



Jim McCormac

The Impacts of Non-native, Invasive Species on Wildlife

Marne Titchenell, Extension Program Specialist – Wildlife
School of Environment & Natural Resources

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The Impact of Invasive Species

- ▶ National Impacts
 - ▶ At least \$200 million annual losses to the Great Lakes Region.
 - ▶ Leafy spurge costs more than \$144 million a year.
 - ▶ Efforts to control purple loosestrife cost \$45 million per year.
 - ▶ The estimated damage from invasive species worldwide totals more than \$1.4 trillion--five percent of the global economy.
 - ▶ The annual US cost from invasives is \$120 billion, with over 100 million acres being affected
 - ▶ Ohio alone - Forest products industry add \$22 billion to the economy.

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The Threat of Invasive Species on Wildlife

- ▶ Invasive species are one of the leading threats to native wildlife
- ▶ ***Loss and degradation of habitat continues to be the primary threat to Ohio's wildlife***



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Outcompete Native Species

- ▶ Oak species regeneration is low in our forests
 - ▶ Require disturbance to let some light in and decrease competition
 - ▶ ***Competition from invasives***
 - ▶ Seeds from buckthorn germinate 2 weeks faster
- ▶ What is on the forest floor is the future forest...



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Do we want this to be our future forests?



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Invasive Species Cause Loss of Habitat

- ▶ In terms of wildlife, this means:
 - ▶ Reducing native food and cover resources
 - ▶ In quantity and diversity
 - ▶ Impacts up through the food webs?



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Disrupting Food Webs

- ▶ Lepidoptera
 - ▶ Butterflies, skippers, and moths
- ▶ Pollinator diversity decreased in honeysuckle invaded areas
- ▶ Spring caterpillar and summer butterfly diversity down (Doyle, thesis, 2006)
- ▶ Removing privet increased diversity and abundance of butterflies and native bees (Hanula and Horn, 2011)



E. Tiger Swallowtail

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Invasive Species Impacts on Wildlife



Arthropod community response to non-native invasive plants -
Total abundance of arthropods decreased in 62% of studies
taxonomic richness decreased in 48% of studies."

(Litt et al. 2014)



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Range of the Eastern Hemlock Tree in Ohio

[illegible]

-
- A close-up photograph of a green spruce branch. The branch is densely covered with numerous small, white, cottony or woolly insects, which are woolly alysiids. These insects are clustered along the length of the branch and its needles. The background is a soft, out-of-focus greyish-green.

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Blue-headed Vireo



Rick and Nora Bowers/VIREO

Black-throated Green Warbler



Rob Curtis/VIREO

Blackburnian Warbler



Glenn Bartley/VIREO

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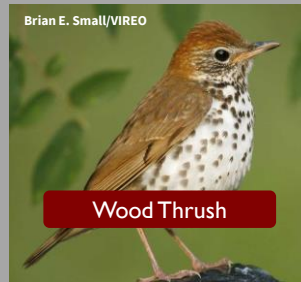
HWA is Changing Bird Communities

- ▶ Hemlock bird specialists **declined** across HWA infested stands (Toenies et al. 2018)
- ▶ Other species increased...

Black-throated Green Warbler

30% decline

Rob Curtis/VIREO



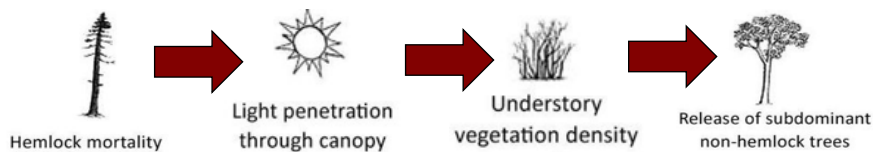
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Birds and Forest Structure

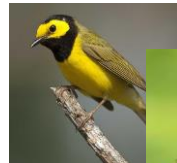
- ▶ The physical structure of a forest plays an important role in bird habitat



Bird species associated with:

- ▶ the shrub layer,
- ▶ forest edge
- ▶ mature deciduous habitat

showed the strongest increases.



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Hemlock Woolly Adelgid & Bird Communities



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Hemlock Woolly Adelgid & Bird Communities

- ▶ **Similar studies have found changed or declined bird communities in EAB infested stands and honeysuckle invaded stands. Unfortunately, this is a very common ecological response when non-native species are introduced into new areas.**

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Culprits of Their Own Demise

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"In the relatively short period that I monitored their activities, the birds probably ate hundreds of berries." ~Jim McCormac

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Invasives can be Ecological Traps

- ▶ Wood thrush and robin higher nest predation in honeysuckle and buckthorn (Schmidt and Whelan 1999)
- ▶ Cardinals nesting in honeysuckle fledged 20% fewer young (Rodewald, 2010)
- ▶ Early leaf-out appealing for nesting



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Impacts on Reproductive Strategies

- ▶ Carotenoids pigments



- ▶ **Urban birds** eat honeysuckle berries



- ▶ Brightly feathered birds not as healthy



Bright feathers \neq quality mate



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Impacts on Reproductive Strategies

- ▶ Honeysuckle in **rural forests**
 - ▶ Brightest males producing fewer young

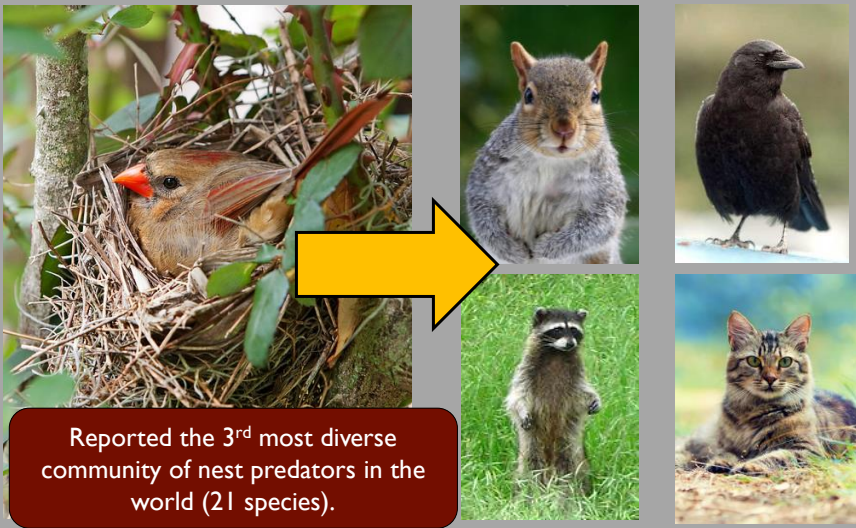


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Songbird Nesting Success



Reported the 3rd most diverse community of nest predators in the world (21 species).

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Songbird Nesting Success



- ▶ Nest predation did NOT increase in urban areas
- ▶ Survival of fledglings was not impacted by urban areas
 - ▶ In rural areas, nest survival did go down with increasing predators.

>4600 nests in 11 years

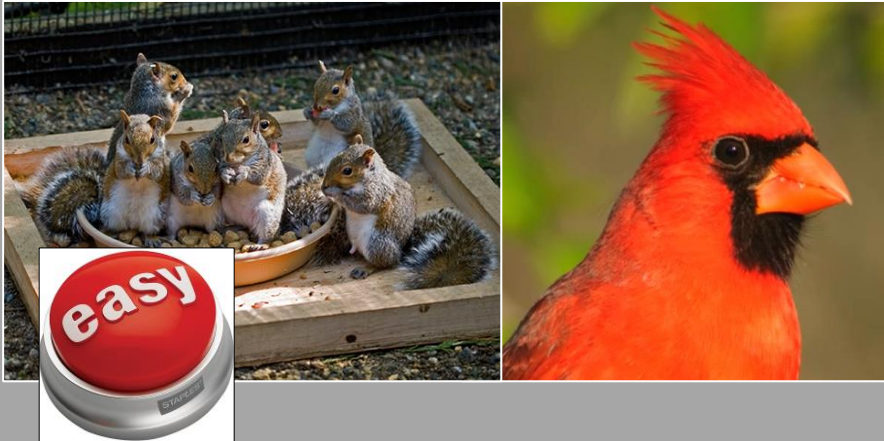
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Please explain...

Most nest predators are generalist.



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Urban Ecosystems

These ecosystems have their own unique challenges that can lead to unique behaviors and activity patterns by wildlife.



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White-tailed Deer and Invasive Species



White-tailed Deer

Browser – 7-10 lbs
vegetation/day

Overabundant populations can
cause damage to forest
understory.

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White-tailed Deer Herbivory Impacts

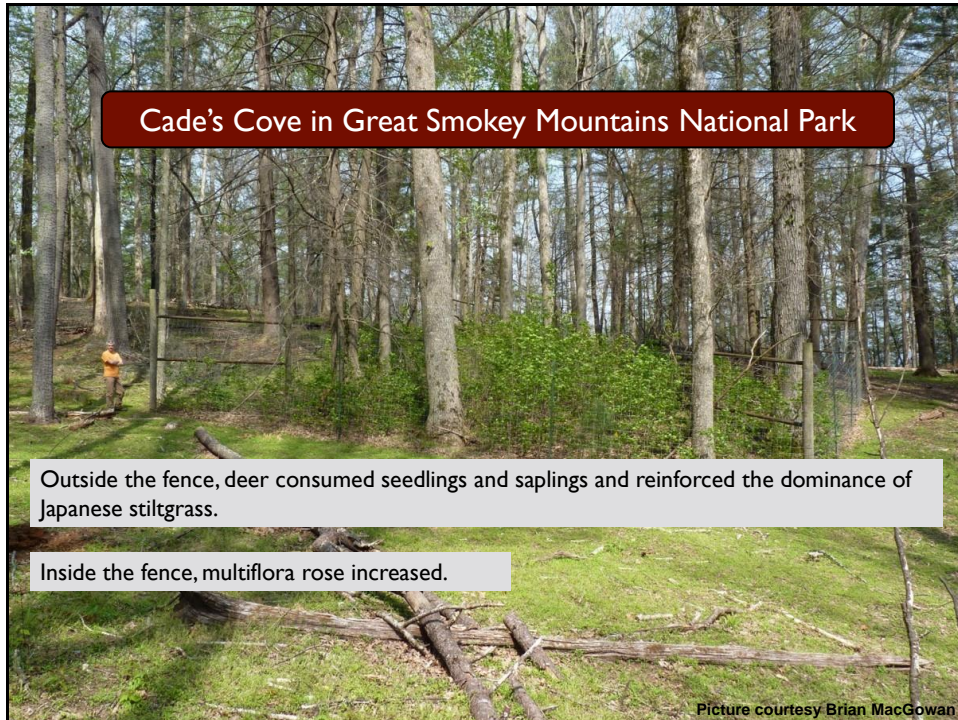
Over-browsing by high deer populations → less palatable
species left & disturbance to understory and forest floor →



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White-tailed Deer Herbivory Impacts

After 17 years of controlled deer hunts, **plant species richness, diversity, and the herbaceous layers increased AND exotic species cover decreased** in Indiana State Parks (Jenkins et al. 2014).

Moderate levels of deer browsing promote herbaceous layer diversity when combined with other disturbances.
(Royo et al. 2010)

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Invasive Species Traverse Many Taxa

- ▶ **Plants**
 - ▶ Honeysuckle, tree of heaven, garlic mustard, lesser celandine, kudzu, Hydrilla, purple loosestrife, stilt grass
- ▶ **Insects**
 - ▶ Hemlock woolly adelgid, viburnum leaf beetle, Asian long-horned beetle, emerald ash borer
- ▶ **Wildlife and Fish species**
 - ▶ **Feral swine**, earthworms, rusty crayfish, Asian carps, round goby
- ▶ **Pathogens**
 - ▶ **White-nose syndrome** in bats, bur oak blight, sudden oak death



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Webinar on Ohio Bats and WNS

Little Brown Bat



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Feral Swine Fact Sheet

OHIO STATE UNIVERSITY EXTENSION
AGRICULTURE AND NATURAL RESOURCES FACT SHEET W-26-13

Feral Swine in Ohio: Managing Damage and Conflicts

Brian Plaster, Information Specialist, Ohio Department of Natural Resources, Division of Wildlife
Craig Hicks, Wildlife Disease Biologist, U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services
Robert Gates, Associate Professor, School of Environment and Natural Resources
Marne Tichenor, Extension Wildlife Program Specialist, School of Environment and Natural Resources

Introduction
Feral swine (also known as wild boars) are a non-native and invasive species that present significant threats to agricultural and natural resources (Figure 1). Feral swine were introduced as livestock to the continental United States in 1539. Estimates as of 2013 are that there are 15 million feral swine in at least 36 states with the greatest concentration in southern and western states. Feral swine are well established in many regions, including Ohio (Figure 2). Feral swine have a wide variety of common names that reflect domestic stock, mixed ancestry, and usage, and histories in different regions of the United States. Common names include feral hog or pig, feral pig, Russian wild boar, razorback and pinny wood, but all swine whether feral or domestic are of the same genus and species, *Sus scrofa*. These mixed ancestry swine vary in physical shape, color, size and reproduction to feral swine.

Feral swine are highly adaptable and destructive animals. Problems caused by feral swine include damage to public and private property such as wildlife habitat, and other natural areas, agricultural crops and livestock fencing. Additional problems include surface water pollution, predation and competition with native wildlife and livestock, and disease and parasite transmission such as swine brucellosis and pseudotuberculosis. Although

Figure 1. Feral swine. Photo courtesy of USDA Wildlife Services.

Figure 2. Feral swine population in Ohio. Map showing the distribution of feral swine in Ohio, with a large section starting in the southern part of the state.

Ohio's feral swine population is primarily concentrated in unglaciated southern counties, but is not solely confined to this region (Figure 2). A large section starting

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What Can Be Done?

- ▶ Invasive species management needs to take priority
- ▶ Ohio's forest land
 - ▶ 87% of forests are privately owned
- ▶ Cities, townships, villages
 - ▶ Majority of people in world living in urban areas



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“Raising the awareness of the public and channeling their energies into constructive action may be the single most effective tool available.”

~ Shroufe and Riley, Arizona Game and Fish Department



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Help us track non-native, invasive species!

Great Lakes Early Detection Network

- ▶ Droid & iPhone version available

**[woodlandstewards.osu.edu/
resources/webinars](http://woodlandstewards.osu.edu/resources/webinars)**



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Invasive Species

- Beech Leaf Disease Pest Alert
- Controlling Non-Native Invasive Plants in Ohio Forests: Ailanthus
- Controlling Non-Native Invasive Plants in Ohio Forests: Bush Honeysuckle
- Controlling Non-Native Invasive Plants in Ohio Forests: Privet
- Controlling Non-Native Invasive Plants in Ohio's Forests-Autumn Olive and Russian Olive
- Controlling Non-Native Invasive Plants in Ohio's Forests: Garlic Mustard
- Controlling Non-Native Invasive Plants in Ohio's Forests: Japanese Stiltgrass
- Thousand Canker Disease

owners and those woodland owner

form a solid foundation for their future woodland education (Name That Tree) while others build on the basics to provide more in depth coverage of specific topics (Improving Your Forest) or deal with new and/or emerging topics such as Emerald Ash Borer and Asian Longhorned Beetle.

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Questions?



Marne Titchenell, Extension Wildlife Specialist
titchenell.4@osu.edu

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