

Hazard Profile - Drought

Description

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over an extended time period, and it is often not obvious or easy to quantify when a drought begins and ends. Drought is a complex issue involving many factors. It occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- **Meteorological** drought is usually defined by a period of below average water supply.
- **Agricultural** drought occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
- **Hydrological** drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- **Socioeconomic** drought occurs when a drought impacts health, well-being, and quality of life or when a drought starts to have an adverse economic impact on a region.

Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users that have a different water supply. Individual water suppliers may use criteria, such as rainfall/runoff, amount of water in storage, to define their water supply conditions. Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline. The Town / Village of Harrison receives its water from the New York City Water Supply System by way of a private utility known as Westchester Joint Water Works. Water is pumped from the Kensico Reservoir into the Westchester Joint Water Works Distribution System.

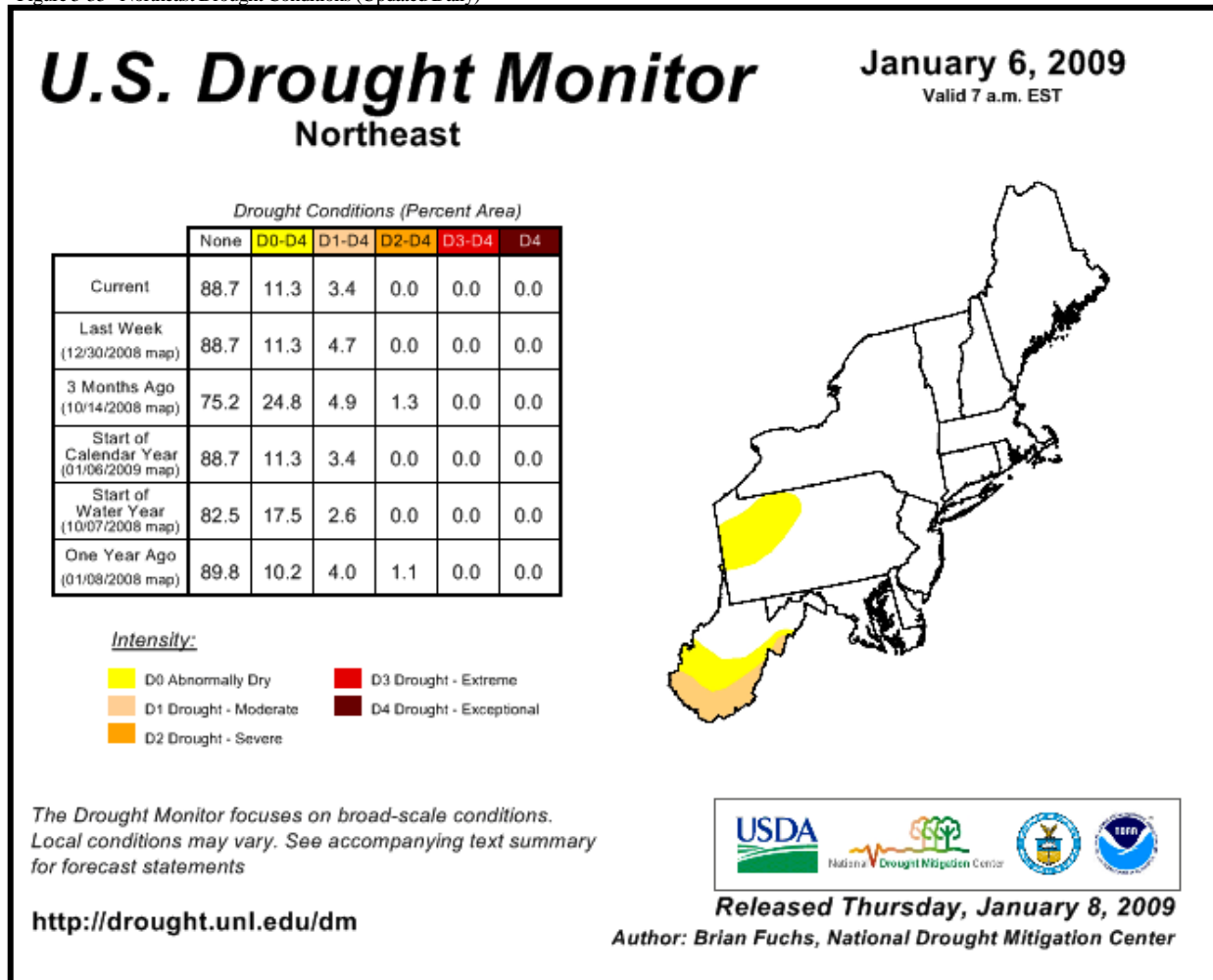
Location and Extent

The entire study area is susceptible to drought. Previous droughts in the study area have been both meteorological or hydrological. Several factors in a variety of combinations contribute to a drought condition including duration (lack of rainfall or mild winter as contributing factors), location as well as demand based on human activity and landscape. While the study area has experienced drought in the

past, the consequences have in general been limited to lawn watering and vehicle washing restrictions. The New York City Water Supply System provides information on a daily basis as to the status of its water supply system. On January 13, 2009, the system stood at 92 % of capacity while the average capacity for this time of year is 75%. The New York City Department of Environmental Protection provides a means for persons with internet access to receive water supply system updates by e-mail.

Figure 5-28 below is updated regularly and shows drought conditions across the northeast United States.

Figure 5-35 Northeast Drought Conditions (Updated Daily)



Source: University of Nebraska, National Drought Mitigation Center

Previous Occurrences

The New York City Water Supply System has experienced 7 periods of drought in the last 46 years. Table 5-52 below illustrates these drought periods as the water supply system status.

Table: 5-52 Drought History (New York City Water Supply System)

Year(s)	Item	Start	End
1963 – 1965	Conservation	11/1/1963	5/1/1964
	Intense Campaign	4/1/1965	
1980 – 1982	Watch	10/16/1980	
	Warning	11/6/1980	
	Emergency (Stage 1)	1/19/1981	
	Emergency (Stage 2)	4/1/1981	
	Modified	5/27/1981	
	Warning	1/18/1982	
	Watch	11/30/1982	
1985	Watch	2/25/1985	
	Warning	4/3/1985	
	Emergency (Stage 1)	4/26/1985	
	Emergency (Stage 2)	6/5/1985	
	Emergency (Stage 3)	7/10/1985	
	Normal	2/25/1986	
1989	Watch	1/17/1989	
	Emergency (Stage 2)	3/22/1989	
	Emergency (Stage 3)	5/1/1989	
	Normal	5/15/89	
1991	Watch	9/25/1991	
	Warning	11/8/1991	
1995	Watch	7/5/1995	
	Warning	9/13/1995	11/14/1995
2002	Watch	12/23/2001	
	Warning	1/27/2002	
	Emergency (Stage1)	4/1/2002	
	Watch	11/1/2002	1/3/2003

Source: NYCDEP website

While the water supply for the study area is owned and operated by the NYCDEP, the New York State Department of Environmental Conservation has been designated to implement, monitor, prepare and plan for future droughts. Information concerning drought preparedness can be found on both the New York State Department of Environmental Conservation and New York City Department of Environmental Protection websites.

Probability of Future Events

Based on previous history, the study area is likely to experience droughts in the future. Based on historical records, the probability of a drought impacting the study area is occasional, (likely to be less than once every 5 years, but more than once every 30 years).

Vulnerability Assessment

The entire study area may be impacted due to drought. At risk areas might include open space where ground cover might die often making the area susceptible to erosion when the rains do return. Forested areas would have a higher exposure to fire during periods of drought. Water supply resources would be reduced during extended drought periods. Segments of the population would be at heightened risk because of advanced age or health related conditions.

Overview of vulnerability

While several droughts has occurred in the past, impacts have been limited for the most part to use restrictions such as lawn watering and car washing. The study area has limited agriculture use of its open land areas. When droughts have occurred, an effective public education effort is instituted until the emergency passes. The potential for warming associated with changes in the global climate is being evaluated and conditions may increase the potential for droughts in the future.

Data and methodology used in the evaluation

Data with respect to past drought events was provided by the New York City Department of Environmental Protection which operates and maintains the system which supplies water to the study area. Additional resources were reviewed including NOAA, FEMA and the Westchester County Drought Emergency Response Plan and the National Drought Monitoring Center at the University of Nebraska-Lincoln.

Impact on life, safety and health

Drought by itself has had minimal or no impact on life, safety and health related issues in the study area. Where droughts have been associated with extreme heat events, the potential for life, safety and health issues increases dramatically, especially for the elderly. Extreme heat hazard events are addressed elsewhere in this plan. When droughts have occurred, an effective educational effort is implemented to assist residents and businesses to conserve water.

Identifying structures including general building stock, critical facilities and critical infrastructure

Drought conditions by itself are not anticipated to impact general building stock, critical facilities and infrastructure.

Economic impact

HAZUS-MH does not provide an analysis of the economic impact to the study area as a result of a drought. Economic impacts of drought are closely associated with agricultural, livestock, timber and fishery production, none of which exist in the study area.

Addressing Repetitive Loss Properties (NFIP data for floods, other hazards as available)

The National Flood Insurance Program provides information on payments to homeowners resulting from losses due to flooding. Under the drought hazard event category, repetitive loss properties are not analyzed.

Estimating Potential Losses

HAZUS-MH does not provide an analysis of structural vulnerability to building stock, critical facilities or infrastructure. Drought may impact buildings by increasing the weathering to outside surfaces and placing increased strain on mechanical systems providing air conditioning when high temperatures are associated with a drought. Potential loss data is not available locally.

Analyzing Development Trends (new buildings, critical facilities and Infrastructure)

Section 4 of this plan Municipal Profile – Future Development identifies several areas in the Town / Village of Harrison where the potential for development or redevelopment exists. As of January 1, 2009, construction underway is limited due to the economic turndown. Structures, critical facilities and infrastructure would not be severely impacted by drought. Landscaped areas may suffer due to a decrease in the availability of water. Landscape designs which have the ability to retain water utilizing ponds, rain gardens and other absorbing features would prove beneficial in the event of a drought.

Additional Data and Next Steps

Data available from Federal, State and local resources indicates that drought in general has not had a significant impact on the study area. Over time, this may change as a result of changes in climate in recent and in future years. The New York State Department of Environmental Conservation, New York City Department of Environmental Protection and County of Westchester all have plans as well as educational efforts in place should the potential for a drought arise.

Overall vulnerability conclusion

Drought has been determined to be an occasional event in the study area and thus a low risk event.