents demand for wholesale supplies from Metropolitan. The example in the chart below shows that 50 percent of this hypothetical agency's Allocation Year Retail Demands will be met by local supplies, and 50 percent by wholesale Metropolitan deliveries.
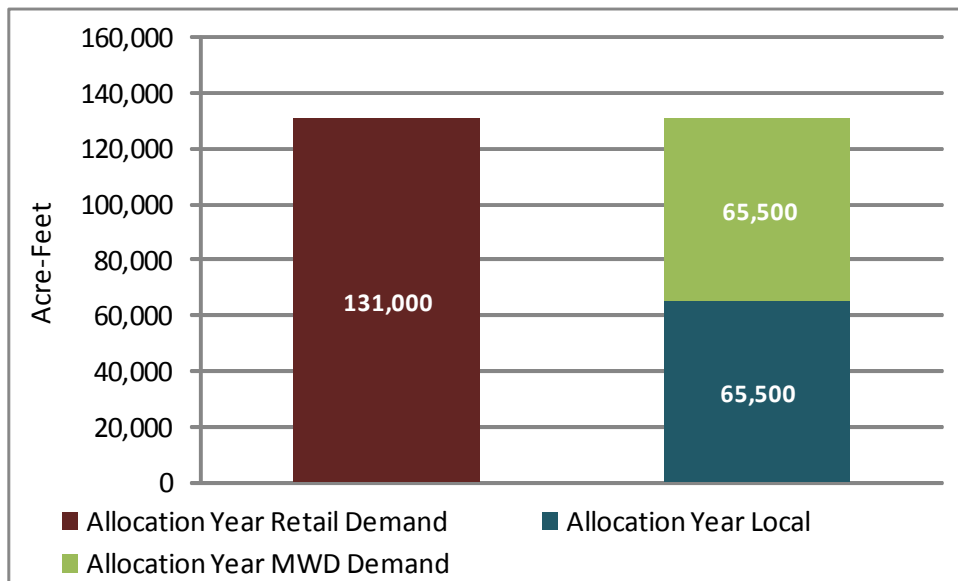
Step 5: Calculate Wholesale Minimum Allocation

Now that the agency's wholesale water needs have been estimated, the allocation formula can be used to calculate the agency's minimum allocation of Metropolitan supplies. This example will follow the allocation formula accounting, through a Level-3 (15 percent regional shortage). The table below shows the essential elements of the allocation formula under a Level-3 shortage.
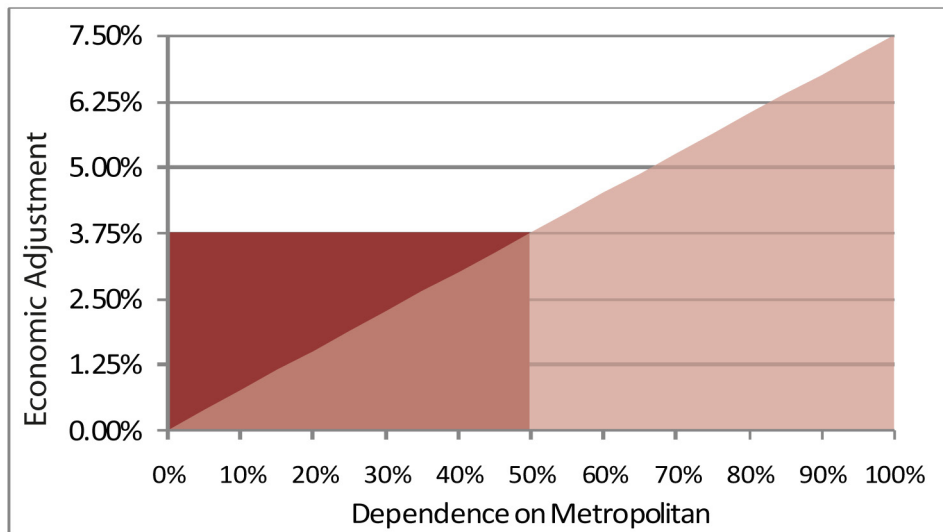
Shortage Level	Shortage Percentage	Wholesale Minimum Allocation	Economic Adjustment Maximum	IAWP Reduction
3	15%	77.5%	7.5%	40%

The first part in determining this agency's allocation is to calculate the Wholesale Minimum Allocation. The Wholesale Minimum Allocation is calculated by multiplying the wholesale promise percentage from the allocation table, by the agency's allocation year wholesale demands on Metropolitan that were calculated above. The following chart illustrates this calculation; 77.5 percent of 65,500 acre-feet is equal to 50,763 acre-feet.
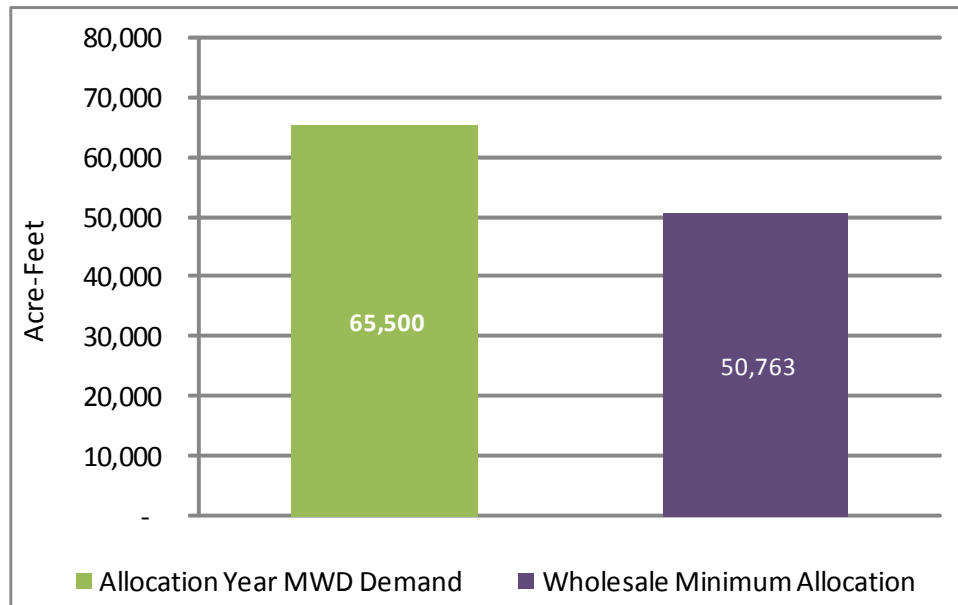
Step 6: Calculate Economic Adjustment Allocation

The next step in determining this agency's allocation is to calculate the Economic Adjustment Allocation. Recall from the allocation table, the Economic Adjustment Maximum factor is the difference between the Wholesale Minimum Allocation and the regional Shortage Percentage. Under a Level-3 (15 percent) shortage, the Economic Adjustment Maximum factor available to any agency is 7.5 percent. In a previous step, this agency was calculated as having a 50 percent dependence on Metropolitan supplies. Under this example the agency would receive 50 percent of the 7.5 percent Economic Adjustment Maximum factor, or an additional 3.75 percent allocation of Metropolitan supplies as the Economic Adjustment Allocation.

Step 7: Calculate Conservation Hardening Credit

The Conservation Hardening Credit is calculated by multiplying the agency's Base Year Conservation savings by the declared regional shortage percentage. Under a Level-3 shortage (15 percent), this agency would receive 15 percent of 14,500 acre-feet, equaling 2,175 acre-feet of additional allocation to account for demand hardening.
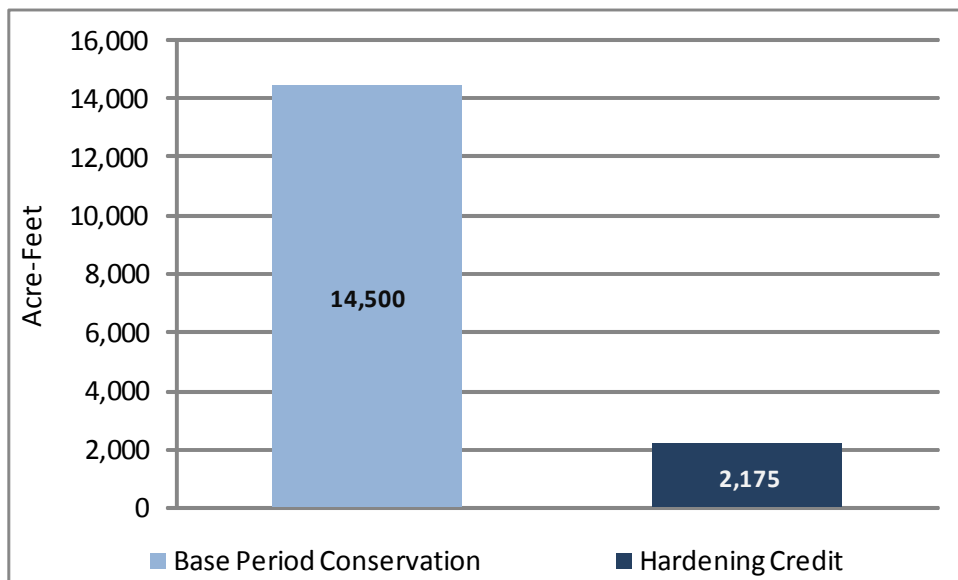

Note: If this agency qualified for any of the other proposed credits, they would be calculated and added to the Credits at this point.

Step 8: Add the Minimum Wholesale Allocation, Economic Adjustment Allocation, and Conservation Hardening Credit to get the final M&I agency allocation

The chart below shows how the Wholesale Minimum Allocation of 50,763 acre-feet, the Economic Adjustment Allocation of 2,456 acre-feet, and the Conservation Hardening Credit of 2,175 acre-feet are added together to total to the final M&I allocation of 55,394 acre-feet.
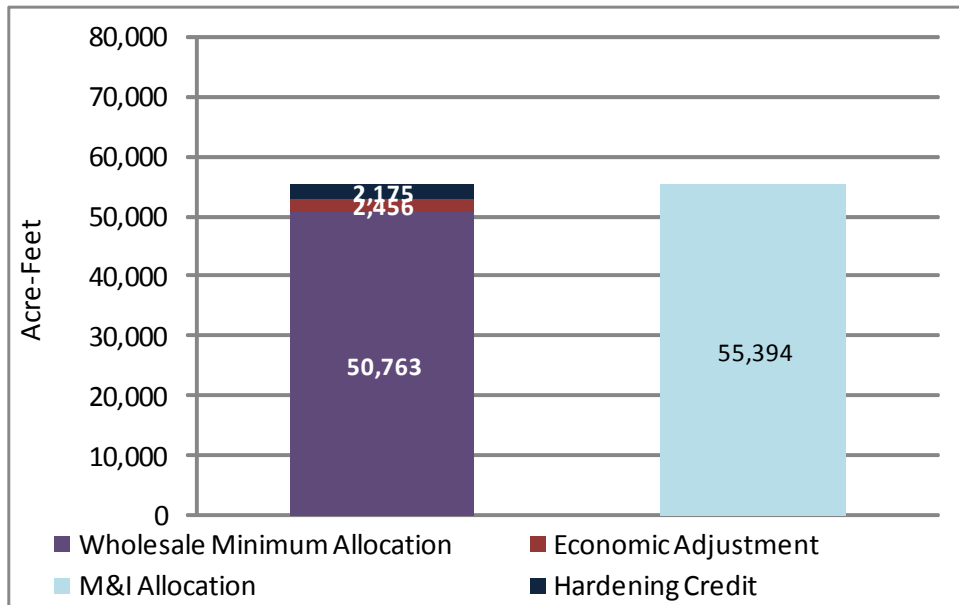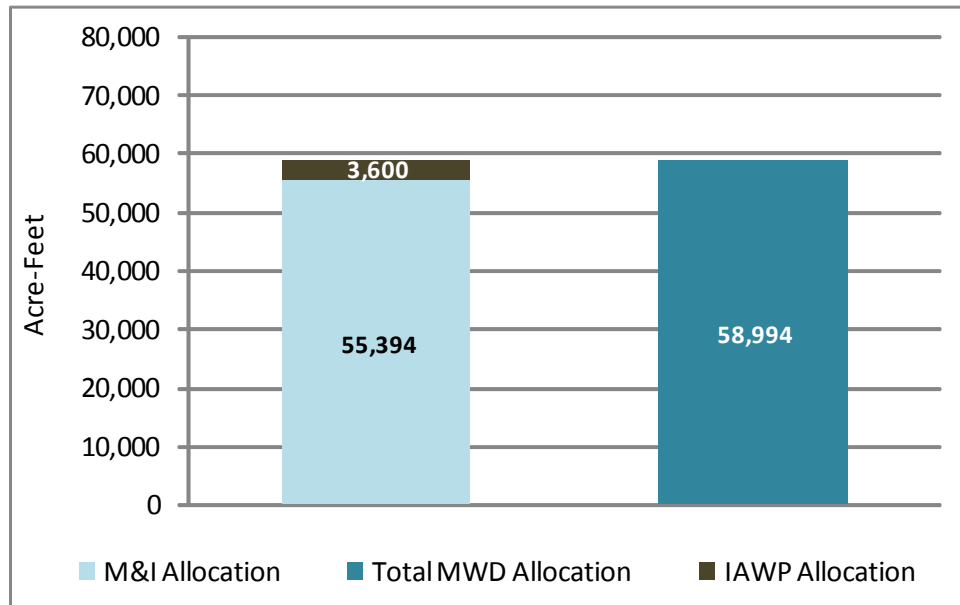
IAWP Allocation

The IAWP allocation for this agency is calculated by simply reducing the Base Year IAWP deliveries by the percent IAWP reduction. Under a Level-3 (15 percent) regional shortage this agency would see a 40 percent reduction in IAWP deliveries in the allocation year. The following chart illustrates this calculation.
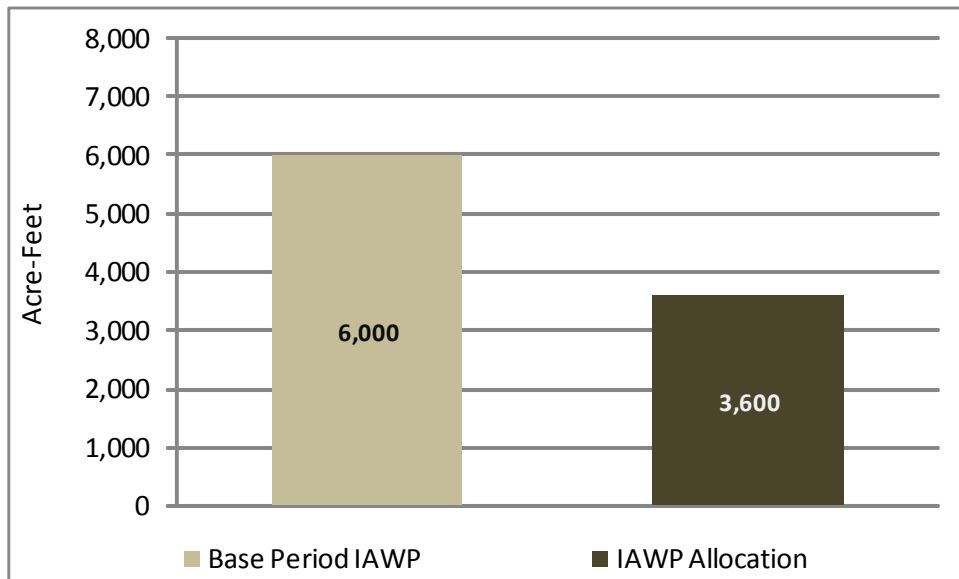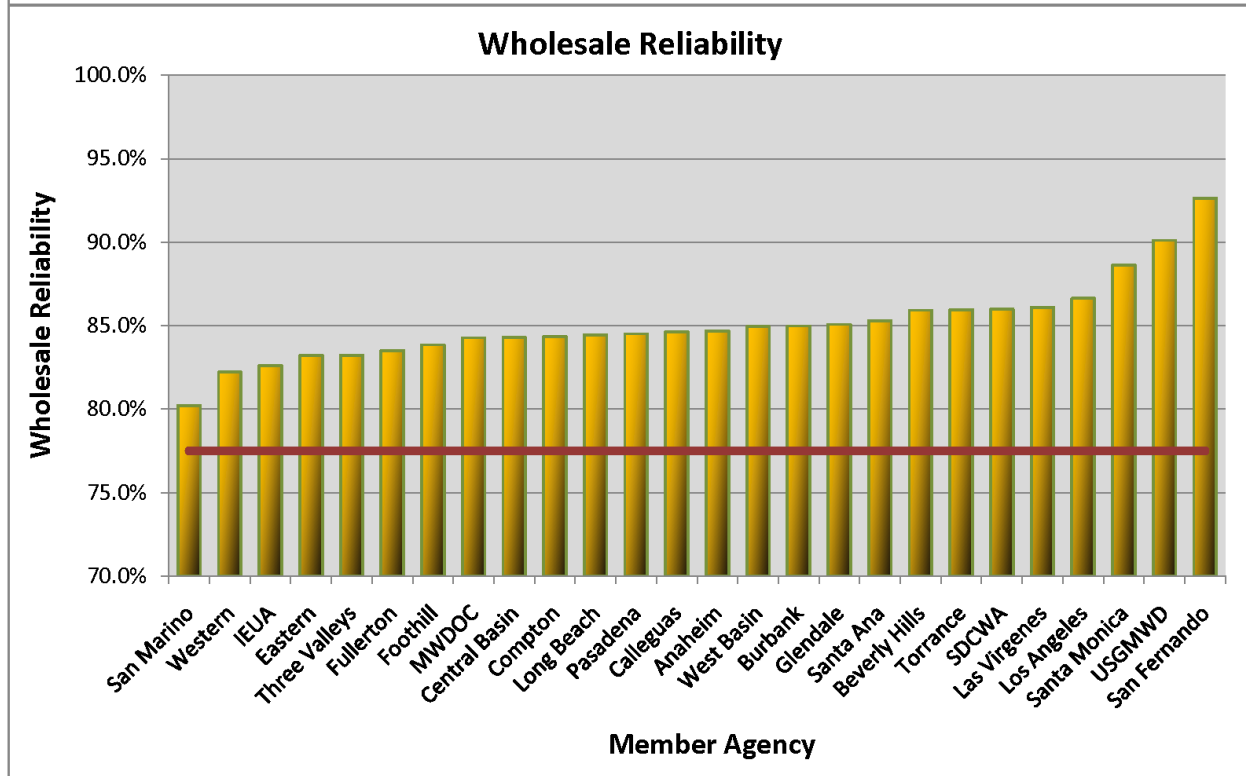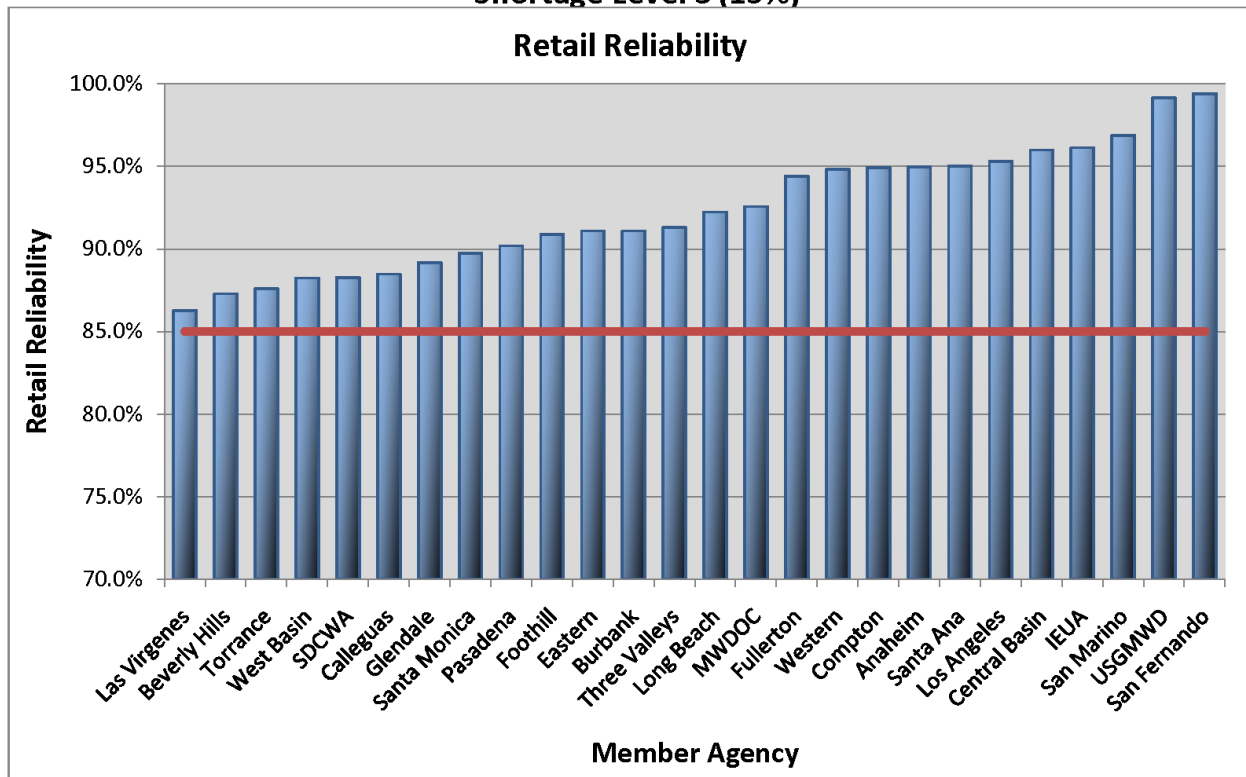

Total Allocation

The final step in calculating this agency's allocation of Metropolitan supplies is to sum up all of the elements of the allocation formula that were calculated above. In this example, the agency would receive 53,219 acre-feet of M&I Allocation, plus 2,175 acre-feet of Credits, plus 3,600 acre-feet of IAWP Allocation, for a Total Allocation of 58,994 acre-feet.

Reliability Under Metropolitan's Draft Shortage Allocation Proposal
Shortage Level 1 (5%)

Retail Reliability

Wholesale Reliability
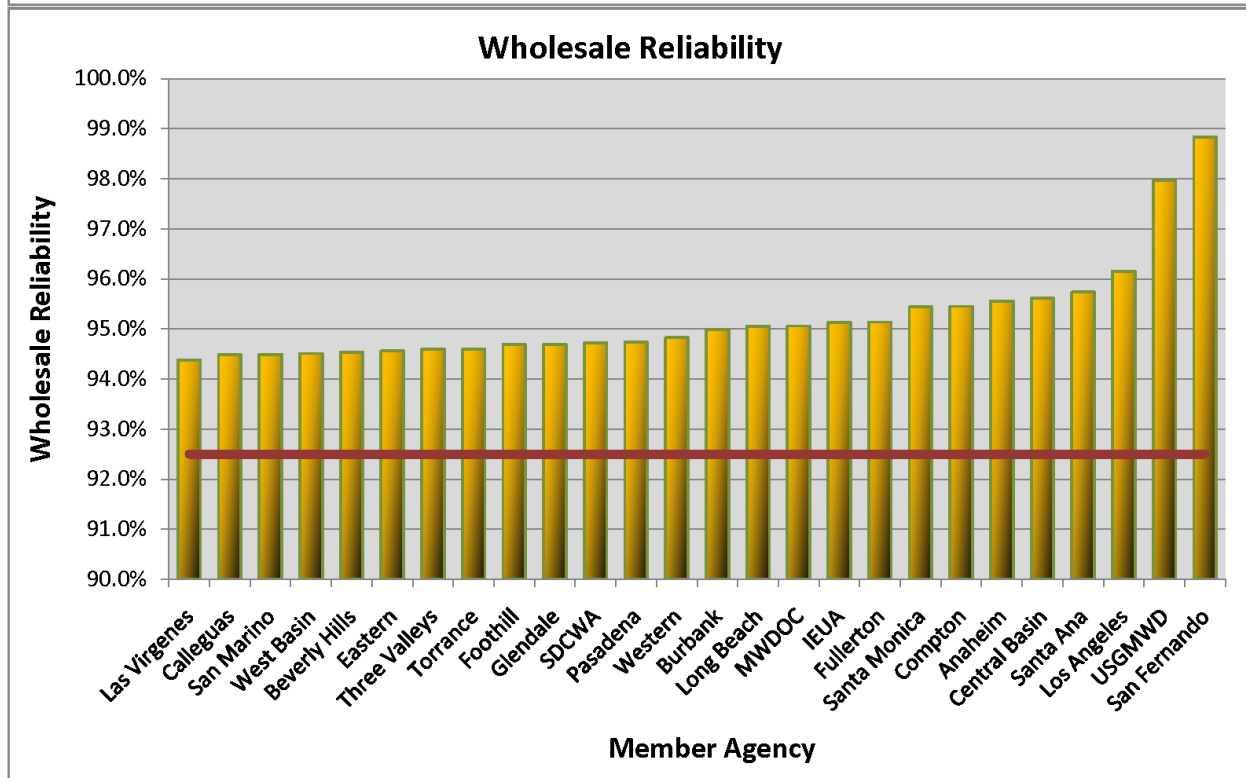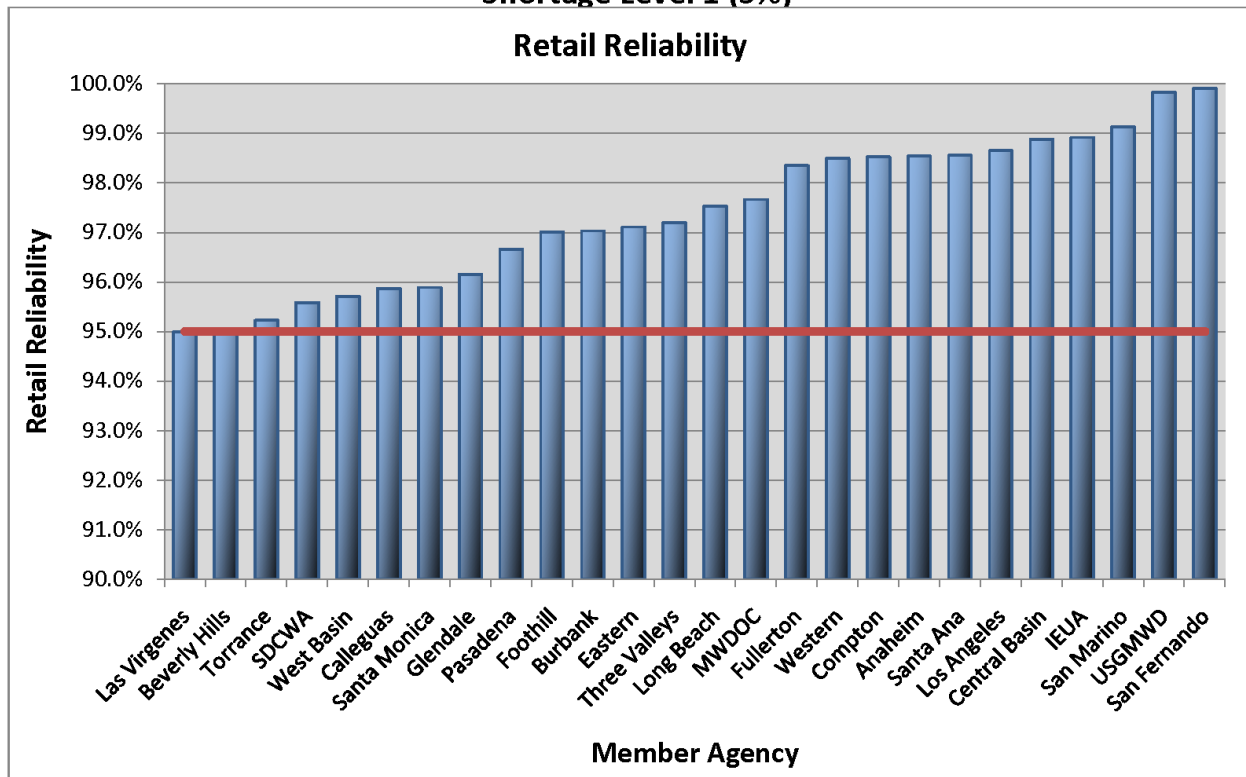
Reliability Under Metropolitan's Draft Shortage Allocation Proposal
Shortage Level 3 (15%)

Reliability Under Metropolitan's Draft Shortage Allocation Proposal
Shortage Level 6 (30%)

Retail Reliability

Wholesale Reliability