Appendix 2

Known past and present fish distributions in the Thunder Bay River system. Distribution of fishes were compiled from Bailey et al. (2003) and from records located at the Michigan Department of Natural Resources Gaylord Operations Service Center, the Michigan Department of Natural Resources, Hunt Creek Fisheries Research Station, and from the Michigan Department of Natural Resources Fish Collection System. 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 follows their scientific name. Categories are declining, rare, special concern, threatened, 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).

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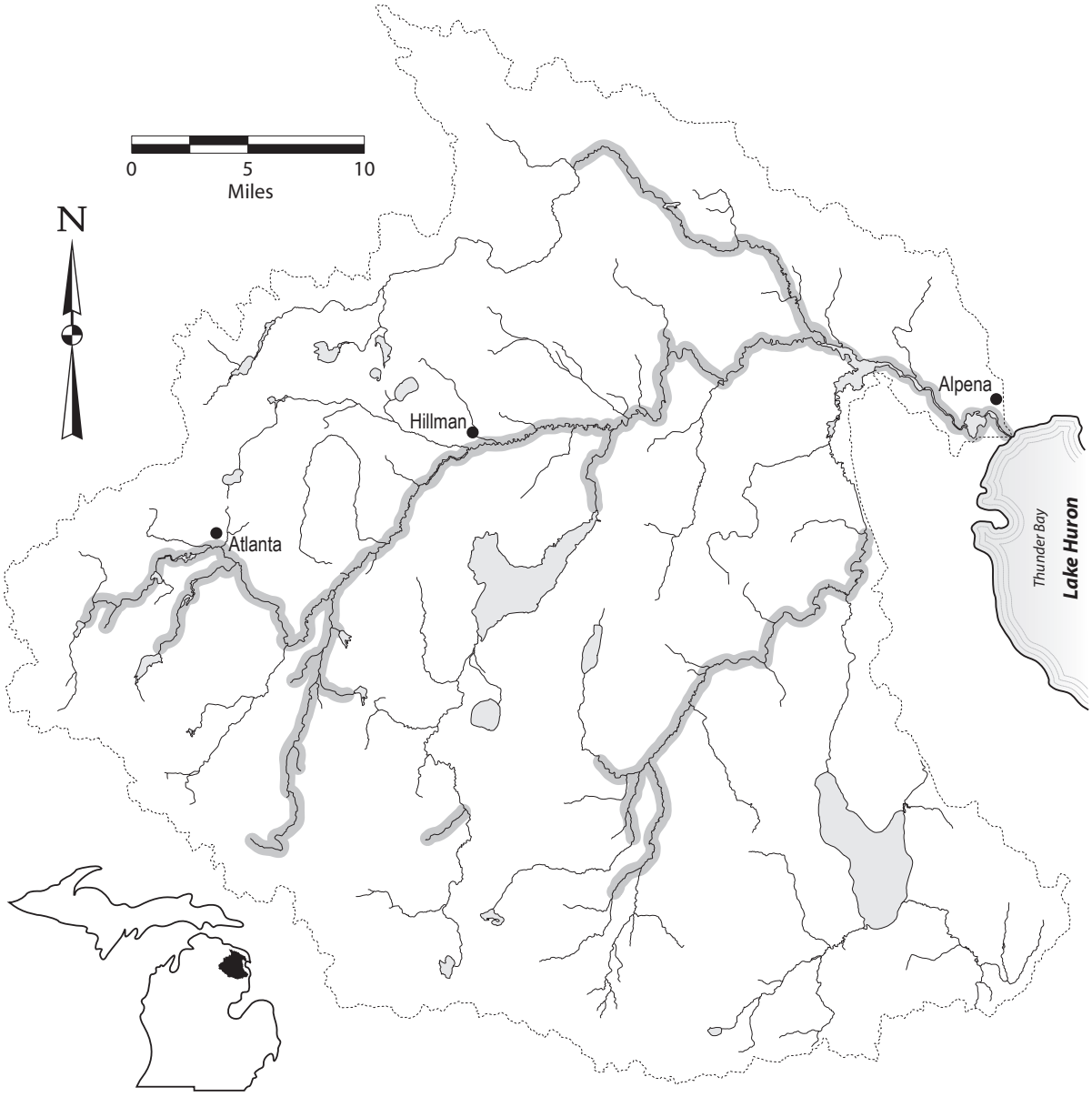
Northern brook lamprey (*Ichthyomyzon fossor*)

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



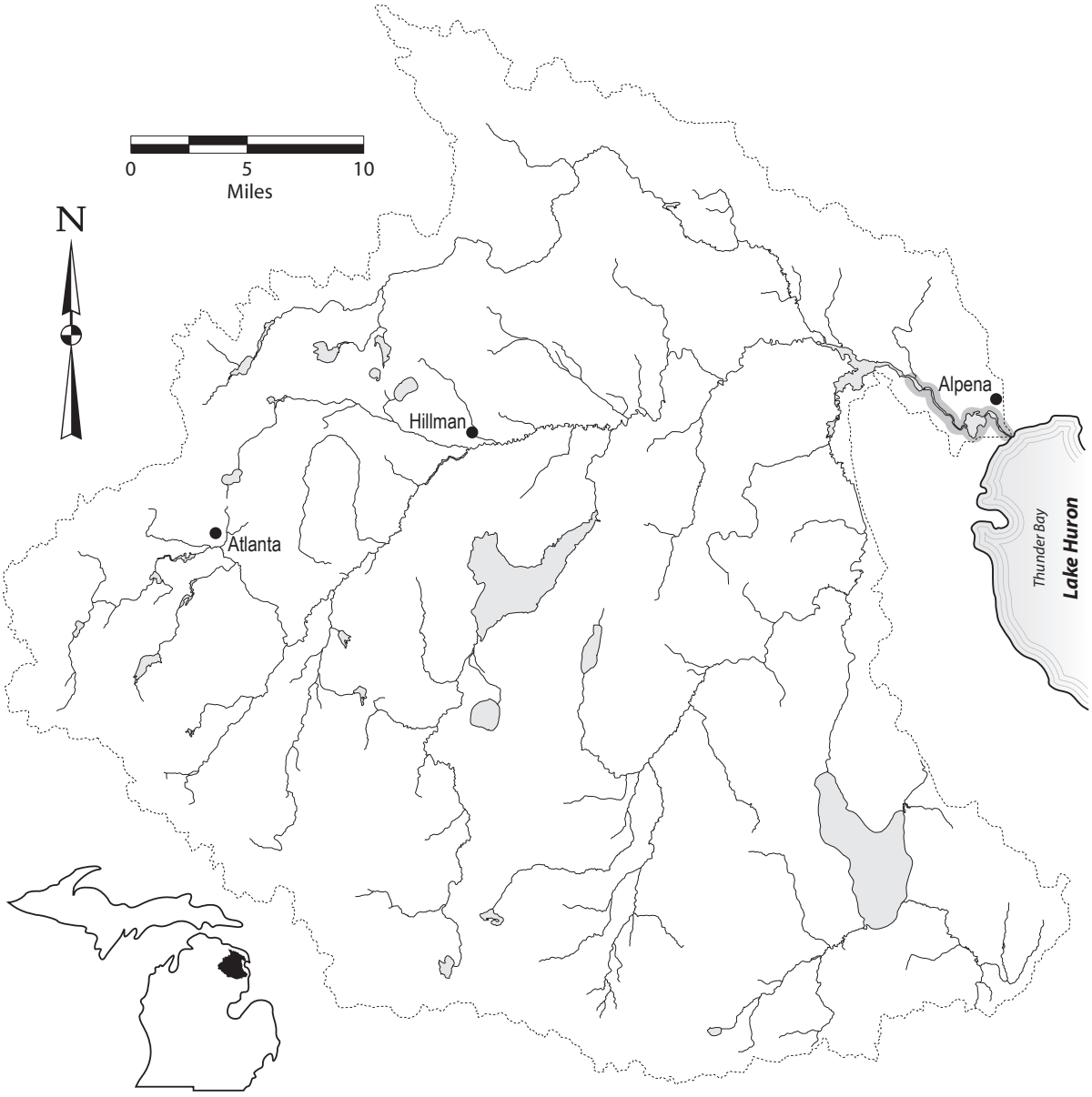
Silver lamprey (*Ichthyomyzon unicuspis*)

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
- amnocetes burrow for 4 to7 years in mud and silt at river margins



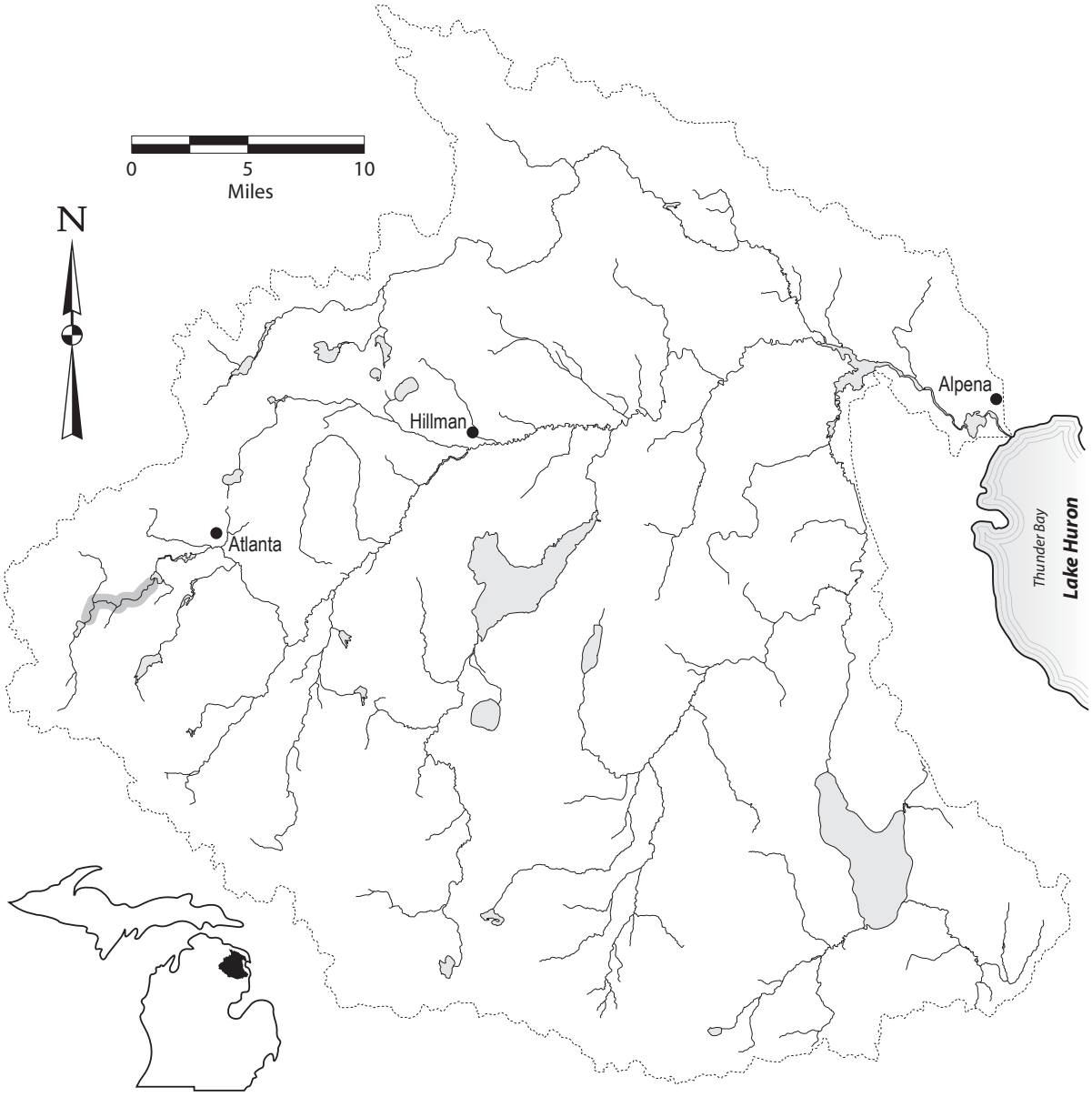
American brook lamprey (*Lampetra appendix*)

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 amnocetes

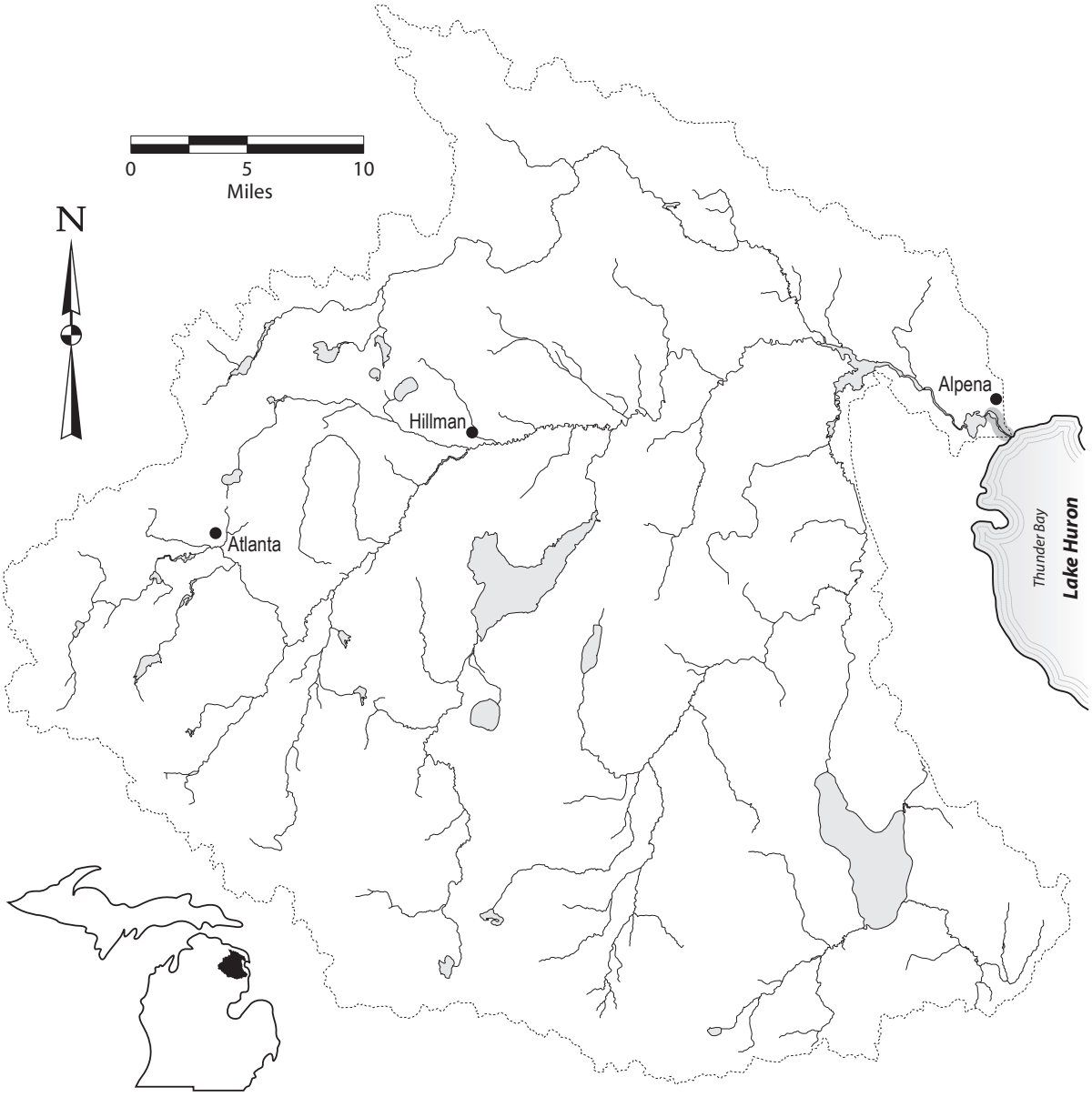


Sea lamprey (*Petromyzon marinus*)

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

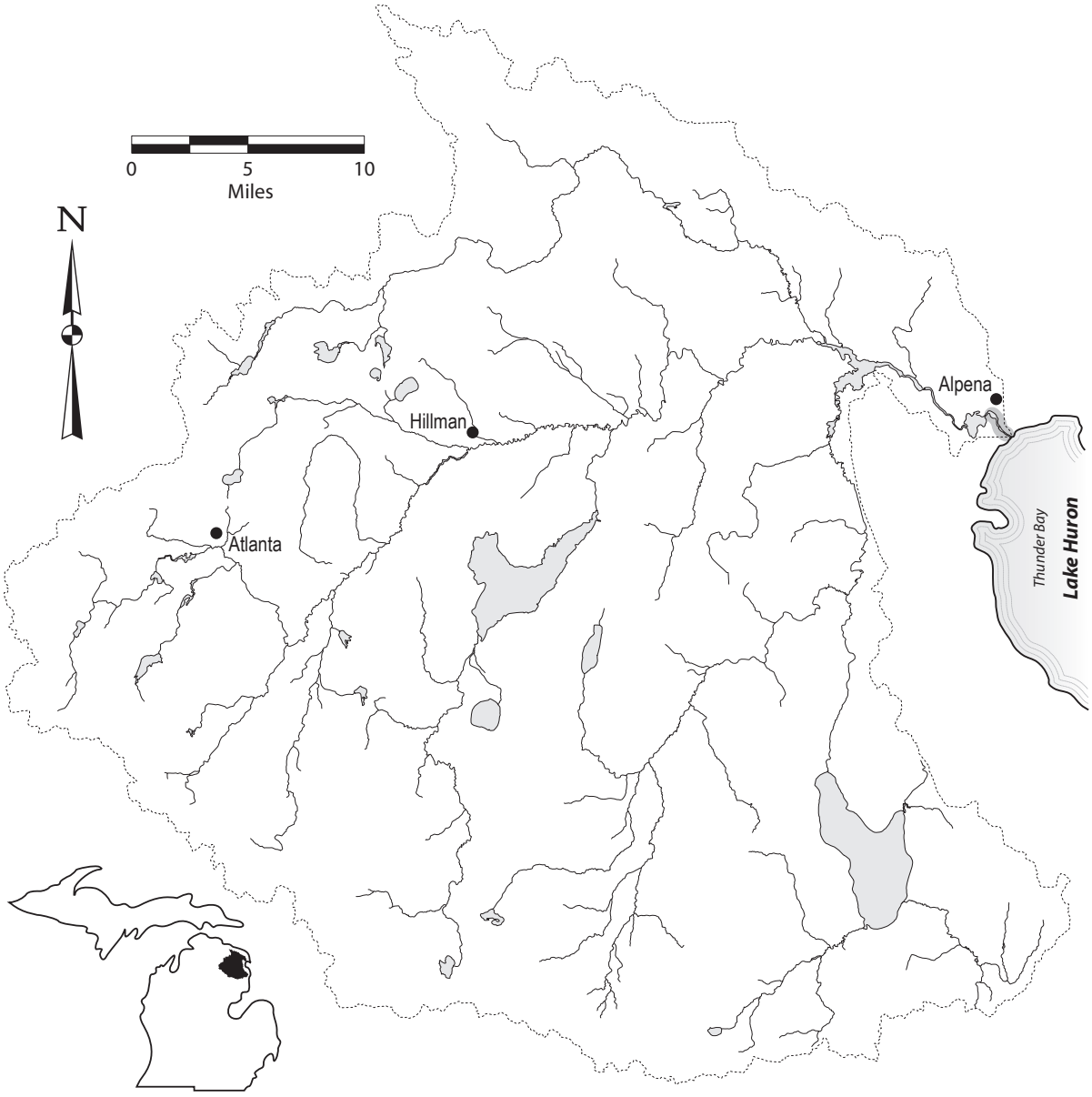


Lake sturgeon (*Acipenser fulvescens*) – **threatened**

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

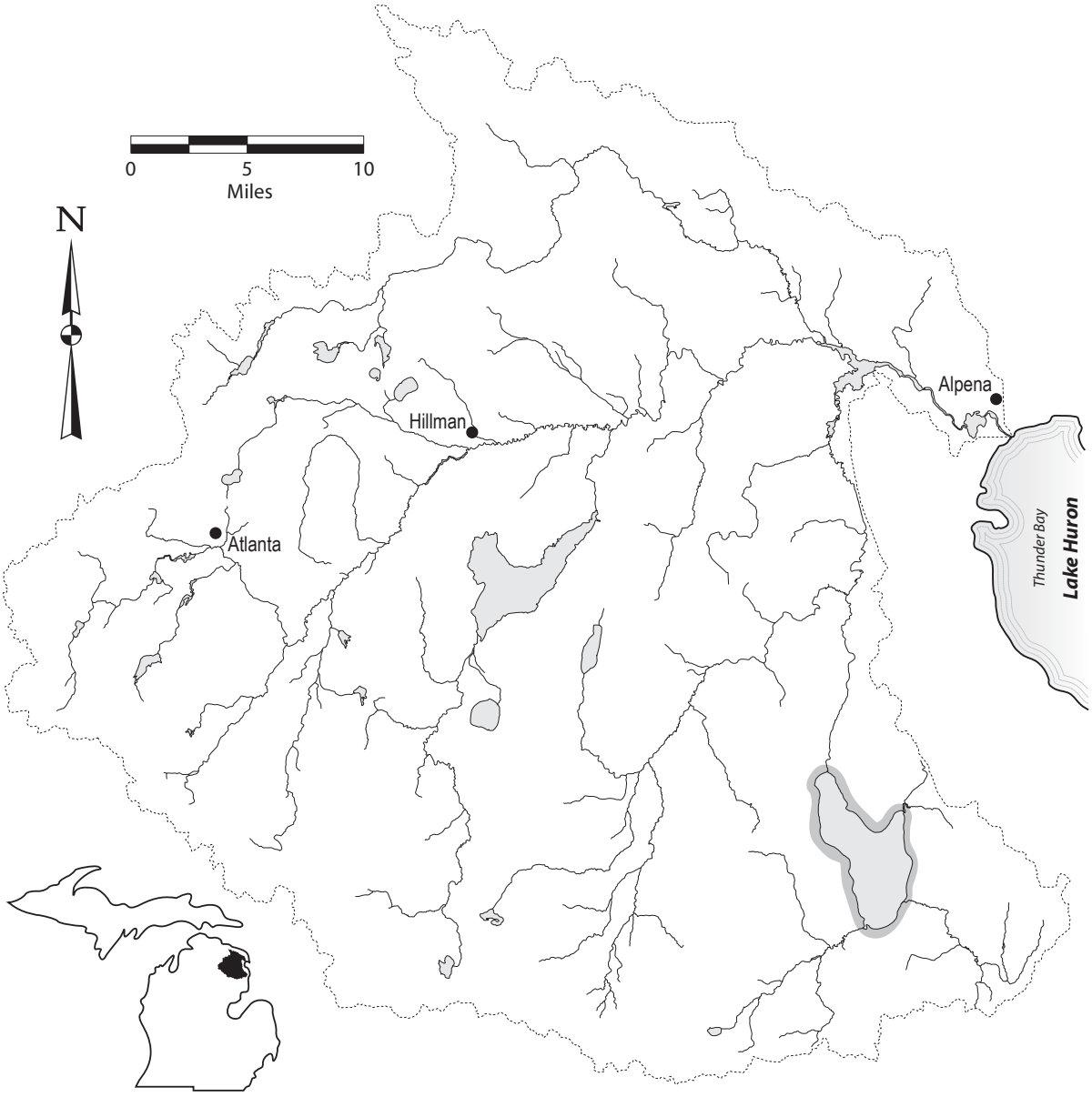


Longnose gar (*Lepisosteus osseus*)

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



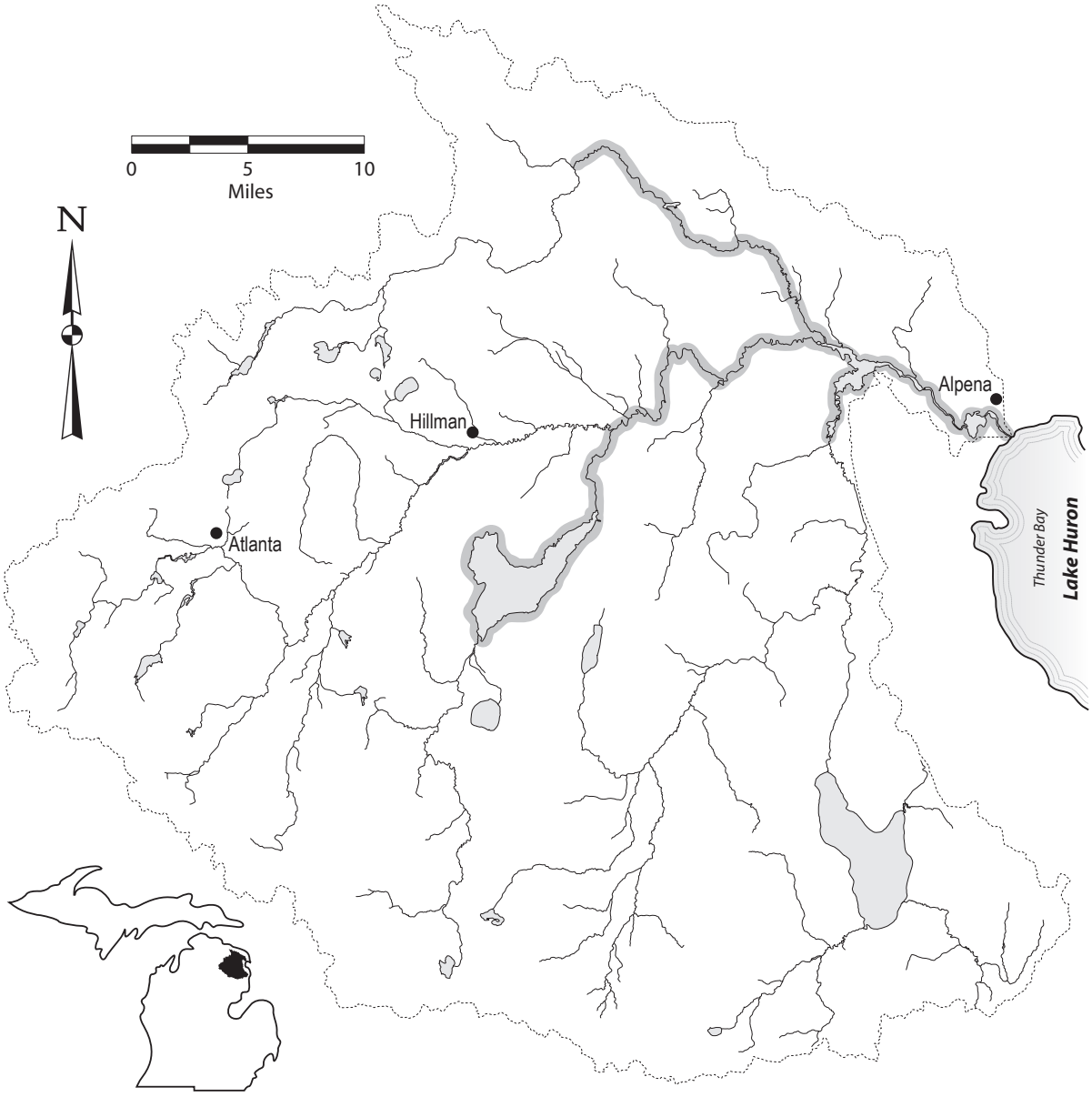
Bowfin (*Amia calva*)

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



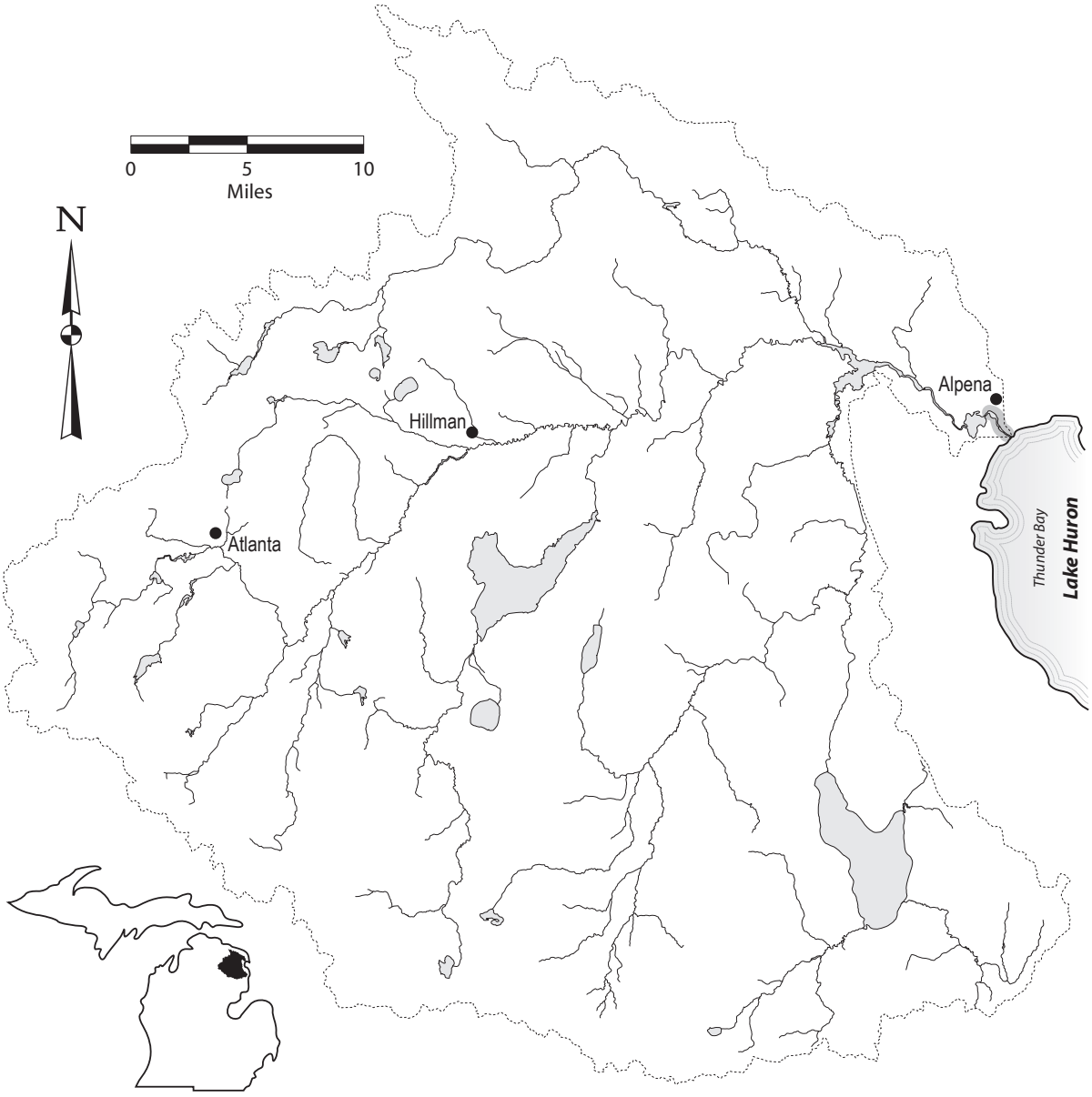
Alewife (*Alosa pseudoharengus*)

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

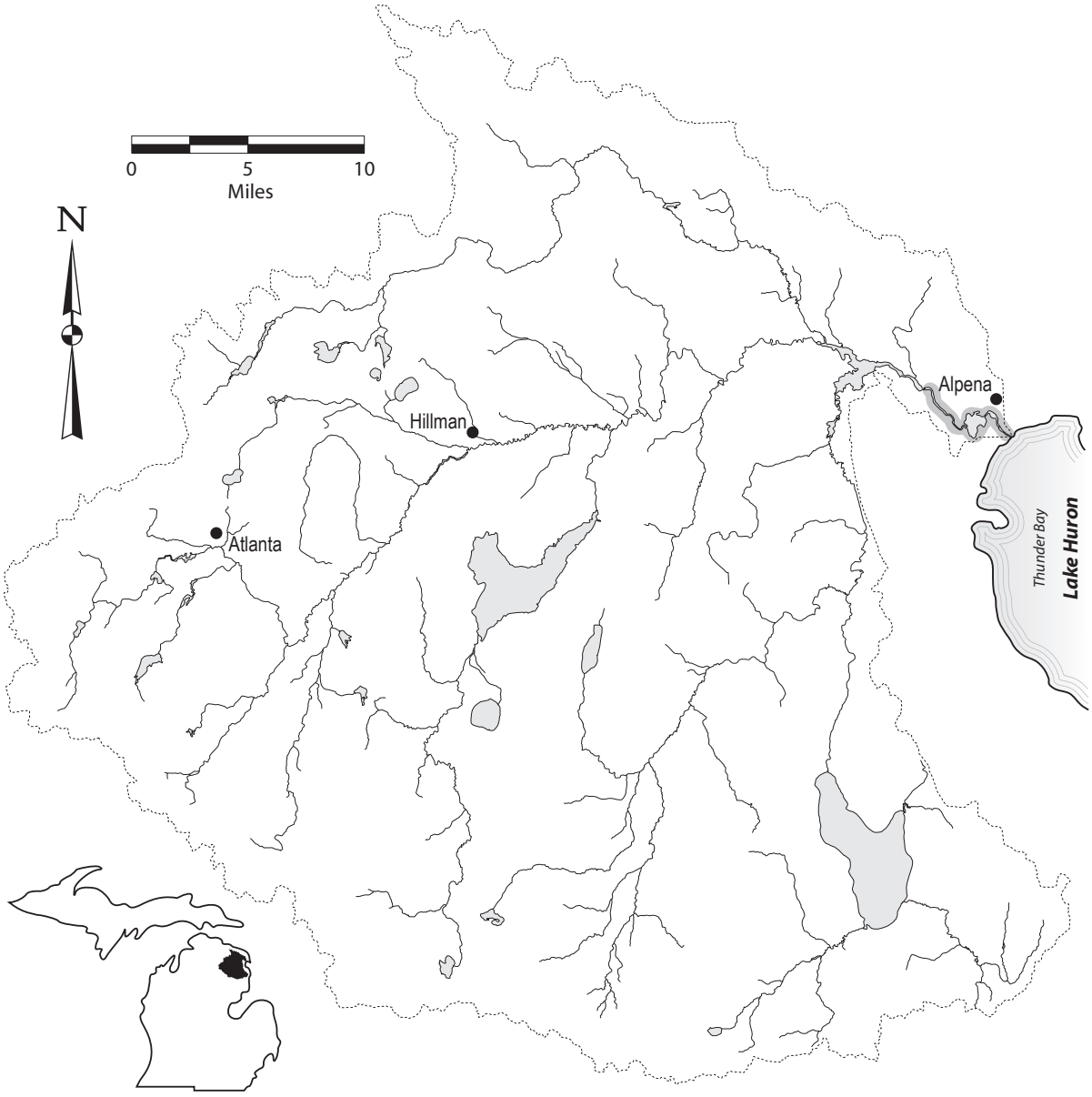


Gizzard shad (*Dorosoma cepedianum*)

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

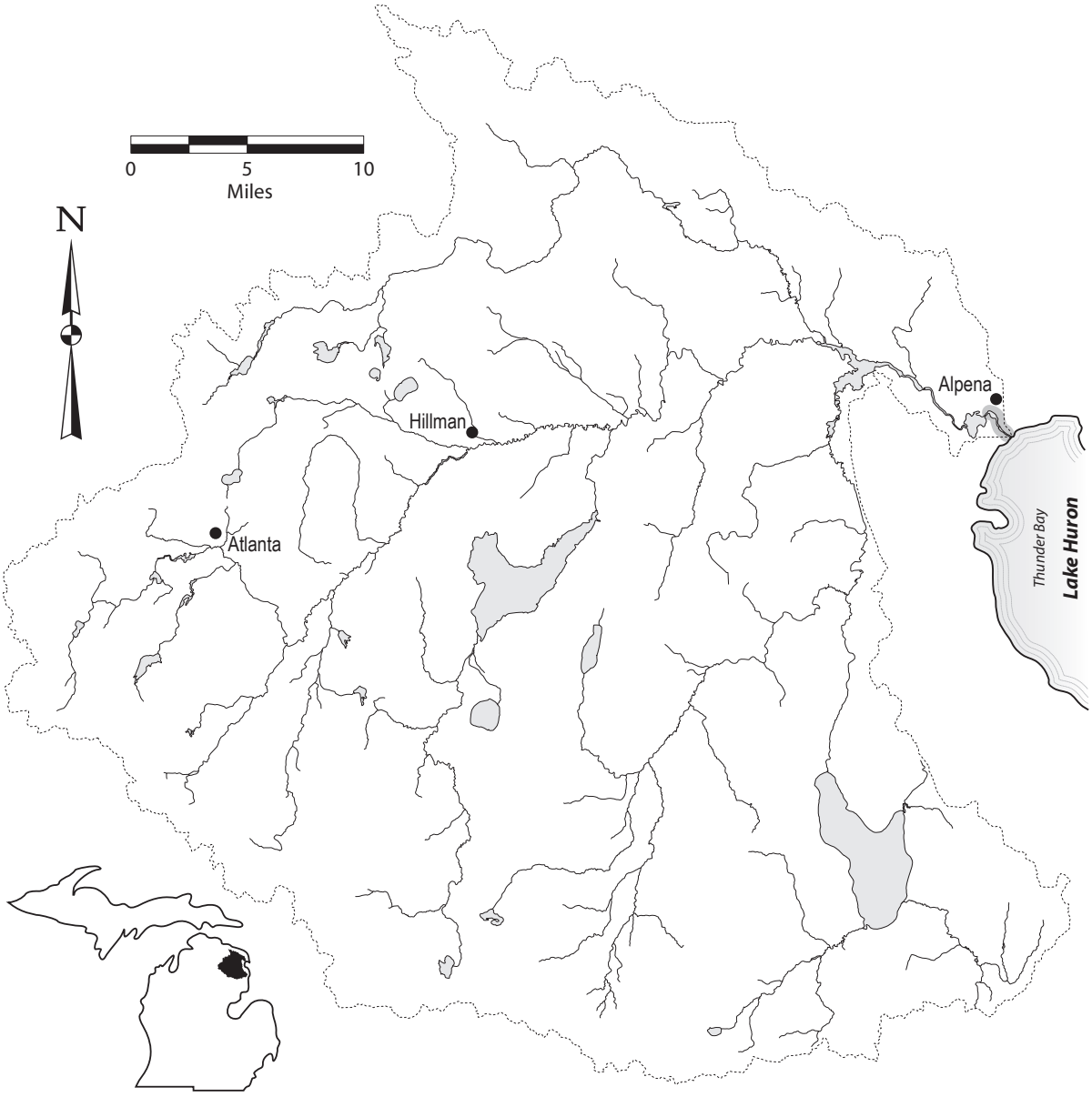


Spotfin shiner (*Cyprinella spiloptera*)

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

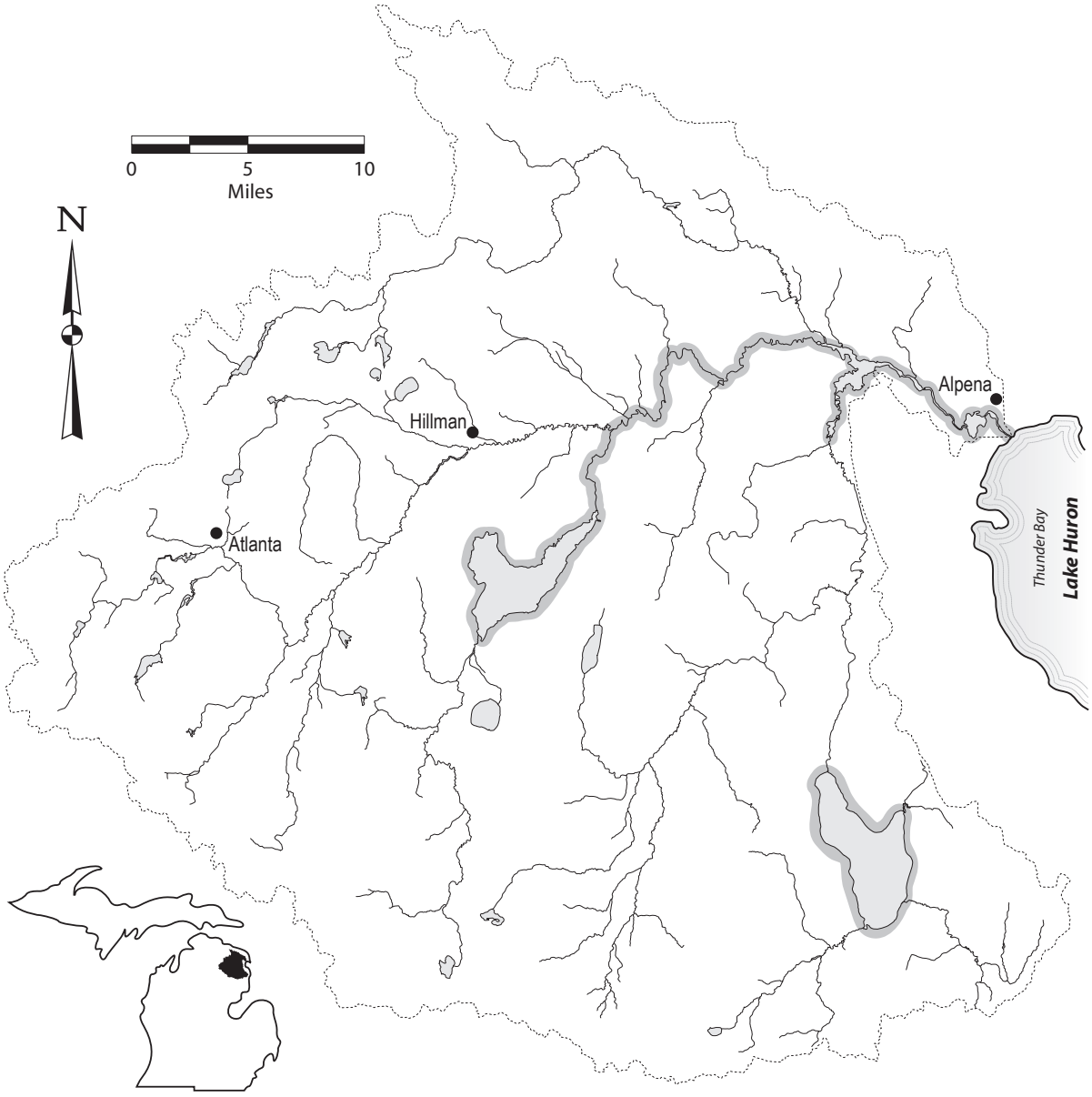


Common carp (*Cyprinus carpio*)

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

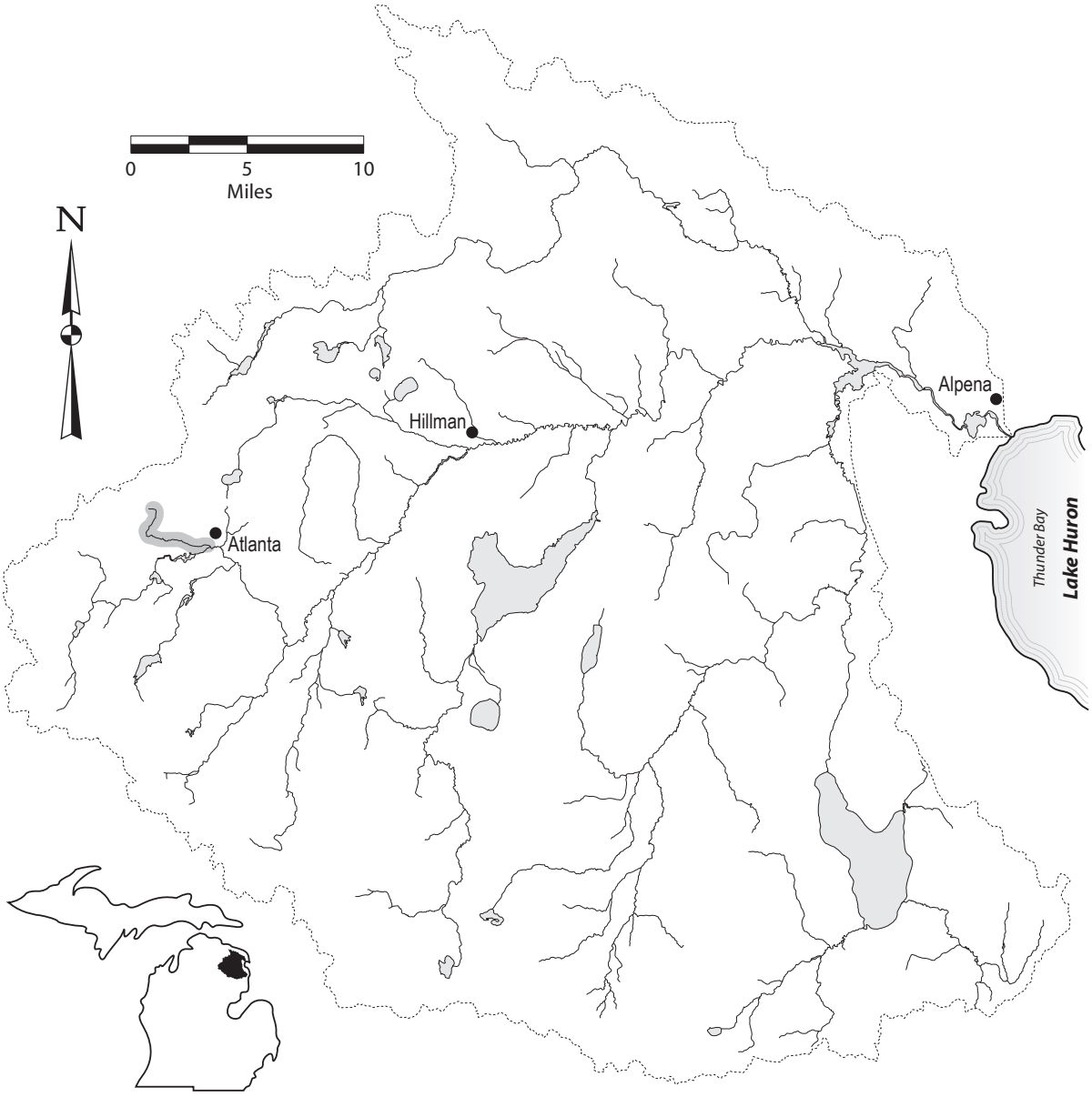
spawning - weedy or grassy shallows



Brassy minnow (*Hybognathus hankinsoni*)

Habitat:

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

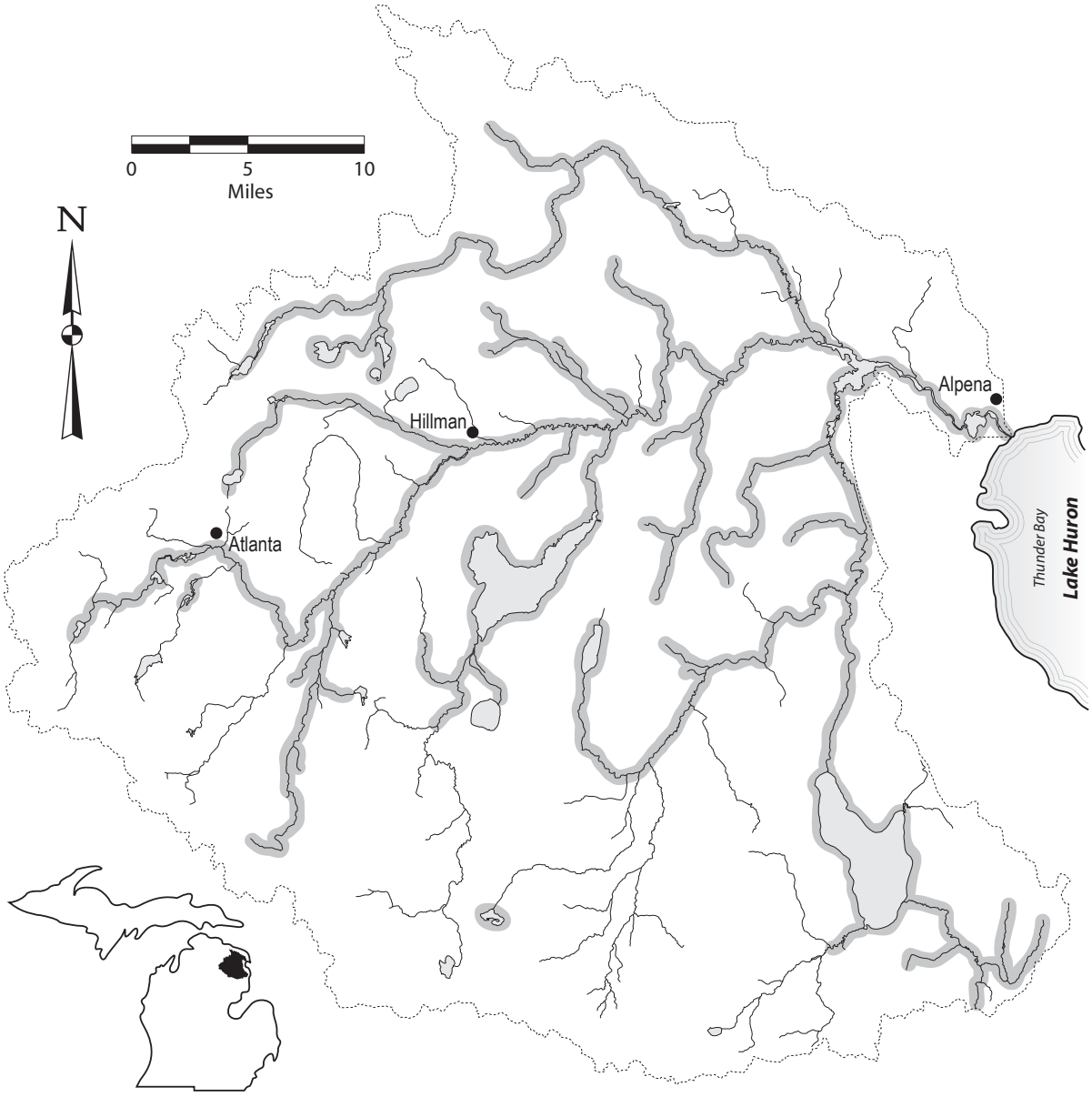


Common shiner (*Luxilus cornutus*)

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

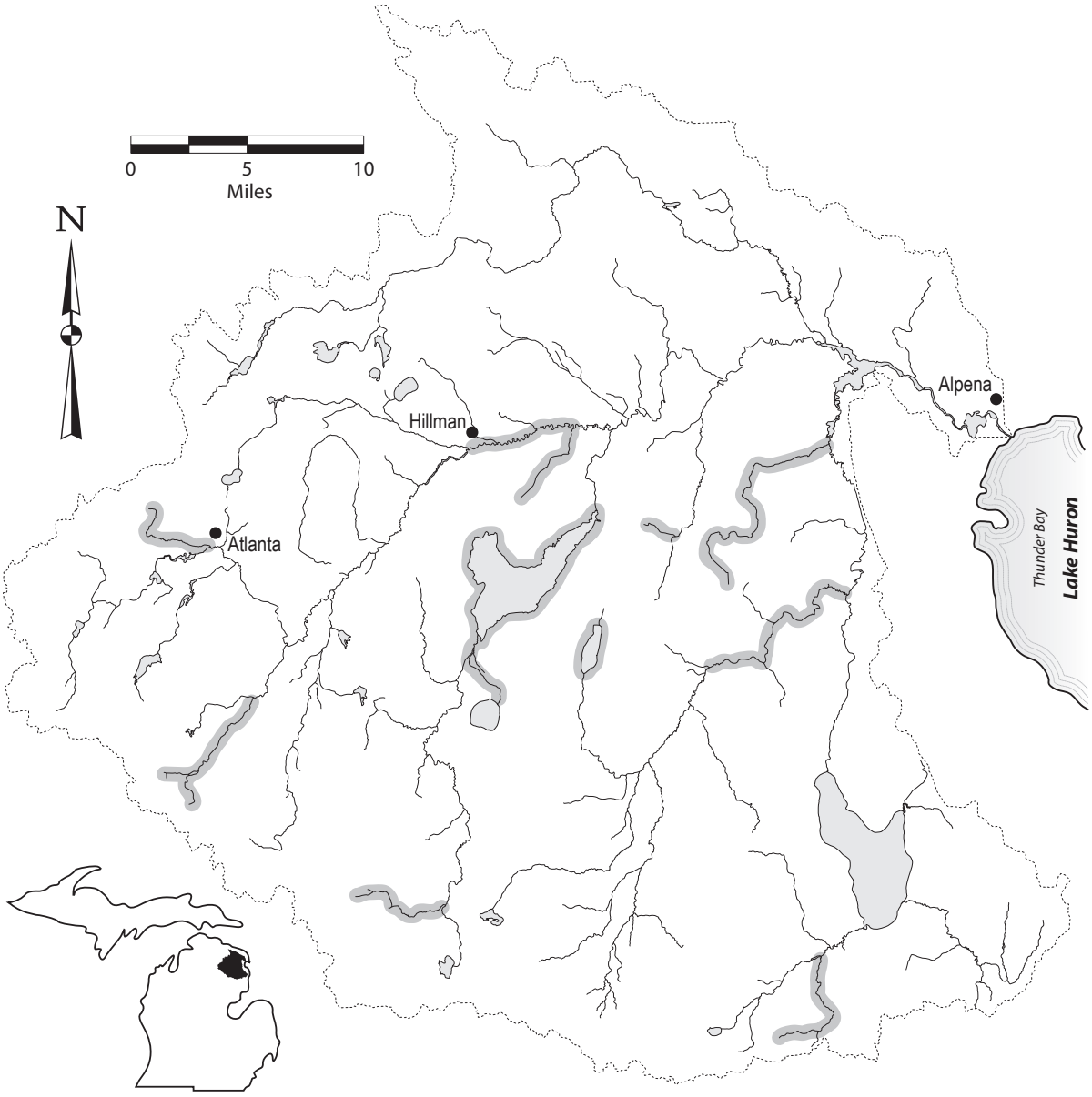


Northern pearl dace (*Margariscus nachtriebi*)

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

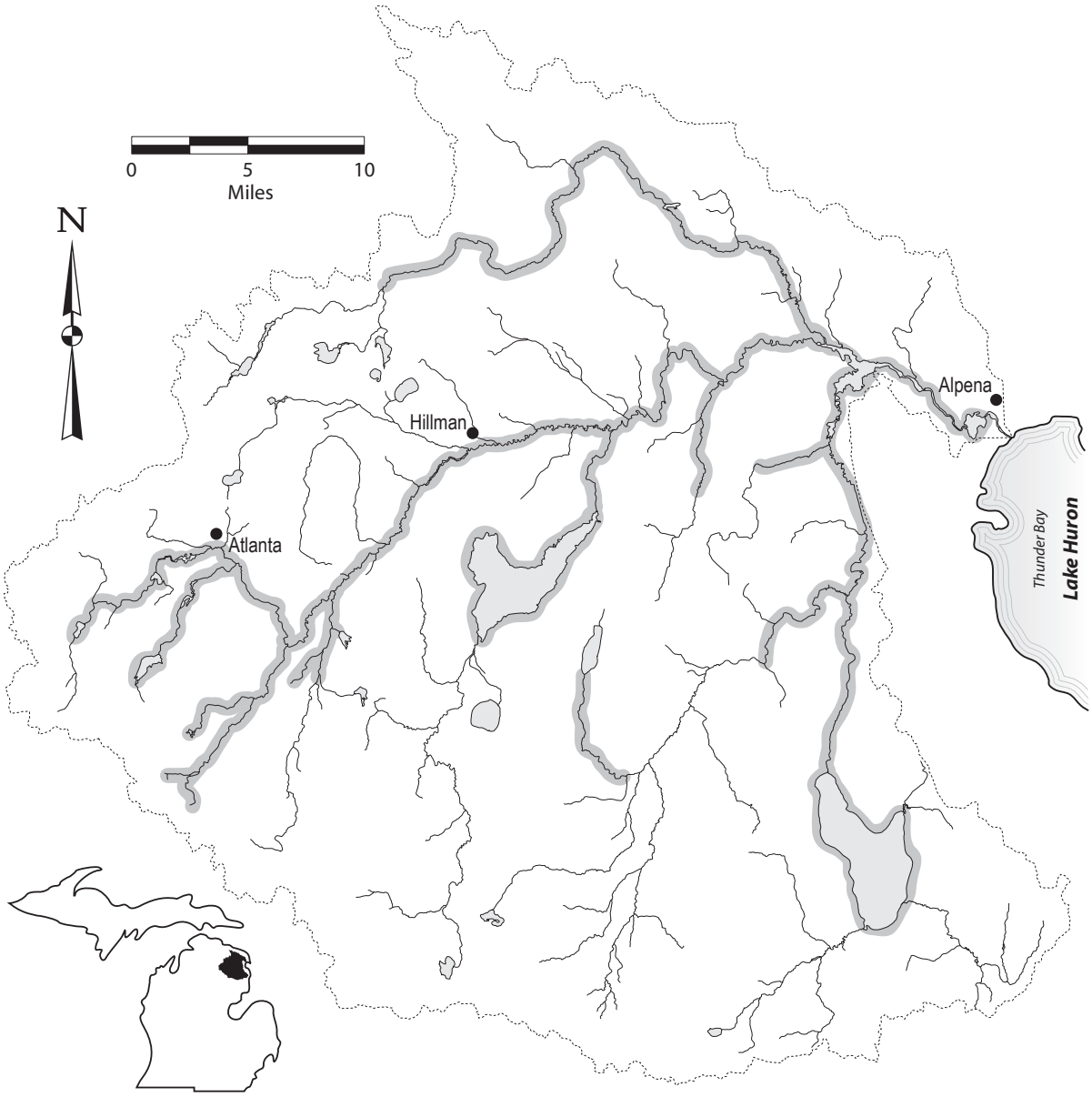


Hornyhead chub (*Nocomis biguttatus*)

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

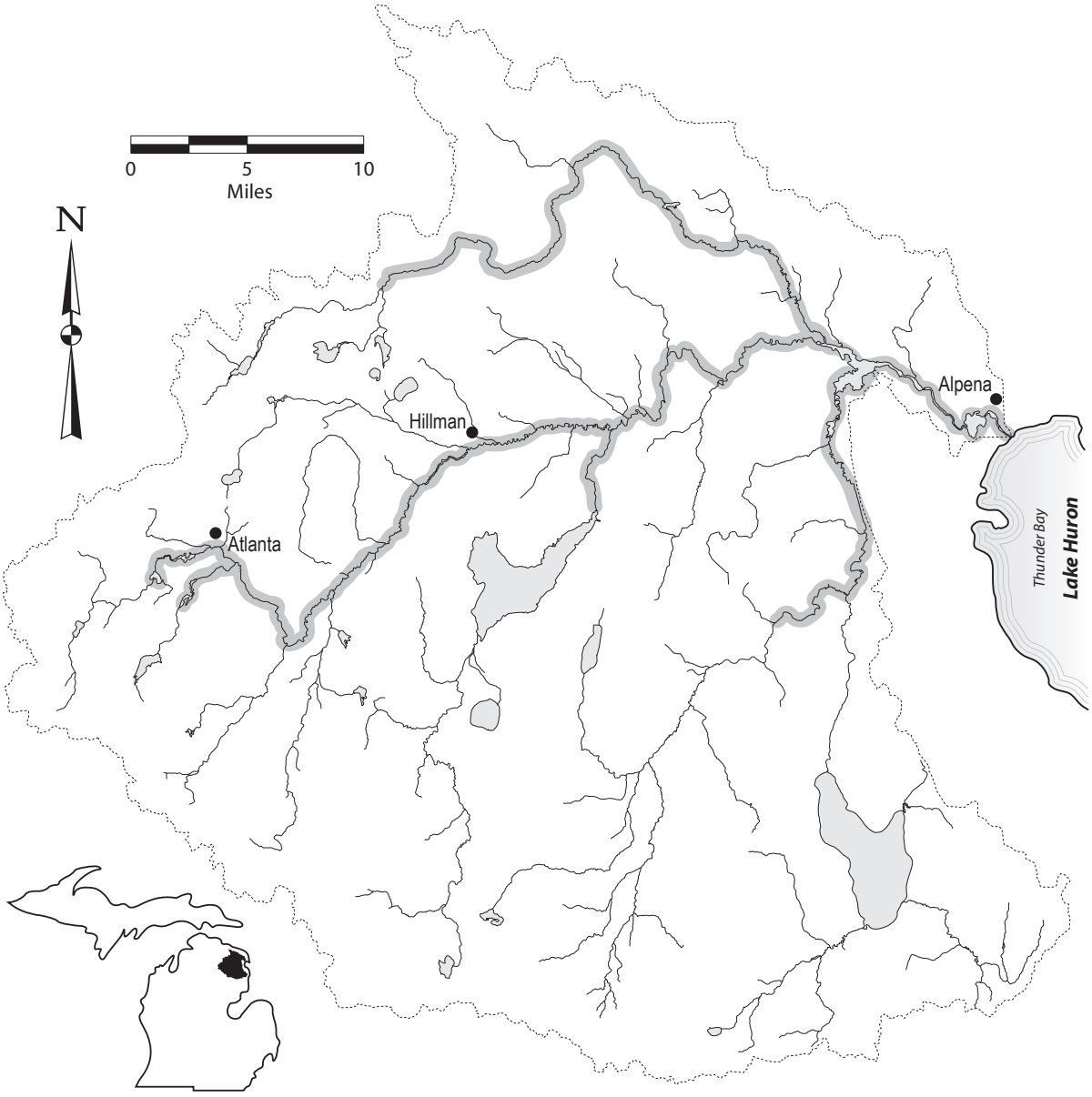
spawning
- large stones and pebbles present
- often below a riffle in shallow water
- gravel substrate



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

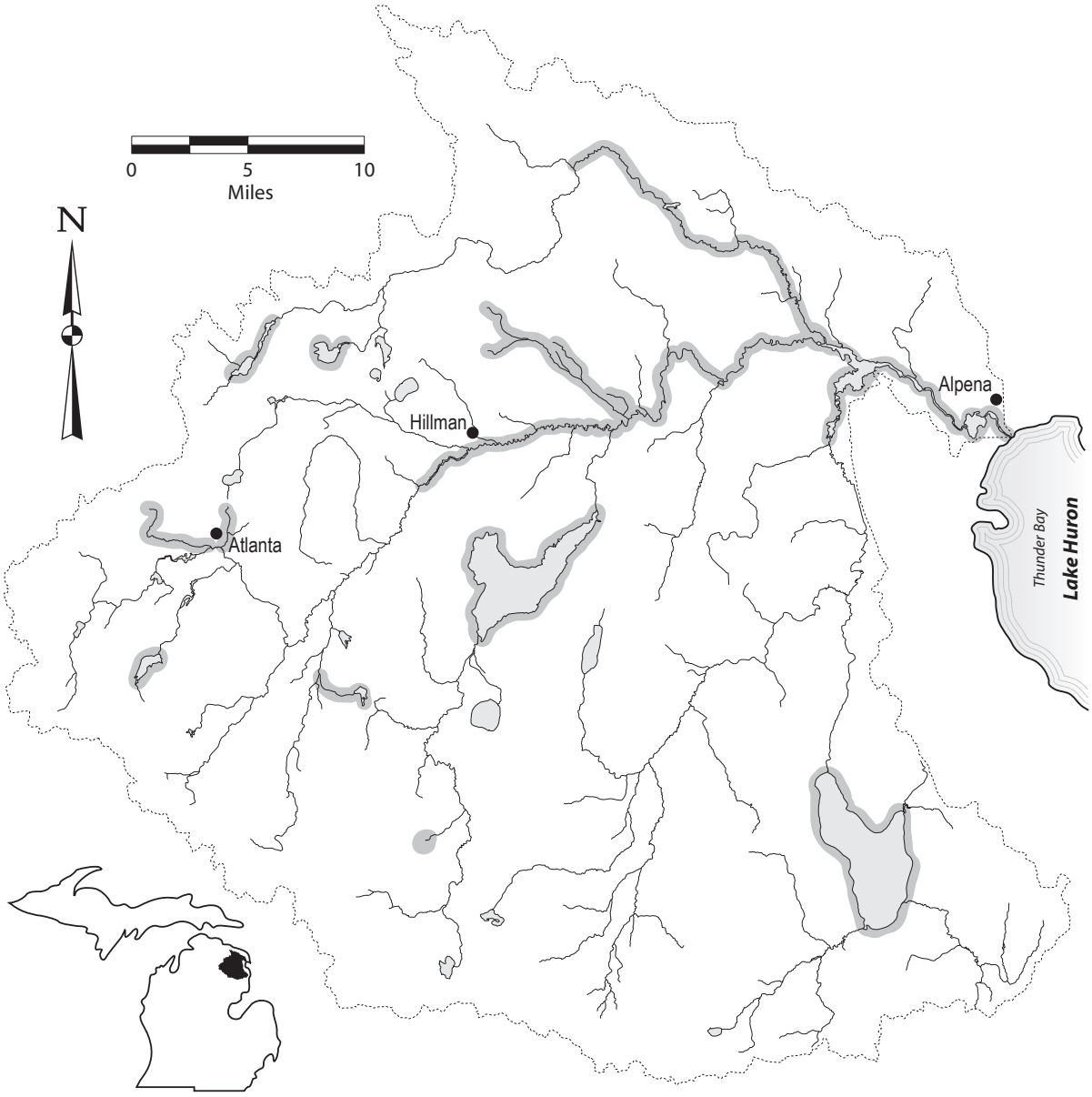


Golden shiner (*Notemigonus crysoleucas*)

Habitat:

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

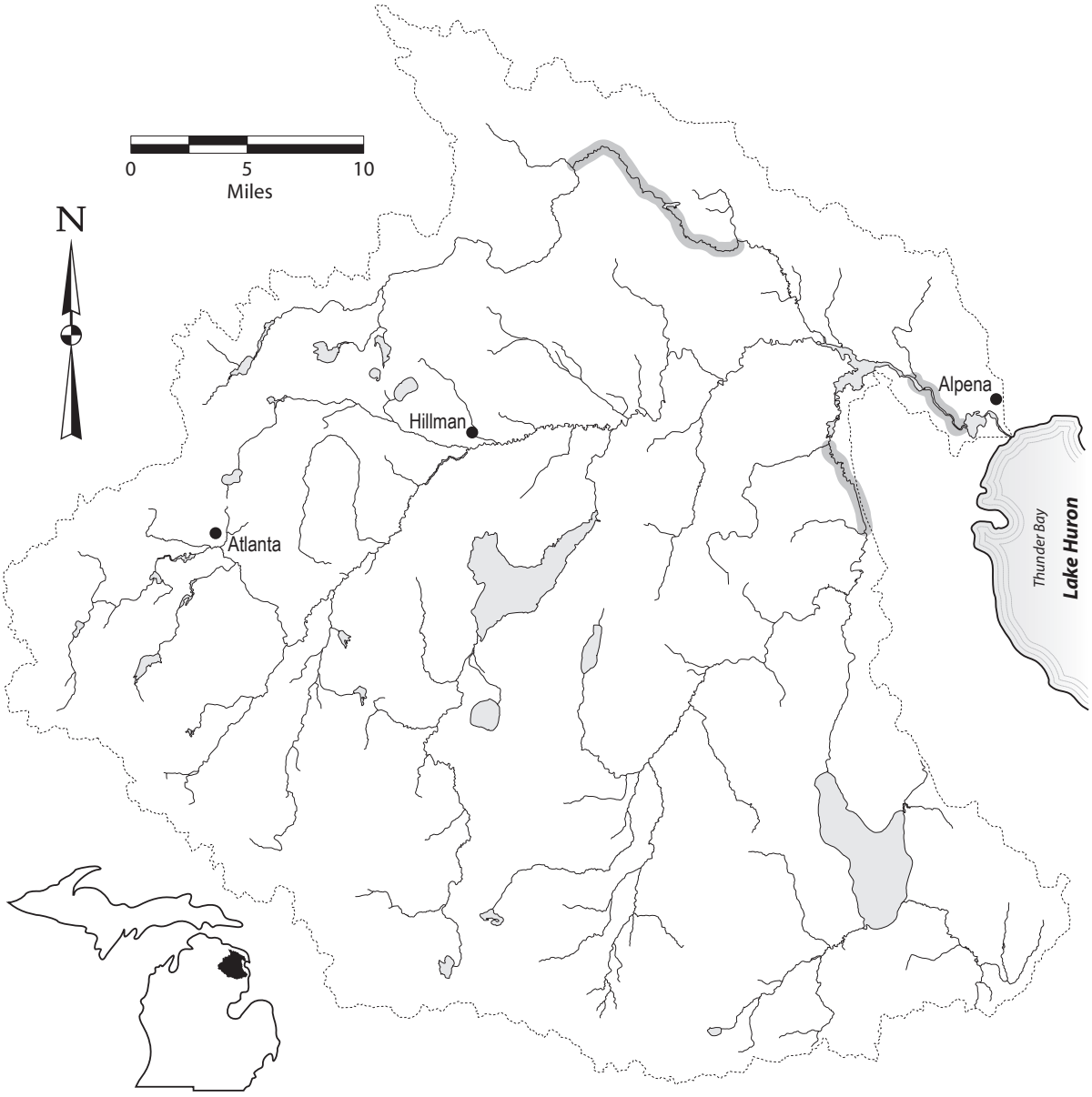
spawning - vegetation



Pugnose shiner (*Notropis anogenus*) – **special concern**

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

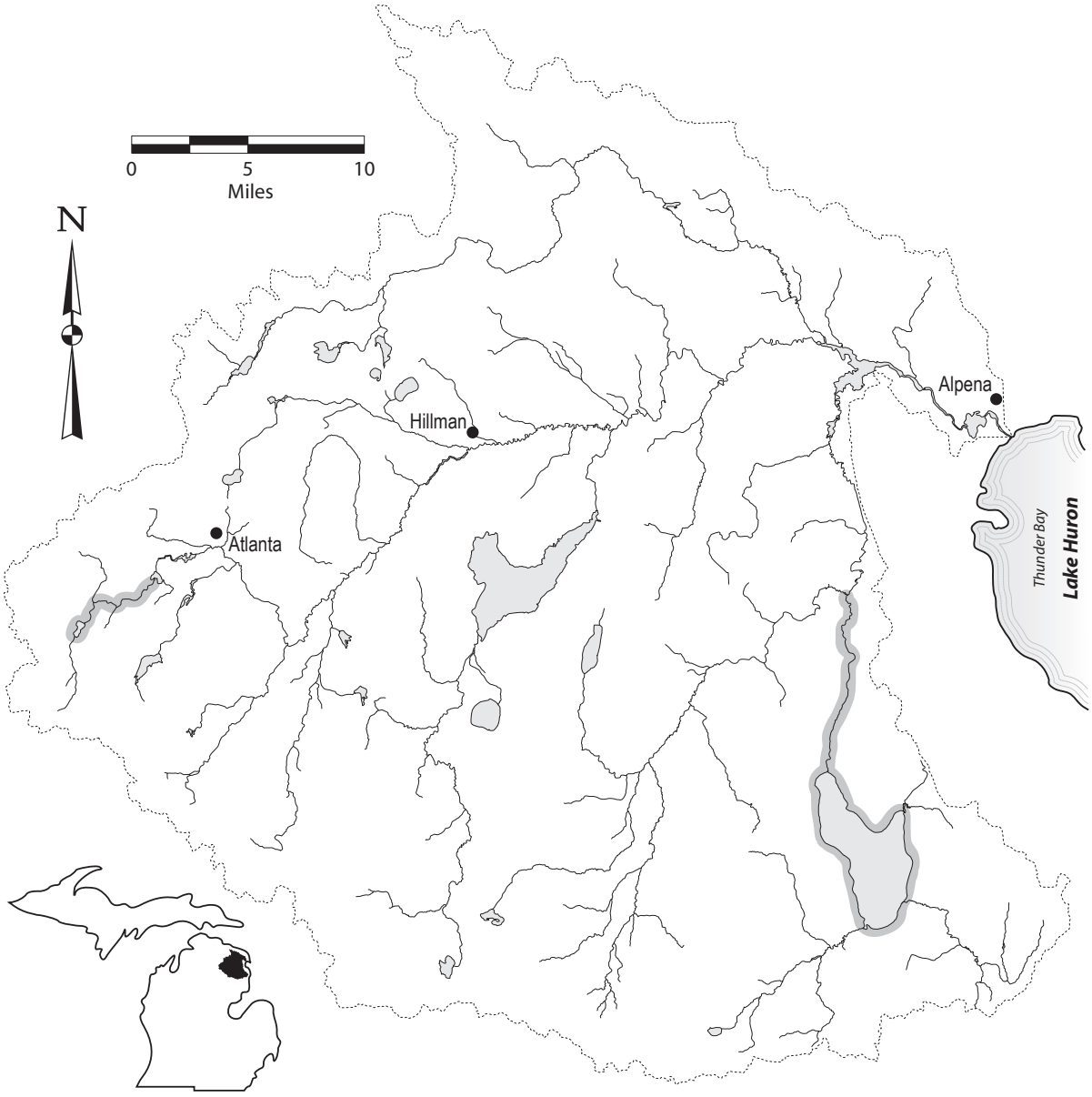


Emerald shiner (*Notropis atherinoides*)

Habitat:

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

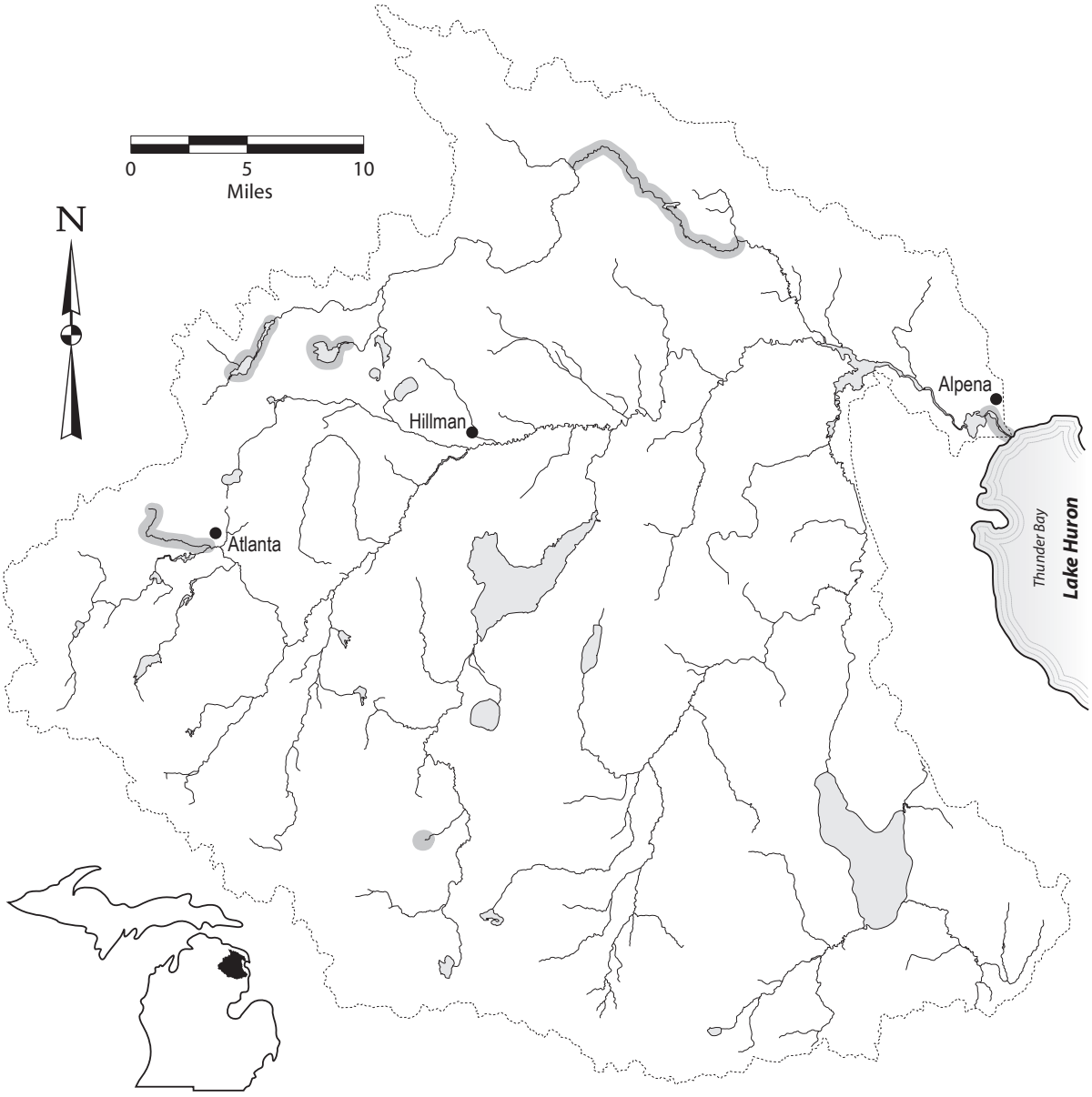
spawning - sand or firm mud substrate or gravel shoals



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

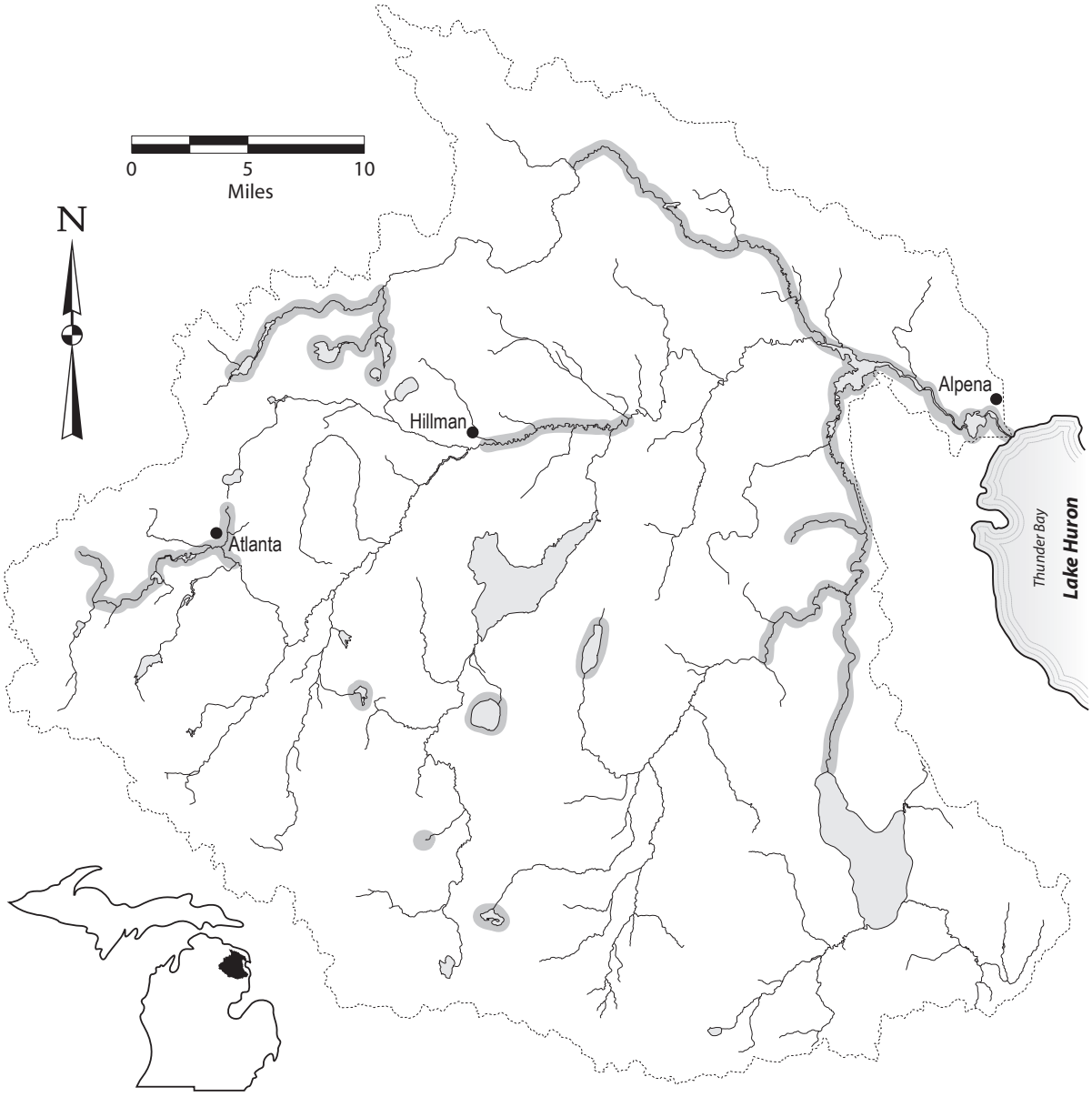


Blacknose shiner (*Notropis heterolepis*)

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

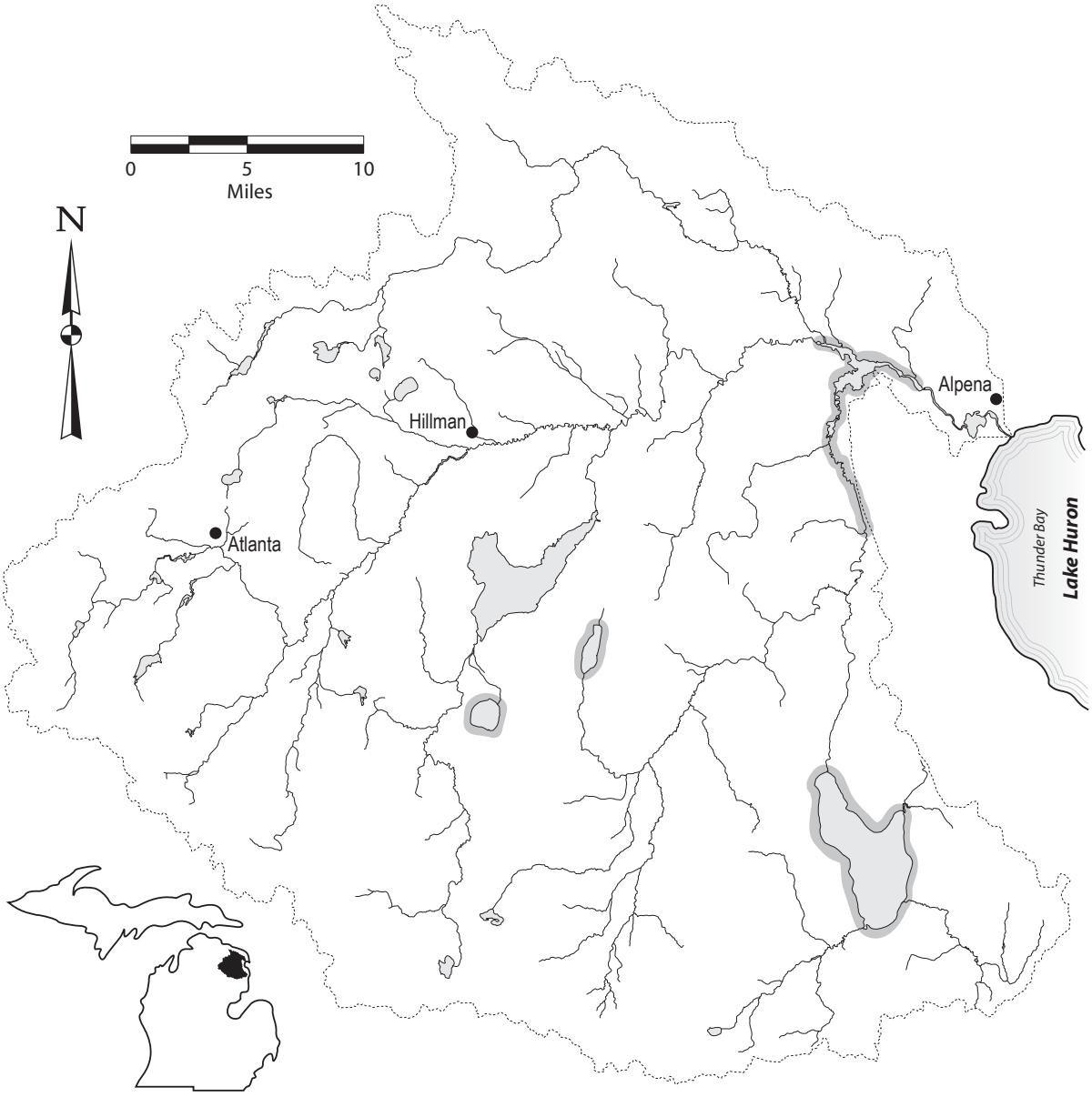


Spottail shiner (*Notropis hudsonius*)

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

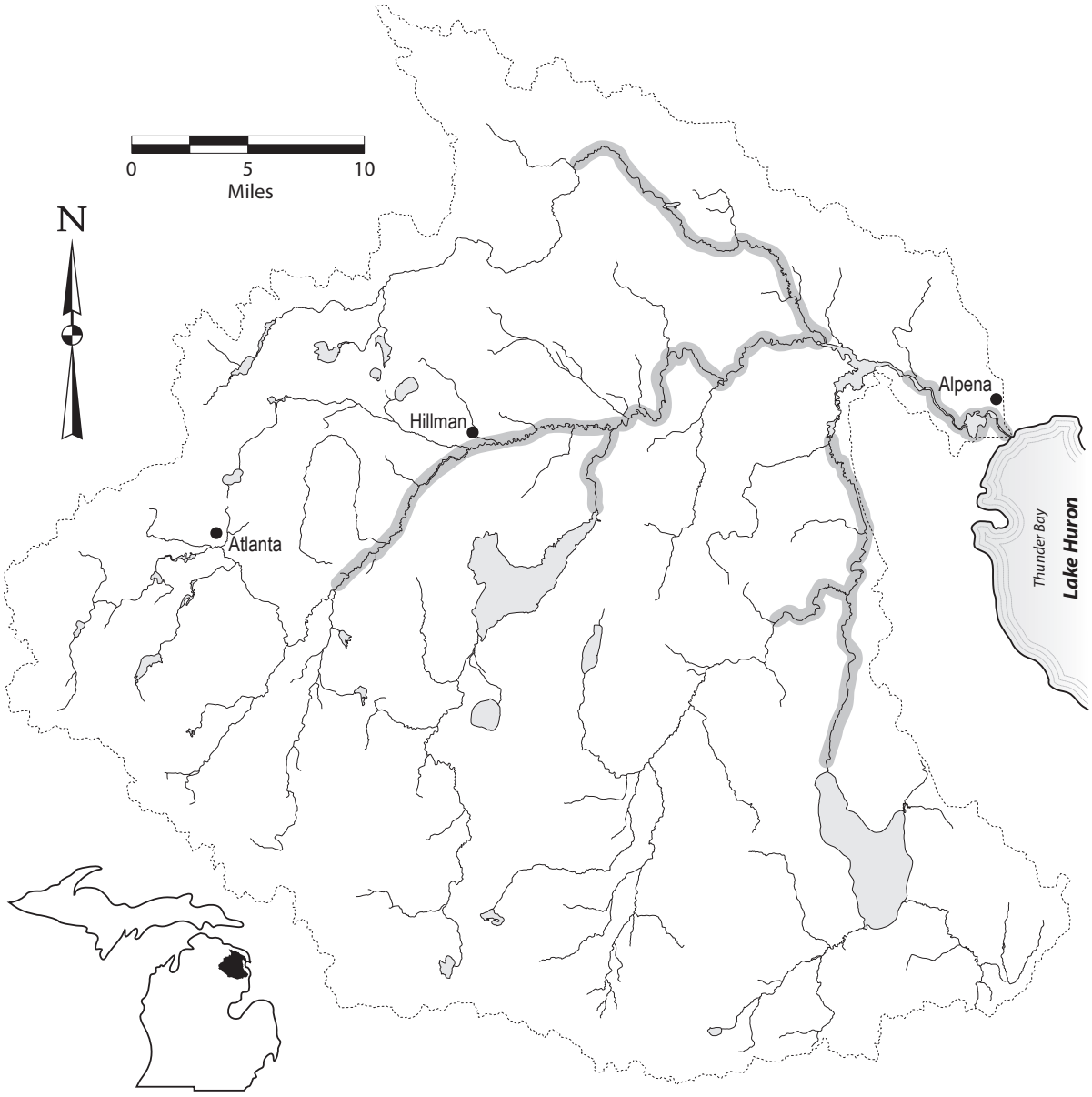


Rosyface shiner (*Notropis rubellus*)

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 hornyhead chub, chestnut lamprey, and redhorses
- sandy-gravel, gravel or bedrock substrate
- shallow high gradient water

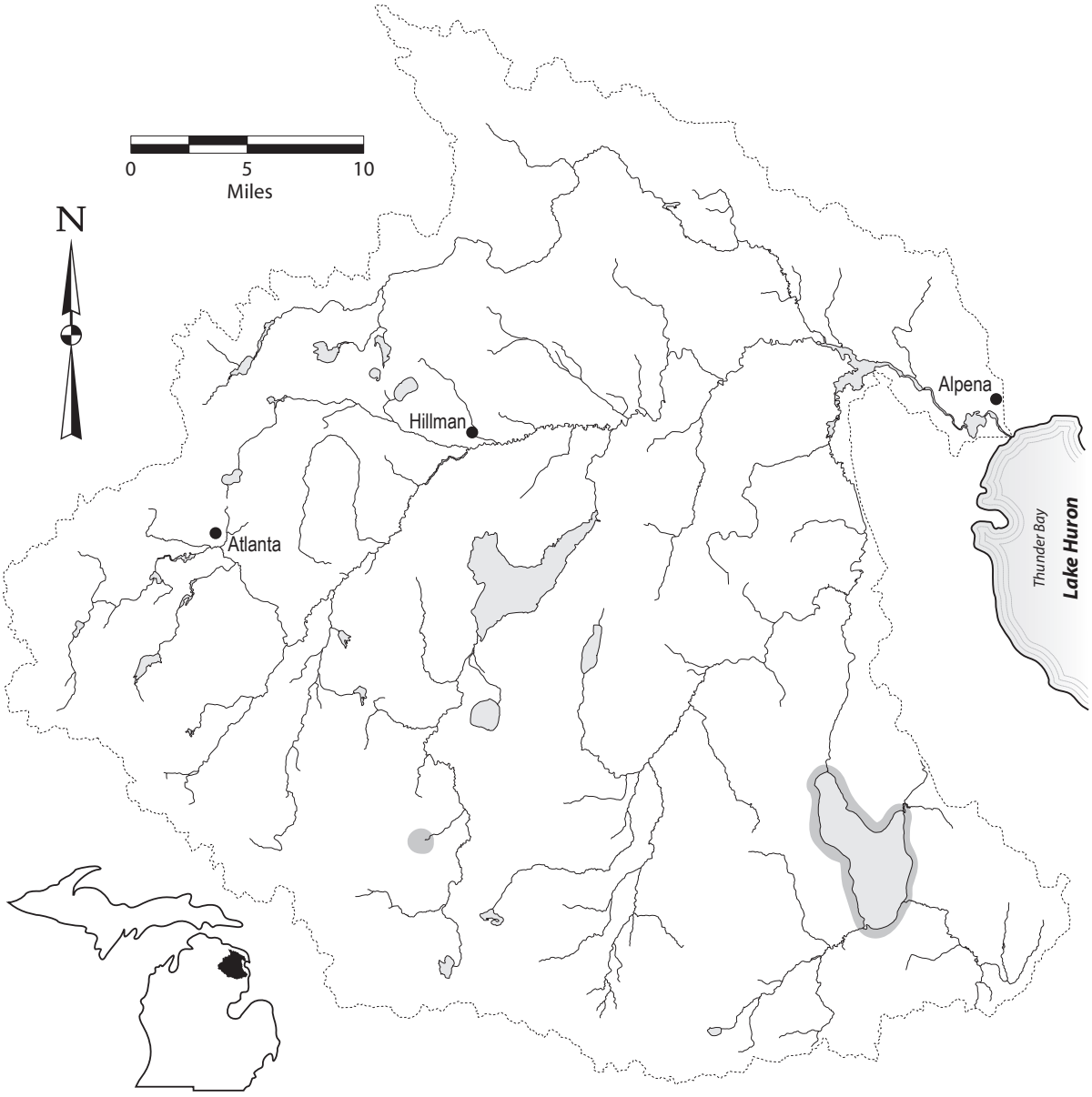


Sand shiner (*Notropis stramineus*)

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

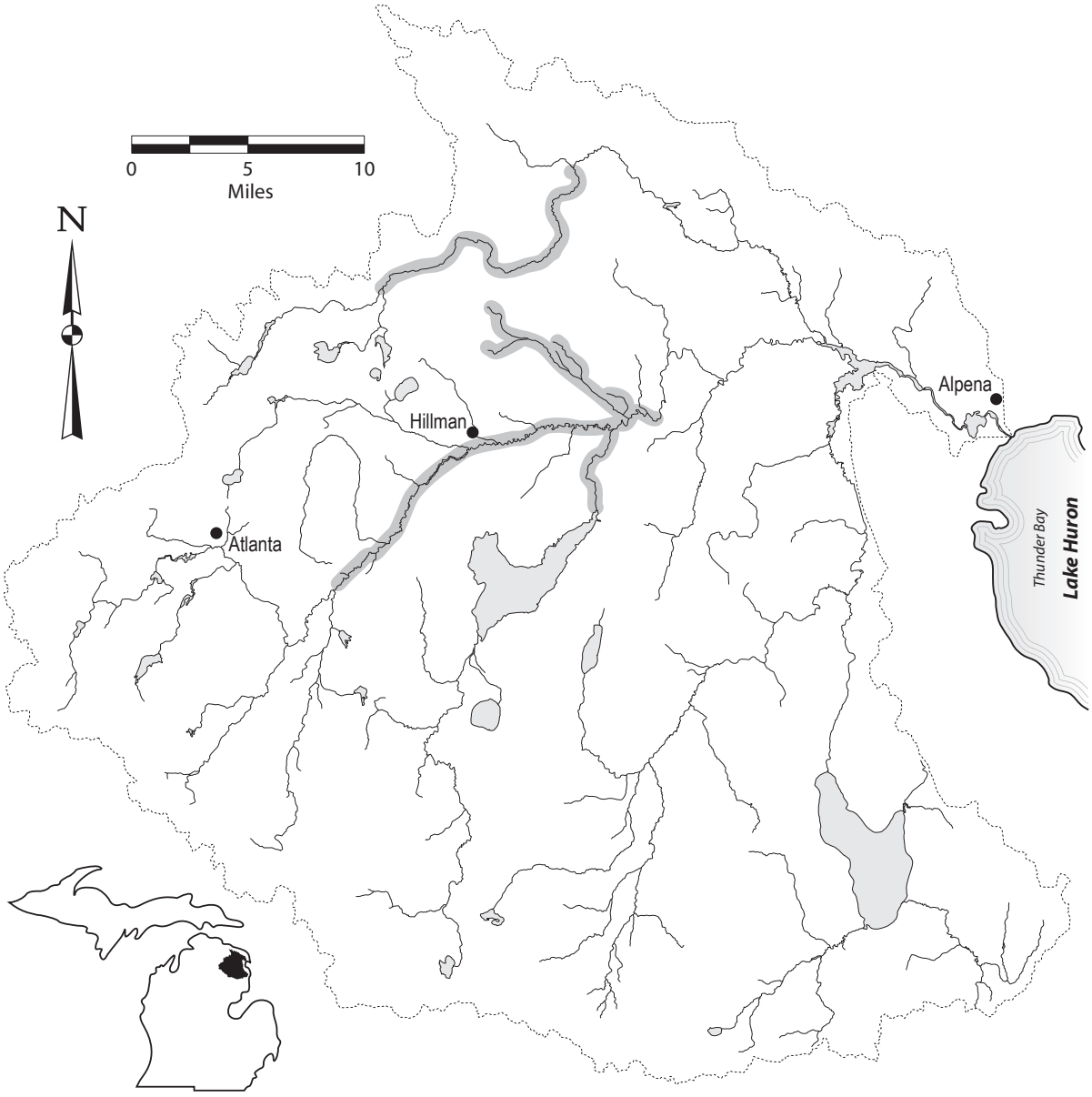


Mimic shiner (*Notropis volucellus*)

Habitat:

feeding - pools and backwater of streams, moderately weedy lakes and impoundments
- quiet or still water
- clear shallow water

spawning - aquatic vegetation necessary

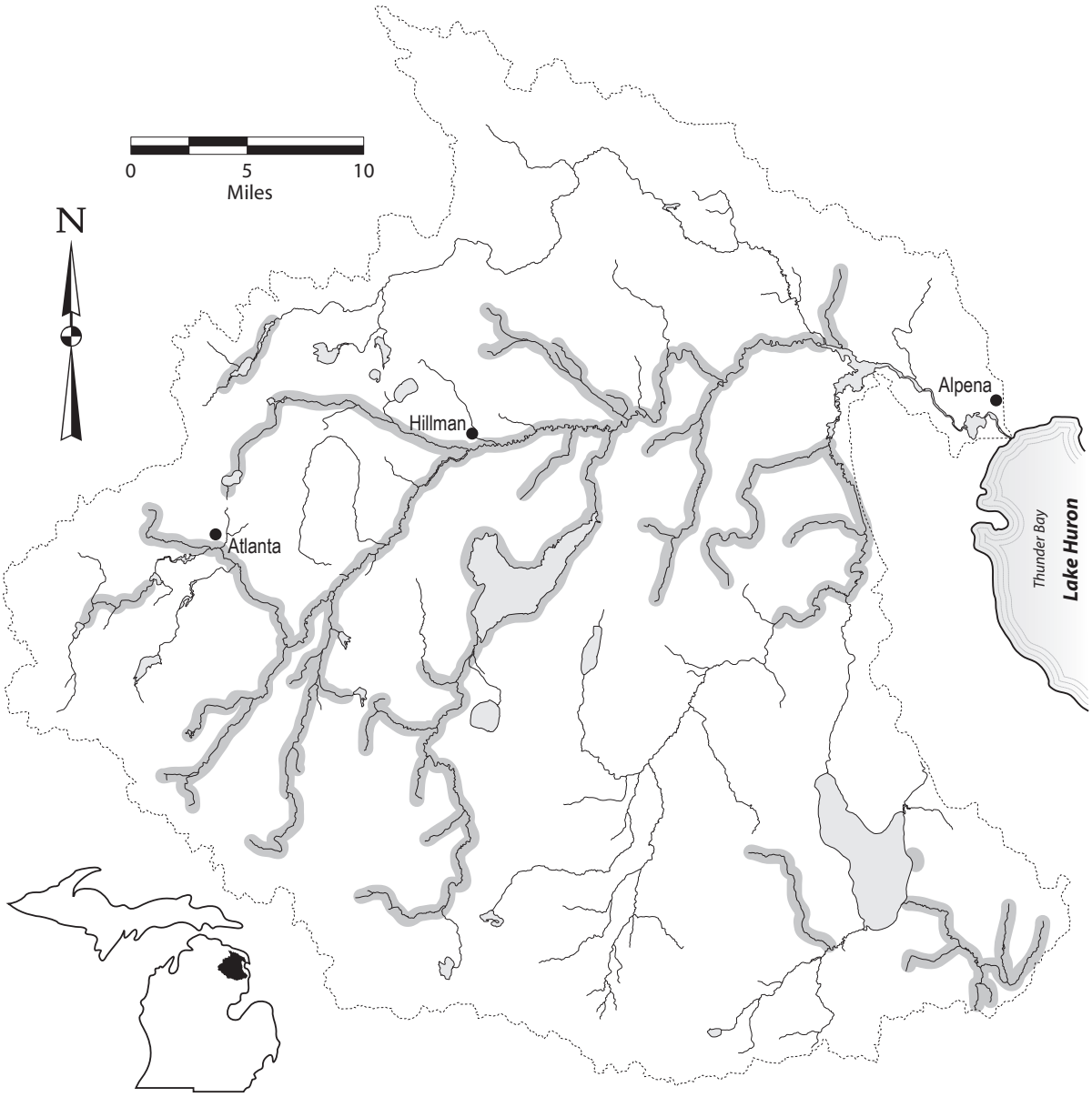


Northern redbelly dace (*Phoxinus eos*)

Habitat:

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

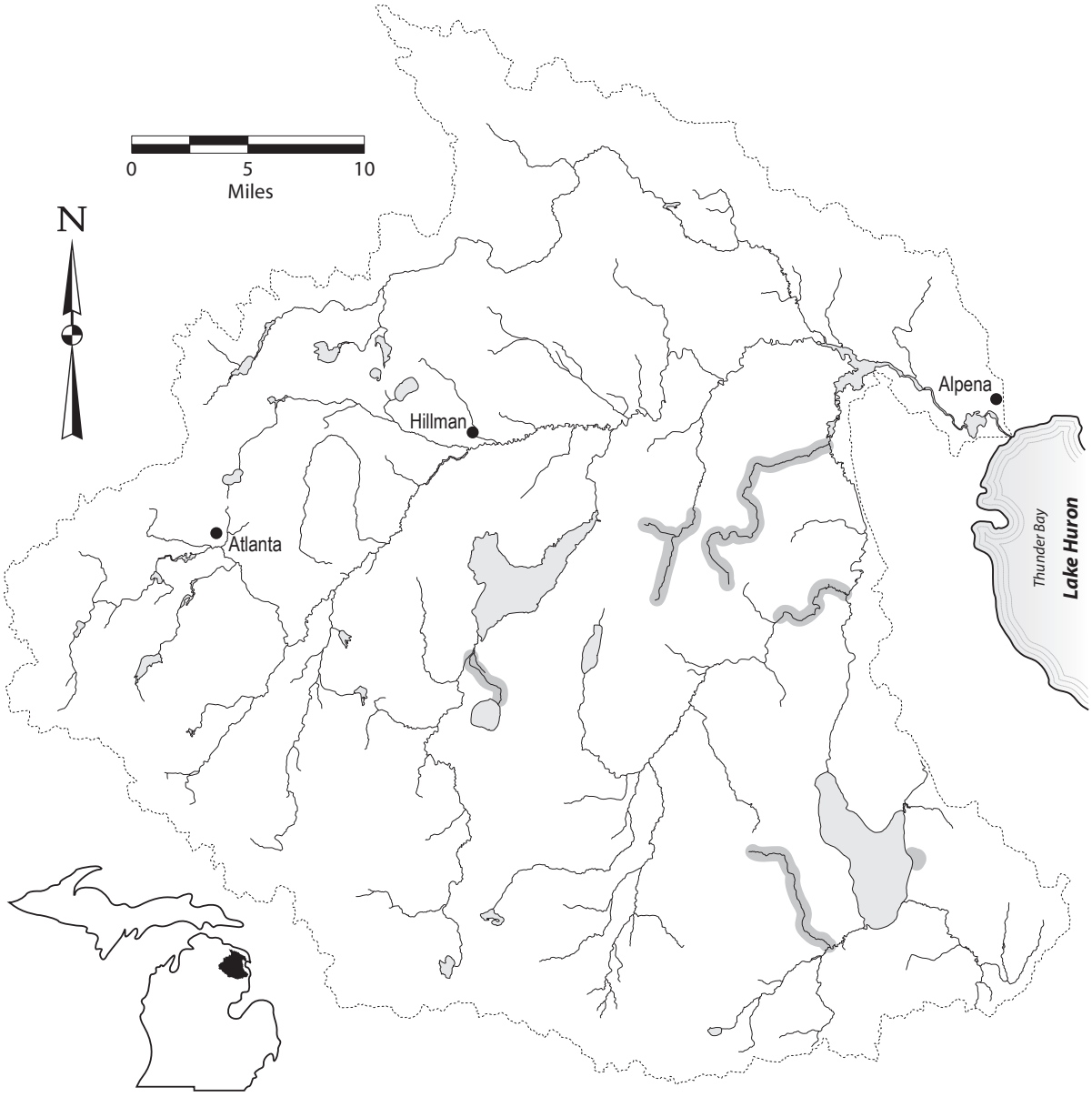
spawning - filamentous algae needed for egg deposition



Finescale dace (*Phoxinus neogaeus*)

Habitat:

feeding - cool bog lakes and streams
- neutral to slightly acidic waters
- various substrates

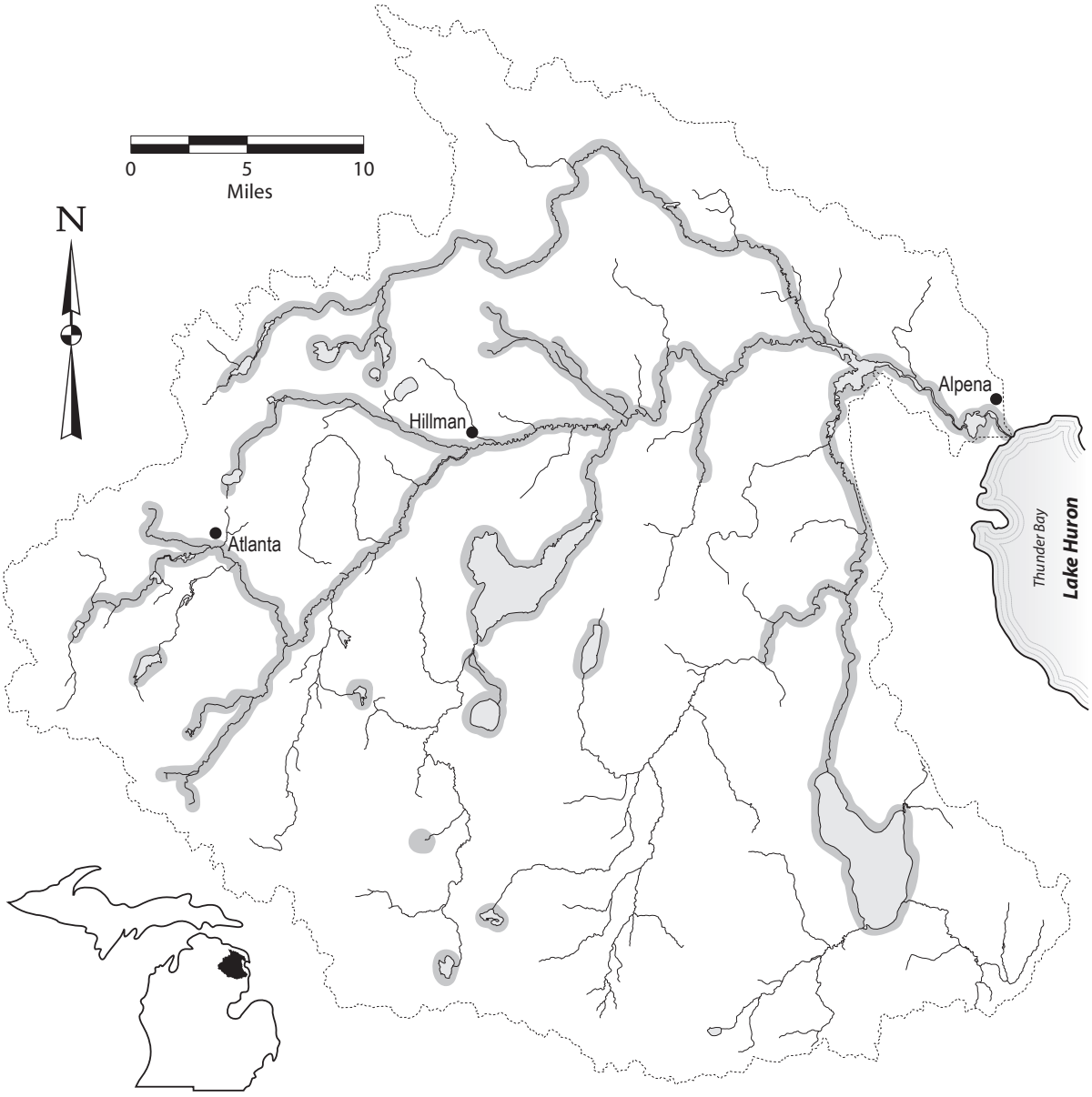


Bluntnose minnow (*Pimephales notatus*)

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

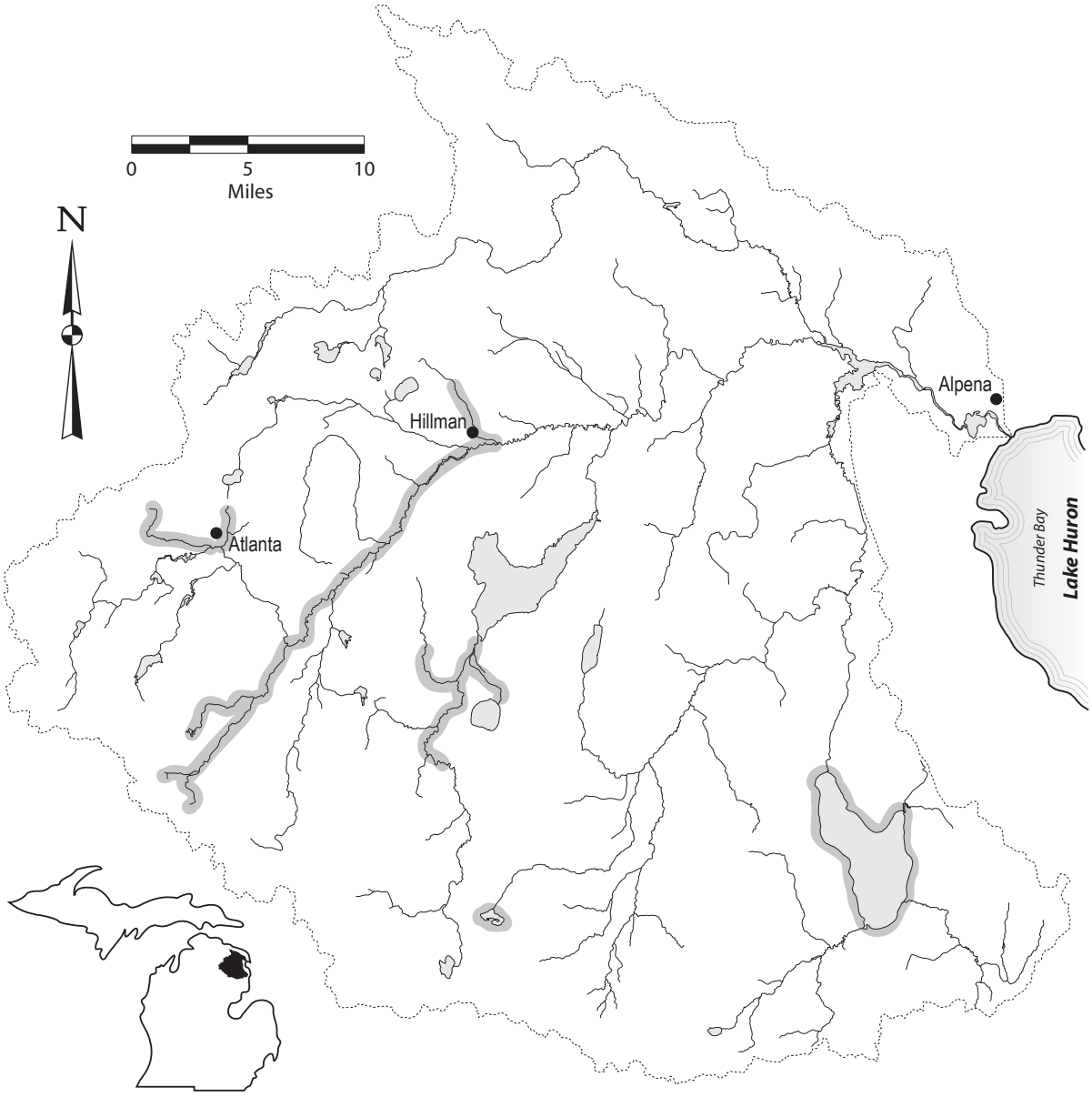


Fathead minnow (*Pimephales promelas*)

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

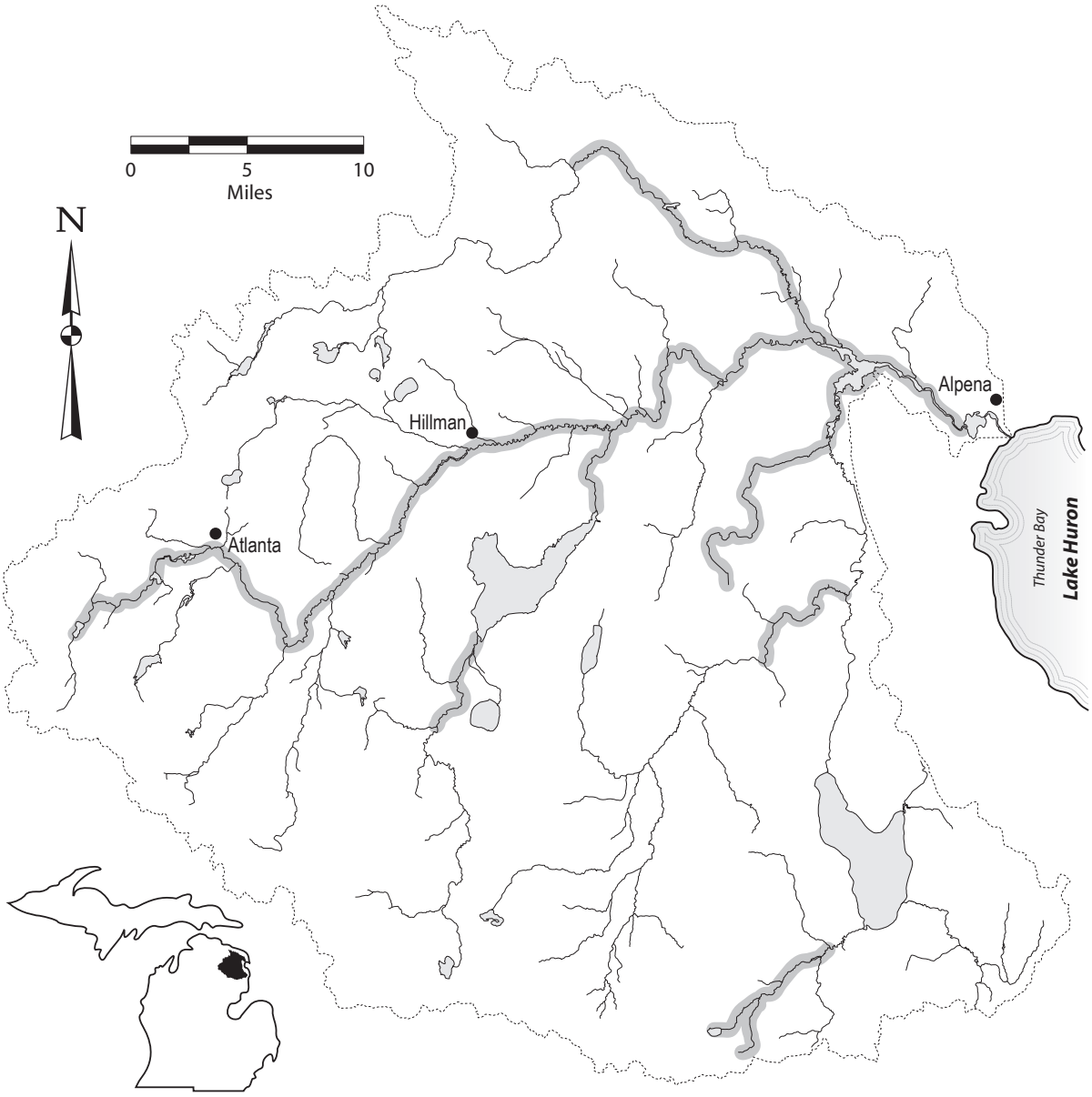


Longnose dace (*Rhinichthys cataractae*)

Habitat:

feeding - lakes and streams
- high gradient
- gravel or boulder substrate

winter refuge - quiet shallow pools, or shallow flat sand and gravel-bottomed areas



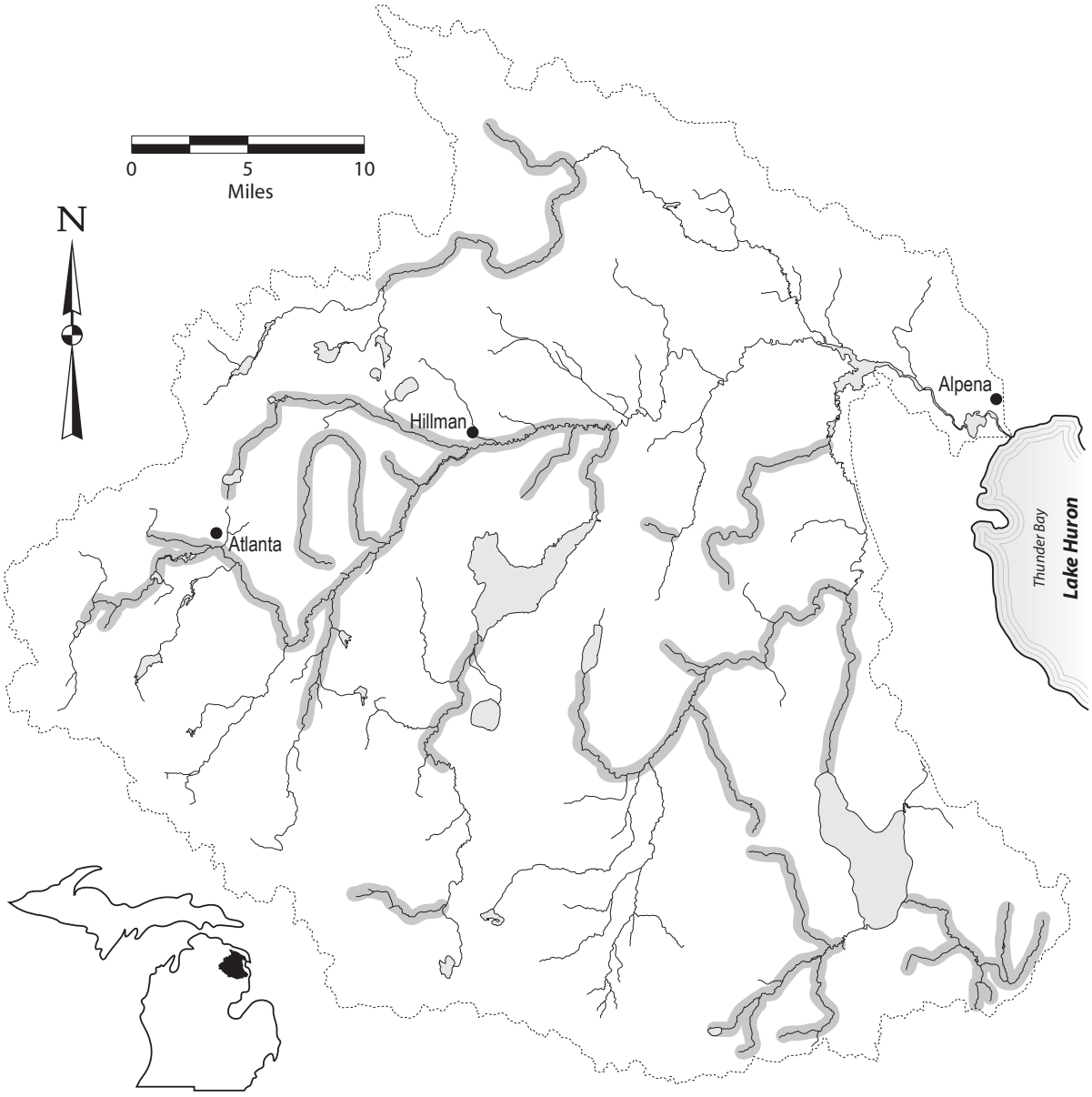
Western blacknose dace (*Rhinichthys obtusus*)

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



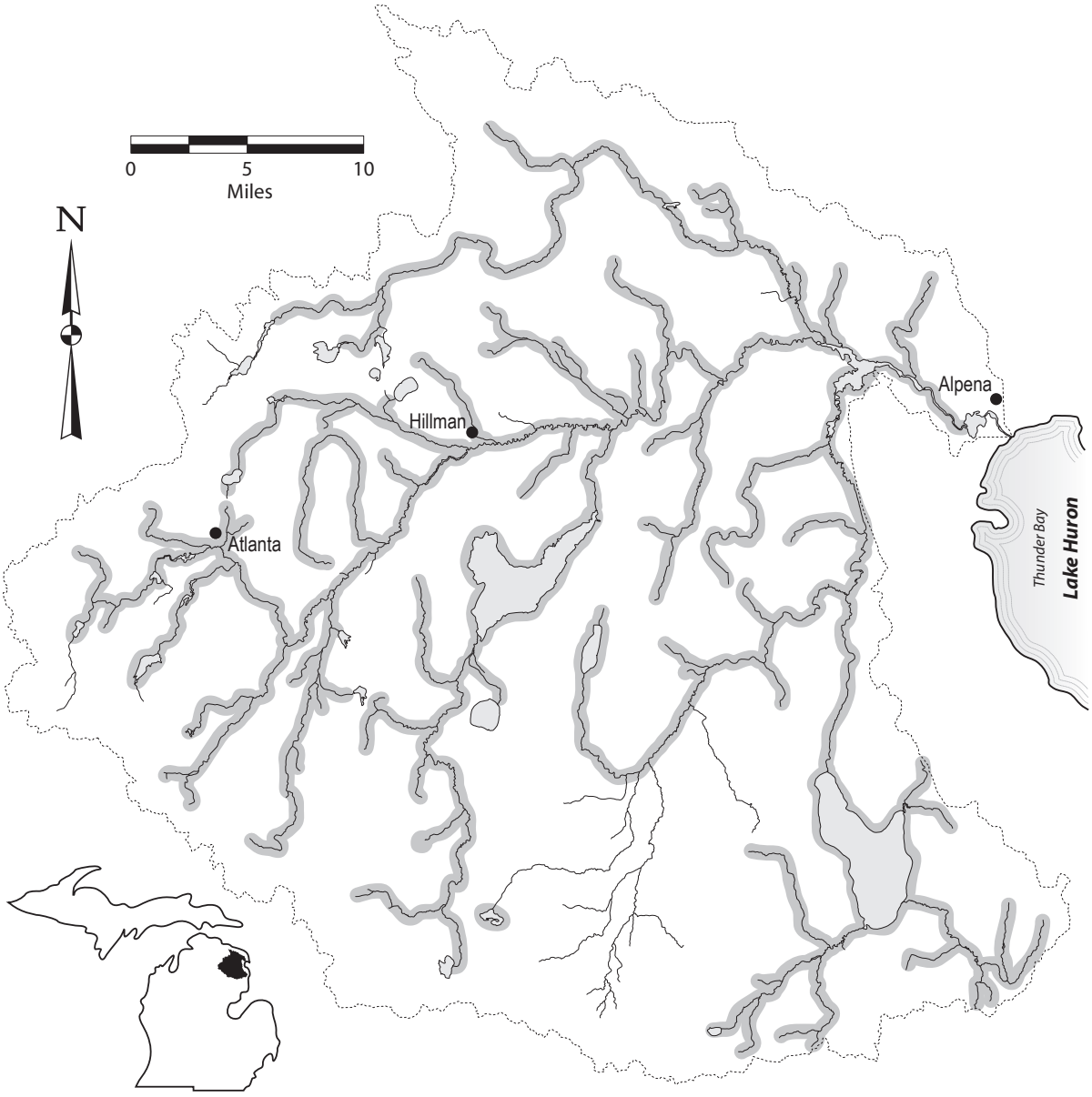
Creek chub (*Semotilus atromaculatus*)

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

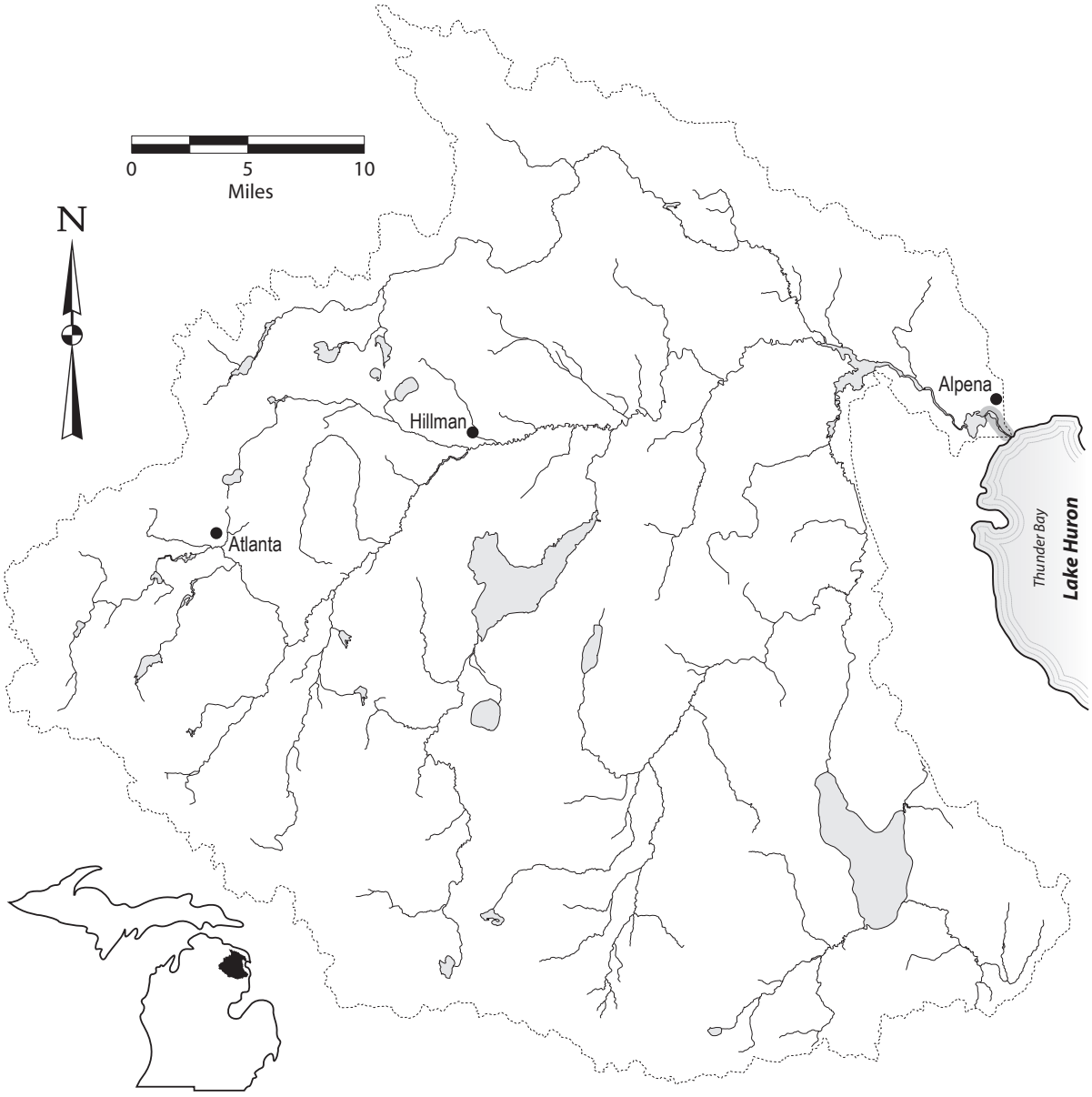


Longnose sucker (*Catostomus catostomus*)

Habitat:

feeding - clear, cold rivers and lakes

spawning - in streams or lake shallows
- current
- gravel substrate

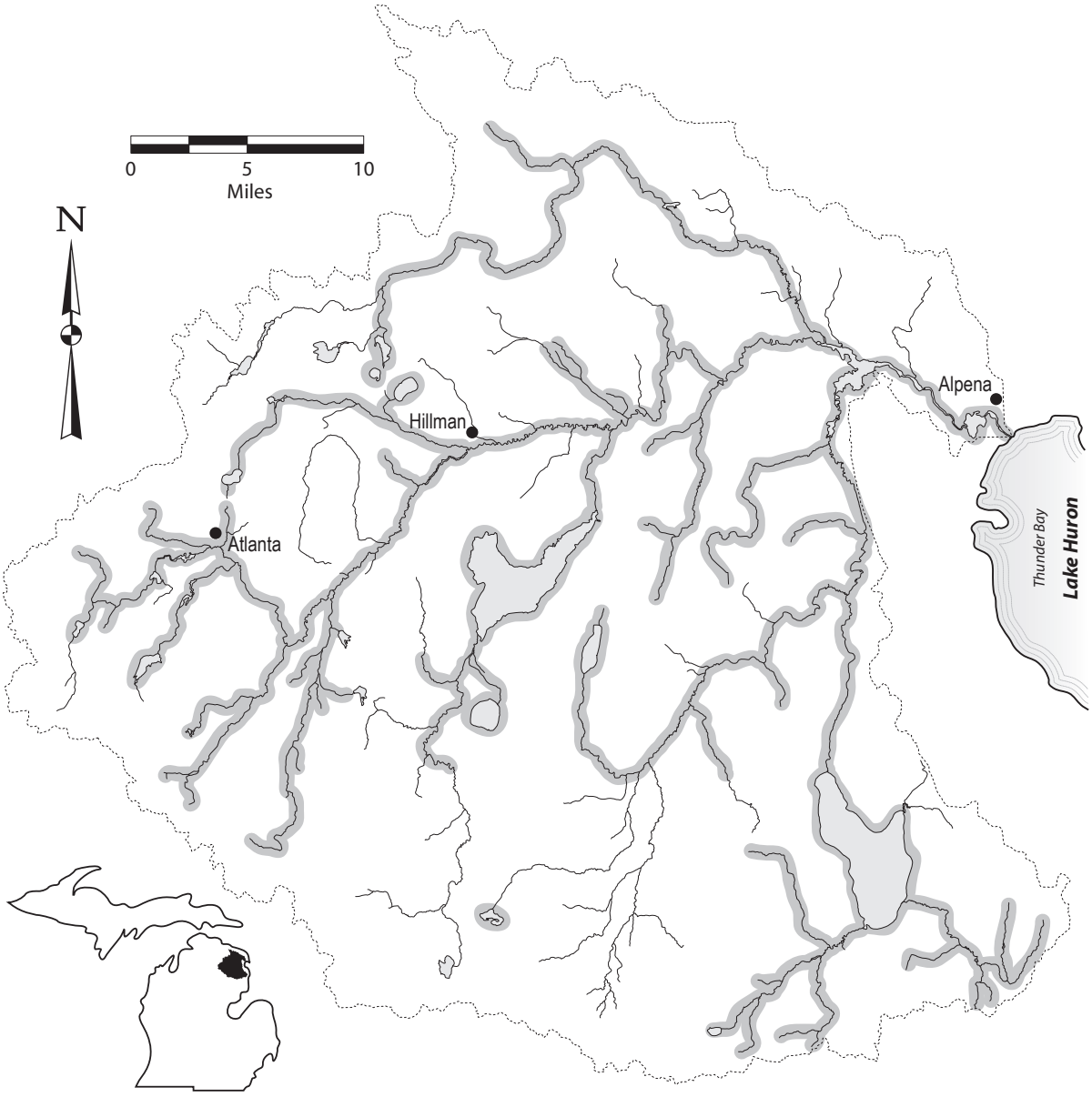


White sucker (*Catostomus commersonii*)

Habitat:

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

spawning - quiet gravelly shallow areas of streams

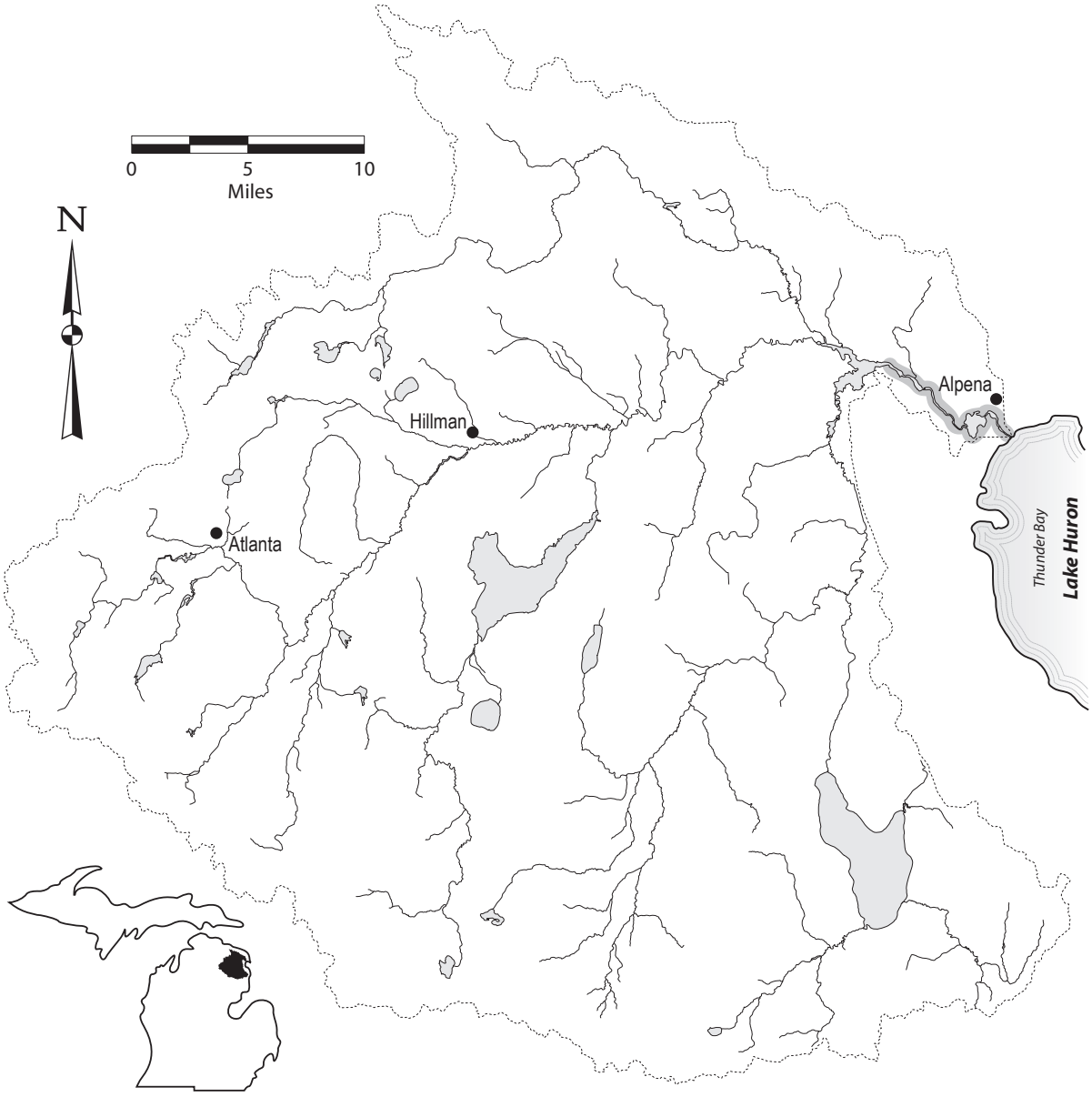


Silver redhorse (*Moxostoma anisurum*)

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

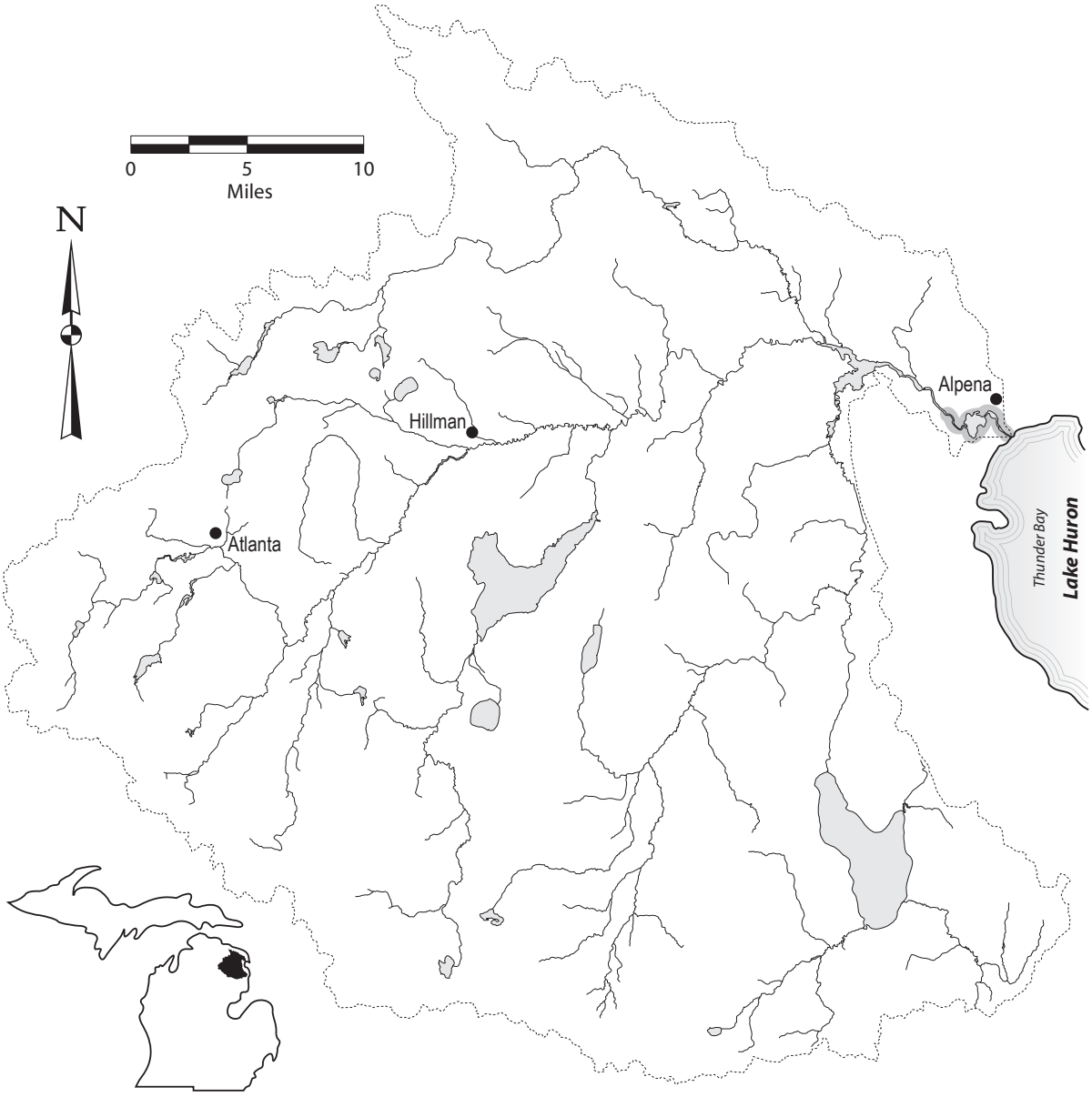


Greater redhorse (*Moxostoma valenciennesi*)

Habitat:

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

spawning - moderately rapid current

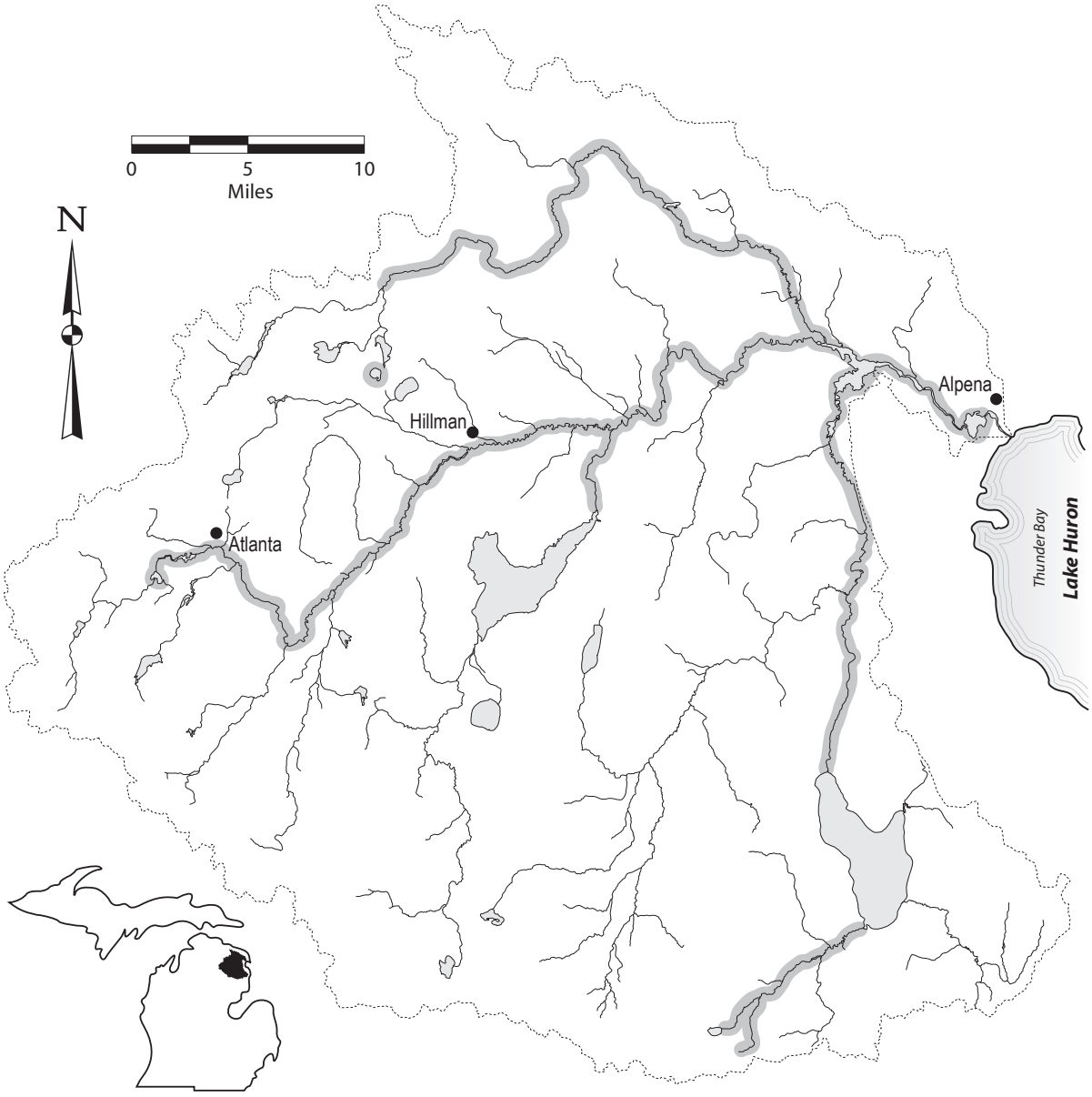


Black bullhead (*Ameiurus melas*)

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

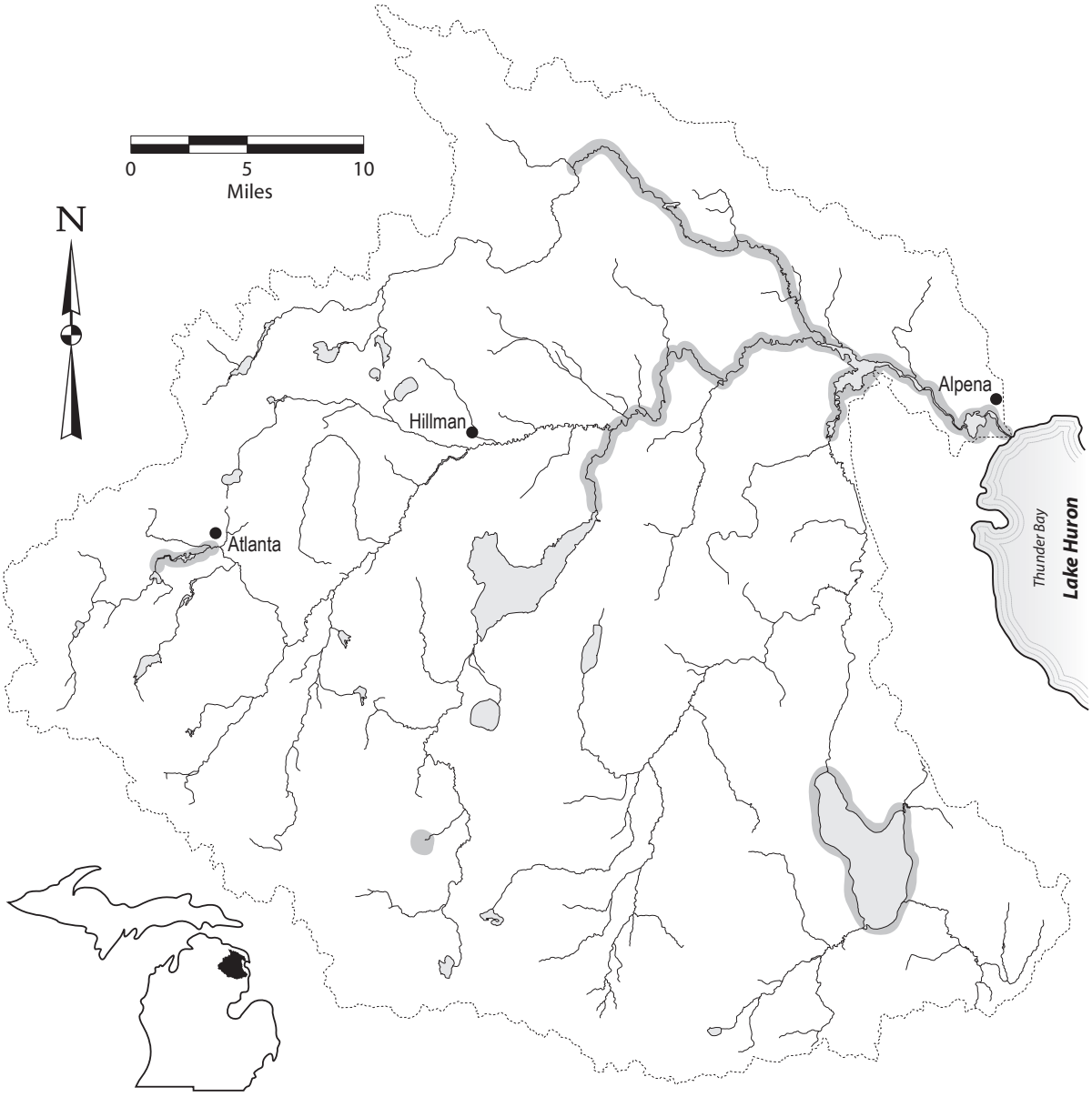


Yellow bullhead (*Ameiurus natalis*)

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



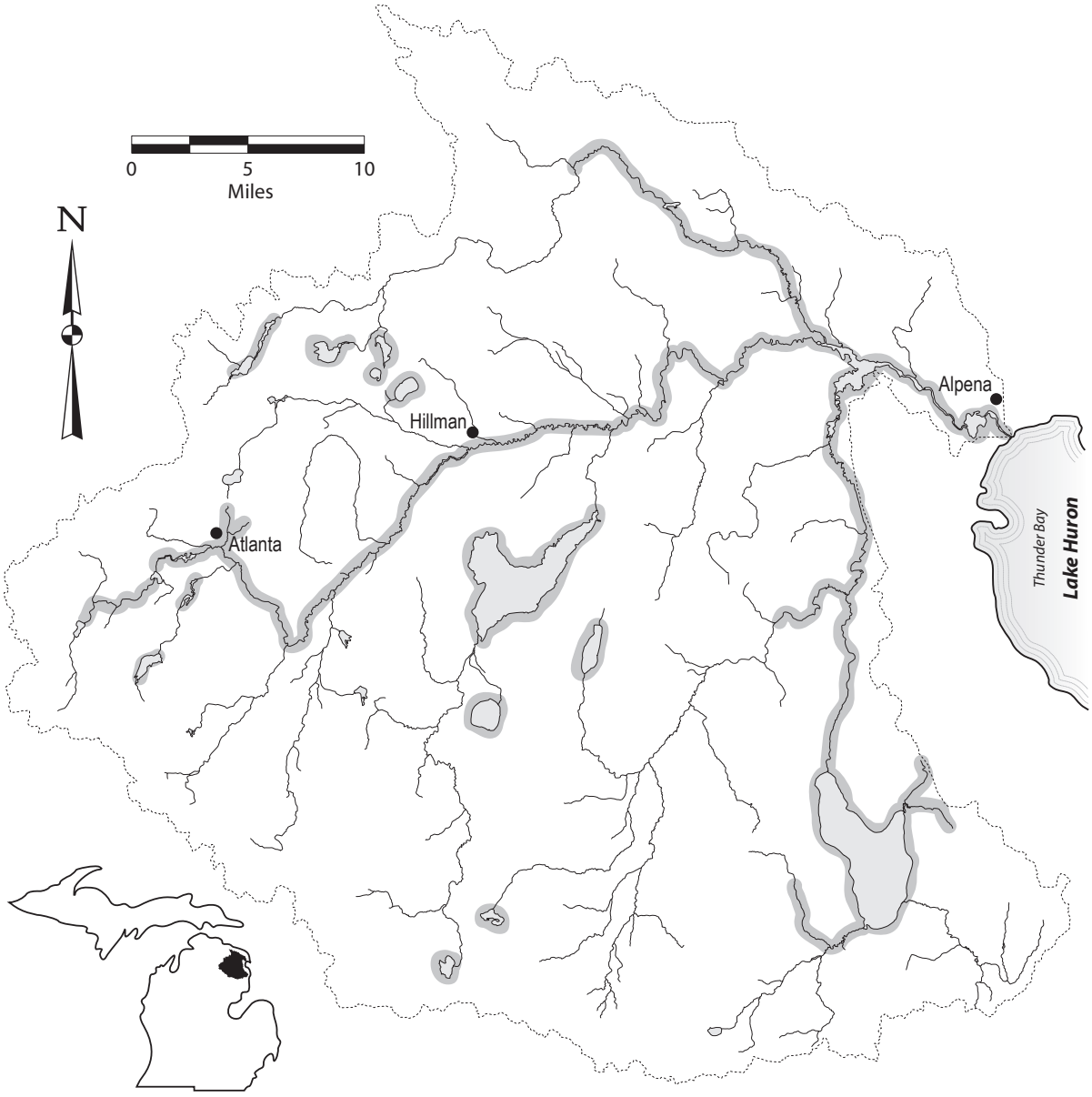
Brown bullhead (*Ameiurus nebulosus*)

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

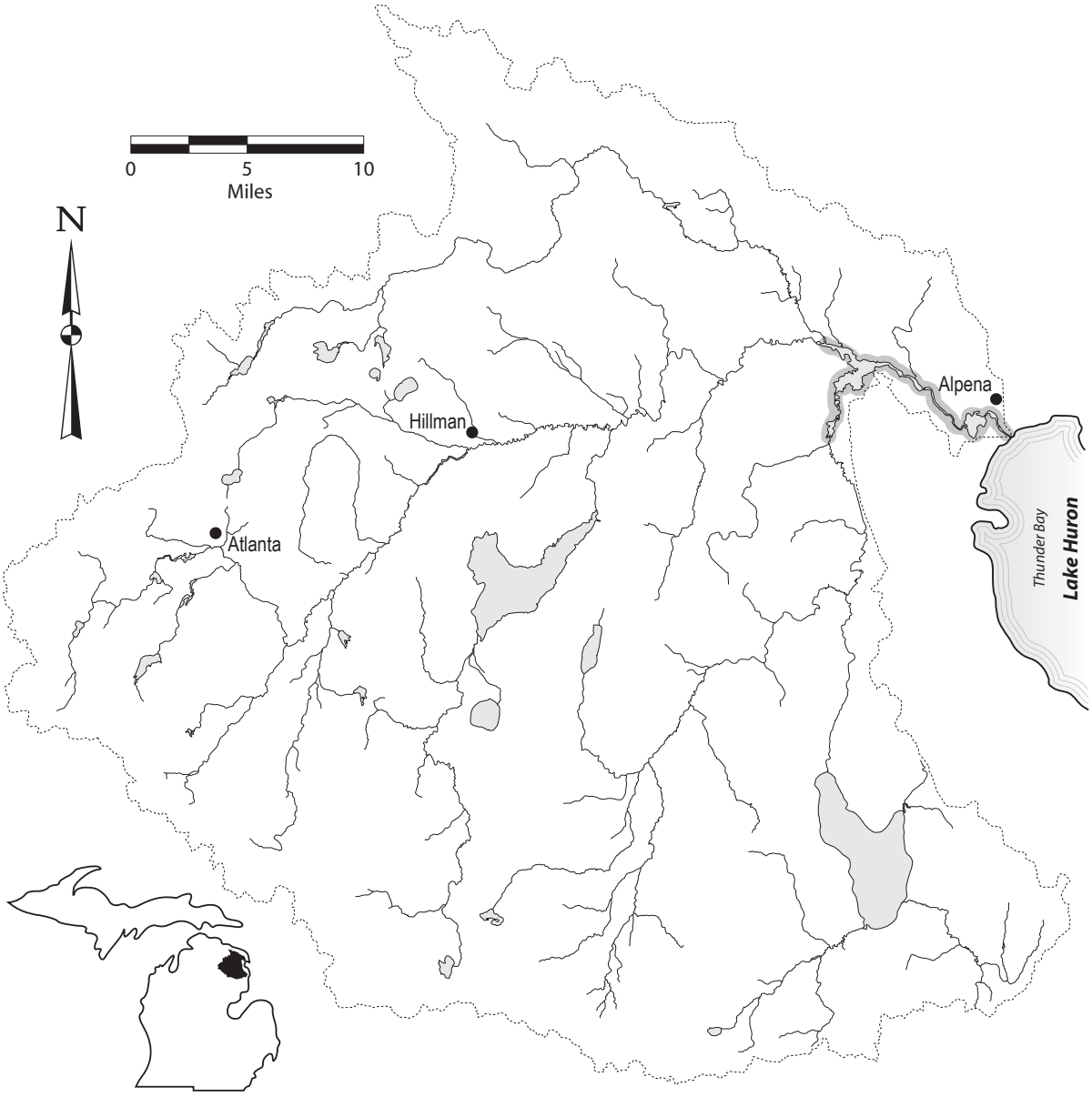


Channel catfish (*Ictalurus punctatus*)

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

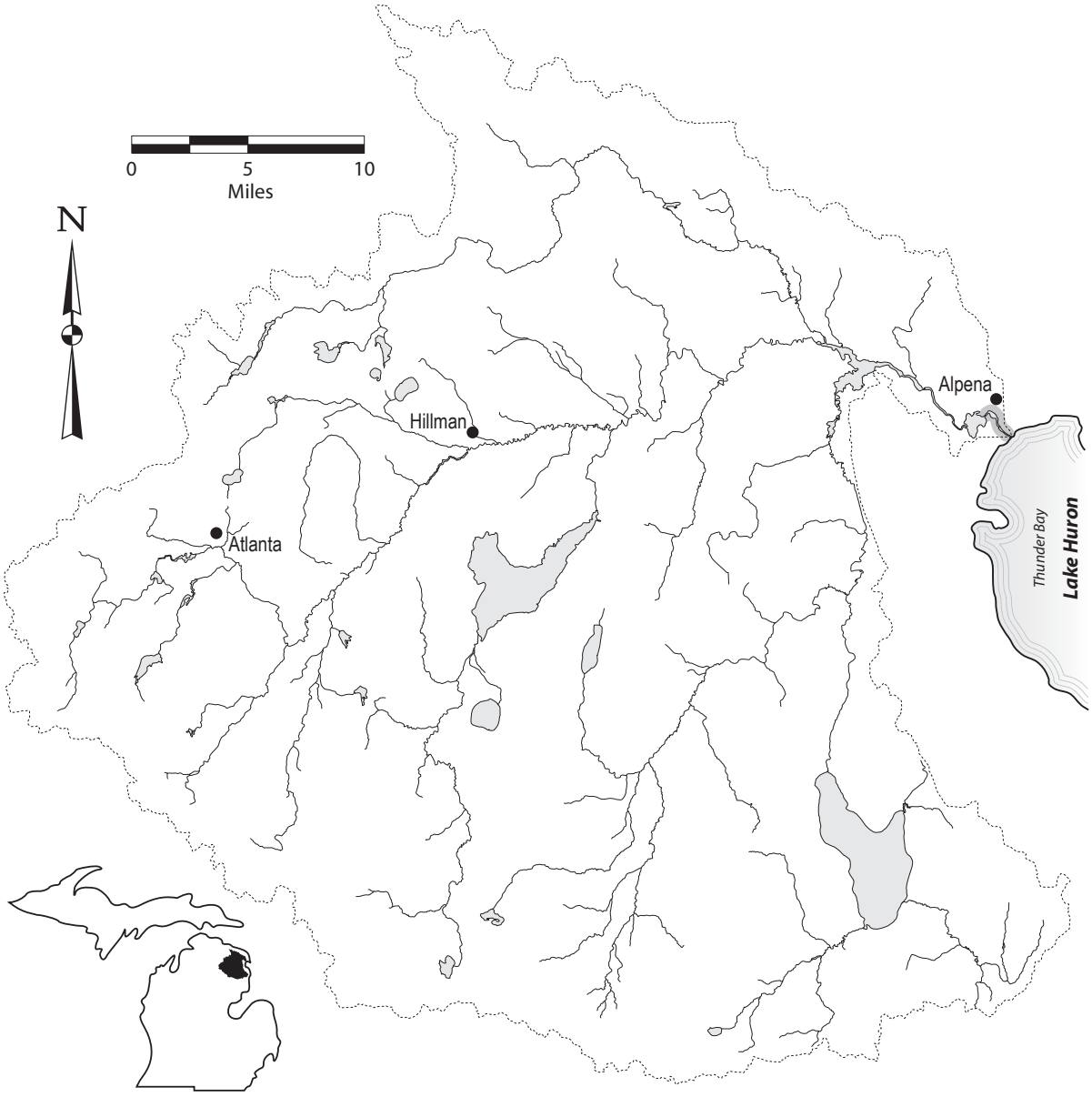


Tadpole madtom (*Noturus gyrinus*)

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 (e.g., beneath boards, logs, crayfish burrows)

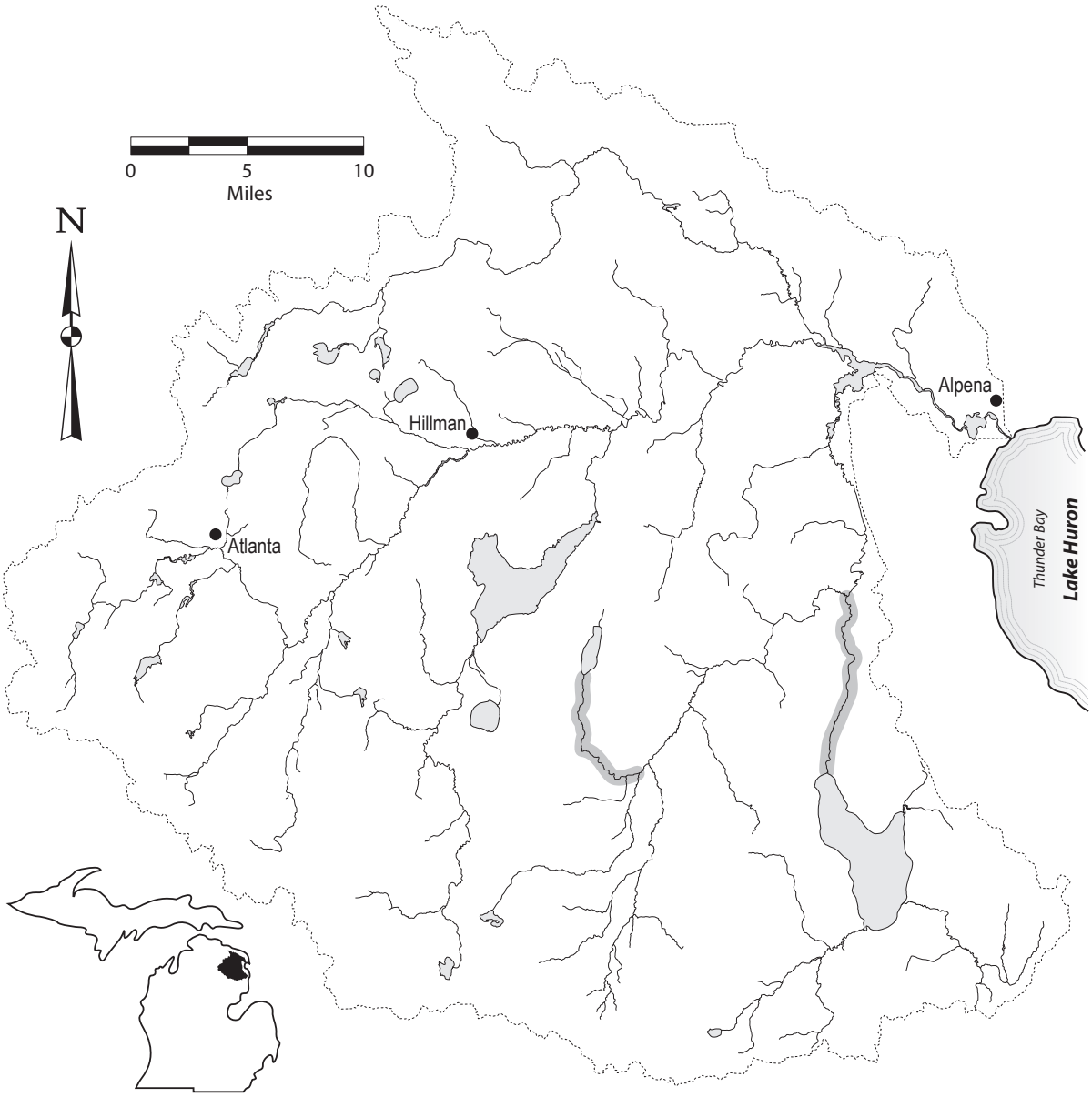


Grass pickerel (*Esox americanus vermiculatus*)

Habitat:

feeding - juveniles: along shore
- adults: in deeper portions of streams, rivers, lakes, and impoundments
- clear water, little current, dense vegetation
- tolerates low oxygen concentrations

spawning - broadcast spawner over submerged vegetation

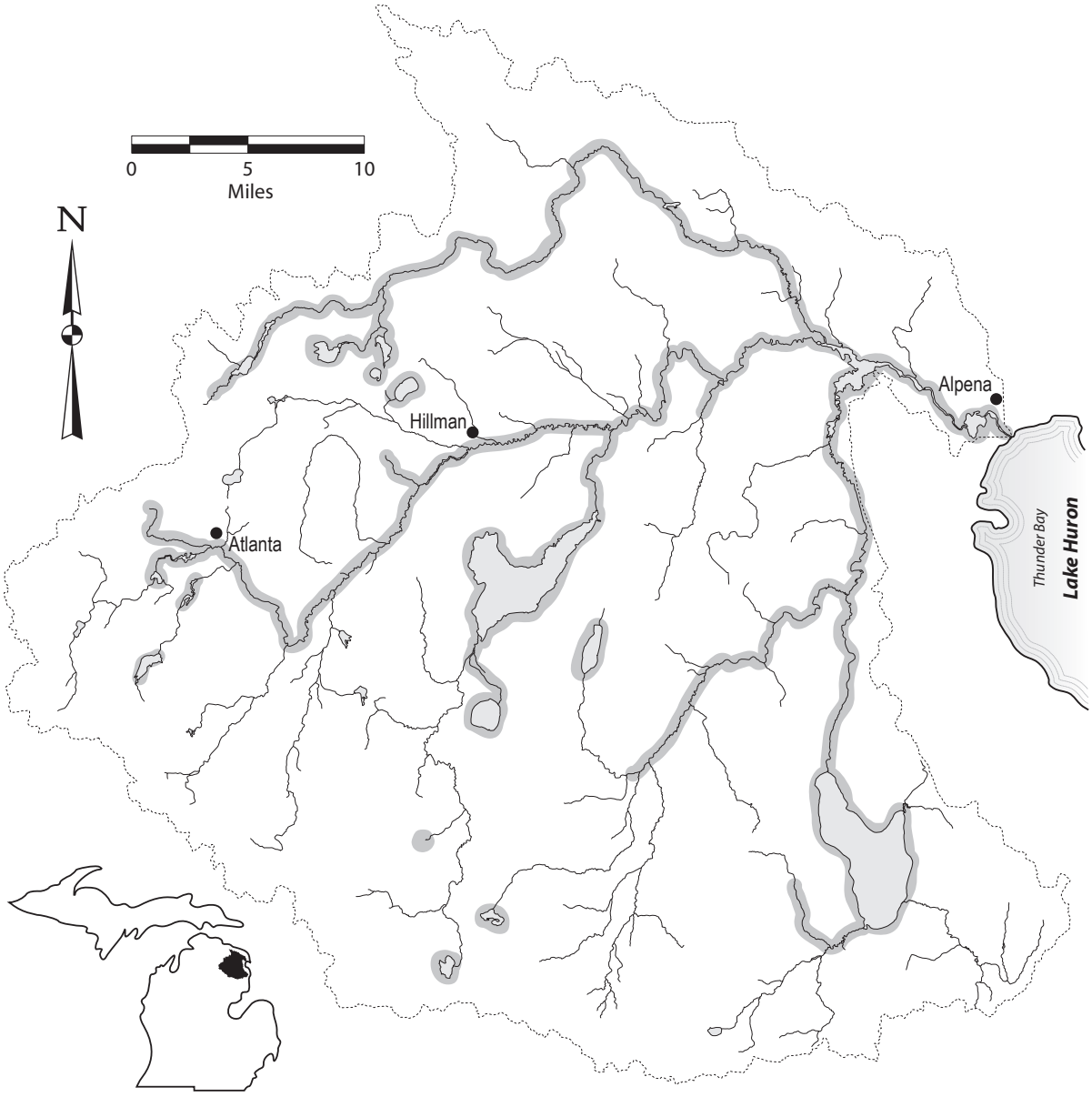


Northern pike (*Esox lucius*)

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

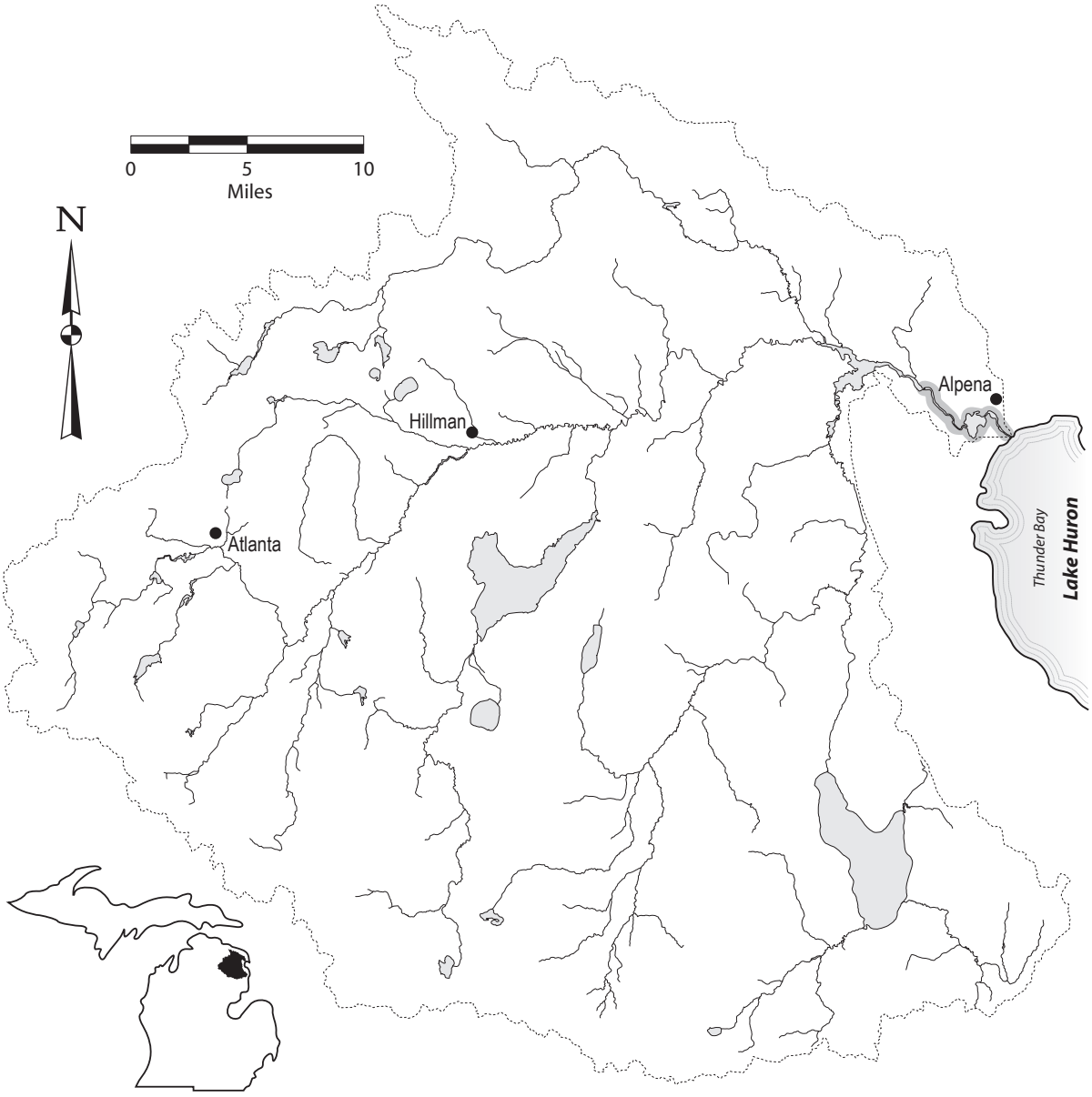


Muskellunge (*Esox masquinongy*)

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

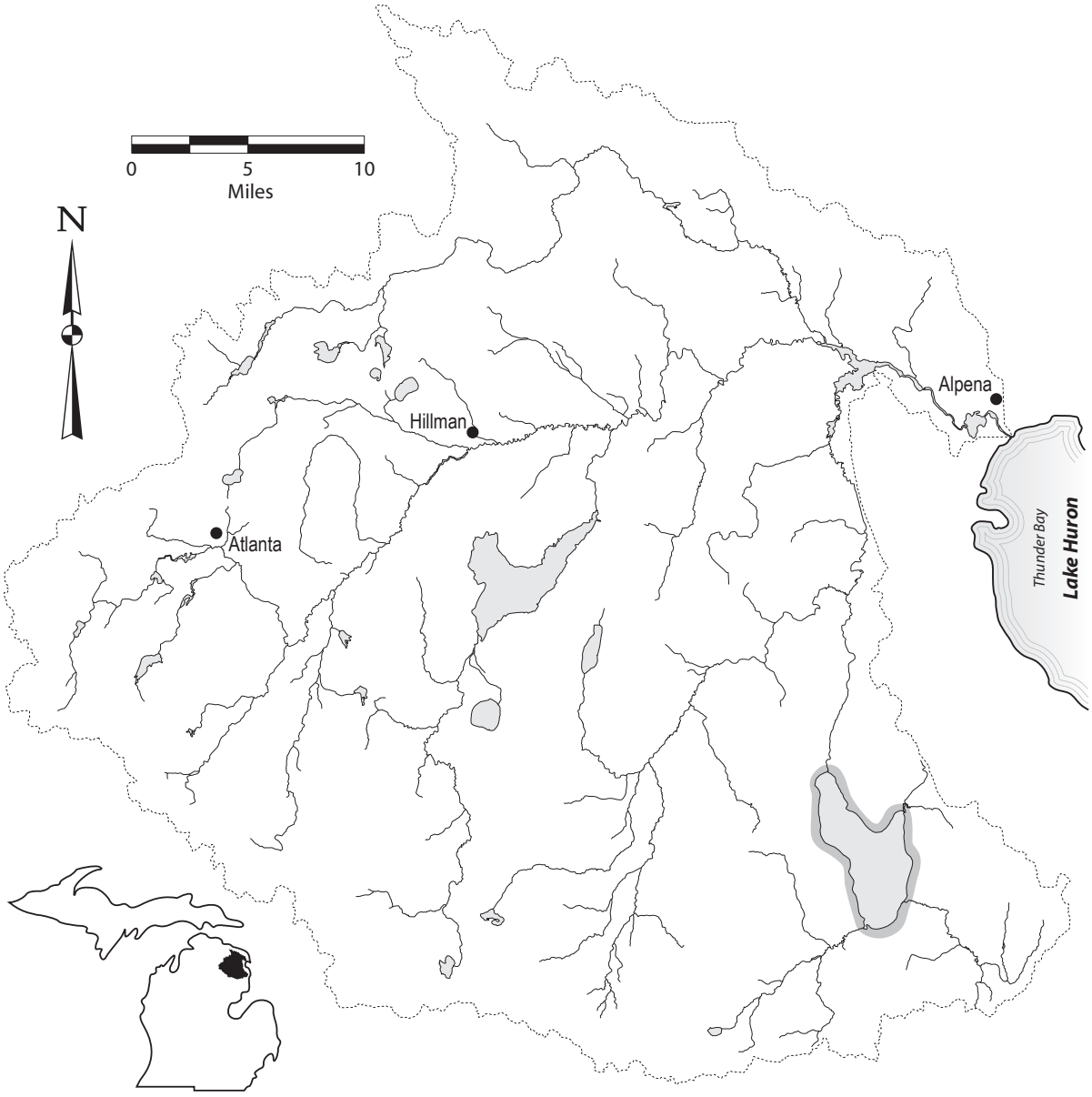


Tiger muskellunge (*Esox masquinongy* x *E. lucius*)

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

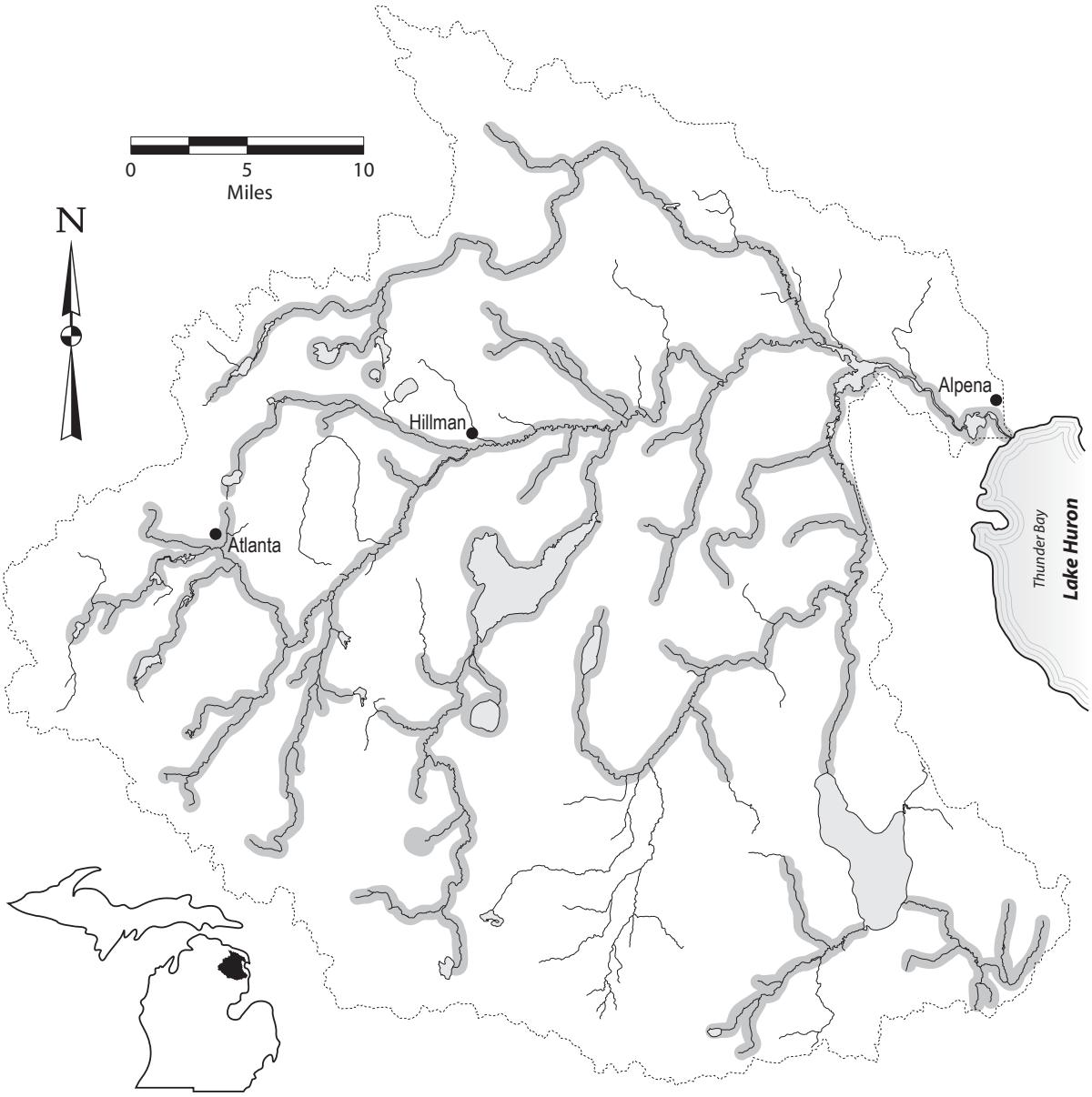


Central mudminnow (*Umbra limi*)

Habitat:

feeding - undisturbed clear, low-gradient streams or rivers and lakes and impoundments
- organic debris, muck, or peat substrates
- aquatic vegetation

spawning - floodplain areas, on vegetation



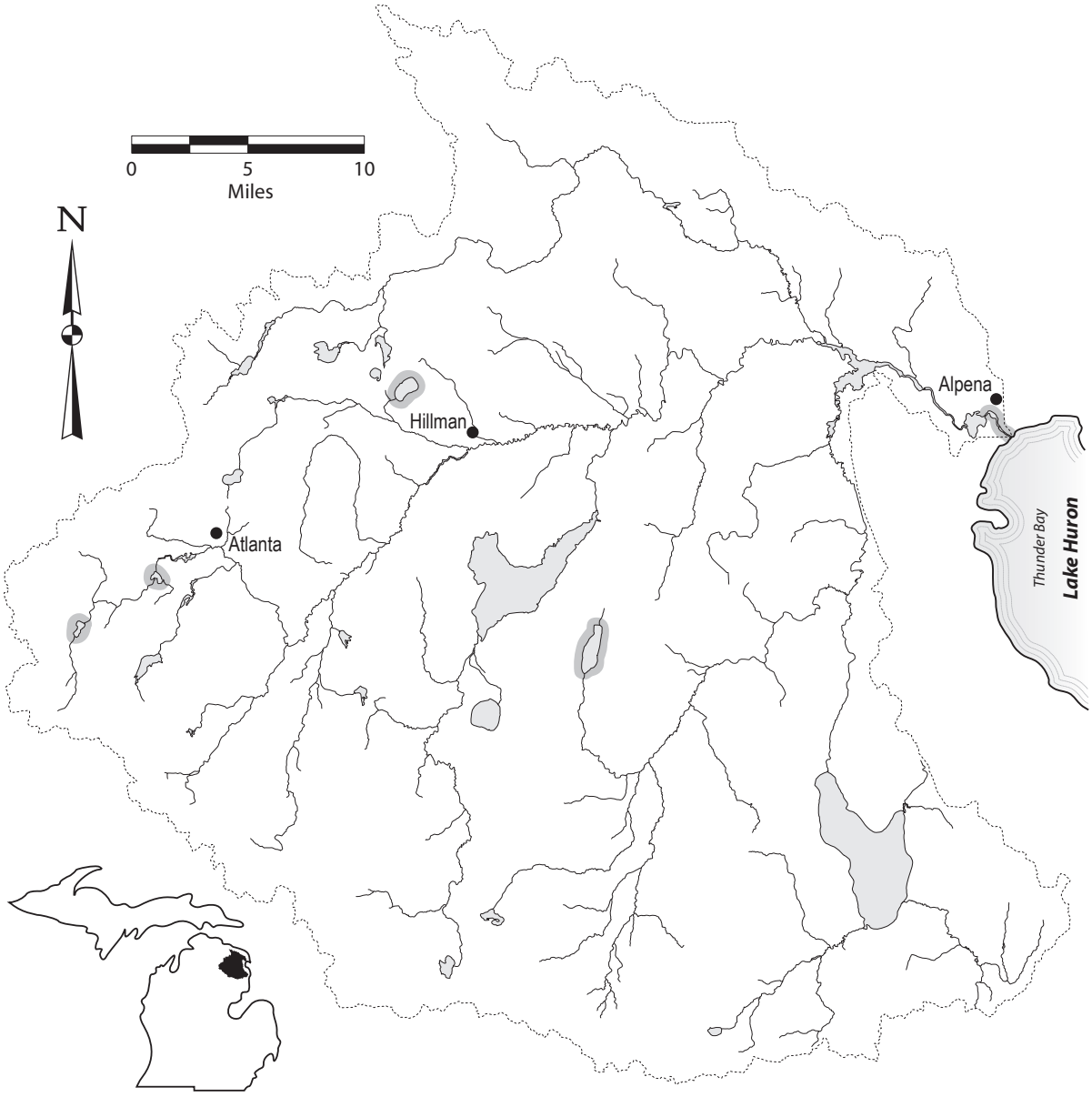
Rainbow smelt (*Osmerus mordax*)

Habitat:

feeding - young:close inshore lake habitat along sand and gravel beaches
- cold water

spawning - clear high-gradient streams or wave swept shoreline
- riffles with coarse sand or gravel substrate

winter refuge - midwaters of lakes or inshore coastal waters

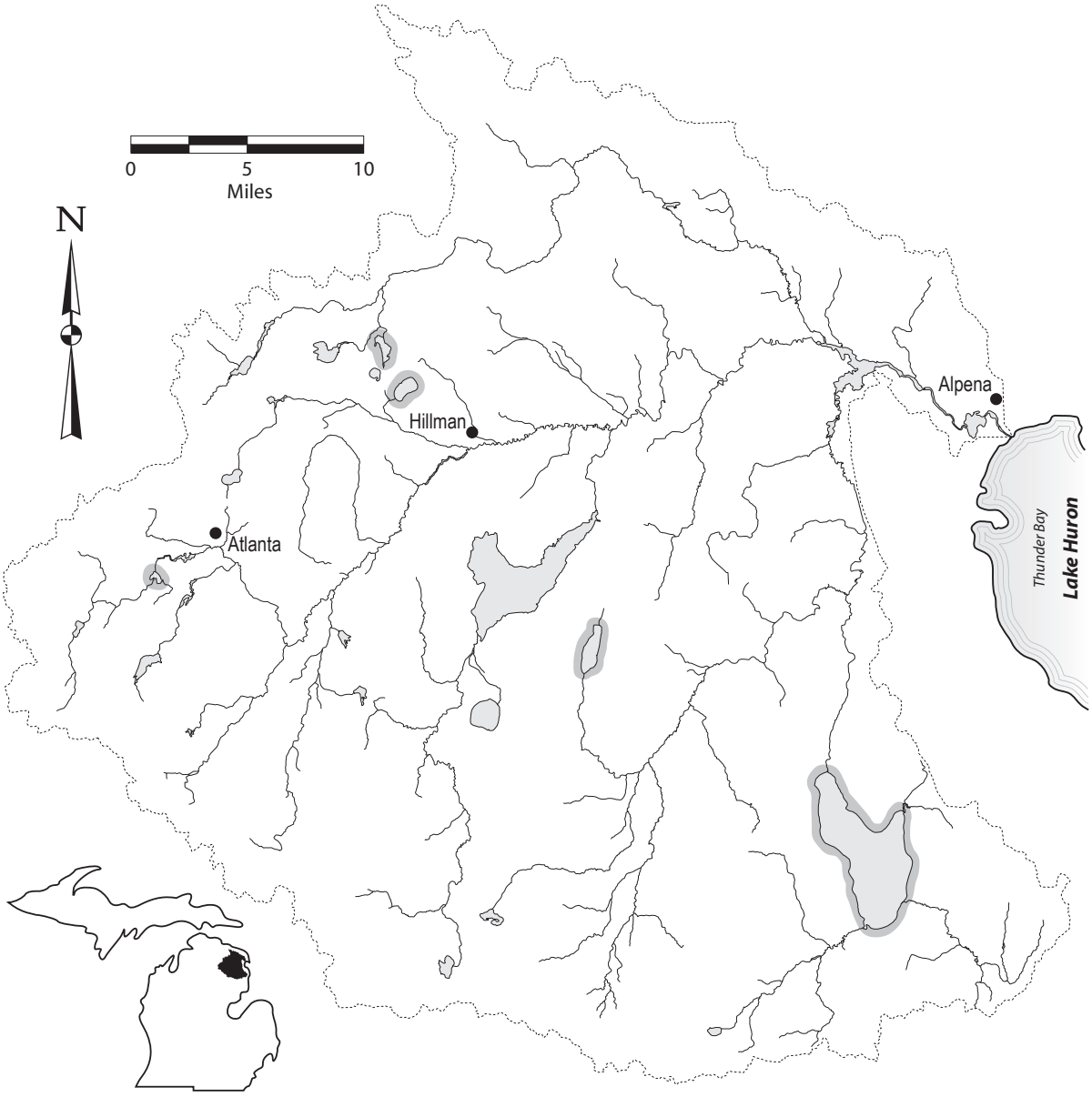


Cisco {lake herring} (*Coregonus artedi*) – threatened

Habitat:

feeding - deep cool lakes, preferably oligotrophic

spawning - usually in lakes
- 3 to 6 feet of water with no vegetation
- often over gravel or stony substrate

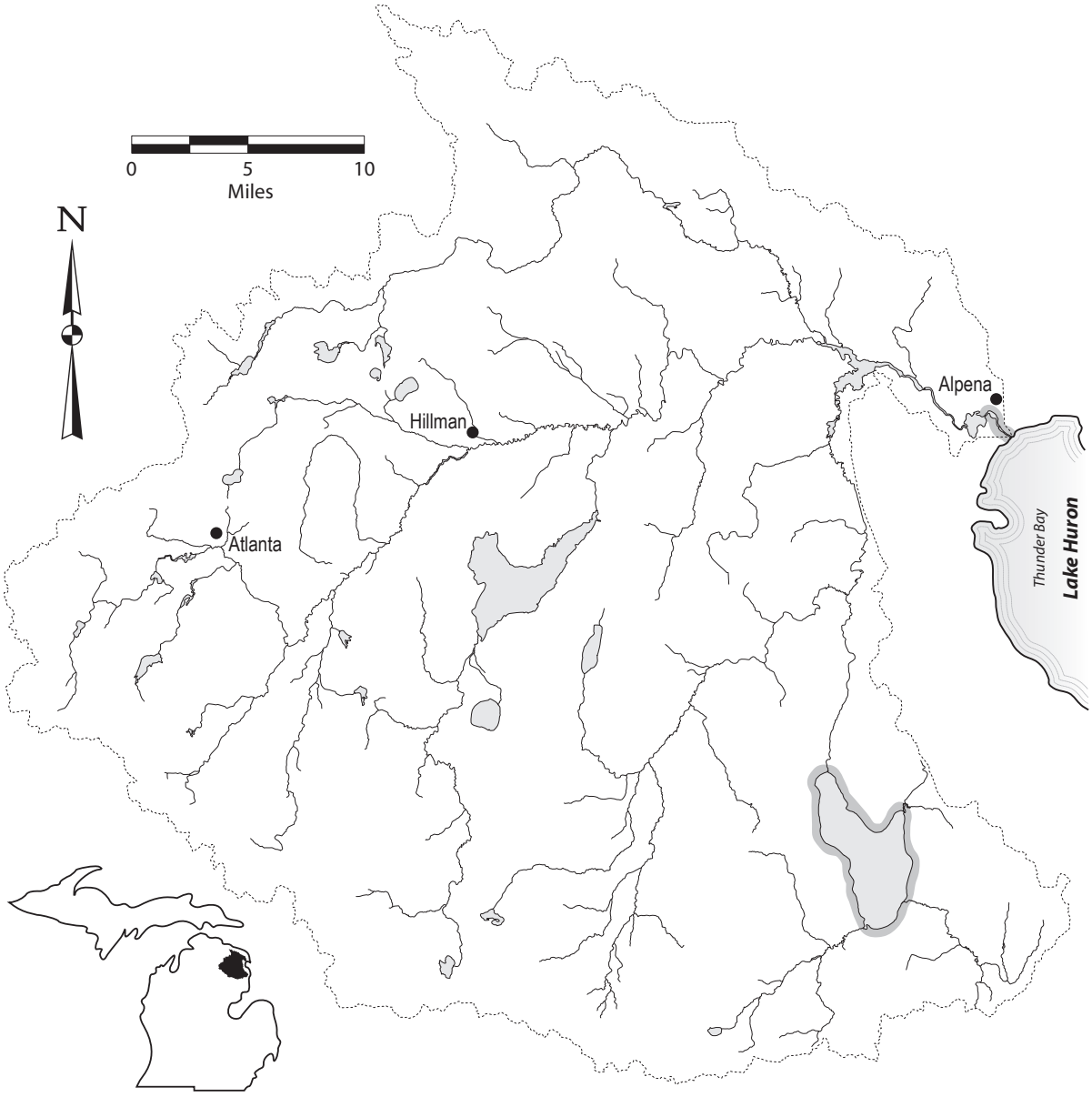


Lake whitefish (*Coregonus clupeaformis*)

Habitat:

feeding - shallow water (for coregonids; 55-105 ft.)

spawning - cold shallow water (<25 ft.)
- hard, stony, or sand substrate

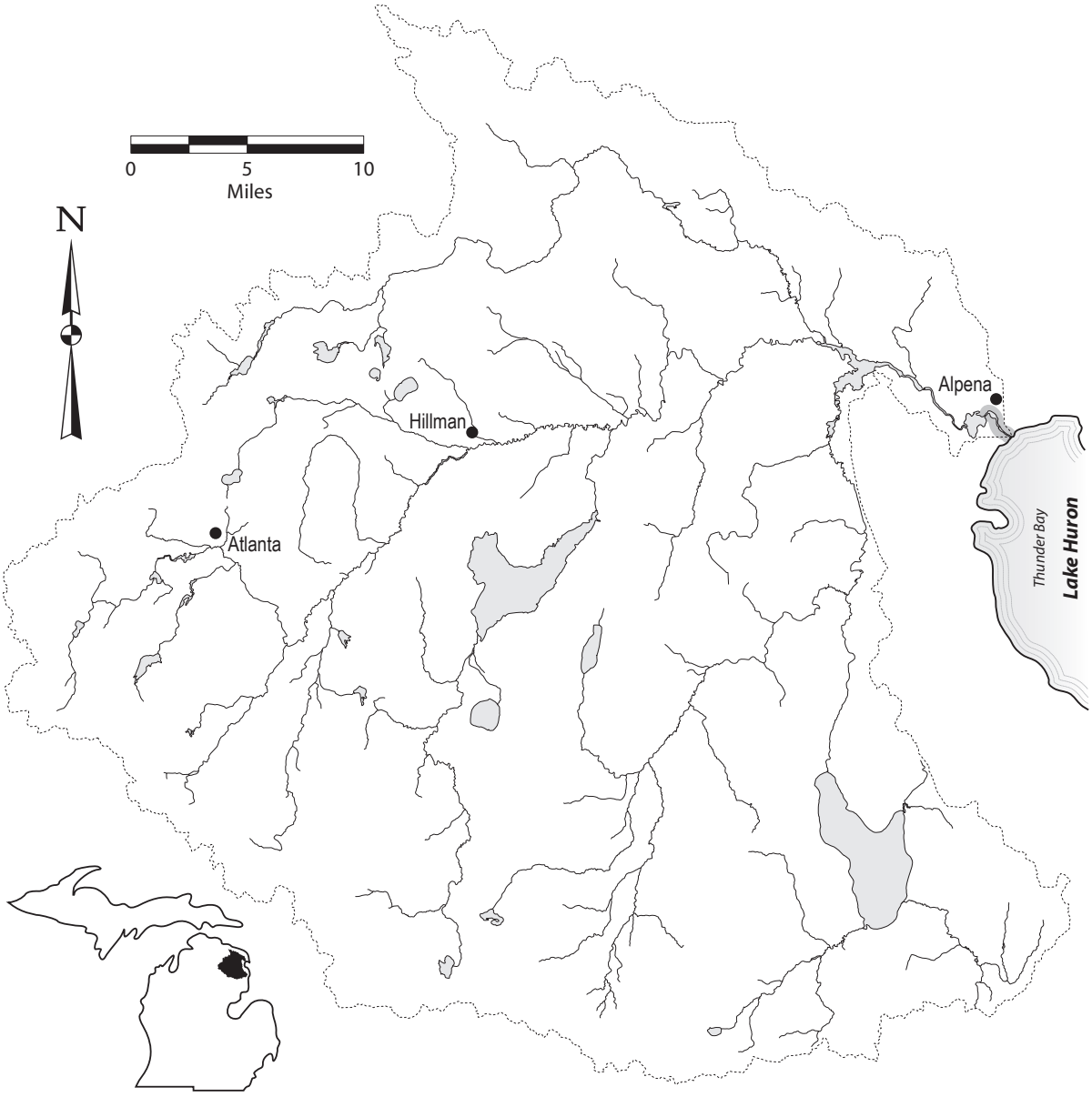


Pink salmon (*Oncorhynchus gorbuscha*)

Habitat:

feeding - large cold deep lakes - Lake Huron

spawning - gravel substrate in rivers
- female prepares and guards nest until death

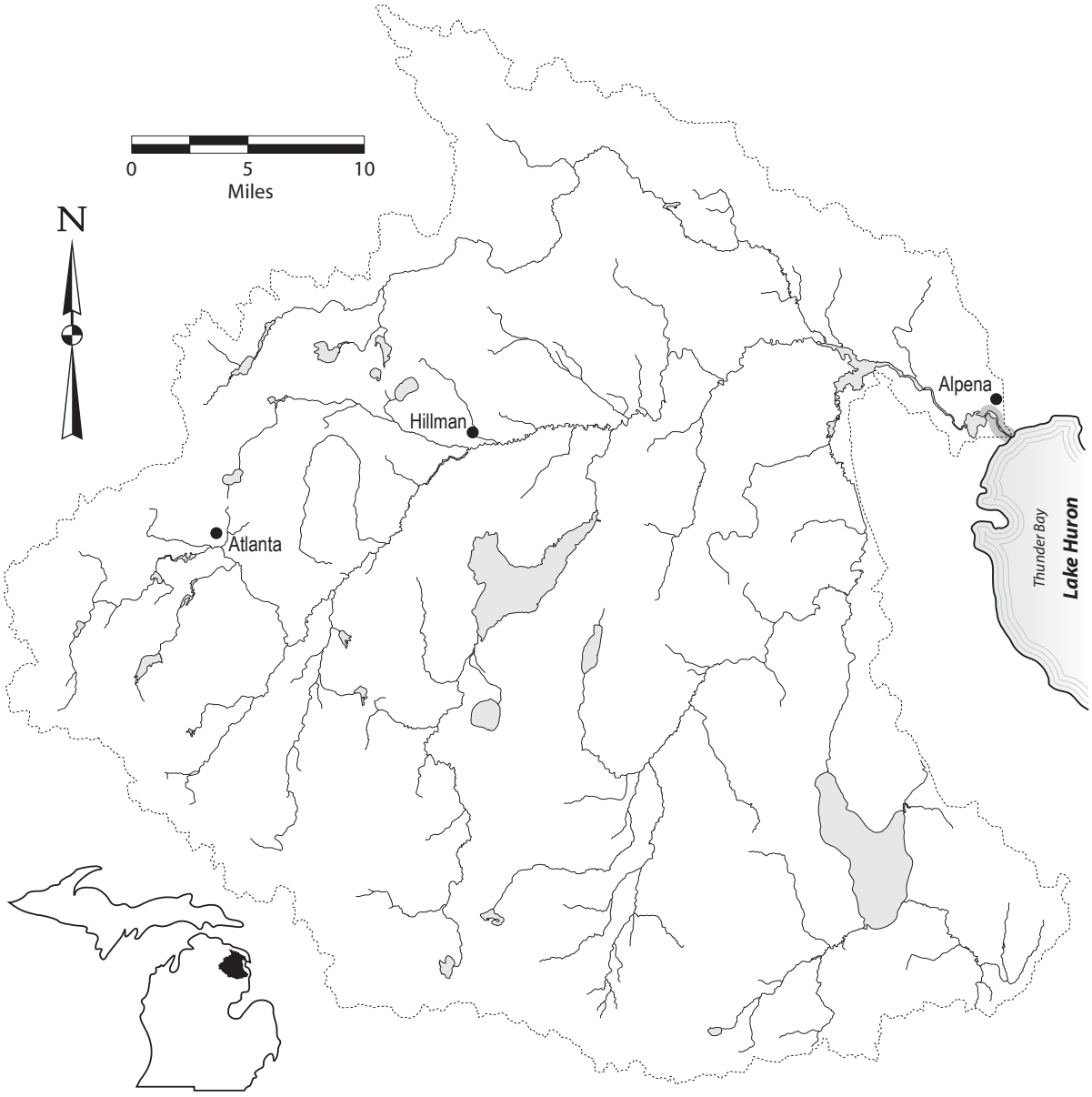


Coho salmon (*Oncorhynchus kisutch*)

Habitat:

feeding - adults: Lake Huron
- young: shallow gravel substrate in cold streams, later into pools

spawning - cold streams and rivers
- swifter water of shallow gravelly substrate

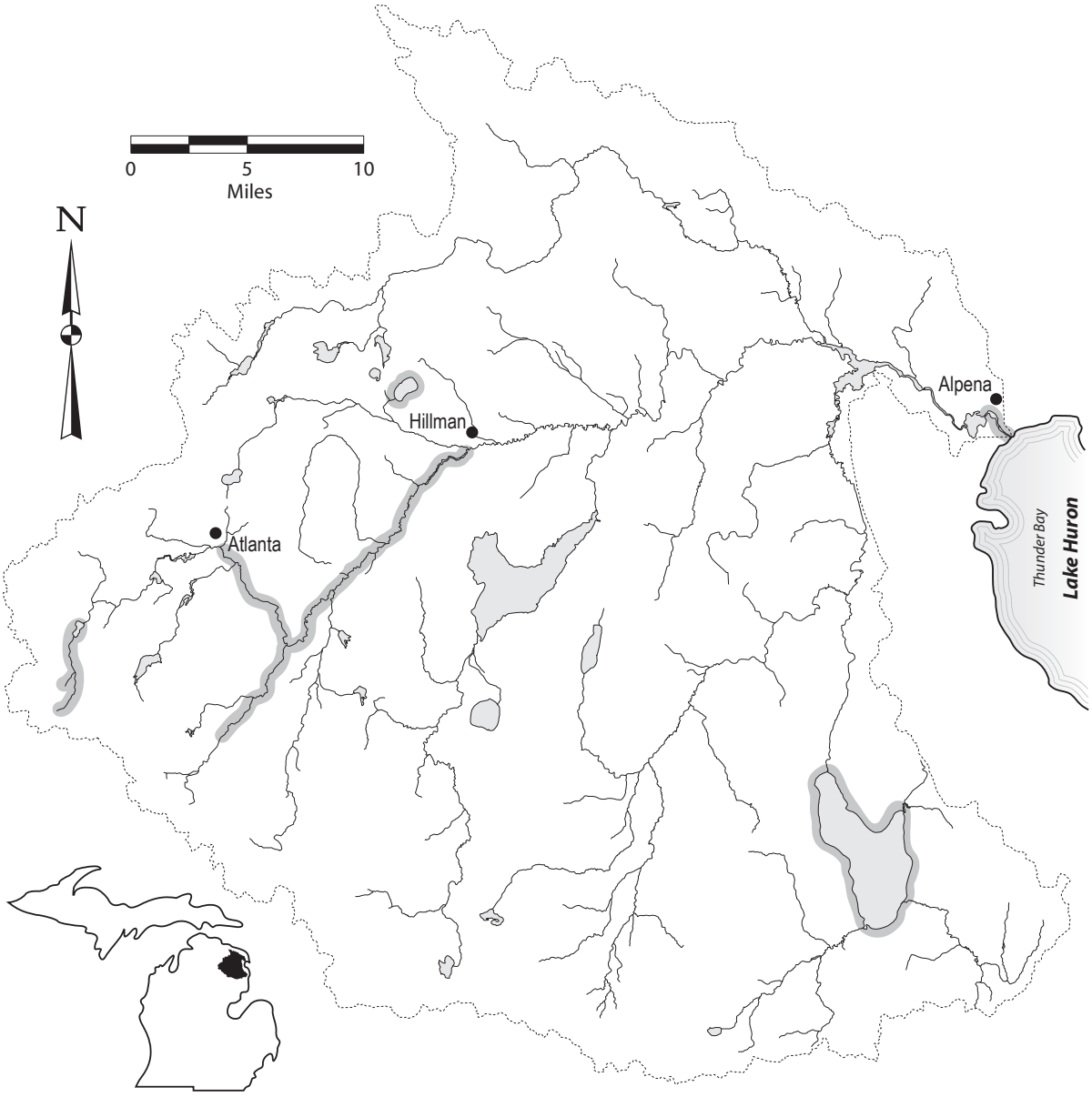


Rainbow trout (*Oncorhynchus mykiss*)

Habitat:

feeding - cold clear water of rivers and Lake Huron
- moderate current

spawning - gravelly riffles above a pool
- smaller tributaries

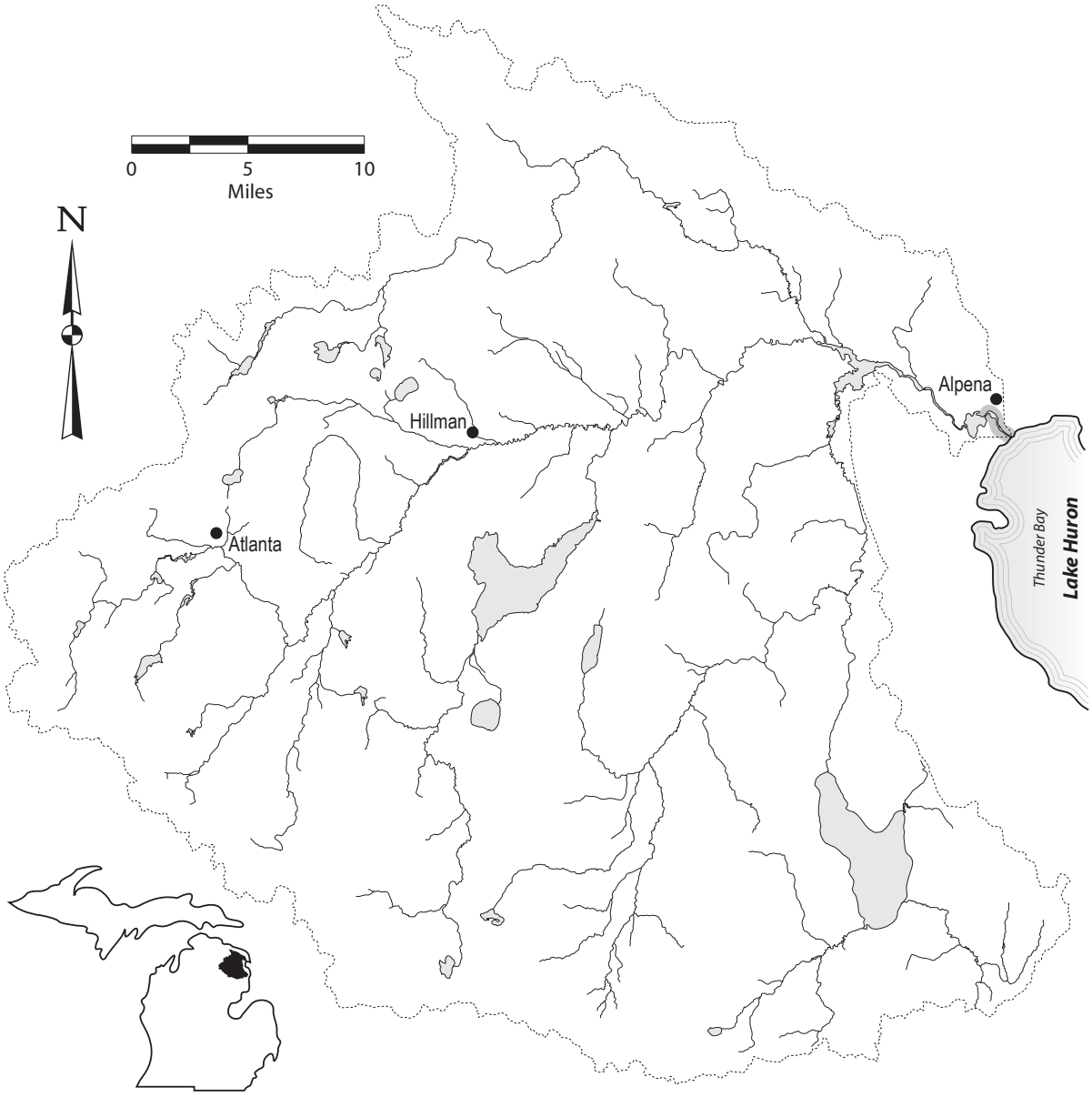


Chinook salmon (*Oncorhynchus tshawyscha*)

Habitat:

feeding - adults: Lake Huron
- young: shallow gravel substrate in cool streams, later into pools

spawning - gravelly substrate in cool streams

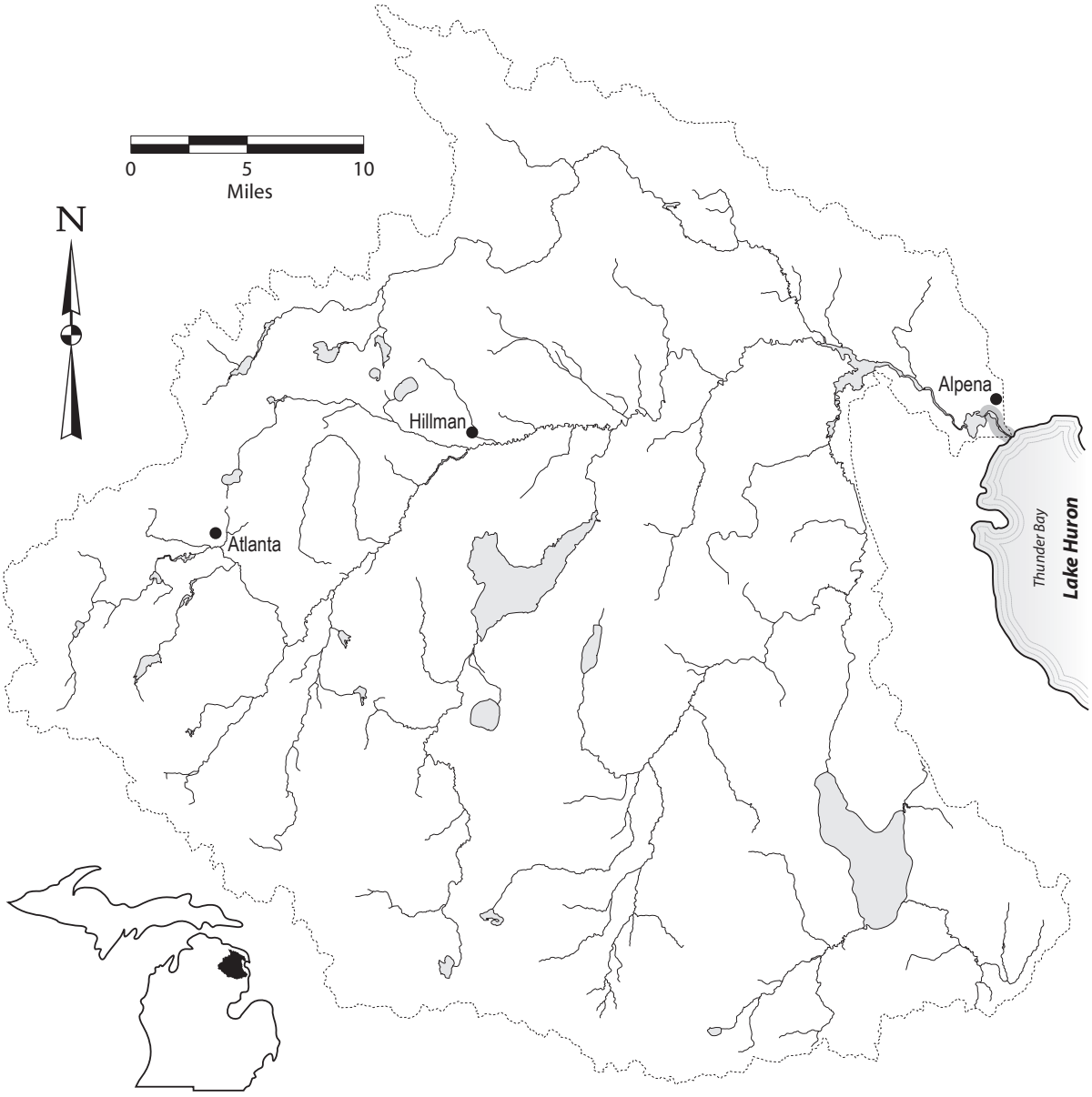


Round whitefish (*Prosopium cylindraceum*)

Habitat:

feeding - lakes, rivers, and streams

spawning - shallows of lakes and rivers
- gravel or rock substrate

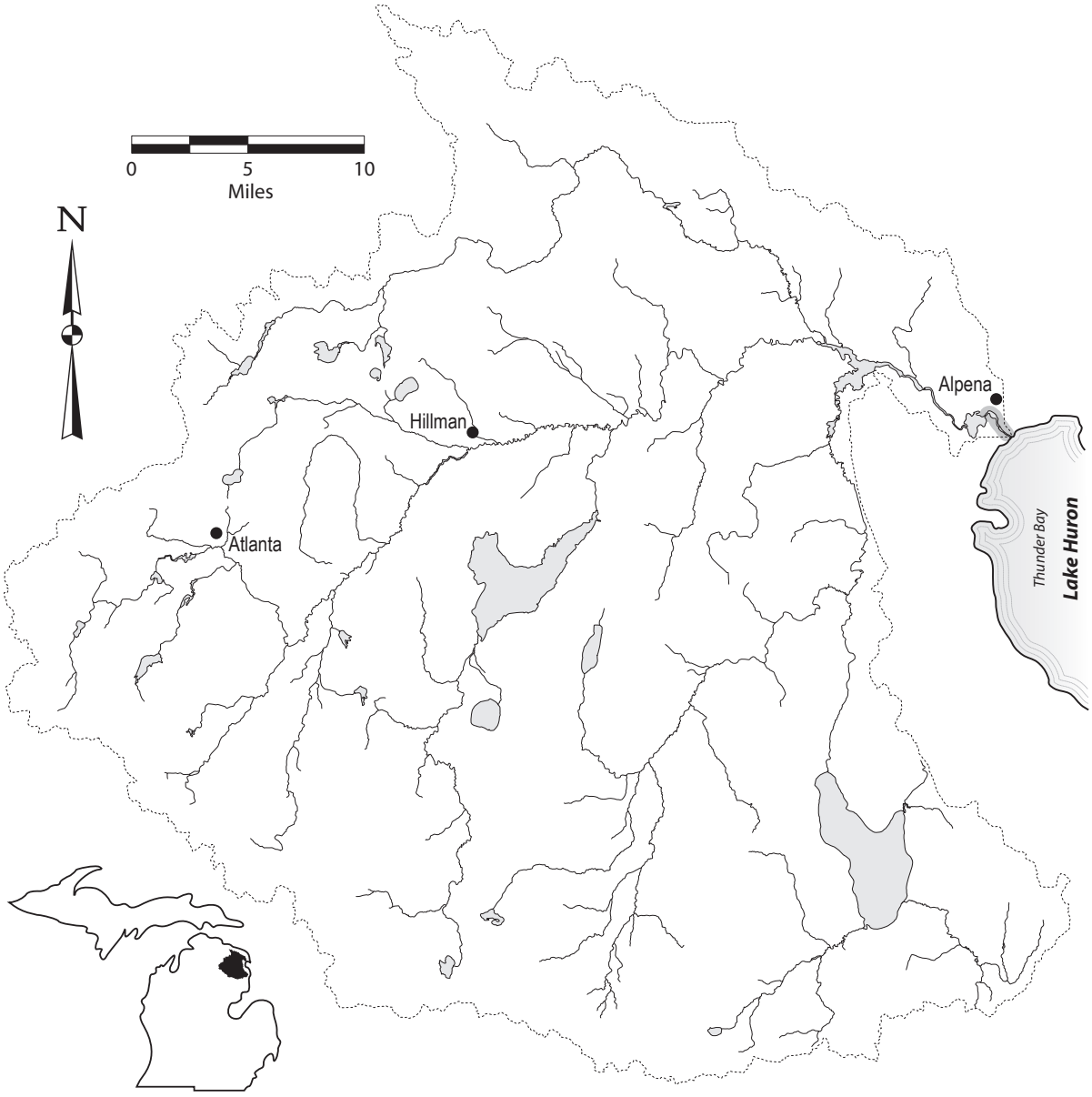


Atlantic salmon (*Salmo salar*)

Habitat:

feeding - young: gravel substrate streams
- adults: Lake Huron

spawning - streams and rivers
- nests in gravel substrate
- swift current

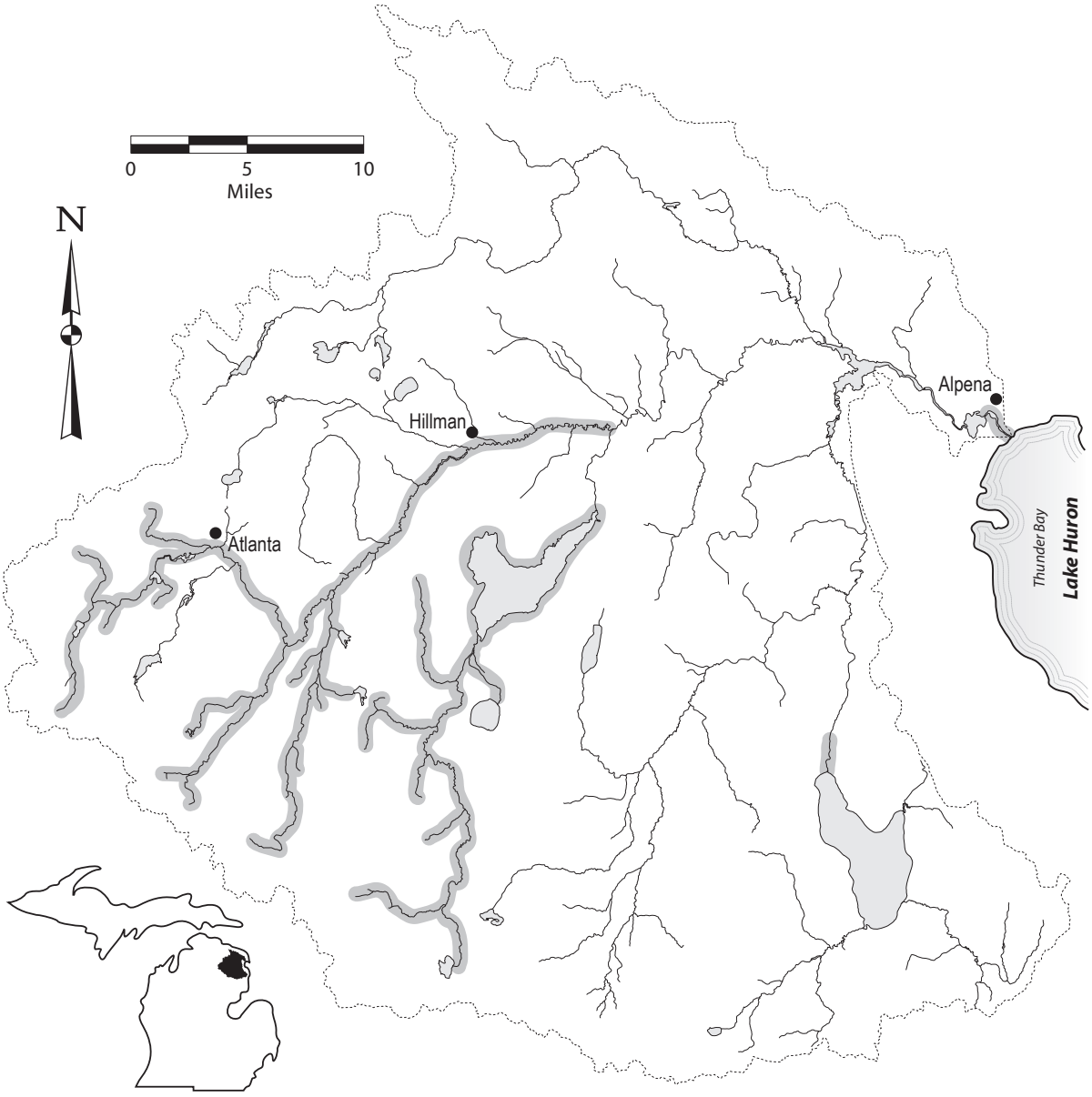


Brown trout (*Salmo trutta*)

Habitat:

feeding
- cold, clear streams, rivers, and lakes (not >70°F)
- medium to swift current in streams
- does not tolerate silt well
- prefers few individuals and species around
- abundance of aquatic and land insects

spawning
- gravelly riffles; shallow headwater areas

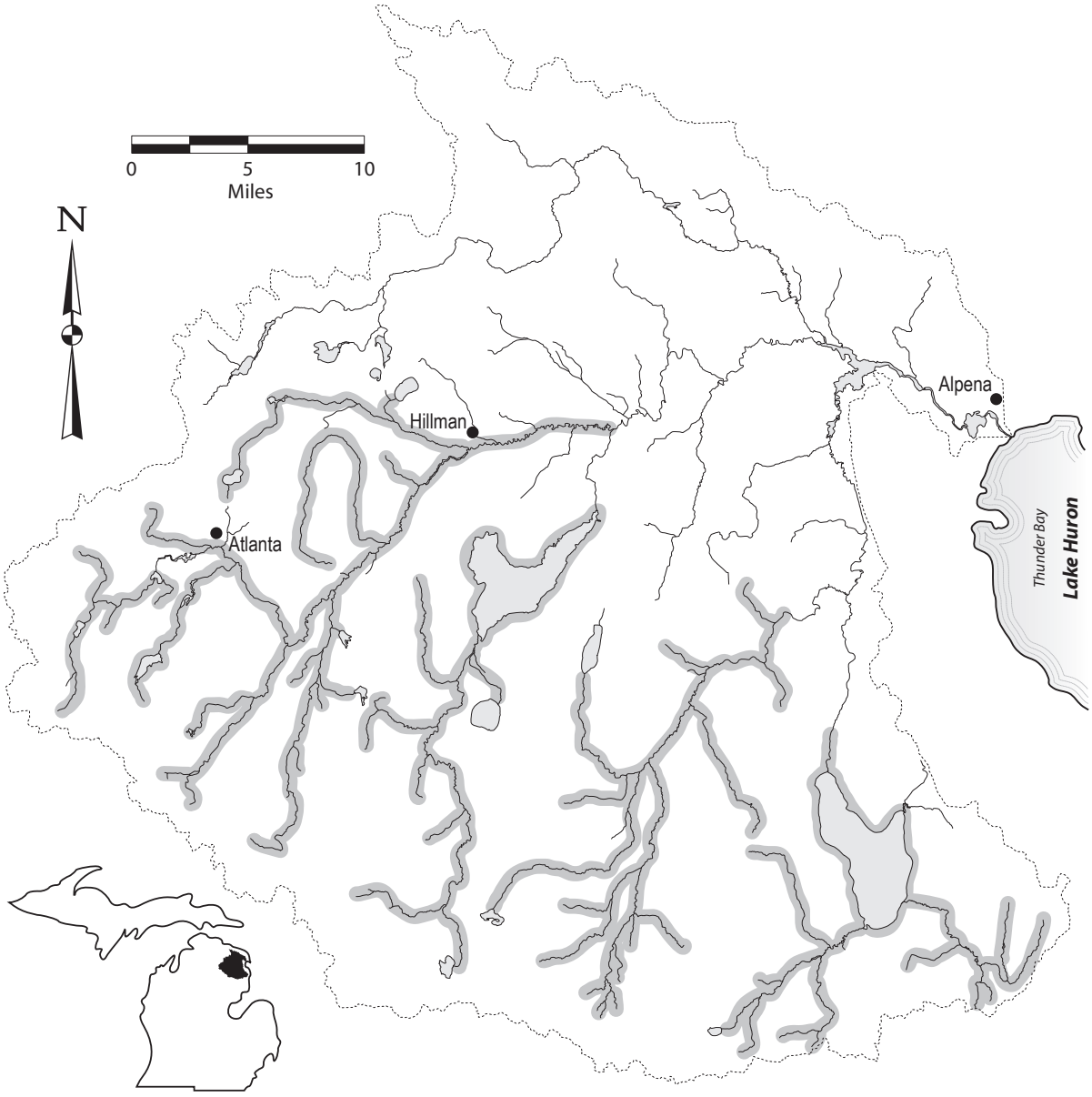


Brook trout (*Salvelinus fontinalis*)

Habitat:

feeding - cold, clear streams, rivers, and lakes (not >65°F)
- low current
- well oxygenated water

spawning - gravelly riffles; shallow or headwater streams

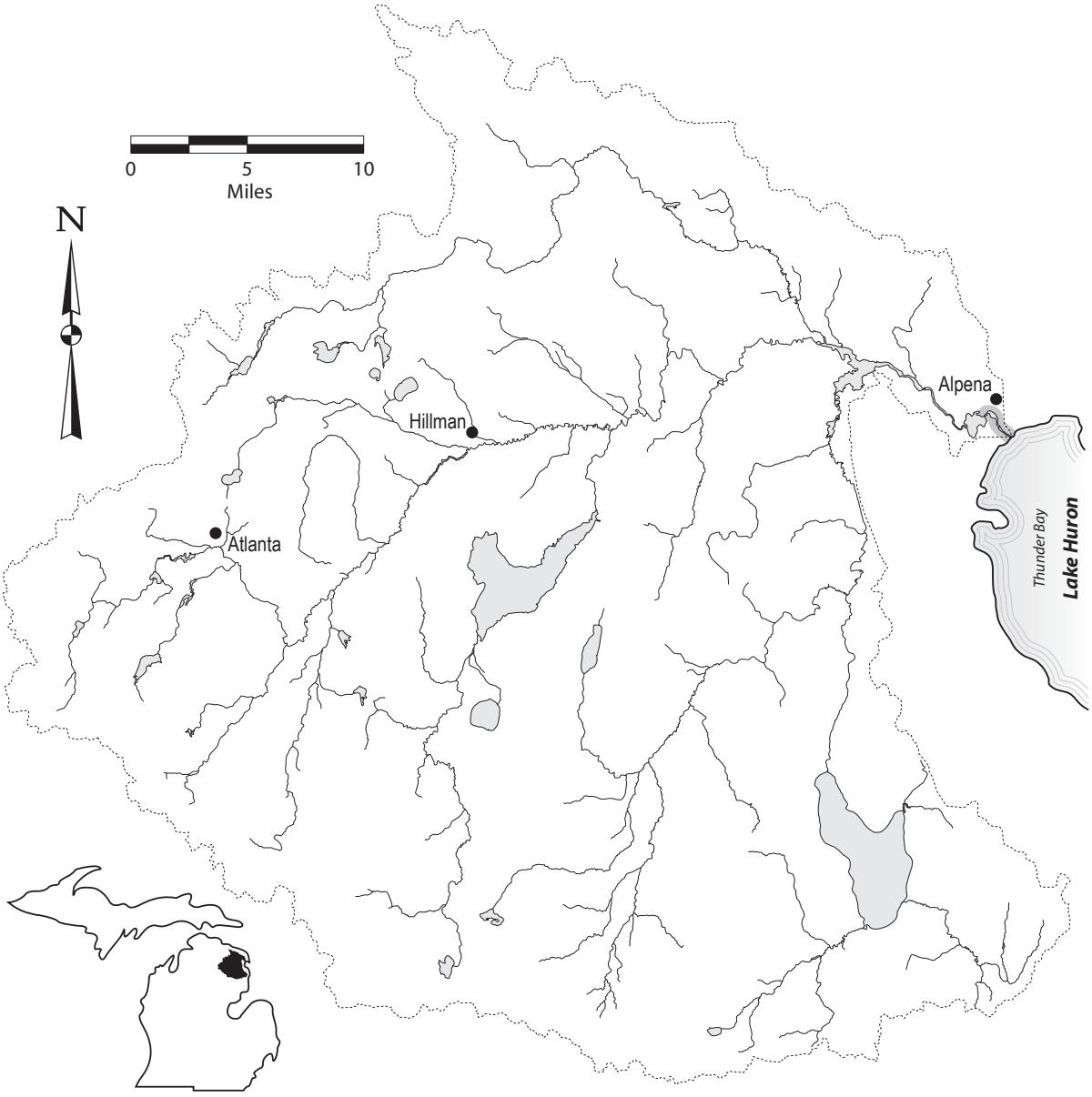


Lake trout (*Salvelinus namaycush*)

Habitat:

feeding - cold lakes and rivers

spawning - large boulder or rubble substrate
- shallow water of lakes and rivers

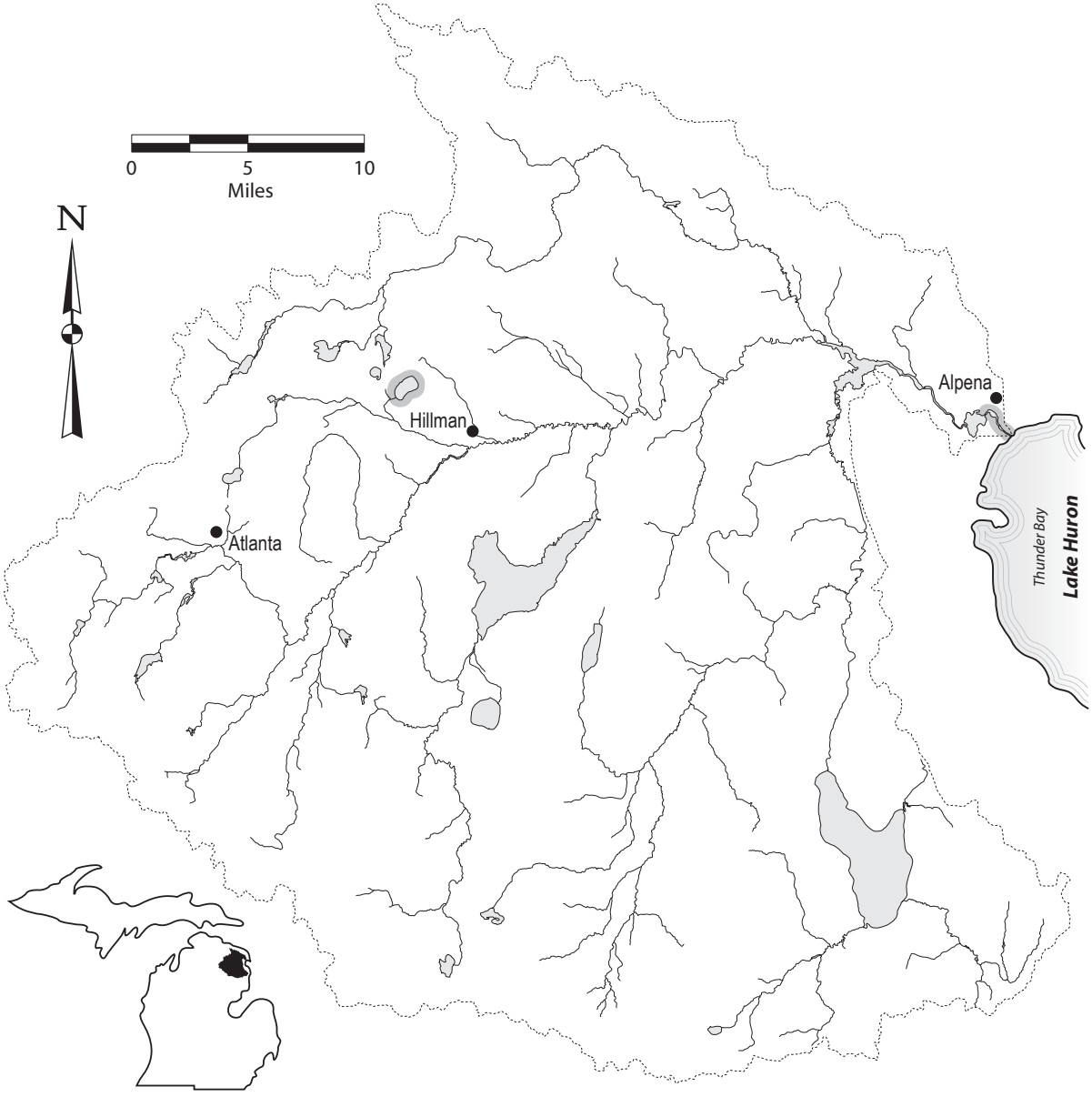


Splake (*Salvelinus fontinalis* x *Salvelinus namaycush*)

Habitat:

feeding - littoral habitat
- cool water lakes; also Lake Huron

spawning - hatchery produced cross of brook and lake trout
- offspring usually fertile, but with lower fecundity than either parent species

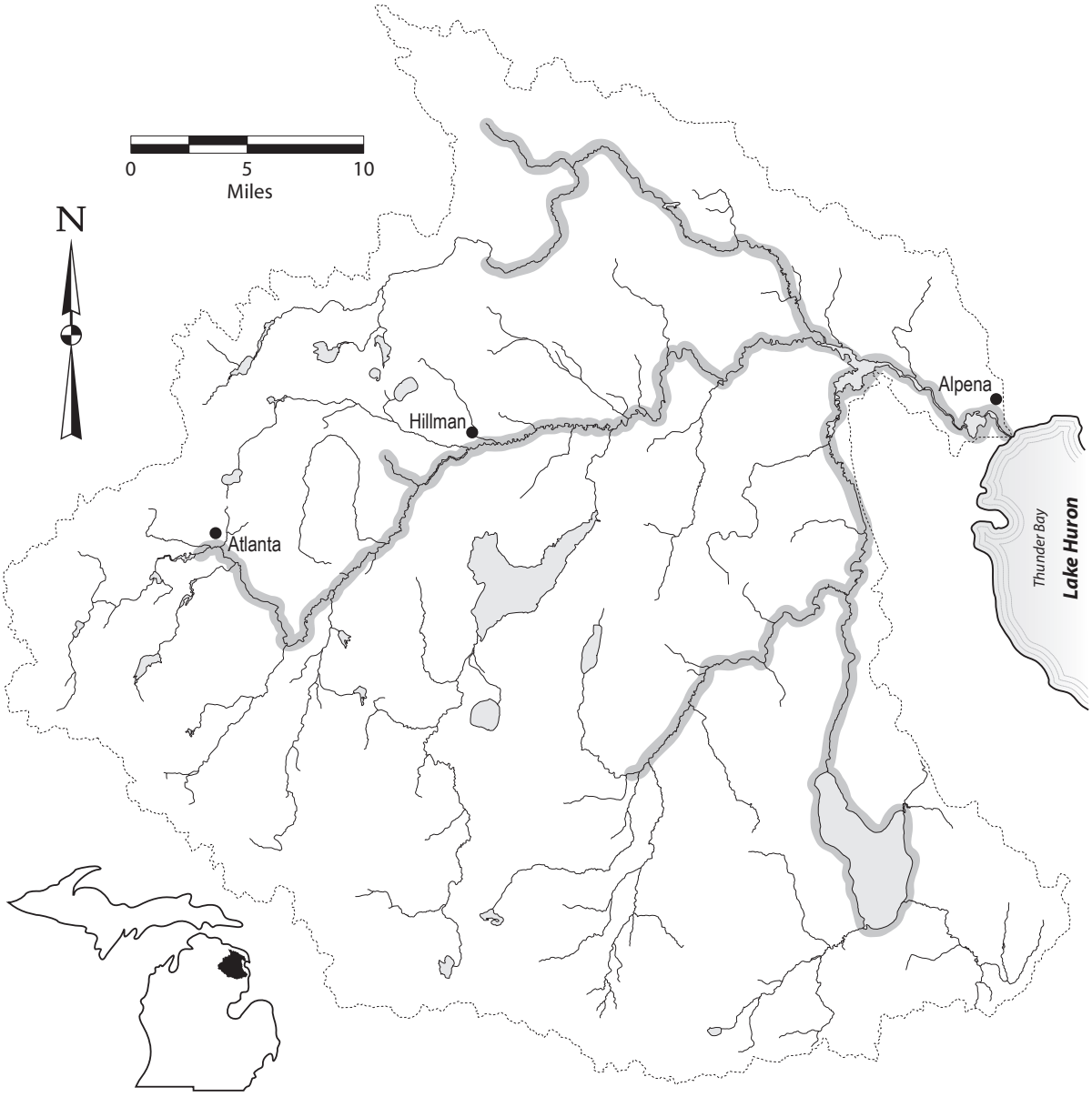


Burbot (*Lota lota*)

Habitat:

feeding - deep cold lakes and large cool rivers
- mud, sand, rubble, boulder, silt, and gravel substrates

spawning - in 1 to 4 feet of water in shallow bays or on shoals 5-10 feet deep usually in lakes, sometimes rivers
- over sand or gravel substrate
- under ice

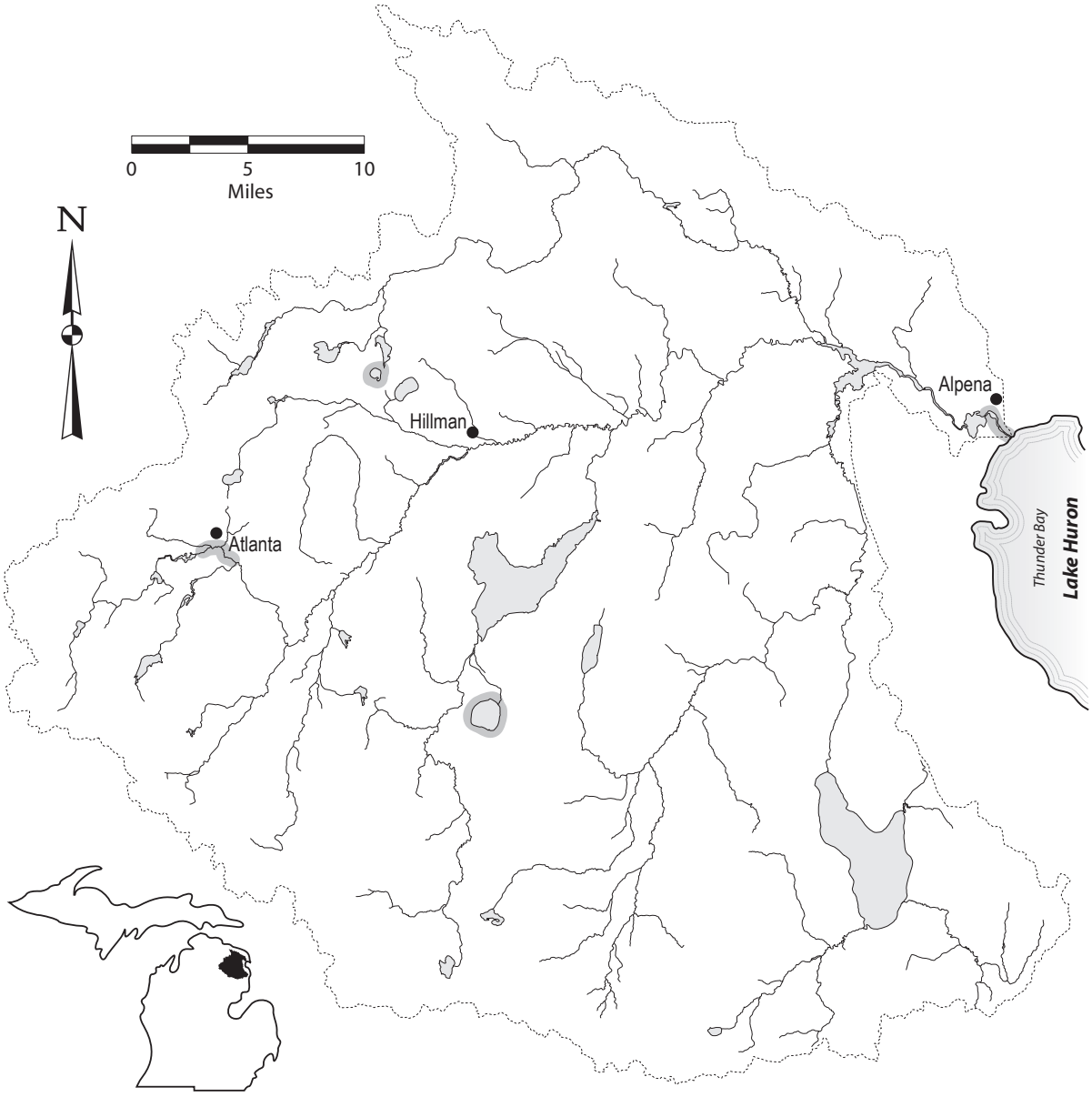


Western banded killifish (*Fundulus diaphanus*)

Habitat:

feeding - quiet backwaters at the mouths of streams and lakes
- substrate of sand, gravel, and a few boulders
- also found over detritus substrate where patches of submerged aquatic vegetation are present

spawning - quiet areas of weedy pools

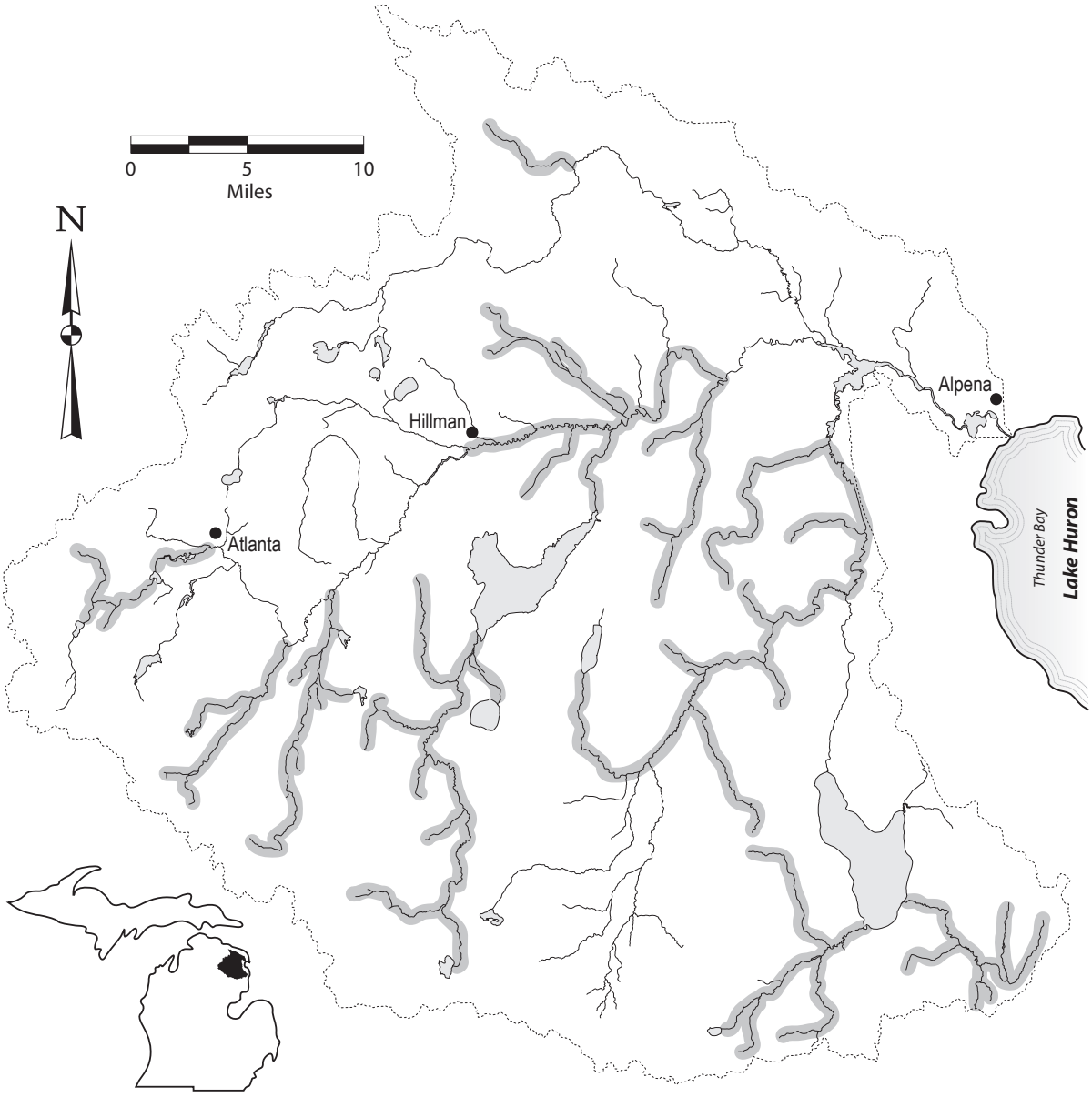


Brook stickleback (*Cluaea inconstans*)

Habitat:

feeding
- clear, cold, densely vegetated streams, and swampy margins of lakes
- low gradient
- muck, peat, or marl substrate
- not tolerant of turbidity

spawning
- shallow cool (<66°F) water
- aquatic reeds or grasses necessary

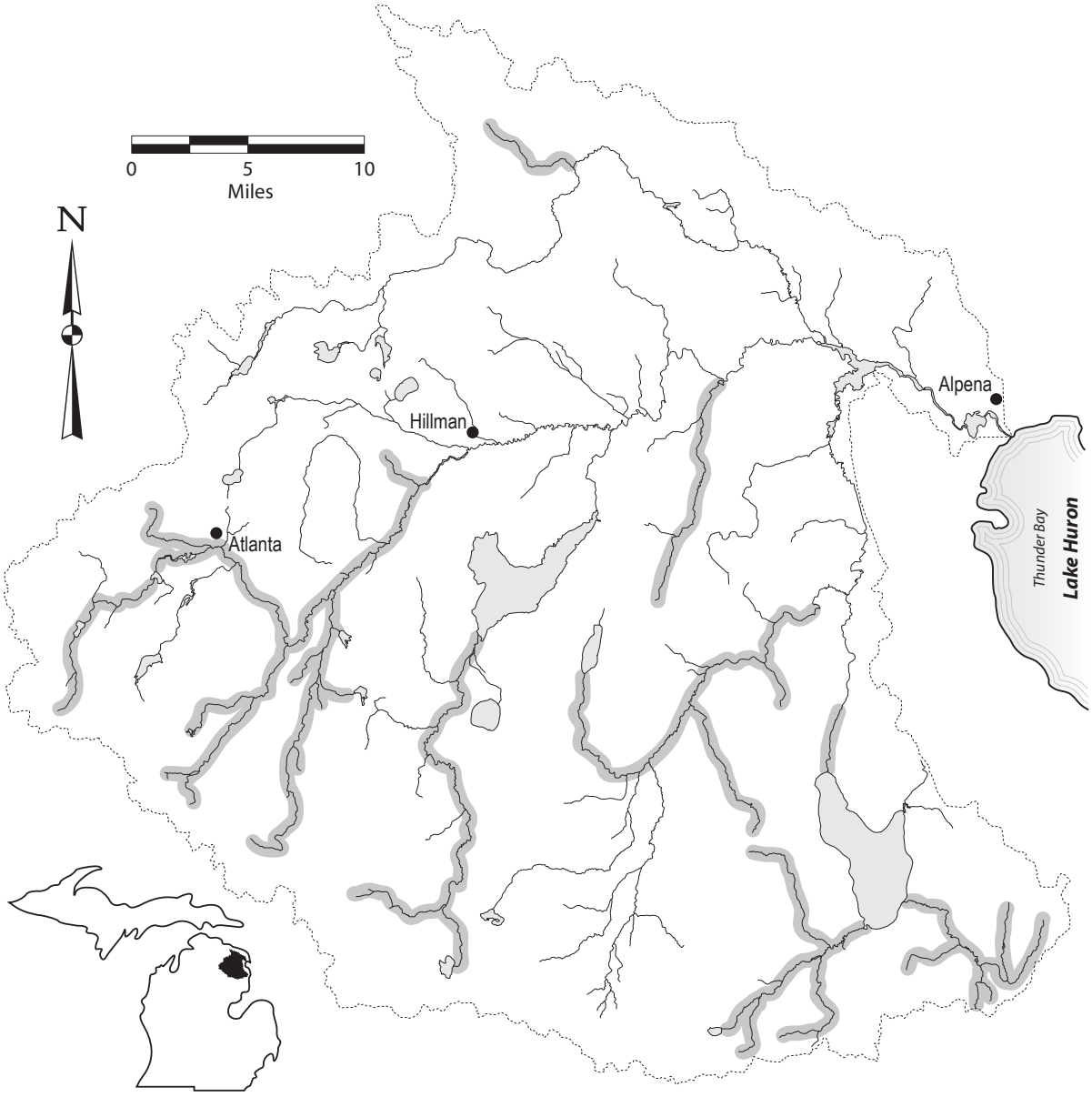


Mottled sculpin (*Cottus bairdi*)

Habitat:

feeding - cool to cold streams
- riffle and rock substrates preferred
- clear to slightly turbid shallow water

spawning - nests under logs or rock

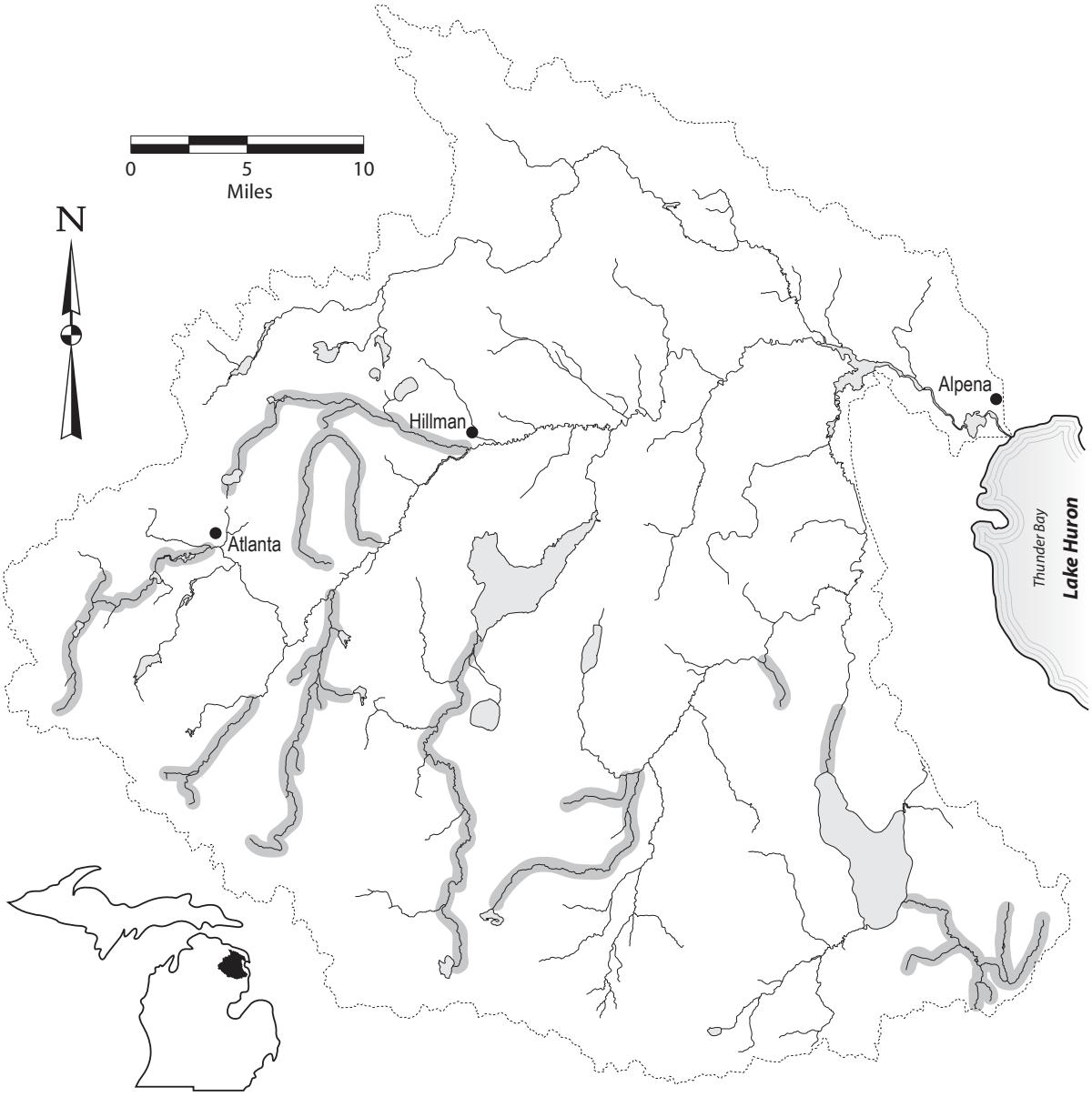


Slimy sculpin (*Cottus cognatus*)

Habitat:

feeding - cool lakes,impoundments,rivers,and streams
- gravel or rock substrate

spawning - nest in shallow areas of lakes
- gravel substrate or rock ledge
- male parental care



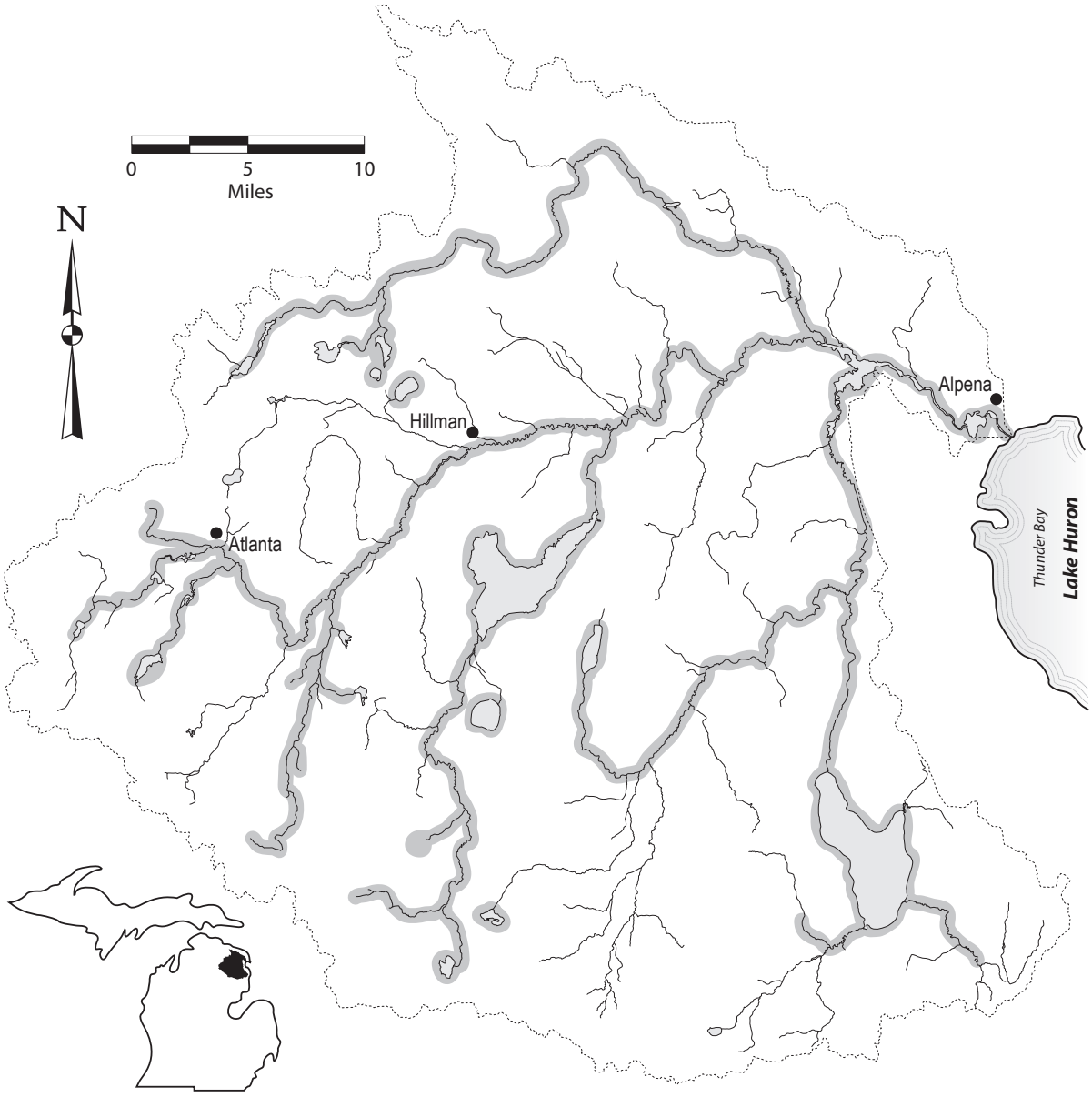
Rock bass (*Ambloplites rupestris*)

Habitat:

feeding
- clear, cool streams, rivers, and lakes
- rocky to sand substrate
- woody or vegetative cover

spawning
- sand or gravel nests
- shallow water

winter refuge
- deep water

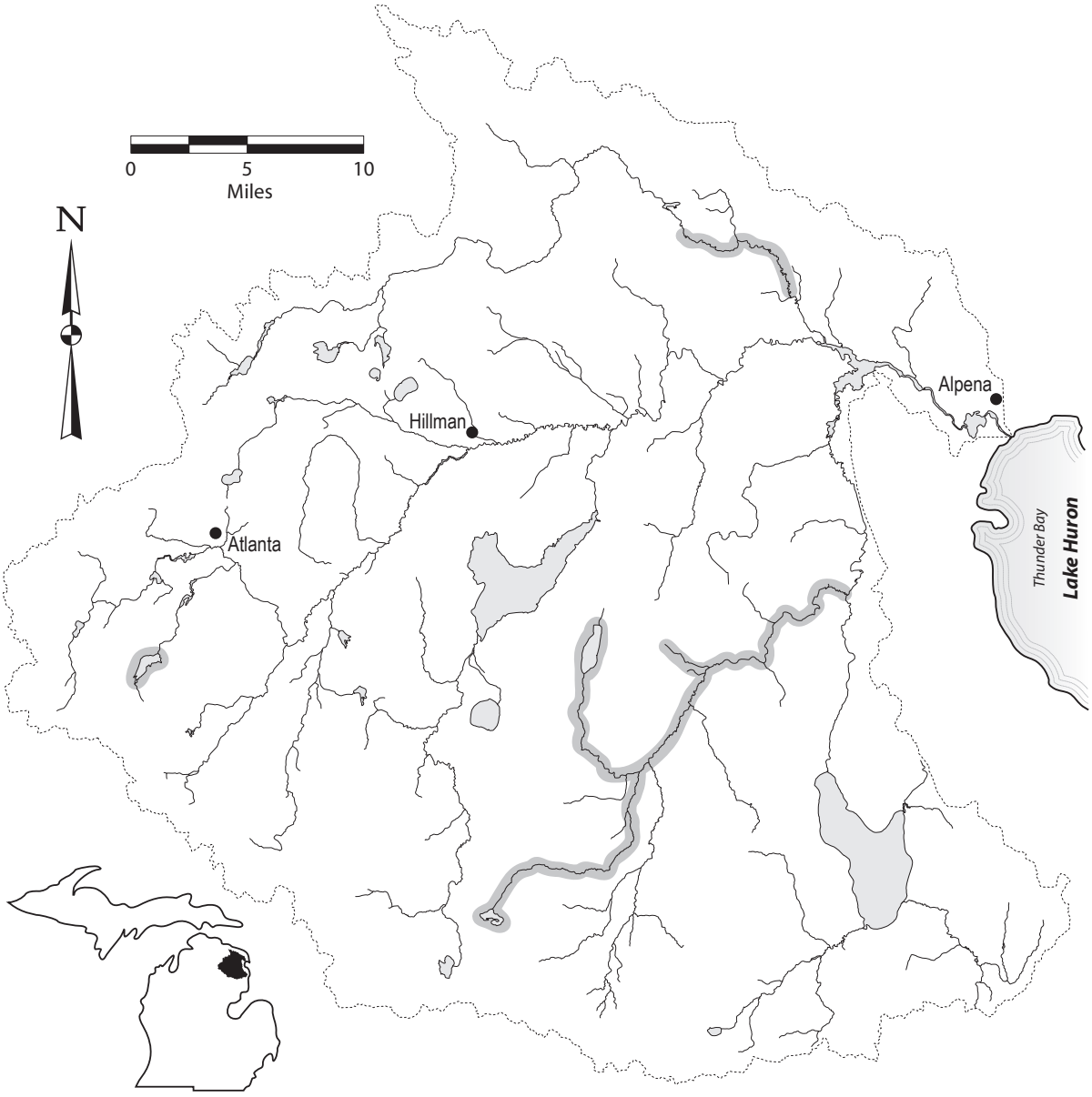


Green sunfish (*Lepomis cyanellus*)

Habitat:

feeding - impoundments and lakes, and low-current streams and rivers
- no substrate preference

spawning - nests in shallow areas sheltered by rocks, logs, or aquatic vegetation

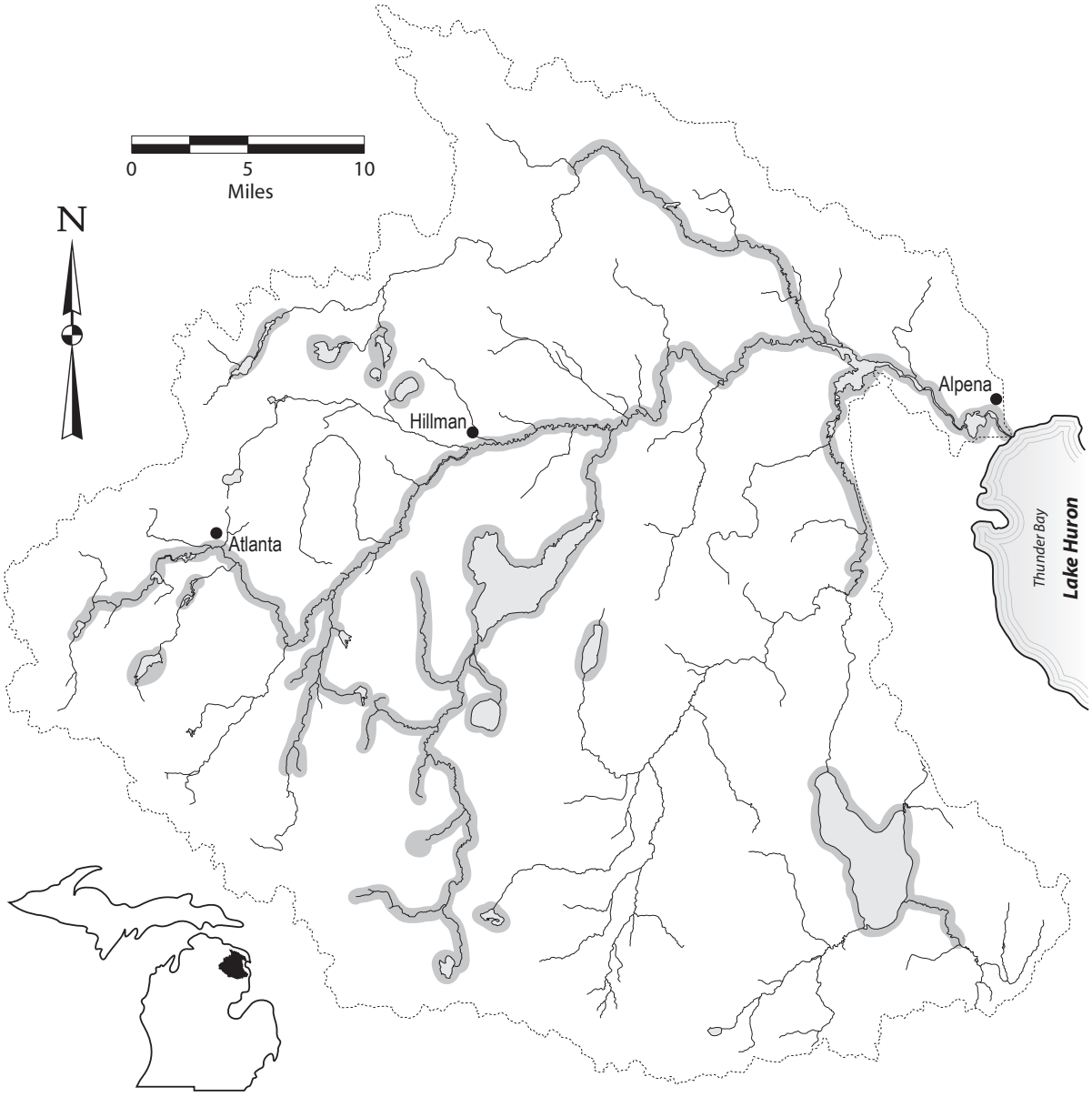


Pumpkinseed sunfish (*Lepomis gibbosus*)

Habitat:

feeding
- non-flowing clear water in streams and rivers; also lakes and impoundments
- muck or sand partly covered with organic debris substrate
- dense beds of submerged aquatic vegetation

spawning
- nest in sand, gravel, or rock substrate
- in shallow water near submerged vegetation



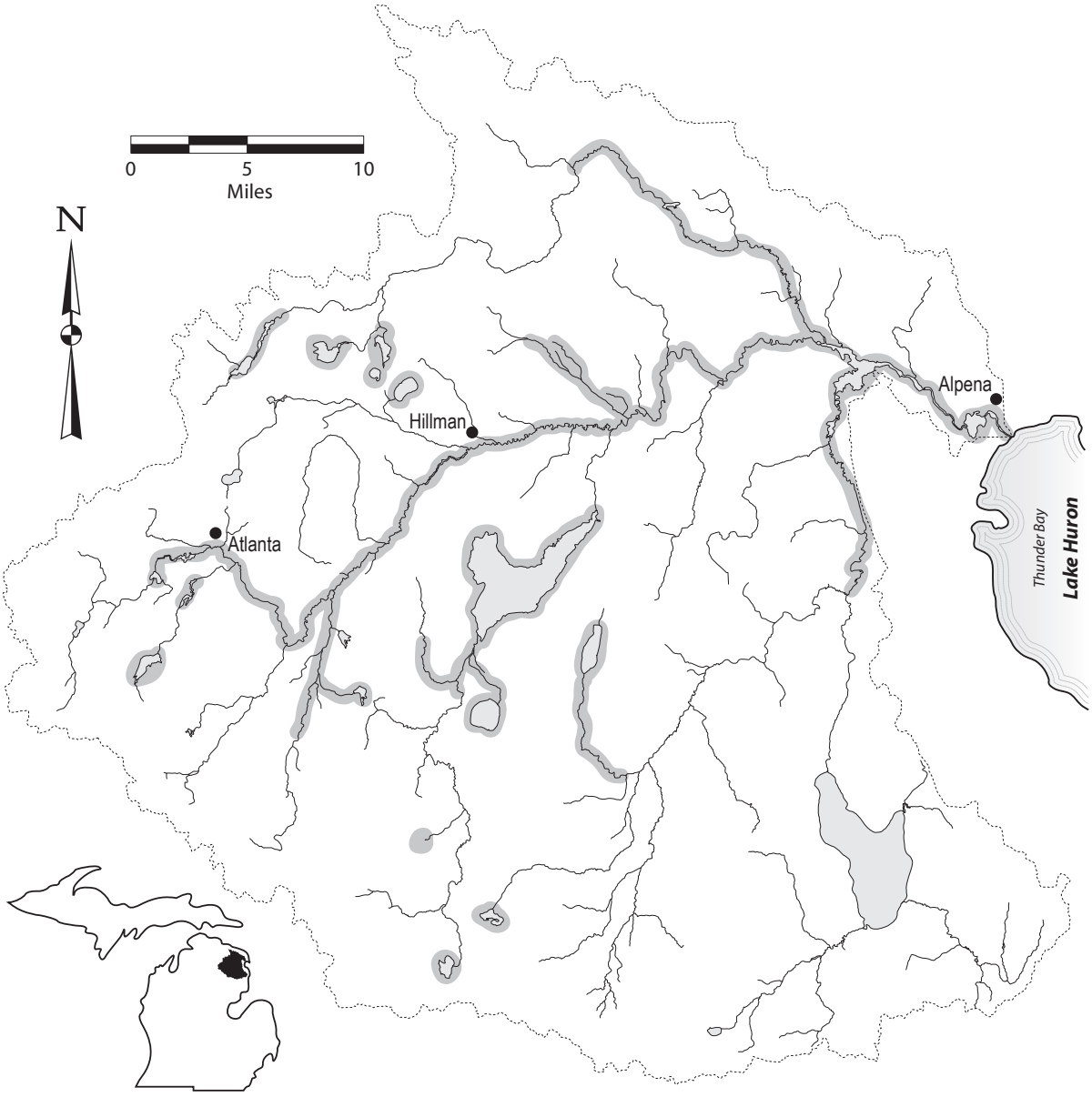
Bluegill (*Lepomis macochrius*)

Habitat:

feeding - non-flowing clear streams and rivers; also lakes and impoundments
- sand, gravel, or muck containing organic debris substrate
- scattered beds of aquatic vegetation
- cannot tolerate low oxygen or continuous high turbidity and siltation

spawning - nests in firm substrate of gravel, sand, or mud

winter refuge - deep water

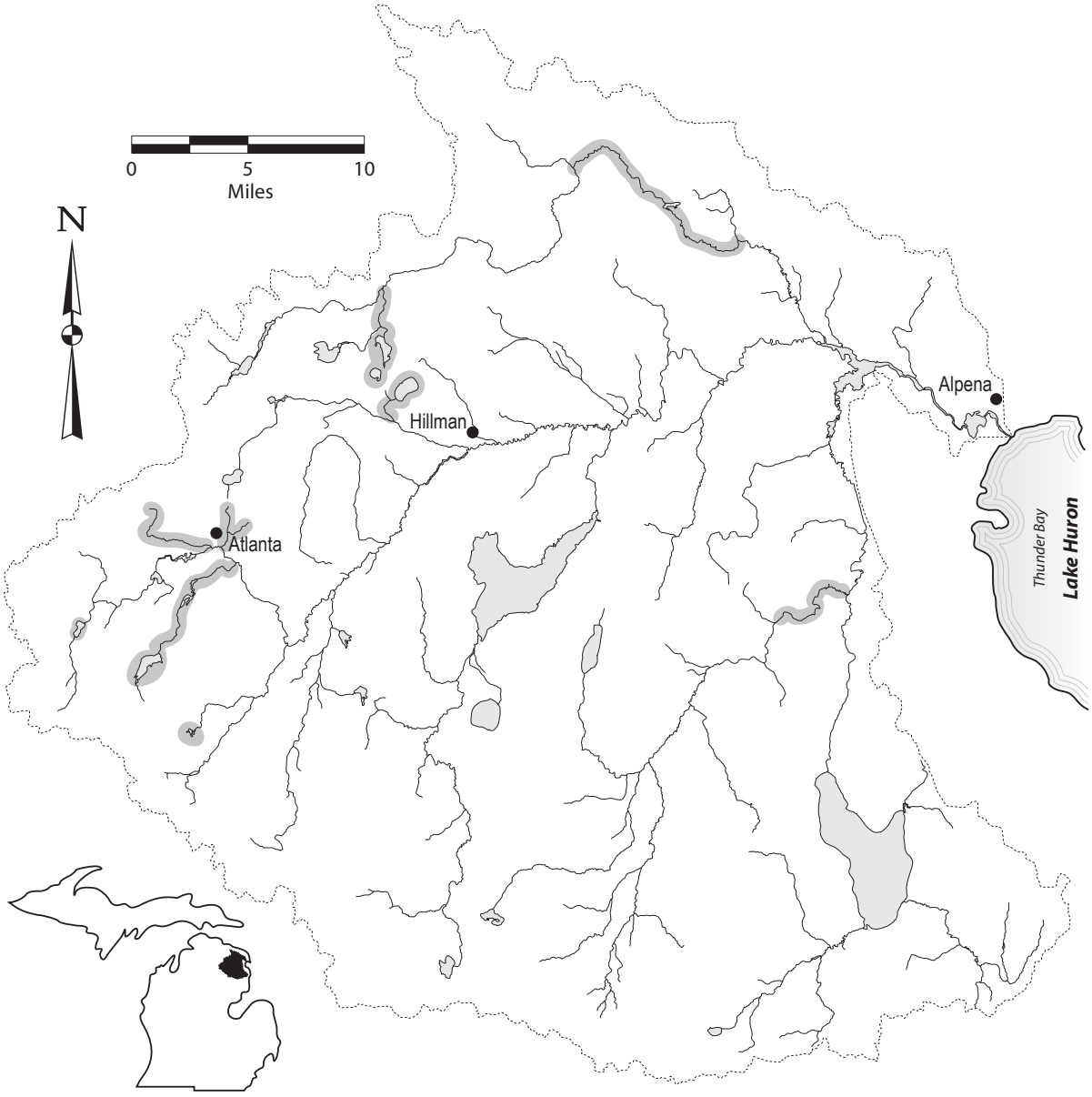


Northern longear sunfish (*Lepomis peltastes*)

Habitat:

feeding - clear moderate-sized shallow streams with moderate vegetation
- rocky substrates
- little to no current

spawning - nests in gravel, sand, or hard rock substrate



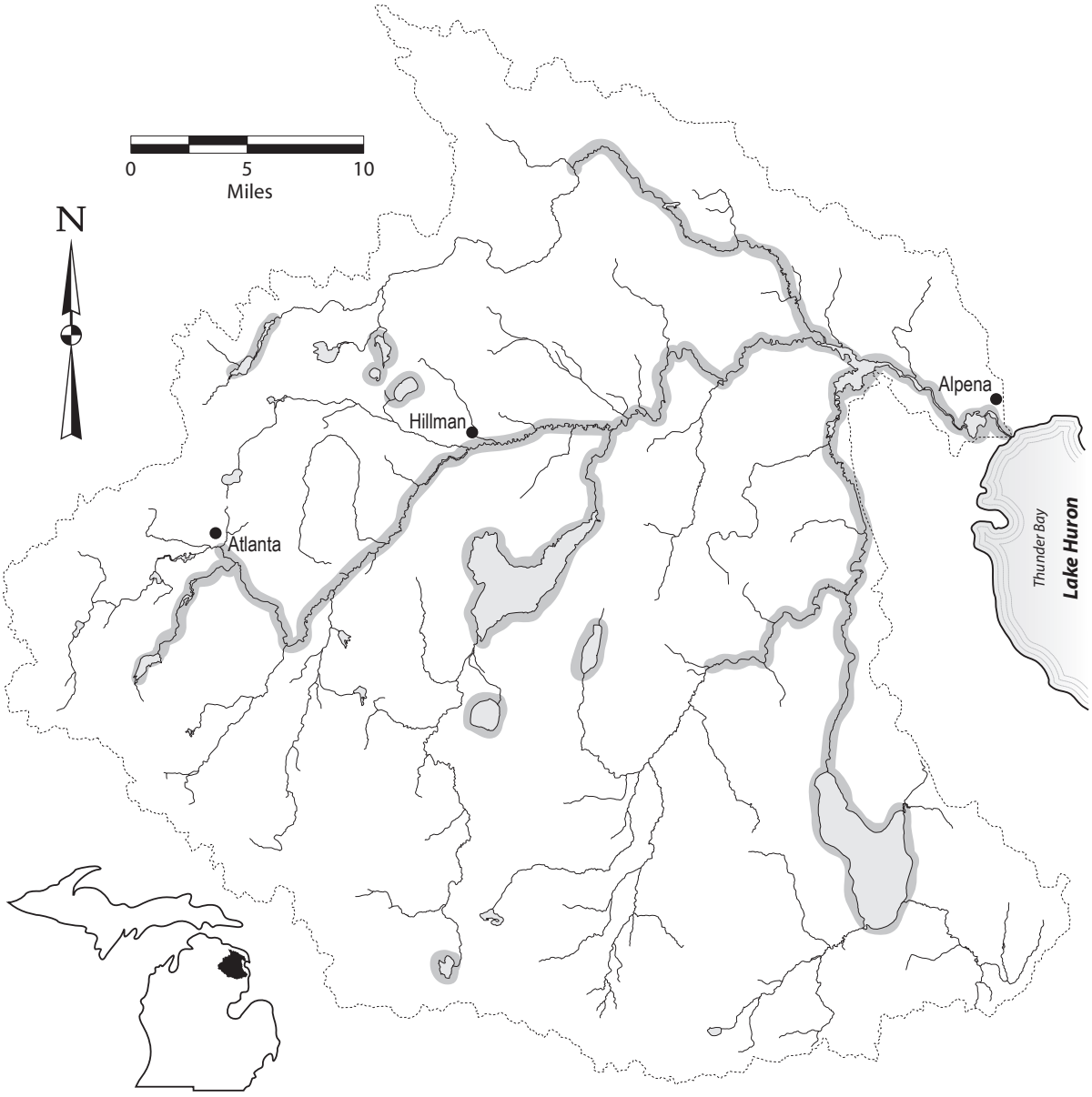
Smallmouth bass (*Micropterus dolomieu*)

Habitat:

feeding
- clear, cool, deep lakes and rivers
- streams where 40% consists of riffles over clean gravel, boulder, or bedrock substrate
- in pools with a current and >4 feet of depth
- gradients between 4 and 25 feet per mile

spawning
- nest in sandy, gravel, or rocky substrate
- gradients 7 to 25 feet per mile
- streams 20 to 100 feet wide

winter refuge
- larger deeper waters with gradients between 3 to 7 feet per mile

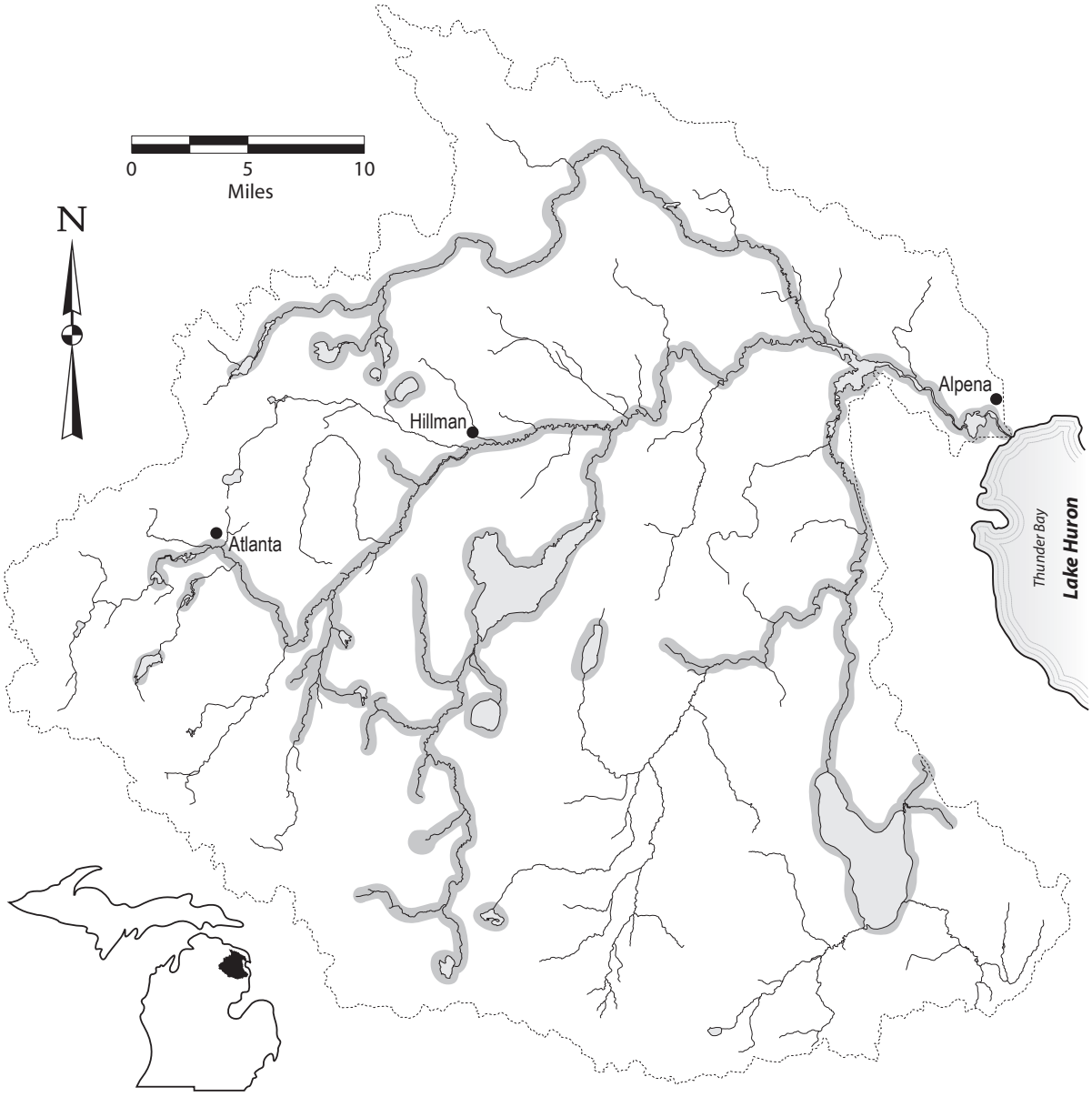


Largemouth bass (*Micropterus salmoides*)

Habitat:

feeding
- non-flowing clear waters - lakes, impoundments, and pools of streams
- abundant aquatic vegetation
- soft muck, organic debris, gravel, sand, and hard non-flocculent clay substrates

spawning
- nest in gravelly sand to marl and soft mud substrates
- emergent vegetation
- quiet shallow bays; no current

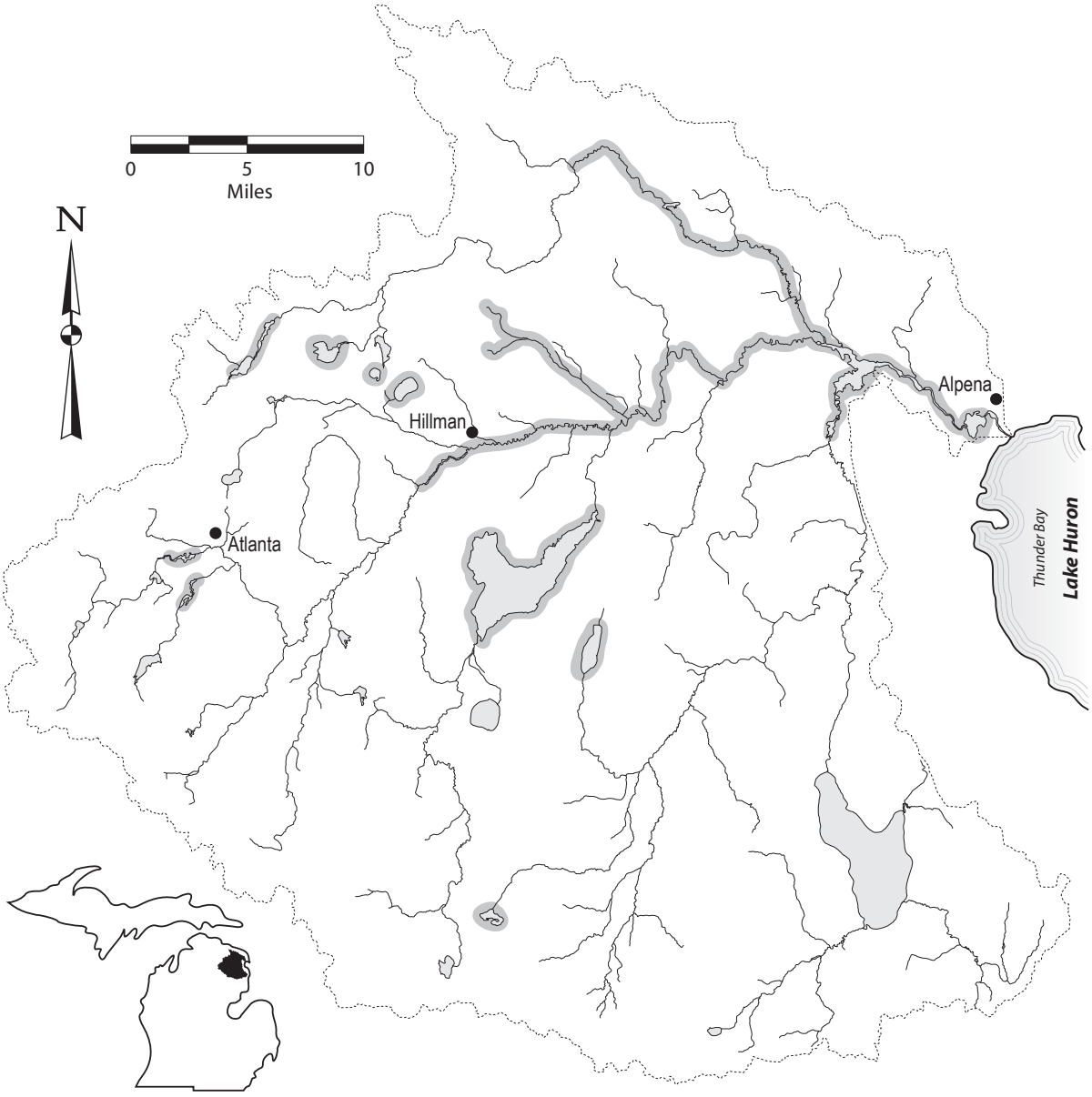


Black crappie (*Pomoxis nigromaculatus*)

Habitat:

feeding
- larger clear non-silty low-gradient rivers; also in lakes and impoundments
- clean hard sand or muck substrate
- associated with submerged aquatic vegetation
- does not tolerate silt or turbidity well

spawning
- nests in gravel, sand, or mud substrate
- some vegetation must be present
- sometimes nests under banks

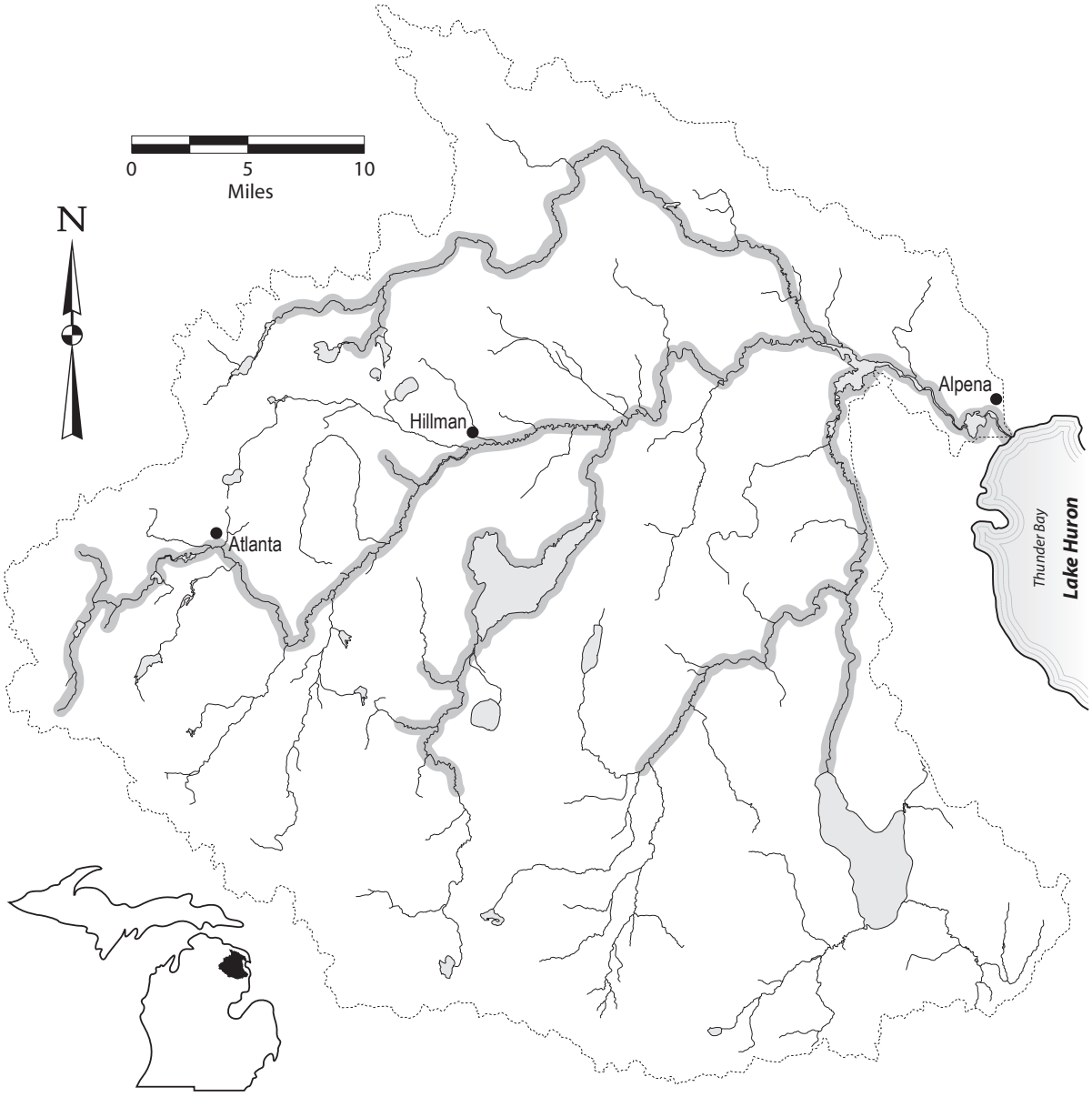


Rainbow darter (*Etheostoma caeruleum*)

Habitat:

feeding - gravelly high gradient riffles
- clear, moderate to large streams
- in shallows (average 1 foot)

spawning - gravel or rubble riffles

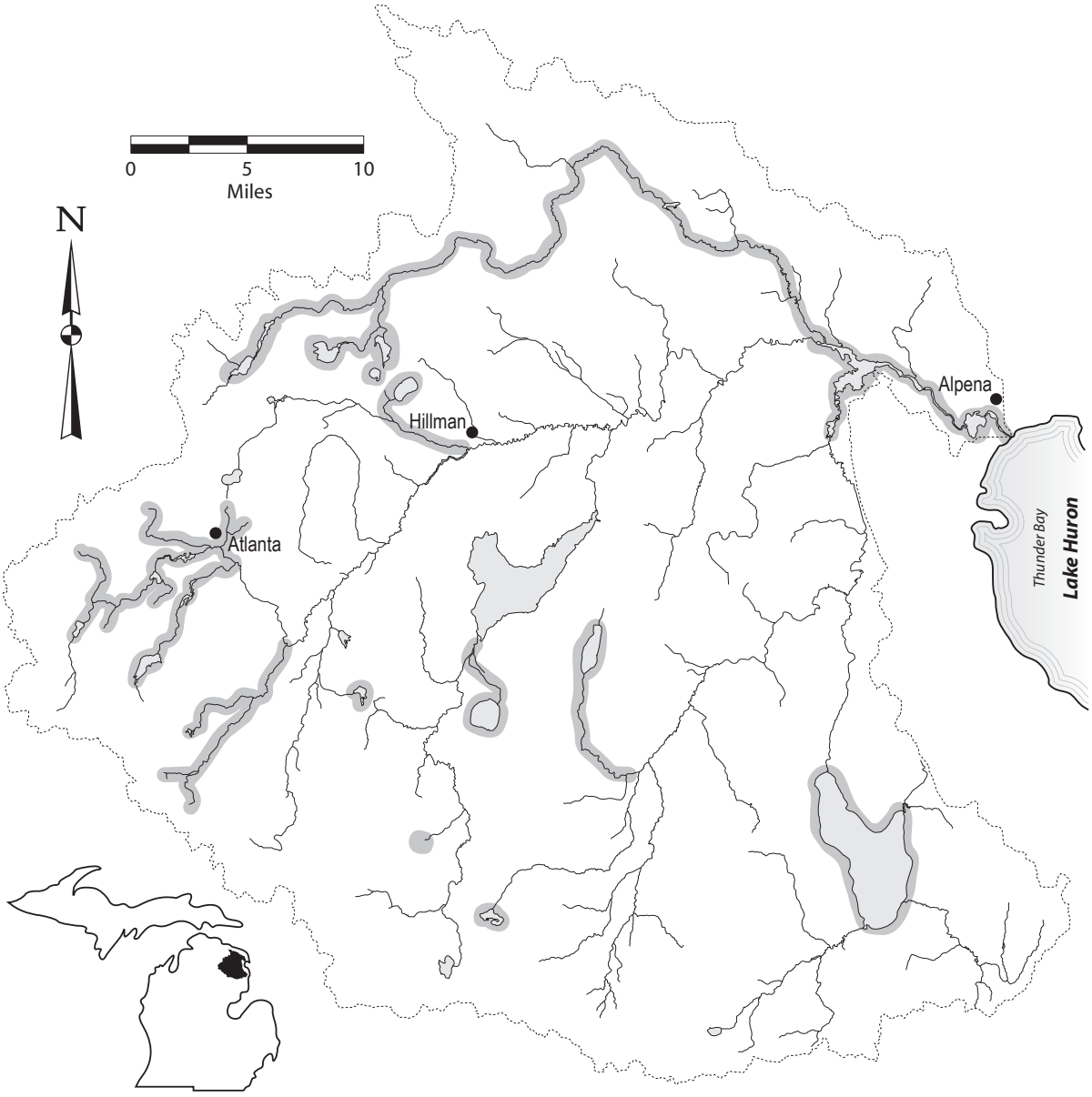


Iowa darter (*Etheostoma exile*)

Habitat:

feeding
- clear, slow moving streams and lakes
- sandy to muddy substrates
- intolerant of turbid water
- lives in rooted aquatic vegetation

spawning
- in pond-like extensions of streams on organic matter or roots
- in shallows

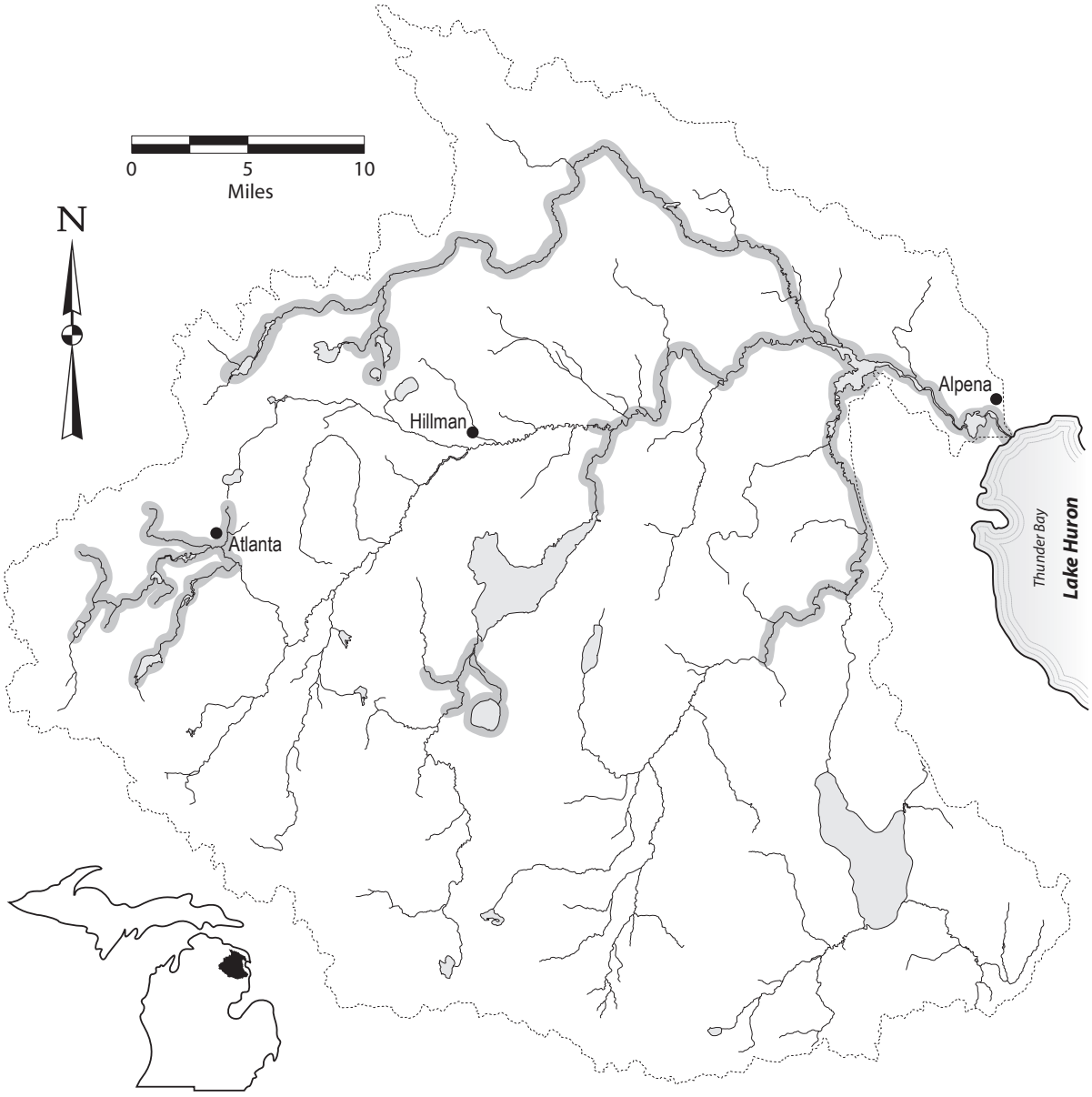


Least darter (*Etheostoma microperca*)

Habitat:

feeding
- moderate to warm temperature
- clear quiet low-gradient vegetated streams (wetlands, floodplains)
- soft substrate

spawning
- spawning occurs on stems of plants
- male guards a territory in a vegetated area

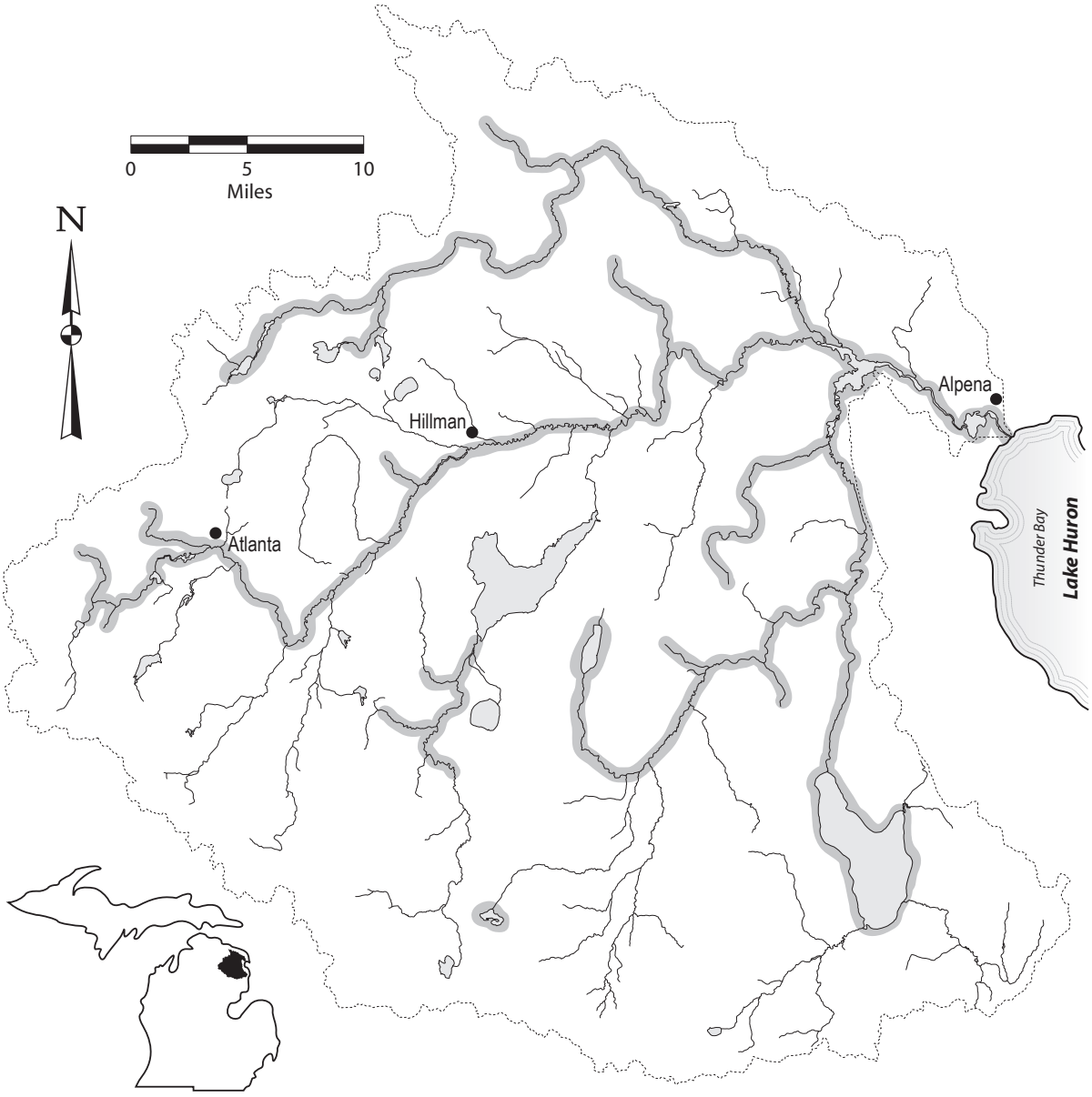


Johnny darter (*Etheostoma nigrum*)

Habitat:

feeding
- sand and silt substrate
- little to moderate current
- shallow areas of streams, rivers, lakes, and impoundments
- tolerant of many organic and inorganic pollutants and turbidity

spawning
- underneath rocks
- in stream pools or protected shallows of lakes



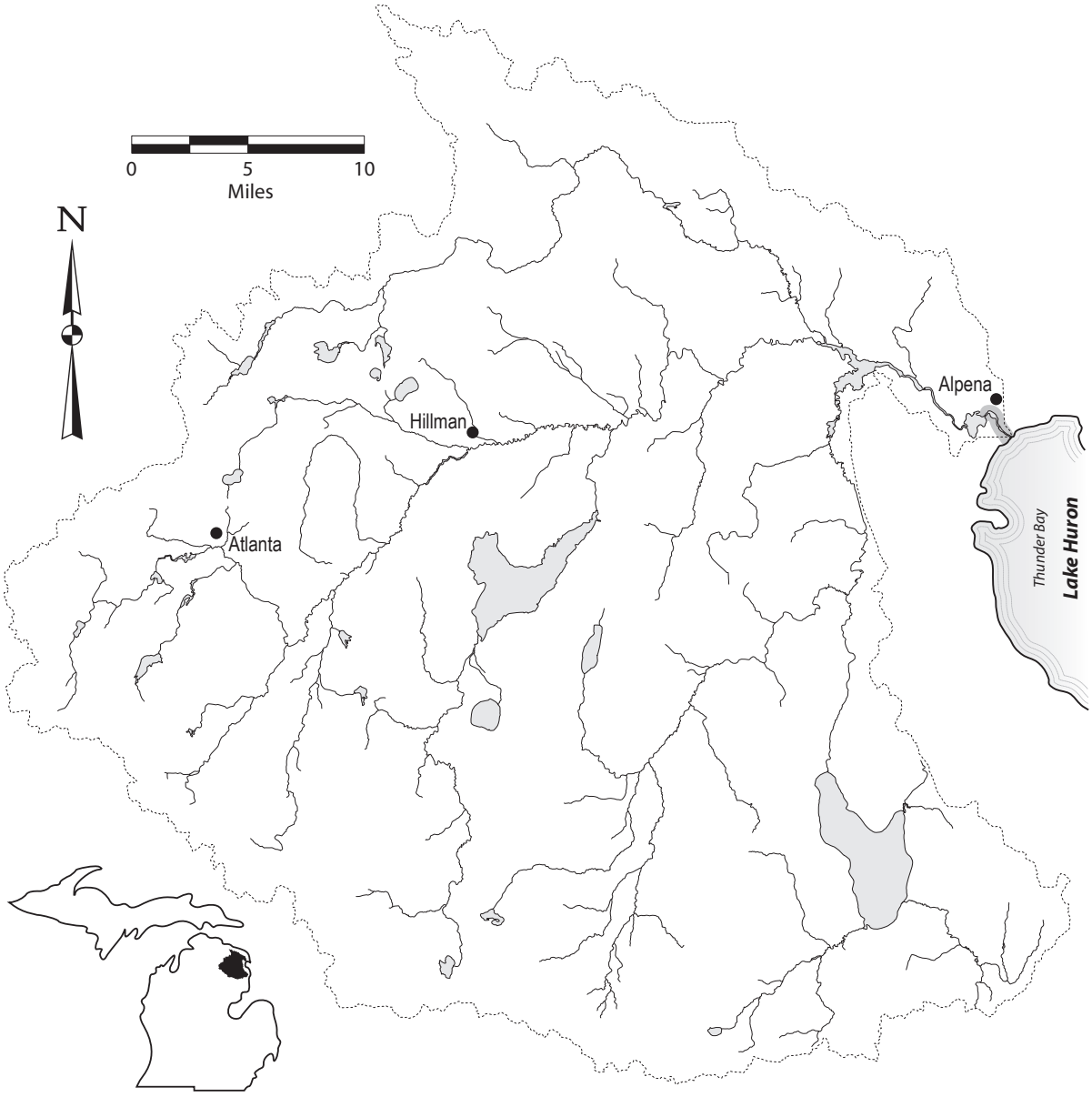
Ruffe (*Gymnocephalus cernuus*)

Habitat:

feeding - shallow waters at night
- soft bottoms and no vegetation

spawning - warm shallows of turbid lakes with soft bottoms
- little or no vegetation present
- slow-moving water

winter refuge - deeper water

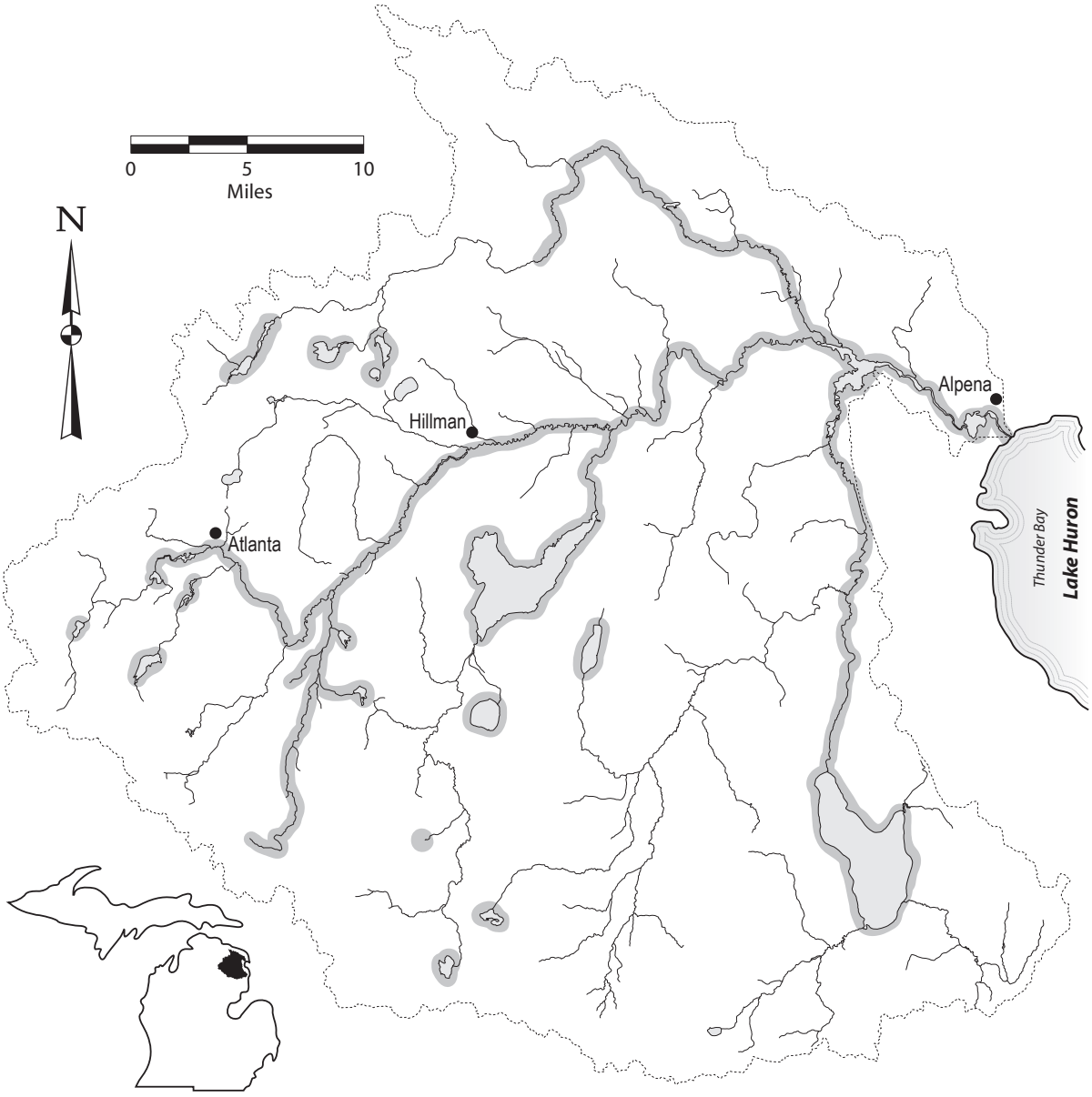


Yellow perch (*Perca flavescens*)

Habitat:

feeding
- clear lakes and impoundments; also Lake Huron
- low gradient rivers
- abundance of rooted aquatics
- muck, organic debris, sand, or gravel substrate
- does not tolerate turbidity and siltation

spawning
- shallows of lakes, tributaries of streams
- occurs over rooted vegetation, submerged brush, fallen trees
- may occur over sand or gravel

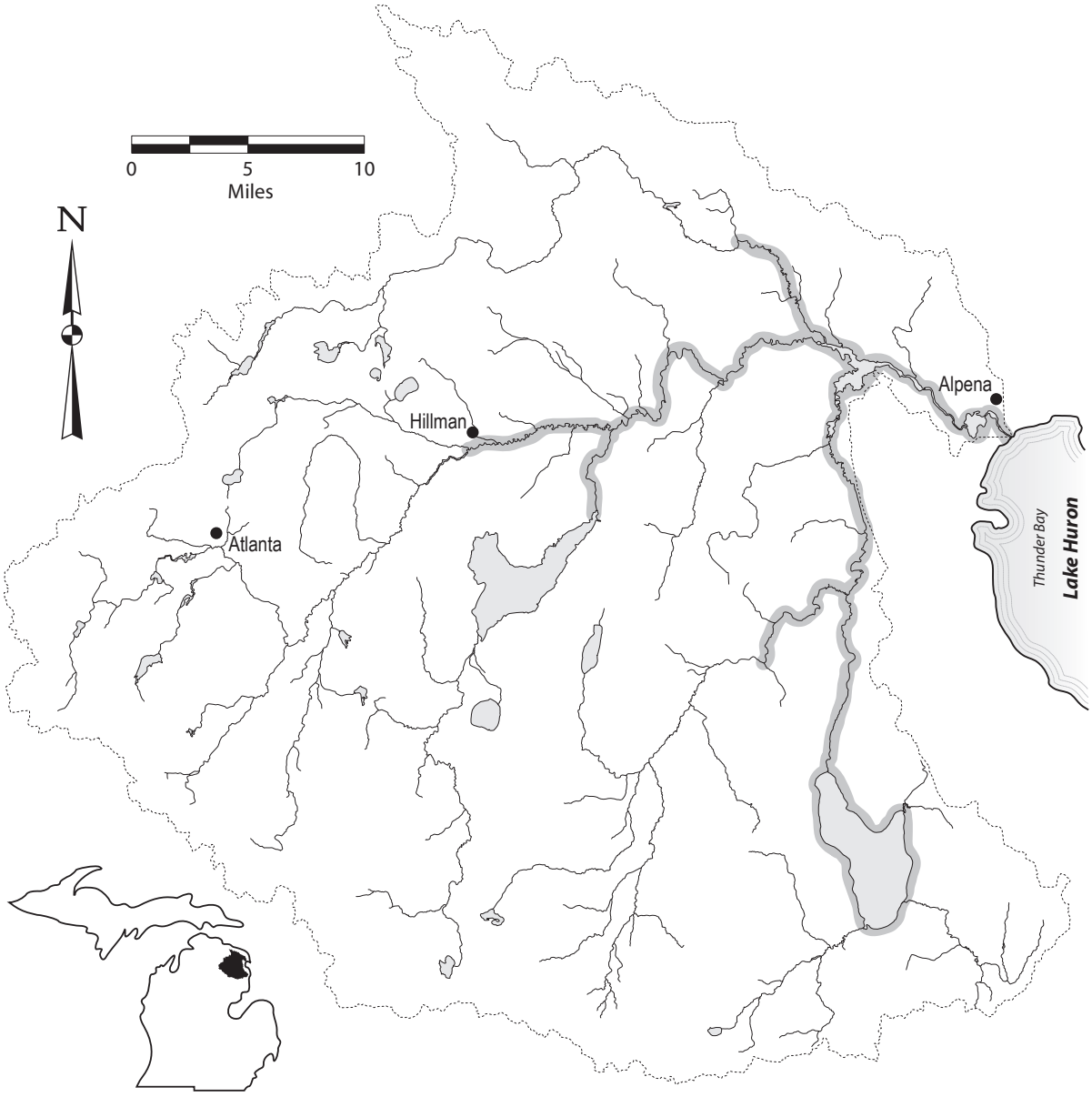


Logperch (*Percina caprodes*)

Habitat:

feeding
- gravel riffles, deeper slower sections of rivers
- medium size streams; also lakes, impoundments, and Lake Huron
- sand, gravel, or rock substrate
- avoids turbidity and silt

spawning
- riffles or sandy in-shore shallows

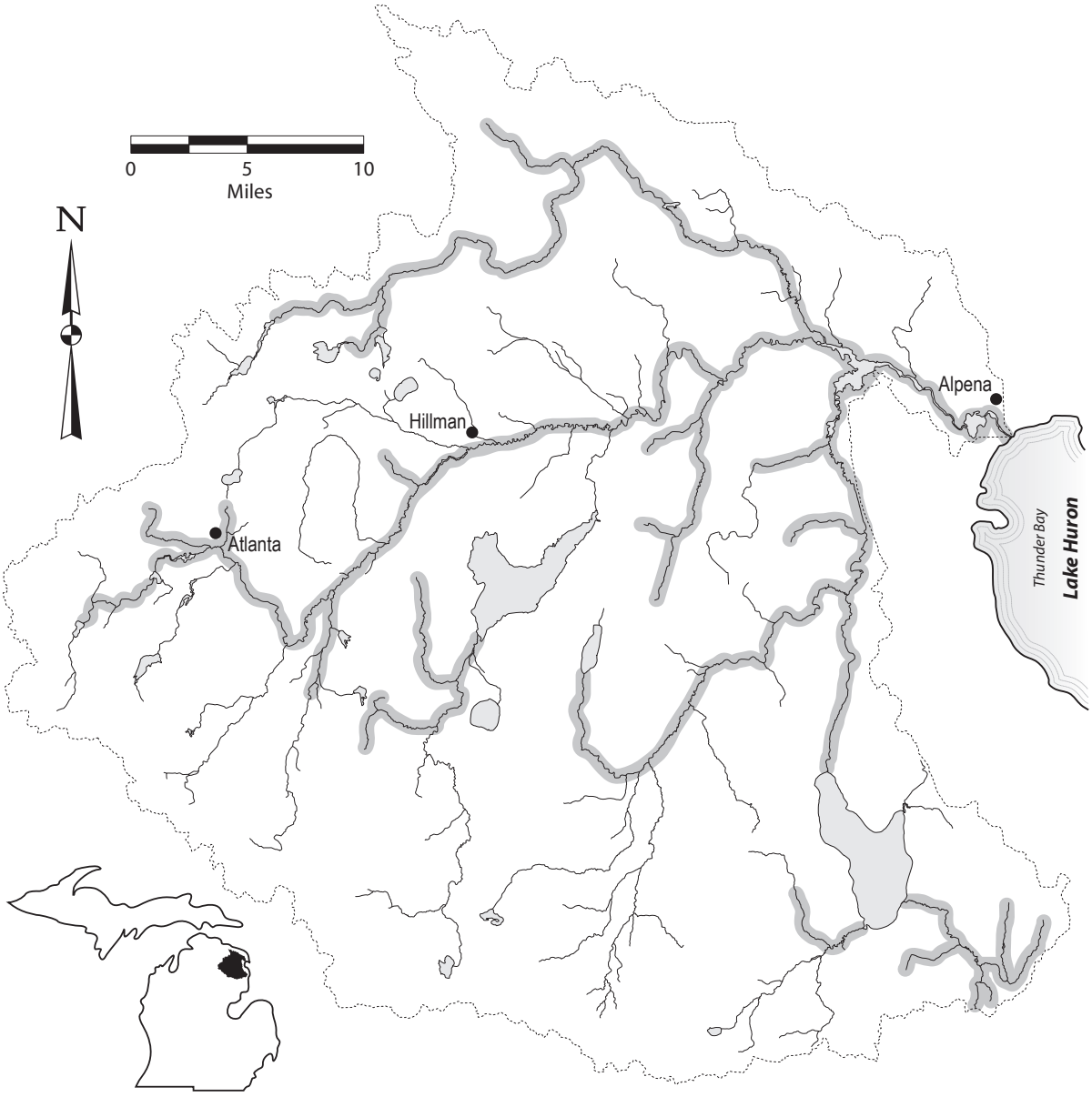


Blackside darter (*Percina maculata*)

Habitat:

feeding - small to medium streams
- low to medium gradient
- gravel and sand substrate
- tolerate some turbidity

spawning - gravel and sand substrate



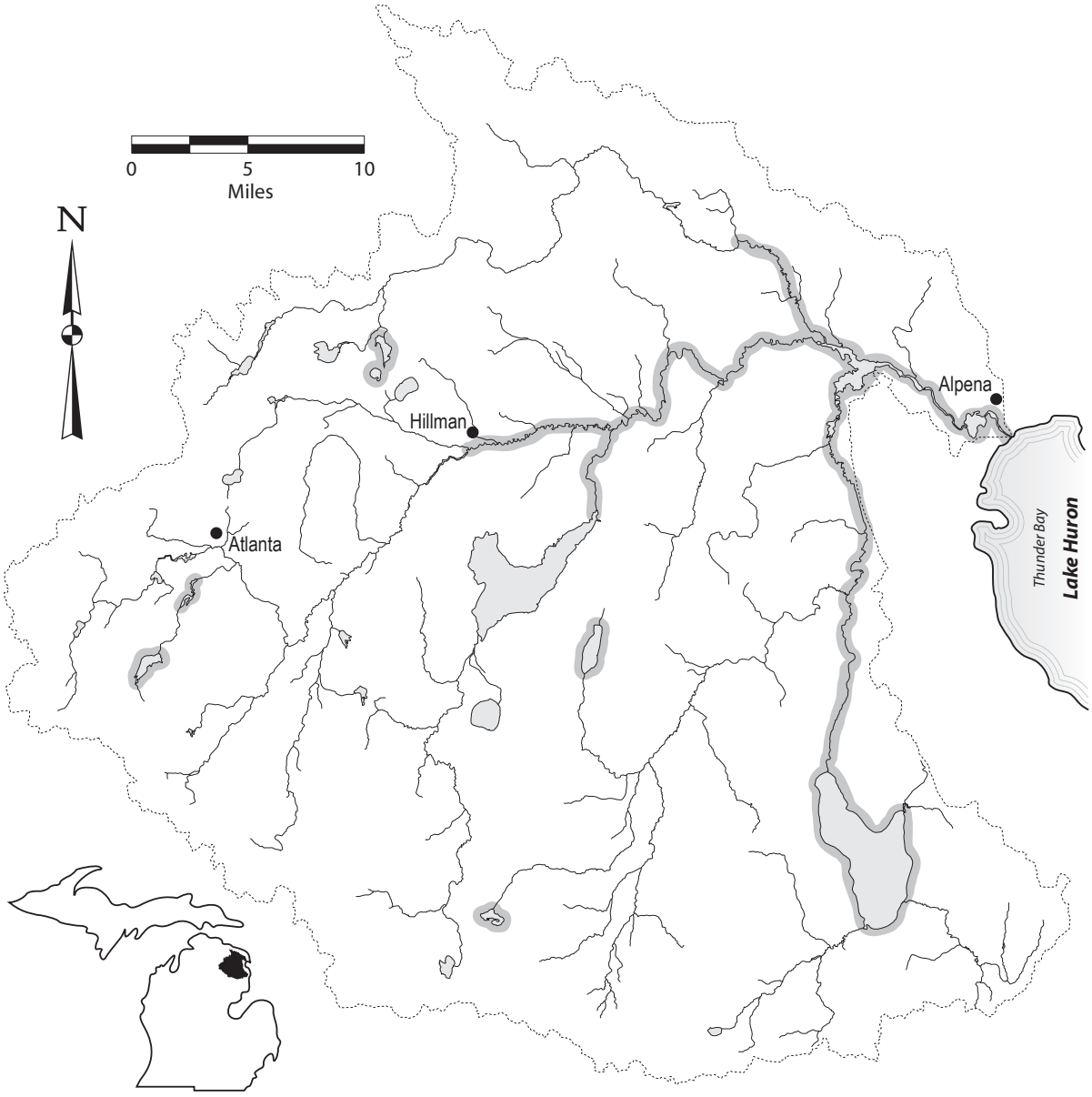
Walleye (*Sander vitreus*)

Habitat:

feeding - larger, deeper streams and in large, shallow, turbid lakes and impoundments; also Lake Huron
- gravel, bedrock, and firm substrates preferred
- does not tolerate a lot of turbidity or low oxygen

spawning - rocky substrates in high gradient water in rivers
- boulder to coarse gravel shoals in lakes

winter refuge - avoids strong currents

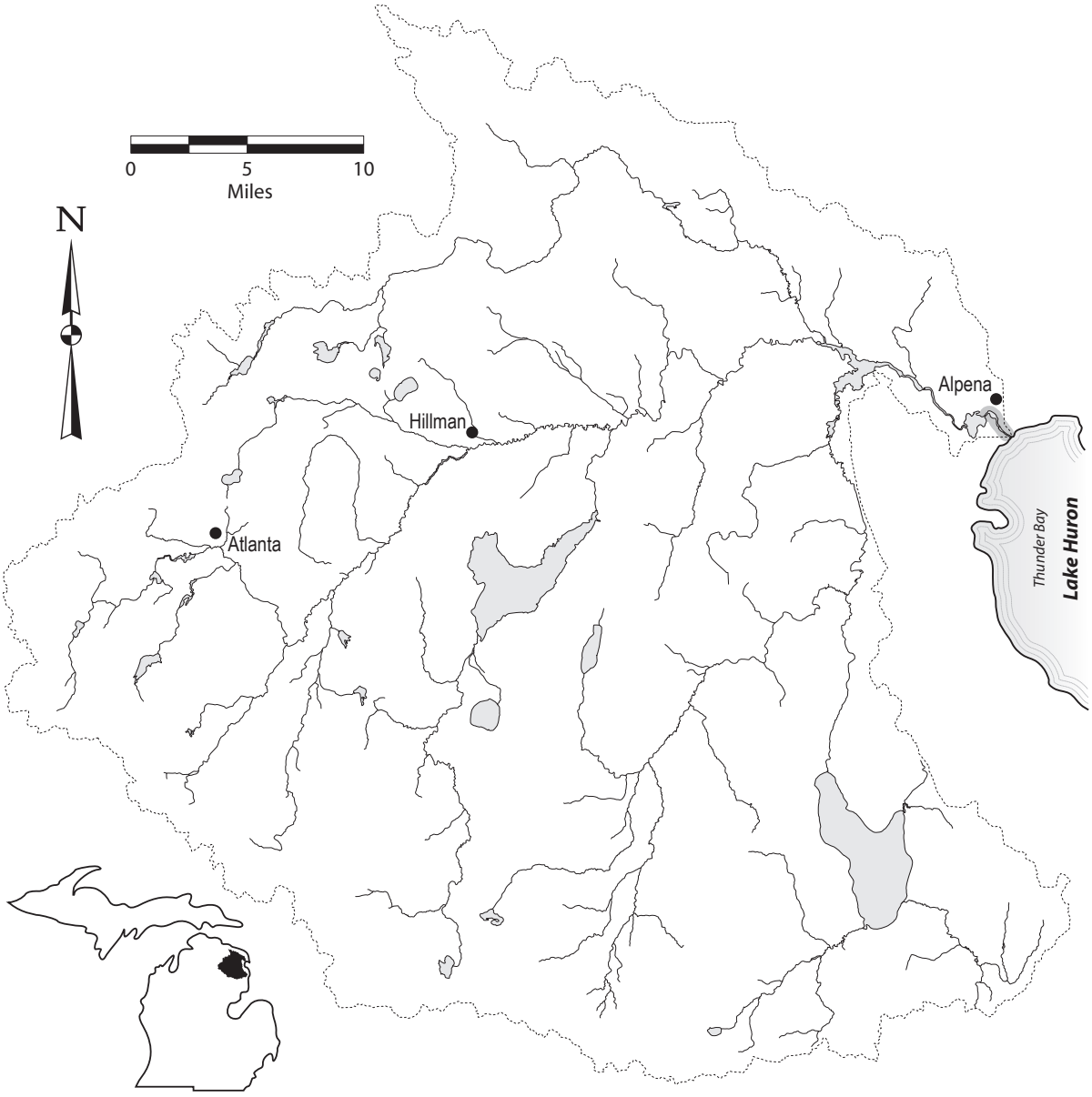


Freshwater drum (*Aplodinotus grunniens*)

Habitat:

feeding
- deeper pools of rivers and Lake Huron
- in shallows
- prefers clear waters and clean substrates
- can adapt to high turbidity levels

spawning
- pelagically, in open water, over sand or mud substrate
- occurs in bays or lower portions of marshes



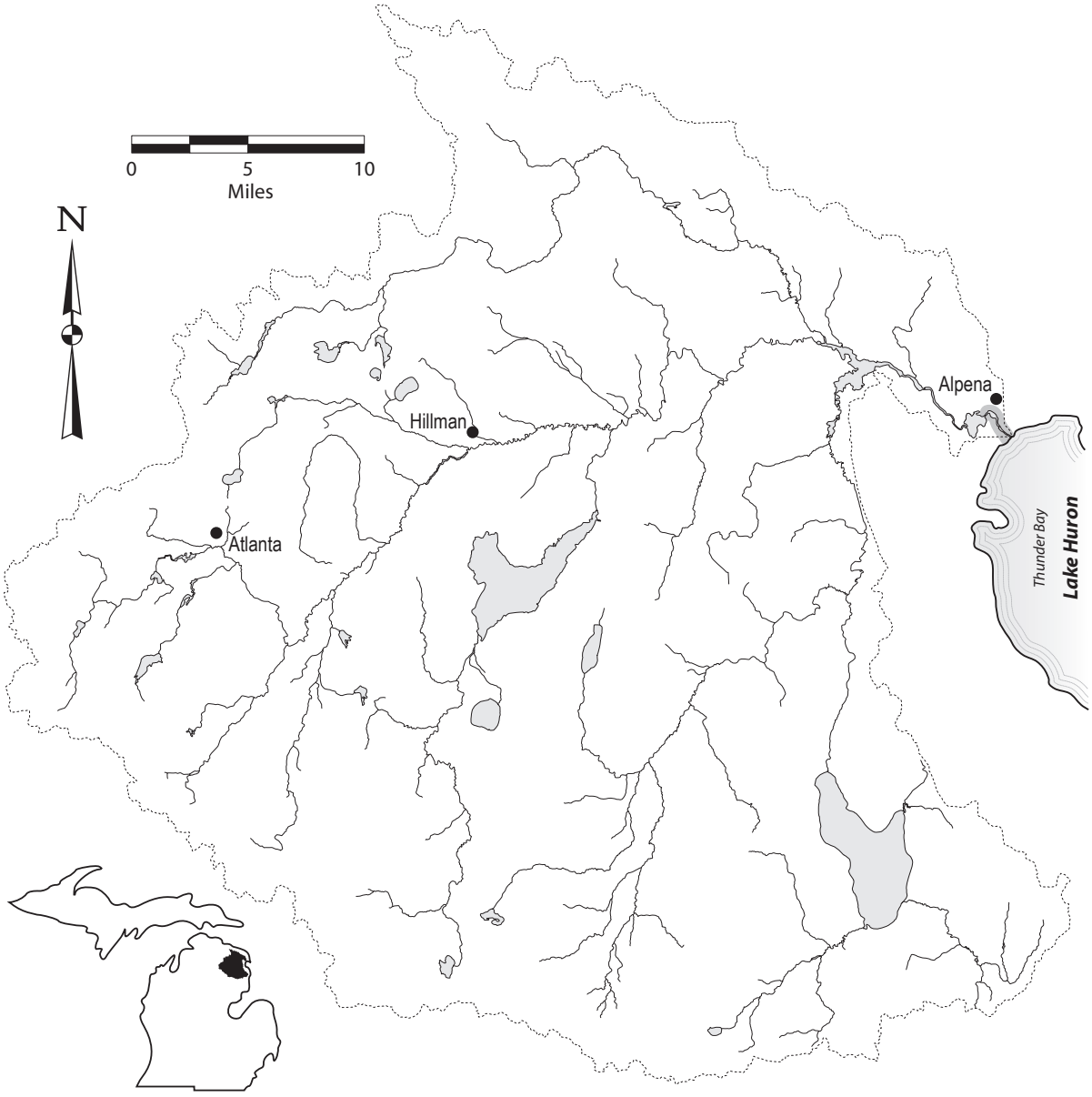
Round goby (*Neogobius melanostomus*)

Habitat:

feeding - rock,cobble,riprap,and vegetate areas of rivers and lakes
- young found over sand substrate

spawning - rocky substrate with large interstitial spaces

winter refuge - rocky substrate with large interstitial spaces
- deep water



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