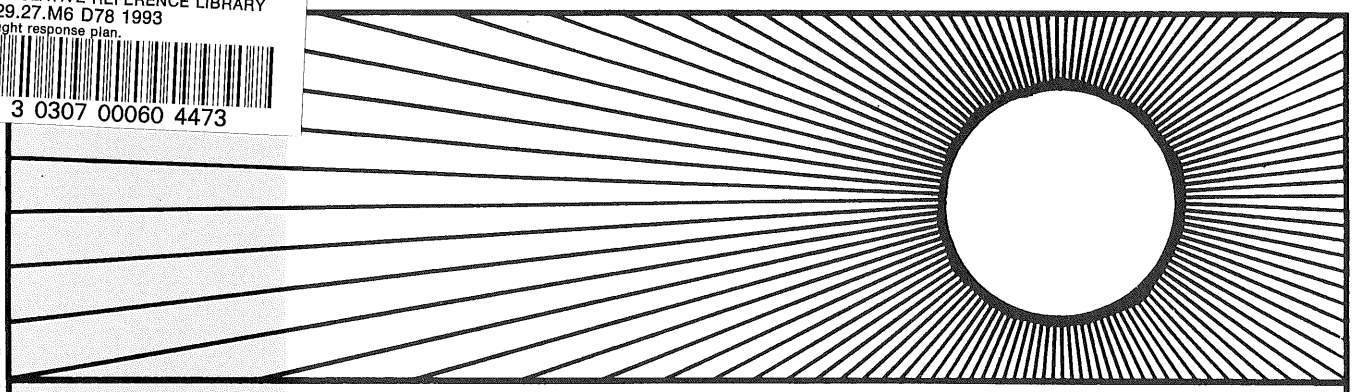
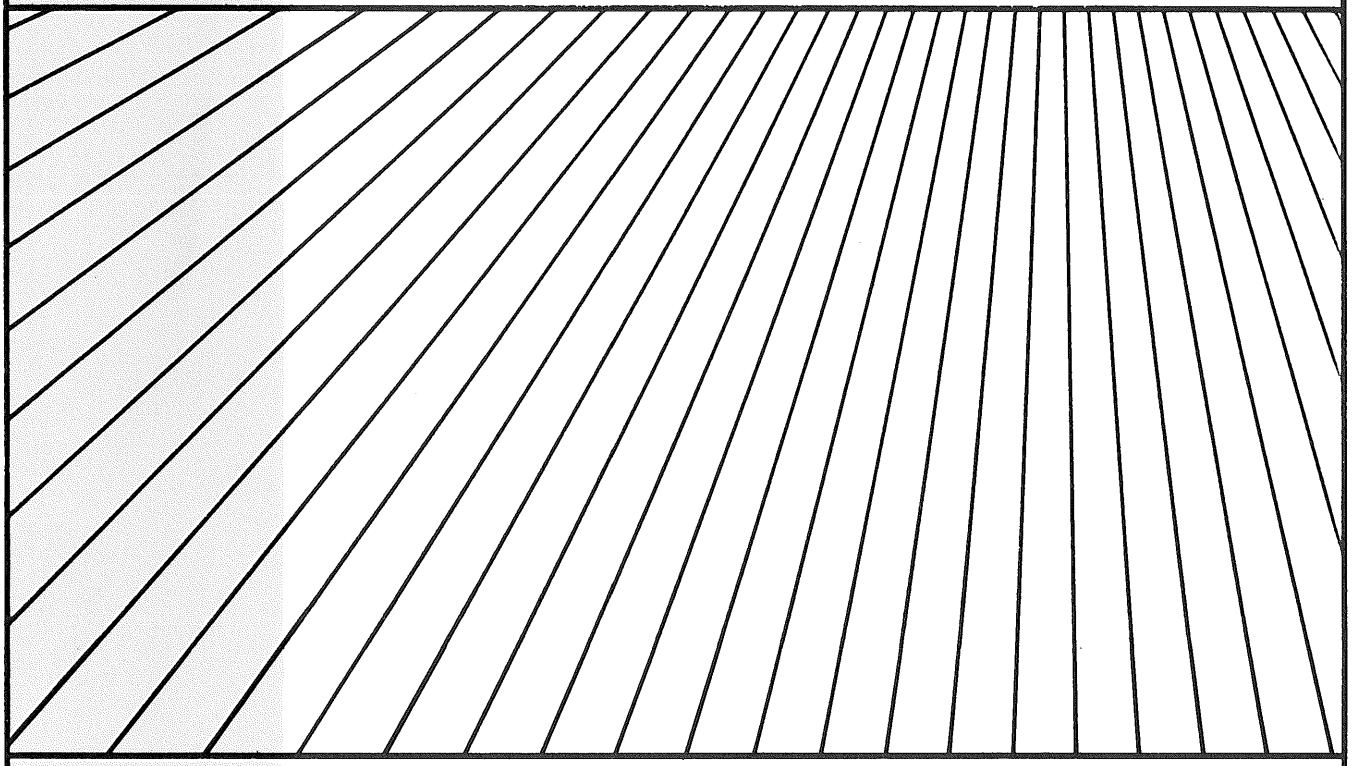


# Drought Response Plan



June 1993

Minnesota
Department of Natural Resources
Division of Waters

# *DROUGHT RESPONSE PLAN*

*MINNESOTA DEPARTMENT OF NATURAL RESOURCES*
*DIVISION OF WATERS*

*JUNE 1993*

*This information is available in an alternative format upon request.*

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Division of Waters

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# *DROUGHT RESPONSE PLAN*

## *MINNESOTA DEPARTMENT OF NATURAL RESOURCES*
## *DIVISION OF WATERS*

### I. INTRODUCTION

While we view Minnesota as a water rich state, serious drought conditions in 1974-77 and 1987-89 reminded us that Minnesota is susceptible to drought. The fact that drought conditions will reoccur in Minnesota is the reason we need a state drought response plan. This plan provides a framework for preparing for and responding to future droughts to minimize conflicts and negative impacts on Minnesota's natural resources and economy.

Legislation enacted in 1990 mandated the Department of Natural Resources (DNR) to prepare a drought plan. Minnesota Statutes, Section 103G.293 states:

> "The commissioner shall establish a plan to respond to drought-related emergencies and to prepare a statewide framework for drought response. The plan must consider metropolitan water supply plans of the metropolitan council prepared under section 473.156. The plan must provide a framework for implementing drought response actions in a staged approach related to decreasing levels of flow. Permits issued under 103G.261 must provide conditions on water appropriation consistent with the drought response plan established by this section."

### II. BACKGROUND

The "dust bowl" of the 1930's was long-considered our only serious drought by most Minnesotans. It took extremely dry conditions in the 1970's and 1980's to raise public awareness of the reoccuring nature of drought and the significant public health and welfare impacts posed by drought conditions.

#### 1974-77 Drought Experience

Drought conditions began in the winter of 1974 and extended through the summer of 1977. The dry conditions of these years lowered water levels in wells and caused record low stream flows throughout the state. Late summer forest fires broke out, and conflicts arose between domestic well owners and neighboring high capacity well owners. The DNR Division of Waters formulated new policies to resolve these resource management problems and user conflicts. Many of these new policies formed the basis of subsequent amendments to agency rules and state statutes.

### 1987-89 Drought Experience

The warm, dry winter of 1986-87 was the beginning of this drought period. Drought conditions became very serious in mid-June 1988 when Mississippi River flow levels threatened to drop below the Minneapolis Water Works intake pipes at Fridley. Below normal precipitation coupled with declining lake levels, ground water levels, and stream flow created statewide concern. To facilitate coordination of drought response actions a State Drought Task Force was convened by the Director of the Division of Waters. The State Drought Task Force brought together local, state, and federal officials to share information and coordinate drought response strategies. Several actions were taken following the summer of 1988 to better prepare the state for the next drought. The Governor appointed a "Twin Cities Water Supply Task Force" specifically to make recommendations on how to meet future water demands in the event of low flow conditions on the Mississippi River. The Corps of Engineers initiated review of its operating plans for the Mississippi River headwaters reservoirs, and the 1989 legislature charged the Metropolitan Council with preparing water use and supply plans for the metropolitan area.

## III. DEFINITION OF DROUGHT

The Palmer Drought Severity Index is a general and standardized method of describing the length and severity of drought. This index is calculated on a weekly basis by the federal Climate Analysis Center in Washington D.C. and is monitored by the State Climatologist in the Division of Waters. The index classifies drought on a five-level scale ranging from "incipient drought" to "extreme drought".

In addition to the Palmer Drought Severity Index, the Division of Waters uses actual precipitation, stream flow, lake level, ground water level, and water use data to assess the status of hydrologic conditions in Minnesota. On a weekly basis the Division of Waters produces maps of precipitation and seasonal departures from normal.

## IV. ONGOING MANAGEMENT ACTIVITIES

The Division of Waters has primary statewide responsibility for water supply allocation and management that become increasingly important and visible during drought periods. Ongoing water quantity management programs make it possible for the Division of Waters to take actions to manage water shortages during drought periods. These programs include monitoring of the resource, regulation of water use, resolution of user conflicts, water allocation planning, emergency and conservation planning, information and technical assistance, and a limited role in water supply development.

## 1. Monitoring of Hydrologic Conditions

Continuous monitoring of hydrologic conditions is necessary to identify and track drought conditions. Actual measurements of precipitation, stream flow, lake levels, ground water levels, and water use are all essential to understanding and characterizing drought. The DNR Division of Waters is the lead state agency in the collection and management of hydrologic information. The Division of Waters relies primarily on a statewide network of local government cooperators and volunteer readers to obtain precipitation, lake level, and ground water level data. The Division collects stream flow data primarily through a cooperative stream gaging program with the United States Geological Survey, National Weather Service, and Corps of Engineers. From April through October the Division generates weekly stream flow reports that give the status of flow levels in each of the state's 81 watershed units.

## 2. Regulation of Water Appropriations

Any appropriation of water exceeding 10,000 gallons per day or 1,000,000 gallons per year requires a Division of Waters permit. Permit conditions define withdrawal limits and require conservation to avoid water use conflicts and provide for sustained use.

Ground water resources constitute the largest source of drinking water available for Minnesotans. To ensure the availability of this source for future generations DNR manages ground water use to avoid over-appropriation. Observation wells are monitored and ground water appropriations managed to avoid the long term decline of levels in major aquifer systems. Ground water management efforts also involve the elimination of wasteful or inefficient water uses and protection of aquifers. For example, withdrawals from the Mount Simon-Hinckley aquifer in metropolitan counties can be permitted for drinking water uses only.

During extended dry periods surface water levels are reduced and reliance on ground water increases. The DNR currently encourages the conjunctive use of surface and ground waters, when possible. This policy encourages the use of surface water as the primary source of water for non-consumptive uses when flows are adequate.

Surface water appropriations are generally discouraged for irrigation purposes because the highest demand for irrigation coincides with periods when surface water levels are low. Surface water appropriations are subject to suspension during periods of low water levels to protect instream flow and higher priority water uses. It is important for appropriators who rely on surface water for consumptive uses, such as crop irrigation, to have a contingency water supply.

Applicants are required to submit a contingency plan describing water supply alternatives, or sign a statement agreeing to withstand the results of no appropriation.

An instream flow program is currently being developed. It's principal objective is to provide stronger protection of instream flow values, such as fisheries, recreation, and navigation. Adoption of rules establishing a process for setting protected flows is targeted for June 1995.

### 3. Resolution of Water Use Conflicts and Well Interference Problems

Water use conflicts arise when water demands exceed the reasonably available supply of surface or ground waters. Well interferences occur when a high capacity well intercepts water from a higher priority water user. Water use conflicts can be a long-term regional problem, while well interferences tend to be short-term and localized in extent. Water use conflicts and well interference problems are resolved by the Division of Waters in accordance with the water use priorities established in Minnesota Statutes, Section 103G.261.

### 4. Water Allocation Planning

Water allocation planning is a process used by the Division of Waters to involve users in local allocation decision making. A water allocation plan is an agreement describing how the available water supply (the quantity in excess of resource protection levels) will be shared during times of shortage.

### 5. Emergency and Conservation Planning

Laws of Minnesota 1993, Chapter 186, requires public water suppliers serving more than 1,000 people to have an approved emergency and conservation plan by January 1, 1996. These plans will address procedures to be taken during periods of limited water supplies. The Division of Waters is working with water utility representatives and other agencies to develop guidelines for plan development.

### 6. Information and Technical Assistance

In addition to the stream flow reports discussed above, the Division of Waters is the primary state source of data on precipitation, lake levels, and ground water levels. The Division also provides general advice and technical assistance to individuals and communities facing water supply emergencies, and provides general advice and information on water conservation techniques.

### 7. Water Supply Development

Development of water supply systems is the responsibility of municipal water utilities and private interests. At the present time no water development programs are conducted by the Division of Waters. The Division of Waters has conducted ground water investigations and provides data on water availability to users. The Division of Waters also indirectly supports water supply through wetland restoration projects, which restore natural water basins and help maintain base flows in streams.

A number of water reservoirs have been constructed in Minnesota by the U.S. Army Corps of Engineers for a variety of purposes. Commercial navigation, flood control, and recreation generally are the primary purposes, with water supply a secondary purpose. The most significant reservoirs in Minnesota from a water supply perspective are Lake Winnibigoshish, Leech Lake, Pokegama Lake, Sandy Lake, Cross Lake, and Gull Lake. These six reservoir lakes make up what are called the "Mississippi River headwaters reservoirs". The Corps of Engineer's St. Paul District Engineer currently asserts complete authority over the operation of these reservoirs. The St. Paul District has adopted a plan that calls for emergency releases from these reservoirs when necessary to meet human health and safety needs under certain conditions and in consultation with the federal Bureau of Indian Affairs, the Minnesota Chippewa Tribal government, and the DNR.

## V. DROUGHT RESPONSE ACTIONS

The Agency Drought Coordination Matrix shown on the next page was initially developed by the State Drought Task Force, and later refined by the Division of Waters and the Corps of Engineers following the drought of 1987-89. The Drought Matrix identifies specific actions to be taken by various agencies in a staged response to decreasing flow conditions in the Mississippi River. Low flows on the Mississippi River are a good indicator of broad drought conditions because the Mississippi basin encompasses over half of Minnesota. The Drought Matrix provides the framework for cooperative actions by state, federal, and local government in response to increasingly serious drought conditions. The five primary responsibilities of the Division of Waters set forth in the Drought Matrix are described below.

### 1. Convening the State Drought Task Force

The State Drought Task Force will be convened by the Director of the Division of Waters when the state enters a drought watch (as defined in the Drought Matrix) to provide coordination and communication between agencies and institutions affected by drought and to provide a central information source for

# Agency Drought Coordination Matrix

| Condition and Program Phase | State and Federal Actions | Public Water Suppliers | Industrial | Agricultural and Private |
|---|---|---|---|---|
| 1. NORMAL CONDITIONS:<br>• Water quantity is adequate for normal purposes; water quality is acceptable under normal management<br>• Normal releases from reservoirs<br>• Normal precip/weather patterns/Hydrologic conditions | • Develop precipitation, streamflow, ground water, and water quality monitoring programs.<br>• Conduct state and regional water studies and coordinate recommended actions.<br>• Assist public water suppliers and local government in developing emergency water management plans.<br>• Establish public education program<br>• Emergency planning is needed in a generic sense. | • Develop Emergency Water Management Plans.<br>• Develop additional storage and treatment facilities, evaluate distribution system.<br>• Adopt standby rates, other necessary ordinances and codes, and establish mutual aid agreements, interconnections, conservation education, etc. | • Develop individual Emergency Water Management Plans.<br>• Develop additional wastewater storage.<br>• Develop alternative water storage, and conservation measures.<br>• Purchase standby equipment and install permanent equipment as necessary for recycling. | • Develop emergency water management plans.<br>• Evaluate need for irrigation.<br>• Enlarge ponds, purchase tanks, drill wells, install conservation devices and livestock watering tanks, etc.<br>• Evaluate agricultural water use and find where conservation could be used.<br>• Evaluate domestic water use and install water saving devices, etc. to reduce stress on supply source. |
| 2. DROUGHT WATCH:<br>• Lower than normal precipitation, declining streamflows and groundwater levels.<br>• Palmer Index, Frost, Reservoir and lake levels, snow/water content, streamflow, groundwater condition result in a 30, 60, 90 day outlook that is deficient. | • "Drought task force" initial meeting (see agency list).<br>• Intensify selected monitoring activities.<br>• State initiates an awareness program via media, etc. | • Monitor water sources and daily water use for specific purposes and anticipate user demand.<br>• Monitor potential conflicts and problems. | • Monitor water source and daily water use for specific purpose and anticipated demand.<br>• Monitor water quality. | • Monitor water sources and daily water use for specific purposes and anticipate demand. |
| 3. CONSERVATION PHASE:<br>• Water quantities/water quality deteriorating or conflicts among users.<br>• Agency/utilities appeal to public for voluntary conservation.<br>• Public awareness program.<br>• Closely monitor drought indicators.<br>• Monitor NWS 30, 60, 90 day weather and precipitation projections.<br>• Monitor NWS streamflow projections. | • More frequent "task force" meetings to exchange water supply and water quality data and discuss actions.<br>• Monitor systems and users having past problems and monitor plan implementation.<br>• Respond to local and individual appeals for assistance.<br>• State agencies issue orders to water suppliers and/or dischargers.<br>• Public information about conditions.<br>• Public water conservation education/ encourage. | • Implement "conservation" phase at plan triggering point. Potential conservation measures include curtailment of outside uses, education, and pricing.<br>• If conservation goal is not obtained, implement restrictions.<br>• Notify MDNR of source conflicts. | • Institute re-cycling, cut back production, store wastewater, alter production schedule per emergency industrial water management plan during a drought.<br>• Notify MDNR of source conflicts. | • Continue conservation of domestic supplies.<br>• Notify MDNR of source conflicts.<br>• Implement water conservation measures for agricultural uses. |
| 4. RESTRICTION PHASE:<br>• Insufficient supplies to meet all demands.<br>• Allocation suspensions taking place.<br>• Continued decline in water supply and/or water quality.<br>• Utilize drought indicators.<br>• Utilize NWS 30, 60, 90 day weather and precipitation projections.<br>• Closely monitor NWS streamflow projections. | • Same responses as in Conservation Phase and State implements mandatory restrictions.<br>• State Contingency Actions accomplished (example: ease NSP thermal permit).<br>• Consider emergency releases from reservoirs above the low flow plans. | • Implement "restrictions" phase at plan triggering point. Restrictions could include banning of some outdoor water uses, per capita quotas, cut-backs to non-residential users.<br>• Notify MDNR of source conflicts. | • Institute additional cut-backs in production, storage of wastewater, or changes in production schedule, etc. per emergency industrial mgmt. plan or Commissioner's orders for suspensions.<br>• Notify MDNR of conflicts. | • Same responses as in Conservation Phase.<br>• Follow MDNR allocation restrictions on irrigation. |
| 5. EMERGENCY PHASE:<br>• Severe water supply or water quality problems.<br>• Highest priority water supplies not being met.<br>• Threatened or actual power "brownouts".<br>• MAPP (NSP power pool) resources threatened<br>• Start monitoring of drought indicators.<br>• Start monitoring of weather and streamflow projections. | • Governor responds to critical situations by declaring an emergency.<br>• MDEM implements emergency operations plan.<br>• State agency mediates conflicts.<br>• Consider Corps PL 99 authorities.<br>• Implement emergency releases from reservoirs above low flow plans. | • Provide bottled water and sanitation supplies to users.<br>• Make hospitals, firefighting, etc. priority.<br>• Initiate hauling of water.<br>• Comply with State Commissioner's Orders. | • Comply with Governor's Emergency Declarations.<br>• Coordinate emergency action with local government.<br>• Implement hauling water for sanitation, domestic uses. | • Request local government assistance in obtaining water for domestic purposes, and in supporting livestock.<br>• Implement hauling water, etc. in cooperation with local government. |

the news media. The State Drought Task Force also could be called together at other times as needed to serve as a forum for discussion of drought management plans and policies. In cases of more localized drought conditions, the Director may bring appropriate parties together on a Regional Drought Task Force for the same purpose.

**2. Intensification of Monitoring and Assistance**

In drought periods the Director will shift Division priorities and reassign staff as needed to support Drought Task Force activities, intensify monitoring efforts, provide for increased communication with water appropriators, and effectively respond to increased water use conflicts and requests for advice and technical assistance. This may involve conducting emergency hydrogeologic and geophysical investigations for a community with an emergency water supply problem, or directing the community to the Minnesota Duty Officer at the state Emergency Operations Center in the Department of Public Safety's Emergency Management Division office in the State Capitol Building for assistance in providing emergency water supplies.

**3. Dissemination of Information to the Public**

The Division of Waters will take the lead role in communicating the extent and intensity of drought conditions to the public. Division staff will prepare summary data and public service announcements to convey accurate and timely information on drought conditions across Minnesota. Appropriation permit holders will receive advance notice of possible permit suspensions, and depending on the severity of drought conditions, be encouraged or required to implement water conservation practices.

**4. Implementation of Mandatory Restrictions**

The law directs appropriation permits to be limited for the purpose of safeguarding "water availability for instream uses and for downstream higher priority users". When necessary, DNR will suspend surface water appropriation permits within specific watersheds when stream flow drops below the protected flow, and on specific water basins when water levels drop below the protected elevation. Stream flow and lake level monitoring will be the basis for consideration of permit suspension. Future implementation of the instream flow program will likely result in higher flow protection levels being established on many Minnesota streams.

**5. Governor's Declaration of Critical Water Deficiency**

The Governor is empowered to declare a critical water deficiency by executive

order. If ordered, public water supply supply authorities are mandated to adopt and enforce emergency water conservation restrictions that limit lawn sprinkling, vehicle washing, golf course and park irrigation, and other nonessential uses.

The DNR will recommend to the Governor when a critical water deficiency should be declared. The recommendation will be based on consultations with the State Drought Task Force and the Division of Water's assessment of hydrologic conditions. A critical water deficiency may be imposed statewide or on a regional basis based on the extent of deficient hydrologic conditions. A mean daily flow of 554 cubic feet per second or less on the Mississippi River at the U. S. Geological Survey gaging station near Anoka (approximately 1.3 miles downstream of the Coon Rapids Dam) will automatically trigger a critical water deficiency recommendation to the Governor for the Mississippi River basin.

The Division of Waters will stay in close consultation with the Corps of Engineers St. Paul District to ensure that emergency low flow releases are made from the Mississippi River headwaters reservoirs when necessary to meet basic human health and safety needs. These consultations will be initiated before the emergency phase of drought is reached in recognition of the approximate one month low flow travel time from Grand Rapids to the Twin Cities.

The DNR may request partial activation of the state Emergency Operating Center during an emergency phase of drought. If a drought is of such severity and magnitude that effective response is beyond the capabilities of the state and affected local governments, the DNR will work closely with the Emergency Management Division of the Department of Public Safety in developing a Governor's request for a Presidential declaration of a drought disaster or an emergency under the federal *Disaster Relief and Emergency Assistance Act* (Public Law 93-288).

## VI. COORDINATION WITH METROPOLITAN COUNCIL

In response to a 1989 legislative mandate to develop a long-term water supply plan for the metropolitan area the Metropolitan Council published the report *Twin Cities Metropolitan Area Water Supply: A Plan For Action in February 1992*. The report discusses an array of metropolitan water supply issues, including water conservation and drought planning.

The report suggests that the controversy over proposed releases from the Mississippi River headwaters reservoirs was the largest and most unnecessary problem associated

with the 1988 drought. The report concludes that the root cause of the problem was the lack of a plan for phasing down water demand in the Metropolitan Area. The report states that it is essential for the regulatory agencies to be provided with sufficient staff resources to aggressively pursue water conservation and contingency planning with water suppliers and users.

The Division of Waters strongly agrees with the report's call for the adoption of a uniform baseline set of water conservation practices by every community in the Twin Cities Metropolitan Area. During the 1987-89 drought, some communities in the Metropolitan Area implemented water conservation programs while adjacent communities did little to encourage conservation. The Division of Waters supports a leadership role for the Metropolitan Council in developing a uniform set of conservation standards for the Metropolitan Area with the participation of metropolitan water suppliers and users.

Water appropriation permits issued by the Division of Waters are required by statute to be consistent with regional water and related land resources plans. Therefore, the state water appropriation permit process can serve as a vehicle for implementing certain objectives of the Metropolitan Area water supply plan. In July of 1992 the Metropolitan Council began reviewing and providing comments to the Division of Waters on metropolitan water appropriation permits.

The Metropolitan Council serves as a member of the State Drought Task Force, and the Division of Waters also works closely with the Metropolitan Council on legislative policy initiatives regarding water supply and water use issues affecting the metropolitan area.

## VII. PLAN AMENDMENTS

This plan outlines the framework for state drought response actions. Specific information or materials mentioned in this document are available upon request from the Division of Waters. The Division of Waters expects this plan will need to be periodically updated as our state drought response strategies further evolve.

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