



## Appendix E-78: Reptiles

Large home range requirements	8% (1)	15% (2)	8% (1)	46% (6)	0% (0)	23% (3)	<b>13</b>
Viable reproductive population size or availability	31% (4)	15% (2)	23% (3)	0% (0)	0% (0)	31% (4)	<b>13</b>
Specialized reproductive behavior or low reproductive rates	31% (4)	23% (3)	23% (3)	8% (1)	0% (0)	15% (2)	<b>13</b>
Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	8% (1)	38% (5)	15% (2)	8% (1)	0% (0)	31% (4)	<b>13</b>
Genetic pollution (hybridization)	0% (0)	0% (0)	8% (1)	23% (3)	38% (5)	31% (4)	<b>13</b>
Unknown	0% (0)	0% (0)	0% (0)	14% (1)	43% (3)	43% (3)	<b>7</b>
Other (please specify below)	0% (0)	25% (2)	0% (0)	0% (0)	38% (3)	38% (3)	<b>8</b>
						<b>Total Respondents</b>	<b>131</b>

### 8. Other threats to ALL reptiles in ALL habitats in Indiana.

1. Artificial manipulation of water levels in wetlands seems likely to increase mortality of overwintering snakes. Snakes hibernate underground at the groundwater interface. Raising water levels in the winter could drown snakes and lowering water table could expose them to extreme cold temperatures. Both activities are likely to kill overwintering snakes.
2.
  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** **2**

(skipped this question) **11**

### 9. Please briefly describe the top two threats to ALL reptiles in ALL habitats 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 coyotes, 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) loss of permanent wetland areas that include huge open/prairie buffer zones for nesting.
  - 2) overland movement for nesting invites road kill of otherwise long-lived adults

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2) overland movement for nesting invites road kill of otherwise longlived adults  
suboptimal size nesting areas focuses nest depredation

Inappropriate management of nesting areas – sandy fire breaks in managed areas are disked at inappropriate times, or are managed in inappropriate cover types

4. Fragmentation of populations due to habitat loss. Wetlands are managed as landscape scale systems relative to Blanding's turtle, resulting in metapopulation disruption and potential metapopulation decline. Because of low densities and small population sizes, populations that have become isolated are likely not viable.

Artificial manipulation of water levels in wetlands seems likely to increase mortality of over wintering snakes. Snakes hibernate underground at the groundwater interface. Raising water levels in the winter could drown snakes and lowering water table could expose them to extreme cold temperatures. Both activities are likely to kill over wintering snakes.

5. Inappropriate management of sandy fire breaks in managed areas that are disked at inappropriate times, or are managed in inappropriate cover types. I have seen dead massasauga that have been disked on DNR lands

6. Populations seem to be in steep decline due to habitat fragmentation (from landuse change and inappropriate management – eg – fire suppression). Most known populations seem to occur at such low densities that mating seems a remote possibility. All the problems associated with small population size and low reproductive rate seem likely to plague the Ornate box turtle. Most populations seem likely to be in a slow-motion death spiral at the moment.

7. habitat loss and fragmentation, loss of connectivity

8. 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 market for this species in illegal trade. Individual take coupled with low reproductive rates pose a serious threat for this species.

9. The top two threats to the eastern box turtle are habitat loss, road mortality, and human collection.

10. 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.

11. 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.

12. 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.

**Total Respondents** 12

(skipped this question) 1

**10.** Please rank the following threats to the HABITAT of ALL reptiles in ALL habitats in Indiana.

**Critical Serious Somewhat Slight No Unknown Response**



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	threat	threat	of a threat	threat	threat		Total
Commercial or residential development (sprawl)	0% (0)	33% (4)	33% (4)	33% (4)	0% (0)	0% (0)	<b>12</b>
Counterproductive financial incentives or regulations	0% (0)	8% (1)	25% (3)	33% (4)	8% (1)	25% (3)	<b>12</b>
Invasive/non-native species	0% (0)	15% (2)	15% (2)	31% (4)	23% (3)	15% (2)	<b>13</b>
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	25% (3)	42% (5)	8% (1)	25% (3)	<b>12</b>
Habitat fragmentation	23% (3)	46% (6)	31% (4)	0% (0)	0% (0)	0% (0)	<b>13</b>
Successional change	8% (1)	31% (4)	23% (3)	23% (3)	0% (0)	15% (2)	<b>13</b>
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	25% (3)	17% (2)	58% (7)	<b>12</b>
Habitat degradation	17% (2)	50% (6)	8% (1)	8% (1)	0% (0)	17% (2)	<b>12</b>
Climate change	0% (0)	0% (0)	0% (0)	8% (1)	17% (2)	75% (9)	<b>12</b>
Stream channelization	17% (2)	17% (2)	0% (0)	8% (1)	25% (3)	33% (4)	<b>12</b>
Impoundment of water/flow regulation	17% (2)	8% (1)	25% (3)	17% (2)	25% (3)	8% (1)	<b>12</b>
Agricultural/forestry practices	8% (1)	25% (3)	50% (6)	8% (1)	0% (0)	8% (1)	<b>12</b>
Residual contamination (persistent toxins)	0% (0)	0% (0)	8% (1)	33% (4)	0% (0)	58% (7)	<b>12</b>
Point source pollution (continuing)	0% (0)	0% (0)	17% (2)	25% (3)	0% (0)	58% (7)	<b>12</b>
Mining/acidification	8% (1)	0% (0)	0% (0)	17% (2)	25% (3)	50% (6)	<b>12</b>
Drainage practices (stormwater runoff)	0% (0)	17% (2)	0% (0)	25% (3)	25% (3)	33% (4)	<b>12</b>
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	38% (3)	62% (5)	<b>8</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	38% (3)	62% (5)	<b>8</b>
					<b>Total Respondents</b>		<b>211</b>

### 11. Other HABITAT threats to ALL reptiles in ALL habitats in Indiana.

1. 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

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2. Although the Southeastern crowned snake is found in conjunction with upland forested habitats in Indiana, the species prefers sand and siltstone glades

<b>Total Respondents</b>	<b>2</b>
(skipped this question)	11

### 12. Please briefly describe the top two HABITAT threats to ALL reptiles in ALL habitats in Indiana identified above.

1. 1) channelization  
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

3. 1) Habitat loss through wetland drainage/ tiny stream ditching.  
2) conversion of sand prairie nesting habitat to cropland or something else (e.g. forestation via fire prevention)

Manipulation of natural wetlands for management of other species has a disruptive impact on natural wetland dynamics. This may include reduced survival of Blanding's or reduced productivity of the habitat.

4. Loss of adjacent uplands or inappropriate cover/management. Blanding's requires nesting habitats that are secure from disturbance and that are within a reasonable distance to wetland habitats. Loss of appropriate habitat (ether due to tradition conversion to agriculture or to conversion of inappropriate conservation cover types) is negatively impacting reproductive success in this species. Long-distance movements

Fire suppression in graminoid wetland habitat creates late successional wetlands that are not appropriate habitat. Conversely, late spring fire in these habitats is likely to cause direct adult mortality.

5. Artificial manipulation of water levels in wetlands seems likely to increase mortality of over wintering snakes. Snakes hibernate underground at the groundwater interface. Raising water levels in the winter could drown snakes and lowering water table could expose them to extreme cold temperatures. Both activities are likely to kill over wintering snakes. IN addition, herbaceous wetland are lost under this management regime, replaced by open water wetlands.

Fragmentation – most habitats are now old dunes with overgrown savanna. Flat ground that was habitat is largely under row crop agriculture. Populations seem highly fragmented, and while population size estimates are tough to come by, populations seem small. Small isolated populations are likely to be subject to inbreeding and are at increased risk for local extinction.

6. From personal experience, m edges on old dunes or in high-quality oak savanna habitats. Fire suppression has changed the nature of these plant communities on private and public lands (with the exception of nature preserves). It seems likely that continued fire suppression will degrade additional habitat as time passes.

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Fragmentation and small habitat size – most habitats are small remnants of native grassland, surrounded by either agriculture or fire-suppressed oak savanna. Habitat size needs to be expanded at sites which support seemingly salvageable populations of the Ornate box turtle

7. Much potentially suitable habitat has been lost through succession to exotic species and oak woodland. This turtle requires expansive open grassland. Lack of habitat management, or in the case of invasive species, because of the purposeful introduction of invasive shrubs, has resulted in open native grassland being lost to shrub land and oak woodland.
8. coal mining, agriculture
- The top two habitat threats to the timber rattlesnake include forest fragmentation and habitat loss.
9. The timber rattlesnakes need large continuous blocks of forest habitat. When these areas are lost rattlesnakes become susceptible to human and predator encounters.
10. The largest threat to the box turtle habitat is fragmentation and urbanization.
1. Development of drainage areas and flood plains, including development of park-like areas in which natural or man-made cover is removed.
11. 2. Habitat fragmentation that disrupts gene flow and re-colonization.
12. Threats to some reptiles habitat include invasive species encroachment and habitat destruction.

<b>Total Respondents</b>	<b>12</b>
(skipped this question)	1

### 13. What current monitoring efforts by state agencies are you aware of for ALL reptiles in ALL habitats in Indiana?

	Yes, these efforts occur	Not aware of these efforts occurring	Response Total
Statewide year-round monitoring conducted by state agencies	8% (1)	92% (12)	<b>13</b>
Statewide once a year monitoring conducted by state agencies	8% (1)	92% (12)	<b>13</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	0% (0)	100% (13)	<b>13</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	15% (2)	85% (11)	<b>13</b>
Regional or local year-round monitoring conducted by state agencies	8% (1)	92% (12)	<b>13</b>
Regional or local once a year monitoring conducted by state agencies	8% (1)	92% (12)	<b>13</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state	0% (0)	100% (13)	<b>13</b>

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agencies

Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	54% (7)	46% (6)	<b>13</b>
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**Total Respondents 104**

### 14. What current monitoring efforts by other organizations are you aware of for ALL reptiles in ALL 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% (13)	<b>13</b>
Statewide once a year monitoring conducted by other organizations	0% (0)	100% (12)	<b>12</b>
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (13)	<b>13</b>
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	8% (1)	92% (12)	<b>13</b>
Regional or local year-round monitoring conducted by other organizations	0% (0)	100% (13)	<b>13</b>
Regional or local once a year monitoring conducted by other organizations	0% (0)	100% (12)	<b>12</b>
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (13)	<b>13</b>
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	38% (5)	62% (8)	<b>13</b>

**Total Respondents 102**

### 15. How crucial are these monitoring efforts by state agencies for the conservation of ALL reptiles in ALL 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)	23% (3)	8% (1)	69% (9)	0% (0)	<b>13</b>
Statewide once a year monitoring conducted by state agencies	0% (0)	31% (4)	15% (2)	54% (7)	0% (0)	<b>13</b>
Periodic statewide (less than once a year						



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monitoring conducted by other organizations

**Total Respondents 101**



### 17. Regional or local state agency monitoring for ALL reptiles in ALL habitats 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. I'd guess that agencies that issue drainage permits are relevant here.
4. Fish Creek, Patoka River, Pigeon Creek
5. IDNR has monitored timber rattlesnake in Brown, Monroe, and Morgan counties.
6. The state is monitoring box turtles in Martin, Brown, and Morgan counties.

7. 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.
8. I am not aware of any agency monitoring black kingsnakes in Indiana.
9. The DNR occasionally monitors some reptiles.

**Total Respondents 9**

(skipped this question) 4

### 18. Regional or local monitoring by other organizations for ALL reptiles in ALL habitats in Indiana.

1. I'm unaware of any.
2. "BioBlitz" in Lake Co.  
Herp Center at IUPFW - I presume they've done something in Steuben and La Grange Cos.
3. Fish Creek, Patoka River, Pigeon Creek, Muscatatuck River
4. The USFS has contracted out survey work in the southern portions of the Hoosier National Forest.
5. I am not sure who else might be monitoring box turtle in Indiana
6. None known.

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7. I am not aware of any agency monitoring black kingsnakes in Indiana.
8. The Nature Conservancy occasionally montiors for some reptiles.

**Total Respondents**      **8**  
(skipped this question)      5

### 19. Please list organizations that are monitoring ALL reptiles in ALL habitats in Indiana.

1. None?
2. What I know is above.
3. TNC has funded some work at Cline Lake Fen to better understand population dynamics, habitat use, etc...
4. TNC- funded research at Cline Lake Fen
5. Bruce Kingsbury, IUPU Fort Wayne,
6. USFS
7. 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 Hertiage Database.
8. I am not aware of any agency monitoring black kingsnakes in Indiana.

**Total Respondents**      **8**  
(skipped this question)      5

### 20. What are the current monitoring techniques for ALL reptiles in ALL 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	21% (3)	29% (4)	29% (4)	7% (1)	0% (0)	14% (2)	<b>14</b>
Modeling	0% (0)	15% (2)	46% (6)	0% (0)	0% (0)	38% (5)	<b>13</b>
Coverboard routes	0% (0)	0% (0)	55% (6)	9% (1)	0% (0)	36% (4)	<b>11</b>

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Spot mapping	8% (1)	38% (5)	31% (4)	0% (0)	0% (0)	23% (3)	<b>13</b>
Driving a survey route	0% (0)	0% (0)	60% (6)	0% (0)	0% (0)	40% (4)	<b>10</b>
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	7% (1)	14% (2)	14% (2)	14% (2)	0% (0)	50% (7)	<b>14</b>
Mark and recapture	23% (3)	15% (2)	31% (4)	0% (0)	0% (0)	31% (4)	<b>13</b>
Professional survey/census	25% (3)	42% (5)	17% (2)	0% (0)	0% (0)	17% (2)	<b>12</b>
Volunteer survey/census	0% (0)	31% (4)	31% (4)	0% (0)	0% (0)	38% (5)	<b>13</b>
Trapping (by any technique)	0% (0)	31% (4)	23% (3)	0% (0)	0% (0)	46% (6)	<b>13</b>
Representative sites	0% (0)	38% (5)	23% (3)	0% (0)	0% (0)	38% (5)	<b>13</b>
Probabilistic sites	0% (0)	0% (0)	45% (5)	0% (0)	0% (0)	55% (6)	<b>11</b>
Other (please specify below)	0% (0)	0% (0)	25% (2)	0% (0)	0% (0)	75% (6)	<b>8</b>
<b>Total Respondents</b>							<b>158</b>

### 21. Other monitoring techniques for ALL reptiles in ALL habitats in Indiana.

1. 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.

**Total Respondents**      **1**

(skipped this question)      12

### 22. What one or two monitoring techniques would you recommend for effective conservation of ALL reptiles in ALL habitats in Indiana?

- 1) Occasional censusing with very large, heavily baited hoop nets left out overnight.
- a) do not set during rising waters.
1. b) check within 12 hours.
- 2) Search for nests in June (after determining any adults present at all) methods used in FL and LA for nests, in AR and LA for capturing adults

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- 1) looking for basking individuals with a spotting scope.
2. 2) perhaps use of fyke nets with big leads, or basking traps to estimate numbers after visual spotting determines presence.
- 1) radiotrack females to nesting sites.
3. 2) monitor nests for depredation
- (Both somewhat labor-intensive for at least one person.)
- Population recruitment needs to be assessed at sites, which are likely to be identified for the conservation of the Blanding's turtle. Because of the long life-span of this turtle, it is unclear if seemingly robust populations are in fact, recruiting new members, or are simply on a long slide towards population senescence.
- 4.
- I'm not sure if a salvageable population exists in the State of Indiana. It would be critical to survey know populations to determine population structure, density and potential for recruitment. This information could then be used to plan and implement a conservation effort geared towards the Ornate box turtle.
- 5.
- 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.
6. ; 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.
7. I would recommend long-term surveys and radio-telemetry of box turtle. Surveys would include mark recapture methods.
8. I do not believe that an effective nationally or regionally accepted monitoring technique exist. This should be identified as a need in the CWS.
- 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.
- 9.
10. I would recommend the use of professional surveys and test the effectiveness of cover objects for "trapping" some reptiles.

**Total Respondents 11**

(skipped this question) 2

**23.** What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for ALL reptiles in ALL habitats in Indiana?

	Yes, these efforts occur	No effort that I'm aware of	Response Total
Statewide annual inventory and assessment conducted by	10% (1)	90% (9)	10

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state agencies			
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	100% (9)	<b>9</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	0% (0)	100% (9)	<b>9</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	11% (1)	89% (8)	<b>9</b>
Regional or local year-round inventory and assessment conducted by state agencies	10% (1)	90% (9)	<b>10</b>
Regional or local once a year inventory and assessment conducted by state agencies	11% (1)	89% (8)	<b>9</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	20% (2)	80% (8)	<b>10</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	44% (4)	56% (5)	<b>9</b>
		<b>Total Respondents</b>	<b>75</b>

<b>24.</b>	<b>What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for ALL reptiles in ALL habitats in Indiana?</b>		
	<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% (10)	<b>10</b>
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (10)	<b>10</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (10)	<b>10</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (10)	<b>10</b>
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	100% (10)	<b>10</b>
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	100% (10)	<b>10</b>

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Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	10% (1)	90% (9)	<b>10</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	30% (3)	70% (7)	<b>10</b>
		<b>Total Respondents</b>	<b>80</b>

**25.** How crucial are these HABITAT efforts by state agencies for the conservation of ALL reptiles in ALL 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)	10% (1)	20% (2)	30% (3)	40% (4)	<b>10</b>
Statewide once a year inventory and assessment conducted by state agencies	0% (0)	11% (1)	11% (1)	33% (3)	44% (4)	<b>9</b>
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	22% (2)	0% (0)	22% (2)	22% (2)	33% (3)	<b>9</b>
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	22% (2)	33% (3)	11% (1)	11% (1)	22% (2)	<b>9</b>
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	0% (0)	33% (3)	11% (1)	56% (5)	<b>9</b>
Regional or local once a year inventory and assessment conducted by state agencies	0% (0)	0% (0)	33% (3)	11% (1)	56% (5)	<b>9</b>
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	22% (2)	11% (1)	44% (4)	0% (0)	22% (2)	<b>9</b>
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	11% (1)	22% (2)	33% (3)	0% (0)	33% (3)	<b>9</b>

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Total Respondents 73

**26.** How crucial are these HABITAT efforts by other organizations for the conservation of ALL reptiles in ALL 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)	33% (3)	22% (2)	44% (4)	9
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	33% (3)	22% (2)	44% (4)	9
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	11% (1)	11% (1)	22% (2)	22% (2)	33% (3)	9
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	22% (2)	22% (2)	22% (2)	33% (3)	9
Regional or local year-round inventory and assessment conducted by other organizations	0% (0)	0% (0)	22% (2)	11% (1)	67% (6)	9
Regional or local once a year inventory and assessment conducted by other organizations	0% (0)	0% (0)	22% (2)	11% (1)	67% (6)	9
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	11% (1)	0% (0)	22% (2)	0% (0)	67% (6)	9
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	11% (1)	22% (2)	0% (0)	67% (6)	9
						<b>Total Respondents 72</b>

**27.** Regional or local state agency HABITAT inventory and assessment for ALL reptiles in ALL habitats in Indiana.

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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. These habitat assessments might occur in Indiana, but I am not positive how often these activities take place.

4. I am not aware of what efforts are being made to monitor these habitats

None known:

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).

5. 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.

6. I am not knowledgeable of the monitoring efforts being performed by state or nonprofit agencies.

7. I am not sure how often state agencies survey the crowned snakes habitat. The division of nature preserves monitors these habitats.

**Total Respondents** 7

(skipped this question) 6

### 28. Regional or local HABITAT inventory and assessment by other organizations for ALL reptiles in ALL habitats in Indiana.

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

2. Occasional grants to universities - ???

3. IUPUI-FW faculty and students work in wetlands with some reptiles in NE Indiana

TNC has been focused on sand savanna and sand prairie conservation in the NW for over a decade.

4. These include some efforts to look for landscape scale opportunities for restoration and conservation of the habitat for some reptiles.

5. These habitat assessments might occur in Indiana, but I am not positive how often these activities take place.

6. None known

7. I am not knowledgeable of the monitoring efforts being performed by state or nonprofit agencies.

**Total Respondents** 7

(skipped this question) 6

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**29.** Please list organizations that are monitoring this HABITAT for ALL reptiles in ALL habitats in Indiana.

1. whoever samples for state water pollution control.  
Fish quality? State board of health??
2. Because something is known about wetland loss in Indiana, I presume the state is keeping track of something.
3. I would assume the Nature Conservancy, IDNR, USFS, and other organizations monitor these habitats
4. I would assume the Nature Conservancy, IDNR, and other Federal Agencies monitor these habitats
5. None known.
6. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.
7. Nature Conservancy and IDNR nature preserves.

**Total Respondents**      **7**  
(skipped this question)      **6**

**30.** What are the current HABITAT inventory and/or assessment techniques for ALL reptiles in ALL 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)	44% (4)	22% (2)	0% (0)	0% (0)	33% (3)	<b>9</b>
Aerial photography and analysis	0% (0)	33% (3)	22% (2)	0% (0)	0% (0)	44% (4)	<b>9</b>
Systematic sampling	10% (1)	0% (0)	10% (1)	10% (1)	10% (1)	60% (6)	<b>10</b>
Property tax estimates	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (9)	<b>9</b>
State revenue data	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (8)	<b>8</b>
Regulatory information	0% (0)	12% (1)	0% (0)	0% (0)	0% (0)	88% (7)	<b>8</b>

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Participation in landuse programs	0% (0)	12% (1)	0% (0)	0% (0)	0% (0)	88% (7)	<b>8</b>
Modeling	0% (0)	0% (0)	12% (1)	0% (0)	0% (0)	88% (7)	<b>8</b>
Voluntary landowner reporting	0% (0)	12% (1)	0% (0)	0% (0)	0% (0)	88% (7)	<b>8</b>
Other (please specify below)	11% (1)	0% (0)	0% (0)	0% (0)	0% (0)	89% (8)	<b>9</b>
<b>Total Respondents</b>							<b>86</b>

### 31. Other HABITAT inventory and assessment techniques for ALL reptiles in ALL habitats in Indiana.

1. I am not sure what techniques are being applied to assess this habitat
2. I am not sure of the techniques to monitor this habitat
3. Insufficient data on Kirtland's snake habitat.
4. I am not knowledgeable of the monitoring efforts being preformed by state or nonprofit agencies.
5. I believe this habitat "siltstone glade in upland forest" is monitored through surveys preformed in this habitat.

**Total Respondents**      **5**

(skipped this question)      8

### 32. What one or two HABITAT inventory and assessment techniques would you recommend for effective conservation of ALL reptiles in ALL habitats in Indiana?

1. High resolution aerial photography DURING LOW WATER - digitized for GIS. locate:
  - 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) High resolution aerial photography at normal marsh water levels - digitize for GIS.
  - 2) Monitor wetland vegetation - blandings prefer floating emergents (e.g. duck weed) and get crowded out by cattail expansion.
4. Insufficient data on Kirtland's snake habitat.

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

<b>Total Respondents</b>	<b>5</b>
(skipped this question)	8

**33.** What is the current body of science for the in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	0	0%
Adequate <span style="color: yellow;"> </span>	2	15%
Inadequate <span style="color: yellow;"> </span>	10	77%
Nonexistent	0	0%
Other (please explain below) <span style="color: yellow;"> </span>	1	8%
The science in adequate in some aspects of the turtles life history, but inadequate in others		
<b>Total Respondents</b>		<b>13</b>

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

Author = review Minton's guide;  
Date = 2001;  
Publisher = Get BioBlitz & IUPFW reports from DNR

Title = various theses;  
Author = Bruce Kingsbury et al

Title = Status and Distribution of candidate endangered herpetofauna in the Fish Creek watershed;  
Author = Bruce Kingsbury, Spencer Cortwright;  
Date = 1994;  
Publisher = IDNR Division of Fish and Wildlife

Title = Spatial Ecology of the Timber Rattlesnake in south central Indiana;  
Author = Walker and Kingsbury;  
Date = 2000;  
Publisher = Masters Thesis, IPFW

Title = A long term study of a box turtle (*Terrapene carolina*) population at Allee Memorial Woods, Indiana, with emphasis on survivorship;  
Author = Williams and Parker;  
Date = 1987;  
Publisher = Herpetologica

Title = Conservation Assessment for Kirtland's Snake (*Clonophis kirtlandii*);

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Author = Jonanna Gibson and Bruce Kingsbury;  
 Date = 2004;  
 Publisher = USDA Forest Service, Eastern Region

Title = Amphibians and Reptiles of Indiana;  
 Author = Minton;  
 Date = 2001;  
 Publisher = Indiana Academy of Sciences.

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

Title = ongoing background work in NE & MN

Author = Gibson and Kingsbury;  
 Date = 2003;  
 Publisher = Masters Thesis, IPFW

Title = North American Box Turtles;  
 Author = Dodd;  
 Date = 2001;  
 Publisher = University of Oklahoma Press

Title = Kirtland's Snake;  
 Author = www.natureserve.org

Title = Snakes of the United States and Canada;  
 Author = Ernst and Ernst;  
 Date = 2003;  
 Publisher = Smithsonian Institution

**36.** What is the current HABITAT body of science for ALL reptiles in ALL habitats in Indiana?

		Response Total	Response Percent
Complete, up to date and extensive		0	0%
Adequate		3	23%
Inadequate		6	46%
Nonexistent		0	0%
Other (please explain below)		4	31%

## Appendix E-78: Reptiles

1. not my expertise - look for historical geography/hydrology
2. I am not sure on the habitat's body of science... I would assume complete and up to date
3. unknown
4. Unknown

13

**Total Respondents**

**37.** Please provide a citation (title, author, date, publisher) that would give the best HABITAT overview of ALL reptiles in ALL habitats 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

Title = Not my expertise. Looks for historical;

Author = accounts of river geography &;

Date = physiography + hydrology

Title = Not my expertise;

Author = contact JW Lang for NE & MN

Title = Amphibians and Reptiles of Indiana;

Author = Sherman A. Minton, Jr.;

Date = 2001;

Publisher = Indiana Academy of Science

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

Title = Indiana Heritage Database;

Author = Indiana Division of Nature Preserves

## Appendix E-78: Reptiles

### 39. What are the research needs for ALL reptiles in ALL 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	8% (1)	15% (2)	62% (8)	15% (2)	0% (0)	0% (0)	<b>13</b>
Distribution and abundance	23% (3)	15% (2)	46% (6)	15% (2)	0% (0)	0% (0)	<b>13</b>
Limiting factors (food, shelter, water, breeding sites)	23% (3)	38% (5)	38% (5)	0% (0)	0% (0)	0% (0)	<b>13</b>
Threats (predators/competition, contamination)	23% (3)	15% (2)	54% (7)	8% (1)	0% (0)	0% (0)	<b>13</b>
Relationship/dependence on specific habitats	15% (2)	15% (2)	46% (6)	23% (3)	0% (0)	0% (0)	<b>13</b>
Population health (genetic and physical)	23% (3)	23% (3)	38% (5)	8% (1)	0% (0)	8% (1)	<b>13</b>
Other (please specify below)	0% (0)	12% (1)	25% (2)	0% (0)	0% (0)	62% (5)	<b>8</b>
						<b>Total Respondents</b>	<b>86</b>

### 40. Other research needs for ALL reptiles in ALL habitats in Indiana.

- 1) cost effectiveness and periodic effective duration of local raccoon elimination
  - 2) socioeconomic impacts of terminating commercial fishing use of commercial equipment in the lower West Fork and Middle East Fork White River.
  - 3) Whether genetic stock from northern Arkansas will suffice for re-introduction - or will farmed stock from AR or LA will suffice.
- 1) Longterm fidelity to specific sites.
  - 2) Limits to sand prairie needs for nesting.
  - 3) Limits to recruitment when forced to nest in rowcrop areas.
- 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.
- General life history information is needed for the Southeastern crowned snake in Indiana. Due to some reptiles secretive nature, little is known about Indiana's populations.

**Total Respondents**      **4**

(skipped this question)      9

### 41. What are the HABITAT research needs for ALL reptiles in ALL habitats in Indiana?

## Appendix E-78: Reptiles

	<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)	60% (6)	40% (4)	0% (0)	0% (0)	0% (0)	<b>10</b>
Distribution and abundance (fragmentation)	0% (0)	70% (7)	30% (3)	0% (0)	0% (0)	0% (0)	<b>10</b>
Threats (land use change/competition, contamination/global warming)	10% (1)	40% (4)	40% (4)	10% (1)	0% (0)	0% (0)	<b>10</b>
Relationship/dependence on specific site conditions	20% (2)	40% (4)	20% (2)	10% (1)	0% (0)	10% (1)	<b>10</b>
Growth and development of individual components of the habitat	0% (0)	50% (5)	30% (3)	10% (1)	0% (0)	10% (1)	<b>10</b>
Other (please specify below)	20% (1)	20% (1)	20% (1)	0% (0)	0% (0)	40% (2)	<b>5</b>
	<b>Total Respondents</b>						<b>55</b>

### 42. Other HABITAT research needs for ALL reptiles in ALL habitats in Indiana.

1. Same as on previous panel
2. Prairie restoration & fire management to perpetuate small sand blowouts
3. The relationship between upland nesting habitat, dispersal distance, barriers to dispersal etc may be critical information for the conservation of this turtle.
4. Spatial relationships between occupied wetlands relative to population dynamics  
Physical characteristics of over wintering sites
5. Understanding the successional dynamics of sand systems relative to the habitat requirements of some reptiles
6. 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**      **6**

(skipped this question)      **7**

### 43. How well do the following conservation efforts address the threats to ALL reptiles in ALL habitats in Indiana?

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	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection (use below for details)	23% (3)	77% (10)	0% (0)	0% (0)	0% (0)	13
Population management (hunting, trapping)	0% (0)	8% (1)	8% (1)	85% (11)	0% (0)	13
Population enhancement (captive breeding and release)	8% (1)	0% (0)	0% (0)	77% (10)	15% (2)	13
Reintroduction (restoration)	8% (1)	0% (0)	0% (0)	77% (10)	15% (2)	13
Food plots	0% (0)	0% (0)	23% (3)	69% (9)	8% (1)	13
Threats reduction	8% (1)	15% (2)	0% (0)	77% (10)	0% (0)	13
Native predator control	8% (1)	0% (0)	0% (0)	92% (12)	0% (0)	13
Exotic/invasive species control	15% (2)	8% (1)	8% (1)	54% (7)	15% (2)	13
Regulation of collecting	8% (1)	77% (10)	0% (0)	0% (0)	15% (2)	13
Disease/parasite management	0% (0)	8% (1)	0% (0)	38% (5)	54% (7)	13
Translocation to new geographic range	8% (1)	0% (0)	0% (0)	85% (11)	8% (1)	13
Protection of migration routes	0% (0)	8% (1)	8% (1)	54% (7)	31% (4)	13
Limiting contact with pollutants/contaminants	8% (1)	0% (0)	0% (0)	38% (5)	54% (7)	13
Public education to reduce human disturbance	8% (1)	46% (6)	0% (0)	8% (1)	38% (5)	13
Culling/selective removal	0% (0)	0% (0)	8% (1)	77% (10)	15% (2)	13
Stocking	8% (1)	0% (0)	0% (0)	77% (10)	15% (2)	13
Other (please specify below)	14% (1)	0% (0)	14% (1)	29% (2)	43% (3)	7
	<b>Total Respondents</b>					<b>215</b>

### 44. Other current conservation practices for ALL reptiles in ALL habitats in Indiana.

1. The species is listed as endangered and illegal to take/"collect."  
People need to be reminded of this.
2. Invasive species control (buckthorn, autumn olive, phargimtes) to keep open herbaceous habitat suitable for massasauga

**Total Respondents**

**2**

**45.** What one or two specific practices would you recommend for more effective conservation of ALL reptiles in ALL habitats 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
- 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.
- 1) Restoration in new, very large natural areas in NW Indiana.
  - 2) Raccoon reduction near constrained (small) areas of occupied habitat in NE Indiana.
- Design and management of conservation areas that specifically incorporate life history requirements of the Blanding's turtle across relatively large habitats (>1,000 acres). The Blanding's turtle is often subjected to management decisions that favor other species, and these often have a negative impact on available wetland and nesting habitat. In some cases, these management decisions seem likely to result in direct mortality of adults and eggs.
- 4.
- Design and management of conservation areas that specifically incorporate life history requirements of the species across relatively large habitats (>1,000 acres). Some reptiles is too often subjected to management decisions that favor other species, and these often have a negative impact on available wetland and nesting habitat. In some cases (water level manipulations , late spring prescribed fire), these management decisions seem likely to result in direct mortality of adults.
- 5.
- Increasing habitat via restoration seems like a simple approach that would add sand prairie habitat to the fringes of savanna
- 6.
- Understanding the potential impacts of disked fire breaks on Slender glass lizard could be important. This practice seems likely to result in direct adult and juvenile mortality
- Restoration of grassland habitats adjacent to known population sites would be a great start. Restoration could involve creation of native grassland system from adjacent agricultural fields, with the restoration designed to create habitat specifically for this and other species.
- 7.
- Restoration of oak savanna at known sites would involve opening the canopy in oak woodlands to ~50% cover and control of invasive exotic shrubs. This would restore connectivity between potentially occupied habitat patches at larger public lands, and expand potential habitat.
8. Restoration of habitat and connectivity
  9. I would recommend public education and habitat protection.
- 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 nest cavities.
- 10.

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- When areas known or suspected to have Kirtland's snakes are threatened with development, seek to
11. 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.
  12. I would recommend habitat protection and collection regulation.
  13. Habitat protection and research of general life history requirements.

**Total Respondents 13**

### 46. How well do the following conservation efforts address the HABITAT threats to ALL reptiles in ALL 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% (1)	45% (5)	9% (1)	18% (2)	18% (2)	<b>11</b>
Habitat protection on public lands	27% (3)	45% (5)	9% (1)	0% (0)	18% (2)	<b>11</b>
Habitat protection incentives (financial)	18% (2)	27% (3)	0% (0)	0% (0)	55% (6)	<b>11</b>
Habitat restoration through regulation	20% (2)	30% (3)	0% (0)	10% (1)	40% (4)	<b>10</b>
Habitat restoration on public lands	50% (5)	20% (2)	20% (2)	0% (0)	10% (1)	<b>10</b>
Habitat restoration incentives (financial)	33% (3)	22% (2)	0% (0)	0% (0)	44% (4)	<b>9</b>
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	30% (3)	0% (0)	40% (4)	30% (3)	<b>10</b>
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	30% (3)	70% (7)	0% (0)	<b>10</b>
Succession control (fire, mowing)	20% (2)	20% (2)	10% (1)	50% (5)	0% (0)	<b>10</b>
Corridor development/protection	10% (1)	20% (2)	10% (1)	40% (4)	20% (2)	<b>10</b>
Managing water regimes	0% (0)	20% (2)	40% (4)	30% (3)	10% (1)	<b>10</b>
Pollution reduction	0% (0)	30% (3)	0% (0)	20% (2)	50% (5)	<b>10</b>
Protection of adjacent buffer zone	30% (3)	30% (3)	10% (1)	20% (2)	10% (1)	<b>10</b>
Restrict public access and disturbance	20% (2)	20% (2)	0% (0)	10% (1)	50% (5)	<b>10</b>
Land use planning	10% (1)	20% (2)	10% (1)	0% (0)	60% (6)	<b>10</b>
Technical assistance	0% (0)	10% (1)	10% (1)	0% (0)	80% (8)	<b>10</b>
Cooperative land management agreements (conservation easements)	20% (2)	30% (3)	0% (0)	0% (0)	50% (5)	<b>10</b>
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (4)	<b>4</b>

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**Total Respondents** 176

**47.** Other current HABITAT conservation practices for ALL reptiles in ALL habitats in Indiana.

No responses were entered for this question.

**Total Respondents** 0

(skipped this question) 13

**48.** What one or two specific HABITAT practices would you recommend for more effective conservation of ALL reptiles in ALL habitats 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) Use fire to maintain large sand prairies near appropriate wetlands
  - 2) Acquire/purchase easments on additional blocks of land that have permanent wetlands associated with large sandy uplands.
  
4. Protection, restoration and appropriate management of adjacent uplands as nesting habitat around known populations
  
5.
 

Increasing habitat via restoration seems like a simple approach that would add sand prairie habitat to the fringes of savanna

Understanding the potential impacts of disked fire breaks on some reptiles could be important. This practice seems likely to result in direct adult and juvenile mortality
  
6. restore habitat and connectivity, allow beaver activity
  
7. Preserve large tracts of forested habitat.
  
8.
 

Reduction of development along the upper reaches of drainages.

Development of mowing protocols relative to mowing schedules to reduce snake/mower encounters.

**Total Respondents** 8

(skipped this question) 5

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

## Appendix E-78: Reptiles

- 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).

- 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.
2. 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.

- Contiguous blandings populations have 4000 >yearling turtles in Minnesota and 140000 >yearling turtles in Nebraska, among the largest for any turtle in the USA. Main habitat components include big shallow but permanent wetlands, and very large sand prairies for nesting - so large as to be non-economical for regular raccoon use (some foxes & others use). These places have excellent juvenile recruitment, evidently not seen in other habitat. Take it from here.
- 3.

- Protection, restoration and appropriate management of adjacent uplands as nesting habitat around known populations
4. Ornate box turtles are too often taken for granted on managed lands. Populations may be senescent due to loss or inappropriate management of adjacent nesting habitat. Management activities in wetlands and adjacent uplands may contribute directly to increased mortality.

- Some reptiles are too often taken for granted on managed lands. Management activities in wetlands and adjacent uplands (water level manipulations , late spring prescribed fire) contribute directly to increased mortality.
- 5.

- Some reptiles are too often taken for granted on managed lands. Populations that were once among the best in the state may be senescent or extinct due to loss or inappropriate management of habitat. Loss of early successional native grasslands, due to uncontrolled succession or invasion of purposefully introduced invasive shrubs, are the likely culprits. Some reptiles need to be explicitly incorporated into management plans for public lands where it still persists.
- 6.

**Total Respondents**      **6**

(skipped this question)      7