F. DRIFT PLAINS REGION

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

Figure 6-26. Outline of the Drift Plains 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 Drift Plains 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 sixregions. These include:

- **Habitat Loss:** Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soilhealth)
- **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 Drift Plains Region include:

- **Habitat Loss of Barren Lands and Glades:** Build external capacity by forming partnerships and networks, raising and providing funds and resources for conservation organizations to maintain and protect barren lands and glades
    - Land management (e.g., timber cutting, fire, girdling, and mechanical and chemical treatments
- **Habitat Loss of Wetlands:** Build external capacity by forming partnerships and networks, raising and providing funds and resources for conservation organizations to maintain and protect wetlands

Current Habitat Conditions

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

Table 6-16. Species of Great Conservation Need present in the Drift Plains Region.

Taxa	Scientific Name	Common Name
Amphibians	*Necturus maculosus*	Common Mudpuppy
Amphibians	*Ambystoma barbouri*	Streamside Salamander
Amphibians	*Hemidactylium scutatum*	Four-toed Salamander
Amphibians	*Acris blanchardi*	Blanchard's Cricket Frog
Amphibians	*Lithobates areolatus*	Crawfish Frog
Birds	*Cygnus buccinator*	Trumpeter Swan
Birds	*Colinus virginianus*	Northern Bobwhite
Birds	*Bonasa umbellus*	Ruffed Grouse
Birds	*Chordeiles minor*	Common Nighthawk
Birds	*Antrostomus vociferus*	Eastern Whip-poor-will
Birds	*Rallus elegans*	King 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
Birds	*Nyctanassa violacea*	Yellow-crowned Night-heron
Birds	*Pandion haliaetus*	Osprey
Birds	*Ictinia mississippiensis*	Mississippi Kite

Taxa	Scientific Name	Common Name
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	*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 cerulea*	Cerulean Warbler
Fish	*Anguilla rostrata*	American Eel
Fish	*Noturus stigmosus*	Northern Madtom
Fish	*Etheostoma variatum*	Variegate Darter
Fish	*Percina copelandi*	Channel Darter
Fish	*Percopsis omiscomaycus*	Trout-perch
Mammals	*Sorex hoyi*	American Pygmy Shrew
Mammals	*Myotis grisescens*	Gray Myotis
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	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat
Mammals	*Ursus americanus*	Black Bear
Mammals	*Mustela nivalis*	Least Weasel
Mammals	*Taxidea taxus*	American Badger
Mollusks	*Plethobasus cyphyus*	Sheepnose
Mollusks	*Pleurobema cordatum*	Ohio Pigtoe
Mollusks	*Ptychobranchus fasciolaris*	Kidneyshell
Mollusks	*Simpsonaias ambigua*	Salamander Mussel
Mollusks	*Toxolasma lividum*	Purple Lilliput
Mollusks	*Villosa lienosa*	Little Spectaclecase

Taxa	Scientific Name	Common Name
Reptiles	*Terrapene carolina*	Eastern Box Turtle
Reptiles	*Nerodia erythrogaster neglecta*	Copper-bellied Watersnake
Reptiles	*Clonophis kirtlandii*	Kirtland's Snake
Reptiles	*Opheodrys aestivus*	Rough Greensnake
Reptiles	*Cemophora coccinea*	Scarletsnake
Reptiles	*Tantilla coronata*	Southeastern Crowned Snake
Reptiles	*Crotalus horridus*	Timber Rattlesnake

During the Habitat Survey, respondents were asked to evaluate the overall quality of fish and wildlife habitats in the Drift Plains Region (Fig. 6-27), estimate changes in overall quality since 2005 (Fig. 6-28), and predict changes in overall quality over the next ten years (Fig. 6-29). 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 the Habitat Survey results can be found in Appendix P.

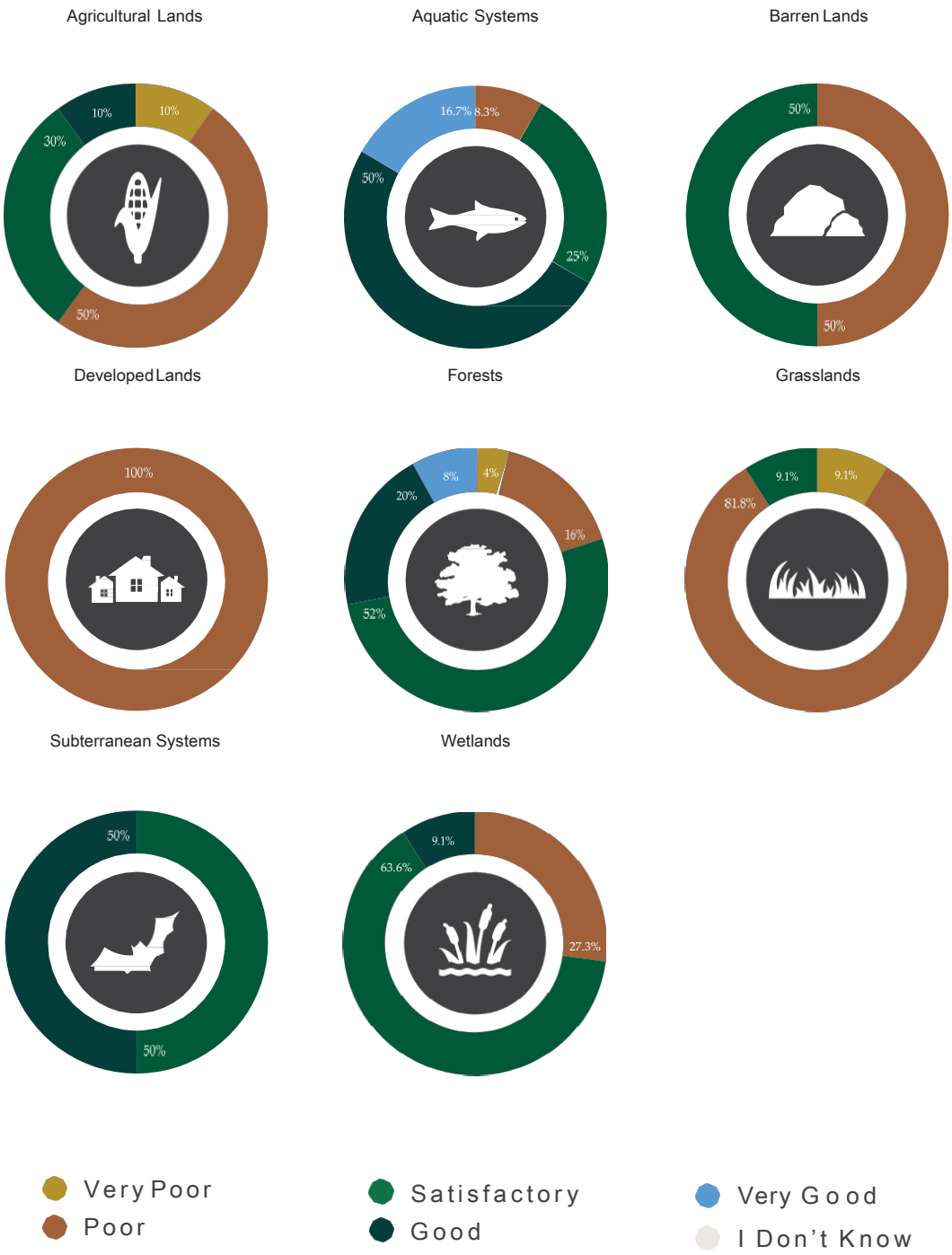


Figure 6-27. Overall quality of fish and wildlife habitats in the Drift Plains Region in 2014.

Figure 6-28. Estimated change in the overall quality of fish and wildlife habitats from 2005 to 2014 for each of the major habitat types in the Drift Plains Region.

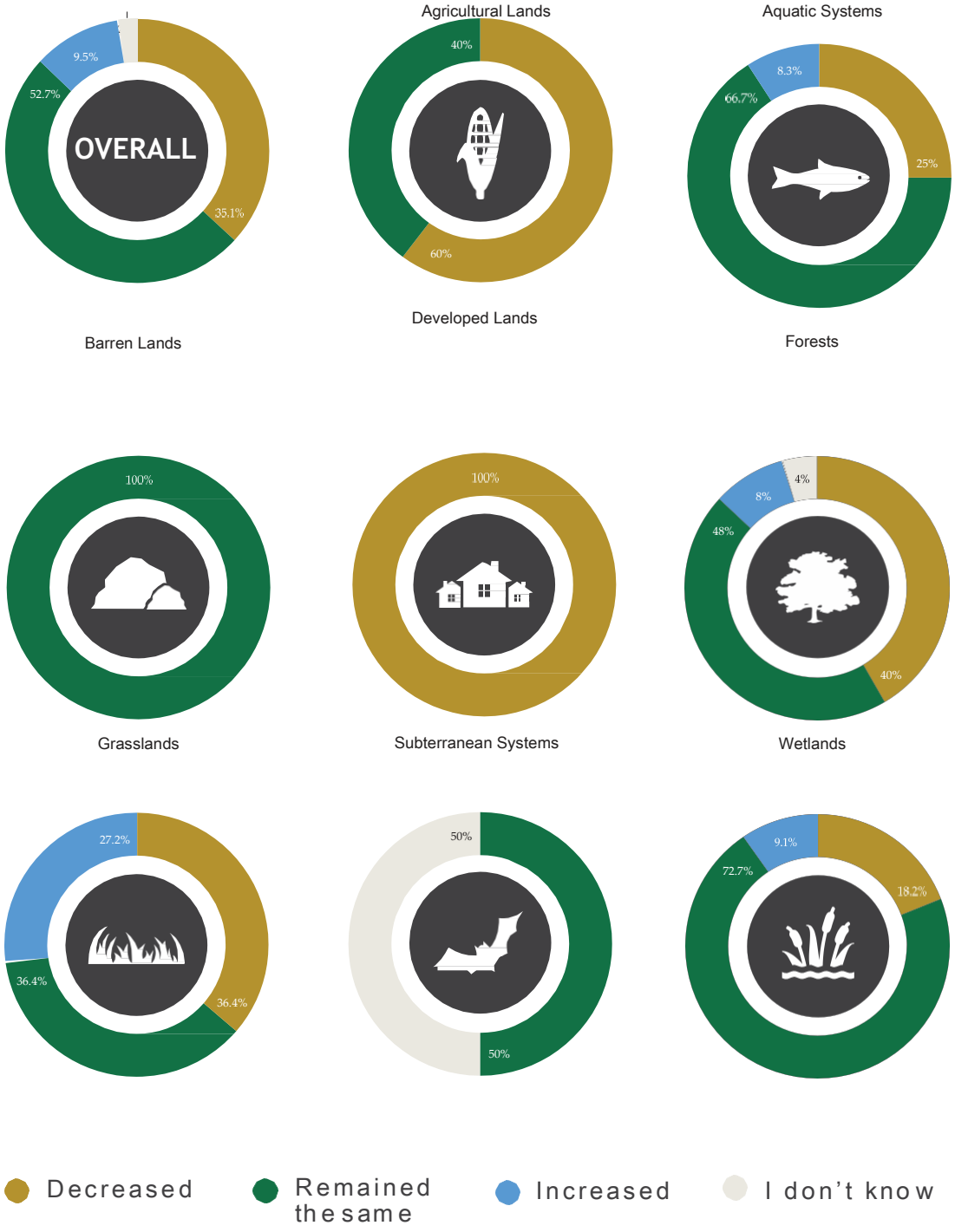
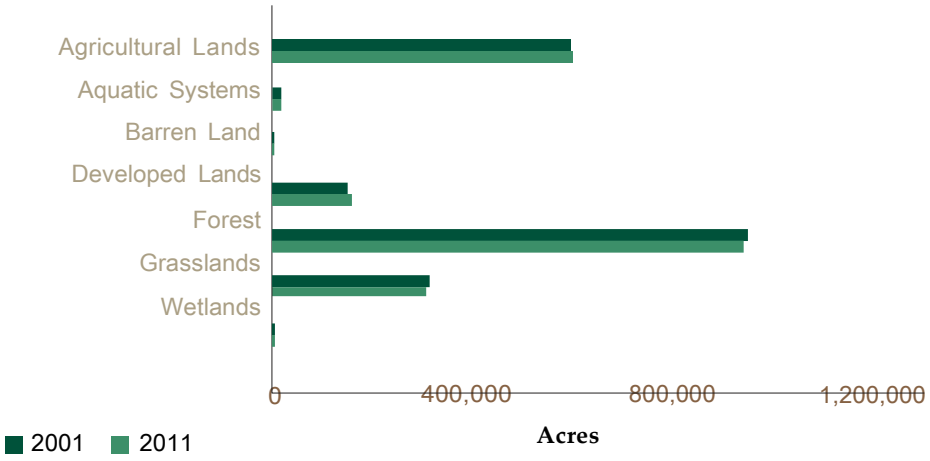


Figure 6-29. Predicted changes in overall quality of fish and wildlife habitats over the next ten years for each major habitat type in the Drift Plains Region.

Changes in Land Cover

Unlike other regions of the state, which are dominated by agricultural lands, most land cover in the Drift Plains Region consists of forested land, followed by agricultural lands and grasslands (Fig. 6-30). Compared to other Indiana regions, the Drift Plains Region has a relatively low percentage of developed lands. The region is also home to limited areas of Indiana's karst subterranean systems.

The Drift Plains Region has experienced changes in habitat coverage over the past ten years. Agricultural lands, aquatic systems, barren lands, developed lands, and wetlands increased while forests and grasslands decreased. These habitats were mostly lost to urban development (Fig. 6-30). Percentage-wise, the greatest net losses were seen in grasslands (1.3%) and forests (0.6%). The greatest net increases were seen in wetlands (59.6%), barren lands (23.6%), and aquatic systems (4.4%). Comprising of only .03% of the total land cover in the region, these habitat types were not abundant to begin with.



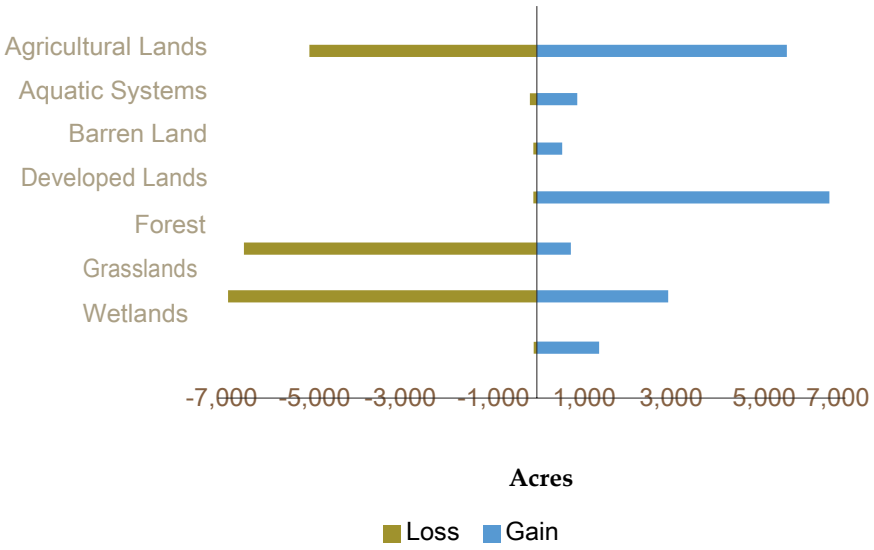


Figure 6-30. Distribution of land cover and losses and gains in land cover in the Drift Plains Region between 2001 and 2011 from NLCD.

Threats Affecting Habitats

Top Threat Categories

The third element requires the description of threats to SGCN and their habitats. The 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 6-17). A full summary of the Habitat Survey results for the Great Lakes Region can be found in Appendix P.

For first-level threat categories, all threat categories were rated either significant to moderate or moderate to minor for the region. Agriculture and aquaculture was identified as a significant threat to habitats within this region. Within this category, conversion of habitat to annual crops and annual and perennial non-timber crops were both, on average, rated as significant to moderate specific second-level threats.

Residential and commercial development was ranked highly across different major habitat types; invasive and other problematic species and genes were also rated highly across categories. Invasive and alien species received a mean threat rating between significant and moderate, while other specific threats in this category were rated in the moderate to minor threat level for this region.

Categories ranked below invasive species received regional ratings of moderate-minor threats. Human intrusion and disturbance was ranked as the most significant threat category for barren lands, developed lands, and subterranean systems. Within barren lands and subterranean systems, recreational activities were rated as a significant to moderate threat. Natural system modification was rated as the top threat in wetlands. Within this category, natural habitat conversion was rated as a significant and moderate threat to wetlands.

Within the pollution category, the most significant threats identified were runoff from service corridors, agricultural and residential development, and forestry effluents and point source pollution. Both diseases and low genetic diversity were rated as significant to moderate threats within other stressors, another mid-ranked threat category to this region.

Energy production and mining, climate change and other severe weather, and biological resource use were on average rated closer to minor threats than moderate threats. However, within the climate change category, temperature extremes, shifting seasons, and changing frequency/duration of droughts were rated as significant to moderate specific threats within the region. Forestry practices were also rated as a significant to moderate threat across all habitat types and rated especially high in barren lands, grasslands, and wetlands.

Table 6-17. Threat category ranking to habitats in the Drift Plains Region. First-level threat categories are based on hierarchical method of identifying threats outlines in Salafsky et al. (2008). Ranked threat categories for the entire region are arranged by each major habitat type (1 - highest threat).

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

Top Specific Threats in Ranked Order

In the Habitat Survey, respondents were also 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 Drift Plains Region, aggregated across habitat types:

1. Invasive and alien species
2. Conversion of habitat to annual crops
3. Conversion of natural habitats to other land uses
4. Housing and urban areas
5. Commercial and industrial areas
6. Recreation activities
7. Annual and perennial non-timber crops
8. Plant diseases
9. Problematic native species
10. Livestock farming and ranching

In the Species Survey, respondents were also 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 Drift Plains Region, aggregated across all species:

1. Natural habitat conversion
2. Invasive and alien species
3. Housing and urban areas
4. Conversion of habitat to annual crops
5. Commercial and industrial areas
6. Annual and perennial non-timber crops
7. Tourism and recreation areas
8. Recreation areas
9. Livestock farming and ranching

Emerging/Anticipated Threats

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 in a free-response question.

In this region, respondents identified an emerging threat was a growing disconnect to natural resources, which might increase difficulty in sustaining public support for lands devoted to conservation. Other respondents identified more land-based threats like fragmentation and forest pests, such as the emerald ash borer.

Conservation Actions Needed

Top Action Categories

The fourth element 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 at the regional level 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 actions are outlined in the list on the following page (Table 6-18).

Regionally, land, water, andspecies management, educationandawareness, land and water protection, and livelihood, economic, and other incentives received average category ratings between very and moderately important. Law and policy and external capacity building were rated between moderately and somewhat important. No action category ranked in the somewhat to not important range, indicating the identification of a wide range and variety of specific actions important to conservation of habitats within the region.

Within land, water, and species management, approximately half of the specific actions were on average rated as very to moderately important regionally. Top-ranking actions identified a need to restore natural systems, promote a diversity of successional stages, and control invasive species in a variety of habitat types. Reducing loss of habitat was also ranked as the most important action in agricultural lands, barren lands, and developed lands while being highly ranked in the remaining habitat types. Species reintroduction was also identified as important in forests, grasslands, and wetlands, with respondents suggesting reintroduction of extirpated native species, native grasses, quail and other game birds, crawfish frog, elk, black bears, wolves, hellbenders, and threatened mussel species.

Education and awareness also ranked highly for this region. Education programs in general, education programs for K-12, and training programs for stakeholders all received mean ratings between very and moderately important for this region.

Land and water protection was ranked third regionally; every specific action except for acquiring currently unprotected barren lands was rated between very and moderately important. Important actions in this region reflects a need to acquire unprotected habitats and preserve currently existing corridors. Reducing conversion to cropland and strengthening CRP partnerships were also identified as the most important actions in multiple habitat types.

Livelihood, economic, and other incentives was ranked between very and moderately important as a category within this region. Promoting conservation payments was ranked fi regionally and within every habitat type within this category. Promoting nonmonetary values of natural systems and managing recreational opportunities to be compatible with fish and wildlife habitats were also both rated as very to moderately important specific actions within this category for this region.
Within law and policy, respondents identified an importance for regulations on invasive species and improving compliance and enforcement of current policies. Using zoning to reduce urban sprawl was ranked as the most important action for habitats in aquatic systems and developed lands. Changing current policy was rated between moderately to somewhat important, but respondents did suggest

policy changes to increase pollution control regulations, reducing turtle harvest, and wetland mitigation.

Promotion of research in conservation decision-making, developing alliances and partnerships, increasing state's capacity for research and monitoring of conservation actions, and strengthening conservation financing were all rated between very and moderately important within external capacity building for this region.

Table 6-18. Action category ranking to habitats in the Drift Plains Region. First-level categories are based on the hierarchical method of identifying actions outlined in Salafsky et al. (2008). Ranked actions for the entire region are arranged by each major habitat type.

Category	Regional Ranking	Aquatic Systems	Agricultural Lands	Barren Lands	Developed Lands	Forests	Grasslands	Subterranean Systems	Wetlands
Land/Water/Species Management	1	2	1	3	3	1	1	1	1
Education and Awareness	2	3	2	3	1	2	2	4	3
Land/Water Protection	3	1	5	1	3	4	3	1	2
Livelihood, Economic, and Other Incentives	4	4	3	1	3	4	4	5	5
Law and Policy	5	6	5	5	1	3	6	1	4
External Capacity Building	6	5	4	5	3	6	5	5	6
	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 et al. (2008). These second-level actions represent subcategories of actions within the major action categories listed in the table above. The following are the top specific second-level conservation actions for habitats in the Drift Plains

Region, aggregated across habitat types:

1. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
2. Develop education programs in general
3. Develop education programs specifically for K-12
4. Preserve currently existing corridors
5. Increase acres of riparian buffers
6. Reduce conversion to cropland
7. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
8. Establish training programs for stakeholders
9. Increase regulations on invasive species
10. Acquire conservation easements to protect important wildlife habitats

The following are top actions for SGCN occurring in the Drift Plains Region, as summarized from the free-response questions about conservation actions for individual species:

1. Educate and engage with landowners and citizens (especially regarding bat ecology and issues)
2. Implement agricultural practices that improve water quality
3. Protect large contiguous forested areas and reduce forest fragmentation
4. Control invasive plants
5. Enhance connectivity of habitats
6. Use burning and mowing as management techniques in grasslands
7. Protect and manage large wetland complexes
8. Implement best management practices in forestry
9. Protect/Restore riparian buffer zones
10. Protect subterranean systems and limit recreational caving

Prioritization of Actions

In order to prioritize these actions within an environment of limited resources, respondents were then 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 Drift Plains Region include:

1. Promote diversity of forest types and successional stages
2. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
3. Control invasive species in forests
4. Preserve currently existing corridors
5. Acquire currently unprotected wetlands

Priority actions in this region are mostly drawn from land, water, and species management and land and water protection. Forests-specific and wetland-specific actions, like promoting diversity of successional stages in forests, controlling invasive species in forests, and acquiring currently unprotected wetlands, were all included in this set of priority actions. Preserving currently existing corridors, which is not tied to any specific habitat type, was another land and water protection effort allocated to this region. Strengthening conservation financing was an external capacity building action identified to facilitate the implementation of the other land-based actions.

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. The SGCN that occur there, top threats to SGCN, top actions for SGCN, key threats to habitats, and priority actions for each major habitat type in this region 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 Drift Plains Region:

1. Natural habitat conversion
2. Conversion of habitat to annual crops
3. Annual and perennial non-timber crops

Top conservation actions for SGCN occurring in agricultural lands in the Drift Plains Region:

1. Educate and engage with landowners and citizens
2. Increase use of CRP partnerships
3. Implement agricultural practices that improve water quality
4. Maintain shallow-water areas for migrating shorebirds
5. Establish no-plow zones
6. Provide incentives to farmers to increase landowner participation

Top threats to fish and wildlife habitats in agricultural lands in the Drift Plains Region:

1. Conversion of habitat to annual crops
2. Housing and urban areas
3. Over-mowing of natural areas
4. Commercial and industrial areas
5. Conversion of natural habitats to other land uses
6. Recreational activities
7. Log jam removal
8. Annual and perennial non-timber crops
9. Tourism and recreational areas
10. Livestock farming and ranching

Top conservation actions for fish and wildlife habitats in agricultural lands in the Drift Plains Region:

1. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
2. Build and strengthen CRP partnerships
3. Develop education programs in general
4. Develop education programs specifically for K-12
5. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
6. Preserve currently existing corridors
7. Improve compliance with and enforcement of current policies
8. Link existing habitat blocks through corridor enhancement in agricultural lands
9. Promote conservation payment programs (e.g., payment for ecosystem services, conservation easements)
10. Promote nonmonetary values of natural systems within the state

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 Drift Plains Region:

1. Natural habitat conversion
2. Dams and water management and use

Top conservation actions for SGCN occurring in aquatic systems in the Drift Plains Region:

1. Enhance public, stakeholder, and landowner education and awareness
2. Implement agricultural best management practices to improve water quality
3. Reduce sediment and nutrient loads
4. Reduce point and non-point source pollution
5. Clean up polluted areas
6. Protect and restore riparian buffer zones
7. Reconnect floodplains and rivers
8. Remove dams
9. Reduce bank erosion

Top threats to fish and wildlife habitats in aquatic systems in the Drift Plains Region:

1. Invasive and alien species
2. Conversion of natural habitats to other land uses
3. Annual and perennial non-timber crops
4. Conversion of habitat to annual crops
5. Commercial and industrial areas
6. Problematic native species
7. Housing and urban areas
8. Dams and water management and use
9. Livestock farming and ranching
10. Introduced genetic material

Top conservation actions for fish and wildlife habitats in aquatic systems in the Drift Plains Region:

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

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 Drift Plains Region:

1. Natural habitat conversion
2. Dams and water management and use

Top conservation actions for SGCN occurring in barren lands in the Drift Plains Region:

1. Educate public about Peregrine Falcon
2. Protect Bald Eagle nest sites

Top threats to fish and wildlife habitats in barren lands in the Drift Plains Region:

1. Recreational activities
2. Tourism and recreation areas
3. Housing and urban areas
4. Commercial and industrial areas

Top conservation actions for fish and wildlife habitats in barren lands in the Drift Plains Region:

1. Reduce conversion to cropland
2. Strengthen and increase CRP partnerships
3. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
4. Species reintroduction
5. Develop education programs in general
6. Develop education programs specifically for K-12
7. Training programs for stakeholders
8. Promote conservation payment programs (e.g., payment for ecosystem services, conservation easements)

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 Drift Plains Region:*

1. Housing and urban areas
2. Commercial and industrial areas
3. Renewable energy production
4. Conversion of habitat to annual crops
5. Invasive and alien species
6. Diseases from domestic populations and unknown sources
7. Mining and quarrying
8. Fossil fuel energy production
9. Tourism and recreation areas

Top conservation actions for SGCN occurring in developed lands in the Drift Plains Region:

1. Enhance public education and awareness (especially regarding 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
6. Limit mowing along roads

Top threats to fish and wildlife habitats in developed lands in the Drift Plains Region:

1. Housing and urban areas
2. Commercial and industrial areas
3. Runoff from roads and service corridors

Top conservation actions for fish and wildlife habitats in Developed Lands in the Drift Plains Region:

1. Preserve currently existing corridors
2. Increase acres of riparian buffers
3. Link existing habitat blocks through corridor enhancement in developed lands
4. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
5. Develop education programs in general
6. Develop education programs specifically for K-12
7. Increase regulations on invasive species
8. Reduce urban sprawl through planning and zoning
9. Establish training programs for stakeholders

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 Drift Plains Region:*

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

Top conservation actions for SGCN occurring in forests in the Drift Plains Region:

1. Protect large contiguous forested areas and reduce forest fragmentation
2. Limit conversion of forests to non-forest land uses
3. Control invasive woody plants
4. Restore forests and woodlands
5. Implement best management practices in forestry
6. Reduce development in forested areas
7. Protect roost trees for bat species
8. Create small forest openings to increase diversity

Top threats to fish and wildlife habitats in forests in the Drift Plains Region:

1. Invasive and alien species
2. Housing and urban areas
3. Conversion of habitat to annual crops
4. Problematic native species
5. Commercial and industrial areas
6. Plant diseases
7. Annual and perennial non-timber crops
8. Introduced genetic material
9. Livestock farming and ranching
10. Tourism and recreation areas

Top conservation actions for fish and wildlife habitats in forests in the Drift Plains Region:

1. Control invasive species in forests
2. Preserve currently existing corridors
3. Restore habitats and natural systems in forests
4. Promote use of research and science in conservation decision-making processes
5. Develop education programs in general
6. Develop education programs specifically for K-12
7. Develop alliances and partnerships (e.g., between producers, landowners, and conservation professionals)
8. Increase state's capacity for research and monitoring of conservation actions
9. Promote diversity of forest types and successional stages
10. Reduce conversion to cropland

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 Drift Plains Region:

1. Conversion of habitat to annual crops
2. Annual and perennial non-timber crops

Top conservation actions for SGCN occurring in grasslands in the Drift Plains Region:

1. Restore and improve connectivity of grasslands
2. Prevent conversion of grasslands to cropland
3. Increase CRP grasslands
4. Reduce woody encroachment on grasslands
5. Use burning and mowing as management techniques in grasslands
6. Improve grazing practices
7. Maintain low wet meadows

Top threats to fish and wildlife habitats in grasslands in the Drift Plains Region:

1. Invasive and alien species
2. Conversion of habitat to annual crops
3. Conversion of natural habitats to other land uses
4. Over-mowing of natural areas
5. Housing and urban areas
6. Fire and fire suppression
7. Annual and perennial non-timber crops
8. Recreation activities
9. Livestock farming and ranching

Top conservation actions for fish and wildlife habitats in grasslands in the Drift Plains Region:

1. Promote diversity of grassland types and successional stages
2. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
3. Re-establish natural disturbance regimes in grasslands
4. Restore habitats and natural systems in grasslands
5. Develop and promote farming technologies and practices that have conservation benefits (e.g., cover crops, no-till, and soil health)
6. Develop education programs in general
7. Reduce conversion to cropland
8. Promote conservation payment programs (e.g., payment for ecosystem services, conservation easements)
9. Develop education programs specifically for K-12
10. Establish training programs for stakeholders

Subterranean Systems

Subterranean systems are defined as connecting underground rooms and passages beyond natural light penetration. Examples of subterranean systems include: underground waters, above and below the water table, and terrestrial air-filled habitats ranging from large caves to interstitial crevices below soil horizons.

Top threats to SGCN occurring in subterranean systems in the Drift Plains Region:

1. Invasive and alien species
2. Diseases from domestic populations and unknown sources

Top conservation actions for SGCN occurring in subterranean systems in the Drift Plains Region:

1. Protect subterranean systems
2. Limit recreational caving
3. Protect bat hibernacula

Top threats to fish and wildlife habitats in subterranean systems in the Drift Plains Region:

1. Housing and urban areas
2. Runoff from roads and service corridors
3. Recreation activities
4. Invasive and alien species
5. Commercial and industrial areas
6. Roads and railroads

Top conservation actions for fish and wildlife habitats in subterranean systems in the Drift Plains Region:

1. Acquire currently unprotected subterranean systems
2. Preserve currently existing corridors
3. Acquire conservation easements
4. Control invasive species in subterranean systems
5. Restore habitats and natural systems in subterranean systems
6. Develop education programs in general
7. Develop education programs specifically for K-12
8. Establish training programs for stakeholders
9. Increase regulations on invasive species

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 Drift Plains Region:*

1. Natural habitat conversion
2. Invasive and alien species
3. Conversion of habitat to annual crops
4. Annual and perennial non-timber crops
5. Tourism and recreation areas
6. Dams and water management and use

Top conservation actions for SGCN occurring in wetlands in the Drift Plains Region:

1. Protect and maintain large wetlands complexes
2. Restore wetlands
3. Protect buffers around wetlands
4. Control invasive plants in wetlands
5. Create shorebird management areas
6. Mitigate road hazards to amphibians and reptiles when roads cross over wetlands
7. Enroll wetlands in WRP
8. Provide stopover and roosting habitat for cranes
9. Manage for diversity in wetlands
10. Conserve ephemeral wetlands

Top threats to fish and wildlife habitats in wetlands in the Drift Plains Region:

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

Top conservation actions for fish and wildlife habitats in wetlands in the Drift Plains Region:

1. Reduce conversion to cropland
2. Increase acres of riparian zones
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. Reduce loss of fish and wildlife habitats (due to agriculture, urban sprawl, commercial development, etc.)
6. Reduce nutrient and toxin loads
7. Restore habitats and natural systems in wetlands
8. Develop education programs specifically for K-12
9. Acquire conservation easements to protect important wildlife habitats
10. Develop alliances and partnerships (e.g., between producers, landowners, and conservation professionals)
11. Promote use of research and science in conservation decision-making processes