



8. DROUGHT

8.1 HAZARD PROFILE

8.1.1 Hazard Description

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry. Drought is a temporary aberration from normal climatic conditions and can vary significantly from one region to another. Human factors, such as water demand and water management, can exacerbate the impact that a drought has on a region (NIDIS 2020).

Anomalies of precipitation and temperature may last from several months to several decades. How long they last depends on interactions between the atmosphere and the oceans, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of weather systems on the global scale (NIDIS n.d.).

Drought can be characterized in one or more of the following ways:

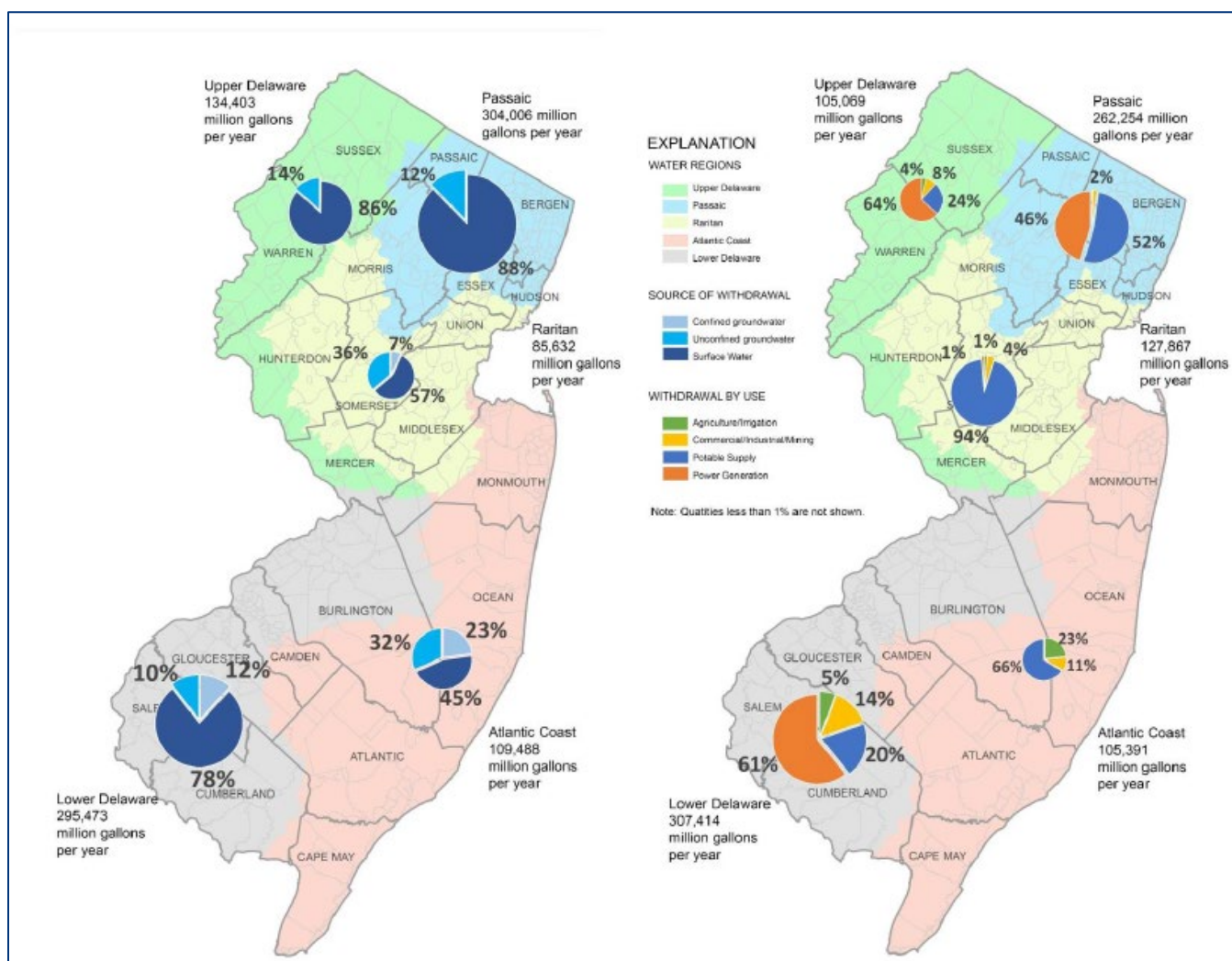
- **Meteorological drought** is a measure of the departure of precipitation from normal. It is defined solely by the relative degree of dryness. Due to climatic differences, what might be considered a drought in one location may not be a drought in another location (NDMC n.d.).
- **Agricultural drought** links drought to agricultural impacts, focusing on precipitation shortages, evapotranspiration, soil water deficits, reduced ground water or reservoir levels, and other parameters. It occurs when there is not enough water available for a particular crop to grow at a particular time (NDMC n.d.).
- **Hydrological drought** is defined by stream flows and reservoir, lake, and groundwater levels being below normal levels due to precipitation shortfalls (NDMC n.d.).
- **Socioeconomic drought** occurs when the demand for an economic good exceeds supply because of a weather-related shortfall in water supply. The supply of many economic goods depends on the weather (for example water, forage, food grains, fish, and hydroelectric power) (NDMC n.d.).
- **Ecological drought** is a prolonged and widespread deficit in naturally available water supplies that create multiple stresses across ecosystems (NDMC n.d.).

Meteorological and hydrological droughts pose the greatest threat to Sussex County and regional water supplies. Droughts such as these may lead to other impacts such as socioeconomic droughts, by impacting access to water for residents and businesses.

8.1.2 Water Supply and Water Use

Water resources are important to both society and ecosystems. Humans depend on reliable, clean supply of drinking water to sustain their health. Water is also needed for agriculture, energy production, navigation, recreation, and manufacturing. Understanding water supplies and withdrawal trends can assist in identifying the lifelines most at risk from drought. There are five water regions in New Jersey. Sussex County is primarily in the Upper Delaware water region, with a small area along the southeast border with Passaic County located in the Passaic water region (see Figure 8-1).

Figure 8-1. Water Regions, Sources, and Withdrawal by Sector in New Jersey



Source: New Jersey Department of Environmental Protection 2017

The water supply sources in the Upper Delaware water region are surface water and unconfined groundwater (NJDEP 2022). The majority of water withdrawal is for power generation, followed by potable water supply, commercial/industrial/mining, and agriculture. Water use trends vary from month to month, typically peaking in summer when outdoor and irrigation demands are high (EPA 2010).

Drought affects groundwater sources, but generally not as quickly as surface water supplies. Groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells. Reduced replenishment of groundwater affects streams also. Much of the flow in streams comes from groundwater, especially during the summer when there is less precipitation and after snowmelt ends. Reduced groundwater levels mean that even less water will enter streams when steam flows are lowest (NJDEP 2021).



Water Suppliers

According to the NJ Drinking Water Watch List, there are 483 suppliers of water to Sussex County (New Jersey Drinking Water Watch 2023). Only two of these provide water from surface water sources. The remaining 481 are sourced from groundwater.

The U.S. Environmental Protection Agency classifies water suppliers into three categories (EPA 2022):

- **Community Water System**—A public water system that supplies water to the same population year-round
- **Non-Transient Non-Community Water System**—A public water system that regularly supplies water to at least 25 of the same people at least six months per year. Examples are schools, factories, office buildings, and hospitals that have their own water systems
- **Transient Non-Community Water System**—A public water system that provides water in a place such as a gas station or campground where people do not remain for long periods of time

Overall, in Sussex County, 340 sources are transient non-community water suppliers, 77 are non-transient non-community suppliers, 62 are community suppliers, and 4 are non-public water supplies. Some County residents and organizations also rely on private wells for their water supply needs (New Jersey Drinking Water Watch 2023).

Agricultural Uses

Farms are at a higher risk for drought impacts than other types of land use, as crop growth relies on water. According to the 2017 Census of Agriculture, Sussex County is home to 1,008 farms covering 59,755 acres. About 407 acres are irrigated (USDA 2017). Table 8-1 summarizes agricultural areas in Sussex County jurisdictions.

8.1.3 Location

New Jersey is divided into six drought regions based on hydrogeologic conditions, watershed boundaries, municipal boundaries, water supply characteristics, and rainfall patterns. Sussex County is located in the Northwest Drought Region, which also includes Warren County and a portion of Hunterdon County (see Figure 8-2). Drought region boundaries are contiguous with municipal boundaries because municipal police forces serve as the primary enforcement mechanism for restrictions during a water emergency (Hoffman 2001). For planning purposes, the drought hazard is assumed to be constant across each state drought region.

8.1.4 Extent

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts (NOAA 2022). The State of New Jersey uses a multi-index system to determine the severity of a drought (NJDEP 2021).

U.S. Drought Monitor

The U.S. Drought Monitor uses six classifications for drought: normal conditions, abnormally dry (D0), moderate drought (D1), severe drought (D2), extreme drought (D3), and exceptional drought (D4). Table 8-2 describes these drought categories. Moderate and severe droughts have short-term impacts, typically last less than six months, and primarily affect agriculture and grasslands. Extreme and exceptional droughts have longer-term impacts, typically last longer than six months, and affect hydrology and ecology (NIDIS 2023).



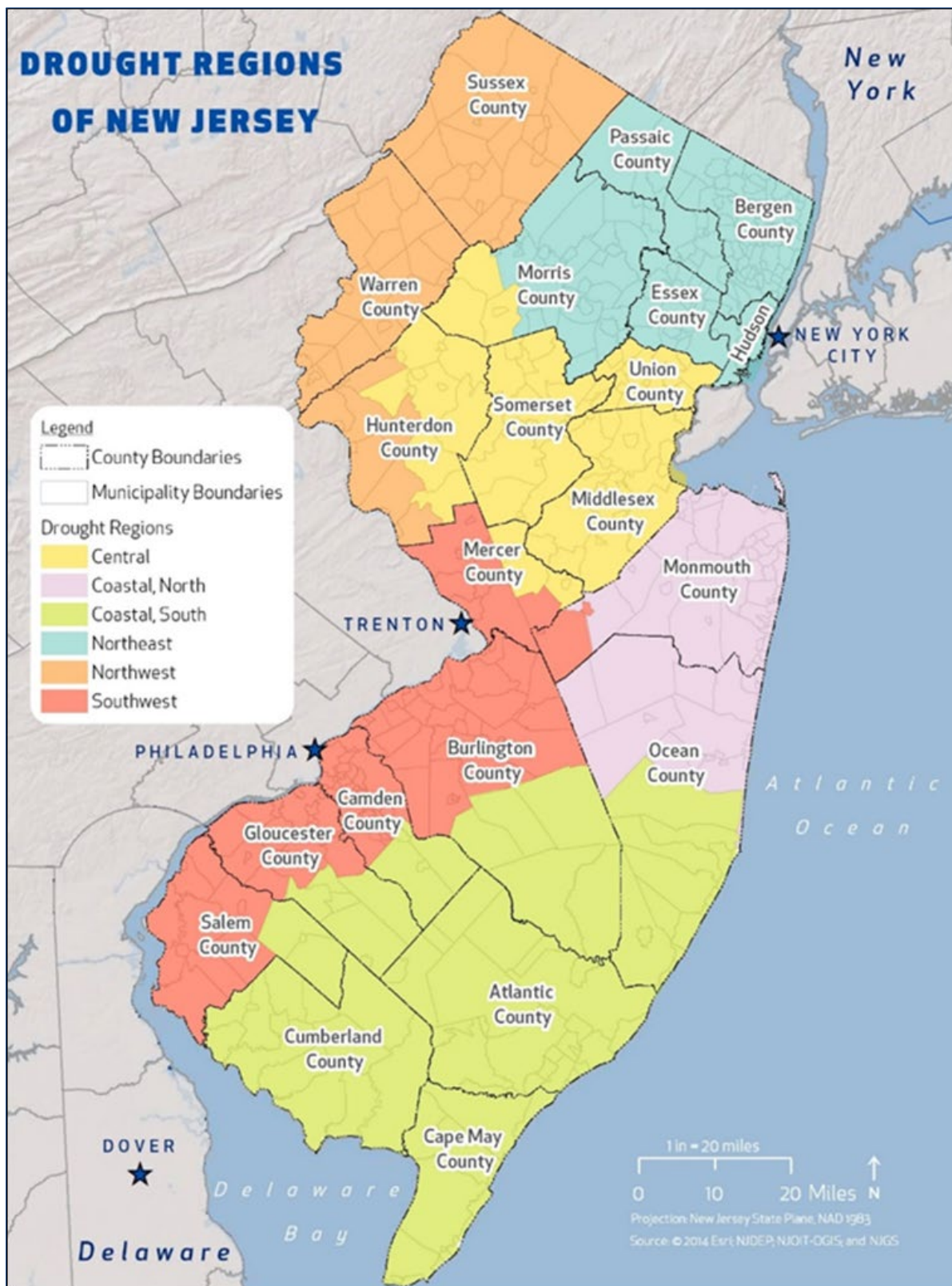
Table 8-1. Agricultural Land Use Area by Jurisdiction

| Jurisdiction | Total Area (Acres) | Agriculture | |
|------------------------------|--------------------|---------------|-----------------------|
| | | Area (Acres) | Percent of Total Area |
| Andover (B) | 872 | 211 | 24.2% |
| Andover (Twp) | 13,304 | 1,407 | 10.6% |
| Branchville (B) | 383 | 7 | 1.9% |
| Byram (Twp) | 14,536 | 74 | 0.5% |
| Frankford (Twp) | 22,585 | 4,360 | 19.3% |
| Franklin (B) | 2,833 | 188 | 6.6% |
| Fredon (Twp) | 11,464 | 2,619 | 22.8% |
| Green (Twp) | 10,429 | 2,575 | 24.7% |
| Hamburg (B) | 747 | 10 | 1.3% |
| Hampton (Twp) | 16,305 | 1,959 | 12.0% |
| Hardyston (Twp) | 20,892 | 985 | 4.7% |
| Hopatcong (B) | 7,949 | 25 | 0.3% |
| Lafayette (Twp) | 11,499 | 2,930 | 25.5% |
| Montague (Twp) | 29,840 | 1,088 | 3.6% |
| Newton (T) | 2,164 | 42 | 1.9% |
| Ogdensburg (B) | 1,438 | 13 | 0.9% |
| Sandyston (Twp) | 26,926 | 1,841 | 6.8% |
| Sparta (Twp) | 24,828 | 1,007 | 4.1% |
| Stanhope (B) | 1,341 | 0 | 0.0% |
| Stillwater (Twp) | 18,076 | 1,509 | 8.3% |
| Sussex (B) | 399 | 8 | 1.9% |
| Vernon (Twp) | 44,769 | 1,756 | 3.9% |
| Walpack (Twp) | 15,945 | 369 | 2.3% |
| Wantage (Twp) | 43,175 | 9,761 | 22.6% |
| Sussex County (Total) | 342,701 | 34,745 | 10.1% |

Source: NJDEP 2015

Note: B = Borough; T = Town; Twp = Township

Figure 8-2. Drought Regions of New Jersey



Source: State of New Jersey 2019



Table 8-2. Palmer Drought Category Descriptions

| Category | Description | Possible Impacts | Palmer Drought Index |
|----------|---------------------|---|----------------------|
| D0 | Abnormally Dry | Going into drought—short-term dryness slowing planting and growth of crops or pastures; fire risk above average. Coming out of drought—some lingering water deficits; pastures or crops not fully recovered. | –1.0 to –1.99 |
| D1 | Moderate drought | Some damage to crops and pastures; fire risk high; streams, reservoirs, or wells low; some water shortages developing or imminent; voluntary water-use restrictions requested. | –2.0 to –2.99 |
| D2 | Severe drought | Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed. | –3.0 to –3.99 |
| D3 | Extreme drought | Major crop or pasture losses; extreme fire danger; widespread water shortages or restrictions. | –4.0 to –4.99 |
| D4 | Exceptional drought | Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies. | –5.0 or less |

Source: NDMC 2023

Palmer Drought Severity Index

The Palmer Drought Severity Index (PDSI) is primarily based on soil conditions. Soil with decreased moisture content is the first indicator of an overall moisture deficit. Table 8-2 lists the PDSI classifications. A value of zero represents normal conditions, and drought is indicated by negative numbers. For example, –2 is moderate drought, –3 is severe drought, and –4 is extreme drought. The PDSI reflects above-normal precipitation using positive numbers; this is not shown in Table 8-2 (NDMC 2023).

New Jersey State Watches, Warnings, and Emergencies

The New Jersey Department of Environmental Protection (NJDEP) Division of Water Supply and Geoscience regularly monitors water supply conditions in the state. The NJDEP can declare individual regions as being within one of the following four stages of water supply drought (NJDEP 2023, NJDEP 2021):

- **Normal Conditions** indicate no drought conditions are present. There is routine monitoring of water supply and meteorological indicators.
- A **Drought Watch** is issued when drought or other factors begin to adversely affect water supply conditions. A watch indicates that conditions are dry but not significantly so. During a drought watch, NJDEP closely monitors drought indicators (including precipitation, stream flows, reservoir and ground water levels, and water demand) and consults with affected water suppliers. The aim of a drought watch is to avert a more serious water shortage that would necessitate declaration of a water emergency and the imposition of mandatory water use restrictions, bans on water use, or other potentially drastic measures.
- A **Drought Warning** represents a non-emergency phase of managing water supplies during the developing stages of drought. Under a drought warning, the commissioner of the NJDEP may order water purveyors to develop alternative sources of water or transfer water from areas of the state with more water to those with less. While mandatory water use restrictions are not imposed, the general public is strongly urged to use water sparingly in affected areas.
- A **Drought Emergency** can only be declared by the governor. Efforts initiated under a water emergency focus on reducing water demand. A phased approach to restricting water consumption is typically initiated. Phase I water use restrictions typically target non-essential, outdoor water use.



8.1.5 Previous Occurrences

FEMA Major Disaster and Emergency Declarations

Sussex County has been included in two major disaster (DR) or emergency (EM) declarations for drought-related events (FEMA 2024). Table 8-3 lists these declarations.

Table 8-3. FEMA Declarations for Drought Events in Sussex County

| Event Date | Declaration Date | Declaration Number | Description |
|------------------|------------------|--------------------|-------------------------|
| August 18, 1965 | August 18, 1965 | DR-205 | Drought: Water Shortage |
| October 19, 1980 | October 19, 1980 | EM-3083 | Drought: Water Shortage |

Source: FEMA 2024

USDA Declarations

The U.S. Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans from the U.S. Department of Agriculture (USDA) to producers suffering losses in those counties and in contiguous counties. Since the previous Sussex County HMP, the County has not been included in any USDA declarations issued for drought (USDA 2024).

Previous Events

Known drought events that impacted Sussex County between January 2020 and June 2024 are listed in Table 8-4. For events prior to 2020, refer to the 2021 Sussex County HMP.

8.1.6 Probability of Future Occurrences

Probability Based on Previous Occurrences

Based on risk factors and past occurrences, it is likely that Sussex County will continue to experience direct and indirect impacts of drought on occasion, with secondary effects causing potential disruption or damage to agricultural activities and creating shortages in community water supplies. Based on historical records and input from the Steering Committee, the probability of occurrence for drought in the County is considered “occasional.”

Effect of Climate Change on Future Probability

The pressure on water resources due to diverse water demands are likely to be worsened by future climate change. Warming is projected by the end of the 21st century. Increases in the number of extremely hot days and decreases in the number of extremely cold days are projected to accompany the overall warming. These trends will affect the probability and frequency of dry conditions that could lead to drought events in Sussex County.

Projections of climate change for New Jersey predict more intense rainfall events and increases in total annual precipitation (see Section 3.3.4). However, decreases in the amount of precipitation may occur in the summer months, resulting in greater potential for more frequent and prolonged droughts (NJDEP 2020). This follows the trend of increased extreme weather. With isolated precipitation in between long stretches of dry weather, wildfires, riverine flooding, and degraded water supply can all happen over the course of a year. The County is vulnerable to droughts, especially along the Delaware River, where the temperatures increase dramatically and severe runoff from dry soils can cause degraded water supply (Cornell University 2021).



Table 8-4. Drought Events in Sussex County (2020 to 2024)

| Event Date | FEMA Declaration or State Proclamation Number | Sussex County included in declaration ? | Location Impacted | Description |
|----------------------------------|---|---|-------------------|--|
| March 17 – -30, 2020 | N/A | N/A | Sussex County | Rating of D0 or “abnormally dry” across Sussex County |
| July 7 – August 11, 2020 | N/A | N/A | Sussex County | Rating of D0 or “abnormally dry” across Sussex County |
| May 4 – June 8, 2021 | N/A | N/A | Sussex County | Rating of D0 or “abnormally dry” across Sussex County |
| February 1 – April 12, 2022 | N/A | N/A | Sussex County | Rating of D0 or “abnormally dry” across Sussex County |
| July 12, 2022 – January 31, 2023 | N/A | N/A | Sussex County | Rating of D0 or “abnormally dry” across Sussex County |
| August 9 – November 17, 2022 | N/A | N/A | Sussex County | New Jersey was under a statewide drought watch as drought and heat strained water supplies. Water conservation was urged. Stream flow and ground water levels were below normal for most of the state, and some reservoirs were dropping quickly. |
| August 23 – December 27, 2022 | N/A | N/A | Sussex County | Rating of D1 or “moderate drought” across Sussex County |
| August 30 – September 13, 2022 | N/A | N/A | Sussex County | Rating of D2 or “moderate drought” across Sussex County |
| April 4 – May 2, 2023 | N/A | N/A | Sussex County | Rating of D0 or “abnormally dry” across Sussex County |
| May 30 – July 11, 2023 | N/A | N/A | Sussex County | Rating of D0 or “abnormally dry” across Sussex County |
| April 18 – May 2, 2023 | N/A | N/A | Sussex County | Rating of D1 or “moderate drought” across Sussex County |
| June 20 – July 4, 2023 | N/A | N/A | Sussex County | Rating of D1 or “moderate drought” across Sussex County |
| June 20 – July 20, 2023 | N/A | N/A | Sussex County | The state urged residents and businesses to use water wisely due to dry conditions and the start of summer. Statewide, rainfall in New Jersey was less than half of normal over the preceding 30 days. |

Source: National Integrated Drought Information System 2023; FEMA 2023; National Drought Monitoring Center 2023

8.1.7 Cascading Impacts on Other Hazards

Drought can lead to increasing temperatures and evaporation of moisture, which are ideal dry conditions for wildfires. Dry, hot, and windy weather combined with dry vegetation makes areas more susceptible to wildfires. Additionally, droughts can lead to the following (NIDIS 2019):

- Long-term damage to crop quality and crop losses
- Insect infestation leading to crop losses and reduced tree canopy
- Reduction in the ability to perform outdoor activities, resulting in loss of tourism and recreation opportunities



8.2 VULNERABILITY AND IMPACT ASSESSMENT

All of Sussex County is at risk from the impacts of drought. Due to a lack of quantifiable loss information, a qualitative assessment was conducted to evaluate the assets exposed to this hazard and its potential impacts.

8.2.1 Life, Health, and Safety

Overall Population

The entire population of Sussex County (144,221) is exposed to drought events. Drought conditions can cause a shortage of potable water for human consumption, both in quantity and quality. A decrease in available water may also impact power generation and availability to residents.

Public health impacts may include an increase in heat-related illnesses, waterborne illnesses, recreational risks, and limited food availability. Other possible impacts include increased recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and sanitation; compromised food and nutrition; and increased incidence of illness and disease. Some drought-related health effects are short-term while others can be long-term (CDC 2021).

Socially Vulnerable Population

Some populations are particularly susceptible to the drought hazard due to age, health conditions, or limited ability to mobilize to medical resources. Without a quantitative assessment of potential impacts of a drought on socially vulnerable populations, the Planning Partners can best assess mitigation options through an understanding of the general numbers and locations of such populations across Sussex County. Section 3.5.3 provides detailed data on socially vulnerable populations within the planning area. Table 8-5 summarizes highlights of this information. For planning purposes, it is reasonable to assume that percentages and distribution of socially vulnerable populations affected by a drought will be similar to the countywide numbers.

8.2.2 General Building Stock

No structures are anticipated to be directly affected by a drought event. However, droughts contribute to conditions conducive to wildfires and reduce fire-fighting capabilities. Wildfire fuel tends to be most plentiful in areas where development densities are lowest, which works to reduce losses to the general building stock. The wildfire risk to buildings is greatest in two areas:

- **The wildland-urban interface**—Where forested areas adjoin urbanized areas
- **Wildfire fuel hazard areas**—Where predominant plant species are highly susceptible to wildfire

8.2.3 Community Lifelines and Other Critical Facilities

Droughts have the potential to impact agriculture-related facilities, critical facilities, and lifelines that are associated with water supplies, such as water used for fire-fighting. Water systems and thus distribution to the population may also be impacted by drought conditions. The impacts droughts cause to agricultural-related facilities are particularly important to Sussex County due to its large area devoted to farmland. Critical facilities and lifelines in and adjacent to the wildfire hazard areas are also considered vulnerable to drought.



Table 8-5. Distribution of Socially Vulnerable Populations by Municipality

| Category | Sussex County Total | | Municipality Highest in Category | | Municipality Lowest in Category | |
|----------------------------------|---------------------|---------|----------------------------------|--------------------------|--|--|
| | Number | Percent | Number | Percent | Number | Percent |
| Population Over 65 | 25,451 | 17.65% | Vernon (Twp) 3,687 | Walpack (Twp) 100.00% | Walpack (Twp) 7 | Sparta (Twp) 13.38% |
| Population Under 5 | 6,500 | 4.51% | Sparta (Twp) 1,160 | Lafayette (Twp) 7.21% | Walpack (Twp) 0 | Walpack (Twp) 0.00% |
| Non-English-Speaking Population | 1,922 | 1.33% | Hopatcong (B) 339 | Hamburg (B) 10.17% | Andover, Frankford, Sandyston, Stanhope, Stillwater, Walpack 0 | Andover, Frankford, Sandyston, Stanhope, Stillwater, Walpack 0.00% |
| Population With Disability | 15,697 | 10.88% | Vernon (Twp) 2,318 | Franklin (B) 17.32% | Walpack (Twp) 0 | Walpack (Twp) 0.00% |
| Population Below Poverty Level | 7,320 | 5.08% | Vernon (Twp) 877 | Sussex (B) 18.03% | Walpack (Twp) 0 | Walpack (Twp) 0.00% |
| Households Below ALICE Threshold | 14,428 | 21% | Vernon (Twp) 1,833 | Sussex (B0) 48% | Branchville (B) 90 | Green (Twp) 14% |

Note: B = Borough; Twp = Township

8.2.4 Economy

The impacts of drought can be economic, environmental, or social, including reduced crop yield, increased fire hazard, reduced water levels, reduced outdoor activities, and damage to wildlife and fish habitat. When drought conditions persist, water restrictions may be put into place by local or state governments. This may include limitations on lawn watering, car washing services, or any recreational/commercial outdoor uses of water. Water withdrawals for the commercial, industrial, and mining sectors may be affected, as well as for power generation.

Increased demand for water and electricity can also result in shortages and higher costs for these resources. Industries that rely on water for business could be impacted the most (e.g., landscaping businesses). Although most businesses will still be operational, they may be impacted aesthetically. These aesthetic impacts are most significant within the recreation and tourism industry. Moreover, droughts in another area could impact the food supply and price of food for residents within the County (North Carolina State University 2013).

When a state of water emergency is declared in New Jersey, the NJDEP may impose mandatory water restrictions and require specific actions to be taken by water suppliers, though the New Jersey Water Supply Plan calls for water emergencies to cause as little disruption as possible to commercial activity and employment (NJDEP 2017).

The agricultural industry is most at risk in terms of economic impact and damage from drought. For example, crops may not mature, leading to a lessened crop yield, wildlife and livestock may become undernourished, land values could decrease, and ultimately there could be a financial loss for the farmer. Crop shortages can in turn lead to increases in the price of food (North Carolina State University 2013). Based on the 2017 Census of Agriculture, Sussex County farms had a total market value of \$10.8 million for crops and \$7.4 million for livestock (USDA 2017).



8.2.5 Natural, Historic and Cultural Resources

Natural

Droughts can impact the environment if they trigger wildfires, increase insect infestations, or exacerbate the spread of disease (Intergovernmental Panel on Climate Change 2016). Droughts impact water resources that are relied upon by aquatic and terrestrial species. Ecologically sensitive areas, such as wetlands, can be particularly vulnerable to drought periods because they are dependent on steady water levels and soil moisture to sustain growth. These types of habitats can be negatively impacted after long periods of dryness (NJDEP 2017).

Droughts also have the potential to lead to water pollution due to the lack of rainwater to dilute any chemicals in water sources. Contaminated water supplies may be harmful to plants and animals. If water is not getting into the soil, the ground will dry up and become unstable. Unstable soils increase the risk of erosion and loss of topsoil (North Carolina State University 2013).

Historic

The primary impacts on historic resources from drought would be an increased risk of wildfires, which could threaten these assets, and impacts on structure foundations from the shrink-swell cycle of expansive soils.

Cultural

The primary impacts on cultural resources from drought would be an increased risk of wildfires, which could threaten these assets, and impacts on structure foundations from the shrink-swell cycle of expansive soils.

Droughts may impact the traditional and customary practices of indigenous persons, who rely on healthy terrestrial ecosystems. These practices may include the collection of plants, animals, and minerals and other practices.

Drought impacts on agriculture in the County could negatively impact events associated with agriculture including farmers markets and harvest festivals.

8.3 CHANGE OF VULNERABILITY SINCE 2021 HMP

Since the 2021 HMP update, the total population across the County has experienced a slight decrease, which can place less stress on the water supply during a drought event. However, the number of farm operations has increased since the 2012 USDA report by over 10 percent, which may increase the overall stress on the water supply during a drought event.

8.4 FUTURE CHANGES THAT MAY AFFECT RISK

Understanding future changes that affect vulnerability can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The following sections examine potential conditions that may affect hazard vulnerability.



8.4.1 Potential or Planned Development

The New Jersey Water Supply Plan indicates that seasonal outdoor water use is rising statewide and is attributable to continued suburbanization and increases in residential and commercial lawn and landscape maintenance. Changes in water demand by commercial/industrial users will depend on future development of this water use and whether efficiency techniques are effectively implemented (NJDEP 2017).

8.4.2 Projected Changes in Population

Potable water use is the second largest water use sector and largest consumptive use in New Jersey. As such, population projections, per capita water use, and non-residential water use are important factors to consider when assessing future water needs.

The New Jersey Department of Labor and Workforce Development produced population projections by County from 2014 to 2019, 2024, 2029, and 2034. Sussex County is projected to have a decrease in population in the upcoming years. These projections estimate a population of 140,400 by 2024, 137,300 by 2029, and 136,600 by 2034 (State of New Jersey 2017).

Even though the population is projected to decrease, any changes in the distribution of the population can impact the source of water resources required to sustain the user demand of each household, agricultural operation, and business operation.

8.4.3 Climate Change

The State of New Jersey is expected to see an increase in average annual temperatures. Additionally, the state is projected to experience more frequent droughts, which will affect the availability of water supplies, placing an increased stress on the population and their available potable water. Agricultural needs may increase if the climate grows warmer but may decrease if more efficient irrigation techniques are adopted broadly or if precipitation increases. A decrease in water supply, or increase in water supply demand, may increase the County's vulnerability to structural fire and wildfire events. Critical water-related service sectors may need to adjust management practices and actively manage resources to accommodate future changes.