Manistee River Assessment
Appendix

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This appendix contains maps of known past and present fish distributions within the Manistee River watershed. The distributions of fish species were compiled from records located at the University of Michigan, Museums Fisheries Library, Michigan Department of Natural Resources, Institute for Fisheries Research, and offices in Cadillac and Grayling. Scientific names and phylogenic order follow Robins et al. (1991). Species that are listed under Michigan’s Endangered Species Act (Part 365, Endangered Species Protection, of the Natural Resource and Environmental Protection Act, Act 451 of the Public Acts of 1994), their status follows their scientific name. Categories are declining, rare, threatened, endangered, extinct, and locally extinct.

Habitat descriptions were compiled from The Fishes of Ohio (Trautman 1982), Freshwater Fishes of Canada (Scott and Crossman 1973), Fishes of Wisconsin (Becker 1983), Fishes of Missouri (Pflieger 1975), and Fishes of the Great Lakes Region (Hubbs and Lagler 1947).
Chestnut lamprey (*Ichthyomyzon castaneus*)

**Habitat:**
- **Feeding:**
  - Stable substrate of sand and silt with light growth of *chara* or quiet backwaters of muck and silt with dense rooted vegetation
  - Moderate current
  - Clear moderate-size water
- **Spawning:**
  - Moderate-size stream
  - Nest builder
Northern brook lamprey (*Ichthyomyzon fossor*)

**Habitat:**
- **feeding** - young: low gradient, substrate with bars and beds of mixed sand and organic debris
  - moderately warm water
- **spawning** - clear, high gradient streams (<15 feet wide)
  - riffles with sand or gravel substrate
American brook lamprey (*Lampetra appendix*)

**Habitat:**
- **feeding** - young: low gradient, substrate with bars and beds of mixed sand and organic debris
  - clear cool stream water, sensitive to turbidity
- **spawning** - clear, high gradient streams (>15 feet wide)
  - cold water
  - gravel substrate
- **winter refuge** - sand or silt substrate for annacoetes
Sea lamprey (*Petromyzon marinus*)

**Habitat:**

- **feeding** - young: substrate with beds of sand mixed with organic debris
  - cannot tolerate silt
  - adults: clear cool water of Lake Michigan

- **spawning** - no dams
  - riffles with sand and gravel substrates
Lake sturgeon (*Acipenser fulvescens*)

**Habitat:**

- **feeding**
  - shoal areas of large rivers, lakes, and impoundments
  - gravel, sand, rock substrates

- **spawning**
  - in or before rapids, at the base of dams in rivers
  - in 2-15 feet of water
  - swift current
  - rocky ledges or around rocky islands in Great Lakes
**Longnose gar** (*Lepisosteus osseus*)

**Habitat:**
- **feeding** - adults: in deeper water
  - young: in shallows
  - clear water, low-gradient streams, lakes, and impoundments
  - will feed in moderate current
  - aquatic vegetation preferred, but not necessary
  - open water fish

- **spawning** - warm shallow water of lakes or streams over vegetation
**Bowfin** (*Amia calva*)

**Habitat:**

- **feeding** - clear water
  - abundant rooted aquatic vegetation
  - low gradient streams, lakes, and impoundments
  - tolerate only small amount of silt

- **spawning** - need vegetated water, 1 to 2 feet deep
  - can spawn under logs, stumps, or bushes

- **winter refuge** - gravelly pockets among aquatic vegetation
Alewife (*Alosa pseudoharengus*)

**Habitat:**
- **feeding** - adults: deep water of Lake Michigan
  - young: shallow water of Lake Michigan
  - prefers warmer waters
- **spawning** - streams or shallow beaches of lake
  - sand or gravelly substrate
- **winter refuge** - deep water

![Map of Manistee River Assessment with locations labeled](image-url)
Gizzard shad (*Dorosoma cepedianum*)

**Habitat:**

- **feeding** - large streams with low gradient, impoundments, and Lake Huron
  - tolerant of clear and turbid water

- **spawning** - shallow areas of ponds, lakes, and large rivers
  - low gradient
Central stoneroller (*Campostoma anomalum*)

**Habitat:**
- **feeding** - moderate to high gradients
  - rocky riffles
  - somewhat tolerant of turbidity
  - riffles and adjacent pools of warm, clear, shallow streams
  - gravel or cobble substrate

- **spawning** - riffles
Lake chub (*Couesius plumbeus*) - rare

**Habitat:**
- **feeding** - large rivers and lakes
  - over a variety of substrates
- **spawning** - tributary streams
  - rock substrate
Spotfin shiner (*Cyprinella spiloptera*)

**Habitat:**

**Feeding:**
- Clear water tolerant of turbidity and siltation
- Some current
- Shallow depths
- Medium sized streams, lakes, and impoundments
- Clear sand or gravel substrate

**Spawning:**
- Swift current
- Crevice spawner or on underside of submerged logs and roots
Common carp (*Cyprinus carpio*)

**Habitat:**
- **feeding** - low gradient fertile streams, rivers, lakes, and impoundments
  - abundance of aquatic vegetation or organic matter
  - tolerant of all substrates and clear to turbid water
- **spawning** - weedy or grassy shallows
Brassy minnow (*Hybognathus hankinsoni*)

**Habitat:**
- feeding - cool acidic streams
  - slow to moderate current
  - sand or gravel substrate
Common shiner *Luxilus cornutus*

**Habitat:**

- **feeding** - small, clear, high-gradient streams and rivers, or shores of clear water lakes and impoundments
  - gravel substrate
  - can tolerate some submerged aquatic vegetation
  - not very tolerant of turbidity or silted waters

- **spawning** - gravel nests of other fish, especially those at the head of a riffle
Pearl dace (*Margariscus margarita*)

**Habitat:**
- **feeding**: cool, neutral to acidic streams and lakes
  - clear to slightly turbid water
- **spawning**: males are territorial
  - clear water, 18-24 inches deep
  - sand or gravel substrate
  - weak to moderate current
**Hornyhead chub** (*Nocomis biguttatus*)

**Habitat:**

- **feeding**
  - adults: near riffles
  - young: near vegetation
  - clear water, does not tolerate turbidity
  - gravel substrate
  - low gradient streams that are tributaries to large streams

- **spawning**
  - large stones and pebbles present
  - often below a riffle in shallow water
  - gravel substrate
River chub (*Nocomis micropogon*)

**Habitat:**
- feeding - moderate to large streams
- moderate to high gradient
- gravel, boulder, or bedrock substrate
- little to no aquatic vegetation
- cannot tolerate turbidity or siltation
**Golden shiner** (*Notemigonus crysoleucas*)

**Habitat:**

- **Feeding:** lakes and impoundments and quiet pools of low gradient streams
  - clear shallow water
  - heavy vegetation

- **Spawning:** vegetation
Pugnose shiner (*Notropis anogenus*) - rare

**Habitat:**

- Feeding: very clear water of lakes, impoundments, and low-gradient streams
- Aquatic vegetation
- Clean sand, marl, or organic debris substrate
- Extremely intolerant of turbidity
Emerald shiner (*Notropis atherinoides*)

**Habitat:**

- feeding: open-large stream channels and lake
- low to moderate gradient
- range of turbidites and bottom types
- midwater or surface preferred, substrate of little importance
- avoids rooted vegetation

- spawning: sand or firm mud substrate or gravel shoals
Blackchin shiner (*Notropis heterodon*)

**Habitat:**
- feeding - lakes, impoundments, and quiet pools in streams and rivers
  - clear water
  - clean sand, gravel, or organic debris substrate
  - dense beds of submerged aquatic vegetation
  - cannot tolerate turbidity, silt, or loss of aquatic vegetation
**Blacknose shiner** (*Notropis heterolepis*)

**Habitat:**
- feeding - clear lakes, impoundments, and pools of small, clear, low-gradient streams
- aquatic vegetation
- clean sand, gravel, marl, muck, peat, or organic debris substrate
- cannot tolerate much turbidity, much siltation, or loss of aquatic vegetation

- spawning - sandy substrate
Spottail shiner (*Notropis hudsonius*)

**Habitat:**
- feeding: large rivers, lakes, and impoundments
  - firm sand and gravel substrate
  - low current
  - sparse to moderate vegetation
  - avoids turbidity
- spawning: over sandy shoals or gravelly riffles
  - near the mouths of small streams
**Rosyface shiner** (*Notropis rubellus*)

**Habitat:**

- **feeding** - moderate sized streams
  - moderate to high gradient
  - gravel or sand substrate; intolerant of silt substrate
  - clear water; intolerant of turbidity

- **spawning** - on nests of horneyhead chub, chesnut lamprey, and redhorses
  - sandy-gravel, gravel or bedrock substrate
  - shallow high gradient water
Sand shiner (*Notropis stramineus*)

**Habitat:**
- feeding - sand and gravel substrate
- shallow pools in medium size streams, lakes, and impoundments
- clear water and low gradient
- rooted aquatic vegetation preferred
- tolerant of some inorganic pollutants provided substrate is not covered

- spawning - clean gravel or sand substrate
Mimic shiner (*Notropis volucellus*)

**Habitat:**
- **Feeding:**
  - pools and backwater of streams, moderately weedy lakes and impoundments
  - quiet or still water
  - clear shallow water
- **Spawning:**
  - aquatic vegetation necessary
Northern redbelly dace (*Phoxinus eos*)

**Habitat:**

- **feeding** - slow current
  - in boggy lakes and streams
  - detritus or silt substrate
  - clear to slightly turbid water

- **spawning** - filamentous algae needed for egg deposition
Finescale dace \textit{(Phoxinus neogaeus)}

**Habitat:**
- feeding - cool bog lakes and streams
- neutral to slightly acidic waters
- various substrates
Bluntnose minnow (*Pimephales notatus*)

**Habitat:**

- **feeding**
  - quiet pools and backwaters of medium to large streams, lakes, and impoundments
  - clear warm water
  - some aquatic vegetation
  - firm substrates
  - tolerates all gradients, turbidity, organic and inorganic pollutants

- **spawning**
  - eggs deposited on the underside of flat stones or objects
  - nests in sand or gravel substrate
Fathead minnow (*Pimephales promelas*)

**Habitat:**
- **Feeding:** pools of small streams, lakes, and impoundments
  - tolerant of turbidity, high temperatures, and low oxygen
- **Spawning:** on underside of objects in water 2 to 3 feet deep
  - prefer sand, marl, or gravel substrate
Blacknose dace (*Rhinichthys atratulus*)

**Habitat:**
- feeding: moderate to high gradient streams
  - sand and gravel substrate
  - clear cool water in pools with deep holes and undercut banks
  - does not tolerate turbidity and silt well
- spawning: riffles with gravel substrate and fast current
- winter refuge: larger waters
**Longnose dace** \textit{(Rhinichthys cataractae)}

**Habitat:**
- feeding - lakes and streams
  - high gradient
  - gravel or boulder substrate
**Creek chub (Semotilus atromaculatus)**

**Habitat:**

- **feeding**
  - streams, rivers, or shore waters of lakes and impoundments
  - can tolerate intermittent flows
  - tolerates moderate turbidity

- **spawning**
  - gravel nests
  - low current

- **winter refuge**
  - deeper pools and runs
Quillback (*Carpoides cyprinus*)

**Habitat:**
- **feeding** - clear to turbid water
  - Lake Michigan
  - sand, sandy gravel, sandy silt, or clay-silt substrate
  - medium- to low-gradient rivers and streams; also lakes and sloughs
- **spawning** - streams or overflow areas of bends of rivers or bays of lakes
  - scatter eggs over sand or mud substrate
Longnose sucker (*Catostomus catostomus*)

**Habitat:**

- **feeding** - clear, cold rivers and lakes
- **spawning** - in streams or lake shallows
  - current
  - gravel substrate
White sucker (*Catostomus commersoni*)

**Habitat:**
- **feeding** - streams, rivers, lakes, and impoundments
- can inhabit highly turbid and polluted waters

- **spawning** - quiet gravelly shallow areas of streams
Northern hog sucker (*Hypentelium nigricans*)

**Habitat:**
- **feeding** - gravel or rubble substrate
  - riffles and adjacent pools of warm shallow streams
  - clear water
  - doesn’t like turbidity or siltation
  - avoids profuse amounts of aquatic vegetation
- **spawning** - riffles
  - shallow gravel substrate
  - high gradient
- **winter refuge** - deeper quieter pools
Silver redhorse (*Moxostoma anisurum*)

**Habitat:**

- **Feeding:**
  - Streams, rivers, lakes, and impoundments
  - Low current
  - Pollution and turbidity intolerant

- **Spawning:**
  - Swift current in rivers, do not spawn in tributaries
  - Males territorial
  - Gravel to rubble substrate
Golden redhorse (*Moxostoma erythrurum*)

**Habitat:**
- feeding - warm medium gradient streams and rivers  
  - clear riffly streams  
  - medium size streams and rivers  
  - tolerates some turbidity and silt
- spawning - shallow gravelly riffles
- winter refuge - larger streams
Shorthead redhorse (*Moxostoma macrolepidotum*)

**Habitat:**
- **feeding** - downstream sections of large rivers, lakes, and impoundments
  - rocky substrates
  - swift water near riffles
  - clear to slightly turbid water

- **spawning** - gravelly riffles in smaller feeder streams
Greater redhorse (*Moxostoma valenciennesi*)

**Habitat:**

- feeding - large clear streams
  - clean sand, gravel, or boulder substrate
  - intolerant of excessive turbidity and chemical pollutants

- spawning - moderately rapid current
Black bullhead (*Ameiurus melas*)

**Habitat:**

- feeding - turbid water
  - silt bottom
  - low gradient small to medium streams, pools, and headwaters of large rivers; also in lakes and impoundments
  - can tolerate very warm water and very low dissolved oxygen

- spawning - nest in moderate to heavy vegetation or woody debris and under overhanging banks
Yellow bullhead (*Ameiurus natalis*)

**Habitat:**

- feeding: clear flowing water
- heavy vegetation
- low gradient streams, lakes, and impoundments
- tolerant of low oxygen

- spawning: nest under a stream bank or near stones or stumps
Brown bullhead (*Ameiurus nebulosus*)

**Habitat:**
- **feeding** - larger streams and rivers, lakes and impoundments
  - clear cool water with little clayey silt
  - moderate amounts of aquatic vegetation
  - sand, gravel, or muck substrate
  - not tolerant of turbid water
  - tolerant of warm water and low oxygen
- **spawning** - nest in mud or sand substrate among rooted aquatic vegetation usually near a stump, tree, or rock
- **winter refuge** - in muddy bottoms
Channel catfish (*Ictalurus punctatus*)

**Habitat:**

- **feeding** - moderately-clear, deeper waters of rivers, lakes, and impoundments
  - sand, gravel, or rubble substrate
  - low to moderate gradient

- **spawning** - secluded semi-dark areas such as holes, under banks, log jams, or rocks
Tadpole madtom (*Noturus gyrinus*)

**Habitat:**

- **Feeding:** vegetative cover in low-moderate current waters
  - muddy substrate with extensive vegetation
  - clear waters of streams, rivers, and lakes

- **Spawning:** mostly in rivers, sometimes shallows of lakes
  - nests in dark cavities (ex: beneath boards, logs, crayfish burrows)
Northern pike (*Esox lucius*)

**Habitat:**
- **feeding** - cool to moderately warm streams, rivers, lakes, and impoundments
  - vegetation in slow to moderate current
- **spawning** - submerged vegetation with slow current in shallow water
**Tiger muskellunge** (*Esox masquinongy x E. lucius*)

**Habitat:**

- **feeding** - intermediate between muskellunge and northern pike

- **spawning** - hybrid species; muskellunge x northern pike
  - occasionally produced in wild, but most often from hatcheries
  - males are sterile, females may be fertile
Muskellunge (*Esox masquinongy*)

**Habitat:**

feeding - warm, heavily vegetated lakes, stumpy weedy bays, and slow heavily vegetated medium to large rivers
- shallow cool water
- tolerant of low oxygen

spawning - clear shallow waters (15-20”) in heavily vegetated areas