



Infestation

An infestation is to swarm or overcome in an intrusive manner. Species that are both non-native (or alien) to an ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm, or harm to human health are considered invasive.



2.0 RISK ASSESSMENT

2.2.7 Infestation

Species that are both non-native (or alien) to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm, or harm to human health are considered invasive. An infestation is to swarm or overcome in an intrusive manner.				
<p>Vulnerability</p> <p>HIGHEST HIGH MEDIUM LOW LOWEST</p>	<p>Period of Occurrence:</p>	Invasive species can occur at any time	<p>Hazard Index Ranking:</p>	Low
	<p>Warning Time:</p>	None	<p>State Risk Ranking:</p>	8
	<p>Probability:</p>	Probable (Likely to occur on an annual basis)	<p>Severity:</p>	Marginal (10-25% of land area affected)
	<p>Type of Hazard:</p>	Natural	<p>Disaster Declarations:</p>	None

Hazard Introduction and Overview

The National Invasive Species Council defines invasive species as “both non-native (or alien) to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm, or harm to human health” (ODNR, 2020). Human actions are the primary cause of invasive species transfer. There are four main types of invasive species: aquatic species, plants, animals, and microbes (USDA, n.d.). An invasive species can be any living organism, amphibian, plant, insect, fish, fungus, bacteria, and seed or egg (National Wildlife Federation, n.d.). Ohio has a large number of invasive plants and animals. A description of each type of invasive organism, as well as control measures, appears below.

Location and Extent

Invasive Terrestrial Plants

Invasive terrestrial plants are those that displace or crowd native plant species, impact wildlife, which relies on native plant communities for food, shelter and breeding habitat, and for monoculture plant communities, which reduces biological diversity. An infestation can occur anywhere in Washington County.



INVASIVE PLANT SPECIES – WASHINGTON COUNTY	
Common Name	Distribution
<p>Honeysuckles: Amur, Morrow's are upright, deciduous shrubs that range from 6 to 15 feet in height at maturity. These honeysuckles fruit prolifically and are highly attractive to birds, which widely disseminate seeds across the landscape. Deer also disperse seeds. Cut stems will resprout vigorously. These shrubs shade native vegetation since they leaf out earlier in the spring and drop their leaves later in the fall than native plants. It has been documented that birds nesting in honeysuckle suffer greater nest predation than those nesting in native shrubs.</p>	<p>AMUR HONEYSUCKLE MORROW'S HONEYSUCKLE</p>
<p>Japanese Honeysuckle: Japanese honeysuckle is a vine with entire (sometimes lobed), oval-oblong, opposite leaves from 1 ½ -3 inches long. In Ohio, the plants are semi-evergreen with leaves persisting into late winter or early spring. Japanese honeysuckle thrives in disturbed areas such as roadsides, fencerows, forest edges, and forest gaps. Areas of special concern are woodland edges, early successional forests, and riparian corridors. Although preferring sunny areas, both are shade tolerant and can live in marginal habitats until favorable conditions arise.</p>	<p>JAPANESE HONEYSUCKLE</p>
<p>Garlic Mustard: Garlic mustard is a biennial herb that emits a garlic-like odor from crushed leaves. Garlic mustard prefers some shade in mesic upland and floodplain forests, savannas, pastures, lawns, and along fencerows and roadsides. It invades forest edges and progresses into the interior along streams and trails.</p>	
<p>Purple Loosestrife: Purple loosestrife is an erect perennial with opposite or whorled leaves. The thick taproot supports thirty to fifty stems that can attain a height of 3-6 feet. Purple loosestrife thrives in wetlands, including marshes, fens, wet meadows, stream and river banks, lake shores and ditches. It can also survive in drier conditions.</p>	
<p>Reed Canary Grass: Reed canary grass is a large, coarse grass that attains a height of 2 to 7 feet. The erect, hairless stem supports rough-textured, tapering leaves of 3 ½ to 10 inches long and 1/4 to 3/4 inch wide. Reed canary grass grows best on fertile, moist organic soils in full sun. It can grow in standing water by producing special roots along the submersed portion of the stem. It also grows on dry soils in upland sites and under partial shade.</p>	



<p>Autumn-Olive: Autumn-olive are deciduous shrubs or small trees that grow to a height of 30 feet. Autumn-olive has nitrogen-fixing root nodules, which allow them to adapt to many poor soil types including bare mineral substrates. Autumn-olive is found throughout Ohio, occurring in various open to semi-shaded habitats including old fields, grasslands, barrens, woodlands, savannas, alvars (limestone prairies), roadsides, reclaimed strip-mined areas, and open disturbed sites.</p>	 <p>2010</p>
<p>Multiflora Rose: Multiflora rose is a thorny shrub with arching stems (canes). The compound leaves are divided into 5-11 sharply-toothed leaflets. Multiflora rose prefers sunny to semi-shaded habitats with well-drained soils, but can tolerate a wide range of habitats including mesic upland and flood plain woods, forest edges, old fields, savannas, prairies, fens, roadsides, fencerows and lawns.</p>	 <p>2010</p>
<p>Narrow-leaved and Hybrid Cattail: Narrow-leaved cattail is an introduced species which hybridizes with the native common cattail (<i>T. latifolia</i>). Cattails can be found in damp soil or shallow water where sufficient nutrients are available. They are commonly found along expressways, in artificial ditches and shallow ponds, at the edges of calm waters, in consistently damp patches of rural and suburban yards, in marshes as well as brackish and polluted waters to a depth nearing 3 feet. These taxa also invade fens, wet meadows, wet prairies, and beach swales.</p>	<p>NARROW-LEAVED CATTAIL</p>  <p>2010</p>
<p>Moneywort: Also called pennywort and creeping jenny, moneywort is a member of the primrose family that was once used as an ornamental form of ground cover. It grows close to the ground and forms a thick mat up to two feet long and up to four inches tall. Moneywort spreads rapidly by creeping stems and dispersing seeds. Seeds can be spread by floodwaters or human activity.</p>	<p>Ohio Distribution</p> 

Source: ODNR

According to the ODNR, Division of Natural Areas & Preserves, of the approximately 2,300 species of plants known to occur in Ohio, about 78% are native, the remaining 22% are not native to the state. Non-native plants have been introduced for erosion control, horticulture, forage crops, medicinal use, wildlife foods, or by accident. Most of these species never stray far from where they are introduced, but some become very invasive and displace native plants throughout the state. Of the top ten invasive plant species listed by ODNR, nine appear in Washington County. Invasive plants can spread in numerous ways. Three methods of control (mechanical, chemical, and biological) can help abate the spread of these plants, but some methods work better than others.



- **Mechanical control methods** involve cutting, digging, burning, or otherwise physically removing the plant. Mechanical control methods are labor-intensive and ultimately unsuccessful at eradicating invasive plants long-term.
- **Chemical control methods** involve herbicides that target specific plant species while protecting native species. Some herbicides are non-selective and have the ability to kill or contaminate the surrounding ecosystem.
- **Biological control methods** involve introducing natural enemies that destroy the invasive plant species. Care is necessary so that the introduced species does not itself become a problem for the area in which they are introduced.

Invasive Terrestrial Wildlife

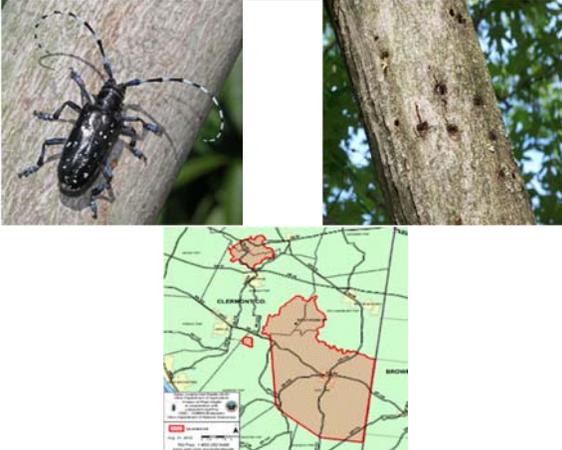
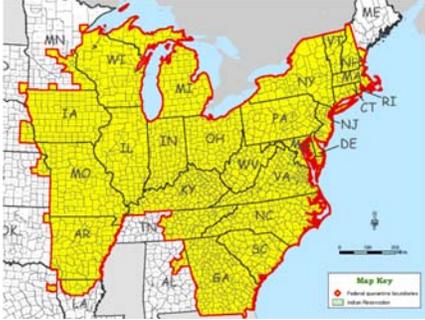
Invasive terrestrial wildlife are animals or other organisms that evolved to live on land rather than aquatic habitats; these organisms cause damage to important habitat that other wildlife depends on. In Ohio, the primary invasive terrestrial animal is the feral hog. Originally introduced to the United States in 1539, these animals were once domestic pigs that escaped, bred with Eurasian wild boars, and are now present in 35 states. The greatest concentration of verified populations can be found in the unglaciated region of southeastern Ohio. These animals can weigh up to 200 pounds and cause significant damage to crops and property. Litter size varies depending on the lineage of the pig, with descendants of domestic breeds producing up to ten piglets whereas descendants of Eurasian boars produce on average four to five piglets. Each lineage can have up to two litters per year under ideal conditions. Typical control methods for feral hogs include open-season hunting, poisons, or trapping.

Invasive Insects and Diseases

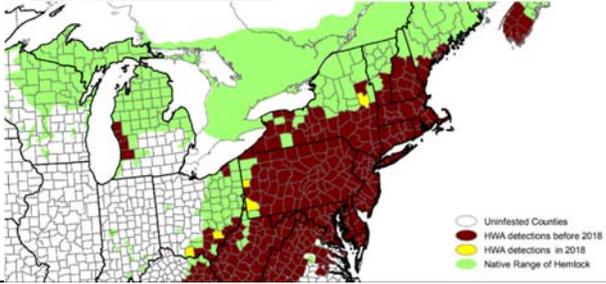
Invasive insects and diseases are other tiny organisms that can cause a great deal of damage to plant, forest, and wildlife health. Non-native insects, fungus and microbes can cause significant damage to forests and other wildlife. The spread of these organisms, such as the emerald ash borer, can be controlled by taking care not transporting firewood long distances. According to the ODNR, Division of Forestry, one of the most invasive insect species in Ohio is the Emerald Ash Borer, which can now be found in all 88 counties in Ohio, and well as six neighboring states and the province of Ontario. This Asian pest is part of a group of insects known as metallic wood-boring beetles. The Emerald Ash Borer affects all species of native ash found in Ohio. Because North American ash trees did not coexist in association with this pest, they have



little or no resistance to its attack. In three to five years, even the healthiest ash tree is unable to survive an attack. Below are the most prominent invasive species of insects and diseases in Ohio.

INVASIVE INSECTS AND DISEASES - WASHINGTON COUNTY	
Common Name	Description
<p>Asian Longhorned Beetle: The Asian Longhorned Beetle (ALB) is native to Japan, Korea, and southern China. Experts believe that the beetle "hitchhiked" to the U.S. during the early 1990s in solid wood packing or crating materials on a cargo ship arriving from China. When the eggs hatch, the beetle grubs bore into hardwood trees. Once they mature, they chew exit holes in branches and trunks. The larvae eventually burrow deep enough to damage the living portion of the trunk, ultimately killing the tree.</p>	
<p>Emerald Ash Borer: The Emerald Ash Borer is a small, wood-boring beetle native to Asia. These beetles affect all species of ash tree by eating the living portion of the tree directly underneath the bark. Adult beetles are dark metallic green and up to half an inch long. Larvae are about an inch long and carve S-shaped tunnels while feeding, which kills the tree. The Emerald Ash Borer has spread across much of the East Coast. As of September 8, 2010, all of Ohio has been quarantined.</p>	
<p>Lanternfly: Spotted lanternflies, feed on grapevines, hops, and fruit trees, was recently discovered in Ohio, and could become established and spread quickly. In October, 2020 adult lanternflies were found outside a business in Jefferson County. Native to Asia, spotted lanternflies were first found in the US in 2014 in Pennsylvania. They typically only travel a radius of about 30 feet, but they can hitchhike into an area, riding on trains, cars, or trucks.</p>	
<p>Gypsy Moth: The gypsy moth, native to Europe, Asia, and North Africa, was established in North America in 1869 when they were brought to Massachusetts in an unsuccessful attempt to cross breed them with silk worms. Caterpillars are dark gray or brown and grow to about 2.5 inches long. Adult male moths are gray-brown while female moths are whitish with</p>	



INVASIVE INSECTS AND DISEASES – WASHINGTON COUNTY	
Common Name	Description
<p>brown markings. Caterpillars feed on the leaves of trees and cause mass defoliation.</p> <p>The gypsy moth has an expansive quarantine zone that encompasses much of Ohio.</p>	
<p>Hemlock Woolly Adelgid: The hemlock woolly adelgid (HWA) is a small, aphid-like insect that feeds on stored nutrients in young hemlock branches. Young adelgids cover themselves with a white substance until they mature into adults. Adults are black and all females that can lay up to 300 eggs twice a year. Juveniles attach themselves to the tree in one spot for and feed continuously for the rest of their lives, disrupting the flow of nutrients to the rest of the branch. This eventually kills the tree.</p>	 

Source: ODNR



Aquatic Invasive Species

Aquatic invasive species are plants and animals living in and degrading the quality of waterways. In many cases, the spread of these organisms can be abated by taking care to wash recreational water equipment before transportation. Additionally, residents should avoid the release of plants and animals from personal aquariums.

AQUATIC INVASIVE SPECIES, PLANTS – WASHINGTON COUNTY	
Common Name	Description
<p>Eurasian Watermilfoil: A feathery submerged aquatic plant that was sold as an aquarium plant. It forms thick mats that cause harm to shallow areas to lakes and rivers. The plant is very hardy and can survive a wide range of temperatures, still or flowing water, and even under ice.</p> <p>Eurasian Watermilfoil reproduces by fragmentation. Pieces break off and float to new locations or are transported by boats, trailers, and fishing gear.</p>	 

Source: ODNR

AQUATIC INVASIVE SPECIES, INVERTEBRATES – WASHINGTON COUNTY	
Common Name	Description
<p>Asian Clam: Also called the Asiatic clam, pygmy clam, or gold clam, the Asian clam is a small freshwater clam that rarely grow more than an inch in diameter. The shell is typically yellowish green to brown. The clams can be found in streams, rivers, ponds, lakes, and canals, but prefer running waters with a sand or gravel bed. It is capable of self-fertilization and can release up to thousands of young a day that are then spread by currents and human activity</p> <p>The Asian clam was originally introduced to the west coast of the US, but has spread to the eastern US. They attach themselves to boating, fishing, and scuba diving equipment and their young can be transferred by buckets or live wells.</p>	 
<p>Mystery Snails: Large freshwater snails commonly sold for freshwater aquariums and garden ponds. They can outcompete native snails in their habitat. Mystery snails tend to live in lakes, marshes, rivers, ponds and slower portions of rivers.</p> <p>Due to its popularity, the mystery snail has spread across the United States. The snail can continue to spread by recreational water activities, water holds on boats, and bait buckets,</p>	 

AQUATIC INVASIVE SPECIES, INVERTEBRATES – WASHINGTON COUNTY		
Common Name	Description	
<p>Rusty Crayfish: A large, aggressive crayfish that outcompetes native species. They are typically three to five inches long and are usually grayish green or reddish brown in color. Rusty crayfish are pollution tolerant and prefer areas with adequate cover. They can survive in lakes, ponds, and streams.</p> <p>Rusty crayfish are used as fishing bait and can be accidentally introduced to new areas. They are capable of hybridization and it is not necessary to have both a male and female rusty crayfish in the same area to begin new invasions.</p>		<p>Ohio Distribution</p>  <p>Orange - Invasive Green - Native Blue - Both Native & Invasive</p>
<p>Zebra Mussel: Small freshwater mollusks that attach to hard surfaces including other mussels and crayfish. They can be found in lakes, rivers, reservoirs, ponds, and quarries. Zebra mussels require environments rich in calcium to aid in shell production and waters above 50°F to reproduce. Young zebra mussels float for up to five weeks before settling.</p> <p>The control and removal of zebra mussels costs billions of dollars. They have quickly spread across North America and have become one of the most intrusive, prolific, and costly aquatic alien species. Once established in open-water environments, they are virtually impossible to eradicate.</p>		<p>Ohio Distribution</p> 

AQUATIC INVASIVE SPECIES, FISH – WASHINGTON COUNTY		
Common Name	Description	
<p>Common Carp: The common carp is the largest member of the minnow family. It can live up to 50 years and has a voracious appetite. They can grow up to 22 inches long and weigh up to ten pounds, but some can reach 48 inches long and weigh 40 pounds or more. They tend to live in lakes, ponds, and calmer rivers.</p> <p>Common carp can spread through connected bodies of water once they've been established in a waterway. Juvenile carp are used as bait and can be released by anglers or escape into new territories.</p>		<p>Ohio Distribution</p> 



AQUATIC INVASIVE SPECIES, FISH – WASHINGTON COUNTY	
Common Name	Description
<p>Goldfish: Goldfish are a freshwater species of carp that was originally introduced to North America as an ornamental fish in the 1600s. They can grow up to 23 inches long and weigh almost seven pounds, but are typically up to eight inches long and weigh less than a pound. Goldfish prefer muddy water with thick vegetation, but are tolerant to pollution, fluctuating temperatures, and otherwise murky waters.</p> <p>Goldfish are intentionally introduced to lakes, ponds, and fountains as ornamental fish. They are also popular pets and are used as bait. Sometimes these animals are released by owners or anglers without them realizing the potential environmental impact.</p>	 
<p>Grass Carp: The grass carp, or white amur, was originally introduced into the ecosystem to control aquatic weed growth. However, these fish voraciously feed on different animals and other plant life. They typically vary between 65-80 pounds. They prefer to live in shallow waters of lakes, ponds, and backwaters.</p> <p>Grass carp are intentionally stocked in private ponds to control aquatic vegetation, but only sterilized triploid grass carp can be stocked or owned within Ohio. If they are released or escape into other waterways, they can easily spread into tributaries, waterways, river systems, canals, and dams.</p>	 

Source: ODNR

Hazard Impacts

Invasive species can harm wildlife in several different ways. When a species enters an ecosystem, it can breed or spread quickly and take over an area if it has no natural predators. Native species may not be able to defend their habitats from the invasive species. Native species may also become prey or have to compete for food. Invasive species can carry disease, prevent native species from reproducing or kill native species offspring (National Wildlife Federation, 2018).

There are also indirect results of an alien species moving into a new habitat. Invasive species can change the food web in an ecosystem by destroying or replacing native food sources. Though a new species may become an optional food source, it may not produce enough to supply the wildlife around it. Some species can completely reconstruct an ecosystem; aggressive plant species can take over ecosystems and replace every plant with a form of itself (National Wildlife Federation, 2018).



Though the tables above list invasive species that directly impact Washington County, many surrounding counties harbor many different animals and plants that could eventually inhabit the area.

Historical Occurrences

Most invasive species have been introduced due to human intervention, whether intentionally or accidentally. Invasive species have been around since the settlers of the 1750’s. The movement of people and transportation of goods around the world via airplanes and shipping vessels has made the spread of invasive species more prevalent. The emerald ash borer was introduced in the U.S. in the 1990’s from wood packing material from China, first being discovered in lower Michigan, spreading to Ohio, Maryland, Pennsylvania, Northern Indiana, West Virginia, Virginia, and Chicago. In almost all cases, once an invasive species is introduced they are a continuous issue due to the difficulty in not only eliminating, but also eradicating them from the area.

Loss and Damages

Infestations will likely cause no damage to structural assets; however, invasive species can put human health and economies at risk. These organisms can threaten the livelihoods of people who depend on agriculture for financial stability by destroying crops and decreasing the availability of water. The cost of repairing damages or controlling populations can drain budgets whereas the cost of lost crops can harm farmers. The devastation to ash trees from the emerald ash borer could result in significant increases in fuel for wildfires in southeastern Ohio.

Vulnerability Assessment

Washington County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding infestations.

PUBLIC SENTIMENT, INFESTATION – WASHINGTON COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
Infestation	15 (41.67%)	13 (36.11%)	7 (19.44%)	1 (2.78%)	36
In the past ten years, do you remember this hazard occurring in your community?				3 (8.33%)	36
Have you noticed an increase in the occurrences or intensity of this hazard?				3 (8.33%)	36
Have you noticed a decrease in the occurrences or intensity of this hazard?				3 (8.33%)	36

Source: Online Public Survey Results



This section summarizes the vulnerability to Washington County from infestation. The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

INFESTATION VULNERABILITY SUMMARY			
<i>Category</i>	<i>Points</i>	<i>Description</i>	<i>Notes</i>
Frequency	4	High	There are 24 known species of invasive organisms in Washington County. Once introduced, invasive species are difficult to remove.
Response	5	More than one month	Invasive species do not generally warrant a traditional emergency response; however, the response measures put into place are long term.
Onset	1	Over 24 hours	Once introduced to a new area, invasive species need time to establish an infestation.
Magnitude	2	Limited (10-25% of land area affected)	The most notable invasive species in Washington County, the EAB, has affected ash trees. Loss of these trees has caused destabilization of streambanks.
Business	1	Less than 24 hours	Typically, the economy would not be interrupted by an invasive species.
Human	1	Minimum (minor injuries)	Invasive species does not pose a direct threat to human health at this time.
Property	1	Less than 10% of property affected	Invasive species in Washington County would not affect significant amounts of property. Losses and damages are primarily limited to land area and the environment.
Total	15	Low	

The probability of a large-scale infestation event actually occurring in Washington County is relatively low, with only moderate associated risk. Infestation is most likely to occur in the acres of forested to include the Wayne National Forest or farmland and will likely cause no damage to structural assets; however, it may cause significant economic loss. Infestation is considered as a hazard in Washington County due to the high percentage of agricultural and forestland in the county.

Mitigation efforts for all types of infestation should be closely coordinated with the Ohio Division of Forestry and the Ohio Department of Agriculture. Current practices by these organizations, including quarantining infested areas, have shown as in the case of the gypsy moth to be very successful. Some infested areas have also begun spraying crops or infested foliage to prevent further infestation. This has also proven to be very successful.

