ENVASIVE SPECIES animals, plants, insects, diseases, fungi, microorganisms

VOCABULARY:

BIODIVERSITY – diversity among and within plant and animal species in an environment

ECOSYSTEM – a system formed by the interaction of a community of organisms with their environment

ENTOMOLOGY - the study of insects

FOLIAGE – the leaves of a plant

HABITAT – the natural environment of an organism

LARVAE – immature, wingless, feeding stage of an insect that undergoes complete metamorphosis

LIMNOLOGY – the scientific study of bodies of fresh water with reference to their features

MARINE BIOLOGY — the scientific study of organisms living in or dependent on the oceans

NATIVE – being in the place or environment in which a person was born, or a thing came into being

ORNITHOLOGY - the study of birds

WHAT ARE INVASIVE SPECIES:

An invasive species is one that is not native to an ecosystem and that causes harm to the environment. Invasive species can cause the loss of native species, loss of natural biodiversity and reduction in highquality wildlife habitats. They can prey on native species take away food needed by native species and they can carry or cause diseases. They can change food webs by destroying or replacing native food sources. Some invasive species can even change the conditions in an ecosystem so that native organisms can no longer survive.

Sometimes organisms do move to new areas. They can do so naturally. For instance, their seeds may be blown or carried by ocean currents to new areas. They may move from a central location to other areas as their population grows over time. It may take a long time for a species to expand its range, or it can happen quickly if conditions in the environment change.

Humans can be involved in moving species, too, either on purpose or by accident. Not only mature animals and plants can be transported also, but their seeds, eggs, larvae, spores, and other life stages can be moved. Human-influenced transport can include ships and other boats, wood products, ornamental plants, and pets. Ships can pick up aquatic species in their ballast water and release them in a new location when the water is dumped. Shipping crates often contain insects or their larvae, pupae, or eggs.

Invasive species are one of the greatest threats to Illinois' natural resources. They are especially harmful to rare species or those whose populations are declining. These species already are having trouble surviving because they are few in number and have difficulty adapting to change. May is Illinois Invasive Species Awareness Month. It was started in hopes of educating and informing citizens of Illinois about the threat of invasive species.

TIMELINE/HISTORY:

1600s Goldfish were introduced to North America.

1745 – Mimosa trees were first introduced to the United States.

1800s – Honeysuckle arrived in the United States.

1837 – Narrowleaf cattail was first recorded in Michigan.

1870S – Gypsy moth was introduced to North America.

1916 – Japanese beetles were first seen in New Jersey.

1970s – Asian carp were released to control algal blooms.

1986 – Northwest Illinois Forestry Association organized to educate members of Carroll, Jo Daviess, Lee, Ogle, Stephenson, and Whiteside counties.

1996 – National Invasive Species Act passed.

1999 – West Nile virus was discovered in the United States.

2000 – Soybean aphid was first detected in the Midwest.

2002 – Emerald ash borer was found in the United States.

2005 – Illinois Invasive Species Council was established.

2006 – Emerald ash borer made it to Illinois.

2015 – The first Invasive Species Week took place.

EXAMPLES OF INVASIVE **SPECIES:**

Japanese beetle, emerald ash borer, West Nile virus, goldfish, mimosa, honeysuckle, baby's breath, narrowleaf cattail, Asian carp

EXOTIC SPECIES VS. INVASIVE SPECIES

An exotic species are those plants and animals that were not present in Illinois prior to the time of European settlement and an invasive species is one that is not native to an ecosystem and that is likely to cause harm to the environment. Not all exotic species are invasive; however, many of them are aggressively invasive in new environments because their natural enemies and other environmental controls were left behind in their native lands. Invasion by exotic species usually results in the elimination of native species, reduction of the natural biological diversity and degradation of habitat.

SPOTLIGHT ON COMMON INVASIVE SPECIES:

Invasive species can be plants, animals, microorganisms, or any other organism. Some live in water. Some live on land. Some live inside other organisms.



JAPANESE BEETLE

Japanese beetles came to the United States in a shipment of iris bulbs. They were first found in New Jersey in 1916 and have now spread through the eastern half of the United States. Japanese beetles can be very destructive to plants, since there are few plants they won't eat.



EMERALD ASH BORER

The emerald ash borer is originally from Asia and was discovered in Michigan - its first known presence in the U.S. - in 2002. It quickly spread from Michigan to other states and into Canada. The emerald ash borer made it to Illinois in 2006. This invasive species attacks the inner bark of ash trees, causing them to die.

GOLDFISH

In the 1600s, goldfish were released into the waters of North America. Goldfish are often spread due to the release of aquarium fish or used as bait fish. They can survive in conditions in which other fish cannot. This still causes problems in aquatic habitats. Goldfish feed on the bottom, which stirs up soil, increases turbidity, and decreases the amount of aquatic vegetation.



ASIAN CARP

Asian carp is a species of carp from Southeast Asia. They are only found in the Illinois, Mississippi, Ohio, and Wabash rivers. They are considered invasive because they have the same diet as native species and grow very quickly. Not only do they take food away from native species, but they are also dangerous to humans. Asian carp have been known to jump out of water when boat motors are near, injuring those on the boat.



MIMOSA TREE

The mimosa tree is native to Asia and was first introduced into the United States in 1745. Mimosa trees are commonly found in old fields, stream banks, and roadsides. These trees are commonly used as ornamental trees and are very difficult to remove. They have long-lived seeds and they are difficult to kill.





CAREERS

horticulturist, **arborist**, environmental scientist, natural resources specialist, **wildlife biologist**, biosecurity specialist, **aquatic specialist**

SPOTLIGHT ON CAREERS

WILDLIFE BIOLOGIST

A wildlife biologist is a scientist that observes and studies the behaviors of animals. They observe the features of certain wildlife and determine the creature's role in specific ecosystems. Many wildlife biologists specialize in an area of study defined by ecosystem or species. Some of these fields include: entomology, ornithology, marine biology, or limnology.

HORTICULTURIST

While many think of horticulturalists as people working in a gardening center, horticulture is quite broad. Horticulturalists work with plants, applying their knowledge to fruits, vegetables, ornamentals, and non-food crops to maximize their health or growth. Some horticulturalists focus solely on pest management.

DID YOU KNOW?



HOW CAN YOU HELP:

- If you are an aquarium or water garden enthusiast...
- Do not release aquatic invasive plants into waters.
- Select non-invasive aquatic plants for your water garden or fish tank.
- Rinse your aquatic garden plants before planting.
- Keep aquatic plants contained in your water garden.
- Do not release unwanted aquarium fish and other pets, live bait, or other exotic animals into the wild.

If you are a hiker, hunter, or camper...

- Clean your boots and clothing before you hike in a new area to get rid of hitchhiking seeds.
- Do not use invasive plants in food plots and clean all soil and plant material off equipment.
- Do not bring firewood from home purchase firewood locally.

If you are an angler or boater...

- Clean all plant stems and fragments and mud from the boats and trailers before leaving the body of water.
- Empty all water from live well before moving to a new body of water.
- Dispose of leftover bait in the trash.
- Clean out waders and wading boots before moving to a new body of water.

If you are a gardener...

- Verify that the plants you are buying for your yard or garden are not invasive.
- Replace invasive plants in your garden with non-invasive alternatives.
- Ask your local nursery staff for help in identifying invasive plants.

Methods everyone can use...

- Control invasive species if they occur on land you own.
- Do not "pack a pest" when traveling. Fruits and vegetables, plants, insects, and animals can carry pests or become invasive themselves.
- Volunteer at your local park, refuge, or other wildlife area to help remove invasive species.
- Help others learn about the threat of invasive species.
- Costs for food and lumber production generally increase while property values and recreational opportunities often decline in areas where invasive species have taken hold.
- Legislators have a role in the control of invasive species, too. They can set policies and enact laws to stop possession and commerce of invasive species. They can provide funding for invasive species research, education, and elimination.
- Invasive species are called the silent invaders of our times.
- Invasive species destroy over three million acres each year in the United States.
- It costs over \$35 billion every year to fight invasive species.

CONTROL:

The most effective means to stop invasive species is to prevent them from being introduced.

When invasive species are present, a variety of actions are taken to control them based upon the behaviors and life history of the species as well as where it lives.

Cutting, burning, digging, mowing, flooding, and/ or pulling are techniques used on some invasive exotic plants. Spraying herbicides on the plants to kill them or on their cut stalks to eliminate the parts underground may be necessary.

Removing an invasive plant out of its habitat is a start towards control, but what do you do with it after you remove it? Some plants can continue to develop seeds even after you remove them from the soil. Some of them can grow not only from seeds but also from plant parts. The best method for you to use is to place them with other waste for disposal in a landfill.

Removing the habitat that supports a species can lead to the elimination of the species.

Invasive species often spread quickly in a new location because there are no predators that have evolved to help control them.

BIOLOGICAL CONTROL involves releasing a natural predator from the invasive species' native habitat into its new habitat. Animals, fungi, or diseases can be used for biological control.

CULTURAL CONTROL is managing a forest or other area to control invasive species when they are present or to limit their effects if they have not arrived but are expected.

It may be impossible to eliminate an invasive species once it becomes established in an area. In this case, reducing its population density enough to allow native species to survive can be the goal.

When prevention doesn't work, detecting the presence of new invasive species in an area is critical to their control.

SPOTLIGHT ON TREATMENT

EMERALD ASH BORER:

The emerald ash borer is an exotic beetle that was first discovered in Michigan – its first known presence in the U.S. – in 2006, and is now found in 35 states and Canada. The adult beetles cause little damage to ash trees because they just nibble on the foliage. The larvae cause the real damage. They feed on the inner bark of ash trees, disrupting



the tree's ability to transport water and nutrients. Treatment for emerald ash borer can be very costly or bad for the tree. The more ash trees that the emerald ash borer kills, the fewer places it will have remaining to live. When the ash trees are gone, this pest will also be gone. Ash tree seeds have been saved in seed banks to start growing these plants again once the infestation of emerald ash borers is finished.

INTEGRATED PEST MANAGEMENT:

Integrated pest management (IPM) is an effective and environmentally sensitive approach to pest management. This type of pest control uses information about the pest's life cycle and their interaction with the environment to know the best method of control. This information is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment. Integrated pest



management has four control methods: cultural, physical, biological, and chemical.

- CULTURAL Any practice to make the environment less favorable to insect pests, such as: crop rotation, trap crops, and adjusting the timing of planting.
- **PHYSICAL** Methods include hand-weeding of pests, using sticky boards or tapes for control of flying insects in greenhouses, and various trapping techniques.
- **BIOLOGICAL** A method of utilizing other living organisms, like other insects, to control the targeted pests.
- **CHEMICAL** A method of chemical-based control, which utilizes both natural and synthetic-based pesticides.

www.emeraldashborer.info/ www.environmentalscience.org/careers

www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles www2.illinois.gov/dnr/conservation/InvasiveSpecies/Pages/default.aspx www.invasive.org/illinois/WhatYouCanDo.html



