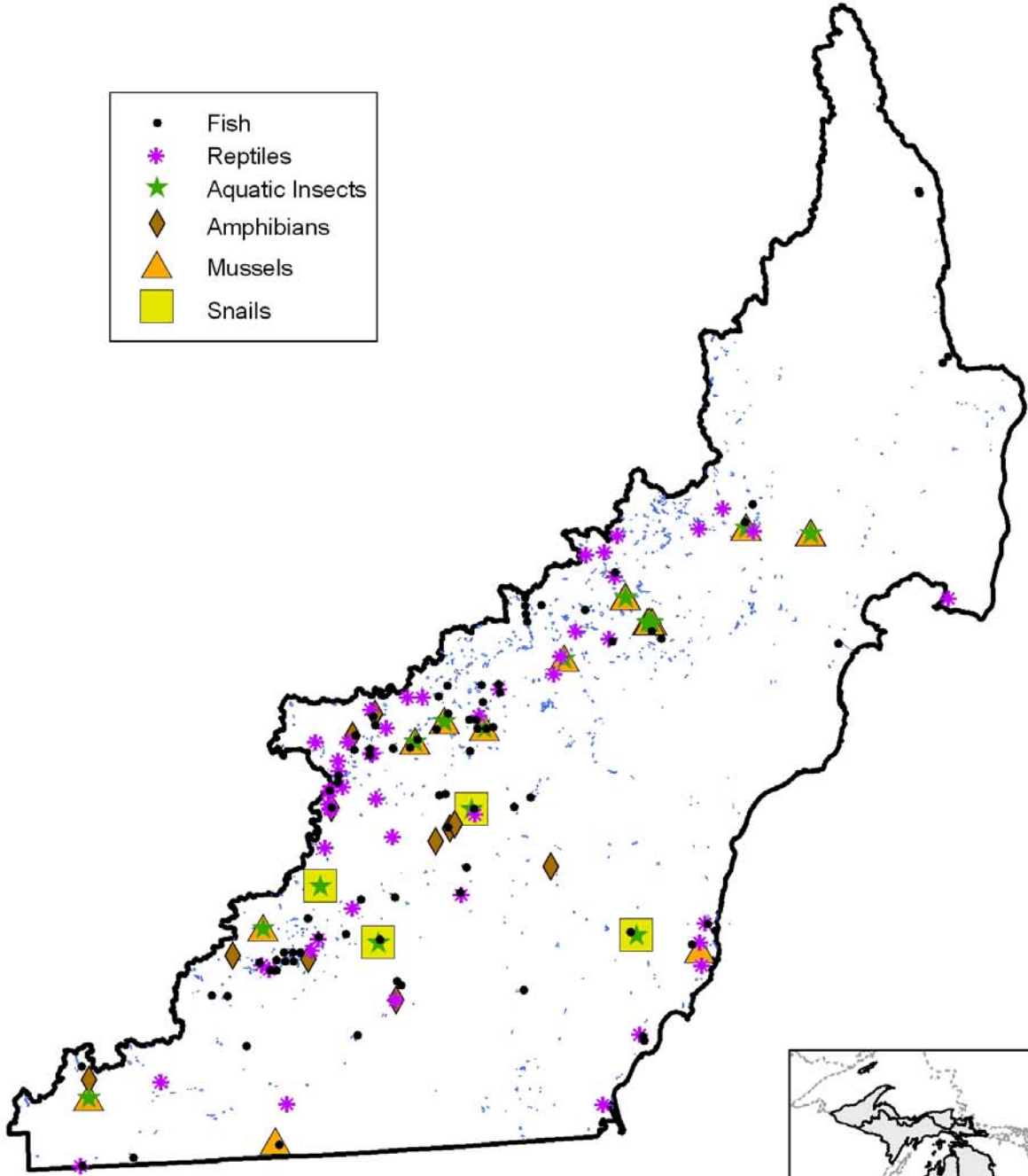
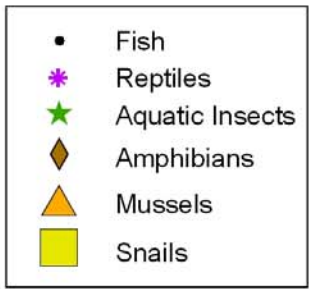


Inland Lakes: Small lakes



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Description

Small lakes are permanent standing water bodies that are greater than 5 acres and less than 99 acres in area. Water bodies in this group are highly diverse in terms of chemical and biological variables. Stratification status can range from fully stratified throughout the summer season, to no stratification. In lakes with stratification, there is development of true open-water (pelagic) zones that are distinct from shallow nearshore zones. Small lakes can range from cold to warm water depending on amounts of groundwater inflows, lake depth, and climate. Winter oxygen levels are also variable and depend on lake depth. If lakes are shallow (< 2 m average depth), there are two states in which they are generally found. The first is characterized by high nutrients, high wind resuspension, no rooted plants, and turbid water, and the second is characterized by low to medium nutrients, low wind resuspension, rooted plants dominant, and clear water.

General Condition of Feature

This habitat is considered 30% in good to excellent condition, 30% in fair condition, and 40% in degraded to very degraded condition.

Associated Species of Greatest Conservation Need

MUSSELS

slippershell mussel (*Alasmidonta viridis*)
rainbow (*Villosa iris*)
cylindrical papershell (*Anodontooides ferussacianus*)
eastern pondmussel (*Ligumia nasuta*)
lilliput (*Toxolasma parvus*)
rayed bean (*Villosa fabalis*)

SNAILS

spindle lymnaea (*Acella haldemani*)

INSECTS

spatterdock damer (*Aeshna mutata*)

FISH

pugnose shiner (*Notropis anogenus*)
pugnose minnow (*Opsopoeodus emiliae*)
finescale dace (*Phoxinus neogaeus*)
lake chubsucker (*Erimyzon sucetta*)
brown bullhead (*Ameiurus nebulosus*)

FISH cont.

tadpole madtom (*Noturus gyrinus*)
brindled madtom (*Noturus miurus*)
grass pickerel (*Esox americanus*)
eastern sand darter (*Ammocrypta pellucida*)
least darter (*Etheostoma microperca*)

AMPHIBIANS

mudpuppy (*Necturus maculosus maculosus*)
Fowler's toad (*Bufo fowleri*)
Blanchard's cricket frog (*Acris crepitans blanchardi*)
pickerel frog (*Rana palustris*)
northern leopard frog (*Rana pipiens*)

REPTILES

copperbelly water snake (*Nerodia erythrogaster neglecta*)
queen snake (*Regina septemvittata*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES

- Altered hydrologic regimes: Lake level control structures, dams
- Climate change

POLLUTION

- Altered nutrient inflows: Surface water runoff – nutrients; run-off from fertilizers
- Altered sediment loads
- Pesticides herbicides: Runoff, fertilizer, etc (low threat)
- Thermal changes
- Urban, municipal, and industrial pollution: Surface water runoff - contaminants

HABITAT CONVERSION

- Dams: Lake level manipulations
- Dredging and channelization: Dredging
- Riparian modification: Lack of woody debris; Alteration of shoreline; Clearing of shoreline for beach areas

BIOLOGICAL INTERACTIONS

- Disease, pathogens, and parasites: (low threat)
- Invasive plants and animals: Zebra mussels, round gobies, water milfoil

CONSUMPTIVE BIOLOGICAL RESOURCE USE

- Removal of wildlife: Over harvesting of species such as turtles

NON-CONSUMPTIVE BIOLOGICAL RESOURCE USE

- Macrophyte removal: Vegetation control through mowing or chemical treatments
- Non-consumptive recreation: Recreational boating - wave energy and ramp damage

MICHIGAN'S WILDLIFE ACTION PLAN
AQUATIC SYSTEMS: LAKE ERIE BASIN

EDUCATION

- Other: Lack of knowledge about these ecosystems
- Social attitudes: Lack of aquatic resource education on the importance of this habitat

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 or establish riparian buffers to at least 50 ft. (riparian modification)
- Modify remaining lake-level control structures to mimic the natural hydrologic regime (altered hydrologic regimes)
- Removal of exotic vegetation needs to preserve 60-80% of native vegetation (invasive plants and animals, macrophyte removal)
- Remove lake-level control structures where possible (altered hydrologic regimes)
- Rehabilitate native flora (invasive plants and animals, macrophyte removal, riparian modification)
- Use soft engineering instead of hard structures for shoreline modification (riparian modification)
- Vegetation management should be performed in conjunction with a lake management plan (macrophyte removal)
- Work with Drain Commissioners to allow or closely mimic natural hydrologic processes (altered hydrologic regimes)

LAW & POLICY

- Restrict beach grooming (macrophyte removal)
- Enact and enforce shoreline protection (riparian modification)
- Encourage clustered developments rather than evenly spaced home lots (riparian modification)
- Strengthen water quality laws and continue enforcing permits that control effluent discharge (Urban, municipal, and industrial pollution)
- Upgrade and maintain septic systems (altered nutrient inflows, Urban, municipal, and industrial pollution)
- Work with local officials on setback and buffer ordinances (riparian modification)
- Work with local officials to develop planning and zoning guidelines that consider natural processes (altered hydrologic regimes, altered sediment loads, riparian modification)

EDUCATION & AWARENESS

- Educate legislators, local planning boards, and other policy makers on the importance of natural processes (social attitudes)
- Educate the public on the prevention and control of aquatic invasive species (invasive plants and animals, social attitudes)
- Expand education programs for the general public regarding natural processes, invasive species, hydrologic cycles, riparian buffers, and stewardship issues (social attitudes)

Research and Survey Needs

- Determine effective prevention, control, and survey techniques for aquatic invasive species
- Determine life history requirements for SGCN associated with small lakes
- Determine the number and method of operation of lake-level control structures
- Determine effects of over zealous macrophyte removal on native vegetation and species communities
- Determine effects of various pollutants on small lakes and their processes
- Determine socially acceptable ways of maintaining natural lake inflows and outlets

Monitoring

- Aquatic invasive species
- Indicator species
- Effluent discharges: waste water treatment plants, septic systems, industrial
- Macrophyte removals
- Riparian modification
- Water levels downstream of water-level controlled lakes to ensure that streams continue to have sufficient water
- Water levels in water-level controlled lakes to ensure they mimic natural hydrologic regimes within lake