Invasion of the Resource Snatchers: Invasive Plants and Animals of the Cincinnati Region

Presented by
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Zoology Department

About us

Cincinnati Museum Center

Natural History and Science, Cincinnati History, Children’s Museum

Zoology Collections

Mammals, birds, reptiles, amphibians, fish, invertebrates

What is an invasive species?

“A species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” - National Invasive Species Council

Currently 50,000 non-native species in the USA, 43,000 are considered invasive
- US Fish & Wildlife Service

Well-known Invasions Around the World

Pythons in the Everglades

Rabbits and Cane Toads in Australia

Kudzu in southeastern USA

Lionfish off the Florida coast

Terminology

Native species

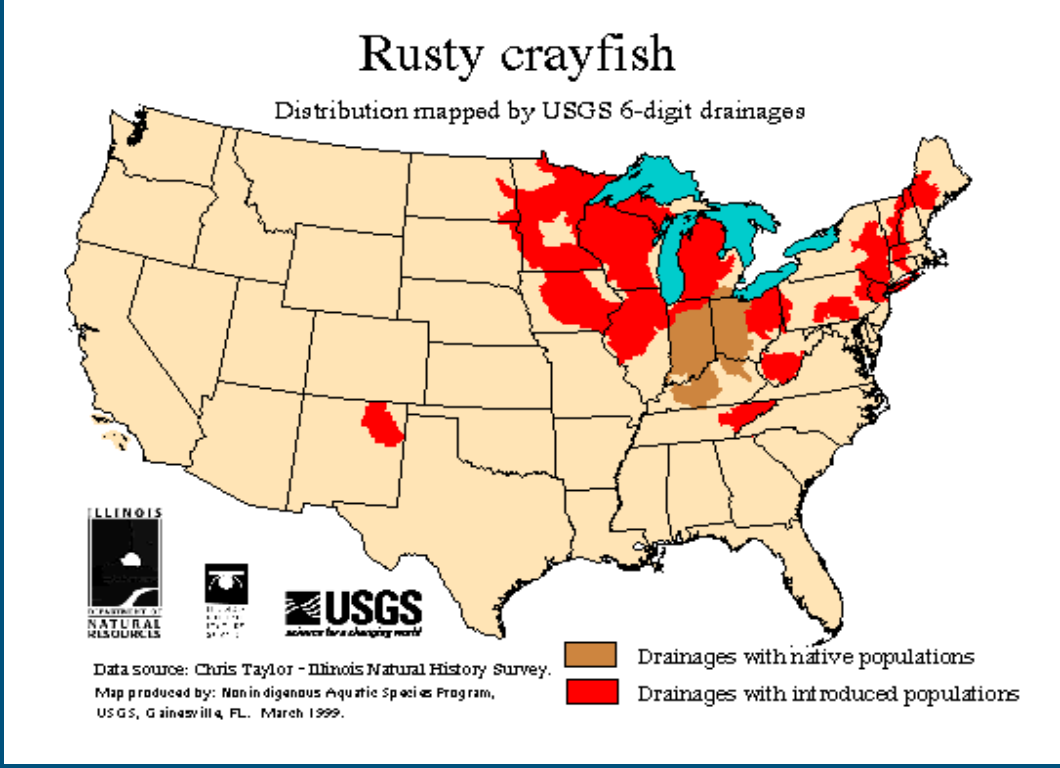
Native range

Introduced species

Invasive species

Many introduced species do not become invasive

A native species can be “invasive”



What do we mean by “resources”

Resources can be anything used by an organism to live or reproduce

Plants: Sunlight, space, water, nutrients

Animals: Food, habitat/territory, mates

Organisms with less specific resource needs are more adaptable

ex. Plants that can grow in various soil types, animals with varied diets

Process of Invasion

Arrival – individuals of the invasive species arrive in a new habitat

Establishment – individuals survive and reproduce in the new habitat

Lag – the population builds up

Spread – the species begins colonizing new areas away from site of introduction

How do invasive species get here?

Intentional

- Garden “escapees”
- Stocked for food/sport
- Planted for agricultural purposes
- Released to control other species

Accidental

- In cargo shipments
- In ships’ ballast water
- On imported plants
- Released or escaped pets/captive animals/bait

What makes invaders so successful?

Propagule pressure - how many are introduced?

What makes invaders so successful?

Can live in disturbed habitat or urban areas

Adaptable, tolerant of difficult environments

Reproduce rapidly

Grow or reproduce early in season

Aggressive

Disease/parasite resistance

What makes invaders so successful?

Some introduced animals live where most native species fear to tread:

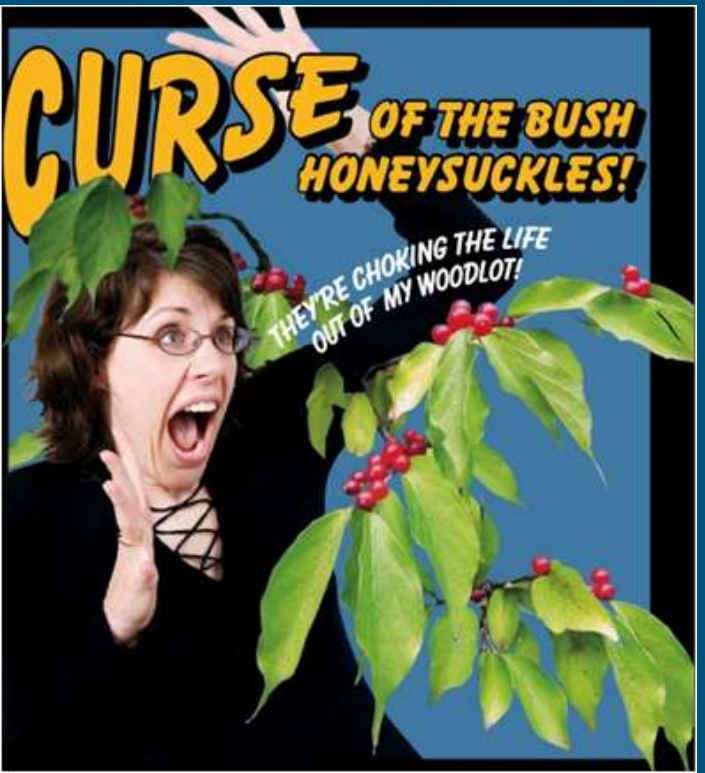
in human settlements

They have adapted to live alongside humans

Think of some animals you usually see in cities

Pigeons, rats, cats, house sparrows

Why are invasive species problematic?



Endanger native species

Cause loss of biodiversity and natural resources

Damage property and reduce property value

Are expensive to control

May transmit diseases to humans or native species

What influences invasibility of an ecosystem?

Introduction

- Vectors: how can invaders arrive?

Habitat

- Disturbance: has the habitat been altered?
- Similarity: is it similar to the invader's native habitat

Native community

- Is the native community in its natural state, and diverse?
- Niches: are there unused resources in the ecosystem?
- Enemies: are there predators, parasites, or diseases that can harm invaders?

What is...Disturbance?

Natural:

- Often caused by weather
  - Forest or prairie fires
  - Storms (tornadoes, hurricanes, etc)
  - Severe flooding

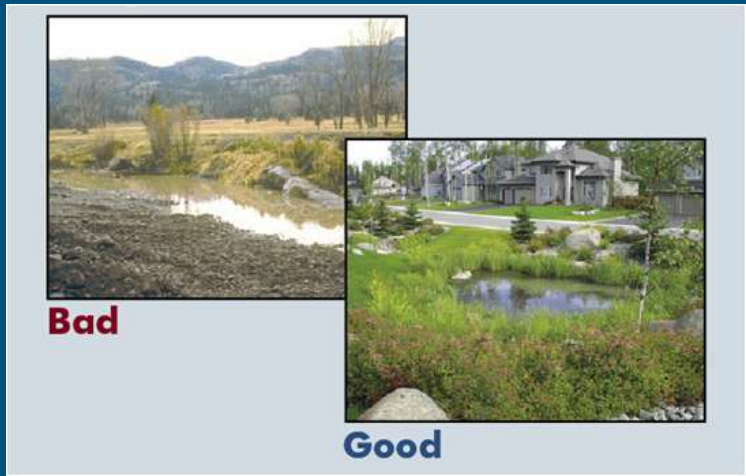
Human-caused:

- Result of human activities
  - Pollution or excess sediment in water
  - Agriculture or construction projects
  - Removal of native vegetation

How can we prevent invasions?

Reduce possible introduction vectors
- Regulations
- Public outreach/education

Improve or protect native habitats
- Assess native community - is it healthy?
- Mitigate disturbances - “repair” ecosystems



Native “invaders”

Something changes in the ecosystem

Often comes about through disturbance of natural habitat

Example:

- Rusty Crayfish
- Eastern Coyotes

Photo: Amy Benson - USGS

Take-away points

Preventing introduction is the real key to controlling invasions

Once an invasion starts it is often impossible to stop

Invasive species cause environmental and economic harm

Harm can be reduced by physically removing invasive species in desired areas

We should all do our part to control invasive species!

Common Local Invaders - Plants

Bush Honeysuckles

Callery Pear

Garlic Mustard

Japanese Honeysuckle

Multiflora Rose

English Ivy

Fig Buttercup

Bush honeysuckles

Lonicera species

Native to: Europe and Asia

Arrival: Intentionally planted to control erosion

Problems:

- Forms a monoculture and outcompetes native plar
- Berries nutritionally inferior to many native berries
- Bird nests in these shrubs have lower success

Callery Pear

Pyrus calleryana

Native to: China and Vietnam

Arrival: Escaped from intentional ornamental plantings

Problems:

- Different cultivars hybridized and produced invasive offspring
- Prone to storm damage
- Grows rapidly and outcompetes native plants to form a monoculture
- Produces an unpleasant smell

Garlic Mustard

Alliaria petiolata

Native to: Europe, Asia, and northern Africa

Arrival: imported as an herb in 1860s

Problems:

- Is able to dominate forest understory
- Allelochemicals suppress mycorrhizal fungi
- Reduces native biodiversity
- Not consumed by deer - they seek remaining native plants instead

Japanese Honeysuckle

Lonicera japonica

Native to: eastern Asia

Arrival: brought as an ornamental in 1800s

Problems:

- Grows over and smothers native plants
- Forms dense mats
- Can disfigure and even pull down trees

Multiflora rose

Rosa multiflora

Native to: Eastern Asia

Arrival: imported for erosion control, fencerows

Problems:

- Disrupts grazing
- Dense thickets crowd out native plants
- Birds eat seeds and spread plant widely
- Bird nests have lower success

English Ivy

Hedera helix

Native to: Europe and western Asia

Arrival: imported as an ornamental

Problems:

- Forms a monoculture
- Smothers native plants
- Can pull down young trees

Fig Buttercup

Ficaria verna

Native to: Europe and western Asia

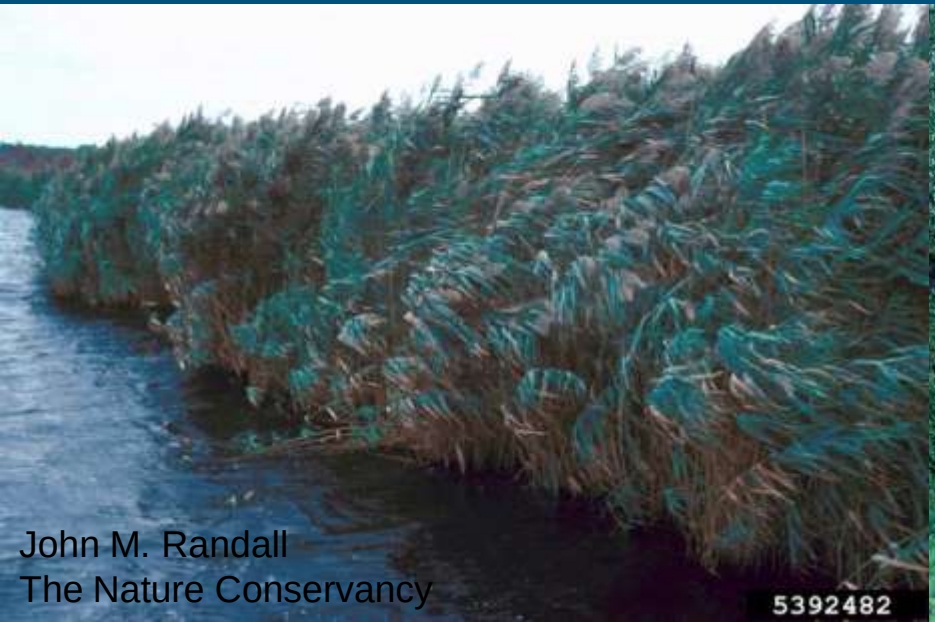
Arrival: imported as an ornamental

Problems:

- Forms a monoculture
- Excludes natives, especially spring wildflowers
- Juices contain a toxin which can cause rashes
- Poisonous to humans and animals

Coming soon?

Phragmites reeds



John M. Randall
The Nature Conservancy

Kudzu vine

Scott Ehardt

Invasive plant control

Physical removal:

- Herbacious plants
  - Pull up individual plants with roots
  - Burn the area
- Woody plants
  - Cut through trunk, paint stump with herbicide
  - Dig out, including roots, or use a “weed wrench”

Chemical removal: **Always follow directions for safe application**

- Spray foliage with dilute herbicide
- Paint base of stems/trunks with oil-based herbicide

Invasive plant control

After removal of invasives:

Plant native trees, shrubs, grasses, or wildflowers

Or let them return naturally

Be ready to continue to remove invasive plants when they try to return!

Benefits of removal?

Return of native plants

Increased biodiversity

Benefits to native animal species

With invasives

Without invasives

Without invasives

Local Invaders - Animals

Invertebrates - Emerald Ash Borer, Asian Lady Beetles, Zebra Mussels, Asian Clams, Rusty Crayfish, Asian Tiger Mosquito, Asian Longhorned beetle, Gypsy Moth, Brown Marmorated Stink Bug

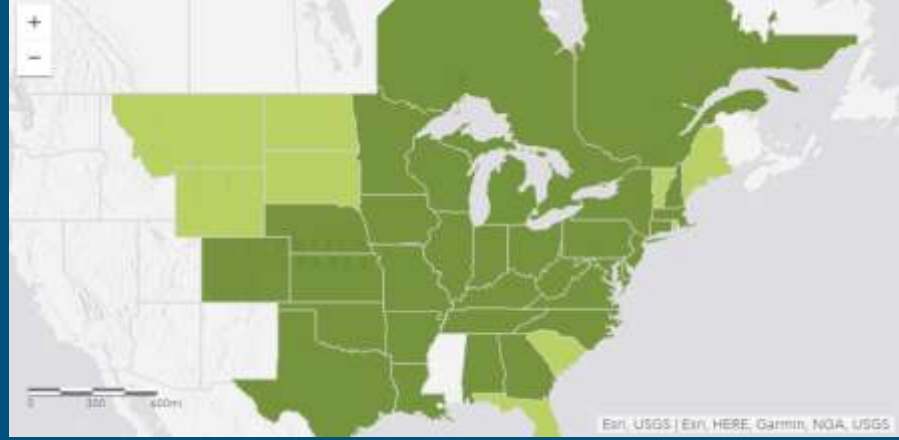
Fish - Common Carp, Asian Carp, Snakehead maybe in the future?

Herps - Common Wall Lizards

Birds - House Sparrow, European Starling, House Finch, Rock Dove

Mammals - Norway Rat, Domestic Cats, Nutria

Emerald Ash Borer



Agrilus planipennis

Native to: northeast Asia

Arrival: likely in the early 1990s in cargo shipments

Problems:

- Kills ash trees in 1-4 years
- Drastically alters forest composition
- Opens up canopy, encouraging invasive plant species
- Dead trees can cause home and property damage

Images © www.emeraldashborer.info and http://www.ohioagriculture.gov/eab/

Emerald Ash Borer

What to do about it:

Never move firewood! Use firewood gathered or purchased on location.

Valuable trees can be protected with insecticides

Fell dead trees near buildings to prevent property damage

Replace deceased ash trees with another species

Brown Marmorated Stink Bug

Halyomorpha halys

Native to: Asia

Arrival: Accidentally imported as a stowaway

Problems:

Damage various crops including fruits, soybeans, and more

Invade homes by the thousands

David R. Lance, USDA

Asian Long-Horned Beetle

Donald Duerr, USDA Forest Service

Anoplophora glabripennis

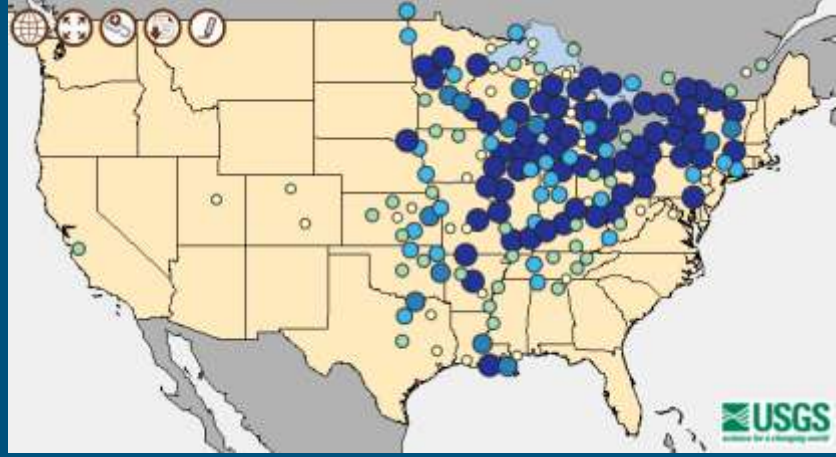
Native to: Asia

Arrival: Accidentally brought over in cargo, first noted in New York in 1996

Problems: Pest of maple and other hardwood trees

Currently found in Clermont Co. – East Fork State Park

Zebra Mussels



Dreissena polymorpha

Native to: southern Russia

Arrival: accidental, in ballast water of ships, first found in Lake Erie 1988

Problems:

- Consume algae resources
- Smother native mussels
- Cause physical damage to boat motors, etc
- Clog water intake pipes

Zebra Mussel

What to do about it:

Before moving a boat or other equipment to a new body of water, always clean plants, mud, and debris off. Then dry the boat and equipment thoroughly, preferably in the sun for multiple days. This will kill any mussels.

Scientists are trying to develop a method to kill zebra mussels but not harm native mollusks. This is challenging!

Asian Carp

Silver carp *Hypophthalmichthys molitrix* and bighead carp *H. nobilis*

Native to: Asia

Arrival: intentionally stocked in ponds

Problems:

- Consumes resources (filter feeders)
- Leaping behavior dangerous to boaters
- Alter ecosystems

Asian Carp

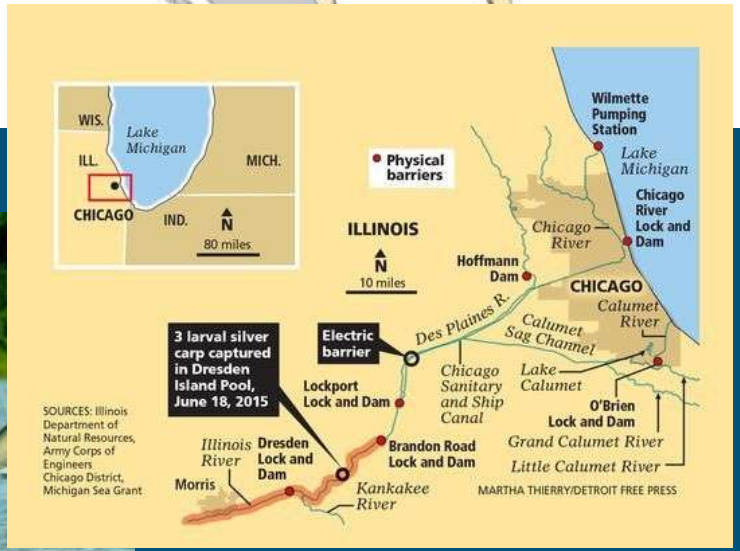
What to do about it:

- Not much in already invaded areas
- Great Lakes is primary concern

Electric fish barrier in Chicago area

Need a market for them:

- Food
- Fertilizer



Detecting aquatic invasive species

More challenging than terrestrial invasives:

- May be difficult to find until population is large
- Large, 3D space
- Organisms are mobile
- Poor visibility

Detecting aquatic invasive species

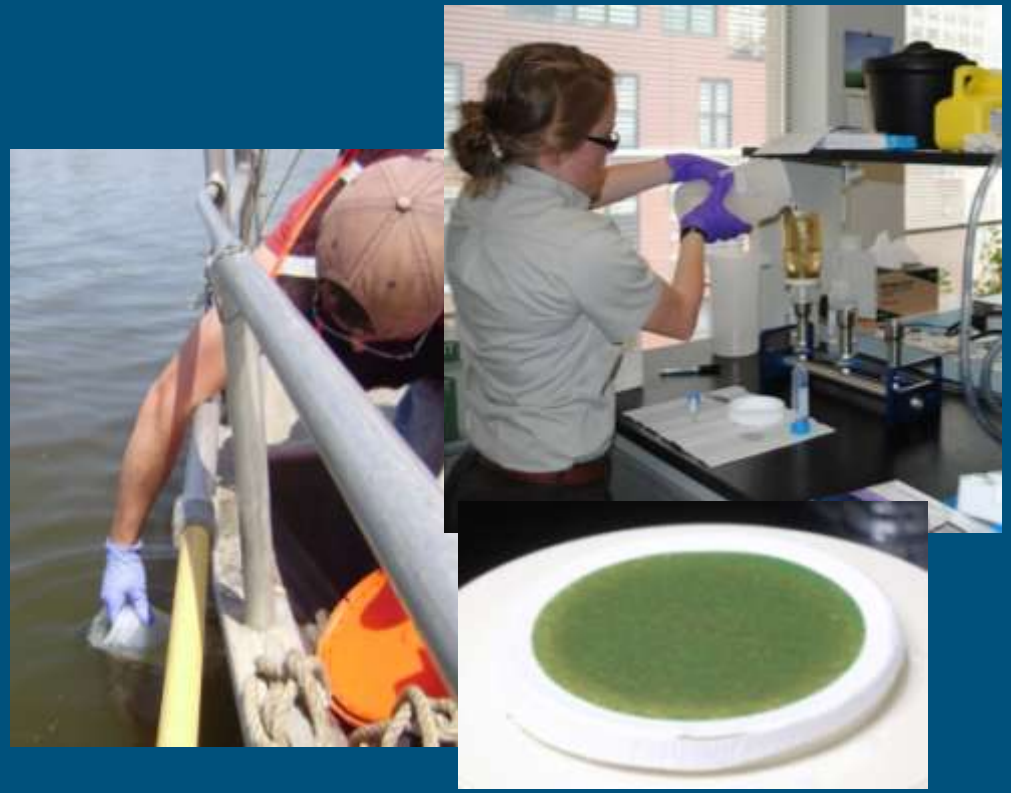
Common Methods:

- Fishing/Electrofishing
- Netting/traps
- SCUBA

Very expensive and time consuming

New Methods:

- “environmental DNA”



Common Wall Lizard – unique to our area

Podarcis muralis

Native to: Europe

Arrival: pets released into wild around 1950 in Cincinnati

How did they cross the Ohio River?

Only other population in NA is on Vancouver Island in Western Canada

Problems:

Competes for resources

Extent of problem not known

Common Wall Lizard – unique to our area

What to do about it:

Do not move any to new locations

Never release pets of any species into the wild

Invaders Close To Home

These species have a long-standing relationship with humans

Most arrived here with European colonists 100s of years ago

Some have always been considered pests

Some were once considered beneficial

Many have been here so long we barely recognize them as invasive – these are called “naturalized” species.

House Sparrow

Passer domesticus

Native to: Europe and Asia

Problems: Competition with native birds,
especially for nesting sites (bluebirds)

Often nest in human structures

Most widely distributed wild bird in the world

European Starling

Sturnus vulgaris

Native to: Europe and western Asia

Problems:

- Competition with native birds
- Crop pest, especially on fruit crops
- Airplane collisions

Rock Dove (feral pigeon)

Columba livia

Native to: southern Europe, northern Africa, southern Asia

Problems:

- Considered a pest in urban locations
- Droppings can degrade structures
- Droppings may contain disease-causing agents (histoplasmosis)

Lee Kamey
US Fish & Wildlife Service

Brown Rat

Rattus norvegicus

Native to: likely northern China

Problems:

- Competes with native species for food
- Displaces native rat species
- Carries and transmits disease to humans and other animals
- Causes structural damage

Domestic Cat

Felis catus

Native to: originated from a wild species native to Africa

Problems:

Preys on native birds and other wildlife even if well-fed

Can transmit diseases to humans and other animals

Ex. toxoplasmosis, rabies, feline leukemia, FIV

What to do about it:

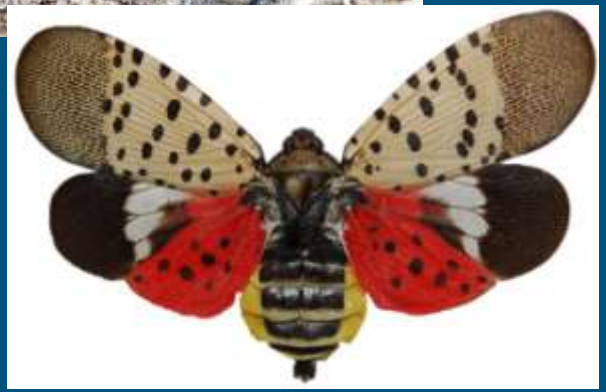
Keep pet cats indoors or in a contained area

Do not feed stray/feral cats

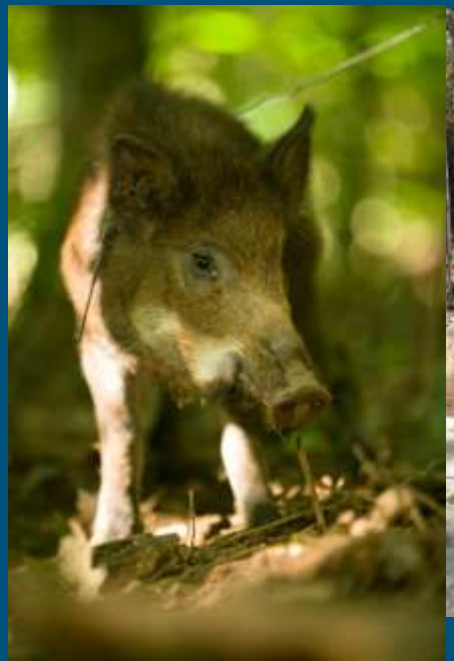
Ensure feral cats do not come into contact with pets or children

Coming Soon?

Planthoppers



Feral hogs



Missouri Department of Conservation

It goes both ways

North American species are invasive in many locations around the world!

- Eastern gray squirrels in England
- Bluegill sunfish in Japan
- American bullfrogs in China
- Prickly pear cactus in Australia, southern Asia and Europe, and South Africa
- And many more!

Local organizations with removal events

Great Parks of Hamilton County
http://www.greatparks.org/discovery/projects/removing-invasive-species

Western Wildlife Corridor
http://westernwildlifecorridor.org/

Cincinnati Wildflower Preservation Society
http://www.cincywildflower.org/

State Online Resources

Ohio Department of Natural Resources:
http://ohiodnr.gov/invasivespecies

Ohio Invasive Plants Council:
http://www.oipc.info/invasive-plants-of-ohio.html

Kentucky Exotic Pest Plant Council:
https://www.se-eppc.org/ky/

Nationwide Online Resources

USDA invasive species website:
https://www.invasivespeciesinfo.gov/index.shtml

Center for invasive species and ecosystem health:
www.invasives.org

USGS invasive species website:
https://www2.usgs.gov/ecosystems/invasive_species/index.html

Natural History opportunities with the Museum

Mill Creek Heritage Program
Saturday April 29, 9-1pm

Fernald Preserve
Saturday June 3, 9-noon

Faces of Change: Aquatic Invasive Species in the Ohio River
Thursday July 13, 7pm


Thank you for your attention!