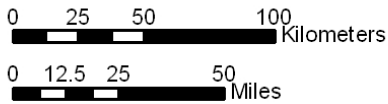
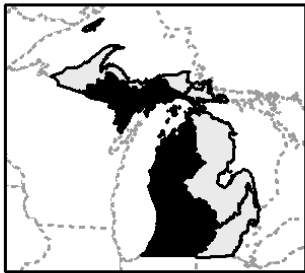


## Aquatic Characteristic: Soft Substrates



## Aquatic Characteristic: Soft Substrates

### Description

Soft substrates are predominately composed of particles less than 2 mm often described as sand, silt, mud, or organic matter.

### General Condition of Feature

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

### Associated Species of Greatest Conservation Need

#### MUSSELS

slippershell mussel (*Alasmidonta viridis*)  
scaleshell (*Leptodea leptodon*)  
round pigtoe (*Pleurobema coccineum*)  
rainbow (*Villosa iris*)  
purple wartyback (*Cyclonaias tuberculata*)  
pimpleback (*Quadrula pustulosa*)  
cylindrical papershell (*Anodontoides ferussacianus*)  
creek heelsplitter (*Lasmigona compressa*)  
round lake floater (*Pyganodon subgibbosa*)  
wavy-rayed lampmussel (*Lampsilis fasciola*)  
eastern pondmussel (*Ligumia nasuta*)  
black sandshell (*Ligumia recta*)  
fawnsfoot (*Truncilla donaciformis*)

#### SNAILS

spindle lymnaea (*Acella haldemani*)

#### INSECTS

splendid clubtail (*Gomphus lineatifrons*)  
riverine snaketail (*Stylurus amnicola*)  
Laura's snaketail (*Stylurus laurae*)  
tiger spiketail (*Cordulegaster erronea*)  
arrowhead spiketail (*Cordulegaster obliqua*)  
Hine's emerald dragonfly (*Somatochlora hineana*)  
Douglas Stenelmis riffle beetle (*Stenelmis douglasensis*)

#### FISH

lake sturgeon (*Acipenser fulvescens*)

#### FISH cont.

spotted gar (*Lepisosteus oculatus*)  
brassy minnow (*Hybognathus hankinsoni*)  
pugnose shiner (*Notropis anogenus*)  
bigmouth shiner (*Notropis dorsalis*)  
finescale dace (*Phoxinus neogaeus*)  
western creek chubsucker (*Erimyzon claviformis*)  
black buffalo (*Ictiobus niger*)  
spotted sucker (*Minytrema melanops*)  
brown bullhead (*Ameiurus nebulosus*)  
tadpole madtom (*Noturus gyrinus*)  
grass pickerel (*Esox americanus*)  
cisco or lake herring (*Coregonus artedii*)  
pirate perch (*Aphredoderus sayanus*)  
starhead topminnow (*Fundulus dispar*)  
deepwater sculpin (*Myoxocephalus thompsonii*)  
least darter (*Etheostoma microperca*)

#### AMPHIBIANS

western lesser siren (*Siren intermedia nettingi*)  
Blanchard's cricket frog (*Acris crepitans blanchardi*)  
pickerel frog (*Rana palustris*)

#### REPTILES

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

### Associated Threats

#### MODIFICATION OF NATURAL PROCESSES

- Altered hydrologic regimes: Altered flow regime
- Climate change: (low threat)
- Fragmentation

#### POLLUTION

- Altered nutrient inflows
- Altered sediment loads: Sedimentation; Road crossings can change sediment loads
- Pesticides and herbicides
- Urban, municipal, and industrial pollution

#### HABITAT CONVERSION

- Dams
- Dredging and channelization: Dredging; Channelization
- Incompatible natural resources management
- Riparian modification: Riparian development; Unregulated development
- Wetland modification

#### BIOLOGICAL INTERACTIONS

- Invasive plants and animals

#### CONSUMPTIVE BIOLOGICAL RESOURCE USE

- Forestry practices
- Removal of wildlife

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

*NON-CONSUMPTIVE BIOLOGICAL RESOURCE USE*

- Macrophyte removal: Vegetation management (low threat)

*EDUCATION*

- Lack of scientific knowledge
- Social attitudes

Conservation Actions Needed (Threats addressed)

*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, altered sediment loads, riparian modification)
- Maintain or rehabilitate natural hydrology (altered hydrologic regimes)
- Soften or remove hard stream and shoreline structures (riparian modification)
- Survey erosion sites within watershed and develop strategies to address problems (altered nutrient inflows, altered sediment loads)
- Use natural materials or soft engineering instead of hard structures for shoreline or riparian modification (riparian modification)
- Work with road commissioners on siting and maintaining river crossings (altered hydrologic regimes, altered sediment loads)

*LAW & POLICY*

- Enforce the use of sediment barriers and best management practices during road siting, construction, and maintenance (altered sediment loads)
- Remove dams to rehabilitate natural hydrology and habitat connectivity (altered hydrologic regimes, dams, fragmentation)
- Restrict dredging and channelization (dredging and channelization)
- Strengthen wetland regulations, mitigation requirements, and enforcement (wetland modification)
- Use best management practices (Variety of threats)
- 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)

*EDUCATION & AWARENESS*

- Expand education programs for the general public regarding natural processes and stewardship issues (social attitudes)

Research and Survey Needs

- Determine and implement methods to handle runoff
- Determine incompatible natural resource management threats
- Determine life history requirements for SGCN associated with soft substrates
- Determine number of dams and those that are no longer necessary
- Determine number and condition of road crossings
- Determine number and location of sand mining operations in the basin
- Determine ways of decreasing imperviousness in watersheds
- Model hydrologic flows in each watershed

Monitoring

- Dredging and channelization
- Floodplain modification
- Riparian modification
- Sand mining operations
- Sedimentation
- Storm water flows
- Wetland modification