

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)	4	
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1	
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1	
					Total Respondents		38	

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.

- 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.
- 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.
- 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.
- 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.

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

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Successional change	0% (0)	0% (0)	50% (2)	0% (0)	25% (1)	25% (1)	4
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	0% (0)	50% (2)	50% (2)	4
Habitat degradation	25% (1)	50% (2)	0% (0)	0% (0)	0% (0)	25% (1)	4
Climate change	0% (0)	0% (0)	0% (0)	0% (0)	25% (1)	75% (3)	4
Stream channelization	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	4
Impoundment of water/flow regulation	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	0% (0)	4
Agricultural/forestry practices	25% (1)	0% (0)	0% (0)	50% (2)	25% (1)	0% (0)	4
Residual contamination (persistent toxins)	0% (0)	0% (0)	0% (0)	50% (2)	25% (1)	25% (1)	4
Point source pollution (continuing)	0% (0)	0% (0)	0% (0)	25% (1)	25% (1)	50% (2)	4
Mining/acidification	0% (0)	0% (0)	0% (0)	0% (0)	50% (2)	50% (2)	4
Drainage practices (stormwater runoff)	0% (0)	0% (0)	0% (0)	25% (1)	75% (3)	0% (0)	4
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)	0% (0)	1
Total Respondents							66

11. Other HABITAT threats to the Wildlife in All Barren Lands 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 All Barren Lands Habitat in Indiana identified above.

1. 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.
2. Forested communities in association with cliffs, however, are vulnerable to development, fragmentation, loss of hard mast producing species, etc.
3. Specific dune habitat configuration. Threats by gulls and human disturbance.

Total Respondents 3

13. What current monitoring efforts by state agencies 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
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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
		Total Respondents	32

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
			Total Respondents	32

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15. How crucial are these monitoring efforts by state agencies for the conservation of the Wildlife in All Barren Lands 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)	75% (3)	25% (1)	4
Statewide once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	75% (3)	25% (1)	4
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)	4
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)	4
Regional or local year-round monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Regional or local once a year monitoring conducted by state agencies	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
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)	4
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)	4
				Total Respondents		30

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

	Very crucial	Somewhat crucial	Slightly crucial	Not crucial	Unknown	Response Total
Statewide year-round monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
Statewide once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
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)	3
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)	3
Regional or local year-round monitoring conducted by other organizations	0% (0)	33% (1)	0% (0)	66% (2)	0% (0)	3
Regional or local once a year monitoring conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (3)	0% (0)	3
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)	3

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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)	3
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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)	4
Modeling	0% (0)	0% (0)	75% (3)	25% (1)	0% (0)	0% (0)	4
Coverboard routes	0% (0)	0% (0)	25% (1)	75% (3)	0% (0)	0% (0)	4
Spot mapping	0% (0)	0% (0)	66% (2)	0% (0)	0% (0)	33% (1)	3
Driving a survey	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	0% (0)	2

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route								
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	33% (1)	0% (0)	33% (1)	0% (0)	33% (1)		3
Mark and recapture	50% (2)	0% (0)	50% (2)	0% (0)	0% (0)	0% (0)		4
Professional survey/census	0% (0)	66% (2)	33% (1)	0% (0)	0% (0)	0% (0)		3
Volunteer survey/census	0% (0)	33% (1)	33% (1)	33% (1)	0% (0)	0% (0)		3
Trapping (by any technique)	25% (1)	0% (0)	75% (3)	0% (0)	0% (0)	0% (0)		4
Representative sites	0% (0)	33% (1)	66% (2)	0% (0)	0% (0)	0% (0)		3
Probabilistic sites	0% (0)	66% (2)	33% (1)	0% (0)	0% (0)	0% (0)		3
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)		0
							Total Respondents	40

21. Other monitoring techniques for the Wildlife in All Barren Lands 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 All Barren Lands 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.
3. 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.
4. 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 4

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

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	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
		Total Respondents	22

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

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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
						Total Respondents 16

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

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Statewide once a year inventory and assessment conducted by other organizations	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 other organizations	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 other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
Regional or local once a year inventory and assessment conducted by other organizations	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 other organizations	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2
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)	2
Total Respondents						16

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

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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)	3
Aerial photography and analysis	0% (0)	33% (1)	66% (2)	0% (0)	0% (0)	0% (0)	3
Systematic sampling	0% (0)	33% (1)	33% (1)	0% (0)	0% (0)	33% (1)	3
Property tax estimates	0% (0)	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	3
State revenue data	0% (0)	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	3
Regulatory information	0% (0)	0% (0)	0% (0)	33% (1)	33% (1)	33% (1)	3
Participation in landuse programs	0% (0)	0% (0)	0% (0)	33% (1)	0% (0)	66% (2)	3
Modeling	0% (0)	0% (0)	33% (1)	0% (0)	0% (0)	66% (2)	3
Voluntary landowner reporting	0% (0)	0% (0)	0% (0)	33% (1)	0% (0)	66% (2)	3
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Total Respondents							27

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

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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 performed 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%
Total Respondents		3	

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%

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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.

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

36. What is the current HABITAT 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		0	0%
Inadequate		2	66%
Nonexistent		0	0%
Other (please explain below)		1	33%
Total Respondents		3	

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.

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		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%
Total Respondents		2	0%

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%
Total Respondents		0	0%

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						
Total Respondents							24						

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

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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?

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

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?

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

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

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?

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

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

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?

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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