



Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

7. Please also rank these threats to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

	Critical threat	Serious threat	Somewhat of a threat	Slight threat	No threat	Unknown	Response Total
Habitat loss (breeding range)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Habitat loss (feeding/foraging areas)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Small native range (high endemism)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Near limits of natural geographic range	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Large home range requirements	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Viable reproductive population size or availability	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Specialized reproductive behavior or low reproductive rates	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
<b>Total Respondents</b>							<b>7</b>

8. Other threats to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** 0

(skipped this question) 1

9. Please briefly describe the top two threats to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana identified above.

Degradation of nesting and staging sites- pools or riffles with slow current beneath flat rocks  
 Low reproductive rates-Males reach sexual maturity at 2 while females can reproduce at 1 and they only have a life span of about 3 years.

**Total Respondents** 1

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

**10.** Please rank the following threats to the HABITAT of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>													
Commercial or residential development (sprawl)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1													
Counterproductive financial incentives or regulations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1													
Invasive/non-native species	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1													
Nonpoint source pollution (sedimentation and nutrients)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1													
Habitat fragmentation	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1													
Successional change	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1													
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1													
Habitat degradation	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1													
Climate change	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1													
Stream channelization	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1													
Impoundment of water/flow regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1													
Agricultural/forestry practices	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1													
Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1													
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1													
Mining/acidification	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1													
Drainage practices (stormwater runoff)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1													
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0													
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0													
<b>Total Respondents</b>							<b>16</b>													

**11.** Other HABITAT threats to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** 0

(skipped this question) 1

**12.** Please briefly describe the top two HABITAT threats to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana identified above.

Habitat degradation in terms of removal of substrate for spawning and sedimentation for covering the substrate needed to spawn.

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

**Total Respondents 1**

**13.** What current monitoring efforts by state agencies are you aware of for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	100% (1)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	100% (1)	0% (0)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

**14.** What current monitoring efforts by other organizations are you aware of for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>			<b>8</b>

**15.** How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>



Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

<b>Total Respondents</b>	<b>0</b>
(skipped this question)	1

**20.** What are the current monitoring techniques for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Coverboard routes	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Spot mapping	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Driving a survey route	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Mark and recapture	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Professional survey/census	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Volunteer survey/census	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Trapping (by any technique)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Representative sites	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Probabilistic sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
<b>Total Respondents</b>							<b>2</b>

**21.** Other monitoring techniques for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

<b>Total Respondents</b>	<b>0</b>
(skipped this question)	1



Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

conducted by other organizations			
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

**25.** How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>These efforts are very crucial for this HABITAT</b>	<b>These efforts are somewhat crucial for this HABITAT</b>	<b>These efforts are slightly crucial for this HABITAT</b>	<b>These efforts are not crucial for this HABITAT</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
					<b>Total Respondents</b>	<b>8</b>



Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

IDEM performs habitat assessments in this area

**Total Respondents 1**

**30.** What are the current monitoring techniques for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?  
If a technique is not applicable to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat do not select a response in that row.

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Aerial photography and analysis	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Systematic sampling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
							<b>0</b>
							(skipped this question) 1

**31.** Other HABITAT inventory and assessment techniques for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland  
Headwater

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

**32.** What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**33.** What is the current body of science for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%
Adequate	0	0%
Inadequate	1	100%
Nonexistent	0	0%
Other (please explain below)	0	0%
<b>Total Respondents</b>	<b>1</b>	

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana, if available. This resource may be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
(skipped this question)		1

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
(skipped this question)		1

**36.** What is the current HABITAT body of science for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%
Adequate	0	0%
Inadequate	1	100%
Nonexistent	0	0%
Other (please explain below)	0	0%
<b>Total Respondents</b>	<b>1</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana, if available. This resource may be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
(skipped this question)		1

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
(skipped this question)		1

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland  
Headwater

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

**39.** What are the research needs for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Life cycle	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Distribution and abundance	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Limiting factors (food, shelter, water, breeding sites)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Threats (predators/competition, contamination)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Relationship/dependence on specific habitats	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Population health (genetic and physical)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
	<b>Total Respondents</b>						<b>6</b>

**40.** Other research needs for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) 1

**41.** What are the HABITAT research needs for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Distribution and abundance (fragmentation)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Threats (land use change/competition, contamination/global warming)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Relationship/dependence on specific site conditions	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Growth and development of individual components of the habitat	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
	<b>Total Respondents</b>						<b>5</b>

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

**42.** Other HABITAT research needs for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**43.** How well do the following conservation efforts address the threats to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total															
Habitat protection (use below for details)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Food plots	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Threats reduction	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Native predator control	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Regulation of collecting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Disease/parasite management	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Translocation to new geographic range	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Protection of migration routes	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Public education to reduce human disturbance	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Culling/selective removal	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Stocking	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0															
						<b>Total Respondents 0</b>															
						(skipped this question)															

**44.** Other current conservation practices for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

(skipped this question) 1

**45.** What one or two specific practices would you recommend for more effective conservation of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

Habitat protection and threats reduction

**Total Respondents 1**

**46.** How well do the following conservation efforts address the HABITAT threats to the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection through regulation	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Habitat protection on public lands	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Habitat protection incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Habitat restoration through regulation	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Habitat restoration on public lands	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Habitat restoration incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Succession control (fire, mowing)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Corridor development/protection	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Managing water regimes	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Pollution reduction	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Protection of adjacent buffer zone	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Restrict public access and disturbance	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Land use planning	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Technical assistance	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Cooperative land management agreements (conservation easements)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0

**Total Respondents 0**

(skipped this question) 1

**47.** Other current HABITAT conservation practices for the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland  
Headwater

Appendix E-19: Rivers and Streams Ohio River Drainage Interior River Lowland Headwater

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

Habitat restoration and protection

**Total Respondents 1**

**49.** Do you have any additional comments or information on the Wildlife in Headwaters in the Interior River Lowland of the Ohio River Drainage Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

IDEM has collected spottail darters in Posey Co. on a trib of Black River and Hawthorne Creek.

**Total Respondents 1**





Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

9. Please briefly describe the top two threats to All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana identified above.

1. 1) commercial type fishing devices - trot lines, branch lines, big nets, other passive fishing  
2) extreme depredation by overabundant raccoons (on eggs) - maybe by cayotes, too.  
3) extant population (if any) far below level for unassisted recovery.

2. 1) nest depredation mainly by raccoons = very low recruitment.  
2) nest/embryo/hatchling loss associated with attraction to rowcrop land for nesting.  
3) potential loss of adults to road kill and to rogue raccoons (kill adults for their eggs)

3. 1. Insuring that populations maintain critical larva-host connections.

4. Habitat loss for both breeding and feeding/foraging areas. The slough darter prefers a mud or silt bottom with little current velocity and vegetation to deposit eggs on. They also spawn few eggs so reproduction is lower in places where vegetation is lacking. They also compete with other darters for insects and have a high mortality due to stagnation and freezing in the pools they desire to live in.

**Total Respondents**

**4**



Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**12.** Please briefly describe the top two HABITAT threats to All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana identified above.

- 1) channelization
1. 2) drain/cut off oxbow ponds
- 3) trample sandbars or remove other nesting areas along banks
2. 1) habitat loss through channelization and draining of oxbow ponds and elimination of flows that create point bars on rivers.
- 2) rowcrop practices: crushing nests during ground insect/weed control; crushing overwinter hatchlings during harvest & early spring plowing
1. Pollutants and toxins are major threats.
3. 2. Habitat degradation may be a factor, since there are large expanses in the Wabash and East Fork White River where relic valves are common, but the living species is absent.
4. Habitat degradation and stream channelization as development continues in the Ohio River Drainage Habitat.

**Total Respondents 4**

**13.** What current monitoring efforts by state agencies are you aware of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (5)	5
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (5)	5
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (5)	5
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	20% (1)	80% (4)	5
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (5)	5
Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (5)	5
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	40% (2)	60% (3)	5
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	60% (3)	40% (2)	5
	<b>Total Respondents</b>		<b>40</b>

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**14.** What current monitoring efforts by other organizations are you aware of for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (5)	5
Statewide once a year monitoring conducted by other organizations	0% (0)	100% (5)	5
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (5)	5
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (5)	5
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (5)	5
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (5)	5
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (5)	5
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	20% (1)	80% (4)	5
	<b>Total Respondents</b>		<b>40</b>

**15.** How crucial are these monitoring efforts by state agencies for the conservation of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Very crucial	Somewhat crucial	Slightly crucial	Not crucial	Unknown	Response Total
Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	5
Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	5
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	20% (1)	0% (0)	60% (3)	20% (1)	5
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	5
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	5
Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	5
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	33% (2)	33% (2)	33% (2)	0% (0)	6
Occasional regional or local (less than						

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

once a year and not regularly scheduled)  
monitoring conducted by state agencies

**Total Respondents 40**

**16.** How crucial are these monitoring efforts by other organizations for the conservation of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	<b>5</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	<b>5</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	<b>5</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	<b>5</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	<b>5</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	80% (4)	20% (1)	<b>5</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	60% (3)	40% (2)	<b>5</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	20% (1)	0% (0)	40% (2)	40% (2)	<b>5</b>
						<b>Total Respondents 40</b>

**17.** Regional or local state agency monitoring for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. I'm unaware of any. Perhaps some occur coincident with large fish survey.
2. Ask Zack Walker  
I believe there was an accidental capture near Shoals
3. IDNR nongame biologist continually monitors fishes and mussels throughout the state, including Yellow Sandshell habitat. Two surveys have been done- ten years apart, completed last year - by IDNR biologists in the Wabash, Tippecanoe, and East Fork White Rivers; results are pending. This is in prime Yellow Sandshell habitat.
4. Blue River (Harrison County)  
East Fork White River  
West Fork White River

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

<b>Total Respondents</b>	<b>4</b>
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Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**18.** Regional or local monitoring by other organizations for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. I'm unaware of any.
2. none

**Total Respondents 2**

**19.** Please list organizations that are monitoring All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. None?
2. IDEM monitors fish communities not particular species; however, the Slough darter has been captured by electrofishing in the Ohio River Drainage Habitat
3. DNR/DFW

**Total Respondents 3**

**20.** What are the current monitoring techniques for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	50% (2)	0% (0)	0% (0)	50% (2)	4
Modeling	0% (0)	0% (0)	50% (2)	0% (0)	0% (0)	50% (2)	4
Coverboard routes	0% (0)	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	2
Spot mapping	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	2
Driving a survey route	0% (0)	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	2
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	3
Mark and recapture	25% (1)	0% (0)	25% (1)	0% (0)	0% (0)	50% (2)	4
Professional survey/census	25% (1)	50% (2)	0% (0)	0% (0)	0% (0)	25% (1)	4
Volunteer	0% (0)	33% (1)	33% (1)	0% (0)	0% (0)	33% (1)	3

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

survey/census							
Trapping (by any technique)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (3)	<b>3</b>
Representative sites	25% (1)	25% (1)	0% (0)	0% (0)	0% (0)	50% (2)	<b>4</b>
Probabilistic sites	33% (1)	33% (1)	33% (1)	0% (0)	0% (0)	0% (0)	<b>3</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
						<b>Total Respondents</b>	<b>39</b>

**21.** Other monitoring techniques for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

**22.** What one or two monitoring techniques would you recommend for effective conservation of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

- 1) Occasional censusing with very large, heavily bated hoop nets left out overnight.
  - a) do not set during rising waters.
  - b) check within 12 hours.
1. 2) Search for nests in June (after determining any adults present at all) methods used inFL and LA for nests, in AR and LA for capturing adults
2. 1) looking for basking individuals with a spotting scope.  
2) perhaps use of fyke nets with big leads, or basking traps to estimate numbers after visual spotting determines presence.
3. 1. Systematic monitoring of probabilistic sites (professional).  
2. Use of volunteer census/monitoring.
4. Seining or electrofishing representative sites using professionals.
5. ELECTROFISHING CATCH RATES  
POPULATION ESTIMATES

**Total Respondents 5**

**23.** What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (5)	<b>5</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (5)	<b>5</b>
Periodic statewide (less than once a year but still regularly			

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

scheduled) inventory and assessment conducted by state agencies			
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (5)	5
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (5)	5
Regional or local once a year inventory and assessment conducted by state agencies	20% (1)	80% (4)	5
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	60% (3)	40% (2)	5
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	40% (2)	60% (3)	5
		<b>Total Respondents</b>	<b>40</b>

**24.** What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (5)	5
		<b>Total Respondents</b>	<b>40</b>





Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**27.** Regional or local state agency HABITAT inventory and assessment for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. If any inventory is occurring, it's for water quality or fish contamination.

I am assuming that the governmental division responsible for water pollution control conducts some sampling regarding organic and heavy metal toxins in the water.

2. I'm unclear as to whether there is any survey on silting in or natural changes in river channels

3. IDNR primarily monitors mussel species, making habitat notations. No real habit monitors made. However, Indiana Department of Environmental Management, IDNR Division of Water do monitor water quality (as a component of habitat).

4. BLUE RIVER (HARRISON COUNTY)

**Total Respondents 4**

**28.** Regional or local HABITAT inventory and assessment by other organizations for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. If any inventory is occurring, it's for water quality or fish contamination.

2. Occasional grants to universities - ???

3. NONE

**Total Respondents 3**

**29.** Please list organizations that are monitoring this HABITAT for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. whoever samples for state water pollution control.  
Fish quality? State board of health??

2. IDEM makes assessments of the habitat while doing fish community surveys in the Ohio River Drainage Habitat.

3. DNR/DFW

**Total Respondents 3**

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**30.** What are the current monitoring techniques for All Wildlife in the Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.  
If a technique is not applicable to the Alligator snapping turtle (*Macrochelys temmincki*) do not select a response in that row.

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	50% (2)	25% (1)	0% (0)	0% (0)	25% (1)	4
Aerial photography and analysis	0% (0)	25% (1)	0% (0)	0% (0)	0% (0)	75% (3)	4
Systematic sampling	0% (0)	0% (0)	0% (0)	25% (1)	0% (0)	75% (3)	4
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
Other (please specify below)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	3
<b>Total Respondents</b>							<b>39</b>

**31.** Other HABITAT inventory and assessment techniques for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

OHEI.

**Total Respondents 1**

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**32.** What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

- High resolution aerial photography DURING LOW WATER - digitized for GIS. locate:
1.
    - 1) Deep river holes with woody debris (favored by adults)
    - 2) health/permanence of oxbow ponds
    - 3) nesting habitat
  2.
    - 1) high resolution aerial photography during low water periods - digitize and use in GIS - re. how lasting are oxbow ponds during droughts.
    - 2) occasional site visits to assess vegetation quality for this herbivorous turtle.
  3.
    1. To look at saturation of potential habitat: with GIS construction of existing potential habitat(based upon known factors)and overlaying the current distribution of the Yellow Sandshell.
  4. QHEI

**Total Respondents 4**

**33.** What is the current body of science for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		2	40%
Inadequate		3	60%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>5</b>	

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana, if available. This resource may be used if further detail is needed.

Title =

Author = Minton

Date = 2001

Publisher =

Title = (Numerous internet sites, including USF&W)

Author =

Date =

Publisher =

**Response Response  
Total Percent**

Title = A survey of fish communities and aquatic habitats at Indiana's major streams with emphasis on smallmouth bass distribution and abundance

Author = Stuart Shipman

Date = 12/1997

Publisher = DNR/Fisheries section

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana. This resource may also be used if further detail is needed.

Title = Freshwater Mussels of the Midwest

Author = Cummings & Mayer

Date = 1992

Publisher = Illinois Natural History Survey

**Response Response  
Total Percent**

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**36.** What is the current HABITAT body of science for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		2	0%
Inadequate		2	40%
Nonexistent		0	40%
Other (please explain below)	 not my expertise - look for historical geography/hydrology	1	20%
<b>Total Respondents</b>		<b>5</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana, if available. This resource may be used if further detail is needed.

Title = ??? Sugar Creek???

Author = ?

Date = late 1970s/early 1980s

Publisher = PhD thesis IU Bloomington

Response  
Total      Response  
Percent

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>		<b>0</b>



Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**Total Respondents 26**

**42.** Other HABITAT research needs for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. Same as on previous panel

**Total Respondents 1**

**43.** How well do the following conservation efforts address the threats to All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection (use below for details)	25% (1)	50% (2)	0% (0)	0% (0)	25% (1)	4
Population management (hunting, trapping)	25% (1)	25% (1)	0% (0)	25% (1)	25% (1)	4
Population enhancement (captive breeding and release)	25% (1)	0% (0)	0% (0)	75% (3)	0% (0)	4
Reintroduction (restoration)	50% (2)	0% (0)	0% (0)	50% (2)	0% (0)	4
Food plots	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	4
Threats reduction	25% (1)	0% (0)	0% (0)	50% (2)	25% (1)	4
Native predator control	25% (1)	0% (0)	0% (0)	75% (3)	0% (0)	4
Exotic/invasive species control	0% (0)	0% (0)	25% (1)	50% (2)	25% (1)	4
Regulation of collecting	0% (0)	25% (1)	25% (1)	0% (0)	50% (2)	4
Disease/parasite management	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
Translocation to new geographic range	50% (2)	0% (0)	0% (0)	50% (2)	0% (0)	4
Protection of migration routes	0% (0)	25% (1)	0% (0)	0% (0)	75% (3)	4
Limiting contact with pollutants/contaminants	50% (2)	0% (0)	0% (0)	25% (1)	25% (1)	4
Public education to reduce human disturbance	25% (1)	25% (1)	25% (1)	0% (0)	25% (1)	4
Culling/selective removal	0% (0)	0% (0)	25% (1)	50% (2)	25% (1)	4
Stocking	50% (2)	0% (0)	0% (0)	50% (2)	0% (0)	4
Other (please specify below)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)	2
	<b>Total Respondents</b>					<b>66</b>

**44.** Other current conservation practices for All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

1. Wildlife species listed as endangered are illegal to take/"collect."  
People need to be reminded of this.

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

<b>Total Respondents</b>	<b>1</b>
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Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

**45.** What one or two specific practices would you recommend for more effective conservation of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

- 1) restock, as too few if any turtles remain
  - 2) end use of commercial fishing equipment
  - 3) Do periodic local removal of raccoons
2. 1. Protection of the habitat against pollutants and toxins.
    - 1) Expand and liberalize the taking of raccoons so as to greatly reduce numbers associated with river cooter habitat. Raccoon reduction used re. sea turtles in FL and endangered Illinois mud turtle in IA, proposed for alligator s. in LA
    - 2) Cease any future channelization plans and restore existing oxbow ponds - provide landowner financial incentive.
    - 3) local restocking where raccoons reduced should hasten delisting criteria.
4. Habitat protection  
Threats Reduction

**Total Respondents 4**

**46.** How well do the following conservation efforts address the HABITAT threats to All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	0% (0)	50% (2)	25% (1)	0% (0)	25% (1)	<b>4</b>
Habitat protection on public lands	0% (0)	75% (3)	0% (0)	0% (0)	25% (1)	<b>4</b>
Habitat protection incentives (financial)	50% (2)	25% (1)	0% (0)	0% (0)	25% (1)	<b>4</b>
Habitat restoration through regulation	25% (1)	50% (2)	0% (0)	0% (0)	25% (1)	<b>4</b>
Habitat restoration on public lands	50% (2)	25% (1)	0% (0)	0% (0)	25% (1)	<b>4</b>
Habitat restoration incentives (financial)	75% (3)	0% (0)	0% (0)	0% (0)	25% (1)	<b>4</b>
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	75% (3)	0% (0)	0% (0)	25% (1)	<b>4</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	<b>4</b>
Succession control (fire, mowing)	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	<b>4</b>
Corridor development/protection	25% (1)	25% (1)	0% (0)	25% (1)	25% (1)	<b>4</b>
Managing water regimes	0% (0)	75% (3)	0% (0)	0% (0)	25% (1)	<b>4</b>
Pollution reduction	25% (1)	50% (2)	0% (0)	0% (0)	25% (1)	<b>4</b>
Protection of adjacent buffer zone	75% (3)	0% (0)	0% (0)	0% (0)	25% (1)	<b>4</b>
Restrict public access and disturbance	25% (1)	25% (1)	25% (1)	0% (0)	25% (1)	<b>4</b>
Land use planning	50% (2)	25% (1)	0% (0)	0% (0)	25% (1)	<b>4</b>
Technical assistance	0% (0)	25% (1)	0% (0)	0% (0)	75% (3)	<b>4</b>

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

Cooperative land management agreements (conservation easements)	75% (3)	0% (0)	0% (0)	0% (0)	25% (1)	<b>4</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>						<b>69</b>

**47.** Other current HABITAT conservation practices All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana.

No responses were entered for this question.

**Total Respondents      0**

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat in Indiana?

1.
  - 1) Encourage return to natural meander channel (within flood control).
  - 2) Let dead trees in river stay; perhaps add some.
  - 3) rehabilitate drained oxbow ponds through conservation easment.
2.
  - 1) oxbow pond conservation easements and restoration - prime feeding habitat.
  - 2) enhance natural river channel evolution including point bar development and snags (downed trees in the water) - provides basking sites and nesting habitat away from row crop agriculture
3.
  1. Manage water quality and pollutants.
  2. Protection of adjacent buffer zones.
4. Habitat protection

**Total Respondents      4**

**49.** Do you have any additional comments or information on All Wildlife in Wadeable/Large Rivers in the Interior River Lowland of the Ohio River Drainage Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

1.
  - 1) Convince DNR that some restocking will be necessary (only known capture in Indiana in last 50 years died on DNR watch).
  - 2) Convince DNR that raccoon population reduction will be critical during early rehab (and important later on - increase recreational harvest).
  - 3) Put lower West Fork and Middle East Forks White River off limits to commercial fishing. Forget about Ohio R & lower Wabash (State cannot control).
2.
 

As with alligator snapping turtle, persuade DNR to take measures for significant raccoon reduction in/near river cooter habitat. Assuming cooter populations then increase, raccoon control remains desirable but less important.

This species is herbivorous and thus not attracted to fish bait. Use of giant nets in oxbow ponds would trap cooters, which might then drown.
3.
 

Yellow Sandshell appear to be a resilient species that are relatively tolerant of some silt; it has expanded beyond rivers and streams and has taken up residence in reservoirs. If we afford it the broad protection (i.e., against pollutants and habitat destruction) that we attempt to give to mussels in general and to other components of our wildlife and environment, it should do well.

Appendix E-20: Rivers and Streams Ohio River Drainage Interior River Lowland  
Wadeable/Large River

4. IDEM has captured slough darters on the following streams: Turkey Cr (Clay Co.), Patoka R and N Fk Little Pigeon Cr (Dubois Co.), Patoka R and Yellow Cr as well as Smith Fk Pigeon Cr (Gibson Co.), Bruster Br and Flat Cr (Pike Co.), E Fk Crooked Cr (Spencer Co.), Busseron Cr (Sullivan Co.), and Lost Cr, Otter Cr, N Br Otter Cr in Vigo Co.
5. no

**Total Respondents 5**

## Appendix E-21: Aggregated Barren Lands

### 6. Please rank the following threats to the Wildlife in All Barren Lands Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Invasive/non-native species	0% (0)	25% (1)	25% (1)	0% (0)	25% (1)	25% (1)	<b>4</b>
High sensitivity to pollution	0% (0)	0% (0)	0% (0)	25% (1)	50% (2)	25% (1)	<b>4</b>
Bioaccumulation of contaminants	0% (0)	0% (0)	0% (0)	25% (1)	25% (1)	50% (2)	<b>4</b>
Predators (native or domesticated)	0% (0)	25% (1)	25% (1)	25% (1)	0% (0)	25% (1)	<b>4</b>
Dependence on other species (mutualism, pollinators)	0% (0)	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	<b>4</b>
Diseases/parasites (of the species itself)	0% (0)	25% (1)	0% (0)	0% (0)	0% (0)	75% (3)	<b>4</b>
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	<b>4</b>
Species over population	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	<b>4</b>
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	0% (0)	25% (1)	0% (0)	50% (1)	50% (2)	0% (0)	<b>4</b>
Unregulated collection pressure	0% (0)	25% (1)	0% (0)	0% (0)	75% (3)	0% (0)	<b>4</b>
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	0% (0)	0% (0)	75% (3)	0% (0)	0% (0)	25% (1)	<b>4</b>
							<b>44</b>
							<b>Total Respondents</b>

### 7. Please also rank these threats to the Wildlife in All Barren Lands Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat loss (breeding range)	0% (0)	50% (2)	25% (1)	25% (1)	0% (0)	0% (0)	<b>4</b>
Habitat loss (feeding/foraging areas)	0% (0)	50% (2)	50% (2)	0% (0)	0% (0)	0% (0)	<b>4</b>
Small native range (high endemism)	25% (1)	25% (1)	0% (0)	25% (1)	25% (1)	0% (0)	<b>4</b>
Near limits of natural geographic range	25% (1)	25% (1)	25% (1)	0% (0)	25% (1)	0% (0)	<b>4</b>
Large home range requirements	0% (0)	0% (0)	0% (0)	50% (2)	50% (2)	0% (0)	<b>4</b>
Viable reproductive population size or availability	25% (1)	25% (1)	0% (0)	0% (0)	0% (0)	50% (2)	<b>4</b>
Specialized reproductive behavior or low reproductive rates	0% (0)	0% (0)	25% (1)	25% (1)	25% (1)	25% (1)	<b>4</b>
Degradation of movement/migration routes	25% (1)	0% (0)	25% (1)	25% (1)	25% (1)	0% (0)	<b>4</b>

## Appendix E-21: Aggregated Barren Lands

(overwintering habitats, nesting and staging sites)								
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	<b>4</b>	
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>	
							<b>Total Respondents</b>	<b>38</b>

### 8. Other threats to the Wildlife in All Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

### 9. Please briefly describe the top two threats to the Wildlife in All Barren Lands Habitat in Indiana identified above.

1. The green salamander is only found at two sites in Indiana, are at the edge of the geographic range and they are habitat specialists.

The Allegheny woodrat occupies cliffs, caves, and other rocky habitats in deciduous forests. When forests become fragmented, for whatever reasons, several negative impacts to woodrat populations can result. First, loss of mature mast-producing trees can occur; changes in forest composition can also result. Woodrats may have to cross non-forested areas to reach preferred feeding areas (i.e., hard mast crops or soft mass .... berries, etc.). While doing so, they may become exposed to ubiquitous predators (great-horned owls, raccoons). Raccoon densities may be higher in non-forested settings (such as farmed areas on top of cliffs), which could expose woodrats to higher levels of raccoon roundworm.

2. have to cross non-forested areas to reach preferred feeding areas (i.e., hard mast crops or soft mass .... berries, etc.). While doing so, they may become exposed to ubiquitous predators (great-horned owls, raccoons). Raccoon densities may be higher in non-forested settings (such as farmed areas on top of cliffs), which could expose woodrats to higher levels of raccoon roundworm.
3. I believe the top two threats to the black kingsnake include human collection and habitat loss. How these factors have effected kingsnake populations in Indiana is unknown.
4. quality of habitat. Low population size/edge of range.

**Total Respondents 4**

### 10. Please rank the following threats to the HABITAT of the Wildlife in All Barren Lands Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>	
Commercial or residential development (sprawl)	0% (0)	25% (1)	75% (3)	0% (0)	0% (0)	0% (0)	<b>4</b>	
Counterproductive financial incentives or regulations	0% (0)	25% (1)	0% (0)	0% (0)	0% (0)	75% (3)	<b>4</b>	
Invasive/non-native species	0% (0)	25% (1)	50% (2)	0% (0)	0% (0)	25% (1)	<b>4</b>	
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	25% (1)	0% (0)	25% (1)	50% (2)	<b>4</b>	
Habitat fragmentation	50% (2)	0% (0)	50% (2)	0% (0)	0% (0)	0% (0)	<b>4</b>	



## Appendix E-21: Aggregated Barren Lands

Statewide year-round monitoring conducted by state agencies	0% (0)	100% (4)	4
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (4)	4
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	25% (1)	75% (3)	4
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	50% (2)	50% (2)	4
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (4)	4
Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (4)	4
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	25% (1)	75% (3)	4
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	50% (1)	75% (3)	4
		<b>Total Respondents</b>	<b>32</b>

14. What current monitoring efforts by other organizations are you aware of for the Wildlife in All Barren Lands Habitat in Indiana?	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (4)	4
Statewide once a year monitoring conducted by other organizations	0% (0)	100% (4)	4
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (4)	4
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (4)	4
Regional or local year-round monitoring conducted by other organizations	25% (1)	75% (3)	4
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (4)	4
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (4)	4
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (4)	4
		<b>Total Respondents</b>	<b>32</b>

## Appendix E-21: Aggregated Barren Lands

### 15. How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in All Barren Lands Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	<b>4</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	<b>4</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	25% (1)	0% (0)	25% (1)	50% (2)	0% (0)	<b>4</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	50% (2)	0% (0)	25% (1)	25% (1)	0% (0)	<b>4</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	25% (1)	0% (0)	25% (1)	50% (2)	0% (0)	<b>4</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	50% (2)	0% (0)	25% (1)	25% (1)	0% (0)	<b>4</b>
				<b>Total Respondents</b>		<b>30</b>

### 16. How crucial are these monitoring efforts by other organizations for the conservation of the Wildlife in All Barren Lands Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (1)	66% (2)	0% (0)	<b>3</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (1)	66% (2)	0% (0)	<b>3</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	33% (1)	0% (0)	66% (2)	0% (0)	<b>3</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (1)	66% (2)	0% (0)	<b>3</b>

## Appendix E-21: Aggregated Barren Lands

Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (1)	66% (2)	0% (0)	<b>3</b>
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**Total Respondents 24**

### 17. Regional or local state agency monitoring for the Wildlife in All Barren Lands Habitat in Indiana.

1. Harrison and Crawford counties.
2. I am not aware of any agency monitoring black kingsnakes in Indiana.
3. Awareness of reports by bird watchers

**Total Respondents 3**

### 18. Regional or local monitoring by other organizations for the Wildlife in All Barren Lands Habitat in Indiana.

1. None that I am aware of.
2. I am not aware of any agency monitoring black kingsnakes in Indiana.
3. Indiana Dunes National Lakeshore biologists stay abreast of sightings along Lake Michigan

**Total Respondents 3**

### 19. Please list organizations that are monitoring the Wildlife in All Barren Lands Habitat in Indiana.

1. Indiana DNR.
2. I am not aware of any agency monitoring black kingsnakes in Indiana.
3. Bird watchers. USGS biologists.

**Total Respondents 3**

### 20. What are the current monitoring techniques for the Wildlife in All Barren Lands Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	50% (2)	50% (2)	0% (0)	0% (0)	<b>4</b>
Modeling	0% (0)	0% (0)	75% (3)	25% (1)	0% (0)	0% (0)	<b>4</b>
Coverboard routes	0% (0)	0% (0)	25% (1)	75% (3)	0% (0)	0% (0)	<b>4</b>
Spot mapping	0% (0)	0% (0)	66% (2)	0% (0)	0% (0)	33% (1)	<b>3</b>
Driving a survey	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	0% (0)	<b>2</b>



## Appendix E-21: Aggregated Barren Lands

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (3)	3
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (3)	3
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (3)	3
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (3)	3
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (3)	3
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (3)	3
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (2)	2
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (2)	2
		<b>Total Respondents</b>	<b>22</b>

### 24. What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for the Wildlife in All Barren Lands Habitat in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (3)	3
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (3)	3
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (3)	3
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (3)	3
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (3)	3
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (3)	3
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (3)	3
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	33% (1)	66% (2)	3

Appendix E-21: Aggregated Barren Lands

Total Respondents 24

**25.** How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in All Barren Lands Habitat in Indiana?

	These efforts are very crucial for this HABITAT	These efforts are somewhat crucial for this HABITAT	These efforts are slightly crucial for this HABITAT	These efforts are not crucial for this HABITAT	Unknown	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	2
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	2
						<b>Total Respondents 16</b>

**26.** How crucial are these HABITAT efforts by other organizations for the conservation of the Wildlife in All Barren Lands Habitat in Indiana?

	These efforts are very crucial for this HABITAT	These efforts are somewhat crucial for this HABITAT	These efforts are slightly crucial for this HABITAT	These efforts are not crucial for this HABITAT	Unknown	Response Total
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2

## Appendix E-21: Aggregated Barren Lands

Statewide once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	50% (1)	0% (0)	50% (1)	0% (0)	<b>2</b>
<b>Total Respondents</b>						<b>16</b>

### 27. Regional or local state agency HABITAT inventory and assessment for the Wildlife in All Barren Lands Habitat in Indiana.

1. The closest thing I can think of is the Division of Nature Preserves may have a decent inventory of cliff habitat in the state. As far as inventory of cliff habitat that is occupied by woodrats, Division of Fish and Wildlife has these data.

2. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

3. Lake Michigan shoreline/Gibson Lake

**Total Respondents 3**

### 28. Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in All Barren Lands Habitat in Indiana.

1. None that I am aware of.

2. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

3. Lake Michigan shoreline

**Total Respondents 3**

## Appendix E-21: Aggregated Barren Lands

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in All Barren Lands Habitat in Indiana.

1. I don't believe any organizations are truly monitoring cliff habitat in Indiana.
2. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.
3. Unknown.

**Total Respondents 3**

**30.** What are the current HABITAT inventory and/or assessment techniques for the Wildlife in All Barren Lands Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	33% (1)	66% (2)	0% (0)	0% (0)	0% (0)	<b>3</b>
Aerial photography and analysis	0% (0)	33% (1)	66% (2)	0% (0)	0% (0)	0% (0)	<b>3</b>
Systematic sampling	0% (0)	33% (1)	33% (1)	0% (0)	0% (0)	33% (1)	<b>3</b>
Property tax estimates	0% (0)	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	<b>3</b>
State revenue data	0% (0)	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	<b>3</b>
Regulatory information	0% (0)	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	<b>3</b>
Participation in landuse programs	0% (0)	0% (0)	0% (0)	33% (1)	0% (0)	66% (2)	<b>3</b>
Modeling	0% (0)	0% (0)	33% (1)	0% (0)	0% (0)	66% (2)	<b>3</b>
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	33% (1)	0% (0)	66% (2)	<b>3</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>							<b>27</b>

**31.** Other HABITAT inventory and assessment techniques for the Wildlife in All Barren Lands Habitat in Indiana.

1. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

**Total Respondents 2**

## Appendix E-21: Aggregated Barren Lands

**32.** What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in All Barren Lands Habitat in Indiana?

1. Systematic sampling & GIS
2. GIS is the best tool available to depict (inventory) cliff, outcrops, talus slopes, caves, or other rocky habitats within the range of the Allegheny woodrat.
3. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.
4. aerial photography and ground visits to determine habitat suitability.

**Total Respondents 3**

**33.** What is the current body of science for the Wildlife in All Barren Lands Habitat in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		1	25%
Inadequate		3	75%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>3</b>	

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in All Barren Lands Habitat in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Discovery of green salamanders in Indiana and a distributional survey. In Status & Conservation of Midwestern Amphibians Reassessment of the Allegheny woodrat in Indiana Amphibians and Reptiles of Indiana Piping Plover Recovery Plan	4	100%
Author	Robert Madej Scott Johnson Minton USFWS	4	100%
Date	1998 2002 2001 unknown	4	100%
Publisher	University of Iowa Press, Iowa City Proceedings of the Indiana Academy of Science 111:56-66. Indiana Academy of Sciences. USFWS	4	100%

## Appendix E-21: Aggregated Barren Lands

**Total Respondents 4**

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in All Barren Lands Habitat in Indiana. This resource may also be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Green salamander: Family plethodontidae, Aneides aeneus Cope and Packard, 1881.		
	2002 Allegheny woodrat monitoring program	<b>3</b>	<b>100%</b>
Author	Snakes of the United States and Canada Pauley, T. K. and M.B. Watson		
	Scott Johnson, Heather Walker, Cassie Conrad, Aaron Holbrook	<b>3</b>	<b>100%</b>
Date	Ernst and Ernst 2005		
	2003	<b>3</b>	<b>100%</b>
Publisher	In: Amphibian Declines: The Conservation Status of United States Species. M. Lannoo, (ed.), University of Indiana Department of Natural Resources (internal report) Smithsonian Institution	<b>3</b>	<b>100%</b>
<b>Total Respondents</b>		<b>3</b>	

**36.** What is the current HABITAT body of science for the Wildlife in All Barren Lands Habitat in Indiana?

		<b>Response Total</b>	<b>Response Percent</b>
Complete, up to date and extensive		<b>0</b>	<b>0%</b>
Adequate		<b>0</b>	<b>0%</b>
Inadequate		<b>2</b>	<b>66%</b>
Nonexistent		<b>0</b>	<b>0%</b>
Other (please explain below)		<b>1</b>	<b>33%</b>
<b>Total Respondents</b>		<b>3</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in All Barren Lands Habitat in Indiana, if available. This resource may be used if further detail is needed.

## Appendix E-21: Aggregated Barren Lands

		Response Total	Response Percent
Title	Natural Features of Indiana? Piping Plover Recovery Plan	2	0%
Author	Alton Lindsey (editor) USFWS	2	0%
Date	1966 unknown	2	0%
Publisher	Indiana Academy of Science USFWS	2	0%
<b>Total Respondents</b>			<b>2</b>

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in All Barren Lands Habitat in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title		0	0%
Author		0	0%
Date		0	0%
Publisher		0	0%
<b>Total Respondents</b>			<b>0</b>

**39.** What are the research needs for the Wildlife in All Barren Lands Habitat in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total						
Life cycle	0% (0)	0% (0)	75% (3)	0% (0)	25% (1)	0% (0)	4						
Distribution and abundance	25% (1)	0% (0)	50% (2)	25% (1)	0% (0)	0% (0)	4						
Limiting factors (food, shelter, water, breeding sites)	50% (2)	0% (0)	50% (2)	0% (0)	0% (0)	0% (0)	4						
Threats (predators/competition, contamination)	50% (2)	0% (0)	50% (2)	0% (0)	0% (0)	0% (0)	4						
Relationship/dependence on specific habitats	50% (2)	0% (0)	50% (2)	0% (0)	0% (0)	0% (0)	4						
Population health (genetic and physical)	25% (1)	25% (1)	50% (2)	0% (0)	0% (0)	0% (0)	4						
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0						
<b>Total Respondents</b>							<b>24</b>						

**40.** Other research needs for the Wildlife in All Barren Lands Habitat in Indiana.

## Appendix E-21: Aggregated Barren Lands

I believe more information is needed for all topics concerning the black kingsnake in Indiana. However, this species is not currently endangered and this information is not urgently needed.

**Total Respondents 1**

### 41. What are the HABITAT research needs for the Wildlife in All Barren Lands Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	66% (2)	0% (0)	0% (0)	33% (1)	<b>3</b>
Distribution and abundance (fragmentation)	66% (2)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	<b>3</b>
Threats (land use change/competition, contamination/global warming)	33% (1)	33% (1)	0% (0)	33% (1)	0% (0)	0% (0)	<b>3</b>
Relationship/dependence on specific site conditions	66% (2)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	<b>3</b>
Growth and development of individual components of the habitat	33% (1)	33% (1)	33% (1)	0% (0)	0% (0)	0% (0)	<b>3</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
	<b>Total Respondents</b>						<b>15</b>

### 42. Other HABITAT research needs for the Wildlife in All Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

### 43. How well do the following conservation efforts address the threats to the Wildlife in All Barren Lands Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	25% (1)	75% (3)	0% (0)	0% (0)	0% (0)	<b>4</b>
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	<b>4</b>
Population enhancement (captive breeding and release)	0% (0)	25% (1)	0% (0)	75% (3)	0% (0)	<b>4</b>
Reintroduction (restoration)	0% (0)	25% (1)	0% (0)	75% (3)	0% (0)	<b>4</b>
Food plots	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	<b>4</b>
Threats reduction	0% (0)	25% (1)	0% (0)	50% (2)	25% (1)	<b>4</b>
Native predator control	0% (0)	25% (1)	0% (0)	50% (2)	25% (1)	<b>4</b>
Exotic/invasive species control	0% (0)	25% (1)	0% (0)	25% (1)	50% (2)	<b>4</b>
Regulation of collecting	0% (0)	50% (2)	0% (0)	50% (2)	0% (0)	<b>4</b>

## Appendix E-21: Aggregated Barren Lands

Disease/parasite management	0% (0)	0% (0)	0% (0)	25% (1)	75% (3)	<b>4</b>
Translocation to new geographic range	0% (0)	25% (1)	0% (0)	75% (3)	0% (0)	<b>4</b>
Protection of migration routes	0% (0)	25% (1)	0% (0)	50% (2)	25% (1)	<b>4</b>
Limiting contact with pollutants/contaminants	0% (0)	25% (1)	0% (0)	25% (1)	50% (2)	<b>4</b>
Public education to reduce human disturbance	0% (0)	25% (1)	0% (0)	25% (1)	50% (1)	<b>4</b>
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	<b>4</b>
Stocking	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	<b>4</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
				<b>Total Respondents</b>		<b>64</b>

### 44. Other current conservation practices for the Wildlife in All Barren Lands Habitat in Indiana.

There are no current conservation practices for woodrats in place in Indiana at this time. Monitoring population levels and trying to determine factors limiting woodrats have been focus of work in state.

**Total Respondents 1**

### 45. What one or two specific practices would you recommend for more effective conservation of the Wildlife in All Barren Lands Habitat in Indiana?

1. The main threat to green salamander populations is deforestation resulting in loss, degradation or fragmentation of habitat. Logging activities should be managed to keep at least 100m of buffered forest habitat around rock outcrops and Barren Lands Cliffs.
- Little is known about the population biology, lifespan, mortality rates, dispersal, colonization of habitats, metapopulation dynamics, and the extent of arboreal activity.
1. Research aimed to identify factors that limit woodrat populations is a high priority.
2. 2. Periodic monitoring of extant populations.
3. Revisit previously-occupied sites to assess recolonization potential.
3. I would recommend habitat protection and collection regulation.
4. Protection of potential habitat. Limiting disturbance by humans and predators if birds ever recolonize Indiana's Lake Michigan shoreline.

**Total Respondents 4**

### 46. How well do the following conservation efforts address the HABITAT threats to the Wildlife in All Barren Lands Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	0% (0)	50% (2)	0% (0)	0% (0)	50% (2)	<b>4</b>
Habitat protection on public lands	25% (1)	50% (2)	0% (0)	0% (0)	25% (1)	<b>4</b>

## Appendix E-21: Aggregated Barren Lands

Habitat protection incentives (financial)	0% (0)	25% (1)	0% (0)	0% (0)	75% (3)	<b>4</b>
Habitat restoration through regulation	0% (0)	0% (0)	0% (0)	66% (2)	33% (1)	<b>3</b>
Habitat restoration on public lands	0% (0)	33% (1)	0% (0)	0% (0)	66% (2)	<b>3</b>
Habitat restoration incentives (financial)	0% (0)	33% (1)	0% (0)	0% (0)	66% (2)	<b>3</b>
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	66% (2)	33% (1)	<b>3</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	66% (2)	33% (1)	<b>3</b>
Succession control (fire, mowing)	0% (0)	33% (1)	0% (0)	33% (1)	33% (1)	<b>3</b>
Corridor development/protection	0% (0)	33% (1)	0% (0)	33% (1)	33% (1)	<b>3</b>
Managing water regimes	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Pollution reduction	0% (0)	33% (1)	0% (0)	33% (1)	33% (1)	<b>3</b>
Protection of adjacent buffer zone	0% (0)	66% (2)	0% (0)	33% (1)	0% (0)	<b>3</b>
Restrict public access and disturbance	33% (1)	33% (1)	0% (0)	0% (0)	33% (1)	<b>3</b>
Land use planning	0% (0)	33% (1)	0% (0)	33% (1)	33% (1)	<b>3</b>
Technical assistance	0% (0)	33% (1)	0% (0)	33% (1)	33% (1)	<b>3</b>
Cooperative land management agreements (conservation easements)	0% (0)	33% (1)	0% (0)	33% (1)	33% (1)	<b>3</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>						<b>54</b>

**47.** Other current HABITAT conservation practices for the Wildlife in All Barren Lands Habitat in Indiana.

**Total Respondents**      **0**

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in All Barren Lands Habitat in Indiana?

1. The main threat to green salamander populations is deforestation resulting in loss, degradation or fragmentation of habitat. Logging activities should be managed to keep at least 100m of buffered forest habitat around rock outcrops and Barren Lands Cliffs.
2. Encourage retention and development of hard mast trees (oaks, hickories) in close proximity to woodrat cliffs.
3. Habitat protection and management.

**Total Respondents**      **3**

**49.** Do you have any additional comments or information on the Wildlife in All Barren Lands Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

## Appendix E-21: Aggregated Barren Lands

1. Little is known about the population biology, lifespan, mortality rates, dispersal, colonization of habitats, metapopulation dynamics, the extent of arboreal activity, and the phylogeography of significant evolutionary-units throughout the range.

- Factors responsible for the decline and local extirpation of woodrats, rangewide and in Indiana, remain unclear. Suspected causes include habitat fragmentation, increased predation from ubiquitous predators (owls, raccoons), changes in forest composition, severe winters, fatal exposure to raccoon roundworm, and decreased production of hard mast. Remnant populations in Indiana are exceedingly small and probably vulnerable to extirpation from any number of stochastic events. Such small colonies may also suffer inbreeding and loss of genetic variation as seen in Illinois. Invasion by exotic plant species, such as garlic mustard, was evident at several Indiana sites ... which may affect availability of green vegetation, soft mass, fungi, or other food items. Hard mast is an important, high energy food resource for woodrats, and low acorn crops may impact local populations. Raccoon roundworm is present at woodrat localities in Indiana, but contamination levels and impacts to the species are unknown.
- 2.

**Total Respondents**

**2**



## Appendix E-22: Barren Lands

Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
							<b>Total Respondents</b>
							<b>11</b>

### 8. Other threats to the Wildlife in Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **1**

### 9. Please briefly describe the top two threats to the Wildlife in Barren Lands Habitat in Indiana identified above.

1. I believe the top two threats to the black kingsnake include human collection and habitat loss. How these factors have effected kingsnake populations in Indiana is unknown.

**Total Respondents** **1**

### 10. Please rank the following threats to the HABITAT of the Wildlife in Barren Lands Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Counterproductive financial incentives or regulations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Invasive/non-native species	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat fragmentation	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Successional change	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Habitat degradation	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Stream channelization	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>

## Appendix E-22: Barren Lands

Impoundment of water/flow regulation	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Agricultural/forestry practices	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Mining/acidification	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
<b>Total Respondents</b>							<b>18</b>

### 11. Other HABITAT threats to the Wildlife in Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) 1

### 12. Please briefly describe the top two HABITAT threats to the Wildlife in Barren Lands Habitat in Indiana identified above.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) 1

### 13. What current monitoring efforts by state agencies are you aware of for the Wildlife in Barren Lands Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>

## Appendix E-22: Barren Lands

Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

<b>14.</b>	What current monitoring efforts by other organizations are you aware of for the Wildlife in Barren Lands Habitat in Indiana?	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
	Statewide year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Statewide once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
			<b>Total Respondents</b>	<b>8</b>

<b>15.</b>	How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Barren Lands Habitat in Indiana?	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
	Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
	Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>

## Appendix E-22: Barren Lands

Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

### 16. How crucial are these monitoring efforts by other organizations for the conservation of the Wildlife in Barren Lands Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

### 17. Regional or local state agency monitoring for the Wildlife in Barren Lands Habitat in Indiana.

## Appendix E-22: Barren Lands

1. I am not aware of any agency monitoring black kingsnakes in Indiana.

**Total Respondents 1**

**18.** Regional or local monitoring by other organizations for the Wildlife in Barren Lands Habitat in Indiana.

1. I am not aware of any agency monitoring black kingsnakes in Indiana.

**Total Respondents 1**

**19.** Please list organizations that are monitoring the Wildlife in Barren Lands Habitat in Indiana.

1. I am not aware of any agency monitoring black kingsnakes in Indiana.

**Total Respondents 1**

**20.** What are the current monitoring techniques for the Wildlife in Barren Lands Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Modeling	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Coverboard routes	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Spot mapping	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Driving a survey route	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Mark and recapture	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Professional survey/census	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Volunteer survey/census	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Trapping (by any)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1

## Appendix E-22: Barren Lands

technique)								
Representative sites	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Probabilistic sites	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
							<b>Total Respondents</b>	<b>11</b>

### 21. Other monitoring techniques for the Wildlife in Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **1**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Barren Lands Habitat in Indiana?

1. I believe monitoring black kingsnakes through professional or volunteer survey would be the best for Indiana. This could be done through the use of representative sites or on volunteer chosen routes.

**Total Respondents** **1**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Barren Lands Habitat Wildlife in Barren Lands Habitat in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	0% (0)	<b>0</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	<b>0</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	<b>0</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	<b>0</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	0% (0)	<b>0</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	<b>0</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	<b>0</b>
Occasional regional or local (less than once a year and not			





## Appendix E-22: Barren Lands

Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
						<b>Total Respondents</b>
						<b>0</b>
						(skipped this question)
						<b>1</b>

**27.** Regional or local state agency HABITAT inventory and assessment for the Wildlife in Barren Lands Habitat in Indiana.

1. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

**Total Respondents 1**

**28.** Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in Barren Lands Habitat in Indiana.

1. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

**Total Respondents 1**

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in Barren Lands Habitat in Indiana.

1. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

**Total Respondents 1**

**30.** What are the current HABITAT inventory and/or assessment techniques for Wildlife in Barren Lands Habitat in Indiana?

Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total

## Appendix E-22: Barren Lands

GIS mapping	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Aerial photography and analysis	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Systematic sampling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
<b>Total Respondents</b>							<b>0</b>
(skipped this question)							1

### 31. Other HABITAT inventory and assessment techniques for the Wildlife in Barren Lands Habitat in Indiana.

- I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

**Total Respondents 1**

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Barren Lands Habitat in Indiana?

- I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.

**Total Respondents 1**

### 33. What is the current body of science for the Wildlife in Barren Lands Habitat in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%
Adequate	0	0%

## Appendix E-22: Barren Lands

Inadequate		1	100%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>1</b>	

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Barren Lands Habitat in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Amphibians and Reptiles of Indiana	1	100%
Author	Minton	1	100%
Date	2001	1	100%
Publisher	Indiana Academy of Sciences.	1	100%
<b>Total Respondents</b>		<b>1</b>	

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	Snakes of the United States and Canada	1	100%
Author	Ernst and Ernst	1	100%
Date	2003	1	100%
Publisher	Smithsonian Institution	1	100%
<b>Total Respondents</b>		<b>1</b>	

**36.** What is the current HABITAT body of science for the Wildlife in Barren Lands Habitat in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		0	0%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)	unknown	1	100%
<b>Total Respondents</b>		<b>1</b>	



## Appendix E-22: Barren Lands

### 40. Other research needs for the Wildlife in Barren Lands Habitat in Indiana.

- I believe more information is needed for all topics concerning the black kingsnake in Indiana. However, this species is not currently endangered and this information is not urgently needed.

**Total Respondents**      **1**

### 41. What are the HABITAT research needs for the Wildlife in Barren Lands Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>						
Successional changes	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>						
Distribution and abundance (fragmentation)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>						
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>						
Relationship/dependence on specific site conditions	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>						
Growth and development of individual components of the habitat	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>						
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>						
							<b>Total Respondents</b>	<b>0</b>					
							(skipped this question)	1					

### 42. Other HABITAT research needs for the Wildlife in Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

### 43. How well do the following conservation efforts address the threats to the Wildlife in Barren Lands Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>							
Habitat protection (use below for details)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>							
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>							
Population enhancement (captive	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>							

## Appendix E-22: Barren Lands

breeding and release)							
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)		<b>1</b>
Food plots	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)		<b>1</b>
Threats reduction	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)		<b>1</b>
Native predator control	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)		<b>1</b>
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)		<b>1</b>
Regulation of collecting	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)		<b>1</b>
Disease/parasite management	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)		<b>1</b>
Translocation to new geographic range	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)		<b>1</b>
Protection of migration routes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)		<b>1</b>
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)		<b>1</b>
Public education to reduce human disturbance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)		<b>1</b>
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)		<b>1</b>
Stocking	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)		<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)		<b>0</b>
						<b>Total Respondents</b>	<b>16</b>

**44.** Other current conservation practices for the Wildlife in Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **1**

**45.** What one or two specific practices would you recommend for more effective conservation of the Wildlife in Barren Lands Habitat in Indiana?

1. I would recommend habitat protection and collection regulation.

**Total Respondents** **1**

**46.** How well do the following conservation efforts address the HABITAT threats to the Wildlife in Barren Lands Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Habitat protection on public lands	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Habitat protection incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>

## Appendix E-22: Barren Lands

Habitat restoration through regulation	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Habitat restoration on public lands	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Habitat restoration incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Succession control (fire, mowing)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Corridor development/protection	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Managing water regimes	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Pollution reduction	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Protection of adjacent buffer zone	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Restrict public access and disturbance	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Land use planning	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Technical assistance	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Cooperative land management agreements (conservation easements)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
						<b>Total Respondents</b>
						<b>3</b>

**47.** Other current HABITAT conservation practices for the Wildlife in Barren Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Barren Lands Habitat in Indiana?

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

**49.** Do you have any additional comments or information on the Wildlife in Barren Lands Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

## Appendix E-22: Barren Lands

## Appendix E-23: Active Quarries

Technical experts did not provide input on a representative species for this habitat.

There are no species of greatest conservation need in this guild.

Appendix E-24: Bare Dunes

**6.** Please rank the following threats to the Wildlife in Bare Dunes Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Invasive/non-native species	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
High sensitivity to pollution	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Bioaccumulation of contaminants	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Predators (native or domesticated)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Dependence on other species (mutualism, pollinators)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Diseases/parasites (of the species itself)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Species over population	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Unregulated collection pressure	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
<b>Total Respondents</b>							<b>11</b>

**7.** Please also rank these threats to the Wildlife in Bare Dunes Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat loss (breeding range)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat loss (feeding/foraging areas)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Small native range (high endemism)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Near limits of natural geographic range	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Large home range requirements	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Viable reproductive population size or availability	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Specialized reproductive							





## Appendix E-24: Bare Dunes

Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

<b>14.</b>	What current monitoring efforts by other organizations are you aware of for the Wildlife in Bare Dunes Habitat in Indiana?	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
	Statewide year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Statewide once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Regional or local year-round monitoring conducted by other organizations	100% (1)	0% (0)	<b>1</b>
	Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
			<b>Total Respondents</b>	<b>8</b>

<b>15.</b>	How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Bare Dunes Habitat in Indiana?	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
	Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
	Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>

## Appendix E-24: Bare Dunes

Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

### 16. How crucial are these monitoring efforts by other organizations for the conservation of the Wildlife in Bare Dunes Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

### 17. Regional or local state agency monitoring for the Wildlife in Bare Dunes Habitat in Indiana.

## Appendix E-24: Bare Dunes

1. Awareness of reports by bird watchers

**Total Respondents 1**

**18.** Regional or local monitoring by other organizations for the Wildlife in Bare Dunes Habitat in Indiana.

1. Indiana Dunes National Lakeshore biologists stay abreast of sightings along Lake Michigan

**Total Respondents 1**

**19.** Please list organizations that are monitoring the Wildlife in Bare Dunes Habitat in Indiana.

1. Bird watchers. USGS biologists.

**Total Respondents 1**

**20.** What are the current monitoring techniques for the Wildlife in Bare Dunes Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Modeling	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Coverboard routes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Spot mapping	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Driving a survey route	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Mark and recapture	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Professional survey/census	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Volunteer survey/census	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Trapping (by any)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1

## Appendix E-24: Bare Dunes

technique)								
Representative sites	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Probabilistic sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
							<b>Total Respondents</b>	<b>12</b>

### 21. Other monitoring techniques for the Wildlife in Bare Dunes Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **1**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Bare Dunes Habitat in Indiana?

1. Because the Piping Plover rarely occurs in Indiana, keep track of all reports by birders and have Indiana Dunes personnel systematically survey appropriate habitat along Lake Michigan.

**Total Respondents** **1**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Bare Dunes Habitat in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>

## Appendix E-24: Bare Dunes

Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	100% (1)	0% (0)	<b>1</b>
	<b>Total Respondents</b>		<b>8</b>

### 24. What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for the Wildlife in Bare Dunes Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	100% (1)	0% (0)	<b>1</b>
	<b>Total Respondents</b>		<b>8</b>

### 25. How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in Bare Dunes Habitat in Indiana?

	<b>These efforts are very crucial for this HABITAT</b>	<b>These efforts are somewhat crucial for this HABITAT</b>	<b>These efforts are slightly crucial for this HABITAT</b>	<b>These efforts are not crucial for this HABITAT</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a						



## Appendix E-24: Bare Dunes

and assessment conducted by other organizations

Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations

0% (0)      0% (0)      0% (0)      100% (1)      0% (0)      **1**

Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations

0% (0)      100% (1)      0% (0)      0% (0)      0% (0)      **1**

**Total Respondents      8**

**27.** Regional or local state agency HABITAT inventory and assessment for the Wildlife in Bare Dunes Habitat in Indiana.

1. Lake Michigan shoreline/Gibson Lake

**Total Respondents      1**

**28.** Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in Bare Dunes Habitat in Indiana.

1. Lake Michigan shoreline

**Total Respondents      1**

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in Bare Dunes Habitat in Indiana.

1. Unknown.

**Total Respondents      1**

**30.** What are the current HABITAT inventory and/or assessment techniques for Wildlife in Bare Dunes Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Aerial photography and analysis	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>

## Appendix E-24: Bare Dunes

Systematic sampling	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>												
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>											
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>											
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>											
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>											
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>											
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>											
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>											
<b>Total Respondents</b>								<b>9</b>											

### 31. Other HABITAT inventory and assessment techniques for the Wildlife in Bare Dunes Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Bare Dunes Habitat in Indiana?

1. aerial photography and ground visits to determine habitat suitability.

**Total Respondents 1**

### 33. What is the current body of science for the Wildlife in Bare Dunes Habitat in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		1	100%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)		0	0%

## Appendix E-24: Bare Dunes

**Total Respondents 1**

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Bare Dunes Habitat in Indiana, if available. This resource may be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Piping Plover Recovery Plan	1	100%
Author	USFWS	1	100%
Date	unknown	1	100%
Publisher	USFWS	1	100%
<b>Total Respondents</b>		<b>1</b>	<b>1</b>

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Bare Dunes Habitat in Indiana. This resource may also be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title		0	0%
Author		0	0%
Date		0	0%
Publisher		0	0%
<b>Total Respondents</b>		<b>0</b>	<b>0</b>
(skipped this question)			1

**36.** What is the current HABITAT body of science for the Wildlife in Bare Dunes Habitat in Indiana?

		<b>Response Total</b>	<b>Response Percent</b>
Complete, up to date and extensive		0	0%
Adequate		1	100%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>1</b>	<b>1</b>

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Bare Dunes Habitat in Indiana, if available. This resource may be used if further detail is needed.

Appendix E-24: Bare Dunes

		Response Total	Response Percent
Title	see previous citation	1	100%
Author		0	0%
Date		0	0%
Publisher		0	0%
<b>Total Respondents</b>		<b>1</b>	

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Bare Dunes Habitat in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title		0	0%
Author		0	0%
Date		0	0%
Publisher		0	0%
<b>Total Respondents</b>		<b>0</b>	
(skipped this question)			1

**39.** What are the research needs for the Wildlife in Bare Dunes Habitat in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total							
Life cycle	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1							
Distribution and abundance	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1							
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1							
Threats (predators/competition, contamination)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1							
Relationship/dependence on specific habitats	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1							
Population health (genetic and physical)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1							
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0							
<b>Total Respondents</b>							<b>6</b>							

**40.** Other research needs for the Wildlife in Bare Dunes Habitat in Indiana.

Appendix E-24: Bare Dunes

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**41.** What are the HABITAT research needs for the Wildlife in Bare Dunes Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Distribution and abundance (fragmentation)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Relationship/dependence on specific site conditions	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Growth and development of individual components of the habitat	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
	<b>Total Respondents</b>						<b>5</b>

**42.** Other HABITAT research needs for the Wildlife in Bare Dunes Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**43.** How well do the following conservation efforts address the threats to the Wildlife in Bare Dunes Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Population enhancement (captive breeding and release)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Reintroduction (restoration)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Food plots	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Threats reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>

## Appendix E-24: Bare Dunes

Native predator control	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Exotic/invasive species control	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Regulation of collecting	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Disease/parasite management	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Translocation to new geographic range	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Protection of migration routes	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Limiting contact with pollutants/contaminants	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Public education to reduce human disturbance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>	
Stocking	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
<b>Total Respondents</b>						<b>16</b>	

### 44. Other current conservation practices for the Wildlife in Bare Dunes Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 45. What one or two specific practices would you recommend for more effective conservation of the Wildlife in Bare Dunes Habitat in Indiana?

1. Protection of potential habitat. Limiting disturbance by humans and predators if birds ever recolonize Indiana's Lake Michigan shoreline.

**Total Respondents 1**

### 46. How well do the following conservation efforts address the HABITAT threats to the Wildlife in Bare Dunes Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>	
Habitat protection through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Habitat protection on public lands	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Habitat protection incentives (financial)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Habitat restoration through regulation	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>	
Habitat restoration on public lands	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Habitat restoration incentives (financial)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	

## Appendix E-24: Bare Dunes

Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Succession control (fire, mowing)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Corridor development/protection	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Managing water regimes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Pollution reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Protection of adjacent buffer zone	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Restrict public access and disturbance	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Land use planning	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Technical assistance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Cooperative land management agreements (conservation easements)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>						<b>17</b>

### 47. Other current HABITAT conservation practices for the Wildlife in Bare Dunes Habitat in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

### 48. What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Bare Dunes Habitat in Indiana?

- Habitat protection and management.

**Total Respondents**      **1**

### 49. Do you have any additional comments or information on the Wildlife in Bare Dunes Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

No responses were entered for this question.

**Total Respondents**      **-1**

(skipped this question)      2



## Appendix E-25: Cliffs

(overwintering habitats, nesting and staging sites)

Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>							<b>18</b>

### 8. Other threats to the Wildlife in Barren Lands Cliffs Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

### 9. Please briefly describe the top two threats to the Wildlife in Barren Lands Cliffs Habitat in Indiana identified above.

- The green salamander is only found at two sites in Indiana, are at the edge of the geographic range and they are habitat specialists.

The Allegheny woodrat occupies cliffs, caves, and other rocky habitats in deciduous forests. When forests become fragmented, for whatever reasons, several negative impacts to woodrat populations can result. First, loss of mature mast-producing trees can occur; changes in forest composition can also result. Woodrats may have to cross non-forested areas to reach preferred feeding areas (i.e., hard mast crops or soft mass ....

- berries, etc.). While doing so, they may become exposed to ubiquitous predators (great-horned owls, raccoons). Raccoon densities may be higher in non-forested settings (such as farmed areas on top of cliffs), which could expose woodrats to higher levels of raccoon roundworm.

**Total Respondents 2**

### 10. Please rank the following threats to the HABITAT of the Wildlife in Barren Lands Cliffs Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	<b>2</b>
Counterproductive financial incentives or regulations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
Invasive/non-native species	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	50% (1)	<b>2</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Habitat fragmentation	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
Successional change	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Habitat degradation	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>

## Appendix E-25: Cliffs

Climate change	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Stream channelization	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Impoundment of water/flow regulation	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Agricultural/forestry practices	50% (1)	0% (0)	0% (0)	50% (1)	0% (0)	0% (0)	<b>2</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Mining/acidification	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
					<b>Total Respondents</b>		<b>32</b>

### 11. Other HABITAT threats to the Wildlife in Barren Lands Cliffs Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

### 12. Please briefly describe the top two HABITAT threats to the Wildlife in Barren Lands Cliffs Habitat in Indiana identified above.

- Habitat loss, degradation & fragmentation due to deforestation around rocky outcrops.  
Cliff habitat, in general, appears somewhat secure except for quarrying operations along the Ohio River.
- Forested communities in association with cliffs, however, are vulnerable to development, fragmentation, loss of hard mast producing species, etc.

**Total Respondents 2**

### 13. What current monitoring efforts by state agencies are you aware of for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	50% (1)	50% (1)	<b>2</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state	100% (2)	0% (0)	<b>2</b>

## Appendix E-25: Cliffs

agencies			
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	50% (1)	50% (1)	<b>2</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	50% (1)	50% (1)	<b>2</b>
		<b>Total Respondents</b>	<b>16</b>

<b>14. What current monitoring efforts by other organizations are you aware of for the Wildlife in Barren Lands Cliffs Habitat in Indiana?</b>			
	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (2)	<b>2</b>
		<b>Total Respondents</b>	<b>16</b>

<b>15. How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Barren Lands Cliffs Habitat in Indiana?</b>						
	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>

## Appendix E-25: Cliffs

Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	50% (1)	0% (0)	0% (0)	50% (1)	0% (0)	<b>2</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	50% (1)	0% (0)	0% (0)	50% (1)	0% (0)	<b>2</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
<b>Total Respondents</b>						<b>14</b>

### 16. How crucial are these monitoring efforts by other organizations for the conservation of the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

## Appendix E-25: Cliffs

**17.** Regional or local state agency monitoring for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

Harrison and Crawford counties.

**Total Respondents 1**

**18.** Regional or local monitoring by other organizations for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

None that I am aware of.

**Total Respondents 1**

**19.** Please list organizations that are monitoring the Wildlife in Barren Lands Cliffs Habitat in Indiana.

Indiana DNR.

**Total Respondents 1**

**20.** What are the current monitoring techniques for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	<b>2</b>
Modeling	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	0% (0)	<b>2</b>
Coverboard routes	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	<b>2</b>
Spot mapping	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Driving a survey route	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Mark and recapture	50% (1)	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	<b>2</b>
Professional survey/census	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Volunteer survey/census	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>

## Appendix E-25: Cliffs

Trapping (by any technique)	50% (1)	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	<b>2</b>
Representative sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Probabilistic sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>							<b>17</b>

### 21. Other monitoring techniques for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

Presence/absence can generally be determined by searching cliff lines for fresh sign (latrines, food caches, maintained nests) usually in fall. Research underway in other areas to determine if woodrats can be genotyped through scats.

**Total Respondents 1**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Barren Lands Cliffs Habitat in Indiana?

1. Systematic surveys in & near rocky outcrops  
Standardized, live-trapping for 2 nights is effective for determining distribution and relative abundance.
2. Searches for woodrat sign --- at new sites or previously-occupied sites to assess recolonization potential.

**Total Respondents 2**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Periodic regional or local (less than once a year but still			





## Appendix E-25: Cliffs

Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

### 27. Regional or local state agency HABITAT inventory and assessment for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

The closest thing I can think of is the Division of Nature Preserves may have a decent inventory of cliff habitat in the state. As far as inventory of cliff habitat that is occupied by woodrats, Division of Fish and Wildlife has these data.

**Total Respondents 1**

### 28. Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

None that I am aware of.

**Total Respondents 1**

### 29. Please list organizations that are monitoring this HABITAT for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

I don't believe any organizations are truly monitoring cliff habitat in Indiana.

**Total Respondents 1**

### 30. What are the current HABITAT inventory and/or assessment techniques for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	<b>2</b>
Aerial photography and analysis	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	<b>2</b>
Systematic sampling	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	50% (1)	<b>2</b>
Property tax estimates	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	<b>2</b>

## Appendix E-25: Cliffs

State revenue data	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	<b>2</b>												
Regulatory information	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	<b>2</b>												
Participation in landuse programs	0% (0)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)	<b>2</b>												
Modeling	0% (0)	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	<b>2</b>												
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)	<b>2</b>												
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>												
							<b>Total Respondents</b>	<b>18</b>											

**31.** Other HABITAT inventory and assessment techniques for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

**32.** What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Barren Lands Cliffs Habitat in Indiana?

1. Systematic sampling & GIS
2. GIS is the best tool available to depict (inventory) cliff, outcrops, talus slopes, caves, or other rocky habitats within the range of the Allegheny woodrat.

**Total Respondents 2**

**33.** What is the current body of science for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		0	0%
Inadequate		2	100%
Nonexistent		0	0%
Other (please explain below)		0	0%
		<b>Total Respondents</b>	<b>2</b>

Appendix E-25: Cliffs

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Barren Lands Cliffs Habitat in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Discovery of green salamanders in Indiana and a distributional survey. In Status & Conservation of Midwestern Amphibians	2	100%
Author	Reassessment of the Allegheny woodrat in Indiana Robert Madej	2	100%
Date	Scott Johnson 1998	2	100%
Publisher	2002 University of Iowa Press, Iowa City	2	100%
	Proceedings of the Indiana Academy of Science 111:56-66.		
<b>Total Respondents</b>		<b>2</b>	<b>2</b>

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Barren Lands Cliffs Habitat in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	Green salamander: Family plethodontidae, Aneides aeneus Cope and Packard, 1881.	2	100%
Author	2002 Allegheny woodrat monitoring program Pauley, T. K. and M.B. Watson	2	100%
Date	Scott Johnson, Heather Walker, Cassie Conrad, Aaron Holbrook 2005	2	100%
Publisher	2003 In: Amphibian Declines: The Conservation Status of United States Species. M. Lannoo, (ed.), University of Indiana Department of Natural Resources (internal report)	2	100%
<b>Total Respondents</b>		<b>2</b>	<b>2</b>

**36.** What is the current HABITAT body of science for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%

## Appendix E-25: Cliffs

Adequate		0	0%
Inadequate		2	100%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>2</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Barren Lands Cliffs Habitat in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Natural Features of Indiana?	1	0%
Author	Alton Lindsey (editor)	1	0%
Date	1966	1	0%
Publisher	Indiana Academy of Science	1	0%
<b>Total Respondents</b>		<b>1</b>	

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Barren Lands Cliffs Habitat in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title		0	0%
Author		0	0%
Date		0	0%
Publisher		0	0%
<b>Total Respondents</b>		<b>0</b>	

**39.** What are the research needs for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total				
Life cycle	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	2				
Distribution and abundance	50% (1)	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	2				
Limiting factors (food, shelter, water, breeding sites)	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	2				
Threats (predators/competition, contamination)	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	2				
Relationship/dependence on specific habitats	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	2				

## Appendix E-25: Cliffs

Population health (genetic and physical)	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
	<b>Total Respondents</b>						<b>12</b>

**40.** Other research needs for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

**41.** What are the HABITAT research needs for the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	<b>2</b>
Distribution and abundance (fragmentation)	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
Threats (land use change/competition, contamination/global warming)	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
Relationship/dependence on specific site conditions	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
Growth and development of individual components of the habitat	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
	<b>Total Respondents</b>						<b>10</b>

**42.** Other HABITAT research needs for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

**43.** How well do the following conservation efforts address the threats to the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	<b>2</b>
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>

## Appendix E-25: Cliffs

Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Food plots	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Threats reduction	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Native predator control	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Regulation of collecting	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Disease/parasite management	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Translocation to new geographic range	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Protection of migration routes	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Public education to reduce human disturbance	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Stocking	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>						<b>16</b>

### 44. Other current conservation practices for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

There are no current conservation practices for woodrats in place in Indiana at this time. Monitoring population levels and trying to determine factors limiting woodrats have been focus of work in state.

**Total Respondents 1**

### 45. What one or two specific practices would you recommend for more effective conservation of the Wildlife in Barren Lands Cliffs Habitat in Indiana?

1. The main threat to green salamander populations is deforestation resulting in loss, degradation or fragmentation of habitat. Logging activities should be managed to keep at least 100m of buffered forest habitat around rock outcrops and Barren Lands Cliffs.

Little is known about the population biology, lifespan, mortality rates, dispersal, colonization of habitats, metapopulation dynamics, and the extent of arboreal activity.

1. Research aimed to identify factors that limit woodrat populations is a high priority.
2. Periodic monitoring of extant populations.
3. Revisit previously-occupied sites to assess recolonization potential.

**Total Respondents 2**

## Appendix E-25: Cliffs

### 46. How well do the following conservation efforts address the HABITAT threats to the Wildlife in Barren Lands Cliffs Habitat in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection through regulation	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	2
Habitat protection on public lands	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	2
Habitat protection incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	2
Habitat restoration through regulation	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Habitat restoration on public lands	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	2
Habitat restoration incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	2
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Succession control (fire, mowing)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Corridor development/protection	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Managing water regimes	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Pollution reduction	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Protection of adjacent buffer zone	0% (0)	50% (1)	0% (0)	50% (1)	0% (0)	2
Restrict public access and disturbance	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	2
Land use planning	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Technical assistance	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Cooperative land management agreements (conservation easements)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
				<b>Total Respondents</b>		<b>34</b>

### 47. Other current HABITAT conservation practices for the Wildlife in Barren Lands Cliffs Habitat in Indiana.

**Total Respondents 0**

### 48. What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Barren Lands Cliffs Habitat in Indiana?

1. The main threat to green salamander populations is deforestation resulting in loss, degradation or fragmentation of habitat. Logging activities should be managed to keep at least 100m of buffered forest habitat around rock outcrops and Barren Lands Cliffs.
2. Encourage retention and development of hard mast trees (oaks, hickories) in close proximity to woodrat cliffs.

## Appendix E-25: Cliffs

**Total Respondents 2**

**49.** Do you have any additional comments or information on the Wildlife in Barren Lands Cliffs Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

1. Little is known about the population biology, lifespan, mortality rates, dispersal, colonization of habitats, metapopulation dynamics, the extent of arboreal activity, and the phylogeography of significant evolutionary-units throughout the range.

2. Factors responsible for the decline and local extirpation of woodrats, rangewide and in Indiana, remain unclear. Suspected causes include habitat fragmentation, increased predation from ubiquitous predators (owls, raccoons), changes in forest composition, severe winters, fatal exposure to raccoon roundworm, and decreased production of hard mast. Remnant populations in Indiana are exceedingly small and probably vulnerable to extirpation from any number of stochastic events. Such small colonies may also suffer inbreeding and loss of genetic variation as seen in Illinois. Invasion by exotic plant species, such as garlic mustard, was evident at several Indiana sites ... which may affect availability of green vegetation, soft mass, fungi, or other food items. Hard mast is an important, high energy food resource for woodrats, and low acorn crops may impact local populations. Raccoon roundworm is present at woodrat localities in Indiana, but contamination levels and impacts to the species are unknown.

**Total Respondents 2**

## Appendix E-26: Rock Outcrops

Technical experts did not provide input on a representative species for this habitat.

There are no species of greatest conservation need in this guild.

Appendix E-27: Aggregated Developed Lands

6. Please rank the following threats to the Wildlife in All Developed Lands Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Invasive/non-native species	0% (0)	0% (0)	50% (4)	0% (0)	38% (3)	12% (1)	<b>8</b>
High sensitivity to pollution	0% (0)	12% (1)	50% (4)	0% (0)	12% (1)	25% (2)	<b>8</b>
Bioaccumulation of contaminants	0% (0)	14% (1)	29% (2)	14% (1)	14% (1)	29% (2)	<b>7</b>
Predators (native or domesticated)	0% (0)	0% (0)	25% (2)	38% (3)	38% (3)	0% (0)	<b>8</b>
Dependence on other species (mutualism, pollinators)	0% (0)	0% (0)	14% (1)	14% (1)	71% (5)	0% (0)	<b>7</b>
Diseases/parasites (of the species itself)	0% (0)	25% (2)	25% (2)	38% (3)	0% (0)	12% (1)	<b>8</b>
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	12% (1)	25% (2)	63% (5)	0% (0)	<b>8</b>
Species over population	25% (2)	25% (2)	0% (0)	0% (0)	50% (4)	0% (0)	<b>8</b>
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	0% (0)	12% (1)	25% (2)	0% (0)	63% (5)	0% (0)	<b>8</b>
Unregulated collection pressure	0% (0)	0% (0)	12% (1)	12% (1)	63% (5)	12% (1)	<b>8</b>
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	0% (0)	12% (1)	25% (2)	25% (2)	38% (3)	0% (0)	<b>8</b>
<b>Total Respondents</b>							<b>86</b>

7. Please also rank these threats to the Wildlife in All Developed Lands Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat loss (breeding range)	0% (0)	12% (1)	12% (1)	50% (4)	25% (2)	0% (0)	<b>8</b>

## Appendix E-27: Aggregated Developed Lands

Habitat loss (feeding/foraging areas)	0% (0)	12% (1)	12% (1)	25% (2)	50% (4)	0% (0)	<b>8</b>
Small native range (high endemism)	0% (0)	0% (0)	0% (0)	12% (1)	88% (7)	0% (0)	<b>8</b>
Near limits of natural geographic range	0% (0)	0% (0)	0% (0)	14% (1)	86% (6)	0% (0)	<b>7</b>
Large home range requirements	0% (0)	0% (0)	0% (0)	14% (1)	86% (6)	0% (0)	<b>7</b>
Viable reproductive population size or availability	0% (0)	0% (0)	12% (1)	12% (1)	75% (6)	0% (0)	<b>8</b>
Specialized reproductive behavior or low reproductive rates	0% (0)	0% (0)	12% (1)	0% (0)	88% (7)	0% (0)	<b>8</b>
Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	50% (4)	12% (1)	25% (2)	0% (0)	12% (1)	<b>8</b>
Genetic pollution (hybridization)	12% (1)	0% (0)	25% (2)	25% (2)	38% (3)	0% (0)	<b>8</b>
Unknown	0% (0)	0% (0)	0% (0)	33% (1)	0% (0)	66% (2)	<b>3</b>
Other (please specify below)	0% (0)	50% (2)	25% (1)	0% (0)	0% (0)	25% (1)	<b>4</b>
<b>Total Respondents</b>							<b>77</b>

### 8. Other threats to the Wildlife in All Developed Lands Habitats in Indiana.

1. Urban Canada Geese are a real problem in Indiana. I deal specifically with Ft. Wayne (Allen County). Canada geese have benefitted from the way humans have altered the landscape within Urban areas. Human-goose conflicts within the urban environment will increase.
2. "Urbanization and domestication of "wild" Mallards leading to the hybridization w/ domestic stock of ducks. The threat is one of unusual circumstance. As opposed to typical habitat loss or fragmentation, this threat constitutes displacement of Mallards into undesirable/"unnatural" areas creating nuisance problems and genetic integrity concerns. The "developed" land itself creates wild scale loss of "high quality" habitat for Mallards. However, Mallard ducks are adaptable creatures and have adapted to this "developed" environment. Nonetheless, their adaptiveness could also be their downfall in "developed" lands.
3. 1. Abrupt changes in drainage patterns due to development. Kirtland's snakes prefer moist soils that support earthworms.  
2. Mowing, or moving or clearing of debris (cover items) on the ground as Kirtland's snakes are found in moist open environments; but, often under natural and man-made debris on the ground
4. Tolerance by building managers of nesting sites.

**Total Respondents      4**



## Appendix E-27: Aggregated Developed Lands

Stream channelization	0% (0)	38% (3)	12% (1)	12% (1)	25% (2)	12% (1)	<b>8</b>
Impoundment of water/flow regulation	0% (0)	50% (4)	0% (0)	0% (0)	50% (4)	0% (0)	<b>8</b>
Agricultural/forestry practices	0% (0)	25% (2)	0% (0)	38% (3)	25% (2)	12% (1)	<b>8</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	50% (4)	38% (3)	0% (0)	12% (1)	<b>8</b>
Point source pollution (continuing)	0% (0)	0% (0)	38% (3)	50% (4)	0% (0)	12% (1)	<b>8</b>
Mining/acidification	0% (0)	0% (0)	0% (0)	14% (1)	57% (4)	29% (2)	<b>7</b>
Drainage practices (stormwater runoff)	0% (0)	25% (2)	12% (1)	38% (3)	25% (2)	0% (0)	<b>8</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
Other (please specify below)	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	50% (1)	<b>2</b>
<b>Total Respondents</b>							<b>131</b>

### 11. Other HABITAT threats to the Wildlife in All Developed Lands Habitats in Indiana.

1. The developed land itself creates a threat to "quality habitat" for Mallards. The Mallards are simply placed in an urban/suburban setting creating a whole host of problems and for humans and Mallards alike (genetic pollution, nuisance ducks, possible fecal contamination, etc.).

2. Although I marked invasive/non-native species as a slight threat, the impact of non-native earthworms should be closely monitored as the Kirtland's snake's natural diet is believed to be comprised predominately of earthworms and slugs. The ecological impact of some non-native invertebrates has not been adequately studied.

3. Potential for pollution reducing productivity of aquatic habitats over which Cliff Swallows feed.

**Total Respondents** **3**

### 12. Please briefly describe the top two HABITAT threats to the Wildlife in All Developed Lands Habitats in Indiana identified above.

1. Commercial and residential development with lakes and ponds offer all the resources Canada Geese need to survive. With an overpopulation of Canada Geese in Urban areas; it's hard to say there is a habitat threat.

2. Regulations  
urban development

1. 1) Urban sprawl creating attractive areas for Mallards to become "more domesticated" (i.e. retention/detention ponds)

## Appendix E-27: Aggregated Developed Lands

(i.e retention/detention ponds).

2)Feeding of birds by people.

3)Destruction of beneficial areas for Mallards (and other puddle ducks), ie wetlands, streams, small ponds, etc. These areas are converted to retention/detention ponds.

4. 2. urban sprawl  
retention ponds

5. 1. Developement of drainage areas and flood plains, including development of park-like areas in which natural or man-made cover is removed.

2. Habitat fragmentation that disrupts gene flow and re-colonization.

6 Reduction in quantity and quality of prey populations.  
Design of buildings that do not provide nesting ledges.

7. Changes in design of bridges and causeways to make them less suitable for nest placement.

**Total Respondents 7**

**13.** What current monitoring efforts by state agencies are you aware of for the Wildlife in All Developed Lands Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occuring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	50% (4)	50% (4)	<b>8</b>
Statewide once a year monitoring conducted by state agencies	67% (4)	33% (2)	<b>6</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	50% (3)	50% (3)	<b>6</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	33% (2)	67% (4)	<b>6</b>
Regional or local year-round monitoring conducted by state agencies	17% (1)	83% (5)	<b>6</b>
Regional or local once a year monitoring conducted by state agencies	50% (3)	50% (3)	<b>6</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	33% (2)	67% (4)	<b>6</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	33% (2)	67% (4)	<b>6</b>

Appendix E-27: Aggregated Developed Lands

**Total Respondents 50**

**14.** What current monitoring efforts by other organizations are you aware of for the Wildlife in All Developed Lands Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	14% (1)	86% (6)	<b>7</b>
Statewide once a year monitoring conducted by other organizations	63% (5)	38% (3)	<b>8</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	14% (1)	86% (6)	<b>7</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	14% (1)	86% (6)	<b>7</b>
Regional or local year-round monitoring conducted by other organizations	14% (1)	86% (6)	<b>7</b>
Regional or local once a year monitoring conducted by other organizations	17% (1)	83% (5)	<b>6</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	14% (1)	86% (6)	<b>7</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	14% (1)	86% (6)	<b>7</b>
		<b>Total Respondents</b>	<b>56</b>

**15.** How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in All Developed Lands Habitats in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	33% (2)	12% (1)	0% (0)	25% (2)	38% (3)	<b>8</b>
Statewide once a year monitoring conducted by state agencies	29% (2)	43% (3)	0% (0)	14% (1)	14% (1)	<b>7</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	17% (1)	17% (1)	17% (1)	17% (1)	33% (2)	<b>6</b>
Occasional statewide (less than once						



## Appendix E-27: Aggregated Developed Lands

Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	29% (2)	29% (2)	43% (3)	<b>7</b>
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**Total Respondents 58**

### 17. Regional or local state agency monitoring for the Wildlife in All Developed Lands Habitats in Indiana.

1. The division of Fish & Wildlife conducts Canada Goose banding yearly. This consists of neck collars and leg bands. Water fowl surveys are also conducted. Hunter harvest are reported.
2. The Wildlife Diversity Section of the DFW coordinates Indiana's North American Amphibian Monitoring and Frog Watch Programs. These two programs collectively are the statewide effort to monitor frog and toad populations in Indiana, including bull frogs. The data can be analysed regionally.
3. The Wildlife Diversity Section of the DFW coordinates Indiana's North American Amphibian Monitoring and Frog Watch Programs. These two programs collectively are the statewide effort to monitor frog and toad populations in Indiana, including bull frogs. The data can be analysed regionally.
4. Regionally (throughout the state)-waterfowl breeding status surveys, population surveys  
Regionally (throughout the state)-Statewide trapping, banding, and recapture efforts
5. Kirtland snake encounters are reported to the Indiana Natural Heritage Database on a sporadic basis by citizens and scientist. Although sporadic these reports are often sufficient to demonstrate persistent Kirtland snake occupied sites. However, the environmental parameters of these sites have not been adequately studied or described to reveal important micro-habitat associations.
6. DNR monitors most nest sites in the state and obtains information from others.
7. None exist.

**Total Respondents 7**

### 18. Regional or local monitoring by other organizations for the Wildlife in All Developed Lands Habitats in Indiana.

1. I believe Ducks Unlimited conducts waterfowl surveys
2. Breeding surveys, population surveys
3. None known.
4. Building managers and volunteers report nesting activity at many nests.

**Total Respondents 4**

### 19. Please list organizations that are monitoring the Wildlife in All Developed Lands Habitats in Indiana.

## Appendix E-27: Aggregated Developed Lands

- US Fish & Wildlife Service
1. Indiana Division of Fish & Wildlife  
Ducks Unlimited
  
  2. IDNR-Division of Fish and Wildlife  
IDNR-Division of Parks and Reservoirs  
U.S. FWS  
Ducks Unlimited  
Waterfowl USA
  
  3. None know to be "monitoring" the Wildlife Diversity Section of the Indiana Division of Fish and Wildlife accepts sighting information as does the Division of Nature Preserves for inclusion in the Heritage Database.
  
  4. Private companies (NIPSCO, Ispat Inland, building managers).
  
  5. Federal Breeding Bird Survey serves this function. But does not focus on suitable habitat; yet, occurrence on these surveys would be tied to nearby presence of this breeding habitat.

**Total Respondents 5**

### 20. What are the current monitoring techniques for the Wildlife in All Developed Lands Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	83% (5)	0% (0)	17% (1)	0% (0)	<b>6</b>
Modeling	14% (1)	29% (2)	43% (3)	0% (0)	0% (0)	14% (1)	<b>7</b>
Coverboard routes	0% (0)	0% (0)	33% (1)	33% (1)	0% (0)	33% (1)	<b>3</b>
Spot mapping	25% (1)	25% (1)	0% (0)	25% (1)	0% (0)	25% (1)	<b>4</b>
Driving a survey route	50% (4)	12% (1)	12% (1)	25% (2)	0% (0)	0% (0)	<b>8</b>
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	71% (5)	29% (2)	0% (0)	0% (0)	0% (0)	0% (0)	<b>7</b>
Mark and recapture	57% (4)	0% (0)	43% (3)	0% (0)	0% (0)	0% (0)	<b>7</b>

## Appendix E-27: Aggregated Developed Lands

Professional survey/census	60% (3)	0% (0)	40% (2)	0% (0)	0% (0)	0% (0)	<b>5</b>
Volunteer survey/census	50% (3)	0% (0)	33% (2)	0% (0)	0% (0)	17% (1)	<b>6</b>
Trapping (by any technique)	29% (2)	14% (1)	71% (4)	0% (0)	0% (0)	0% (0)	<b>7</b>
Representative sites	50% (3)	17% (1)	33% (2)	0% (0)	0% (0)	0% (0)	<b>6</b>
Probabilistic sites	66% (2)	33% (1)	33% (1)	0% (0)	0% (0)	0% (0)	<b>4</b>
Other (please specify below)	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	50% (1)	<b>2</b>
<b>Total Respondents</b>							<b>74</b>

### 21. Other monitoring techniques for the Wildlife in All Developed Lands Habitats in Indiana.

1. aerial surveys

Bull frog tadpoles and adults are often recorded during amphibian surveys of particular sites, such as a military base or superfund sites. Bull frogs are also encountered and recorded during fish surveys.

2. 1. N/A

3. 2. aerial breeding survey

A standardized protocol could be developed as suggested by Gibson and Kingsbury 2004. However, a more difficult question might be where should the standardized protocol be implemented to provide an adequate picture of the status of the Kirtland's snake in Indiana.

4. Surveys for colonies and periodic censuses of nests/ populations.

**Total Respondents 5**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in All Developed Lands Habitats in Indiana?

1. Neck collars and leg bands - Driving surveys

2. population surveys

1. 1)Mark and Recapture

2)Modelling-To determine population dynamics and evaluate genetic integrity of Mallards in developed lands versus "wild" Mallards (i.e Mallards in undeveloped areas).

3.

2. monitoring throughout annual cycle

## Appendix E-27: Aggregated Developed Lands

4. I do not believe that an effective nationally or regionally accepted monitoring technique exist. This should be identified as a need in the CWS.
5. Nest monitoring of all known nests (or representative sample) with 2-3 visits according to USFWS protocol.
6. Surveys for colonies and periodic censuses of nests/ populations.

**Total Respondents      6**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in All Developed Lands Habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (8)	<b>8</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (8)	<b>8</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (8)	<b>8</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	12% (1)	88% (7)	<b>8</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (8)	<b>8</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (8)	<b>8</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (8)	<b>8</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	12% (1)	88% (7)	<b>8</b>
<b>Total Respondents</b>			<b>64</b>

### 24. What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for the Wildlife in All Developed Lands Habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>

## Appendix E-27: Aggregated Developed Lands

Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (8)	<b>8</b>
		<b>Total Respondents</b>	<b>64</b>

### 25. How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in All Developed Lands Habitats in Indiana?

	<b>These efforts are very crucial for this HABITAT</b>	<b>These efforts are somewhat crucial for this HABITAT</b>	<b>These efforts are slightly crucial for this HABITAT</b>	<b>These efforts are not crucial for this HABITAT</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	25% (2)	0% (0)	12% (1)	50% (4)	12% (1)	<b>8</b>
Statewide once a year inventory and assessment conducted by state agencies	14% (1)	0% (0)	14% (1)	43% (3)	29% (2)	<b>7</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	17% (1)	17% (1)	17% (1)	33% (2)	17% (1)	<b>6</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	67% (4)	33% (2)	<b>6</b>





Appendix E-27: Aggregated Developed Lands

4. None known to me.

**Total Respondents 4**

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in All Developed Lands Habitats in Indiana.

1. I'm not aware of any
2. None known
3. None known
4. None
5. None known to me.

**Total Respondents 4**

**30.** What are the current HABITAT inventory and/or assessment techniques for Wildlife in All Developed Lands Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	25% (2)	63% (5)	0% (0)	0% (0)	12% (1)	<b>8</b>
Aerial photography and analysis	12% (1)	38% (3)	38% (3)	0% (0)	12% (1)	0% (0)	<b>8</b>
Systematic sampling	0% (0)	0% (0)	75% (6)	0% (0)	12% (1)	12% (1)	<b>8</b>
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (5)	<b>5</b>
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (5)	<b>5</b>
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (5)	<b>5</b>
Participation in landuse programs	0% (0)	0% (0)	29% (2)	0% (0)	0% (0)	71% (5)	<b>7</b>
Modeling	0% (0)	0% (0)	86% (6)	0% (0)	0% (0)	14% (1)	<b>7</b>

## Appendix E-27: Aggregated Developed Lands

Voluntary landowner reporting	20% (1)	40% (2)	0% (0)	0% (0)	0% (0)	40% (2)	<b>5</b>
Other (please specify below)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	<b>3</b>
<b>Total Respondents</b>							<b>61</b>

### 31. Other HABITAT inventory and assessment techniques for the Wildlife in All Developed Lands Habitats in Indiana.

If there was a significant decline in bull frog habitat on state owned properties the state would hear about it from frog hunters.

Insufficient data on Kirtland's snake habitat.

"Habitat" for some wildlife species is defined primarily by suitable nesting sites near water. Volunteer participation in building a database of known breeding colonies and volunteer periodic censusing of colony sizes.

**Total Respondents 3**

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in All Developed Lands Habitats in Indiana?

1. Aerial Photography and modeling
2. Urban residents could be encouraged to participate in the Frog Watch program.
  1. N/A
3.
  2. aerial spring surveys
4. Insufficient data on Kirtland's snake habitat.
5. Only casual assessment needed.

6. "Habitat" for this species is defined primarily by suitable nesting sites near water. Volunteer participation in building a database of known breeding colonies and volunteer periodic censusing of colony sizes.

**Total Respondents 7**

### 33. What is the current body of science for the Wildlife in All Developed Lands Habitats in Indiana?

	Response Total	Response Percent
Complete, up to date and	1	12%

## Appendix E-27: Aggregated Developed Lands

extensive			
Adequate		2	25%
Inadequate		3	38%
Nonexistent		2	25%
Other (please explain below)		0	0%
		<b>Total Respondents</b>	<b>8</b>

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in All Developed Lands Habitats in Indiana, if available. This resource may be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Managing Canada Geese in Urban Environments		
	Amphibians and Reptiles of Indiana	4	100%
Author	Peregrine Falcon nesting and management in Indiana Arthur E. Smith, Scott R. Craven and Paul D. Curtis		
	Sherman A. Minton, Jr.	4	100%
	Castrale, J.S., and A. Parker		
Date	1199		
	2001	4	100%
	1999		
Publisher	Indiana Audubon Quaterly 77:65-74. Cornell Cooperative Extension		
	Indiana Academy of Sciences	4	100%
		<b>Total Respondents</b>	<b>4</b>

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in All Developed Lands Habitats in Indiana. This resource may also be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
	Prevention and Control of Wildlife Damage		

Appendix E-27: Aggregated Developed Lands

	Blank		
	N/A		
	Midwest Peregrine Falcon Restoration - 2004 Annual Report		
Author	Blank www.natureserve.org/explorer	3	75%
	Blank Tordoff, H.B., J.A. Goggin, J.S. Castrale		
Date	1994 Blank Blank 2004	2	50%
Publisher	University of Nebraska Blank Blank The Raptor Center at the Univ. of Minnesota	2	50%
		<b>Total Respondents</b>	<b>4</b>

36. What is the current HABITAT body of science for the Wildlife in All Developed Lands Habitats in Indiana?		Response Total	Response Percent
Complete, up to date and extensive		1	14%
Adequate		1	14%
Inadequate		1	14%
Nonexistent		3	43%
Other (please explain below)	Unknown-Developed land "IS NOT" quality habitat AT ALL for Mallards. Therefore, it should not be addressed or perceived as such.	1	14%
		<b>Total Respondents</b>	<b>7</b>

37. Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in All Developed Lands Habitats in Indiana, if available. This resource may be used if further detail is needed.		Response Total	Response Percent
Title	Managing Canada Geese in Urban Environments		
	NA	3	100%
	Amphibians and Reptiles of Indiana Arthur E. Smith, Scott R. Craven and Paul D. Curtis		

Appendix E-27: Aggregated Developed Lands

	Blank		
	Sherman A. Minton, Jr.		
	1999		
Date	Blank	2	67%
	2001		
	Cornel Cooperative Extension		
Publisher	Blank	2	67%
	Indiana Academy of Science		
		<b>Total Respondents</b>	<b>3</b>

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in All Developed Lands Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	Indiana Heritage Database	2	100%
Author	Indiana Division of Nature Preserves	1	50%
Date		0	0%
Publisher		0	0%
		<b>Total Respondents</b>	<b>2</b>

**39.** What are the research needs for the Wildlife in All Developed Lands Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total
Life cycle	0% (0)	12% (1)	25% (2)	25% (2)	38% (3)	0% (0)	8
Distribution and abundance	12% (1)	38% (3)	25% (2)	25% (2)	0% (0)	0% (0)	8
Limiting factors (food, shelter, water, breeding sites)	0% (0)	38% (3)	25% (2)	25% (2)	12% (1)	0% (0)	8
Threats (predators/competition, contamination)	0% (0)	25% (2)	38% (3)	25% (2)	12% (1)	0% (0)	8
Relationship/dependence on specific habitats	25% (2)	0% (0)	25% (2)	25% (2)	25% (2)	0% (0)	8

## Appendix E-27: Aggregated Developed Lands

Population health (genetic and physical)	0% (0)	12% (1)	38% (3)	50% (4)	0% (0)	0% (0)	<b>8</b>
Other (please specify below)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	66% (2)	<b>3</b>
<b>Total Respondents</b>							<b>51</b>

### 40. Other research needs for the Wildlife in All Developed Lands Habitats in Indiana.

Movement pattern of urban Canada Geese.

1. Affinity for Canada Geese hatched in an urban environment to move or migrate back to a similar environment.
2. Ways to reduce urban populations
3. None known
  - 1) To determine the genetic integrity of Mallards in Developed Areas.
  - 2) To determine effective management tools and a management plan of Mallards in Developed Lands.

**Total Respondents 4**

### 41. What are the HABITAT research needs for the Wildlife in All Developed Lands Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	12% (1)	25% (2)	50% (5)	0% (0)	<b>8</b>
Distribution and abundance (fragmentation)	0% (0)	25% (2)	25% (2)	25% (2)	25% (2)	0% (0)	<b>8</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	25% (2)	38% (3)	25% (2)	12% (1)	0% (0)	<b>8</b>
Relationship/dependence on specific site conditions	12% (1)	25% (2)	38% (3)	0% (0)	25% (2)	0% (0)	<b>8</b>
Growth and development of individual components of the habitat	12% (1)	12% (1)	38% (3)	0% (0)	38% (3)	0% (0)	<b>8</b>
Other (please specify below)	0% (0)	67% (2)	0% (0)	0% (0)	0% (0)	33% (1)	<b>3</b>
<b>Total Respondents</b>							<b>43</b>

### 42. Other HABITAT research needs for the Wildlife in All Developed Lands Habitats in Indiana.

1. Ways to exclude geese

## Appendix E-27: Aggregated Developed Lands

2. None known

1) To determine the long term effects of Mallards in Developed Lands on the overall Mallard population

3. 2) To device management tools and concepts to help professionals manage better for Mallards in Developed Lands

4. The highest priority should be to understand why Kirtland's snake occur where we are currently finding them. With that information, we can maintain current populations before we determine the feasibility of increasing their numbers and distribution.

**Total Respondents 4**

**43.** How well do the following conservation efforts address the threats to the Wildlife in All Developed Lands Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	38% (3)	38% (3)	12% (1)	0% (0)	12% (1)	<b>8</b>
Population management (hunting, trapping)	12% (1)	12% (1)	25% (2)	38% (3)	12% (1)	<b>8</b>
Population enhancement (captive breeding and release)	0% (0)	12% (1)	12% (1)	50% (4)	25% (2)	<b>8</b>
Reintroduction (restoration)	0% (0)	12% (1)	12% (1)	50% (4)	25% (2)	<b>8</b>
Food plots	12% (1)	12% (1)	12% (1)	50% (4)	12% (1)	<b>8</b>
Threats reduction	0% (0)	38% (3)	12% (1)	38% (3)	12% (1)	<b>8</b>
Native predator control	0% (0)	12% (1)	12% (1)	63% (5)	12% (1)	<b>8</b>
Exotic/invasive species control	0% (0)	25% (2)	0% (0)	63% (5)	12% (1)	<b>8</b>
Regulation of collecting	38% (3)	25% (2)	12% (1)	12% (1)	12% (1)	<b>8</b>
Disease/parasite management	0% (0)	38% (3)	12% (1)	50% (4)	0% (0)	<b>8</b>
Translocation to new geographic range	0% (0)	38% (3)	25% (2)	38% (3)	0% (0)	<b>8</b>
Protection of migration routes	25% (2)	12% (1)	12% (1)	25% (2)	25% (2)	<b>8</b>
Limiting contact with pollutants/contaminants	12% (1)	25% (2)	25% (2)	25% (2)	12% (1)	<b>8</b>
Public education to reduce human disturbance	25% (2)	38% (3)	12% (1)	25% (2)	0% (0)	<b>8</b>
Culling/selective removal	0% (0)	50% (4)	12% (1)	38% (3)	0% (0)	<b>8</b>
Stocking	0% (0)	0% (0)	12% (1)	75% (6)	12% (1)	<b>8</b>
Other (please specify below)	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	<b>2</b>
						<b>Total Respondents 130</b>

Appendix E-27: Aggregated Developed Lands

**44.** Other current conservation practices for the Wildlife in All Developed Lands Habitats in Indiana.

1. Bull frog tadpoles could be introduced into an area as by-product to fish stocking or from released pet tadpoles.
2. Habitat Alteration
3. None known to me.

**Total Respondents 3**

**45.** What one or two specific practices would you recommend for more effective conservation of the Wildlife in All Developed Lands Habitats in Indiana?

1. See question 49
2. Population reduction
3. None needed
  1. 1)HUNTING (first and foremost)
  - 2)Habitat Alteration
4.
  2. removal of habitat in urban zones
5. When areas known or suspected to have Kirtlans's snakes are threatened with development, seek to have the developer include shrubs and rock features near drainages to provide cover and to reduce mowing in areas Kirtland's snakes are likely to use.
6. Education/awareness of falcon needs for feeding and nesting.
7. Continued use of bridge architecture that favors nest placement.

**Total Respondents 7**

**46.** How well do the following conservation efforts address the HABITAT threats to the Wildlife in All Developed Lands Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	25% (2)	38% (3)	0% (0)	12% (1)	25% (2)	<b>8</b>
Habitat protection on public lands	25% (2)	12% (1)	12% (1)	25% (2)	25% (2)	<b>8</b>
Habitat protection incentives (financial)	25% (2)	0% (0)	12% (1)	38% (3)	25% (2)	<b>8</b>
Habitat restoration through regulation	25% (2)	12% (1)	0% (0)	38% (3)	25% (2)	<b>8</b>
Habitat restoration on public lands	38% (3)	12% (1)	0% (0)	25% (2)	25% (2)	<b>8</b>
Habitat restoration incentives (financial)	25% (2)	0% (0)	12% (1)	38% (3)	25% (2)	<b>8</b>
Artificial habitat creation (artificial reefs, nesting platforms)	50% (4)	0% (0)	12% (1)	25% (2)	12% (1)	<b>8</b>

## Appendix E-27: Aggregated Developed Lands

Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	25% (2)	12% (1)	50% (4)	12% (1)	<b>8</b>
Succession control (fire, mowing)	25% (2)	0% (0)	12% (1)	38% (3)	12% (1)	<b>7</b>
Corridor development/protection	25% (2)	12% (1)	12% (1)	25% (2)	25% (2)	<b>8</b>
Managing water regimes	29% (2)	29% (2)	29% (2)	14% (1)	0% (0)	<b>7</b>
Pollution reduction	12% (1)	33% (3)	0% (0)	25% (2)	25% (2)	<b>8</b>
Protection of adjacent buffer zone	25% (2)	25% (2)	17% (1)	17% (1)	25% (2)	<b>8</b>
Restrict public access and disturbance	25% (2)	25% (2)	0% (0)	25% (2)	25% (2)	<b>8</b>
Land use planning	25% (2)	0% (0)	25% (2)	38% (3)	12% (1)	<b>8</b>
Technical assistance	25% (2)	38% (3)	12% (1)	12% (1)	12% (1)	<b>8</b>
Cooperative land management agreements (conservation easements)	25% (2)	12% (1)	12% (1)	25% (2)	25% (2)	<b>8</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
						<b>Total Respondents 137</b>

### 47. Other current HABITAT conservation practices for the Wildlife in All Developed Lands Habitats in Indiana.

1. The development and proliferation of storm water retention ponds.
2. N/A

**Total Respondents 2**

### 48. What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in All Developed Lands Habitats in Indiana?

1. See question 49
2. Landscaping to excluded geese
3. None needed
4.
  1. Habitat Alteration
  2. Removal of habitat in urban zones
5. When areas known or suspected to have Kirtlans's snakes are threatened with development, seek to have the developer include shrubs and rock features near drainages to provide cover and to reduce mowing in areas Kirtland's snakes are likely to use.
6. Education/awareness programs for building managers.
7. Critical habitat for Cliff Swallows is nesting sites, most are on public (DOT) structures (bridges). Much less important is water quality, etc. for feeding areas.

**Total Respondents 7**

## Appendix E-27: Aggregated Developed Lands

### 49. Do you have any additional comments or information on the Wildlife in All Developed Lands Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

This survey was hard to complete for Canada Geese in Developed land Habitats. What is effective conservation? I consider the large numbers of Canada Geese in urban environments (developed lands) a real problem. So do many residents of Fort Wayne.

- Urban goose-human conflicts are on the rise. Each year the Division of Fish & Wildlife issues more and more egg/nest destruction and trap/transport permits. Urban areas attract geese by offering lakes and ponds, short lush lawns, protection and even those individuals that intentionally feed geese. Effective conservation for urban geese should deal with how to limit numbers through education and habitat modifications. I.e.: if a retention pond must be constructed, install habitats around the pond that help limit geese. Urban geese can nest in inappropriate sites, demonstrate aggressive behavior, cause damage to lawns, beaches, sidewalks, parking lots, etc. In my opinion, the best conservation practice would be to limit Canada Goose numbers in developed land habitats.

1. There is currently an overpopulation of Canada geese in developed lands. State, municipal, and federal governments and private landowners need to work together to reduce the population of nuisance geese.

2. Bull frogs are mobil, hearty, omnivorous and indiscriminate predator, and habitat generalist. They are believed to be detrimental to other frogs. They do not require management at this time and should be monitored as an environmental sentinel. If bull frogs start declining then something serious is happening to the environment

3. The information and comments that I have provided are true and accurate to the best of my knowledge. However, I don't feel that this was the best platform to have conveyed information on Mallards in Developed Habitats. Mallards in developed lands is a topic unlike that of most species threatened by habitat loss and its accompanying problems. Rather, Mallards in Developed Lands is a situation which must be dealt with in a responsible manner if we are to maintain the integrity of Mallards in a "natural" or less developed setting in Indiana. As the size and distribution of developed lands in Indiana grows, this situation becomes more and more complex for a multitude of reasons (genetic pollution, fecal contamination, habitat loss or destruction, nuisance animal complaints, nutrient loading, etc.) I tried to convey that message in the format provided in this survey. However, Mallards in Developed Lands is not always a positive situation (which I tried to convey throughout this survey). Nonetheless, it is a crucial issue which must be addressed by the DFW. Proper planning and management now on the part of the DFW may result in "quality" Mallard habitat in Developed lands (in the future), better understanding of current Mallard and Developed Land dynamics, and a reduction of problems and conflicts in this current genre. This is my hope as well as justification for the answers and comments I provided on this topic.

**Total Respondents**

**3**

## Appendix E-28: Developed Lands

### 6. Please rank the following threats to the Wildlife in Developed Land Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Invasive/non-native species	0% (0)	0% (0)	50% (3)	0% (0)	33% (2)	17% (1)	<b>6</b>
High sensitivity to pollution	0% (0)	17% (1)	50% (3)	0% (0)	17% (1)	17% (1)	<b>6</b>
Bioaccumulation of contaminants	0% (0)	20% (1)	20% (1)	20% (1)	20% (1)	20% (1)	<b>5</b>
Predators (native or domesticated)	0% (0)	0% (0)	33% (2)	17% (1)	50% (3)	0% (0)	<b>6</b>
Dependence on other species (mutualism, pollinators)	0% (0)	0% (0)	17% (1)	17% (1)	67% (4)	0% (0)	<b>6</b>
Diseases/parasites (of the species itself)	0% (0)	33% (2)	17% (1)	50% (3)	0% (0)	0% (0)	<b>6</b>
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	17% (1)	33% (2)	50% (3)	0% (0)	<b>6</b>
Species over population	33% (2)	33% (2)	0% (0)	0% (0)	33% (2)	0% (0)	<b>6</b>
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	0% (0)	17% (1)	17% (1)	0% (0)	67% (4)	0% (0)	<b>6</b>
Unregulated collection pressure	0% (0)	0% (0)	17% (1)	17% (1)	50% (3)	17% (1)	<b>6</b>
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	0% (0)	17% (1)	17% (1)	17% (1)	50% (3)	0% (0)	<b>6</b>
							<b>65</b>

### 7. Please also rank these threats to the Wildlife in Developed Land Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat loss (breeding range)	0% (0)	17% (1)	17% (1)	33% (2)	33% (2)	0% (0)	<b>6</b>
Habitat loss (feeding/foraging areas)	0% (0)	17% (1)	17% (1)	17% (1)	50% (3)	0% (0)	<b>6</b>
Small native range (high endemism)	0% (0)	0% (0)	0% (0)	17% (1)	83% (5)	0% (0)	<b>6</b>
Near limits of natural geographic range	0% (0)	0% (0)	0% (0)	0% (0)	100% (5)	0% (0)	<b>5</b>
Large home range requirements	0% (0)	0% (0)	0% (0)	17% (1)	83% (5)	0% (0)	<b>6</b>
Viable reproductive population size or availability	0% (0)	0% (0)	17% (1)	0% (0)	83% (5)	0% (0)	<b>6</b>
Specialized reproductive behavior or low reproductive rates	0% (0)	0% (0)	17% (1)	0% (0)	83% (5)	0% (0)	<b>6</b>
Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	67% (4)	17% (1)	17% (1)	0% (0)	0% (0)	<b>6</b>

## Appendix E-28: Developed Lands

Genetic pollution (hybridization)	17% (1)	0% (0)	33% (2)	33% (2)	17% (1)	0% (0)	<b>6</b>
Unknown	0% (0)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)	<b>2</b>
Other (please specify below)	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
<b>Total Respondents</b>							<b>57</b>

### 8. Other threats to the Wildlife in Developed Land Habitats in Indiana.

1. Urban Canada Geese are a real problem in Indiana. I deal specifically with Ft. Wayne (Allen County). Canada geese have benefitted from the way humans have altered the landscape within Urban areas. Human-goose conflicts within the urban environment will increase.
2. "Urbanization and domestication of "wild" Mallards leading to the hybridization w/ domestic stock of ducks. The threat is one of unusual circumstance. As opposed to typical habitat loss or fragmentation, this threat constitutes displacement of Mallards into undesirable/"unnatural" areas creating nuisance problems and genetic integrity concerns. The "developed" land itself creates wild scale loss of "high quality" habitat for Mallards. However, Mallard ducks are adaptable creatures and have adapted to this "developed" environment. Nonetheless, their adaptiveness could also be their downfall in "developed" lands.
3.
  1. Abrupt changes in drainage patterns due to development. Kirtland's snakes prefer moist soils that support earthworms.
  2. Mowing, or moving or clearing of debris (cover items) on the ground as Kirtland's snakes are found in moist open environments; but, often under natural and man-made debris on the ground

**Total Respondents 3**

### 9. Please briefly describe the top two threats to the Wildlife in Developed Land Habitats in Indiana identified above.

1. The top two threats to Canada Geese in Developed Land habitats are: Overpopulation and aggressive behavior during courtship/nesting
2. Over population  
Migratory habitat loss
3.
  - 1) Genetic pollution
  - 2) Population explosions and accompanying diseases, nuisance concerns, etc.
 urbanization  
overpopulation
4.
  1. Development of drainage areas and flood plains, including development of park-like areas in which natural or man-made cover is removed.
  2. Habitat fragmentation that disrupts gene flow and re-colonization.

**Total Respondents 4**

### 10. Please rank the following threats to the HABITAT of the Wildlife in Developed Land Habitats in Indiana.

	Critical threat	Serious threat	Somewhat of a threat	Slight threat	No threat	Unknown	Response Total
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## Appendix E-28: Developed Lands

need to survive. With an overpopulation of Canada Geese in Urban areas; it's hard to say there is a habitat threat.

2. Regulations  
urban development

1. 1)Urban sprawl creating attractive areas for Mallards to become "more domesticated" (i.e retention/detention ponds).  
2)Feeding of birds by people.

3. 3)Destruction of beneficial areas for Mallards (and other puddle ducks), ie wetlands, streams, small ponds, etc. These areas are converted to retention/detention ponds.

2. urban sprawl  
retention ponds

4. 1. Development of drainage areas and flood plains, including development of park-like areas in which natural or man-made cover is removed.  
2. Habitat fragmentation that disrupts gene flow and re-colonization.

**Total Respondents 5**

### 13. What current monitoring efforts by state agencies are you aware of for the Wildlife in Developed Land Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	50% (3)	50% (3)	<b>6</b>
Statewide once a year monitoring conducted by state agencies	75% (3)	25% (1)	<b>4</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	50% (2)	50% (2)	<b>4</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	50% (2)	50% (2)	<b>4</b>
Regional or local year-round monitoring conducted by state agencies	25% (1)	75% (3)	<b>4</b>
Regional or local once a year monitoring conducted by state agencies	75% (3)	25% (1)	<b>4</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	50% (2)	50% (2)	<b>4</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	50% (2)	50% (2)	<b>4</b>
		<b>Total Respondents</b>	<b>34</b>

### 14. What current monitoring efforts by other organizations are you aware of for the Wildlife in Developed Land Habitats in Indiana?

## Appendix E-28: Developed Lands

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (5)	5
Statewide once a year monitoring conducted by other organizations	50% (3)	50% (3)	6
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	20% (1)	80% (4)	5
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	20% (1)	80% (4)	5
Regional or local year-round monitoring conducted by other organizations	20% (1)	80% (4)	5
Regional or local once a year monitoring conducted by other organizations	25% (1)	75% (3)	4
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	20% (1)	80% (4)	5
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	20% (1)	80% (4)	5
		<b>Total Respondents</b>	<b>40</b>

15. How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Developed Land Habitats in Indiana?		Very crucial	Somewhat crucial	Slightly crucial	Not crucial	Unknown	Response Total
Statewide year-round monitoring conducted by state agencies		33% (2)	0% (0)	0% (0)	17% (1)	50% (3)	6
Statewide once a year monitoring conducted by state agencies		40% (2)	40% (2)	0% (0)	0% (0)	20% (1)	5
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies		20% (1)	20% (1)	20% (1)	0% (0)	40% (2)	5
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies		0% (0)	0% (0)	40% (2)	20% (1)	40% (2)	5
Regional or local year-round monitoring conducted by state agencies		20% (1)	0% (0)	20% (1)	20% (1)	40% (2)	5
Regional or local once a year monitoring conducted by state agencies		20% (1)	0% (0)	40% (2)	0% (0)	40% (2)	5
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies		40% (2)	0% (0)	20% (1)	0% (0)	40% (2)	5
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies		0% (0)	20% (1)	20% (1)	20% (1)	40% (2)	5

## Appendix E-28: Developed Lands

**Total Respondents 41**

### 16. How crucial are these monitoring efforts by other organizations for the conservation of the Wildlife in Developed Land Habitats in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	17% (1)	0% (0)	17% (1)	67% (4)	<b>6</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	50% (3)	0% (0)	0% (0)	50% (3)	<b>6</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	17% (1)	0% (0)	33% (2)	0% (0)	50% (3)	<b>6</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (2)	17% (1)	50% (3)	<b>6</b>
Regional or local year-round monitoring conducted by other organizations	17% (1)	0% (0)	17% (1)	0% (0)	67% (4)	<b>6</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	50% (3)	0% (0)	50% (3)	<b>6</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	17% (1)	0% (0)	33% (2)	0% (0)	50% (3)	<b>6</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (2)	17% (1)	50% (3)	<b>6</b>
						<b>Total Respondents 48</b>

### 17. Regional or local state agency monitoring for the Wildlife in Developed Land Habitats in Indiana.

1. The division of Fish & Wildlife conducts Canada Goose banding yearly. This consists of neck collars and leg bands. Water fowl surveys are also conducted. Hunter harvest are reported.
2. The Wildlife Diversity Section of the DFW coordinates Indiana's North American Amphibian Monitoring and Frog Watch Programs. These two programs collectively are the statewide effort to monitor frog and toad populations in Indiana, including bull frogs. The data can be analysed regionally.
3. The Wildlife Diversity Section of the DFW coordinates Indiana's North American Amphibian Monitoring and Frog Watch Programs. These two programs collectively are the statewide effort to monitor frog and toad populations in Indiana, including bull frogs. The data can be analysed regionally.
4. Regionally (throughout the state)-waterfowl breeding status surveys, population surveys  
Regionally (throughout the state)-Statewide trapping, banding, and recapture efforts
5. Kirtland snake encounters are reported to the Indiana Natural Heritage Database on a sporadic basis by citizens and scientist. Although sporadic these reports are often sufficient to demonstrate persistent Kirtland snake occupied sites. However, the environmental parameters of these sites have not been adequately studied or

## Appendix E-28: Developed Lands

occupied sites. However, the environmental parameters of these sites have not been adequately studied or described to reveal important micro-habitat associations.

**Total Respondents 5**

### 18. Regional or local monitoring by other organizations for the Wildlife in Developed Land Habitats in Indiana.

1. I believe Ducks Unlimited conducts waterfowl surveys
2. Breeding surveys, population surveys
3. None known.

**Total Respondents 3**

### 19. Please list organizations that are monitoring the Wildlife in Developed Land Habitats in Indiana.

1. US Fish & Wildlife Service  
Indiana Division of Fish & Wildlife  
Ducks Unlimited
2. IDNR-Division of Fish and Wildlife  
IDNR-Division of Parks and Reservoirs  
U.S. FWS  
Ducks Unlimited  
Waterfowl USA
3. None know to be "monitoring" the Wildlife Diversity Section of the Indiana Division of Fish and Wildlife accepts sighting information as does the Division of Nature Preserves for inclusion in the Heritage Database.

**Total Respondents 3**

### 20. What are the current monitoring techniques for the Wildlife in Developed Land Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	80% (4)	0% (0)	20% (1)	0% (0)	5
Modeling	17% (1)	17% (1)	50% (3)	0% (0)	0% (0)	17% (1)	6
Coverboard routes	0% (0)	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	2
Spot mapping	33% (1)	33% (1)	0% (0)	0% (0)	0% (0)	33% (1)	3
Driving a survey route	67% (4)	17% (1)	17% (1)	0% (0)	0% (0)	0% (0)	6



## Appendix E-28: Developed Lands

2. monitoring throughout annual cycle

4. I do not believe that an effective nationally or regionally accepted monitoring technique exist. This should be identified as a need in the CWS.

**Total Respondents 4**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Developed Land Habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (6)	6
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (6)	6
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (6)	6
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (6)	6
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (6)	6
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (6)	6
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (6)	6
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	20% (1)	80% (5)	6
		<b>Total Respondents</b>	<b>48</b>

### 24. What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for the Wildlife in Developed Land Habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (6)	6
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (6)	6
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (6)	6
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (6)	6

## Appendix E-28: Developed Lands

Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (6)	<b>6</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (6)	<b>6</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (6)	<b>6</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (6)	<b>6</b>
		<b>Total Respondents</b>	<b>48</b>

<b>25.</b>	How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in Developed Land Habitats in Indiana?					
	<b>These efforts are very crucial for this HABITAT</b>	<b>These efforts are somewhat crucial for this HABITAT</b>	<b>These efforts are slightly crucial for this HABITAT</b>	<b>These efforts are not crucial for this HABITAT</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	33% (2)	0% (0)	17% (1)	33% (2)	17% (1)	<b>6</b>
Statewide once a year inventory and assessment conducted by state agencies	20% (1)	0% (0)	0% (0)	40% (2)	40% (2)	<b>5</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	25% (1)	25% (1)	0% (0)	25% (1)	25% (1)	<b>4</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	50% (2)	50% (2)	<b>4</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	50% (2)	50% (2)	<b>4</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	50% (2)	50% (2)	<b>4</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	25% (1)	25% (1)	0% (0)	25% (1)	25% (1)	<b>4</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	50% (2)	50% (2)	<b>4</b>

Appendix E-28: Developed Lands

Total Respondents 35

**26.** How crucial are these HABITAT efforts by other organizations for the conservation of the Wildlife in Developed Land Habitats in Indiana?

	These efforts are very crucial for this HABITAT	These efforts are somewhat crucial for this HABITAT	These efforts are slightly crucial for this HABITAT	These efforts are not crucial for this HABITAT	Unknown	Response Total
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	40% (2)	60% (3)	5
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	40% (2)	60% (3)	5
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	20% (1)	20% (1)	0% (0)	20% (1)	40% (2)	5
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	40% (2)	60% (3)	5
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	25% (1)	75% (3)	4
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	40% (2)	60% (3)	5
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	20% (1)	20% (1)	0% (0)	20% (1)	40% (2)	5
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	40% (2)	60% (3)	5
				<b>Total Respondents</b>		<b>39</b>

**27.** Regional or local state agency HABITAT inventory and assessment for the Wildlife in Developed Land Habitats in Indiana.

1. I'm not aware of any  
None known
2. (Bull frogs are amphibian habitat generalist and fairly mobile. I know of no habitat inventory protocol for bull frogs in developed land habitat.)

## Appendix E-28: Developed Lands

None known:

3. At this time, the habitat characteristics of Kirtland's snake are not sufficiently defined as to be monitored by general habitat measures (such as habitat classification based on remote sensing). More information on Kirtland's snake habitat requirements is needed to define a reasonable habitat model for this species and to monitor the distribution and abundance of suitable habitat in the state.

**Total Respondents 2**

### 28. Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in Developed Land Habitats in Indiana.

1. I'm not aware of any
2. None known
3. None known

**Total Respondents 3**

### 29. Please list organizations that are monitoring this HABITAT for the Wildlife in Developed Land Habitats in Indiana.

1. I'm not aware of any
2. None known
3. None known

**Total Respondents 2**

### 30. What are the current HABITAT inventory and/or assessment techniques for Wildlife in Developed Land Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	17% (1)	67% (4)	0% (0)	0% (0)	17% (1)	6
Aerial photography and analysis	17% (1)	33% (2)	50% (3)	0% (0)	0% (0)	0% (0)	6
Systematic sampling	0% (0)	0% (0)	67% (4)	0% (0)	17% (1)	17% (1)	6
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4
Regulatory	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	4

## Appendix E-28: Developed Lands

information								
Participation in landuse programs	0% (0)	0% (0)	33% (2)	0% (0)	0% (0)	67% (4)	<b>6</b>	
Modeling	0% (0)	0% (0)	83% (5)	0% (0)	0% (0)	17% (1)	<b>6</b>	
Voluntary landowner reporting	25% (1)	25% (1)	0% (0)	0% (0)	0% (0)	50% (2)	<b>4</b>	
Other (please specify below)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	<b>3</b>	
<b>Total Respondents</b>							<b>49</b>	

### 31. Other HABITAT inventory and assessment techniques for the Wildlife in Developed Land Habitats in Indiana.

If there was a significant decline in bull frog habitat on state owned properties the state would hear about it from frog hunters.

Insufficient data on Kirtland's snake habitat.

**Total Respondents 2**

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Developed Land Habitats in Indiana?

1. Aerial Photography and modeling
2. Urban residents could be encouraged to participate in the Frog Watch program.
  1. N/A
3.
  2. aerial spring surveys
4. Insufficient data on Kirtland's snake habitat.

**Total Respondents 5**

### 33. What is the current body of science for the Wildlife in Developed Land Habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		2	33%
Inadequate		2	33%
Nonexistent		2	33%
Other (please explain below)		0	0%

Appendix E-28: Developed Lands

**Total Respondents 6**

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Developed Land Habitats in Indiana, if available. This resource may be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Managing Canada Geese in Urban Environments	3	100%
Author	Amphibians and Reptiles of Indiana Arthur E. Smith, Scott R. Craven and Paul D. Curtis	3	100%
Date	Sherman A. Minton, Jr.	3	100%
Publisher	1199 2001 Cornell Cooperative Extension Indiana Academy of Sciences	3	100%
<b>Total Respondents</b>		<b>3</b>	

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Developed Land Habitats in Indiana. This resource may also be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Prevention and Control of Wildlife Damage Blank N/A	3	100%
Author	Blank www.natureserve.org/explorer Blank	2	67%
Date	1994 Blank Blank	1	33%
Publisher	University of Nebraska Blank Blank	1	33%
<b>Total Respondents</b>		<b>3</b>	

**36.** What is the current HABITAT body of science for the Wildlife in Developed Land Habitats in Indiana?

**Response Total Response Percent**

## Appendix E-28: Developed Lands

Complete, up to date and extensive		0	0%
Adequate		1	17%
Inadequate		1	17%
Nonexistent		3	33%
Other (please explain below)	Unknown-Developed land "IS NOT" quality habitat AT ALL for Mallards. Therefore, it should not be addressed or perceived as such.	1	17%
<b>Total Respondents</b>		<b>6</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Developed Land Habitats in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Managing Canada Geese in Urban Environments NA	3	100%
Author	Amphibians and Reptiles of Indiana Arthur E. Smith, Scott R. Craven and Paul D. Curtis Blank	2	67%
Date	Sherman A. Minton, Jr. 1999 Blank	2	67%
Publisher	2001 Cornel Cooperative Extension Blank Indiana Academy of Science	2	67%
<b>Total Respondents</b>		<b>3</b>	

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Developed Land Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	Indiana Heritage Database	2	100%
Author	Indiana Division of Nature Preserves	1	50%
Date		0	0%
Publisher		0	0%

## Appendix E-28: Developed Lands

Total Respondents 2

### 39. What are the research needs for the Wildlife in Developed Land Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total
Life cycle	0% (0)	17% (1)	33% (2)	17% (1)	33% (2)	0% (0)	6
Distribution and abundance	17% (1)	50% (3)	17% (1)	17% (1)	0% (0)	0% (0)	6
Limiting factors (food, shelter, water, breeding sites)	0% (0)	50% (3)	17% (1)	17% (1)	17% (1)	0% (0)	6
Threats (predators/competition, contamination)	0% (0)	33% (2)	33% (2)	17% (1)	17% (1)	0% (0)	6
Relationship/dependence on specific habitats	33% (2)	0% (0)	33% (2)	0% (0)	33% (2)	0% (0)	6
Population health (genetic and physical)	0% (0)	17% (1)	50% (3)	33% (2)	0% (0)	0% (0)	6
Other (please specify below)	0% (0)	50% (1)	0% (0)	0% (0)	0% (0)	50% (1)	2
							<b>Total Respondents</b>
							<b>38</b>

### 40. Other research needs for the Wildlife in Developed Land Habitats in Indiana.

- Movement pattern of urban Canada Geese.
1. Affinity for Canada Geese hatched in an urban environment to move or migrate back to a similar environment.
  2. Ways to reduce urban populations
  3. None known
  4. 1)To determine the genetic integrity of Mallards in Developed Areas.  
2)To determine effective management tools and a management plan of Mallards in Developed Lands.

Total Respondents 4

### 41. What are the HABITAT research needs for the Wildlife in Developed Land Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total
Successional changes	0% (0)	0% (0)	17% (1)	33% (2)	50% (3)	0% (0)	6
Distribution and abundance (fragmentation)	0% (0)	33% (2)	17% (1)	17% (1)	33% (2)	0% (0)	6
Threats (land use change/competition, contamination/global warming)	0% (0)	33% (2)	33% (2)	17% (1)	17% (1)	0% (0)	6

## Appendix E-28: Developed Lands

Relationship/dependence on specific site conditions	17% (1)	17% (1)	33% (2)	0% (0)	33% (2)	0% (0)	<b>6</b>
Growth and development of individual components of the habitat	17% (1)	17% (1)	50% (3)	0% (0)	17% (1)	0% (0)	<b>6</b>
Other (please specify below)	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	<b>2</b>
							<b>Total Respondents 32</b>

### 42. Other HABITAT research needs for the Wildlife in Developed Land Habitats in Indiana.

1. Ways to exclude geese
2. None known
3.
  - 1) To determine the long term effects of Mallards in Developed Lands on the overall Mallard population
  - 2) To device management tools and concepts to help professionals manage better for Mallards in Developed Lands
4. The highest priority should be to understand why Kirtland's snake occur where we are currently finding them. With that information, we can maintain current populations before we determine the feasibility of increasing their numbers and distribution.

**Total Respondents 4**

### 43. How well do the following conservation efforts address the threats to the Wildlife in Developed Land Habitats in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection (use below for details)	33% (2)	33% (2)	17% (1)	0% (0)	17% (1)	<b>6</b>
Population management (hunting, trapping)	17% (1)	17% (1)	17% (1)	33% (2)	17% (1)	<b>6</b>
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	67% (4)	33% (2)	<b>6</b>
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	67% (4)	33% (2)	<b>6</b>
Food plots	17% (1)	17% (1)	0% (0)	50% (3)	17% (1)	<b>6</b>
Threats reduction	0% (0)	33% (2)	0% (0)	50% (3)	17% (1)	<b>6</b>
Native predator control	0% (0)	17% (1)	0% (0)	67% (4)	17% (1)	<b>6</b>
Exotic/invasive species control	0% (0)	17% (1)	0% (0)	67% (4)	17% (1)	<b>6</b>
Regulation of collecting	33% (2)	33% (2)	0% (0)	17% (1)	17% (1)	<b>6</b>
Disease/parasite management	0% (0)	17% (1)	17% (1)	67% (4)	0% (0)	<b>6</b>
Translocation to new geographic range	0% (0)	33% (2)	17% (1)	50% (3)	0% (0)	<b>6</b>
Protection of migration routes	33% (2)	0% (0)	17% (1)	33% (2)	17% (1)	<b>6</b>

## Appendix E-28: Developed Lands

Limiting contact with pollutants/contaminants	0% (0)	33% (2)	17% (1)	33% (2)	17% (1)	<b>6</b>
Public education to reduce human disturbance	17% (1)	50% (3)	0% (0)	33% (2)	0% (0)	<b>6</b>
Culling/selective removal	0% (0)	67% (4)	0% (0)	33% (2)	0% (0)	<b>6</b>
Stocking	0% (0)	0% (0)	0% (0)	83% (5)	17% (1)	<b>6</b>
Other (please specify below)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
				<b>Total Respondents</b>		<b>97</b>

### 44. Other current conservation practices for the Wildlife in Developed Land Habitats in Indiana.

1. Bull frog tadpoles could be introduced into an area as by-product to fish stocking or from released pet tadpoles.
2. Habitat Alteration

**Total Respondents**      **2**

### 45. What one or two specific practices would you recommend for more effective conservation of the Wildlife in Developed Land Habitats in Indiana?

1. See question 49
2. Population reduction
3. None needed
  1. 1)HUNTING (first and foremost)
  - 2)Habitat Alteration
4.
  2. removal of habitat in urban zones

5. When areas known or suspected to have Kirtlans's snakes are threatened with development, seek to have the developer include shrubs and rock features near drainages to provide cover and to reduce mowing in areas Kirtland's snakes are likely to use.

**Total Respondents**      **5**

### 46. How well do the following conservation efforts address the HABITAT threats to the Wildlife in Developed Land Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	33% (2)	17% (1)	0% (0)	17% (1)	33% (2)	<b>6</b>
Habitat protection on public lands	33% (2)	17% (1)	0% (0)	17% (1)	33% (2)	<b>6</b>
Habitat protection incentives (financial)	33% (2)	0% (0)	0% (0)	33% (2)	33% (2)	<b>6</b>
Habitat restoration through regulation	33% (2)	00% (0)	0% (0)	33% (2)	33% (2)	<b>6</b>
Habitat restoration on public lands	33% (2)	17% (1)	0% (0)	17% (1)	33% (2)	<b>6</b>

## Appendix E-28: Developed Lands

Habitat restoration incentives (financial)	33% (2)	0% (0)	0% (0)	33% (2)	33% (2)	<b>6</b>
Artificial habitat creation (artificial reefs, nesting platforms)	33% (2)	0% (0)	17% (1)	33% (2)	17% (1)	<b>6</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	33% (2)	0% (0)	50% (3)	17% (1)	<b>6</b>
Succession control (fire, mowing)	40% (2)	0% (0)	0% (0)	40% (2)	20% (1)	<b>5</b>
Corridor development/protection	33% (2)	0% (0)	0% (0)	33% (2)	33% (2)	<b>6</b>
Managing water regimes	40% (2)	40% (2)	20% (1)	0% (0)	0% (0)	<b>5</b>
Pollution reduction	0% (0)	33% (2)	0% (0)	33% (2)	33% (2)	<b>6</b>
Protection of adjacent buffer zone	33% (2)	17% (1)	0% (0)	17% (1)	33% (2)	<b>6</b>
Restrict public access and disturbance	17% (1)	17% (1)	0% (0)	33% (2)	33% (2)	<b>6</b>
Land use planning	33% (2)	0% (0)	17% (1)	33% (2)	17% (1)	<b>6</b>
Technical assistance	17% (1)	50% (3)	0% (0)	17% (1)	17% (1)	<b>6</b>
Cooperative land management agreements (conservation easements)	33% (2)	0% (0)	0% (0)	33% (2)	33% (2)	<b>6</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
				<b>Total Respondents</b>		<b>102</b>

**47.** Other current HABITAT conservation practices for the Wildlife in Developed Land Habitats in Indiana.

1. The development and proliferation of storm water retention ponds.
2. N/A

**Total Respondents 2**

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Developed Land Habitats in Indiana?

1. See question 49
2. Landscaping to excluded geese
3. None needed
4.
  1. Habitat Alteration
  2. Removal of habitat in urban zones

5. When areas known or suspected to have Kirtland's snakes are threatened with development, seek to have the developer include shrubs and rock features near drainages to provide cover and to reduce mowing in areas Kirtland's snakes are likely to use.

**Total Respondents 5**

## Appendix E-28: Developed Lands

**49.** Do you have any additional comments or information on the Wildlife in Developed Land Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

This survey was hard to complete for Canada Geese in Developed land Habitats. What is effective conservation? I consider the large numbers of Canada Geese in urban environments (developed lands) a real problem. So do many residents of Fort Wayne. Urban goose-human conflicts are on the rise. Each year the Division of Fish & Wildlife issues more and more egg/nest destruction and trap/transport permits. Urban areas attract geese by offering lakes and ponds, short lush lawns, protection and even those individuals that intentionally feed geese. Effective conservation for urban geese should deal with how to limit numbers through education and habitat modifications. I.e.: if a retention pond must be constructed, install habitats around the pond that help limit geese. Urban geese can nest in inappropriate sites, demonstrate aggressive behavior, cause damage to lawns, beaches, sidewalks, parking lots, etc. In my opinion, the best conservation practice would be to limit Canada Goose numbers in developed land habitats.

1.

There is currently an overpopulation of Canada geese in developed lands. State, municipal, and federal governments and private landowners need to work together to reduce the population of nuisance geese.

2.

Bullfrogs are mobile, hearty, omnivorous and indiscriminate predator, and habitat generalist. They are believed to be detrimental to other frogs. They do not require management at this time and should be monitored as an environmental sentinel. If bullfrogs start declining then something serious is happening to the environment.

3.

The information and comments that I have provided are true and accurate to the best of my knowledge. However, I don't feel that this was the best platform to have conveyed information on Mallards in Developed Habitats. Mallards in developed lands is a topic unlike that of most species threatened by habitat loss and its accompanying problems. Rather, Mallards in Developed Lands is a situation which must be dealt with in a responsible manner if we are to maintain the integrity of Mallards in a "natural" or less developed setting in Indiana. As the size and distribution of developed lands in Indiana grows, this situation becomes more and more complex for a multitude of reasons (genetic pollution, fecal contamination, habitat loss or destruction, nuisance animal complaints, nutrient loading, etc.) I tried to convey that message in the format provided in this survey. However, Mallards in Developed Lands is not always a positive situation (which I tried to convey throughout this survey). Nonetheless, it is a crucial issue which must be addressed by the DFW. Proper planning and management now on the part of the DFW may result in "quality" Mallard habitat in Developed lands (in the future), better understanding of current Mallard and Developed Land dynamics, and a reduction of problems and conflicts in this current genre. This is my hope as well as justification for the answers and comments I provided on this topic.

4.

**Total Respondents**

**3**

## Appendix E-29: Golf Courses

Technical experts did not provide input on a representative species for this habitat.

There are no species of greatest conservation need in this guild.



## Appendix E-30: Industrial Lands

Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Other (please specify below)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
							<b>Total Respondents</b>
							<b>9</b>

### 8. Other threats to the Wildlife in Industrial Lands Habitat in Indiana.

1. Tolerance by building managers of nesting sites.

**Total Respondents** **1**

### 9. Please briefly describe the top two threats to the Wildlife in Industrial Lands Habitat in Indiana identified above.

1. Availability of undisturbed nesting sites.  
Collisions with buildings, powerlines, other structures.

**Total Respondents** **1**

### 10. Please rank the following threats to the HABITAT of the Wildlife in Industrial Lands Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Counterproductive financial incentives or regulations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Invasive/non-native species	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Habitat fragmentation	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Successional change	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Habitat degradation	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Stream channelization	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Impoundment of water/flow regulation	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>

## Appendix E-30: Industrial Lands

Agricultural/forestry practices	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Mining/acidification	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
							<b>Total Respondents</b>
							<b>16</b>

### 11. Other HABITAT threats to the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **1**

### 12. Please briefly describe the top two HABITAT threats to the Wildlife in Industrial Lands Habitat in Indiana identified above.

1. Reduction in quantity and quality of prey populations.  
Design of buildings that do not provide nesting ledges.

**Total Respondents** **1**

### 13. What current monitoring efforts by state agencies are you aware of for the Wildlife in Industrial Lands Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	100% (1)	0% (0)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>





Appendix E-30: Industrial Lands

**Total Respondents 1**

**18.** Regional or local monitoring by other organizations for the Wildlife in Industrial Lands Habitat in Indiana.

1. Building managers and volunteers report nesting activity at many nests.

**Total Respondents 1**

**19.** Please list organizations that are monitoring the Wildlife in Industrial Lands Habitat in Indiana.

1. Private companies (NIPSCO, Ispat Inland, building managers).

**Total Respondents 1**

**20.** What are the current monitoring techniques for the Wildlife in Industrial Lands Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Modeling	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Coverboard routes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Spot mapping	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Driving a survey route	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Mark and recapture	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Professional survey/census	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Volunteer survey/census	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Trapping (by any technique)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Representative	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1

## Appendix E-30: Industrial Lands

sites								
Probabilistic sites	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
								<b>Total Respondents 12</b>

### 21. Other monitoring techniques for the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Industrial Lands Habitat in Indiana?

1. Nest monitoring of all known nests (or representative sample) with 2-3 visits according to USFWS protocol.

**Total Respondents 1**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Industrial Lands Habitat in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	100% (1)	0% (0)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>





## Appendix E-30: Industrial Lands

once a year but still regularly scheduled) inventory and assessment conducted by other organizations

Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations

0% (0)      0% (0)      0% (0)      100% (1)      0% (0)      **1**

**Total Respondents      8**

**27.** Regional or local state agency HABITAT inventory and assessment for the Wildlife in Industrial Lands Habitat in Indiana.

1. Opportunistic statewide determination of potential nest sites in Indiana with the idea of erecting a nest box.

**Total Respondents      1**

**28.** Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents      0**

(skipped this question)      1

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in Industrial Lands Habitat in Indiana.

1. None

**Total Respondents      1**

**30.** What are the current HABITAT inventory and/or assessment techniques for Wildlife in Industrial Lands Habitat in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Aerial photography and analysis	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Systematic sampling	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>

## Appendix E-30: Industrial Lands

Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Modeling	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>												
Voluntary landowner reporting	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>												
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>												
<b>Total Respondents</b>							<b>9</b>												

### 31. Other HABITAT inventory and assessment techniques for the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Industrial Lands Habitat in Indiana?

1. Only casual assessment needed.

**Total Respondents 1**

### 33. What is the current body of science for the Wildlife in Industrial Lands Habitat in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		1	100%
Adequate		0	0%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>			<b>1</b>

## Appendix E-30: Industrial Lands

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Industrial Lands Habitat in Indiana, if available. This resource may be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Peregrine Falcon nesting and management in Indiana	1	100%
Author	Castrale, J.S., and A. Parker	1	100%
Date	1999	1	100%
Publisher	Indiana Audubon Quaterly 77:65-74.	1	100%
<b>Total Respondents</b>		<b>1</b>	

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Industrial Lands Habitat in Indiana. This resource may also be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Midwest Peregrine Falcon Restoration - 2004 Annual Report	1	100%
Author	Tordoff, H.B., J.A. Goggin, J.S. Castrale	1	100%
Date	2004	1	100%
Publisher	The Raptor Center at the Univ. of Minnesota	1	100%
<b>Total Respondents</b>		<b>1</b>	

**36.** What is the current HABITAT body of science for the Wildlife in Industrial Lands Habitat in Indiana?

		<b>Response Total</b>	<b>Response Percent</b>
Complete, up to date and extensive		1	100%
Adequate		0	0%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>1</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Industrial Lands Habitat in Indiana, if available. This resource may be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	see previous citations	1	100%
Author		0	0%
Date		0	0%

## Appendix E-30: Industrial Lands

Publisher	0	0%
<b>Total Respondents</b>	<b>1</b>	

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Industrial Lands Habitat in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
	(skipped this question)	1

**39.** What are the research needs for the Wildlife in Industrial Lands Habitat in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total
Life cycle	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Distribution and abundance	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Threats (predators/competition, contamination)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Relationship/dependence on specific habitats	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Population health (genetic and physical)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
<b>Total Respondents</b>							<b>6</b>

**40.** Other research needs for the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

<b>Total Respondents</b>	<b>0</b>
(skipped this question)	1

## Appendix E-30: Industrial Lands

### 41. What are the HABITAT research needs for the Wildlife in Industrial Lands Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Distribution and abundance (fragmentation)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Relationship/dependence on specific site conditions	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Growth and development of individual components of the habitat	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
	<b>Total Respondents</b>						<b>5</b>

### 42. Other HABITAT research needs for the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

### 43. How well do the following conservation efforts address the threats to the Wildlife in Industrial Lands Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Population enhancement (captive breeding and release)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Reintroduction (restoration)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Food plots	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Threats reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Native predator control	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regulation of collecting	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Disease/parasite management	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>

## Appendix E-30: Industrial Lands

Translocation to new geographic range	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Protection of migration routes	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Limiting contact with pollutants/contaminants	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Public education to reduce human disturbance	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Stocking	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
						<b>Total Respondents 16</b>

### 44. Other current conservation practices for the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 45. What one or two specific practices would you recommend for more effective conservation of the Wildlife in Industrial Lands Habitat in Indiana?

1. Education/awareness of falcon needs for feeding and nesting.

**Total Respondents 1**

### 46. How well do the following conservation efforts address the HABITAT threats to the Wildlife in Industrial Lands Habitat in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat protection on public lands	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Habitat protection incentives (financial)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Habitat restoration through regulation	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Habitat restoration on public lands	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Habitat restoration incentives (financial)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Artificial habitat creation (artificial reefs, nesting platforms)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Succession control (fire, mowing)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>

## Appendix E-30: Industrial Lands

Corridor development/protection	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Managing water regimes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>	
Pollution reduction	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Protection of adjacent buffer zone	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Restrict public access and disturbance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Land use planning	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>	
Technical assistance	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Cooperative land management agreements (conservation easements)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
<b>Total Respondents</b>						<b>17</b>	

**47.** Other current HABITAT conservation practices for the Wildlife in Industrial Lands Habitat in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Industrial Lands Habitat in Indiana?

1. Education/awareness programs for building managers.

**Total Respondents**      **1**

**49.** Do you have any additional comments or information on the Wildlife in Industrial Lands Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

No responses were entered for this question.

**Total Respondents**      **-1**

(skipped this question)      2



## Appendix E-31: Roads/Rails/Bridges

Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
						<b>Total Respondents</b>	<b>11</b>

### 8. Other threats to the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **1**

### 9. Please briefly describe the top two threats to the Wildlife in Roads/Rails/Bridges Habitat in Indiana identified above.

- House Sparrow preemption of nests.  
Vandalism potential at nesting colonies.

**Total Respondents** **1**

### 10. Please rank the following threats to the HABITAT of the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Counterproductive financial incentives or regulations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Invasive/non-native species	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Habitat fragmentation	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Successional change	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Habitat degradation	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Stream channelization	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>



## Appendix E-31: Roads/Rails/Bridges

Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

### 14. What current monitoring efforts by other organizations are you aware of for the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by other organizations	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

### 15. How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>





## Appendix E-31: Roads/Rails/Bridges

technique)								
Representative sites	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Probabilistic sites	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
							<b>Total Respondents</b>	<b>4</b>

### 21. Other monitoring techniques for the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

1. Surveys for colonies and periodic censuses of nests/ populations.

**Total Respondents 1**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

1. Surveys for colonies and periodic censuses of nests/ populations.

**Total Respondents 1**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>







## Appendix E-31: Roads/Rails/Bridges

State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
<b>Total Respondents</b>							<b>3</b>

### 31. Other HABITAT inventory and assessment techniques for the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

1. "Habitat" for some species is defined primarily by suitable nesting sites near water. Volunteer participation in building a database of known breeding colonies and volunteer periodic censusing of colony sizes.

**Total Respondents 1**

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

1. "Habitat" for this some species is defined primarily by suitable nesting sites near water. Volunteer participation in building a database of known breeding colonies and volunteer periodic censusing of colony sizes.

**Total Respondents 1**

### 33. What is the current body of science for the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%
Adequate	0	0%
Inadequate	1	100%
Nonexistent	0	0%
Other (please explain below)	0	0%
<b>Total Respondents</b>		<b>1</b>

## Appendix E-31: Roads/Rails/Bridges

- 34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Roads/Rails/Bridges Habitat in Indiana, if available. This resource may be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
(skipped this question)		1

- 35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Roads/Rails/Bridges Habitat in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
(skipped this question)		1

- 36.** What is the current HABITAT body of science for the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%
Adequate	0	0%
Inadequate	1	100%
Nonexistent	0	0%
Other (please explain below)	0	0%
<b>Total Respondents</b>	<b>1</b>	

- 37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Roads/Rails/Bridges Habitat in Indiana, if available. This resource may be used if further detail is needed.

## Appendix E-31: Roads/Rails/Bridges

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
	(skipped this question)	1

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Roads/Rails/Bridges Habitat in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
	(skipped this question)	1

**39.** What are the research needs for the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total						
Life cycle	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1						
Distribution and abundance	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1						
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1						
Threats (predators/competition, contamination)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1						
Relationship/dependence on specific habitats	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1						
Population health (genetic and physical)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1						
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1						
<b>Total Respondents</b>							<b>7</b>						

## Appendix E-31: Roads/Rails/Bridges

### 40. Other research needs for the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 41. What are the HABITAT research needs for the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Distribution and abundance (fragmentation)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Relationship/dependence on specific site conditions	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Growth and development of individual components of the habitat	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
					<b>Total Respondents</b>		<b>6</b>

### 42. Other HABITAT research needs for the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 43. How well do the following conservation efforts address the threats to the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Population management (hunting, trapping)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Population enhancement (captive breeding and release)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Reintroduction (restoration)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>

## Appendix E-31: Roads/Rails/Bridges

Food plots	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Threats reduction	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Native predator control	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Exotic/invasive species control	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Regulation of collecting	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Disease/parasite management	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Translocation to new geographic range	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Protection of migration routes	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Public education to reduce human disturbance	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Culling/selective removal	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Stocking	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
						<b>Total Respondents 17</b>

### 44. Other current conservation practices for the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

1. None known to me.

**Total Respondents 1**

### 45. What one or two specific practices would you recommend for more effective conservation of the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

1. Continued use of bridge architecture that favors nest placement.

**Total Respondents 1**

### 46. How well do the following conservation efforts address the HABITAT threats to the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat protection on public lands	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Habitat protection incentives (financial)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Habitat restoration through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat restoration on public lands	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat restoration incentives (financial)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>

## Appendix E-31: Roads/Rails/Bridges

Artificial habitat creation (artificial reefs, nesting platforms)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Succession control (fire, mowing)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Corridor development/protection	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Managing water regimes	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Pollution reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Protection of adjacent buffer zone	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Restrict public access and disturbance	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Land use planning	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Technical assistance	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Cooperative land management agreements (conservation easements)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
						<b>Total Respondents 18</b>

### 47. Other current HABITAT conservation practices for the Wildlife in Roads/Rails/Bridges Habitat in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 48. What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Roads/Rails/Bridges Habitat in Indiana?

1. Critical habitat for Cliff Swallows is nesting sites, most are on public (DOT) structures (bridges). Much less important is water quality, etc. for feeding areas.

**Total Respondents 1**

### 49. Do you have any additional comments or information on the Wildlife in Roads/Rails/Bridges Habitat that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1





**9.** Please briefly describe the top two threats to all wildlife in all forest habitats in Indiana identified above.

1. Overpopulation will lead to an unmanageable resource and severe habitat degradation.
2. Captive cervids contaminate genetic integrity and increase chance of infection for wild deer
3. CWD will come to IN  
Trophy mgt & associated leasing will lead to overpopulation & fewer active hunters  
CWD, EHD & tuberculosis could be a management issue to a deer herd of our density.
4. Loss of habitat to rural development .  
Habitat loss- Land development  
Invasive species and its relation to habitat loss  
I seek to manage my answer about loss of migration habitat. The large-scale mortality being reported from wind turbines and other sources is the most threatening issue for this species.
5. We also need information about how this species migrates to begin thinking about where not to place such structures.  
Loss of winter range is a slight concern since we really don't know where they are going.
6. Habitat fragmentation & habitat destruction.
7. The 2 greatest threats to the fox squirrel are overall loss of habitat and fragmentation of the remaining forest tracts.  
Threats to bobcat populations in Indiana are human-related factors such as direct mortality (incidental take, road-kills, persecution) and habitat loss. Conversion of native communities and habitats for human use cause direct loss of habitats for bobcats and their prey items.
8. The top two threats to the eastern box turtle are habitat loss, road mortality, and human collection.
9. Loss of large blocks of mature forest and increases in forest fragmentation that causes and increase in cowbird nest parasitism and increases edge nest predators (e.g., bluejays). This causes a decrease in recruitment.
10. 1. We still have very little information on the Cerulean Warbler. We need to assess basic demography in Indiana and across the breeding range, learn how this species responds to land management, develop an understanding of post-fledging habitat use, and determine the effect of the brown-headed cowbird on this species.  
2. Because the Cerulean Warbler is an area-sensitive species, a loss of large tracts of mature forest on both the breeding and wintering grounds is a critical threat.
11. Brown-headed Cowbird brood parasitism is likely a significant negative impact.
12. Nest predation may also be important.  
Habitat fragmentation may exacerbate both of these.
13. Loss of contiguous blocks of mature forest  
Low reproductive output – possibly 'sink' populations due to poor habitat quality  
The top two threats to timber rattlesnakes in this habitat are habitat loss and human persecution. Timber rattlesnakes are often killed because they are large venomous snakes. There is also a

## Appendix E-32: Aggregated Forests

Timber rattlesnakes are often killed because they are large venomous snakes. There is also a market for this species in illegal trade. Individual take coupled with low reproductive rates pose a serious threat for this species.

15. 1) Lack of periodic vegetative disturbance (Man-made or natural every 5-10 yrs) that adequately opens the forest canopy well distributed throughout predominately forested management s, management in the large contiguous forested areas of the state in public ownership which form the core or heart of the residual and current grouse range. 2) Potential habitat on private lands is fragmented in distribution due to small ownership and different management objectives (lack of active timber mgmt) that does not provide a consistent continuum of management habitat for successful population dispersal. A recent population model analysis based on current habitat conditions and actual grouse population data for Indiana projects that ruffed grouse will potentially disappear as a viable species in much of their current range by 2007. Ruffed grouse population indices are now at the lowest levels recorded in over 40+ yrs.
16. 1. Loss of early successional forest age class.  
2. Preservationist (anti-management folks) and their influence on the politics of timber management and legal management to sound timber/wildlife management activities.
17. The lack of public knowledge/information regarding the importance of disturbances and early successional habitat in forested areas is the main contributing factor to the near extirpation of the ruffed grouse. The lack of early successional habitats in forested areas is causing major declines in the ruffed grouse population.
18. Potential habitat loss due development and lack of management.
19. Adequate habitat (primarily American sycamores along riparian areas) in breeding areas.
20. availability and quality of suitable nesting/feeding habitat.
21. Eastern Towhee is considered a habitat generalist that uses early successional habitats within deciduous forests. With prevailing land management that does not generate early succession habitat (such as maturation of forest on former farm lands), habitat is reduced. A second top threat is probably loss of nest and nesting females to cats, chipmunks, snakes and other ground predators.
22. Loss and degradation of breeding and foraging habitats along river corridors and uplands.
23. Little is known concerning the crowned snake in Indiana. I believe the top threats to this species in Indiana include habitat destruction, habitat fragmentation, and accidental take.
24. Adequate habitat (primarily American sycamores along riparian areas) in breeding areas.

**Total Respondents**

**24**

**10.** Please rank the following threats to the HABITAT of all wildlife in all forest habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	17% (4)	63% (15)	21% (5)	0% (0)	0% (0)	0% (0)	<b>24</b>
Counterproductive financial incentives or regulations	0% (0)	8% (2)	29% (7)	25% (6)	13% (3)	25% (6)	<b>24</b>
Invasive/non-native species	0% (0)	12% (3)	24% (6)	44% (11)	8% (2)	12% (3)	<b>25</b>

## Appendix E-32: Aggregated Forests

Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	4% (1)	42% (10)	33% (8)	21% (5)	<b>24</b>
Habitat fragmentation	20% (5)	28% (7)	44% (11)	8% (2)	0% (0)	0% (0)	<b>25</b>
Successional change	20% (5)	8% (2)	20% (5)	32% (8)	16% (4)	4% (1)	<b>25</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	21% (5)	38% (9)	17% (4)	25% (6)	<b>24</b>
Habitat degradation	17% (4)	17% (4)	33% (8)	33% (8)	0% (0)	0% (0)	<b>24</b>
Climate change	0% (0)	0% (0)	0% (0)	21% (5)	25% (6)	54% (13)	<b>24</b>
Stream channelization	0% (0)	8% (2)	8% (2)	13% (3)	54% (13)	17% (4)	<b>24</b>
Impoundment of water/flow regulation	0% (0)	0% (0)	17% (4)	17% (4)	46% (11)	21% (5)	<b>24</b>
Agricultural/forestry practices	13% (3)	25% (6)	33% (8)	13% (3)	13% (3)	4% (1)	<b>24</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	4% (1)	21% (5)	42% (10)	33% (8)	<b>24</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	38% (9)	38% (9)	25% (6)	<b>24</b>
Mining/acidification	0% (0)	4% (1)	13% (3)	21% (5)	50% (12)	13% (3)	<b>24</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	25% (6)	54% (13)	21% (5)	<b>24</b>
Unknown	0% (0)	0% (0)	0% (0)	8% (1)	17% (2)	75% (9)	<b>12</b>
Other (please specify below)	17% (2)	0% (0)	8% (1)	0% (0)	17% (2)	58% (7)	<b>12</b>
					<b>Total Respondents</b>		<b>411</b>

### 11. Other HABITAT threats to all wildlife in all forest habitats in Indiana.

1. Modern farm practices-the creation of large open, clean farm fields leaves no habitat for deer or many other mammals for that manner
2. Urban spread, construction, clearing for agriculture crops and fence row removal

3. Eastern hardwood forests, including those in Indiana, are relatively young and even-aged with less species diversity, vertical structure, natural canopy gaps, large woody debris, and other structural features than pre-European settlement forests. The influence of Native Americans, and particularly the subsequent wave of European expansion across the Midwest, left permanent changes across the landscape of Indiana, changes reflected in the extirpated flora and fauna of the region. Furthermore, the suppression of natural disturbances such as fire has resulted in a shift in species composition, structural complexity, and landscape pattern across much of the region. Fire-intolerant species such as sugar maple and American beech have become established at the expense of fire-adapted oak and hickory species, especially after fire control measures were. Before European settlement, fires, beavers, floods, and windstorms created extensive openings. The restoration of natural landscapes requires the re-introduction or simulation of these disturbances.

4. Not clear what is causing decline of the Cerulean Warbler, regionally brood parasitism and forest fragmentation may be negative impacts. It may be possible the species geographic range is shifting (climate?). Exact habitat associations of the species are not known -- not clear what is optimal habitat in Indiana in my view.

Public resistance and acceptance of periodic vegetative disturbance (timber management) is necessary because the forest cover across the landscape no longer exists in the same continuum and natural forces no longer operate (or are allowed to operate, e.g. regional firestorms) as they did prior to settlement. The public needs to accept that man-made disturbances (e.g. even-age timber management) can be used to mimic natural

## Appendix E-32: Aggregated Forests

accept that man-made disturbances (e.g. even-age timber management) can be used to mimic natural disturbances on a smaller & controlled scale to create a diversity of habitats in the residual forested landscape where once such natural disturbances operated at a larger scale in a relatively continuous forested landscape assuring early successional forest species viability. Another threat is excessive environmental review and assessment which makes timber management on public lands so costly in agency resources that it is deemed unaffordable within budgeted resources and attracts public ire as being too costly.

6. unknown
7. Although the Southeastern crowned snake is found in conjunction with upland forested habitats in Indiana, this species prefers sand and siltstone glades.

**Total Respondents 7**

### 12. Please briefly describe the top two HABITAT threats to all wildlife in all forest habitats in Indiana identified above.

1. Degredation by overpopulation  
Fragmentation in farmed/heavily populated regions prevents historical movements from summer to winter ranges
2. Urban sprawl is consuming significant amounts of our forest habitat  
Urban sprawl has started to interrupt movements and increased accidental mortality.
3. Fragmentation of habitat forces unnatural movement and increases accidental mortality as well as the opportunity to spread disease.
4. Development- this completely removes the habitat  
Habitat fragmentation- this also removes habitat  
Our unpublished work on eastern red bats suggest the critical habitat is a combination of forests for roosting and edge habitat for roosting. As such the main threats are
5. 1) loss of forest habitat  
2) loss of suitable foraging habitat to development  
Top threats to bobcat habitat are loss of forested habitats (or any native or non-developed habitats) to residential, commercial, industrial, etc. uses. Conversion of habitats to types dominated for human activity, on a cumulative scale, are problematic. Fragmentation, to a lesser extent, also negatively impacts bobcat habitats, but is probably less of a factor because the species is somewhat adaptable and highly mobile.
6. The largest threat to the box turtle habitat is fragmentation and urbanization.
7. Forest habitat fragmentation and loss of habitat.
8. The 2 greatest threats to fox squirrel habitat in Indiana are overall loss of habitat and fragmentation, both due primarily to agricultural practices of urban sprawl.
9. Loss of high quality forest habitat (over mature uneven-aged forest) and forest fragmentation (lots of cowbirds and bluejays). This results in lower quality habitat available to ceruleans.
  1. We still do not know the specific habitat preferences for this species. The types of habitats where these species were especially abundant in the past (i.e. old-growth bottomland forest) no longer exist. This area needs more research.
  2. The cerulean's dependence on large tracts of mature deciduous forests make the species

## Appendix E-32: Aggregated Forests

2. The cerulean's dependence on large tracts of mature deciduous forests, make the species especially sensitive to continuing forest fragmentation and isolation. The mechanism by which fragmentation affects populations in Indiana is unknown, but the response of this species to habitat fragmentation may be related to other factors associated with fragment size. Brood parasitism by the Brown-headed Cowbird (*Molothrus ater*), and high rates of nest predation by generalist predators such as Blue Jay (*Cyanocitta cristata*) and raccoon (*Procyon lotor*) are likely factors. Fragmentation of forest in Indiana especially in predominately agricultural landscapes has resulted in small patches of forest surrounded by open habitat that cowbirds require for feeding and nest searching.

12. Fragmentation of canopied forest habitats  
Brown-headed Cowbird brood parasitism.

13. Habitat fragmentation

The top two habitat threats to the timber rattlesnake include forest fragmentation and habitat loss.

14. The timber rattlesnakes need large continuous blocks of forest habitat. When these areas are lost rattlesnakes become susceptible to human and predator encounters.

This is somewhat repetitive of the previous questions but here we go again:

15. 1) lack of active timber management that adequately opens or removes the overhead forest canopy and allows for natural regeneration back into a forest cover. 2) the lack of public understanding and acceptance of timber management, especially even-age timber management.

2) the lack of public understanding and acceptance that vegetative disturbance whether natural or man-made

16. loss of early successional forest habitats  
fragmentation resulting in islands of habitat too far removed from others for immigration or emigration

17. The answers listed above indicate the absence of early successional habitat in forests, i.e. absence of clear-cutting, and other disturbance types in forested habitats is the major cause of ruffed grouse habitat declines. Forestry practices that do NOT lead to early successional habitat development are the problem. Grouse and many songbirds, need early forest successional stages and due to the current policies of the USFS and some state properties, the grouse is being "not-managed" to extirpation.

18. Conversion of habitat to other than pine forests  
Lack of active habitat management

19. Loss of floodplain sycamores and upland pine forests.

20. Loss of cavity trees and harvest of older forests.

21. Primary sources of loss of young forest habitats in Indiana are urban development / sprawl into remaining forest areas, and maturation of existing forest out of young forest age classes.; Primary sources of loss of young forest habitats in Indiana are urban development / sprawl into remaining forest areas, and maturation of existing forest out of young forest age classes.

22. Loss and habitat degradation of forested habitat along riparian areas and in uplands.

23. Threats to this species habitat include invasive species encroachment and habitat destruction.

24. Loss of floodplain sycamores and upland pine forests.

**Total Respondents**

**24**

## Appendix E-32: Aggregated Forests

### 13. What current monitoring efforts by state agencies are you aware of for all wildlife in all forest habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	17% (4)	83% (20)	<b>24</b>
Statewide once a year monitoring conducted by state agencies	30% (7)	70% (16)	<b>23</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	17% (4)	83% (19)	<b>23</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	39% (9)	61% (14)	<b>23</b>
Regional or local year-round monitoring conducted by state agencies	14% (3)	86% (19)	<b>22</b>
Regional or local once a year monitoring conducted by state agencies	30% (6)	70% (14)	<b>20</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	10% (2)	90% (19)	<b>21</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	15% (3)	85% (17)	<b>20</b>
		<b>Total Respondents</b>	<b>176</b>

### 14. What current monitoring efforts by other organizations are you aware of for all wildlife in all forest habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (23)	<b>23</b>
Statewide once a year monitoring conducted by other organizations	48% (11)	52% (12)	<b>23</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	13% (3)	88% (21)	<b>24</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	4% (1)	96% (22)	<b>23</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (24)	<b>24</b>
Regional or local once a year monitoring conducted by other organizations	25% (6)	75% (18)	<b>24</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	25% (6)	75% (18)	<b>24</b>
Occasional regional or local (less than once a year and not			

## Appendix E-32: Aggregated Forests

regularly scheduled) monitoring conducted by other organizations

**Total Respondents 189**

### 15. How crucial are these monitoring efforts by state agencies for the conservation of all wildlife in all forest habitats in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	8% (2)	13% (3)	4% (1)	63% (15)	13% (3)	<b>24</b>
Statewide once a year monitoring conducted by state agencies	23% (5)	23% (5)	9% (2)	27% (6)	18% (4)	<b>22</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	19% (4)	24% (5)	48% (10)	10% (2)	<b>21</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	48% (10)	10% (2)	33% (7)	10% (2)	<b>21</b>
Regional or local year-round monitoring conducted by state agencies	4% (1)	8% (2)	13% (3)	50% (12)	21% (5)	<b>23</b>
Regional or local once a year monitoring conducted by state agencies	17% (4)	17% (4)	17% (4)	25% (6)	21% (5)	<b>23</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	14% (3)	24% (5)	43% (9)	19% (4)	<b>21</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	10% (2)	20% (4)	50% (10)	20% (4)	<b>20</b>
						<b>Total Respondents 175</b>

### 16. How crucial are these monitoring efforts by other organizations for the conservation of all wildlife in all forest habitats in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	8% (2)	71% (17)	21% (5)	<b>24</b>
Statewide once a year monitoring conducted by other organizations	22% (5)	22% (5)	13% (3)	39% (9)	4% (1)	<b>23</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	8% (2)	8% (2)	63% (15)	21% (5)	<b>24</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	13% (3)	4% (1)	67% (16)	7% (4)	<b>24</b>
Regional or local year-round monitoring	0% (0)	4% (1)	13% (3)	58% (14)	25% (6)	<b>24</b>



## Appendix E-32: Aggregated Forests

15. In southern Indiana in the unglaciated forested region.

16. None known

17. periodic statewide Breeding Bird Atlas.

18. Breeding Bird Atlas - statewide

19. State-wide breeding bird atlas efforts are coordinated by the state DNR. This atlas effort was done in the 1980s, and is being redone now. Also the state DNR nongame bird program coordinates publication of a summer bird count that generates some data on towhee numbers (along with all other summer birds. No analysis is done, however.

20. The DNR occasionally monitors this species.

21. periodic statewide Breeding Bird Atlas.

**Total Respondents**

**21**

### **18.** Regional or local monitoring by other organizations for all wildlife in all forest habitats in Indiana.

1. Some municipalities; University properties

Purdue U

2. Beverly Shores  
US Nat'l Lkshore

Wesselman woods (Evansville)

3. Private groups have helped with counts in some State Parks.

4. Unknown

5. I don't know of any official monitoring that is occurring

6. None that I am aware of.

7. I am not sure who else might be monitoring box turtle in Indiana

8. Unknown

9. I am not aware of any other monitoring.

10. Audubon supports May Day count throughout state which detects cerulean warblers. TNC is working on developing a research project in the state for ceruleans.

1. BBS routes provide some information for this species. However, most routes are located along roads and do not adequately monitor interior forest species such as the cerulean.

2. The Hoosier National Forest conducts breeding bird point counts each year along points located in interior forest blocks or varying fragment size. Although the cerulean is not the focus of this study, data is collected on its occurrence.

11.

3. Cornell Lab of Ornithology collects data on the cerulean warbler for their program "Birds in Forested Landscapes." I am unsure whether data has been collected and submitted in Indiana.

4. Ball State has been conducting studies on the Hoosier and Big Oaks for this species. Currently, students from this university are working in conjunction with the Hoosier.

## Appendix E-32: Aggregated Forests

12. USGS roadside Breeding Bird Survey. These are not tied to this habitat type, but frequency of the other Cerulean habitats in the BBS coverage is low so most data refer to this habitat.
13. The USFS has contracted out survey work in the southern portions of the Hoosier National Forest.
14. Incidental observations on Christmas Bird Counts (extremely minor)  
Species occurrence noted during the Statewide Breeding Bird Atlas Project (only one ever done).
15. unknown
16. On state properties or USFS land where populations have been known to exist.
17. None known
18. federal Breeding Bird Survey statewide; statewide May Day Bird Counts, Summer Bird Counts.
19. federal Breeding Bird Surveys - statewide. Regional May Day Bird Counts, Summer Bird Counts, Christmas Bird Counts
20. Other bird monitoring efforts that collect data nationwide generate information on eastern towhees. These include the Breeding Bird Surveys, Christmas Bird Counts (towhees are rare in winter, though), Cornell nest record program. The Hoosier National Forest conducts breeding bird monitoring on the forest since 1991.
21. statewide Breeding Bird Survey. Periodic area surveys in the Hoosier National Forest.
22. The nature conservancy occasionally monitors for this species.
23. federal Breeding Bird Survey statewide; statewide May Day Bird Counts, Summer Bird Counts.

**Total Respondents**

**23**

### **19.** Please list organizations that are monitoring all wildlife in all forest habitats in Indiana.

1. state Universities
2. see # 18
3. unknown
4. Unknown
5. Indiana State University  
Wildlife Biologists at Military bases
6. I hesitate to use the term "monitoring" to describe this .... but IDNR does maintain records, databases, etc. regarding reports of bobcats throughout the state. These reports are, for the most part, unsolicited and obtained as they become available. It is not a regular, routine survey ... but more of a clearinghouse for information regarding bobcat sightings, road-kills, incidental captures, etc, which is one of the few means of "monitoring" low-density and wide-ranging species such as the bobcat.
7. Unknown
8. Indiana Division of Fish and Wildlife

## Appendix E-32: Aggregated Forests

9. USFWS, INDNR, TNC, Audubon, American Bird Conservancy, MAPS program (Point Reyes Bird Observatory), Local bird clubs, NRCS (thru WRP program monitoring)
  1. Hoosier National Forest
10. 2. Ball State University  
3. USFWS – Big Oaks
11. Indiana Department of Natural Resources (breeding bird atlas project)  
USGS roadside bird surveys
12. Ball State University, Department of Biology has been monitoring Cerulean Warbler populations at Big Oaks National Wildlife Refuge, Hoosier National Forest, and Yellowwood and Morgan-Monroe state forests during the last 5 years
13. USFS
14. Audubon Christmas Bird Counts
15. unknown
16. IDNR, Div. Fish and Wildlife
17. DNR Division of Fish and Wildlife  
USGS Breeding Bird Survey
18. bird-watchers, USGS,volunteers
19. USGS, birding groups, National Audubon Society  
USGS coordinates the Breeding Bird Survey, National Audubon Society coordinates the Christmas Bird Counts, Cornell's Laboratory of Ornithology collects the nest records, federal agencies do monitoring on lands they manage within the state (e.g., Hoosier NF).
20. USFS, universities
21. bird-watchers, USGS,volunteers

**Total Respondents                    22**

**20.** What are the current monitoring techniques for all wildlife in all forest habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	14% (3)	14% (3)	50% (11)	9% (2)	5% (1)	9% (2)	<b>22</b>
Modeling	4% (1)	43% (10)	30% (7)	0% (0)	0% (0)	22% (5)	<b>23</b>
Coverboard routes	0% (0)	0% (0)	29% (4)	36% (5)	7% (1)	29% (4)	<b>14</b>
Spot mapping	13% (3)	33% (8)	29% (7)	4% (1)	0% (0)	21% (5)	<b>24</b>



## Appendix E-32: Aggregated Forests

4. Harvest reports, unintentional kill  
Modeling  
White-tailed Deer Ecology and Management, Lowell K. Halls  

We need make sure someone continues to examine all animals submitted for rabies testing.
5. A regular monitoring program (using traps, echolocation calls, and mistnets) for bats should be initiated on a state-wide basis. This should be a combined effort by IDNR, Universities, and private organizations.
  1. Continued documentation of sightings, road-kills, and accidental captures. Obtain pertinent biological data from recovered specimens such as age and reproductive parameters (pregnancy rate, litter size). These data could be used to model populations or build life tables in future years.
  2. Some form of questionnaire or survey that is sent to trappers, hunters, professional resource managers could also be useful. The Indiana Bowhunter Survey is a good example although reporting rates for bobcats are so low they may not be effective to detect changes and monitor trends.

I do not have a good, single reference that describes these techniques although they are commonly used by many state wildlife agencies.
7. I would recommend long term surveys and radio-telemetry of box turtle. Surveys would include mark recapture methods.
8. This is a research question to be answered by research personnel.

A hunter report card sent out to dedicated squirrel hunters would be a useful tool to provide an index to the fox squirrel population. I would also like to see a radio-telemetry project in northern
9. Indiana to document fox squirrel dispersal between forest tracts. Another objective of this proposed radio-telemetry project would be to evaluate the possibility of overharvesting fox squirrel metapopulations.
10. A study that experimentally tests how forest management influences demography and presence and absence. This species needs basic life history studied, too.

We would benefit from obtaining basic demography data on this species. Mist-netting is not particularly feasible because the species stays so high in the canopy. Due to the difficulty of locating nests of ceruleans and of capturing adults, especially females, determination of reproductive success is problematic. Assessing survivorship of eggs, nestlings, and fledglings is also difficult. Until such reproductive success and survivorship information is available, the dynamics of populations will continue to be unknown.
11. Point counts, spot mapping, and territory mapping provide important information about ceruleans. Banding individual birds could supply information on site fidelity and survivorship.

Regular monitoring of migratory stopover and winter habitats will also be an important part of the conservation of the cerulean warbler.
12. Roadside bird surveys on selected routes maximizing forest habitats.

Repeated point count surveys in representative forest sites.
13. Professional Survey/Census – To locate Cerulean Warblers  
Nest search and monitoring – To assess productivity to determine if Indiana has a ‘source’ or ‘sink’ population of Cerulean Warblers  
Hutto, R.L., S.M. Pletschett, and T.P. Hendricks. 1986. A fixed-radius point-count method for nonbreeding and breeding season use. *Auk* 103:593-602.

## Appendix E-32: Aggregated Forests

I would recommend the use of radio-telemetry, mark recapture techniques, and transect surveys. Due to the cryptic nature of these snakes, locating individuals without the help of telemetry is extremely difficult. Many studies conducted locally and nationally have included telemetry in their methods.

14. ; I would recommend the use of radio-telemetry, mark recapture techniques, and transect surveys. Due to the cryptic nature of these snakes, locating individuals without the help of telemetry is extremely difficult. Many studies conducted locally and nationally have included telemetry in their methods.
15. 24. Roadside Drumming indices
- Spring drumming routes – used nationally for spring breeding trend data.
16. On particular or “study areas”, complete spring drumming counts for accurate breeding densities. Assumes a low # of non-drumming males and requires at least three opportunities, on good mornings, to hear a drumming bird in any portion of the study area
17. Driving routes, hunter bag surveys
18. Sampling of mature pine forest habitat to better determine distribution
19. Roadside surveys, canoe surveys, local, more intensive studies
20. federal Breeding Bird Surveys annually statewide.
21. Primary technique used is point counts of singing birds in breeding season, either by roadside counts (BBS) or set survey points (e.g., Hoosier NF monitoring). Roadside surveys are probably most effective because towhees are edge/early successional species, using habitats found near roads. Long term banding programs (e.g., MAPS) provide demographic information not gained with other monitoring, but are more intensive.
22. Road/streamside surveys in appropriate habitat.
23. I would recommend the use of professional surveys and test the effectiveness of cover objects for “trapping” this species.
24. Roadside surveys, canoe surveys, local, more intensive studies

**Total Respondents 24**

**23.** What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for all wildlife in all forest habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	5% (1)	95% (21)	22
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (21)	21
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	14% (3)	86% (18)	21
Occasional statewide (less than once a year and not regularly			

## Appendix E-32: Aggregated Forests

scheduled) inventory and assessment conducted by state agencies			
Regional or local year-round inventory and assessment conducted by state agencies	5% (1)	95% (21)	<b>22</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (21)	<b>21</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	18% (4)	82% (18)	<b>22</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	24% (5)	76% (16)	<b>21</b>
		<b>Total Respondents</b>	<b>171</b>

### 24. What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for all wildlife in all forest habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (22)	<b>22</b>
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (22)	<b>22</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	32% (7)	68% (15)	<b>22</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	14% (3)	86% (19)	<b>22</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (22)	<b>22</b>
Regional or local once a year inventory and assessment conducted by other organizations	9% (2)	91% (20)	<b>22</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	9% (2)	91% (20)	<b>22</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	14% (3)	86% (19)	<b>22</b>
		<b>Total Respondents</b>	<b>176</b>

### 25. How crucial are these HABITAT efforts by state agencies for the conservation of all wildlife in all forest habitats in Indiana?

	<b>These efforts are very crucial</b>	<b>These efforts are somewhat crucial for</b>	<b>These efforts are slightly</b>	<b>These efforts are not crucial</b>	<b>Unknown</b>	<b>Response Total</b>

Appendix E-32: Aggregated Forests

	for this HABITAT	this HABITAT	crucial for this HABITAT	for this HABITAT		
Statewide annual inventory and assessment conducted by state agencies	14% (3)	9% (2)	5% (1)	45% (10)	27% (6)	<b>22</b>
Statewide once a year inventory and assessment conducted by state agencies	10% (2)	19% (4)	5% (1)	33% (7)	33% (7)	<b>21</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	14% (3)	29% (6)	10% (2)	19% (4)	29% (6)	<b>21</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	24% (5)	10% (2)	33% (7)	33% (7)	<b>21</b>
Regional or local year-round inventory and assessment conducted by state agencies	5% (1)	19% (4)	5% (1)	29% (6)	43% (9)	<b>21</b>
Regional or local once a year inventory and assessment conducted by state agencies	10% (2)	14% (3)	5% (1)	33% (7)	38% (8)	<b>21</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	24% (5)	14% (3)	24% (5)	38% (8)	<b>21</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	24% (5)	14% (3)	29% (6)	33% (7)	<b>21</b>
				<b>Total Respondents</b>		<b>169</b>

26. How crucial are these HABITAT efforts by other organizations for the conservation of all wildlife in all forest habitats in Indiana?						
	These efforts are very crucial for this HABITAT	These efforts are somewhat crucial for this HABITAT	These efforts are slightly crucial for this HABITAT	These efforts are not crucial for this HABITAT	Unknown	Response Total
Statewide year-round inventory and assessment conducted by other organizations	5% (1)	0% (0)	10% (2)	60% (12)	25% (5)	<b>20</b>
Statewide once a year inventory and assessment conducted by other organizations	10% (2)	5% (1)	15% (3)	40% (8)	30% (6)	<b>20</b>
Periodic statewide (less than once a year but still regularly scheduled)	10% (2)	25% (5)	5% (1)	40% (8)	20% (4)	<b>20</b>



## Appendix E-32: Aggregated Forests

Indiana Div. of Forestry, IDNR.

13. On state and national forest. There is no need to do habitat evaluations at this point. As a specialist species and tied very closely to early successional forest habitats, we know the reason for the decline in grouse populations, and we know nothing is being done to provide habitat for the ruffed grouse and other early forest successional species.
14. None known
15. unknown
16. None
17. Forest inventory plots in established forest management lands give some information on trends in early succession habitat. But I am unaware of any regular coordinated effort by state or other agencies to monitor young forest age classes. Analysis of remote sensing data can provide some trend information where young forest classes can be mapped.
18. unknown
19. I am not sure how often state agencies survey the crowned snakes habitat. The division of nature preserves monitors these habitats.

**Total Respondents**

**19**

### **28.** Regional or local HABITAT inventory and assessment by other organizations for all wildlife in all forest habitats in Indiana.

1. Bev Shores  
Nat'l Lkshore  
Nat'l Forest  
Wesselman Woods
2. Unknown
3. Unknown
4. Local planning boards monitor land use in most localities
5. The Indiana GAP project categorizes land use cover types from landsat imagery. I assume that the change in cover types is being calculated over a specified period of time.
6. Unknown
7. TNC and USFWS and Forest Service uses habitat models to examine forest habitat in Indiana (Hoosier NF and Big Oaks NWR).
8. 1. Hoosier National Forest and Ball State University are collecting data on habitat use by cerulean warblers on the northern portion of the Forest.  
2. Cornell's "Birds in Forested Landscapes" collects some data on habitat use. I am not sure if data has been submitted from Indiana.
9. These habitat assessments might occur in Indiana, but I am not positive how often these activities take place.
10. None known

## Appendix E-32: Aggregated Forests

11. statewide aerial imagery of habitats in Indiana
12. Periodical aerial imagery
13. See above #17
14. USDA, USGS? statewide
15. statewide aerial imagery of habitats in Indiana

**Total Respondents**

**15**

**29.** Please list organizations that are monitoring this HABITAT for all wildlife in all forest habitats in Indiana.

1. state Universities
2. PU  
Gov't careing for #28
3. Unknown
4. Unknown
5. See Above
6. In addition to state and federal agencies, I suspect Indiana Hardwoods Lumberman Association or other private groups may monitor forested lands, particularly those in private ownership.
7. I would assume the Nature Conservancy, IDNR, and other Federal Agencies monitor these habitats
8. Indiana GAP Project
9. Unknown
10. INDNR, USFWS, USFS, TNC
11. 1. Hoosier National Forest  
2. Ball State University  
3. Cornell Lab of Ornithology
12. Ball State University, Department of Biology has been monitoring Cerulean Warbler populations at Big Oaks National Wildlife refuge, Hoosier national Forest, and Yellowwood and Morgan-Monroe state forests during the last 5 years
13. I would assume the Nature Conservancy, IDNR, USFS, and other organizations monitor these habitats
14. None known
15. unknown
16. USDA?, USGS?
17. See above #13 Q. 28
18. USFS, USDA?

## Appendix E-32: Aggregated Forests

19. Nature Conservancy and IDNR nature preserves.

**Total Respondents**      **19**

**30.** What are the current monitoring techniques for all wildlife in the Forest Habitats in Indiana. If a technique is not applicable to all wildlife do not select a response in that row.

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	20% (4)	40% (8)	5% (1)	5% (1)	0% (0)	30% (6)	<b>20</b>
Aerial photography and analysis	20% (4)	35% (7)	15% (3)	5% (1)	0% (0)	25% (5)	<b>20</b>
Systematic sampling	14% (3)	33% (7)	10% (2)	0% (0)	10% (2)	33% (7)	<b>21</b>
Property tax estimates	5% (1)	0% (0)	0% (0)	5% (1)	0% (0)	89% (16)	<b>18</b>
State revenue data	0% (0)	0% (0)	0% (0)	5% (1)	0% (0)	95% (18)	<b>19</b>
Regulatory information	0% (0)	5% (1)	0% (0)	5% (1)	0% (0)	89% (16)	<b>18</b>
Participation in landuse programs	5% (1)	36% (7)	5% (1)	5% (1)	0% (0)	47% (9)	<b>19</b>
Modeling	5% (1)	50% (10)	10% (2)	0% (0)	0% (0)	35% (7)	<b>20</b>
Voluntary landowner reporting	0% (0)	16% (3)	5% (1)	0% (0)	0% (0)	79% (15)	<b>19</b>
Other (please specify below)	7% (1)	14% (2)	0% (0)	0% (0)	0% (0)	79% (11)	<b>14</b>
							<b>Total Respondents</b>
							<b>188</b>

**31.** Other HABITAT inventory and assessment techniques for all wildlife in all forest habitats in Indiana.

1. unknown
2. Unknown
3. I am not sure of the techniques to monitor this habitat
4. Unknown
5. Samples at known nest sites are compared with random sites at Big Oaks NWR

## Appendix E-32: Aggregated Forests

- There have been several Master's projects on habitat selection for the Cerulean Warbler in Indiana. These studies have collected the following information on habitat use: diameter at breast height (DBH) and identification of tree species in a nested plot at the center of a territory, number of saplings (trees <3cm DBH) , number and DBH of standing dead trees (snags) , Canopy cover, ground cover, canopy height, percent canopy coverage and ground cover, canopy height, and vertical stratification of foliage
- 6.
  7. I am not sure what techniques are being applied to assess this habitat
  8. Unknown
  9. I believe this habitat "siltstone glade in upland forest" is monitored through surveys performed in this habitat.

**Total Respondents**

**9**

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of all wildlife in all forest habitats in Indiana?

1. GIS Habitat Modeling
2. GIS mapping and aerial photo analysis
3. GIS  
Aerial Photography
4. Statewide habitat mapping is needed (and mostly available if you know who to ask)  
Property tax assessments can be used as a proxy as well  
GIS is a logical tool to inventory and assess all aspects of forested habitats in Indiana (species composition, age & size class, ownership, management regime, etc.). It would be nice to have a GIS coverage of rock outcrops in the state to supplement forest data.  
To a lesser extent, interpretation of aerial photographs would also be useful.
5. Collect hunter data from DNR Properties & Private Land hunters.
6. Universities keep record of habitat loss and habitat fragmentation.
7. I would recommend a GIS analysis that examines changes in land use over the last 30+ year period.
8. GIS modeling, and intensive study to determine habitat quality (source vs. sink)
  1. I think that a crucial piece of habitat data for the cerulean warbler is the size and distribution of canopy gaps within territories. At this point, researchers have not determined an effective means to quantify this data.
9.
  2. Another important habitat inventory would be looking at landscape characteristics of cerulean occurrence and distribution in relation to forest fragmentation. Monitoring should incorporate the occurrence of the species in relation to landscape characteristics such as proportion of agricultural use, tract size and shape, and amount of edge.
10. Habitat association studies to determine which habitat types used/ preferred in IN.  
GIS/aerial photo analysis to map these habitat types.

## Appendix E-32: Aggregated Forests

11. Systematic sampling/survey techniques – To locate Cerulean Warblers  
Hutto et al. 1986. Auk 103:593-602
12. Statewide Forest Inventory
13. GIS and current aerial photos
14. Statewide inventory and mapping of mature pine forest communities to determine more accurate potential distribution of pine warbler. References suggested would be Flora of Indiana by Charles Deam 1940 and unpublished data/files from Division of Forestry.
15. Aerial imagery of riparian and pine habitats coupled with habitat modeling.
16. Aerial imagery and modeling
17. As stated before, I am unaware of efforts to monitor young age classes of forest. GIS mapping can certainly generate amounts and trends of habitat if forest type and age are mapped. Aerial photography can be used when young age classes appear distinct from other habitat classes.
18. Aerial imagery coupled with modeling.
19. Aerial imagery of riparian and pine habitats coupled with habitat modeling.

**Total Respondents 19**

### 33. What is the current body of science for all wildlife in all forest habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		2	9%
Adequate		10	43%
Inadequate		9	39%
Nonexistent		0	0%
Other (please explain below)	The science is adequate in some aspects of the turtles life history, but inadequate in others Breeding Bird Atlas and Breeding Bird Survey data	2	9%
<b>Total Respondents</b>		<b>23</b>	

### 34. Please provide a citation (title, author, date, publisher) that would give the best overview of all wildlife in all forest habitats in Indiana, if available. This resource may be used if further detail is needed.

	Response Total	Response Percent
1. White-tailed Deer Ecology and Management		
2. IN Mammals		
3. White-tailed Deer Ecology & Management		
4. White-tailed Deer Ecology & Management		
5. Mammals of Indiana		
6. The bobcat in Illinois		

## Appendix E-32: Aggregated Forests

	7.A long term study of a box turtle ( <i>Terrapene carolina</i> ) population at Allee Memorial Woods, Indiana, with emphasis on survivorship		
	8.None known		
	9.Gray and Fox Squirrel Management in Indiana		
	10.Cerulean Warbler MS Thesis		
	11.Habitat Selection and Territory Size of Cerulean Warblers in Southern Indiana		
	12.Habitat selection and reproductive success of Cerulean Warblers in Southern Indiana		
	13.Spatial Ecology of the Timber Rattlesnake in south central Indiana		
	14. Population status of ruffed grouse in Indiana;		
	15. Ruffed Grouse Restoration in IN		
	16. Atlas of Breeding Birds in Indiana		
	17. Breeding Bird Atlas of Indiana		
	18. Breeding Bird Atlas of Indiana		
	19. Eastern Towhee, Birds of North American account #262		
	20. Atlas of Breeding Birds of Indiana		
	21. Amphibians and Reptiles of Indiana		
	1.Halls, L. K. (editor)		
	2.Whittaker		
	3.Wildlife Management Institute Book		
	4.Lowell K. Halls		
	5.John Whitaker		
	6.Alan Woolf and Clayton Nielsen		
	7.Williams and Parker		
	8.John M. Allen		
	9.		
	10. Kirk Roth		
Author	11.Cynthia M. Basile	5	100%
	12.Kamal Islam and Kirk L.Roth		
	13.Walker and Kingsbury		
	14. Steven E. Backs		
	15. Steve Backs		
	16. Castrale, Hopkins, and Keller		
	17. Castrale, J.S., E. Hopkins, C. Keller		
	18. Castrale, Hopkins, Keller		
	19. Greenlaw, J.S.		
	20. Castrale, JS., E Hopkins, C Keller		
	21. Minton		
	1. 1984		
	2. 1984		
	3. 1984		
	4. IN Press		
	5. 2002		
	6. 1987		
	7.1964		
	8.		
	9.		
	10. 2004		
Date	11.6/02	4	75%
	12. December 2004		
	13. 2000		
	14. Annual Progress Reports		
	15. 1984		

Appendix E-32: Aggregated Forests

	16. 1998		
	17. 1988		
	18. 1988		
	19. 1996		
	20 1988		
	21. 2001		
	1.Stackpole Books		
	2. Stackpole Books		
	3.Stackpole Books		
	4. IU Press		
	5.Southern Illinois University Carbondale		
	6. Herpetologica		
	7. Indiana Department of Conservation		
	8.		
	9.		
	10. Ball State University		
	11. N/A		
Publisher	12. Department of Biology Technical Report No. 4, Ball State University, submitted to U.S. Fish & Wildlife Service, Fort Snelling, MN	3	75%
	13. Masters Thesis, IPFW		
	14. Indiana Div. Fish and Wildlife		
	15. N. Central Section of the Wildlife Soc.		
	16. Indiana Department of Natural Resources		
	17. IDNR		
	18. IDNR		
	19. The Birds of North America, Inc.		
	20. IDNR		
	21. Indiana Academy of Science		
		<b>Total Respondents</b>	<b>11</b>

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of all wildlife in all forest habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
	1. Mammals of Indiana		
	2. Nocturnal Behavior of Eastern Red Bats		
	3. Status and management of bobcas in the United States over three decades		
	4. North American Box Turtles		
	5. None known		
	6.Cerulean Warbler MS Thesis		
	7. Master's Thesis (Title Unknown)		
	8. Relative abundance and habitat selection of Cerulean Warblers in Southern Indiana		
Title	9. Blank	1	100%
	10. The historic and present distribution of ruffed grouse in Indiana;		
	11. Characteristics of Drumming Habitat of Grouse in IN		
	12. BNA Account - Yellow-throated Warbler		
	13. BNA Account - Pileated Woodpecker		
	14. Decline of the Rufous-sided Towhee in the eastern United States		
	15. BNA Account - Red-shouldered Hawk		

Appendix E-32: Aggregated Forests

	16. Snakes of the United States and Canada		
	1. Russell E. Mumford and John O. Whitaker, Jr.		
	2. Brianne Everson		
	3. Woolf, A. and G.F. Hubert, Jr.		
	4. Dodd		
	5.		
	6. Cindy Basile		
	7. Kirk Roth		
Author	8. Kamal Islam and Cynthia Basile	1	100%
	9. Gibson and Kingsbury		
	10. Steven E. Backs		
	11. Backs, Kelly, Major, Miller		
	12. G.A. Hall		
	13. E.L. Bull and J.A. Jackson		
	14. Hagan, J.M.		
	15. ST Crocoll		
	16. Ernst and Ernst		
	1. 1982		
	2. 2005?		
	3. 1998		
	4. 2001		
	5.		
	6. 2002		
	7. 6/2004		
Date	8. December 2002	1	100%
	9. 2003		
	10. 1984		
	11. 1984		
	12. 1996		
	13. 1995		
	14. 1993		
	15. 1994		
	16. 2003		
	1. Indiana University Press		
	2. MS Thesis, Indiana State University (not yet complete)		
	3. Wildlife Society Bulletin 26:287-293.		
	4. University of Oklahoma Press		
	5.		
	6. Ball State University		
	7. Department of Biology Technical Report No. 1, Ball State university, final report submitted to U.S. Fish & Wildlife Service,		
Publisher	8. Fort Snelling, MN	1	100%
	9. Masters Thesis, IPFW		
	10. Ind. Acad. Sci. 93:161-166.		
	11. Proceedings of Indiana Academy of Science: 94:227-230		
	12. American Ornithologists' Union		
	13. American Ornithologists' Union		
	14. Auk 110:863-874.		
	15. American Ornithologists' Union		
	16. Smithsonian Institute		
		<b>Total Respondents</b>	<b>8</b>

**36.** What is the current HABITAT body of science for all wildlife in all forest habitats in Indiana?

## Appendix E-32: Aggregated Forests

		Response Total	Response Percent
Complete, up to date and extensive		1	4%
Adequate		9	39%
Inadequate		8	35%
Nonexistent		2	9%
Other (please explain below)	Unknown I am not sure on the habitat's body of science... I would assume complete and up to date Unknown unknown	3	13%
<b>Total Respondents</b>		<b>23</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of all wildlife in all forest habitats in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	1. White-tailed Deer Ecology and Management 2. White-tailed Deer Ecology and Management 3. Natural Heritage of Indiana 4. The bobcat in Illinois 5. Cerulean Warbler MS Thesis 6. The natural regions of Indiana 7. Statewide Forest Inventory 8. Indiana Natural Heritage Data Center	3	100%
Author	1. Halls, L. K. (editor) 2. Lowell K. Halls 3. Marion Jackson 4. Alan Woolf and Clayton Nielsen 5. Kirk Roth 6. Homoya, M.A., D.B. Abrell, J.R. Aldrich, and T.W. Post 7. 8.	2	100%
Date	1. 1984 2. 1984 3. 1999 4. 2002 5. 2004 6. 1985 7. periodic 8.	2	100%
Publisher	1. Stackpole Books 2. Stackpole Books 3. IU Press 4. Southern Illinois University Carbondale 5. Ball State University 6. Proceedings of the Indiana Academy of Science 94:245-268 7. US Forest Service/IDNR	2	100%

## Appendix E-32: Aggregated Forests

8. unpublished data

**Total Respondents 3**

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of all wildlife in all forest habitats in Indiana. This resource may also be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	1. Nocturnal Behavior of Eastern Red Bats 2. Cerulean Warbler MS Thesis 3. The Natural Regions of Indiana	<b>2</b>	<b>0%</b>
Author	1. Brianne Everson 2. Cindy Basile 3. Homoya, Abrell, Aldrich, and Post	<b>1</b>	<b>0%</b>
Date	1. 2005? 2. 2002 3. 1985	<b>1</b>	<b>0%</b>
Publisher	1. Unpublished MS Thesis (should be complete by may 2005) 2. Ball State University 3. Indiana Academy of Science	<b>1</b>	<b>0%</b>
<b>Total Respondents</b>		<b>2</b>	

**39.** What are the research needs for all wildlife in Forest Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Life cycle	13% (3)	13% (3)	29% (7)	21% (5)	25% (6)	0% (0)	<b>24</b>
Distribution and abundance	21% (5)	8% (2)	38% (9)	21% (5)	13% (3)	0% (0)	<b>24</b>
Limiting factors (food, shelter, water, breeding sites)	17% (4)	0% (0)	46% (11)	13% (3)	25% (6)	0% (0)	<b>24</b>
Threats (predators/competition, contamination)	17% (4)	13% (3)	46% (11)	17% (4)	8% (2)	0% (0)	<b>24</b>
Relationship/dependence on specific habitats	17% (4)	13% (3)	33% (8)	29% (7)	8% (2)	0% (0)	<b>24</b>
Population health (genetic and physical)	13% (3)	26% (6)	22% (5)	13% (3)	26% (6)	0% (0)	<b>23</b>
Other (please specify below)	31% (4)	15% (2)	23% (3)	0% (0)	8% (1)	23% (3)	<b>13</b>
<b>Total Respondents</b>							<b>156</b>

**40.** Other research needs for all wildlife in Forest Habitats in Indiana.

1. A deer harvest analysis and modeling program  
Baseline life history data.

## Appendix E-32: Aggregated Forests

2. CWD all aspects

The aging techniques (tooth wear) biologists use were developed in New York and may not be accurate for deer of the midwest. My personal experience with deer of known ages indicates that wear is less than the aging charts we currently use. Additional local research needs to be done if we are interested in accurately aging deer over 2 1/2 years.

3. Research needs explore the role of age and social structure in deer herd health.

4. We desperately need to know how bats interact with each other in terms of competition.

5. WHY DOES THIS PAGE SAY I'M DOING THE OTTER QUESTIONNAIRE??? I ANSWERED #39 ABOVE FOR BOBCATS IN FORESTED HABITATS .... NOT OTTERS IN AQUATIC SYSTEMS!

6. Unknown

Due to the high fragmentation of forest tracts in Indiana (especially northern Indiana) I believe that dispersal distance is a critical area of research. I also would like to see a research project that evaluates the amount of harvest pressure can be sustained by isolated metapopulations of squirrels.

7. Effects of Forestry practices on demography and presence and absence of cerulean warblers (TNC) proposed study

Whether the distribution of early successional habitat is now so poor and low (as are ruffed grouse populations) that the disappearance of ruffed grouse from local areas now expand into a more regional or complete extinction.

10. We don't need more reserch. We need habitat management for early successional forest species, including but not limited to the ruffed grouse.

11. unknown

The eastern towhee is a well-known, fairly common species. The general life-history literature is extensive. Population trends, habitat needs and threats are not well defined for Indiana. The documented population declines in databases such as the Breeding Bird Surveys are poorly explained.

13. General life history information is needed for the Southeastern crowned snake in Indiana. Due to this species secretive nature, little is known about Indiana's populations.

**Total Respondents 14**

**41.** What are the HABITAT research needs for all wildlife in Forest Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	14% (3)	10% (2)	38% (8)	19% (4)	19% (4)	0% (0)	<b>21</b>
Distribution and abundance (fragmentation)	18% (4)	27% (6)	41% (9)	9% (2)	5% (1)	0% (0)	<b>22</b>
Threats (land use change/competition, contamination/global warming)	19% (4)	5% (1)	57% (12)	14% (3)	5% (1)	0% (0)	<b>21</b>
Relationship/dependence on specific site conditions	24% (5)	0% (0)	38% (8)	19% (4)	19% (4)	0% (0)	<b>21</b>

## Appendix E-32: Aggregated Forests

Growth and development of individual components of the habitat	10% (2)	5% (1)	33% (7)	19% (4)	29% (6)	5% (1)	<b>21</b>
Other (please specify below)	0% (0)	0% (0)	29% (2)	0% (0)	14% (1)	57% (4)	<b>7</b>
							<b>Total Respondents 113</b>

### 42. Other HABITAT research needs for all wildlife in Forest Habitats in Indiana.

1. unknown
2. Research needs explore the effects of land development.
3. Unknown
4. Effects of forestry practices on cerulean warbler presence or absence and on demography
5. We do not need research on grouse habitat. We know what they need, it just needs to be provided before the ruffed grouse is extirpated.
6. unknown
7. Forest succession is well understood in Indiana. But the relationship between towhee occupancy and habitat age is not explicitly well studied here.

**Total Respondents 7**

### 43. How well do the following conservation efforts address the threats to all wildlife in Forest Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	35% (8)	52% (12)	4% (1)	4% (1)	4% (1)	<b>23</b>
Population management (hunting, trapping)	13% (3)	25% (6)	8% (2)	50% (12)	4% (1)	<b>24</b>
Population enhancement (captive breeding and release)	0% (0)	0% (0)	8% (2)	92% (22)	0% (0)	<b>24</b>
Reintroduction (restoration)	0% (0)	0% (0)	17% (4)	83% (20)	0% (0)	<b>24</b>
Food plots	4% (1)	13% (3)	17% (4)	67% (16)	0% (0)	<b>24</b>
Threats reduction	4% (1)	25% (6)	8% (2)	42% (10)	21% (5)	<b>24</b>
Native predator control	0% (0)	8% (2)	21% (5)	50% (12)	21% (5)	<b>24</b>
Exotic/invasive species control	0% (0)	17% (4)	13% (3)	46% (11)	25% (6)	<b>24</b>
Regulation of collecting	8% (2)	29% (7)	13% (3)	38% (9)	13% (3)	<b>24</b>
Disease/parasite management	0% (0)	13% (3)	13% (3)	48% (11)	25% (6)	<b>23</b>
Translocation to new geographic range	0% (0)	0% (0)	17% (4)	79% (19)	4% (1)	<b>24</b>
Protection of migration routes	8% (2)	13% (3)	17% (4)	50% (12)	13% (3)	<b>24</b>
Limiting contact with pollutants/contaminants	0% (0)	13% (3)	13% (3)	46% (11)	29% (7)	<b>24</b>
Public education to reduce human disturbance	0% (0)	33% (8)	17% (4)	29% (7)	21% (5)	<b>24</b>
Culling/selective removal	0% (0)	4% (1)	17% (4)	79% (19)	0% (0)	<b>24</b>

## Appendix E-32: Aggregated Forests

Stocking	0% (0)	0% (0)	13% (3)	88% (21)	0% (0)	<b>24</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	44% (4)	56% (5)	<b>9</b>
<b>Total Respondents</b>						<b>391</b>

### 44. Other current conservation practices for all wildlife in Forest Habitats in Indiana.

1. Contraceptives; currently not used due to efficacy and economical reasons

2. unknown

3. Unknown

4. Instead of the word "protection" perhaps "enhancement" would be a better choice as the "protection" of habitat for ruffed grouse requires active vegetative management. While hunting is not responsible for the declining population trends and hunting pressure is self-limiting/regulated by diminishing returns, the question does eventually come to the point (with the continuous decline of habitat and subsequently low populations) where one must ask if there is an available surplus or are we shooting the last grouse in an area that was doomed anyway due to the lack of habitat.

5. N/A

6. What is needed is habitat management in the form of producing early successional forest stages in large tracts throughout the forested regions of the state, especially on public lands. If this is not provided, the grouse will soon be extirpated.

7. unknown

8. Education of public to reduce losses due to exotic predators such as cats is probably important to some local populations.

**Total Respondents 8**

### 45. What one or two specific practices would you recommend for more effective conservation of all wildlife in Forest Habitats in Indiana?

1. Population management via hunting

2. Ban cervid farming & canned hunting

3. Woodland habitat protection

4. Control of forest habitat fragmentation

5. Habitat Protection  
Invasive species control

Studies of migration routes are needed so these areas can be protected.

6. Care should be taken in approving wind turbine power stations because of the large direct take associated with these structures. We also need some studies of these power stations in this section of the Midwest (Indiana, Ill, OH).

7. I would recommend preserving large continuous blocks of forested habitat and prohibiting the collection of box turtles. If possible, I would attempt to lower meso predator numbers and protect

## Appendix E-32: Aggregated Forests

collection of box turtles. If possible, I would attempt to lower meso predator numbers and protect nest cavities.

7. Unknown

8. Protecting existing forest tracts and maintaining or creating corridors between fragments would, in my opinion, be the 2 most effective conservation practices for fox squirrels in Indiana.

9. Increasing the area of mature forest in the landscape and decreasing fragmentation. The conservation of existing forest land is also critical.

1. We desperately need to learn how silvicultural activities and land management affect this species. Are there silvicultural activities (such as single-tree selection) that actually improve cerulean warbler habitat.

10. 2. Increasing the size and reducing the fragmentation of forest blocks within the state will likely improve habitat for this species.

11. Maintenance of contiguous forest areas.

Habitat protection (maintenance of old-growth/mature forest components in Indiana)  
Additional research (nest productivity, annual monitoring of populations to assess trends in population numbers)

Hamel, P.B. 2000. Cerulean Warbler (*Dendroica cerulea*). In *The Birds of North America*, no. 511 (A. Poole and F. Gill, Eds.). The Birds of North America, Inc., Philadelphia.

12. Islam, K. and K.L. Roth. 2004. Habitat Selection and Reproductive Success of Cerulean Warblers in Southern Indiana. Final report submitted to U.S. Fish and Wildlife Service, Fort Snelling, MN, December 2002. Department of Biology Technical Report No. 4, Ball State University, Muncie, Indiana 51pp.

Islam, K. and C. Basile. 2002. Relative abundance and habitat selection of Cerulean Warblers in Southern Indiana. Final report submitted to U.S. Fish and Wildlife Service, Fort Snelling, MN, December 2002. Department of Biology Technical Report No. 1, Ball State University, Muncie, Indiana 76pp.

13. I would recommend public education and habitat protection.

14. Active timber management, especially on the larger blocks of public forest lands, especially those timber management practices that remove at least 75% of the overhead canopy.

15. Habitat decline must be addressed - methods to initiate active timber/wildlife management on the landscape is necessary to stem the serious decline of ruffed grouse in the state.

16. Immediate production of early successional stages of vegetation on public lands. Forstry practices such as clear-cutting and certain select cutting methods are needed to provide the habitat that is essential to returning ruffed grouse populations to earlier levels.

17. Prescription burning to maintain sparse understory in mature pine forests may potentially help this species, for example on DNR lands. Suggested reference: Rodewald, P.G., J.H. Withgott, and K.G. Smith. 1999. Wildlife. In *The Birds of North America*, No. 438 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

18. Conservation of habitats.

19. Conservation of forests and wise timber management emphasizing older forests.

20. The major need is regional land management plans that retain young forest age classes and mixes of habitats within regional landscapes. Second practice may be exotic plant control. Garlic mustard and Amur honeysuckle have the ability to change vegetative structure of ground and understory layers. As ground nester and ground forager, towhees could be affected, but this is unstudied.

21. Incentives to conserve wooded riparian corridors and responsible forestry practices.

## Appendix E-32: Aggregated Forests

22. Habitat protection and research of general life history requirements.

**Total Respondents**      **22**

**46.** How well do the following conservation efforts address the HABITAT threats to all wildlife in Forest Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	9% (2)	52% (12)	13% (3)	22% (5)	4% (1)	<b>23</b>
Habitat protection on public lands	26% (6)	65% (15)	4% (1)	0% (0)	4% (1)	<b>23</b>
Habitat protection incentives (financial)	13% (3)	61% (14)	9% (2)	9% (2)	9% (2)	<b>23</b>
Habitat restoration through regulation	9% (2)	43% (10)	9% (2)	26% (6)	13% (3)	<b>23</b>
Habitat restoration on public lands	17% (4)	65% (15)	0% (0)	9% (2)	9% (2)	<b>23</b>
Habitat restoration incentives (financial)	9% (2)	52% (12)	9% (2)	4% (1)	26% (6)	<b>23</b>
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	5% (1)	95% (21)	0% (0)	<b>22</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	4% (1)	0% (0)	17% (4)	73% (17)	4% (1)	<b>23</b>
Succession control (fire, mowing)	9% (2)	39% (9)	13% (3)	30% (7)	9% (2)	<b>23</b>
Corridor development/protection	9% (2)	39% (9)	4% (1)	39% (9)	9% (2)	<b>23</b>
Managing water regimes	0% (0)	9% (2)	5% (1)	68% (15)	18% (4)	<b>22</b>
Pollution reduction	0% (0)	27% (6)	5% (1)	45% (10)	23% (5)	<b>22</b>
Protection of adjacent buffer zone	0% (0)	48% (11)	9% (2)	30% (7)	13% (3)	<b>23</b>
Restrict public access and disturbance	4% (1)	26% (6)	30% (7)	30% (7)	9% (2)	<b>23</b>
Land use planning	18% (4)	41% (9)	5% (1)	18% (4)	18% (4)	<b>22</b>
Technical assistance	0% (0)	73% (16)	0% (0)	9% (2)	18% (4)	<b>22</b>
Cooperative land management agreements (conservation easements)	10% (2)	67% (14)	0% (0)	5% (1)	19% (4)	<b>21</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	17% (1)	83% (5)	<b>6</b>
						<b>Total Respondents</b>
						<b>390</b>

**47.** Other current HABITAT conservation practices for all wildlife in Forest Habitats in Indiana.

1. unknown
2. Restriction of motorized access into habitat
3. Unknown

4. Under the habitat through "protection and regulation", some states have "policies or regulations" that specifically mandate that a certain percentage of their public lands will be maintained in early successional and transitional forest types

## Appendix E-32: Aggregated Forests

successional and transitional forest types

5. There are very few if any "current habitat conservation practices" being implemented for the ruffed grouse. That is the major problem with the critically low population levels for this species.
6. unknown

**Total Respondents**

**6**

### **48.** What one or two specific HABITAT practices would you recommend for more effective conservation of all wildlife in Forest Habitats in Indiana?

1. Restricting housing development in forested areas.  
Incentives for establishing new forested areas and protection of existing ones.
2. Habitat Protection  
Habitat Restoration  
  
Preservation of both forest and agricultural land scapes will protect this species habitat.
3. Most forest conservation practices (including corridors and greenways) are likely success stories for this species
4. Protection of large blocks of natural communities and habitats. Management of forested lands to provide early/mid successional stage habitats.
5. Preserve large tracts of forested habitat.
6. Legislation to protect habitat.
7. The 2 specific habitat practices that I would recommend would be to create corridors between forest tracts and provide financial incentives to protect or create forest habitat.
8. Land use planning and habitat protection and restoration on public and private land.  
  
Due to natural succession and the reduction of natural disturbance, sugar maple and American beech are increasing in stand density and basal area at the expense of the oak-hickory overstory throughout many of the forests in the state. A shift in forest composition from oak-hickory to maple-beech dominated forests has implications for many wildlife species. This shift could result in a reduction of species richness and abundance within forest bird communities and may negatively influence the cerulean warbler. Differences in foliage and bark structure may affect arthropod (spiders and related species) availability for this species. And, the short-petioled leaves and furrowed bark of oak trees compared to maples may provide better foraging opportunities for these birds.
9. Promotion of older growth forest on public and private lands.  
  
Habitat protection (maintenance of old growth/mature forest components in Indiana)  
Additional research (nest productivity, annual monitoring of populations to assess trends)
10. Hamel P.B. 2000. (see complete citation elsewhere)  
Islam and Roth. 2004. (see complete citation elsewhere)  
Islam and Basile. 2002. (see complete citation elsewhere)
11. I thought I answered this already but here we go:  
ACTIVE TIMBER MANAGEMENT THAT REMOVES AT LEAST 75% OF THE EXISTING FOREST CANOPY ON A PROPORTION OF THE FORESTED LANDSCAPE EVERY 5-10 YEARS ON A 80-120 YEAR ROTATION (DEPENDING SITECONSTRAINTS AND MGMT OBJECTIVES) USING PRIMARILY EVEN-AGE TIMBER MANAGEMENT TECHNIQUES.
- 12.

## Appendix E-32: Aggregated Forests

### 13. TIMBER MANAGEMENT

Implement forestry practices that will benefit early successional species including grey fox, bobcat, and woodcock, as well as ruffed grouse.

14. Educate the public so they understand that "nature knows best" and that "letting things go back to nature" are ignorant and foolish concepts. Educate the public to understand that habitat management in this day and age is necessary if we are to provide habitat for specialist species whose populations are in peril.

15. Potentially prescribed burning on public lands to maintain mature forests with sparse understory. Rodewald et al. 1999. Pine Warbler in Birds of North America

16. Incentives to conserve floodplain forests.

17. Incentives to preserve forests and use good timber managements practices.

18. Encouragement of forest management plans that retains / creates mix of young and older forest should retain towhees in regional avifaunas. Forest habitat restoration provides habitat in early stages. Encouragement of forest management plans that retains / creates mix of young and older forest should retain towhees in regional avifaunas. Forest habitat restoration provides habitat in early stages.

19. Incentives to conserve wooded riparian corridors.

20. Conservation of habitats.

**Total Respondents**

**20**

### 49. Do you have any additional comments or information on all wildlife in Forest Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

1. Evaluate current harvest and hunting strategies to determine if we need to better balance opportunity with harvest. Continue to monitor QDM practices (quality deer management) in other areas. I believe we already have quality deer in Indiana without getting involved in QDM restrictions or regulations.

2. Research into the how the elimination of the older age classes of deer effects the health of the deer herd.

This is still a common bat, but threats to its migration routes are a critical issue.

3. Little is known about population dynamics for any bat--this one in particular.

A state-wide monitoring effort should be undertaken.

4. None

5. There is still a lot unknown about cerulean warblers. We need to improve our knowledge and to see what is limiting population growth (could be wintering area habitat loss or poor survival in addition to breeding habitat problems). We need to encourage a forest landscape wherever possible (that includes actively managed forest lands) to increase the amount of forest in the landscape and actively encourage a percentage of that landscape to be in mature forests.

Recently The Nature Conservancy has held meetings with many agencies and universities to determine the feasibility of conducting a landscape ecology project for the cerulean warbler. This

## Appendix E-32: Aggregated Forests

determine the feasibility of conducting a landscape ecology project for the cerulean warbler. This project would focus on the response of this species to silvicultural practices and could yield very useful information. Basic demography data could also be collected. With proper funding, many other species that use this habitat type could be studied as well. A key issue to cerulean warbler conservation is research. Before effective conservation strategies can be developed, a lot of questions will need to be answered.

7. Ruffed grouse should be viewed as an interior forest dependent species requiring early successional forests. While their populations will also benefit to some degree from the transitional habitats that develop from abandoned fields going into forested cover, they are primarily dependent on the larger tracts of contiguous forests. They are not an "edge" species even though that is commonly found in the popular literature and some older technical publications. Grouse are often found on forest edges because that is the only early successional habitat they can find. They are also more vulnerable to natural and man-induced (hunting) predation when forced up to the edge or limit of good or marginal habitat.

8. Indiana mirrors other states, especially on the southern periphery of the ruffed grouse range in the severe reduction of suitable habitats and consequently, populations. As land abandonment and reverting farmlands are a thing of the past, only timber management on public (especially) and private lands can rebalance successional age classes in forest lands to benefit grouse and a host of other early successional species.

9. In terms of breeding habitat, this species appears to be closely tied to native Virginia pine in southern Indiana and in some mature pine plantations at scattered locations around the state. At some point in the future, many of the pine plantations that were established since the 1930's will undoubtedly be replaced by native deciduous forest. Thus, it may be prudent to conduct more intensive inventories of native Virginia pine and its distribution as well as assessing the habitat and potential management strategies for pine warbler.

10. Eastern towhee is a non-endangered but declining species across much of the United States. It is not the focus of specific monitoring efforts (because it is not on threatened lists), but it has shown sharp declines. Indiana populations on the Breeding Bird Survey show a negative (-1%/year) but nonsignificant decline. The species is best used as an indicator on young forest age-classes within a management district or region.

**Total Respondents**

**10**

## Appendix E-33: Forests

### 6. Please rank the following threats to all wildlife in Forest Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Invasive/non-native species	0% (0)	11% (1)	22% (2)	22% (2)	44% (4)	0% (0)	<b>9</b>
High sensitivity to pollution	0% (0)	0% (0)	11% (1)	44% (4)	33% (3)	11% (1)	<b>9</b>
Bioaccumulation of contaminants	0% (0)	0% (0)	11% (1)	33% (3)	22% (2)	33% (3)	<b>9</b>
Predators (native or domesticated)	0% (0)	0% (0)	11% (1)	44% (4)	44% (4)	0% (0)	<b>9</b>
Dependence on other species (mutualism, pollinators)	0% (0)	0% (0)	0% (0)	44% (1)	66% (6)	22% (2)	<b>9</b>
Diseases/parasites (of the species itself)	11% (1)	22% (2)	22% (2)	0% (0)	33% (3)	11% (1)	<b>9</b>
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	11% (1)	22% (2)	55% (5)	11% (1)	<b>9</b>
Species over population	0% (0)	22% (2)	11% (1)	11% (1)	55% (5)	0% (0)	<b>9</b>
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	11% (1)	22% (2)	22% (2)	11% (1)	22% (2)	11% (1)	<b>9</b>
Unregulated collection pressure	11% (1)	0% (0)	0% (0)	0% (0)	77% (7)	11% (1)	<b>9</b>
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	0% (0)	0% (0)	0% (0)	44% (4)	55% (5)	0% (0)	<b>9</b>
							<b>99</b>

### 7. Please also rank these threats to all wildlife in Forest Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat loss (breeding range)	0% (0)	33% (3)	22% (2)	44% (4)	0% (0)	0% (0)	<b>9</b>
Habitat loss (feeding/foraging areas)	0% (0)	33% (3)	22% (2)	44% (4)	0% (0)	0% (0)	<b>9</b>
Small native range (high endemism)	0% (0)	0% (0)	0% (0)	22% (2)	77% (7)	0% (0)	<b>9</b>
Near limits of natural geographic range	0% (0)	0% (0)	0% (0)	11% (1)	77% (7)	11% (1)	<b>9</b>
Large home range requirements	0% (0)	0% (0)	11% (1)	33% (3)	55% (5)	0% (0)	<b>9</b>
Viable reproductive population size or availability	0% (0)	0% (0)	11% (1)	33% (3)	55% (5)	0% (0)	<b>9</b>
Specialized reproductive behavior or low reproductive rates	11% (1)	0% (0)	0% (0)	22% (2)	66% (6)	0% (0)	<b>9</b>
Degradation of movement/migration routes	11% (1)	11% (1)	11% (1)	37% (3)	25% (2)	0% (0)	<b>8</b>

## Appendix E-33: Forests

(overwintering habitats, nesting and staging sites)

Genetic pollution (hybridization)	0% (0)	11% (1)	0% (0)	33% (3)	55% (5)	0% (0)	<b>9</b>
Unknown	0% (0)	0% (0)	0% (0)	33% (2)	0% (0)	67% (4)	<b>6</b>
Other (please specify below)	0% (0)	25% (2)	25% (2)	0% (0)	13% (1)	38% (3)	<b>8</b>
<b>Total Respondents</b>							<b>94</b>

### 8. Other threats to all wildlife in Forest Habitats in Indiana.

1. Captive cervids
2. Genetic contamination from farmed white-tails
3. Fragmentation of forest habitat and loss of farmland habitat to housing.
4. The spread of BushHoneySuckles, construction, tree diseases, tree insects, and the removal of fence rows.
5. It might be possible to overharvest fox squirrels in small forest fragments in the northern part of the state but I believe that this too is unlikely.

**Total Respondents 5**

### 9. Please briefly describe the top two threats to all wildlife in Forest Habitats in Indiana identified above.

1. Overpopulation will lead to an unmanageable resource and severe habitat degradation.  
Captive cervids contaminate genetic integrity and increase chance of infection for wild deer
2. CWD will come to IN  
Trophy mgt & associated leasing will lead to overpopulation & fewer active hunters  
CWD, EHD & tuberculosis could be devastating to a deer herd of our density.
3. Loss of habitat to rural development.
4. Habitat loss- Land development  
Invasive species and its relation to habitat loss  
I seek to qualify my answer about loss of migration habitat. The large-scale mortality being reported from wind turbines and other sources is the most threatening issue for this species.
5. We also need information about how this species migrates to begin thinking about where not to place such structures.  
Loss of winter range is a slight concern since we really don't know where they are going.
6. Habitat fragmentation & habitat destruction.

## Appendix E-33: Forests

7. The 2 greatest threats to the fox squirrel are overall loss of habitat and fragmentation of the remaining forest tracts.
8. Threats to bobcat populations in Indiana are human-related factors such as direct mortality (incidental take, road-kills, persecution) and habitat loss. Conversion of native communities and habitats for human use cause direct loss of habitats for bobcats and their prey items.
9. The top two threats to the eastern box turtle are habitat loss, road mortality, and human collection.

**Total Respondents 9**

### 10. Please rank the following threats to the HABITAT of all wildlife in Forest Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	11% (1)	77% (7)	11% (1)	0% (0)	0% (0)	0% (0)	<b>9</b>
Counterproductive financial incentives or regulations	0% (0)	11% (1)	11% (1)	33% (3)	33% (3)	11% (1)	<b>9</b>
Invasive/non-native species	0% (0)	22% (2)	22% (2)	44% (4)	11% (1)	0% (0)	<b>9</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	0% (0)	44% (4)	33% (3)	22% (2)	<b>9</b>
Habitat fragmentation	11% (1)	44% (4)	33% (3)	11% (1)	0% (0)	0% (0)	<b>9</b>
Successional change	0% (0)	0% (0)	0% (0)	55% (5)	44% (4)	0% (0)	<b>9</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	22% (2)	55% (5)	22% (2)	0% (0)	<b>9</b>
Habitat degradation	0% (0)	11% (1)	44% (4)	44% (4)	0% (0)	0% (0)	<b>9</b>
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	55% (5)	44% (4)	<b>9</b>
Stream channelization	0% (0)	0% (0)	0% (0)	0% (0)	77% (7)	22% (2)	<b>9</b>
Impoundment of water/flow regulation	0% (0)	0% (0)	0% (0)	11% (1)	66% (6)	22% (2)	<b>9</b>
Agricultural/forestry practices	0% (0)	11% (1)	33% (3)	22% (2)	33% (3)	0% (0)	<b>9</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	33% (3)	44% (4)	22% (2)	<b>9</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	33% (3)	44% (4)	22% (2)	<b>9</b>
Mining/acidification	0% (0)	0% (0)	0% (0)	22% (2)	66% (6)	11% (1)	<b>9</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	22% (2)	66% (6)	11% (1)	<b>9</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	20% (1)	80% (4)	<b>5</b>
Other (please specify below)	0% (0)	0% (0)	17% (1)	0% (0)	17% (1)	67% (4)	<b>6</b>
							<b>Total Respondents 155</b>

## Appendix E-33: Forests

### 11. Other HABITAT threats to all wildlife in Forest Habitats in Indiana.

1. Modern farm practices-the creation of large open, clean farm fields leaves no habitat for deer or many other mammals for that manner
2. Urban spread, construction, clearing for agriculture crops and fence row removal

**Total Respondents 2**

### 12. Please briefly describe the top two HABITAT threats to all wildlife in Forest Habitats in Indiana identified above.

1. Degredation by overpopulation  
Fragmentation in farmed/heavily populated regions prevents historical movements from summer to winter ranges
2. Urban sprawl is consuming significant amounts of our forest habitat  
Urban sprawl has started to interrupt movements and increased accidental mortality.
3. Fragmentation of habitat forces unnatural movement and increases accidental mortality as well as the opportunity to spread disease.
4. Development- this completely removes the habitat  
Habitat fragmentation- this also removes habitat  
Our unpublished work on eastern red bats suggest the critical habitat is a combination of forests for roosting and edge habitat for roosting. As such the main threats are
5. 1) loss of forest habitat  
2) loss of suitable foraging habitat to development  
Top threats to bobcat habitat are loss of forested habitats (or any native or non-developed habitats) to residential, commercial, industrial, etc. uses. Conversion of habitats to types dominated for human activity, on a cumulative scale, are problematic. Fragmentation, to a lesser extent, also negatively impacts bobcat habitats, but is probably less of a factor because the species is somewhat adaptable and highly mobile.
6. The largest threat to the box turtle habitat is fragmentation and urbanization.
7. Forest habitat fragmentation and loss of habitat.
8. The 2 greatest threats to fox squirrel habitat in Indiana are overall loss of habitat and fragmentation, both due primarily to agricultural practices of urban sprawl.

**Total Respondents 9**

### 13. What current monitoring efforts by state agencies are you aware of for all wildlife in Forest Habitats in Indiana?

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by state agencies	44% (4)	55% (5)	9

## Appendix E-33: Forests

Statewide once a year monitoring conducted by state agencies	50% (4)	50% (4)	<b>8</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	25% (2)	75% (6)	<b>8</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	22% (1)	88% (7)	<b>8</b>
Regional or local year-round monitoring conducted by state agencies	37% (3)	63% (5)	<b>8</b>
Regional or local once a year monitoring conducted by state agencies	43% (3)	57% (4)	<b>7</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	25% (2)	75% (6)	<b>8</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	25% (2)	75% (6)	<b>8</b>
		<b>Total Respondents</b>	<b>65</b>

### 14. What current monitoring efforts by other organizations are you aware of for all wildlife in Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (9)	<b>9</b>
Statewide once a year monitoring conducted by other organizations	13% (1)	87% (7)	<b>8</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (9)	<b>9</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (9)	<b>9</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (9)	<b>9</b>
Regional or local once a year monitoring conducted by other organizations	11% (1)	88% (8)	<b>9</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	22% (2)	77% (7)	<b>9</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	33% (3)	66% (6)	<b>9</b>
		<b>Total Respondents</b>	<b>71</b>

### 15. How crucial are these monitoring efforts by state agencies for the conservation of all wildlife in Forest Habitats in Indiana?

Appendix E-33: Forests

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	22% (2)	22% (2)	0% (0)	44% (4)	11% (1)	<b>9</b>
Statewide once a year monitoring conducted by state agencies	13% (1)	50% (4)	13% (1)	13% (1)	13% (1)	<b>8</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	29% (2)	29% (2)	47% (3)	0% (0)	<b>7</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	43% (3)	0% (0)	29% (2)	29% (2)	<b>7</b>
Regional or local year-round monitoring conducted by state agencies	13% (1)	13% (1)	13% (1)	50% (4)	13% (1)	<b>8</b>
Regional or local once a year monitoring conducted by state agencies	13% (1)	39% (3)	13% (1)	26% (2)	13% (1)	<b>8</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	14% (1)	14% (1)	57% (4)	14% (1)	<b>7</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	14% (1)	14% (1)	57% (4)	14% (1)	<b>7</b>
				<b>Total Respondents</b>		<b>61</b>

<b>16.</b>	How crucial are these monitoring efforts by other organizations for the conservation of all wildlife in Forest Habitats in Indiana?	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
	Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	11% (1)	55% (5)	33% (3)	<b>9</b>
	Statewide once a year monitoring conducted by other organizations	0% (0)	13% (1)	26% (2)	50% (4)	13% (1)	<b>8</b>
	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	11% (1)	66% (6)	22% (2)	<b>9</b>
	Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	11% (1)	11% (1)	55% (5)	22% (2)	<b>9</b>
	Regional or local year-round monitoring conducted by other organizations	0% (0)	0% (0)	22% (2)	55% (5)	22% (2)	<b>9</b>
	Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	33% (3)	44% (4)	22% (2)	<b>9</b>
	Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (3)	44% (4)	22% (2)	<b>9</b>

## Appendix E-33: Forests

Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (3)	44% (4)	22% (2)	<b>9</b>
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**Total Respondents 71**

### 17. Regional or local state agency monitoring for all wildlife in Forest Habitats in Indiana.

1. On a statewide basis in the bloomington DNR office
2. St Parks, Nature Preserves
3. State Parks and selected urban areas.
4. State deer check stations
5. Red bats are monitored as part of the regular bat sampling that occurs at Indianapolis Airport, Camp Atterbury, Newport Chemical Depot.  
Also the population trends may be assess via animals submitted to the state rabies lab.
6. Ongoing ecological studies of bobcats in southwestern section of Indiana - primarily Greene, Lawrence, and Martin counties.
7. The state is monitoring box turtles in Martin, Brown, and Morgan counties.
8. Hunter harvest data on State Fish and Wildlife Properties.
9. The small game harvest questionnaire is the only survey the agency conducts to monitor the Indiana fox squirrel population. The survey is only conducted in odd years.

**Total Respondents 9**

### 18. Regional or local monitoring by other organizations for all wildlife in Forest Habitats in Indiana.

1. Some municipalites; University properties  
Purdue U
2. Beverly Shores  
US Nat'l Lkshore  
Wesselman woods (Evansville)
3. Private groups have helped with counts in some State Parks.
4. Unknown
5. I don't know of any official monitoring that is occurring
6. None that I am aware of.
7. I am not sure who else might be monitoring box turtle in Indiana
8. Unknown

## Appendix E-33: Forests

9. I am not aware of any other monitoring.

**Total Respondents 9**

**19.** Please list organizations that are monitoring all wildlife in Forest Habitats in Indiana.

1. state Universities
2. see # 18
3. unknown
4. Unknown
5. Indiana State University  
Wildlie Biologists at Military bases

I hesitate to use the term "monitoring" to describe this .... but IDNR does maintain records, databases, etc. regarding reports of bobcats throughout the state. These reports are, for the most part, unsolicited and obtained as they become available. It is not a regular, routine survey ... but more of a clearinghouse for information regarding bobcat sightings, road-kills, incidental captures, etc, which is one of the few means of "monitoring" low-density and wide-ranging species such as the bobcat.

- 6.
7. Unknown
8. Indiana Division of Fish and Wildlife

**Total Respondents 8**

**20.** What are the current monitoring techniques for all wildlife in Forest Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	11% (1)	22% (2)	55% (5)	0% (0)	0% (0)	11% (1)	<b>9</b>
Modeling	0% (0)	33% (3)	44% (4)	0% (0)	0% (0)	22% (2)	<b>9</b>
Coverboard routes	0% (0)	0% (0)	14% (1)	29% (2)	0% (0)	57% (4)	<b>7</b>
Spot mapping	13% (1)	0% (0)	25% (2)	13% (1)	0% (0)	50% (4)	<b>8</b>
Driving a survey route	0% (0)	25% (2)	38% (3)	0% (0)	13% (1)	25% (2)	<b>8</b>
Reporting from							



## Appendix E-33: Forests

1. Continued documentation of sightings, road-kills, and accidental captures. Obtain pertinent biological data from recovered specimens such as age and reproductive parameters (pregnancy rate, litter size). These data could be used to model populations or build life tables in future years.
  2. Some form of questionnaire or survey that is sent to trappers, hunters, professional resource managers could also be useful. The Indiana Bowhunter Survey is a good example although reporting rates for bobcats are so low they may not be effective to detect changes and monitor trends.
- I do not have a good, single reference that describes these techniques although they are commonly used by many state wildlife agencies.
7. I would recommend long term surveys and radio-telemetry of box turtle. Surveys would include mark recapture methods.
  8. This is a research question to be answered by research personnel.
- A hunter report card sent out to dedicated squirrel hunters would be a useful tool to provide an index to the fox squirrel population. I would also like to see a radio-telemetry project in northern Indiana to document fox squirrel dispersal between forest tracts. Another objective of this proposed radio-telemetry project would be to evaluate the possibility of overharvesting fox squirrel metapopulations.

**Total Respondents 9**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for all wildlife in Forest Habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (8)	8
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (8)	8
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	25% (2)	75% (6)	8
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	37% (3)	63% (5)	8
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (8)	8
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (8)	8
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	37% (3)	63% (5)	8
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	50% (4)	50% (4)	8





## Appendix E-33: Forests

once a year but still regularly scheduled) inventory and assessment conducted by other organizations

Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations

0% (0)      25% (2)      0% (0)      38% (3)      38% (3)

**8**

**Total Respondents      64**

### 27. Regional or local state agency HABITAT inventory and assessment for all wildlife in Forest Habitats in Indiana.

1. State Forests  
Nature Preserves
2. Unknown, possibly Division of Forestry.
3. IDNR
4. I know the forestry division keeps track of changes in forest cover.
5. I suspect that most, if not all, public properties in the state (Hoosier National Forest, Crane NSWC, State Forests, State Reservoirs, etc.) periodically inventory and assess forested habitats under their jurisdiction. Commercial timbered lands are probably also inventoried on a regular basis. The Nature Conservancy may also have access to data.
6. I am not aware of what efforts are being made to monitor these habitats
7. Unknown
8. I am not aware of any habitat assessment being done by a state agency.

**Total Respondents      8**

### 28. Regional or local HABITAT inventory and assessment by other organizations for all wildlife in Forest Habitats in Indiana.

1. Bev Shores  
Nat'l Lkshore  
Nat'l Forest  
Wesselman Woods
2. Unknown
3. Unknown
4. Local planning boards monitor land use in most localities
5. The Indiana GAP project categorizes land use cover types from landsat imagery. I assume that the change in cover types is being calculated over a specified period of time.
6. Unknown

**Total Respondents      6**

## Appendix E-33: Forests

**29.** Please list organizations that are monitoring this HABITAT for all wildlife in Forest Habitats in Indiana.

1. state Universities
2. PU  
Gov't careing for #28
3. Unknown
4. Unknown
5. See Above
6. In addition to state and federal agencies, I suspect Indiana Hardwoods Lumberman Association or other private groups may monitor forested lands, particularly those in private ownership.
7. I would assume the Nature Conservancy, IDNR, and other Federal Agencies monitor these habitats
8. Indiana GAP Project
9. Unknown

**Total Respondents**

**9**

**30.** What are the current monitoring techniques for all wildlife in the Forest Habitats in Indiana. If a technique is not applicable to all wildlife do not select a response in that row.

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	13% (1)	50% (4)	0% (0)	0% (0)	0% (0)	37% (3)	<b>8</b>
Aerial photography and analysis	29% (2)	43% (3)	14% (1)	0% (0)	0% (0)	29% (2)	<b>8</b>
Systematic sampling	0% (0)	25% (2)	0% (0)	0% (0)	25% (2)	50% (4)	<b>8</b>
Property tax estimates	13% (1)	0% (0)	0% (0)	0% (0)	0% (0)	87% (7)	<b>8</b>
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (8)	<b>8</b>
Regulatory information	0% (0)	13% (1)	0% (0)	0% (0)	0% (0)	87% (7)	<b>8</b>
Participation in landuse programs	13% (1)	50% (4)	0% (0)	0% (0)	0% (0)	37% (3)	<b>8</b>
Modeling	0% (0)	13% (1)	25% (2)	0% (0)	0% (0)	63% (5)	<b>8</b>

## Appendix E-33: Forests

Voluntary landowner reporting	0% (0)	13% (1)	0% (0)	0% (0)	0% (0)	88% (7)	<b>8</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (8)	<b>8</b>	
						<b>Total Respondents</b>	<b>80</b>	

### 31. Other HABITAT inventory and assessment techniques for all wildlife in Forest Habitats in Indiana.

1. unknown
2. Unknown
3. I am not sure of the techniques to monitor this habitat
4. Unknown

**Total Respondents 4**

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of all wildlife in Forest Habitats in Indiana?

1. GIS Habitat Modeling
2. GIS mapping and aerial photo analysis
3. GIS Aerial Photography  
Statewide habitat mapping is needed (and mostly available if you know who to ask)
4. Property tax assessments can be used as a proxy as well  
GIS is a logical tool to inventory and assess all aspects of forested habitats in Indiana (species composition, age & size class, ownership, management regime, etc.). It would be nice to have a GIS coverage of rock outcrops in the state to supplement forest data.
5. To a lesser extent, interpretation of aerial photographs would also be useful.  
Collect hunter data from DNR Properties & Private Land hunters.
6. Universities keep record of habitat loss and habitat fragmentation.
7. I would recommend a GIS analysis that examines changes in land use over the last 30+ year period.

**Total Respondents 7**

### 33. What is the current body of science for all wildlife in Forest Habitats in Indiana?

**Response Response  
Total Percent**

Appendix E-33: Forests

		Total	Percent
Complete, up to date and extensive		1	13%
Adequate		3	38%
Inadequate		3	38%
Nonexistent		0	0%
Other (please explain below)	The science in adequate in some aspects of the turtles life history, but inadequate in others	1	13%
<b>Total Respondents</b>		<b>8</b>	

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of all wildlife in Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	White-tailed Deer Ecology and Management IN Mammals White-tailed Deer Ecology & Management White-tailed Deer Ecology & Management Mammals of Indiana The bobcat in Illinois A long term study of a box turtle ( <i>Terrapene carolina</i> ) population at Allee Memorial Woods, Indiana, with emphasis on survivorship None known Gray and Fox Squirrel Management in Indiana	5	100%
Author	Halls, L. K. (editor) Whittaker Wildlife Management Institute Book Lowell K. Halls John Whitaker Alan Woolf and Clayton Nielsen Williams and Parker John M. Allen	5	100%
Date	1984 1984 1984 IN Press 2002 1987 1964	4	75%
Publisher	Stackpole Books Stackpole Books Stackpole Books IU Press Southern Illinois University Carbondale Herpetologica Indiana Department of Conservation	3	75%
<b>Total Respondents</b>		<b>11</b>	

## Appendix E-33: Forests

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of all wildlife in Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	Mammals of Indiana Nocturnal Behavior of Eastern Red Bats Status and management of bobcas in the United States over three decades North American Box Turtles None known	1	100%
Author	Russell E. Mumford and John O. Whitaker, Jr. Brienne Everson Woolf, A. and G.F. Hubert, Jr. Dodd	1	100%
Date	1982 2005? 1998 2001	1	100%
Publisher	Indiana University Press MS Thesis, Indiana State University (not yet complete) Wildlife Society Bulletin 26:287-293. University of Oklahoma Press	1	100%
<b>Total Respondents</b>		<b>8</b>	

**36.** What is the current HABITAT body of science for all wildlife in Forest Habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		1	11%
Adequate		3	33%
Inadequate		2	22%
Nonexistent		1	11%
Other (please explain below)	Unknown I am not sure on the habitat's body of science... I would assume complete and up to date	2	22%
1. unknown			
<b>Total Respondents</b>		<b>9</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of all wildlife in Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

	Response Total	Response Percent
White-tailed Deer Ecology and Management White-tailed Deer Ecology and Management		

## Appendix E-33: Forests

	Natural Heritage of Indiana The bobcat in Illinois Unknown		
Author	Halls, L. K. (editor) Lowell K. Halls Marion Jackson Alan Woolf and Clayton Nielsen	2	100%
Date	1984 1984 1999 2002	2	100%
Publisher	Stackpole Books Stackpole Books IU Press Southern Illinois University Carbondale	2	100%
<b>Total Respondents</b>		<b>3</b>	

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of all wildlife in Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	Nocturnal Behavior of Eastern Red Bats Unknown	2	0%
Author	Brianne Everson	1	0%
Date	2005?	1	0%
Publisher	Unpublished MS Thesis (should be complete by may 2005)	1	0%
<b>Total Respondents</b>		<b>2</b>	

**39.** What are the research needs for all wildlife in Forest Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total	
Life cycle	0% (0)	33% (3)	11% (1)	33% (3)	22% (2)	0% (0)	9	
Distribution and abundance	11% (1)	0% (0)	33% (3)	22% (2)	33% (3)	0% (0)	9	
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	33% (3)	22% (2)	44% (4)	0% (0)	9	
Threats (predators/competition, contamination)	0% (0)	11% (1)	55% (5)	33% (3)	0% (0)	0% (0)	9	
Relationship/dependence on specific habitats	0% (0)	11% (1)	33% (3)	44% (4)	11% (1)	0% (0)	9	
Population health (genetic and physical)	13% (1)	38% (3)	13% (1)	13% (1)	25% (2)	0% (0)	8	
Other (please specify below)	29% (2)	29% (2)	29% (2)	0% (0)	0% (0)	14% (1)	7	
<b>Total Respondents</b>							<b>60</b>	

## Appendix E-33: Forests

### 40. Other research needs for all wildlife in Forest Habitats in Indiana.

1. A deer harvest analysis and modeling program  
Baseline life history data.
2. CWD all aspects
3. The aging techniques (tooth wear) biologists use were developed in New York and may not be accurate for deer of the midwest. My personal experience with deer of known ages indicates that wear is less than the aging charts we currently use. Additional local research needs to be done if we are interested in accurately aging deer over 2 1/2 years.
4. Research needs explore the role of age and social structure in deer herd health.
5. We desperately need to know how bats interact with each other in terms of competition.
6. WHY DOES THIS PAGE SAY I'M DOING THE OTTER QUESTIONNAIRE??? I ANSWERED #39 ABOVE FOR BOBCATS IN FORESTED HABITATS .... NOT OTTERS IN AQUATIC SYSTEMS!
7. Unknown
8. Due to the high fragmentation of forest tracts in Indiana (especially northern Indiana) I believe that dispersal distance is a critical area of research. I also would like to see a research project that evaluates the amount of harvest pressure can be sustained by isolated metapopulations of squirrels.

**Total Respondents 8**

### 41. What are the HABITAT research needs for all wildlife in Forest Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	43% (3)	29% (2)	29% (2)	0% (0)	<b>7</b>
Distribution and abundance (fragmentation)	0% (0)	33% (3)	33% (3)	33% (2)	0% (0)	0% (0)	<b>8</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	86% (6)	14% (1)	0% (0)	0% (0)	<b>7</b>
Relationship/dependence on specific site conditions	0% (0)	0% (0)	29% (2)	29% (2)	43% (3)	0% (0)	<b>7</b>
Growth and development of individual components of the habitat	0% (0)	0% (0)	14% (1)	29% (2)	43% (3)	14% (1)	<b>7</b>
Other (please specify below)	0% (0)	0% (0)	25% (1)	0% (0)	0% (0)	75% (3)	<b>4</b>
							<b>Total Respondents 40</b>

### 42. Other HABITAT research needs for all wildlife in Forest Habitats in Indiana.

## Appendix E-33: Forests

1. unknown
2. Research needs explore the effects of land development.
3. Unknown

**Total Respondents 3**

### 43. How well do the following conservation efforts address the threats to all wildlife in Forest Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	22% (2)	55% (5)	11% (1)	11% (1)	0% (0)	<b>9</b>
Population management (hunting, trapping)	22% (2)	44% (4)	0% (0)	22% (2)	11% (1)	<b>9</b>
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	100% (9)	0% (0)	<b>9</b>
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	100% (9)	0% (0)	<b>9</b>
Food plots	11% (1)	22% (2)	11% (1)	55% (5)	0% (0)	<b>9</b>
Threats reduction	0% (0)	11% (1)	11% (1)	55% (5)	22% (2)	<b>9</b>
Native predator control	0% (0)	0% (0)	44% (4)	55% (5)	0% (0)	<b>9</b>
Exotic/invasive species control	0% (0)	22% (2)	11% (1)	66% (6)	0% (0)	<b>9</b>
Regulation of collecting	11% (1)	22% (2)	11% (1)	44% (4)	11% (1)	<b>9</b>
Disease/parasite management	0% (0)	33% (3)	11% (1)	44% (4)	11% (1)	<b>9</b>
Translocation to new geographic range	0% (0)	0% (0)	22% (2)	77% (7)	0% (0)	<b>9</b>
Protection of migration routes	11% (1)	0% (0)	33% (3)	55% (5)	0% (0)	<b>9</b>
Limiting contact with pollutants/contaminants	0% (0)	11% (1)	22% (2)	44% (4)	22% (2)	<b>9</b>
Public education to reduce human disturbance	0% (0)	33% (3)	22% (2)	33% (3)	11% (1)	<b>9</b>
Culling/selective removal	0% (0)	11% (1)	22% (2)	66% (6)	0% (0)	<b>9</b>
Stocking	0% (0)	0% (0)	11% (1)	88% (8)	0% (0)	<b>9</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	50% (3)	50% (3)	<b>6</b>
				<b>Total Respondents</b>		<b>150</b>

### 44. Other current conservation practices for all wildlife in Forest Habitats in Indiana.

## Appendix E-33: Forests

1. Contraceptives; currently not used due to efficacy and economical reasons
2. unknown
3. Unknown

**Total Respondents 3**

### 45. What one or two specific practices would you recommend for more effective conservation of all wildlife in Forest Habitats in Indiana?

1. Population management via hunting
2. Ban cervid farming & canned hunting  
Woodland habitat protection
3. Control of forest habitat fragmentation
4. Habitat Protection  
Invasive species control  
  
Studies of migration routes are needed so these areas can be protected.
5. Care should be taken in approving wind turban power stations because of the large direct take associated with these structures. We also need some studies of these power stations in this section of the Midwest (Indiana, Ill, OH).  
  
I would recommend preserving large contionous blocks of forested habitat and prohibiting the collection of box turtles. If possible, I would attempt to lower meso predator numbers and protect nest cavaties.
6. Unknown
7. Unknown
8. Protecting existing forest tracts and maintaining or creating corridors between fragments would, in my opinion, be the 2 most effective conservation practices for fox squirrels in Indiana.

**Total Respondents 7**

### 46. How well do the following conservation efforts address the HABITAT threats to all wildlife in Forest Habitats in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection through regulation	22% (2)	44% (4)	22% (2)	11% (1)	0% (0)	9
Habitat protection on public lands	33% (3)	66% (6)	0% (0)	0% (0)	0% (0)	9
Habitat protection incentives (financial)	33% (3)	55% (5)	11% (1)	0% (0)	0% (0)	9
Habitat restoration through regulation	0% (0)	66% (6)	11% (1)	22% (2)	0% (0)	9
Habitat restoration on public lands	11% (1)	77% (7)	0% (0)	11% (1)	0% (0)	9
Habitat restoration incentives (financial)	11% (1)	66% (6)	11% (1)	0% (0)	11% (1)	9

## Appendix E-33: Forests

Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	11% (1)	88% (8)	0% (0)	<b>9</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	22% (2)	77% (7)	0% (0)	<b>9</b>
Succession control (fire, mowing)	0% (0)	33% (3)	22% (2)	33% (3)	11% (1)	<b>9</b>
Corridor development/protection	11% (1)	22% (2)	11% (1)	55% (5)	0% (0)	<b>9</b>
Managing water regimes	0% (0)	11% (1)	11% (1)	77% (7)	0% (0)	<b>9</b>
Pollution reduction	0% (0)	22% (2)	11% (1)	55% (5)	11% (1)	<b>9</b>
Protection of adjacent buffer zone	0% (0)	33% (3)	11% (1)	44% (4)	11% (1)	<b>9</b>
Restrict public access and disturbance	0% (0)	22% (2)	33% (3)	33% (3)	11% (1)	<b>9</b>
Land use planning	11% (1)	33% (3)	11% (1)	33% (3)	11% (1)	<b>9</b>
Technical assistance	0% (0)	66% (6)	0% (0)	11% (1)	22% (2)	<b>9</b>
Cooperative land management agreements (conservation easements)	0% (0)	88% (8)	0% (0)	0% (0)	11% (1)	<b>9</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	25% (1)	75% (3)	<b>4</b>
				<b>Total Respondents</b>		<b>157</b>

### 47. Other current HABITAT conservation practices for all wildlife in Forest Habitats in Indiana.

1. unknown
2. Restriction of motorized access into habitat
3. Unknown

**Total Respondents 3**

### 48. What one or two specific HABITAT practices would you recommend for more effective conservation of all wildlife in Forest Habitats in Indiana?

1. Restricting housing development in forested areas.  
Incentives for establishing new forested areas and protection of existing ones.
2. Habitat Protection  
Habitat Restoration  
Preservation of both forest and agricultural landscapes will protect some wildlife species habitat.
3. Most forest conservation practices (including corridors and greenways) are likely success stories for wildlife species.
4. Protection of large blocks of natural communities and habitats. Management of forested lands to provide early/mid successional stage habitats.
5. Preserve large tracts of forested habitat.
6. Legislation to protect habitat.

## Appendix E-33: Forests

7. The 2 specific habitat practices that I would recommend would be to create corridors between forest tracts and provide financial incentives to protect or create forest habitat.

**Total Respondents 7**

### **49.** Do you have any additional comments or information on all wildlife in Forest Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

1. Evaluate current harvest and hunting strategies to determine if we need to better balance opportunity with harvest. Continue to monitor QDM practices (quality deer management) in other areas. I believe we already have quality deer in Indiana without getting involved in QDM restrictions or regulations.

2. Research into how the elimination of the older age classes of deer affects the health of the deer herd.

This is still a common bat, but threats to its migration routes are a critical issue.

3. Little is known about population dynamics for any bat--this one in particular.

A state-wide monitoring effort should be undertaken.

4. None

**Total Respondents 4**

## Appendix E-34: Deciduous

Technical experts did not provide input on a representative species for this habitat.

There are no species of greatest conservation need in this guild.







Appendix E-35: Early Forest Stage

(skipped this question)

2

**12.** Please briefly describe the top two HABITAT threats to the Wildlife in Early Forest Stage Forest Habitats in Indiana identified above.

1. This is somewhat repetitive of the previous questions but here we go again:

1) lack of active timber management that adequately opens or removes the overhead forest canopy and allows for natural regeneration back into a forest cover. 2) the lack of public understanding and acceptance of timber management, especially even-age timber management.

2) the lack of public understanding and acceptance that vegetative disturbance whether natural or man-made

2. loss of early successional forest habitats

fragmentation resulting in islands of habitat too far removed from others for immigration or emigration

3. The answers listed above indicate the absence of early successional habitat in forests, i.e. absence of clear-cutting, and other disturbance types in forested habitats is the major cause of ruffed grouse habitat declines. Forestry practices that do NOT lead to early successional habitat development are the problem. Grouse and many songbirds, need early forest successional stages and due to the current policies of the USFS and some state properties, the grouse is being "not-managed" to extirpation.

**Total Respondents**

**3**

**13.** What current monitoring efforts by state agencies are you aware of for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Statewide once a year monitoring conducted by state agencies	33% (1)	67% (2)	<b>3</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (2)	<b>2</b>
Regional or local once a year monitoring conducted by state agencies	100% (3)	0% (0)	<b>3</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (3)	<b>3</b>
		<b>Total Respondents</b>	<b>3</b>

## Appendix E-35: Early Forest Stage

### 14. What current monitoring efforts by other organizations are you aware of for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (2)	2
Statewide once a year monitoring conducted by other organizations	33% (1)	67% (2)	3
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (3)	3
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (3)	3
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (3)	3
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (3)	3
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (3)	3
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	33% (1)	67% (2)	3
		<b>Total Respondents</b>	<b>3</b>

### 15. How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	Very crucial	Somewhat crucial	Slightly crucial	Not crucial	Unknown	Response Total
Statewide year-round monitoring conducted by state agencies	0% (0)	33% (1)	0% (0)	67% (2)	0% (0)	3
Statewide once a year monitoring conducted by state agencies	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	2
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Regional or local year-round monitoring conducted by state agencies	0% (0)	33% (1)	33% (1)	33% (1)	0% (0)	3
Regional or local once a year monitoring conducted by state agencies	33% (1)	33% (1)	33% (1)	0% (0)	0% (0)	3
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	33% (1)	33% (1)	0% (0)	33% (1)	3

Appendix E-35: Early Forest Stage

Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	<b>3</b>
<b>Total Respondents</b>						<b>3</b>

**16.** How crucial are these monitoring efforts by other organizations for the conservation of the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	33% (1)	0% (0)	67% (2)	0% (0)	<b>3</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	33% (1)	0% (0)	67% (2)	0% (0)	<b>3</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (1)	67% (2)	0% (0)	<b>3</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	33% (1)	67% (2)	0% (0)	<b>3</b>
<b>Total Respondents</b>						<b>3</b>

**17.** Regional or local state agency monitoring for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

1. 8 Roadside spring drumming survey (drumming indices) conducted in primarily in souhtcentral Indiana. Activity Center counts on the 900 acre Maumee Grouse Study Area in Jackson/Brown counties.
2. unknown
3. In southern Indiana in the unglaciated forested region.

**Total Respondents 3**

Appendix E-35: Early Forest Stage

**18.** Regional or local monitoring by other organizations for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

1. Incidental observations on Christmas Bird Counts (extremely minor)

Species occurrence noted during the Statewide Breeding Bird Atlas Project (only one ever done).

2. unknown

3. On state properties or USFS land where populations have been known to exist.

**Total Respondents 3**

**19.** Please list organizations that are monitoring the Wildlife in Early Forest Stage Forest Habitats in Indiana.

1. Audubon Christmas Bird Counts

2. unknown

3. IDNR, Div. Fish and Wildlife

**Total Respondents 3**

**20.** What are the current monitoring techniques for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	33% (1)	33% (1)	0% (0)	33% (1)	0% (0)	3
Modeling	0% (0)	100% (3)	0% (0)	0% (0)	0% (0)	0% (0)	3
Coverboard routes	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Spot mapping	0% (0)	67% (2)	33% (1)	0% (0)	0% (0)	0% (0)	3
Driving a survey route	67% (2)	33% (1)	0% (0)	0% (0)	0% (0)	0% (0)	3
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	67% (2)	33% (1)	0% (0)	0% (0)	0% (0)	3
Mark and recapture	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)	2
Professional survey/census	67% (2)	33% (1)	0% (0)	0% (0)	0% (0)	0% (0)	3

## Appendix E-35: Early Forest Stage

Volunteer survey/census	0% (0)	33% (1)	33% (1)	0% (0)	0% (0)	33% (1)	<b>3</b>
Trapping (by any technique)	0% (0)	0% (0)	67% (2)	0% (0)	33% (1)	0% (0)	<b>3</b>
Representative sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Probabilistic sites	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>							<b>3</b>

### 21. Other monitoring techniques for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **3**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Early Forest Stage Forest Habitats in Indiana?

1. Roadside Drumming indices
2. Spring drumming routes - used nationally for spring breeding trend data.

On particular or "study areas", complete spring drumming counts for accurate breeding densities. Assumes a low # of non-drumming males and requires at least three opportunities, on good mornings, to hear a drumming bird in any portion of the study area

3. Driving routes, hunter bag surveys

**Total Respondents** **3**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	67% (2)	33% (1)	<b>3</b>

## Appendix E-35: Early Forest Stage

Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (3)	<b>3</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (3)	<b>3</b>
<b>Total Respondents</b>			<b>3</b>

<b>24.</b> What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for the Wildlife in Early Forest Stage Forest Habitats in Indiana?	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (3)	<b>3</b>
<b>Total Respondents</b>			<b>3</b>

<b>25.</b> How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in Early Forest Stage Forest Habitats in Indiana?	<b>These efforts are very crucial for this HABITAT</b>	<b>These efforts are somewhat crucial for this HABITAT</b>	<b>These efforts are slightly crucial for this HABITAT</b>	<b>These efforts are not crucial for this HABITAT</b>	<b>Unknown</b>	<b>Response Total</b>
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Appendix E-35: Early Forest Stage

**30.** What are the current monitoring techniques for the Wildlife in Early Forest Stage Forest Habitats in Indiana.  
 If a technique is not applicable to the Wildlife in Early Forest Stage Forest Habitats, do not select a response in that row.

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	0% (0)	33% (1)	33% (1)	0% (0)	33% (1)	<b>3</b>
Aerial photography and analysis	0% (0)	0% (0)	33% (1)	33% (1)	0% (0)	33% (1)	<b>3</b>
Systematic sampling	33% (1)	33% (1)	0% (0)	0% (0)	0% (0)	33% (1)	<b>3</b>
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (3)	<b>3</b>
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
Participation in landuse programs	0% (0)	33% (1)	33% (1)	0% (0)	0% (0)	33% (1)	<b>3</b>
Modeling	0% (0)	100% (3)	0% (0)	0% (0)	0% (0)	0% (0)	<b>3</b>
Voluntary landowner reporting	0% (0)	0% (0)	33% (1)	0% (0)	0% (0)	67% (2)	<b>3</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>							<b>3</b>

**31.** Other HABITAT inventory and assessment techniques for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 3

**32.** What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Early Forest Stage Forest Habitats in Indiana?

1. Statewide Forest Inventory
2. GIS and current aerial photos

Appendix E-35: Early Forest Stage

	<b>Total Respondents</b>	<b>2</b>
	(skipped this question)	1

**33.** What is the current body of science for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		1	33%
Adequate		2	67%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)		0	0%
	<b>Total Respondents</b>	<b>3</b>	

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Early Forest Stage Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Population status of ruffed grouse in Indiana; Ruffed Grouse Restoration in IN;	2	100%
Author	Steven E. Backs; Steve Backs;	2	100%
Date	Annual Progress Reports; 1984;	2	100%
Publisher	Indiana Div. Fish and Wildlife N. Central Section of the Wildlife Soc.	2	100%
	<b>Total Respondents</b>	<b>2</b>	
	(skipped this question)		1

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Early Forest Stage Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	The historic and present distribution of ruffed grouse in Indiana; Characteristics of Drumming Habitat of Grouse in IN;	2	100%
Author	Steven E. Backs; Backs, Kelly, Major, Miller;	2	100%
Date	1984; 1984;	2	100%

## Appendix E-35: Early Forest Stage

Publisher	Ind. Acad. Sci. 93:161-166. Proceedings of Indiana Academy of Science: 94:227-230	2	100%
		<b>Total Respondents</b>	<b>2</b>
		(skipped this question)	1

**36.** What is the current HABITAT body of science for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		2	67%
Inadequate		1	33%
Nonexistent		0	0%
Other (please explain below)		0	0%
		<b>Total Respondents</b>	<b>3</b>

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Early Forest Stage Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Statewide Forest Inventory;	2	100%
Author	?;	1	50%
Date	periodic;	1	50%
Publisher	US Forest Service/IDNR	1	50%
		<b>Total Respondents</b>	<b>2</b>
		(skipped this question)	1

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Early Forest Stage Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title		0	0%
Author		1	100%
Date		0	0%
Publisher		0	0%
		<b>Total Respondents</b>	<b>1</b>

Appendix E-35: Early Forest Stage

(skipped this question)

2

**39.** What are the research needs for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Life cycle	0% (0)	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	<b>3</b>
Distribution and abundance	33% (1)	0% (0)	33% (1)	33% (1)	0% (0)	0% (0)	<b>3</b>
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	0% (0)	33% (1)	67% (2)	0% (0)	<b>3</b>
Threats (predators/competition, contamination)	0% (0)	33% (1)	0% (0)	0% (0)	67% (2)	0% (0)	<b>3</b>
Relationship/dependence on specific habitats	0% (0)	0% (0)	0% (0)	67% (2)	33% (1)	0% (0)	<b>3</b>
Population health (genetic and physical)	0% (0)	0% (0)	33% (1)	0% (0)	67% (2)	0% (0)	<b>3</b>
Other (please specify below)	50% (1)	0% (0)	0% (0)	0% (0)	50% (1)	0% (0)	<b>2</b>
					<b>Total Respondents</b>		<b>3</b>

**40.** Other research needs for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

1. Whether the distribution of early successional habitat is now so poor and low (as are ruffed grouse populations) that the disappearance of ruffed grouse from local areas now expand into a more regional or complete extinction.

2. We don't need more reserch. We need habitat management for early successional forest species, including but not limited to the ruffed grouse.

**Total Respondents 2**

(skipped this question) 1

**41.** What are the HABITAT research needs for the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	0% (0)	<b>3</b>
Distribution and abundance (fragmentation)	33% (1)	0% (0)	33% (1)	0% (0)	33% (1)	0% (0)	<b>3</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	0% (0)	<b>3</b>
Relationship/dependence on specific site conditions	33% (1)	0% (0)	0% (0)	33% (1)	33% (1)	0% (0)	<b>3</b>
Growth and development of individual components of the	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	0% (0)	<b>3</b>

## Appendix E-35: Early Forest Stage

habitat							
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
					<b>Total Respondents</b>		<b>3</b>

### 42. Other HABITAT research needs for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

We do not need research on grouse habitat. We know what they need, it just needs to be provided before the ruffed grouse is extirpated.

**Total Respondents**      **1**  
(skipped this question)      2

### 43. How well do the following conservation efforts address the threats to the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection (use below for details)	33% (1)	67% (2)	0% (0)	0% (0)	0% (0)	3
Population management (hunting, trapping)	33% (1)	67% (2)	0% (0)	0% (0)	0% (0)	3
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Reintroduction (restoration)	0% (0)	0% (0)	67% (2)	33% (1)	0% (0)	3
Food plots	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Threats reduction	0% (0)	0% (0)	0% (0)	67% (2)	33% (1)	3
Native predator control	0% (0)	0% (0)	0% (0)	67% (2)	33% (1)	3
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	67% (2)	33% (1)	3
Regulation of collecting	0% (0)	0% (0)	0% (0)	67% (2)	33% (1)	3
Disease/parasite management	0% (0)	0% (0)	0% (0)	67% (2)	33% (1)	3
Translocation to new geographic range	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Protection of migration routes	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Public education to reduce human disturbance	0% (0)	33% (1)	0% (0)	67% (2)	0% (0)	3
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Stocking	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Other (please specify below)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
				<b>Total Respondents</b>		<b>3</b>

Appendix E-35: Early Forest Stage

**44.** Other current conservation practices for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

1. Instead of the word "protection" perhaps "enhancement" would be a better choice as the "protection" of habitat for ruffed grouse requires active vegetative management. While hunting is not responsible for the declining population trends and hunting pressure is self-limiting/regulated by diminishing returns, the question does eventually come to the point (with the continuous decline of habitat and subsequently low populations) where one must ask if there is an available surplus or are we shooting the last grouse in an area that was doomed anyway due to the lack of habitat.

2. N/A

3. What is needed is habitat management in the form of producing early successional forest stages in large tracts throughout the forested regions of the state, especially on public lands. If this is not provided, the grouse will soon be extirpated.

**Total Respondents 3**

**45.** What one or two specific practices would you recommend for more effective conservation of the Wildlife in Early Forest Stage Forest Habitats in Indiana?

1. Active timber management, especially on the larger blocks of public forest lands, especially those timber management practices that remove at least 75% of the overhead canopy.

2. Habitat decline must be addressed - methods to initiate active timber/wildlife management on the landscape is necessary to stem the serious decline of ruffed grouse in the state.

3. Immediate production of early successional stages of vegetation on public lands. Forstry practices such as clear-cutting and certain select cutting methods are needed to provide the habitat that is essential to returning ruffed grouse populations to earlier levels.

**Total Respondents 3**

**46.** How well do the following conservation efforts address the HABITAT threats to the Wildlife in Early Forest Stage Forest Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	0% (0)	67% (2)	33% (1)	0% (0)	0% (0)	<b>3</b>
Habitat protection on public lands	0% (0)	67% (2)	33% (1)	0% (0)	0% (0)	<b>3</b>
Habitat protection incentives (financial)	0% (0)	67% (2)	33% (1)	0% (0)	0% (0)	<b>3</b>
Habitat restoration through regulation	33% (1)	0% (0)	33% (1)	0% (0)	33% (1)	<b>3</b>
Habitat restoration on public lands	33% (1)	0% (0)	0% (0)	33% (1)	33% (1)	<b>3</b>
Habitat restoration incentives (financial)	33% (1)	0% (0)	0% (0)	33% (1)	33% (1)	<b>3</b>
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	33% (1)	67% (2)	0% (0)	<b>3</b>
Succession control (fire, mowing)	33% (1)	0% (0)	33% (1)	33% (1)	0% (0)	<b>3</b>
Corridor development/protection	33% (1)	33% (1)	0% (0)	33% (1)	0% (0)	<b>3</b>

## Appendix E-35: Early Forest Stage

Managing water regimes	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	<b>2</b>
Pollution reduction	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Protection of adjacent buffer zone	0% (0)	33% (1)	33% (1)	33% (1)	0% (0)	<b>3</b>
Restrict public access and disturbance	0% (0)	0% (0)	33% (1)	67% (2)	0% (0)	<b>3</b>
Land use planning	33% (1)	33% (1)	0% (0)	33% (1)	0% (0)	<b>3</b>
Technical assistance	0% (0)	100% (3)	0% (0)	0% (0)	0% (0)	<b>3</b>
Cooperative land management agreements (conservation easements)	0% (0)	67% (2)	0% (0)	33% (1)	0% (0)	<b>3</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
				<b>Total Respondents</b>		<b>48</b>

### 47. Other current HABITAT conservation practices for the Wildlife in Early Forest Stage Forest Habitats in Indiana.

1. Under the habitat through "protection and regulation", some states have "policies or regulations" that specifically mandate that a certain percentage of their public lands will be maintained in early successional and transitional forest types

2. There are very few if any "current habitat conservation practices" being implemented for the ruffed grouse. That is the major problem with the critically low population levels for this species.

**Total Respondents** **2**

(skipped this question) **1**

### 48. What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Early Forest Stage Forest Habitats in Indiana?

1. I thought I answered this already but here we go:

ACTIVE TIMBER MANAGEMENT THAT REMOVES AT LEAST 75% OF THE EXISTING FOREST CANOPY ON A PROPORTION OF THE FORESTED LANDSCAPE EVERY 5-10 YEARS ON A 80-120 YEAR ROTATION (DEPENDING SITECONSTRAINTS AND MGMT OBJECTIVES) USING PRIMARILY EVEN-AGE TIMBER MANAGEMENT TECHNIQUES.

2. TIMBER MANAGEMENT

3. Implement forestry practices that will benefit early successional species including grey fox, bobcat, and woodcock, as well as ruffed grouse.

Educate the public so they understand that "nature knows best" and that "letting things go back to nature" are ignorant and foolish concepts. Educate the public to understand that habitat management in this day and age is necessary if we are to provide habitat for specialist species whose populations are in peril.

**Total Respondents** **3**

### 49. Do you have any additional comments or information on the Wildlife in Early Forest Stage Forest Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

1. Ruffed grouse should be viewed as an interior forest dependent species requiring early successional forests. While their populations will also benefit to some degree from the transitional habitats that develop from abandoned fields going into forested cover, they are primarily dependent on the larger tracts of contiguous forests. They are not an

## Appendix E-35: Early Forest Stage

"edge" species even though that is commonly found in the popular literature and some older technical publications. Grouse are often found on forest edges because that is the only early successional habitat they can find. they are also more vulnerable to natural and man-induced (hunting)predation when forced up to the edge or limit of good or marginal habitat.

2. Indiana mirrors other states, especially on the southern periphery of the ruffed grouse range in the severe reduction of suitable habitats and consequently, populations. As land abandonment and reverting farmlands are a thing of the past, only timber management on public (especially) and private lands can rebalance successional age classes in forest lands to benefit grouse and a host of other early successional species.

**Total Respondents**      **2**

(skipped this question)      1

Appendix E-36: Evergreen

**6.** Please rank the following threats to the Wildlife in Evergreen Forest Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Invasive/non-native species	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
High sensitivity to pollution	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Bioaccumulation of contaminants	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Predators (native or domesticated)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Dependence on other species (mutualism, pollinators)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Diseases/parasites (of the species itself)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Species over population	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Unregulated collection pressure	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>							<b>11</b>

**7.** Please also rank these threats to the Wildlife in Evergreen Forest Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat loss (breeding range)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat loss (feeding/foraging areas)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Small native range (high endemism)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Near limits of natural geographic range	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Large home range requirements	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Viable reproductive population size or availability	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Specialized reproductive behavior or low reproductive rates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>

## Appendix E-36: Evergreen

Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
							<b>Total Respondents 11</b>

### 8. Other threats to the Wildlife in Evergreen Forest Habitats in Indiana.

1. unknown

**Total Respondents 1**

### 9. Please briefly describe the top two threats to the Wildlife in Evergreen Forest Habitats in Indiana identified above.

1. Potential habitat loss due development and lack of management.

**Total Respondents 1**

### 10. Please rank the following threats to the HABITAT of the Wildlife in Evergreen Forest Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Counterproductive financial incentives or regulations	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Invasive/non-native species	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Habitat fragmentation	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Successional change	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Habitat degradation	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Stream channelization	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Impoundment of water/flow regulation	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Agricultural/forestry practices	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>

## Appendix E-36: Evergreen

Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Mining/acidification	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>							<b>18</b>

### 11. Other HABITAT threats to the Wildlife in Evergreen Forest Habitats in Indiana.

1. unknown

**Total Respondents 1**

### 12. Please briefly describe the top two HABITAT threats to the Wildlife in Evergreen Forest Habitats in Indiana identified above.

1. Conversion of habitat to other than pine forests  
Lack of active habitat management

**Total Respondents 1**

### 13. What current monitoring efforts by state agencies are you aware of for the Wildlife in Evergreen Forest Habitats in Indiana?

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	100% (1)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>

## Appendix E-36: Evergreen

Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>			<b>8</b>

### 14. What current monitoring efforts by other organizations are you aware of for the Wildlife in Evergreen Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by other organizations	100% (1)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>			<b>8</b>

### 15. How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Evergreen Forest Habitats in Indiana?

	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>

## Appendix E-36: Evergreen

Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

<b>16.</b> How crucial are these monitoring efforts by other organizations for the conservation of the Wildlife in Evergreen Forest Habitats in Indiana?						
	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

<b>17.</b> Regional or local state agency monitoring for the Wildlife in Evergreen Forest Habitats in Indiana.	
1. None known	
<b>Total Respondents</b>	
<b>1</b>	

## Appendix E-36: Evergreen

**18.** Regional or local monitoring by other organizations for the Wildlife in Evergreen Forest Habitats in Indiana.

1. None known

**Total Respondents 1**

**19.** Please list organizations that are monitoring the Wildlife in Evergreen Forest Habitats in Indiana.

1. DNR Division of Fish and Wildlife  
USGS Breeding Bird Survey

**Total Respondents 1**

**20.** What are the current monitoring techniques for the Wildlife in Evergreen Forest Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Coverboard routes	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Spot mapping	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Driving a survey route	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Mark and recapture	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Professional survey/census	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Volunteer survey/census	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Trapping (by any technique)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Representative sites	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>

## Appendix E-36: Evergreen

Probabilistic sites	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
<b>Total Respondents</b>							<b>12</b>	

### 21. Other monitoring techniques for the Wildlife in Evergreen Forest Habitats in Indiana.

1. unknown

**Total Respondents 1**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Evergreen Forest Habitats in Indiana?

1. Sampling of mature pine forest habitat to better determine distribution

**Total Respondents 1**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Evergreen Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>			<b>8</b>

Appendix E-36: Evergreen

**24.** What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for the Wildlife in Evergreen Forest Habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	1
		<b>Total Respondents</b>	<b>8</b>

**25.** How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in Evergreen Forest Habitats in Indiana?

	These efforts are very crucial for this HABITAT	These efforts are somewhat crucial for this HABITAT	These efforts are slightly crucial for this HABITAT	These efforts are not crucial for this HABITAT	Unknown	Response Total
Statewide annual inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1



## Appendix E-36: Evergreen

once a year but still regularly scheduled) inventory and assessment conducted by other organizations

Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations

0% (0)      0% (0)      0% (0)      0% (0)      100% (1)      **1**

**Total Respondents      8**

**27.** Regional or local state agency HABITAT inventory and assessment for the Wildlife in Evergreen Forest Habitats in Indiana.

1. None known

**Total Respondents      1**

**28.** Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in Evergreen Forest Habitats in Indiana.

1. None known

**Total Respondents      1**

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in Evergreen Forest Habitats in Indiana.

1. None known

**Total Respondents      1**

**30.** If a technique is not applicable to the Wildlife in Evergreen Forest Habitats do not select a response in that row.

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Aerial photography and analysis	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Systematic sampling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>

## Appendix E-36: Evergreen

State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>												
<b>Total Respondents</b>							<b>10</b>												

**31.** Other HABITAT inventory and assessment techniques for the Wildlife in Evergreen Forest Habitats in Indiana.

1. Unknown

**Total Respondents 1**

**32.** What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Evergreen Forest Habitats in Indiana?

1. Statewide inventory and mapping of mature pine forest communities to determine more accurate potential distribution of pine warbler. References suggested would be Flora of Indiana by Charles Deam 1940 and unpublished data/files from Division of Forestry.

**Total Respondents 1**

**33.** What is the current body of science for the Wildlife in Evergreen Forest Habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		0	0%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)	Breeding Bird Atlas and Breeding Bird Survey data	1	100%
<b>Total Respondents</b>		<b>1</b>	<b>1</b>

## Appendix E-36: Evergreen

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Evergreen Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Atlas of Breeding Birds in Indiana	1	100%
Author	Castrale, Hopkins, and Keller	1	100%
Date	1998	1	100%
Publisher	Indiana Department of Natural Resources	1	100%
<b>Total Respondents</b>		<b>1</b>	

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Evergreen Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title		0	0%
Author		0	0%
Date		0	0%
Publisher		0	0%
<b>Total Respondents</b>		<b>0</b>	
(skipped this question)			1

**36.** What is the current HABITAT body of science for the Wildlife in Evergreen Forest Habitats in Indiana?

		<b>Response Total</b>	<b>Response Percent</b>
Complete, up to date and extensive		0	0%
Adequate		0	0%
Inadequate		1	100%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>1</b>	

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Evergreen Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

		<b>Response Total</b>	<b>Response Percent</b>
Title	Indiana Natural Heritage Data Center	1	100%

## Appendix E-36: Evergreen

Author		0	0%
Date		0	0%
Publisher	unpublished data	1	100%
		<b>Total Respondents</b>	<b>1</b>

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Evergreen Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	The Natural Regions of Indiana	1	100%
Author	Homoya, Abrell, Aldrich, and Post	1	100%
Date	1985	1	100%
Publisher	Indiana Academy of Science	1	100%
		<b>Total Respondents</b>	<b>1</b>

**39.** What are the research needs for the Wildlife in Evergreen Forest Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total	
Life cycle	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Distribution and abundance	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Threats (predators/competition, contamination)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Relationship/dependence on specific habitats	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Population health (genetic and physical)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1	
							<b>Total Respondents</b>	<b>7</b>

**40.** Other research needs for the Wildlife in Evergreen Forest Habitats in Indiana.

1. unknown

**Total Respondents** 1

Appendix E-36: Evergreen

**41.** What are the HABITAT research needs for the Wildlife in Evergreen Forest Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Distribution and abundance (fragmentation)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Relationship/dependence on specific site conditions	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Growth and development of individual components of the habitat	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
	<b>Total Respondents</b>						<b>6</b>

**42.** Other HABITAT research needs for the Wildlife in Evergreen Forest Habitats in Indiana.

1. unknown

**Total Respondents 1**

**43.** How well do the following conservation efforts address the threats to the Wildlife in Evergreen Forest Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Food plots	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Threats reduction	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Native predator control	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regulation of collecting	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Disease/parasite management	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Translocation to new geographic range	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>



## Appendix E-36: Evergreen

Managing water regimes	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Pollution reduction	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Protection of adjacent buffer zone	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Restrict public access and disturbance	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Land use planning	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Technical assistance	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Cooperative land management agreements (conservation easements)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
					<b>Total Respondents</b>	<b>18</b>	

### 47. Other current HABITAT conservation practices for the Wildlife in Evergreen Forest Habitats in Indiana.

1. unknown

**Total Respondents 1**

### 48. What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Evergreen Forest Habitats in Indiana?

1. Potentially prescribed burning on public lands to maintain mature forests with sparse understory. Rodewald et al. 1999. Pine Warbler in Birds of North America

**Total Respondents 1**

### 49. Do you have any additional comments or information on the Wildlife in Evergreen Forest Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

1. In terms of breeding habitat, this species appears to be closely tied to native Virginia pine in southern Indiana and in some mature pine plantations at scattered locations around the state. At some point in the future, many of the pine plantations that were established since the 1930's will undoubtedly be replaced by native deciduous forest. Thus, it may be prudent to conduct more intensive inventories of native Virginia pine and its distribution as well as assessing the habitat and potential management strategies for pine warbler.

**Total Respondents 1**



## Appendix E-37: Floodplain Forests

Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
							<b>Total Respondents 9</b>

### 8. Other threats to the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 2

### 9. Please briefly describe the top two threats to the Wildlife in Floodplain Forest Habitats in Indiana identified above.

1. Adequate habitat (primarily American sycamores along riparian areas) in breeding areas.

**Total Respondents 1**

(skipped this question) 1

### 10. Please rank the following threats to the HABITAT of the Wildlife in Floodplain Forest Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Counterproductive financial incentives or regulations	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Invasive/non-native species	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Habitat fragmentation	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Successional change	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Habitat degradation	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Stream channelization	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>

## Appendix E-37: Floodplain Forests

Impoundment of water/flow regulation	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Agricultural/forestry practices	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Mining/acidification	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>							<b>16</b>

### 11. Other HABITAT threats to the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **2**

### 12. Please briefly describe the top two HABITAT threats to the Wildlife in Floodplain Forest Habitats in Indiana identified above.

1. Loss of floodplain sycamores and upland pine forests.

**Total Respondents** **1**

(skipped this question) **1**

### 13. What current monitoring efforts by state agencies are you aware of for the Wildlife in Floodplain Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	100% (1)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>

## Appendix E-37: Floodplain Forests

Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

<b>14.</b>	What current monitoring efforts by other organizations are you aware of for the Wildlife in Floodplain Forest Habitats in Indiana?	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
	Statewide year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Statewide once a year monitoring conducted by other organizations	100% (1)	0% (0)	<b>1</b>
	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
	Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (1)	<b>1</b>
			<b>Total Respondents</b>	<b>8</b>

<b>15.</b>	How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in Floodplain Forest Habitats in Indiana?	<b>Very crucial</b>	<b>Somewhat crucial</b>	<b>Slightly crucial</b>	<b>Not crucial</b>	<b>Unknown</b>	<b>Response Total</b>
	Statewide year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
	Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>



## Appendix E-37: Floodplain Forests

1. periodic statewide Breeding Bird Atlas.

**Total Respondents**      **1**  
(skipped this question)      1

### 18. Regional or local monitoring by other organizations for the Wildlife in Floodplain Forest Habitats in Indiana.

1. federal Breeding Bird Survey statewide; statewide May Day Bird Counts, Summer Bird Counts.

**Total Respondents**      **1**  
(skipped this question)      1

### 19. Please list organizations that are monitoring the Wildlife in Floodplain Forest Habitats in Indiana.

1. bird-watchers, USGS,volunteers

**Total Respondents**      **1**  
(skipped this question)      1

### 20. What are the current monitoring techniques for the Wildlife in Floodplain Forest Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Coverboard routes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Spot mapping	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Driving a survey route	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Mark and recapture	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1

## Appendix E-37: Floodplain Forests

Professional survey/census	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Volunteer survey/census	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Trapping (by any technique)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Representative sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Probabilistic sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>
<b>Total Respondents</b>							<b>12</b>

### 21. Other monitoring techniques for the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **2**

### 22. What one or two monitoring techniques would you recommend for effective conservation of the Wildlife in Floodplain Forest Habitats in Indiana?

- Roadside surveys, canoe surveys, local, more intensive studies

**Total Respondents** **1**

(skipped this question) **1**

### 23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for the Wildlife in Floodplain Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>

## Appendix E-37: Floodplain Forests

Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

### 24. What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for the Wildlife in Floodplain Forest Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	100% (1)	0% (0)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

### 25. How crucial are these HABITAT efforts by state agencies for the conservation of the Wildlife in Floodplain Forest Habitats in Indiana?

	<b>These efforts are very crucial for this HABITAT</b>	<b>These efforts are somewhat crucial for this HABITAT</b>	<b>These efforts are slightly crucial for this HABITAT</b>	<b>These efforts are not crucial for this HABITAT</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>



## Appendix E-37: Floodplain Forests

by other organizations

Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
<b>Total Respondents</b>						<b>8</b>

**27.** Regional or local state agency HABITAT inventory and assessment for the Wildlife in Floodplain Forest Habitats in Indiana.

1. unknown

**Total Respondents** **1**

(skipped this question) 1

**28.** Regional or local HABITAT inventory and assessment by other organizations for the Wildlife in Floodplain Forest Habitats in Indiana.

1. statewide aerial imagery of habitats in Indiana

**Total Respondents** **1**

(skipped this question) 1

**29.** Please list organizations that are monitoring this HABITAT for the Wildlife in Floodplain Forest Habitats in Indiana.

1. unknown

**Total Respondents** **1**

(skipped this question) 1

**30.** If a technique is not applicable to the Wildlife in Floodplain Forest Habitats do not select a response in that row.

	Frequently	Occasionally	Not used but possible	Not used and not possible	Not	Response
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## Appendix E-37: Floodplain Forests

			with existing technology and data	with existing technology and data				
GIS mapping	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Aerial photography and analysis	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Systematic sampling	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Modeling	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
<b>Total Respondents</b>							<b>9</b>	

### 31. Other HABITAT inventory and assessment techniques for the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **2**

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of the Wildlife in Floodplain Forest Habitats in Indiana?

1. Aerial imagery of riparian and pine habitats coupled with habitat modeling.

**Total Respondents** **1**

(skipped this question) **1**

### 33. What is the current body of science for the Wildlife in Floodplain Forest Habitats in Indiana?

**Response  
Total** **Response  
Percent**

## Appendix E-37: Floodplain Forests

Complete, up to date and extensive		0	0%
Adequate		1	100%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>1</b>	
(skipped this question)			1

**34.** Please provide a citation (title, author, date, publisher) that would give the best overview of the Wildlife in Floodplain Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	Breeding Bird Atlas of Indiana	1	50%
Author	Castrale, J.S., E. Hopkins, C. Keller	1	50%
Date	1988	1	50%
Publisher	IDNR	1	50%
<b>Total Respondents</b>		<b>1</b>	
(skipped this question)			1

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of the Wildlife in Floodplain Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title	BNA Account - Yellow-throated Warbler	1	50%
Author	G.A. Hall	1	50%
Date	1996	1	50%
Publisher	American Ornithologists' Union	1	50%
<b>Total Respondents</b>		<b>1</b>	
(skipped this question)			1

**36.** What is the current HABITAT body of science for the Wildlife in Floodplain Forest Habitats in Indiana?

Complete, up to date and extensive		0	0%
Adequate		1	100%

## Appendix E-37: Floodplain Forests

Inadequate	0	0%
Nonexistent	0	0%
Other (please explain below)	0	0%
	<b>Total Respondents</b>	<b>1</b>
	(skipped this question)	1

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of the Wildlife in Floodplain Forest Habitats in Indiana, if available. This resource may be used if further detail is needed.

		Response Total	Response Percent
Title	see previous citations	1	50%
Author		0	0%
Date		0	0%
Publisher		0	0%
	<b>Total Respondents</b>	<b>1</b>	
	(skipped this question)		1

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of the Wildlife in Floodplain Forest Habitats in Indiana. This resource may also be used if further detail is needed.

		Response Total	Response Percent
Title		0	0%
Author		0	0%
Date		0	0%
Publisher		0	0%
	<b>Total Respondents</b>	<b>0</b>	
	(skipped this question)		2

**39.** What are the research needs for the Wildlife in Floodplain Forest Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total	
Life cycle	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Distribution and abundance	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1	
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	
Threats (predators/competition,	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1	

## Appendix E-37: Floodplain Forests

contamination)								
Relationship/dependence on specific habitats	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Population health (genetic and physical)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
							<b>Total Respondents</b>	<b>6</b>

### 40. Other research needs for the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) 2

### 41. What are the HABITAT research needs for the Wildlife in Floodplain Forest Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>	
Successional changes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>	
Distribution and abundance (fragmentation)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Relationship/dependence on specific site conditions	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Growth and development of individual components of the habitat	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
							<b>Total Respondents</b>	<b>5</b>

### 42. Other HABITAT research needs for the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) 2

### 43. How well do the following conservation efforts address the threats to the Wildlife in Floodplain Forest Habitats in Indiana?

## Appendix E-37: Floodplain Forests

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection (use below for details)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Food plots	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Threats reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Native predator control	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Regulation of collecting	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Disease/parasite management	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Translocation to new geographic range	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Protection of migration routes	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Public education to reduce human disturbance	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Stocking	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
				<b>Total Respondents</b>		<b>16</b>

**44.** Other current conservation practices for the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** 0

(skipped this question) 2

**45.** What one or two specific practices would you recommend for more effective conservation of the Wildlife in Floodplain Forest Habitats in Indiana?

1. Conservation of habitats.

**Total Respondents** 1

(skipped this question) 1

## Appendix E-37: Floodplain Forests

**46.** How well do the following conservation efforts address the HABITAT threats to the Wildlife in Floodplain Forest Habitats in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Habitat protection on public lands	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Habitat protection incentives (financial)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Habitat restoration through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Habitat restoration on public lands	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Habitat restoration incentives (financial)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Succession control (fire, mowing)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Corridor development/protection	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Managing water regimes	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Pollution reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Protection of adjacent buffer zone	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Restrict public access and disturbance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Land use planning	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Technical assistance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Cooperative land management agreements (conservation easements)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
				<b>Total Respondents</b>		<b>17</b>

**47.** Other current HABITAT conservation practices for the Wildlife in Floodplain Forest Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** 0

(skipped this question) 2

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of the Wildlife in Floodplain Forest Habitats in Indiana?

1. Incentives to conserve floodplain forests.

**Total Respondents** 1

## Appendix E-37: Floodplain Forests

(skipped this question)

1

**49.** Do you have any additional comments or information on the Wildlife in Floodplain Forest Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      2

Appendix E-38: Forested Wetlands

**6.** Please rank the following threats to All Wildlife in Forested Wetland Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Invasive/non-native species	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
High sensitivity to pollution	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Bioaccumulation of contaminants	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Predators (native or domesticated)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Dependence on other species (mutualism, pollinators)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Diseases/parasites (of the species itself)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Species over population	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Unregulated collection pressure	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>							<b>11</b>

**7.** Please also rank these threats to All Wildlife in Forested Wetland Habitats in Indiana.

	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat loss (breeding range)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat loss (feeding/foraging areas)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Small native range (high endemism)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Near limits of natural geographic range	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Large home range requirements	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Viable reproductive population size or availability	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Specialized reproductive behavior or low reproductive rates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>

Appendix E-38: Forested Wetlands

Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Genetic pollution (hybridization)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>							<b>11</b>

<b>8.</b> Other threats to All Wildlife in Forested Wetland Habitats in Indiana.
No responses were entered for this question.
<b>Total Respondents</b> <b>0</b>
(skipped this question) <b>1</b>

<b>9.</b> Please briefly describe the top two threats to All Wildlife in Forested Wetland Habitats in Indiana identified above.
Adequate habitat (primarily American sycamores along riparian areas) in breeding areas.
<b>Total Respondents</b> <b>1</b>

<b>10.</b> Please rank the following threats to the HABITAT of All Wildlife in Forested Wetland Habitats in Indiana.							
	<b>Critical threat</b>	<b>Serious threat</b>	<b>Somewhat of a threat</b>	<b>Slight threat</b>	<b>No threat</b>	<b>Unknown</b>	<b>Response Total</b>
Commercial or residential development (sprawl)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Counterproductive financial incentives or regulations	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Invasive/non-native species	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Habitat fragmentation	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Successional change	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Habitat degradation	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Stream channelization	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Impoundment of water/flow regulation	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>

## Appendix E-38: Forested Wetlands

Agricultural/forestry practices	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Mining/acidification	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
<b>Total Respondents</b>							<b>18</b>

### 11. Other HABITAT threats to All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** **0**

(skipped this question) **1**

### 12. Please briefly describe the top two HABITAT threats to All Wildlife in Forested Wetland Habitats in Indiana identified above.

Loss of floodplain sycamores and upland pine forests.

**Total Respondents** **1**

### 13. What current monitoring efforts by state agencies are you aware of for All Wildlife in Forested Wetland Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>Not aware of these efforts occurring</b>	<b>Response Total</b>
Statewide year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	100% (1)	0% (0)	<b>1</b>
Regional or local year-round monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year monitoring conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state	0% (0)	100% (1)	<b>1</b>





Appendix E-38: Forested Wetlands

**18.** Regional or local monitoring by other organizations for All Wildlife in Forested Wetland Habitats in Indiana.

federal Breeding Bird Survey statewide; statewide May Day Bird Counts, Summer Bird Counts.

**Total Respondents 1**

**19.** Please list organizations that are monitoring All Wildlife in Forested Wetland Habitats in Indiana.

bird-watchers, USGS,volunteers

**Total Respondents 1**

**20.** What are the current monitoring techniques for All Wildlife in Forested Wetland Habitats in Indiana?

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
Radio telemetry and tracking	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Coverboard routes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Spot mapping	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Driving a survey route	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Mark and recapture	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Professional survey/census	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Volunteer survey/census	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Trapping (by any technique)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Representative sites	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Probabilistic sites	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1

Appendix E-38: Forested Wetlands

**Total Respondents 13**

**21.** Other monitoring techniques for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**22.** What one or two monitoring techniques would you recommend for effective conservation of All Wildlife in Forested Wetland Habitats in Indiana?

Roadside surveys, canoe surveys, local, more intensive studies

**Total Respondents 1**

**23.** What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for All Wildlife in Forested Wetland Habitats in Indiana?

	<b>Yes, these efforts occur</b>	<b>No effort that I'm aware of</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	<b>1</b>
			<b>Total Respondents 8</b>

**24.** What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for All Wildlife in Forested Wetland Habitats in Indiana?

**Yes, these efforts occur**      **No effort that I'm aware of**      **Response Total**

Appendix E-38: Forested Wetlands

	<b>occur</b>	<b>aware of</b>	<b>Total</b>
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	100% (1)	0% (0)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (1)	<b>1</b>
		<b>Total Respondents</b>	<b>8</b>

**25.** How crucial are these HABITAT efforts by state agencies for the conservation of All Wildlife in Forested Wetland Habitats in Indiana?

	<b>These efforts are very crucial for this HABITAT</b>	<b>These efforts are somewhat crucial for this HABITAT</b>	<b>These efforts are slightly crucial for this HABITAT</b>	<b>These efforts are not crucial for this HABITAT</b>	<b>Unknown</b>	<b>Response Total</b>
Statewide annual inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>



Appendix E-38: Forested Wetlands

**Total Respondents 8**

**27.** Regional or local state agency HABITAT inventory and assessment for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**28.** Regional or local HABITAT inventory and assessment by other organizations for All Wildlife in Forested Wetland Habitats in Indiana.

statewide aerial imagery of habitats in Indiana

**Total Respondents 1**

**29.** Please list organizations that are monitoring this HABITAT for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**30.** If a technique is not applicable to All Wildlife in Forested Wetland Habitats do not select a response in that row.

	Frequently used	Occasionally used	Not used but possible with existing technology and data	Not used and not possible with existing technology and data	Not economically feasible	Unknown	Response Total
GIS mapping	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Aerial photography and analysis	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	1
Systematic sampling	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
Regulatory information	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1

## Appendix E-38: Forested Wetlands

Participation in landuse programs	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1							
Modeling	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1							
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1							
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1							
<b>Total Respondents</b>							<b>10</b>							

### 31. Other HABITAT inventory and assessment techniques for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents** 0

(skipped this question) 1

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of All Wildlife in Forested Wetland Habitats in Indiana?

Aerial imagery of riparian and pine habitats coupled with habitat modeling.

**Total Respondents** 1

### 33. What is the current body of science for All Wildlife in Forested Wetland Habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		1	100%
Inadequate		0	0%
Nonexistent		0	0%
Other (please explain below)		0	0%
<b>Total Respondents</b>		<b>1</b>	

### 34. Please provide a citation (title, author, date, publisher) that would give the best overview of All Wildlife in Forested Wetland Habitats in Indiana, if available. This resource may be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%

## Appendix E-38: Forested Wetlands

Date	0	0%
Publisher	0	0%
	<b>Total Respondents</b>	<b>0</b>
	(skipped this question)	1

**35.** If possible, please provide a second citation (title, author, date, publisher) that would give another good overview of All Wildlife in Forested Wetland Habitats in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
	<b>Total Respondents</b>	<b>0</b>
	(skipped this question)	1

**36.** What is the current HABITAT body of science for All Wildlife in Forested Wetland Habitats in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%
Adequate	1	100%
Inadequate	0	0%
Nonexistent	0	0%
Other (please explain below)	0	0%
	<b>Total Respondents</b>	<b>1</b>

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of All Wildlife in Forested Wetland Habitats in Indiana, if available. This resource may be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%

Appendix E-38: Forested Wetlands

<b>Total Respondents</b>	<b>0</b>
(skipped this question)	1

**38.** If possible, please provide a second citation (title, author, date, publisher) that would give another good HABITAT overview of All Wildlife in Forested Wetland Habitats in Indiana. This resource may also be used if further detail is needed.

	Response Total	Response Percent
Title	0	0%
Author	0	0%
Date	0	0%
Publisher	0	0%
<b>Total Respondents</b>	<b>0</b>	
(skipped this question)		1

**39.** What are the research needs for All Wildlife in Forested Wetland Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total
Life cycle	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Distribution and abundance	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Limiting factors (food, shelter, water, breeding sites)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Threats (predators/competition, contamination)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Relationship/dependence on specific habitats	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	1
Population health (genetic and physical)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	1
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	1
<b>Total Respondents</b>							<b>7</b>

**40.** Other research needs for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.	
<b>Total Respondents</b>	<b>0</b>
(skipped this question)	1

Appendix E-38: Forested Wetlands

**41.** What are the HABITAT research needs for All Wildlife in Forested Wetland Habitats in Indiana?

	<b>Urgently needed</b>	<b>Greatly needed</b>	<b>Needed</b>	<b>Slightly needed</b>	<b>Not needed</b>	<b>Unknown</b>	<b>Response Total</b>
Successional changes	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Distribution and abundance (fragmentation)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Threats (land use change/competition, contamination/global warming)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Relationship/dependence on specific site conditions	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Growth and development of individual components of the habitat	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
	<b>Total Respondents</b>						<b>6</b>

**42.** Other HABITAT research needs for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

**43.** How well do the following conservation efforts address the threats to All Wildlife in Forested Wetland Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection (use below for details)	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	<b>1</b>
Population management (hunting, trapping)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Food plots	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Threats reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Native predator control	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Exotic/invasive species control	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Regulation of collecting	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Disease/parasite management	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>

## Appendix E-38: Forested Wetlands

Translocation to new geographic range	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Protection of migration routes	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Public education to reduce human disturbance	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
Culling/selective removal	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Stocking	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>
						<b>Total Respondents 17</b>

### 44. Other current conservation practices for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 45. What one or two specific practices would you recommend for more effective conservation of All Wildlife in Forested Wetland Habitats in Indiana?

No responses were entered for this question.

**Total Respondents 0**

(skipped this question) 1

### 46. How well do the following conservation efforts address the HABITAT threats to All Wildlife in Forested Wetland Habitats in Indiana?

	<b>Very well</b>	<b>Somewhat</b>	<b>Not at all</b>	<b>Not used</b>	<b>Unknown</b>	<b>Response Total</b>
Habitat protection through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat protection on public lands	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat protection incentives (financial)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat restoration through regulation	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat restoration on public lands	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Habitat restoration incentives (financial)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	<b>1</b>

## Appendix E-38: Forested Wetlands

Succession control (fire, mowing)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Corridor development/protection	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Managing water regimes	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
Pollution reduction	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Protection of adjacent buffer zone	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Restrict public access and disturbance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Land use planning	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	<b>0</b>	
Technical assistance	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Cooperative land management agreements (conservation easements)	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	<b>1</b>	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	<b>1</b>	
<b>Total Respondents</b>						<b>17</b>	

**47.** Other current HABITAT conservation practices for All Wildlife in Forested Wetland Habitats in Indiana.

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of All Wildlife in Forested Wetland Habitats in Indiana?

Conservation of habitats.

**Total Respondents**      **1**

**49.** Do you have any additional comments or information on All Wildlife in Forested Wetland Habitats that you feel would be useful in the development of the Indiana Comprehensive Wildlife Strategy?

No responses were entered for this question.

**Total Respondents**      **0**

(skipped this question)      1