Appendix 3

Distribution Maps of Fish Species

This appendix contains maps of past and known present fish distributions within the Flint 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, Michigan Department of Natural Resources offices in Perry and Bay City, and Michigan Department of Environmental Quality. Specific locations were plotted and extrapolated by the authors. Scientific names and phylogenic order follow Robins et al. (1991). For 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 follow their scientific name. Categories are declining, rare, threatened, endangered, extinct, and locally extinct.

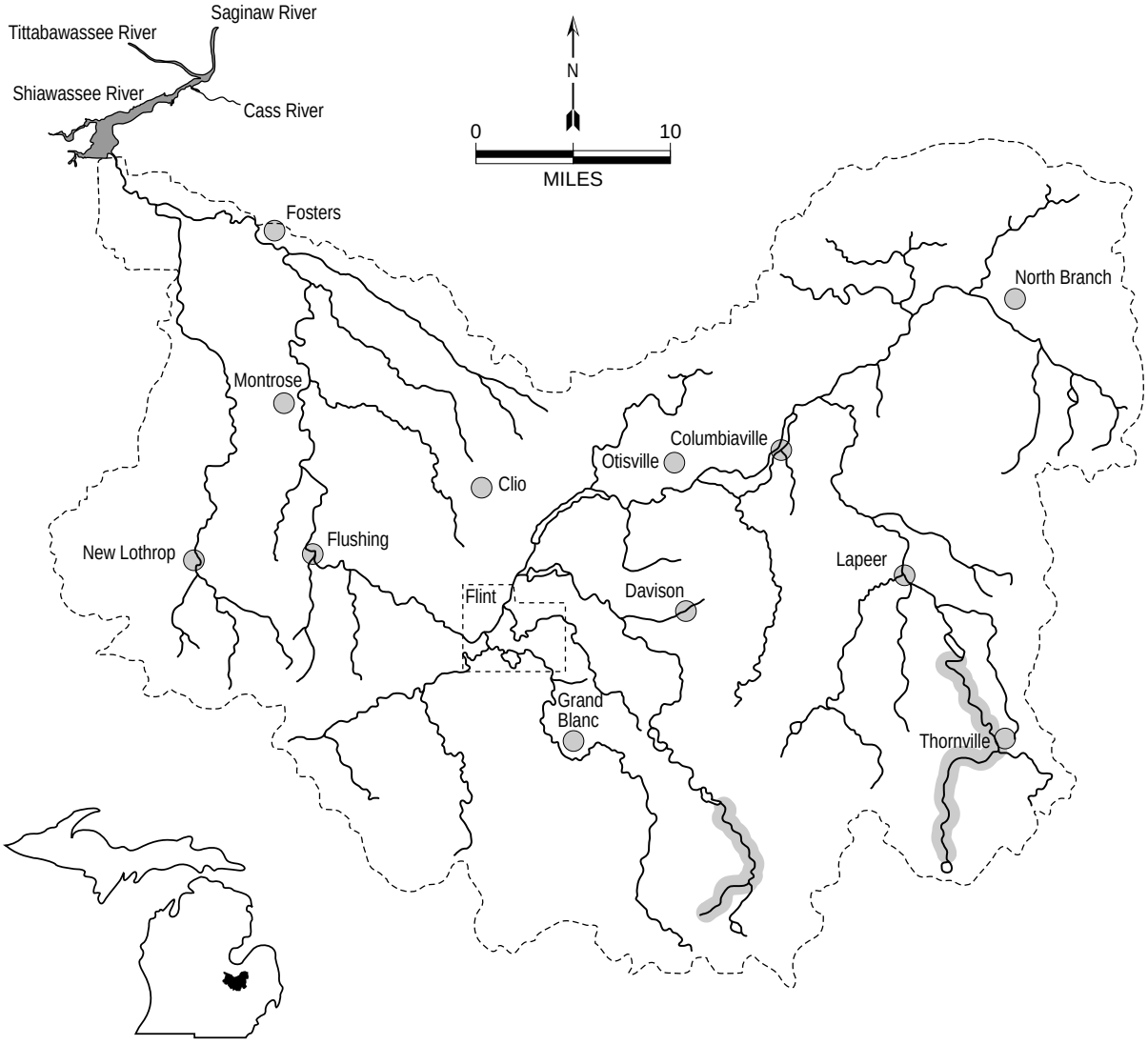
Habitat descriptions were compiled from the Fishes of Ohio (Trautman 1981), Freshwater Fishes of Canada (Scott and Crossman 1973), Fishes of Wisconsin (Becker 1983), Fishes of Missouri (Pflieger 1975) and fishes of the Great Lakes Region (Hubbs and Lagler 1947).

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



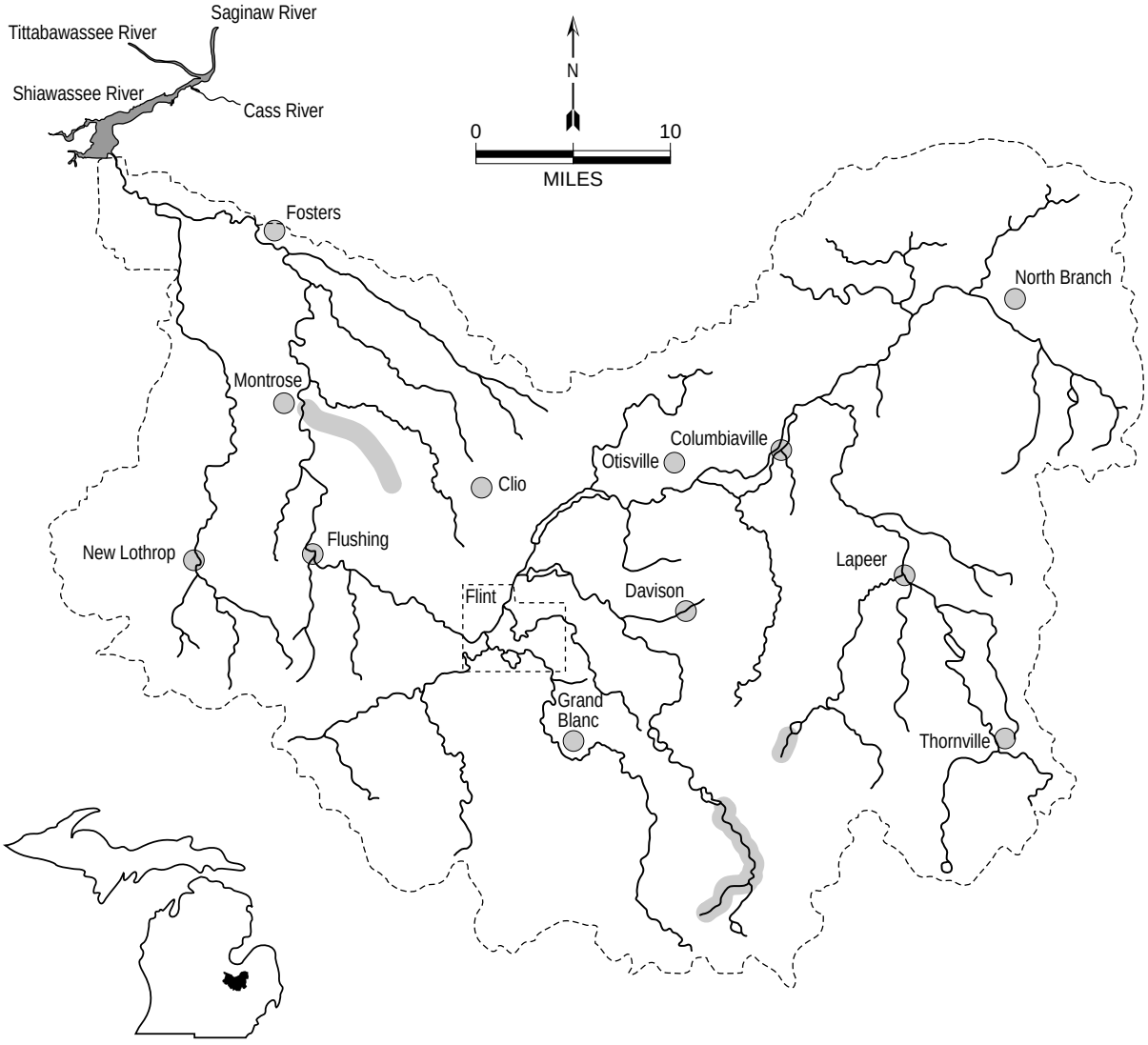
American brook lamprey (*Lampetra appendix*)

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 amnocetes

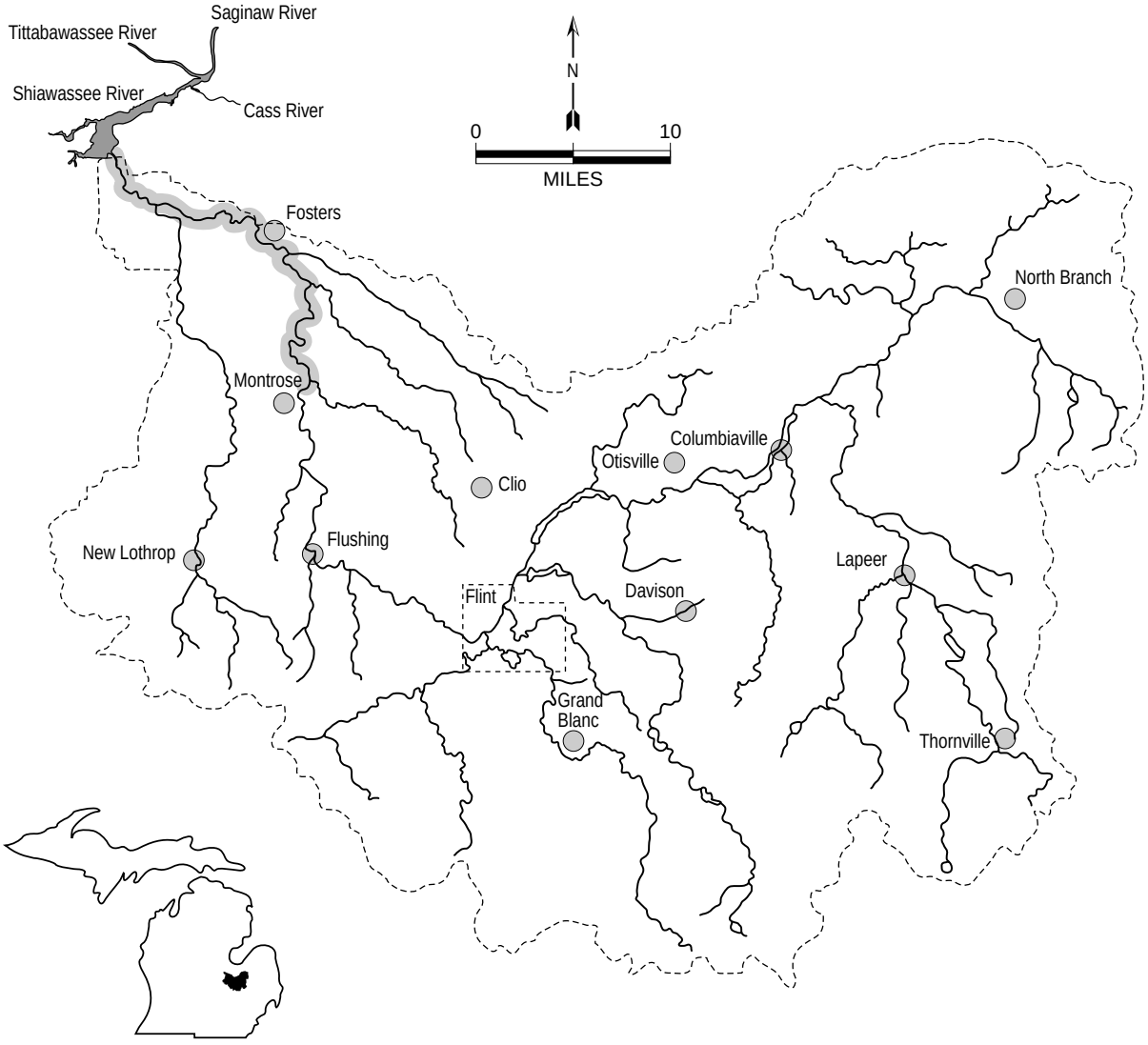


Sea lamprey (*Petromyzon marinus*)

Habitat:

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

spawning
- no dams
- riffles with sand and gravel substrates

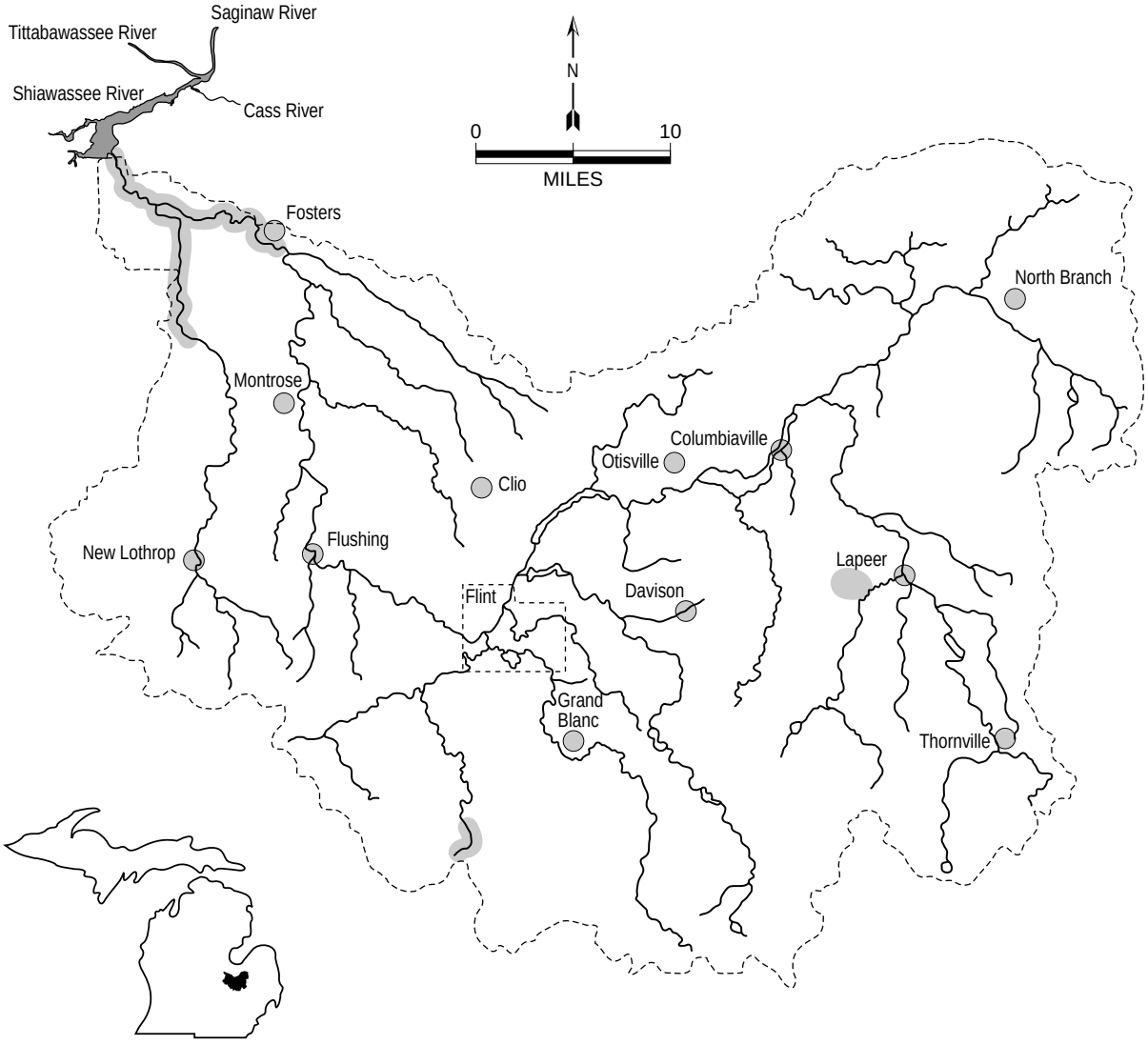


Longnose gar (*Lepisosteus osseus*)

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



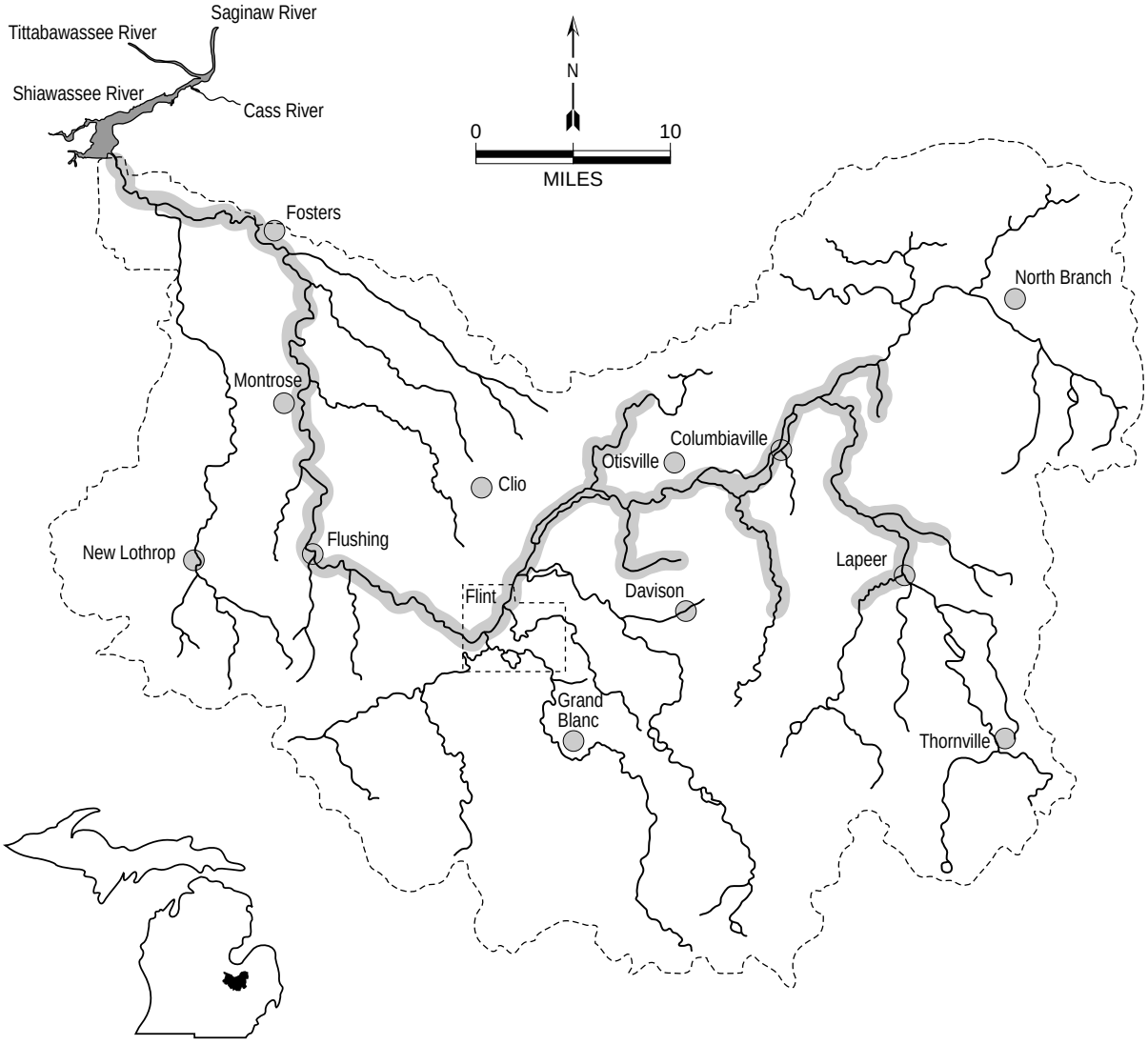
Bowfin (*Amia calva*)

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



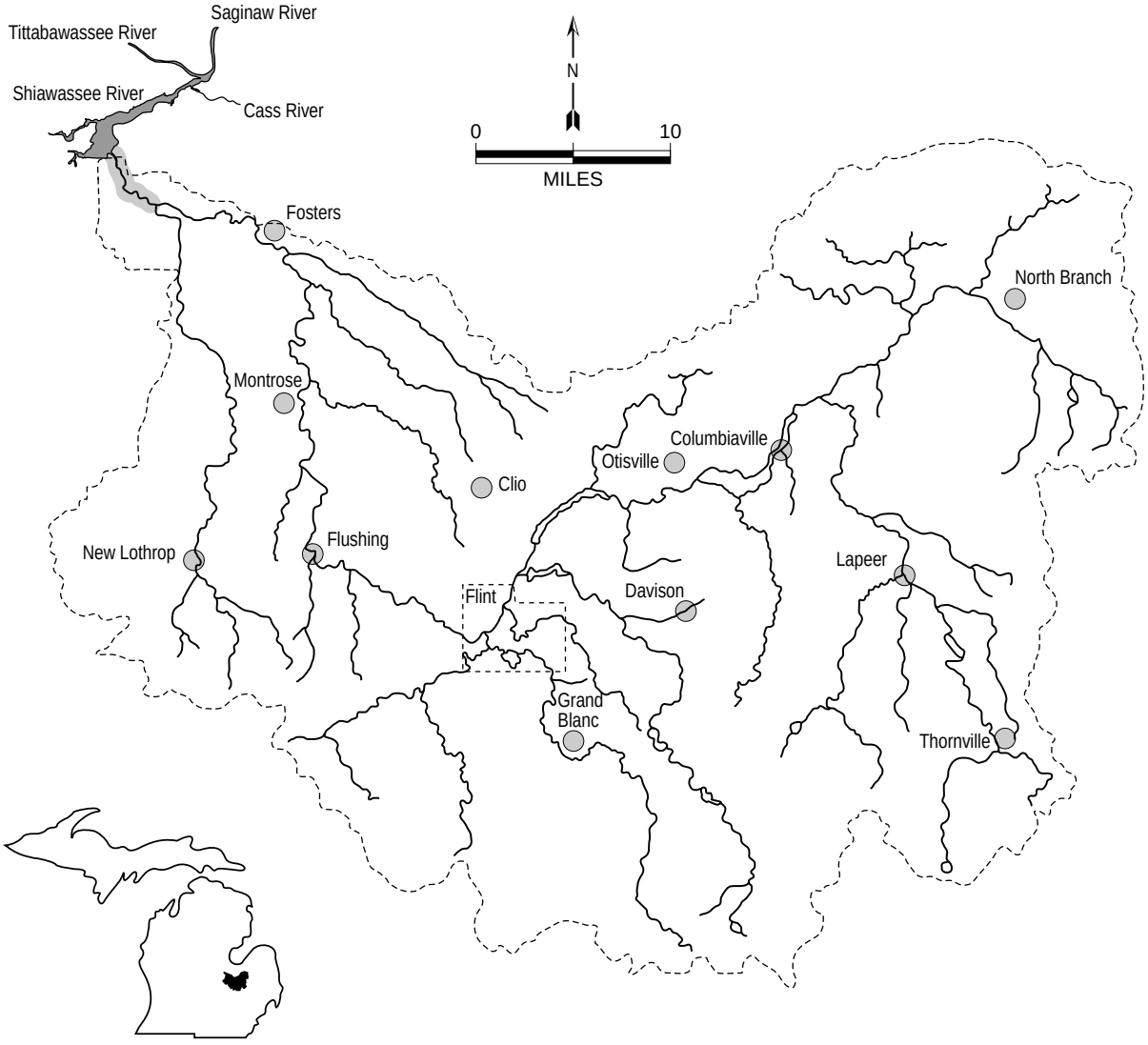
Alewife (*Alosa pseudoharengus*)

Habitat:

feeding - adults: deep water of Lake Huron
- young: shallow water of Lake Huron
- prefers warmer waters

spawning - streams or shallow beaches of lake
- sand or gravelly substrate

winter refuge - deep water

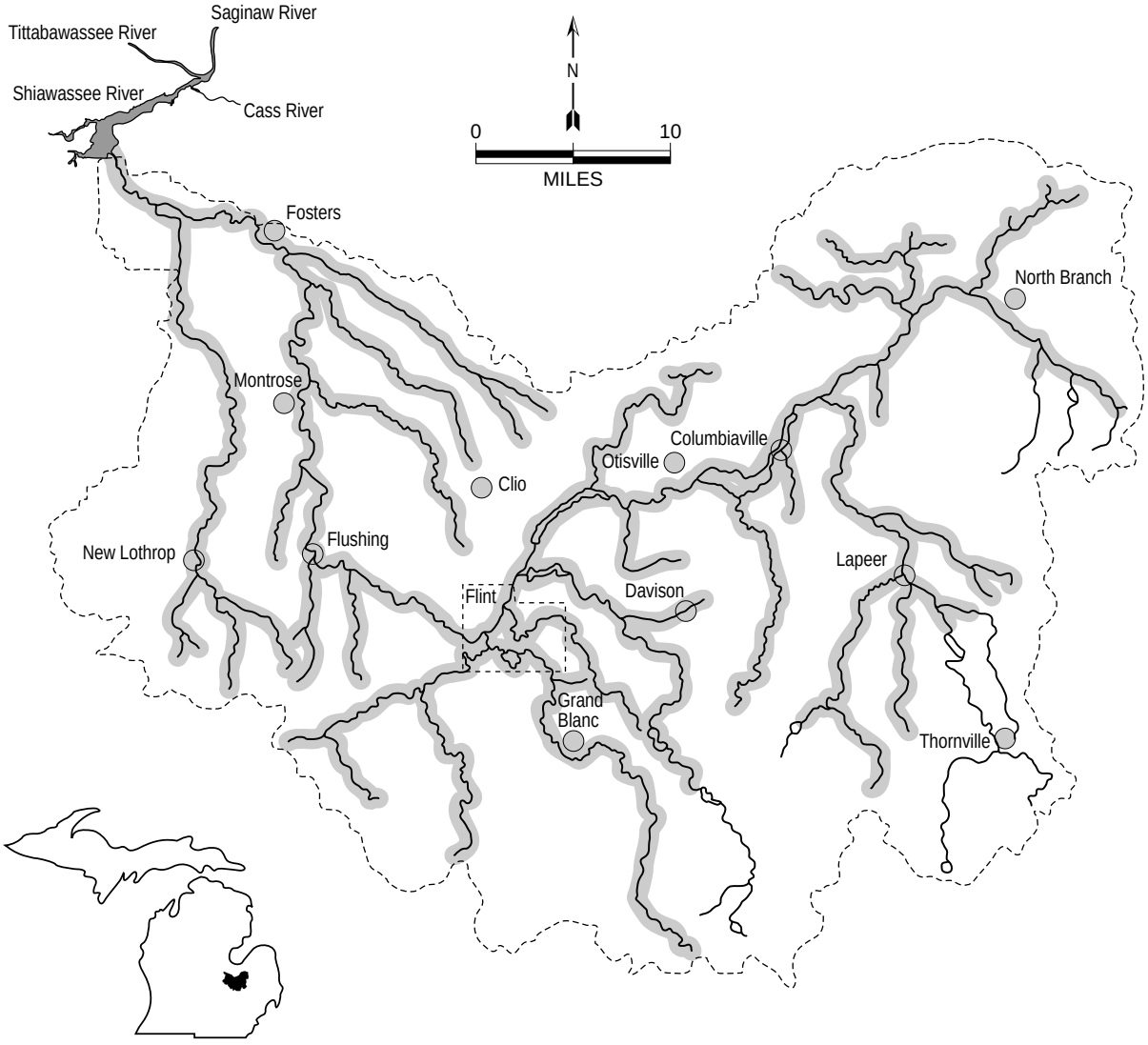


Gizzard shad (*Dorosoma cepedianum*)

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

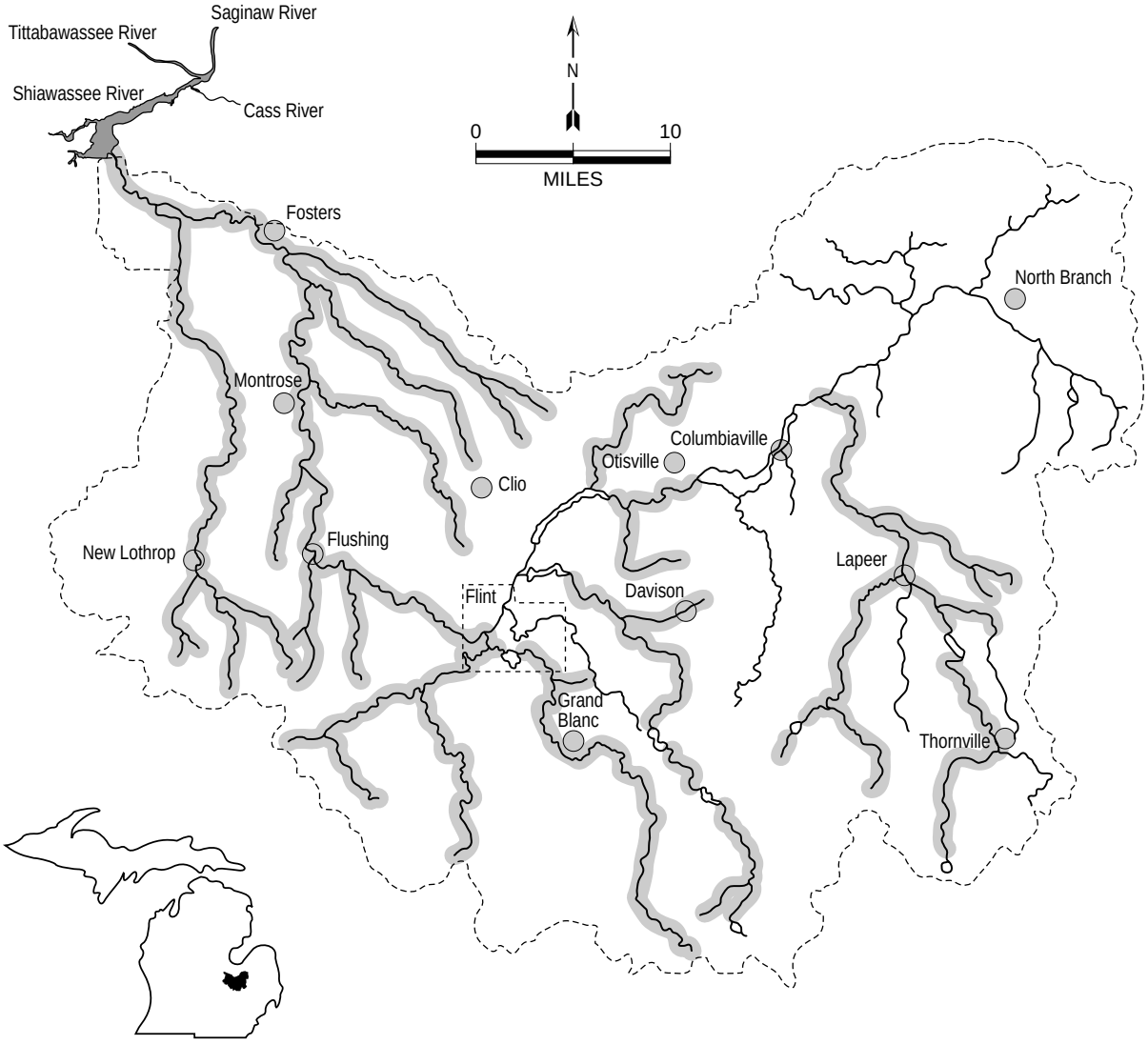


Central stoneroller (*Campostoma anomalum*)

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

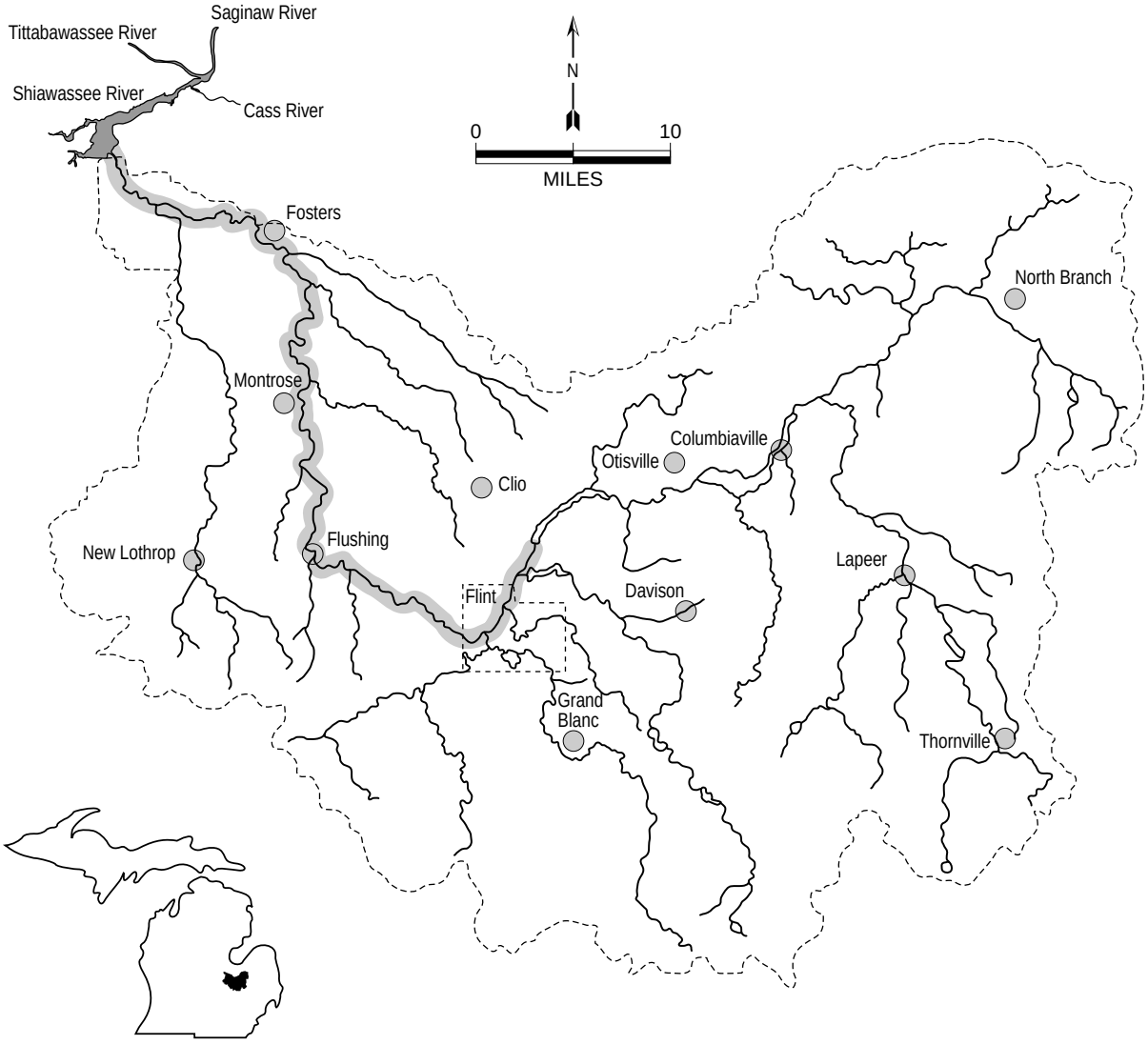


Goldfish (*Carassius auratus*)

Habitat:

feeding - vegetation
- low gradient, shallow, warm water streams, rivers, lakes, and impoundments
- tolerates some turbidity and siltation

spawning - warm, weedy shallows

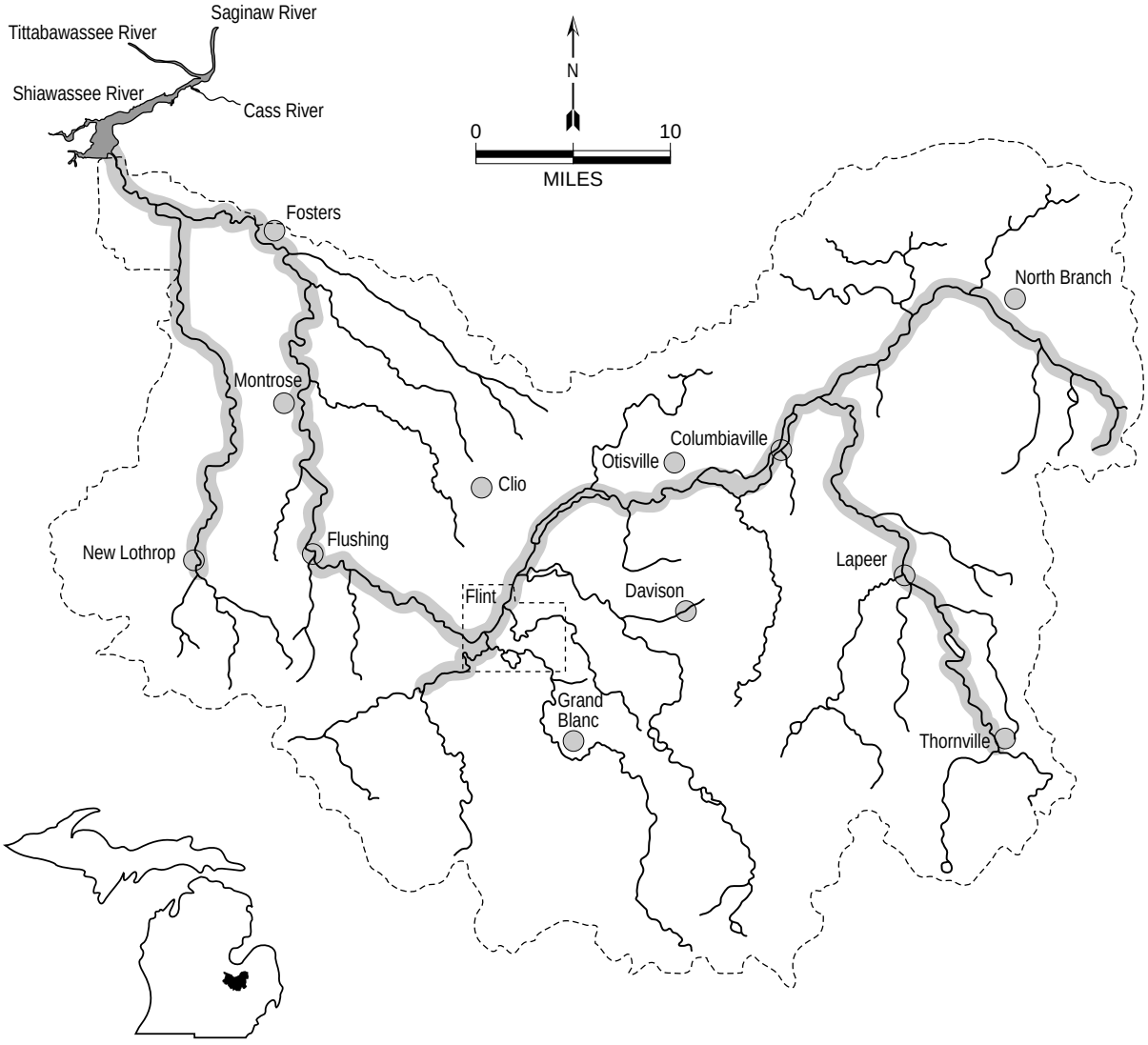


Spotfin shiner (*Cyprinella spiloptera*)

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

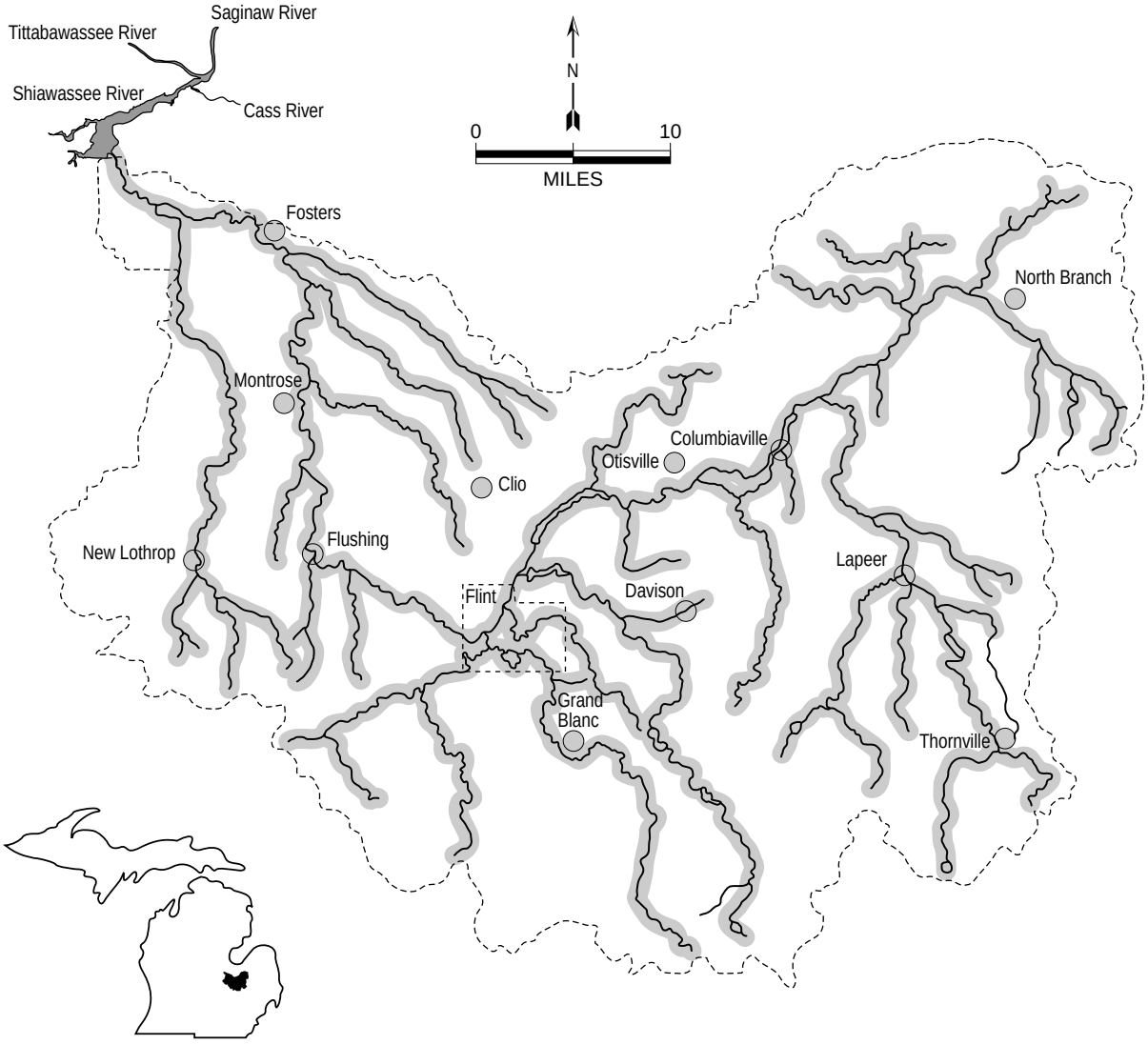


Common carp (*Cyprinus carpio*)

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

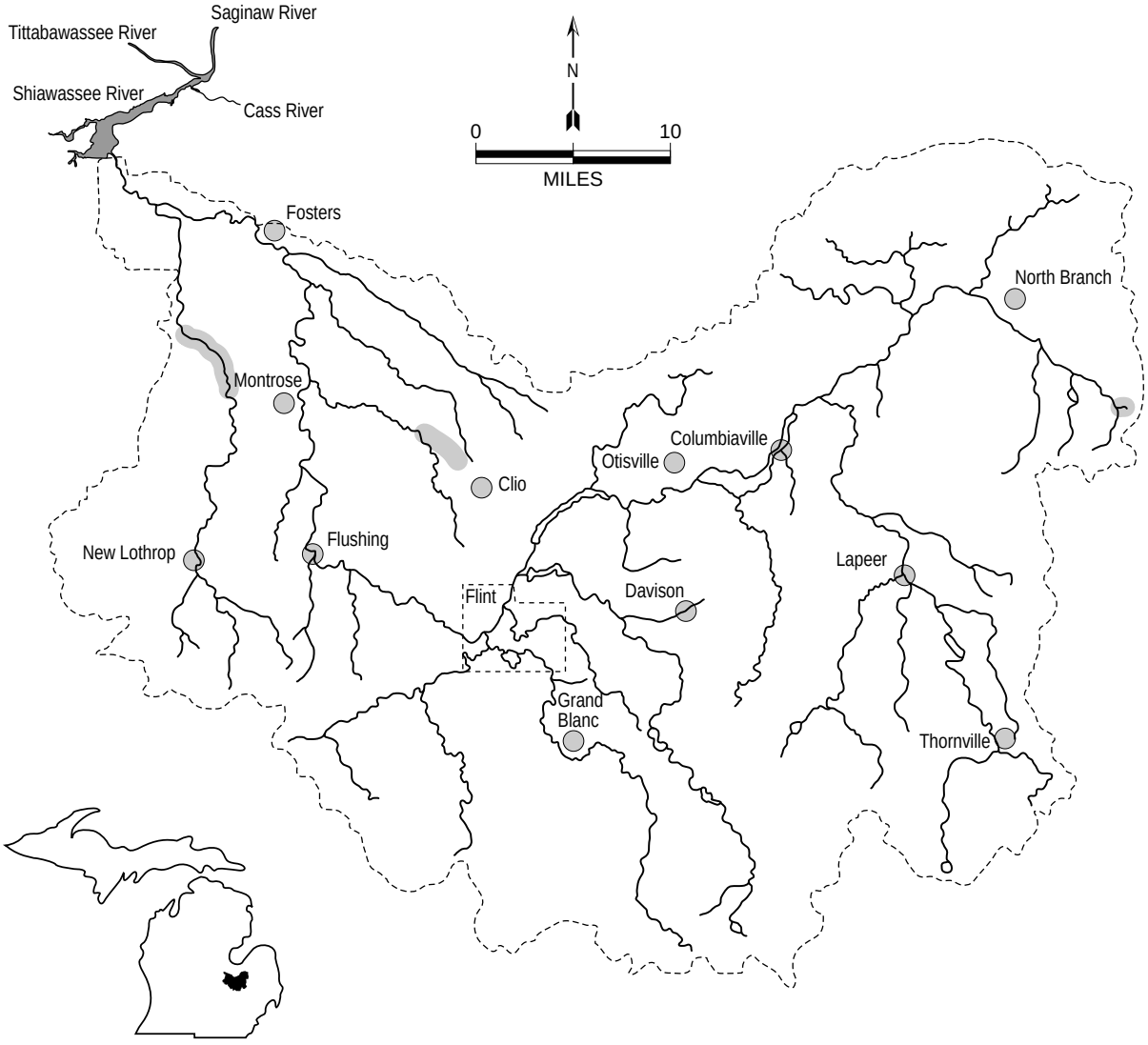
spawning - weedy or grassy shallows



Brassy minnow (*Hybognathus hankinsoni*)

Habitat:

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

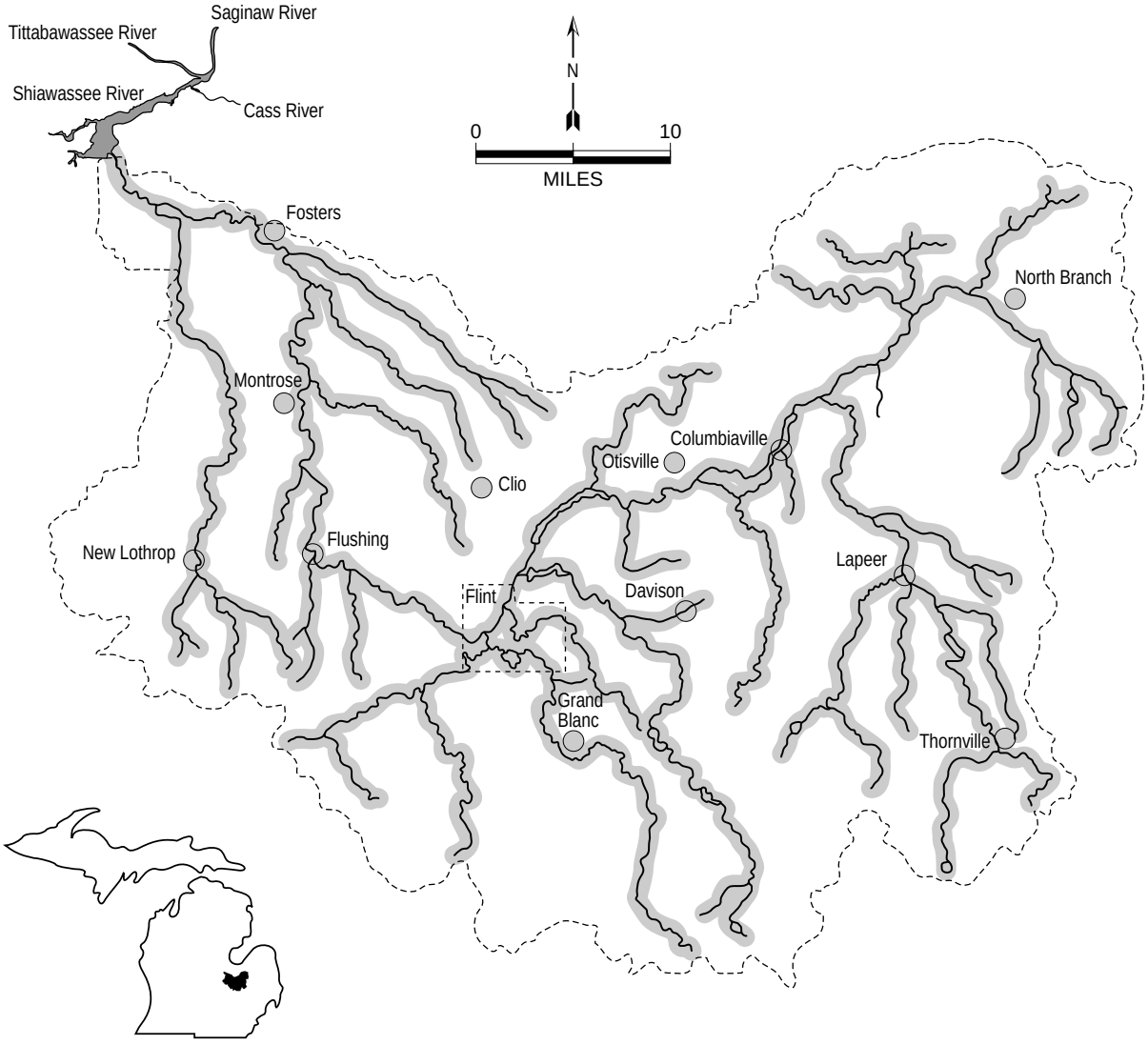


Common shiner (*Luxilus cornutus*)

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

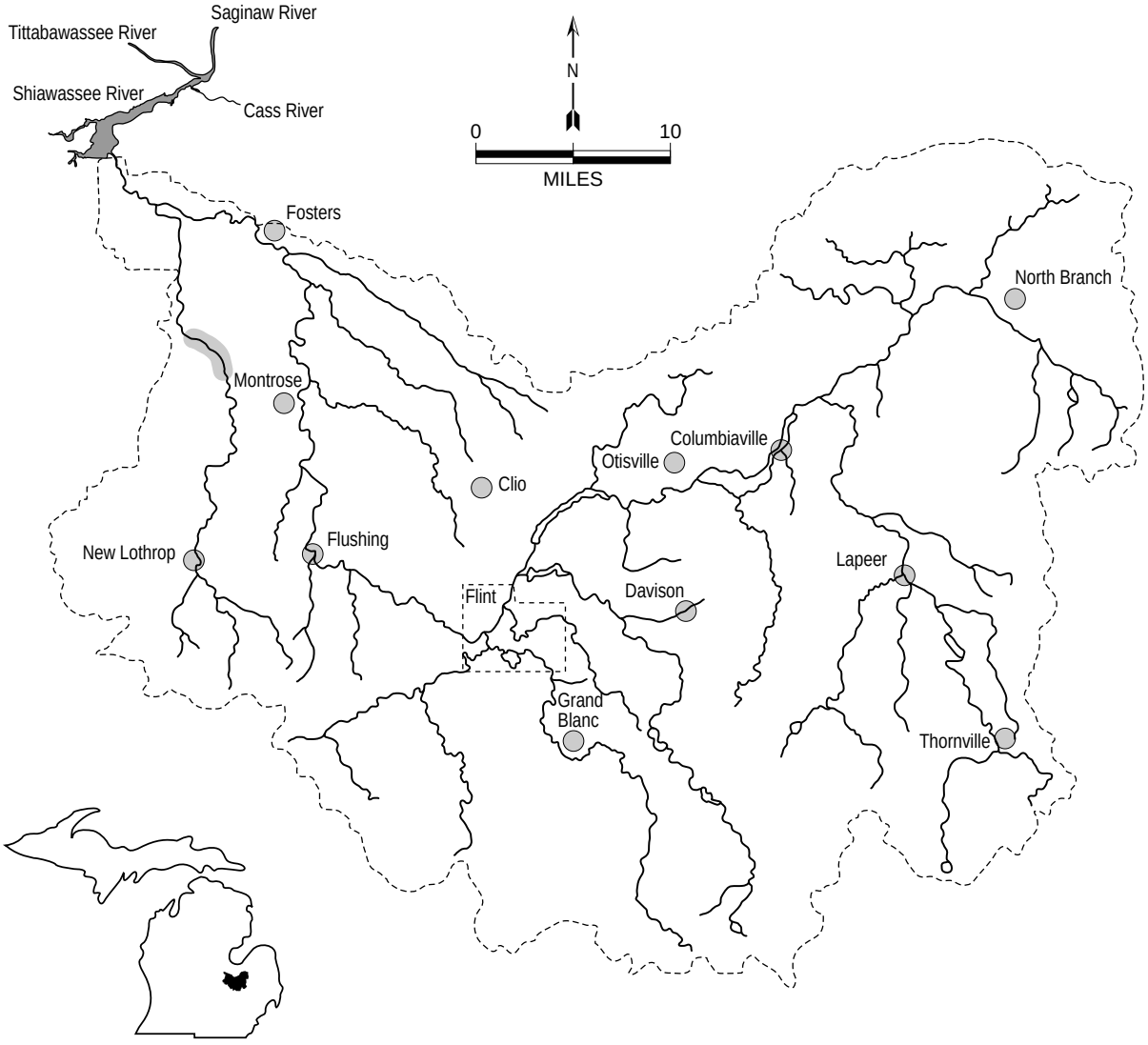


Redfin shiner (*Lythrurus umbratilis*)

Habitat:

feeding - clear, quiet warm rivers in weedy pools
- little to no current
- abundant submerged and emergent vegetation

spawning - over sand and gravel substrate in slow moving sections of streams

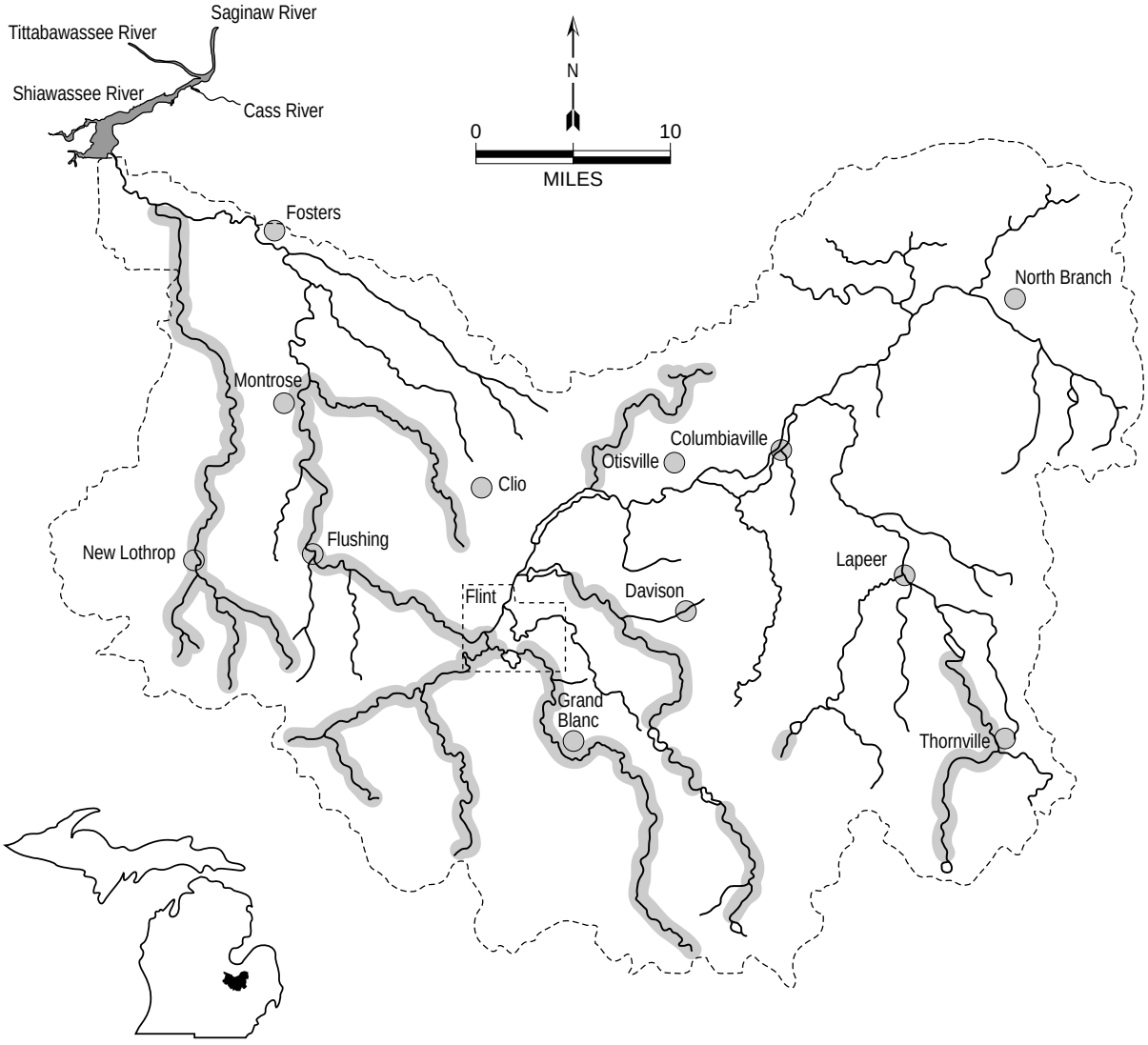


Hornyhead chub (*Nocomis biguttatus*)

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