



Incident Specific Annex 6 Drought

Coordinating Agency

West Virginia Division of Homeland Security and Emergency Management (WVDHSEM)

Primary Support Agencies

West Virginia Department of Environmental Protection (WVDEP)

West Virginia Department of Health and Human Resources (WVDHHR)

West Virginia Department of Agriculture (WVDA)

Support Agencies and Organizations

West Virginia Department of Transportation (WVDOT)

West Virginia Department of Military Affairs and Public Safety (WVDMAPS)

West Virginia Department of Commerce

West Virginia Department of Tax and Revenue

West Virginia Department of Administration

West Virginia Public Service Commission (PSC)

West Virginia Conservation Agency

West Virginia Radio Amateur Civil

National Weather Service

USDA, Farm Service Agency

US Army Corps of Engineers

Purpose

A. This annex provides the framework necessary to coordinate Federal, State, local, and private sector recovery efforts from the long-term consequences of a drought disaster affecting West Virginia.

B. State assistance under this function consists of three components:

- Providing monitoring and assessment.
- Helping affected communities return to normal status through coordination and implementation of applicable assistance programs, if needed.
- Identifying and implementing programs to minimize the adverse impact of drought.

Scope

This annex applies to all departments and agencies of the State of West Virginia.

Policies

A. This annex is intended to be consistent with the State of West Virginia Emergency Operations Plan (WVEOP), the National Response Framework (NRF), and the National Incident Management System (NIMS).

B. All agencies assigned responsibilities within this annex will develop and maintain the necessary plans, standard operating procedures, mutual aid agreements, and model contracts to successfully accomplish their tasks.

C. The WVDHSEM and the WVDEP are responsible for the development of this annex with input provided by appropriate agencies. This should occur at minimum once every two years.

D. Each State and Federal agency responding to a drought is to prepare an interim and final reports and After Action Reviews (AAR) on their activities and submit them to the WVDHSEM.

Situation

A. A drought is a natural, yet unpredictable occurrence that can vary widely in progression, duration, severity, and local impact. A drought is a persistent and extended period of below normal precipitation causing abnormal moisture deficiency that results in adverse impacts on vegetation, animals and/or people. This definition can be further subdivided into:

- **Meteorological Drought:** This drought stage is often defined by a period of substantially diminished precipitation for a duration and/or intensity that persists long enough to produce a significant hydrologic imbalance. The commonly-used definition of meteorological drought is an interval of time, generally on the order of months or years, during which the actual moisture supply at a given place consistently falls below the climatologically appropriate moisture supply.
- **Agricultural Drought:** This drought stage occurs when there is inadequate precipitation and/or soil moisture to sustain crop or forage production systems. The water deficit results in serious damage and economic loss to plant or animal agriculture. Agricultural drought usually begins after meteorological drought, but before hydrological drought, and can also affect livestock and other agricultural operations.
- **Hydrological Drought:** This drought stage is a result of deficiencies in surface and subsurface water supplies. It is measured as stream flow, and as lake reservoir and ground water levels. There is usually a time lag between a lack of rain or snow and lower water levels in streams, lakes and reservoirs.

- **Socio-economic Drought:** This drought stage occurs when physical water shortages start to affect the health, well-being and quality of human life, or when the drought starts to affect the supply and demand of an economic product.

B. Drought is a complex physical and social process of widespread significance. Although drought sometimes can affect the entire state, it frequently is more of a regional problem. Despite the frequency and economic damage caused by drought, the term drought remains difficult to define, and there are no universally- accepted parameters because:

- Drought, unlike floods, is not a distinct event in that it has no clearly defined beginning or end, thereby complicating attempts to define it;
- The definition of drought varies with its impact on individuals and circumstances, thus influencing the perception and meaning of drought, depending upon whom it affects and how they are affected; and
- While the effects of drought on the environment cannot be avoided in many cases, the adverse effects of drought caused by human activities in drought-prone areas can be avoided. There are several obvious problems with drought situations, but the initial problem is in recognizing drought conditions. Drying trends tend to be associated with “good” weather; too much “good” weather can wreak havoc on the environment, create serious water shortages, and delay or stop business and industry.

C. West Virginia receives an annual average of 44.2 inches of precipitation which replenishes ground water and reservoirs. Extended droughts can severely diminish the amount of water in streams, reservoirs, and aquifers.

D. The population of West Virginia is equally dependent on public ground water systems, private wells or cisterns and surface water for their water supply.

Planning Assumptions

A. Local jurisdictions implement conservation and mitigation procedures where possible. Zoning restrictions and planned development of identified drought vulnerable areas are enforced.

B. Public education efforts encourage individuals to adopt water conservation measures.

Organizational Structure

- A. A shared responsibility for managing agriculture droughts exists at the State level with WVDA and WVDHSEM. WVDA is to work directly with local jurisdictions that have been affected by droughts.
 - B. Planning and policies are to be maintained at the State level by WVDA and WVDHSEM to manage agriculture droughts and the recovery process afterwards.
 - C. Shared responsibility for managing hydrological droughts exists at the State level with WVDA, WVDEP, WVDHSEM, and WVDHHR.
 - D. Lines of succession are in accordance with the WVEOP Basic Plan, Emergency Support Functions (ESFs) and Incident Specific Annexes. It is the responsibility of each agency to ensure sufficient trained staff is available to perform its mission.
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Concept of Operations

A. General

- 1. The State of West Virginia monitors precipitation, ground water levels, stream flows, snow pack and water quality. Utilization of the Palmer Drought Severity Index and other indices allows the State of West Virginia to ascertain drought potential.

B. Phases of Management

- 1. Preparedness
 - a. Coordinate with all supporting and other appropriate departments/agencies and organizations to ensure accuracy and currency of information.
 - b. Develop systems to use predictive modeling, including the HAZUS loss estimation methodology, to determine vulnerable demographics as a basis for identifying recovery activities.
 - c. Develop and organize damage assessment teams and plans to obtain and analyze damage assessment data.
 - d. Ensure all personnel integrate the NIMS principles in all planning activities. All Emergency Support Function (ESF) personnel are to complete all required NIMS training, as outlined in the 2006 Department of Homeland Security (DHS) training guidance.

e. Develop and implement plans to reduce State and local socio-economic consequences.

2. Response

a. WVDHSEM may use the following policies in all drought emergencies:

1) Recommend to the Governor that Mandatory Water Conservation Rules be instituted if at any time a city, community or public water supplier who depends on impoundment as its main source of water, and upon that impoundment reaching a point of a 60 day remaining water supply.

2) When drought conditions are in the developing stages, the Commissioner of Agriculture is to regularly receive/obtain data and information from WVDA staff and USDA Farm Service Agency. As this information is received, monitored and analyzed, the Commissioner is to keep WVDHSEM informed with the most up to date information.

3) Recommend to the Governor that mandatory water conservation rules be instituted if at any time a city, community or public water supplier who draws water from either small or large streams exceeds 25 percent of the stream flow.

3. Recovery Operations

a. Recovery operations are to be monitored and coordinated by WVDHSEM and in conjunction with WVDA implement a wide range of specific actions to be taken by state agencies to support local governments and to coordinate recovery activities.

1) Initiate recovery activities after the damage assessment is complete.

2) When conditions allow, rapid and thorough assessments must be conducted to:

i. Assess the overall damage to affected areas;

ii. Assess the overall damage to critical public services; and

iii. Determine whether those damages are sufficient to warrant supplemental State and/or Federal disaster assistance.

3) Determine the need for a Governor's request for a Presidential disaster declaration, which makes the State eligible for a variety of Federal assistance programs.

4) Coordinate Federal assistance programs via the Governor's appointment of a State Coordinating Officer (SCO), a Governor's Authorized Representative (GAR) and a State Hazard Mitigation Officer (SHMO).

5) Upon activation of a Joint Field Office (JFO), West Virginia State Emergency Operations Center (WVSEOC) operations may terminate and State operations can be transferred to the JFO.

5) Deploy damage assessment teams; obtain and analyze damage assessment data.

6) Assign staff to identify and document economic impact and losses in affected areas in coordination with the Federal government (if there is a declaration).

7) Coordinate identification of appropriate Federal and State programs to support implementation of long-term recovery plans.

4. Mitigation Operations

a. Following a Presidential disaster declaration, the SHMO is to execute the State Hazard Mitigation Plan and implement the State Hazard Mitigation Grant Program (HMGP) according to the HMGP Administrative Plan.

b. The SHMO reviews and revises the HMGP Administrative Plan, as necessary.

c. The SHMO reviews and revises the State Hazard Mitigation Plan, as necessary.

d. The WVDHSEM Chief of Mitigation and Recovery and the SHMO develop the State's Management Cost Plan.

e. The SHMO works with the Public Assistance Program to ensure that all Stafford Act Section 406 mitigation opportunities are identified. Section 406 provides for direct Federal assistance for repairs and improvements to the eligible affected public and private entities.

- f. The SHMO works with the FEMA and appropriate state agencies to develop a disaster-specific mitigation implementation strategy. The implementation strategy includes an overview of the disaster, geographical and mitigation measure priorities, and a JFO action plan.
- g. Mitigation project completions are overseen by WVDHSEM. The WVDHSEM tracks progress, pays grant funds to the applicants, and conducts a final inspection with FEMA prior to final payment. The WVDHSEM submits quarterly reports to FEMA on the status of all projects.
- h. Plan for mitigation measures using the HAZUS loss estimation methodology support and other mitigation strategies.
- i. Support requests and directives resulting from the Governor and/or FEMA concerning mitigation and/or re-development activities.
- j. Document matters that may be needed for inclusion in agency or State/Federal briefings, situation reports and action plans.
- k. Coordinate assessment and revision of existing mitigation plans, as necessary.
- l. Review the State mitigation plan and local mitigation plans for affected areas to identify potential mitigation projects.

C. Drought Indices

1. While drought is difficult to define, it is equally difficult to develop an index to measure it. Many quantitative measures of drought have been developed in the United States, depending on the discipline affected, the region being considered, and the particular application. Common to all types of drought is the fact that they originate from a deficiency of precipitation resulting from an unusual weather pattern, but can be further classified as short or long term. No one indicator provides a sweeping overview of all possible drought conditions. West Virginia chooses to use a combination of five widely used indices for information regarding drought conditions. A brief description of these indicators follows:

- a. Palmer Drought Severity Index (PDSI)

- 1) The PDSI attempts to measure the duration and intensity of the long-term drought-inducing circulation patterns. Long-term drought is cumulative, so the intensity of drought during the current month is dependent on the current weather patterns plus the cumulative patterns of previous months.

b. Palmer Z Index

1) The Palmer Z index is a variation of the PDSI that measures short-term drought on a monthly scale.

c. Crop Moisture Index (CMI)

1) This index uses a meteorological approach to monitor week-to-week crop conditions by evaluating short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps can be used to compare moisture conditions at different locations.

d. Standardized Precipitation Index (SPI)

1) This is a probability index that considers the probability of recording a given amount of precipitation. The probabilities are standardized so that an index of zero indicates the median precipitation amount where half of the historical precipitation amounts are below the median, and half are above the median. The index is negative for drought, and positive for wet conditions. The SPI is computed by the National Climatic Data Center (NCDC) for several time scales, ranging from one (1) month to 24 months, to capture both short-term and long-term drought.

e. National Fire Danger Rating System

1) A broad scale system that incorporates science, technology and local experience to analyze the various factors of fuels, weather, topography and risk, in combination, to assess the daily fire potential of an area including the potential for a fire to ignite, spread and require suppression action. Fire danger is usually expressed in numeric or adjective terms.

D. Stages of Drought Response

1. A drought monitoring and assessment system is required to provide sufficient time for State and local decision-makers to take appropriate action. The drought stages are intended to guide implementation of the State's response to a drought depending upon seasonality and meteorological events. Each stage is determined by weighing all of the criteria used with the aid of the National Climatic Data

Center of the National Oceanic and Atmospheric Administration (NOAA) to determine the severity of the drought which includes: precipitation, ground water, stream flow, reservoir levels, PDSI, CMI, SPI, Fire Weather Forecast, and the Fire Danger. These nine (9) drought criteria are reassessed each month; therefore, the stages are adjusted only once per month. This facilitates progression through the stages on a monthly basis and if the drought worsens, the spacing of re-assessments every 30 days also provides for conservation measures to be effective.

2. Assessments will employ four stages of concern:

a. Normal

1) Refers to conditions that do not negatively impact water supplies, vegetation or water quality in the state. No action needed.

b. Alert

PDSI	CMI	SPI
-2.00 to -2.99 (yellow) Moderate Drought	-1.0 to -1.9 (yellow) Abnormally Dry	-1.00 to -1.49 (tan) Moderately Dry

1) When the PDSI reads -2.00 to -2.99 and stream flow, reservoir levels and ground water levels are below normal over a several month period and/or the WVDHSEM Director, in coordination with appropriate state officials, determines Stage II activities are required, the Governor is to be requested to make a Drought Alert Declaration.

2) The alert can be rescinded once rainfall, stream flows, reservoir levels and ground water levels return to normal or near normal levels for that time of year. The PDSI would be above -1.0 for normal or near normal levels.

c. Conservation

PDSI	CMI	SPI
-3.00 to -3.99 (tan) Severe Drought	-2.0 to -2.9 (tan) Excessively Dry	-1.50 to -1.99 (brown) Severely Dry

1) Activated when the PDSI is between -3.00 to -3.99 and/or when the Director of WVDHSEM, in coordination with appropriate state officials, determines that Stage III activities are required. Stream flow, reservoir levels and ground water levels

continue to decline and forecasts indicate an extended period of below normal precipitation.

2) A return to Alert level happens when precipitation increases; stream flows, reservoir levels and ground water levels stop their decline; and the PDSI begins to rise to -2.99 or higher or when the Director of WVDHSEM, in coordination with appropriate state officials, determines that Stage II activities are required. Extended forecasts should indicate a return to normal conditions.

d. Emergency

PDSI	CMI	SPI
-4.00 and below (brown) Extreme Drought	-3.0 or less (brown) Severely Dry	-2.00 and less (red) Extremely Dry

1) Activated when the PDSI is lower than -4.00 and/or the Director of WVDHSEM, in coordination with appropriate State officials, determines that Stage 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 are to indicate that precipitation levels, stream flows, 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.

E. Federal Interface

1. This annex is supported by the National Response Framework (NRF).
2. Federal support is tailored based on the type, extent and duration of the event and long-term recovery period, and on the availability of federal resources.
3. All response personnel are to be familiar with the NRF and the corresponding annex with federal counterpart concepts, actions, and responsibilities.
4. Following a Presidential disaster declaration, a Letter of Agreement is drawn between FEMA and the state. In that letter, the state agrees to revise its State hazard mitigation plan. This agreement is signed prior to the release of any federal disaster assistance funds.

5. An agriculture disaster declaration may be entered into by the State of West Virginia with the Secretary of USDA and may not necessarily involve FEMA.

Agency Responsibilities Matrix

Supporting Agency	Acronym	Responsibilities
West Virginia Department of Agriculture	WVDA	<ul style="list-style-type: none"> • Monitor trends and serve as the technical advisor for State and local decision-makers. • Request from the Governor a declaration of drought emergency for agriculture drought emergency purposes. • Provide information to farmers on crops and livestock. • Coordinate with the USDA in collecting information regarding critical shortages of water and livestock feed. • Distribute livestock feed. • Assist in encouraging cutbacks of agricultural use of water
West Virginia Division of Homeland Security and Emergency Management	WVDHSEM	<p>Coordinate with WVDA to:</p> <ul style="list-style-type: none"> • Monitor the drought situation throughout all stages with appropriate State assessment and response/recovery recommendations being made to the Governor regarding the potential impacts on the state's agricultural, economic, environmental, and natural resources. • Conduct meetings with support agencies to address specific drought issues. • Provide a reporting system format and regularly issues reports (e.g. Situation Reports) on drought status through all stages of a drought, including supplemental reports whenever a significant weather event occurs. • Identify resource information gaps and makes recommendations for improvement. • Emphasize on improving the capability to provide accurate and timely assessments of water availability or agricultural deficiencies. • Develop additional assessment information and the identification of emergency needs. • Increase monitoring, oversight and analysis activities during the Conservation Stage. Partial activation of the WVSEOC may occur depending upon the needs/requests of citizens and public officials in drought stricken areas of the State. • Monitor trends and serves as the technical advisor for State and local decision-makers. • Identify resource deficiencies that may aggravate drought effects.

		<ul style="list-style-type: none"> • Coordinate with the Governor’s Office and other organizations, as needed, to develop drought legislation. • Coordinate the use of the West Virginia Division of Highways and West Virginia National Guard water tankers/tenders for use by local communities. • Coordinate all drought-related and family emergency information press releases with the Governor’s Office of Communications for dissemination to the news media and public (see ESF 15, External Affairs). • Identify sources of water hauling and pumping capabilities.
<p>West Virginia Department of Environmental Protection</p>	<p>WVDEP</p>	<ul style="list-style-type: none"> • Monitor water quality on a regular basis and provides this information to WVDHSEM. • Post signage of notice/warning to streams where water quality standards are not met. • Coordinate with the West Virginia Department of Health and Human Resources on the release of drought-related health advisories. • Maintain information on outlet discharge capacity of state-owned dams/reservoirs and improves structural work as appropriate for state- owned dams/reservoirs. • Provide a water availability report to the Governor, comprised of information on precipitation, stream flow, reservoirs, ground water levels, and reports of dry or impacted wells, along with forecasted weather
<p>West Virginia Department of Health and Human Resources</p>	<p>WVDHHR</p>	<ul style="list-style-type: none"> • Provide increased monitoring of bulk water haulers and tankers through Office of Environmental Health Services district offices in cooperation with county and local government agencies. Requires public water utilities to document all sales of finished water to contract haulers. • Document the number of new and replacement wells drilled. • Perform routine laboratory testing for total and fecal coliforms for well and water system samples submitted by the local health departments. • Monitor trends and serves as the technical advisor for State and local decision-makers. • Provide information about 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. • Provide information about food safety in drought-impacted areas of the State, in cooperation with county health departments and Office of Environmental Health Services district offices. • Provide permitting and inspection services for bottled water plants and distributors.

		<ul style="list-style-type: none"> • Review available stream flow data from United States Geological Survey (USGS) website and advises WVDHSEM when withdrawal rates by public water utilities reach a level of concern. • 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 the lower stratum of reservoirs. • Provide design standards information for various individual and public water supplies. • Provide information for water quality criteria for recreational contact with water in lakes, on request
West Virginia Conservation Agency	WVCA	<ul style="list-style-type: none"> • Coordinate with other State and Federal agencies on stream draws for water resources for agriculture purposes. • Identify and monitors water impoundments that can be used as water resources.
West Virginia Public Service Commission	WVPSC	<ul style="list-style-type: none"> • Receive weekly status reports from regulated investor-owned utilities regarding their drought status and recommended conservation education activities. • Recommend voluntary cutbacks on water usage. • Advise PSC-regulated, investor-owned utilities to follow their tariffs with regard to voluntary and mandatory conservation measures. • Develop recommendations for water conservation based upon recognized priorities. • Provide weekly reports on current status of PSC-regulated, investor- owned utilities ability to provide service to their customers. • Assist in encouraging cutbacks of industrial use of water. • Monitor events that may/will impact other PSC-regulated, investor-owned utilities.
USDA Farm Service Agency	FSA	<ul style="list-style-type: none"> • Provide assessments of drought damage. • Coordinate requests for Presidential Declarations of Drought Emergency. • Provide technical support to WVDHSEM and WVDA in preparing the Governor’s request for a Presidential Declaration of Drought Emergency. • Implement Federal drought assistance programs. • Administer drought-related relief in coordination with the WVDA.
U.S. Army Corps of Engineers	USACE	<ul style="list-style-type: none"> • Develop drought plans and procedures for Corps of Engineers projects within West Virginia. • Provide information/reports as needed to WVDHSEM. • Coordinate USACE drought-related activities with WVDHSEM and affected West Virginia localities.

		<ul style="list-style-type: none"> • Provide water from USACE reservoirs/dams, as available during emergencies.
National Weather Service	NWS	<ul style="list-style-type: none"> • Provide research and reports on local weather patterns and forecasts to support drought-related planning and response activities.

Authorities & References

Authorities

West Virginia Code §15-1

West Virginia Code §15-5

West Virginia Code §15-6

West Virginia Code §16

West Virginia Code §19

West Virginia Code §22

West Virginia Code §24

References

State of West Virginia Emergency Operations Plan, Basic Plan

West Virginia State Hazard Mitigation Plan

West Virginia Drought Emergency Action Plan, West Virginia Department of Agriculture