

## ANNEX U

### DROUGHT

#### A. PURPOSE

1. The purpose of this annex is to provide an effective and systematic means of assessing and responding to a drought emergency.
2. The West Virginia Office of Emergency Services (WVOES) will use the following two (2) policies in all drought emergencies:
  - Any time a city, community or public water supplier who depends on impoundment's as its main source of water, and the impoundment reaches a point of a 60 day remaining supply of water, WVOES will recommend to the governor that Mandatory Water Conservation Rules be instituted.
  - Any time a city, community or public water supplier who draws water from streams, either small or large, exceeds 25% of the stream flow it will also be include in the Mandatory Water Conservation Rules.

#### B. SITUATION AND ASSUMPTIONS

##### 1. Situation

Drought is a cyclical weather phenomenon, which can have a profound effect upon the State of West Virginia. It is progressive in nature, and its presence may not be recognized until it reaches a severe level.

Drought impacts the State with a variety of complex problems, which, if identified and evaluated, can be dealt with in a well-organized manner.

The most significant impacts which confront the State are in the areas of agriculture, forestry, fish and wildlife, recreation and tourism, public and private water supplies, water quality, and economic impacts.

This plan is based upon current legislation and authorities, which do not provide for the mandatory allocation of water supplies to the State.

- a. Drought is defined as a prolonged period of abnormally dry weather, where the lack of sufficient precipitation causes a serious hydrologic unbalance, having economic and/or social consequences which may affect all or a portion of the State of West Virginia.
- b. Drought severity depends upon the degree of moisture deficiency, the duration, and the size of the effected area.
- c. Drought is considered a meteorological phenomenon rather than the result of underdeveloped public water supply systems.
- d. The State of West Virginia via cooperators monitors precipitation, ground water levels, stream flows, snowpack, and water quality and utilizes the Palmer Drought Severity Index (See Appendix 1) and other indices to ascertain drought potential.
- e. West Virginia receives an annual average of 42.00 inches of precipitation which recharges ground water and reservoirs. Extended droughts severely diminish the amount of water in streams, reservoirs and aquifers.
- f. The population of West Virginia is equally dependent on public ground water systems, private wells or cisterns and surface water for their water supply.

## 2. Assumptions

- a. Droughts can be categorized into two different types, each one affecting the other: Agricultural and Hydrological.
  - (1) Agricultural Drought is a moisture deficiency seriously injurious to crops, livestock, or other agricultural commodities.
  - (2) Hydrological Drought is evidenced by reductions in stream flow and in lake and reservoir levels, depletion of soil moisture, a lowering of ground water table and consequently a decrease in ground water discharge to streams and lakes.

- b. Three indicators are frequently utilized, along with specific water resource information, to determine drought conditions.
  - (1) Crop Moisture Index (See Appendix 1) measures soil moisture to a depth of approximately five feet (5') and is the most commonly used indicator of short-term drought affecting agriculture.
  - (2) Palmer Hydrological Drought Index (See Appendix 1) measures the reduction in streamflow, lake and reservoir levels, and the lowering of ground water levels.
  - (3) The Palmer Drought Severity Index (See Appendix 1) depicts prolonged abnormal dryness or wetness over a period of months or years. The index reflects long-term moisture, runoff, recharge, precipitation, deep percolation and evapotranspiration. It is useful in measuring disruptive effects of prolonged dryness or wetness on water sensitive economies, designating disaster areas of drought or wetness, and reflecting the general long-term status of water supplies in reservoirs and streams.

## 2. Phases of the Drought Response System

State of West Virginia response to a drought situation whether agricultural and/or hydrological is divided into four phases:

- a. Phase I – Normal Conditions

A drought monitoring and assessment system is required to provide enough time for State and local decision-makers to take appropriate action.

- b. Phase II – Drought Alert

- (1) When the Palmer Drought Index (See Appendix 1) reads - 2.0 to -3.0 and streamflow, reservoir levels, the ground water levels are below normal over a several month period, and/or the State Director of Emergency Services determines Phase II activities are required, then the Governor will be requested to make a Drought Alert Declaration.

- (2) The Drought Alert may be issued for all or a portion of the State of West Virginia based on data collected. Conditions would indicate the potential for a serious water shortage or agricultural emergency with below normal precipitation and declining streamflows and ground water levels are expected over a period of one to two months.
- (3) The State Director of Emergency Services with representatives from the following agencies will implement the Drought Annex:
  - (a) WV Division of Environmental Protection
  - (b) WV Department of Agriculture
  - (c) WV Office of Emergency Services
  - (d) National Weather Service-Charleston
  - (e) Farm Service Agency
  - (f) WV Public Service Commission
  - (g) U.S Army Corps of Engineers
  - (h) WV Department of Health and Human Resources
  - (i) WV Department of Transportation
- (4) The WVOES shall carry out these and other tasks as assigned during this phase.
  - (a) Conduct meetings with the above agencies to address issues.
  - (b) Provide a reporting system format and regularly issue reports on drought status through Phases II-IV of a drought.
  - (c) Identify resource information gaps and make recommendations for improvement.

- (d) Provide a water availability report, comprised of information on precipitation, streamflow, reservoirs, ground water levels, and reports of dry or impacted wells, and forecasted weather. WVOES will provide this report to the Governor.
- (e) Provide supplemental reports whenever a significant weather event occurs or as requested.
- (f) Place continuous emphasis on improving the capability to provide accurate and timely assessments of water availability or agricultural deficiencies.
- (g) Development of additional assessment information and the identification of emergency needs.
- (h) Make recommendations to the Governor concerning State level response and recovery.
- (i) Develop and provide weekly Situation Reports (Sitreps) on the drought.
- (j) Monitor trend and serve as the technical advisor for State and local decision-makers.
- (k) Provide drought awareness information for the public and the media.
- (l) Make recommendations relating to proposed State actions, including but not limited to, monitoring and reviewing of potential impacts on the State's agricultural, economy, environmental, and natural resources.
- (m) Review, approve, and provide updated information for this annex.
- (n) Identify resource deficiencies that may aggravate drought effects.
- (o) Coordinate with Governor's Office and other organizations as needed to develop drought legislation.

- (5) The Drought Alert would be rescinded once rainfall, streamflows, reservoir levels, and ground water levels return to normal or near normal levels for that time of year. The Palmer Drought Severity Index (See Appendix 1) would be above -1.0.

c. Phase III – Conservation Phase

- (1) Phase III is activated when the Palmer Drought Severity Index (See Appendix 1) is between -3 to -4 and/or when the State Director of Emergency Services determines that Phase III activities are required. Streamflow, reservoir levels and ground water levels continue to decline, and forecasts indicate an extended period of below normal precipitation.
- (2) During Phase III monitoring, oversight, and analysis activities are increased. Water conservation measures are increased. Partial activation of the State Emergency Operations Center (SEOC) may occur depending upon the needs/requests of citizens and public officials in drought stricken areas of the State.
- (3) The Conservation Phase would return to a Drought Alert when precipitation increases, streamflows, reservoir levels, and ground water levels stop their decline and the Palmer Drought Severity Index (See Appendix 1) begins to rise to -2.0 or higher or when the State Director of Emergency Services determines the Phase II actions are required. Extended forecasts should indicate a return to normal conditions.

d. Phase IV – Drought Emergency

- (1) Phase IV is activated when the Palmer Drought Severity Index (See Appendix 1) is lower than -4 and/or the State Director of Emergency Services determines that Phase IV activities are required. The Governor may issue a Drought emergency declaration when water supplies are inadequate to meet projected demands and extreme measures must be taken. Forecasts will indicate that precipitation levels, streamflows, reservoir levels, and ground water levels will continue to decline.

- (2) The Governor's declaration empowers State agencies to review allocation of supplies in communities not adequately responding to their water shortage; and to implement emergency programs and actions as provided in the West Virginia Code.

## C. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

### 1. Organization

#### a. Federal

The following agencies of the federal government may assist the State of West Virginia during drought emergencies with a variety of loans, grants and programs for material and personnel support.

U.S. Department of Agriculture  
U.S. Department of Commerce  
Internal Revenue Services  
Small Business Administration  
Federal Emergency Management Agency  
U.S. Department of Labor  
U.S. Army Corps of Engineers  
General Service Administration  
U.S. Department of Interior

Although some federal assistance and resources are released for use prior to a formal declaration of a drought emergency, most federal assistance is available only after a Presidential Declaration.

#### b. State

- (1) The following State agencies may provide assistance to local governments during drought emergencies.

WV Department of Agriculture  
WV Department of Health and Human Resources  
WV Division of Natural Resources  
WV Bureau of Employment Programs  
WV National Guard  
WV Taxpayers Services Division  
WV Office of Emergency Services

- (2) Monitoring of the drought situation will be maintained throughout Phase II – Phase IV with appropriate State assessment and response/recovery recommendations being made to the Governor.
- (2) Although some State assistance and resources are released for local use prior to a formal declaration of a drought emergency by the Governor, most State assistance is available only after a State declaration, as requested by local authorities.

## 2. Assignment of Responsibilities

### a. West Virginia Office of Emergency Services (WVOES)

- (1) Develop weekly Situation Reports (Sitreps) of the drought.
- (2) Refer to Annex C-Communications, and Annex M-Public Information in the West Virginia Emergency Operations Plan (WVEOP) for coordination functions applicable to all emergencies.
- (3) Coordinate the use of the WV Division of Highways and WV National Guard water tankers/buffaloes for use by local communities.
- (4) Coordinate all drought-related press releases with the news media.
- (5) Identify sources of water hauling and pumping capabilities.
- (6) Assure family emergency information is provided to the public.
- (7) Develop written updates of this annex for review, recommendations and approval.

### b. WV Division of Environmental Protection (WV DEP)

- (1) Monitor water quality on a regular basis and provide this information to the WVOES.
- (2) Post streams where water quality standards are not met.



- (3) Coordinate with the WV Department of Health and Human Resources on the release of drought related health advisories.
  - (4) Maintain information on outlet discharge capacity of State owned dams/reservoirs and improve structural work as appropriate for State owned dams/reservoirs.
- c. WV Department of Health and Human Resources (WV DHHR)
- (1) Provide increased monitoring of bulk water haulers and tankers through the Office of Environmental Health Services district offices in cooperation with county and local government agencies. Require public water utilities to document all sales of finished water to contract haulers. offices.
  - (2) Document number of new and replacement wells drilled.
  - (3) Perform routine laboratory testing for total and fecal coliforms for well samples submitted by the local health departments.
  - (4) Provide public instruction via press release and/or for individual inquiry for the disinfection of drinking water supplies, as necessary, in drought impacted areas of the State, in cooperation with county health departments and Office of Environmental Health Services district offices.
  - (5) Provide information on food safety via press release and/or for individual inquiry, as necessary, in drought impacted areas of the State, in cooperation with county health departments and Office of Environmental Health Services district offices.
  - (6) Permitting and inspection of bottled water plants and distributors.
  - (7) Review available stream flow data from USGS Internet website and advise WVOES when withdrawal rates by public water utilities reaches a level of concern.

- (8) To provide technical assistance to public water utilities on an as needed basis for modification to treatment processes which may be required to facilitate adequate treatment of water from alternate sources or unusual source water quality conditions such as lower stratum of reservoirs.
  - (9) Provide design standards information for various individuals and public water supplies.
  - (10) Provide information for water quality criteria for recreational contact with water in streams and lakes on request.
- d. WV Department of Agriculture (WV DOA)
- (1) Identify and monitor water impoundment's that can be used as water resources.
  - (2) Coordinate with the U.S. Department of Agriculture in collecting information regarding critical shortages of water and livestock feed.
  - (3) Provide information to farmers on crops and livestock.
  - (4) Plan for the emergency distribution of livestock feed.
  - (5) Assist in encouraging cutbacks of agricultural use of water.
- e. WV Public Service Commission (WV PSC)
- (1) Regulated investor owned utilities advise PSC of their drought status, establish contact person and alternate for weekly status report, and recommend conservation education.
  - (2) Recommend voluntary cutbacks on water usage.
  - (3) Advise PSC regulated investor owned utilities to follow their tariffs with regard to voluntary and mandatory conservation measures.
  - (4) Initiate recommendations for water conservation based upon recognized priorities.

- (5) Provide weekly reports on current status of PSC regulated investor owned utilities ability to provide service to their customers.
  - (6) Assist in encouraging cutbacks of industrial use of water.
  - (7) Monitor events that may/will impact on this or other PSC regulated investor owned utilities.
- f. Farm Service Agency (FSA)
- (1) Provide assessments of drought damage.
  - (2) Coordinate requests for drought related Presidential Declaration of Drought Emergency.
  - (3) Recommend federal drought assistance declaration to the Governor through the WVOES.
  - (4) Implement federal drought assistance programs.
  - (5) Administer drought-related relief in coordination with the WV Department of Agriculture.
- g. U.S. Army Corps of Engineers (USACE)
- (1) Coordinate the development of drought plans and procedures for lakes, dams, etc. within the State of West Virginia under the jurisdiction of the Corps of Engineers.
  - (2) Provide information/reports as needed to WVOES.
  - (3) Coordinate USACE drought related activities with WVOES and affected West Virginia localities.
  - (4) Provide water from USACE reservoirs/dams, as available during emergencies.
- h. National Weather Service
- Provide research and reports on local weather patterns and forecasts to support drought related planning and response activities.

## E. PLAN DEVELOPMENT AND MAINTENANCE

1. The WVOES is responsible for the maintenance of this annex. It will be reviewed annually by appropriate State and federal agencies, updates will be provided as needed.
2. Each affected State agency shall develop operating procedures to implement their responsibilities as identified within this plan.
3. Each State and federal agency responding to the drought will prepare interim and a final report on their activities and submit a copy to the WVOES.

## F. AUTHORITIES AND REFERENCES

### 1. Authorities

#### a. Federal

- (1) PL 93-288, The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, as amended.
- (2) PL 84-99, Emergency Authority, as amended U.S. Army COE.
- (3) Safe Drinking Act of 1986, as amended.
- (4) Code of Federal Regulation (CFR) Title 44, Emergency Management and Assistance, 1996, as amended.

#### b. State

- (1) WV Code, Chapter 15, Article 5; WV Office of Emergency Services, as amended.
- (2) WV Code, Chapter 16; WV Department of Health and Human Resources, as amended.
- (3) WV Code, Chapter 19; WV Department of Agriculture, as amended.
- (4) WV Code, Chapter 22; WV Division of Environmental Protection, as amended.
- (5) WV Code, Chapter 24; WV Public Service Commission, as amended.

- (6) WV Code, Chapter 15, Article 1 and 6; WV National Guard, as amended.

## 2. References

- a. WV Drought Emergency Action Plan, WV DOA, 1999
- b. State of Ohio Drought Response Plan, 1994
- c. State of New Jersey Drought Emergency Plan, 1991
- d. State of North Carolina Emergency Operations Procedures for Drought, 1994
- e. State of Oklahoma Drought Management Plan, 1997
- f. State of Oregon Drought Annex, 1991
- g. State of Utah Drought Response Plan, 1993
- h. Disaster Assistance: A Guide to Recovery Programs, FEMA 229(4), November, 1995
- i. "Preparing for Drought in the New Millennium," Report of the National Drought Policy Commission, March, 2000

ANNEX U

APPENDIX 1

PALMER DROUGHT AND CROP MOISTURE INDICES

I. Palmer Drought Severity Index

Above +4	Extremely Moist Spell
3.0 to 3.9	Very Moist Spell
2.0 to 2.9	Unusual moist Spell
1.0 to 1.0	Moist Spell
0.5 to 0.9	Incipient Moist Spell
0.4 to -0.4	Near Normal
-0.5 to -1.9	Incipient Drought
-1.0 to -1.9	Mild Drought
-2.0 to -2.9	Moderate Drought
-3.0 to -3.9	Severe Drought
Below -4.0	Extreme Drought

II. Crop Moisture Index

Above +3	Extremely Wet
2.0 to 2.9	Wet
1.0 to 1.9	Abnormally Moist
0 to 0.9	Slightly Dry
0 to -0.9	Favorably Moist
-1.0 to -1.9	Abnormally Dry
-2.0 to -2.9	Excessively Dry
-3.0 to -3.9	Severely Dry
Below -4.0	Extremely Dry