

Invasive Species and Biodiversity

Current Issues 2024

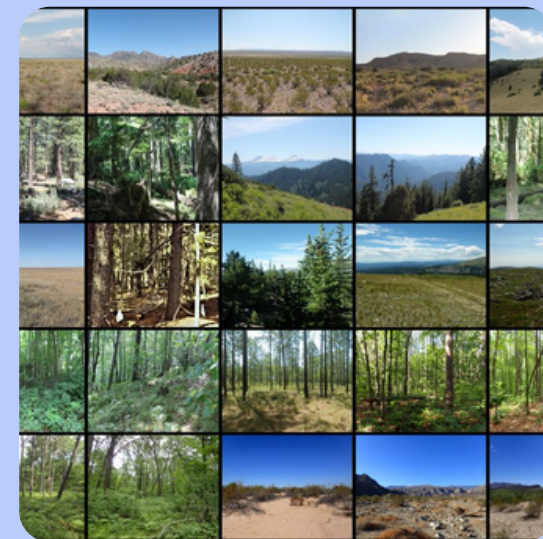




What is biodiversity?

Biodiversity is the variety of life on earth, reflected in the variety of ecosystems and species, their processes and interactions and the genetic variation within the species.

Biodiversity includes **species** diversity, **ecosystem** diversity, and **genetic** diversity.



Species Diversity

Species diversity includes all living things, from tiny bacteria, to raccoons, to giant hemlock trees. It is estimated that there are between 10 and 300,000 million species on earth.

Ecosystem Diversity

Ecosystem diversity include the habitats that house all life forms and the interconnections that tie living things together. Ecosystem diversity includes wetlands, woodlands, and other environments where species live.

Genetic Diversity

Genetic diversity is the genetic variation that is present in a population or species. It is what makes every living thing unique. It also safeguards against future problems such as disease or natural disaster.

Is our biodiversity being threatened?



All living things have evolved to live in special areas of the planet. Local climate, geology, soils, water, and other natural factors have great influence on the species that live in particular ecosystems or habitats.

Unfortunately, our biodiversity is threatened. According to the world's many leading experts in science, the loss of biodiversity is one of the most urgent environmental problems facing our planet. As human population increases so, too, do pressures on our natural resources. These pressures are altering ecosystems and species around the world.

People make a significant impact on the landscape and its diversity. Clearing forests, draining wetlands, developing urban areas, building roads and conducting other human activities is reducing the diversity of habitats and altering the overall biodiversity. When people alter habitats, they kill and/or force out the organisms that live in the area, upset ecological relationships, and reduce the ecosystem's ability to perform necessary functions like flood control, water purification, and nutrient recycling.

Benefits of Biodiversity

- Helps to maintain the atmosphere, keeps the soil fertile, purifies the water, and provides other functions that enable life to exist on the planet.
- Provides a wide variety of resources to humans, including food and medicinal products.
- Species variety can provide the ability to avert disasters, like a major crop failure due to disease and drought.
- Drives the economy by providing/producing many products.
- Beneficial for the quality of life as the natural world offers us a place to relax and reflect.

How do invasive species affect biodiversity?



A key issue threatening biodiversity is invasive species. Invasive species often reproduce quickly and spread over the landscape and waterways. They typically have few, if any, natural controls like herbivores, predators, or diseases.

Many times people introduce non-native species to an area either on purpose or by accident. Some species are introduced for landscaping purposes or erosion control while others arrive unknowingly, on various imported products. Many aquatic invasives are introduced by dumping unwanted aquarium plants and other species into waterways. Once established in a new environment, some non-native species proliferate and expand over larger areas, becoming invasive pests.

Invasive species, like invading armies, are taking over and degrading our natural ecosystems. They disrupt the intricate web of life for plants, animals and microorganisms and compete for limited resources. Some invasives spread so rapidly that they stifle other species. An invasive plant, for example, could change a forest, meadow, or wetland into a landscape dominated by one species. Such monocultures (stands of a single plant species) have little ecological value and greatly reduce the biodiversity of an area.



Spotted Lanternfly



How can we protect biodiversity?

The greatest challenge we face to protect biodiversity is how to balance the needs of the present without jeopardizing those of the future. There is no single way to address the loss of biodiversity because there is no single reason why it is being lost. One approach is to maintain a relative state of equilibrium with our environment called sustainability.

A society that reaches sustainability is one that can persist for generations without producing significant amounts of pollution, depleting natural resources, and causing a decline in biodiversity.

How can sustainability be achieved??

Land use planning is needed so that space may continue to exist for species and ecosystems.

Legal protections for some species may be necessary.

Increased education will lead to a better understanding of the problems and solutions. This can help citizens to take action in the community.

Habitat restoration is very important. We need research to determine what species exist, how they depend on their habitats and how habitats can be managed to ensure healthy populations.

Stewardship of natural resources should be considered when making land use decisions.

Prevent and control the spread of invasive species. Remove invasives on your property. Do not dump fishing bait. Be alert to avoid "hitchhiking" species.



Eastern
Massasauga
Rattlesnake



Green
Salamander



Allegheny
Woodrat



Long Eared
Owl



Canada Lynx



Wolf

At Risk

Endangered

Species in **imminent danger** of extinction or extirpation throughout their range in PA

Threatened

Species that **may become endangered** within the foreseeable future throughout their range in PA

Extirpated

Species that **have disappeared** from PA but exist elsewhere

Extinct

Species that occurred in PA but **no longer exists**



The Endangered Species Act of 1973



The Endangered Species Act of 1973 was signed into law by President Nixon on December 28, 1973. It was designed to protect critically imperiled species from extinction as a "*consequence of economic growth and development untempered by adequate concern and conservation.*"

The Act is administered by two federal agencies: The United States Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA). FWS has responsibility over freshwater fish and all other species. NOAA manages the marine species. Those that occur in both habitats (e.g. sea turtles and sturgeon) are jointly managed.

According to the US Department of Environmental Protection (EPA), there are **over 1,300 endangered species of animals and plants** in the United States.

According to National Geographic, California has the most endangered animals (113). Vermont has the fewest (4).

Top 10 Endangered Animals in the US

- Florida Panther
- Florida Manatee
- Red Wolf
- California Condor
- Black-footed Ferret
- Loggerhead Sea Turtle
- San Joachim Kit Fox
- Mississippi Gopher Frog
- Atlantic Bluefin Tuna
- Woodland Caribou

What is in place in Pennsylvania?

In PA, the Pennsylvania Natural Heritage Program (PNHP) conducts inventories and collects data regarding PA's native biological diversity. The PNHP is a partnership between the Western Pennsylvania Conservancy, PA Department of Conservation and Natural Resources (PA DCNR), PA Game Commission and the PA Fish and Boat Commission.

Information is stored in an integrated data management system consisting of maps, manual and computer files.



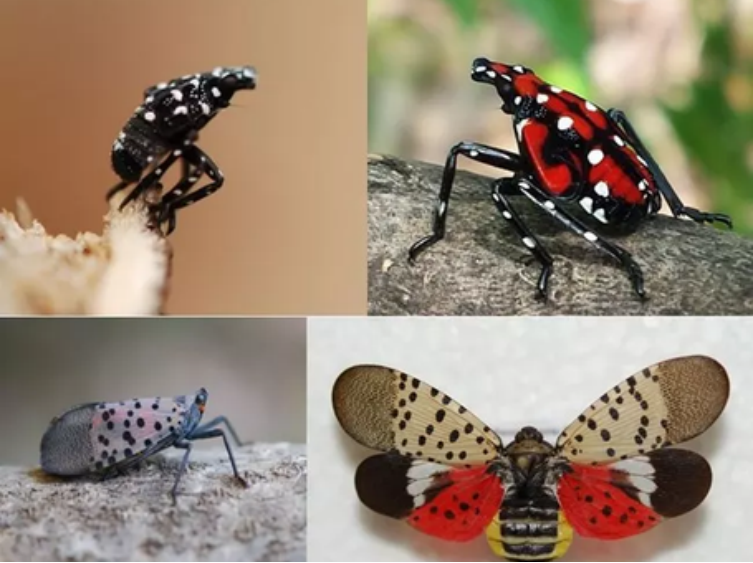

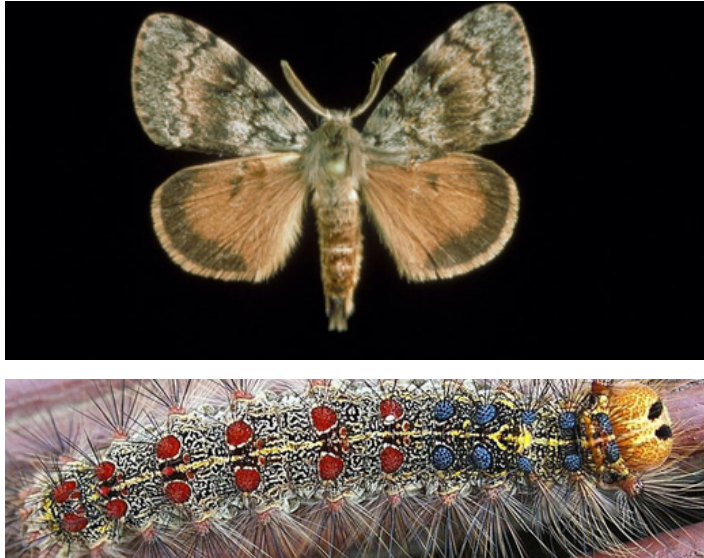
The PNDI (PA Natural Diversity Index) is continually refined and updated to include recently discovered locations and to describe environmental changes affecting known sites. The goal is to build, maintain and provide accurate and accessible ecological information needed for conservation, development planning, and natural resource management.




<https://www.naturalheritage.state.pa.us/SpeciesFeatures.aspx>










Eastern Cricket Frog

York County Species and Natural Features List (8/25/2023)	
Reptiles and Amphibians	18
Birds	16
Mammals	4
Spiders, Insects, Crustaceans	20
Musels	5
Plants	180

COMMON NAME	PICTURE	NOTES/DESCRIPTION	CONTROL METHODS
<p align="center">SPOTTED LANTERNFLY</p>		<ul style="list-style-type: none"> • 1-1 1/2 inch wingspan • egg masses have grey, mud-like covering • greatest impact to grape, hops and logging industries; particularly stone fruits • infected trees develop wounds of sap near trunk • 51 counties in PA in quarantine zone (Feb 2023) 	<ul style="list-style-type: none"> • scrape egg masses, place in double bag and dispose • kill eggs October - May • treat trees with insecticide June-August • Protect trees by wrapping in tape • preferred host is Tree of Heaven (another PA Invasive)
<p align="center">EMERALD ASH BORER</p>		<ul style="list-style-type: none"> • adults are metallic green wood-boring beetles with 2 sets of wings • bullet-shaped, 1/3 inch long • larvae are 1-1/4 inches long white with 10 abdominal segments and pinchers • affects white, green, and black ash trees with S-shaped galleries, D-shaped exit holes. • kills trees within 4 years 	<ul style="list-style-type: none"> • remove affected trees • annual chemical treatment of soil drenches, soil injections or stem injections • treat large trees before they become infected • DO NOT TRANSPORT FIREWOOD
<p align="center">GYPSY MOTH</p>		<ul style="list-style-type: none"> • egg masses are light tan and eggs (400-600 in each mass) look like black pellets • in the larval stage they are hairy caterpillars with 5 pairs of blue spots, 6 pairs of red spots and a black and yellow head • male moths are dark buff and females are white • causes heavy defoliation of trees 	<ul style="list-style-type: none"> • cold air temperatures may kill exposed eggs • freezing temperatures in spring may kill larvae • protect trees by wrapping trunk in burlap to catch larvae • treat trees with insecticide • DO NOT TRANSPORT FIREWOOD

COMMON NAME	PICTURE	NOTES/DESCRIPTION	CONTROL METHODS
<p style="text-align: center;">GARLIC MUSTARD</p>		<ul style="list-style-type: none"> • stalked, triangular heart-shaped leaves, coarsely toothed • smells like garlic when crushed • 1st year rosette of green leaves close to ground; 2nd year contains small white flowers with 4 petals • found in moist shaded soils of floodplains but can be widespread 	<ul style="list-style-type: none"> • hand removal of plant and root • mechanical cutting for 5 years (seeds can remain viable in the soil for up to 5 years) • treat with herbicide
<p style="text-align: center;">TREE OF HEAVEN</p>		<ul style="list-style-type: none"> • rapid growth, can reach 80' feet; up to 6' feet in diameter. • resembling the skin of a cantaloupe • typically grows in dense colonies • produces allelopathic chemicals in its leaves, roots, and bark that can limit or prevent the establishment of other plants • found in urban areas, woodland edges, roadsides, fencerows; intolerant of shade 	<ul style="list-style-type: none"> • mechanical methods, such as cutting or mowing, are ineffective, as the tree responds by producing large numbers of stump sprouts and root suckers • target the roots with systemic herbicides applied in mid- to late summer (July to onset of fall color)
<p style="text-align: center;">PURPLE LOOSESTRIFE</p>		<ul style="list-style-type: none"> • perennial plant that can grow 4' to 10' tall • a plant can produce over 1 million seeds; can also grow from small pieces of broken or mowed plants that root in moist soil • crowds out native plants that wildlife use for food, nesting, and cover • chokes waterways, slows natural flows, promoting the deposit of silt 	<ul style="list-style-type: none"> • rinse off equipment, gear, clothing and footwear used in infested areas before moving into uninfested areas. • pull young plants and dig older (including roots) • use herbicides approved for aquatic use • PA has approved biological control (leaf-eating beetles)

COMMON NAME	PICTURE	NOTES/DESCRIPTION	CONTROL METHODS
<p>MILE-A-MINUTE</p>		<ul style="list-style-type: none"> • vinyl stems can be up to 20' long, containing sharp downward curving spines • leaves are triangular and light green with round iridescent blue fruit • spreads by water dispersal, birds, rodents, and humans by moving soil containing seeds • flourishes in recently harvested forest sites forming dense canopies over establishing regeneration resulting in tree seedling mortality 	<ul style="list-style-type: none"> • can be cleared by hand • treat with herbicide • various methods of biocontrol under study • try to remove plant before fruits start to ripen in mid-July • DO NOT MOVE CONTAMINATED SOIL
<p>NUTRIA</p>		<ul style="list-style-type: none"> • furry, swimming rodents that have long scaly tails and webbed feet • 15-20 pounds • resemble muskrats and beavers • were brought to the US in the early 1900s for fur ranching • compete with and displace native muskrats • contribute to the erosion of marshes leading to harm to fish, crab and shrimp spawning areas 	<ul style="list-style-type: none"> • trapping or hunting
<p>HOUSE SPARROW (ENGLISH SPARROW)</p>		<ul style="list-style-type: none"> • males have black throat, light cheeks and a brown nape • nests are built in enclosed places like shutters, downspouts, and building rafters • aggressive; force other birds from nests and area • nests clog gutters and drainage pipes • feces buildup can cause structural damage and health risk 	<ul style="list-style-type: none"> • eliminate potential nesting spots • eliminate food and water sources

COMMON NAME	PICTURE	NOTES/DESCRIPTION	CONTROL METHODS
<p>ASIAN CARP</p>	 	<ul style="list-style-type: none"> • “Asian” carp refers to 4 species: Bighead, Silver, Black and Grass carp • can grow to 4'-5' and 100 lbs • threatening because of large size, reproductive success, and large quantities of foods they eat • hazardous to boaters because they can jump 6'-10' out of the water • no North American fish large enough to eat an adult Asian Carp 	<ul style="list-style-type: none"> • electric dispersal barriers • DO NOT RELEASE BAIT! • learn to identify Asian Carp • drain all water from bait buckets, bilges, and live wells
<p>RUSTY CRAWFISH</p>		<ul style="list-style-type: none"> • 3"-5" long with large claws with black banded tips • very aggressive • mates with native crayfish producing sterile offspring, reducing the native population • destroys aquatic plant beds that are food, shelter and spawning sites for other species 	<ul style="list-style-type: none"> • DO NOT RELEASE BAIT! • never transport crayfish from one water body to another
<p>ASIAN CLAMS</p>		<ul style="list-style-type: none"> • shell is thick, triangular, distinctive growth rings • less than 1 inch, ~ size of a nickel • capable of self-fertilization-single clam can release hundreds to thousands of free-floating, microscopic larva per day • found in streams, rivers, ponds, lakes, and canals • biofouler - clog pipes, irrigation canals, and intake systems, and damage equipment like boat motors, diving gear, and commercial water systems 	<ul style="list-style-type: none"> • learn to identify and distinguish it from native mussels • remove plants, mud, debris from boats, trailers, clothing, and equipment before leaving a water body. • drain all water from bait buckets, bilges, and live wells • clean all gear with soapy or salt water • DO NOT RELEASE BAIT!