



5.4.12 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.

2015 Plan Update Changes

- The infestation hazard is a new addition to the 2015 HMP Update.

5.4.12.1 Hazard Profile

Hazard Description

An infestation is defined as a state of being invaded or overrun by parasites that attack plants, animals and humans. Insect, fungi and parasitic infestations can result in destruction of various natural habitats and cropland, impact human health, and cause disease and death among native plant, wildlife and livestock. 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 include the following: gypsy moth, white tailed deer, and rodents.

Gypsy Moth

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 (Rutgers Cooperative Research & Extension 2003; NJDA 2006). Each year, since 1970, gypsy moth caterpillars have caused varying degrees of leaf loss (defoliation) between 1,900 and 800,000 acres of forest land.

Defoliation from gypsy moths first appeared in 1966 in Morris County. By 1970, nearly 130,000 acres in 1 counties were defoliated by the gypsy moth. Since 1966, there are 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 by be infested by the gypsy moth (USDA 2006).

White-Tailed Deer

White-tailed deer can be found from southern Canada to South America. In summer months, they typically live in fields and meadows and during the winter, the deer generally keep to forests. White-tailed deer are herbivores



and graze on most types of plants. There are not many natural predators to white-tailed deer which causes the deer population to grow too large for their environment and some areas may experience an overpopulation of deer (National Geographic 2015).

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. 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. 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 2011).

In Morris County, the white-tailed deer population have a history of impacting native plants and wildlife species in natural areas of the County. Studies have found that a high population density of deer and the amount of browsing done can have detrimental effects on the forest communities in the County.

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.

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.

Gypsy Moth

The gypsy moth is the most destructive forest insect pest to infest New Jersey's forests. 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 New Jersey Department of Agriculture, there are small areas of defoliation from gypsy moths throughout Morris County. During the 2014 aerial defoliation survey, the Borough of Kinnelon and the Townships of Mount Olive, Parsippany-Troy Hills, and Rockaway have all been impacted by the gypsy moth. This survey indicated that 315 acres of the County had moderate defoliation; 51 acres have heavy defoliation; and 42 acres from severe defoliation (NJDA 2014).

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.

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. The presence of the gypsy moth, white-tailed deer and rodents have been reported throughout most of Morris County.

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 New Jersey Department of Agriculture (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 completely voluntary (NJDA 2006).

In 2014, four municipalities in Morris County were surveyed, Kinnelon Borough, Mount Olive Township, Parsippany-Troy Hills Township, and Rockaway Township. The survey showed that 408 acres of trees in the County were defoliated, with a majority of the trees having moderate defoliation. Rockaway Township had the largest acreage of defoliated trees, 191 acres, with 149 acres identified as moderate and 42 acres as severe (NJDA 2014).

White-Tailed Deer

White-tailed deer population in New Jersey has increased and decreased over the years and more recently, has become quite abundant today. Changes to the natural landscape created 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 5.4.11 of this Plan Update) (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 Nature Conservancy 2004).



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.

Previous Occurrences and Losses

Many sources provided information regarding infestations in Morris County; however, specific events and/or losses were not identified. Based on information stated earlier in this profile, Morris County has been and will continue to be impacted by gypsy moths, white-tailed deer and rodents. 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 was included in this declaration (FEMA 2015). For details regarding West Nile Virus in Morris County, refer to Section 5.4.10 (Disease Outbreak).

Probability of Future Events

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 events that may induce secondary hazards and health threats to the County population if infestations are not prevented, controlled or eradicated effectively. The Planning Committee views this as a “frequent” hazard of concern (likely to occur within 25 years) (see Table 5.3-3).

Climate Change Impacts

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 (ONJSC 2011). 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).

ONJSC indicates that northern New Jersey, which includes Morris County, has become wetter over the past century. Northern New Jersey’s 1971-2000 precipitation average was over five inches (12%) greater than the average from 1895-1970. Average annual precipitation is projected to increase in the region by 5% by the 2020s and up to 10% by the 2050s. Most of the additional precipitation is expected to come during the winter months (New York City Panel on Climate Change [NPCC] 2009). In addition, heavy precipitation events have increased in the past 20 years.

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

Gypsy Moths

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).

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 5.4.10 (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 5.4.5 (Flood) for information regarding climate change and flooding in Morris County.



5.4.12.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For infestation, Morris County has been identified as the hazard area. Therefore, all assets in Morris County, as described in the County Profile section, are vulnerable to infestation. The following text evaluates and estimates the potential impact of infestation on Morris County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2010 Morris County Hazard Mitigation Plan
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

Infestation and invasive species are a significant concern to Morris County, mainly due to its impact on public health and natural resources. Estimated losses are difficult to quantify; however, infestation can impact Morris County’s population and economy. As discussed in the Hazard Profile, insect infestations can cause a great deal of harm to the natural environment. If an infestation is allowed to spread, dead vegetation, including trees and shrubs, could become an additional debris hazard for severe wind storms, flooding or even wildfire events.

Data and Methodology

Due to a lack of quantifiable loss information, a qualitative assessment was conducted to evaluate the assets exposed to this hazard and the potential impacts associated with this hazard.

Impact on Life, Health and Safety

The entire population of Morris County is vulnerable to infestation. According to the 2010 U.S. Census, Morris County had a population of 492,276. The elderly population and people with suppressed immune systems are most susceptible to the effects of WNV. According to the 2010 U.S. Census, Morris County’s population of 65 and over was 68,155.

Impact on General Building Stock and Critical Facilities

No structures are anticipated to be directly affected by infestation or invasive species

Impact on Economy

The impact infestation and invasive species have on the economy and estimated dollar losses are difficult to measure and quantify. Costs associated with the activities and programs implemented to conduct surveillance and address infestation have not been quantified in available documentation. Instead, activities and programs implemented by the County to address this hazard are described below, all of which could impact the local economy.

West Nile Virus

The Morris County Department of Public Works, Division of Mosquito Control, is responsible for controlling mosquito infestations in the County. The main goal of the Division is to reduce the number of nuisance and disease transmitting mosquitoes by using an Integrated Pest Management program comprised of inspections,



biological controls, water management and public education. The County tries to cause as little impact to the environment as possible, and only uses pesticides as a last resort (Morris County, Date Unknown).

Impact of Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the infestation hazard because the entire planning area is exposed and vulnerable.

Change of Vulnerability

An infestation exposure analysis was not conducted as part of the 2010 HMP risk assessment.

Additional Data and Next Steps

For the Plan Update, any additional information regarding localized concerns and past impacts will be collected and analyzed. This data will be developed to support future revisions to the plan. Mitigation efforts could include building on existing State, County and local efforts.