



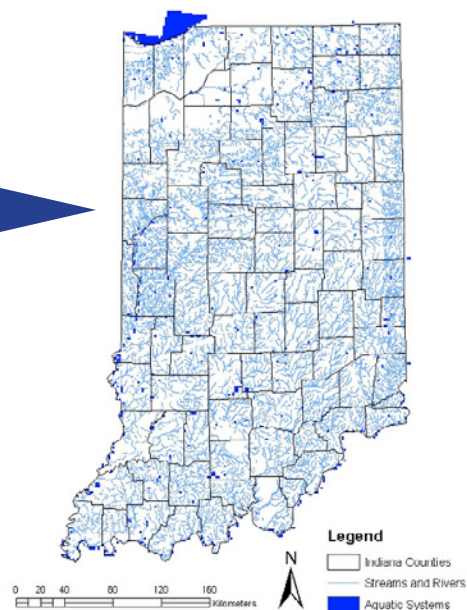
# NATURAL LAKES HABITAT SUMMARY



*Eighteen counties in northern Indiana contain natural lakes, although Kosciusko, LaGrange, Noble and Steuben counties contain nearly 70% of the total surface acreage. Natural lakes vary widely in habitat and eutrophication. Less fertile lakes tend to be deep and well oxygenated with marl or sandy substrates. More fertile lakes tend to be shallow with muck bottoms and dense stands of aquatic vegetation.*



*Indiana's stationary and free-flowing aquatic habitats are spread throughout the state, covering 2.36% of Indiana or 899 miles<sup>2</sup> (575,151 acres). Aquatic systems include lakes and reservoirs, streams and rivers, and parts of Lake Michigan.*



# Indiana's State Wildlife Action Plan

## Representative Species of Natural Lakes

Natural lakes habitat guild is represented by several species. These representative species “paint a reasonable mental picture” of natural lakes.

Largemouth Bass  
Iowa Darter

Northern Pike

Cisco (Lake Herring)  
Pond Mussel



Brant Fisher



Brant Fisher

From left to right: Iowa Darter and Northern Pike

## Species of Greatest Conservation Need (SGCN) in Natural Lakes

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

Pugnose Shiner

Cisco (Lake Herring)



John Lyons, Wisconsin DNR



Steve Donabauer

From left to right: Pugnose Shiner and Cisco

## Threats to Natural Lakes

- Habitat degradation
- Commercial or residential development (sprawl)
- Nonpoint source pollution (sedimentation and nutrients)
- Agricultural/forestry practices
- Drainage practices (stormwater runoff)
- Successional change
- Stream channelization
- Habitat fragmentation
- Invasive/non-native species
- Point source pollution (continuing)

# Indiana's State Wildlife Action Plan

## High-Priority Conservation Actions for Natural Lakes

### Habitat protection through regulation

- Support the implementation of environmental BMPs and regulations to prevent eutrophication of Indiana's natural lakes for the conservation of pugnose shiner and cisco.

### Pollution reduction

- Promote the implementation of BMPs to decrease the rate of eutrophication in Indiana's natural lakes to help maintain pugnose shiner and cisco populations.

### Protection of adjacent buffer zone

- Cooperate with partners to protect (acquisition, easements, BMPs, etc.) the watersheds, wetlands and upland areas associated with Indiana natural lakes to protect provide quality habitat for the pugnose shiner and cisco.

### Land-use planning

- Provide technical assistance to lake associations and work with other government programs (e.g., Lake and River Enhancement Program) and encourage land uses that protect Indiana's natural lakes

### Habitat protection on public lands

- Employ BMPs and watershed protection measures on public lands within the watershed of a natural lake for the benefit of SGCN, especially the pugnose shiner and cisco.

### Habitat restoration through regulation

- Promote the use of native vegetation, wetland development and watershed protection practices to benefit SCGN in natural lakes on projects conducted under state permit or receiving public funds.

### Cooperative land management agreements (conservation easements)

- Develop cooperative agreements with landowners in natural lake watersheds for the protection of natural lake habitat for SGCN.

### Habitat protection incentives (financial)

- Support cost-share programs that provide financial incentives for the protection of natural lake shorelines and watersheds for the benefit of SGCN.

### Habitat restoration incentives (financial)

- Provide technical assistance to partners and provide financial incentives for the restoration of natural lake habitat features for the benefit of pugnose shiner and cisco.

### Habitat restoration on public lands

- Restore degraded wetlands, control exotic vegetation and re-vegetate eroded areas (with appropriate native plants) on public lands within natural lake watersheds and provide demonstration sites for these BMPs.

### 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 Natural Lakes

- High sensitivity to pollution
- Habitat loss (feeding/foraging areas)
- Viable reproductive population size or availability
- Habitat loss (breeding range)
- Near limits of natural geographic range
- Predators (native or domesticated)
- Small native range (high endemism)
- Specialized reproductive behavior or low reproductive rates
- 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)

## High-Priority Conservation Actions for SGCN in Natural Lakes

### Habitat protection

- Employ technical assistance, land protection measures and support regulations to protect natural lake habitat for the benefit of SGCN.

### Threats reduction

- Investigate threats to the pugnose shiner and cisco to determine priority actions in the conservation of these species.

### Exotic/invasive species control

- Support the development and implementation of measures to control exotic/invasive species at natural lakes (e.g., the release of beetles to control purple loosestrife) to provide a higher quality habitat for SGCN.

### Population management

- Investigate the impacts to cisco from predatory fish management.
- Investigate the impacts of fishing on cisco.

### Public education to reduce human disturbance

- Support the work of the Lake Management Work Group in the development of sustainable use of natural lakes.

### Population enhancement (captive breeding and release)

- Investigate the feasibility of population augmentation for pugnose shiner and cisco.

### Reintroduction (restoration)

- Investigate the feasibility of restoring cisco and pugnose to natural lakes from which they have been extirpated.

### Regulation of collecting

- Support fishing regulations that limit the accidental take of cisco and pugnose shiner.

### Disease/parasite management

- Monitor populations of pugnose shiner and cisco to detect disease/parasite incidence.

### Adaptive Management

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

