

## APPENDIX 3

### Distribution Maps of Fish Species

This appendix contains maps of known past and present fish distributions within the Manistique 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 the Northern Lake Michigan Management Unit office in Escanaba.

Habitat descriptions were compiled from the Fishes of Ohio (Trautman 1981), 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).

### References

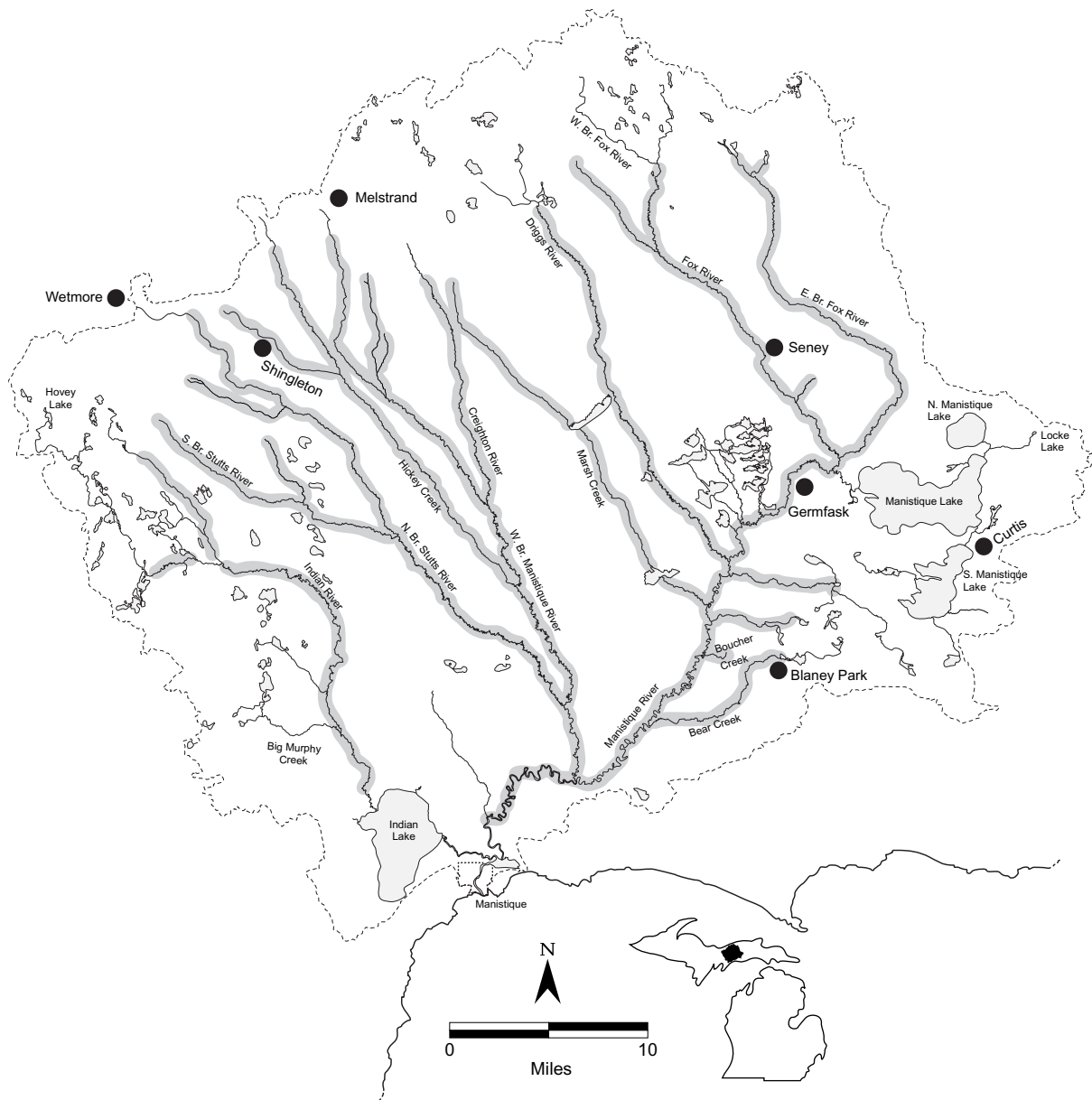
- Becker, G. C. 1983. Fishes of Wisconsin. The University Wisconsin Press, Madison.
- Hubbs, C. L., and K. F. Lagler. 1947. Fishes of the Great Lakes region. The University of Michigan Press, Ann Arbor.
- Pflieger, W. L. 1975. The fishes of Missouri. Missouri Department of Conservation, Jefferson City.
- Scott, W. B., and E. J. Crossman. 1973. Freshwater fishes of Canada. Bulletin 184. Fisheries Research Board of Canada, Ottawa.
- Trautman, M. B. 1981. Fishes of Ohio, revised edition. Ohio State University Press, Columbus.



**Northern brook lamprey (*Ichthyomyzon fossor*)**

**Habitat:**

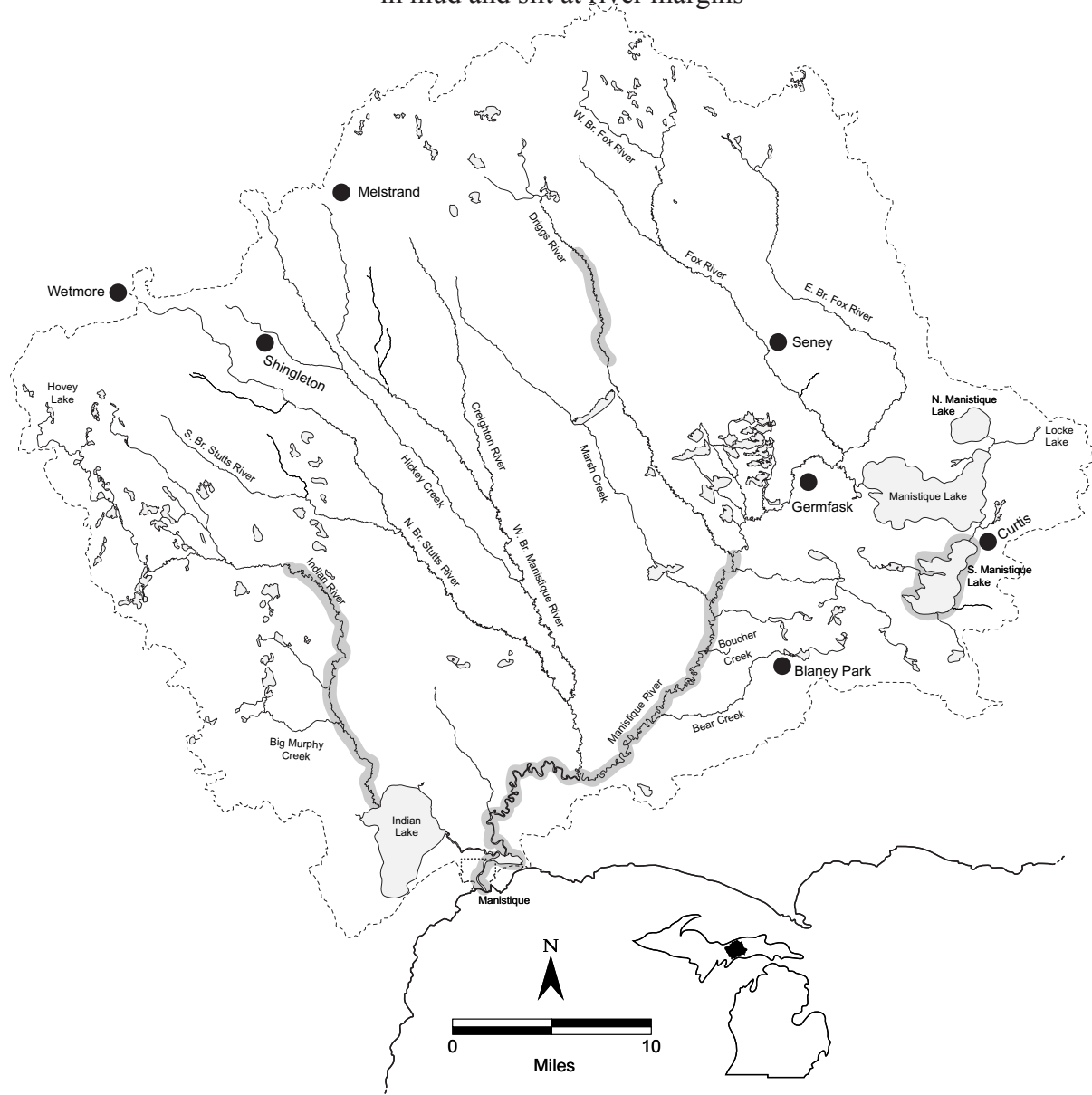
- feeding - young: low gradient, substrate with bars and beds of mixed sand and organic debris
- moderately warm water
  
- spawning - clear, high gradient streams (<15 feet wide)
- riffles with sand or gravel substrate



**Silver lamprey (*Ichthyomyzon unicuspis*)**

**Habitat:**

- feeding - young: sand, muck, or organic debris substrate
- adults: clear river water with prey species
  
- spawning - gravel and sand substrate
- moderate gradient
- moderate size stream
- cannot tolerate silt
- no dams
  
- winter refuge - ammocetes burrow for 4 to 7 years  
in mud and silt at river margins



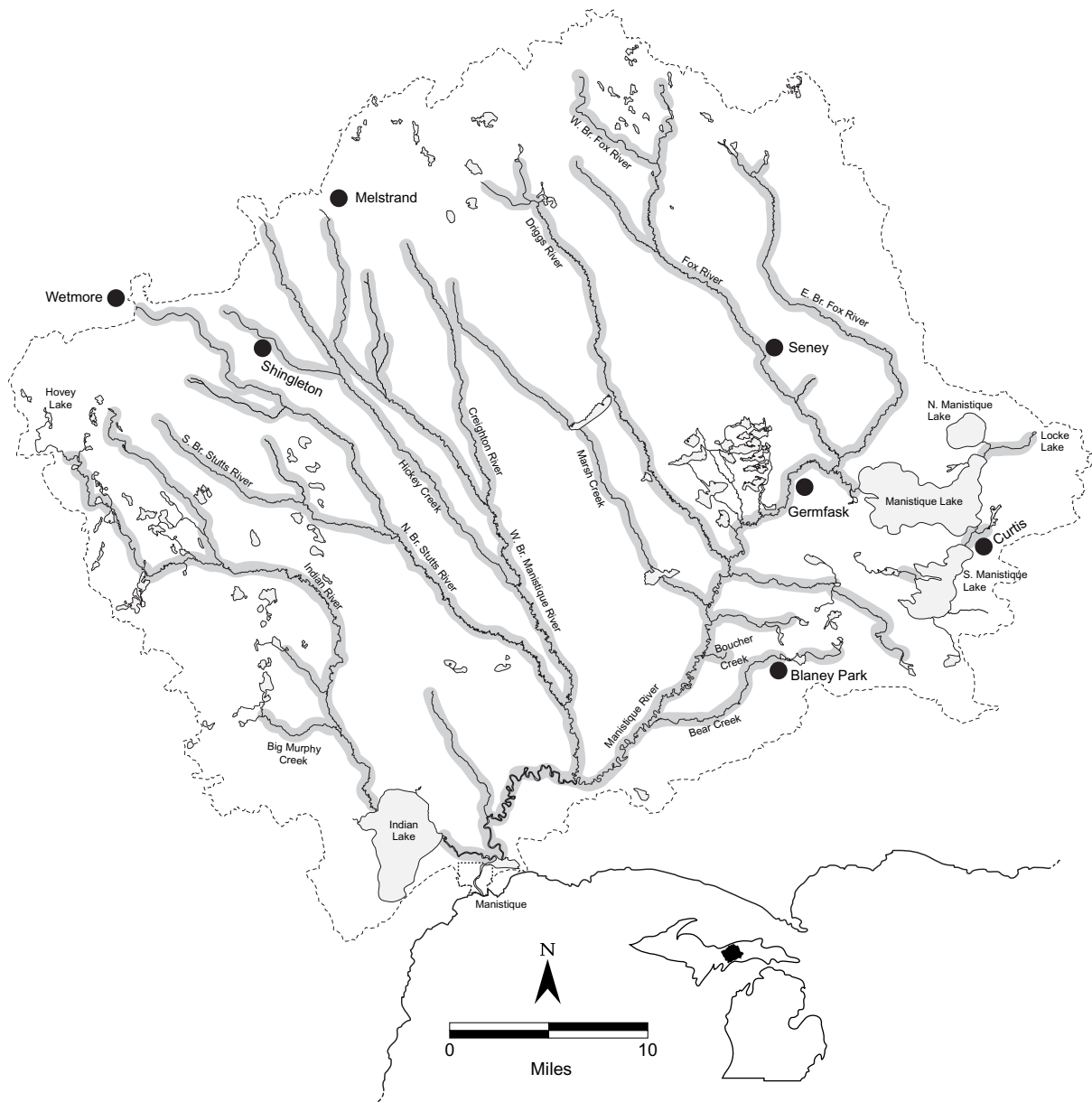
**American brook lamprey (*Lampetra appendix*)**

**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

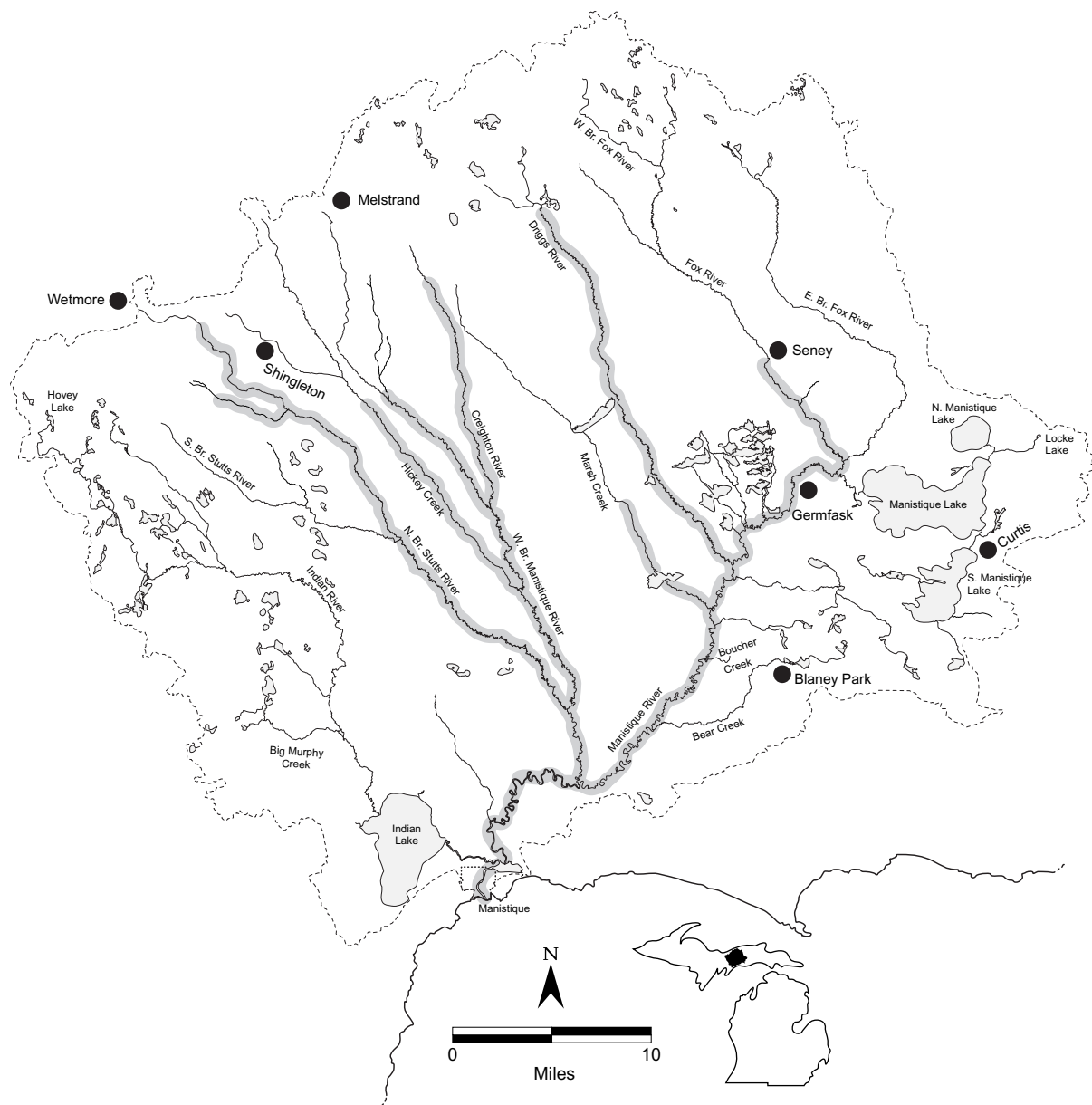
- winter refuge - sand or silt substrate for ammocetes



## Sea lamprey (*Petromyzon marinus*)

### Habitat:

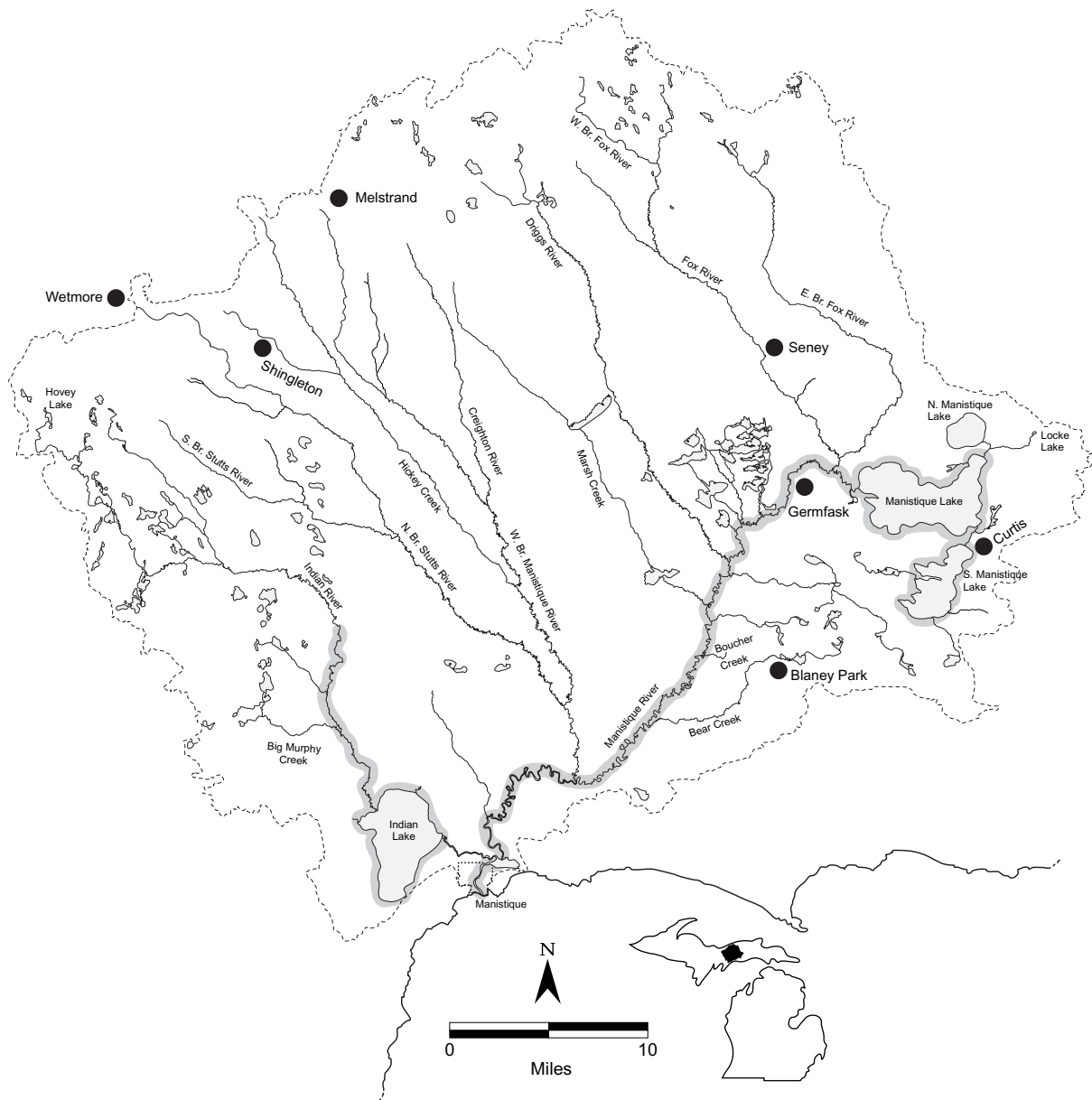
- feeding - young: substrate with beds of sand mixed with organic debris
- cannot tolerate silt
- adults: clear cool water of Lake Michigan
  
- spawning - no dams
- riffles with sand and gravel substrates



**Lake sturgeon (*Acipenser fulvescens*) - threatened**

**Habitat:**

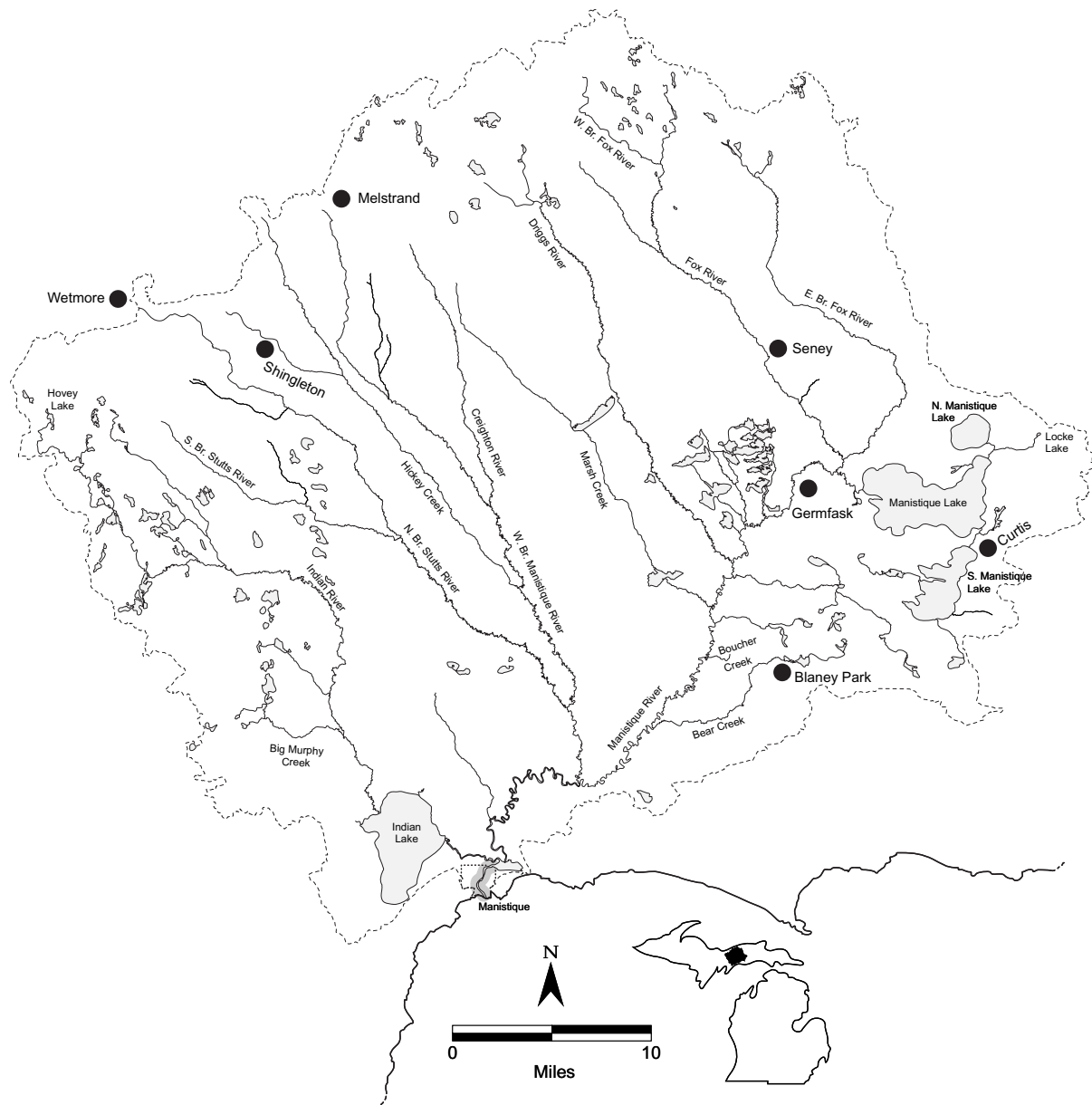
- feeding - shoal areas of large rivers, lakes, and impoundments
- gravel, sand, rock substrates
  
- spawning - in or before rapids, at the base of dams in rivers
- in 2-15 feet of water
- swift current
- rocky ledges or around rocky islands in Great Lakes



**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 lakes
- sand or gravelly substrate
  
- winter refuge - deep water

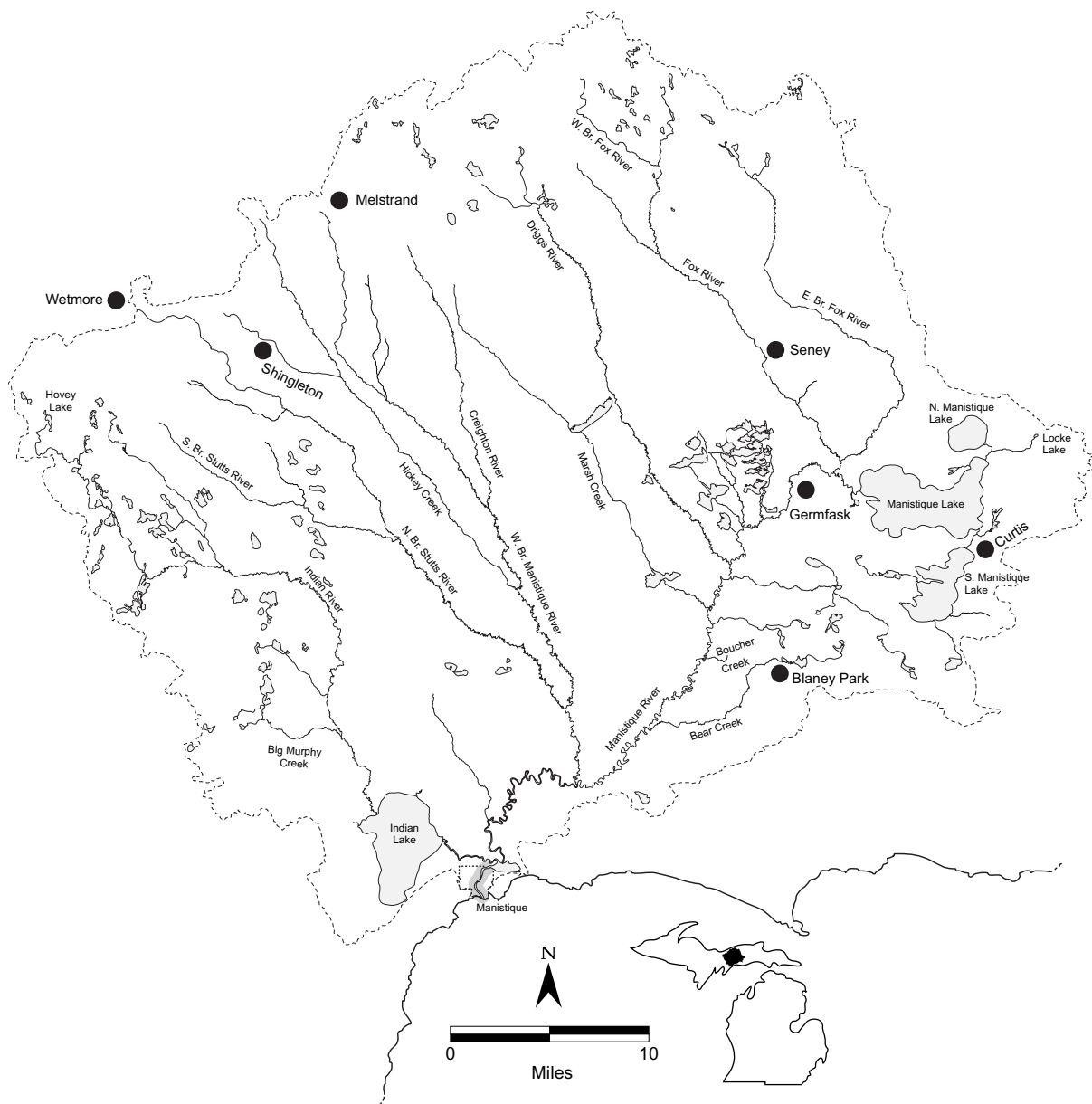




**Common carp (*Cyprinus carpio*)**

**Habitat:**

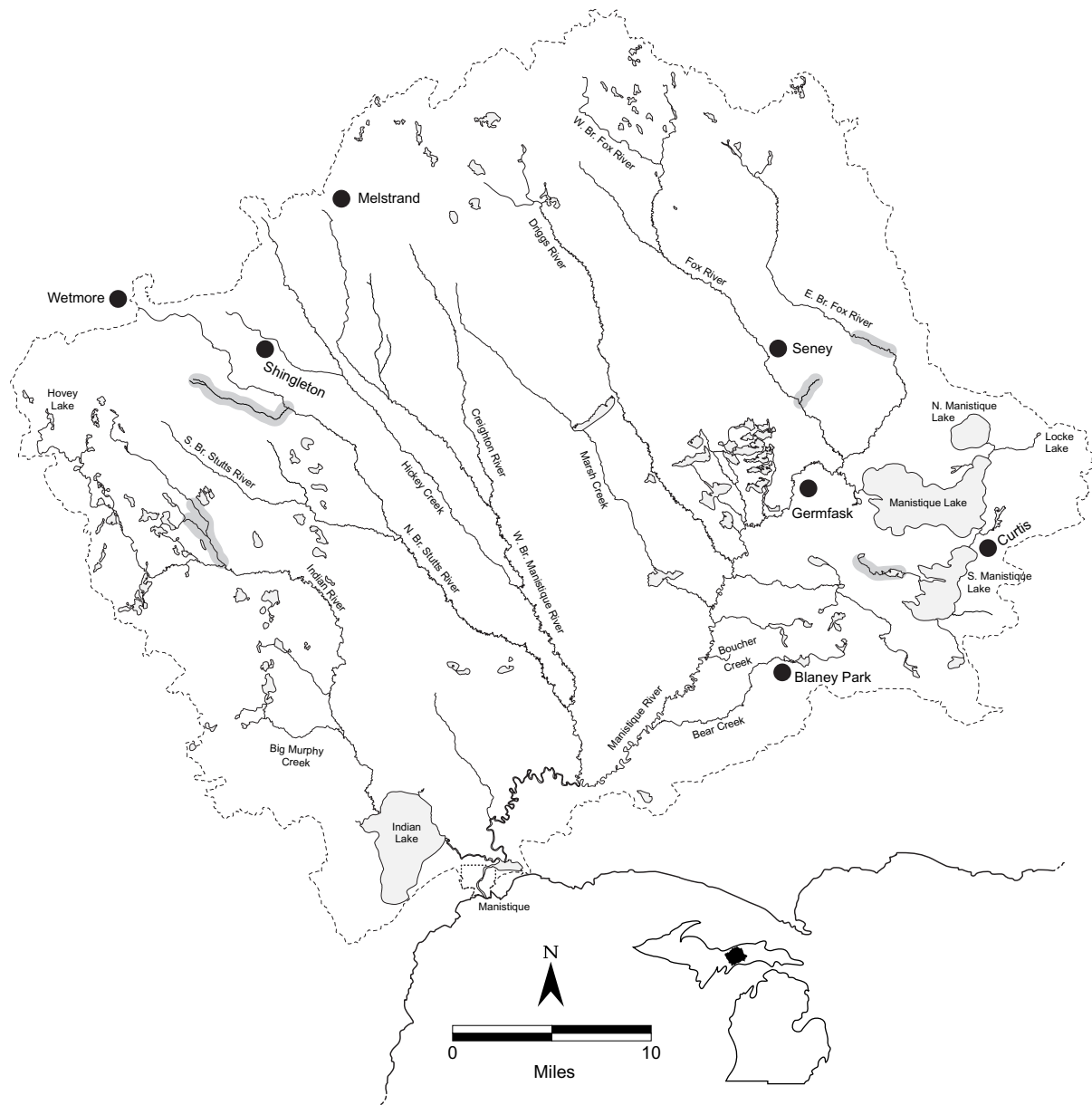
- feeding - low gradient fertile streams, rivers, lakes, and impoundments
  - abundance of aquatic vegetation or organic matter
  - tolerant of all substrates and clear to turbid water
- spawning - weedy or grassy shallows



**Brassy minnow (*Hybognathus hankinsoni*)**

**Habitat:**

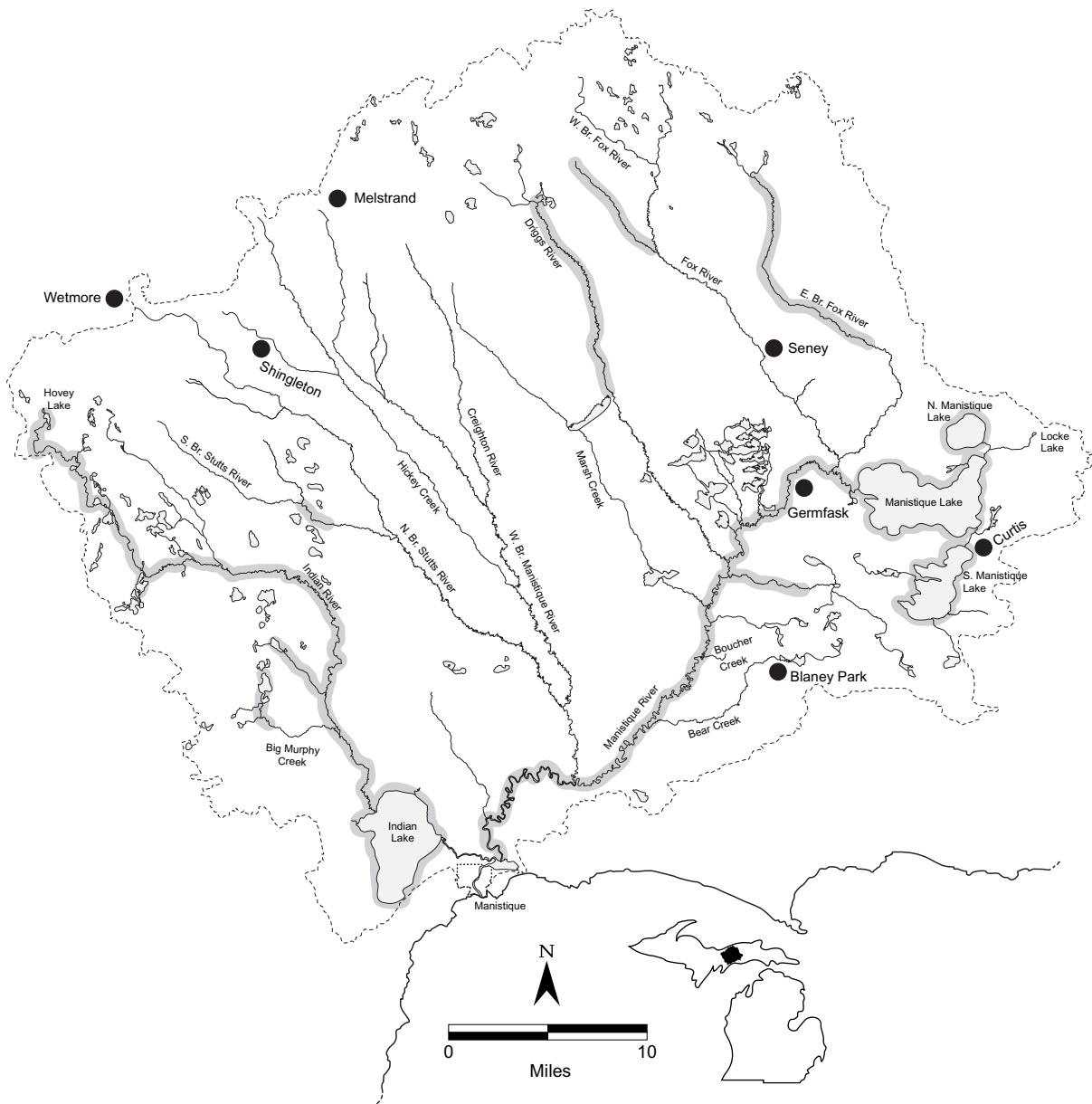
- feeding - cool acidic streams
- slow to moderate current
- sand or gravel substrate



**Common shiner (*Luxilus cornutus*)**

**Habitat:**

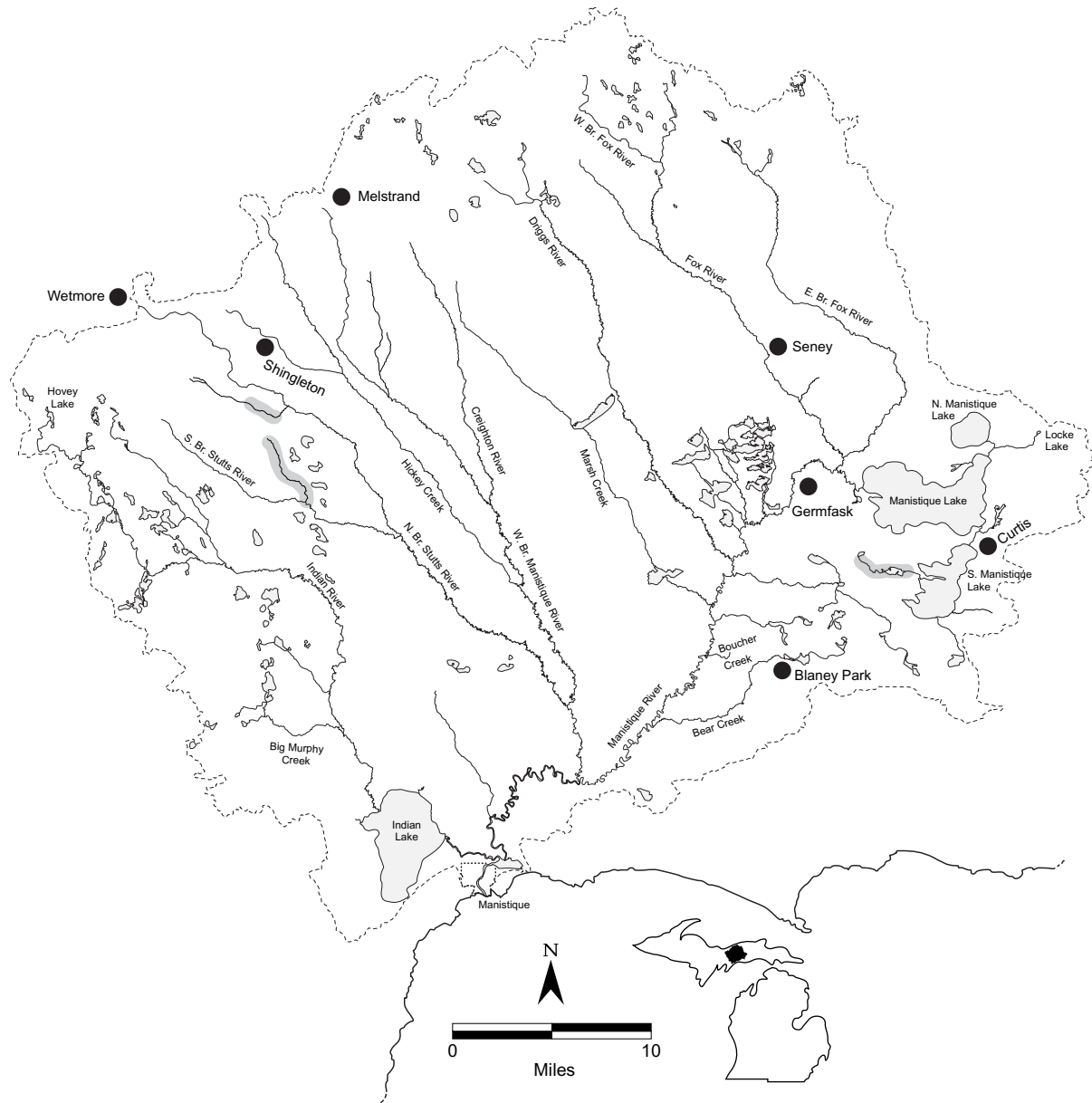
- feeding - small, clear, high-gradient streams and rivers, or shores of clear water lakes and impoundments
  - gravel substrate
  - can tolerate some submerged aquatic vegetation
  - not very tolerant of turbidity or silted waters
- spawning - gravel nests of other fish, especially those at the head of a riffle



**Northern pearl dace (*Margariscus nachtriebi*)**

**Habitat:**

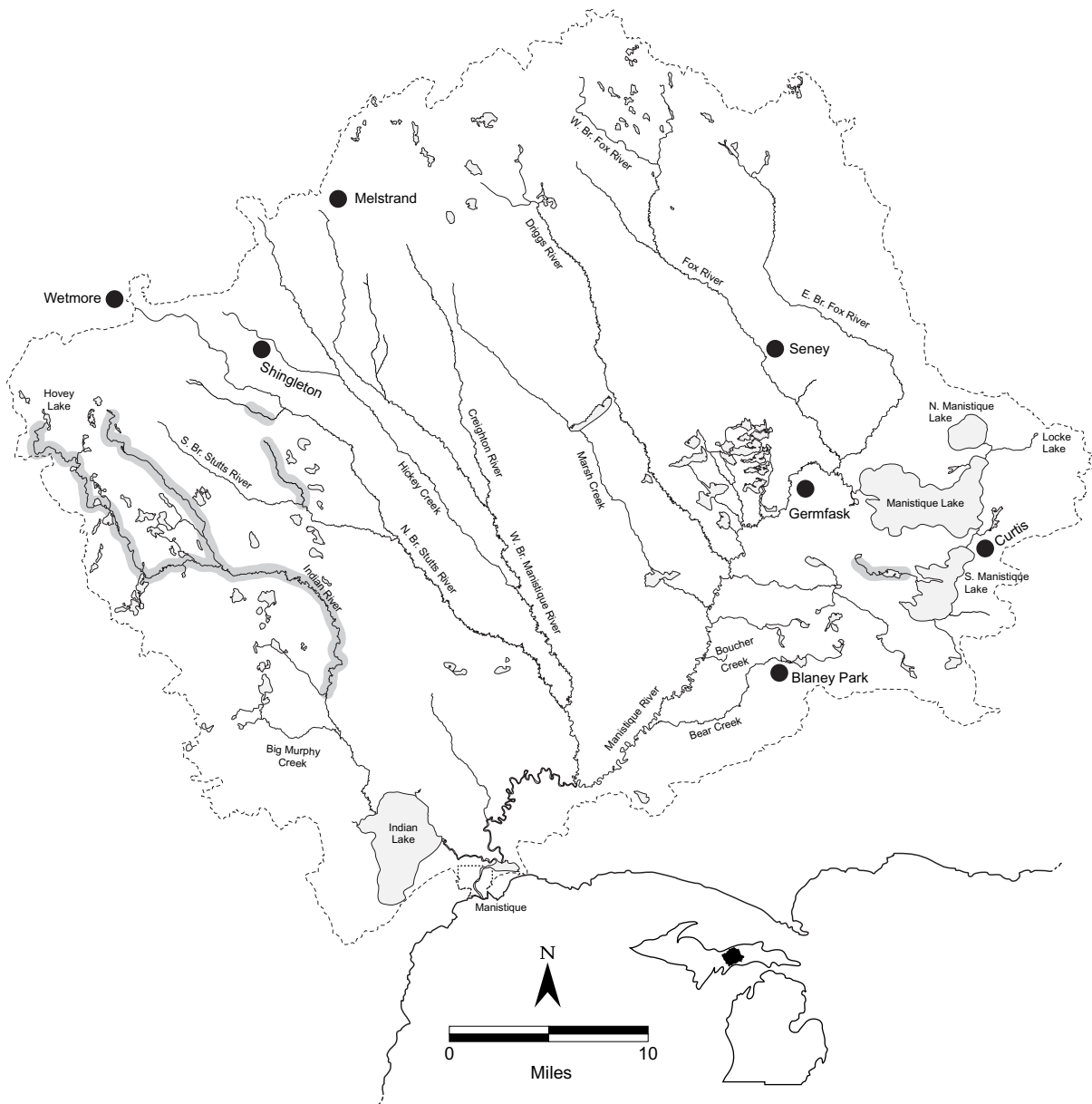
- feeding - cool, neutral to acidic streams and lakes
- clear to slightly turbid water
  
- spawning - males are territorial
- clear water, 18-24 inches deep
- sand or gravel substrate
- weak to moderate current



**Hornyhead chub** (*Nocomis biguttatus*)

**Habitat:**

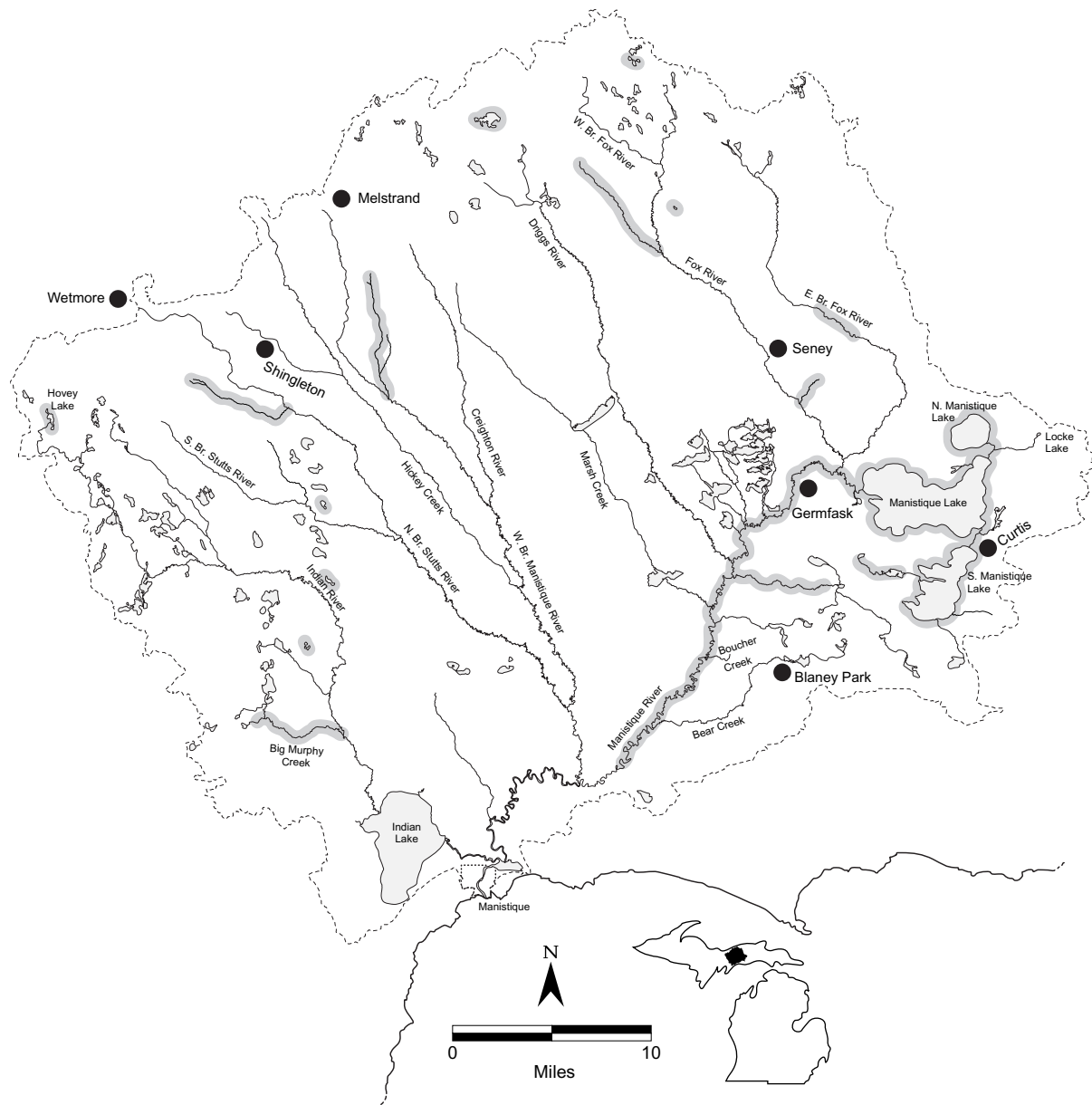
- feeding - adults: near riffles
  - young: near vegetation
  - clear water, does not tolerate turbidity
  - gravel substrate
  - low gradient streams that are tributaries to large streams
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- spawning - large stones and pebbles present
  - often below a riffle in shallow water
  - gravel substrate



**Golden shiner (*Notemigonus crysoleucas*)**

**Habitat:**

- feeding - lakes and impoundments and quiet pools of low gradient streams
- clear shallow water
- heavy vegetation
  
- spawning - vegetation



**Emerald shiner (*Notropis atherinoides*)**

**Habitat:**

- feeding - open-large stream channels and lakes
  - low to moderate gradient
  - range of turbidities and bottom types
  - midwater or surface preferred, substrate of little importance
  - avoids rooted vegetation
- spawning - sand or firm mud substrate or gravel shoals

