



## 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?

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
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>

### 14. What current monitoring efforts by other organizations 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 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>

### 15. How crucial are these monitoring efforts by state agencies 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 state agencies	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</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?

	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% (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?

	<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% (1)	0% (0)	0% (0)	50% (1)	<b>2</b>
Habitat protection on public lands	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	<b>2</b>
Habitat protection incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
Habitat restoration through regulation	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Habitat restoration on public lands	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
Habitat restoration incentives (financial)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	<b>2</b>
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Succession control (fire, mowing)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Corridor development/protection	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
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)	50% (1)	0% (0)	50% (1)	0% (0)	<b>2</b>
Restrict public access and disturbance	0% (0)	50% (1)	0% (0)	0% (0)	50% (1)	<b>2</b>
Land use planning	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Technical assistance	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<b>2</b>
Cooperative land management agreements (conservation easements)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	<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>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**