C. CORN BELT REGION

Great Lakes
Kankakee
● Corn Belt
Valleys and Hills
Interior Plateau
Drift Plains

Figure 6-11. Outline of the Corn Belt Region in Indiana for the SWAP.

Introduction

This section summarizes habitat conditions, threats to SGCN and their habitats, and conservation actions for species and habitats in the Corn Belt Region. This section also reviews land cover changes over the past decade and identifies unique habitat types in this region. Summaries of threats to and conservation actions for SGCN and their habitats that were generated from two surveys can be found at the end of this section.

In addition to the threats and actions identified in the Habitat Survey and the Species Survey, the DFW recognized the need to identify threats aligned with specific actions. Several threats and actions were identified as ubiquitous across all six regions. These include:

- **Habitat Loss:** Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)

- **Invasive Species:** Build external capacity (form and facilitate partnerships, alliances, and networks of organizations to address invasive species)

- **Law and Policy:** Develop, change, influence and help implement formal legislation, regulations and voluntary standards

- **Dams and Water Management and Use:** Remove unnecessary dams and utilize necessary dams with effective fish passage structures

The DFW also identified specific threats and actions for each SWAP region based on DFW priorities. These threats were identified due to their high level of relevancy to the specific region and the workability of the associated actions. These threats and actions for the Corn Belt Region include:

- **Habitat Fragmentation:** Preserve and restore habitat corridors

- **Natural System Modifications (Residential/Commercial Development):** Build external capacity by forming partnerships and networks, raising and providing funds, and resources to develop conservation-minded urban planning

Current Habitat Conditions

During the Species Survey, respondents were asked to identify SGCN within the Corn Belt Region. A full summary of the Species Survey results can be found in Appendix O.

Table 6-7. Distribution of SGCN across the Corn Belt Region.

Taxa	Scientific Name	Common Name
Amphibians	*Necturus maculosus*	Common Mudpuppy
Amphibians	*Ambystoma laterale*	Blue-spotted Salamander
Amphibians	*Hemidactylium scutatum*	Four-toed Salamander
Amphibians	*Acris blanchardi*	Blanchard's Cricket Frog
Amphibians	*Lithobates blairi*	Plains Leopard Frog
Birds	*Cygnus buccinator*	Trumpeter Swan
Birds	*Colinus virginianus*	Northern Bobwhite
Birds	*Chordeiles minor*	Common Nighthawk
Birds	*Antrostomus vociferus*	Eastern Whip-poor-will
Birds	*Laterallus jamaicensis*	Black Rail
Birds	*Rallus elegans*	King Rail
Birds	*Rallus limicola*	Virginia Rail
Birds	*Gallinula galeata*	Common Gallinule
Birds	*Grus canadensis*	Sandhill Crane
Birds	*Grus americana*	Whooping Crane
Birds	*Pluvialis dominica*	American Golden-plover
Birds	*Charadrius melodus*	Piping Plover
Birds	*Bartramia longicauda*	Upland Sandpiper
Birds	*Arenaria interpres*	Ruddy Turnstone
Birds	*Calidris subruficollis*	Buff-breasted Sandpiper
Birds	*Limnodromus griseus*	Short-billed Dowitcher
Birds	*Scolopax minor*	American Woodcock
Birds	*Tringa solitaria*	Solitary Sandpiper
Birds	*Tringa melanoleuca*	Greater Yellowlegs
Birds	*Phalaropus tricolor*	Wilson's Phalarope
Birds	*Sternula antillarum athalassos*	Interior Least Tern
Birds	*Chlidonias niger*	Black Tern
Birds	*Botaurus lentiginosus*	American Bittern
Birds	*Ixobrychus exilis*	Least Bittern
Birds	*Ardea alba*	Great Egret
Birds	*Nycticorax nycticorax*	Black-crowned Night-heron

Taxa	Scientific Name	Common Name
Birds	*Nyctanassa violacea*	Yellow-crowned Night-heron
Birds	*Pandion haliaetus*	Osprey
Birds	*Ictinia mississippiensis*	Mississippi Kite
Birds	*Haliaeetus leucocephalus*	Bald Eagle
Birds	*Circus cyaneus*	Northern Harrier
Birds	*Accipiter striatus*	Sharp-shinned Hawk
Birds	*Buteo platypterus*	Broad-winged Hawk
Birds	*Tyto alba*	Barn Owl
Birds	*Asio flammeus*	Short-eared Owl
Birds	*Falco peregrinus*	Peregrine Falcon
Birds	*Lanius ludovicianus*	Loggerhead Shrike
Birds	*Cistothorus platensis*	Sedge Wren
Birds	*Cistothorus palustris*	Marsh Wren
Birds	*Ammodramus henslowii*	Henslow's Sparrow
Birds	*Xanthocephalus xanthocephalus*	Yellow-headed Blackbird
Birds	*Sturnella neglecta*	Western Meadowlark
Birds	*Helmitheros vermivorum*	Worm-eating Warbler
Birds	*Vermivora chrysoptera*	Golden-winged Warbler
Birds	*Mniotilta varia*	Black-and-white Warbler
Birds	*Setophaga citrina*	Hooded Warbler
Birds	*Setophaga kirtlandii*	Kirtland's Warbler
Birds	*Setophaga cerulea*	Cerulean Warbler
Fish	*Ichthyomyzon fossor*	Northern Brook Lamprey
Fish	*Anguilla rostrata*	American Eel
Fish	*Clinostomus elongatus*	Redside Dace
Fish	*Coregonus artedi*	Cisco
Fish	*Moxostoma valenciennesi*	Greater Redhorse
Fish	*Percina evides*	Gilt Darter
Fish	*Etheostoma maculatum*	Spotted Darter
Mammals	*Condylura cristata*	Star-nosed Mole
Mammals	*Myotis lucifugus*	Little Brown Myotis
Mammals	*Myotis septentrionalis*	Northern Long-eared Myotis
Mammals	*Myotis sodalis*	Indiana Myotis
Mammals	*Lasionycteris noctivagans*	Silver-haired Bat
Mammals	*Perimyotis subflavus*	Tri-colored Bat
Mammals	*Nycticeius humeralis*	Evening Bat
Mammals	*Lasiurus borealis*	Eastern Red Bat
Mammals	*Lasiurus cinereus*	Hoary Bat
Mammals	*Spermophilus franklinii*	Franklin's Ground Squirrel
Mammals	*Geomys bursarius*	Plains Pocket Gopher
Mammals	*Mustela nivalis*	Least Weasel
Mammals	*Taxidea taxus*	American Badger

Taxa	Scientific Name	Common Name
Mollusks	*Cyprogenia stegaria*	Fanshell
Mollusks	*Epioblasma torulosa rangiana*	Northern Riffleshell
Mollusks	*Epioblasma triquetra*	Snuffbox
Mollusks	*Lampsilis fasciola*	Wavyrayed Lampmussel
Mollusks	*Obovaria subrotunda*	Round Hickorynut
Mollusks	*Plethobasus cyphyus*	Sheepnose
Mollusks	*Pleurobema clava*	Clubshell
Mollusks	*Ptychobranchus fasciolaris*	Kidneyshell
Mollusks	*Quadrula cylindrica cylindrica*	Rabbitsfoot
Mollusks	*Simpsonaias ambigua*	Salamander Mussel
Mollusks	*Toxolasma lividum*	Purple Lilliput
Mollusks	*Villosa fabalis*	Rayed Bean
Mollusks	*Villosa lienosa*	Little Spectaclecase
Mollusks	*Campeloma decisum*	Pointed Campeloma
Mollusks	*Lymnaea stagnalis*	Swamp Lymnaea
Reptiles	*Clemmys guttata*	Spotted Turtle
Reptiles	*Emydoidea blandingii*	Blanding's Turtle
Reptiles	*Terrapene carolina*	Eastern Box Turtle
Reptiles	*Terrapene ornata*	Ornate Box Turtle
Reptiles	*Pseudemys concinna*	River Cooter
Reptiles	*Thamnophis butleri*	Butler's Gartersnake
Reptiles	*Thamnophis proximus*	Western Ribbonsnake
Reptiles	*Nerodia erythrogaster neglecta*	Copper-bellied Watersnake
Reptiles	*Clonophis kirtlandii*	Kirtland's Snake
Reptiles	*Opheodrys aestivus*	Rough Greensnake
Reptiles	*Opheodrys vernalis*	Smooth Greensnake
Reptiles	*Cemophora coccinea*	Scarletsnake
Reptiles	*Tantilla coronata*	Southeastern Crowned Snake
Reptiles	*Farancia abacura*	Red-bellied Mudsnake
Reptiles	*Agkistrodon piscivorus*	Cottonmouth
Reptiles	*Sistrurus catenatus*	Eastern Massasauga
Reptiles	*Crotalus horridus*	Timber Rattlesnake

During the Habitat Survey, respondents were asked to evaluate the overall quality of fish and wildlife habitats in the Corn Belt Region (Fig. 6-12), estimate changes in overall quality since 2005 (Fig. 6-13), and predict changes in overall quality over the next ten years (Fig. 6-14). Each respondent was asked to respond for one or more of the eight major habitat types within the region, and results were aggregated at the regional level. A full list of these survey results can be found in Appendix P.
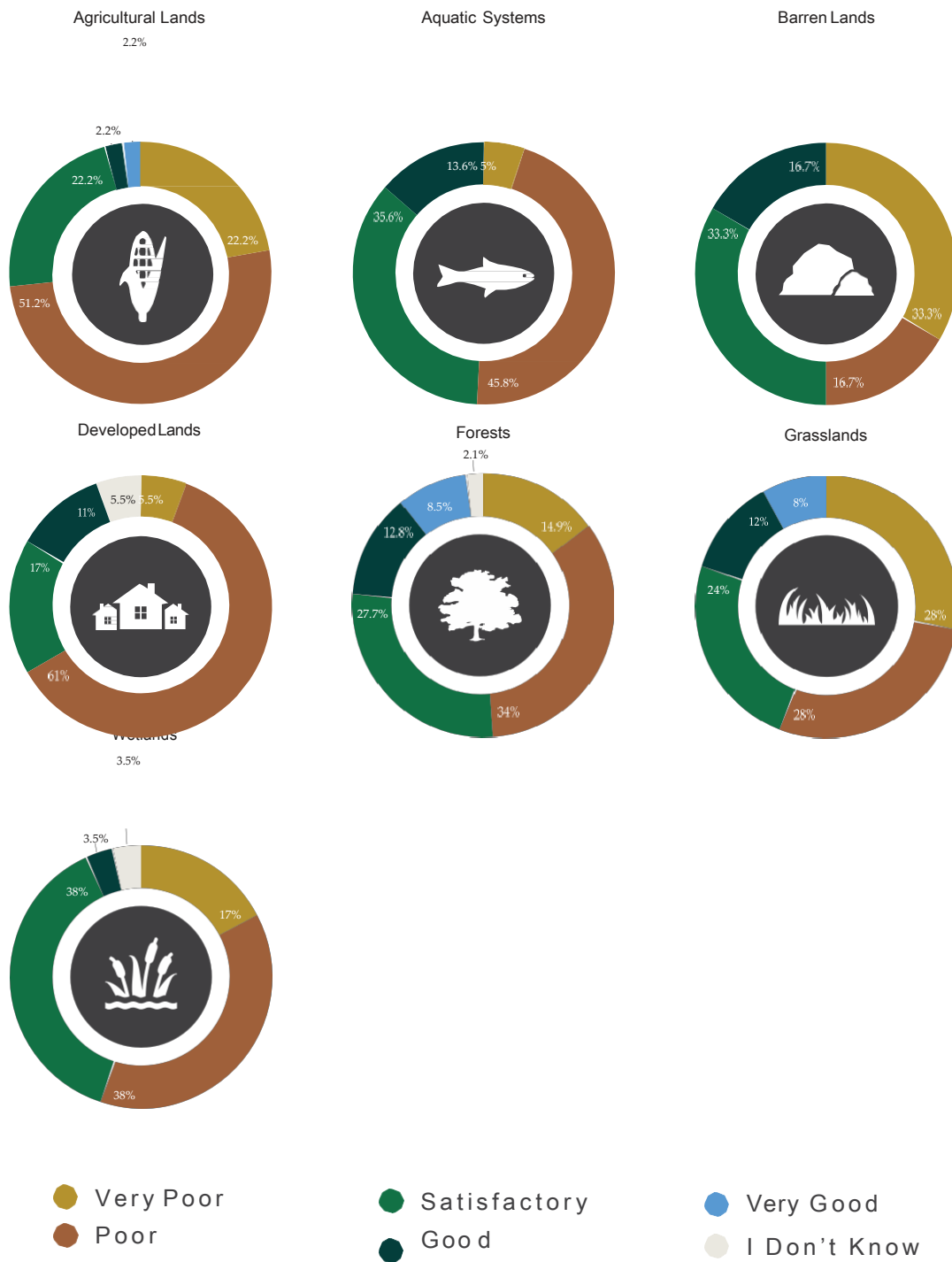
Agricultural Lands

Aquatic Systems

Barren Lands

Developed Lands

Forests

Grasslands

Wetlands

● Very Poor	● Satisfactory ● Very Good
● Poor	● Good ○ I Don't Know

Figure 6-12. Overall quality of fish and wildlife habitats in the Corn Belt Region in 2014.

Agricultural Lands

Aquatic Systems

OVERALL

Barren Lands

Developed Lands

Forests

Grasslands

Wetlands

Decreased
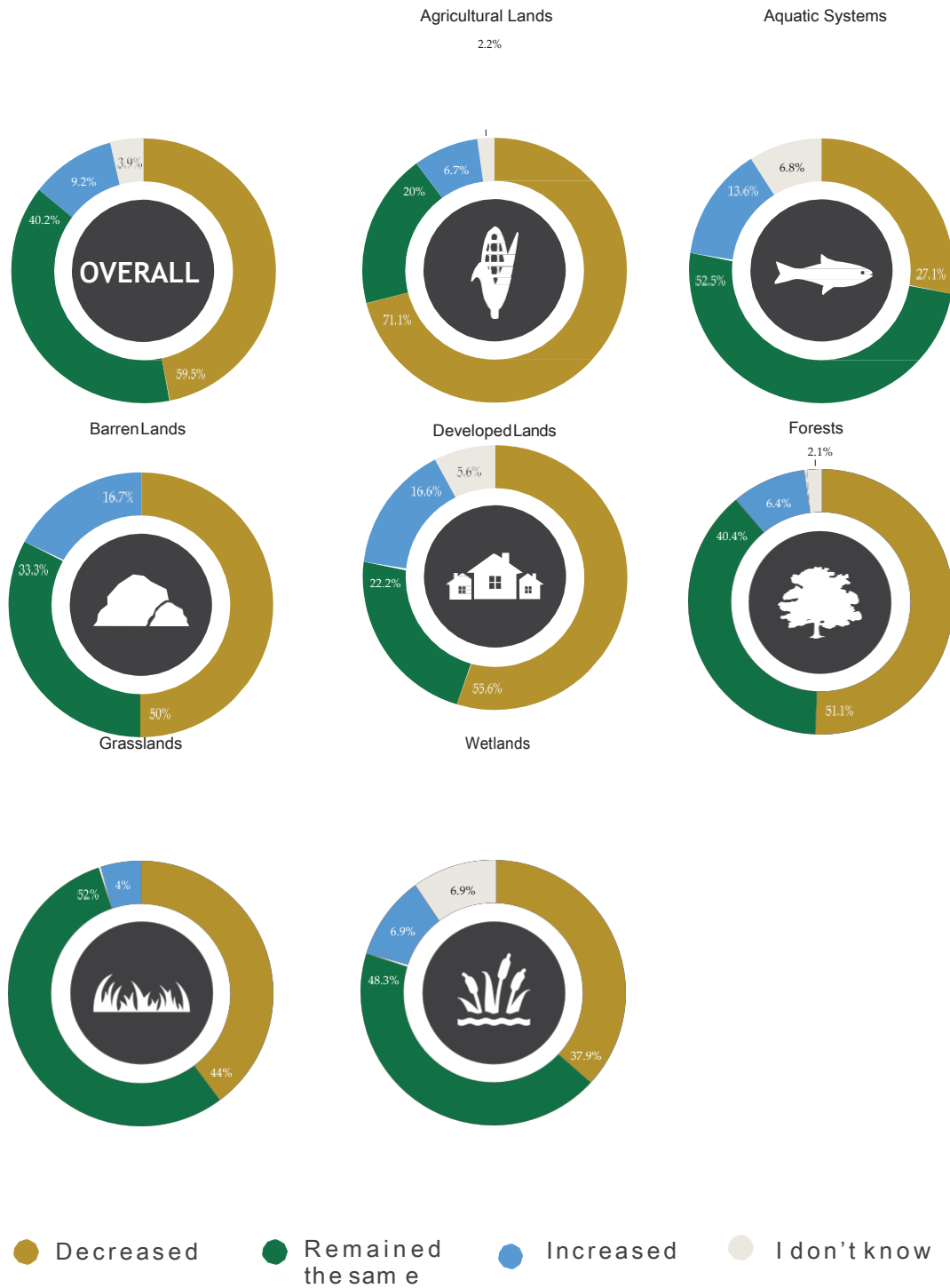Remained the same
Increased
I don't know

Figure 6-13. Estimated change in the overall quality of fish and wildlife habitats from 2005 to 2014 for each of the major habitat types in the Corn Belt Region.

Agricultural Lands

Aquatic Systems

OVERALL

4%
10.5%
26%
5954%

11.1%
13.3%
75.6%

6.9%
15.5%
31%
46.6%

Barren Lands

Developed Lands

Forests

66.7%
33.3%

5%
15%
20%
60%

6.4%
4.3%
27.7%
61.6%

Grasslands

Wetlands

8.3%
29.2%
62.5%

7%
10.3%
24.1%
58.6%

● Decreased   ● Remained the same   ● Increased   ○ I don't know

Figure 6-14. Predicted changes in overall quality of fish and wildlife habitats over the next ten years for each major habitat type in the Corn Belt Region.

Changes in Land Cover

Most land cover in the Corn Belt Region, 71.6%, consists of agricultural lands, followed by 12% developed lands, 9.6% forests, and 5.3% grasslands (Fig. 6-15). Compared to other regions, the Corn Belt Region has a high percentage of agricultural and developed lands, and a low percentage of wetlands and barren lands.

Although the aquatic systems and wetlands increased marginally (Table 6-8), the Corn Belt Region has experienced loss in many habitat types over the past ten years. Most habitats were lost to urban development, and agriculture lost the most cover in terms of total acreage (Fig. 6-15). Percentage-wise, the greatest net losses were seen in grasslands (0.9%), agricultural lands (0.7%), and forests (0.6%). The greatest net increases were seen in barren lands (29.2%), developed lands (4.8%), and aquatic systems (2.9%).
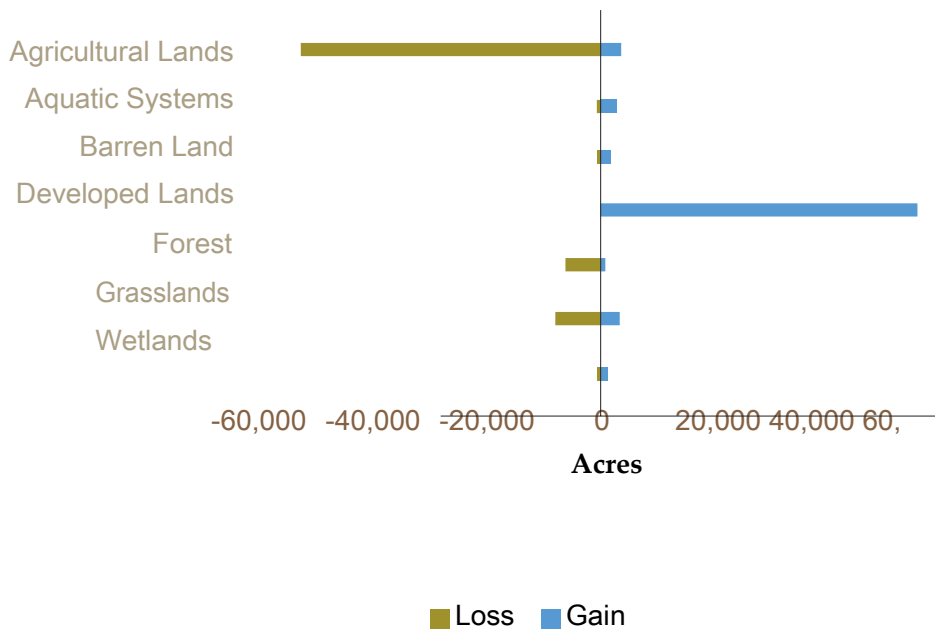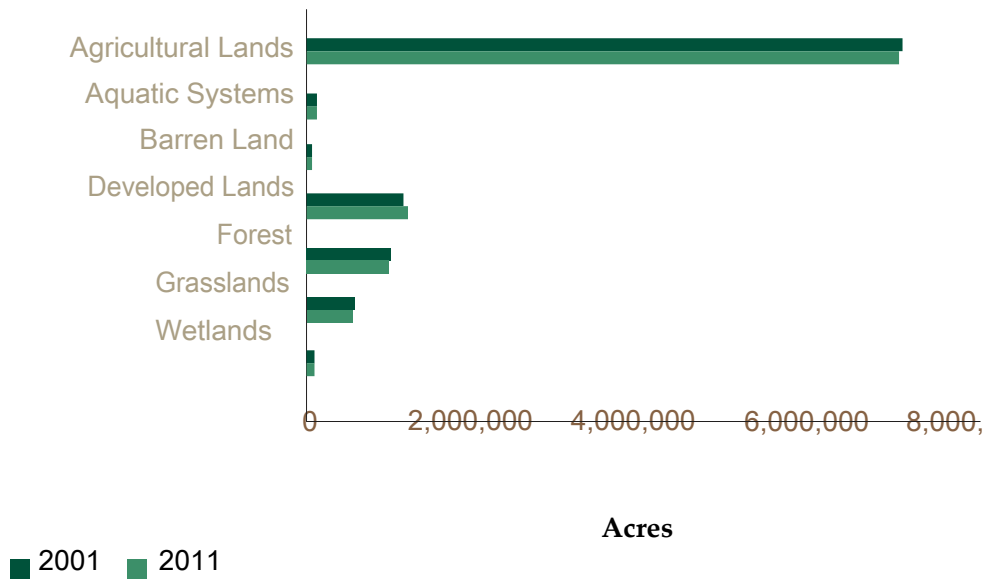
Figure 6-15. Distribution of land cover and losses and gains in land cover in the Corn Belt Region between 2001 and 2011 from NLCD.

Threats Affecting Habitats

Top Threat Categories

The third element requires the description of threats to SGCN and their habitats. This SWAP identifies a habitat perspective in order to manage for the conservation of species in Indiana. This section utilizes the same hierarchical method of identifying and rating threats based on Salafsky et al. (2008) that was outlined in Chapter V. Category rankings and specific threat rankings for habitats in this region are outlined below (Table 6-8). A full summary of the Habitat Survey results for the Corn Belt Region can be found in Appendix P.

First-level threat categories in this region received an average rating of above moderate to minor threat. Agriculture and aquaculture, invasive and other problematic species and genes, residential and commercial development, natural systems modification, and pollution received mean ratings from significant to moderate threat levels. Human intrusion and disturbance, other stressors, climate change and severe weather, transportation and service corridors, energy production and mining, and biological resource use received category ratings between moderate to minor threat level. No threat category received an average rating in the minor threat to not a threat for this region.

Agriculture and aquaculture were ranked first when aggregated regionally. Within agriculture and aquaculture, conversion of habitat and annual and perennial non-timber crops were, on average, rated as significant to moderately specific second-level threats. Aquaculture and wood and pulp plantations rated in the minor to no threat level in this region. Invasive and other problematic species and genes were also highly rated as a category across the region and ranked first in barren lands and forests. Invasive and alien species were the highest ranked specific threat across land types within this category. Residential and commercial development was ranked first in developed lands; both housing and urban areas and commercial and industrial areas were, on average, rated in the significant to moderately specific threat level for fish and wildlife habitats within this land type.

Natural systems modification was mid-ranked regionally but was ranked first within wetlands specifically. Conversion of habitat was identified as a significant to moderately specific threat to fish and wildlife habitats within wetlands. Dams and water management and use was also, on average, rated as a significant to moderately specific threat to fish and wildlife habitats in wetlands specifically, while it was rated as moderate to minor or minor to no threat in other land types.

Table 6-8. This table shows threat category rankings to habitats in the Corn Belt Region. First-level threats are based on the hierarchical method of identifying threats outlined in Salafsky et al. (2008). Ranked threat categories for the entire region are arranged by major habitat type (1 - highest threat).

Category	Regional Ranking	Aquatic Systems	Agricultural Lands	Barren Lands	Developed Lands	Forests	Grasslands	Wetlands
Agriculture and Aquaculture	1	1	1	3	9	2	1	3
Invasive and Other Problematic Species and Genes	2	3	2	1	5	1	3	2
Residential and Commercial Development	3	4	3	5	1	3	4	5
Natural Systems Modification	4	5	5	7	4	5	2	1
Pollution	5	2	4	6	2	7	7	4
Human Intrusion and Disturbance	6	6	7	2	3	4	5	7
Other Stressors	7	8	6	4	8	6	8	6
Climate Change and Severe Weather	8	7	8	8	7	9	6	8
Transportation and Service Corridors	9	9	9	10	6	8	9	9
Energy Production and Mining	10	11	10	9	10	11	10	11
Biological Resource Use	11	10	11	11	11	10	11	10

Top Specific Threats in Ranked Order

In the Habitat Survey, respondents were asked to identify specific threats to major habitat types using the same threat category ranking system outlined in Salafsky et al. (2008). These second-level threats represent subcategories of threats within the major threat categories listed in the table above. The following are the top specific second-level threats to habitats in the Corn Belt Region, aggregated across habitat types:

1. Invasive and alien species
2. Conversion of natural habitats to other land uses
3. Conversion of habitat to annual crops
4. Housing and urban areas
5. Agriculture, residential, and forestry effluents
6. Runoff from roads and service corridors
7. Commercial and industrial areas
8. Annual and perennial non-timber crops
9. Point source pollution from commercial/industrial sources
10. Household sewage and urban water waste

In the Species Survey, respondents were asked to identify threats to individual SGCN using the same threat category ranking system. The following are the top specific second-level threats to SGCN occurring in the Corn Belt Region, aggregated across all species:

1. Natural habitat conversion
2. Conversion of habitat to annual crops
3. Annual and perennial non-timber crops
4. Livestock farming and ranching
5. Dams and water management and use
6. Over-mowing of natural areas

Emerging/Anticipated Threats

In a free-response question, respondents were asked specifically to identify any emerging or anticipated threats over the next ten years for fish and wildlife habitats within the major habitat types for a region. A brief summary of the responses includes:

- A loss of forest cover was occurring in this region
- Some respondents identified specific subhabitat types, such as the Savanna Woodlands, as declining in this landscape
- Respondents also identified fragmentation of habitats as a concern for this region, especially in an agricultural matrix with little or no corridors and connective habitat leading to increasingly isolated forested areas
- Prevalent invasive species, such as bush honeysuckle, may also be a threat in remaining privately owned woodlots

Conservation Actions Needed
Top Action Categories

The fourth element of the Congressional guidelines requires that the SWAP describe conservation actions proposed to conserve identified species and habitats as well as outlining priorities for their implementation.

This section outlines conservation actions identified on a regional basis for each of the major habitat types. This section follows the same protocol to rate and rank actions in this region based on Salafsky et al. (2008) that was outlined in Chapter V. A full list of survey results can be found in Appendix P. Category rankings for actions and specific section-level actions are outlined in Table 6-9.

Land, water, and species management ranked first regionally and within aquatic systems, agricultural lands, and grasslands. Within the categories, means were used to determine rankings. Because of this, some habitat-specific options with few respondents may have higher threat averages regionally. Overall, top ranked actions within this category reflect a need to control invasive species, restore

natural habitats, and re-establish natural disturbance regimes in a variety of habitat types. Reducing loss of fish and wildlife habitats was identified as the top ranking action within this category for agricultural lands, developed lands, and wetlands; this action was ranked second for forests and grasslands. Developing and promoting farming technologies with conservation benefits was also highly ranked with several land types.

Education and awareness was also ranked highly for this region and was ranked first for developed lands and forests. Educational programs in general (specifically K-12) received average ratings between very and moderately important actions for this region. Respondents identified a need to improve public valuation of resources within this region through education. Respondents also wrote in college- level education as an important action. While improvement of signage was rated between moderately and somewhat important for this region, one respondent specifically identified Spanish language signage as needed in this region.

Land/Water protection was rated first as a category for barren lands and wetlands. In both habitat types, preserving currently existing corridors was rated as the most important action. Regionally, protection of specific habitat types (i.e., wetlands, grasslands, etc.) was also identified as important. Reducing conversion to cropland also received a mean rating of very to moderately important in this region.

While law and policy ranked lower as a category regionally, respondents identified improving compliance and enforcement of current policies as a very to moderately important action. Respondents suggested changes to policies regarding a variety of topics. Revising the drainage code was listed as important for aquatic systems. Changes to deer harvest were suggested as important in this region; respondents suggested both outlawing captive/"canned" deer hunts as well as expanding areas included in the "earn-a-buck" mandate in this region. Respondents emphasized a need for increasing regulations on invasive species, particularly suggesting a ban on the sale of known invasive plants, such as bush honeysuckle and winter creeper.

Table 6-9. Action category rankings to habitats in the Corn Belt Region. First-level action categories are based on the hierarchical method of identifying actions outlined in Salafsky et al. (2008). Ranked action categories for the entire region are arranged by major habitat type.

Category	Regional Ranking	Aquatic Systems	Agricultural Lands	Barren Lands	Developed Lands	Forests	Grasslands	Wetlands
Land/Water/Species Management	1	1	1	2	2	2	1	2
Education and Awareness	2	2	2	2	1	1	2	3
Land/Water Protection	3	3	5	1	3	3	3	1
Law and Policy	4	4	4	4	4	4	4	4
Livelihood, Economic, and Other Incentives	5	6	3	6	6	5	6	6
External Capacity Building	6	5	6	4	5	6	5	5
		Indicates a tie within this habitat type						

Top Specific Actions in Ranked Order

In the Habitat Survey, respondents were also asked to identify specific actions for major habitat types using the same action category ranking system outlined in Salafsky etal.(2008). These second-levelactions representsubcategoriesofactions within the major action categories listed in the table above. The following are the top specific second-level conservation actions for habitats in the Corn Belt Region, aggregated across habitat types:

1. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
2. Preserve currently existingcorridors
3. Promote use of research and science in conservation decision-making processes
4. Develop alliances and partnerships (e.g., between producers, landowners, and conservation professionals)
5. Strengthen conservation financing
6. Develop education programs in general
7. Reduce conversion to cropland
8. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
9. Increase acres of riparian buffers
10. Reduce nutrient and toxin loads (e.g., heavy metals, pharmaceuticals, fertilizers, insecticides)

The following are top actions for SGCN to occur in the Corn Belt Region, as summarized from the free-response questions about conservation actions for individual species:

1. Educate and engage with landowners and citizens
2. Enhance connectivity of habitats
3. Increase CRP lands and use of conservation easements
4. Protect large contiguous forested areas
5. Implement agricultural practices that improve water quality in aquatic systems and wetlands
6. Limit conversion of habitat to non-habitat
7. Restore and protect riparian corridors
8. Control invasive plants
9. Use burning and mowing as management techniques
10. Protect and manage large wetland complexes

Prioritization of Actions

In order to prioritize these actions within an environment of limited resources, respondents were asked to distribute hypothetical "effort points" to any action they had previously rated as "very important" for any of the major habitat types within a region. The effort ratings were averaged and then ranked to identify the top five actions for each region. A full list of these results can be found in Appendix P. Priority actions for the Corn Belt Region include:

1. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
2. Reduce conversion to cropland
3. Strengthen conservation financing
4. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
5. Preserve currently existing corridors

Reducing loss of habitat through agricultural expansion and conversion to cropland echo the identification of agriculture as a threat within this region. Overall, these priority actions are primarily management and protection actions, although strengthening of conservation financing will be vital to successful implementation.

Threats and Actions by Major Habitat Type

The following summaries break down threats and conservation actions in this region by major habitat type, based on responses to the Habitat Survey and the Species Survey. For each major habitat type in this region, the SGCN, top threats to SGCN, top actions for SGCN, key threats to habitats, and priority actions for habitats are summarized on the following pages.

Threats and actions were only included in detail below if a majority of eligible survey respondents, greater than 50%, rated them, to avoid artificially elevating items, which were highly ranked but only by a few respondents. This approach left some threats and action lists with no items for certain habitats, which is illogical from a practical perspective. Therefore, in these situations, the top threats and actions are still listed but are denoted with an asterisk (*) to signify that there may be some items, which seem out-of-place, reflecting a lack of sufficient response for a particular habitat in the survey. This approach and the survey design also caused for some disparities between threats and actions.

Approximately ten items are given for each list below. Lists may be shorter if fewer than ten items were rated by a majority of survey respondents, or longer if there were tires between items.

Top actions for SGCN were summarized from free-response questions about individual species and do not follow the same categorizations as actions for habitats. A full summary of the Habitat Survey responses can be found in Appendix P.

Agricultural Lands

Agricultural lands are defined as lands devoted to commodity production. Examples of agricultural lands include: intensively managed non-native grasses, row crops, fruit and nut-bearing trees, confined feeding operations, and feedlots.

Top threats to SGCN occurring in agricultural lands in the Corn Belt Region:

1. Natural habitat conversion
2. Conversion of habitat to annual crops
3. Annual and perennial non-timber crops
4. Fire and fire suppression
5. Over-mowing of natural areas
6. Dams and water management and use
7. Livestock farming and ranching

Top conservation actions for SGCN occurring in agricultural lands in the Corn Belt Region:

1. Educate and engage with landowners and citizens
2. Use conservation easements on farmland surrounding protected areas
3. Increase and maintain CRP partnerships
4. Implement agricultural practices that improve water quality in aquatic systems and wetlands (for aquatic and wetland species)
5. Maintain shallow-water areas for migrating shorebirds

Top threats to fish and wildlife habitats in agricultural lands in the Corn Belt Region conversion of natural habitats to other land uses:

1. Invasive and alien species
2. Conversion of habitat to annual crops
3. Agriculture, residential, and forestry effluents
4. Changing frequency, duration, and intensity of floods
5. Annual and perennial non-timber crops
6. Housing and urban areas
7. Changing frequency, duration, and intensity of drought
8. Plant diseases
9. Shifting seasons/phenology

Top conservation actions for fish and wildlife habitats in agricultural lands in the Corn Belt Region:

1. Preserve currently existing corridors
2. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
3. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
4. Develop alliances and partnerships (e.g., between producers, landowners, and conservation professionals)
5. Promote use of research and science in conservation decision-making processes
6. Reduce conversion to cropland
7. Increase acres of riparian buffers
8. Restore and integrate diversity of habitats into crop-production dominated landscapes
9. Acquire conservation easements to protect important wildlife habitats
10. Build and strengthen CRP partnerships

Aquatic Systems

Aquatic systems are defined as all water habitats, both flowing and stationary. Examples of aquatic systems include: manmade impoundments, natural lakes rivers, streams, oxbows, sloughs, embayments, and backwaters (not including wetlands).

Top threats to SGCN occurring in aquatic systems in the Corn Belt Region Natural habitat conversion:

1. Conversion of habitat to annual crops
2. Annual and perennial non-timber crops
3. Housing and urban areas
4. Commercial and industrial areas
5. Dams and water management and use
6. Livestock farming and ranching
7. Tourism and recreation areas

Top conservation actions for SGCN occurring in aquatic systems in the Corn Belt Region:

1. Implement agricultural best management practices to improve water quality
2. Reduce point and non-point source pollution
3. Clean polluted areas
4. Enhance public, stakeholder, and landowner education and awareness
5. Protect, restore, and maintain riparian corridors
6. Reduce recreational overuse
7. Maintain floodplain habitat
8. Stabilize banks
9. Remove dams
10. Preserve nest sites for Bald Eagles and Osprey
11. Control invasive aquatic vegetation

Top threats to fish and wildlife habitats in aquatic systems in the Corn Belt Region:

1. Invasive and alien species
2. Conversion of natural habitats to other land uses
3. Agriculture, residential, and forestry effluents
4. Changing frequency, duration, and intensity of floods
5. Annual and perennial non-timber crops
6. Changing frequency, duration, and intensity of drought
7. Temperature extremes
8. Shifting and alteration of habitats due to climate change
9. Conversion of habitat to annual crops
10. Housing and urban areas

Top conservation actions for fish and wildlife habitats in aquatic systems in the Corn Belt Region:

1. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
2. Reduce nutrient and toxin loads (e.g., heavy metals, pharmaceuticals, fertilizers, insecticides)
3. Preserve currently existing corridors
4. Develop education programs in general
5. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
6. Strengthen conservation financing
7. Reduce conversion to cropland
8. Reduce stream bank erosion
9. Acquire conservation easements to protect important wildlife habitats
10. Restore habitats and natural systems in aquatic systems

Barren Lands

Barren lands are defined as lands dominated by exposed rock or minerals with sparse vegetation. Examples of barren lands include: sand/dunes, rock outcrops, cliffs, and bare rock.

Top threats to SGCN occurring in barren lands in the Corn Belt Region:

1. Natural habitat conversion
2. Annual and perennial non-timber crops
3. Conversion of habitat to annual crops
4. Dams and water management and use
5. Over-mowing of natural areas
6. Fire and fire suppression

Top conservation actions for SGCN occurring in barren bands in the Corn Belt Region:

1. Educate public about Peregrine Falcon
2. Protect Bald Eagle nest sites
3. Maintain stopover habitat for Kirtland's Warbler

Top threats to fish and wildlife habitats in barren lands in the Corn Belt Region:

1. Invasive and alien species
2. Conversion to other land uses
3. Plant diseases
4. Housing and urban areas
5. Commercial and industrial areas
6. Problematic native species
7. Recreation activities (e.g., ATVs, trail use, horseback riding, high-speed boating, canoeing)
8. Fire and fire suppression
9. Over-mowing of natural areas
10. Introduced genetic material (such as crop, seed stock, bio-control, stocked/released species, etc.)

Top conservation actions for fish and wildlife habitats in barren lands in the Corn Belt Region:

1. Control invasive species in barren lands
2. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
3. Improve drainage management
4. Increase acres of riparian buffers
5. Protect adjacent buffer zones
6. Reduce nutrient and toxin loads (e.g., heavy metals, pharmaceuticals, fertilizers, insecticides)
7. Re-establish natural disturbance regimes in barren lands
8. Improve enforcement and compliance of current policies
9. Develop alliances and partnerships (e.g., between producers, landowners, and conservation professionals)

Developed Lands

Developed lands are defined as highly impacted lands intensively modified to support human habitation, transportation, commerce, and recreation. Examples of developed lands include: urban lands, suburban lands, industrial areas, commercial areas, towers for communication and wind power generation, and recreational areas such as golf courses and soccer fields.

Top threats to SGCN occurring in developed lands in the Corn Belt Region:

1. Renewable energy production
2. Invasive and alien species
3. Diseases from domestic populations and unknown sources
4. Fossil fuel energy production
5. Mining and quarrying

Top conservation actions for SGCN occurring in developed lands in the Corn Belt Region:

1. Public education and awareness about bat ecology and issues
2. Reduce urban sprawl and commercial property expansion
3. Manage urban areas for Peregrine Falcons; minimize disturbance during nesting
4. Increase gravel-surfaced rooftop habitat for breeding Common Nighthawks
5. Mitigate road hazards for wildlife

Top threats to fish and wildlife habitats in developed lands in the Corn Belt Region:

1. Invasive and alien species
2. Housing and urban areas
3. Commercial and industrial areas
4. Conversion of natural habitats to other land uses
5. Roads and railroads
6. Problematic native species
7. Runoff from roads and service corridors
8. Point and non-point source pollution
9. Plant diseases
10. Air pollution (e.g., smoke, mercury emissions)

Top conservation actions for fish and wildlife habitats in developed lands in the Corn Belt Region:

1. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
2. Preserve currently existing corridors
3. Restore and integrate diversity of habitats into developed landscapes
4. Control invasive species in developed lands
5. Reduce nutrient and toxin loads (e.g., heavy metals, pharmaceuticals, fertilizers, insecticides)
6. Manage urban woodlots
7. Develop education programs in general
8. Develop education programs specifically for K-12
9. Acquire conservation easements to protect important wildlife habitats
10. Link existing habitat blocks through corridor enhancement in developed lands

Forests

Forests are defined as a plant community dominated by trees. Examples of forests include, but are not limited to, all stages of natural forest and plantations.

Top threats to SGCN occurring in forests in the Corn Belt Region:

1. Natural habitat conversion
2. Conversion of habitat to annual crops
3. Housing and urban areas
4. Commercial and industrial areas
5. Annual and perennial non-timber crops
6. Invasive and alien species
7. Diseases from domestic populations and unknown sources
8. Wood and pulp plantations
9. Fire and fire suppression
10. Tourism and recreation areas
11. Over-mowing of natural areas
12. Livestock farming and ranching
13. Recreation activities
14. Problematic native species

Top conservation actions for SGCN occurring in forests in the Corn Belt Region:

1. Protect large contiguous forested areas and reduce forest fragmentation
2. Limit conversion of forests to non-forest land uses
3. Enhance forest connectivity
4. Control invasive woody plants
5. Reduce development in forested areas
6. Protect roost trees for bat species
7. Restore forests and woodlands
8. Implement best management practices in forestry
9. Create small forest openings to increase diversity
10. Provide downed woody debris for the Least Weasel
11. Remove Brown-headed Cowbirds

Top threats to fish and wildlife habitats in forests in the Corn Belt Region:

1. Invasive and alien species
2. Conversion of natural habitats to other land uses
3. Housing and urban areas
4. Conversion of habitat to annual crops
5. Problematic native species
6. Runoff from roads and service corridors
7. Point source pollution from commercial/industrial sources
8. Commercial and industrial areas
9. Plant diseases
10. Agriculture, residential, and forestry effluents

Top conservation actions for fish and wildlife habitats in forests in the Corn Belt Region:

1. Control invasive species in forests
2. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
3. Reduce conversion to cropland
4. Preserve currently existing corridors
5. Promote use of research and science in conservation decision-making processes
6. Develop education programs in general
7. Develop education programs specifically for K-12
8. Increase acres of riparian buffers
9. Strengthen conservation financing
10. Increase regulations on invasive species

Grasslands

Grasslands are defined as an open area dominated by grass species. Examples of grasslands include: haylands, pasture, prairies, savannahs, or reclaimed mine lands.

Top threats to SGCN occurring in grasslands in the Corn Belt Region:

1. Conversion of habitat to annual crops
2. Annual and perennial non-timber crops
3. Livestock farming and ranching

Top conservation actions for SGCN occurring in grasslands in the Corn Belt Region

1. Restore and improve connectivity of grasslands
2. Reduce woody encroachment on grasslands
3. Prevent conversion of grassland to cropland
4. Increase CRP grasslands
5. Use conservation easements
6. Implement burning regimes
7. Minimize disturbance to nesting grassland birds (e.g., Henslow's Sparrow)
8. Mow properly (reduce mowing for shorebirds and owls)
9. Improve grazing practices
10. Restore prairies

Top threats to fish and wildlife habitats in grasslands in the Corn Belt Region:

1. Invasive and alien species
2. Conversion of natural habitats to other land uses
3. Conversion of habitat to annual crops
4. Housing and urban areas
5. Annual and perennial non-timber crops
6. Commercial and industrial areas
7. Over-mowing of natural areas
8. Recreation activities (e.g., ATVs, trail use, horseback riding, high-speed boating, canoeing)
9. Introduced genetic material (such as crop, seed stock, bio-control, stocked/released species, etc.)
10. Problematic native species

Top conservation actions for fish and wildlife habitats in grasslands in the Corn Belt Region:

1. Reduce conversion to cropland
2. Develop alliances and partnerships (e.g., between producers, landowners, and conservation professionals)
3. Strengthen conservation financing
4. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
5. Restore habitats and natural systems in grasslands
6. Increase state's capacity for research and monitoring of conservation actions
7. Promote use of research and science in conservation decision-making processes
8. Acquire currently unprotected grasslands
9. Re-establish natural disturbance regimes in grasslands
10. Build and strengthen CRP partnerships

Wetlands

Wetlands are defined as either ephemeral or permanently flooded habitat. Examples of wetlands include: swamps, marshes, bogs, fens, potholes, wetlands of farmed areas, and mudflats.

Top threats to SGCN occurring in wetlands in the Corn Belt Region:

1. Natural habitat conversion
2. Invasive and alien species
3. Conversion of habitat to annual crops
4. Housing and urban areas
5. Commercial and industrial areas
6. Annual and perennial non-timber crops
7. Tourism and recreation areas
8. Dams and water management and use
9. Problematic native species
10. Recreation activities
11. Fire and fire suppression

Top conservation actions for SGCN occurring in wetlands in the Corn Belt Region:

1. Protect and maintain large wetland complexes
2. Restore wetlands.
3. Protect buffers around wetlands
4. Control invasive plants in wetlands
5. In some cases, actively manage water levels (e.g., for Black Tern, Common Gallinule)
6. Mitigate road hazards to amphibians and reptiles when roads cross over wetlands
7. Minimize disturbance to nesting turtles
8. Manage for high-diversity marshes
9. Encourage enrollment in wetland protection programs
10. Protect and create vernal pools for amphibians

Top threats to fish and wildlife habitats in wetlands in the Corn Belt Region:

1. Invasive and alien species
2. Agriculture, residential, and forestry effluents
3. Conversion of natural habitats to other land uses
4. Shifting and alteration of habitats due to climate change
5. Commercial and industrial areas
6. Changing frequency, duration, and intensity of floods
7. Housing and urban areas
8. Household sewage and urban water waste
9. Livestock farming and ranching
10. Conversion of habitat to annual crops
11. Point source pollution from commercial and industrial sources

Top conservation actions for fish and wildlife habitats in wetlands in the Corn Belt Region:

1. Promote use of research and science in conservation decision-making processes
2. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
3. Preserve currently existing corridors
4. Develop alliances and partnerships (e.g., between producers, landowners, and conservation professionals)
5. Protect natural water regimes (e.g., withdraws, warm-water discharge).
6. Develop education programs in general
7. Acquire currently unprotected wetlands
8. Control invasive species in wetlands
9. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
10. Protect adjacent buffer zones
11. Reduce nutrient and toxin loads (e.g., heavy metals, pharmaceuticals, fertilizers, insecticides)