

## SECTION 4. RISK ASSESSMENT

### 4.3 Hazards of Concern

This section provides a hazard profile and vulnerability assessment of the drought hazard in Camden County.

#### 2022 HMP Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and climate change impacts.
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2015 and 2020.
- The County's 2019 5-year ACS population was considered when determining its exposure and vulnerability to the drought hazard.

#### 4.3.4 Drought

Drought is a period characterized by long durations of below normal precipitation. Drought conditions occur in virtually all climatic zones, yet characteristics of drought vary significantly from one region to another, relative to normal precipitation within respective regions. Drought can affect agriculture, water supply, aquatic ecology, wildlife, and plant life. Drought is a temporary irregularity in typical weather patterns and differs from aridity, which reflects low rainfall within a specific region and is a permanent feature of the climate of that area.

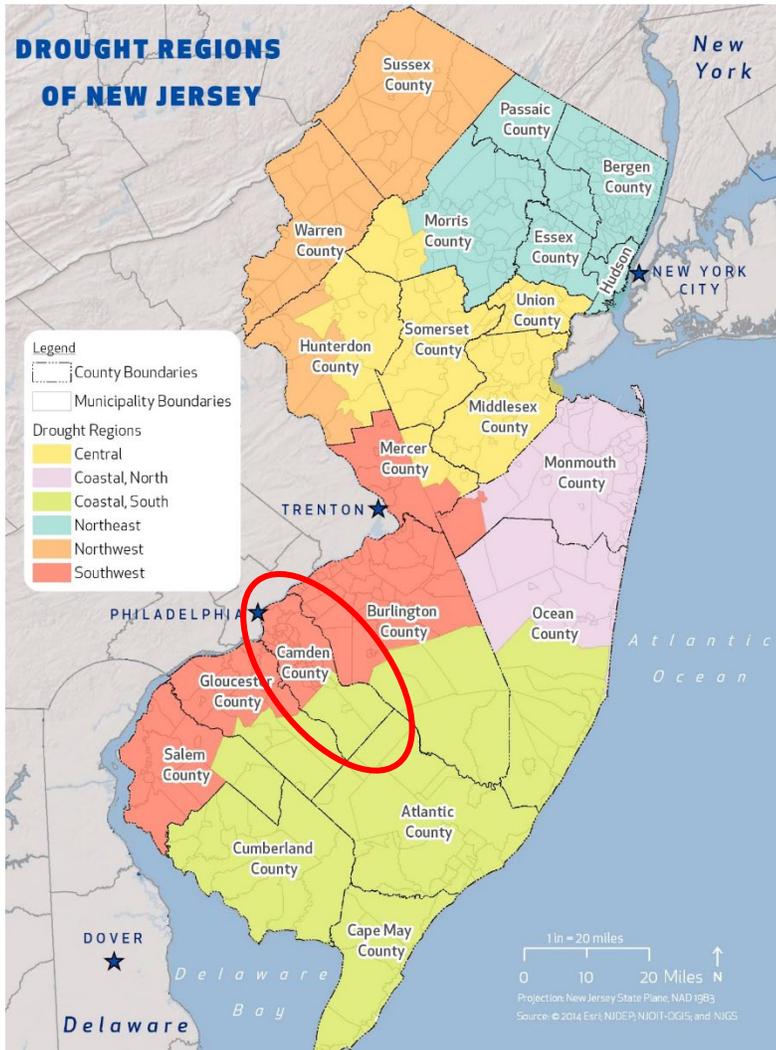
##### 4.3.4.1 Location and Extent

Climate divisions are regions within a state that are climatically homogenous. The National Oceanic and Atmospheric Administration (NOAA) has divided the U.S. into 359 climate divisions. The boundaries of these divisions typically coincide with the county boundaries, except in the western U.S., where they are based largely on drainage basins (U.S. Energy Information Administration 2020). According to NOAA, New Jersey is made up of three climate divisions: Northern, Southern, and Coastal (NCDC 2020). Camden County is located in the Southern Climate Division.

Drought regions allow New Jersey to respond to changing conditions without imposing restrictions on areas not experiencing water supply shortages. These regions were developed based upon hydro-geologic conditions, watershed boundaries, municipal boundaries, and water supply characteristics. Drought region boundaries are contiguous with municipal boundaries because during a water emergency, the primary enforcement mechanism for restrictions is municipal police forces. New Jersey is divided into six drought regions that are based on regional similarities in water supply sources and rainfall patterns. Camden County is located in both the Southwest and the Coastal, South Drought Regions. According to the NJDEP, major water supply sources available to the Southwest Drought Region and northern portion of Camden County include the Delaware River Basin and unconfined groundwater,

and rivers as a minor source. For the Coastal, South Drought Region and southern portion of Camden County, major water sources include unconfined ground water, and minor sources include rivers and the New Jersey Reservoir (NJDEP 2003). Figure 4.3.4-1 shows the drought regions of New Jersey with Camden County circled in red.

Figure 4.3.4-1. Drought Regions of New Jersey



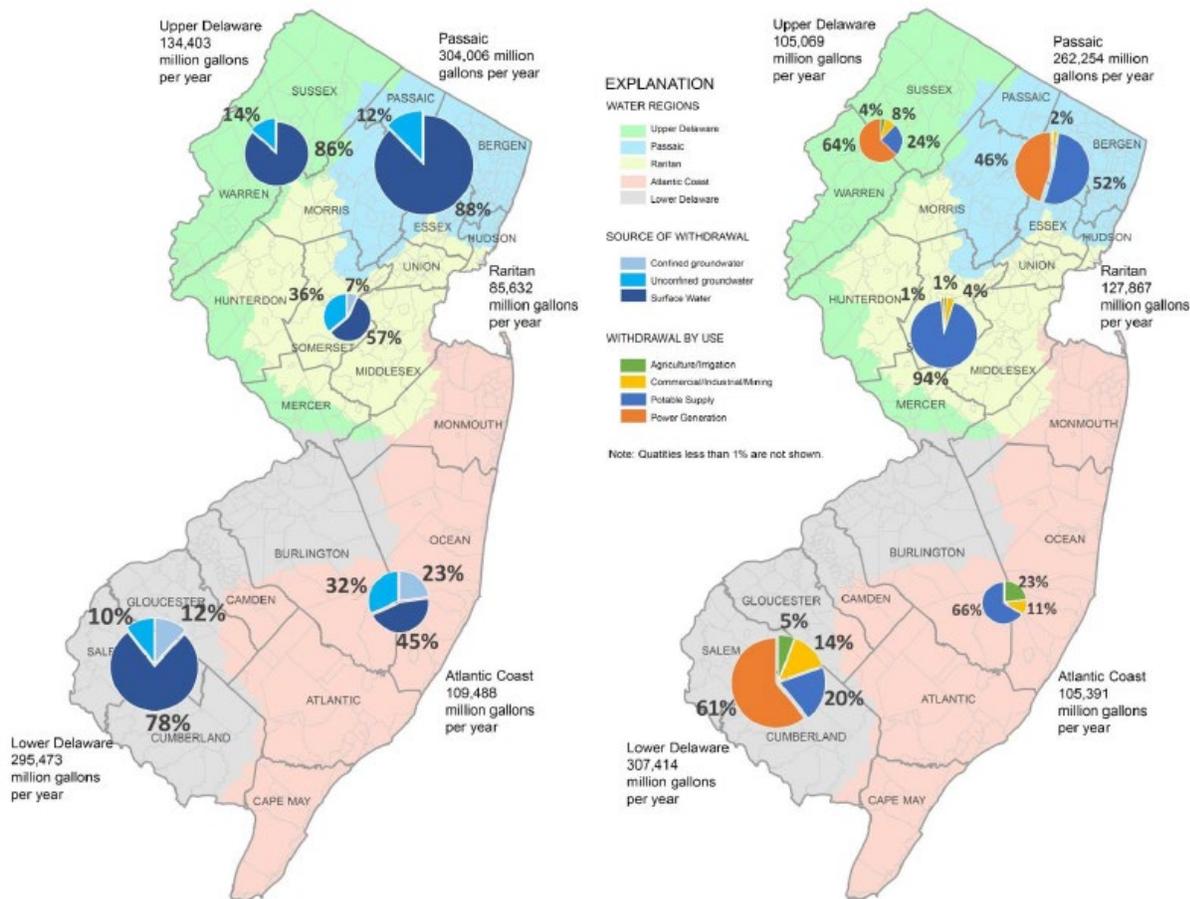
Source: NJOEM (State HMP) 2019

Note: The red oval indicates the location of Camden County

Surface waters in New Jersey provide much of the water used for drinking supplies, as well as for recreation, fishing, tourism, and commercial uses (NJDEP 2021). The state is divided into five water regions based upon watershed management area and HUC11 (Hydrologic Unit Code). Camden County is located within both the Lower Delaware and Atlantic Coastal water regions; refer to Figure 4.3.4-2. In terms of annual water withdrawal by sector in the Lower Delaware Region, the majority is for power generation, with a small percent of surface water used for potable water supply. By comparison, in the Atlantic Coastal region, the majority of water withdrawals is for potable water supply, followed by agricultural and

commercial uses. Water use trends, like withdrawal trends, vary from month to month with water use typically peaking during summer months when outdoor and irrigation demands are high (NJDEP 2017).

Figure 4.3.4-2. Water Regions, Sources and Withdrawal by Sector



Source: NJDEP 2017

Over 1.2 billion gallons of potable water are used in New Jersey each day, with 88-percent of the state’s population receiving its drinking water from public community water systems (NJDEP 2016). A public water system is defined as a water system that pipes water for human consumption that has at least 15 service connections or regularly serves at least 25 individuals 60 days or more a year. About half the state’s population receives its drinking water from surface water, the rest from ground water. Table 4.3.4-1 below lists the Community Water Systems in Camden County.

Table 4.3.4-1. Community Water Systems in Camden County

Water System Name	Population Served	Primary Water Source Type
Ancora Psychiatric Hospital	Winslow Township	3 Wells
Berlin Water Department	11,845	6 Wells
Bellmawr Water Department	9,522	4 Wells

Water System Name	Population Served	Primary Water Source Type
Brooklawn Water Department	2,800	3 Wells
Camden City Water Department O&M	50,000	30 Wells
Clementon Water Department	Berlin Township Clementon Borough Lindenwold Borough Pine Hill Borough	3 Wells
Collingswood Water Department	Collingswood Borough Haddon Township Woodlynne Borough	7 Wells
Consumers NJ Water Company – Blackwood System	41,000	13 Wells
Elm Towne Village Association - System 1	Winslow Township	3 Wells
Elm Towne Village Association - System 2	100	2 Wells
Gloucester City Water Department	12,200	4 Wells
Haddon Township Water Department	Collingswood Borough Haddon Township Haddonfield Borough	5 Wells
Merchantville Pennsauken Water Commission	Camden City Cherry Hill Township Merchantville Borough Pennsauken Township	15 Wells
Mount Ephraim Water Department	4,500	2 Purchased Ground Water
New Jersey American Water Company – Western Division	186,986	71 Wells
Town & Country Mobile Home Park	200	2 Wells
Pine Hill Borough MUA	10,400	6 Wells
Strawberry Village Mobile Home Park	90	2 Wells
Waterford Township MUA	Waterford Township	2 Purchased Ground Water
Winslow Court Homes Inc.	100	1 Well
Winslow Township Municipal Utility - Elmtown	172	1 Well
Winslow Township Municipal Utility - Sicklerville	Waterford Township Winslow Township	9 Wells

Source: NJDEP 2004

#### 4.3.4.2 Range of Magnitude

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 (NDMC n.d.). The State of New Jersey uses a multi-index system that takes advantage of some of these indices to determine the severity of a drought or extended period of dry conditions.

#### Palmer Drought Severity Index

The Palmer Drought Severity Index is commonly used by drought monitoring agencies for drought reporting. The PDSI is primarily based on soil conditions. Soil with decreased moisture content is the first indicator of an overall moisture deficit. Table 4.3.4-2 lists the PDSI classifications. Zero is used to define normal conditions and negative numbers define drought conditions. For example, -2 is moderate

drought, -3 is severe drought, and -4 is extreme drought. The PDSI also reflects excess precipitation using positive numbers; however, this is not shown in Table 4.3.4-2 (National Drought Mitigation Center [NDMC] 2013).

Table 4.3.4-2. 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

### Watches, Warnings and Emergencies

The Division of Water Supply and Geoscience within the NJDEP, regularly monitors various water supply conditions within the state based on the different Water Supply Regions. The water supply conditions aid the Department in declaring the regions as being within one of the four stages of water supply drought; Normal, Drought Watch, Drought Warning, and Drought Emergency.

- A **Drought Watch** is an administrative designation made by the Department when drought or other factors begin to adversely affect water supply conditions. A Watch indicates that conditions are dry but not yet significantly so. During a Drought Watch, the Department closely monitors drought indicators (including precipitation, stream flows, reservoir and ground water levels, and water demands) and consults with affected water suppliers.
- A **Drought Warning** represents a non-emergency phase of managing available water supplies during the developing stages of drought and falls between the Watch and Emergency levels of drought response. The aim of a Drought Warning 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 **Water Emergency** (sometimes called a drought emergency) can only be declared by the governor. While drought warning actions focus on increasing or shifting the supply of water, efforts initiated under a water emergency focus on reducing water demands. During a water emergency, a phased approach to restricting water consumption is typically initiated. Phase I water use restrictions typically target non-essential, outdoor water use (NJDEP Division of Water Supply and Geoscience 2018).

#### 4.3.4.3 Past Occurrences

Precipitation variability, coupled with concentrated population centers, can produce wide fluctuations in water availability and demands. The State has experienced several episodes of drought that have resulted in water shortages of varying degrees (e.g., mid-1960’s, early to mid-1980’s and 2001-2002) (NJDEP 2017).

Between 1954 and 2019, the State of New Jersey experienced two FEMA declared drought-related disasters (DR) or emergencies (EM) classified as a water shortage. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Of those two declarations, Camden County has been included in both declarations (FEMA 2020).

*Table 4.3.4-3. FEMA DR and EM Declarations for Drought Events in Camden County, 1954 to 2020*

FEMA Declaration Number	Event Date	Declaration Date	Event Type
DR-205	August 18, 1965	August 8, 1967	Water Shortage
EM-3083	October 19, 1980	May 21, 1983	Water Shortage

Source: FEMA 2020

Agriculture-related drought disasters are quite common. One-half to two-thirds of the counties in the U.S. have been designated as disaster areas in each of the past several years. The USDA Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in counties that are contiguous to a designated county. Between 2015 and 2020, Camden County has been included in five USDA declarations as summarized in Table 4.3.4-4 (USDA 2020).

*Table 4.3.4-4. USDA Disaster Declarations for Camden County, 2015 to 2020*

Declaration	Event Date	Declaration Date	Event Description
S3930	April 1, 2015 – September 29, 2015	November 4, 2015	Excessive Heat and Drought
S3932	July 16, 2015 – September 29, 2015	November 4, 2015	Excessive Heat and Drought

Declaration	Event Date	Declaration Date	Event Description
S4071	April 1, 2016 – September 19, 2016	October 5, 2016	Combined Effects of Freeze, Excessive Heat, and Drought
S4425	June 24, 2018 – July 21, 2018	October 31, 2018	Excessive Heat and Drought
S4602	August 15, 2019 – October 16, 2019	January 1, 2020	Drought

Source: USDA 2020

Table 4.3.4-5 summarizes the drought events identified in Camden County from 2015 to 2021. Refer to Appendix E (Risk Assessment Supplement) for details on drought events that have impacted Camden County prior to 2015.

*Table 4.3.4-5. Drought Incidents in Camden County, 2015 to 2021*

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Camden County Designated?	Description
May 26 – June 1, 2015	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from May 26 – June 1, 2015.
September 1 – 28, 2015	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from September 1 – 28, 2015.
September 29 – October 5, 2015	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D1 or “moderate drought” status from September 29 – October 5, 2015.
May 3 – September 12, 2016	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from May 3 – September 12, 2016.
September 13, 2016 – March 13, 2017	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D1 or “moderate drought” status from September 13, 2016 – March 13, 2017.
October 3 – 30, 2017	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from October 3 – 30, 2017.
February 6 – 12, 2018	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from February 6 – 12, 2018.
July 17 – 30, 2018	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from July 17 – 30, 2018.
September 17 – December 9, 2019	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Mercer County from September 17 – October 14, 2019; D1 or “moderate drought” status from October 15 – 28, 2019; and D0 or “abnormally dry” from October 29 – December 9, 2019.

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Camden County Designated?	Description
May 25 – 31, 2021	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from May 25 – 31, 2021.
June 1 – 7, 2021	Drought	N/A	N/A	According to the U.S. Drought Monitor, conditions held at a D0 or “abnormally dry” status across Camden County from June 1 – 7, 2021.

Source: US Drought Monitor 2021

#### 4.3.4.4 Future Occurrence

Based upon risk factors for and past occurrences, it is likely that droughts will occur across New Jersey and Camden County in the future. In addition, as temperatures increase (see climate change impacts), the probability for future droughts will likely increase as well. Therefore, it is likely that droughts will occur in New Jersey of varied severity in the future.

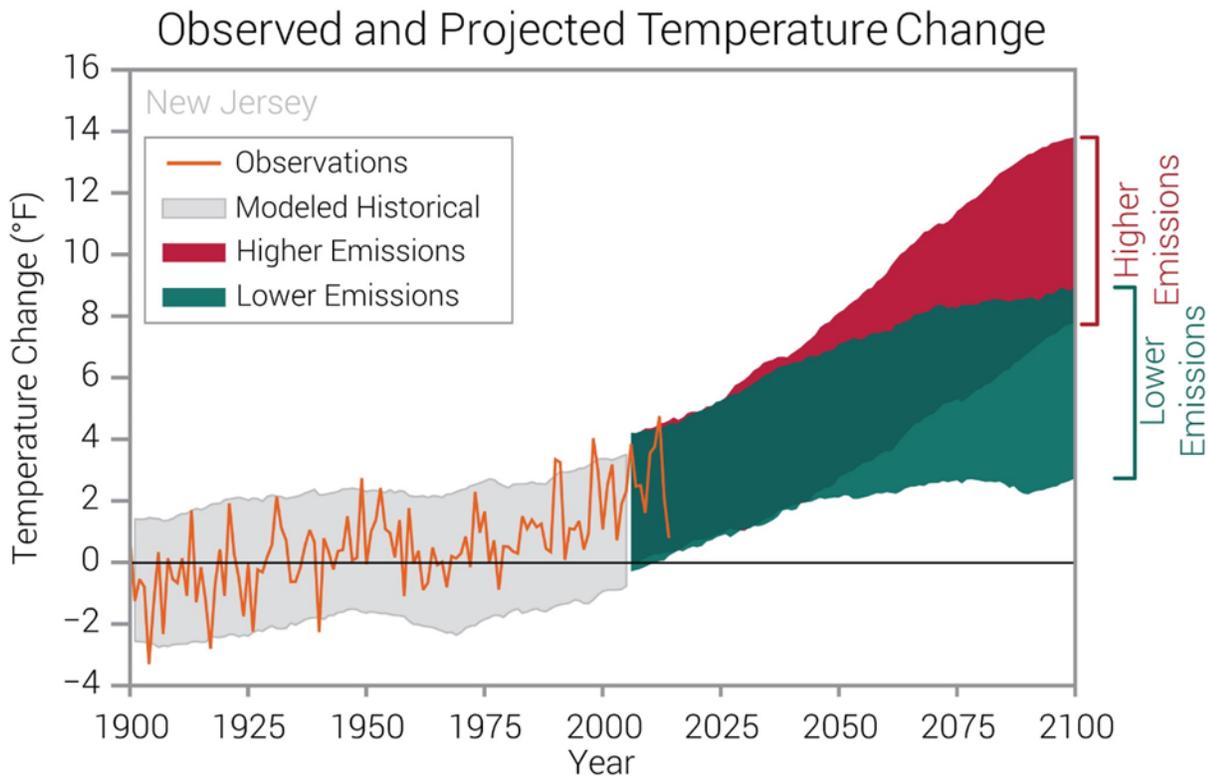
It is estimated that Camden County will continue to experience direct and indirect impacts of drought and its impacts on occasion, with the secondary effects causing potential disruption or damage to agricultural activities and creating shortages in water supply within communities.

In Section 4.4 (Hazard Ranking), the identified hazards of concern for Camden County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Steering Committee and Planning Committee, the probability of occurrence for drought in the County is considered ‘frequent’.

#### 4.3.4.5 Climate Change Impacts

The climate of New Jersey is already changing and will continue to change over the course of this century. Since 1900, temperatures in New Jersey have increased an average of 3 degrees Fahrenheit (°F). Historically unprecedented warming is projected by the end of the 21<sup>st</sup> century. Heat waves are projected to be more intense while cold waves are projected to be less intense (Office of the New Jersey State Climatologist [ONJSC] 2020). New Jersey has consistently been above the 1900-2014 mean during the 21<sup>st</sup> century with the highest 5-year average number occurring during 2010-2014 (NOAA NCICS 2020). Figure 4.3.4-3 depicts the observed and projected temperature change for New Jersey from 1900 to 2100.

Figure 4.3.4-3. Observed and Projected Temperature Change in New Jersey



Source: NOAA NCICS 2020

Either under a high or lower emissions pathway, historically unprecedented 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. According to state-level analysis, by the middle of the 21st century an estimated 70-percent of summers are anticipated to be hotter than what we now recognize as the warmest summer on record (NOAA NCICS 2020). The increase in temperatures is expected to be felt more during the winter months (December, January, and February), resulting in less intense cold waves, fewer sub-freezing days, and less snow accumulation. These trends will certainly affect the probability and frequency of dry conditions that could lead to drought events in Camden County.

As temperatures increase, Earth’s atmosphere can hold more water vapor which leads to a greater potential for precipitation. Currently, New Jersey receives an average of 46 inches of precipitation each year (Office of the New Jersey State Climatologist 2020). Since the end of the twentieth century, New Jersey has experienced slight increases in the amount of precipitation it receives each year, and over the last 10 years there has been a 7.9-percent increase. By 2050, annual precipitation in New Jersey could increase by 4-percent to 11 percent (Horton et al. 2015). By the end of this century, heavy precipitation events are projected to occur two to five times more often (Walsh et al. 2014) and with more intensity (Huang et al. 2017) than in the last century. New Jersey will experience more intense rain events, less snow, and more rainfalls (Fan et al. 2014, Demaria et al. 2016, Runkle et al. 2017). Also, small decreases in

the amount of precipitation may occur in the summer months, resulting in greater potential for more frequent and prolonged droughts (Trenberth 2011).

#### 4.3.4.6 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. The following discusses Camden County's vulnerability, in a qualitative nature, to the drought hazard.

##### Impact on Life, Health and Safety

The entire population of Camden County is exposed to drought events (population of 506,738 people, according to the 2015-2019 ACS population estimates). 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, limited food availability, and reduced living conditions. Vulnerable populations could be particularly susceptible to the drought hazard and cascading impacts due to age, health conditions, and limited ability to mobilize to shelter, cooling and medical resources. Other possible impacts to health due to drought include increased recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and sanitation and hygiene; compromised food and nutrition; and increased incidence of illness and disease. Health implications of drought are numerous. Some drought-related health effects are short-term while others can be long-term (CDC 2020).

Surface water supplies are affected more quickly during droughts than groundwater sources; however, groundwater supplies generally take longer to recover. According to the NJ Drinking Water Watch List, there are 107 suppliers of water to Camden County (NJ Drinking Water Watch 2020). Of these suppliers, only two suppliers provide water from surface water sources. All other suppliers provide water from groundwater sources. The EPA classifies water suppliers into three major categories: community water systems, non-transient non-community water systems, transient non-community water systems.

- **Community Water System (CWS):** A public water system that supplies water to the same population year-round.
- **Non-Transient Non-Community Water System (NTNCWS):** A public water system that regularly supplies water to at least 25 of the same people at least six months per year. Some examples are schools, factories, office buildings, and hospitals which have their own water systems.
- **Transient Non-Community Water System (TNCWS):** 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 (EPA 2020).

Overall, in Camden County, 64 sources are transient non-community water suppliers, 20 are non-transient non-community suppliers, 21 are community suppliers, and 1 is a non-public water supply.

The Centers for Disease Control and Prevention's (CDC) 2016 Social Vulnerability Index (SVI) ranks U.S. Census tracts on socioeconomic status, household composition and disability, minority status and language, and housing and transportation. Camden County's overall score is 0.6118, indicating that its communities have moderate to high social vulnerability (CDC 2018). A majority of the high social vulnerability census tracts are in the northern portion of Camden County.

#### Impact on 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. Risk to life and property is greatest in those areas where forested areas adjoin urbanized areas (high density residential, commercial and industrial) also known as the wildfire urban interface (WUI) or where areas are made up of species that are highly susceptible to erupting into wildfire events. Therefore, all assets in and adjacent to the WUI zone and wildfire fuel hazard areas, including population, structures, critical facilities, lifelines, and businesses are considered vulnerable to wildfire. Refer to Section 4.3.13 for the Wildfire risk assessment.

#### Impact on Critical Facilities

As mentioned, drought events generally do not impact buildings; however, droughts have the potential to impact agriculture-related facilities and critical facilities that are associated with water supplies such as potable water used with fire-fighting services. Critical facilities in and adjacent to the wildfire hazard areas are also considered vulnerable to drought.

Water systems and thus distribution to the population may also be impacted by other hazards such as extreme weather events. A good example is Superstorm Sandy where storm surge damaged critical water supply infrastructure along the coast and high winds impacted energy distribution across the State which in turn impacted the ability to supply water. As a result, NJDEP has developed new guidance aimed to ensure that repairs, reconstruction, new facilities and operations/maintenance are focused on enhancing the resilience of critical infrastructure (NJDEP 2017).

#### Impact on the Economy

Drought can produce a range of impacts that span many economic sectors and can reach beyond an area experiencing physical drought. As previously discussed, water withdrawals are not only used for potable water but for use in the commercial/industrial/mining sectors and power generation. When a state of water emergency is declared by the Governor (when a potential or actual water shortage endangers the public health, safety and welfare), the NJDEP may impose mandatory water restrictions and require specific actions to be taken by water suppliers. According to the New Jersey Water Supply Plan, a water emergency seeks to cause as little disruption as possible to commercial activity and employment (NJDEP 2017).

A prolonged drought can have a serious economic impact on a community. One impact of drought is its impact on water supply. When drought conditions persist with little to no relief, water restrictions may be put into place by local or state governments. These restrictions may include placing limitations on when or how frequent lawns can be watered, car washing services, or any other recreational/commercial

outdoor use of water supplies. In exceptional drought conditions, watering of lawns and crops may not be an option. If crops are not able to receive water, farmland will dry out and crops will die. This can lead to crop shortages, which, in turn, increases the price of food.

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 within another area could impact the food supply and price of food for residents within the County.

Direct impacts of drought include reduced crop yield, increased fire hazard, reduced water levels, and damage to wildlife and fish habitat. The many impacts of drought can be listed as economic, environmental, or social. Direct and indirect losses include the following:

- Damage to crop quality and crop losses.
- Insect infestation leading to crop and tree losses.
- Plant diseases leading to loss of agricultural crops and trees.
- Reduction in outdoor activities.
- Increased risk of brush fires and wildfires due to dried crops, grasses, and dying trees.

When a drought occurs, the agricultural industry is most at risk in terms of economic impact and damage. 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. Based on the 2017 Census of Agriculture, there were 197 farms in Camden County, a 12.6-percent increase from the 2012 reports. The median farm size was 15 acres. Camden County farms had a total market value of products sold of approximately \$22.8 million in crop sales and \$84,000 in livestock sales. Table 4.3.4-6 summarizes the acreage of agricultural land exposed to the drought hazard.

*Table 4.3.4-6. Agricultural Land in Camden County in 2017*

Number of Farms	Land in Farms (acres)	Total Cropland (acres)	Harvested Cropland (acres)	Irrigated Land (acres)
197	9,298	5,017	4,609	2,308

Source: USDA 2017

### Impact on the Environment

Droughts can impact the environment because these events can trigger wildfires, increase insect infestations, and exacerbate the spread of disease (NOAA 2020). Droughts will also 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 availability to sustain growth. As a result, 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 soils, the ground will dry up and become unstable for plant species. Maintaining stability prevents erosion and treefall that is susceptible to catching fire and starting wildfire events (North Carolina State University 2020).

#### Future Changes That May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

#### Projected Development

As discussed in Section 3 (County Profile), areas targeted for future growth and development have been identified across Camden County. The New Jersey Water Supply Plan indicates 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 demands by commercial/industrial users will depend on future development of this water type use and how effectively efficiency techniques are implemented (NJDEP 2017). Overall, the Camden County Planning Partners have identified that there are 89 recent or anticipated new development sites in the County. Out of the total new development sites, 32 are for residential properties for several hundred apartment/condo units or single-family homes.

#### 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 capital water use and percent non-residential water use by water system are important factors to consider when assessing future water needs. According to the 2019 5-year population estimates from the ACS, the population of Camden County (i.e., 506,738 persons) has decreased by approximately 1.3-percent since 2010. Even though the population has decreased, 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.

#### Climate Change

As discussed above, most studies project that the State of New Jersey will see an increase in average annual temperatures. Additionally, the State is projected to experience more frequency droughts which may affect the availability of water supplies, primarily 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 for future changes.

#### Vulnerability Change Since the 2017 HMP

When examining the change in the County's vulnerability to drought events from the 2017 HMP to this update, it is important to look at each entity that is exposed and vulnerable. 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 12-percent, which may increase the overall stress on the water supply during a drought event.

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