Maryland Technical Advisory Committee on Water Supply Infrastructure

Final Report October 2000

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EXECUTIVE SUMMARY

The Maryland Technical Advisory Committee on Water Supply Infrastructure was formed on January 7, 2000, by Governor Parris N. Glendening's Executive Order 01.01.200.01. The Committee was asked to make recommendations regarding community water system infrastructure deficiencies and needed improvements in Maryland.

In 1999, Maryland experienced one of the worst droughts on record. Many public water systems had difficulty meeting the high demands combined with diminishing sources. This water supply infrastructure plan focuses on the areas of deficiencies with the water supply infrastructure in Maryland and recommends options to address them. The plan identifies the following as problems affecting Maryland's water system infrastructure:

- Adequacy of system capacity to meet demands during drought periods;
- High unaccounted water within distribution systems;
- Opportunity to elevate water conservation among consumers and;
- Inadequate available funding for necessary water system improvements

This document outlines the Committee's recommendations for addressing these concerns. The Committee recommends the following to assess and improve water system infrastructure and to reduce unaccounted water.

- Water systems that serve a population of 10,000 or greater should determine the adequacy of the water system supply and storage to provide acceptable service during drought periods.
- These systems should determine their per capita usage and conduct a water audit on an annual basis. If the residential per capita usage is greater than 100 gallons per capita per day, the water system should conduct annual water conservation public education. If the water system's unaccounted water is greater than 10% the water system should prepare a plan for identifying and reducing water losses.
- Water systems that serve a population of 10,000 or greater that are approaching their capacity should prepare a capital improvement plan that ensures the sufficient capacity will be available for a planning period of 10 years. This plan should be updated every 5 years. When feasible, the plan should include the potential for interconnection with nearby water systems to improve reliability.
- The Maryland Department of the Environment (MDE) should further review the per capita usage of water systems, including those that serve a population less than 10,000, at the time of appropriation permit application or renewal.
- Available funding for water supply infrastructure improvements is inadequate when compared to capital improvement needs. Current water rate structures should be evaluated to provide the necessary capital where feasible, and additional sources of funding should be pursued.
- The MDE should further review its authority to enforce the above recommendations and seek additional legislative/regulatory authority if necessary.

INTRODUCTION

Although Maryland is blessed with abundant water resources, climate conditions combined with growth and water use practices have periodically resulted in a shortage of water for Maryland's citizens.

Maryland has experienced two severe drought situations in the memorable past, one in the mid-1960's, and more recently in the late 1990's. The recent experience led Governor Parris Glendening to reevaluate the State's existing drought preparedness plan.

On January 7, 2000, an Executive Order 01.01.2000.01 (Appendix 1) formed the Maryland Technical Advisory Committee on Water Supply Infrastructure (Appendix 2). The Committee was tasked with:

- Studying the impact of infrastructure deficiencies on water conservation;
- Recommending and prioritizing infrastructure improvements to minimize water loss;
- Identifying all possible funding sources for infrastructure improvements; and
- Suggesting statutory or regulatory amendments to address its findings, if necessary.

The Maryland Technical Advisory Committee on Water Supply Infrastructure met from Spring 2000 to Fall 2000. This document is the result of the Committee's efforts to assist the State in developing and implementing long-term water supply infrastructure policies and programs.

Types of Difficulties Experienced in 1999 Drought

Many water systems in Maryland experienced problems associated with the 1999 drought. These problems generally fell into two categories; diminishing sources and; water system demands approaching the system's ability to produce water. Because of low stream flows, some surface water systems had difficulty meeting requirements for minimum flow-by permits.

In addition because of the extreme temperatures, combined with the drought, water systems were facing historical high demands, further compounding problems associated with diminishing sources. Over 60 water systems already had water restrictions in place prior to the Statewide outdoor water restrictions.

As discussed later in this report, a number of water systems may have experienced high demands that were close to or at their maximum capacity. This experience has shown that water systems need to evaluate their ability to supply sufficient water during high demand periods and drought years.

RESPONSIBILITIES

Monitoring the condition of water supply infrastructure is a responsibility shared by numerous organizations and agencies. In Maryland, MDE has primary responsibility of inspecting, reviewing designs, surface and groundwater permitting, and enforcement of State and federal drinking water monitoring requirements. Responsibilities follow:

WATER SYSTEMS

Responsible for operation, maintenance and compliance with all State and federal regulations. Water systems may be owned by a county department of public works, a Mayor and Council, private investors or homeowners associations or governmental agencies.

STATE

Department of the Environment

Administers the federal Safe Drinking Water Act.
Develops the State's comprehensive ground water protection program.
Issues water appropriation permits for use of surface and ground waters.
Responds to local water supply emergencies.
Conducts sanitary surveys, on-site training and evaluations of water systems.
Provides financial assistance in the form of grants and low interest loans permits and inspects capital projects.

Department of Housing and Community Development

Administers Maryland's Community Development Block Grant program for smaller non-entitlement communities. Includes drinking water projects and individual hook-ups.

Department of General Services

Operation and maintenance of State facilities.

Department of Natural Resources

Monitors the effects of drought on forests, fish and wildlife. The Maryland Geological Survey conducts studies of Maryland's water sources.

Department of Health and Mental Hygiene

Assess and responds to any impacts of water shortages on public health

FEDERAL

Environmental Protection Agency

Awards capitalization grants to States as appropriated by the US Congress to establish revolving loan funds to assist public water systems with infrastructure improvements. Administers funding for State water supply programs.

U.S. Department of Agriculture

Rural Development Office is responsible for administering a federal loan and grant program, as well as construction management services.

Housing and Urban Development

Provides block grants for smaller non-entitlement communities for projects implementing approved housing and community development activities including drinking water projects and individual hook-ups.

DEFINING DROUGHT

The Technical Advisory Committee on Water Supply Infrastructure has elected to use the U.S. Army Corps of Engineers' definition of drought, which states, "droughts are periods of time when natural or managed water systems do not provide enough water to meet established human and environmental uses because of natural shortfalls in precipitation or stream flow". This Committee focused on how to identify and prioritize infrastructure-related problems in Maryland's community water supply systems.

One measure of natural shortfall is rainfall deficit. In particular, it is useful to compare current rainfall deficit to deficits within the period of record. In this way, it can be determined if a current deficit is within a commonly experienced range, or whether it is unusually large.

It is important to keep in mind that, while maintaining water supplies for human use is an important aspect of drought management, drought can also have many other dramatic and detrimental effects on the environment and wildlife. For instance, water suppliers using surface water sources must remain vigilant to ensure that sufficient flow remains in the rivers to meet other environmental needs. These indicators are designed to ensure that Maryland considers all potential impacts of extended periods of dry weather when evaluating drought conditions.

DROUGHT INDICATORS AS DETERMINED BY THE WATER CONSERVATION COMMITTEE

In order to monitor potential drought conditions in a uniform manner across the State, Maryland will use four indicators of water sufficiency. The indicators are based on the amount of precipitation and the effect of the precipitation (or lack of precipitation) in the hydrologic system. These indicators include precipitation levels, stream flows, ground water levels, and reservoir storage. The indicators will be used in conjunction with the condition of water supplies.

Indicators will be evaluated by comparing current conditions to natural conditions within the period of record. In this way, it can be determined if a current deficit is within a commonly experienced range, or whether it is unusually large.

Precipitation

Precipitation amounts will be reported by comparing current precipitation amounts with historical precipitation values as a percent of normal precipitation. Comparisons will be made for each county using data prepared by the Mid-Atlantic River Forecast Center of the National Weather Service. The percent of normal precipitation value for a region will be the average of the county values within that region. Normal is defined as the mean precipitation for a thirty-year record for the area and time period being evaluated.

Precipitation amounts will be evaluated based on the water year (beginning October 1). Water years are a natural dividing point for water supply drought as precipitation that falls in the first six months of a water year is analogous to putting money in the bank. A higher percentage of this rainfall or snowfall ends up recharging the ground water system, which sustains the stream flows and ground water levels during dry periods. Deficits during this time are more critical for later water levels than deficits during the growing season. If a precipitation deficit outside of the normal range exists at the end of a water year, the precipitation records will carry forward until a normal condition is reached.

Stream Flow

Stream flow gages representing each region (except Southern Maryland) will be used to measure stream flow. Using 7-day a verage flows, the median flow for the evaluation period will be compared with low flows representing historical occurrence frequencies of 25%, 10% and 5% for the same date for the period of record. A 25% frequency equates to a one in four year occurrence, 10% frequency a one in 10 year occurrence and 5% frequency a one in 20 year occurrence.

Ground Water Levels

Representative wells for each region will be used for monitoring ground water levels. The five Maryland wells reported in the USGS monthly water reports will be supplemented with additional wells monitored by USGS. Ground water conditions will be evaluated on a monthly basis. The monthly levels will be compared with values equivalent to the 25^{th}, 10^{th}, and 5^{th} percentiles of historical records.

Ground water levels in confined aquifers are responsive to pumping stresses at distances far removed from pumping centers. No baseline exists for measuring changes in water levels for confined systems. Therefore percentile frequencies are not available for wells in these systems. Evaluation of drought impacts in these systems will have to be analyzed as a departure from the long-term downward trend in water levels.

Reservoir Storage

Reservoirs are designed to provide adequate storage when demand exceeds reservoir inflow. As the streamflows are lowest during the summer period and demand is also greatest, the most critical time begins at the onset of summer. Adequate storage is presumed enough to last for a four-month period or 120 days.

OTHER INDICATORS

In addition to the four primary indicators, two other factors may enter into evaluating drought conditions.

Palmer Drought Severity Index

The Long-Term Palmer Drought Severity Index depicts prolonged (months, years) of abnormal dryness or wetness. It responds slowly, changes little from week to week, and reflects long-term moisture, runoff, recharge and deep percolation, as well as evaporation. Although the Palmer Index will not be useful for monitoring monthly or more frequent changes in drought status, and thus is not a suitable indicator for purposes of this drought management plan, the Index will be monitored as applicable for reflecting the long-term status of water supplies in aquifers, reservoirs, and streams.

Water System Problems

Water suppliers in Maryland are responsible for monitoring and reporting to MDE their own water supply situations, including any negative impacts resulting from drought conditions. Due to conditions specific to individual systems, some water supplies may suffer negative impacts much sooner or later than others. MDE will continue to monitor drought-related water supplier problems throughout the year.

REGIONAL DROUGHT SUSCEPTIBILITY

Maryland is a State of vast diversity. Watershed topographies range from the relatively flat landscapes of the eastern shore to the mountainous regions of the western areas of the State. Geologic conditions vary as well, with the western and central areas being formed of primarily fractured rock aquifers, while southern Maryland and the eastern shore regions are composed of sandy aquifers. Climates also differ, with normal precipitation ranging from about 36 inches per year in Allegany County to almost 45 inches per year in Harford County.

Maryland's water resources also vary widely. Public water systems obtain their supplies from both surface and ground water sources. Out of a total of 516 community water systems in Maryland, 59 obtain their water from surface sources and 457 use groundwater as a source (see Appendix 3. The two largest water suppliers, the Washington Suburban Sanitary Commission (WSSC) and the City of Baltimore rely on surface water as sources. Because most of the larger water systems use surface water sources, about two-thirds of Maryland's citizens are supplied water that originates from a surface water source. Public water systems in the rural areas of the State use primarily ground water as their source. In addition, many homeowners obtain their domestic water from individual wells. Because of the variety of water sources, and regional differences in climate, susceptibility to drought varies across the State.

Evaluating Infrastructure Problems In Maryland's Water Systems

The first step in determining a course of action was to undertake an extensive evaluation of the current condition of Maryland's water supplies, and the types of problems that the suppliers are experiencing. The Committee used several resources to conduct this research, including reviewing MDE data regarding water appropriation and usage and examining the U.S. Environmental Protection Agency's report on Maryland's Drinking Water Infrastructure Needs Survey. In addition, the Committee asked MDE's Water Supply Program to conduct a survey of large and medium systems and to summarize some of the difficulties that were experienced by Maryland systems in the 1999 drought. Finally, the Committee considered the impact of water pricing on infrastructure. Agenda and minutes of the meetings can be found in Appendix 4.

Results of MDE Survey of Medium and Large Systems

A survey of sixty Maryland water systems that serve more than 3,300 persons per day was conducted in June of 2000. The survey asked for information on the impact of last year's drought, on unaccounted water use and on the metering practices of the systems. Of the fifty systems that responded to the survey, eight reported problems related to water shortages from the drought, including either flow-by restrictions on their water source, or reduced capacity of ground water sources.

Systems were asked to provide information about their unaccounted water, including leakage, the frequency with which they calculate that loss, and their metering practices. Systems were asked to report the percentage of unaccounted water, they experience. Of the 50 systems, seven reported less than 10% unaccounted water, fourteen reported between 10% and 20%, seven reported 21% - 30%, and two systems reported unaccounted water loss in excess of 30%. Twenty systems did not know their unaccounted water. Some statistics suggest that an average for unaccounted water is 15% to 20%.

Systems indicated that meter inaccuracy may be one reason for the unaccounted water. Typically, as a meter ages it tends to become less accurate, generally recording lower use than is actually occurring. As a result, customers may not be aware of their actual water use, and may not implement conservation practices that might be more attractive if the meter readings were more accurate. This could also mean loss of revenue for the system. Many systems did not have a program to replace or calibrate meters, although some systems reported that they calibrate or replace meters every 10 – 30 years. Systems with more aggressive meter calibration programs reported lower unaccounted water losses. Not all systems that took part in the survey meter their residential customers.

In addition, the survey indicated that systems that are more vigilant about calculating their unaccounted water tend to have lower leakage. Systems may monitor their unaccounted water more regularly when normal demand places a burden on the system's production capacity. A tabulated result of this survey is included in Appendix 5.

Statistics Regarding Water System Capacity and Use by Maryland Water Systems

Tables I through VIII in Appendix 6 compare the amount of water that systems are permitted to withdraw under their Water Appropriation Permits, the production capacity of the systems, and their actual water usage. The tables compare, for both surface water and ground water systems, the permitted withdrawals with production capacity, the water use with production capacity, and the water use with the permitted withdrawals. The tables provide information on twenty-eight surface systems and sixty-one ground water systems, all of which serve more than 1,000 persons per day. These data were obtained from MDE's Water Supply Program database. The data collected were for the period of calendar year 1999 and included; 1) maximum day demand from water system monthly operating reports; 2) usage; 3) appropriation permit allowances; 4) system capacity, and; 5) population.

It was difficult to make conclusive generalizations from these statistics, because there are factors specific to individual systems that affect the data. For instance, when a system has multiple sources, appropriation permits are written so that the system can continue to meet its demand even if one source is not operating. Therefore, the sum of the maximum water withdrawal allowed per day on each permit presents a distortion of data. Also, the actual water usage recorded for the systems includes both domestic and non-domestic use and thus the per capita use estimates may be skewed for systems that serve large numbers of industrial users.

The 1999 Maximum Day Demand and Maximum Month as obtained from water system monthly operating reports, (MORs) were used because the 1999 severe drought and excessive heat resulted in extraordinary water demands. The maximum day demand (max day) is generally the maximum amount of finished water used in any day during the months of May to August.

Tables III and IV in Appendix 6 list the water system's capacity versus its max day demand. Table III indicates that 32% (9 of 28) of surface/mixed water systems serving greater than 1,000 people were within 90% of their capacity on the max day in 1999. Table IV indicates that 23% (18 of 80) of groundwater systems serving greater than 1,000 people were within 90% of their capacity on the max day in 1999. For these systems, evaluating water use and looking for ways to improve efficiency and reduce overall use may offer an attractive alternative to finding another source or increasing plant production capacity. In some cases the max day demand exceeded the water system capacity. Explanations for this could be: inaccurate water meters at the plant; they may not have been read everyday at the same time, resulting in water use for a period greater than 24 hours; or water systems may have increased production above their treatment plant design capacity.

Tables V and VI in Appendix 6 indicate that 13 water systems have exceeded their appropriation permit limits. MDE should continue to follow up and take appropriate actions on these systems.

Usage A good indicator of water usage is to calculate residential usage as gallons per capita per day. This can be compared to water industry design standards or the per capita usage of other water systems.

Table VII in Appendix 6 shows, in decreasing order, water system usage as gallons per capita per day. These data include all usage divided by the water system population. For an accurate per capita usage, the amount of water used by commercial and industrial facilities should be subtracted from residential before calculating the usage per capita. Water systems should have this data, however it is not required to be reported to MDE. Therefore the per capita data in Table VII is for the purpose of comparison only.

Nineteen of the twenty-eight surface water systems and thirty-six of eighty ground water systems have a per capita usage greater than 100 gallons per day per consumer. Although these estimates include both domestic and non-domestic users, the systems might benefit from taking a closer look at the reasons why the per capita use is so high, and taking steps to reduce that use if feasible.

IMPROVING WATER SYSTEM CAPACITY AND MINIMIZING WATER LOSSES

Improving Capacity

Capacity represents the maximum amount of good quality water that can be produced by the water system normally expressed in gallons per day. This is generally the water system's source capacity, or treatment capacity, whichever is limiting. Water system's source and treatment should be equal to or greater than the actual or expected maximum demand day. In addition to meeting the maximum day demand with all of its wells in service, a groundwater system should be capable of meeting the average day demand with its largest well out of service as required by COMAR 26.03.02.03 for water systems with 100 connections or greater.

Our evaluation of data (Appendix 6) revealed that there were a number of water systems that experienced maximum day demands that were close to or at their capacity. These water systems were dangerously close to conditions resulting in reduced pressure or even worse, water outages. Both water outages and pressure reductions not only affect the consumer's ability to conduct necessary sanitary practices, but also may allow potential contamination of the water system through backflow and backsiphonage and limit the system's ability to provide adequate fire protection. These water systems should develop plans, as soon as possible, to improve their infrastructure and/or reduce usage. Ways to improve the water system capacity include development of additional sources, expanding treatment capacity, and/or interconnection agreements with neighboring water systems.

It is recommended that all water systems with a population greater than 10,000 that have had a max day within 90% of their capacity, submit a plan to be approved by the MDE. This plan should ensure that the water system will have sufficient capacity to meet its maximum demand within a 10-year period. A schedule of necessary improvements should be included in the plan. It is recognized that some water systems without the potential for future growth may not have to plan for improving their capacity even if they exceeded 90% of their capacity.

Determining Water Losses

When looking for ways to conserve water usage it is important to evaluate distribution system leakage. It also should be recognized that unaccounted water is not always "lost" water. Unaccounted water can be from uncalibrated meters which in time, tend to read low, unmetered connections, flushing programs needed to improve the quality of water in the distribution system, or fire fighting. Water systems are encouraged to improve their routine record keeping so that they can better estimate their unaccounted water. Once this is done, the water system can determine and plan to reduce its water losses that may result from leaks within aging distribution systems. Promoting water conservation should be a two-fold process that includes reducing usage and reducing losses.

In considering water conservation requirements for water systems, the population of the water system should be taken into account. Water conservation measures taken by water systems exceeding a population of 10,000 (29) should account for a much greater water savings than the remaining 485 smaller community water systems. The larger water systems are better able to implement public education programs and infrastructure improvements. In addition, with the exception of three federal facilities, the larger systems already have meters in place for most of their accounts and, as a result, are better able to determine their unaccounted water. For these reasons most efforts will be focused on the water systems that serve a population of 10,000 or more.

Reduce Usage

The Committee recommends that water systems with a population greater than 10,000 be required to determine their water usage on a per capita basis. This estimate should be the average daily amount of water used by residential customers. Water systems that have a per capita water usage greater than 100 gallons per day, should be required to provide annual water conservation education to their customers on water conservation. Appendixes 7 and 8 contain information on water conservation. In addition, these systems should evaluate their rate structure to one that promotes water conservation. The level of 100 gallons per day was selected as an indicator because it is a typical design parameter used for new water systems in Maryland.

It is also recommended that MDE review the per capita usage of water systems at the time of water appropriation permit application submittal or renewal. MDE should require that water systems address excessive per capita usage.

Reduce Water Loss

In the survey conducted of medium and large water systems, with the exception of federal facilities, the water systems with a population greater than 10,000 generally were aware of the amount of their unaccounted water which ranged from 6% to 32%. By far the most common reasons given for the unaccounted water is from fire fighting and flushing programs, followed by distribution leakage and unmetered connections. The Committee recommends that all water systems use meters for every customer to promote responsible use of water as well as to ensure that the water system receives compensation for their product.

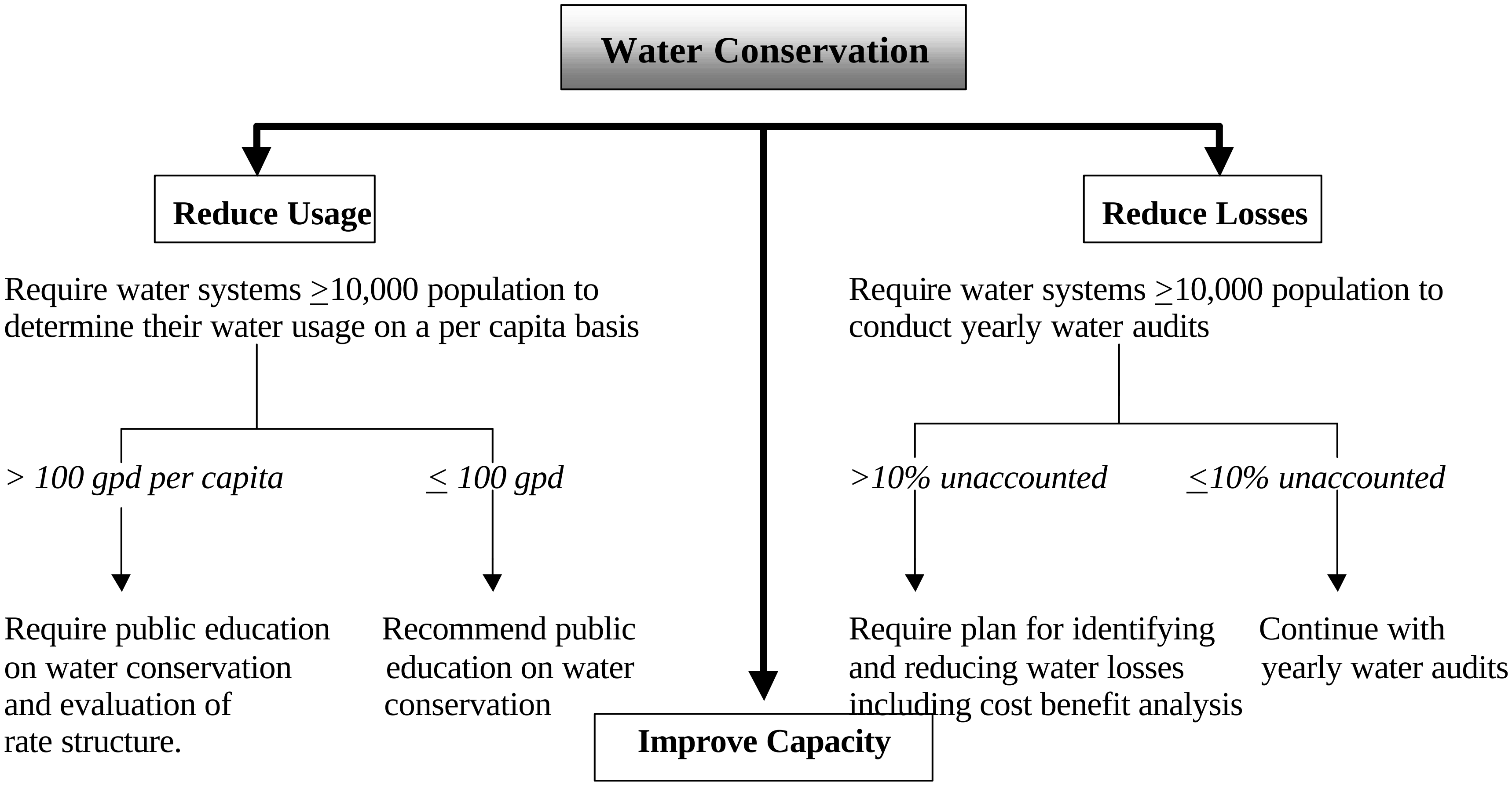
The Committee recommends that water systems with a population greater than 10,000 be required to determine their unaccounted water on a yearly basis in accordance with most recent American Water Works Association practices. Water systems, which exceed an average of 10% unaccounted water, should develop a corrective action plan for identifying and reducing their water losses. Although water systems are encouraged to reduce their water losses as much as possible, their plan may include a cost benefit analysis on the feasibility of reducing losses.

A summary of these recommendations is shown on Table 1 on page 15 of this report.

Water Pricing

Proper water pricing is a tool to control wasteful usage of water. Water systems in Maryland use a variety of water pricing structures. These include flat rate structures, where customers are charged a fixed rate regardless of the amount of water used (often employed in systems that do not have individual meters for residences), declining block structures, where the unit price of water declines as the volume of water used increases. The flat rate and declining block structures do not encourage water conservation. By contrast, pricing structures such as increasing block rate, where the unit price of water increases as the volume of water used increases provide customers with an economic incentive for water conservation. This type of pricing structure not only encourages and rewards water conservation, but also may create additional revenue for water utilities to provide needed infrastructure improvements. It is recognized that the cost of service, because of the economy of scale for large industrial users, needs to be appropriately built into the rate structure.

Considering that residential water usage in Maryland is a major portion of the total usage (in 1996, residential water usage was 62.7% of total usage), it could achieve a major water use reduction in Maryland if water systems were to make use of the increasing block rate for residential water customers.



Require water systems ≥10,000 population that have an actual max day within 90% of capacity to prepare a plan that ensures that sufficient capacity will be available for a minimum of 10 years.

In addition to the above, water conservation plans may be required of water systems that use sensitive or stressed aquifers as a source of water.

MDE will evaluate the per capita usage of water systems, including those that serve a population < 10,000, at the time of water appropriation renewal.

TABLE 1

WATER SYSTEM INFRASTRUCTURE NEEDS

Water systems are faced with ever increasing costs associated with providing safe and adequate drinking water to its customers. Compliance with numerous and complicated drinking water regulations is costly especially to smaller systems. Larger systems are faced with aging infrastructure, especially distribution systems. The following is a description of the Needs Survey findings as they apply to Maryland and an outline of funding that is available to water systems for infrastructure improvements.

Overview of Capital Needs Survey

In 1994, the U.S. Environmental Protection Agency (EPA) conducted a nationwide survey of community water systems. The survey was designed to identify the total need of water systems, which is the capital infrastructure need faced by publicly and privately-owned community water systems nationwide. The total need includes both current and future needs for the 20-year period from January 1995 through December 2014. A copy of a summary of the Needs Survey can be found in Appendix 9.

The survey looked at state needs in several ways. First, needs were compared by system size. In Maryland, and nationwide, the greatest need was in the large systems serving more than 50,000 persons per day.

Total Need by System Size (in 1994 $ millions)

System Size	**State Need**
Large Systems (serving >50,000/day)	746.5
Medium Systems (serving 3,301 to 50,000/day)	273.9
Small Systems (serving <3,301/day)	264.4
Total	**1,284.8**

Next the survey grouped capital infrastructure needs into five general categories:

Source. Includes the costs involved in developing or improving ground water or surface water sources for communities.
Treatment. Includes conditioning water or removing microbiological and chemical contaminants.
Storage. Includes needs for new or improved finished water storage.
Transmission and distribution. Includes replacement or rehabilitation of lines, which carry drinking water from the source to the treatment plant, or from the treatment plant to the home.
Other. Includes projects to protect water systems against earthquake damage, automate treatment plant operations and improve laboratory facilities.

In Maryland, and nationwide, the greatest need, in fact more than 50% of the need, was found to be in the area of transmission and distribution.

Total Need by Category (in 1994 $ millions)	
Type of Need	**State Need**
Transmission and Distribution	721.3
Treatment	302.7
Storage	143.5
Source	69.6
Other	47.7
Total Need	**1284.8**

Finally, when the survey looked at the total need for compliance with Safe Drinking Water Act (SDWA) requirements, again the greatest need was found to be in the area of water distribution improvements. While distribution systems are not directly regulated under the SDWA, they impact a system's ability to meet water quality standards under the Total Coliform Rule, and monitoring requirements under this rule may help to identify distribution system problems.

When distribution piping begins to deteriorate, systems begin to suffer water losses. In Maryland, as nationwide, these distribution problems are more prevalent in the large metropolitan systems which tend to be older and where repair of distribution lines is more difficult and thus more expensive.

Maryland's water system needs as estimated by the EPA Needs Survey, far exceed all available funding from current water rate structures and the few grant assistance programs available to smaller systems.

Funding Needs

Systems will incur costs in conducting audits, repairing or replacing meters, identifying the locations of leaks, and replacing or repairing distribution lines. Activities such as conducting water audits and water meter replacement can be considered good business and maintenance practices that will help the water system identify its unaccounted water. Locating and reducing "lost" water as a result of aging and leaking water mains, however, is more problematic and can be very costly. It should be recognized that given the choice, water system customers might be more willing to accept periodic short-term water restrictions on non-essential uses than incur significant costs of greatly reducing water system leakage and/or increasing its capacity.

Reducing a certain amount of water loss will be cost effective to the water supplier. (i.e., the cost of treating and supplying the water is greater than the cost to locate and repair the leak). Because lining, repairing or replacing distribution mains is very costly, there will be a point when reducing water losses is no longer cost effective. Even if not cost effective to the water supplier, the benefits of such activities go beyond the utility, and may be a worthwhile societal investment. Although inadequate to meet the total need, some federal and State funding is available through existing programs. Additional and specific funding for the construction of water system improvements that will result in reduced leakage and improved reliability is recommended.

STATUTORY / REGULATORY AUTHORITY

Statutory Authority

Statutory authority to carry out the recommendations of this Committee can be found in several sections of the Annotated Code, Environment Article.

Environment Article 9-205(e)(1). The Secretary (of the Department of the Environment) may request any other information about the water supply system, …….. including information or records on maintenance and operation, that the Secretary considers appropriate.

The above provides the authority for MDE to request per capita usage, water audits and unaccounted water data.

Environment Article 9-221 – If, after investigation, the Department determines that any water supply system….is a menace to health or comfort or is causing a nuisance, and that conditions cannot be improved sufficiently only by changing the method of operation, the Department may order the owner: To alter or extend the water supply system.….

This provides the Department authority to require improvements to water systems that do not provide adequate quality or quantity of water.

Environment Article 9-405(b)(1) On receipt of information that a dangerous contaminant is present in or likely to enter a public water system, the Secretary may take any action necessary to protect the health of the individuals whose health is or would be endangered by the dangerous contaminant.

Because exceeding a water system's capacity may result in improperly treated water or distribution system contamination, this authority may be used to require infrastructure improvements of water systems that have exceeded or are likely to exceed their design capacity.

Environment Article 5-507(a). If the Department believes from evidence…… that the proposed appropriation or use of State waters…… is wasteful…. the Department may reject the application….

This provides the Department authority to ensure that water systems do not waste water, and may be used during the appropriation permit review process.

Environment Article 9-512 – A State or local authority may not issue a building permit unless.. the water supply system… is adequate to serve the proposed construction, taking into account all existing and approved developments in the service area and; any water supply system ….. will not overload any present facility.

This provides the Department authority to issue moratoriums on building permits if the water system capacity is not sufficient. This is coordinated with the County Health Departments.

Environment Article 9-503 and 505 – Requires counties to have a county plan that covers a 10-year period that provides for an orderly expansion and extension of, among other facilities, community water supply systems. These plans should include service areas, time schedule and cost of construction.

This provides the Department authority to require counties to maintain Water and

Sewer Plans. Certain recommendations of this report such as requiring water systems to prepare a plan that ensures that sufficient capacity will be available, may be found in the County Water and Sewer Plan.

Regulatory Authority

COMAR 26.03.01 – Planning Water Supply and Sewerage Systems. Regulates the submission of County Water and Sewer Plans.

COMAR 26.04.01 Quality of Drinking Water in Maryland. Regulates Safe Drinking Water Act Requirements.

COMAR.26.17.06 – Water Appropriations and Use. Regulates the appropriation of the State's water resource

RECOMMENDATIONS

The Impact of Infrastructure Deficiencies on Water Conservation

The following are the Committee's findings and recommendations, which are presented according to the duties outlined in the Governor's Executive Order:

- The Committee used several resources to determine the impact of water system infrastructure deficiencies, including MDE data regarding water appropriation and usage, and an evaluation of water systems' capacity as compared to demand and the types of problems that the suppliers are experiencing. In addition, the Committee asked MDE's Water Supply Program to conduct a survey of large and medium systems and to summarize some of the difficulties that were experienced by Maryland systems in the 1999 drought. This survey revealed that of the 50 systems that responded, 40% did not know the amount of their unaccounted water. For those systems that estimated their unaccounted water, most estimated 10% to 20% and two systems exceeded 30%.

Recommend and Prioritize Infrastructure Improvements to Minimize Water Loss

The following are the Committee's recommendations for identifying water systems that could reduce per capita usage, and consider infrastructure improvements to minimize water loss and improve capacity.

- Water systems that serve a population of 10,000 or greater should determine the adequacy of the water system supply, transmission, storage and distribution components to meet average and peak demands, special demands such as fire fighting, and provide acceptable service during drought periods.
- These systems should determine their per capita usage and conduct a water audit on an annual basis. If the residential per capita usage is greater than 100 gallons per capita per day, the water system should conduct annual water conservation public education. If the water system's unaccounted water is greater than 10% the water system should prepare a plan for identifying and reducing water losses.
- Water systems that serve a population greater than or equal to 10,000 that are approaching their capacity should prepare a capital improvement plan that ensures the sufficient capacity will be available for a planning period of 10 years. This plan should be updated every 5 years. When feasible, the plan should include the potential for interconnection with nearby water supply systems to improve reliability.

- MDE should review the per capita usage of water systems, including those that serve a population less than 10,000, at the time of appropriation permit application or renewal.

Identify All Possible Funding Sources for Infrastructure Improvements

As noted in the Responsibilities section of this report, the following agencies provide financial assistance for infrastructure improvements:

- Maryland Department of the Environment
- Maryland Department of Housing and Community Development

- Environmental Protection Agency
    - U.S. Department of Agriculture, Rural Development Office
    - Department of Housing and Urban Development

- Available funding for water supply infrastructure improvements is inadequate when compared to capital improvement needs. Current water rate structures should be evaluated to provide the necessary capital where feasible, and additional sources of funding should be pursued.

- The MDE should further review its authority to enforce the above recommendations and seek additional legislative/regulatory authority if necessary.