6. Please rank the following threats to ALL Amphibians in ALL Habitats in Indiana.

	Critical threat	Serious threat	Somewhat of a threat	Slight threat	No threat	Unknown	Response Total
Invasive/non-native species	6% (1)	11% (2)	11% (2)	11% (2)	11% (2)	50% (9)	**18**
High sensitivity to pollution	0% (0)	11% (2)	28% (5)	11% (2)	6% (1)	44% (8)	**18**
Bioaccumulation of contaminants	6% (1)	0% (0)	6% (1)	11% (2)	6% (1)	72% (13)	**18**
Predators (native or domesticated)	6% (1)	0% (0)	6% (1)	12% (2)	6% (1)	71% (12)	**17**
Dependence on other species (mutualism, pollinators)	6% (1)	6% (1)	0% (0)	0% (0)	17% (3)	72% (13)	**18**
Diseases/parasites (of the species itself)	0% (0)	0% (0)	6% (1)	6% (1)	0% (0)	88% (15)	**17**
Regulated hunting/fishing pressure (too much)	0% (0)	0% (0)	0% (0)	6% (1)	65% (11)	29% (5)	**17**
Species over population	0% (0)	0% (0)	0% (0)	6% (1)	71% (12)	24% (4)	**17**
Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)	0% (0)	0% (0)	6% (1)	12% (2)	41% (7)	41% (7)	**17**
Unregulated collection pressure	0% (0)	0% (0)	6% (1)	0% (0)	59% (10)	35% (6)	**17**
Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)	24% (4)	12% (2)	24% (4)	6% (1)	6% (1)	29% (5)	**17**
					Total Respondents		**191**

7. Please also rank these threats to ALL Amphibians in ALL Habitats in Indiana.

	Critical threat	Serious threat	Somewhat of a threat	Slight threat	No threat	Unknown	Response Total
Habitat loss (breeding range)	47% (8)	35% (6)	6% (1)	6% (1)	0% (0)	6% (1)	**17**
Habitat loss (feeding/foraging areas)	35% (6)	35% (6)	12% (2)	6% (1)	6% (1)	6% (1)	**17**
Small native range (high endemism)	19% (3)	6% (1)	6% (1)	6% (1)	56% (9)	6% (1)	**16**
Near limits of natural geographic range	18% (3)	18% (3)	12% (2)	6% (1)	47% (8)	0% (0)	**17**

Large home range requirements	0% (0)	0% (0)	6% (1)	6% (1)	71% (12)	18% (3)	**17**
Viable reproductive population size or availability	0% (0)	0% (0)	12% (2)	12% (2)	24% (4)	53% (9)	**17**
Specialized reproductive behavior or low reproductive rates	0% (0)	0% (0)	18% (3)	0% (0)	41% (7)	41% (7)	**17**
Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)	12% (2)	24% (4)	18% (3)	6% (1)	6% (1)	35% (6)	**17**
Genetic pollution (hybridization)	0% (0)	0% (0)	6% (1)	12% (2)	47% (8)	35% (6)	**17**
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (3)	**3**
Other (please specify below)	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)	**2**
					Total Respondents		**157**

8. Other threats to ALL Amphibians in ALL Habitats in Indiana.

1. Changes in burowing crayfish or rodent populations that would impact the availability of burrows.
2. Introduction of fish into formally fishless breeding waters.
3. Development of barriers between the Crayfish frog's burrow and breeding waters.

Total Respondents	**1**
(skipped this question)	21

9. Please briefly describe the top two threats to ALL Amphibians in ALL Habitats in Indiana identified above.

1. Oxidus gracilis is a non-native carnivorous millipede invading caves in the east; it is now in several Indiana caves and is preying on the food base for cave salamanders. Further east, reports of greatly decreased insect diversity in caves invaded by this millipide have been reported. Potential impact is unknown, but could be significant.

2. -Loss of ephemeral wetlands is the top threat; unfortunately, most existing ephemeral wetlands have been destroyed in Indiana. Even more unfortunately, many of them were destroyed with the misguided notion that deep water was better for wildlife - landowners were advised to dredge out the ephemeral wetlands to provide duck habitat. These fish-infested deep waters have no habitat for Plains leopard frog.
-invasive species like reed canary grass are proliferating in the habitats that remain, decreasing plant diversity, cover, and the overall health of the wetland.

3. Habitat destruction and habitat degradation

4. Habitat loss & habitat degradation

5. Loss of ephemeral wetland breeding habitat and invasive Purple Loosrife.

6. Habtiat loss and degradation

7. Loss & degradation of ephemeral wetland and upland forested habitat

8. Loss of ephemeral & semipermanent wetlands

9. Wetland loss and degradation

10. Only a few locations are known to have green salamanders in Indiana and this is a habitat specialist needing rocky outcrops in forested areas.

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

12. Wetland loss & degradation

13. Hellbenders has a small geographic range and population sizes in Indiana. In many locations there is concern about low reproductive rates, but this is unknown in Indiana populations.

14. Extreme rarity & habitat loss

15. 1. Land use changes or other factors that impact the availability and persistence of suitable burrows.
2. Introduction of fish into formally fishless breeding waters and the development of barriers between the Crayfish frog's burrow and breeding waters.

16. Loss of ephemeral wetland habitat and increase in migration distance to breeding sites as a result of this loss are the biggest threats to the species.

Total Respondents	**16**
(skipped this question)	6

10. Please rank the following threats to the HABITAT of ALL Amphibians in ALL Habitats in Indiana.

	Critical threat	Serious threat	Somewhat of a threat	Slight threat	No threat	Unknown	Response Total
Commercial or residential development (sprawl)	6% (1)	35% (6)	47% (8)	6% (1)	0% (0)	6% (1)	**17**
Counterproductive financial incentives or regulations	0% (0)	6% (1)	0% (0)	12% (2)	18% (3)	65% (11)	**17**
Invasive/non-native species	0% (0)	6% (1)	12% (2)	12% (2)	12% (2)	59% (10)	**17**
Nonpoint source pollution (sedimentation and nutrients)	0% (0)	0% (0)	24% (4)	12% (2)	0% (0)	65% (11)	**17**
Habitat fragmentation	24% (4)	47% (8)	18% (3)	12% (2)	0% (0)	0% (0)	**17**

Successional change	0% (0)	0% (0)	6% (1)	12% (2)	18% (3)	65% (11)	**17**
Diseases (of plants that create habitat)	0% (0)	0% (0)	0% (0)	0% (0)	6% (1)	94% (16)	**17**
Habitat degradation	47% (8)	41% (7)	6% (1)	6% (1)	0% (0)	0% (0)	**17**
Climate change	0% (0)	0% (0)	0% (0)	6% (1)	0% (0)	94% (16)	**17**
Stream channelization	6% (1)	6% (1)	18% (3)	6% (1)	47% (8)	18% (3)	**17**
Impoundment of water/flow regulation	6% (1)	6% (1)	24% (4)	0% (0)	47% (8)	18% (3)	**17**
Agricultural/forestry practices	19% (3)	38% (6)	19% (3)	12% (2)	0% (0)	12% (2)	**16**
Residual contamination (persistent toxins)	0% (0)	0% (0)	19% (3)	25% (4)	0% (0)	56% (9)	**16**
Point source pollution (continuing)	0% (0)	6% (1)	18% (3)	18% (3)	0% (0)	59% (10)	**17**
Mining/acidification	6% (1)	0% (0)	12% (2)	29% (5)	0% (0)	53% (9)	**17**
Drainage practices (stormwater runoff)	6% (1)	18% (3)	18% (3)	6% (1)	18% (3)	35% (6)	**17**
Unknown	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	**2**
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	**0**
					Total Respondents		**272**

11. Other HABITAT threats to ALL Amphibians in ALL Habitats in Indiana.

No responses were entered for this question.

Total Respondents **0**

(skipped this question) 22

12. Please briefly describe the top two HABITAT threats to ALL Amphibians in ALL Habitats in Indiana identified above.

1. Forestry practices that open the forest canopy around cave entrances can greatly impact the habitat for this species, drying out the entrance to the point it is not useable habitat by the salamanders.
2. Loss of ephemeral wetland habitat, invasion of wetlands by species like reed canary grass, cattails, purple loosestrife or other invasives that create monocultures, agricultural practices that destroy ephemeral wetlands.
3. Habitat destruction and degradation of ephemeral wetlands

4. Habitat loss & degradation

5. Ephemeral Wetland loss and fragmentation

6. Habitat loss & degradation

7. Habitat loss & degradation

8. Habitat loss & degradation

9. Habitat degradation & fragmentation

10. Habitat degradation and fragmentation due to deforestation.

11. Habitat loss, degradation & fragmentation due to deforestation around rocky outcrops.

12. Habitat degradation & fragmentation

13. Habitat degradation of streams

14. Habitat fragmentation & degradation

15. 1. Cattle grazing, farming, and development activities that affect the persistence of burrows in formally flooded or moist grasslands.
2. Draining of breeding ponds, ditche etc. or introduction of fish into breeding waters.

16. Habitat degradation or loss and fragmentation of habitat are the largest threats.

Total Respondents	**16**
(skipped this question)	6

13. What current monitoring efforts by state agencies are you aware of for ALL Amphibians in ALL Habitats in Indiana?

	Yes, these efforts occur	Not aware of these efforts occuring	Response Total
Statewide year-round monitoring conducted by state agencies	12% (2)	88% (14)	**16**
Statewide once a year monitoring conducted by state agencies	20% (3)	80% (12)	**15**
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	7% (1)	93% (14)	**15**
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	14% (2)	86% (12)	**14**
Regional or local year-round monitoring conducted by state agencies	12% (2)	88% (14)	**16**

Regional or local once a year monitoring conducted by state agencies	7% (1)	93% (13)	**14**
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	7% (1)	93% (14)	**15**
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	20% (3)	80% (12)	**15**
		Total Respondents	**120**

14. What current monitoring efforts by other organizations are you aware of for ALL Amphibians in ALL Habitats in Indiana?

	Yes, these efforts occur	Not aware of these efforts occuring	Response Total
Statewide year-round monitoring conducted by other organizations	0% (0)	100% (16)	**16**
Statewide once a year monitoring conducted by other organizations	0% (0)	100% (16)	**16**
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (16)	**16**
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	0% (0)	100% (16)	**16**
Regional or local year-round monitoring conducted by other organizations	6% (1)	94% (15)	**16**
Regional or local once a year monitoring conducted by other organizations	38% (6)	62% (10)	**16**
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	25% (4)	75% (12)	**16**
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	56% (9)	44% (7)	**16**
		Total Respondents	**128**

15. How crucial are these monitoring efforts by state agencies for the conservation of ALL Amphibians in ALL Habitats in Indiana?

	Very crucial	Somewhat crucial	Slightly crucial	Not crucial	Unknown	Response Total

Statewide year-round monitoring conducted by state agencies	15% (2)	8% (1)	0% (0)	8% (1)	69% (9)	**13**
Statewide once a year monitoring conducted by state agencies	29% (4)	0% (0)	0% (0)	7% (1)	64% (9)	**14**
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies	17% (2)	8% (1)	8% (1)	0% (0)	67% (8)	**12**
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies	17% (2)	0% (0)	0% (0)	0% (0)	83% (10)	**12**
Regional or local year-round monitoring conducted by state agencies	17% (2)	8% (1)	0% (0)	8% (1)	67% (8)	**12**
Regional or local once a year monitoring conducted by state agencies	8% (1)	0% (0)	0% (0)	8% (1)	83% (10)	**12**
Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies	17% (2)	0% (0)	0% (0)	8% (1)	75% (9)	**12**
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies	15% (2)	8% (1)	0% (0)	8% (1)	69% (9)	**13**
				Total Respondents		**100**

16. How crucial are these monitoring efforts by other organizations for the conservation of ALL Amphibians in ALL Habitats in Indiana?

	Very crucial	**Somewhat crucial**	**Slightly crucial**	**Not crucial**	**Unknown**	**Response Total**
Statewide year-round monitoring conducted by other organizations	0% (0)	9% (1)	0% (0)	9% (1)	82% (9)	**11**
Statewide once a year monitoring conducted by other organizations	9% (1)	0% (0)	0% (0)	9% (1)	82% (9)	**11**
Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations	9% (1)	9% (1)	9% (1)	0% (0)	73% (8)	**11**
Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations	9% (1)	0% (0)	0% (0)	9% (1)	82% (9)	**11**
Regional or local year-round monitoring conducted by other organizations	9% (1)	9% (1)	0% (0)	9% (1)	73% (8)	**11**
Regional or local once a year monitoring conducted by other organizations	38% (5)	15% (2)	0% (0)	8% (1)	38% (5)	**13**

Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations	8% (1)	17% (2)	17% (2)	8% (1)	50% (6)	**12**
Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations	15% (2)	15% (2)	38% (5)	8% (1)	23% (3)	**13**
					Total Respondents	**93**

17. Regional or local state agency monitoring for ALL Amphibians in ALL Habitats in Indiana.

1. None
2. None
3. IDNR has a NAAMP frog call program
4. INDR Nature Preserve Division
5. IDNR Fish & Wildlife Division
6. INDR runs a NAAMP frog monitory program
7. The Wildlife Diversity Section of the DFW coordinates Indiana's North American Amphibian Monitoring and Frog Watch Programs. These two programs collectively are the statewide effort to monitor frog and toad populations in Indiana, including bull frogs. The data can be analysised regionally.
8. Statewide within the range of Crawfish frogs: he Indiana Amphibian Monitoring Program (IAMP) part of the North American Amphibian Monitoring Program and Frog Watch are conducted annually during the crawfish frog breeding season. The data can be analyzed regionally
9. IDNR, Non-game herpetologist incorporates this as part of the annual field season.

Total Respondents	**9**
(skipped this question)	13

18. Regional or local monitoring by other organizations for ALL Amphibians in ALL Habitats in Indiana.

1. NW Indiana (Newton, Jasper, Pulaski, Lake, Porter counties).
2. Newton, Jasper, Pulaski, Starke, Lake & Porter Counties
3. Chicago Wilderness
   Robert Brodman, Saint Joseph's College

4. Spencer Cortwright, IUN
Robert Brodman, Saint Joseph's College

5. Robert Brodman, Saint Joseph's College

6. Brodman, Saint Joseph's College
Cortwright, IUN

7. Robert Brodman, Saint Joseph's College

8. Robert Brodman, Saint Joseph's College in NW Indiana

9. None known

10. Univerisity professors and members of the Herpetology TAC for the State of Indiana as part of their annual field season.

Total Respondents	**10**
(skipped this question)	12

19. Please list organizations that are monitoring ALL Amphibians in ALL Habitats in Indiana.

1. Robert Brodman, Saint Joseph's College

2. Robert Brodman, Saint Joseph's College

3. Chicago Wilderness
Robert Brodman, Saint Joseph's College

4. Spencer Cortwright, IUN
Robert Brodman, Saint Joseph's College

5. Brodman, Saint Joseph's College
Cortwright, IUN

6. None known

Total Respondents	**6**
(skipped this question)	16

20. What are the current monitoring techniques for ALL Amphibians in ALL Habitats in Indiana?

	Frequently, Occasionally	Not used but possible	Not used and not possible	Not	Response

			with existing technology and data	with existing technology and data			
Radio telemetry and tracking	0% (0)	0% (0)	69% (11)	19% (3)	0% (0)	12% (2)	**16**
Modeling	0% (0)	6% (1)	75% (12)	0% (0)	0% (0)	19% (3)	**16**
Coverboard routes	0% (0)	14% (2)	14% (2)	57% (8)	0% (0)	14% (2)	**14**
Spot mapping	0% (0)	0% (0)	33% (5)	0% (0)	0% (0)	67% (10)	**15**
Driving a survey route	12% (2)	6% (1)	0% (0)	62% (10)	0% (0)	19% (3)	**16**
Reporting from harvest, depredation, or unintentional take (road kill, bycatch)	0% (0)	6% (1)	0% (0)	69% (11)	0% (0)	25% (4)	**16**
Mark and recapture	0% (0)	0% (0)	88% (14)	0% (0)	0% (0)	12% (2)	**16**
Professional survey/census	47% (7)	40% (6)	0% (0)	0% (0)	0% (0)	13% (2)	**15**
Volunteer survey/census	19% (3)	6% (1)	50% (8)	12% (2)	0% (0)	12% (2)	**16**
Trapping (by any technique)	33% (5)	13% (2)	40% (6)	0% (0)	0% (0)	13% (2)	**15**
Representative sites	31% (5)	50% (8)	0% (0)	0% (0)	0% (0)	19% (3)	**16**
Probabilistic sites	38% (5)	46% (6)	0% (0)	0% (0)	0% (0)	15% (2)	**13**
Other (please specify below)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	**3**
					Total Respondents		**187**

21. Other monitoring techniques for ALL Amphibians in ALL Habitats in Indiana.

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

Total Respondents **2**

(skipped this question)	20

22. What one or two monitoring techniques would you recommend for effective conservation of ALL Amphibians in ALL Habitats in Indiana?

1. Minnow trapping and possible either mark recapture or telemtry
2. Minnow trapping and iether mark recapture or telemtry
3. Frog call surveys and tadpole surveys
4. Professional survey and either mark recapture or telemetry
5. Fall surveys at breeding sites
6. Aquatic surveys for eggs & larva, trapping during breeding migration
7. Aquatic surveys and minnow traps
8. Systematic surveys in & near rocky outcrops
9. Professional surveys
10. Professional Survey
11. Call surveys and systematic sampling
12. More intensive call surveys and larva surveys, especially to determine how far the adults are traveling to deposit their eggs.
13. Pit-fall traps and cover board objects near ephemeral wetland breeding sites.

Total Respondents	**13**
(skipped this question)	9

23. What current HABITAT inventory and assessment efforts or activities by state agencies are you aware of for ALL Amphibians 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 state agencies	6% (1)	94% (15)	**16**
Statewide once a year inventory and assessment conducted by state agencies	6% (1)	94% (15)	**16**
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	6% (1)	94% (15)	**16**

Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	12% (2)	88% (14)	**16**
Regional or local year-round inventory and assessment conducted by state agencies	6% (1)	94% (15)	**16**
Regional or local once a year inventory and assessment conducted by state agencies	6% (1)	94% (15)	**16**
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	6% (1)	94% (15)	**16**
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	19% (3)	81% (13)	**16**
		Total Respondents	**128**

24. What current HABITAT inventory and assessment efforts or activities by other organizations are you aware of for ALL Amphibians in ALL Habitats in Indiana?

	Yes, these efforts occur	**No effort that I'm aware of**	**Response Total**
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	100% (16)	**16**
Statewide once a year inventory and assessment conducted by other organizations	0% (0)	100% (16)	**16**
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	0% (0)	100% (15)	**15**
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	7% (1)	93% (14)	**15**
Regional or local year-round inventory and assessment conducted by other organizations	19% (3)	81% (13)	**16**
Regional or local once a year inventory and assessment conducted by other organizations	31% (5)	69% (11)	**16**
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	31% (5)	69% (11)	**16**
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	56% (9)	44% (7)	**16**
		Total Respondents	**126**

25. How crucial are these HABITAT efforts by state agencies for the conservation of ALL Amphibians 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	18% (2)	9% (1)	9% (1)	0% (0)	64% (7)	**11**
Statewide once a year inventory and assessment conducted by state agencies	9% (1)	9% (1)	0% (0)	0% (0)	82% (9)	**11**
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	9% (1)	0% (0)	9% (1)	0% (0)	82% (9)	**11**
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	9% (1)	0% (0)	9% (1)	0% (0)	82% (9)	**11**
Regional or local year-round inventory and assessment conducted by state agencies	0% (0)	18% (2)	0% (0)	0% (0)	82% (9)	**11**
Regional or local once a year inventory and assessment conducted by state agencies	9% (1)	0% (0)	9% (1)	0% (0)	82% (9)	**11**
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by state agencies	9% (1)	0% (0)	9% (1)	0% (0)	82% (9)	**11**
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by state agencies	9% (1)	9% (1)	9% (1)	0% (0)	73% (8)	**11**
				Total Respondents		**88**

26. How crucial are these HABITAT efforts by other organizations for the conservation of ALL Amphibians in ALL Habitats in Indiana?

	These efforts are very crucial	These efforts are somewhat crucial for	These efforts are slightly	These efforts are not crucial	Unknown	Response Total

	for this HABITAT	this HABITAT	crucial for this HABITAT	for this HABITAT		
Statewide year-round inventory and assessment conducted by other organizations	0% (0)	9% (1)	0% (0)	0% (0)	91% (10)	**11**
Statewide once a year inventory and assessment conducted by other organizations	9% (1)	9% (1)	0% (0)	0% (0)	82% (9)	**11**
Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	9% (1)	0% (0)	9% (1)	0% (0)	82% (9)	**11**
Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	9% (1)	0% (0)	9% (1)	0% (0)	82% (9)	**11**
Regional or local year-round inventory and assessment conducted by other organizations	17% (2)	17% (2)	0% (0)	0% (0)	67% (8)	**12**
Regional or local once a year inventory and assessment conducted by other organizations	25% (3)	17% (2)	8% (1)	0% (0)	50% (6)	**12**
Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment conducted by other organizations	9% (1)	9% (1)	27% (3)	0% (0)	55% (6)	**11**
Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment conducted by other organizations	17% (2)	17% (2)	50% (6)	0% (0)	17% (2)	**12**
				Total Respondents		**91**

27. Regional or local state agency HABITAT inventory and assessment for ALL Amphibians in ALL Habitats in Indiana.

1. DFW - nongame
2. Frog call surveys include rural and agricultural areas throughout the state.
3. None known
(Bull frogs are amphibian habitat generalist and fairly mobile. I know of no habitat inventory protocol for bull frogs in developed land habitat.)
4. None:
Crawfish frog habitat is not well understood and is not currently being inventoried to my knowledge. Grasslands may be monitored by not all grasslands are crawfish frog habitat.

Total Respondents	**4**
(skipped this question)	18

28. Regional or local HABITAT inventory and assessment by other organizations for ALL Amphibians in ALL Habitats in Indiana.

1. Indiana Karst Conservancy and local grottos
2. Kankakee Sands and other Conservancy preserves - staff evaluate the restored/created habitat to judge its ability to support Plains leopard frog and other species of concern.
3. NW Indiana (Newton, Jasper, Pulaski, Lake & Porter Counties)
4. Newton, Jasper, Starke, Pulaski, Lake & Porter counties
5. Chicago Wilderness & Saint Joseph's College have frog call monitoring programs in NW IN.
6. Cortwright monitors populations in Brown County & Porter County
   Brodman monitors them in Owens County
7. Brodman in NW Indiana
8. Brodman, Saint Joseph's College in NW Indiana
   Cortwright, IUN in Brown County
9. Robert Brodman, Saint Joseph's College in NW Indiana
10. None known
11. None:
    Crawfish frog habitat is not well understood and is not currently being inventoried to my knowledge. Grasslands may be monitored by not all grasslands are crawfish frog habitat.

Total Respondents	**11**
(skipped this question)	11

29. Please list organizations that are monitoring this HABITAT for ALL Amphibians in ALL Habitats in Indiana.

1. Indiana Karst Conservancy and local grottos
2. TNC.
3. Robert Brodman, Saint Joseph's College
4. Robert Brodman, Saint Joseph's College
5. None known

6.	None: Crawfish frog habitat is not well understood and is not currently being inventoried to my knowledge. Grasslands may be monitored by not all grasslands are crawfish frog habitat.
7.	IDNR, Non-game Herpetologist; University Professors, members of the Herpetology TAC Committee for the State of Indiana

Total Respondents **7**

(skipped this question) 15

30. What are the current HABITAT inventory and/or assessment techniques for ALL Amphibians 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	6% (1)	0% (0)	75% (12)	0% (0)	0% (0)	19% (3)	**16**
Aerial photography and analysis	0% (0)	25% (4)	56% (9)	0% (0)	0% (0)	19% (3)	**16**
Systematic sampling	38% (6)	31% (5)	12% (2)	0% (0)	0% (0)	19% (3)	**16**
Property tax estimates	0% (0)	0% (0)	0% (0)	60% (9)	0% (0)	40% (6)	**15**
State revenue data	0% (0)	0% (0)	0% (0)	60% (9)	0% (0)	40% (6)	**15**
Regulatory information	0% (0)	0% (0)	0% (0)	60% (9)	0% (0)	40% (6)	**15**
Participation in landuse programs	0% (0)	0% (0)	0% (0)	53% (8)	0% (0)	47% (7)	**15**
Modeling	0% (0)	6% (1)	69% (11)	0% (0)	0% (0)	25% (4)	**16**
Voluntary landowner reporting	0% (0)	0% (0)	6% (1)	44% (7)	0% (0)	50% (8)	**16**
Other (please specify below)	0% (0)	60% (3)	0% (0)	0% (0)	0% (0)	40% (2)	**5**

Total Respondents **145**

31. Other HABITAT inventory and assessment techniques for ALL Amphibians in ALL Habitats in Indiana.

1. Visual estimation - has the entrance been changed in anyway from its historical configuration (forest canopy opened up, entrance enlarged or blocked, etc.)
2. Visual estimate of amount of appropriate habitat being provided in restored areas.
3. If there was a significant decline in bull frog habitat on state owned properties the state would hear about it from frog hunters.
4. None known
5. Pit-fall trapping and cover board objects adjacent to ephemeral wetlands; mark and recapture

Total Respondents **5**

(skipped this question) 17

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

1. Systematic sampling (intesive) and GIS (less intensive)
2. suvery (intensive) and GIS (less intenstive)
3. Systematic surveys & GIS
4. Surveys
5. systematic sampling and GIS
6. Systematic sampling & GIS
7. Systematic sampling & GIS
8. Sysematic sampling & GIS
9. Systematic survey & GIS
10. Systematic survey & GIS
11. Urban residents could be encouraged to participate in the Frog Watch program.
12. Crawfish frog habitat may be described by a combination of hydrology, soil type, proximity to breeding waters, and vegetation. These factors should be investigated to develop a model for crawfish frog habitat.
13. Pit-fall traps and cover boards can be used to assess population size and use of ephemeral wetlands for breeding; Mark and recapture can be used to determine migration patterns and use of specific ephemeral wetlands for breeding

Total Respondents	**13**
(skipped this question)	9

33. What is the current body of science for ALL Amphibians in ALL Habitats in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	**0**	**0%**
Adequate	**2**	**12%**
Inadequate	**13**	**81%**
Nonexistent	**1**	**6%**
Other (please explain below)	**0**	**0%**
Total Respondents		**16**
(skipped this question)		6

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

Title = Amphibians and reptiles from 23 counties of Indiana.;
Author = Robert Brodman;
Date = 2003;
Publisher = Proceedings of the Indiana Academy of Science, 112: 43-54.

Title = The Status of Amphibians in Rural Northwest Indiana;
Author = Brodman, R., and M. Kilmurry;
Date = 1998;
Publisher = Iowa University Press, Iowa City, Iowa

Title = Discovery of green salamanders in Indiana and a distributional survey. In Status & Conservation of Midwestern Amphibians;
Author = Robert Madej;
Date = 1998;
Publisher = University of Iowa Press, Iowa City

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

Total Respondents	**10**

(skipped this question) 12

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

Title = Multivariate analyses of the influences of water chemistry and habitat parameters on the abundances of pond-breeding amphibians.;
Author = Robert Brodman et al;
Date = 2003;
Publisher = Journal of Freshwater Ecology 18: 425-436.

Title = Ten- to eleven-year population trends of two pond-breedong amphibian species, red-spotted newts and green frogs. In Status & Conservation of Midwester;
Author = Spencer Cortwright;
Date = 1998;
Publisher = University of Iowa Press, Iowa City

Title = Green salamander: Family plethodontidae, Aneides aeneus Cope and Packard, 1881.;
Author = Pauley, T. K. and M.B. Watson;
Date = 2005;
Publisher = In: Amphibian Declines: The Conservation Status of United States Species. M. Lannoo, (ed.), University of

Author = www.natureserve.org/explorer

Total Respondents **6**

(skipped this question) 16

36. What is the current HABITAT body of science for ALL Amphibians in ALL Habitats in Indiana?

	Response Total	Response Percent
Complete, up to date and extensive	**0**	**0%**
Adequate	**0**	**0%**
Inadequate	**13**	**81%**
Nonexistent	**3**	**19%**
Other (please explain below)	**0**	**0%**
Total Respondents	**16**	

(skipped this question) 6

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

Title = Amphibians and reptiles from 23 counties of Indiana.;
Author = Robert Brodman;
Date = 2003;
Publisher = Proceedings of the Indiana Academy of Science, 112: 43-54.

Total Respondents	**1**
(skipped this question)	21

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

Total Respondents	**0**
(skipped this question)	22

39. What are the research needs for ALL Amphibians in ALL Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total
Life cycle	6% (1)	6% (1)	56% (9)	25% (4)	6% (1)	0% (0)	**16**
Distribution and abundance	31% (5)	31% (5)	25% (4)	12% (2)	0% (0)	0% (0)	**16**
Limiting factors (food, shelter, water, breeding sites)	69% (11)	6% (1)	19% (3)	6% (1)	0% (0)	0% (0)	**16**
Threats (predators/competition, contamination)	69% (11)	6% (1)	19% (3)	6% (1)	0% (0)	0% (0)	**16**
Relationship/dependence on specific habitats	62% (10)	19% (3)	0% (0)	12% (2)	6% (1)	0% (0)	**16**
Population health (genetic and physical)	38% (6)	31% (5)	12% (2)	12% (2)	0% (0)	6% (1)	**16**
Other (please specify below)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	**3**
					Total Respondents		**99**

40. Other research needs for ALL Amphibians in ALL Habitats in Indiana.

1. Quite little is known about much of the basic natural history for amphibians
2. Very little is known about the basic natural history, population ecology and abundance in Indiana of the lesser siren.
3. None known
4. Amphibians are in great need of study on all aspects of its ecology.
5. Information on metapopulation dynamics and migration distances to and from ephemeral wetlands are needed. Information on how many ephemeral wetland habitats within the landscape are needed to maintain healthy populations of the Spotted salamander s is also needed. Information on buffer size and vegetation composition around ephemeral wetlands is needed.

Total Respondents	**5**
(skipped this question)	17

41. What are the HABITAT research needs for ALL Amphibians in ALL Habitats in Indiana?

	Urgently needed	Greatly needed	Needed	Slightly needed	Not needed	Unknown	Response Total
Successional changes	0% (0)	6% (1)	69% (11)	19% (3)	0% (0)	6% (1)	**16**
Distribution and abundance (fragmentation)	50% (8)	31% (5)	12% (2)	6% (1)	0% (0)	0% (0)	**16**
Threats (land use change/competition, contamination/global warming)	62% (10)	19% (3)	12% (2)	6% (1)	0% (0)	0% (0)	**16**
Relationship/dependence on specific site conditions	56% (9)	19% (3)	6% (1)	6% (1)	6% (1)	6% (1)	**16**
Growth and development of individual components of the habitat	6% (1)	25% (4)	44% (7)	6% (1)	6% (1)	12% (2)	**16**
Other (please specify below)	0% (0)	33% (1)	0% (0)	0% (0)	0% (0)	67% (2)	**3**
					Total Respondents		**83**

42. Other HABITAT research needs for ALL Amphibians in ALL Habitats in Indiana.

1. Factors that limit the distribution of sirens in Indiana
2. None known
3. Crawfish frog habitat needs to be adequately described.

4.	Information on metapopulation dynamics and migration distances to and from ephemeral wetlands are needed. Information on how many ephemeral wetland habitats within the landscape are needed to maintain healthy populations of the amphibian species is also needed. Information on buffer size and vegetation composition around ephemeral wetlands is needed.	
	Total Respondents	**4**
	(skipped this question)	18

43. How well do the following conservation efforts address the threats to ALL Amphibians in ALL Habitats in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection (use below for details)	44% (7)	31% (5)	0% (0)	0% (0)	25% (4)	**16**
Population management (hunting, trapping)	0% (0)	0% (0)	6% (1)	62% (10)	31% (5)	**16**
Population enhancement (captive breeding and release)	0% (0)	0% (0)	0% (0)	75% (12)	25% (4)	**16**
Reintroduction (restoration)	0% (0)	0% (0)	0% (0)	81% (13)	19% (3)	**16**
Food plots	0% (0)	0% (0)	0% (0)	81% (13)	19% (3)	**16**
Threats reduction	6% (1)	6% (1)	0% (0)	25% (4)	62% (10)	**16**
Native predator control	0% (0)	0% (0)	0% (0)	38% (6)	62% (10)	**16**
Exotic/invasive species control	0% (0)	12% (2)	0% (0)	25% (4)	62% (10)	**16**
Regulation of collecting	0% (0)	19% (3)	0% (0)	50% (8)	31% (5)	**16**
Disease/parasite management	0% (0)	0% (0)	0% (0)	56% (9)	44% (7)	**16**
Translocation to new geographic range	0% (0)	6% (1)	0% (0)	69% (11)	25% (4)	**16**
Protection of migration routes	0% (0)	0% (0)	0% (0)	38% (6)	62% (10)	**16**
Limiting contact with pollutants/contaminants	0% (0)	0% (0)	0% (0)	50% (8)	50% (8)	**16**
Public education to reduce human disturbance	0% (0)	12% (2)	6% (1)	25% (4)	56% (9)	**16**
Culling/selective removal	0% (0)	0% (0)	0% (0)	88% (14)	12% (2)	**16**
Stocking	0% (0)	0% (0)	0% (0)	88% (14)	12% (2)	**16**
Other (please specify below)	25% (1)	0% (0)	0% (0)	0% (0)	75% (3)	**4**
					Total Respondents	**260**

44. Other current conservation practices for ALL Amphibians in ALL Habitats in Indiana.

1. Too little is known
2. Bull frog tadpoles could be introduced into an area as by-product to fish stocking or from realeased pet tadpoles.
3. Study burrow making crayfish and their burrows.
4. Wetland restoration

Total Respondents	**4**
(skipped this question)	18

45. What one or two specific practices would you recommend for more effective conservation of ALL Amphibians in ALL Habitats in Indiana?

1. Protect cave entrances from inappropriate management activities.
2. Potection of ephermeral wetlands and wetland complexes.
3. Habitat protection is the key, but we need to better understand factors that limit siren abundnace & distribution.
4. Protection of ephemeral wetlands and control of purple loosesrife
5. Ephermeral Wetland and forested upland habitat protection
6. Protection of fishless breeding habitat, wetland restoration
7. Habitat protection
8. 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 cliffs.

   Little is known about the population biology, lifespan, mortality rates, dispersal, colonization of habitats, metapopulation dynamics, and the extent of arboreal activity.
9. Habitat protection
10. Habitat protection
11. Protection & restoration of ephermeral wetlands within the historic range of amphibians.
12. None needed

13.	1. Promote non-disturbance in known crawfish frog habitat. 2. Identification of breeding sites and protect the sites from disturbance and the introduction of fish.
14.	1.Habitat protection needs to be improved greatly. Ephemeral wetlands are not protected or valued as much as other wetlands via regulation. 2.Restoration of ephemeral wetlands and retention of these habitats within the landscape.

Total Respondents	**14**
(skipped this question)	8

46. How well do the following conservation efforts address the HABITAT threats to ALL Amphibians in ALL Habitats in Indiana?

	Very well	Somewhat	Not at all	Not used	Unknown	Response Total
Habitat protection through regulation	31% (5)	38% (6)	0% (0)	6% (1)	25% (4)	**16**
Habitat protection on public lands	56% (9)	31% (5)	0% (0)	0% (0)	12% (2)	**16**
Habitat protection incentives (financial)	6% (1)	25% (4)	6% (1)	12% (2)	50% (8)	**16**
Habitat restoration through regulation	0% (0)	19% (3)	0% (0)	12% (2)	69% (11)	**16**
Habitat restoration on public lands	6% (1)	38% (6)	0% (0)	6% (1)	50% (8)	**16**
Habitat restoration incentives (financial)	0% (0)	12% (2)	6% (1)	12% (2)	69% (11)	**16**
Artificial habitat creation (artificial reefs, nesting platforms)	0% (0)	12% (2)	0% (0)	19% (3)	69% (11)	**16**
Selective use of functionally equivalent exotic species in place of extirpated natives	0% (0)	0% (0)	6% (1)	31% (5)	62% (10)	**16**
Succession control (fire, mowing)	0% (0)	0% (0)	12% (2)	19% (3)	69% (11)	**16**
Corridor development/protection	0% (0)	6% (1)	0% (0)	19% (3)	75% (12)	**16**
Managing water regimes	0% (0)	12% (2)	6% (1)	12% (2)	69% (11)	**16**
Pollution reduction	0% (0)	6% (1)	0% (0)	12% (2)	81% (13)	**16**
Protection of adjacent buffer zone	6% (1)	25% (4)	0% (0)	6% (1)	62% (10)	**16**
Restrict public access and disturbance	0% (0)	6% (1)	0% (0)	12% (2)	81% (13)	**16**
Land use planning	0% (0)	12% (2)	0% (0)	12% (2)	75% (12)	**16**
Technical assistance	0% (0)	6% (1)	6% (1)	19% (3)	69% (11)	**16**
Cooperative land management agreements (conservation easements)	0% (0)	12% (2)	0% (0)	12% (2)	75% (12)	**16**
Other (please specify below)	0% (0)	0% (0)	0% (0)	0% (0)	100% (3)	**3**

Total Respondents **275**

47. Other current HABITAT conservation practices for ALL Amphibians in ALL Habitats in Indiana.

1. Many of the current 'conservation practices' and incentive programs promoted by biologists seem to be aimed at ducks and actually manage against amphibians.
2. The development and proliferation of storm water retention ponds.

Total Respondents **2**

(skipped this question) 20

48. What one or two specific HABITAT practices would you recommend for more effective conservation of ALL Amphibians in ALL Habitats in Indiana?

1. Protect cave entrances from disturbance
2. - When creating wetlands under a landowner incentive program, create ephemeral wetlands whenever possible rather than duck ponds.
3. Habitat protection on private & public lands
4. Habitat protection. However more research is needed to address the effectiveness of habitat restoration on siren conservation.
5. Ephermeral wetland protection and restoration
6. Forested emphermeral wetland protection and forest protection
7. Habitat protection & restoration
8. Habtitat protection
9. 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 cliffs.
10. Wetland protection
11. Habitat protection
12. Protection and restoration of ephemeral wetlands.
13. None needed
14. Public ownership (purchase) of know crawfish frog habitat and maintenance of the hydrology of the site and associated breeding waters.

15.	Restoration and protection of ephemeral wetlands; protection of buffers needed for amphibians migrating to the ephemeral wetland for breeding;

Total Respondents **15**

(skipped this question) 7

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

1.	Step one is the need for more information about this species and its abundance in Indiana.
2.	We need to learn a lot more about lesser sirens in order to develop a good conservation design.
3.	The distribution of spotted salamanders in Indiana is more spotty than one might expect.
4.	Research on metapopulation dynamics and colonization of new breeding habitat is needed.
5.	Newts have a spotty distribution in Indiana. We need to better understand the factors that lead to this.
6.	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.
7.	Four-toed salamanders have a very spotty distribution that is poorly understood. They are often not found in habitats that seem ideally suited but then found in what one might call an inferior site.
8.	Too little in known about amphibians, especially Indiana populations.
9.	It is not known if Rana blairi exists in Indiana. The only known specimen from Indiana were collected and deposited in museums prior to the species even being described. To the best of my knowledge, the most recently documented Rana blairi from Indiana was about 30 years ago.
10.	Bull frogs are mobile, hearty, omnivorousand/indiscriminate predator, and habitat generalist. They are believed to be detrimental to other frogs. They do not require management at this time and should be monitored as an environmental sentinel. If bull frogs start declining then something serious is happening to the environment.
11.	This is a very under-studied species. Research needs to be conducted and management information developed for public land managers and private land owners (education).

Total Respondents **11**