



# AQUATIC SYSTEMS HABITAT SUMMARY



*Aquatic systems habitat comprises of all water, both flowing and stationary. Only 2.36% of Indiana is covered by aquatic systems.*



*Indiana's stationary and free flowing aquatics habitats are spread throughout the state, covering 2.36% of Indiana or 899 miles<sup>2</sup> (575,150 acres). Aquatic systems include lakes and reservoirs, streams and rivers, and parts of Lake Michigan.*



# Indiana's State Wildlife Action Plan

## Representative Species of Aquatic Systems

The aquatic system habitat guild is represented by several species. These representative species “paint a reasonable mental picture” of aquatic systems.

- Eastern Newt
- River Otter
- Mudpuppy
- Red-Winged Blackbird
- Painted Turtle
- Beaver
- Mink

### Great Lakes Drainage

- Blacknose Dace
- Hornyhead Chub
- Northern Brook Lamprey
- Greater Redhorse

### Impoundments

- Mallard
- White Crappie
- Giant Floater
- Osprey
- Paper Pondshell

### Kankakee River

- Least Darter
- Tadpole Madtom

### Lake Michigan

- Ring-Billed Gull
- Yellow Perch
- Spottail Shiner
- Lake Trout

### Natural Lakes

- Largemouth Bass
- Cicso (Lake Herring)
- Iowa Darter
- Pond Mussel
- Northern Pike

### Ohio River Drainage

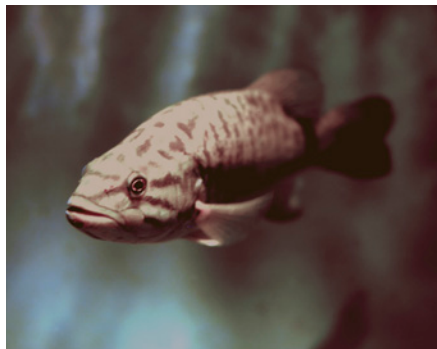
- Channel Catfish
- Rough Pigtoe
- Spike
- Yellow Sandshell
- Hickorynut
- Cylindrical Papershell
- Smallmouth Bass
- Sauger
- Mottled Sculpin
- Rainbow
- Pond Horn
- Northern Hogsucker
- Mucket
- Spottail Darter
- Blue Sucker
- Eastern Sand Darter
- Threeridge
- Spotted Bass
- Orangethroat Darter
- Creek Heelsplitter
- Slough Darter
- Fanshell
- Slippershell Mussel
- Clubshell
- Shovelnose Sturgeon
- Rock Bass
- Southern Redbelly Dace

### Oxbow

- Wood Duck
- Flier
- Flat Floater
- Western Lesser Siren
- Redspotted Sunfish

### Rivers and Streams

- Streamside Salamander
- River Cooter
- Mink
- Alligator Snapping Turtle
- Northern Pike
- Wood Duck
- Two-Lined Salamander
- Hellbender



From left to right: River Otters, Smallmouth Bass, and Ring-Billed Gull

# Indiana's State Wildlife Action Plan

## Species of Greatest Conservation Need (SGCN) in Aquatic Systems

SGCN are animal species whose populations are rare, declining, or vulnerable.

Blue-spotted Salamander	Redside Dace	Four-toed Salamander
Slimy Sculpin	Hellbender	Spotted Darter
Common Mudpuppy	Tippecanoe Darter	Plains Leopard Frog
Trout-perch	Bald Eagle	Variagate Darter
Black Tern	Western Sand Darter	Least Tern
River Otter	Osprey	Clubshell
Peregrine Falcon	Ellipse	Piping Plover
Fanshell	Trumpeter Swan	Fat Pocketbook
Banded Pygmy Sunfish	Kidneyshell	Bantam Sunfish
Little Spectaclecase	Bigmouth Shiner	Longsolid
Channel Darter	Northern Riffleshell	Cisco (Lake Herring)
Ohio Pigtoe	Cypress Darter	Orangefoot Pimpleback
Gilt Darter	Pink Mucket	Greater Redhorse
Pointed Campeloma	Lake Sturgeon	Purple Lilliput
Lake Whitefish	Pyramid Pigtoe	Longnose Dace
Rabbitsfoot	Longnose Sucker	Rayed Bean
Northern Brook Lamprey	Rough Pigtoe	Northern Madtom
Round Hickorynut	Ohio River Muskellunge	Salamander Mussel
Pallid Shiner	Sheepnose	Pugnose Shiner
Snuffbox	Swamp Lymnaea	Blanding's Turtle
Tuberclad Blossom	Copperbelly Water Snake	Wavyrayed Lampmussel
Cottonmouth	White Catpaw	Eastern Mud Turtle
White Wartyback	Hieroglyphic River Cooter	Alligator Snapping Turtle
	Spotted Turtle	

## Threats to Aquatic Systems

- Stream channelization
- Nonpoint source pollution (sedimentation and nutrients)
- Commercial or residential development (sprawl)
- Drainage practices (stormwater runoff)
- Impoundment of water/flow regulation
- Habitat degradation
- Agricultural/forestry practices
- Point source pollution (continuing)
- Habitat fragmentation
- Residual contamination (persistent toxins)

## High Priority Conservation Actions for Aquatic Systems

### Habitat restoration incentives (financial)

- Promote the retention and development of sloughs, oxbows, and backwater habitats to benefit the banded pygmy sunfish, bantam sunfish and cypress darter in the lower Wabash River drainage.

# Indiana's State Wildlife Action Plan

## Protection of adjacent buffer zone

- Promote the establishment and maintenance of buffers on all aquatic systems to control sedimentation and to benefit aquatic SGCN, especially the blue spotted salamander, four-toed salamander, and plains leopard frog, ellipse, swamp lymnaea, bigmouth shiner and pallid shiner.
- Provide grassy, shrubby, and/or woody riparian cover along rivers and streams for resting, denning, and loafing sites for otters.

## Habitat restoration on public lands

- Create nesting islands for least terns in appropriate areas.
- Restore wetland habitats in floodplain areas to provide alternative habitats for aquatic species. Target wetlands in close proximity to rivers and streams.

## Cooperative land management agreements (conservation easements)

- Promote the protection of aquatic systems for SGCN by encouraging public and private entities to enter into cooperative land management agreements and conservation easements. Provide technical assistance on the species that benefit from such protection and potential enhancement measures.

## Habitat protection on public lands

- Protect nesting and foraging areas from human disturbance in order to ensure successful nesting and foraging by bald eagles, osprey, peregrine falcons, least terns, black terns, and piping plovers (potential).
- Conserve existing riparian cover along rivers & streams to provide habitat for otters.

## Habitat protection incentives (financial)

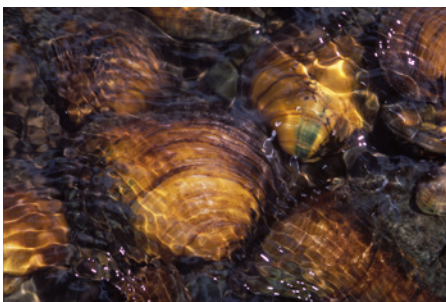
- Provide technical assistance and support the use of state, federal and private incentive programs to protect aquatic habitat for the benefit of SGCN.

## Managing water regimes

- Ensure appropriate water regime targets are selected in manipulated headwater streams, especially headwater streams occupied by redbreast dace.

## Pollution reduction

- Work with state, federal and private partners to reduce point and non-point source pollution in aquatic systems to maintain and increase the distribution of the fat pocketbook, Western sand darter, Northern madtom and channel darter populations in the lower Wabash, White and Ohio Rivers where they are now confined.



From left to right: *Pimpleback Mussel (with green stripes) and Sheepsnose Mussel, Hellbender, and Trumpeter Swans*

- Maintain healthy fish and aquatic invertebrate populations with low contaminant loads in order to provide food for bald eagles, osprey, least terns, black terns, piping plovers, trumpeter swans, and other aquatic birds and species that prey on aquatic-systems- dependent birds such as peregrine falcons and bald eagles.
- Develop/support programs that reduce input of heavy metals, PCBs, and related contaminants into aquatic systems to benefit river otters and other SGCN.

### **Restrict public access and disturbance**

- Develop and distribute BMPs relative to avoiding and minimizing disturbance to reptile hibernating areas (backwaters, small pools and shallow inlets to lakes and rivers) to promote the conservation of SGCN found in aquatic systems.
- Protect nesting and foraging areas from human disturbance in order to ensure successful nesting and foraging by bald eagles, osprey, peregrine falcons, least terns, black terns, and piping plovers (potential).

### **Corridor development/protection**

- Promote the development and adoption of BMPs to protect aquatic systems shorelines and riparian corridors to minimize eutrophication to benefit pointed campeloma populations and other SGCN.

### **Adaptive Management**

- Modify survey and monitoring, research and other conservation actions and activities in response to new information to improve habitat conservation efficiency for SGCN.

## **Threats to SGCN in Aquatic Systems**

- Habitat loss (breeding range)
- Habitat loss (feeding/foraging areas)
- High sensitivity to pollution
- Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)
- Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)
- Specialized reproductive behavior or low reproductive rates
- Invasive/non-native species
- Bioaccumulation of contaminants
- Viable reproductive population size or availability
- Predators (native or domesticated)

## **High Priority Conservation Actions for SGCN in Aquatic Systems**

### **Reintroduction (restoration)**

- Support the development and implementation of practical mussel restoration and evaluation techniques for use in appropriate situations for the restoration of extirpated or nearly extirpated mussel species, i.e., longsolid, orangefoot pimpleback, pink mucket, pyramid pigtoe, rough pigtoe, tubercled blossom, white catspaw and white wartyback.
- Monitor the abundance and distribution of newly restored aquatic-system-dependent species such as the river otter and osprey.

## Population management

- Determine factors affecting the distribution and relative abundance of rare aquatic-based wildlife such as the river otter.
- Refine and improve survey and monitoring programs for aquatic wildlife species such as river otters, mussels species and osprey.
- Implement harvest strategies (season dates, trap set techniques, etc.) to maximize take of targeted species and minimize unintentional take of otters.
- Determine age-specific reproductive parameters for river otters and mussel species.

## Translocation to new geographic range

- Support the development of technical assistance materials to heighten public awareness of the dangers of releasing aquatic species in new geographical areas (even SGCN).
- Track shifts in species geographic range for correlation to global warming trends and new ecological relationships.

## Protection of migration routes

- Protect shoreline areas from high human use along Lake Michigan for migrating piping plovers.
- Secure and appropriately manage sufficient aquatic areas to provide for the needs of self-sustaining populations of migrating birds.

## Habitat protection

- Support programs that promote clean water and maintenance of a diverse aquatic ecosystem for the benefit of reptile and amphibian SGCN.
- Identify and secure critical spawning grounds for greater redhorse, lake sturgeon, Northern brook lamprey and Tippecanoe darter to ensure maintenance of self-sustaining populations.
- Develop and/or support programs that restore/maintain riparian cover along rivers and streams for the benefit of mussels and other aquatic SGCN.

## Culling/selective removal

- Monitor the health of hellbenders and other aquatic SGCN and evaluate the use of selective removal of infected individuals to control the spread of contagious disease.

## Threats reduction

- Cooperate with other programs to evaluate threats (contamination, gravel mining, dams, etc.) to aquatic systems and provide information on impacts to SGCN.

## Native predator control

- Evaluate the use of muskrat and raccoon control in sensitive areas (where populations of SGCN are known to occur) to promote the survival and reproduction of SGCN, especially nesting turtles and mussels.
- Employ effective and appropriate predator deterrents in near least tern nesting colonies and similar vulnerable concentrations of SGCN.

## Adaptive Management

- Modify survey and monitoring, research and other conservation actions and activities in response to new information to improve conservation efficiency for SGCN.

