

MICHIGAN'S WILDLIFE ACTION PLAN

AQUATIC SYSTEMS: LAKE MICHIGAN BASIN

LAW & POLICY

- Assess dam siting to ensure minimal affects and require fish passage both upstream and downstream (dams)
- Continue Natural Rivers planning (variety of threats)
- Continue to use the most current information and innovative methods in cleaning up chemical spills (Urban, municipal, and industrial pollution)
- Continued vigilance and cooperation on preventing more aquatic invasive species establishments (Invasive plants and animals)
- Encourage sound water withdrawal practices that take into account biotic needs (altered hydrologic regimes)
- Encourage use of natural materials or soft engineering techniques for any river modification (riparian modification)
- Implement and continually improve storm water and non-point source best management practices (Urban, municipal, and industrial pollution)
- Manage or modify remaining dams to release water to mimic natural river conditions (altered hydrologic regimes, dams)
- Protect and rehabilitate groundwater recharge by requiring that all development-related runoff be captured by infiltration basins (altered hydrologic regimes)
- Protect fishery resources by screening turbine intakes at operating hydroelectric dams (dams)
- Protect the public trust by requiring dam owners to make appropriate financial provisions for future dam removal or perpetual maintenance (dams)
- Reduce effluent flow (Urban, municipal, and industrial pollution)
- Remove dams to rehabilitate natural hydrology and habitat connectivity (altered hydrologic regimes, dams, fragmentation)
- Require natural fishways, rock arch ramps and bypass channels, for both upstream and downstream fish movements at dams (dams)
- Restrict dredging and channelization, especially during spawning and migration seasons and around mussel beds (dredging and channelization)
- Strengthen and enforce air pollution laws (Urban, municipal, and industrial pollution)
- Strengthen existing water quality laws and enforcement of permits controlling effluent discharge (Urban, municipal, and industrial pollution)
- Use best management practices (variety of threats)
- Work with local governments to develop and refine planning and zoning regulations and ordinances that consider natural processes (variety of threats)
- Work with local officials on setback and buffer ordinances (riparian modification)

EDUCATION & AWARENESS

- Expand education programs for the general public regarding natural processes, invasive species, hydrologic cycles, and stewardship issues (social attitudes)
- Increase education on preventing the spread of aquatic invasive species (Invasive plants and animals)

CAPACITY BUILDING

- Support watershed councils and regional conservation groups (variety of threats)

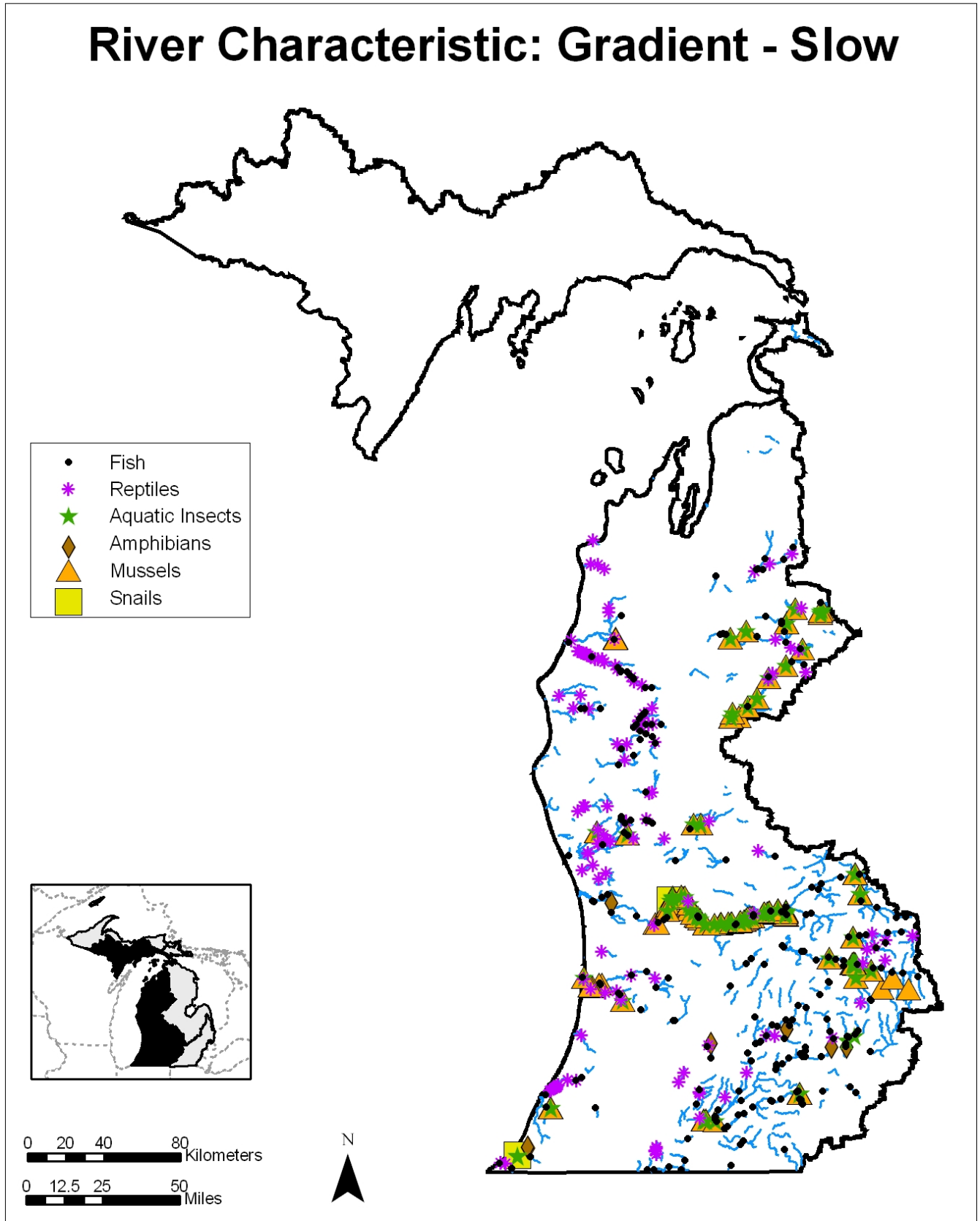
Research and Survey Needs

- Determine effective prevention, control, and survey techniques for aquatic invasive species
- Determine stream temperatures in areas where data is lacking
- Determine the number and condition of areas that are disconnected from the river
- Determine use of very large rivers by mussel, snail, aquatic insect, amphibian, and reptile SGCN
- Ensure that existing dams operate as run-of-the-river
- Inventory dams and determine those which no longer serve a useful purpose
- Inventory the number and condition of wetlands less than 5 acres
- Model hydrologic flow of each watershed
- Survey nutrient loadings and develop strategies to decrease
- Survey sediment loadings and develop strategies to decrease

Monitoring

- Aquatic invasive species
- Dam operations
- Dredging and channelization
- Effluent flows
- Land use changes
- Nutrient loadings
- Riparian modification
- Stream modification
- Wetland and floodplain modification

River Characteristic: Gradient - Slow



River Characteristic: Gradient – Slow

Description

Gradient is the general slope, or the change in vertical elevation per unit of horizontal distance, of the water surface in a flowing stream. The slow gradient is defined as having a change in the vertical elevation of the water surface of a flowing stream ranging from 0.0-3.9 feet per mile.

General Condition of Feature

This habitat is considered 35% in good to excellent condition, 25% in fair condition, and 40% in degraded to very degraded condition.

Associated Species of Greatest Conservation Need

MUSSELS

- cylindrical papershell (*Anodontoidea ferussacianus*)
- eastern pondmussel (*Ligumia nasuta*)
- fawnsfoot (*Truncilla donaciformis*)

SNAILS

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

CRAYFISH

- digger crayfish (*Fallicambarus fodiens*)

INSECTS

- a sand minnow mayfly (*Siphloplecton basale*)
- splendid clubtail (*Gomphus lineatifrons*)
- tiger spiketail (*Cordulegaster erronea*)
- a stonefly (*Taeniopteryx burksi*)
- a stonefly (*Taeniopteryx maura*)

FISH

- spotted gar (*Lepisosteus oculatus*)
- mooneye (*Hiodon tergisus*)
- brassy minnow (*Hybognathus hankinsoni*)
- striped shiner (*Luxilus chrysocephalus*)
- river chub (*Nocomis micropogon*)
- pugnose shiner (*Notropis anogenus*)
- bigmouth shiner (*Notropis dorsalis*)
- finescale dace (*Phoxinus neogaeus*)
- western creek chubsucker (*Erimyzon claviformis*)
- lake chubsucker (*Erimyzon sucetta*)
- spotted sucker (*Minytrema melanops*)

FISH cont.

- river redhorse (*Moxostoma carinatum*)
- black redhorse (*Moxostoma duquesnei*)
- golden redhorse (*Moxostoma erythrurum*)
- brown bullhead (*Ameiurus nebulosus*)
- stonecat (*Noturus flavus*)
- tadpole madtom (*Noturus gyrinus*)
- grass pickerel (*Esox americanus*)
- pirate perch (*Aphredoderus sayanus*)
- starhead topminnow (*Fundulus dispar*)
- fantail darter (*Etheostoma flabellare*)
- least darter (*Etheostoma microperca*)
- banded darter (*Etheostoma zonale*)
- sauger (*Sander canadensis*)

AMPHIBIANS

- four-toed salamander (*Hemidactylium scutatum*)
- mudpuppy (*Necturus maculosus maculosus*)
- western lesser siren (*Siren intermedia nettingi*)
- Blanchard's cricket frog (*Acris crepitans blanchardi*)

REPTILES

- copperbelly water snake (*Nerodia erythrogaster neglecta*)
- queen snake (*Regina septemvittata*)
- Blanding's turtle (*Emydoidea blandingii*)

MAMMALS

- water shrew (*Sorex palustris*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES

- Altered hydrologic regimes: Enclosed streams
- Climate change: (low threat)
- Fragmentation: Road crossings and culverts can be barriers to fish

POLLUTION

- Altered nutrient inflows: (low threat)
- Altered sediment loads: Bank erosion; Turbidity
- Pesticides and herbicides: (low threat)
- Thermal changes: (low threat)
- Urban, municipal, and industrial pollution: (low threat)

HABITAT CONVERSION

- Dams
- Dredging and channelization: Dredging; Channelization; Dredging can change the necessary slow gradient waters by speeding up
- Incompatible natural resources management: Loss of large woody debris to accommodate canoe recreation and winter use of rivers as trail corridors
- Riparian modification: Riparian development; Development; Agriculture; Threats to wood turtle habitat through streams side armoring and road crossing site selection at prime turtle habitat; Campground & canoe launch development on sandy banks
- Wetland modification

BIOLOGICAL INTERACTIONS

- Invasive plants and animals: Purple loosestrife taking over cattail habitat and is a high threat to marsh species (low threat)

CONSUMPTIVE BIOLOGICAL RESOURCE USE

- Forestry practices: (low threat)
- Mining practices: (low threat)
- Removal of wildlife: (low threat)

NON-CONSUMPTIVE BIOLOGICAL RESOURCE USE

- Macrophyte removal: (low threat)

EDUCATION

- Lack of scientific knowledge
- Social attitudes

Conservation Actions (Threats addressed)

LAND, WATER & SPECIES MANAGEMENT

- Decrease amount of impervious surfaces (altered hydrologic regimes)
- Engineered drainage channels should mimic natural stream channel stability, i.e., channel dimension, pattern, and profile (dredging and channelization)
- If culverts are necessary, use single large capacity culverts that match bankfull channel width (altered hydrologic regimes, fragmentation)
- If enclosures are necessary, minimize the length and ensure capacity can handle bankfull flows (altered hydrologic regimes, fragmentation)
- Maintain or establish riparian buffers of at least 50 ft., but 500 ft. or wider maximizes conservation benefits (altered hydrologic regimes, altered sediment loads, riparian modification)
- Maintain or rehabilitate original flow paths and hydrologic functions, i.e., seasonal flooding, connect meanders, throughflow, wetlands (altered hydrologic regimes)
- Preserve woody riparian vegetation to reduce sedimentation (altered sediment loads, dredging and channelization)
- Rehabilitate channel diversity where possible (dredging and channelization)
- Soften or remove hard river structures (riparian modification)
- Work with road commissioners to fix perched culverts (altered hydrologic regimes, fragmentation)
- Work with road commissions on siting new and maintaining river crossings (altered hydrologic regimes, altered sediment loads, fragmentation)

LAW & POLICY

- Encourage use of bridges over culverts for new stream crossings (altered hydrologic regimes, fragmentation)
- Enforce the use of sediment barriers and best management practices during road siting, construction and maintenance (altered sediment loads)
- Include wetland protections in zoning and planning ordinances (wetland modification)
- Limit water withdrawals in flow-limited or groundwater-fed systems (altered hydrologic regimes)
- Manage or modify existing dams to release water to mimic natural river conditions (altered hydrologic regimes, dams)
- Protect and rehabilitate groundwater recharge by requiring all development-related runoff be captured by infiltration basins (altered hydrologic regimes)
- Protect existing natural wetlands and rehabilitate degraded wetlands (wetland modification)
- Protect the natural seasonal flow patterns of the river by incorporating best management practices (altered hydrologic regimes)
- Remove dams to rehabilitate natural hydrology (altered hydrologic regimes, dams)
- Remove unnecessary or abandoned bridges, culverts, and stream enclosures (altered hydrologic regimes, fragmentation)
- Restrict dredging and channelization activities (dredging and channelization)
- Strengthen wetland regulations, mitigation requirements, and enforcement (wetland modification)
- Work with Drain Commissioners to use natural channel processes to allow a river to manage sediment and flow and decrease the amount of channelization needed (variety of threats)
- Work with local governments to develop and refine planning and zoning regulations and ordinances that consider natural processes (variety of threats)
- Work with local officials on setback and buffer ordinances (riparian modification)

EDUCATION & AWARENESS

- Educate canoeists and snowmobile users on the importance of woody structure to water bodies and aquatic species (incompatible natural resource management)
- Educate legislators, other policy makers, and the public on the importance of natural processes (social attitudes)

Research and Survey Needs

- Determine effective prevention, control, and survey techniques for aquatic invasive species