MICHIGAN 2015 - 2025

Great Lakes Marsh & Inland Emergent Wetlands

Wildlife Action Plan

Today's Priorities, Tomorrow's Wildlife

WHAT ARE GREAT LAKES MARSH & INLAND EMERGENT WETLANDS?

Great Lakes Marsh is an herbaceous wetland that occurs statewide along shorelines of the Great Lakes and their major connecting rivers. Vegetation patterns and diversity are strongly influenced by water-level fluctuations and the local configurations of shoreline. Vegetation zones from lake to land generally include a deep marsh with floating-leaved and submergent plants; an emergent marsh of mostly narrow-leaved species such as bulrushes; and a sedge-dominated wet meadow that can be inundated by storms. Great Lakes Marsh develops on all types of mineral soil and occasionally on bedrock, sometimes covered by loosely consolidated, acidic to alkaline organic deposits of variable depth.

The major process that influences these ecosystems is Great Lakes water level fluctuations, which impacts plant, fish, and wildlife distribution and abundance. For example, seasonal and longer-term fluctuating water levels within Great Lakes Marshes result in dynamic shifts in wetland habitat values. Changes in water levels over time result in migration of plant communities (Albert 2003) through lateral displacement (lakeward and landward shifts in wetland cover types) and horizontal zonation (varied composition or height of adjacent plant stands). These changes are natural and vital to plant species diversity and coastal marsh health, and in turn influence use by wildlife.

Inland Emergent Wetlands are shallow-water marshes that occur along the shores of lakes and streams throughout Michigan. Water depths of 15 cm or more is usually present throughout the growing season. Vegetation is comprised of narrow- and broad-leaved grasses and herbs that extend above the water surface, as well as floating-leaved plants. Inland Emergent Wetlands also develop on all types of mineral soil and bedrock, sometimes covered by loosely consolidated, acidic to alkaline organic deposits of variable depth. Natural processes that influence species composition and community structure include fluctuating water levels, seasonal flooding, and flooding by beaver.

– Adapted from Cohen et al. 2015

PLAN CONTRIBUTORS

Detroit Zoological Society

Ducks Unlimited

Michigan Department of Natural Resources

Michigan Department of Environmental Quality

Michigan Nature Association

Michigan Natural Features Inventory

National Audubon Society

The Nature Conservancy

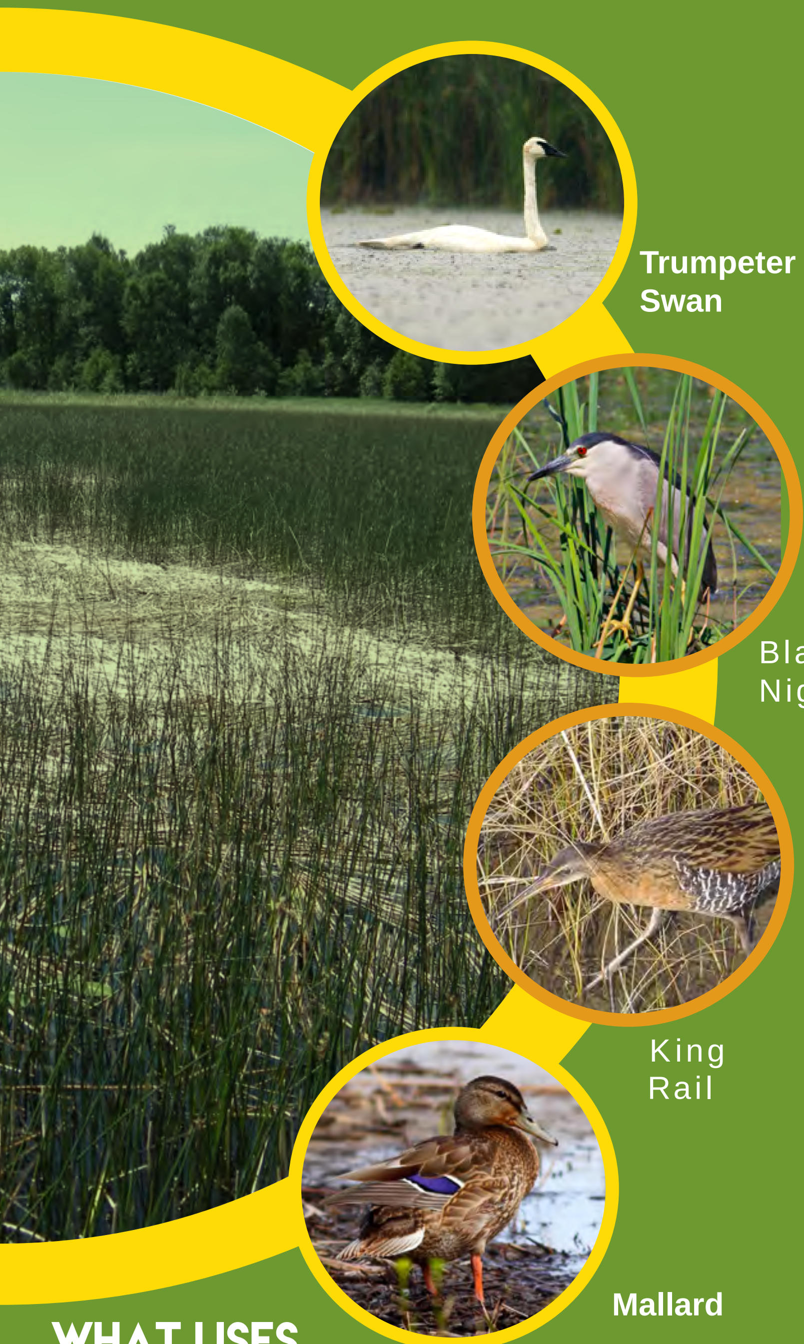
Upper Mississippi River and Great Lakes Region Joint Venture

Upper Midwest and Great Lakes Landscape Conservation Cooperative

WHY ARE GREAT LAKES MARSH & INLAND EMERGENT WETLANDS IMPORTANT?

Our wetlands are a great green sponge on the landscape providing many ecological services, from soaking up floodwaters after heavy rains and spring snowmelt to filtering out contaminants before they enter our lakes and rivers. The filtration process that occurs within wetlands removes excess nutrients, sediments, and pollutants from the water making it healthier for drinking, swimming, and supporting plants and wildlife. Water that has moved through wetlands ends up in better condition before it flows into nearby streams, rivers, and lakes, as well as groundwater. Wetlands can also reduce the frequency and intensity of floods by acting as natural buffers that slow and store large amounts of water. Local communities are beginning to recognize this benefit, and interest in restoring wetlands for this purpose may become increasingly important as extreme precipitation events are predicted to increase in the coming decades. Wetlands protect our homes and the water we drink. They provide needed habitat for a vast array of wildlife including fish, waterfowl, Common Loon, American Mink, American Beaver, and Bald Eagle. Wetlands play host to hunters, anglers, kayakers, birdwatchers, and photographers. Unfortunately, we have lost about half of the state's wetlands through draining and filling, and conversion to other land uses. A small investment now to protect and conserve Michigan's wetlands will save us immeasurably more in increased costs to communities for stormwater management and water quality for drinking and swimming, while continuing to offer great opportunities for recreation.

WHAT USES GREAT LAKES MARSH & INLAND EMERGENT WETLANDS?



Trumpeter Swan

Black-crowned Night-heron

King Rail

Mallard

WHAT IS THE HEALTH OF GREAT LAKES MARSH &INLAND EMERGENT WETLANDS?

Michigan currently has approximately 6.47 million acres of wetland; prior to European settlement Michigan contained approximately 10.7 million acres of wetland. Since the passage of Michigan's wetland protection law in 1979, the rate of wetland loss has declined dramatically. The total decline of wetland since 1978 is estimated at 41,000 acres, with the rate of decline slowing between the periods 1978 to 1998 (loss of approximately 1,642 acres per year) and 1998 to 2005 (loss of approximately 1,157 acres per year). Over the last few years, biodiversity conservation assessments were conducted for each of the Great Lakes, including their associated Great Lakes Marsh communities. Lake Erie and Lake Huron were assessed as having a fair viability, where lakes Michigan and Superior were assessed as good (Franks Taylor et al. 2010; Pearsall et al. 2012a; Pearsall et al. 2012b; Lake Superior Binational Program 2015).

Natural communities are tracked in the state's Natural Heritage Database, which provides information about their locations, their quality, and often the plants and wildlife found there. This data also provides an index of the overall health of wetlands across the state. Between 2005 and 2015, a single Great Lakes Marsh was added to the Natural Heritage Database for a total of 40 tracked ecosystems. Eleven were assessed between 2005 and 2015 to determine quality or health of the ecosystem; of those assessed only 36% were downgraded in quality. Between 2005 and 2015, six additional Emergent Marsh ecosystems were added to the state's Natural Heritage Database for a total of 26 tracked ecosystems. Nine were assessed since 2005, 11% were upgraded in quality, and 44% were downgraded.

An element occurrence is the basic unit of record for documenting and delimiting the presence and geographic extent of a species or natural community on the landscape in the state's Natural Heritage Database. Element occurrences are defined as an area of land and/or water where a species is, or was, present, and which has practical conservation value; for species element occurrences commonly reflect populations or subpopulations.

GOALS

- Increase wetland area and quality to achieve population goals for focal species. [LEBCS; LHBCS; LMBCS; LSBCS; NAWMP; DU]
- Collaborate to pursue wetland goals established within other plans including Michigan's North American Waterfowl Management Plan, the Great Lakes Restoration Initiative coastal wetland focus area, the Great Lakes Water Quality Agreement Annexes, and Upper Mississippi River and Great Lakes Region Joint Venture Conservation Strategies. [NAWMP; DU; LCC]

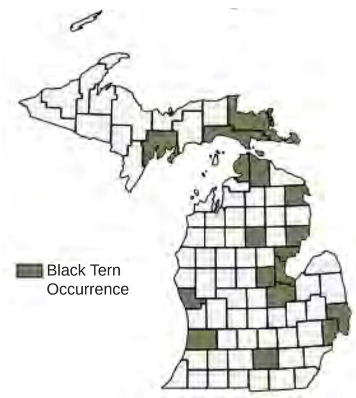
American lotus
(Nelumbo lutea)

Wild rice
(Zizania aquatica var. aquatica)

ASSOCIATED RARE PLANTS

WHAT ARE THE GREAT LAKES MARSH & INLAND EMERGENT WETLAND FOCAL SPECIES?

Where we are now and what we think we can realistically achieve over the next 10 years.



Black Tern
(Chlidonias niger)
Special Concern

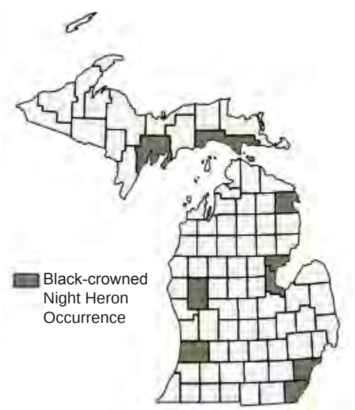
Black Terns are small, dark, graceful birds and the smallest tern found in Michigan. Black Terns prefer marshes with extensive stands of emergent vegetation such as bulrush, cattail, sedge, or wild rice and large areas of open water with floating plant material or other low structures for nesting (Soulliere et al. 2007). They also need wetland complexes greater than 50 acres in size (Soulliere et al. 2007). The Michigan Breeding Bird Atlas II shows steep declines in the number of townships where Black Terns were observed compared with the first atlas (Scharf 2011). Black Terns are quite adaptable and often change colony sites, but recently the number of abandoned sites has exceeded the number of new sites (Sauer et al. 2014). The long-term trend for Black Terns across their range and the Great Lakes region indicates a significant decline (Upper Mississippi and Great Lakes Region Joint Venture, unpublished report).

GOALS

- Determine key population limiting factors.
- Reverse downward trend and stabilize population.

Black-crowned Night-heron
(Nycticorax nycticorax)
Special Concern

Black-crowned Night-herons are stocky herons with red eyes that are most active at night or dusk. These birds occur in marshes with a mix of open water, herbaceous vegetation, and nearby woody cover for nesting; nests are typically <3 m above the ground in trees and shrubs (Soulliere et al. 2007). They prefer breeding sites on islands or in large wetland complexes which limit predation and human disturbance (Soulliere et al. 2007). The Upper Mississippi River Great Lakes Region Joint Venture estimates that there are 8,674 birds in the Great Lakes Region (Soulliere et al. 2007). Black-crowned Night-herons are declining throughout their range (Monfils 2004); however, an increase in the number of colonies of Black-crowned Night-heron was reported in the Michigan Breeding Bird Atlas II compared to the first atlas (Scharf 2011).



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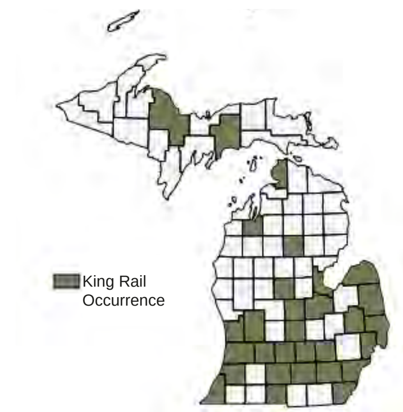


King Rail
(Rallus elegans)
State Endangered

King Rails are large, secretive marsh birds with long bills and long toes (Rabe 2001). Adults will completely molt after nesting and are flightless for nearly a month (Cornell University 2015). These birds prefer wetlands with water depths <25 cm with cattail, grass, sedge, and/or rush, often with scattered shrubs and small trees; they require varied micro-topography – hummocks, swales, and dry patches in marsh for nesting, foraging, and brood rearing (Soulliere et al. 2007). The muddy transition zone of wetlands is an important habitat component and can be degraded by *Phragmites*. Systematic surveys of 82 wetlands within 3 kilometers of the Great Lakes shore during the mid-2000s, which included the use of prerecorded playback calls, yielded not a single observation of this species (M. Sanders, pers. comm.). Similar targeted surveying as late as 1986 yielded as many as 26 individuals (Rabe 1986). Michigan likely only has 5-10 pairs of King Rail (Putnam 2011).

Eastern Fox Snake
(Pantheropis gloydi)
State Threatened

Eastern Fox Snakes are boldly patterned with dark brown or black blotches down their back and sides and a yellowish to light brown body. They will buzz their tail when threatened and so can be mistaken for a venomous snake. However, they are harmless and provide a great rodent control service. These snakes are seldom found far from water and can swim long distances (Harding 1997). They inhabit wetlands along the shorelines of the Great Lakes and can be associated with large rivers and impoundments (Evers 1994). They primarily occur in open wetlands but will occupy drier habitats such as vegetated dunes and beaches (Harding 1997). Uncommon or rare in many areas where it was once abundant, the Eastern Fox Snake occurs only in the Great Lakes basin in southern Ontario, Michigan, and Ohio. There has been a population reduction of more than 50% over the last 10 years. There are 22 known locations for this snake in Michigan since 1994.

GOALS

- Maintain or increase existing populations.

HOW VULNERABLE ARE FOCAL SPECIES TO CLIMATE CHANGE?

Hoving et al. (2013) determined climate vulnerabilities for species in Michigan. Although the focal species do not appear to have severe vulnerabilities to climate change, wetland species of greatest conservation need overall were found to be particularly vulnerable. See threats section for more specifics about how climate change may affect species and habitats.

Climate vulnerabilities are based on projected changes in the abundance or range of a species by 2050 - extreme = greatly reduced or the species would disappear; high = significantly decrease; moderate = likely decrease; increase = likely increase.

	Climate Vulnerability
Black Tern	Moderate
Black-crowned Night-heron	Increase
King Rail	Stable
Eastern Fox Snake	Moderate

WHAT ARE THE CONSERVATION THREATS & ACTIONS?

Major threats that need to be addressed and key actions that need to be implemented over the next 10 years.

THREATS to Habitat

Invasive & Other Problematic Species, Genes & Diseases

- Invasive plants (e.g., *Phragmites*) cause changes in structural diversity and microhabitats (Soulliere et al. 2007).
- Invasive animals (e.g., Zebra Mussels, Mute Swans, Asian Carp) can cause changes in nutrient dynamics and displace native wildlife.

Natural Systems Modifications

- Bulkheads, retaining walls, and dredging alter hydrology and sediment transport (Albert 2001); these changes can significantly impact the types, quantity, and quality of wetland habitats.
- Lack of information about fluvial dynamics of coastal wetland ecosystems.
- Fragmentation of large wetland complexes affects ecological functions.

Residential & Commercial Development

- Shoreline residential development removes and degrades habitats (Albert 2001).

Agriculture & Aquaculture

- Conversions to other land uses and tiling and draining of agricultural fields changes wetland hydrology (Albert 2001).

Human Intrusions & Disturbance

- Incompatible recreation, specifically ORVs and jet skis, cause erosion of habitats and disturb wildlife (Kost et al. 2007).
- Negative perceptions of the value of wetlands and management practices (e.g., water level manipulations).
- Wetland regulations and policies can hamper restoration efforts.

Pollution

- Runoff increases rates of eutrophication and sedimentation (Albert 2001).
- Point-source pollution identified in the Areas of Concern (AOC), including leaking septic systems near wetlands and concentrated animal feeding operations, increases nutrient inputs (Kost et al. 2007).

Climate Change & Severe Weather

- Higher temperatures and longer growing seasons will likely result in greater evapotranspiration and evaporation, less soil moisture, and smaller/fewer wetlands.
- Precipitation is very likely to become more extreme and less consistent. The amount of rain per storm and the time between storms is likely to increase, leading to less consistent moisture for wetlands and greater impacts from runoff pollution. Precipitation inconsistency and extreme precipitation events can also affect nesting success (Soulliere et al. 2007).

Conservation ACTIONS for Habitat

Land & Water Management

H1. Restore, manage, and protect Great Lakes Marsh and Inland Emergent Wetlands on state, federal, and private lands for focal species. [CRA; DU; JV2; LHBCS 1.1, 2.5; LSBCS-1; NAWMP; SCDRS; SWR]

H2. Soften shorelines from bulkheads or retaining walls to options that are more wildlife-friendly. Use Areas of Concern remedial action plans to focus efforts. [LEBCS-6.4; SCDRS]

H3. Manage for priority invasive species, and address factors causing ecosystem susceptibility to invasion (e.g., degraded water quality, salt from roads, altered flood or hydrological regime). [AIS; JV2; SWR]

H4. Continue early detection and response efforts for invasive species. [AIS; CC-7.3; LEBCS-6.3; LMBCS-6.3; LSBCS-3; SCDRS; SWR; TIS]

H5. Implement Michigan's Aquatic and Terrestrial Invasive Species State Management Plans. [AIS; LMBCS-6.3; SCDRS; SWR; TIS]

Raising Awareness

H6. Educate private land owners on the values of Great Lakes wetlands, wetland management, and the wildlife that rely on them. Work with existing private lands programs within the U.S. Forest Service, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, Department of Natural Resources, and Department of Agriculture and Rural Development. [CRA; LEBCS-6.4; LHBCS-4.3; LMBCS-6.4; NAWMP; PIF]

H7. Promote voluntary best management practices for stopping the introduction and spread of invasive species by recreational users, researchers and industry. [AIS; TIS]

H8. Promote and use Michigan's HerpAtlas website and app (www.miherpatlas.org/).

H9. Support, promote, and participate in the Michigan Waterfowl Legacy (www.michigan.gov/mwl).

Conservation Designation & Planning

H10. Use conservation easements and acquisition to increase long-term viability of restored habitats. [DU; LHBCS-1.1; NAWMP]

H11. Develop and promote best practices for including important habitat components for focal species during habitat management, similar to the waterfowl management handbook.

H12. Explore opportunities to work with the Army Corps of Engineers regarding sediment shifts to protect important Great Lakes wetlands.

H13. Identify high-quality Great Lakes Marsh and Inland Emergent Wetlands in climate resilient landscapes and incorporate into conservation planning and management; currently being developed by The Nature Conservancy. [CC-1.2]

H14. Develop best management practices and implement recommendations for climate-smart wetland infrastructure that is engineered to withstand projected extreme precipitation events over the design-life of the project rather than the mean of past precipitation events. [CC-7.1; LEBCS; LHBCS; LMBCS; LSBCS-4]

Law & Policy

H15. Support and increase Farm Bill conservation programs focused on nutrification and sediment retention and drainage. [LEBCS-6.2; LHBCS-2.3; LMBCS-6.2]

H16. Work with land planners and EPA 319 watershed groups to promote, develop, and implement model ordinances and best management practices to support conservation and protection of Great Lakes Marsh and Inland Emergent Wetlands. [CRA; LEBCS-6.5; LHBCS-4.1; LMBCS-6.5; SCDRS]

H17. Take appropriate enforcement actions for violations of the Invasive Species Order, and maintain the Prohibited and Restricted Species list pursuant to the Natural Resources and Environmental Protection Act, 451 of 1994, as amended. [AIS;TIS]

H18. Continue to administer an effective Michigan Department of Environmental Quality protection program for wetlands and provide incentives for conservation practices.

H19. Target mitigation dollars through Michigan Department of Environmental Quality (DEQ) and Natural Resources Damage Assessment (NRDA) on priorities identified in this plan.

H20. Support continuation of Great Lakes Restoration Initiative, Coastal Zone Management grants program, North America Wetlands Conservation Act, and other programs that support wetland conservation and management.

Research & Monitoring

H21. Continue to expand the coastal wetland restoration assessment to aid in identifying the most restorable coastal wetland sites given specific priorities; currently being developed by the U.S. Geological Survey. [LCC; LHBCS-2.6]

H22. Finish developing and implement the coastal wetland functional assessment being developed by the U.S. Geological Survey to provide site-scale and landscape-scale assessments of coastal wetland restoration projects. [LCC]

H23. Work with Michigan Department of Environmental Quality on landscape level assessments of wetlands.

H24. Use and promote the Midwest Invasive Species Information Network (MISIN) to monitor invasive species. [AIS;TIS]

THREATS to Black Tern

Lack of Knowledge

- Lack of information on limiting factors, key habitat needs, basic biology, and impacts of collisions with wind turbines. Colonies can change locations yearly, but it is unclear why they abandon some sites (Soulliere et al. 2007).

Invasive & Problematic Species, Pathogens & Genes

- Disturbance from predators and humans may be an issue (Currier 2000).

Climate Change & Severe Weather

- Climate change could have a variety of impacts: higher lake levels could decrease available habitat; colonies could get swamped due to increased precipitation or intense storms; intense storms can also cause high chick mortality; changes in Great Lakes water levels can affect nesting colony locations and success (Hoving et al. 2013).

Conservation ACTIONS for Black Tern

Research & Monitoring

BT1. Identify limiting factors for Black Tern to aid management. [JV; JV2; WCA; PIF]

BT2. Determine migration pathways and important overwintering areas for Black Tern.

BT3. Determine key habitat components for Black Tern colony site selection and causes of colony abandonment. [JV; JV2]

THREATS to Black-crowned Night-heron

Lack of Knowledge

- Lack of information on limiting factors, key habitat needs, and collisions with wind turbines (Soulliere et al. 2007).

Invasive & Problematic Species, Pathogens & Genes

- Unintentional harassment of herons at rookeries during both legal and illegal cormorant control efforts (Soulliere et al. 2007).

Conservation ACTIONS for Black-crowned Night-heron

Research & Monitoring

BN1. Identify limiting factors of Black-crowned Night -heron to aid management. [JV; JV2; PIF; WCA]

BN2. Determine if cormorants negatively impact Black-crowned Night-heron. Specifically, do cormorant colonies or cormorant culling activities unduly disturb or displace night heron rookeries, particularly newly established ones. [JV; JV2]

THREATS to King Rail

Lack of Knowledge

- Lack of information on limiting factors, key habitat needs, basic biology, and collisions with wind turbines (Soulliere et al. 2007).

Conservation ACTIONS for King Rail

Research & Monitoring

KR1. Identify limiting factors for King Rail to aid management. [JV; JV2; PIF; WCA]

KR2. Describe current King Rail habitat across the Great Lakes region to inform management. [KR]

THREATS to Eastern Fox Snake

Lack of Knowledge
- Lack of information on key habitat needs and basic biology (Lee 2009).

Residential & Commercial Development
- Development and agriculture can destroy and degrade habitat (Harding 1997).
- Roads and bank stabilization infrastructure, such as bulkheads and retaining walls, can disrupt movements and fragment wetland and upland habitats (Lee 2009).

Human Intrusions & Disturbance
- Human persecution and illegal collection (Harding 1997).

Natural System Modifications
- Inappropriate habitat management during critical life stages, specifically flooding important habitats during hibernation and dike mowing (Lee 2009).

Conservation ACTIONS for Eastern Fox Snake

Conservation Designation & Planning
FS1. Use conservation easements and acquisition to protect, secure, and expand occupied sites.

Research & Monitoring
FS2. Identify limiting factors for the Eastern Fox Snake to aid management. [CRA]

FS3. Identify hibernacula and nesting areas for the Eastern Fox Snake. [CC-1.1; CRA]

WHAT ADDITIONAL CONSERVATION ACTIONS ARE NEEDED?

These additional conservation actions were identified by partners and should be addressed as resources become available.

Conservation Designation & Planning

1. Develop a connected decision support tool for wetland conservation to better direct and implement management that includes existing efforts, climate vulnerabilities of focal species and habitats, and a mapping feature. [CC-5.3; LHBCS-7.1]

2. Work proactively with local municipalities and other land planners to suggest wetland creation as green infrastructure to handle stormwater during extreme precipitation events. [CC-7.1]

Law & Policy

3. Support and develop policies and/or legislation to conserve high-quality wetlands, including addressing threats such as invasive species, point-source pollution, disturbance, and water withdrawal. [AIS; LMBCS 6.5; TIS]

Research & Monitoring

4. Quantify functions and values of ecosystem services of Great Lakes Marsh and Inland Emergent Wetlands. [LHBCS-8.2]

Institutional Development

5. Lobby for funding sources to acquire and manage important Great Lakes coastal areas.

HOW WILL WE MONITOR?

Assessing status and measuring progress towards goals.

HABITAT

- Continue Great Lakes Coastal Monitoring Project to provide data on quality across the state. [CWC; LEBCS; LHBCS-8.6; LMBCS; LSBCS]
- Continue Michigan Department of Environmental Quality wetland monitoring efforts.
- Continue Upper Mississippi River and Great Lakes Region Joint Venture habitat management reporting. [JV; JV2]
- Continue to survey and update quality rankings for Great Lakes Marshes and Inland Emergent Wetlands in the state's Natural Heritage Database.

BLACK TERN

- Continue North American Breeding Bird Survey, Great Lakes Colonial Waterbird Survey decadal count,and Michigan Marsh Bird Survey. [JV2]
- Develop a consistent and agreed upon monitoring strategy for Black Tern in Michigan using existing efforts when possible.
- Use citizen science programs, such as eBird, to help assess distribution and relative abundance.
- Continue to update element occurrences in the state's Natural Heritage Database.

BLACK-CROWNED NIGHT-HERON

- Continue Great Lakes Colonial Waterbird Survey decadal count. [JV; JV2]
- Implement modified Great Lakes Colonial Waterbird Survey at an increased frequency at a subset of locations, and incorporate habitat data collection into survey. [JV; JV2]
- Use citizen science programs, such as eBird, to help assess distribution and relative abundance.
- Continue to update element occurrences in the state's Natural Heritage Database.

KING RAIL

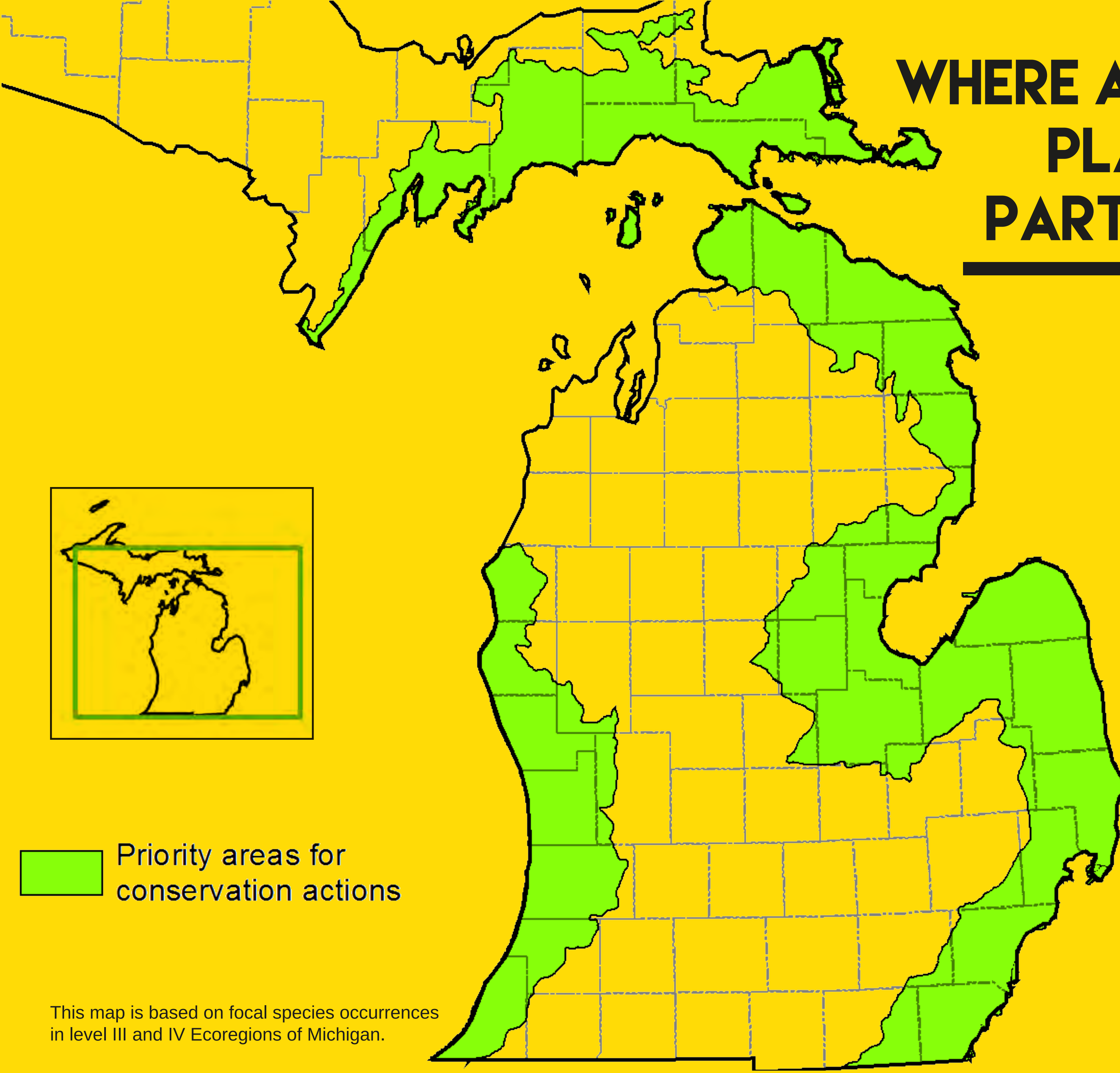
- Use a variety of data sources (relying heavily on the Secretive Marsh Bird Survey) to index species population trends. [JV; JV2]
- Explore the feasibility of implementing a King Rail specific survey; implement if feasible. [JV; JV2]
- Use citizen science programs, such as eBird, to help assess distribution and relative abundance.
- Continue to update element occurrences in the state's Natural Heritage Database.

EASTERN FOX SNAKE

- Survey known sites regularly to determine presence absence and relative abundance.
- Continue to conduct surveys to find new Eastern Fox Snake occupied sites.
- Use citizen science programs, such as the HerpAtlas, to help assess distribution.
- Continue to update element occurrences in the state's Natural Heritage Database.

WHERE ARE THERE PLACES FOR PARTNERSHIP?

This map was designed by partners to help them connect around important places for focal species. Working together on conservation actions on a voluntary basis provides great benefits to wildlife and people.



This map is based on focal species occurrences in level III and IV Ecoregions of Michigan.

HOW DOES THIS PLAN LINK WITH OTHER CONSERVATION PLANS?

There has been a multitude of relevant planning efforts across the state and country over the past ten years. Bracketed superscripts throughout the Wildlife Action Plan indicate where the conservation action, goal, or monitoring strategy aligns with those from another plan. For conservation plans with distinct objectives, the objective or strategy number is also included. This linking of plans is meant to facilitate the expansion of partnerships.

[AIS] Michigan's aquatic invasive species state management plan 2013 update (MDEQ et al. 2013).

[CC] National fish, wildlife and plants climate adaptation strategy (National Fish, Wildlife and Plants Climate Adaptation Partnership 2012).

[CRA] Clinton River assessment (Francis and Haas 2006).

[CWC] Great Lakes coastal wetland monitoring plan (Great Lakes Coastal Wetlands Consortium 2008).

[DU] Ducks Unlimited: Great Lakes Initiative.

[JV] Upper Mississippi Valley/Great Lakes waterbird conservation plan: a plan associated with the Waterbird Conservation for the Americas Initiative (Wires et al. 2010).

[JV2] Upper Mississippi River and Great Lakes Region Joint Venture waterbird habitat conservation strategy. (Soulliere et al. 2007)

[KR] King Rail conservation plan, version 1 (Cooper 2008)

[LCC] Upper Midwest and Great Lakes Landscape Conservation Cooperative: Coastal Conservation Focal Area.

[LEBCS] Returning to a healthy lake: Lake Erie biodiversity conservation strategy (Pearsall et al. 2012a).

[LHBCS] The Sweetwater Sea: an international biodiversity conservation strategy for Lake Huron - technical report (Franks Taylor et al. 2010).

[LMBCS] Michigami: Great Water: strategies to conserve the biodiversity of Lake Michigan (Pearsall et al. 2012b).

[LSBCS] A biodiversity conservation strategy for Lake Superior (Lake Superior Binational Program 2015).

[NAWMP] North American Waterfowl Management Plan and Upper Mississippi River and Great Lakes Region Joint Venture Michigan Implementation Strategy (1998-2013) (Michigan NAWMP Steering Committee 1998).

[PIF] Partners in Flight bird conservation plan for the Upper Great Lakes Plain (Physiographic area 16) (Knutson et al. 2001).

[SCDRS] Selected priority objectives for the St. Clair Detroit River System initiative (SCDRS Initiative Steering Committee 2015).

[SWR] Wildlife Division southwest regional habitat guidance – wetlands (DNRa 2015).

[TIS] Michigan terrestrial invasive species state management plan (DNRb in preparation).

[WCA] Waterbird conservation for the Americas: the North American waterbird conservation plan, version 1 (Kushlan et al. 2002).

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ABOUT THE WILDLIFE ACTION PLAN

Today's Priorities, Tomorrow's Wildlife

Every state has a Wildlife Action Plan, which taken together create a national conservation strategy for safeguarding wildlife and their habitats for current and future generations. Each state's action plan is uniquely designed to serve the needs of that state. These plans provide a framework for proactive conservation and management of fish and wildlife before they become imperiled, which is more straightforward, cost-efficient, and effective.

Michigan's Wildlife Action Plan was developed by conservation partners across the state. It provides information about those species in greatest conservation need. The plan is organized by chapters or mini-plans. Each mini-plan outlines priorities for the next 10 years. The mini-plans detail priority habitats and focal species of greatest conservation need, status of species and habitats, critical threats, needed conservation actions, places for partnerships, monitoring needs, and goals. This is one of 15 mini-plans. For more information about how the plan was built and to read other mini-plans, please visit: www.michigan.gov/dnrwildlifeactionplan.