

## Appendix S. Focus Group Two

Focus group 2

Date: June 3, 2014

Note taker: Colleen Hartel

### ***Presentation about species modelling, summary of response questions:***

- What is base habitat?  
National land cover database
- Is there an error matrix?  
At national level
- How is this different from GAP analysis?  
Not model building, more empirical driven, this is more literature based
- Is the aim the same as gap analysis?  
Our aim is to identify a suite of species that give the range of responses to actions and this is a process we're using to get there
- You're using covertypes but there's a mismatch because invasives are important and not included in that information, is that a constraint?  
Yes, that is a constraint, but we could identify regions where it is controlled, we could potentially build in scores of higher/lower depending on where invasives are controlled
- Is there overlap with surrogate?  
There are a whole suite of ways to identify species like this, similar to surrogate species, in the literature
- To get back to the error, what's this mean for edge species that need small adjacencies like ruffed grouse and woodcock?  
You have to believe the edge data, ruffed grouse is a classic species for these modelling, averaging out over broad enough area that the scores are still very meaningful

- A. Any comments/concerns about indicator species selection process, we want your input and feedback about the feasibility of selecting 3-7 to represent needs of SGCN in a region, taking into the big picture
1. What about four-toed salamanders in caves/what about species that do not seem to match the habitat type they are listed under here (i.e. Wood Peewee, black vultures)?
    - Most of this info came from NatureServe and 2005 species list
    - the list is just a starting point
    - we will go through the list and talk about the species on a region by region basis
  2. What do you want from a cave species? Undisturbed? Good quality?
    - Ultimately we're using this to inform actions, so for example, if a species is sensitive to an action in a cave than we can use that as an indicator on how management actions affect all SGCN in that habitat/region
    - We're not really taking a single species approach, and we have to look at these species as an aggregate
  3. You gave a set of criteria for selecting indicator species, I thought one of them was.... So item 3, remove species on a landscape scale.... Does this mean we are not monitoring or are not capable?
    - Not capable
  4. Is there any advantage of having indicator species sensitive to specific actions i.e. fragmentation rather than just habitat change?
    - yes, this is not just about habitat cover types, it's about types of actions and responses to roads, etc.
  5. I was interpreting this not just by indicator species by habitat types but also by threats
    - yes it ultimately comes back to this action perspective, we don't just want habitat though that's an interface for how actions are taken, so not all the actions are habitat based so not all the selection criteria should be habitat based
  6. So no where do I see presence/absence of a species in the process (citing ornate box turtle as an example), should that species not be chosen because it has no ability to widely disperse?
    - This becomes a consideration based on actions
    - (follow up question) it seems like ability to respond to actions would eliminate a lot of aquatics/herps from the list
    - (Another participant adds) What I would toss into that would be that a species like the racer would be an example of something that can respond on the landscape level rather than other species, so if you find x or y species that would be promising, but not the scale you're looking at. I like using the racer as an example or black ratsnakes, because even though some of the endangered species may not be there, it tells me something about that habitat
  7. Are we looking at a response over a 10 year time frame? If you have species that are really immobile than you may not see it with species with small dispersal capacity
    - (another participant) But then the presences of the species still tells something, so a two stage process, this would not protect the immobile species
  8. Would the two stage process have modelling component for these species with restricted needs? Have these two stage process in order to measure that?
    - We're not saying those species are unimportant, we're just envisioning these broadly based actions/scenarios, we're not trying to devalue those (immobile) species as much as just trying to model large landscape changes
  9. So we're assuming that actions that benefit these "large bodied reptiles" benefit these restricted species
    - yes, we're hoping these species carry-along the benefits

10. So what about these specific anthropogenic needs that may not affect the umbrella species but may affect the restricted species?

- as we contemplate the range of actions, we suspect there are actions that will only affect restricted species

11. But why not just make sure the species covers at least most of the taxa?

- right that's what we're trying to do, what are the 20 species that will "carry along" the other species?
- But there may not be that many
- (Another participant) if you are wanting to protect a particular sensitive species, this modelling effort is really not suited to that and what you're working on has value in terms of looking on landscape level biodiversity impacts. I think we're looking at 2 different things, looking for indicators what tells us what's good, what's bad, but that kind of leaves behind the ornate box turtle, we might want to do that under SWAP but that's not modelling
- So yes, we are still updating the species specific information, we're not ignoring those species, this modelling is just a component
- Amanda: this is just a piece of it, but we do want to use it to measure success of this plan, we're not going to not talk about ornate box turtles, but don't lose sight of this perspective
- (Another participant 2) And I think that helps, I think maybe re-clarifying the objectives of this exercise, we're looking at where are the most effective actions are
- Yes, we're trying to look broadly and have a way to rank the broad landscape actions

B. What is the best way to integrate this information together?

1. [Gives explanation of this question, how to combine/sum up these into a metric that we use to evaluate scenario a, b, c, set different thresholds, sum them, etc., does anyone have any strong feelings?]
2. There's a tradeoff between helping threatened species and maximizing biodiversity and I think one approach is to look at that tradeoff, I think you've got a priority, but you have got to look at that tradeoff
3. There are other region wide conservation efforts (like surrogate species, TNC, NRCS) how are those existing conservation efforts being incorporated, making a plea to incorporate those species
  - Yes we have those lists on our radar, if we are talking about a species please share it

## **Region 1. Great Lakes**

A. Habitats of interest

1. Dunes/swells
2. Eastern part, wetlands and lake complexes (Another participant emphasizes the importance of complexes)
3. Savannahs
4. What about things like river ecosystems?
  - building these for aquatic, you're looking at HUCs and upstream data, it's different than terrestrial models
5. Riverine
6. There's a lot of hay and pasture up there but I've got no idea if it's got conservation value
  - Do we really want to be modelling for hay and pasture?
  - It has more value than cultivated land, but if you think about CRP on a ten year scale, it's important
  - So are we going to have a SWAP promoting hay and pasture?
  - Well that's very different than CRP or managed prairie, this just wipes out nesting habitat

- But there might be things that can be taken on a pasture
- And an action might be prevent pasture to go to row crop
- So the question is basically what effects habitat over the next 10 years?
- Would grassland be a better word? Hayland or CRP is kind of a way of management? (participants all seem to agree)

7. Forested lands, wetlands

8. Woody wetlands

9. Lake Michigan

10. I think once we get to actions we'll want to talk about cultivated crops

#### B. Conservation actions

1. Corridor enhancement (emphasized that we need to do a lot of corridor enhancement)

2. Partnering with CRP, CRP is kind of a broad shot, so CRP by itself won't do it

3. Cover crops (going to be in every region), increasing cover crops

4. And even broader than cover crops is soil health

- yes these are kind of threats, so how do we flip it around?
  - Improvement of soil health and water quality through cover crops, tilling
- Two stage ditches, invasive species control
- The obvious one is that we're in a conservation needy part of the world, so just restoring natural habitats, prairies and savannahs, obviously we need to keep what we've got but there's place where we need to restore them
- Wetland complexes that we need to hammer on
- Just to throw out an idea, the forests in the northern part of the state are being hammered by emerald ash borer, conservation action would be diligence and action
  - The actions would be spray for gypsy moth or survey for new pests, and that can be brought to other areas of the state as well
- Keep forests forests
- So then the mirror image of the corridor one is resist fragmentation
- Restricting overuse of ATVs, high speed boating, horses
- The thing that just popped into my head that maybe is worth mentioning are the actions we are think are important, period, today we're working on stuff that we can model and that's important to keep in mind but that doesn't mean they're not important
- I think actions that perpetuate the diversity of forest types (probably for every region)
- Classified forest system is a concrete thing that can be modeled
- Drainage water management, controlling flow and tile drainage
- Deer management

5. Species

- How are you going to determine response by our indicator species or lack thereof? What are you going to do over 10 years?
  - It's not for us to dictate, but in our report we will recommend
- I think Northern Pike was listed last time, we've got 30 years of data, I think we might be able to detect change within the next ten years so, fit criteria for surrogate species

- What about sandhill crane?
    - Isn't monitored very well, there have been some attempts but...
    - But it is capable of being monitored
    - yeah, maybe our recommendation is to start monitoring
    - The sandhill crane has started being breeding in the last half dozen years
  - Just to throw a different kind of species out there, maybe northern leopard frog, they seem to be fairly mobile, they are responding, they're coming back in areas that have appropriate species, they're not as sexy as some of the other species....
  - Does red headed woodpecker make sense for savannah? And what about Karner blue butterfly? Is it too narrow?
    - I would say it's too narrow, too restricted
    - Is there anything else grabbing the sort of dune-y part of the region?
  - The turtles? Those hit the whole regions
    - I think Blanding's is a wonderful indicator species, will it give us any information over the next 10 years? No, I'm not going to pitch that yet
  - What about massasauga?
    - That's even more restricted [than turtles]
    - I know FW it's likely to be listed and FWS is trying to ramp up their monitoring protocols
    - The effort is perhaps rising up but, what I'm trying to do just what I'm trying to do with habitats of interest, I'm trying to be conservative, they're good indicators for certain things, but what are we trying to do in assess a decade response, I guess I'm watching to see what kind of species are going to surface what might give us a clear definition of success, in terms of this monitoring effort I'm wondering if these species do the trick? Cause Blanding's turtle you'll see it in several places, oh there's some promise to this area.
  - What about blue spotted salamander?
  - That's complicated by the fact that you're not sure you're actually looking at blue spotted salamander (hybrids), again those are the things, you find them and oh that's nice but will we be able to see a response by our actions over the next ten years
6. I know the park service is undertaking the restoration with the golden-winged warbler as their indicator
  7. For this ten years, are we looking at a statistically defensible impact? So the only thing you need to work in the ten year is that this species will make the model light up differently
    - Given Vicky's question, you can look at modelling exercise with enhancement of wetlands, forests, you can look at what you're doing to benefit the landscape and in that sense I might say Blanding's turtle and massasauga actually work, because you can say you need this, this, and this, we can actually enhance the habitat, and look at that. Now they're going to take their time crawling over there but you can actually look at that
  8. Franklin's ground squirrel
    - But franklin's is restricted, in the west
    - I do know we found them on the TNC property
    - Some of the natural areas south of there, you can't find them
  9. I see red bats highlighted, it meets some of these other criteria, perhaps hoary bats and silver haired for forest
  10. Red eyed vireo
    - yeah red eyed vireo and wood thrush

11. Maybe water thrush for wetlands?
12. What about great blue herons?
  - They're pretty generalists
13. I'd like to suggest more river species, the greater red horse
14. How do you deal with sport fish? The complexing factor of harvest?
15. I just noticed red shouldered hawk has shown up
16. Ellipse (mussel)
17. What about otter or bobcat or stuff like that?
  - For monitoring or an indicator species?
  - Well yeah, just as our carnivore...
18. Quail
  - For birds, we found in our analysis that the extremes forest and prairies, the scrubby intermediates tended to have weaker indicators, [he will share the list]
19. Bobolink
20. Sedge wren
21. Deer (not kidding) maybe increasing hunting is an action because they have such an impact on the ecosystem

## Region 2.

### A. Habitat

1. Prairies/grasslands
2. Forests
3. Grassy/herbaceous wetland
4. Swamps
5. Savannahs
6. Kankakee River
7. Uplands
  - Natural lakes
8. Conservation actions
  - Prairie restoration
  - Altered disturbance regime
  - Changes in hydrology and drainage
  - And back to [participant's] soil health measure
    - That's going to be ubiquitous across the state
  - Invasive species management
  - Stop or reduce conversion to cropland, not sure if that's feasible because prices are going up
  - Is there restoration on the Kankakee itself at this point? I know there was a NWR effort a few years back
    - Yes, it should be on the list restoration of the Kankakee itself

## 9. Species

- Pocket gophers
- Henslow's sparrow
- Red bat
- Little browns
  - We can just... group myotis
- What about badger?
- What about red headed woodpecker?
  - Yeah it's good for both regions?
- I'm going to put Franklin's up for the shining light for grasslands
- Bobwhite
- Grasshopper sparrow and lark sparrow
- Leopard frog
- What about bullsnake?
  - Maybe, yeah, sure. They actually, they're mobile, they're big.
  - Gopher snake
  - They're the same thing essentially
- I think river red horse for aquatic, northern brook lamprey, they cover a different size stream, and I'm going to say three ridge as a mussel, that would be one, it's around but it's not as common
- For getting at size, continuous size of grassland, harrier and short eared owl
- I'm going to throw sandhill crane out here as well
- For the drier side, so maybe something like sedge wren or marsh wren
- I put in snipe for that, it kind of covered that
- Would you put in a leopard frog, we're trying to figure out if northern or plains
- I'd put bell's vireo
- I'd put the double ended arrow for bobwhite and grasshopper sparrow, they're pretty similar
- Yeah pretty similar, you could argue for either, bobwhite's taken more habitat species but they're more of a niche species
- I guess you can put Blanding's turtle on there too,
- So plain's would wetlands, northern would be wetlands and other types
  - I don't know what a plain's leopard frog looks like
  - I think if you modeled its habitat needs, it would show up
- I'm looking at the realistic ability to respond to actions implemented on the ground, we've done a number of wetland restoration activities and we haven't seen any of that for plain's
- It's real response or modelling response
- Northern leopard frog seems to be coming back
- Yeah I've seen the northern come back

10. Yeah there should probably be some sort of waterfowl, like wood duck

11. I've just got a general question, what if the population response you see is totally unrelated to action on the ground, like in the case of white nose and wind?

- Does that change its value as an indicator? Yes, probably because it's being driven extinct regardless of actions being taken on the ground
12. Did people want massasauga? Maybe eastern massasauga for pines, they'll use grassland habitat
  13. Weed shiner, no one knows what it is so no one's going to pick it
  14. Why don't we have .....(inaudible species) just because they can't be monitored?
    - Yeah I was thinking about star nosed mole
  15. Are there any rails and stuff that are particularly happy in that mucky stuff?
    - I think Virginia rails sometimes
  16. I'd like to throw river otter up there

### Region 3.

#### A. Habitat

1. Forest
2. I should point out TNC has kind of written off flat woods as a climate change/corn disaster, there's just no chance of them making a big enough target (what about Muscatatuck flats? That's a different reason, not a flat woods conservation, that's a wetlands target)
3. Riverine
4. Ephemeral wetlands, there's probably still some there (VM: by mistake)
5. Woody wetlands
6. Prairie habitat
7. Agriculture
8. Are there caves in there?
  - Yes there are two different sets of caves in this region
9. Big oaks is in it, the big green rectangle
10. Big rivers
11. There are also siltstone glades, this is laid out differently from the ecoregions I'm used to
12. Absolutely barrens and glades
13. Well getting back to rivers, I think there's a difference between the white water, blue, and the Ohio, so up on top is the Wabash
  - I don't even think of the Ohio in this
  - Yeah there's not that much you can do with the Ohio in this one
  - Actually 5 only has the Ohio
14. Are the knobs in there?
  - No, the knobs are in 5
15. The Appalachian low elevation glades, they're in 3 and 5 but the knobs are in 5
16. How do you address the urban context? Especially in this area?
  - Do you want to put urban up as a habitat then?
  - But then you get back to the point, urban and row crop are going to be in the models, you're going to be that in the model, does that mean you want to call it a habitat of interest



- Well I think then you just have to go back to that point where it's like, the objectives are going to be different in that are, urban does have... is an opportunity. If you just make a black space for urban you lose any opportunity for urban conservation
- Meaningful conservation or feel good?
- Amanda: there are SGCN in developed lands, and I know it's the kind of work a lot of us think of doing, but when we do not discuss the urban environment, we do lose that chance to engage groups we would otherwise be cutting off
- The reason I push back is because I want to tease out what we mean in habitat of interest, row crop, urban, those are all things that would come in as factors, so what I am not suggesting is that we would not use these as factors, but they're also going to come in on other parts of the SWAP, conservation actions and outreach in urban areas is crucial, but is it crucial in urban areas?
- But you need to have models in urban areas in order to make these decisions?
- Is this particular habitat important to this whole long list? When you think about habitat of interest you think about the majority of those species
- Maybe the question [another participant] is asking is we're looking at the abundance and distribution of wildlife, what roles does wildlife have in this, and how much can we manipulate this
- BK: Yeah, I'm very interested in urban corridor construction, etc., but what I'm looking at is what's going to be useful for the model

#### 17. Conservation actions

- Deer population management SH
- Reforestation
- Connectivity, corridors
- Urban green infrastructure here and cross it off above
- Drainage improvement
  - These all have to deal with water quality, kind of overlapping
- Cat control
- Keeping forests forests
- Fighting fragmentation of natural habitats
- Focused CRP projects
- Prairie biomass, biofuels (switchgrass)
- Forest management
- Land preservation/acquisition
- Are there restrictions on what groups of animals we consider? I was thinking about pollinators in an agricultural landscape as they are of great concern, we can just put it up there and use it later to figure out and build models

#### 18. Species

- Cerulean warbler
- Pollinators
- Wood frog
- Henslow's sparrow

- The one thing we haven't talked about, we've got a couple of species.... This region is important for migration. How do they fit in? Species that are not resident or breeding here?
  - The question is how well will a species that is using Indiana for a stopover carrying other species with them? It may be that in their stop over they might be showing a critical response to actions
- There's a great deal of drainage management for American golden plover
- Smith's longspur
- Red bat
- Kirtland's snake
  - Really not a fun thing to try and monitor
- Eastern gray squirrel and southern flying squirrel
- Peregrine falcons
- Two lined salamander
- With a species like northern leopard frog because there's so much human habitation and pollution, would that be a good indicator species?
  - We're kind of messing with them already
- What about cricket frog?
  - Cricket frog might be problematic, what about gray ratsnake?
- Quail
- I got some aquatics, blue breast darter, eastern sand darter (completely different habitats), small mouth bass, sauger, kidneyshell, clubshell
- Kentucky warbler
- This region is really big, so I'd say franklin's ground squirrel again
- Ruffed grouse
- Copper bellied watersnake in the south part especially
- This is a bigger planning region, so we may have more
- Do we have any glade butterflies? Ask John Shuey about it

## **Region 4.**

### **A. Habitat**

1. Forest
2. Riparian zones, riverine
3. Oxbows
4. River bottoms
5. Grasslands, reclaimed from coal mining
6. Wooded wetlands
7. Emergent wetlands
8. Sandy scrub/shrub
9. Flatwoods
10. Cypress swamp

11. Coal mining (affects species but not a habitat of interest, a big part of this region)
12. Abandoned coal mines, an action might be restore these
13. Does the division deal with those final cut/spoiled lakes and ponds? Acid drainage that's a bad thing
14. Cane breaks

#### B. Conservation Actions

1. Mine reclamation, conservation coverage (too much going to ag)
2. Keep grasslands grassland
3. River corridors connections
4. Restoration of aquatics, oxbows
5. Conservation of woody bottomlands
6. Two stage ditches
7. Wetland restoration, goose pond is in this area
8. Soil health

#### A. Species

1. Crawfish frogs
2. Cerulean warbler
3. Eastern spadefoot
4. Interior least tern
5. Hooded warbler
6. American woodcock
7. Northern bobwhite
8. Eastern box turtle
9. Red bat
10. Pileated woodpecker
11. Northern harrier (JC: I mean it's a wintering bird, better than short eared owl)
12. Copper bellied watersnake
13. Swamp rabbit
14. Loggerhead shrikes? (agreed)
15. Cricket frog? Spotted salamander
16. Flying squirrel
17. Wood frog
18. Myotis in general
19. Eastern Pipistrelle
20. Yellow Throated Warbler
21. Northern Parula
22. Northern hogsucker
23. What about some of the bigger river fish? Not sure if they will respond in 10 years, but you can project habitat and not actually have a response that you can see in 10 years
24. Blue sucker
25. Red spotted sunfish for oxbows
26. Flier

27. Wood thrush
28. Fat pocketbook (mussel)
29. Dickcissel
30. Six lined racerunner (for sandy scrub)
31. King rail for emergent wetlands
32. Channel catfish

## Region 5.

### A. Habitat

1. Hardwood forest
2. Caves
3. Glades and barrens
4. Rivers
5. Grasslands
6. Reservoirs?
7. I was going to add onto caves as caves/karst sinkholes for some aquatic species
8. Cliffs
9. Wooded wetlands, I'm really after vernal pools but woody wetlands will capture it
10. Shrub/scrub

### B. Conservation Actions

1. Keeping forests and forests
2. Keep Karsts and caves clean for water quality
3. Protect recharge areas, but in terms of getting to know what's coming in/going out can you model that? Know/understand first
4. Preserve/manage forest
5. Limit fragmentation or unfragment
6. Prescribed fire is important in this area, reestablish fire regime
7. Forest opening creation (VM: with great care)
8. Invasive management
9. Deer management
10. Manage for oak hickory
11. Land acquisition
12. Soil health
13. Nutrient management because of the karst especially

### C. Species

1. Eastern spadefoot
2. Ruffed grouse
3. Wood frog
4. Wood thrush
5. Cerulean warbler
6. Hoosier cave fish

7. Hellbender
8. Cave fish
9. Red shouldered hawk
10. Bald eagle
11. Eastern box turtle
12. Whip poor will
13. Wood rat
14. Green salamander
15. Timber rattlesnake
16. Red bat/myotis spp. In general
17. Copperhead (covers more area than timber rattlesnake)
18. Prairie warbler
19. Hooded warbler
20. Pileated woodpecker
21. Worm eating warbler
22. Ovenbird
23. Elephant ear mussel
24. Louisiana water thrush
25. Northern bobwhite
26. River otter
27. Paddlefish
28. Sauger
29. Spotted darter
30. Northern slimy salamander
31. Longtail salamander
32. Cave animal/Cave millipede/cave invertebrate
33. Cave salamander
34. Smoky shrew
35. Pygmy shrew
36. Ohio pigtoe mussel
37. Bobcat? It is more of a forest farmland mix
  - I don't think it's a good indicator species, their niche breadth is too wide
  - If you start modeling it away from urban landscapes, it may not be clear
38. Racer might actually be statewide but might sort out differently by region, this species will show up across the state, if you don't want to have at least some species that are state wide, that we envision have some common species.... It provides an example of something where you can be in an area where it used to occur
39. Eastern chipmunk, good indicator of how well oak hickory is doing
40. Turkey? Does it get into the oak?
  - They certainly eat acorns, I don't know if their populations have been shown to respond to oak increase
41. Lake sturgeon

### **Additions/subtractions**

- A. Region 1
- B. Region 2
- C. Region 3
- D. Region 4
  - 1. Add beavers for region 4
- A. Region 5
  - 1. Beavers
  - 2. General comments
  - 3. Add racer to every section
  - 4. Participant about what another was looking at in red bat, he wanted to look at forest bat, but says northern (long eared) would be better
  - 5. Beavers have a lot of back water, lot of amphibians

## Focus Group 2 Flip Chart Species

Species	SGCN	Class	Taxon	Region 1	Region 2	Region 3	Region 4	Region 5	Comments
Alder Flycatcher	No	Terrestrial	Birds	1	0	0	0	0	
Black Tern	Yes	Terrestrial	Birds	1	0	0	0	0	
Blanding's Turtle	Yes	Terrestrial	Reptiles	1	1	0	0	0	May have a slower dispersal rate than ideal indicator species
Blue-spotted Salamander	Yes	Terrestrial	Amphibians	1	0	0	0	0	Question about meeting criteria, actual identification may be hard because of hybrids
Bobcat	No	Terrestrial	Mammals	1	0	0	1	0	Maybe not a good indicator species
Bobolink	No	Terrestrial	Birds	1	0	0	0	0	
Common Gallinule	Yes	Terrestrial	Birds	1	0	0	0	0	
Eastern Massasauga	Yes	Terrestrial	Reptiles	1	1	0	0	0	
Ellipse	Yes	Aquatic	Mussels	1	0	0	0	0	
Field Sparrow	No	Terrestrial	Birds	1	0	0	0	0	
Franklin's Ground Squirrel	Yes	Terrestrial	Mammals	1	1	1	0	0	Restricted in Region 1
Golden-winged Warbler	Yes	Terrestrial	Birds	1	0	0	0	0	Park service monitoring
Greater Redhorse	Yes	Aquatic	Fish	1	0	0	0	0	
Least Flycatcher	No	Terrestrial	Birds	1	0	0	0	0	
Marsh Wren	Yes	Terrestrial	Birds	1	0	0	0	0	
Northern Bobwhite	No	Terrestrial	Birds	1	1	1	1	1	Question about meeting criteria, could also use Grasshopper Sparrow in Region 2
Northern Leopard Frog	Yes	Terrestrial	Amphibians	1	1	1	0	0	Could also use plains leopard frog in Region 2, group seemed to be leaning towards this species in region 2, may be affected by

									pollution
<b>Northern Pike</b>	No	Aquatic	Fish	1	0	0	0	0	
<b>Northern Waterthrush</b>	No	Terrestrial	Birds	1	0	0	0	0	
<b>Racer</b>	No	Terrestrial	Reptiles	1	1	1	1	1	Brought up for it's state-wide ability
<b>Red Bat</b>	Yes	Terrestrial	Mammals	1	1	1	1	1	
<b>Red-eyed Vireo</b>	No	Terrestrial	Birds	1	0	0	0	0	
<b>Red-headed Woodpecker</b>	No	Terrestrial	Birds	1	1	0	0	0	
<b>River Otter</b>	No	Terrestrial	Mammals	1	1	0	0	1	
<b>Sandhill Crane</b>	Yes	Terrestrial	Birds	1	1	0	0	0	
<b>Southern Bog Lemming</b>	No	Terrestrial	Mammals	1	0	0	0	0	Question about meeting criteria
<b>Star-nosed Mole</b>	Yes	Terrestrial	Mammals	1	0	0	0	0	Question about meeting criteria
<b>Veery</b>	No	Terrestrial	Birds	1	0	0	0	0	
<b>White-tailed Deer</b>	No	Terrestrial	Mammals	1	0	0	0	0	Question about meeting criteria
<b>Wood Thrush</b>	No	Terrestrial	Birds	1	0	0	1	1	
<b>Allegheny Woodrat</b>	Yes	Terrestrial	Mammals	0	0	0	0	1	
<b>American Beaver</b>	No	Terrestrial	Mammals	0	0	0	1	1	Added after discussion/during final comments
<b>American Golden-plover</b>	Yes	Terrestrial	Birds	0	0	1	0	0	Maybe not good indicator because only uses IN as stopover habitat
<b>American Woodcock</b>	No	Terrestrial	Birds	0	0	0	1	0	
<b>Badger</b>	Yes	Terrestrial	Mammals	0	1	0	0	0	
<b>Bald Eagle</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Bell's Vireo</b>	No	Terrestrial	Birds	0	1	0	0	0	
<b>Black Rat Snake</b>	No	Terrestrial	Reptiles	0	0	1	0	0	
<b>Blue Sucker</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Bluebreast Darter</b>	No	Aquatic	Fish	0	0	1	0	0	
<b>Bullsnake</b>	No	Terrestrial	Reptiles	0	1	0	0	0	
<b>Butterfly</b>	Unknown	Terrestrial	Invertebrates	0	0	1	0	0	Need a species associated with glades
<b>Cave Millipede</b>	Yes	Terrestrial	Invertebrates	0	0	0	0	1	
<b>Cave Salamander</b>	No	Terrestrial	Amphibians	0	0	0	0	1	
<b>Cerulean Warbler</b>	Yes	Terrestrial	Birds	0	0	1	1	1	



<b>Channel Catfish</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Clubshell</b>	Yes	Aquatic	Mussels	0	0	1	0	0	
<b>Copperbelly Water Snake</b>	Yes	Terrestrial	Reptiles	0	0	1	1	0	Southern part of Region 3
<b>Crawfish Frog</b>	Yes	Terrestrial	Amphibians	0	0	0	1	0	
<b>Dickcissel</b>	No	Terrestrial	Birds	0	0	0	1	0	
<b>Eastern Box Turtle</b>	Yes	Terrestrial	Reptiles	0	0	0	1	1	
<b>Eastern Chipmunk</b>	No	Terrestrial	Mammals	0	0	0	0	1	
<b>Eastern Gray Squirrel</b>	No	Terrestrial	Mammals	0	0	1	0	0	
<b>Eastern Sand Darter</b>	No	Aquatic	Fish	0	0	1	0	0	
<b>Eastern Spadefoot</b>	No	Terrestrial	Amphibians	0	0	0	1	1	
<b>Eastern Whip-poor-will</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Elephantear</b>	No	Aquatic	Mussels	0	0	0	0	1	
<b>Fat Pocketbook</b>	Yes	Aquatic	Mussels	0	0	0	1	0	
<b>Flier</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Grasshopper Sparrow</b>	No	Terrestrial	Birds	0	1	0	0	0	Alternative to Northern Bobwhite in Region 2
<b>Green Salamander</b>	Yes	Terrestrial	Amphibians	0	0	0	0	1	
<b>Hellbender</b>	Yes	Aquatic	Amphibians	0	0	0	0	1	
<b>Henslow's Sparrow</b>	Yes	Terrestrial	Birds	0	1	1	0	0	
<b>Hooded Warbler</b>	Yes	Terrestrial	Birds	0	0	0	1	1	
<b>Indiana Myotis</b>	Yes	Terrestrial	Mammals	0	1	1	1	1	Myotis spp. May not be good indicator species because of white-nose effects
<b>Kentucky Warbler</b>	No	Terrestrial	Birds	0	0	1	0	0	
<b>Kidneyshell</b>	Yes	Aquatic	Mussels	0	0	1	0	0	
<b>King Rail</b>	Yes	Terrestrial	Birds	0	0	0	1	0	
<b>Kirtland's Snake</b>	Yes	Terrestrial	Reptiles	0	0	1	0	0	Not easy to monitor
<b>Lake Sturgeon</b>	Yes	Aquatic	Fish	0	0	0	0	1	
<b>Lark Sparrow</b>	No	Terrestrial	Birds	0	1	0	0	0	
<b>Least Tern</b>	Yes	Terrestrial	Birds	0	0	0	1	0	
<b>Little Brown Myotis</b>	Yes	Terrestrial	Mammals	0	1	1	1	1	Myotis spp. May not be good indicator species because of white-nose effects
<b>Loggerhead Shrike</b>	Yes	Terrestrial	Birds	0	0	0	1	0	

<b>Longtail Salamander</b>	No	Terrestrial	Amphibians	0	0	0	0	1	
<b>Louisiana Waterthrush</b>	No	Terrestrial	Birds	0	0	0	0	1	
<b>Northern Brook Lamprey</b>	Yes	Aquatic	Fish	0	1	0	0	0	Covers different stream size than river red horse
<b>Northern Cavefish</b>	Yes	Aquatic	Fish	0	0	0	0	1	
<b>Northern Copperhead</b>	No	Terrestrial	Reptiles	0	0	0	0	1	Covers more area than timber rattlesnake in region 5
<b>Northern Cricket Frog</b>	Yes	Terrestrial	Amphibians	0	0	1	1	0	Region 3, may not be the best species, proposed gray ratsnake as an alternative herp
<b>Northern Harrier</b>	Yes	Terrestrial	Birds	0	1	0	1	0	
<b>Northern Hogsucker</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Northern Long-eared Myotis</b>	Yes	Terrestrial	Mammals	0	1	1	1	1	Myotis spp. May not be good indicator species because of white-nose effects
<b>Northern Parula</b>	No	Terrestrial	Birds	0	0	0	1	0	
<b>Northern Slimy Salamander</b>	No	Terrestrial	Amphibians	0	0	0	0	1	
<b>Ohio Pigtoe</b>	Yes	Aquatic	Mussels	0	0	0	0	1	
<b>Ovenbird</b>	No	Terrestrial	Birds	0	0	0	0	1	
<b>Paddlefish</b>	No	Aquatic	Fish	0	0	0	0	1	
<b>Peregrine Falcon</b>	Yes	Terrestrial	Birds	0	0	1	0	0	
<b>Pileated Woodpecker</b>	No	Terrestrial	Birds	0	0	0	1	1	
<b>Plains Leopard Frog</b>	Yes	Terrestrial	Amphibians	0	1	0	0	0	Could also use northern leopard frog in Region 2, group seemed to be leaning towards northern leopard frog in region 2
<b>Plains Pocket Gopher</b>	Yes	Terrestrial	Mammals	0	1	0	0	0	
<b>Pollinators</b>	Unknown	Terrestrial	Invertebrates	0	0	1	0	0	Honeybees?
<b>Prairie Warbler</b>	No	Terrestrial	Birds	0	0	0	0	1	
<b>Pygmy Shrew</b>	Yes	Terrestrial	Mammals	0	0	0	0	1	
<b>Red-shouldered Hawk</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Redspotted Sunfish</b>	No	Aquatic	Fish	0	0	0	1	0	

<b>River Redhorse</b>	No	Aquatic	Fish	0	1	0	0	0	Covers different stream size than northern lamprey
<b>Ruffed Grouse</b>	No	Terrestrial	Birds	0	0	1	0	1	Question about meeting criteria
<b>Sauger</b>	No	Aquatic	Fish	0	0	1	0	1	
<b>Sedge Wren</b>	Yes	Terrestrial	Birds	0	1	0	0	0	Could also use Wilson's snipe in Region 2
<b>Short-eared Owl</b>	Yes	Terrestrial	Birds	0	1	0	0	0	
<b>Shovelnose Sturgeon</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Six-lined Racerunner</b>	No	Terrestrial	Reptiles	0	0	0	1	0	
<b>Smallmouth Bass</b>	No	Aquatic	Fish	0	0	1	0	0	
<b>Smith's Longspur</b>	No	Terrestrial	Birds	0	0	1	0	0	Maybe not good indicator because only uses IN as stopover habitat
<b>Smoky Shrew</b>	Yes	Terrestrial	Mammals	0	0	0	0	1	
<b>Southern Flying Squirrel</b>	No	Terrestrial	Mammals	0	0	1	1	0	
<b>Spotted Darter</b>	Yes	Aquatic	Fish	0	0	0	0	1	
<b>Spotted Salamander</b>	No	Terrestrial	Amphibians	0	0	0	1	0	
<b>Swamp Rabbit</b>	Yes	Terrestrial	Mammals	0	0	0	1	0	
<b>Threeridge</b>	No	Aquatic	Mussels	0	1	0	0	0	
<b>Timber Rattlesnake</b>	Yes	Terrestrial	Reptiles	0	0	0	0	1	
<b>Tri-colored Bat</b>	Yes	Terrestrial	Mammals	0	0	0	1	1	
<b>Two-lined Salamander</b>	No	Terrestrial	Amphibians	0	0	1	0	0	
<b>Virginia Rail</b>	Yes	Terrestrial	Birds	0	1	0	0	0	
<b>Weed Shiner</b>	No	Aquatic	Fish	0	1	0	0	0	
<b>Wild Turkey</b>	No	Terrestrial	Birds	0	0	0	0	1	Question about meeting criteria
<b>Wilson's Snipe</b>	No	Terrestrial	Birds	0	1	0	0	0	Could also use sedge wren in Region 2
<b>Wood Duck</b>	No	Terrestrial	Birds	0	1	0	0	0	
<b>Wood Frog</b>	No	Terrestrial	Amphibians	0	0	1	1	1	
<b>Worm-eating Warbler</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Yellow-throated Warbler</b>	No	Terrestrial	Birds	0	0	0	1	0	

Species	SGCN	Class	Taxon	Region 1	Region 2	Region 3	Region 4	Region 5	Comments
Alder Flycatcher	No	Terrestrial	Birds	1	0	0	0	0	
Black Tern	Yes	Terrestrial	Birds	1	0	0	0	0	
Blanding's Turtle	Yes	Terrestrial	Reptiles	1	1	0	0	0	May have a slower dispersal rate than ideal indicator species
Blue-spotted Salamander	Yes	Terrestrial	Amphibians	1	0	0	0	0	Question about meeting criteria, actual identification may be hard because of hybrids
Bobcat	No	Terrestrial	Mammals	1	0	0	1	0	Maybe not a good indicator species
Bobolink	No	Terrestrial	Birds	1	0	0	0	0	
Common Gallinule	Yes	Terrestrial	Birds	1	0	0	0	0	
Eastern Massasauga	Yes	Terrestrial	Reptiles	1	1	0	0	0	
Ellipse	Yes	Aquatic	Mussels	1	0	0	0	0	
Field Sparrow	No	Terrestrial	Birds	1	0	0	0	0	
Franklin's Ground Squirrel	Yes	Terrestrial	Mammals	1	1	1	0	0	Restricted in Region 1
Golden-winged Warbler	Yes	Terrestrial	Birds	1	0	0	0	0	Park service monitoring
Greater Redhorse	Yes	Aquatic	Fish	1	0	0	0	0	
Least Flycatcher	No	Terrestrial	Birds	1	0	0	0	0	
Marsh Wren	Yes	Terrestrial	Birds	1	0	0	0	0	
Northern Bobwhite	No	Terrestrial	Birds	1	1	1	1	1	Question about meeting criteria, could also use Grasshopper Sparrow in Region 2
Northern Leopard Frog	Yes	Terrestrial	Amphibians	1	1	1	0	0	Could also use plains leopard frog in Region 2, group seemed to be leaning towards this species in region 2, may be affected by pollution
Northern Pike	No	Aquatic	Fish	1	0	0	0	0	
Northern Waterthrush	No	Terrestrial	Birds	1	0	0	0	0	
Racer	No	Terrestrial	Reptiles	1	1	1	1	1	Brought up for it's state-wide ability
Red Bat	Yes	Terrestrial	Mammals	1	1	1	1	1	
Red-eyed Vireo	No	Terrestrial	Birds	1	0	0	0	0	
Red-headed Woodpecker	No	Terrestrial	Birds	1	1	0	0	0	
River Otter	No	Terrestrial	Mammals	1	1	0	0	1	

<b>Sandhill Crane</b>	Yes	Terrestrial	Birds	1	1	0	0	0	
<b>Southern Bog Lemming</b>	No	Terrestrial	Mammals	1	0	0	0	0	Question about meeting criteria
<b>Star-nosed Mole</b>	Yes	Terrestrial	Mammals	1	0	0	0	0	Question about meeting criteria
<b>Veery</b>	No	Terrestrial	Birds	1	0	0	0	0	
<b>White-tailed Deer</b>	No	Terrestrial	Mammals	1	0	0	0	0	Question about meeting criteria
<b>Wood Thrush</b>	No	Terrestrial	Birds	1	0	0	1	1	
<b>Allegheny Woodrat</b>	Yes	Terrestrial	Mammals	0	0	0	0	1	
<b>American Beaver</b>	No	Terrestrial	Mammals	0	0	0	1	1	Added after discussion/during final comments
<b>American Golden-plover</b>	Yes	Terrestrial	Birds	0	0	1	0	0	Maybe not good indicator because only uses IN as stopover habitat
<b>American Woodcock</b>	No	Terrestrial	Birds	0	0	0	1	0	
<b>Badger</b>	Yes	Terrestrial	Mammals	0	1	0	0	0	
<b>Bald Eagle</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Bell's Vireo</b>	No	Terrestrial	Birds	0	1	0	0	0	
<b>Black Rat Snake</b>	No	Terrestrial	Reptiles	0	0	1	0	0	
<b>Blue Sucker</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Bluebreast Darter</b>	No	Aquatic	Fish	0	0	1	0	0	
<b>Bullsnake</b>	No	Terrestrial	Reptiles	0	1	0	0	0	
<b>Butterfly</b>	Unknown	Terrestrial	Invertebrates	0	0	1	0	0	Need a species associated with glades
<b>Cave Millipede</b>	Yes	Terrestrial	Invertebrates	0	0	0	0	1	
<b>Cave Salamander</b>	No	Terrestrial	Amphibians	0	0	0	0	1	
<b>Cerulean Warbler</b>	Yes	Terrestrial	Birds	0	0	1	1	1	
<b>Channel Catfish</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Clubshell</b>	Yes	Aquatic	Mussels	0	0	1	0	0	
<b>Copperbelly Watersnake</b>	Yes	Terrestrial	Reptiles	0	0	1	1	0	Southern part of Region 3
<b>Crawfish Frog</b>	Yes	Terrestrial	Amphibians	0	0	0	1	0	
<b>Dickcissel</b>	No	Terrestrial	Birds	0	0	0	1	0	
<b>Eastern Box Turtle</b>	Yes	Terrestrial	Reptiles	0	0	0	1	1	
<b>Eastern Chipmunk</b>	No	Terrestrial	Mammals	0	0	0	0	1	
<b>Eastern Gray Squirrel</b>	No	Terrestrial	Mammals	0	0	1	0	0	
<b>Eastern Sand Darter</b>	No	Aquatic	Fish	0	0	1	0	0	
<b>Eastern Spadefoot</b>	No	Terrestrial	Amphibians	0	0	0	1	1	
<b>Eastern Whip-poor-will</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Elephantear</b>	No	Aquatic	Mussels	0	0	0	0	1	

<b>Fat Pocketbook</b>	Yes	Aquatic	Mussels	0	0	0	1	0	
<b>Flier</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Grasshopper Sparrow</b>	No	Terrestrial	Birds	0	1	0	0	0	Alternative to Northern Bobwhite in Region 2
<b>Green Salamander</b>	Yes	Terrestrial	Amphibians	0	0	0	0	1	
<b>Hellbender</b>	Yes	Aquatic	Amphibians	0	0	0	0	1	
<b>Henslow's Sparrow</b>	Yes	Terrestrial	Birds	0	1	1	0	0	
<b>Hooded Warbler</b>	Yes	Terrestrial	Birds	0	0	0	1	1	
<b>Indiana Myotis</b>	Yes	Terrestrial	Mammals	0	1	1	1	1	Myotis spp. May not be good indicator species because of white-nose effects
<b>Kentucky Warbler</b>	No	Terrestrial	Birds	0	0	1	0	0	
<b>Kidneyshell</b>	Yes	Aquatic	Mussels	0	0	1	0	0	
<b>King Rail</b>	Yes	Terrestrial	Birds	0	0	0	1	0	
<b>Kirtland's Snake</b>	Yes	Terrestrial	Reptiles	0	0	1	0	0	Not easy to monitor
<b>Lake Sturgeon</b>	Yes	Aquatic	Fish	0	0	0	0	1	
<b>Lark Sparrow</b>	No	Terrestrial	Birds	0	1	0	0	0	
<b>Least Tern</b>	Yes	Terrestrial	Birds	0	0	0	1	0	
<b>Little Brown Myotis</b>	Yes	Terrestrial	Mammals	0	1	1	1	1	Myotis spp. May not be good indicator species because of white-nose effects
<b>Loggerhead Shrike</b>	Yes	Terrestrial	Birds	0	0	0	1	0	
<b>Longtail Salamander</b>	No	Terrestrial	Amphibians	0	0	0	0	1	
<b>Louisiana Waterthrush</b>	No	Terrestrial	Birds	0	0	0	0	1	
<b>Northern Brook Lamprey</b>	Yes	Aquatic	Fish	0	1	0	0	0	Covers different stream size than river red horse
<b>Northern Cavefish</b>	Yes	Aquatic	Fish	0	0	0	0	1	
<b>Northern Copperhead</b>	No	Terrestrial	Reptiles	0	0	0	0	1	Covers more area than timber rattlesnake in region 5
<b>Northern Cricket Frog</b>	Yes	Terrestrial	Amphibians	0	0	1	1	0	Region 3, may not be the best species, proposed gray ratsnake as an alternative herp
<b>Northern Harrier</b>	Yes	Terrestrial	Birds	0	1	0	1	0	
<b>Northern Hogsucker</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Northern Long-eared Myotis</b>	Yes	Terrestrial	Mammals	0	1	1	1	1	Myotis spp. May not be good indicator species because of white-nose effects
<b>Northern Parula</b>	No	Terrestrial	Birds	0	0	0	1	0	
<b>Northern Slimy Salamander</b>	No	Terrestrial	Amphibians	0	0	0	0	1	
<b>Ohio Pigtoe</b>	Yes	Aquatic	Mussels	0	0	0	0	1	

<b>Ovenbird</b>	No	Terrestrial	Birds	0	0	0	0	1	
<b>Paddlefish</b>	No	Aquatic	Fish	0	0	0	0	1	
<b>Peregrine Falcon</b>	Yes	Terrestrial	Birds	0	0	1	0	0	
<b>Pileated Woodpecker</b>	No	Terrestrial	Birds	0	0	0	1	1	
<b>Plains Leopard Frog</b>	Yes	Terrestrial	Amphibians	0	1	0	0	0	Could also use northern leopard frog in Region 2, group seemed to be leaning towards northern leopard frog in region 2
<b>Plains Pocket Gopher</b>	Yes	Terrestrial	Mammals	0	1	0	0	0	
<b>Pollinators</b>	Unknown	Terrestrial	Invertebrates	0	0	1	0	0	Honeybees?
<b>Prairie Warbler</b>	No	Terrestrial	Birds	0	0	0	0	1	
<b>Pygmy Shrew</b>	Yes	Terrestrial	Mammals	0	0	0	0	1	
<b>Red-shouldered Hawk</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Redspotted Sunfish</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>River Redhorse</b>	No	Aquatic	Fish	0	1	0	0	0	Covers different stream size than northern lamprey
<b>Ruffed Grouse</b>	No	Terrestrial	Birds	0	0	1	0	1	Question about meeting criteria
<b>Sauger</b>	No	Aquatic	Fish	0	0	1	0	1	
<b>Sedge Wren</b>	Yes	Terrestrial	Birds	0	1	0	0	0	Could also use Wilson's snipe in Region 2
<b>Short-eared Owl</b>	Yes	Terrestrial	Birds	0	1	0	0	0	
<b>Shovelnose Sturgeon</b>	No	Aquatic	Fish	0	0	0	1	0	
<b>Six-lined Racerunner</b>	No	Terrestrial	Reptiles	0	0	0	1	0	
<b>Smallmouth Bass</b>	No	Aquatic	Fish	0	0	1	0	0	
<b>Smith's Longspur</b>	No	Terrestrial	Birds	0	0	1	0	0	Maybe not good indicator because only uses IN as stopover habitat
<b>Smoky Shrew</b>	Yes	Terrestrial	Mammals	0	0	0	0	1	
<b>Southern Flying Squirrel</b>	No	Terrestrial	Mammals	0	0	1	1	0	
<b>Spotted Darter</b>	Yes	Aquatic	Fish	0	0	0	0	1	
<b>Spotted Salamander</b>	No	Terrestrial	Amphibians	0	0	0	1	0	
<b>Swamp Rabbit</b>	Yes	Terrestrial	Mammals	0	0	0	1	0	
<b>Threeridge</b>	No	Aquatic	Mussels	0	1	0	0	0	
<b>Timber Rattlesnake</b>	Yes	Terrestrial	Reptiles	0	0	0	0	1	
<b>Tri-colored Bat</b>	Yes	Terrestrial	Mammals	0	0	0	1	1	
<b>Two-lined Salamander</b>	No	Terrestrial	Amphibians	0	0	1	0	0	
<b>Virginia Rail</b>	Yes	Terrestrial	Birds	0	1	0	0	0	
<b>Weed Shiner</b>	No	Aquatic	Fish	0	1	0	0	0	

<b>Wild Turkey</b>	No	Terrestrial	Birds	0	0	0	0	1	Question about meeting criteria
<b>Wilson's Snipe</b>	No	Terrestrial	Birds	0	1	0	0	0	Could also use sedge wren in Region 2
<b>Wood Duck</b>	No	Terrestrial	Birds	0	1	0	0	0	
<b>Wood Frog</b>	No	Terrestrial	Amphibians	0	0	1	1	1	
<b>Worm-eating Warbler</b>	Yes	Terrestrial	Birds	0	0	0	0	1	
<b>Yellow-throated Warbler</b>	No	Terrestrial	Birds	0	0	0	1	0	



	Region 1	Region 2	Region 3	Region 4	Region 5
<b>Habitat types of interest</b>	Dunes/Swales	Forests	Appalachian, low-elevation mixed forests	Abandoned mines	Barrens
	Eastern wetland/Lake complexes	Kankakee River	Barrens	Canebreaks	Caves/Karst-sinkholes
	Forests (in western area)	Natural Lakes	Caves	Cypress swamps	Cliffs/rock outcrops
	Grasslands	Pgrassy/Herbaceous wetlands	Cropland	Flatwoods	Glades
	Lake Michigan	Prairies/Grasslands	Forests	Forests	Grasslands
	Riverine	Savannahs	Prairies	Grasslands (reclaimed)	Hardwood forests
	Savannahs	Swamps	Riverine (Wabash and interior)	Lakes/ponds experiencing acid drainage	Reservoirs
	Wetlands - woody		Siltstone glades	Oxbows/Sloughs/River bottoms	Rivers
			Wetlands - ephemeral	Riparian zones	Shrub/Scrub
			Wetlands - woody	Riverine	Wetlands - Woody
				Shrub/Scrub	
				Wetlands - emergent	
			Wetlands - woody		
<b>Conservation Actions</b>	Control forest pests	Altered disturbance regimes	Cat control	Alter disturbance regime (grasslands)	Create forest openings
	Control invasives	Change hydrology/drainage	Corridor enhancement	Corridor enhancement (including river connectivity)	Deer management
	Restore prairie/savannah	Improve soil health through covercrops/tilling practices	CRP projects	Ditch maintenance	Improve soil health through covercrops/tilling practices
	Corridor enhancement	Manage invasive species	Deer management	Improve soil health through covercrops/tilling practices	Improve water quality (especially for caves/drainage)
	CRP partnerships	Preserve forests	Drainage management	Improve water quality	Land acquisition
	Deer management	Reduce conversion to cropland	Forest management	Mine reclamation	Manage forests
	Ditch maintenance	Restore Kankakee river	Green infrastructure	Preserve forests	Manage invasive species
	Drainage management	Restore prairie/savannah	Improve soil health through covercrops/tilling practices	Preserve woody bottomlands	Nutrient management
Expand		Improve water quality	Restore oxbows	Preserve forests	

classified forest proram				
Improve water quality		Land acquisition	Restore wetlands	Protect recharge areas
Improve soil health through covercrops/tilling practices		Mangage prairie biofuels (switchgrass)		Reduce fragmentation
Promote a diversity of forest types		Preserve forests		Resetablish fire regimes
Reduce fragmentation		Reduce fragmentation		
Restrict recreational overuse (i.e. high speed boating)		Reforestation		

## Focus Group 2 Protocol

### Indiana SWAP Focus Group 2 Protocol

For project titled *Integrating Ecological, Landscape and Social Information for Wildlife Conservation and Management in Indiana*

#### **GREETINGS/INTRODUCTION/GROUND RULES – 10 minutes**

- Welcome and thank you for taking the time to participate in this focus group meeting
- Project team introductions (Note: The same handout used in Focus Group 1 with our contact information added will be distributed before the meeting starts.)

PI: Pat Zollner

Co-PI: Rob Chapman, Vanessa Quinn, Zhao Ma

Research Assistants: Rita Blythe, Colleen Hartel

- Project/focus group introductions (with potential verbiage to use)

*As many of you may know, a few of us from Purdue contracted with the Division of Fish and Wildlife to prepare the 2015 State Wildlife Action Plan for Indiana. Through the next few months, we will be working closely with the Division to engage conservation professionals throughout the state and to collect and update wildlife species and habitat information.*

*Today, our goal is to solicit your professional inputs and to **create a pool of 15 to 20 candidate indicator species for each of the five planning regions in Indiana in order to build some landscape-level habitat models.** This focus group meeting will last till about 2 pm, with a 40-minute lunch break around noon. We will begin with a brief presentation of background information on landscape-level habitat models and the purpose of indicator species by Dr. Pat Zollner. We will then go through five segments, each focusing on a common set of three questions.*

*At the end of today, we hope to be able to create a pool of candidate indicator species for each planning region, and we will then solicit feedback on these candidate indicator species from the broader community of technical experts in each planning region in an upcoming internet survey later this month. Eventually, we hope to identify three to seven indicator species that best represent the needs of SGCN for each planning region.*

- Participant introductions (with potential verbiage to use)

*Before we get started, let's go around and have everyone in the room briefly introduce him/herself. Just your name and organization will be fine.*

*Thank you. We would also like to ask for your permission to audio record our meeting, so we won't miss any important ideas you offer. The recording will be used only for the purpose of updating Indiana's State Wildlife Action Plan. Only the project team has access to the recording, and no comments will be attributed to specific individuals in any future reports. Please let us know at this time if you do not feel comfortable with us recording our discussion (Note: The facilitator needs to look around the room for consent and if everyone seems to be ok, make sure to conclude that everyone seems ok and we will get started. The facilitator turns on the recorder).*

- Ground rules (with potential verbiage to use)

o Time duration – *We hope to go through Regions 1 to 3 this morning and Regions 4 to 5 this afternoon, so time is somewhat limited. Please help keep the discussion going at a good pace.*

- Breaks – *If you need to use the restroom at any time during the discussion please feel free to do so. The restrooms are located...*
- Refreshments/lunch – *We have (some cookies and drinks) for everybody. Please feel free to help yourself at any time to the refreshments during the course of our discussion. We will take a 40-minute lunch break, and lunch will be provided here in this room.*
- Concluding comments – *Remember that there are no right or wrong answers, and we expect to hear a wide variety of opinions today. Please feel free to share your ideas. We are eager to hear from everyone in the room.*

### **TOPIC 1 – Introduction to indicator species and landscape-level habitat modeling process – 60 minutes**

*Now, I am going to turn to Dr. Pat Zollner for an introduction of the concept of indicator species and the landscape-level habitat modeling process. We will then discuss two questions about the indicator species selection process itself and the subsequent process of synthesizing landscape-level habitat modeling results across indicator species.*

#### **Presentation given by Dr. Pat Zollner (15 minutes)**

1. Based on Dr. Zollner's presentation and what you read in the handouts that we distributed prior to today's meeting, what are your comments and/or concerns with respect to the indicator species selection process that was described to you? (30 minutes)

*Let's move beyond selecting and modeling individual indicator species. After selecting a set of indicator species for each planning region and modeling the response of each indicator species to potential conservation action scenarios, we will then need to integrate the responses of all indicator species in a region into a synthesized perspective to help evaluate the relative effectiveness of potential conservation actions on habitat/land use conditions across the region. We are still considering a variety of formulations for synthesizing model results across indicator species.*

2. What ideas, comments, and/or suggestions do you have that can help us determine the best way to synthesizing model results across indicator species? (15 minutes)

### **TOPIC 2 – Identification of candidate indicator species for each planning region in Indiana – 240 minutes**

*Now, I want to switch gears and start talking about candidate indicator species for each planning region in Indiana. We have three questions for each region and we will greatly appreciate ideas, comments, and suggestions from those of you who have expertise in each region. However, if you are not from or work in a particular region, but have opinions about what should be considered as indicators species for that region, we also welcome your inputs. Let's start with the Great Lakes Watershed. We will move on to the Kankakee River Watershed and the Eastern Corn Belt Plains this morning, and finish the two planning regions in the Ohio River Watershed after lunch.*

**Region 1 – Great Lakes Watershed** (Note: Show Region 1 map on screen.)

1. Based on the map you see on the screen, what are the habitat types of interest in Region 1? We would like to have you help us identify the unique habitat types for the region and/or habitat types that are particularly important for wildlife and biodiversity in the region. (10 minutes)

2. To build landscape-level habitat models for a set of indicator species, we will need to develop a suite of conservation action scenarios for each planning region. Generally speaking, what do you see as major conservation actions that are being taken or that should be taken to conserve habitat types of interest we just identified within Region 1? (Note: The facilitator needs to write down conservation actions identified by participants on a flip chart. For the facilitator to keep in mind, relevant conservation actions may include restoring natural streams, increasing habitat patch sizes, controlling invasives, creating corridors, and reducing urban sprawl, while it would be hard to incorporate conservation actions that focus on economic incentives, education, and capacity building into a spatial model.) (10 minutes)

(3) Now, I want us to take a look at the list on the flip chart with all SGCN and representative species identified in the 2005 SWAP in Region 1. This list is also available in your Handout 2. Although we do not necessarily need to restrict our discussion to this list, we feel that this list does provide a good starting point for our discussion. Based on what you read in the handouts that we distributed prior to today's focus group, Dr. Zollner's presentation, and a summary of selection criteria on the screen, which of these species would you suggest to be used as indicator species for building landscape-level habitat models in Region 1? (20 minutes) (Note: The selection criteria should be shown on the screen to remind participants what they need to keep in mind. If participants start offering ideas, the facilitator will monitor the discussion to make sure everyone has an opportunity to speak. If no one offers any ideas, the facilitator could suggest participants going down the list together to eliminate species that obviously do not meet the selection criteria, and then focus on the remaining species to determine a pool of 15-20 candidate species.)

*Alright, we've come to agreeing to a pool of candidate indicator species for Region 1. Due to limited time, I would like to move us on to Region 2, the Kankakee River Watershed. We will be going through the same set of three questions as for Region 1. Are we ready to switch our mind out of the Great Lakes Watershed into the Kankakee River Watershed?*

## **Region 2 – Kankakee River Watershed** (Note: Show Region 2 map on screen.)

1. Based on the map you see on the screen, what are the habitat types of interest in Region 2? (10 minutes)

2. Generally speaking, what do you see as major threats to the habitat types of interest we just identified within Region 2 and what do you see as major conservation actions being taken or that should be taken to address these threats? (Note: The facilitator needs to write down threats and conservation actions identified by participants on a flip chart.) (10 minutes)

3. Now, I want us to take a look at the flip chart with all SGCN and representative species in Region 2. Again, we can use this list as our starting point. Based on the handouts, Dr. Zollner's presentation, and this summary of selection criteria, which of these species would you suggest to be used as indicator species for building landscape-level habitat models in Region 2? (20 minutes) (Note: The selection criteria should be shown on the screen to remind participants what they need to keep in mind. If participants start offering ideas, the facilitator will monitor the discussion to make sure everyone has an opportunity to speak. If no one offers any ideas, the facilitator could suggest participants going down the list together to eliminate species that obviously do not meet the selection criteria, and then focus on the remaining species to determine a pool of 15-20 candidate species.)

*Alright, thank you for your inputs on identifying candidate indicator species for Region 2. We will now move on to Region 3 and then we can have our lunch break. Region 3 is the Eastern Corn Belt Plains. We will again discuss three questions.*

**Region 3 – Eastern Corn Belt Plains** (Note: Show Region 3 map on screen.)

1. Based on this map, what are the habitat types of interest in Region 3? (10 minutes)
2. Generally speaking, what do you see as major threats to the habitat types of interest we just identified within Region 3 and what do you see as major conservation actions being taken or that should be taken to address these threats? (Note: The facilitator needs to write down threats and conservation actions identified by participants on a flip chart.) (10 minutes)
3. Please take a look at the flip chart with a list of SGCN and representative species in Region 3. Based on the handouts, Dr. Zollner's presentation, and this summary of selection criteria, which of these species would you suggest to be used as indicator species for building landscape-level habitat models in Region 3? (20 minutes) (Note: The selection criteria should be shown on the screen to remind participants what they need to keep in mind. If participants start offering ideas, the facilitator will monitor the discussion to make sure everyone has an opportunity to speak. If no one offers any ideas, the facilitator could suggest participants going down the list together to eliminate species that obviously do not meet the selection criteria, and then focus on the remaining species to determine a pool of 15-20 candidate species.)

*Alright, thank you for your inputs this morning. We will now take a 40-minute lunch break, and will reconvene at 12:40 to go through the last two planning regions this afternoon.*

*Thank you all for sticking around for this afternoon portion of our focus group meeting. We will go through our last two planning regions, both in the Ohio River Watershed. The first one is the Interior River Valleys and Hills, as shown on the screen here.*

**Region 4 – Ohio River Watershed: Interior River Valleys and Hills** (Note: Show Region 4 map on screen.)

1. Based on this map, what are the habitat types of interest in Region 4? (10 minutes)
2. Generally speaking, what do you see as major threats to the habitat types of interest we just identified within Region 4 and what do you see as major conservation actions being taken or that should be taken to address these threats? (Note: The facilitator needs to write down threats and conservation actions identified by participants on a flip chart.) (10 minutes)
3. Now, I want us to take a look at the species list on the flip chart. As I mentioned this morning, we do not necessarily need to restrict our discussion to this list, but this list can serve as a good starting point for our discussion. Based on the handouts you read prior to coming here today, Dr. Zollner's presentation this morning, and this summary of selection criteria, which of these species would you suggest to be used as indicator species for building landscape-level habitat models in Region 4? (20 minutes) (Note: The selection criteria should be shown on the screen to remind participants what they need to keep in mind. If participants start offering ideas, the facilitator will monitor the discussion to make sure everyone has an opportunity to speak. If no one offers any ideas, the facilitator could suggest participants going down the list together to eliminate species that obviously do not meet the selection criteria, and then focus on the remaining species to determine a pool of 15-20 candidate species.)

*Alright, thank you for your inputs on identifying candidate indicator species for Region 4. We will now move on to the last planning region with the same set of three questions.*

**Region 5 – Ohio River Watershed: Interior Plateau** (Note: Show Region 5 map on screen.)

1. Based on this map, what are the habitat types of interest in Region 5? (10 minutes)
2. Generally speaking, what do you see as major threats to the habitat types of interest we just identified within Region 5 and what do you see as major conservation actions being taken or that should be taken to address these threats? (Note: The facilitator needs to write down threats and conservation actions identified by participants on a flip chart.) (10 minutes)
3. Now, please take a look at the species list on the flip chart. Which of these species would you suggest to be used as indicator species for building landscape-level habitat models in Region 5? (20 minutes) (Note: The selection criteria should be shown on the screen to remind participants what they need to keep in mind. If participants start offering ideas, the facilitator will monitor the discussion to make sure everyone has an opportunity to speak. If no one offers any ideas, the facilitator could suggest participants going down the list together to eliminate species that obviously do not meet the selection criteria, and then focus on the remaining species to determine a pool of 15-20 candidate species.)

**FINAL REMARKS – 3 minutes**

*We've used up all our time today. On behalf of everyone involved in the 2015 SWAP process, I want to thank you all for your participation and great inputs. As I mentioned earlier, we will compile a list of candidate indicator species for each planning region based on our discussion today and this list will be used in an upcoming survey to solicit further feedback from the broader community of technical experts. Eventually, we will determine three to seven indicator species that best represent the needs of SGCN for each planning region. We will then develop landscape-level habitat models for these indicator species. If you have any additional thoughts that you would like to share with us, please feel free to contact us via email or phone. You can find our contact information in Handout 1 distributed earlier this morning. Thank you all very much again. Please take cookies with you on your way out.*