



4.3.10 Infestation

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the infestation hazard in Morris County.

2020 HMP Changes

- A broader category for insects is now included and invasive plants were added to expand this hazard.
- All subsections have been updated using best available data.
- Previous occurrences are updated with events that occurred between 2014 and 2019.

4.3.10.1 Profile

Hazard Description

An infestation is the presence of a large number of pest organisms in an area or field, on the surface of a host, or in soil. They result from when an area is inhabited or overrun by these pest organisms, in numbers or quantities large enough to be harmful, threatening or obnoxious to native plants, animals and humans. Pests are any organism (insects, mammals, birds, parasite/pathogen, fungi, non-native species) that are a threat to other living species in its surrounding environment. Pests compete for natural resources or they can transmit diseases to humans, crops and livestock. Human populations are generally impacted by insect or animal infestations that can result in health impacts and can lead to potential epidemics or endemics.

For the purpose of this HMP update, the infestation hazard profile will discuss the following: insects (e.g., gypsy moth, mosquitoes, spotted lanternfly, emerald ash borer), white tailed deer, rodents and invasive plants.

Insects

Gypsy Moth



Source: NJDA 2020

The gypsy moth is one of most devastating forest pests in the United States and the most destructive forest insect pest to infest New Jersey's forests. Gypsy moths have a large appetite and can cause defoliation of trees. The gypsy moth feeds on a variety of trees, which include oak, maple, birch, beech, willow, and hickory. The larger caterpillars have been known to feed on pine, spruce, hemlock, and many common ornamentals. The gypsy moth develops in four stages: egg, larvae (caterpillars), pupa (transformation stage), and adult (moth). Only the larval stages are destructive. It is not uncommon to observe large numbers of migrating caterpillars crossing roads and on the sides of dwellings and other stationary objects. Migrating caterpillars can stain paint on houses and if handled, their body hairs may irritate the skin of susceptible people (NJDA 2019).

Defoliation from gypsy moths first appeared in 1966 in Morris County. Since 1966, there have been three major population cycles: one in 1972 when 256,000 acres were defoliated, in 1981 when 780,000 acres were defoliated, and in 1990 when 431,000 acres were defoliated. The entire State is now considered to be infested by the gypsy moth (NJDA 2019).



Mosquitoes

Mosquito infestations can result in the spread of disease such as West Nile Virus, Eastern Equine Encephalitis (EEE), and Zika virus through bites from infested mosquitoes. Mosquitos typically lay eggs in or near standing water. For more information on infectious disease spread by mosquitoes, refer to 4.3.10 (Disease Outbreak).

Emerald Ash Borer



Source: NJDA 2020

Emerald Ash Borer (EAB) was first discovered in our neighboring Somerset County in 2014 and first detected in Morris County in 2017 in Chester, Morris, Hanover, and Randolph Townships. This Asian beetle infests and kills North American ash tree species, including green, white, black and blue ash; making all native ash trees susceptible to this insect. The insect is typically present from late May through early September and is most common in June and July. Signs of infection include tree canopy dieback and yellowing and browning of leaves. Most trees die within two to four years of becoming infested (NJDA 2020).

Spotted Lanternfly



Source: NJAES 2020

The spotted lanternfly (*Lycorma deliculata*) is an Asian plant hopper. The adults are quite colorful with a black head, grayish black spotted forewings, and reddish black spotted hind wings. Adults are approximately 1" in length and a 1/2" in width and are present from mid-July through the fall. During this time, SLF adults are mating and laying eggs. Egg masses are laid on smooth surfaces and appear like a patch of mud.

In the USA, spotted lanternfly is an invasive species that could be very devastating to some New Jersey crops and hardwood trees. This insect was accidentally introduced into Pennsylvania and was confirmed in September 2014. In 2018, spotted lanternfly populations were found in New Jersey and a state quarantine encompassing Mercer, Hunterdon, and Warren counties has been established by the NJ Department of Agriculture (New Jersey Agricultural Experiment Station [NJAES] 2020).

The spotted lanternfly can feed on more than 70 plant species including cultivated grapes, fruit trees, and hardwood trees. One tree of particular importance is *Ailanthus altissima* or the Tree of Heaven which is abundant in New Jersey. Tree of Heaven typically grows in clumps in sunny areas along highways or disturbed habitats such as the edges of crop fields, open spaces, or parks. Other key tree hosts include black walnut; red maple; and agricultural crops such as grapes, hops, apples, and peaches.

As with all plant hoppers, the spotted lanternfly has sucking mouthparts that it inserts into plant tissues to remove the fluids it needs to survive. Adults and nymphs are phloem feeders that feed in large congregations on woody tissue. Although there are no numbers or estimates on the economic impact of the spotted lanternfly—because this insect feeds in large numbers it can quickly cause damage. Feeding occurs on the trunk and limbs of plants, not on the fruit or leaf tissues. During feeding, the insect excretes significant amounts of honey dew (or sugar water). Honey dew deposits provide a food source for a sooty mold fungus that can grow on plant surfaces and fruit leading to reduced photosynthesis and plant vigor, leading to additional plant damage (NJAES 2020).



White-Tailed Deer

In New Jersey, white-tailed deer are a major component throughout the State, with the exception of the most urbanized areas. In the early 1900s, the deer population in New Jersey was minimal, but the population rebounded during the 20th century and is thriving today (NJDEP 2020). White-tailed deer in New Jersey affect forests, farms, gardens, backyards and roadways. They can have negative impacts on humans, including car accidents, depredation of agricultural and ornamental plantings, and the potential for harboring diseases that are transmissible to man or domestic animals (NJDEP 2020).

The size of the deer population in New Jersey is managed through controlled sport hunting, with the main goal being to maintain healthy deer populations at a density tolerable to New Jersey residents, and to maximize the recreational and economic benefits derived from the deer (NJDEP 2020).

In Morris County, the white-tailed deer population have a history of impacting native plants and wildlife species in natural areas. Studies have found that a high population density of deer and the amount of browsing can have detrimental effects on the forest communities in the County. In Morris County, the deer population is controlled by the Morris County Park Commission through a controlled hunting program (Morris County Park Commission 2020).

The white-tailed deer is a species with a capacity for very rapid population growth. Females can reach reproductive maturity as early as one year of age and can produce up to three fawns each year. The presence of few natural predators in this region and supplemental feeding by well-meaning homeowners contribute to a continuously expanding population (Morris County Park Commission 2020).

Rodents

Rats and mice are destructive pests that can spread disease, contaminate food, and destroy property. After a disaster, the number of rats and mice is often reduced, so illness or injuries associated with rats and other small rodents are uncommon in the short term. However, rodents that survive a disaster often move to new areas. It takes time for rodents to regroup, reorganize their social behavior, become familiar with their new environment, find safe haven, locate food and water, and memorize their movements. Colony building and reproduction will begin only when their new ecosystem has stabilized. This typically takes between six and 10 months under favorable conditions. As the rodent population grows and resettles, people have a greater chance of being exposed to the diseases carried by rodents. Rodent urine and dander also contain allergens that can cause allergic reactions or trigger asthma symptoms in sensitive persons and more than 9,000 persons are treated in emergency departments annually for rat or mouse bites. Damaged or abandoned homes and other buildings after a disaster may become infested with rodents (CDC 2012). This has become an issue in Morris County after homes have been damaged and abandoned due to floods that impact the County.

Invasive Plants

An invasive plant, including aquatic, has the ability to thrive and spread aggressively outside its native range. A naturally aggressive plant may be especially invasive when it is introduced to a new habitat (USDA 2017). Invasive plants often are introduced to a new area for ornamental gardening or recreational boating activities. Invasive plant species identified as concerns for Morris County include grasses such as Japanese Stiltgrass; shrubs such as Japanese Barberry, Giant Hogweed, and Japanese Knotweed; and vines such as Japanese Hop (Washington Township Environmental Commission 2019).



Location

Due to the diversity of landscape in Morris County, the entire County has the potential to be impacted by each of the species identified above.

Insects

Gypsy Moth

Repeated defoliation by the gypsy moth represents a serious threat to New Jersey woodland and shade tree resources and has impacted Morris County. According to the NJDA, there are areas of defoliation from gypsy moths throughout Morris County. Municipalities impacted by gypsy moth and the level of defoliation have deviated from year to year (NJDA 2019).

Mosquitoes

Mosquitoes are found throughout Morris County, most commonly near areas with standing water.

Spotted Lanternfly

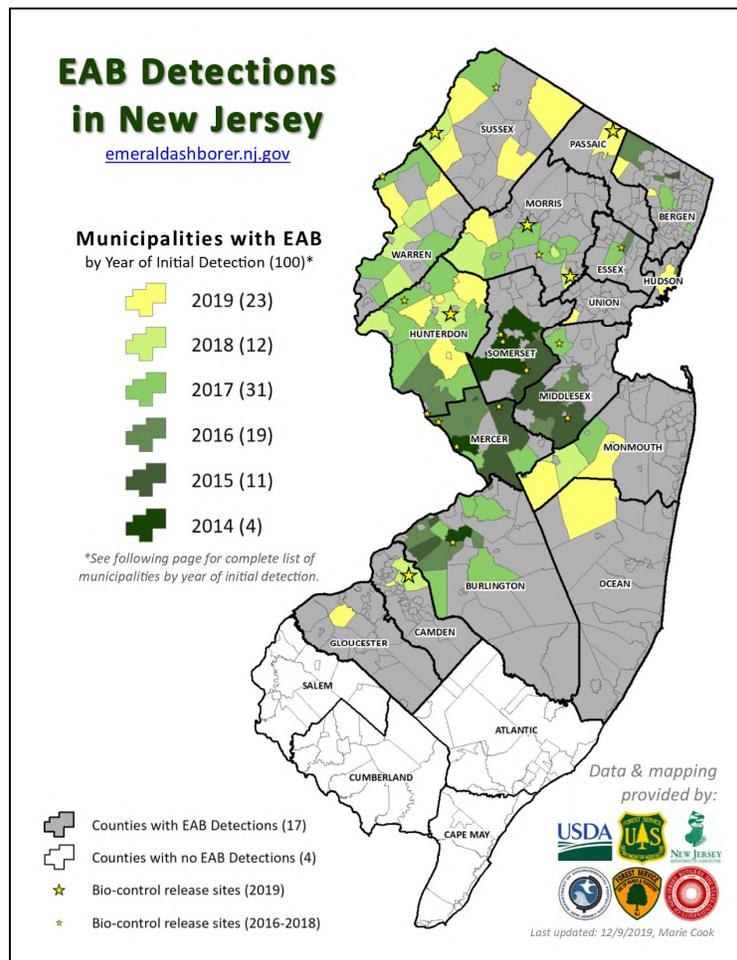
As of 2019, Spotted Lanternfly has not been located in Morris County but has impacted neighboring Warren County and is spreading rapidly throughout the region (NJAES 2020).

Emerald Ash Borer

In 2018, EAB had been detected in Chester, Randolph, Hanover, and Morris Townships. Morris County has the densest ash population in the State. Several areas of Morris County have particularly dense populations of ash trees including the area of the Great Swamp National Wildlife Refuge. Three species of ash are native to Morris County and all are susceptible to EAB: white ash (*F. Americana*), green ash (*T. pennsylvanica*), and black ash (*F. nigra*) (Morris County Parks Commission 2018).



Figure 4.3.10. Emerald Ash Borer Detections in New Jersey



Source: State of New Jersey Department of Agriculture 2020

White-Tailed Deer

White-tailed deer can be found nearly anywhere in Morris County. They are commonly found where forested habitats abut more open areas, such as shrublands, agricultural fields, and riparian zones. Deer can also be found in suburbs where appropriate resources are highly abundant. The landscape of Morris County makes it an ideal habitat for white-tailed deer.

Rodents

Rodents can be found anywhere in Morris County. As previously stated, the County has had issues with rodents in homes that were flooded and abandoned. Areas of previously flood-damaged homes and buildings may have higher populations of rodents.

Invasive Plants

Invasive plant species are most common in areas where human disturbance has occurred or where invasive plants have been unintentionally released but can be found throughout Morris County.



Extent

The extent and location of infestations and invasive species depends on the preferred habitat of the species, as well as the species' ease of movement and establishment. However, each of these threats can impact many areas of Morris County. The magnitude of infestations and invasive species ranges from nuisance to widespread. The threat is typically intensified when the ecosystem or host species is already stressed, such as periods of drought. The already weakened state of the ecosystem causes it to more easily be impacted to an infestation.

Insects

Gypsy Moth

In New Jersey, municipalities with heavy infestations of gypsy moths, as delineated by a summer aerial defoliation survey, are contacted in writing by the NJDA in early fall. The municipalities are asked, if they wish, to have a gypsy moth egg mass count. This is done to determine if the infestation will continue and what areas qualify for the spray program. If the area has an average of more than 500 egg masses per acre, and is at least 50 acres in size, it may qualify for participation in the cooperative gypsy moth suppression program. Municipal participation is voluntary (NJ DEP 2018).

In 2016, the NJDA's spray program included 20,355 acres in 27 municipalities and one county park system in Cape May, Salem, Hunterdon, Morris, Passaic, Sussex and Warren counties. In 2017, the NJDA's spray program included 4,500 acres in 11 municipalities in Cape May, Morris, Ocean, Passaic, Sussex and Warren counties to combat the tree-killing gypsy moth caterpillar. Both treatments and defoliation are down due to a combination of effective treatments in 2017 and sporadic *E. maimaiga* (gypsy moth fungus), reducing the populations especially in the northern counties of the state (NJ DEP 2018)

Mosquitoes

The extent of mosquito-borne viruses is described in Section 4.3.2 (Disease Outbreak). Disease impacts can result in flu-like symptoms, brain damage, or death.

Spotted Lanternfly

Spotted Lantern Fly damages plants through the extraction of plant sap. Infestations of Spotted Lanternfly can result in decimation of crops, forest habitat, and landscaping (NJDA 2019).

Emerald Ash Borer

The NJ Emerald Ash Borer Task Force and other experts predict a 99% mortality rate for untreated ash trees. Peak die off of trees is likely to occur 9 to 10 years after the initial infestation. This suggests that Morris County will be dealing with large volumes of tree deaths in the next 15 years. Management options for EAB include tree removal, treating with insecticides, and biological controls (the release of wasps which act as parasitoids for egg and larvae). The United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA, APHIS, PPQ), operates the biological control production facility in Michigan which was designed to produce EAB parasitoids for release. In order to be considered for inclusion in the parasitoid release program, release sites must meet a certain criteria to be eligible: the site must be forested at least 40 acres in size; the site must contain no less than 25% ash of varying age classes; ash trees must be relatively healthy; and EAB must be detected in close proximity to the release site and be in low to moderate densities. The NJDA is coordinating New Jersey's EAB biocontrol program. The Morris County Parks Commission is working with the NJDA to participate in the program (Morris County Parks Commission 2018).



White-Tailed Deer

Changes to the natural landscape caused by humans provide an abundant and ideal deer habitat, which in return has increased the deer population in the State. Substantial deer populations are not only a by-product of agriculture, but the result of greenways and large building lot sizes common in the suburban and rural areas of the State. In suburban areas, deer populations have been increasing due to land development and opposition to hunting. The impacts of deer overabundance can be shown by the number of deer/automobile collisions, destruction of residential flower and shrub plants, damage to agricultural crops, and increased risks of contracting wildlife-transmitted diseases such as Lyme disease (discussed in Section 4.3.2, Disease Outbreak) (NJDEP Division of Fish and Wildlife Date Unknown).

Impacts from the effects of high densities of white-tailed deer in New Jersey (including Morris County) range from severe reductions in tree regeneration to loss of diversity of native forest plants. High deer population density is typical throughout the eastern United States and in New Jersey, the population has increased dramatically over the past 10 years. The Morris County Parks Commission operates a Deer Management Program which coordinates hunting of white-tailed deer in parks. In the past the Parks Commission has attempted immunocontraception (a form of birth control that works with an animal's immune system to block fertilization thereby preventing pregnancy), repellants, and fencing but these efforts were not found to be effective (Morris County Park Commission 2020).

Rodents

Areas of increased rodent populations have a great risk of being exposed to diseases carried by rodents. There may be an increase in reported diseases from rodents after a flooding event in a community.

Invasive Plants

The most negative impacts from invasive plants involve the destruction of natural habitat and potential damages to infrastructure due to root system impacts.

Previous Occurrences and Losses

Many sources provided information regarding infestations in Morris County. Table 4.3.10-1 summarizes the defoliation and extents for gypsy moth in Morris County from 2015 to 2019. Based on information stated earlier in this profile, Morris County has been and will continue to be impacted by infestations and invasive species. Between 1954 and 2015, FEMA included the State of New Jersey in one infestation-related emergency (EM) classified as a virus threat (EM-3156 in November 2000). Morris County as included in this declaration (FEMA 2019). For details regarding West Nile Virus in Morris County, refer to Section 4.3.2 (Disease Outbreak).

Figure 4.3.10-1. Defoliation from Gypsy Moth in Morris County

Municipality	Moderate 25-50%	Heavy 51-75%	Severe 76-100%	Total
2015				
Boonton Township	0	277	1,082	2,079
Butler Borough	0	2	1	3
Chester Township	0	64	0	64
Denville Township	0	91	0	91
East Hanover Township	0	50	0	50
Hanover Township	43	162	0	205
Harding Township	0	161	0	161
Jefferson Township	0	2,226	20,336	22,562





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Municipality	Moderate 25-50%	Heavy 51-75%	Severe 76-100%	Total
Kinnelon Borough	0	0	8,878	8,878
Long Hill Township	0	304	0	304
Mendham Township	0	968	0	968
Montville Township	0	0	2,426	2,426
Morris Township	0	138	0	138
Mount Arlington Borough	0	91	0	91
Mount Olive Township	0	658	39	697
Netcong Borough	0	39	0	39
Parsippany Troy Hills Township	0	0	9	9
Randolph Township	0	511	0	511
Rockaway Township	0	330	19,203	19,533
Roxbury Township	396	343	0	739
Washington Township				
Total	439	7,566	52,694	60,699
2016				
Jefferson Township	554	0	0	554
Kinnelon Borough	29	60	0	89
Long Hill Township	0	42	0	42
Rockaway Township	1,141	199	0	1,340
Total	1,724	301	0	2,025
2017				
Chester Township	0	51	0	51
East Hanover Township	12	0	0	12
Harding Township	52	46	0	98
Jefferson Township	0	164	49	213
Kinnelon Borough	0	75	0	75
Montville Township	0	15	0	15
Mount Olive Township	0	52	0	52
Rockaway Township	35	277	0	312
Total	99	680	49	828
2018				
Chester Township	15	0	0	15
Harding Township	45	0	0	45
Mendham Township	16	0	0	16
Parsippany-Troy Hills Township	0	35	0	35
Washington Township	0	11	0	11
Total	76	46	0	122
2019				
Long Hill Township	0	27	0	27
Total	0	27	0	27

Source: NJDA 2019





Probability of Future Occurrences

Based on historical documentation, increased incidences of infestation throughout the State of New Jersey and the overall impact of changing climate trends, it is estimated that Morris County and all its jurisdictions will continue to experience infestation that may induce secondary hazards and health threats to the County population if infestations are not prevented, controlled or eradicated effectively. Based on the historical records and input from the Steering Committee and Planning Committee, the probability of occurrence for infestation in Morris County is considered “frequent”. Refer to Section 4.4. (Hazard Ranking) for more information.

Climate Change Impacts

Providing projections of future climate change for a specific region is challenging. Shorter term projections are more closely tied to existing trends making longer term projections even more challenging. The further out a prediction reaches the more subject to changing dynamics it becomes.

Average annual temperatures have increased by 3°F in New Jersey over the past century (NOAA NCEI 2017). Most of this warming has occurred since 1970. The State of New Jersey has observed an increase in average annual temperatures of 1.2°F between the period of 1971-2000 and the most recent decade of 2001-2010. Winter temperatures across the Northeast have seen an increase in average temperature of 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007). By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F (Sustainable Jersey Climate Change Adaptation Task Force 2013).

Northern New Jersey’s 1971-2000 precipitation average was over five inches (12-percent) greater than the average from 1895-1970 (Sustainable Jersey Climate Change Adaptation Task Force [CATF] 2011). The heaviest 1% of daily rainfalls have increased by approximately 70% between 1958 and 2011 in the Northeast (Horton et al. 2015). Increased rainfall and heavy rainfalls increase the risk of flooding events.

Annual precipitation for New Jersey has been about 8 percent above average over the last 10 years. The number of extreme precipitation events has also been above average over the last 10 years. During 2010–2014, the state experienced the largest number of extreme precipitation events (days with more than 2 inches) compared to any other 5-year period, about 50 percent above the long-term average. Winter and spring precipitation are projected to increase for the 21st century; extreme precipitation is also projected to increase. The projections of increasing precipitation are characteristic of a large area of the Northern Hemisphere in the northern middle latitudes, as well as increases in heavy precipitation events. This may result in increased flooding risks throughout the state (NCEI 2019).

The following provides information on the different infestations impacted Morris County and how they may be affected by climate change.

Insects

Gypsy moths are cold-blooded insects and are particularly sensitive to climate changes. Gypsy moths require a climate warm enough for the adults to emerge, have time to mate, and lay eggs and have the eggs develop. The winter temperatures are also important for egg development. A changing climate has the potential to impact the population of gypsy moths, either be increase their population or decreasing (Center for Coastal Resources Management 2015).



A warmer climate would extend the active insect season and allow for species that are not as cold tolerant to move north and expand their range. This may increase the population or prolonged presence of mosquitos, spotted lanternfly, emerald ash borer and their related impacts.

White-Tailed Deer

A changing climate is a long-term stressor that will lead to significant changes in eastern forests; however, high deer populations have had a much greater negative impact currently on forests and over the last several decades. An increase in extreme weather, disease, and change in habitat are potential climate-driven stressors on white-tailed deer. Warmer temperatures may also increase the midge population. Midges transmit hemorrhagic disease to white-tailed deer. Colder temperatures kill the midges; however, warmer winter temperatures may not kill as many midges and there may be a decrease in deer population due to the spread of hemorrhagic disease. Additionally, the white-tailed deer serve as hosts for many tick species. Refer to Section 4.3.2 (Disease Outbreak) for information regarding tick-borne diseases and climate change.

Rodents

In Morris County, rodents become an issue when homes and other buildings are abandoned after flood damages. Refer to Section 4.3.6 (Flood) for information regarding climate change and flooding in Morris County.

Invasive Plants

As the climate changes, ecosystems can become stressed which can allow for invasive plant species to take hold and become more problematic. A changing climate can result in new species entering regions where they previously could not survive. It can also result in species hierarchies in ecosystems changing, leading to new dominant species that may have more invasive tendencies (Masters & Norgrove 2010).

4.3.10.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable. For the infestation hazard, the entire County is exposed. The following discusses Morris County's vulnerability, in a qualitative nature, to the infestation hazard.

Impact on Life, Health and Safety

The entire population of Morris County is vulnerable to infestation. According to the 2017 American Community Survey (ACS) 5-year Estimate, Morris County had a population of 498,847. Of that vulnerable population, the elderly population and people with suppressed immune systems are most susceptible to the effects of West Nile Virus. The ACS has identified that there are 79,042 persons over the age of 65 in Morris County.

As discussed earlier, infestations can have an impact on agricultural commodities. The NJDA has indicated that New Jersey farmers lose \$290 million annually in direct crop loss or damage caused by agricultural pests (New Jersey Department of Agriculture n.d.). This destruction of crop may include consumable resources that are sold to persons in the County. Based on the Department of Agriculture's study, it is reasonable to assume that the farms in Morris County also experience losses in crops. This not only impacts the livelihood of the farmers; it also affects the community that relies on these crops for food or other commodities.

Impact on General Building Stock

No structures are anticipated to be directly affected by infestation or invasive species; however, Emerald Ash Borer may cause a catastrophic loss of ash trees throughout the County, which could result in stream bank



instability, erosion, and increased sedimentation, impacting ground stabilization and possibly cause foundation issues for nearby structures. Additionally, with an increased number of dead trees, there is an increased risk of trees falling on roadways, power lines, and buildings.

Some invasive plants have been shown to destabilize soil due to high densities and shallow root systems, negatively impacting nearby buildings and septic systems. Other invasive plant species have been known to clog culverts and streams, increasing flooding risk.

Impact on Critical Facilities

Water treatment plants could be impacted by infestation and invasive species because of similar issues that the general building stock may experience. Water that becomes polluted due to increased sedimentation and erosion will require additional treatment. If the system becomes clogged with these pollutants, the ability of water treatment plants to operate may become impaired. Additionally, soil that becomes unstable due to decaying vegetation can impact critical facilities that are built on or around these soils.

Impact on Economy

Impacts of invasive species and infestations on the economy and estimated dollar losses are difficult to measure and quantify. Costs associated with activities and programs implemented to conduct surveillance and address invasive species and infestations have not been quantified in available documentation. However, as indicated by the NJDA, farmers across the State may revenue because of crop losses from invasive species and infestations (New Jersey Department of Agriculture n.d.). In 2017, there were 6,659 acres of cropland in Morris County, and 5,904 acres that was harvested (USDA 2017). Therefore, it is reasonable to believe that Morris County farmers have experienced monetary losses from infestations.

In 2010, the USDA Northern Research Station conducted computer simulations of EAB spread to estimate the cost of ash tree treatment, removal, and replacement (re-planting of new trees) between 2009 and 2019. The simulations predicted an EAB infestation covering 25 states, and assumed treatment, removal, and replacement of more than 17 million ash trees on developed land within established communities. The total costs were estimated at \$10.7 billion. This figure doubled when the model was reset to include developed land outside, as well as inside, human communities (USDA 2013).

Impact on the Environment

As previously discussed, Morris County's parks, forests and neighborhood trees are vulnerable to gypsy moth, spotted lanternfly and EAB. In addition, a high population density of deer and the amount of browsing can have detrimental effects on the forest communities in the County.

Invasive species can cause eventual destabilization of soil, such as invasive insects that destroy plants or invasive plants that outcompete native vegetation but have less effective root systems, can increase runoff into waterbodies. This can lead to increased harmful algal blooms and negative impact on drinking water supplies. Soil destabilization can also increase the likelihood of mudslides in areas with a steep slope.

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 and Change in Population

As discussed in Sections 3 (County Profile) and 9 (Jurisdictional Annexes), areas targeted for future growth and development have been identified across Morris County. Changes in land use have the potential to render some habitats more susceptible to invasive species, such as clearing the land and providing opportunities for invasive species to inhabit the area. Clearing the land may also reduce the habitat for predator species that could manage the spread of invasive species naturally. The specific areas of development are indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 of this plan.

Infestation to cropland can have a wider impact on persons outside of Morris County if the farmers within the County supply resources to neighboring communities. Being aware of trends occurring around the County may reveal that infestations within agricultural commodities provided by the County impacts a greater number of persons.

Climate Change

Climate change could exacerbate the impacts of these species in the County. As mentioned above, changing weather patterns could create a change in the migration patterns for when these species move into and out of Morris County. If the species have a more prolonged existence in the County, there may also be a greater number of infestation events or a higher value of loss tied to infestation.

Change of Vulnerability Since the 2015 HMP

Overall, the entire County remains vulnerable to impacts by infestations.