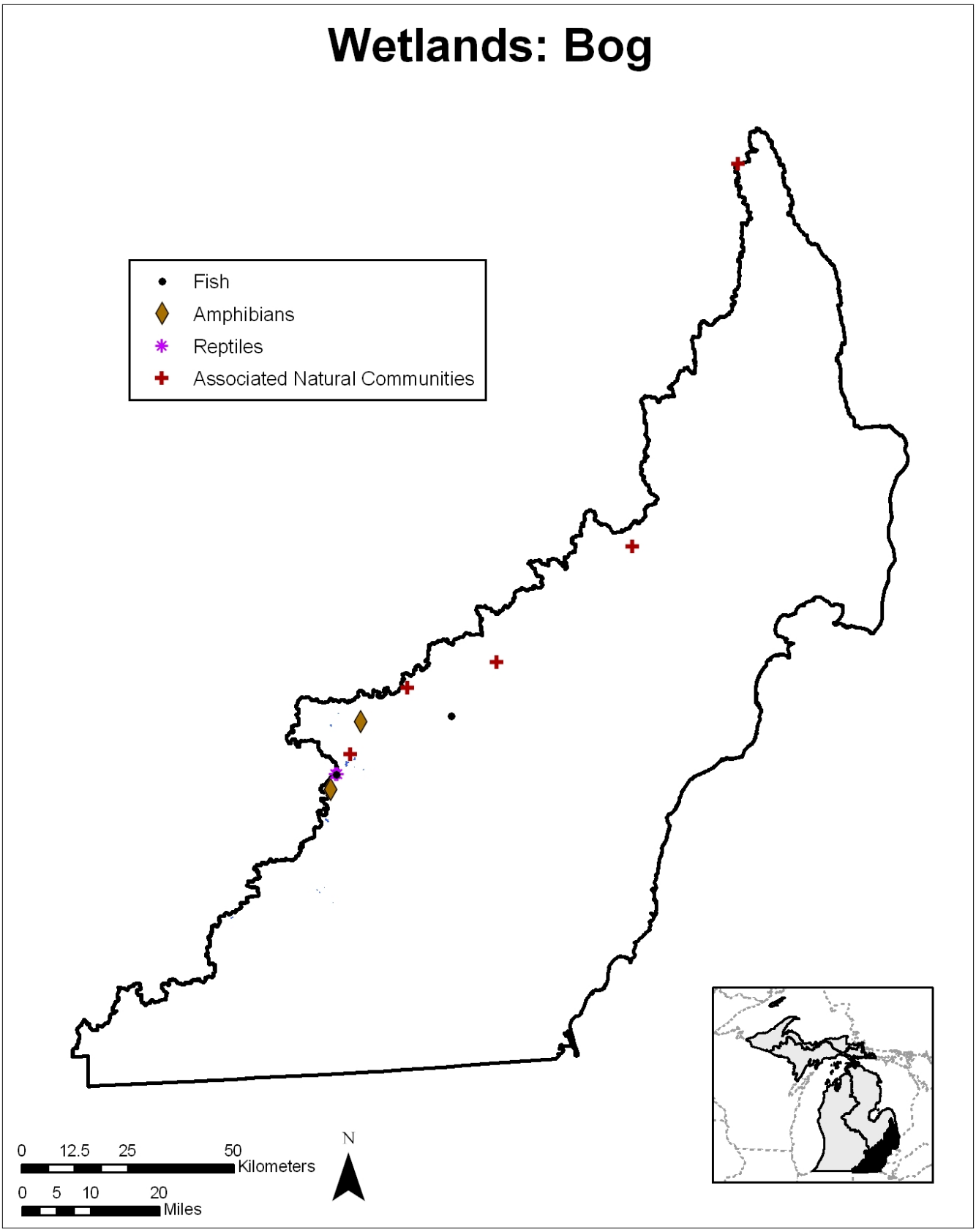
Wetlands: Bog



Wetlands: Bog

Description

Bogs are peat-accumulating, acidic, low nutrient wetlands that receive all or most of their water and nutrients from precipitation. Sphagnum moss (*Sphagnum andersonianum*) mats are characteristic of bogs. Other characteristic vegetation includes carnivorous plants such as sundew (*Drosera sp.*) and pitcher plants (*Sarracenia purpurea*), shrubs from the Heath family, and sedges (*Carex sp.*).

General Condition of Feature

This habitat is considered 50% in good to excellent condition, 25% in fair condition, and 25% in degraded to very degraded condition.

Associated Natural Communities

Bog

Associated Species of Greatest Conservation Need

INSECTS
spatterdock darner (*Aeshna mutata*)
Cantrall's bog beetle (*Liodessus cantralli*)

FISH
finescale dace (*Phoxinus neogaeus*)

AMPHIBIANS
blue-spotted salamander (*Ambystoma laterale*)
four-toed salamander (*Hemidactylium scutatum*)

AMPHIBIANS cont.
Blanchard's cricket frog (*Acris crepitans blanchardi*)
pickerel frog (*Rana palustris*)
northern leopard frog (*Rana pipiens*)

REPTILES
copperbelly water snake (*Nerodia erythrogaster neglecta*)
spotted turtle (*Clemmys guttata*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES
- Altered hydrologic regimes: Loss of groundwater; Loss of water supply due to development and drainage changes; Changes to flow regime
- Altered fire regime: Drought; Fire (low threat)
- Fragmentation

POLLUTION
- Altered nutrient inflows: (low threat)

HABITAT CONVERSION
- Dredging and channelization: Dredging (low threat)
- Riparian modification: Land development and draining
- Wetland modification: Land development and draining

BIOLOGICAL INTERACTIONS
- Disease, pathogens, and parasites
- Invasive plants and animals

CONSUMPTIVE BIOLOGICAL RESOURCE USE
- Mining practices: Removal of peat (low threat)

Conservation Actions Needed (Threats addressed)

LAND & WATER PROTECTION
- Create and expand conservation easements (variety of threats)
- Support land conservancy purchase of undeveloped land (variety of threats)

LAND, WATER & SPECIES MANAGEMENT
- Allow seasonal flooding (altered hydrologic regimes)
- Maintain and rehabilitate natural corridors between significant habitats such as bogs, wetlands, and floodplains (fragmentation, riparian modification)
- Protect and rehabilitate wetlands (altered hydrologic regimes, wetland modification)
- Repair damaged wetland hydrology through the removal of tiles in abandoned farm fields (wetland modification)
- Rehabilitate and maintain riparian buffers of at least 50 ft., however 500 ft provides for better conservation value (riparian modification)
- Use Best management practices to protect hydrology (variety of threats)

LAW & POLICY
- Continue working with and educating Drain Commissioners (altered hydrologic regimes, dredging and channelization, riparian modification, wetland modification)

- Discourage water withdrawals and water diversions (altered hydrologic regimes)
- Encourage cluster development rather than evenly spaced home lots (riparian modification)
- Include wetland protections in zoning and planning ordnances (variety of threats)
- Protect and rehabilitate groundwater recharge by capturing development related runoff in infiltration basins (altered hydrologic regimes)

EDUCATION & AWARENESS

- Continue to educate the public about the benefits of wetlands and stewardship (social attitudes)

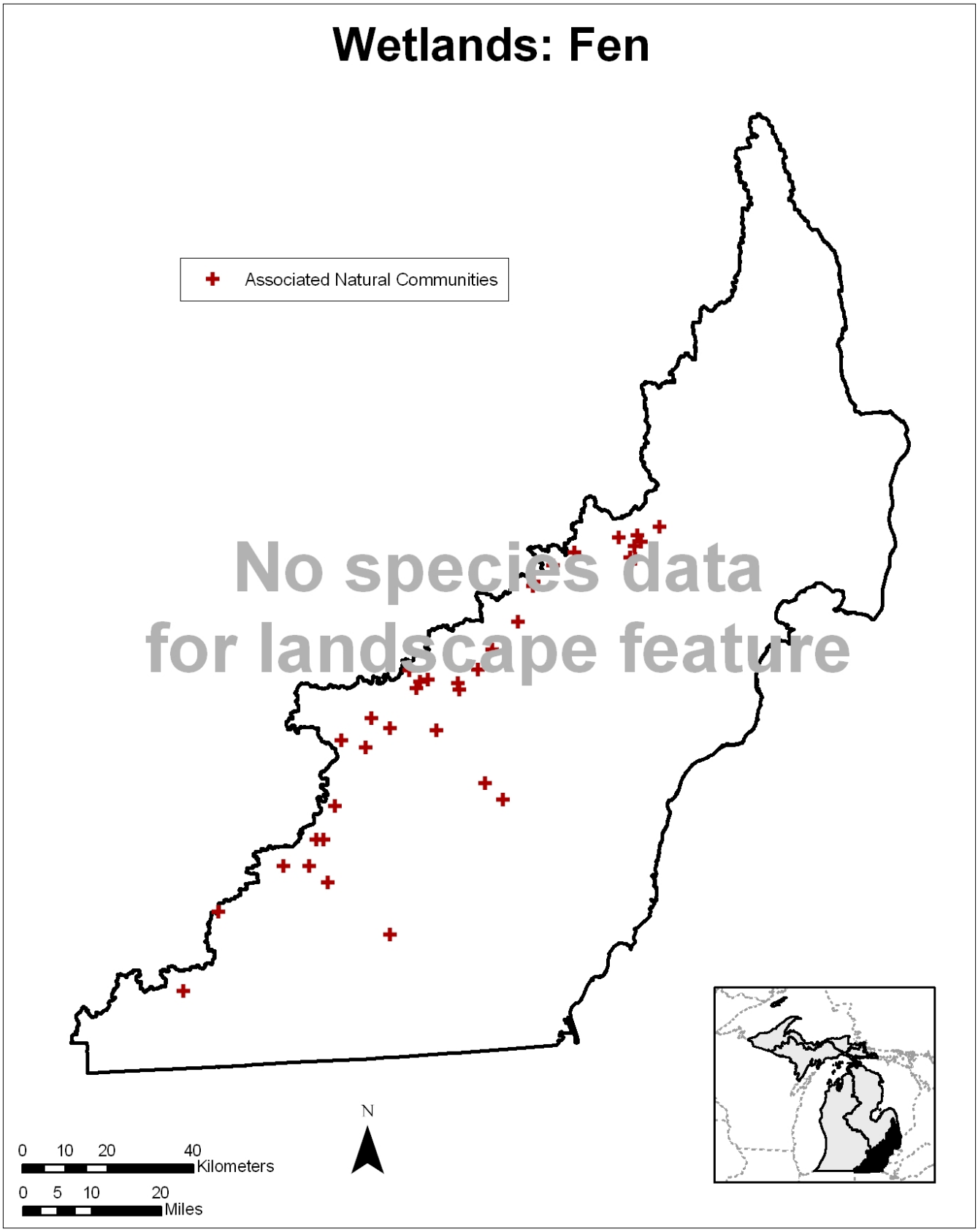
Research and Survey Needs

- Conduct statewide wetlands inventory
- Determine life history requirements for SGCN associated with bog
- Determine the amount of abandoned tiled farmland and ways to return it to the original condition
- Determine the amount of impervious in the watershed
- Investigate alternatives to water withdrawals and diversions
- Model hydrologic flow of each watershed

Monitoring

- Amount of impervious surface in watershed
- Draining and channelization activities
- Storm water
- Water withdrawals
- Wetland modification

Wetlands: Fen



Wetlands: Fen

Description

Fens are peat-accumulating wetlands that receive much of their water and nutrients from groundwater rich in calcium and magnesium carbonates. Fens tend to have relatively high pH and nutrient levels, hence supporting a great diversity of grasses, sedges (*Carex sp.*), rushes (*Juncus sp.)*, and wildflowers. Open conditions are maintained by seasonal water fluctuations, fire, and beaver-flooding.

General Condition of Feature

Condition is unknown for this feature; however fens are very threatened systems in the Lake Erie basin.

Associated Natural Communities

Prairie Fen

Associated Species of Greatest Conservation Need

INSECTS
spatterdock darner (*Aeshna mutata*)
Cantrall's bog beetle (*Liodessus cantralli*)

AMPHIBIANS
pickerel frog (*Rana palustris*)

REPTILES
copperbelly water snake (*Nerodia erythrogaster neglecta*)
spotted turtle (*Clemmys guttata*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES
- Altered hydrologic regimes: Changes to flow regime (phreatic flows); Groundwater level changes

POLLUTION
- Altered nutrient inflows

HABITAT CONVERSION
- Dredging and channelization
- Riparian modification
- Wetland modification

BIOLOGICAL INTERACTIONS
- Invasive plants and animals:

Conservation Actions Needed (Threats addressed)

LAND & WATER PROTECTION
- Create and expand conservation easements (variety of threats)
- Support land conservancy purchase of undeveloped land (variety of threats)

LAND, WATER & SPECIES MANAGEMENT
- Maintain or establish riparian buffers of at least 50 ft., but 500 ft. or wider maximizes conservation benefits (altered hydrologic regimes, riparian modifications)
- Maintain and rehabilitate natural corridors between significant habitats such as fens, wetlands, and floodplains (fragmentation, species issues)
- Protect and rehabilitate groundwater recharge by capturing development related runoff in infiltration basins (altered hydrologic regimes)
- Protect and rehabilitate wetlands (altered hydrologic regimes, wetland modification)

LAW & POLICY
- Continue working and educating Drain Commissioners (altered hydrologic regimes, dredging and channelization, riparian modification, wetland modification)
- Discourage water withdrawals and water diversions (altered hydrologic regimes)

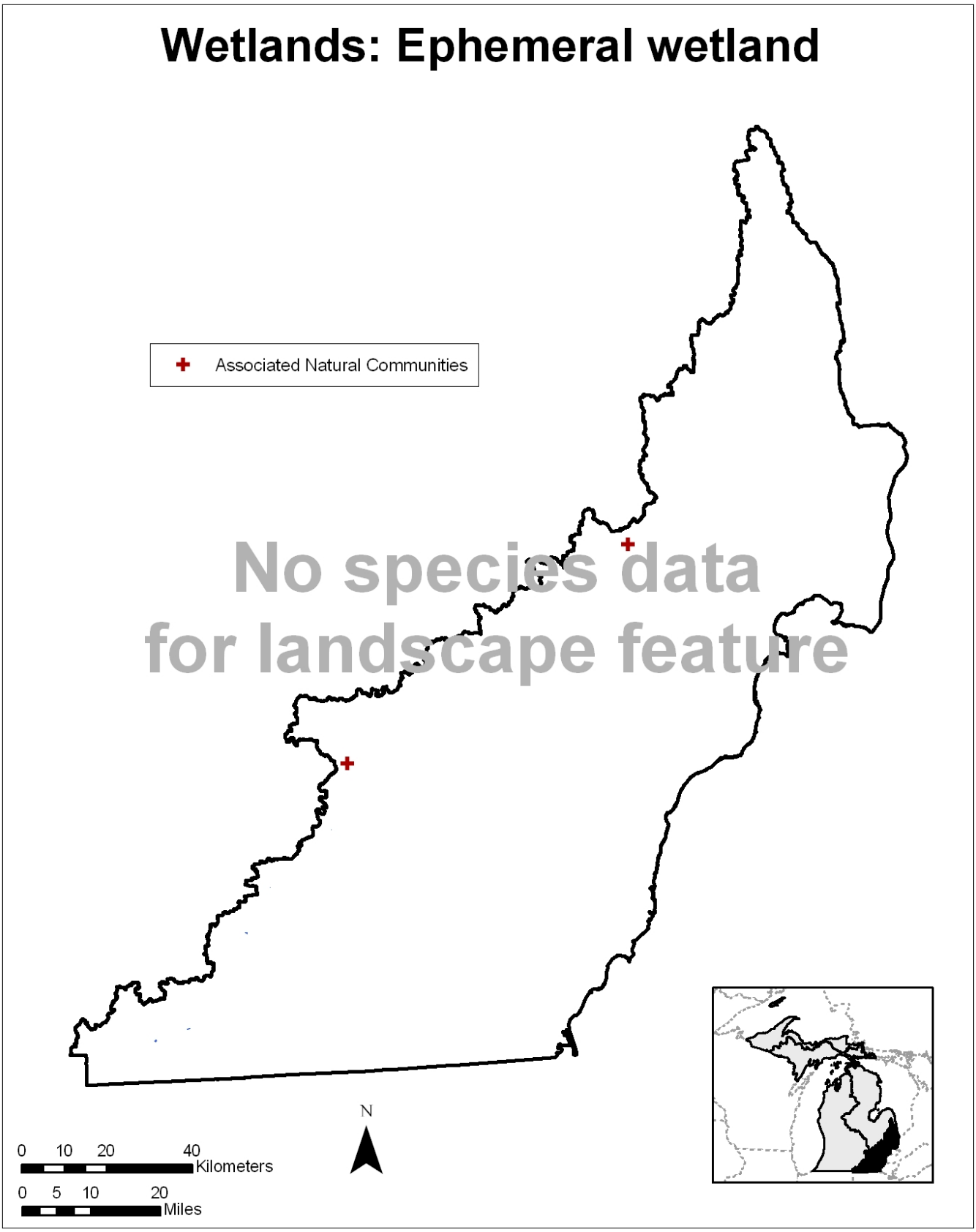
Research and Survey Needs
- Conduct statewide wetlands inventory
- Determine effective restoration techniques
- Determine life histories of those SGCN that use fen
- Determine the locations and conditions of fens in the basin and update information in the National Wetlands Database to reflect this
- Determine the amount of abandoned tiled farmland and ways to return it to the original condition
- Determine the amount of impervious in the watershed
- Determine the number and condition of fens in all watersheds
- Investigate alternatives to water withdrawals and diversions

- Model hydrologic flow of the entire watershed

Monitoring

- Amount of impervious surface in watershed
- Draining and channelization activities
- Storm water
- Water withdrawals
- Wetland modification

Wetlands: Ephemeral wetland



Wetlands: Ephemeral wetland

Description

Ephemeral wetlands are semi-permanent, seasonally flooded areas. These areas may be small and only a couple of feet in diameter (e.g., vernal pools) or very large. Ephemeral wetlands can have standing water for a few weeks in the spring or short periods after heavy rains during the rest of the year. When not flooded, soils in ephemeral wetlands may feel dry but typically show evidence of hydric conditions. In addition to seasonal fluctuations, water level can vary dramatically from year to year in ephemeral wetlands such as coastal plain marsh, interdunal wetland, and intermittent wetland.

General Condition of Feature

This habitat is considered 15% in good to excellent condition, 30% in fair condition, and 55% in degraded to very degraded condition.

Associated Natural Communities

Coastal Plain Marsh
Intermittent Wetland

Associated Species of Greatest Conservation Need

CRAYFISH
digger crayfish (*Fallicambarus fodiens*)

FISH
tadpole madtom (*Noturus gyrinus*)

AMPHIBIANS
blue-spotted salamander (*Ambystoma laterale*)
spotted salamander (*Ambystoma maculatum*)
smallmouth salamander (*Ambystoma texanum*)
eastern tiger salamander (*Ambystoma tigrinum tigrinum*)

AMPHIBIANS cont.
four-toed salamander (*Hemidactylium scutatum*)
western chorus frog (*Pseudacris triseriata triseriata*)

REPTILES
eastern fox snake (*Elaphe gloydi*)
copperbelly water snake (*Nerodia erythrogaster neglecta*)
queen snake (*Regina septemvittata*)
spotted turtle (*Clemmys guttata*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES
- Altered hydrologic regimes: Drainage pattern changes due to development
- Climate change
- Fragmentation: Habitat fragmentation; Isolation of breeding areas from living areas

POLLUTION
- Altered sediment loads
- Pesticides and Herbicides
- Urban, municipal, and industrial pollution

HABITAT CONVERSION
- Dredging and channelization: (low threat)
- Riparian modification: Development; Development and filling of small low areas; Ephemeral wetlands are highly endangered because of their ease of conversion to urban type space; Habitat manipulation for farming: Tiling
- Wetland modification: Filling; Development and filling of small low areas; Loss of wetlands; Ditching; Draining

BIOLOGICAL INTERACTIONS
- Invasive plants and animals

EDUCATION
- Social attitudes: Need public education so that society will see the value of these habitats; Lack of understanding of the importance of this habitat by riparian owners

Conservation Actions Needed (Threats addressed)

LAND & WATER PROTECTION
- Create and expand conservation easements (variety of threats)
- Support land conservancy purchase of undeveloped land (variety of threats)

LAND, WATER & SPECIES MANAGEMENT
- Allow seasonal flooding (altered hydrologic regimes)
- Close roads or install tunnels to allow amphibians and reptiles safe passage to breeding grounds (fragmentation, species issue)
- Control aquatic invasive species (invasive animals and plants)
- Maintain and rehabilitate buffers around wetlands (riparian modification, wetland modification)

- Maintain or rehabilitate natural corridors between ephemeral wetlands and other significant habitats, both upland and wetlands (fragmentation, species issue)
- Maintain or establish riparian buffers to at least 50 ft. (altered hydrologic regimes, altered sediment loads, riparian modification)
- Prevent establishment of new aquatic invasive species (invasive animals and plants)
- Protect and rehabilitate groundwater recharge (altered hydrologic regimes)
- Protect and rehabilitate the natural hydrologic regime (altered hydrologic regimes)
- When removing exotic vegetation at least 60-80% of native species should be preserved (invasive animals and plants)
- Rehabilitate and maintain wetland functions (wetland modification)
- Use integrated pest management practices (invasive –animals and plants)

LAW & POLICY

- Discourage water withdrawals (altered hydrologic regimes)
- Discourage draining practices (altered hydrologic regimes)
- Remove unnecessary or abandoned field tiles (altered hydrologic regimes, wetland modification)
- Continue working with and educating Drain Commissioners (altered hydrologic regimes, altered sediment loads, dredging and channelization, riparian modification, wetland modification)
- Encourage green-space planning and clustered development (riparian modification)
- Work with local officials on setback and buffer ordinances (riparian modification)
- Work with road commissions to site and maintain road crossings (altered hydrologic regimes, altered sediment loads)

EDUCATION & AWARENESS

- Expand education programs regarding natural processes, invasive species, hydrologic cycles, and stewardship (social attitudes)
- Increase awareness of affects of disturbance on the spread of aquatic invasive species (invasive plants and animals, social attitudes)
- Educate landowners on the value of wetlands (social attitudes)
- Continue to educate the public regarding the benefit of wetlands (social attitudes)

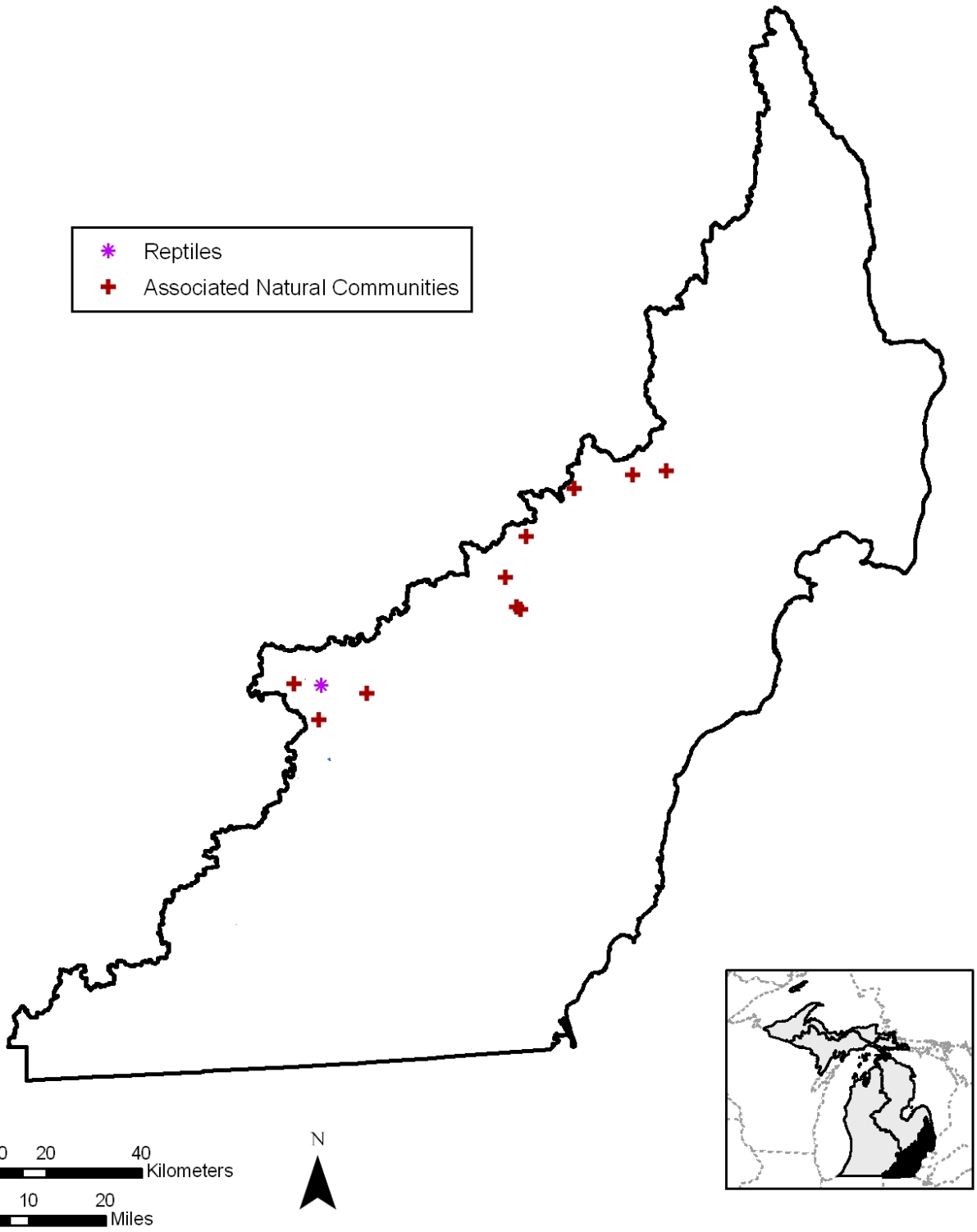
Research and Survey Needs

- Conduct statewide wetlands inventory
- Determine effective prevention, control, and survey techniques for aquatic invasive species
- Determine critical pathways between habitats for amphibians and reptiles to prevent vehicular fatalities and fragmentation of habitats
- Determine life history requirements for SGCN associated with ephemeral wetlands
- Establish effective methods of communicating with the public and their stewardship role
- Investigate ephemeral wetlands and their role in a watershed
- Model hydrologic flows
- Explore safe and cost effective methods to remove exotic vegetation without harming native species

Monitoring

- Aquatic invasive species
- Draining and channelization
- Fragmentation
- Indicator species
- Riparian modification
- Water withdrawals

Wetlands: Inland emergent wetland



Wetlands: Inland Emergent Wetland

Description

Inland emergent wetlands, also called marshes, are frequently or continually inundated with water and are characterized by emergent herbaceous vegetation adapted to saturated soil conditions. These wetlands tend to have abundant nutrients and are highly organic. Inland emergent wetlands are quite varied and can be found in poorly drained depressions and along lakes, ponds, and rivers.

General Condition of Feature

This habitat is considered 20% in good to excellent condition, 20% in fair condition, and 60% in degraded to very degraded condition.

Associated Natural Communities

Coastal Plain Marsh
Emergent Marsh
Intermittent Wetland
Southern Wet Meadow

Associated Species of Greatest Conservation Need

CRAYFISH
devil crawfish (*Cambarus diogenes*)
digger crayfish (*Fallicambarus fodiens*)

INSECTS
Cantrall's bog beetle (*Liodessus cantralli*)

FISH
grass pickerel (*Esox americanus*)
pirate perch (*Aphredoderus sayanus*)

AMPHIBIANS
Fowler's toad (*Bufo fowleri*)
western chorus frog (*Pseudacris triseriata triseriata*)
pickerel frog (*Rana palustris*)
northern leopard frog (*Rana pipiens*)

REPTILES
spotted turtle (*Clemmys guttata*)
Blanding's turtle (*Emydoidea blandingii*)
eastern box turtle (*Terrapene carolina carolina*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES
- Altered hydrologic regimes: Altered drainage patterns due to development; Lake level control
- Climate change
- Fragmentation

POLLUTION
- Altered sediment loads: Sediment impacting vegetation
- Urban, municipal, and industrial pollution: Surface runoff, contamination; Chemicals impacting vegetation

HABITAT CONVERSION
- Dredging and channelization: Dredging
- Riparian modification: Shoreline alteration
- Wetland modification: Filling; Dredging; Development pressure to fill wetlands for economical purposes

BIOLOGICAL INTERACTIONS
- Invasive plants and animals: Purple loosestrife; Phragmites replacing mature plants

NON-CONSUMPTIVE BIOLOGICAL RESOURCE USE
- Macrophyte removal

EDUCATION
- Social attitudes: Lack of public education on the importance of these habitats, especially by riparian owners

Conservation Action Needs (Threats addressed)

LAND & WATER PROTECTION
- Create and expand conservation easements (variety of threats)
- Support land conservancy purchase of undeveloped land (variety of threats)

LAND, WATER & SPECIES MANAGEMENT
- Allow seasonal flooding (altered hydrologic regimes)
- Control aquatic invasive species (invasive plants and animals)
- Maintain or establish buffer zones of at least 50 ft., but 500 ft. or wider maximizes conservation benefits (riparian modification, wetland modification)
- Maintain natural water levels and fluctuations (altered hydrologic regimes)
- Maintain or rehabilitate both woody structure and native macrophytes (invasive plants and animals, macrophyte removal)
- Maintain or rehabilitate natural corridors between other significant wetlands and significant upland areas (fragmentation, species issue)

- Prevent establishment of new aquatic invasive species (invasive plants and animals)
- Protect and rehabilitate wetlands (altered hydrologic regimes, wetland modification)
- When removing exotic vegetation, at least 60-80% of native species should be preserved (invasive plants and animals, macrophyte removal)
- Rehabilitate and maintain wetland functions (wetland modification)
- Rehabilitate original hydrologic functions (altered hydrologic regimes)
- Use integrated pest management practices (invasive plants and animals)
- Use natural materials or soft engineering techniques for any shoreline modification (riparian modification, wetland modification)

LAW & POLICY

- Avoid use of herbicides in inland emergent wetlands (macrophyte removal)
- Enact shoreline protection regulations (riparian modification, wetland modification)
- Manage lake-level control structures as fixed-crest weirs (altered hydrologic regimes)
- Protect existing hydrologic conditions by prohibiting construction of new lake-level control structures (altered hydrologic regimes)
- Remove lake-level control structures where possible (altered hydrologic regimes)
- Restrict beach grooming (macrophyte removal, riparian modification)
- Strengthen wetland regulations and enforcement (wetland modification)
- Work with and educate Drain Commissioners (variety of threats)
- Work with local officials on setback and buffer ordinances (variety of threats)
- Work with regulatory agencies to restrict dredging and channelization (dredging and channelization)
- Work with road commissions to site and maintain road crossings (altered hydrologic regimes, altered sediment loads)

EDUCATION & AWARENESS

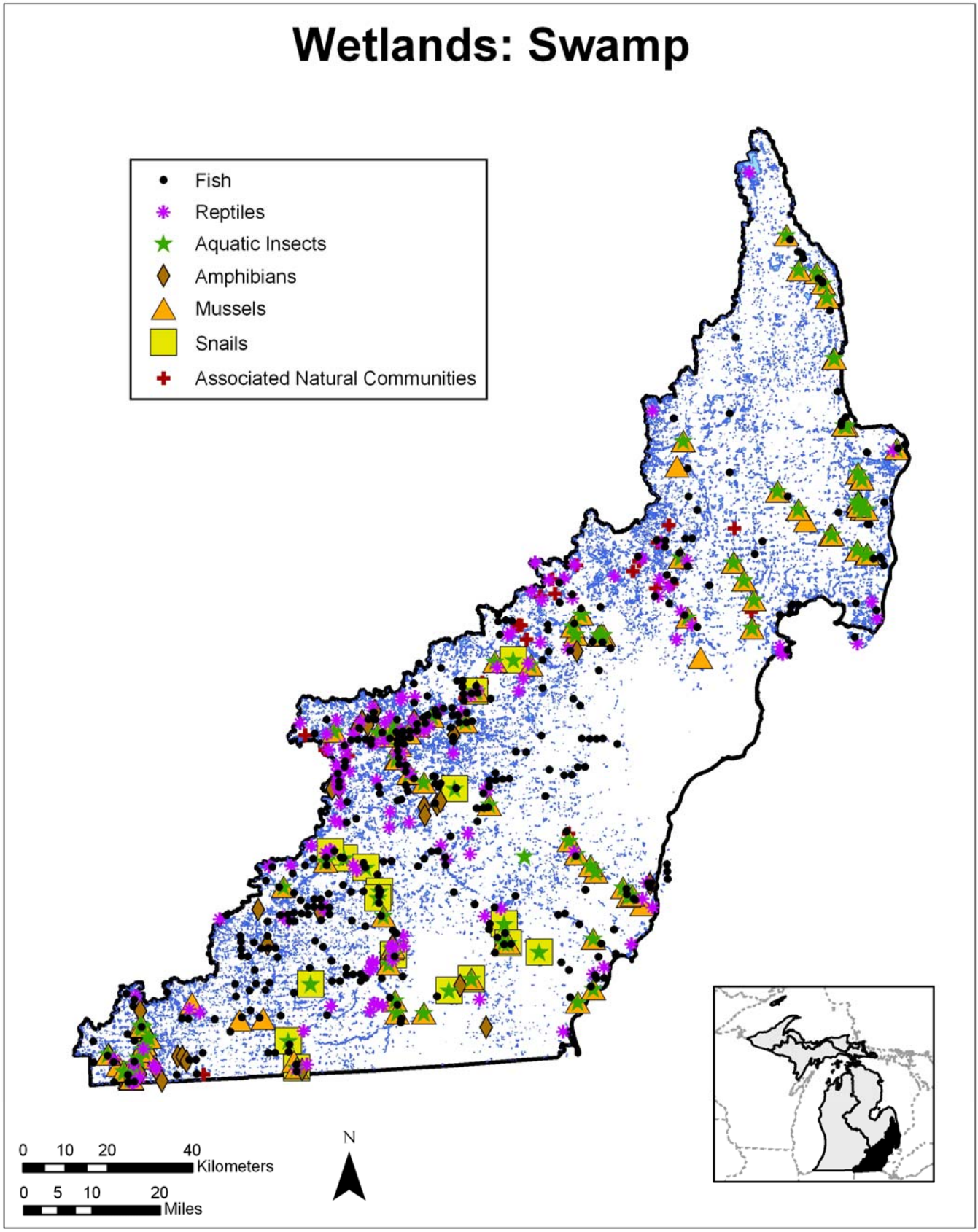
- Educate legislators, local planning boards, and other policy makers on the importance of natural processes (social attitudes)
- Educate private landowners on the value of riparian areas (riparian modification, social attitudes)
- Educate riparian and shoreline owners of the importance of woody structure and macrophytes for a healthy ecosystem (riparian modification, social attitudes)
- Expand education programs for the public on natural processes, invasive species, hydrologic cycles, and stewardship (social attitudes)

Research and Survey Needs

- Conduct statewide wetlands inventory
- Determine effective prevention, control, and survey techniques for aquatic invasive species
- Determine all species and life stages that require inland emergent wetlands
- Determine number and condition of inland emergent wetlands in the Erie basin
- Develop new socially-acceptable ways of managing lake levels
- Document effects on beach grooming
- Explore natural alternatives to pesticides and herbicides
- Explore safe and cost effective methods to remove exotic vegetation without harming native species

Monitoring

- Aquatic invasive species
- Beach grooming
- Dredging and channelization
- Hydrologic regimes
- Indicator species
- Operation of lake-level control structures
- Riparian modification
- Wetland modification


Wetlands: Swamp
Fish
Reptiles
Aquatic Insects
Amphibians
Mussels
Snails
Associated Natural Communities
0 10 20 40
Kilometers
0 5 10 20
Miles
N

Wetlands: Swamp

Description

Swamps are wetlands dominated by trees or shrubs with saturated soils during the growing season and standing or slowly moving water during certain times of the year. Swamps can be dominated by trees such as red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), yellow birch (*Betula alleghaniensis*), northern white cedar (*Thuja occidentalis*) and tamarack (*Larix laricina*), or shrubs such as buttonbush (*Cephalanthus occidentalis*), willow (*Salix sp*.), and dogwood (*Cornus sp*.). Composition and structure are influenced by disturbance factors such as flooding regime, windthrow, insect outbreak, and beaver (*Castor canadensis*).

General Condition of Feature

This habitat is considered 30% in good to excellent condition, 25% in fair condition, and 45% in degraded to very degraded condition.

Associated Natural Communities

Hardwood-Conifer Swamp
Inundated Shrub Swamp
Poor Conifer Swamp
Relict Conifer Swamp
Rich Conifer Swamp
Southern Floodplain Forest
Southern Shrub-Carr
Southern Swamp

Associated Species of Greatest Conservation Need

MUSSELS
Specific associations with this landscape feature were not found in the literature

SNAILS
spindle lymnaea (*Acella haldemani*)

CRAYFISH
devil crawfish (*Cambarus diogenes*)
digger crayfish (*Fallicambarus fodiens*)

INSECTS
spatterdock darner (*Aeshna mutata*)

FISH
pirate perch (*Aphredoderus sayanus*)

AMPHIBIANS
smallmouth salamander (*Ambystoma texanum*)
four-toed salamander (*Hemidactylium scutatum*)
western chorus frog (*Pseudacris triseriata triseriata*)

REPTILES
copperbelly water snake (*Nerodia erythrogaster neglecta*)
spotted turtle (*Clemmys guttata*)
Blanding's turtle (*Emydoidea blandingii*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES
- Altered hydrologic regimes: Development; Draining; Altered hydrology due to runoff and development
- Fragmentation

POLLUTION
- Altered nutrient inflows: Surface runoff, nutrients
- Urban, municipal, and industrial pollution: Surface runoff, contamination

HABITAT CONVERSION
- Riparian modification: Development
- Wetland modification

BIOLOGICAL INTERACTIONS
- Invasive plants and animals: Especially plants

EDUCATION
- Social attitudes: Lack of aquatic resource education, so that society sees the importance of this habitat (low threat)

Conservation Actions Needed (Threats addressed)

LAND & WATER PROTECTION
- Create and expand conservation easements (variety of threats)
- Support land conservancy purchase of undeveloped land (variety of threats)

LAND, WATER & SPECIES MANAGEMENT
- Allow seasonal flooding (altered hydrologic regimes)
- Control aquatic invasive species (invasive plants and animals)
- Maintain natural water levels and fluctuations (altered hydrologic regimes)
- Maintain or establish riparian buffer zones of at least 50 ft., but 500 ft. or wider maximizes conservation benefits (riparian modification, wetland modification)

- Maintain or rehabilitate both woody structure and native macrophytes (wetland modification)
- Maintain or rehabilitate natural corridors between other significant wetlands and significant upland areas (fragmentation, riparian modification, species issue)
- Prevent establishment of new aquatic invasive species (invasive plants and animals)
- Protect and rehabilitate wetland and floodplain functions (altered hydrologic regimes, wetland modification)
- Protect and rehabilitate groundwater recharge (altered hydrologic regimes)
- Protect and rehabilitate wetlands (altered hydrologic regimes, wetland modification)
- When removing exotic vegetation, at least 60-80% of native species should be preserved (invasive plants and animals)
- Rehabilitate hydrologic functions (altered hydrologic regimes)

LAW & POLICY

- Protect the natural hydrologic regime by protecting wetlands and floodplains (altered hydrologic regimes, riparian modification, wetland modification)
- Reduce effluent flow (Urban, municipal, and industrial pollution)
- Remove unnecessary drainage tiles (altered hydrologic regimes, wetland modification)
- Upgrade septic systems (altered hydrologic regimes, altered nutrient inflows)
- Use Best management practices (variety of threats)
- Use integrated pest management practices (invasive plants and animals)
- Work with and educate Drain Commissioners (variety of threats)
- Work with local officials to decrease the amount of impervious surface in a watershed (altered hydrologic regimes, altered nutrient inflows, Urban, municipal, and industrial pollution)
- Work with road commissions to site and maintain road crossings (altered hydrologic regimes, altered sediment loads, fragmentation)
- Work with road commissions to site and maintain road crossings (altered hydrologic regimes, altered sediment loads)

EDUCATION & AWARENESS

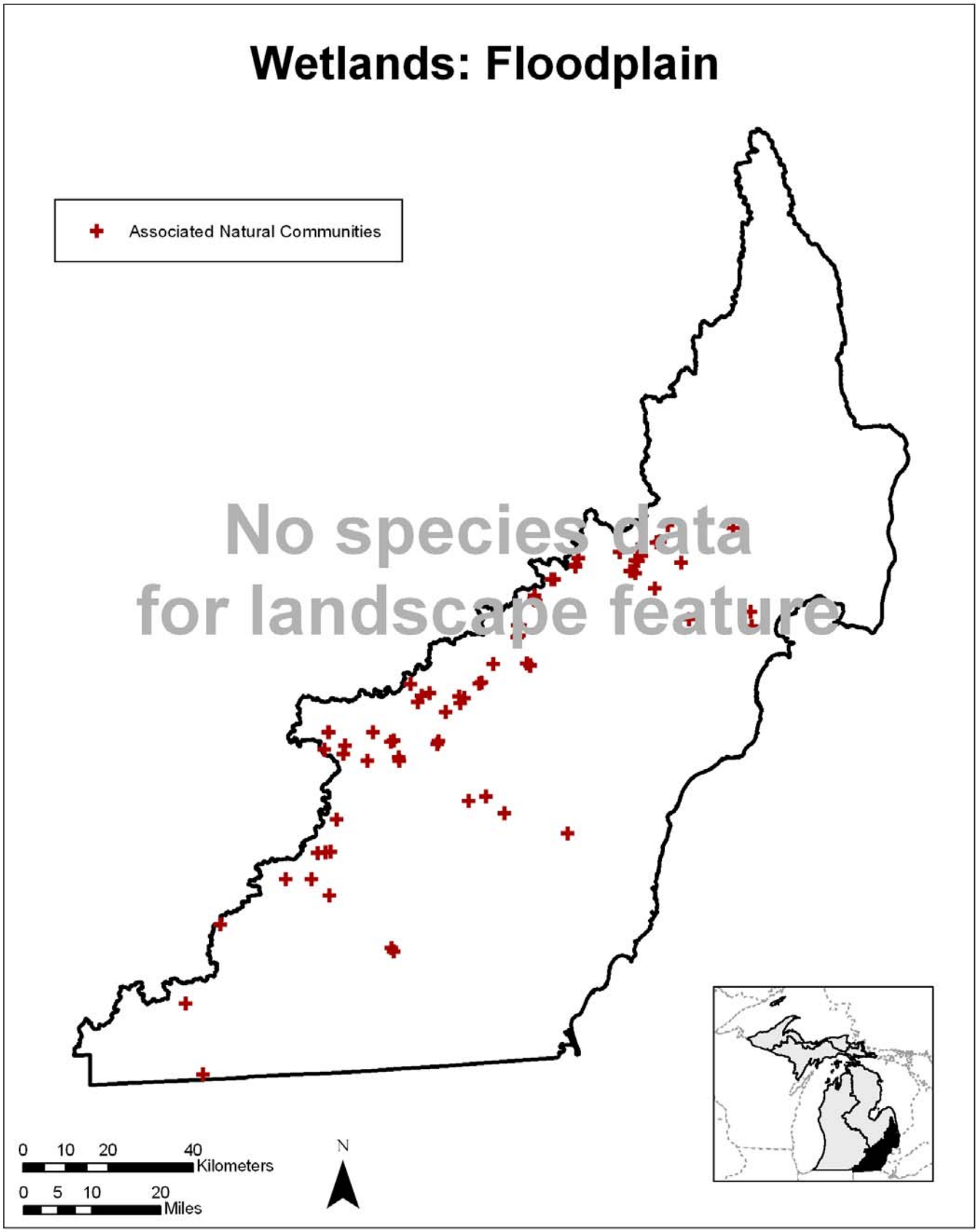
- Educate legislators, local planning boards, and other policy makers on the importance of swamps and natural processes (social attitudes)

Research and Survey Needs

- Conduct statewide wetlands inventory
- Determine effective prevention, control, and survey techniques for aquatic invasive species
- Conduct inventories of wetlands
- Determine critical pathways between habitats for amphibians and reptiles to prevent vehicular fatalities and fragmentation of habitats
- Determine life history requirements for SGCN associated with swamps or where information is lacking
- Determine most effective bridge and culvert designs to limit fragmentation of individual swamps
- Establish effective methods of communicating with the public and their stewardship role
- Model hydrologic flows
- Explore using prescribe burns as a management tool

Monitoring

- Aquatic invasive species
- Dredging and channelization
- Effluent discharges: wastewater treatment plants, septic systems, industrial
- Hydrologic flow
- Indicator species
- Riparian modification
- Storm water
- Water withdrawals


Wetlands: Floodplain
Associated Natural Communities
No species data
for landscape feature
0 10 20 40
Kilometers
0 5 10 20
Miles
N

Wetlands: Floodplain

Description

Floodplains are low-lying areas adjacent to streams and rivers that are subject to periodic over-the-bank flooding and cycles of erosion and deposition, which allow for exchanges of energy and nutrients between terrestrial and aquatic systems. The soils tend to be high in nutrients. Species composition and community structure vary regionally along with varying flooding frequency and duration.

General Condition of Feature

This habitat is considered 20% in good to excellent condition, 20% in fair condition, and 60% in degraded to very degraded condition. Extreme loss of natural habitat in floodplains in SE Michigan

Associated Natural Communities

Emergent Marsh
Hardwood Conifer Swamp
Prairie Fen
Relict Conifer Swamp
Rich Conifer Swamp
Southern Floodplain Forest
Southern Shrub-Carr
Southern Wet Meadow
Submergent Marsh
Wet Prairie
Wet-mesic Prairie

Associated Species of Greatest Conservation Need

FISH
pirate perch (*Aphredoderus sayanus*)

AMPHIBIANS
western chorus frog (*Pseudacris triseriata triseriata*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES
- Altered hydrologic regimes: Flow alterations; Increased flooding

HABITAT CONVERSION
- Dams
- Riparian modification: Inadequate buffers to protect natural processes; Development; Loss of riparian vegetation; Altered land cover; Loss of floodplain through development
- Wetland modification: Fill

EDUCATION
- Social attitudes: Need for public education to understand importance of natural floodplains

Conservation Actions Needed (Threats addressed)

LAND, WATER & SPECIES/MANAGEMENT
- Allow seasonal flooding (altered hydrologic regimes)
- Rehabilitate and maintain floodplains (riparian modification, wetland modification)
- Rehabilitate and maintain natural hydrologic functions (altered hydrologic regimes)
- Rehabilitate and maintain wetlands (wetland modification)

LAW & POLICY
- Continue educating and working with Drain Commissioners (variety of threats)
- Protect the public trust by requiring dam owners to make appropriate financial provisions for future dam removal or perpetual maintenance (dams)
- Remove unnecessary dams (altered hydrologic regimes, dams)
- Require existing dams to operate to provide at run-of-the-river flows (altered hydrologic regimes, dams)
- Work with local officials on setback and buffer ordinances (riparian modification)
- Work with road commissions to site and maintain road crossings (altered hydrologic regimes)

EDUCATION & AWARENESS
- Educate landowners on the value of floodplains (social attitudes)

Research and Survey Needs

- Determine the best way for local planning groups to work together
- Determine the floodplains that are disconnected from the hydrologic system and how to rehabilitate the original conditions
- Develop socially acceptable alternatives to dams
- Effective methods of communicating with the public and their stewardship role
- Inventory dams and determine those which are no longer necessary
- Map, in GIS, this landscape feature
- Model hydrologic flows

Monitoring

- Dam operations
- Dredging and channelization
- Floodplain development
- Hydrologic flow
- Riparian modification