

Maryland Statewide Water Conservation Advisory Committee

Final Report November 2000

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EXECUTIVE SUMMARY

This report represents the efforts of the Maryland Statewide Water Conservation Advisory Committee, formed on January 7, 2000, by Governor Parris N. Glendening's Executive Order 01.01.2000.01. The committee was asked to make recommendations regarding water conservation and drought preparedness in Maryland. This report contains the Committee's recommendations, including a drought monitoring and response plan as well as recommendations for ongoing water conservation measures.

The drought monitoring and response plan outlines the methods and steps the State will take to monitor and respond to drought conditions. The plan divides the State into six regions for evaluating drought conditions, and describes a four-staged approach for monitoring and responding to drought. Using four indicators (precipitation, stream flow,

ground water levels, and available reservoir storage), water availability will be monitored year-round on a regional basis. If two or more indicators reach the "trigger" levels, appropriate responses outlined in the plan will ensure that water conservation efforts increase to reduce consumption of nonessential water uses.

In addition to explaining the staged drought monitoring and response to be undertaken, this document describes in detail the indicators to be used and how they will be monitored. The plan also includes mandatory water use restrictions that will become effective should any region reach the "Emergency" stage.

The committee also recommends ongoing efforts to increase water efficiency and water conservation, regardless of drought status

INTRODUCTION

Although Maryland is blessed with abundant water resources, climate conditions combined with increasing anthropogenic influences have periodically resulted in a shortage of water for Maryland's citizens and environment.

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. In January 2000, an Executive Order formed the Maryland Water Conservation Advisory Committee. The Committee was tasked with:

- Establishing statewide indicators for evaluating drought conditions,
- Examining current water conservation efforts and the need for regional enhancements,

- Assessing well failures and programs for ground water conservation,
- Developing comprehensive public education and outreach programs,
- Recommending short and long term planning solutions for responding to future drought conditions, and
- Suggesting mechanisms to address its findings, if necessary.

The Maryland Water Conservation Advisory Committee met during the Spring and Summer of 2000. This document is the result of the Committee's efforts to assist the State in developing and implementing long-term water conservation policies and programs. The Committee is grateful to the Maryland Department of the Environment staff who assisted with the preparation of this report.

ISSUES

Governor Glendening asked the Committee to investigate and evaluate a number of issues related to water conservation.

Statewide Indicators for Evaluating Drought Conditions

The Committee reviewed several potential water supply indicators, including those used during the 1999 drought. Regional factors such as climate, geology, and typical water sources were considered. The four indicators selected as the most appropriate are discussed at length in the Drought Monitoring and Response Plan.

Current Water Conservation Efforts and the Need for Regional Enhancements

The Committee reviewed some existing regulatory and policy efforts currently undertaken on a routine basis in Maryland. These include evaluations related to approving appropriations from both surface and ground water sources, plumbing codes that require new installations to use water conservation fixtures, prohibitions against wasting well water, and planning and policy efforts such as capacity development for new water systems. Appendix 6 contains a summary of these existing programs. The Committee strongly supports the development of additional programs in the State to increase water use efficiency and promote water conservation efforts year-round.

It was noted that some areas (particularly in the western part of the State) may be more vulnerable to water short-

ages than other areas. It may be wise to prioritize water conservation and public education and outreach efforts by focusing in the areas of greatest need.

The committee strongly encourages the development of programs that evaluate and reduce current water use. The State has the opportunity to become a leader in this area, by implementing a program to evaluate water use at State facilities and to upgrade facilities accordingly in order to minimize water use at State agencies.

Well Failures and Programs for Ground Water Conservation

Following the 1999 drought conditions, MDE personnel coordinated with local environmental health personnel to evaluate the extent and implications of well failure resulting from the drought conditions. In most cases, it was determined that well failures were a result of inadequate well construction. Typically, the wells that failed were either extremely shallow wells or “telescoping” wells, which were built using a 4” casing that decreases to a 2” casing as the well depth increases. Since the 2” portion of the casing is too small for the well pump, decreasing water levels result in the pump being unable to withdraw water from the well. Telescoping wells are no longer acceptable under current well construction regulations. The evaluation of 1999 well failures confirmed that the wells replaced as a result of drought conditions were for the most part wells that would have eventually failed due to poor construction techniques. Newly constructed wells are much more resilient during fluctuating ground water levels.

Comprehensive Public Education and Outreach Programs

Educating the public about the importance of our natural water resources and effective ways to efficiently use water is a crucial aspect of any water conservation efforts. The responsibility for this educational effort does not lie with one agency, but should be undertaken on numerous levels. The Committee proposes that the State consider enhancing public education curriculums to include water conservation awareness. In addition, agencies responsible for oversight of water programs, such as the Maryland Department of the Environment, should enhance their efforts to educate the public on this important issue. Fi-

nally, it is critical that water suppliers, especially those with sources vulnerable to drought conditions, not only educate their consumers but provide incentives for their consumers to reduce water consumption on an ongoing basis.

Short and Long Term Planning Solutions for Responding to Future Drought Conditions

The Committee focused most of its efforts on developing the Drought Monitoring and Response Plan included with this report. The Committee believes that this Plan provides a basis for evaluating drought conditions and addressing any resulting water shortage issues.

Recommendations

The Statewide Water Conservation Advisory Committee has the following recommendations:

1. Maryland should adopt the Drought Monitoring and Response Plan, which includes recommendations for drought indicators, a staged drought response, and mandatory water use restrictions should they become necessary.
2. The Drought Monitoring and Response Plan should be evaluated by the Department of the Environment on a triennial basis to identify and address any deficiencies in the Plan, including modifications to legislative authority, indicators, or other aspects of plan implementation.
3. Funding should be provided to develop and undertake comprehensive water conservation activities aimed at reducing water use on an ongoing year-round basis regardless of drought status.
4. The State should take a leadership role by implementing water conservation efforts at State facilities. The Department of General Services should conduct audits of State facilities to determine whether infrastructure upgrades would significantly improve efficient water use in those facilities, and implement a program to upgrade State facilities and educate State employees where audits have revealed opportunities to improve water use efficiency.
5. The Department of Education should educate Maryland citizens beginning at a young age by including water conservation awareness in the Maryland public education curriculum.
6. Water suppliers should be proactive in developing and implementing water conservation programs, by examining and possibly restructuring rate systems to encourage water conservation, and creating incentive programs to promote water efficiency in business, industrial, and residential settings.
7. The Department of the Environment should develop an ongoing public awareness program that provides the public with basic information on the source of their water, the importance of using water efficiently, and how to better conserve water in the home.

State of Maryland

**Drought Monitoring
And
Response Plan**

DROUGHT SUSCEPTIBILITY

Maryland is a State of generous diversity. 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. In the Baltimore and Washington metropolitan areas, and in some western areas of the State, consumers obtain their water from public water systems that rely on surface waters, including the two largest water suppliers, the Washington Suburban Sanitary Commission (WSSC) and the City of Baltimore. About two-thirds of Maryland's citizens regularly consume 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 drinking water from individual wells rather than from public water supply systems.

Because of the variety of water sources, and regional differences in climate, susceptibility to drought varies across the State. This drought response plan takes into account this range of variability by using a selection of drought indicators that will allow interpretation of conditions on both a statewide and regional basis.

Population growth may affect future drought susceptibility by increasing demands on water supply by residential, commercial and industrial users. Future drought susceptibility may increase without the implementation of additional conservation measures by government, commercial, industrial, and residential users.

Maryland already has many laws, regulations, programs and policies that promote conservation of the State's water resources. A description of some of these existing efforts is included in this document.

RESPONSIBILITIES

Managing drought is a responsibility shared by numerous organizations and agencies at all levels. In Maryland, the Department of the Environment has primary responsibility for tracking drought conditions, and coordinating all drought responses.

FEDERAL

Office of the President

- Declare drought emergency when necessary, allowing areas of the State to receive financial and other assistance from the Federal Emergency Management Administration.

National Weather Service

- Track national and regional weather conditions

U.S. Geological Service

- Track streamflow and ground water levels

U.S. Department of Agriculture

- Monitor and assess wildfire conditions
- Provide assistance to farmers suffering from drought

STATE

Office of the Governor

- May declare drought emergency and issue Executive Order directing response measures

Department of Agriculture

- Provide assistance to farmers suffering from drought

Department of the Environment

- Lead and coordinate all drought management activities
- Provide guidance to local drought coordinators
- Monitor drought indicators, and advises Governor on status of drought conditions when necessary.
- Update local government, utilities, industry and the public of the status of drought conditions.
- Coordinate drought response actions with local governments and utilities.
- Develop public education and outreach materials for the public.
- Maintain drought information on its website.
- Establish and maintain Drought Hotline when necessary.
- Year-round oversight of community and nontransient noncommunity water systems.

Department of General Services

- Responsible for operation and maintenance of State facilities

Department of Health and Mental Hygiene

- Assess and respond to any impacts of water shortages on public health

Department of Natural Resources

- Monitor forest fire conditions
- Establish burning restrictions
- Enforce burning restrictions

***Maryland Emergency
Management Administration***

- Coordinate State response to major disasters and emergencies

State Police

- Enforce mandatory water use restrictions

LOCAL

***County Executives and
County Commissions***

- May declare county emergencies
- Appoint drought coordinators

Drought Coordinators

The county executives or county commissions will appoint a drought coordinator for each county to coordinate with MDE regarding drought assessment and response, and to handle applications for exemptions or variances to the Mandatory Drought Restrictions. In counties served by the WSSC or Baltimore City water supplies, the county drought coordinator will handle applications only for those areas of the county not served by those systems. WSSC and Baltimore City will each appoint their own drought coordinators for handling variance and exemption requests within their service areas. During times of drought emergency, drought coordinators may be removed from that designation at any time by the Secretary of the Department of the Environment, and replaced by a Drought Coordinators of the Secretary's choice who may serve for the duration of the emergency.

- Maintain communications and coordinate with MDE throughout the drought emergency.
- Render decisions regarding applications received for exemptions or variances to mandatory restrictions

on nonessential water uses when a drought emergency has been declared.

- Establish local drought emergency public information and education programs.

***Local Environmental
Health Agencies***

- Provide year-round oversight of transient noncommunity water systems including assistance with drought-related problems.
- Assess and respond to impacts of water shortages on public health.
- Issue well construction permits.
- Assist owners of residential wells with drought-related problems.
- Provide public education related to drought, well failures and public health issues.

Local Law Enforcement Agencies

- Enforce mandatory drought restrictions

***Metropolitan Washington
Council of Governments***

COG is a regional organization of 17 Washington area local governments surrounding our nation's capital, plus area members of the Maryland and Virginia legislatures, the U.S. Senate, and the U.S. House of Representatives. COG provides a focus for action and develops sound regional responses to environmental and other area issues.

- Develop and implement a year-round communications program focusing on water conservation
- Coordinate drought awareness and response for public utilities in the Washington area.

WATER SUPPLY UTILITIES

Each community water supplier is responsible for monitoring water supply conditions in their service areas, responding to customer complaints and problems related to drought conditions, and reporting any drought-related problems to MDE. Water suppliers may impose water use restrictions on their customers based on their individual situations when conditions warrant.

INTERSTATE COMMISSIONS

The ***Susquehanna River Basin Commission*** (SRBC) coordinates water resources efforts of Maryland, New

York, Pennsylvania and the federal government and provides the mechanism to guide the conservation, development, and administration of the water resources of the vast river basin. The mission of the ***Interstate Commission on the Potomac River Basin*** (ICPRB) is to enhance, protect and conserve the water and associated land resources of the Potomac River basin and its tributaries through regional and interstate cooperation.

- Coordinate water supply operations during times of drought.
- Ensure that minimum environmental flow-by requirements are met during times of drought.

DEFINING DROUGHT

DEFINITION

Maryland 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".

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.

INDICATORS

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:

1. Precipitation levels
2. Stream flows
3. Ground water levels, and
4. 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. 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.

Because the significance of a precipitation deficit changes as the water year progresses, drought stages will trigger at different percentages of normal depending upon the date of evaluation. See Table 2 for the precipitation drought triggers.

Stream Flow

Stream flow gages representing each region (except Southern Maryland) will be used to measure stream flow. Using 7-day average 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.

Gages were selected on the basis of the availability of “real-time” data, as well as a sufficient period of record. When additional “real-time” gages with a sufficient period of record become available, they will be added as appropriate. Gages are in the following locations:

- Youghiogheny (near Oakland)
- Savage River (near Barton)
- Wills Creek (near Cumberland)
- Antietam Creek (near Sharpsburg)
- Monocacy (near Frederick)
- Patuxent (near Unity)
- Choptank (near Greensboro)
- Susquehanna (at Marietta)
- Potomac (at Little Falls)
- Deer Creek (near Rocks)

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 the USGS. Ground water conditions will be evaluated on a monthly basis. The monthly levels will be compared with values equivalent to the 25th, 10th, and 5th 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. The following ten reservoirs will be monitored for the purposes of evaluating drought conditions:
 - Loch Raven Reservoir, Baltimore City
 - Prettyboy Reservoir, Baltimore City
 - Liberty Reservoir, Baltimore City
 - Tridelphia Reservoir, WSSC
 - Duckett Reservoir, WSSC
 - Seneca Reservoir, WSSC

- Jennings-Randolph Reservoir, WSSC
- Gordon Reservoir, City of Cumberland
- Koon Reservoir, City of Cumberland
- Piney Reservoir, City of Frostburg

Water supply problems in smaller reservoirs will be taken into account when evaluating problems related to specific water suppliers. These reservoirs are too small to indicate overall water supply conditions.

OTHER INDICATORS

In addition to the four primary indicators, two other factors may enter into evaluating drought conditions. Some regions of the State will not be able to utilize all four of the indicators. For instance, Southern Maryland does not have any reservoir systems, so that indicator cannot be factored into triggering drought stages. In situations where there are fewer than four available indicators, the following additional tools may be used to determine drought stages.

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 APPLICATION

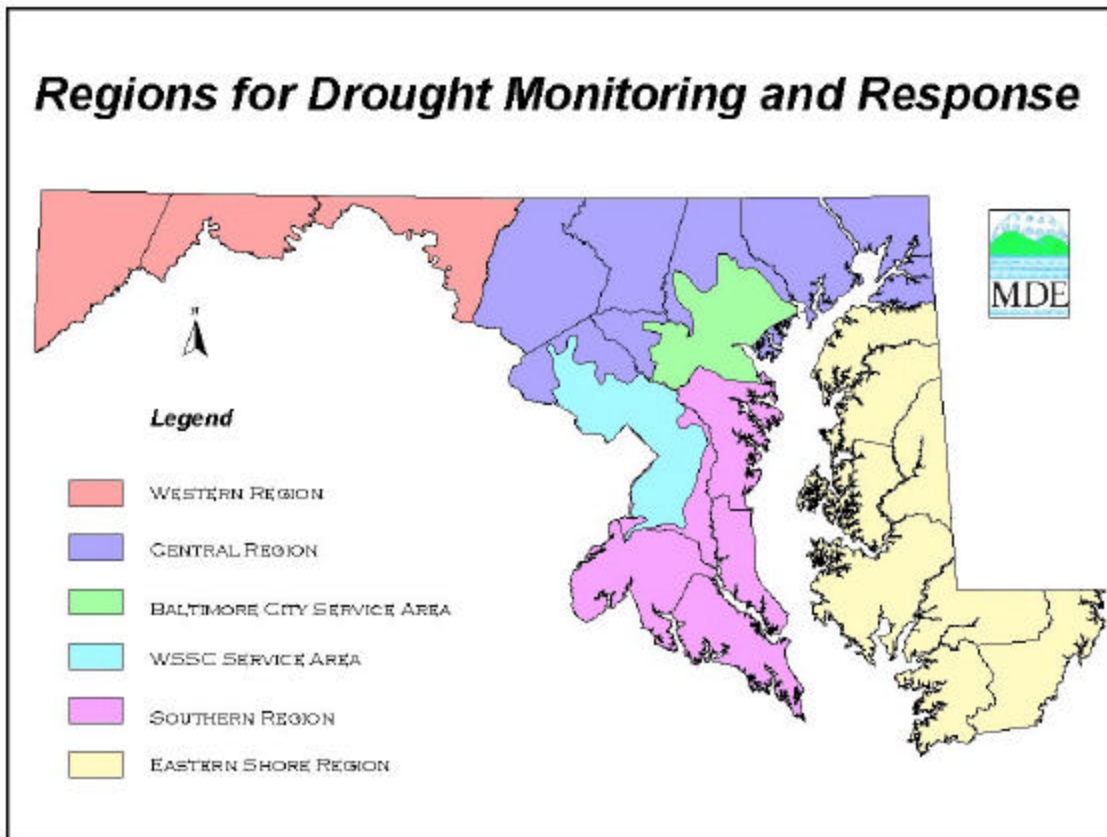
Drought conditions will be evaluated on a Statewide, regional, and county basis. This will allow for varying hydrologic conditions across the State, and provide for the most flexibility when assessing and responding to drought conditions. In addition, monitoring of water supply problems at individual systems may impact drought declarations in specific areas of the State.

Data collection points for monitoring drought indicators are located throughout the State and must be analyzed collectively in order to assess the overall severity of drought. Indicators will be evaluated at all levels. For instance, precipitation values will be provided on a county-by-county basis. Values for individual counties will be averaged to achieve a mean value for a region.

Maryland will be divided into four drought regions based on the similarity of weather patterns and the primary source of water supply. These regions consist of groups of counties, which provide clear political boundaries for assessing and declaring drought. Two

additional regions will be added for the areas of the state that are served by the two large metropolitan systems, WSSC and Baltimore City. Although these regions cross political boundaries, it is appropriate to segregate them because the water supply issues related to these systems are unique due to the existence of reservoir storage systems. In addition, these systems are authorized to

determine their own water supply availability and needs, and to assess and respond to drought conditions. The State has the authority to impose staged drought response in the two metropolitan areas should the water supply systems fail to respond appropriately. In addition, should conditions warrant, staged drought response may be imposed or revoked in individual counties.



Western Region – Allegany, Garrett, and Washington Counties

Central Region – Baltimore, Carroll, Cecil, Frederick, Harford, Howard, and Montgomery Counties except for areas served by Baltimore City or WSSC.

Southern Region – Anne Arundel, Calvert, Charles, Prince George’s and St. Mary’s Counties, except for areas served by Baltimore City or WSSC.

Eastern Region – Caroline, Dorchester, Kent, Queen Anne’s, Somerset, Talbot, Wicomico, and Worcester Counties.

Baltimore City Service Area

Washington Suburban Sanitary Commission Service Area

ASSESSING DROUGHT

Maryland will implement a staged process for defining drought conditions. Drought indicators will be monitored on an ongoing, year-round basis, and drought status will be determined on a variable timeframe according to drought stage (See Tables 1 and 2). The frequency of evaluation will increase if the drought intensifies as indicated below:

- **Stage 1** – Monthly
- **Stage 2** – Bi-weekly
- **Stage 3** – Weekly
- **Stage 4** – Weekly or as needed

Stage 1 – Normal (Green)

No more than one indicator outside of the normal range.

- Precipitation exceeds the percent of normal precipitation for the time period in Table 2
- Streamflows are above the 25th percentile
- Ground water levels are above the 25th percentile
- Reservoirs exceed 120 days of storage

Stage 2 – Watch (Yellow)

At least 2 indicators meet the following conditions:

- Precipitation levels are at or below the percent of normal precipitation for the time period in Table 2

- Streamflows fall between the 10th and 25th percentile
- Ground water levels fall between the 10th and 25th percentile
- Reservoirs contain between 90 and 120 days of storage

Stage 3 – Warning (Orange)

At least 2 indicators meet the following conditions:

- Precipitation levels are at or below the percent of normal precipitation for the time period in Table 2
- Streamflows fall between the 5th and 10th percentile
- Ground water levels fall between the 5th and 10th percentile
- Reservoirs contain between 60 and 90 days of storage

Stage 4 – Emergency (Red)

At least 2 indicators meet the following conditions:

- Precipitation levels are at or below the percent of normal precipitation for the time period in Table 2
- Streamflows are at or below the 5th percentile
- Ground water levels are at or below the 5th percentile
- Reservoirs contain 60 days or less of storage

TABLE 1

Trigger Levels for Indicators				
	Precipitation As Percent of Normal for Evaluation Period ¹	Streamflow As Percentile of Normal ²	Ground Water Levels As Percentile of Normal ²	Reservoir Storage in days
Stage 1 Normal	See Table 2	>25	>25	>120
Stage 2 Watch		25	25	120
Stage 3 Warning		10	10	90
Stage 4 Emergency		5	5	60

¹ These values vary depending of length of review period. For more detail see Precipitation discussion and Table 2.

² At the 25th percentile, it means that historical streamflows or ground water levels are lower than this value only 25% of the time for the evaluation period. 10th and 5th percentiles represent increasingly lower streamflows or ground water levels and more severe drought events.

TABLE 2

Precipitation Triggers				
Number of Months Analyzed	Normal (% of Normal Precipitation)	Watch (% of Normal Precipitation)	Warning (% of Normal Precipitation)	Emergency (% of Normal Precipitation)
3	>75.0	75.0	65.0	55.0
4	>80.0	80.0	70.0	60.0
5	>80.0	80.0	70.0	60.0
6	>80.0	80.0	70.0	60.0
7	>81.5	81.5	71.5	61.5
8	>82.5	82.5	72.5	62.5
9	>83.5	83.5	73.5	63.5
10	>85.0	85.0	75.0	65.0
11	>85.0	85.0	75.0	65.0
12	>85.0	85.0	75.0	65.0

RESPONDING TO DROUGHT

Stage 1

Normal Conditions (Green)

- MDE and public media implement a “Drought Index” public awareness campaign to provide citizens with regular updates about drought status (similar to Air Quality Index).
- Media promotion of wise water use
- Water systems develop and annually update drought plans as part of required Emergency Contingency Plans
- Water systems develop ordinances for enforcing drought measures
- Water systems initiate broad-based public education on water conservation
- Water systems maintain accurate water monitoring and consumption records
- Water systems monitor production on a daily basis and submit monthly reports to MDE
- Water systems determine unaccounted water loss and implement leak detection and repair
- Water systems develop and implement meter installation replacement and calibration programs
- Homeowners repair leaks and drips
- Homeowners install water conserving fixtures during new construction and building rehabilitation
- Government facilities evaluate water use, identify and repair leaks, and install water conservation devices where appropriate
- Business and industry develop water emergency plans to reduce water use by 10%
- Business and industry develop and implement water conservation measures

Stage 2

Watch (Yellow)

5% - 10% Reduction Goal

- MDE advises public, utilities, businesses and industry of changes to indicators, and initiates Statewide or regional “Drought Watch”
- MDE notifies municipal and county governments, and other appropriate agencies of drought watch status.
- Drought conditions evaluated bi-weekly
- MDE media office works with local TV and radio stations to issue frequent drought updates to public
- Verify contact information for local drought coordinators
- MDE and water systems provide public with water conservation tips
- MDE will increase monitoring of any problems incurred by water systems
- MDE website updated every 2 weeks or more frequently as needed
- Utilities or local governments may impose restrictions more stringent than the state guidelines
- Water systems activate Water Conservation Plans
- Water systems aggressively pursue leak detection surveys and repair programs
- Reduce water usage for main flushing, street flushing, and park irrigation
- Business and industries activate water emergency plans
- Homeowners, government facilities, business and industry should reduce water use for irrigation purposes

Stage 3
Warning (Orange)
10% - 15% Reduction Goal

- MDE notifies municipal and county governments, and other appropriate agencies of drought warning status
- MDE and water systems advise public of changes to indicators and initiates Statewide or regional “Drought Warning”
- Drought conditions evaluated on a weekly basis
- Residences, businesses, and industry voluntarily comply with nonessential water use restrictions
- MDE media office works with local TV and radio stations to issue periodic notification of drought measures, and to increase public awareness of water conservation
- MDE continues to monitor problems incurred by water systems
- MDE website updated weekly
- Utilities or local governments may impose restrictions more stringent than the state guidelines
- Water systems actively implement water conservation measures
- Water systems individually contact industrial users to reduce water usage
- Water systems discontinue flushing water lines, fire hydrants and distribution equipment
- Facility managers for government buildings identify leaks and accelerate maintenance and/or repairs
- Encourage business and industry to irrigate with treated wastewater in accordance with health guidelines

Stage 4
Emergency (Red)
15% - 20% Reduction Goal

- Governor declares a “Drought Emergency” by executive order.
- MDE notifies municipal and county governments, and other appropriate agencies of Drought Emergency status
- Drought conditions evaluated at least weekly
- Implement mandatory restrictions on nonessential water uses
- MDE media office works with local TV and radio stations to issue daily drought updates to public
- Establish Drought Hotline
- Utilities or local governments may impose restrictions more stringent than the state guidelines
- MDE website updated weekly or daily as needed
- MDE and water systems notify consumers of severity of water shortage
- Water systems conduct field surveillance of abuses, leaks, etc.
- Local police and/or water systems execute enforcement of water conservation violators
- Water systems verify availability of alternate water source or interconnection
- Residences comply with mandatory nonessential water use restrictions
- Business and industry comply with water conservation plans to reduce water use by at least 10%
- Business and industry evaluate need for reduced hours of operation

SUGGESTED ACTIONS FOR EFFECTIVE RESPONSE AT EACH DROUGHT STAGE

NORMAL	WATCH	WARNING	EMERGENCY
PROMOTE WATER CONSERVATION	5% - 10% REDUCTION GOAL	10% - 15% REDUCTION GOAL	15% - 20% REDUCTION GOAL
PUBLIC WATER SUPPLIERS			
Develop and annually update drought plan as part of required Emergency Contingency Plan	Activate Water Conservation Plan		
Develop ordinances for enforcement	Alert public of water shortage	Increase public awareness interest	Notify consumers of severity of water shortage
Initiate broad-based public education on water conservation	Distribute information on water conservation	Request and/or require that active conservation measures be practiced	Comply with mandatory nonessential water use restrictions
Maintain accurate water monitoring and consumption records	Activate water conservation measures		Conduct field surveillance of abuses, leaks, etc.
Monitor water production on a daily basis and submit readings on a monthly basis to MDE	Aggressively pursue leak detection surveys and repair programs	Individually contact industrial users to reduce water usage	Execute enforcement of water conservation violators
Determine unaccounted for water loss implement leak detection and repair	Reduce water usage for main flushing, street flushing, and park irrigation	Discontinue flushing water lines, fire hydrants and distribution equipment	Verify availability of alternate water source or interconnection
Develop meter installation replacement and calibration program	Caution industrial users to reduce water usage	Distribute water conservation kits to large volume customers	

PRIVATE RESIDENCES			
Repair leaks and drips. Install water conserving fixtures during new construction and rehabilitation	Reduce lawn watering	Voluntarily comply with nonessential water use restrictions	Comply with mandatory non-essential water use restrictions
Practice water conservation on an ongoing basis			
GOVERNMENT			
Facility managers for government buildings should conduct water use evaluations and improve water use efficiency where practical		Facility managers for government buildings shall identify leaks and accelerate maintenance measures and/or repairs	Comply with mandatory non-essential water use restrictions
Government agencies should educate employees about wise water use			
BUSINESS AND INDUSTRY			
Develop water emergency plan to reduce water use by at least 10%	Activate water emergency plan	Voluntarily comply with nonessential water use restrictions	Comply with mandatory non-essential water use restrictions
Develop and implement water conservation measures	Reduce water for non-essential uses		Review need for reduced hours of operation
Evaluate and reduce water use for landscaping	All irrigation uses should be voluntarily reduced	Treated wastewater irrigation should be encouraged in accordance with health guidelines	Reduce water use by at least 10%

Mandatory Water Use Restrictions

Prohibited

Exceptions

Watering of lawns

- To establish and maintain newly seeded and sodded grass areas, water may be applied on the day of installation and for 21 days following installation by any means designed and operated to assure effective water conservation. Irrigation must be personally supervised at all times to eliminate run-off or excessive watering.
- To maintain athletic fields when a 50% water reduction plan is in effect.
- Wastewater effluent or storm water treatment systems utilizing spray irrigation may apply water in designated areas according to permit conditions.

Use of Watering for irrigation and watering of gardens, landscaped areas, trees, shrubs and other outdoor plants

- For agricultural irrigation for the production of food and fiber, the maintenance of livestock and poultry or the production of nursery stock.
- By means of a hand-held container, hand-held hose equipped with an automatic shut-off nozzle, or drip irrigation system when applied between the hours of 8 p.m. and 8 a.m.
- When used by commercial nurseries at the minimum rate necessary to maintain stock.
- Water may be used by arboretums and public gardens of National, State, or regional significance at the minimum rate necessary to preserve specimens.

Irrigation and watering of golf courses

- To water tees and greens between the hours of 8 p.m. and 8 a.m.
- To water localized areas with a handheld hose at the minimum rate necessary.
- To water fairways when irrigation is reduced by at least 30%.
- As part of a necessary overseeding or resodding operation during the months of September and October at the minimum rate necessary.
- Sources of water other than potable water should be used when available.
- Irrigation of rough areas is not allowed.

<p><i>Washing paved surfaces such as streets, roads, sidewalks, driveways, garages, parking areas, tennis courts, and patios</i></p>	<ul style="list-style-type: none"> • For prewashing in preparation of asphalt street or driveway recoating and sealing. • At the minimum rate necessary for the maintenance of tennis courts composed of clay or similar materials by means of a hand-held hose equipped with an automatic shutoff nozzle. • At the minimum rate necessary for sanitation or public health purposes, such as eating and drinking areas. • At the minimum rate necessary to maintain effective dust control during the construction of highways and roads.
<p><i>Use of water for the operation of ornamental fountains, artificial waterfalls, misting machines, and reflecting pools</i></p>	<ul style="list-style-type: none"> • None
<p><i>Use of water for washing or cleaning of mobile equipment including automobiles, trucks, trailers and boats</i></p>	<ul style="list-style-type: none"> • Commercial car washes that recycle 45% of their wash water or reduce total water consumption by at least 10%. • Cleaning of construction, emergency or public transportation vehicles if necessary to preserve the proper functioning and safe operation of the vehicle. • Cleaning of new and used vehicles which are part of a dealer's sales inventory only under the following provisions: a) a vehicle is being prepared for sale at the time the vehicle is received from the manufacturer or prior owner, b) a vehicle shall be washed no more than once every 7 days, and c) a vehicle may be washed following sale immediately prior to delivery to the purchaser. Vehicles may be washed only by a means of a bucket or hand-held hose equipped with an automatic shut-off nozzle.
<p><i>Use of water to fill and top off swimming pools</i></p>	<ul style="list-style-type: none"> • Public or residential swimming pools serving 25 or more dwelling units, if the pools have filtration equipment allowing for continued use and recycling of water over the swimming season. • Swimming pools operated by health care facilities used in relation to patient care and rehabilitation. • Filling of newly constructed pools or following pool repair.
<p><i>Homeowner power-washing of buildings, fences, decks or other structures</i></p>	<ul style="list-style-type: none"> • None
<p><i>Serving of water in restaurants, clubs, or eating places, unless specifically requested by the customer</i></p>	<ul style="list-style-type: none"> • None
<p><i>All other businesses and industries implement plans to reduce water consumption by 10%</i></p>	