

Threats to Aquatic Species of Greatest Conservation Need

From Michigan's Wildlife Action Plan



Mussels

elktoe (*Alasmidonta marginata*)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		not found in impoundments
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats

slippershell mussel (*Alasmidonta viridis*)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		not found in impoundments
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats

scaleshell (*Leptodea leptodon*)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
Lack of scientific knowledge		only one host species has been identified thru lab experiments

round pigtoe (*Pleurobema coccineum*)

<i>Threat Susceptibility:</i>	99	
Removal of wildlife		may be used in polished chip industry
<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats

Threat Susceptibility Definitions:

- 99: Unknown - A threat, but susceptibility of this species to the threat is unknown.
- 3: High - This species has a high susceptibility to this threat.
- 2: Medium - This species has a medium susceptibility to this threat.
- 1: Low - This species has a low susceptibility to this threat.

The comments included were drawn from scientific literature and communications with species experts.

Invasive plants & animals	general mussel threats - zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats
Lack of scientific knowledge	

ellipse (Venustaconcha ellipsiformis)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats
Lack of scientific knowledge	hosts have only been identified in lab - not under natural conditions

rainbow (Villosa iris)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats
Lack of scientific knowledge	host species only known from lab

purple wartyback (Cyclonaias tuberculata)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats

eastern elliptio (Elliptio complanata)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats

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clubshell (Pleurobema clava)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats - zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
Lack of scientific knowledge		likely for this species

pimpleback (Quadrula pustulosa)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats

cylindrical papershell (Anodontooides ferussacianus)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats - zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats

creek heelsplitter (Lasmigona compressa)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats

salamander mussel (Simpsonaias ambigua)

<i>Threat Susceptibility:</i>	3	
Other biological interactions		host species (mudpuppy) also species of greatest conservation need

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white catspaw (Epioblasma obliquata perobliqua)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
Lack of scientific knowledge		little known about habitat requirements and host species unknown

northern riffleshell (Epioblasma torulosa rangiana)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		
Altered sediment loads		general mussel threats
Pesticides & herbicides		
Urban, municipal & industrial pollution		
Invasive plants & animals		general mussel threats
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
Lack of scientific knowledge		hosts have only been identified in laboratory

snuffbox (Epioblasma triquetra)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats

wavy-rayed lampmussel (Lampsilis fasciola)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats

eastern pondmussel (Ligumia nasuta)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats

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Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats
Lack of scientific knowledge	host species unknown

black sandshell (*Ligumia recta*)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats

threehorn wartyback (*Obliquaria reflexa*)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats
Lack of scientific knowledge	Host species only known from lab exp., not confirmed in natural settings

hickorynut (*Obovaria olivaria*)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats

round hickorynut (*Obovaria subrotunda*)

Threat Susceptibility: 3

Dredging & channelization	general mussel threats
Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
Urban, municipal & industrial pollution	general mussel threats
Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats

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Fragmentation		general mussel threats
Lack of scientific knowledge		host species unknown
<u>kidneyshell (Ptychobranchus fasciolaris)</u>		
<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
Lack of scientific knowledge		No host species known
<u>purple lilliput (Toxolasma lividus)</u>		
<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
<u>lilliput (Toxolasma parvus)</u>		
<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
<u>fawnsfoot (Truncilla donaciformis)</u>		
<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats
Dams		general mussel threats
Altered sediment loads		general mussel threats
Pesticides & herbicides		general mussel threats
Urban, municipal & industrial pollution		general mussel threats
Invasive plants & animals		general mussel threats, zebra mussels
Altered hydrologic regimes		general mussel threats
Fragmentation		general mussel threats
<u>raved bean (Villosa fabalis)</u>		
<i>Threat Susceptibility:</i>	3	
Dredging & channelization		general mussel threats

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Dams	general mussel threats
Altered sediment loads	general mussel threats
Pesticides & herbicides	general mussel threats
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Invasive plants & animals	general mussel threats, zebra mussels
Altered hydrologic regimes	general mussel threats
Fragmentation	general mussel threats
Lack of scientific knowledge	host species unknown

Freshwater Snails

spindle lymnaea (Acella haldemani)

Threat Susceptibility: 3

Lack of scientific knowledge

deepwater pondsnail (Stagnicola contracta)

Threat Susceptibility: 3

Lack of scientific knowledge

Petoskey pondsnail (Stagnicola petoskeyensis)

Threat Susceptibility: 3

Lack of scientific knowledge

acorn ramshorn (Planorbella multivolvis)

Threat Susceptibility: 3

Lack of scientific knowledge

watercress snail (Fontigens nickliniana)

Threat Susceptibility: 3

Lack of scientific knowledge

little known about this species

gravel pyrg (Pyrquolopsis letsoni)

Threat Susceptibility: 3

Lack of scientific knowledge

Virtually nothing known about this species

brown walker (Pomatiopsis cincinnatiensis)

Threat Susceptibility: 3

Altered sediment loads

Pesticides & herbicides

Urban, municipal & industrial pollution

Altered hydrologic regimes

Lack of scientific knowledge

Crayfish

devil crawfish (Cambarus diogenes)

Threat Susceptibility: 3

Lack of scientific knowledge

digger crayfish (Fallicambarus fodiens)

Threat Susceptibility: 3

Lack of scientific knowledge

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Insects: Mayflies

a mayfly (Epeorus suffusus)

Threat Susceptibility: 3
Lack of scientific knowledge

a mayfly (Habrophlebiodes americana)

Threat Susceptibility: 3
Lack of scientific knowledge

a mayfly (Ameletus lineatus)

Threat Susceptibility: 3
Lack of scientific knowledge

a sand minnow mayfly (Siphloplecton basale)

Threat Susceptibility: 3
Lack of scientific knowledge

Insects: Dragonflies and Damselflies

grey petaltail (Tachopteryx thoreyi)

Threat Susceptibility: 3
Wetland modifications
Riparian modifications
Dredging & channelization

sedge darner (Aeshna juncea)

Threat Susceptibility: 99
Pesticides & herbicides

likely problem for this species

spatterdock darner (Aeshna mutata)

Threat Susceptibility: 3
Wetland modifications
Invasive plants & animals

introduction of fish likely detrimental to this species

muskeg darner (Aeshna subarctica)

Threat Susceptibility: 3
Wetland modifications

rapids clubtail (Gomphus quadricolor)

Threat Susceptibility: 3
Dredging & channelization
Dams
Urban, municipal & industrial pollution
Invasive plants & animals

extra-striped snaketail (Ophiogomphus anomalus)

Threat Susceptibility: 3
Dredging & channelization
Dams
Altered sediment loads
Pesticides & herbicides
Urban, municipal & industrial pollution

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pygmy snaketail (Ophiogomphus howei)

Threat Susceptibility: 3

- Dredging & channelization
- Dams
- Urban, municipal & industrial pollution
- Invasive plants & animals

riverine snaketail (Stylurus amnicola)

Threat Susceptibility: 3

- Dredging & channelization
- Dams
- Forestry practices
- Pesticides & herbicides
- Urban, municipal & industrial pollution
- Invasive plants & animals

laura's snaketail (Stylurus laurae)

Threat Susceptibility: 3

- Dredging & channelization
- Dams
- Forestry practices
- Altered sediment loads
- Pesticides & herbicides
- Urban, municipal & industrial pollution

elusive snaketail (Stylurus notatus)

Threat Susceptibility: 99

- Forestry practices

Threat Susceptibility: 3

- Dredging & channelization
- Dams
- Pesticides & herbicides
- Urban, municipal & industrial pollution
- Invasive plants & animals

russet-tipped clubtail (Stylurus plagiatus)

Threat Susceptibility: 3

- Riparian modifications

Adults rest at the top of the tallest trees

Hine's emerald (Somatochlora hineana)

Threat Susceptibility: 3

- Wetland modifications
- Urban, municipal & industrial pollution
- Invasive plants & animals
- Altered hydrologic regimes

incurvate emerald (Somatochlora incurvata)

Threat Susceptibility: 3

- Mining practices
- Pesticides & herbicides
- Urban, municipal & industrial pollution
- Altered hydrologic regimes

peat harvesting

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ebony boghaunter (Williamsonia fletcheri)

Threat Susceptibility: 99

Forestry practices

Threat Susceptibility: 3

Mining practices peat moss harvesting
Pesticides & herbicides
Urban, municipal & industrial pollution
Altered hydrologic regimes

ringed boghaunter (Williamsonia lintneri)

Threat Susceptibility: 3

Riparian modifications
Dredging & channelization
Mining practices peat moss harvesting
Removal of wildlife
Pesticides & herbicides
Invasive plants & animals introduced fish
Altered hydrologic regimes

subarctic bluet (Coenagrion interrogatum)

Threat Susceptibility: 3

Invasive plants & animals fish are a threats

Insects: Stoneflies

a stonefly (Ostrocerca albidipennis)

Threat Susceptibility: 3

Lack of scientific knowledge

a stonefly (Oemopteryx glacialis)

Threat Susceptibility: 3

Lack of scientific knowledge

eastern willowfly (Taeniopteryx burksi)

Threat Susceptibility: 3

Lack of scientific knowledge

spinyleg willowfly (Taeniopteryx maura)

Threat Susceptibility: 3

Lack of scientific knowledge

Canadian willowfly (Capnia vernalis)

Threat Susceptibility: 3

Lack of scientific knowledge

a stonefly (Paracapnia opis)

Threat Susceptibility: 3

Lack of scientific knowledge

a stonefly (Arcynopteryx compacta)

Threat Susceptibility: 3

Lack of scientific knowledge

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a stonefly (Helopicus nalatus)

Threat Susceptibility: 3
Lack of scientific knowledge

a stonefly (Isogenoides doratus)

Threat Susceptibility: 3
Lack of scientific knowledge

a stonefly (Perlesta shubuta)

Threat Susceptibility: 99
Lack of scientific knowledge

Insects: Beetles

Hungerford's crawling water beetle (Brychius hungerfordi)

Threat Susceptibility: 99
Incompatible natural resources management removal of beaver dams, fish management
Forestry practices
Removal of wildlife scientific collecting
Altered nutrient inflows site have low phosphorous
Pesticides & herbicides
Thermal changes
Disease, pathogens & parasites
Other biological interactions decline in beavers; increase in predators

Threat Susceptibility: 3
Dredging & channelization
Altered sediment loads
Altered hydrologic regimes
Lack of scientific knowledge

Cantrall's bog beetle (Liodessus cantralli)

Threat Susceptibility: 3
Lack of scientific knowledge

Douglas stenelmis riffle beetle (Stenelmis douglasensis)

Threat Susceptibility: 99
Pesticides & herbicides
Urban, municipal & industrial pollution
Fragmentation

Threat Susceptibility: 3
Riparian modifications
Dredging & channelization
Dams impounded habitat loss; altered downstream function
Altered sediment loads
Altered nutrient inflows organic impacts on oxygen
Altered hydrologic regimes
Lack of scientific knowledge

Threat Susceptibility Definitions:

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Insects: Caddisflies

a caddisfly (Wormaldia moesta)

Threat Susceptibility: 3
Lack of scientific knowledge

a caddisfly (Rhyacophila sp.)

Threat Susceptibility: 3
Lack of scientific knowledge

a caddisfly (Limnephilus sp.)

Threat Susceptibility: 3
Lack of scientific knowledge

Insects: True Bugs

a belostoman bug (Belostoma lutarium)

Threat Susceptibility: 3
Lack of scientific knowledge No information available on threats

Insects: Alderflies, Dobsonflies & Fishflies

a dobsonfly (Neohermes sp.)

Threat Susceptibility: 3
Lack of scientific knowledge

a dobsonfly (Nigronia fasciatus)

Threat Susceptibility: 3
Lack of scientific knowledge

Fish

lake sturgeon (Acipenser fulvescens)

Threat Susceptibility: 3
Dredging & channelization loss of spawning, nursery, and general habitats
Removal of wildlife mainly historic problem
Altered sediment loads siltation
Urban, municipal & industrial pollution
Other biological interactions loss of mussels and gastropods for food
Altered hydrologic regimes
Fragmentation thru dams

mooneye (Hiodon tergisus)

Threat Susceptibility: 99
Lack of scientific knowledge
Threat Susceptibility: 3
Altered sediment loads siltation a problem for spawning

reeside dace (Clinostomus elongatus)

Threat Susceptibility: 99
Other biological interactions hybridization
Threat Susceptibility: 3
Riparian modifications

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Altered sediment loads		turbidity, siltation
<u>brassy minnow (Hybognathus hankinsoni)</u>		
<i>Threat Susceptibility:</i>	99	
Altered hydrologic regimes		due to use of temporary wet/flooded areas
<i>Threat Susceptibility:</i>	3	
Removal of wildlife		collected for fish bait
Invasive plants & animals		do best without predatory fish
<u>striped shiner (Luxilus chrysocephalus)</u>		
<i>Threat Susceptibility:</i>	3	
Removal of wildlife		used as fish bait
Altered sediment loads		siltation, extreme turbidity
Pesticides & herbicides		
Altered hydrologic regimes		
Fragmentation		dams as barriers to spawning sites
<u>silver chub (Macrhybopsis storeriana)</u>		
<i>Threat Susceptibility:</i>	99	
Altered nutrient inflows		low DO levels
<i>Threat Susceptibility:</i>	3	
Removal of wildlife		used as fish bait
Altered sediment loads		siltation
<u>river chub (Nocomis micropogon)</u>		
<i>Threat Susceptibility:</i>	99	
Removal of wildlife		used as fish bait
Other biological interactions		hybridization
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		siltation and turbidity
Urban, municipal & industrial pollution		coal mine pollution specifically mentioned
<u>pugnose shiner (Notropis anogenus)</u>		
<i>Threat Susceptibility:</i>	3	
Macrophyte removal		
Altered sediment loads		extremely sensitive to turbidity
<u>bigmouth shiner (Notropis dorsalis)</u>		
<i>Threat Susceptibility:</i>	99	
Other biological interactions		hybridization, competition with silverjaw minnow
<i>Threat Susceptibility:</i>	3	
Riparian modifications		
Altered nutrient inflows		sensitive to eutrophications
Urban, municipal & industrial pollution		
<u>silver shiner (Notropis photogenis)</u>		
<i>Threat Susceptibility:</i>	99	
Dredging & channelization		stated as possible threats
Dams		stated as possible threats
Pesticides & herbicides		stated as possible threats
Urban, municipal & industrial pollution		stated as possible threats

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<i>Threat Susceptibility:</i>	3	
Altered sediment loads		siltation and turbidity
<u>pugnose minnow (<i>Opsopoeodus emiliae</i>)</u>		
<i>Threat Susceptibility:</i>	99	
Lack of scientific knowledge		This threat added based on research and knowledge needs identified
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		turbidity, siltation
<u>southern redbelly dace (<i>Phoxinus erythrogaster</i>)</u>		
<i>Threat Susceptibility:</i>	99	
Other biological interactions		hybridization
<i>Threat Susceptibility:</i>	3	
Riparian modifications		
Dredging & channelization		channel modifications
Removal of wildlife		used for fish bait
Altered sediment loads		siltation
<u>finescale dace (<i>Phoxinus neogaeus</i>)</u>		
<i>Threat Susceptibility:</i>	99	
Other biological interactions		hybridization
<u>western creek chubsucker (<i>Erimyzon claviformis</i>)</u>		
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		silt
Altered hydrologic regimes		
<u>lake chubsucker (<i>Erimyzon sucetta</i>)</u>		
<i>Threat Susceptibility:</i>	3	
Wetland modifications		draining
Altered sediment loads		turbidity, siltation
<u>spotted sucker (<i>Minytrema melanops</i>)</u>		
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		
Urban, municipal & industrial pollution		
<u>river redhorse (<i>Moxostoma carinatum</i>)</u>		
<i>Threat Susceptibility:</i>	99	
Other biological interactions		mainly feeds on mollusks
<i>Threat Susceptibility:</i>	3	
Dams		potential for large scale movements, dams can fragment habitats and remove habitat
Altered sediment loads		
Urban, municipal & industrial pollution		
Fragmentation		potential for large scale movements, dams can fragment habitats and remove habitat
<u>black redhorse (<i>Moxostoma duquesnei</i>)</u>		
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		siltation, turbidity
Disease, pathogens & parasites		

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golden redhorse (Moxostoma erythrurum)

<i>Threat Susceptibility:</i>	3	
Pesticides & herbicides		
Urban, municipal & industrial pollution		
Thermal changes		intolerant of warm and cold waters
Altered hydrologic regimes		
Fragmentation		due to dams - separation of spawning areas
<i>Threat Susceptibility:</i>	1	
Altered sediment loads		

brown bullhead (Ameiurus nebulosus)

<i>Threat Susceptibility:</i>	99	
Other biological interactions		hybridization

stonecat (Noturus flavus)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		channelized sections of rivers may act as barriers to this species
Dams		
Altered sediment loads		

tadpole madtom (Noturus gyrinus)

<i>Threat Susceptibility:</i>	99	
Removal of wildlife		used for fish bait
Other biological interactions		hybridization
<i>Threat Susceptibility:</i>	3	
Dredging & channelization		
Altered sediment loads		turbidity and siltation

brindled madtom (Noturus miurus)

<i>Threat Susceptibility:</i>	99	
Other biological interactions		hybridization
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		siltation
Pesticides & herbicides		
Urban, municipal & industrial pollution		

northern madtom (Noturus stigmosus)

<i>Threat Susceptibility:</i>	99	
Invasive plants & animals		likely competes with round goby for spawning sites
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		siltation
Pesticides & herbicides		
Urban, municipal & industrial pollution		

grass pickerel (Esox americanus)

<i>Threat Susceptibility:</i>	3	
Dredging & channelization		
Altered sediment loads		
Altered hydrologic regimes		

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<i>Threat Susceptibility:</i>	2	
Other biological interactions		interspecific competition with other pikes
<u>cisco or lake herring (Coregonus artedi)</u>		
<i>Threat Susceptibility:</i>	3	
Removal of wildlife		early declines due to exploitation
Altered nutrient inflows		enrichment of waters
Invasive plants & animals		smelt and alewife likely cause of declines
<u>kiyi (Coregonus kiyi)</u>		
<i>Threat Susceptibility:</i>	99	
Invasive plants & animals		alewife and smelt are suspected of declines
<i>Threat Susceptibility:</i>	3	
Removal of wildlife		over exploitation by commercial fishing - historic?
Altered nutrient inflows		eutrophication
<u>shortjaw cisco (Coregonus zenithicus)</u>		
<i>Threat Susceptibility:</i>	99	
Other biological interactions		hybridization with bloater
<i>Threat Susceptibility:</i>	3	
Removal of wildlife		over exploitation - historic
Urban, municipal & industrial pollution		
Invasive plants & animals		competition with alewife and rainbow smelt
<u>pygmy whitefish (Prosopium coulterii)</u>		
<i>Threat Susceptibility:</i>	99	
Lack of scientific knowledge		
<i>Threat Susceptibility:</i>	3	
Other biological interactions		isolated population
<u>pirate perch (Aphredoderus sayanus)</u>		
<i>Threat Susceptibility:</i>	99	
Lack of scientific knowledge		
<u>starhead topminnow (Fundulus dispar)</u>		
<i>Threat Susceptibility:</i>	3	
Wetland modifications		
Dredging & channelization		
Altered hydrologic regimes		
<u>slimy sculpin (Cottus cognatus)</u>		
<i>Threat Susceptibility:</i>	3	
Invasive plants & animals		gobies
<u>spoonhead sculpin (Cottus ricei)</u>		
<i>Threat Susceptibility:</i>	99	
Pesticides & herbicides		
Other biological interactions		predation by or competition with alewife
<i>Threat Susceptibility:</i>	3	
Altered sediment loads		
Invasive plants & animals		gobies

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deepwater sculpin (Myoxocephalus thompsonii)

Threat Susceptibility: 99

Invasive plants & animals

may compete with and be preyed upon by alewife

Threat Susceptibility: 3

Pesticides & herbicides

Urban, municipal & industrial pollution

eastern sand darter (Ammocrypta pellucida)

Threat Susceptibility: 3

Dredging & channelization

Dams

Mining practices

Altered sediment loads

siltation

Pesticides & herbicides

sea lamprey control chemicals

Urban, municipal & industrial pollution

Fragmentation

fantail darter (Etheostoma flabellare)

Threat Susceptibility: 3

Altered hydrologic regimes

least darter (Etheostoma microperca)

Threat Susceptibility: 3

Wetland modifications

Riparian modifications

Dredging & channelization

Dams

Macrophyte removal

Altered sediment loads

turbidity

Pesticides & herbicides

chemicals used to kill carp suggested problem, likely vulnerable to TFM

Urban, municipal & industrial pollution

Altered hydrologic regimes

orangethroat darter (Etheostoma spectabile)

Threat Susceptibility: 3

Altered sediment loads

Pesticides & herbicides

Urban, municipal & industrial pollution

banded darter (Etheostoma zonale)

Threat Susceptibility: 99

Other biological interactions

hybridization with rainbow darter

Lack of scientific knowledge

channel darter (Percina copelandi)

Threat Susceptibility: 99

Other biological interactions

hybridizes with logperch

Threat Susceptibility: 3

Altered sediment loads

siltation

Thermal changes

Disease, pathogens & parasites

increasing susceptibility to parasites

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Altered hydrologic regimes

river darter (*Percina shumardi*)

<i>Threat Susceptibility:</i>	99	
Dredging & channelization		potential threats
Dams		potential threats
Pesticides & herbicides		potential threats
Urban, municipal & industrial pollution		potential threats

sauger (*Sander canadensis*)

<i>Threat Susceptibility:</i>	99	
Other biological interactions		hybridization - with walleye

Amphibians

blue-spotted salamander (*Ambystoma laterale*)

<i>Threat Susceptibility:</i>	99	
Forestry practices		
Pesticides & herbicides		
Urban, municipal & industrial pollution		acid deposition
Other biological interactions		potential hybridization problems

<i>Threat Susceptibility:</i>	3	
Invasive plants & animals		needs fishless waters

<i>Threat Susceptibility:</i>	1	
Riparian modifications		fairly tolerant as long as critical parts of habitat remain intact

spotted salamander (*Ambystoma maculatum*)

<i>Threat Susceptibility:</i>	99	
Pesticides & herbicides		
<i>Threat Susceptibility:</i>	3	
Incompatible natural resources management		
Forestry practices		
Urban, municipal & industrial pollution		acid rain
Fragmentation		

<i>Threat Susceptibility:</i>	2	
Removal of wildlife		

marbled salamander (*Ambystoma opacum*)

<i>Threat Susceptibility:</i>	99	
Forestry practices		
Pesticides & herbicides		
Other biological interactions		shows density-dependent regulation during larval stage
Climate change		

<i>Threat Susceptibility:</i>	3	
Incompatible natural resources management		
Fragmentation		

smallmouth salamander (*Ambystoma texanum*)

<i>Threat Susceptibility:</i>	99	
Pesticides & herbicides		

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Threat Susceptibility: 3
Invasive plants & animals introduction of fish
Fragmentation

eastern tiger salamander (*Ambystoma tigrinum tigrinum*)

Threat Susceptibility: 99
Pesticides & herbicides
Other biological interactions hybridization

Threat Susceptibility: 3
Wetland modifications
Urban, municipal & industrial pollution
Invasive plants & animals introduction of fish

Threat Susceptibility: 2
Removal of wildlife sometimes used for fish bait

four-toed salamander (*Hemidactylum scutatum*)

Threat Susceptibility: 99
Forestry practices
Pesticides & herbicides

Threat Susceptibility: 3
Incompatible natural resources management
Fragmentation

mudpuppy (*Necturus maculosus maculosus*)

Threat Susceptibility: 3
Altered sediment loads siltation
Pesticides & herbicides reported to be sensitive to lampricides
Urban, municipal & industrial pollution
Social attitudes

western lesser siren (*Siren intermedia nettingi*)

Threat Susceptibility: 99
Lack of scientific knowledge

Threat Susceptibility: 3
Incompatible natural resources management
Pesticides & herbicides Rotenone
Social attitudes

Blanchard's cricket frog (*Acris crepitans blanchardi*)

Threat Susceptibility: 3
Wetland modifications
Pesticides & herbicides
Urban, municipal & industrial pollution

Threat Susceptibility: 2
Invasive plants & animals

boreal chorus frog (*Pseudacris triseriata maculata*)

Threat Susceptibility: 99
Incompatible natural resources management
Disease, pathogens & parasites

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Threat Susceptibility: 3
 Wetland modifications
 Pesticides & herbicides
 Urban, municipal & industrial pollution
 Altered hydrologic regimes

western chorus frog (*Pseudacris triseriata triseriata*)

Threat Susceptibility: 3
 Wetland modifications
 Pesticides & herbicides
 Urban, municipal & industrial pollution
 Altered hydrologic regimes

pickerel frog (*Rana palustris*)

Threat Susceptibility: 3
 Wetland modifications
 Pesticides & herbicides
 Urban, municipal & industrial pollution
 Altered hydrologic regimes

northern leopard frog (*Rana pipiens*)

Threat Susceptibility: 3
 Wetland modifications
 Removal of wildlife biological supply and fish bait
 Pesticides & herbicides
 Urban, municipal & industrial pollution acidification
 Disease, pathogens & parasites massive die-offs attributed to disease
 Fragmentation

Reptiles

copperbelly watersnake (*Nerodia erythrogaster neglecta*)

Threat Susceptibility: 3
 Wetland modifications
 Dredging & channelization
 Fragmentation
 Social attitudes persecution / fear killing
Threat Susceptibility: 2
 Removal of wildlife illegal collection

queen snake (*Regina septemvittata*)

Threat Susceptibility: 3
 Altered sediment loads siltation, anything that reduces crayfish populations (main prey)
 Pesticides & herbicides anything that reduces crayfish populations (main prey)
 Urban, municipal & industrial pollution anything that reduces crayfish populations (main prey)
 Invasive plants & animals
 Social attitudes fear killing

spotted turtle (*Clemmys guttata*)

Threat Susceptibility: 99
 Dredging & channelization
 Pesticides & herbicides
 Invasive plants & animals

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Threat Susceptibility: 3
 Wetland modifications
 Riparian modifications
 Removal of wildlife pet trade collecting
 Macrophyte removal require macrophytes
 Urban, municipal & industrial pollution
 Fragmentation

Blanding's turtle (*Emydoidea blandingii*)

Threat Susceptibility: 99
 Urban, municipal & industrial pollution
 Invasive plants & animals

Threat Susceptibility: 3
 Wetland modifications
 Fragmentation
 Social attitudes used for target practice

Threat Susceptibility: 2
 Removal of wildlife so far have attracted minimal attention from pet trade, however in past have been exploited for biological supply and for food

wood turtle (*Glyptemys insculpta*)

Threat Susceptibility: 3
 Riparian modifications can withstand modest levels of riparian modifications
 Incompatible natural resources management fisheries mgt practices such as bank stabilization, sand traps
 Removal of wildlife pet trade
 Pesticides & herbicides surface water pollution
 Urban, municipal & industrial pollution surface water pollution

Threat Susceptibility: 2
 Altered hydrologic regimes

Threat Susceptibility: 1
 Forestry practices
 Non-consumptive recreation

Mammals

water shrew (*Sorex palustris*)

Threat Susceptibility: 99
 Mining practices
 Pesticides & herbicides
 Thermal changes prefer cold water; uncertain of the importance of alteration though
 Altered hydrologic regimes prefer high flow; uncertain of the importance of alteration though
 Fragmentation populations are naturally fragmented

Threat Susceptibility: 3
 Wetland modifications
 Riparian modifications
 Dredging & channelization
 Altered sediment loads

Threat Susceptibility: 2
 Forestry practices

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