

Bats, Forest Management, and the Endangered Species Act

(or, "Can't we all just get along?")



Scott Haulton
Forestry Wildlife Specialist
Indiana DNR, Division of Forestry



Bat Conservation in Managed Forests: Why Important?



Why are bats important? Why should forest managers care?

- Help control forest pests
- **All** of Indiana's bats eat insects
- **Only** major predator of night-flying insects
- Little brown bat: ~1,200 insects per hour
- Big brown bat: ~3,000-7,000 insects per night

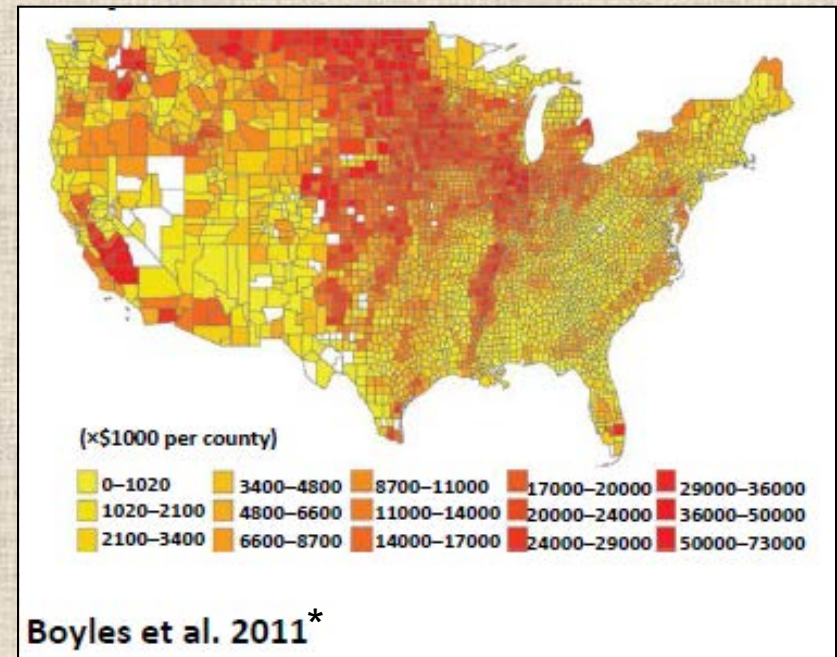


Bat Conservation in Managed Forests: Why Important?



Agricultural pest control...

- Annual avoidance-value: ~\$23 billion in U.S.
- Indiana: ~\$900 million annually
- Not including value for forest pest control



*Boyles, J.G., P.M. Cryan, G.F. McCracken, Kunz, T.H. 2011. Science, vol. 332.

Bat Conservation in Managed Forests: Why Important?



High Conservation Value

12 bat species in state...

- 2 current federally endangered (also state endangered)
- 1 state endangered
- 8 state-listed as species of “special concern”
(...includes 1 species currently “proposed” and another “petitioned” for federal listing)



Bat Conservation in Managed Forests: Forest Habitat Use



How do bats use Indiana's forests?

- All bats in IN use forests (or woodlands, woodlots, riparian corridors, etc.)
- Forest used when not hibernating (IN)
 - Spring: “emergence” & migration
 - Summer: maternity season
 - Fall: migration & “swarming”



Bat Conservation in Managed Forests: Forest Habitat Use



Trees as Roosts

- Snags
- Live trees
- Cavities
- Foliage



Bat Conservation in Managed Forests: Forest Habitat Use



Foraging Habitat

- Open, “uncluttered” forest
- “Cluttered” forest
- Forest edges
- Gaps & Openings
- Water



Bat Conservation in Managed Forests: Threats



Two types of major threats:

- Historic/on-going
- New/emergent



CAVES CLOSED

All caves, sinkholes, tunnels and mines on this property are closed to provide protection from White-Nose Syndrome, a fungus that is killing bats in large numbers in the Northeastern U.S. and is now spreading west.

Thank you for cooperating with IDNR in this effort.

DNR
Indiana Department of
Natural Resources

Bat Conservation in Managed Forests: Threats



Major historic/chronic threats

- Habitat loss & fragmentation
 - Roads/Traffic
- Cave & mine disturbance
- Toxicants & Pollutants
 - Water
 - Pesticides
 - Heavy metals
 - Light pollution



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Bat Conservation in Managed Forests: Threats

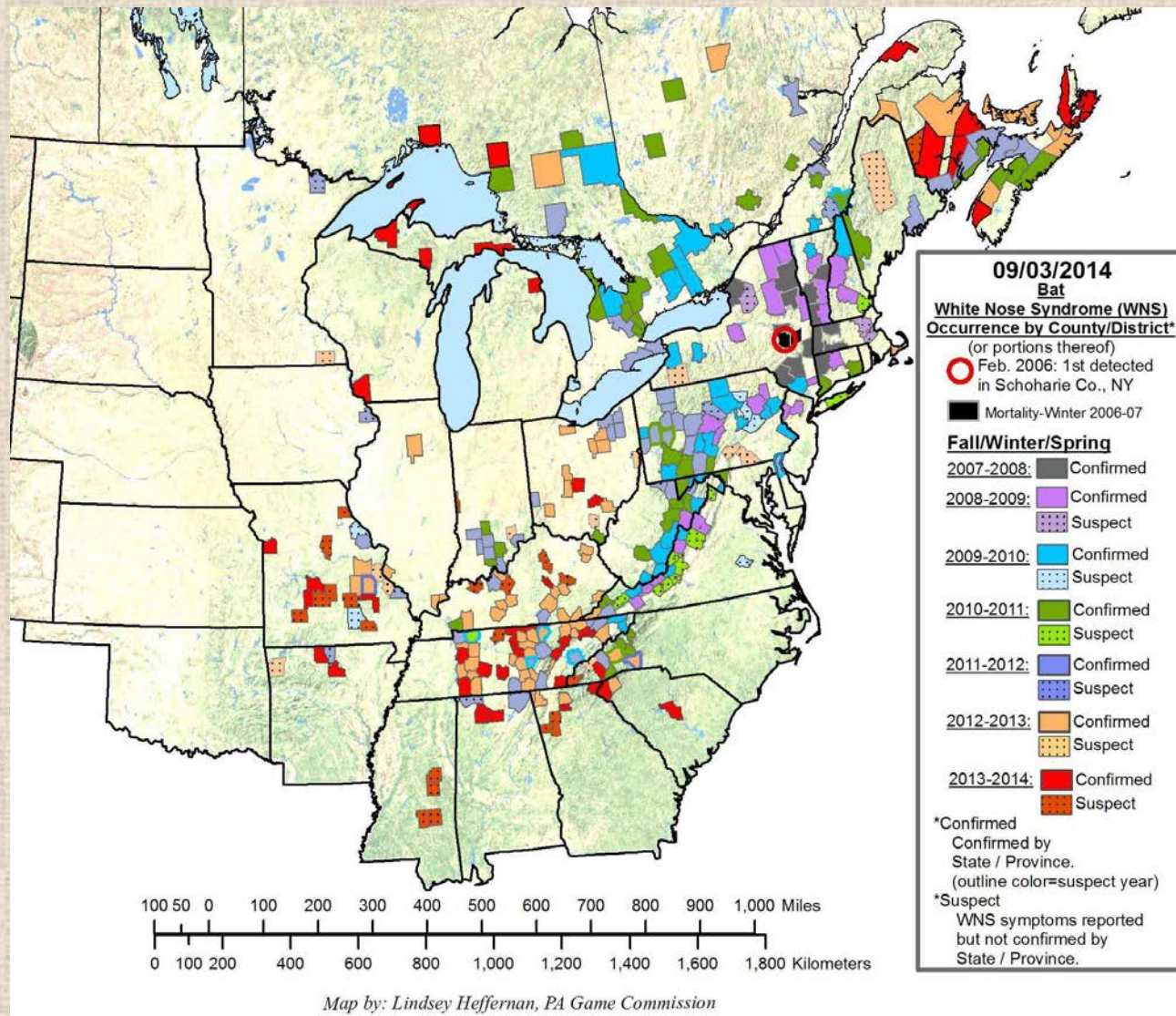


Major new/emerging threats

- Wind energy
- White-nose Syndrome



Bat Conservation in Managed Forests: Threats



Bat Conservation in Managed Forests: Threats



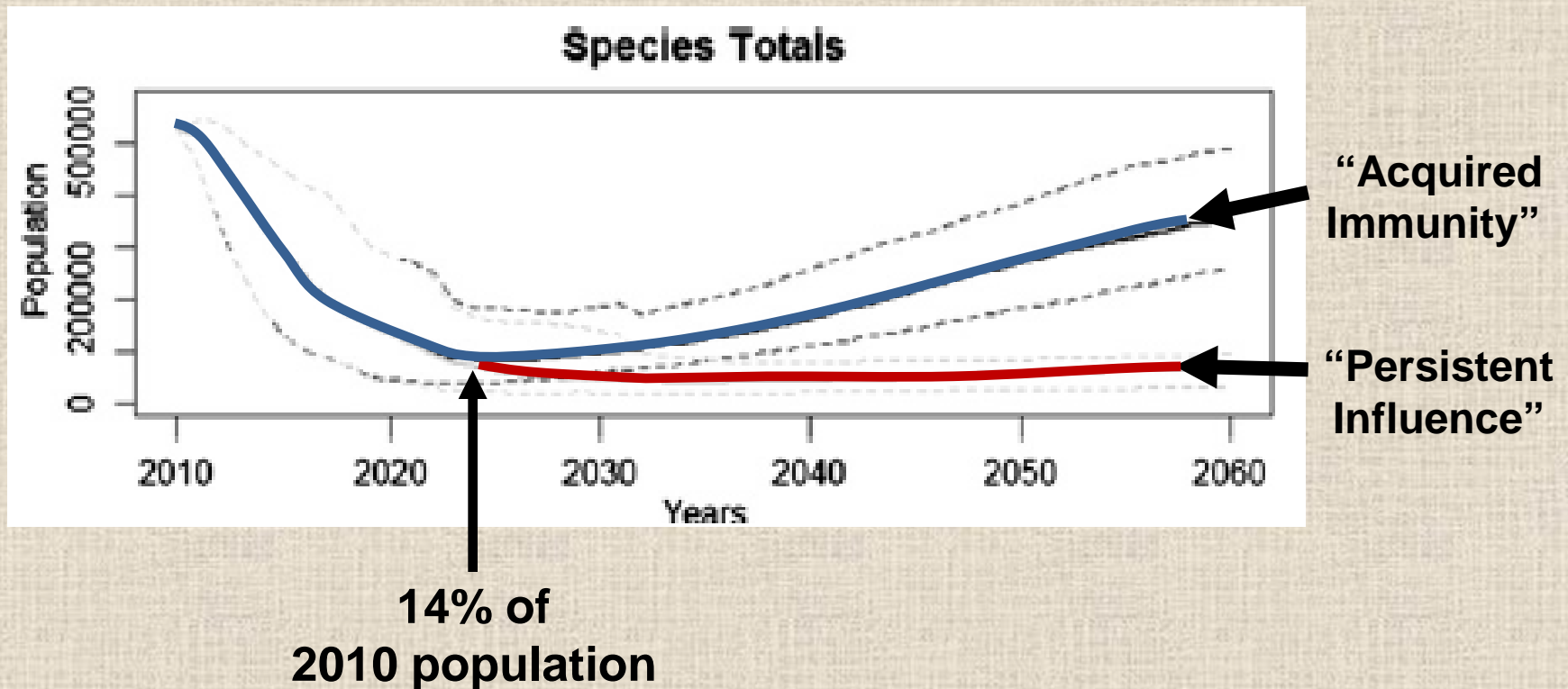
Impacts of White-nose Syndrome

- >>6 million bats dead since 2006
- 10 species known to be affected (7 from IN)
- Affects currently endangered species
 - Indiana bat (-72%)
 - Gray bat (-/+ ?)
- More listed species likely
 - Northern long-eared bat (-98%)
 - Little brown bat (-91%)





Model-projected *Indiana Bat* Decline



From: Thogmartin et al. 2013.
Biological Conservation, vol. 160



...So, is *timber harvesting* considered a primary threat to bat populations?



NO!



“...[M]any types of timber management, when properly designed, will not impact (or may improve) northern long-eared bat habitat...”

- USFWS Northern Long-eared Bat Interim Conference and Planning Guidance (2014)

Bat Conservation in Managed Forests: Threats



“Generally, forest management is considered compatible with maintenance of Indiana bat summer habitat, provided that key components of summer habitat are provided for in the management system.”

- USFWS Indiana Bat Recovery Plan (2007)





What does the research show?

- Experimental harvests on state forests (“HEE”); 10 years of state forest research
- Timber harvests did not reduce activity levels for any bat species
- ...in fact, most bat species *increased* activity after harvests
- Results similar to what most other researchers have found



2014 Indiana Bat Maternity Roosting Sites

6 year old 5-acre regeneration opening – Yellowwood SF



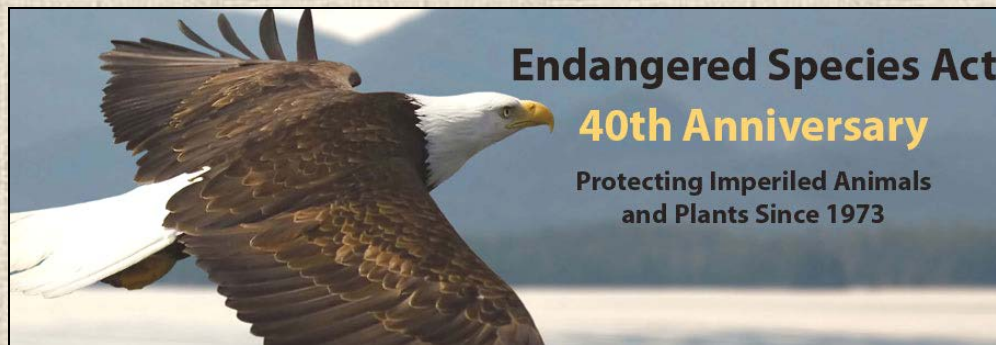
2014 Indiana Bat Maternity Roosting Sites

1 year old oak shelterwood – TNC/Yellowwood SF





Bats and “Take” Under Endangered Species Act



- **Endangered Species Act** prohibits “take” of federally listed species
- IN’s endangered bats: Indiana bat and gray bat
- “Proposed”: Northern long-eared bat



Prohibited Acts – *Section 9 of ESA (1973)*

“Take”: harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in these activities. **Harm** includes habitat destruction/modification that kills or injures listed species.

“Incidental Take”: Take that results from, but is not the purpose of, carrying out an otherwise lawful activity.


Take is prohibited on Federal, State, and private lands.

Bat Conservation in Managed Forests: BFO Guidelines



USFWS guidance for Indiana bat take avoidance

- Developed by USFWS office in Bloomington (“BFO”)
- Originally developed for federal properties and projects
- Provided “shortcut” to consultation

 U.S. Fish & Wildlife Service

BFO Forest Management Guidelines for Avoiding Incidental Take^{*} of Indiana Bats within the State of Indiana

These guidelines were developed by the Bloomington Field Office (BFO) of the U.S. Fish and Wildlife Service (FWS) to conserve the federally endangered Indiana bat (*Myotis sodalis*) and its summer/fall habitat within the State of Indiana. Adherence to these guidelines will avoid incidental take of Indiana bats and result in forest habitat that is suitable for the species' use, but may not represent optimal habitat. Maintaining or creating optimal Indiana bat maternal habitat typically would require more intensive management practices than provided here. This is a working document and periodically will be revised as new data warrant.

For forest parcels or stands managed in accordance with these guidelines, the BFO typically will provide concurrence letters to managers needing Section 7 clearance (i.e., an informal consultation will suffice) and an incidental take permit/Habitat Conservation Plan (HCP) will not be required on state-owned or privately owned lands with known Indiana bat occurrences because the risk of taking one or more Indiana bats will be discountable or insignificant. However, if any aspects of these management guidelines cannot be followed or conflict with other land management goals or directives, then forest managers are strongly encouraged to contact the BFO to discuss alternative processes available to federal and non-federal land managers under the Endangered Species Act of 1973 (ESA). [NOTE: Take of federally listed species is prohibited by Section 9 of the ESA regardless of whether the taking occurs on federal, state, or privately owned lands].

FOREST MANAGEMENT GUIDELINES

1. At least 60% canopy cover (on a stand-by-stand basis, depending on size of stands) shall be maintained after any timber harvest activities.
2. Shagbark hickory (*Carya ovata*) or shellbark hickory (*C. laciniosa*) trees shall not be harvested or manipulated during timber stand improvement (TSI) activities, unless the combined density of these species exceeds 16 trees/acre. If present, at least 16 live shagbark and shellbark hickory (combined) >11" dbh must be maintained per acre.
3. Standing snags shall not be felled/removed, except where they pose a serious human safety hazard (a tree with <10% live canopy should be considered a snag). Snags that have no remaining bark and no visible cracks, splits, or hollows may be felled as well as any snags leaning more than 45° from vertical.

^{*} **Incidental take** - Take that results from, but is not the purpose of, carrying out an otherwise lawful activity.
"Take" - To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.
"Harass" - To intentionally or negligently, through act or omission, create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, and sheltering (defined by FWS regulation; NOAA Fisheries has not defined harass by regulation).
"Harm" - To perform an act that kills or injures wildlife; may include significant habitat modification or degradation when it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.

U.S. Fish & Wildlife Service - Indiana (812) 334-4261 Revised 12/19/11

Bat Conservation in Managed Forests: BFO Guidelines



General components of USFWS-BFO Forest Management Guidelines:

- Forest cover retention
- Shagbark hickory and snag retention
- Large tree retention
- Riparian areas
- Seasonal harvest & prescribed burning restrictions





USFWS-BFO's "Summer" Harvest Restrictions

- **April 1 through September 30**
- Bats begin leaving caves in April
- Females migrate to maternity areas in May
- Pups born; unable to fly June-July
- Bats migrate back to caves August through September
- *USFWS: Harvest restrictions when bats present only sure way to avoid all forms of take under ESA*



Bat Conservation in Managed Forests: BFO Guidelines



Q: Where do the “BFO Forest Management Guidelines” apply?



A: Wherever the Indiana bat *is known to occur* on public or private land.

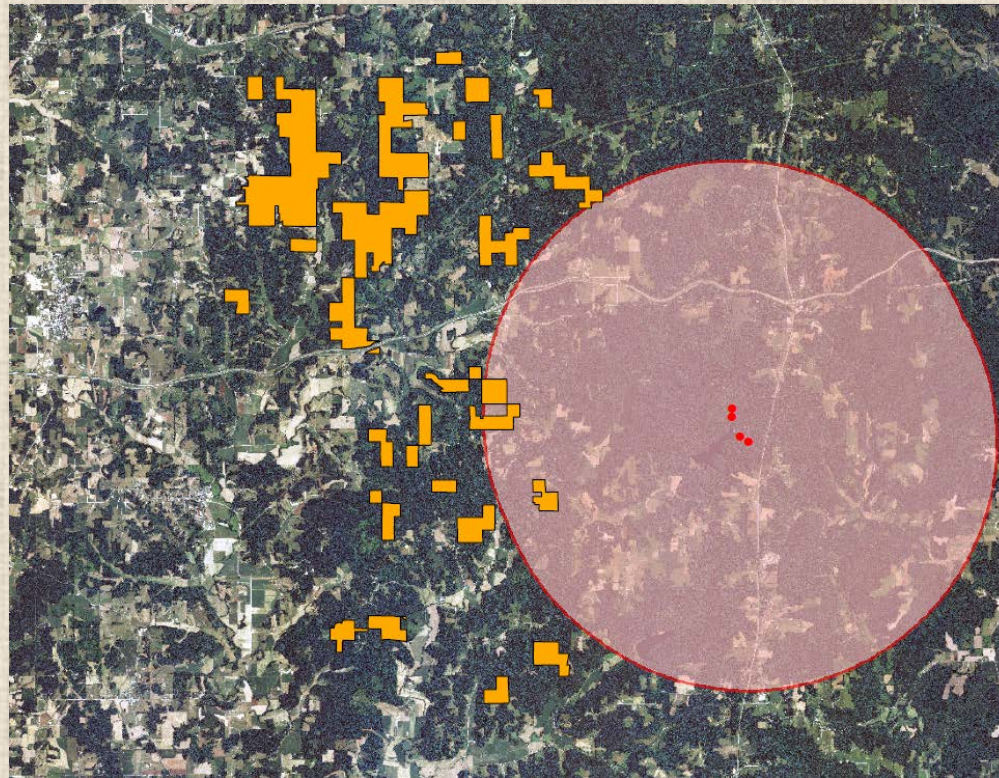
From USFWS-BFO: “We do not require our guidelines to be followed on lands without records.”

Bat Conservation in Managed Forests: BFO Guidelines



Known Summer Locations

- Indiana bat: 5 miles from capture location
- No harvesting >3" DBH April 1 thru September 30

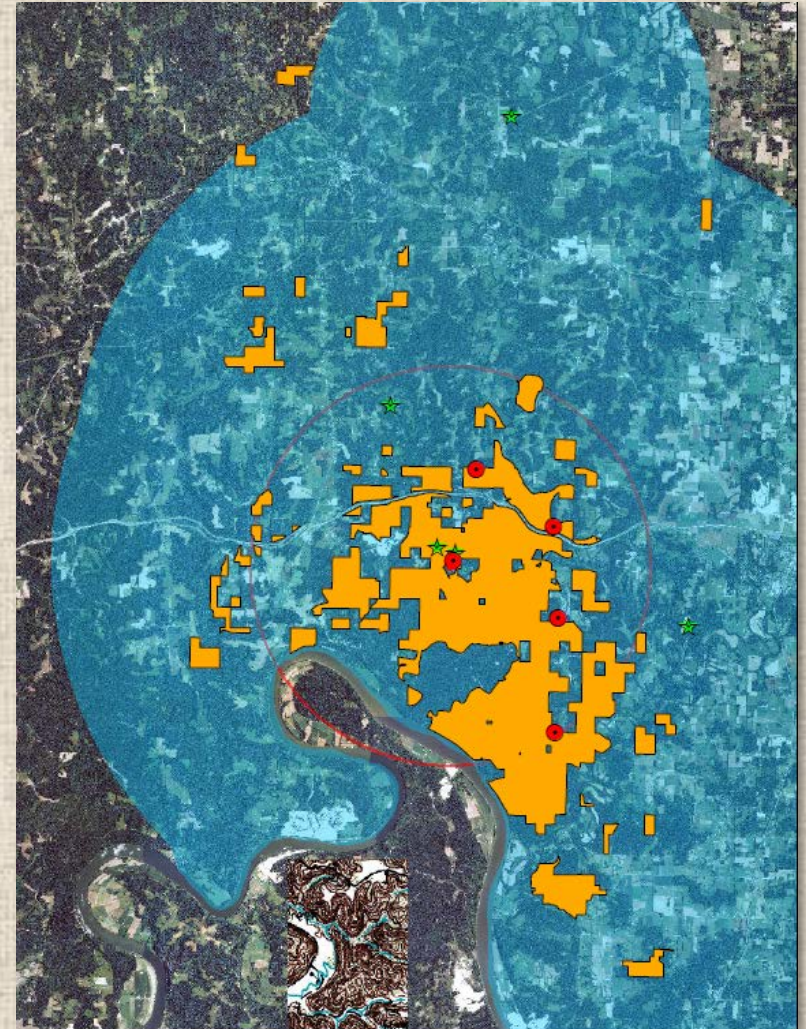


Bat Conservation in Managed Forests: BFO Guidelines



Known Spring/Fall Locations

- Indiana bat: 10/5 miles from known hibernacula
- No harvesting >3" DBH April 1 thru November 15





Alternatives to BFO Forest Management Guidance (where Indiana bats are known to be present)

- Work with BFO on site-specific avoidance plans
- If full avoidance is not possible, work with BFO to receive “Incidental Take Permit” (ITP)
- ITP must be accompanied by *Habitat Conservation Plan* (HCP)
- Many state forestry agencies now considering HCPs due to WNS and northern long-eared bat

Bat Conservation in Managed Forests: NLEB Update



Northern long-eared bat vs. Indiana bat

- **IN Bat Roosts:** primarily in snags, shagbark hickory; solar exposure
- **NLEB Roosts:** “more variable”, snags, live cavity trees, bat boxes; suppressed, smaller diameter mid-story trees



Bat Conservation in Managed Forests: NLEB Update



Northern long-eared bat vs. Indiana bat

- **IN Bat Foraging:** Around forest canopies, open forest, edges, forest openings, riparian areas; < 2.5 miles from roost
- **NLEB Foraging:** Within upland forests, under canopies, within gaps, forest edges; < 1.5 miles from roost





Proposed Endangered: Northern long-eared bat

- (Historically) common forest bat
- >90% decline in East and Northeast (Indiana??)
- 2010: Petitioned for Federal listing
- 2013: Proposed for “Endangered” Status
- Final Listing Decision: April 2, 2015
 - Comment period extended
 - Additional input from States





Proposed Endangered: Northern long-eared bat

Listing Options:

- Endangered – prohibitions take effect 1 month after listing
- Threatened – take prohibitions, but opportunity for exemptions & more flexibility
- No Federal listing warranted



Any Questions?

