



P E N N S Y L V A N I A
W I L D L I F E A C T I O N P L A N

2015–2025

Species of Greatest Conservation Need Species Accounts

Appendix 1.4E-Fish

- *Fish Species of Greatest Conservation Need*
- *Maps: Physiographic Provinces and HUC Watersheds*
- *Species Accounts (Click species name below or bookmark to navigate to species account)*

FISH

Ohio Lamprey	Tonguetied Minnow	Tadpole Madtom
Northern Brook Lamprey	Cutlip Minnow	Margined Madtom
Mountain Brook Lamprey	Bigmouth Shiner	Brindled Madtom
Least Brook Lamprey	Redfin Shiner	Northern Madtom
Shortnose Sturgeon	Allegheny Pearl Dace	Cisco
Lake Sturgeon	Hornyhead Chub	Brook Trout
Atlantic Sturgeon	Comely Shiner	Central Mudminnow
Paddlefish	Bridle Shiner	Eastern Mudminnow
Spotted Gar	River Shiner	Burbot
Bowfin	Ghost Shiner	Allegheny Burbot
American Eel	Ironcolor Shiner	Brook Stickleback
Blueback Herring	Blackchin Shiner	Threespine Stickleback
Hickory Shad	Swallowtail Shiner	Checkered Sculpin
Alewife	Longnose Sucker	Banded Sunfish
American Shad	Bigmouth Buffalo	Warmouth
Northern Redbelly Dace	Spotted Sucker	Longear Sunfish
Southern Redbelly Dace	White Catfish	Eastern Sand Darter
Redside Dace	Black Bullhead	Iowa Darter
Streamline Chub	Blue Catfish	Spotted Darter
Gravel Chub	Mountain Madtom	Tessellated Darter

FISH, CONTINUED

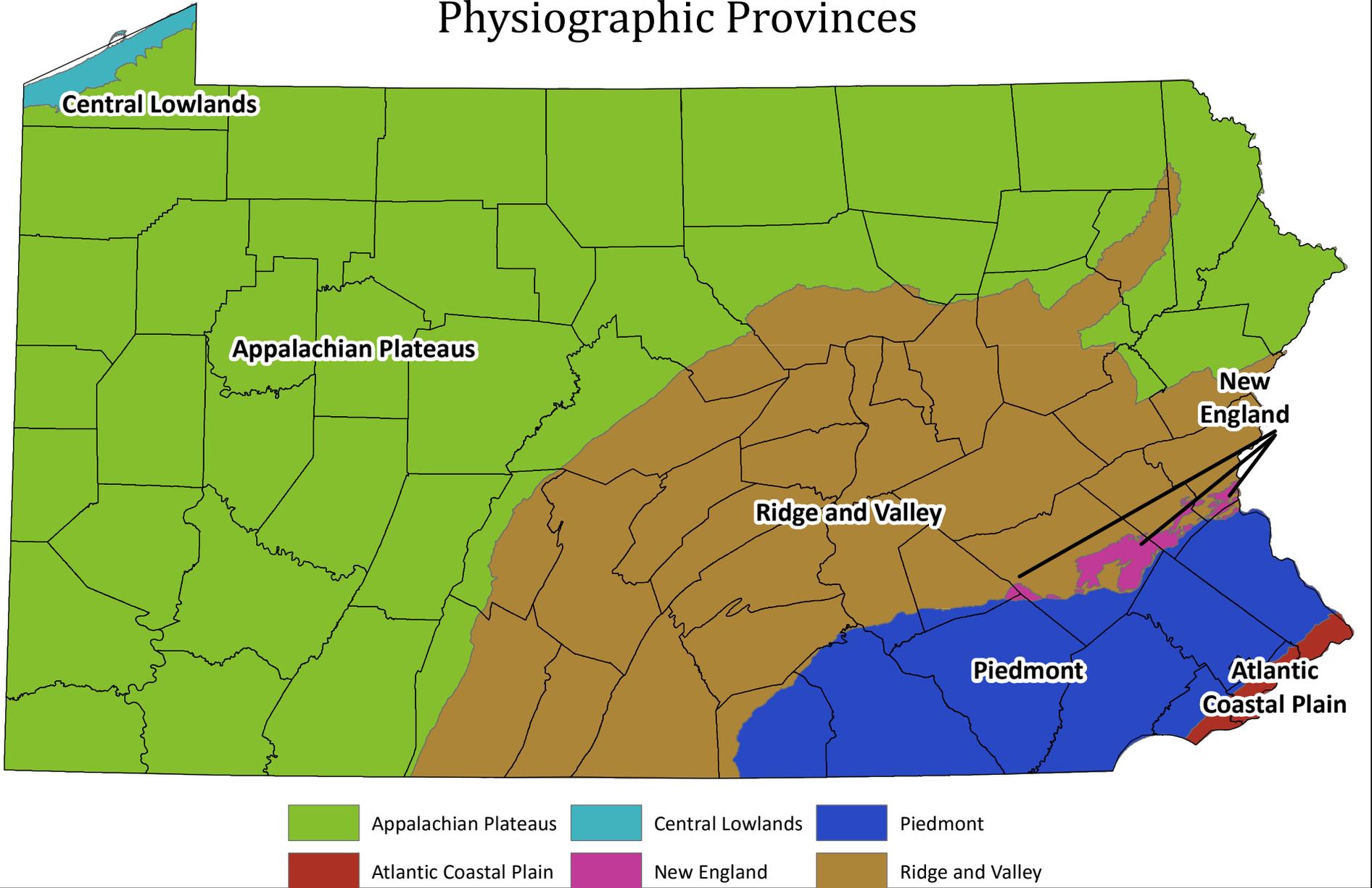
Tippecanoe Darter
Variegate Darter

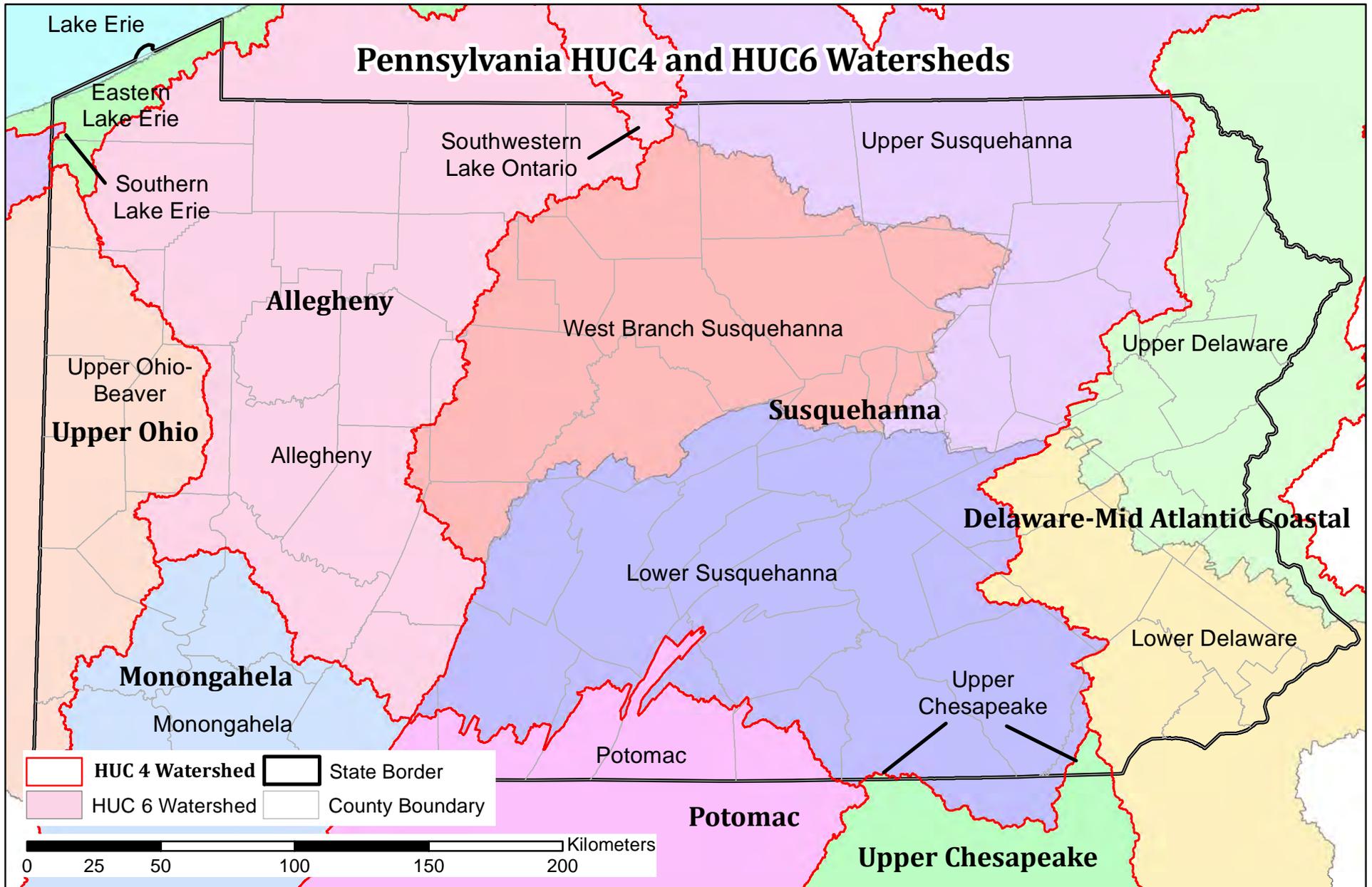
Chesapeake Logperch
Longhead Darter

Shield Darter

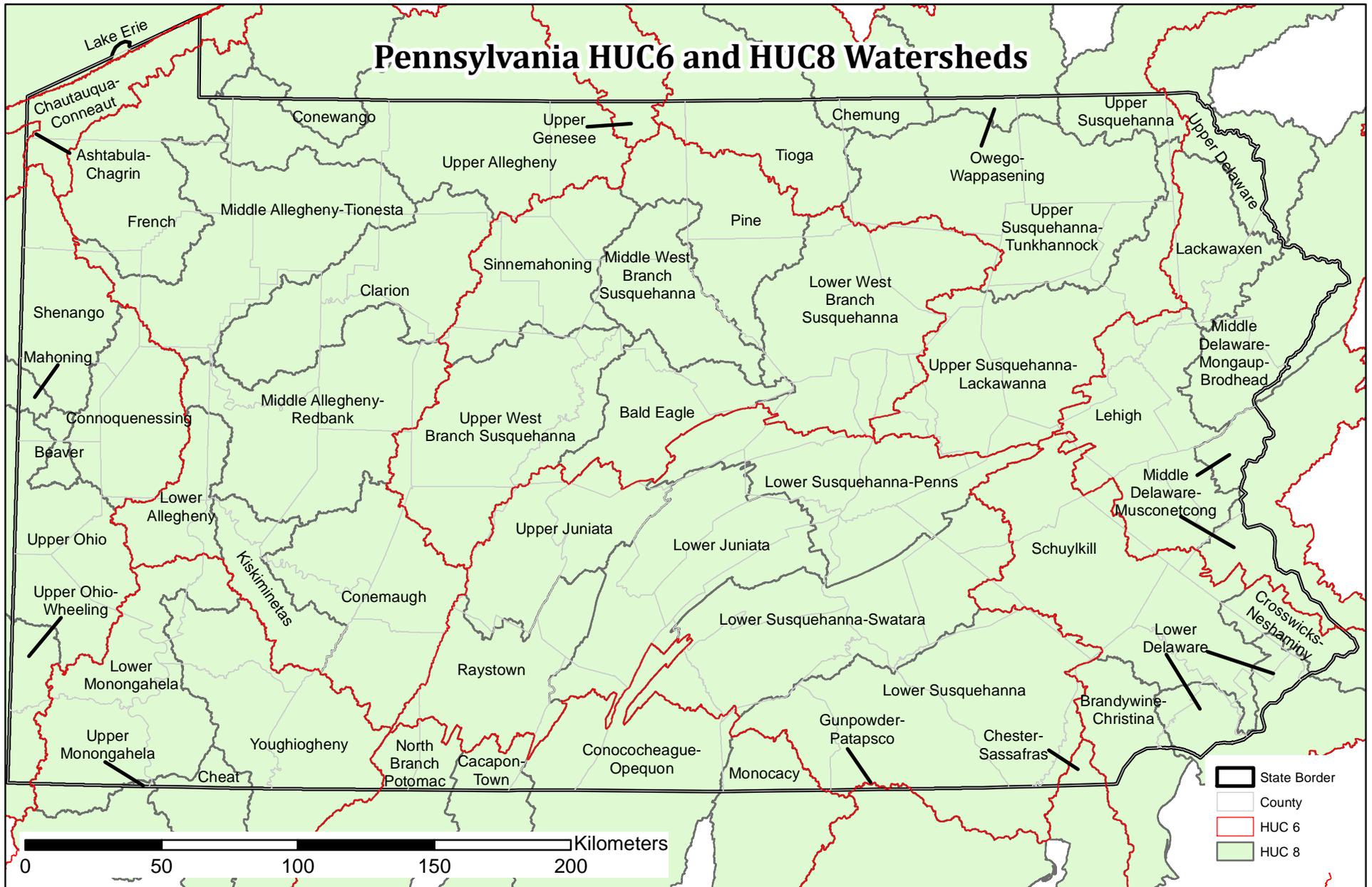
The following Physiographic Province and HUC Watershed maps are presented here for reference with conservation actions identified in the species accounts. Species account authors identified appropriate Physiographic Provinces or HUC Watershed (Level 4, 6, 8, 10, or statewide) for specific conservation actions to address identified threats. HUC watersheds used in this document were developed from the Watershed Boundary Dataset, a joint project of the U.S. Dept. of Agriculture-Natural Resources Conservation Service, the U.S. Geological Survey, and the Environmental Protection Agency.

Physiographic Provinces

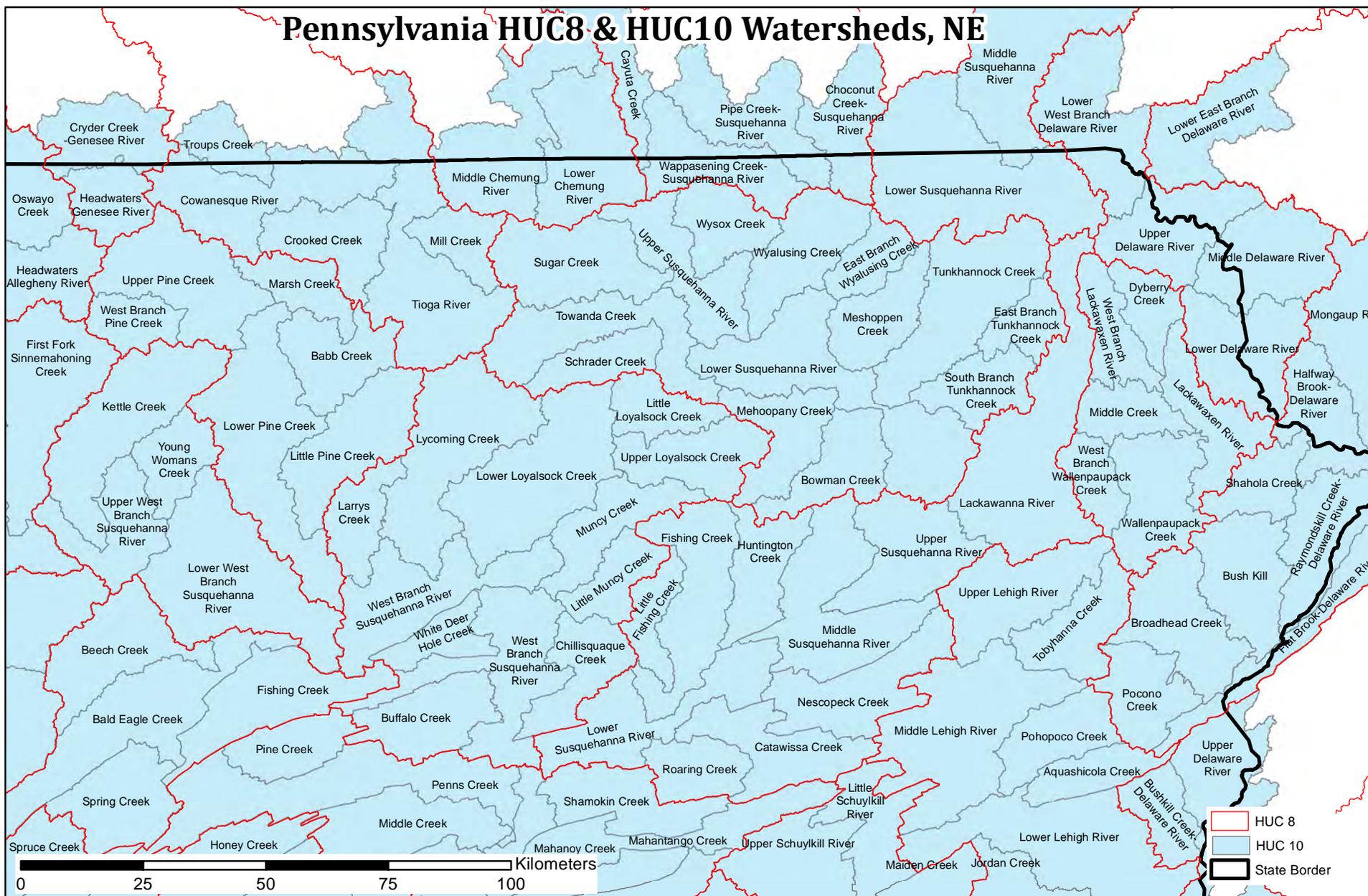


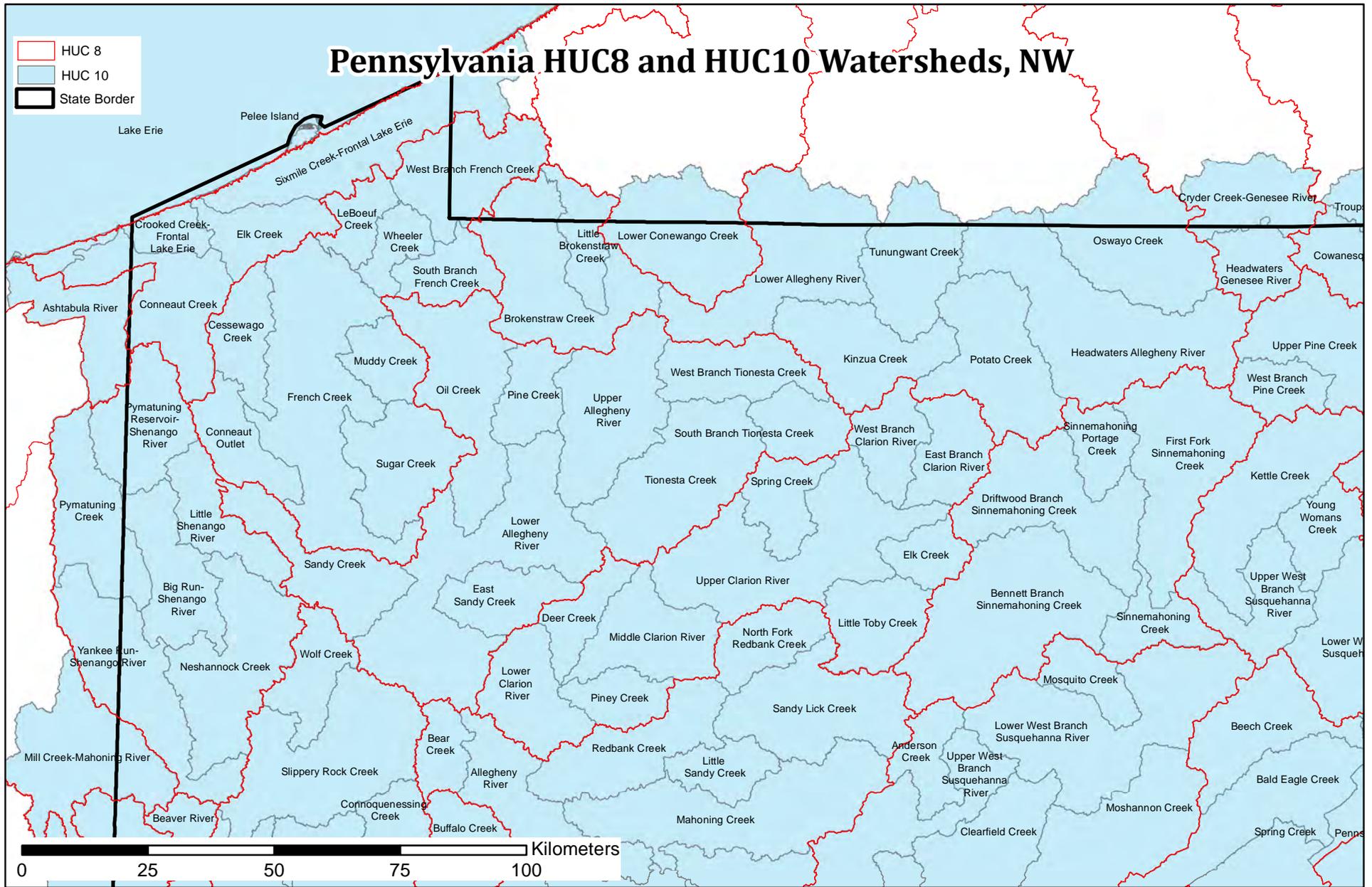


Pennsylvania HUC6 and HUC8 Watersheds

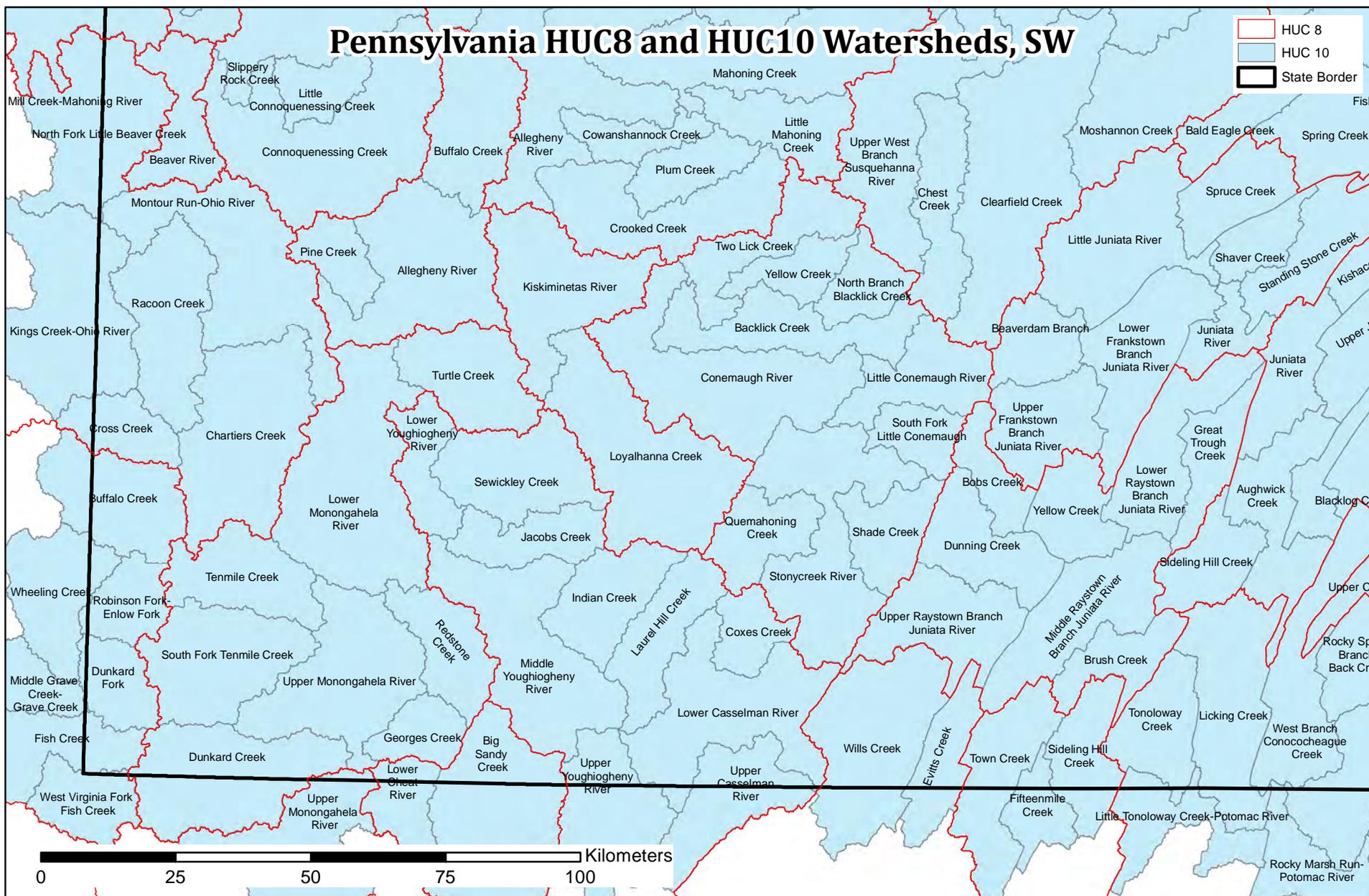


Pennsylvania HUC8 & HUC10 Watersheds, NE





Pennsylvania HUC8 and HUC10 Watersheds, SW



Ohio Lamprey

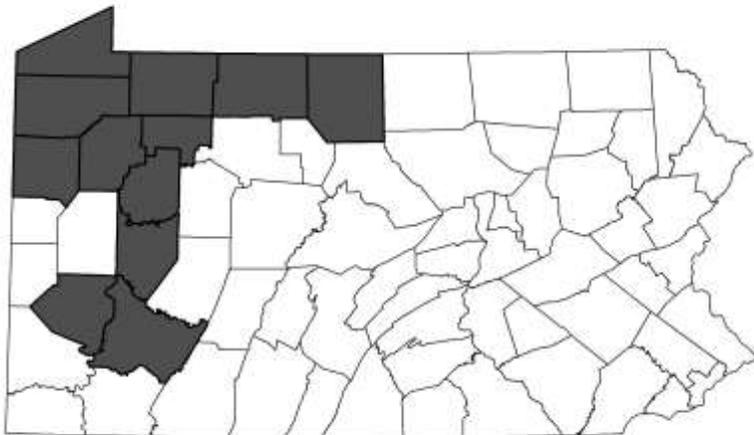
Ichthyomyzon bdellium

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3G4	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Candidate
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Small Rivers	Large Rivers
Habitat	Moderate Gradient, Cool, Small River	Warm, Large River

Specific Habitat Requirements:

Occurs in large streams to large rivers during parasitic phase, but enters smaller streams to spawn. Adults are generally taken in riffles and runs over gravel, cobble, and rubble. Ammonoetes generally prefer sluggish sections of small-medium sized streams with significant deposits of mud, muck, silt, sand, detritus and coarse woody debris.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, U. Ohio

Associated Species: All species occupying waterway.

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, U. Ohio

Associated Species: All species occupying waterway.

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys needed at this time. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Northern Brook Lamprey

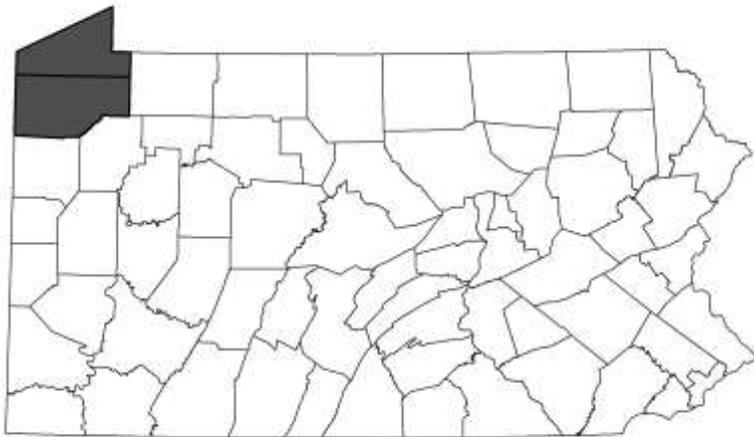
Ichthyomyzon fossor

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Increase population in Temple Creek; re-establish populations in Conneaut Creek and its East and West Branches.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Moderate Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Small-medium sized streams, usually in moderately warm waters. Substrates include sand, gravel, mud, and silt.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Lampricide applications targeting Sea Lamprey in drainage.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources	Eliminate lampricide treatments.	Number of treatments.	Sample waterway annually until recovery; then each 5 years.	1
Cessation of treatments. Rebuild breached low-head dam in OH to serve as lamprey barrier.				
Action Location: HUC10 Watershed: Lake Erie				
Associated Species: Hornyhead chub, brindled madtom, eastern sand darter, American brook lamprey				

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation smothering ammocoete habitat and riffles.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources	Reduce siltation.	Turbidity.	Monitor survival of plantings only.	3
Increase vegetated buffers.				
Action Location: HUC10 Watershed: Lake Erie				
Associated Species: Hornyhead chub, brindled madtom, eastern sand darter, American brook lamprey				

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Loss of permanent stream flow in Temple Creek.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	3
Action Location: HUC10 Watershed: Lake Erie				
Associated Species: All species in drainage				

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Erosion and sedimentation; spill potential of brine or oil.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Maintain or enhance current levels of protection by regulation.	No net impact from siltation or pollution.	Reported pollution events.	Difficult to monitor - primary concern is rare catastrophic event.	3
Action Location: HUC10 Watershed: Lake Erie				
Associated Species: Hornyhead chub, brindled madtom, eastern sand darter, American brook lamprey				

RESEARCH NEEDS

1. Is the remaining northern brook lamprey population viable over the long-term, given its reduction as a result of lampricide treatments?
2. Can habitat (e.g., sand, muck, detritus) for larvae be enhanced and increased in Temple Creek to augment recruitment?

SURVEY NEEDS

1. Status of population recommended. Remnant population is very small and potentially impacted by only viable sampling gear (i.e., electrofishing).

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
Surveys to monitor lamprey ammocoete densities in Lake Erie drainage streams every two years or prior to lampricide treatments.	U.S. Fish & Wildlife Service		Surveys to monitor lamprey ammocoete densities in Lake Erie drainage streams every two years or prior to lampricide treatments.

Mountain Brook Lamprey

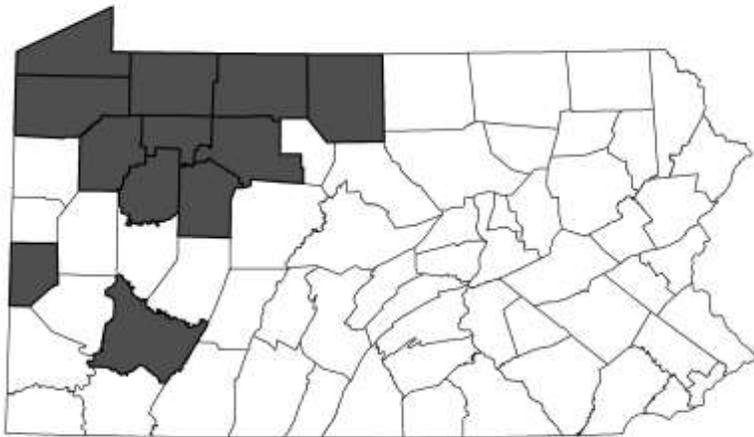
Ichthyomyzon greeleyi

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Threatened
Northeast Region	Very High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Small Rivers	Medium Rivers
Habitat	Moderate Gradient, Cool, Small River	Warm, Medium River

Specific Habitat Requirements:

Clear, small-medium sized creeks, but occasionally found in larger waters.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Siltation and chemical pollution resulting from oil and gas development activities.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Strictly enforce Erosion & Sedimentation standards and regulations governing discharges.	No net increase in pollution.	Pollution reports.	Unknown.	2

Action Location: Physiographic Province: Appalachian Plateaus
Associated Species: All species in drainage

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Loss of minimum flows required to sustain species.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	3

Action Location: Physiographic Province: Appalachian Plateaus
Associated Species: All species in drainage

RESEARCH NEEDS

1. No research is currently required. The mountain brook lamprey population is stable; a PA responsibility species.

SURVEY NEEDS

1. Status survey completed. No survey work necessary.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Least Brook Lamprey

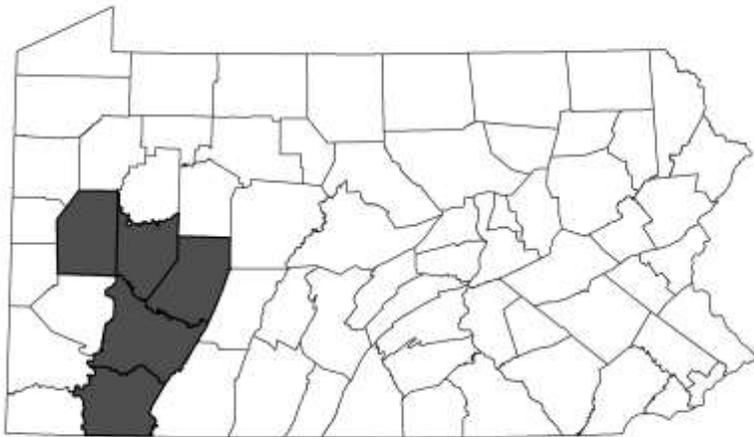
Lampetra aepyptera

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Wikimedia Commons, University of Mississippi Field Station, Fredlyfish4



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Candidate
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Headwaters and Creeks
Habitat	Moderate Gradient, Cool, Headwaters and Creeks	Low Gradient, Cool, Headwaters and Creeks

Specific Habitat Requirements:

Creeks with rocky, gravelly, and/or sandy riffles, along with significant deposits of mud, muck, sand, and detritus associated with sluggish pools, edges, backwaters, and/or eddies.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Water temperature could increase as water level decreases in response to drought. Habitat could be limited by drought.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, Susquehanna, U. Ohio, Monongahela

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, Susquehanna, U. Ohio, Monongahela

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, U. Ohio

Associated Species: All species occupying waterway.

IUCN Threat: 9.0 Pollution
Specific Threat: Depressed pH; erosion and sedimentation; flocculant fotation and deposition; altered hydrology, groundwater, and stream temperatures.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Remediate existing discharges, ensure current and future mining operations do not affect habitat and water quality.	Restore water quality.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, U. Ohio

Associated Species: All aquatic species in Casselman Basin

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys needed at this time. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Shortnose Sturgeon

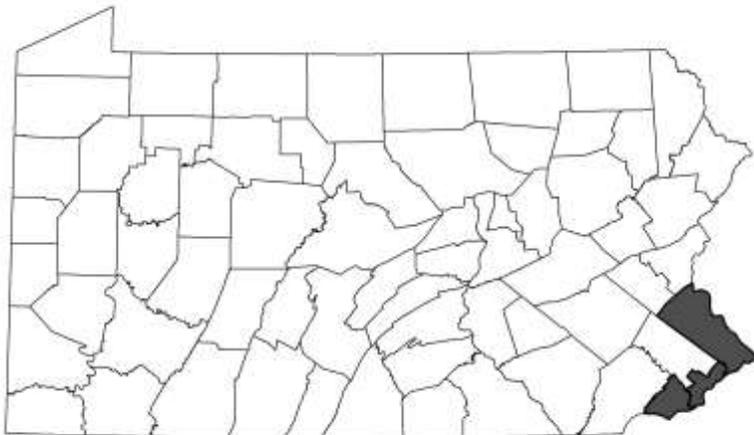
Acipenser brevirostrum

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3	State Rank	S1
IUCN Red List	VU Vulnerable	PA Legal Status	Endangered
Northeast Region	Very High Concern / High Responsibility	PA Abundance	5,000-15,000
Federal Status	Endangered	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

For each population segment, the minimum population size will be large enough to maintain genetic diversity and avoid extinction.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Tidal Large Rivers	
Habitat	Tidal Large River	

Specific Habitat Requirements:

Large coastal rivers and estuaries.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Impingement and entrainment at power generation plant cooling water intakes.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas	Minimize entrainment and impingement.	Individual mortality.	Regular impingement surveys.	1

Design improvements to intakes.

Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal

Associated Species: Atlantic sturgeon, threespine stickleback, banded sunfish

IUCN Threat: 9.0 Pollution

Specific Threat: Chemicals linked to reproductive and developmental disorders.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy	Eliminate endocrine disrupting chemical (EDC) impacts.	Individual health.	Periodic sediment sampling.	1

Maintain and strengthen discharge restrictions.

Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal

Associated Species: Atlantic sturgeon

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Propeller strikes.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 8.0 Outreach	Minimize strikes.	Number of strikes.	Monitoring difficult - rely on injury and mortality reports	2

Post notices and take other educational steps to make vessel operators aware of threat.

Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal

Associated Species: Atlantic sturgeon

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Habitat degradation caused by dredging and channelization.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Consider life history, seasonal movements, and impacts to habitats prior to commencing dredging projects.	Minimize impact to habitat.	Area of habitat impacted.	Pre- and post-project habitat assessments would be necessary	2
Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal				
Associated Species: Atlantic sturgeon				

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Inadvertent mortality caused by commercial fishing.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management First action is mandatory reporting of bycatch. Until a better understanding of bycatch impacts is attained, it will be difficult to implement actions.	Minimize bycatch.	Individual catch and mortality.	Monitoring somewhat effective, but ongoing mark-recapture programs should continue	3
Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal				
Associated Species: Atlantic sturgeon				

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Alteration of habitat due to shoreline development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Consider life history, seasonal movements, and impacts to habitats prior to commencing waterfront projects.	Minimize impact to habitat.	Area of habitat impacted.	Pre- and post-project habitat assessments would be necessary	3
Action Location:	HUC4 Watershed: Delaware-Mid Atlantic Coastal			
Associated Species:	Atlantic sturgeon			

RESEARCH NEEDS

1. What is the status of the Delaware River population of the shortnose sturgeon? (Appears to be stable-to-improving)
2. What are the impacts to shortnose sturgeon resulting from dredging projects in the shipping channel of the Delaware River?
3. What are the impacts to shortnose sturgeon resulting from impingement and entrainment?

SURVEY NEEDS

1. Periodic surveys are conducted by NJ, DE, and NMFS, in particular surveys that provide information addressing spawning and nursery habitat.
2. Acoustic tagging surveys to track activity in response to vessels.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
Periodic status surveys by other states.	Delaware, NMFS		Population is surveyed by other states.

Lake Sturgeon

Acipenser fulvescens

PA Fish & Boat Commission

PA Fish & Boat Commission

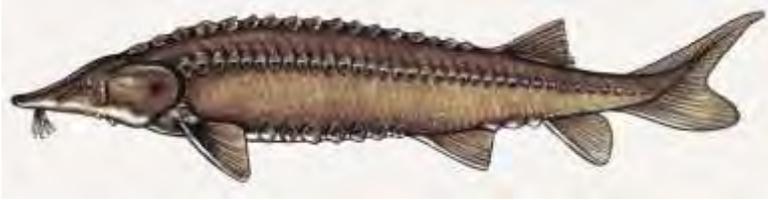
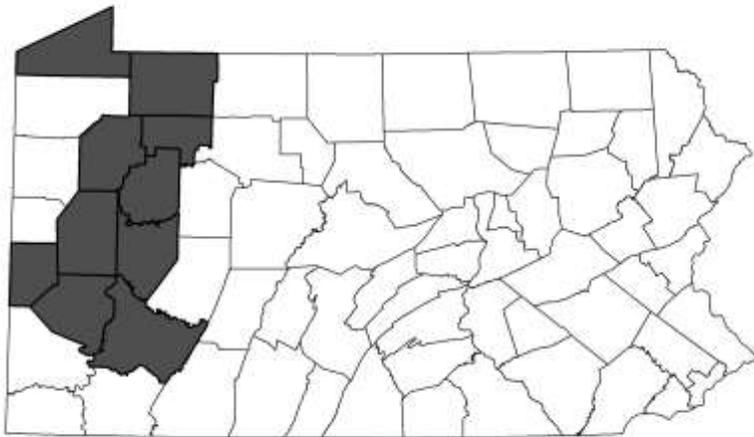


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3G4	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Not able to determine conservation target at this time, more information needed about species in Pennsylvania.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	
Habitat	Lake Erie	

Specific Habitat Requirements:

Occupies rock, gravel, and firm sand substrates of deep benthic to shoal habitats of large lakes and large river channels, side channels, islands, and backwater complexes; avoids soft substrates and high gradients.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Mortality from botulism thought to be caused by algae, zebra mussel and quagga mussel, and goby introductions and outbreaks.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0	Direct Management of Natural Resources	N/A	N/A	

No actions are feasible which Pennsylvania can undertake to reduce this threat. Lake Sturgeon population here is very small and specific mechanism that triggers outbreaks is poorly understood.

Action Location: HUC4 Watershed: E. Lake Erie-Lake Erie

RESEARCH NEEDS

1. What is the status of the lake sturgeon in Pennsylvania waters of Lake Erie?
2. Is it feasible to reintroduce the lake sturgeon into the Allegheny River?
3. What is the trigger for botulism outbreaks in Lake Erie?

SURVEY NEEDS

1. This species is very rare in the PA waters of Lake Erie. A status survey would be useful, but PA would provide only a minor role in conservation of this species.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
Monitoring by PFBC started in 2014 as part of a larger Lake Erie lake sturgeon initiative. Annual monitoring with gill nets will continue for in the near term then a longer term, periodic approach will be taken.	Pennsylvania Fish and Boat Commission		

Atlantic Sturgeon

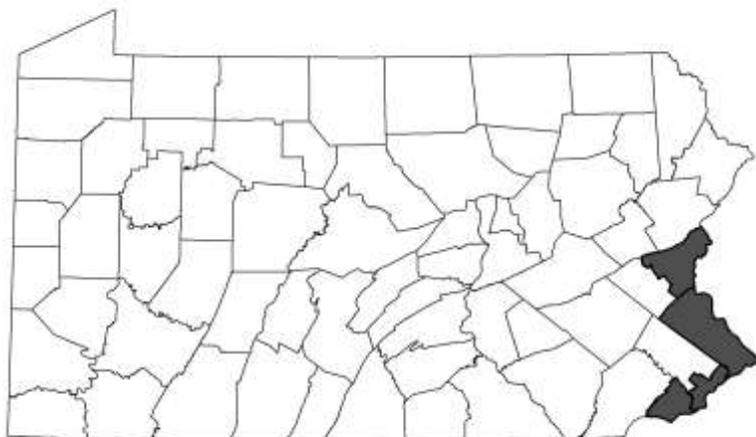
Acipenser oxyrinchus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3	State Rank	S2
IUCN Red List	CR Critically Endangered	PA Legal Status	Endangered
Northeast Region	Very High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Endangered	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Stock assessment indicates target of 20 extant year classes (ASMFC 1998).

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Tidal Large Rivers	
Habitat	Tidal Large River	

Specific Habitat Requirements:

Rivers, estuaries, and coastal oceanic habitats depending upon season; spawn in flowing water over hard substrates and pools at the base of waterfalls.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Increased extreme precipitation events may degrade water quality by increasing pollutants and sedimentation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: Physiographic Province: Statewide

Associated Species: Has potential to impact all species in river

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Impingement and entrainment at power generation plant cooling water intakes.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Design improvements to intakes	minimize entrainment/impingement	individual mortality	Regular impingement surveys.	1

Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal

Associated Species: Shortnose sturgeon

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Habitat degradation caused by dredging and channelization.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Consider life history, seasonal movements, and impacts to habitats prior to commencing dredging projects.	Minimize impact to habitat.	Area of habitat impacted.	Pre- and post-project habitat assessments would be necessary	1
Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal				
Associated Species: Shortnose sturgeon				

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Droughts may advance salt wedge, potentially disrupting spawning.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Legislation reducing greenhouse emissions is necessary.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1
Action Location: Physiographic Province: Statewide				
Associated Species: Has potential to impact all species in river				

THREATS AND ACTIONS

IUCN Threat: 6.0 Human Intrusions and Disturbance

Specific Threat: Propeller and hull strikes.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 8.0 Outreach Post notices and take other educational steps to make vessel operators aware of threat.	Minimize strikes.	Number of strikes.	Monitoring difficult - rely on injury and mortality reports	2
Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal				
Associated Species: Shortnose sturgeon				

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Inadvertent mortality caused by commercial fishing.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management Implement mandatory reporting of bycatch to better understand impacts.	Minimize bycatch.	Individual catch and mortality.	Monitoring somewhat effective, but ongoing mark-recapture programs should continue	3
Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal				
Associated Species: Shortnose sturgeon				

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Impacts from spills and pollution events could be significant, given very small population size.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Maintain high construction and operation standards for vessels and infrastructure.	Minimize pollution events.	Number of events.	Monitor response reports and inspections	3

Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal

Associated Species: Shortnose sturgeon

RESEARCH NEEDS

1. What is the status of the Delaware River and Estuary Atlantic sturgeon populations? Is significant reproduction occurring?
2. What are the impacts to Atlantic sturgeon resulting from dredging projects in the shipping channel of the Delaware River?
3. What are the cumulative impacts, if any, of vessel strikes?

SURVEY NEEDS

1. Conduct surveys of known and suspected Atlantic sturgeon spawning sites for activity.
2. Survey non-spawning areas to identify potential concentration areas.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
Periodic status surveys by other states.	Delaware, NMFS		Population is surveyed by other states.

Paddlefish

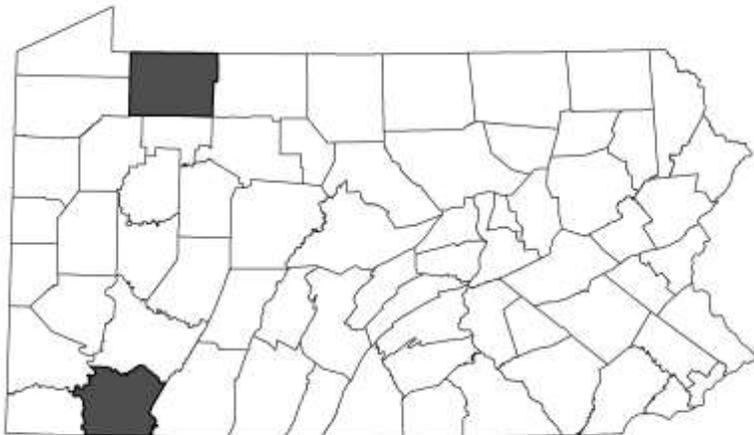
Polyodon spathula

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	SX
IUCN Red List	VU Vulnerable	PA Legal Status	Not Listed
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	

Conservation Goal:

Develop a reproducing population in the Ohio basin, Western Pennsylvania.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Large Rivers	
Habitat		

Specific Habitat Requirements:

Low gradient sections of large rivers, including sluggish pools, backwaters, bayous, and oxbows; reservoirs and large lakes.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Determine current status of reintroduced paddlefish population(s) in Ohio River drainage, in particular reproduction status.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

Spotted Gar

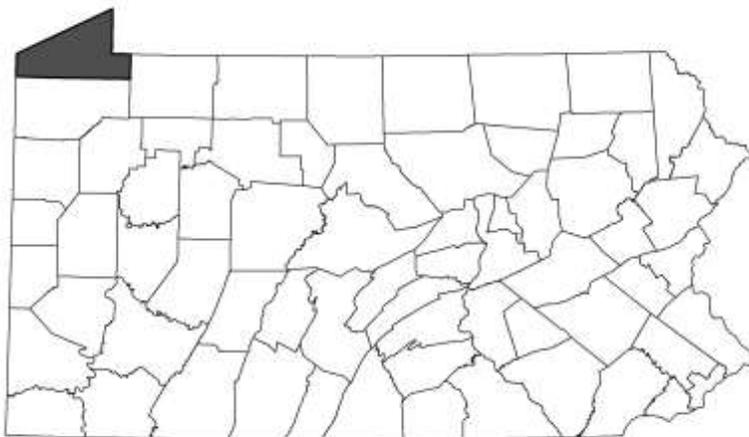
Lepisosteus oculatus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List		PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	
Habitat	Lake Erie	

Specific Habitat Requirements:

Clear, weedy backwaters and oxbows of low-gradient creeks and rivers; also swamps, sloughs, ditches, and lakes.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Cumulative inputs of chemicals and nutrients may degrade water quality and cause algal blooms, creating anoxic areas during decomposition.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC4 Watershed: E. Lake Erie-Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

IUCN Threat: 9.0 Pollution

Specific Threat: Cumulative inputs of chemicals and nutrients may degrade water quality and cause algal blooms, creating anoxic areas during decomposition.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC4 Watershed: E. Lake Erie-Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Cumulative inputs of chemicals and nutrients may degrade water quality and cause algal blooms, creating anoxic areas during decomposition.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC10 Watershed: Frontal Lake Erie, Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Introduced fishes may compete for food resources; exotic mussels may impact soft substrate and vegetation growth.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources No actions are feasible which Pennsylvania can undertake to significantly reduce invasive animal species populations; however, measures for the prevention of further introductions should be undertaken.	Reduce or eliminate adverse interactions attributed to introduced species.	Community sampling.	Fish community sampling targeted at spotted gar annually or as appropriate at reference sites.	3
Action Location: HUC6 Watershed: E. Lake Erie				
Associated Species: Native fishes.				

RESEARCH NEEDS

1. No research currently required. Spotted gar population in Presque Isle Bay currently appears to be stable.

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys. Spotted gar population in Presque Isle is considered stable at present.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites within Presque Isle is recommended. This could possibly be integrated into ongoing gamefish monitoring initiatives.	Pennsylvania Fish and Boat Commission		

Bowfin

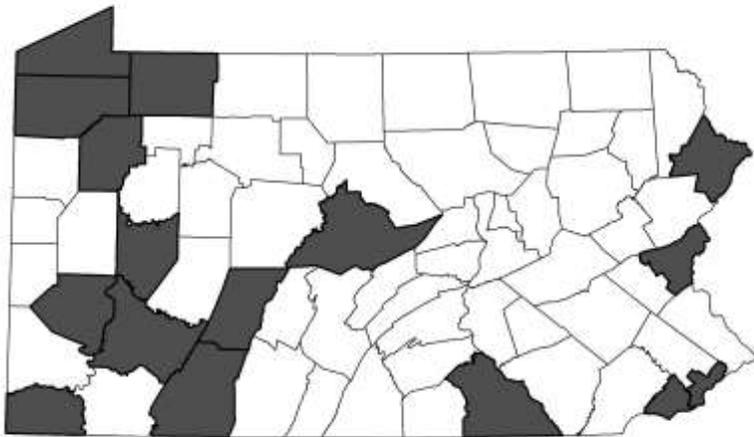
Amia calva

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Candidate
Northeast Region	High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Small Rivers
Habitat	Warm, Medium River	Low Gradient, Cool, Small River

Specific Habitat Requirements:

Inhabits swamps, marshes, ditches, ponds, and lakes, and sluggish sections of rivers and creeks, where it prefers areas with submerged vegetation, undercut banks, and coarse woody debris.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Wastewater and sewage seepage into Conneaut Lake and/or water table may be expected.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Improve infrastructure and devices if, and when impacts are detected.	No increase in pollution or impacts to water table.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 5 years for changes.	2

Action Location: HUC8 Watershed: French

Associated Species: All species in Conneaut Lake

IUCN Threat: 9.0 Pollution

Specific Threat: Discharge and non-point from Erie into Presque Isle Bay; localized water quality degradation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	2

Action Location: HUC6 Watershed: Lake Erie

Associated Species: Potentially impacts all organisms in near-shore environment.

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys needed at this time. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species appears to be expanding its range, so a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

American Eel

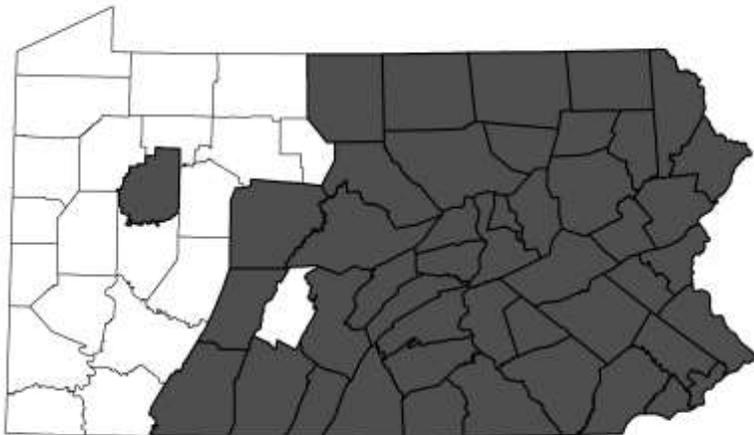
Anguilla rostrata

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S5
IUCN Red List		PA Legal Status	Not Listed
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

No sustainable targets established in the 2012 Benchmark ASMFC Stock Assessment; ensure all eels are passed by dams on lower Susquehanna (Susquehanna River Anadromous Fish Cooperative - Migratory Fish Management and Restoration Plan Addendum 2013).

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	

Habitat

Specific Habitat Requirements:

Freshwater dwelling American eels appear to be habitat generalists with no consistent habitat requirements. Migrations typically occur throughout lotic environments ranging from estuaries to creeks.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Ineffective dam fishways and dams without fishways prevent recolonization of Susquehanna River and Schuylkill River drainages.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Design and construct efficient fish passage facilities and remove dams where feasible.	Restore migratory fish runs to native watersheds.	Presence of migratory fishes.	Monitor fish passage visually during migrations; surveys upriver of dams.	1
Action Location: HUC6 Watershed: Lwr Susquehanna, U. Susquehanna, U. Delaware				
Associated Species: Shad species; all migratory fishes				

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Climate change may alter ocean currents and redirect drifting leptocephali away from historic natal areas.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Legislation reducing greenhouse emissions is necessary.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1
Action Location: HUC6 Watershed: Lwr Susquehanna, U. Susquehanna, U. Delaware				
Associated Species: Has potential to impact all species in river				

RESEARCH NEEDS

1. What is the contribution of silver eel outmigration from PA? What is the passage of eels past dams on Delaware tributaries (Schuylkill and Lehigh rivers)?
2. What effect do multi-species interactions have on populations?
3. Define extent of upstream migrations.

SURVEY NEEDS

1. See research needs.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Alosid survey of Schuylkill River - annual.	Philadelphia Water Dept.		Annual survey to determine species and number of shad/herring running in Schuylkill River below Fairmont Dam.
Compliance for 401 water quality certification on lower Susquehanna, fish passage performance measures	PADEP, PFBC, SRBC, MDNR		
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
PA contracts with Lewis Haul Seine Fishery for CPUE fishery data (Delware)	Pennsylvania Fish and Boat Commission		

Blueback Herring

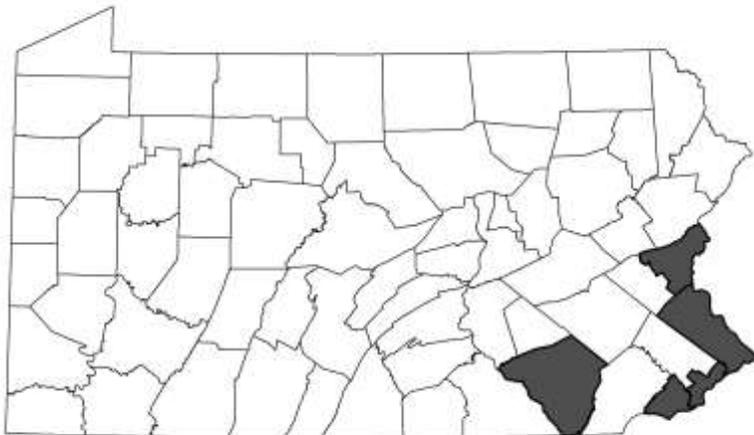
Alosa aestivalis

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



Documented Presence

CONSERVATION PROFILE

Global Rank	G3G4	State Rank	S3
IUCN Red List	VU Vulnerable	PA Legal Status	Not Listed
Northeast Region	High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Decline of >10%

Conservation Goal:

Five million spawning herring above York Haven (Susquehanna River Anadromous Fish Cooperative - Migratory Fish Management and Restoration Plan 2010).

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Central Oak-Pine	
Habitat	Northeastern Interior Dry-Mesic Oak Forest	

Specific Habitat Requirements:

Anadromous coastal marine species: spawns in tidal and non-tidal mainstem river sections, backwater sloughs, and flooded swamps of tributary streams.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Predation by Striped Bass may be impacting population.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management	N/A	N/A	N/A	

No actions recommended. Striped bass is an important sport and commercial species that has been sensitive to overharvest and is being carefully managed. Possible overfishing concerns should be addressed before other actions are considered.

Action Location: HUC8 Watershed: Lwr Delaware

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Dams on the Schuylkill, Susquehanna, Lehigh Rivers and tributaries prevent upriver migrations

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Design and construct efficient fish passage facilities and remove dams where feasible	Restore migratory fish runs to native watersheds	Presence of migratory fishes	Monitor fish passages visually during migrations; surveys upriver of dams	1

Action Location: HUC6 Watershed: Upper Delaware, Lower Delaware, Lower Susquehanna

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Overfishing may be a factor in decline; moratorium now in place.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management Refine regulations to protect resources; moratorium on commercial fishing currently (2015) in effect; work closely with the Mid Atlantic Fishery Management Council to minimize bycatch from commercial fishing for other species in federal waters (3-200 miles off the Atlantic coast).	Increase population in Delaware River and estuary	Fish density	Annual monitoring during migration at specific sites.	1

Action Location: HUC8 Watershed: Lwr Delaware
Associated Species: Alewife

RESEARCH NEEDS

1. What are the specific causes of the recent population declines?
2. What effect do multi-species interactions have on populations?
3. Define spawning and nursery habitats (potentially assessed with telemetry?).

SURVEY NEEDS

1. See research needs.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Alosid survey of Schylkill River - annual.	Philadelphia Water Dept.		Annual survey to determine species and number of shad/herring running in Schylkill River below Fairmont Dam.
Compliance for 401 water quality certification on lower Susquehanna, fish passage performance measures	PADEP, PFBC, SRBC, MDNR		
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
PA contracts with Lewis Haul Seine Fishery for CPUE fishery data (Delware)	Pennsylvania Fish and Boat Commission		

Hickory Shad

Alosa mediocris

PA Fish & Boat Commission

PA Fish & Boat Commission

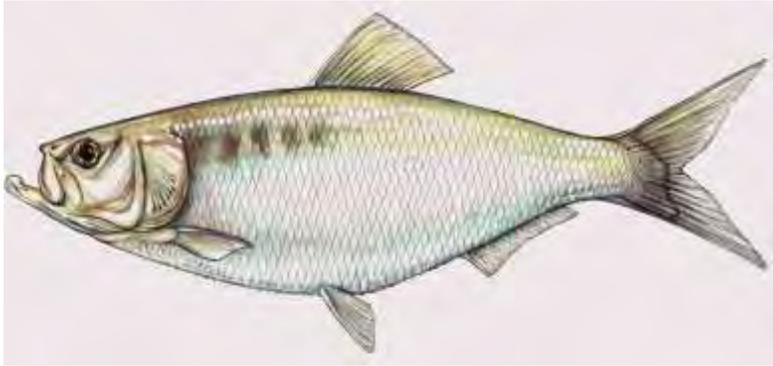
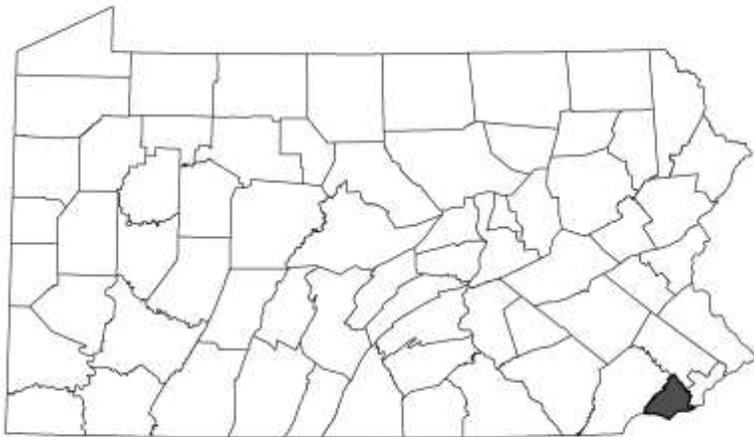


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S2
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Tidal Large Rivers	Large Rivers

Habitat

Specific Habitat Requirements:

Anadromous coastal marine species: spawns in tidal and non-tidal mainstem river sections, backwater sloughs, and flooded swamps of tributary streams.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Dams on Schuylkill and Susquehanna Rivers prevent upriver migrations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Design and construct efficient fish passage facilities and remove dams where feasible.	Restore migratory fish runs to native watersheds	Presence of migratory fishes	Monitor fish passage visually during migrations; surveys upriver of dams.	1

Action Location: HUC6 Watershed: Upper Delaware, Lower Delaware, Lower Susquehanna

Associated Species: Shad species; all migratory fishes

RESEARCH NEEDS

1. What effect do multi-species interactions have on populations?
2. Define spawning and nursery habitats (potentially assessed with telemetry?).

SURVEY NEEDS

1. See research needs.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Alosid survey of Schuylkill River - annual.	Philadelphia Water Dept.		Annual survey to determine species and number of shad/herring running in Schuylkill River below Fairmont Dam.
Compliance for 401 water quality certification on lower Susquehanna, fish passage performance measures	PADEP, PFBC, SRBC, MDNR		

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
PA contracts with Lewis Haul Seine Fishery for CPUE fishery data (Delware)	Pennsylvania Fish and Boat Commission		

Alewife

Alosa pseudoharengus

PA Fish & Boat Commission

PA Fish & Boat Commission

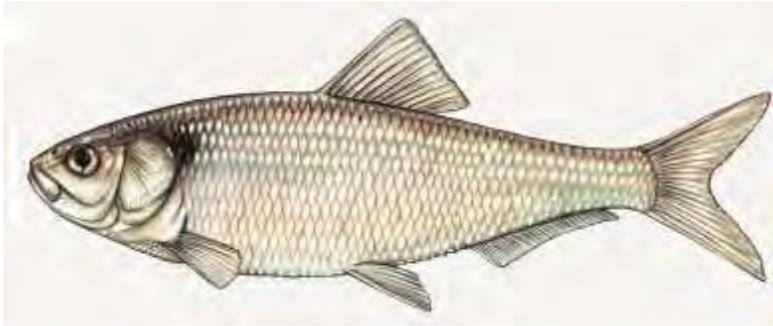
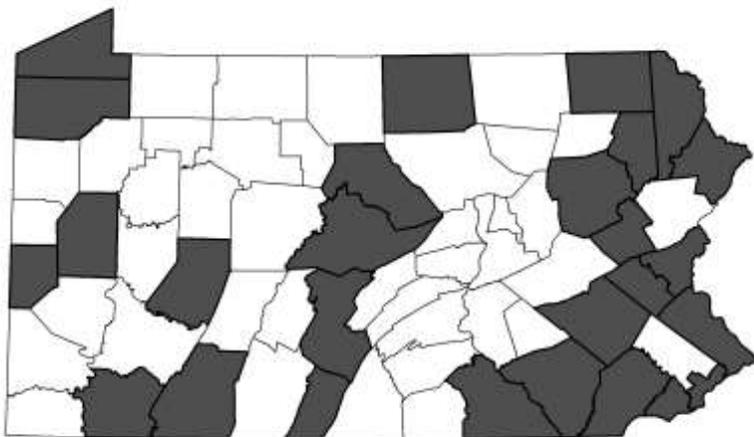


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S3
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Decline of >10%

Conservation Goal:

Five million spawning herring above York Haven (Susquehanna River Anadromous Fish Cooperative - Migratory Fish Management and Restoration Plan 2010).

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Tidal Large Rivers	Large Rivers

Habitat

Specific Habitat Requirements:

Anadromous coastal marine species: spawns in tidal and non-tidal mainstem river sections, backwater sloughs, and flooded swamps of tributary streams.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Predation by Striped Bass may be impacting population.

Action	Objective	Measure	Monitoring	Priority
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TRACS Action 101.0 Species Management

No actions recommended. Striped bass is an important sport and commercial species that has been sensitive to overharvest and is being carefully managed. Possible overfishing concerns should be addressed before other actions are considered.

Action Location: HUC8 Watershed: Lwr Delaware

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Dams on the Schuylkill, Susquehanna, Lehigh Rivers and tributaries prevent upriver migrations

Action	Objective	Measure	Monitoring	Priority
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TRACS Action 5.0 Facilities and Areas Design and construct efficient fish passage facilities and remove dams where feasible	Restore migratory fish runs to native watersheds	Presence of migratory fishes	Monitor fish passages visually during migrations; surveys upriver of dams	1
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Action Location: HUC6 Watershed: Upper Delaware, Lower Delaware, Lower Susquehanna

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Overfishing may be a factor in decline; moratorium now in place.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management Refine regulations to protect resources; moratorium on commercial fishing currently (2015) in effect; work closely with the Mid Atlantic Fishery Management Council to minimize bycatch from commercial fishing for other species in federal waters (3-200 miles off the Atlantic coast).	Increase population in Delaware River and estuary	Fish density	Annual monitoring during migration at specific sites.	1

Action Location: HUC8 Watershed: Lwr Delaware

Associated Species: Alewife

RESEARCH NEEDS

1. What are the specific causes of the recent population declines?
2. What effect do multi-species interactions have on populations?
3. Define spawning and nursery habitats (potentially assessed with telemetry?).

SURVEY NEEDS

1. See research needs.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

American Shad

Alosa sapidissima

PA Fish & Boat Commission

PA Fish & Boat Commission

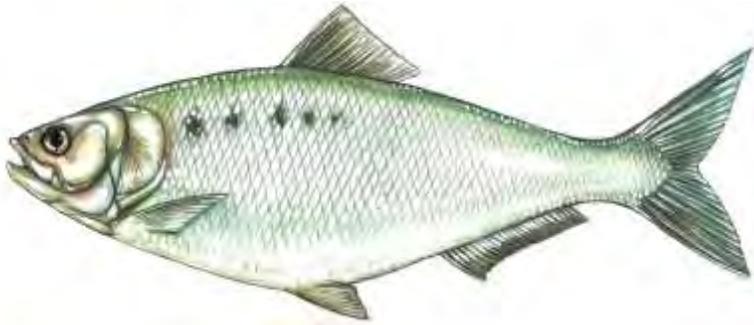
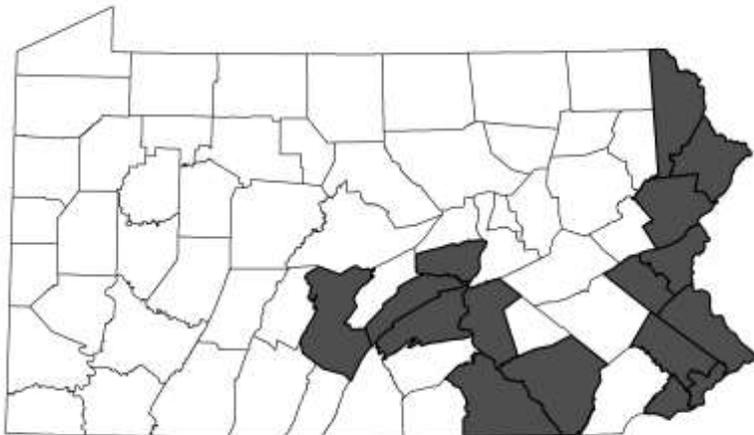


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Two million spawning adults above York Haven (Susquehanna River Anadromous Fish Cooperative - Migratory Fish Management and Restoration Plan 2010); In the Delaware Basin, create self-sustaining populations in the Schuylkill and Lehigh rivers (ASMFC 2011).

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Tidal Large Rivers	Large Rivers

Habitat

Specific Habitat Requirements:

Main stem of the Susquehanna and Delaware Rivers, tributaries to the main stems and their freshwater tidal areas.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Predation by Striped Bass may be impacting population.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management				
No actions recommended. Striped bass is an important sport and commercial species that has been sensitive to overharvest and is being carefully managed. Possible overfishing concerns should be addressed before other actions are considered.				
Action Location: HUC6 Watershed: Lwr Delaware				

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Fishing mortality.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management	Ensure harvest levels do not deplete stocks.		Periodic stock assessments.	1
Continue to work with ASMFC to ensure proper population management; work closely with the Mid Atlantic Fishery Management Council to minimize bycatch from commercial fishing for other species in federal waters (3-200 miles off the Atlantic coast).				
Action Location: HUC8 Watershed: Lwr Delaware				

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Dams on Schuylkill, Susquehanna, and Lehigh Rivers prevent upriver migrations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Design and construct efficient fish passage facilities and remove dams where feasible.	Restore migratory fish runs to native watersheds	Presence of migratory fishes	Monitor fish passage visually during migrations; surveys upriver of dams.	1
Action Location: HUC6 Watershed: Upper Delaware, Lower Delaware, Lower Susquehanna				
Associated Species: Shad species; all migratory fishes				

RESEARCH NEEDS

1. What are the specific causes of the recent population declines? Define fishing and natural mortality.
2. What effect do multi-species interactions have on populations?
3. Define spawning and nursery habitats (potentially assessed with telemetry?).

SURVEY NEEDS

1. See research needs.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Alosid survey of Schylkill River - annual.	Philadelphia Water Dept.		Annual survey to determine species and number of shad/herring running in Schylkill River below Fairmont Dam.
Compliance for 401 water quality certification on lower Susquehanna, fish passage performance measures	PADEP, PFBC, SRBC, MDNR		
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
PA contracts with Lewis Haul Seine Fishery for CPUE fishery data (Delware); Smithfield Beach annual gillnetting CPUE for adults (spawning); Raubsville annual monitoring for adult spawning migration (electrofishing, CPUE); Delaware river-wide beach seining	Pennsylvania Fish and Boat Commission		

Northern Redbelly Dace

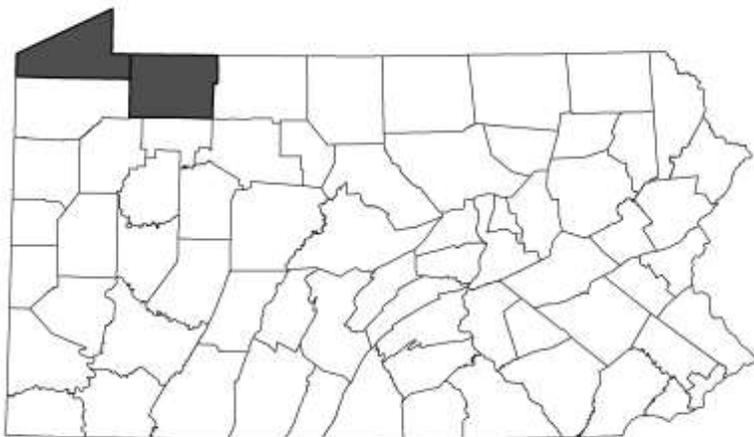
Chrosomus eos

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Wikimedia: Ellen Edmonson and Hugh Chrisp



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	High Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Sluggish current in small springs and streams, headwater wetlands, beaver ponds.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Development and compliance with Erosion & Sedimentation standards; outreach and education regarding value of buffers.	No significant impacts on sites and populations. Reduce siltation where present.	Suspended solids sampling.	50% of sites should be sampled annually for changes in turbidity and deposition.	1
Action Location: HUC10 Watershed: S. Br. French Cr.				

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Scrutiny to minimize impacts during environmental reviews and enforcement of current standards.	No significant impact on sites and populations.	Chemical and suspended solids sampling.	50% of sites should be sampled annually for changes in chemistry, turbidity, and deposition of solids.	1
Action Location: HUC10 Watershed: S. Br. French Cr.				

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Multiple populations in small headwater streams and wetlands; drought will likely impact one or more but timing unknown.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	3

Action Location: Physiographic Province: Central Lowland

Associated Species: All species in drainage

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

- 1. Status surveys recently completed.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at all known sites every 2 years is recommended.	Pennsylvania Fish and Boat Commission		

Southern Redbelly Dace

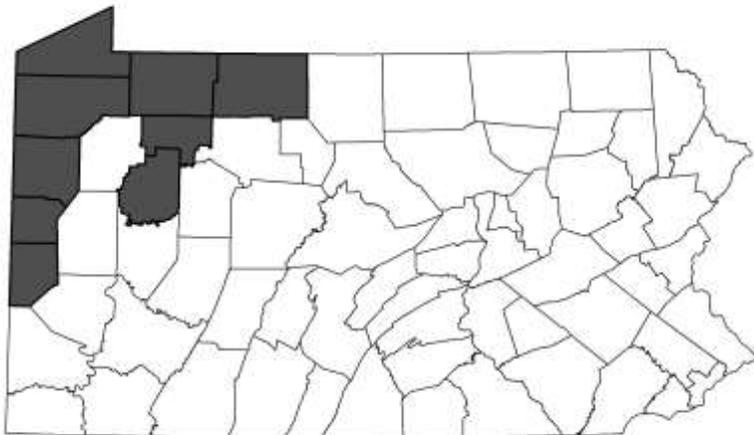
Chrosomus erythrogaster

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S2
IUCN Red List	LC Least Concern	PA Legal Status	Threatened
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Headwaters and Creeks
Habitat	Moderate Gradient, Cool, Headwaters and Creeks	Low Gradient, Warm, Headwaters and Creeks

Specific Habitat Requirements:

Clear, cool, small to medium-sized streams w/quiet pools and slow runs; spring runs. Occasionally in lakes & swamps in Pennsylvania.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Best-management practices and adherence to farm plans and Erosion & Sedimentation permits during activities. Maintain riparian buffers.	No net loss of populations.	Degree of loss of riparian cover and silt loading in stream.	Monitor occupied streams in agricultural areas every 2 years for changes in chemistry and deposition; monitor logging operations during periods of activity by direct observation.	1

Action Location: HUC8 Watershed: Lake Erie (E. Lake Erie), French, Beaver, Shenango

IUCN Threat: 9.0 Pollution

Specific Threat: Occupied waterways are small, first-order streams that may be impacted by even minor discharge events.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Responsible planning and development, and adherence to regulations and standards.	No net loss of populations.	Incidence of spills and impacts, and deforestation.	Monitor susceptible populations every 2 years for changes.	1

Action Location: HUC8 Watershed: Lake Erie (E. Lake Erie), French, Beaver, Shenango

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Minnow traps have been observed at 2 occupied sites.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Monitor sites; outreach and education, or prosecute where appropriate.	No net loss of populations.	Patrol and inspections.	Periodic inspection/observation, primarily prior to and during trout season.	2

Action Location: HUC10 Watershed: Pymatuning Reservoir-Shenango R.

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

- 1. Status surveys recently completed.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at 50% of known sites every 2 years is recommended.	Pennsylvania Fish and Boat Commission		

Redside Dace

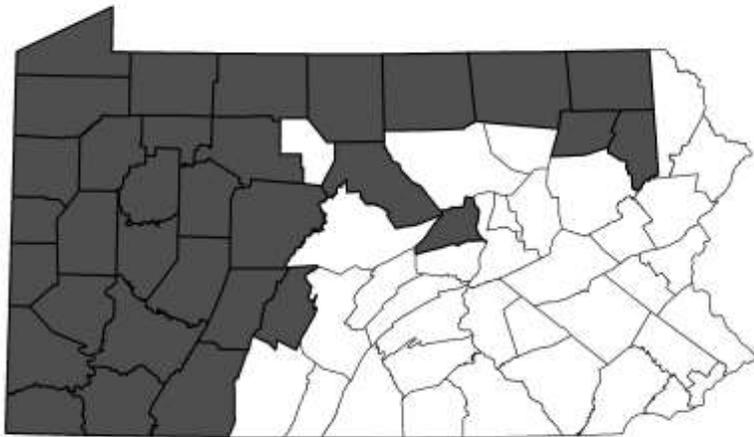
Clinostomus elongatus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: NOAA



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3G4	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Small Rivers

Habitat

Specific Habitat Requirements:

Pools of clear, cooler streams and small rivers with hard or sand substrate.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Development of deep gas wells and infrastructure.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in water quality.	Chemical and silt deposition sampling.	Monitor sites and streams as per stipulations of permit.	1
Action Location: HUC6 Watershed: Allegheny, U. Ohio-Beaver, E. Lake Erie, Monongahela				
Associated Species: All species occupying waterway.				

IUCN Threat: 9.0 Pollution
Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Development and adherence to farm plans that protect riparian zones; development and adherence to Erosion & Sedimentation permits.	No net loss of populations.	Degree of loss of riparian cover and silt loading in stream.	Monitor occupied streams in agricultural areas every 5 years for changes in chemistry and deposition; monitor logging operations during periods of activity by direct observation.	2
Action Location: Physiographic Province: Appalachian Plateaus, Central Lowland				

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Mining effluent in SW Pennsylvania

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Develop and implement remediation plans where impacts are occurring.	Reduce mining-related impacts.	Improved water quality- pH and chemistry.	Monitor remediation sites as per project plan and permit stipulations.	2
Action Location: HUC10 Watershed: Backlick Cr., Little Conemaugh R., Loyalhanna Cr., Kiskiminetas R., Conemaugh R.				
Associated Species: All species occupying waterway.				

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Projected droughts will likely impact some populations via in-stream water loss and warming.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	3
Action Location: Physiographic Province: Central Lowland				
Associated Species: All species in drainage				

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. No surveys recommended. Population appears stable.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 5 years is recommended.	Pennsylvania Fish and Boat Commission		

Streamline Chub

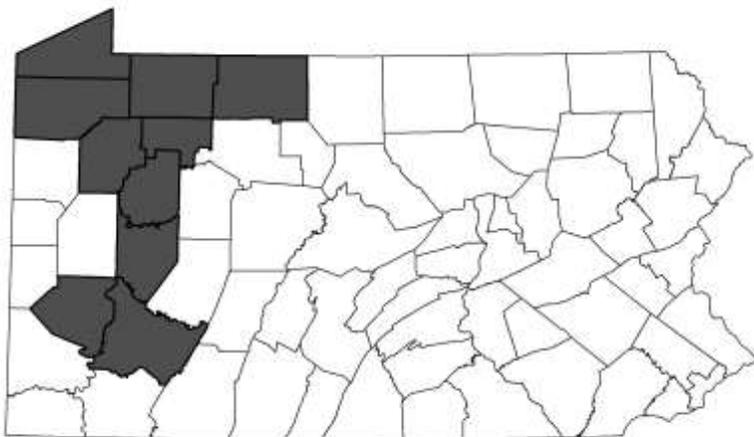
Erimystax dissimilis

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S4S5
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Increase of 10 - 25%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Large Rivers
Habitat	Warm, Medium River	Warm, Large River

Specific Habitat Requirements:

Swift sections of large streams and rivers, where it prefers clean sand, gravel, and rubble substrate.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Very minor local impacts only.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning	No reduction in water quality.	Silt loading.	Periodic sampling at reference sites.	3

Use permitting and planning process to minimize runoff, siltation, and silt deposition in larger streams and rivers.

Action Location: HUC6 Watershed: Allegheny, Monongahela, U. Ohio-Beaver

Associated Species: All species in drainage

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. No surveys recommended. Population appears stable-to-increasing.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 5 years is recommended.	Pennsylvania Fish and Boat Commission		

Gravel Chub

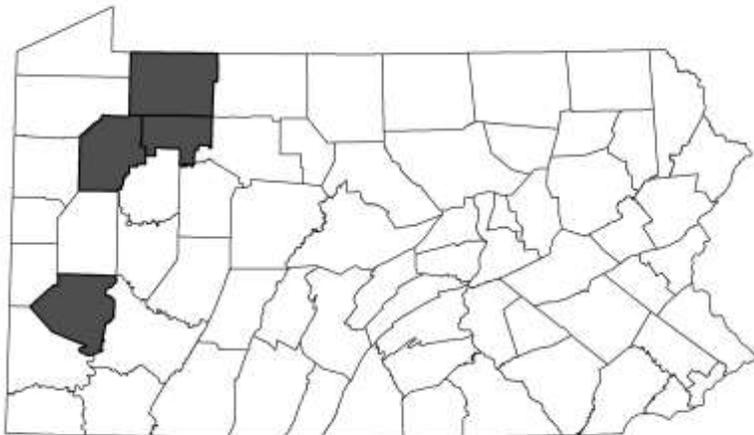
Erimystax x-punctatus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Ohio DNR



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	SU
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Decline of 30 - 50%

Conservation Goal:

Not able to determine conservation target at this time, more information needed about species in Pennsylvania; however it is likely extirpated.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Large Rivers	
Habitat	Warm, Large River	

Specific Habitat Requirements:

Clear to somewhat turbid sections of large streams and rivers, preferring riffles and runs with moderate to swift current over sand, gravel or rocky substrate.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Status surveys underway; anticipated completion in 2015.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. None recommended pending results of status survey. If found to be present, the monitor known site(s) every 2 years.	Pennsylvania Fish and Boat Commission		

Tonguetied Minnow

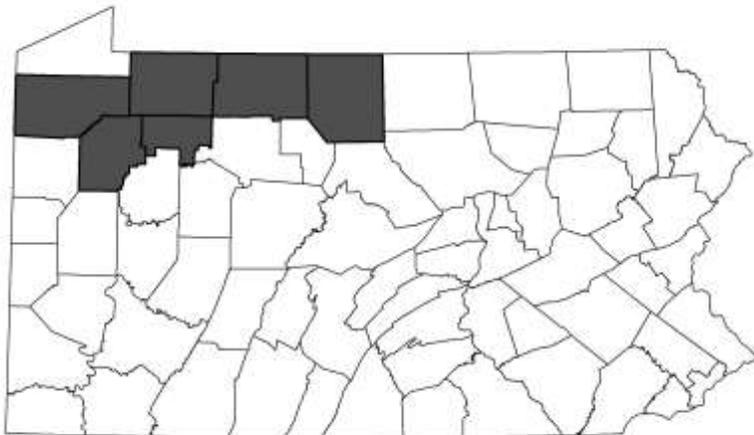
Exoglossum laurae

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Small Rivers

Habitat

Specific Habitat Requirements:

Small to medium sized streams in forested watersheds with clear water and substrates of gravel and rubble, often found in pools and gentle runs.

THREATS AND ACTIONS

IUCN Threat: 0.0 No known threats

Specific Threat: No known threats

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. No surveys recommended. Population appears stable.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 5 years is recommended.	Pennsylvania Fish and Boat Commission		

Cutlip Minnow

Exoglossum maxillingua

PA Fish & Boat Commission

PA Fish & Boat Commission

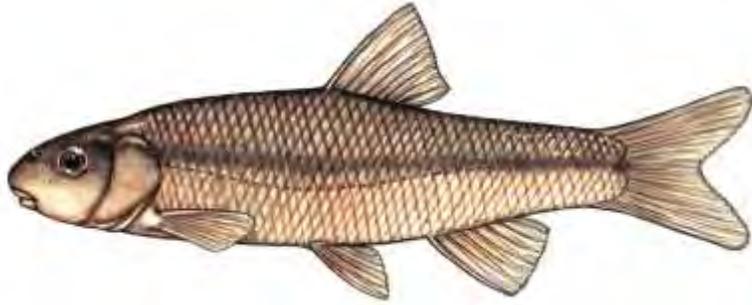
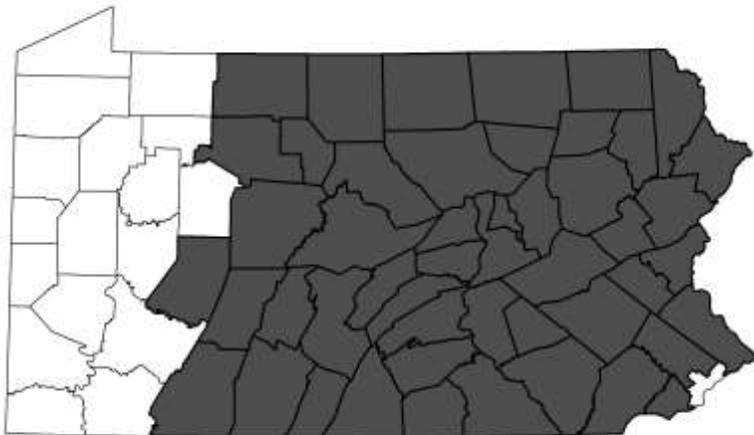


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S5
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Low Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Small Rivers

Habitat

Specific Habitat Requirements:

Pools and runs in creeks and small rivers with substrates of gravel and rubble.

THREATS AND ACTIONS

IUCN Threat: 0.0 No known threats

Specific Threat: No known threats

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. No surveys recommended. Population appears stable.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Bigmouth Shiner

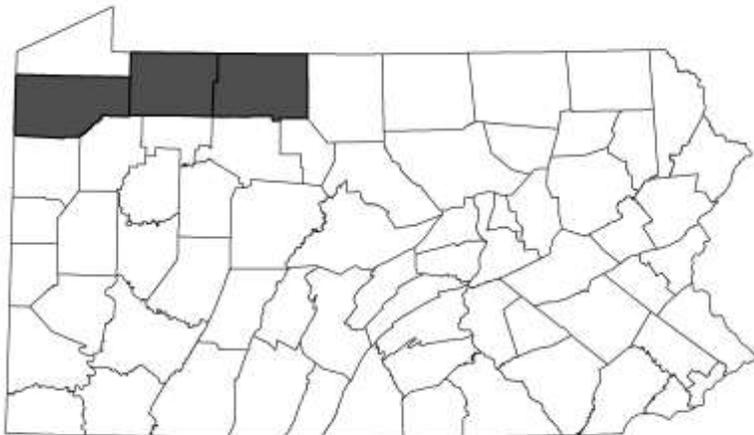
Notropis dorsalis

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S2
IUCN Red List	LC Least Concern	PA Legal Status	Threatened
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Decline of 10 - 30%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Small Rivers

Habitat

Specific Habitat Requirements:

Small rivers and streams with clear water and moderate gradient; prefers sand and gravel substrates.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Most of species' range coincides with Marcellus shale gas formation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Scrutiny to minimize impacts during environmental reviews and enforcement of current standards.	No significant impact on sites and populations.	Chemical and suspended solids sampling.	33% of sites should be sampled annually for changes in chemistry, turbidity, and deposition of solids.	2

Action Location: HUC10 Watershed: Brokenstraw Cr., Lwr Allegheny R. (U. Allegheny), Potato Cr.

Associated Species: All species in drainage

IUCN Threat: 9.0 Pollution
Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Development and adherence to farm plans that protect riparian zones; development and adherence to Erosion & Sedimentation permits.	No net loss of populations.	Degree of loss of riparian cover and silt loading in stream.	Monitor occupied streams in agricultural areas every 5 years for changes in chemistry and deposition; monitor logging operations during periods of activity by direct observation.	3

Action Location: HUC10 Watershed: Brokenstraw Cr., Lwr Allegheny R. (U. Allegheny), Potato Cr.

Associated Species: All species in drainage

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Status and trends for this species uncertain. A comprehensive status survey should be undertaken.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at selected reference sites is recommended. Interval to be determined based on results of status survey.	Pennsylvania Fish and Boat Commission		

Redfin Shiner

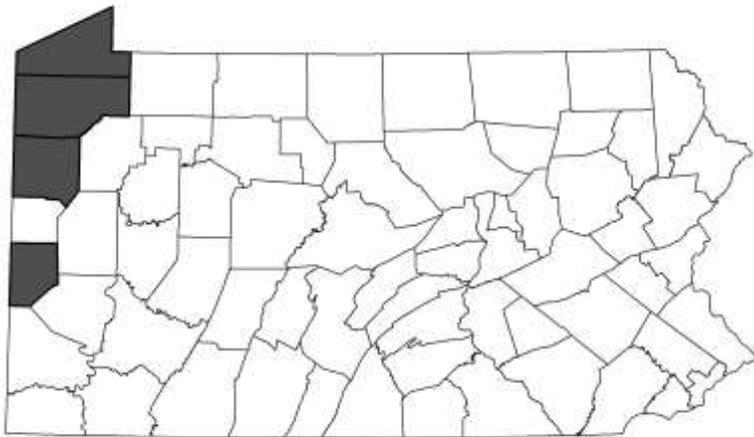
Lythrurus umbratilis

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S2
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Low Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Warm-water creeks and small rivers with a mud and sand bottom in quiet water.

THREATS AND ACTIONS

IUCN Threat: 6.0 Human Intrusions and Disturbance

Specific Threat: Application of lampricides in Conneaut Creek drainage may impact this species.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Cessation of treatments. Rebuild breached low-head dam to serve as lamprey barrier.	Eliminate lampricide treatments.	Community surveys, including ammocoete sampling	Sample waterway annually until recovery; then each 5 years.	1
Action Location: HUC10 Watershed: Conneaut Cr.				
Associated Species: American brook lamprey, hornyhead chub, northern brook lamprey, brindled madtom				

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation and turbidity from agricultural and forestry practices may be limiting populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Development and adherence to farm plans that protect riparian zones; deveopment and adherence to Erosion & Sedimentation permits.	No net loss of populations.	Degree of loss of riparian cover and silt loading in stream.	Monitor logging operations during periods of activity by direct observation.	2
Action Location: HUC10 Watershed: Conneaut Cr.				
Associated Species: All species in drainage				

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Extended drought would exacerbate annual cessation of surface flow.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	3

Action Location: HUC10 Watershed: Conneaut Cr.

Associated Species: All species in drainage

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. No surveys recommended. Population appears stable.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 3 years is recommended.	Pennsylvania Fish and Boat Commission		

Allegheny Pearl Dace

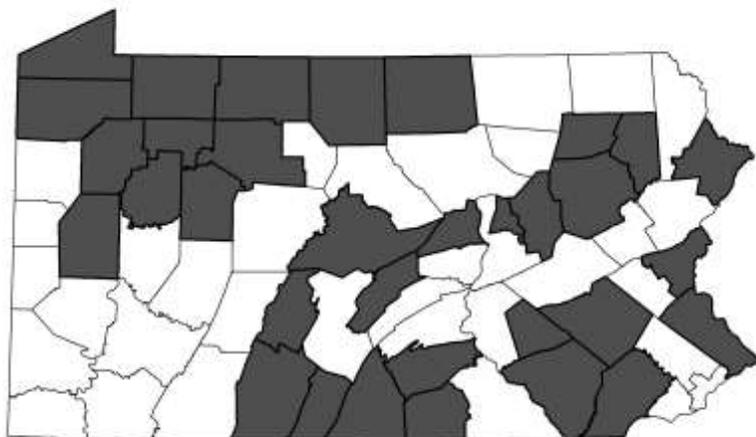
Margariscus margarita

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Moderate Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Pools and sluggish current in cool and cold spring runs and creeks; occasionally ponds.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Predicted increase in water temperatures will likely extirpate some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Statewide

Associated Species: All species in drainage

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Development of deep gas wells and infrastructure.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in water quality.	Chemical and silt deposition sampling.	Monitor sites and streams as per stipulations of permit.	2

Action Location: HUC4 Watershed: Statewide

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation and turbidity from forestry activities may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Development and adherence to Erosion & Sedimentation permits.	No net loss of populations.	Degree of loss of riparian cover and silt loading in stream.	Monitor logging operations during periods of activity by direct observation.	3
Action Location:	HUC4 Watershed: Statewide			
Associated Species:	All species in drainage			

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. No surveys recommended. Population appears stable.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Hornyhead Chub

Nocomis biguttatus

PA Fish & Boat Commission

PA Fish & Boat Commission

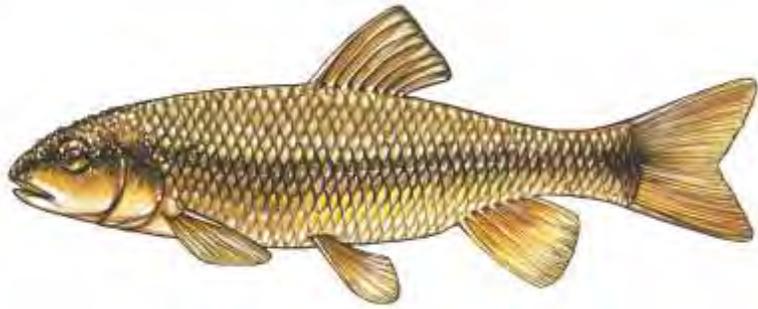
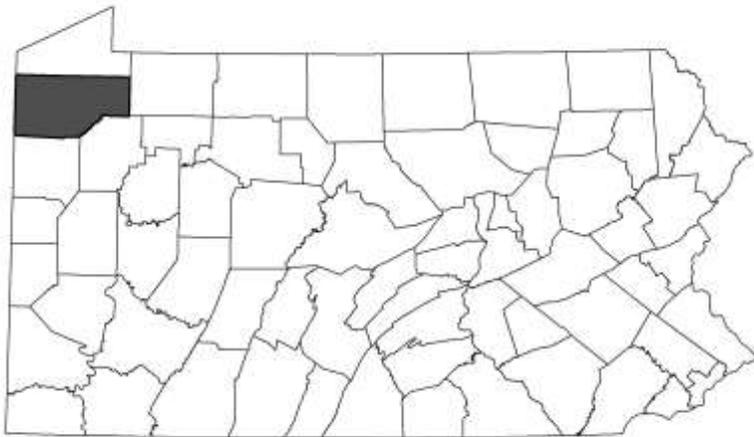


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Candidate
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain populations in Neshannock Creek and Conneaut Creek. Reintroduce into historic waters that currently exhibit amenable conditions.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Small Rivers
Habitat	Moderate Gradient, Cool, Headwaters and Creeks	Moderate Gradient, Cool, Small River

Specific Habitat Requirements:

Clear, small to medium-sized streams with clean gravel, rubble, and sandy substrates.

THREATS AND ACTIONS

IUCN Threat: 6.0 Human Intrusions and Disturbance

Specific Threat: Lampricide applications are suspected of suppressing population in Conneaut Creek.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Cessation of treatments; rehabilitate breached dam on Conneaut Creek to be used as a season barrier to sea lamprey migration.	Recover hornyhead chub populations.	Cessation of treatments.	Monitoring unnecessary upon completion of project.	1
Action Location: HUC10 Watershed: Conneaut Cr.				
Associated Species: American brook lamprey, northern brook lamprey, redbfin shiner, brindled madtom				

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Predicted droughts may reduce flows to degree that nest success will drop and expose juveniles to increased predation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	2
Action Location: HUC8 Watershed: Lake Erie (E. Lake Erie), Shenango				
Associated Species: All species in drainage				

THREATS AND ACTIONS

IUCN Threat: 2.0 Agriculture and Aquaculture

Specific Threat: Locations where stock are permitted in tributary streams, increasing erosion and siltation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 8.0 Outreach Fence riparian zones.	Reduce turbidity and siltation.	Concentration of suspended solids.	Proven effective; maintenance required.	2
Action Location: HUC8 Watershed: Lake Erie (E. Lake Erie), Shenango				
Associated Species: All species in drainage				

IUCN Threat: 2.0 Agriculture and Aquaculture

Specific Threat: Agricultural runoff in Otter Creek and Conneaut Creek.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Development and renewal of farm plans should address factors causing runoff into streams.	Reduce turbidity and siltation.	Concentration of suspended solids.	Annual Inspection to ensure compliance with approved plans.	2
Action Location: HUC8 Watershed: Lake Erie (E. Lake Erie), Shenango				
Associated Species: All species in drainage				

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Predation by introduced species (Steelhead) may occur in Conneaut Creek.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning No actions recommended. Research to determine causes of hornyhead chub declines is needed, and may validate or erase this concern.				3
Action Location: HUC10 Watershed: Conneaut Cr.				

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Deep-well shale gas development may impact populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in water quality.	Chemical and silt deposition sampling.	Monitor sites and streams as per stipulations of permit.	3

Action Location: HUC8 Watershed: Lake Erie (E. Lake Erie), Shenango

Associated Species: All species occupying waterway.

RESEARCH NEEDS

1. What has caused the decline of the hornyhead chub in Conneaut Creek, as well as its extirpation in historic waterways?
2. Are conditions now suitable for a hornyhead chub reintroduction project in Little Neshannock Creek and its West Branch?

SURVEY NEEDS

1. Status survey recently completed. A study to determine life-history requisites and causes for declines and extirpations should be completed. A reintroduction program should be initiated in Little Neshannock Creek and its West Branch, if study determines that it is feasible.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 2 years is recommended.	Pennsylvania Fish and Boat Commission		

Comely Shiner

Notropis amoenus

PA Fish & Boat Commission

PA Fish & Boat Commission

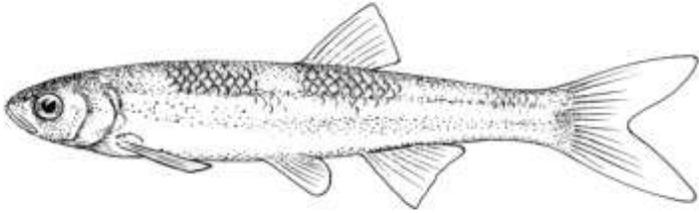
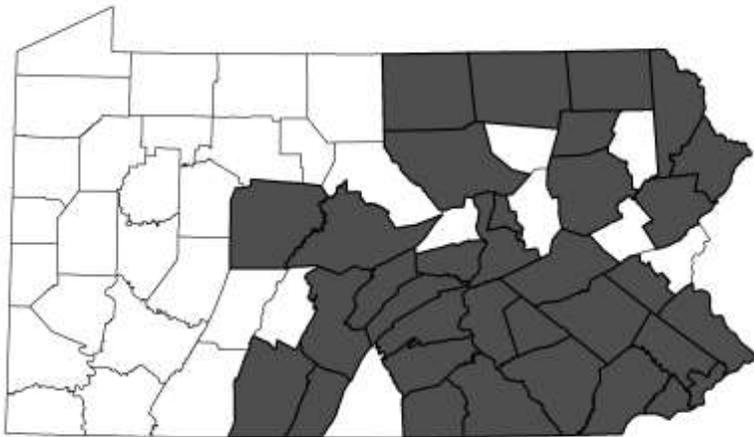


Illustration: Ellen Edmonson and Hugh Chrisp



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Large Rivers

Habitat

Specific Habitat Requirements:

Slow to moderate current in runs and pools with hard substrate and/or sand; medium-sized creeks to large rivers.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. No research currently required. However, pending outcome of recommended surveys, assessing the causative factors of the apparent decline in the Susquehanna Basin may be required.

SURVEY NEEDS

1. Additional river surveys by PFBC, PADEP, and SRBC may determine that a status survey should be undertaken. Comely shiner may be declining.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A status survey is necessary before a monitoring plan is designed and implemented.	Pennsylvania Fish and Boat Commission		

Bridle Shiner

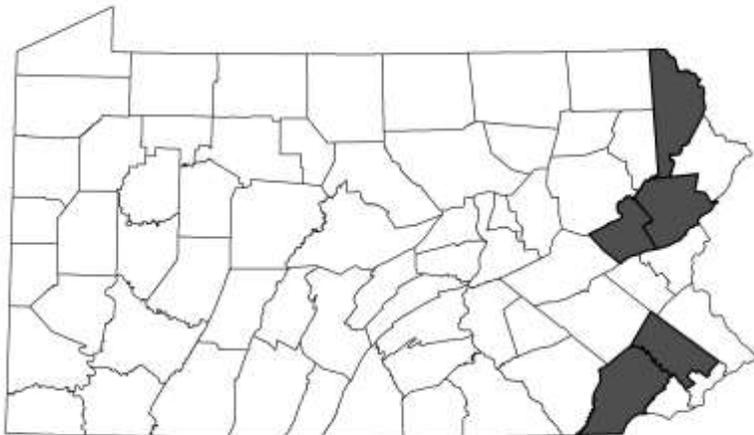
Notropis bifrenatus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Roger Thomas



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3	State Rank	S1
IUCN Red List	NT Near Threatened	PA Legal Status	Endangered
Northeast Region	Very High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; continue to protect the ecology and habitats within Marshalls Creek, Monroe County.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Low Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Swamps and sluggish sections of clear, warmwater creeks and rivers with abundant coarse woody debris and aquatic vegetation.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Recent traffic project will increase development in vicinity of primary population.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: Ironcolor shiner

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Recent traffic project will increase development in vicinity of primary population.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: Ironcolor shiner

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Rain events of increased intensity may destroy vegetated pool habitat and increased turbidity and siltation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain habitat.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC10 Watershed: Broadhead Cr.
Associated Species: All species in drainage

IUCN Threat: 9.0 Pollution
Specific Threat: Potential threats are similar to those presented by new development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.
Associated Species: Ironcolor shiner

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Increased turbidity and siltation may result from logging activities.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: Ironcolor shiner

RESEARCH NEEDS

1. Is it feasible to reintroduce the bridle shiner elsewhere within its historic range? An unsuccessful attempt was made to re-establish the bridle shiner in the Brodhead Creek drainage.

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys. Status fairly well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
<p>No current monitoring program in place; however PSU has monitored this population since the late 1990s until recently. Standardized monitoring protocol at occupied site every 2 years is recommended.</p>	<p>Pennsylvania Fish and Boat Commission</p>		

River Shiner

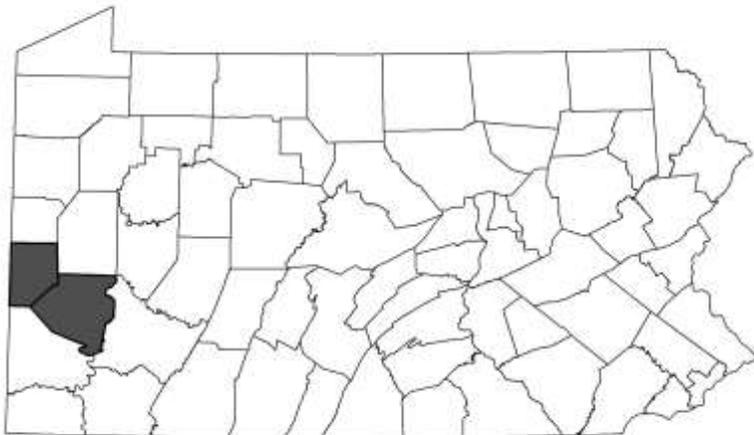
Notropis blennius

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	SU
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Not able to determine conservation target at this time, more information needed about species in Pennsylvania.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Low Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Large rivers and river lakes, where it prefers channels, eddies, sloughs, and sandbars; affinity for sand and gravel substrates, but occurs over a variety of substrates.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. What is the current status of the river shiner in the Ohio and Monongahela Rivers, including abundance and habitat condition?

SURVEY NEEDS

1. A status survey should be undertaken.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A status survey is necessary before a monitoring plan is designed and implemented.	Pennsylvania Fish and Boat Commission		

Ghost Shiner

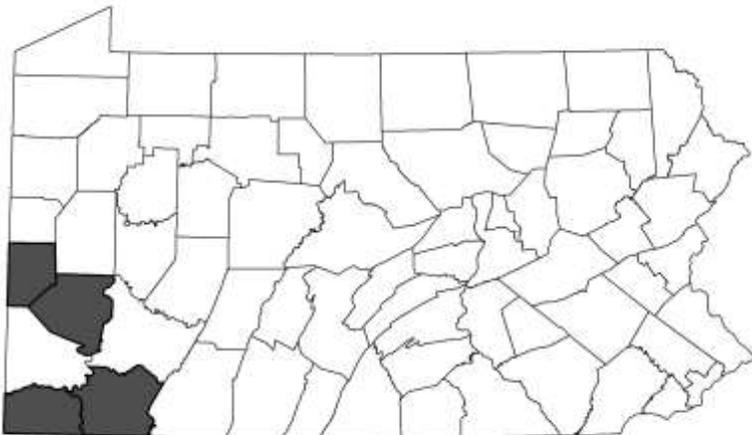
Notropis buchanani

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Brian Zimmerman



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	SU
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Increase of >25%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Large Rivers	
Habitat	Warm, Large River	

Specific Habitat Requirements:

Low-gradient sections of large streams and rivers, usually in quiet water with sluggish current.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. What is the current status of the ghost shiner in the Ohio and Monongahela Rivers, including abundance and habitat condition?

SURVEY NEEDS

1. A status survey should be undertaken.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A status survey is necessary before a monitoring plan is designed and implemented.	Pennsylvania Fish and Boat Commission		

Ironcolor Shiner

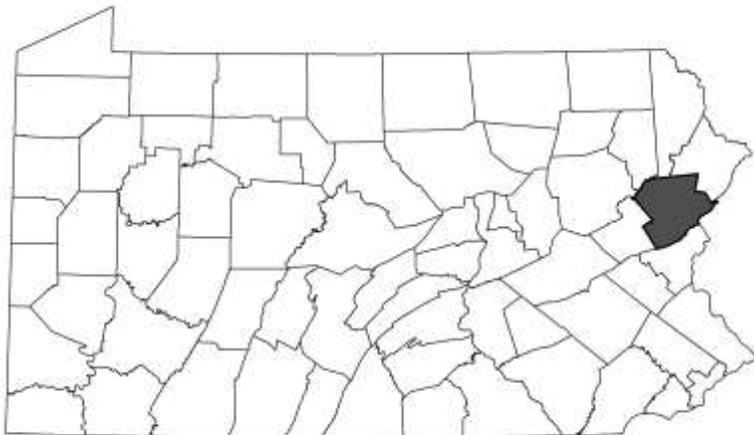
Notropis chalybaeus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rich Horowitz



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S1
IUCN Red List		PA Legal Status	Endangered
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; continue to protect the ecology and habitats within Marshalls Creek, Monroe County.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Low Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Swamps and sluggish sections of clear, warmwater creeks with abundant coarse woody debris and aquatic vegetation.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Recent traffic project will increase development in vicinity of primary population.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: Ironcolor shiner

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Recent traffic project will increase development in vicinity of primary population.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: Ironcolor shiner

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Rain events of increased intensity may destroy vegetated pool habitat and increase turbidity and siltation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain habitat.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: All species in drainage

IUCN Threat: 9.0 Pollution

Specific Threat: Potential threats are similar to those presented by new development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: Ironcolor shiner

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Increased turbidity and siltation may result from logging activities.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: Ironcolor shiner

RESEARCH NEEDS

1. Is it feasible to reintroduce the ironcolor shiner elsewhere within historic range?

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys. Status fairly well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
<p>No current monitoring program in place; however PSU has monitored this population since the late 1990s until recently. Standardized monitoring protocol at occupied site every 2 years is recommended.</p>	<p>Pennsylvania Fish and Boat Commission</p>		

Blackchin Shiner

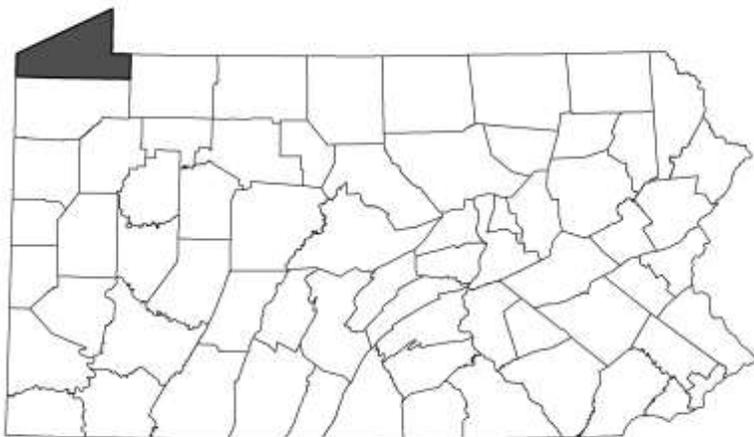
Notropis heterodon

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Continue to protect the ecology of Lake Pleasant, the only known extant PA population, in order to maintain population.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	
Habitat	Mesotrophic, High Alkalinity Lake	

Specific Habitat Requirements:

Shallow sections of glacial lakes w/stands of dense aquatic vegetation.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Deveopment of well-sites and infrastructure may degrade water quality and lower water tables.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution or impacts to water table.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 5 years for changes.	1

Action Location: HUC10 Watershed: French Cr., LeBoeuf Cr.

Associated Species: All species in Lakes Pleasant and LeBoeuf

IUCN Threat: 9.0 Pollution

Specific Threat: Wastewater and sewage seepage into Lake LeBoeuf and/or water table may be expected.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Improve infrastructures and devices if, and when impacts are detected.	No increase in pollution or impacts to water table.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 5 years for changes.	2

Action Location: HUC10 Watershed: French Cr., LeBoeuf Cr.

Associated Species: All species in Lakes Pleasant and LeBoeuf

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. No surveys recommended. Range of blackchin shiner in PA is sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at occupied site every 5 years is recommended. If gas extraction activities begin to occur in watersheds, accelerate monitoring to every 2 years.	Pennsylvania Fish and Boat Commission		

Swallowtail Shiner

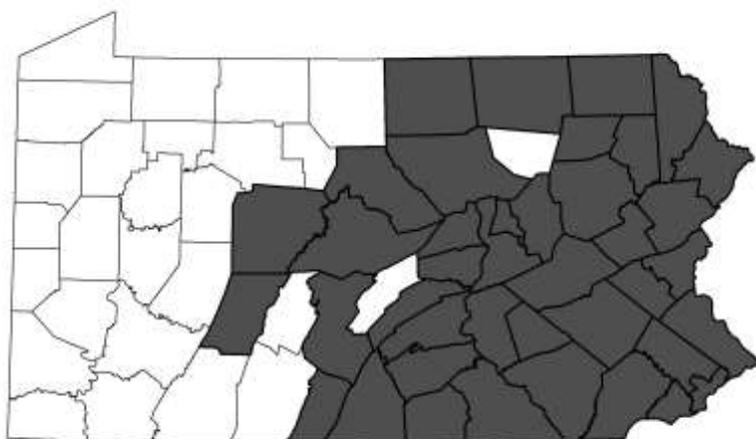
Notropis procne

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Moderate Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Large Rivers

Habitat

Specific Habitat Requirements:

Runs and pools in creeks to large rivers; hard or sandy substrate.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. No research currently required. However, pending outcome of recommended surveys, assessing the causative factors of apparent decline of swallowtail shiner in the Susquehanna Basin may be required.

SURVEY NEEDS

1. This species may be declining. Additional river surveys by PFBC, PADEP, and SRBC may determine that a status survey should be undertaken.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A status survey is necessary before a monitoring plan is designed and implemented.	Pennsylvania Fish and Boat Commission		

Longnose Sucker

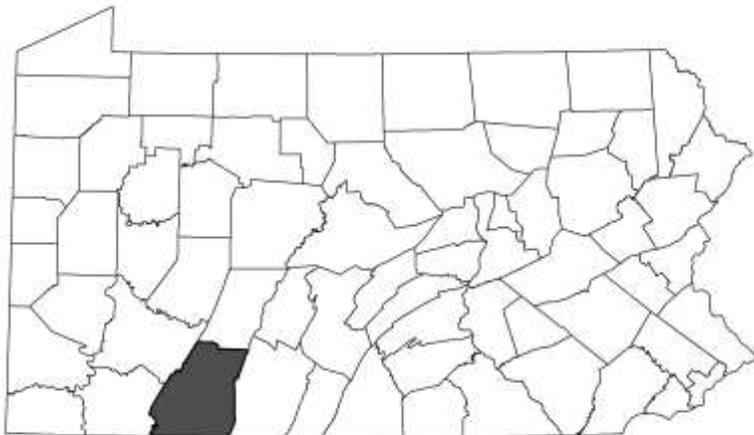
Catostomus catostomus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List		PA Legal Status	Endangered
Northeast Region	High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels by protecting habitat and stream temperatures within the Casselman River basin.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Small Rivers
Habitat	Low Gradient, Cool, Headwaters and Creeks	Moderate Gradient, Cool, Small River

Specific Habitat Requirements:

Casselman River drainage, small-medium cool, clear streams. (deeper pools w/ boulder-rubble substrate or a significant coarse, woody debris).

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Water temperatures will exceed upper limit of life history requirements.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain suitable stream temperatures.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC10 Watershed: Lwr Casselman R., U. Casselman R.

Associated Species: All aquatic species in Casselman Basin

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC10 Watershed: Lwr Casselman R., U. Casselman R.

Associated Species: All aquatic species in Casselman Basin

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in habitat or water quality.	Water quality and silt deposition monitoring.	Monitor sites and streams as per stipulations of permit.	1
Action Location: HUC10 Watershed: Lwr Casselman R., U. Casselman R.				
Associated Species: All species occupying waterway.				

IUCN Threat: 9.0 Pollution
Specific Threat: Depressed pH; erosion and sedimentation; flocculant fomatation and deposition; altered hydrology, groundwater, and stream temperatures.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Remediate existing discharges, ensure current and future mining operations do not affect habitat and water quality.	Restore water quality.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1
Action Location: HUC10 Watershed: Lwr Casselman R., U. Casselman R.				
Associated Species: All aquatic species in Casselman Basin				

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Depressed pH potentially causing cascade of lethal and non-lethal negative affects on populations and ecosystems.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure federal and state air quality regulations are followed.	Eliminate or reduce acid deposition.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC10 Watershed: Lwr Casselman R., U. Casselman R.

Associated Species: All aquatic species in Casselman Basin

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Piney Creek Dam in MD impacting water quality (DO).

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Manage or modify dam so not to impact aquatic life.	Manage/restore water quality.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC10 Watershed: Lwr Casselman R., U. Casselman R.

Associated Species: All aquatic species in Piney Creek

RESEARCH NEEDS

1. What is the specific status of the Monongahela longnose sucker population?
2. Is it feasible to reintroduce the longnose sucker into other waters within its historic range?

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys. Status of longnose sucker is fairly well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 5 years is recommended; however, populations are small enough that collection is considered a threat and mortality from electrofishing would need to	Pennsylvania Fish and Boat Commission		

Bigmouth Buffalo

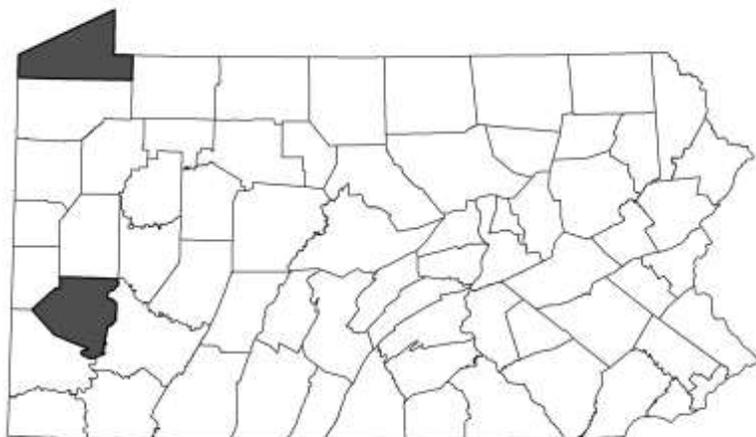
Ictiobus cyprinellus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: USFWS



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes and Ponds	Large Rivers

Habitat

Specific Habitat Requirements:

Rivers, lakes (Erie), reservoirs, oxbows, and bayous with still waters or sluggish current.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Surveys in the Ohio River are recommended, possibly as part of other initiatives. The population recently documented in the Ohio River is poorly understood. Status otherwise sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 5 years is recommended. This would include a reference site at the border with OH on the Ohio River.	Pennsylvania Fish and Boat Commission, ORSANCO		

Spotted Sucker

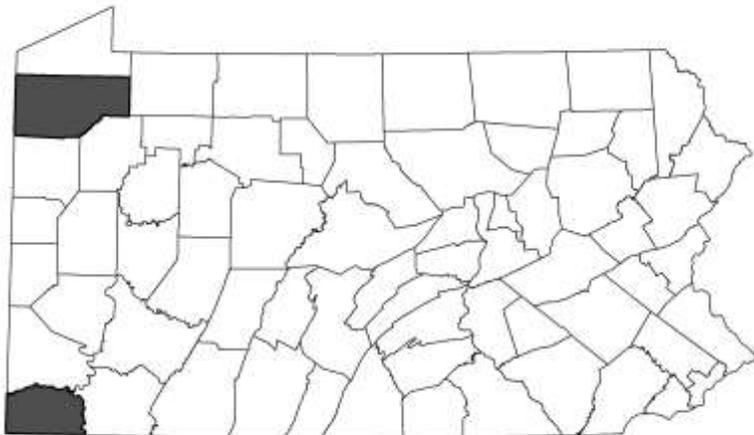
Minytrema melanops

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Freeman Johns



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S2
IUCN Red List	LC Least Concern	PA Legal Status	Threatened
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Northern Peatland & Fens	Northern Hardwood & Conifer
Habitat	North-Central Interior and Appalachian Acidic Peatland	South-Central Interior Mesophytic Forest

Specific Habitat Requirements:

Clear to slightly turbid waters of streams, rivers, lakes, and reservoirs with submerged aquatic vegetation, soft substrates, and detritus.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Turbidity and siltation from common carp activities.

Action	Objective	Measure	Monitoring	Priority	
TRACS Action 2.0 Manage common carp populations.	Direct Management of Natural Resources	Reduce turbidity and sedimentation.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC10 Watershed: Conneaut Cr., Pymatuning Reservoir-Shenango R.

Associated Species: All species occupying waterway.

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

- 1. No surveys recommended. Status of spotted sucker sufficiently well-known and population appears stable.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
<p>No current monitoring program in place. Standardized monitoring protocol at selected reference sites every 5 years is recommended. The Pymatuning and Lake Erie populations could possibly be integrated into ongoing gamefish monitoring initiatives.</p>	<p>Pennsylvania Fish and Boat Commission</p>		

White Catfish

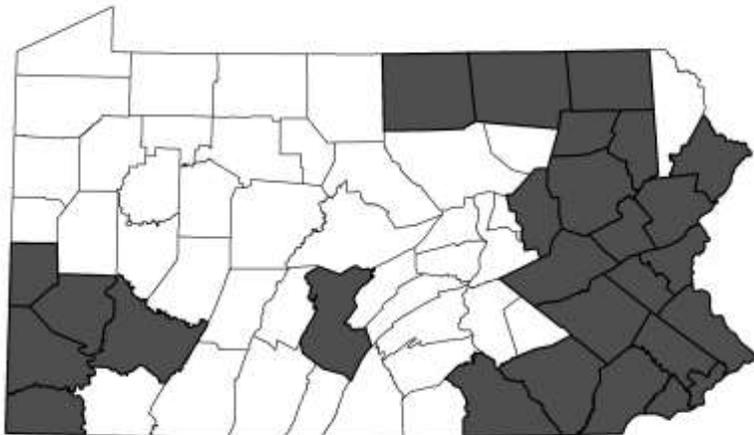
Ameiurus catus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S3
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Decline of >10%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Large Rivers

Habitat

Specific Habitat Requirements:

Sluggish sections of large streams and rivers, ponds, reservoirs, estuaries, and occasionally smaller streams.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Competition for habitat and resources with other catfishes.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Manage channel and flathead catfish populations.	Direct Management of Natural Resources Reduce or eliminate adverse interactions attributed to introduced catfishes.	Sampling targeted at catfish (ictalurid) populations.	Fish community sampling targeted at ictalurids annually or as appropriate at reference sites.	3

Action Location: Physiographic Province: Atlantic Coastal Plains, Piedmont, Ridge and Valley

Associated Species: All species occupying waterway.

RESEARCH NEEDS

1. What are the effects on white catfish resulting from introduced populations of channel and flathead catfish?

SURVEY NEEDS

1. White catfish appear to be declining. Additional surveys by PFBC, PADEP, ANSP, and Philadelphia Water Dept. may determine that a status survey should be undertaken. Currently, gamefish surveys and hoopnet surveys conducted by PFBC appear to be capturing this need and will likely be instructive in the future.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A status survey is necessary before a monitoring plan is designed and implemented.	Pennsylvania Fish and Boat Commission		

Black Bullhead

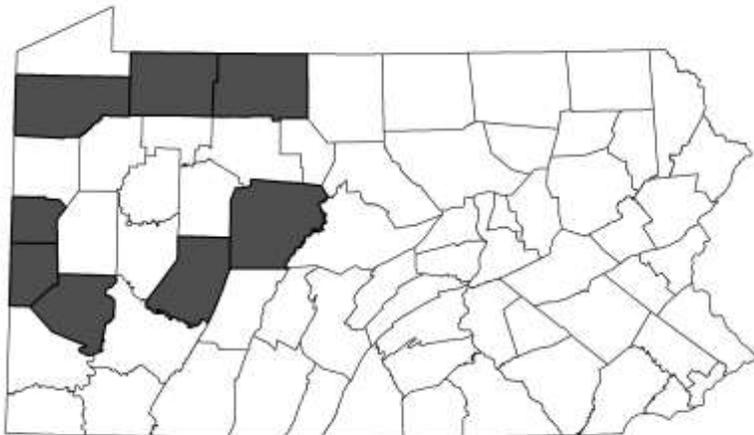
Ameiurus melas

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Duane Raver



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	SU
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	

Conservation Goal:

Not able to determine conservation target at this time, more information needed about species in Pennsylvania; however it is likely extirpated.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Northern Swamp	
Habitat	North-Central Appalachian Acidic Swamp	

Specific Habitat Requirements:

Inhabits backwaters of rivers, ponds, and stream pools often in association with vegetation, mud, and slow currents. Tolerant of turbidity.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Status survey under way; anticipated completion in 2015.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
Monitoring by PFBC incidental during other Lake Erie surveys.	Pennsylvania Fish and Boat Commission		This species is rarely detected, but could be captured during lake surveys targeting other fish taxa.

Blue Catfish

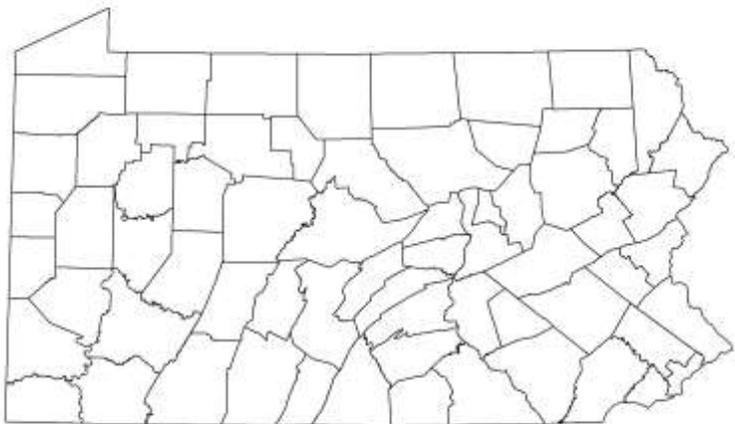
Ictalurus furcatus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Paul Overbeck



No Current Records

CONSERVATION PROFILE

Global Rank	G5	State Rank	SX
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	

Conservation Goal:

Promote stocking program for sport fishing as a first step in determining the current suitability of PA for a resident population.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Large Rivers	

Habitat

Specific Habitat Requirements:

Big river channels, often in deep water. Also utilizes backwaters and swift currents.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

Mountain Madtom

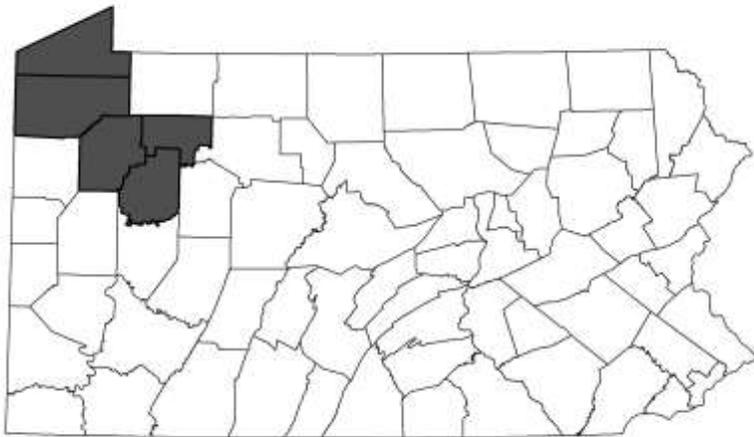
Noturus eleutherus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Increase of >25%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; establish new populations above barriers.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Large Rivers
Habitat	Warm, Medium River	Warm, Large River

Specific Habitat Requirements:

Mod-swift rivers, large streams with clear water and substrates of sand, gravel, cobble, and rubble. Usually taken in riffles or rapids.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation and turbidity from activities may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: French, Mid. Allegheny-Redbank, Mid. Allegheny-Tionesta, Lwr Allegheny

Associated Species: French Creek and Allegheny River fishes

RESEARCH NEEDS

1. Can populations of mountain madtom be established above barriers in recolonized waters?

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys needed at this time. Status fairly well-known except with regards to the lock and dam section of the Allegheny River. Population appears to be expanding and surveys are recommended within the next ten years.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Tadpole Madtom

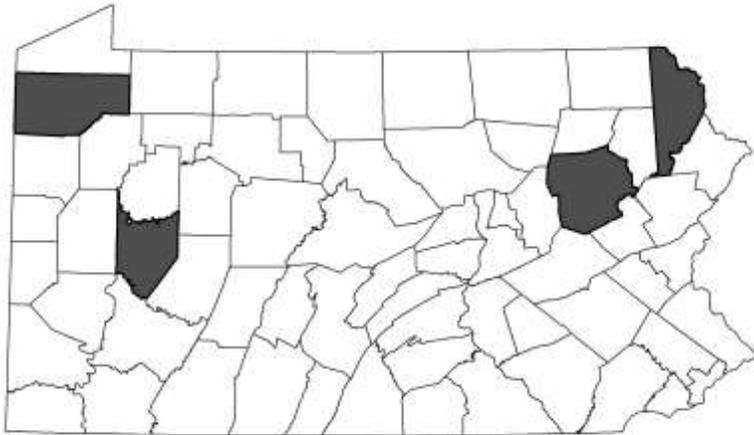
Noturus gyrinus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ellen Edmonson and Hugh Chrisp



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Decline of >10%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	
Habitat	Eutrophic, Medium Alkalinity Lake	

Specific Habitat Requirements:

Backwaters and sluggish current in flowing waters, ponds, lakes, and oxbows with soft, organic substrates and an abundant cover, provided by dense aquatic vegetation or coarse woody debris.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Cumulative inputs of chemicals and nutrients may degrade water quality and cause algal blooms, creating anoxic areas during decomposition.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC6 Watershed: Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

IUCN Threat: 9.0 Pollution

Specific Threat: Cumulative inputs of chemicals and nutrients may degrade water quality and cause algal blooms, creating anoxic areas during decomposition.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC6 Watershed: Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Competition and predation by gobies.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Manage goby populations, prevent further introductions.	Reduce or eliminate adverse interactions attributed to introduced gobies.	Targeted sampling.	Fish community sampling targeted at tadpole madtoms annually or as appropriate at reference sites.	3

Action Location: HUC6 Watershed: Lake Erie

Associated Species: Native fishes competing with gobies

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

- 1. Tadpole madtom populations in the Oil Creek drainage need to be surveyed and records for the Atlantic Slope need to be reviewed and possibly surveyed. Status of Presque Isle population sufficiently well-known and appears stable.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.



MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Margined Madtom

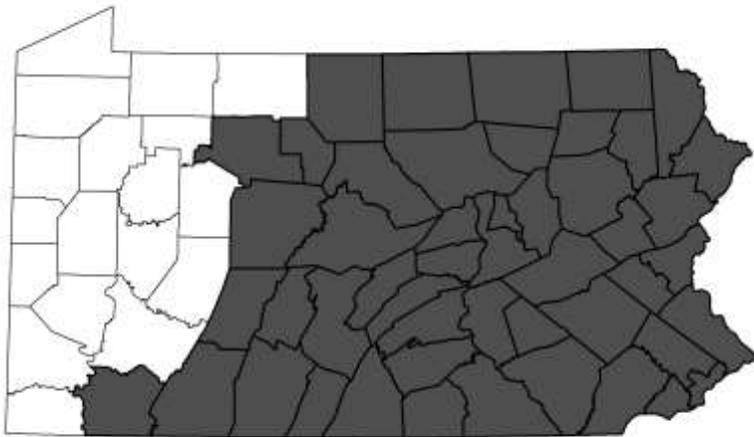
Noturus insignis

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S5
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Small Rivers

Habitat

Specific Habitat Requirements:

Clear riffles with moderate-swift current, and substrate of gravel, cobble, and rubble.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Potential competition.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management Enforce bait fishing regulations or propose new regulation that allows no potential interbasin transfer.	Reduce risk of interbasin transfer of taxa.	Fish community sampling.	Sample reference sites periodically to determine species status throughout the Atlantic Slope	3

Action Location: HUC4 Watershed: Susquehanna, Potomac, Delaware-Mid Atlantic Coastal

Associated Species: Unknown

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Direct mortality.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management Currently this is not likely having a population impact but if ever does then harvest limits should be developed.	Manage mortality, maintain populations.	Population Assessments	Sample reference sites periodically to determine species status throughout the Atlantic Slope	3

Action Location: HUC4 Watershed: Susquehanna, Potomac, Delaware-Mid Atlantic Coastal

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
<p>This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.</p>	<p>Pennsylvania Fish and Boat Commission</p>		

Brindled Madtom

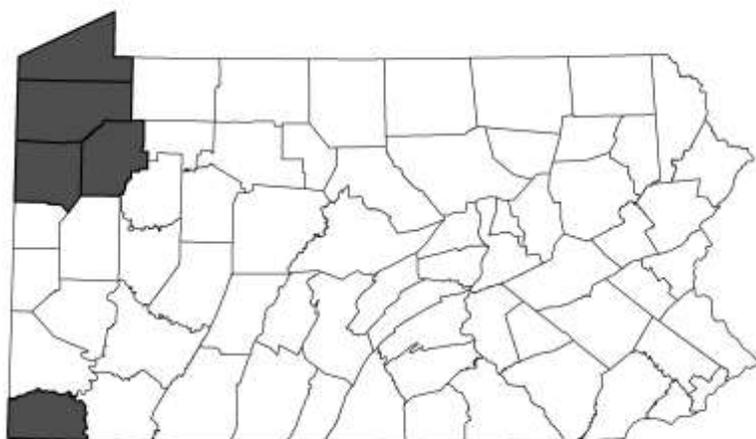
Noturus miurus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S2
IUCN Red List	LC Least Concern	PA Legal Status	Threatened
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Northern Swamp	Northern Peatland & Fens
Habitat	North-Central Appalachian Acidic Swamp	North-Central Interior and Appalachian Acidic Peatland

Specific Habitat Requirements:

Low gradient sections of streams, rivers, lakes. Especially areas of little or no current with substrates of sand, silt, mud, and organic debris.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Storms of increased severity may affect integrity of sand habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain habitat.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: Chautauqua-Conneaut, Shenango, French, U. Ohio-Wheeling

Associated Species: All species in drainage

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation and turbidity from activities may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: Chautauqua-Conneaut, Shenango, French, U. Ohio-Wheeling

Associated Species: All species in drainage

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in habitat or water quality.	Water quality and silt deposition monitoring.	Monitor sites and streams as per stipulations of permit.	1

Action Location: HUC8 Watershed: Chautauqua-Conneaut, Shenango, French, U. Ohio-Wheeling

Associated Species: All species occupying waterway.

IUCN Threat: 6.0 Human Intrusions and Disturbance

Specific Threat: Mortality resulting from lampricide treatments in Conneaut Creek.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Cessation of treatments. Rebuild breached low-head dam in OH to serve as lamprey barrier to eliminate the need to apply lampricide.	Eliminate lampricide treatments.	Number of treatments.	Sample waterway annually until recovery; then each 5 years.	1

Action Location: HUC10 Watershed: Lake Erie

Associated Species: Hornyhead chub, northern brook lamprey, eastern sand darter, American brook lamprey

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Mining activity in Greene County results in erosion, sedimentation, and altered hydrology.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Remediate existing discharges, ensure current and future mining operations do not affect habitat and water quality.	Restore water quality.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: U. Ohio-Wheeling

Associated Species: All species occupying waterway.

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

- 1. Monitoring recommended, but no additional surveys needed at this time. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Northern Madtom

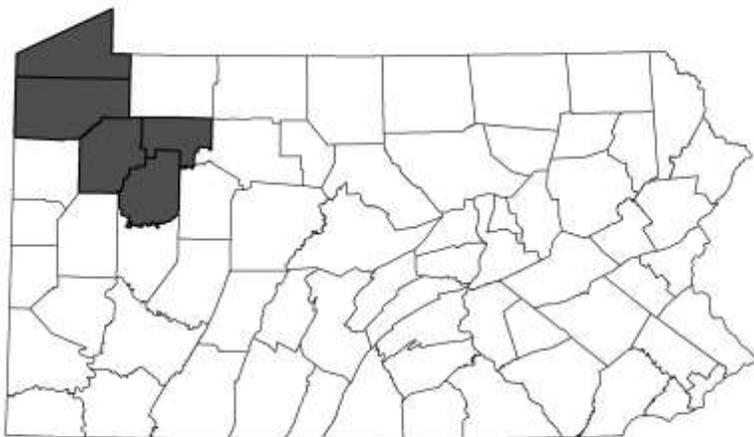
Noturus stigmosus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3	State Rank	S4
IUCN Red List		PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Increase of >10%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; establish new populations above barriers.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Large Rivers
Habitat	Warm, Medium River	Warm, Large River

Specific Habitat Requirements:

Clear riffles with moderate-swift current, and substrate of gravel, cobble, and rubble in French Creek.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation and turbidity from activities may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: French, Mid. Allegheny-Redbank, Mid. Allegheny-Tionesta, Lwr Allegheny

Associated Species: French Creek and Allegheny River fishes

RESEARCH NEEDS

1. Can populations of northern madtom be established above barriers in recolonized waters?

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys needed at this time. Status fairly well known except with regards to the lock and dam section of the Allegheny River. Population appears to be expanding and surveys are recommended within the next ten years.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Cisco

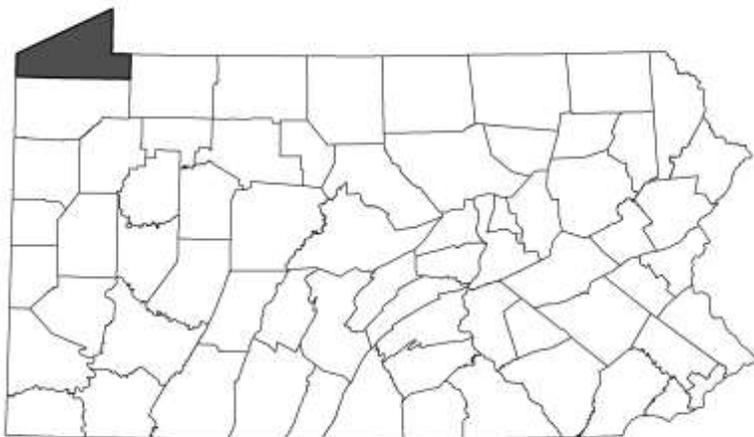
Coregonus artedii

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ellen Edmonson and Hugh Chrisp



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	SU
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Not able to determine conservation target at this time, more information needed about species in Pennsylvania.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	
Habitat	Lake Erie	

Specific Habitat Requirements:

Pelagic species occurring in infertile lakes greater than 10 m deep and large rivers.

THREATS AND ACTIONS

IUCN Threat: 0.0 Threat unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. Determine presence of a spawning stock; determining available spawning habitat / habitat quality.
2. Determine fishery effects and how to confront rainbow smelt issues.
3. What are hatchery options in the absence of a spawning stock?

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Benthic trawl and gill net surveys are conducted annually.	Pennsylvania Fish and Boat Commission		
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

Brook Trout

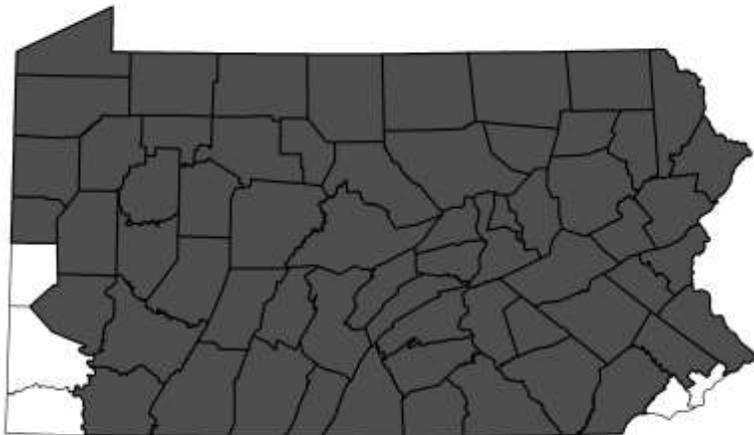
Salvelinus fontinalis

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S3S4
IUCN Red List		PA Legal Status	Not Listed
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Moderate Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Clear mountain streams at elevations > 1,500 to 2,000 ft. with high quality, moderate flow and bordered by deeply undercut stream banks, exposed tree root balls, rock, brush piles, and greater than 75% ground cover.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Acid deposition reduces water quality for eastern brook trout

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure federal and state air quality regulations are followed.	Eliminate or reduce acid deposition	Water samples- chemical and physical analyses	Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate	1
Action Location: HUC4 Watershed: Statewide				

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Dams and culverts impede movement of fish and other aquatic biota

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Work with landowners, townships, and relevant agencies & organizations to remove dams, provide fish passage if dam removal is not possible and improve culverts to allow passage of native eastern brook trout.	To increase connectivity of streams with native eastern brook trout	Number of dams removed; culverts improved allowing documented movement of native eastern brook trout	Monitor streams with new facilities to assess presence of brook trout	1
Action Location: HUC4 Watershed: Statewide				

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Acidic runoff from abandoned coal mines impacts some populations

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Expand efforts to neutralize acidic discharges into brook trout habitat	To restore water quality in historical brook trout streams	Stream miles where brook trout now exist after treatment	Monitor streams with new facilities to assess presence of brook trout	1
Action Location: HUC4 Watershed: Statewide				

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation and turbidity from activities may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Statewide

Associated Species: All species occupying waterway.

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Runoff from dirt & gravel roads impacts some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in habitat or water quality.	Water quality and silt deposition monitoring.	Monitor sites and streams as per stipulations of permit.	1

Action Location: HUC4 Watershed: Statewide

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Predicted temperature increases may impact some populations during next 25 years.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Statewide

Associated Species: All coldwater and coolwater species

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in habitat or water quality.	Water quality and silt deposition monitoring.	Monitor sites and streams as per stipulations of permit.	1

Action Location: HUC4 Watershed: Statewide

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Riparian overstory removal.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Maintain or create riparian buffers.	Maintain or increase coldwater environs.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Statewide

Associated Species: All species occupying waterway.

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Predicted droughts may impact some populations during next 25 years.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Statewide

Associated Species: All aquatics

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Competition for resources and habitat with introduced brown trout.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 10.0 Species Reintroduction and Stocking Remove brown trout in areas managed for brook trout.	Reduce competition.	brook trout population assessments.	Trout population assessments.	2
Action Location:	HUC4 Watershed: Statewide			

RESEARCH NEEDS

1. Determine brook trout population movements in relation to barriers and characterize movements of individuals.
2. Develop a brook trout status and trends monitoring program, including review and analysis of PFBC data to guide sampling design.
3. Evaluate brook trout population genetics structure within major Pennsylvania drainages. Refine existing models that predict brook trout occurrence.

SURVEY NEEDS

1. Continue surveys conducted through PFBC Unassessed Waters Program.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
The brook trout is being monitored by PFBC Fisheries Managers' game fish surveys in certain streams. A formal state monitoring plan is currently being developed to assess populaiton trends.	Pennsylvania Fish and Boat Commission		

Central Mudminnow

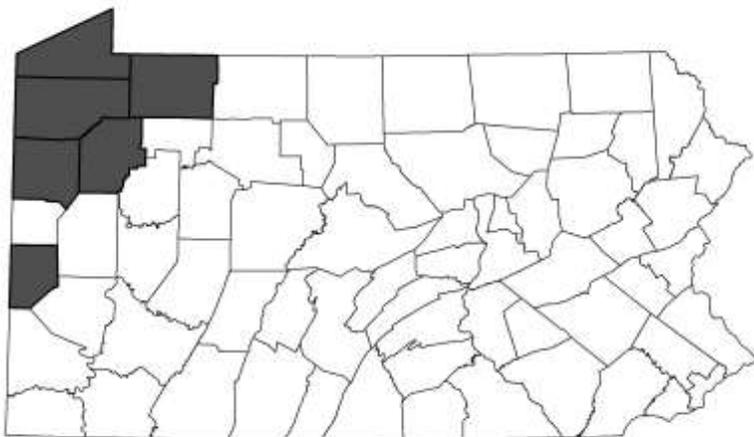
Umbra limi

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Candidate
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Low Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Prefers lakes, ponds, swamps, marshes, and sluggish or ponded sections of streams with substrates of mud, muck, and organic debris. It is most frequent in areas with dense vegetation.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Wetland habitat impacts directly affect available habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Review permits to mitigate or avoid impacts to wetland fish habitat.	Mitigate or avoid impacts to wetland fish habitat.	Wetland and associated area.	Fish population assessments.	2
Action Location: HUC4 Watershed: Allegheny, E. Lake Erie-Lake Erie, U. Ohio				
Associated Species: All species occupying waterway.				

IUCN Threat: 9.0 Pollution
Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2
Action Location: HUC4 Watershed: Allegheny, E. Lake Erie-Lake Erie				
Associated Species: All species occupying waterway.				

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Predicted droughts may impact populations confined to small wetlands but extent and timing unknown.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, E. Lake Erie-Lake Erie

Associated Species: All aquatics

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, E. Lake Erie-Lake Erie, U. Ohio

Associated Species: All species occupying waterway.

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys needed at this time. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Eastern Mudminnow

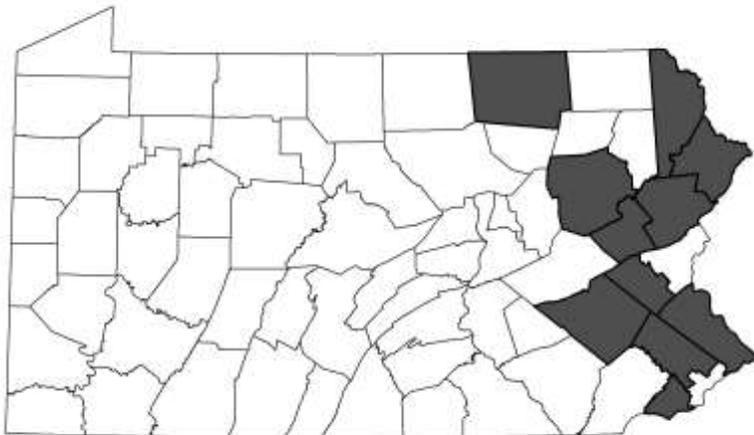
Umbra pygmaea

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Paul Overbeck



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S3
IUCN Red List	LC Least Concern	PA Legal Status	Candidate
Northeast Region	Low Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	Northern Swamp
Habitat	Mesotrophic, Low Alkalinity Lake	North-Central Appalachian Acidic Swamp

Specific Habitat Requirements:

Sluggish sections of small creeks to medium-sized streams and lentic habitats, including lakes, ponds, bog, marshes, swamps, and ditches; waters may be clear to somewhat turbid.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Wetland habitat impacts directly affect available habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Review permits to mitigate or avoid impacts to wetland fish habitat.	Mitigate or avoid impacts to wetland fish habitat.	Wetland and associated area.	Fish population assessments.	1
Action Location: Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains, Piedmont, New England, Ridge and Valley				
Associated Species: All species occupying waterway.				

IUCN Threat: 9.0 Pollution
Specific Threat: Nutrient-rich discharges contributing to biological oxygen demand (BOD), flash flows, sediment, habitat degradation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1
Action Location: Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains, Piedmont, New England, Ridge and Valley				
Associated Species: All species occupying waterway.				

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Various impacts to water and habitat quality.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Maintain or enhance current levels of protection by regulation.	No net impact from siltation or pollution.	Reported pollution events.	Difficult to monitor - primary concern is rare catastrophic event.	2
Action Location: Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains, Piedmont, New England, Ridge and Valley				
Associated Species: All species occupying waterway.				

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Predicted droughts may impact populations confined to small wetlands but extent and timing unknown.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Reduce emissions.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	2
Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal				
Associated Species: All aquatics				

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Increased turbidity and siltation may result from logging activities.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	2

Action Location: HUC10 Watershed: Broadhead Cr.

Associated Species: All species occupying waterway.

RESEARCH NEEDS

1. How widespread are populations of eastern mudminnow in areas with limited human access?

SURVEY NEEDS

1. Status fairly well-known throughout most of its range with the exception of areas with suitable habitat and limited access.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Burbot

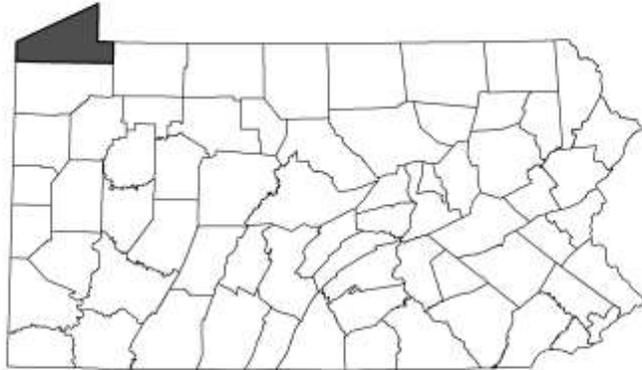
Lota lota

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S3
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Decline of 30 - 50%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	Headwaters and Creeks
Habitat	Lake Erie	Moderate Gradient, Cold, Headwaters and Creeks

Specific Habitat Requirements:

Clear cold creeks of moderate gradient that are well oxygenated and deep cold lakes.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Water temperatures could exceed preference in currently occupied habitats.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain suitable stream temperatures.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: E. Lake Erie-Lake Erie

Associated Species: All coldwater and coolwater species

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Fungal infection in testes implicated in recent decline in Lake Erie burbot populations; also, burbot populations are dependent on sea lamprey control and lake trout numbers.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Promote new sea lamprey control measures and research.	Reduce burbot mortality.	Burbot population assessments.	Burbot population assessments.	2

Action Location: HUC4 Watershed: E. Lake Erie-Lake Erie

Associated Species: Large-bodied Lake Erie fish and native lamprey populations

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Mortality associated with bycatch and commercial fishing. Some mortality associated with sport fishing.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 101.0 Species Management Assess current regulations and ensure population is not in danger.	Manage mortality, maintain populations.	Burbot population assessments.	Burbot population assessments.	3
Action Location: HUC4 Watershed: E. Lake Erie-Lake Erie				

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Benthic trawl and gill net surveys are conducted annually.	Pennsylvania Fish and Boat Commission		
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.



Allegheny Burbot

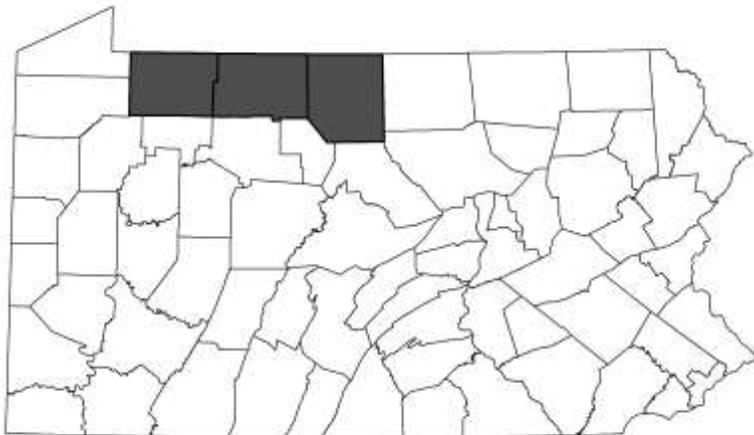
Lota sp. cf. lota

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Doug Fischer



Documented Presence

CONSERVATION PROFILE

Global Rank	State Rank	S2
IUCN Red List	PA Legal Status	Not Listed
Northeast Region	Not NE Regional SGCN	PA Abundance Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year) Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels by protecting stream temperatures; promote colonization of new habitat by creating preferred habitat when instream work is permitted.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Small Rivers

Habitat

Specific Habitat Requirements:

Cold to cool creeks or small rivers with slow moving pools associated with large substrate, crevices, or large woody debris.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Water temperatures could exceed preference in currently occupied habitats.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain suitable stream temperatures.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: All coldwater and coolwater species

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: Upper Allegheny

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in habitat or water quality.	Water quality and silt deposition monitoring.	Monitor sites and streams as per stipulations of permit.	1
Action Location: HUC8 Watershed: Upper Allegheny				
Associated Species: All species occupying waterway.				

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Water temperature could increase as water level decreases in response to drought. Habitat could be limited by drought.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain suitable stream temperatures and flow regimes.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	2
Action Location: HUC8 Watershed: Upper Allegheny				
Associated Species: All aquatics				

RESEARCH NEEDS

1. Describe the specific status of the Allegheny burbot.
2. Describe reproduction and related aspects of the Allegheny burbot.

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys. Status assessment completed in 2004 and fairly well understood.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Brook Stickleback

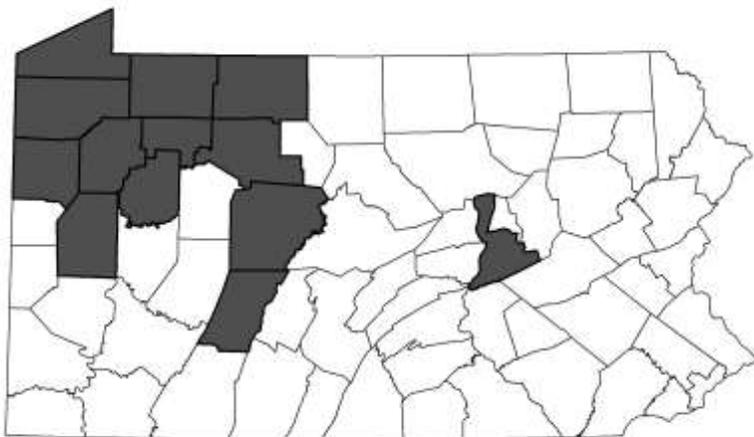
Culaea inconstans

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ken Anderson



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S4
IUCN Red List	LC Least Concern	PA Legal Status	Candidate
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	Headwaters and Creeks
Habitat	Low Gradient, Cool, Headwaters and Creeks	High Gradient, Cool, Headwaters and Creeks

Specific Habitat Requirements:

Inhabits clear, cool waters of lakes, ponds, sluggish stream and river sections, spring runs, wetlands, and bogs. Prefers heavily vegetated areas with sand, muck, organic debris, and gravel substrates, but sometimes occurs near structure like stumps/roots or where vegetation is sparse to moderate and substrates rubble and cobble.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Water temperatures could exceed preference in currently occupied habitats.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain suitable stream temperatures.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, U. Ohio, E. Lake Erie-Lake Erie

Associated Species: All cold/cool water spp.

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, U. Ohio, E. Lake Erie-Lake Erie

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	2

Action Location: HUC4 Watershed: Allegheny, E. Lake Erie-Lake Erie

Associated Species: All species occupying waterway.

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

- 1. Monitoring recommended, but no additional surveys needed at this time. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Threespine Stickleback

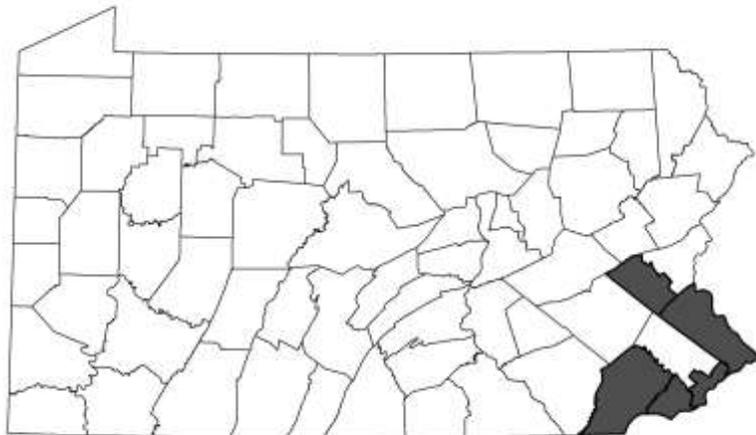
Gasterosteus aculeatus

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Small Rivers	
Habitat	Moderate Gradient, Warm, Small River	

Specific Habitat Requirements:

Shallow, vegetated areas of tidal pools, creeks, marshes, estuaries, shore waters, and freshwater lakes.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Nutrient-rich discharges contributing to biological oxygen demand (BOD), flash flows, sediment, habitat degradation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Closely scrutinize permit applications for potential impacts and tailor permit stipulations to minimize them.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually at reference sites and during projects. Sample fish community every 2 years for changes.	1

Action Location: Physiographic Province: Atlantic Coastal Plains, Piedmont, New England, Ridge and Valley

Associated Species: All species occupying waterway.

IUCN Threat: 9.0 Pollution

Specific Threat: Various impacts to water and habitat quality.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Maintain or enhance current levels of protection by regulation.	No net impact from siltation or pollution.	Reported pollution events.	Difficult to monitor - primary concern is rare catastrophic event.	2

Action Location: Physiographic Province: Atlantic Coastal Plains, Piedmont

Associated Species: All species occupying waterway.

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Closed tidal gates act as barriers and restrict access to spawning habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 5.0 Facilities and Areas Provide fish passage using tide gates.	Provide fish passage and spawning	Fish community sampling	Fish community sampling, in particular during migrations.	3

Action Location: HUC8 Watershed: Lower Delaware

RESEARCH NEEDS

1. What is the current distribution and habitat use of the threespine stickleback in PA?

SURVEY NEEDS

1. A status assessment including sampling in winter and spring and a review of available current information is needed to better understand current distribution and habitat usage in PA.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A status survey is necessary before a monitoring plan is designed and implemented.	Pennsylvania Fish and Boat Commission		

Checkered Sculpin

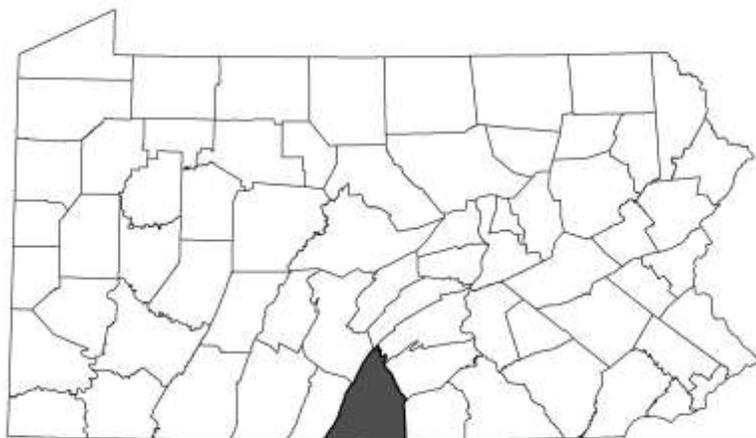
Cottus sp. cf. cognatus

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4Q	State Rank	S2
IUCN Red List		PA Legal Status	undescribed sp.
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; maintain protection for ground water and springs within the extent of occupation.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	

Habitat

Specific Habitat Requirements:

Cold, spring-fed runs and streams. It occurs over substrates of sand, gravel, cobble, rubble, silt, and organic debris in riffles, runs, and pools.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Stream containing one of largest populations probably near upper thermal limit for this species now; increased temperatures predicted may extirpate population.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain suitable stream temperatures.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Potomac

Associated Species: All coldwater and coolwater species

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Potomac

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation, turbidity, nutrient loading, and deforestation may be impacting some populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Potomac

Associated Species: All species occupying waterway.

RESEARCH NEEDS

1. Describe the specific status of the checkered sculpin.

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys at this time. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Banded Sunfish

Enneacanthus obesus

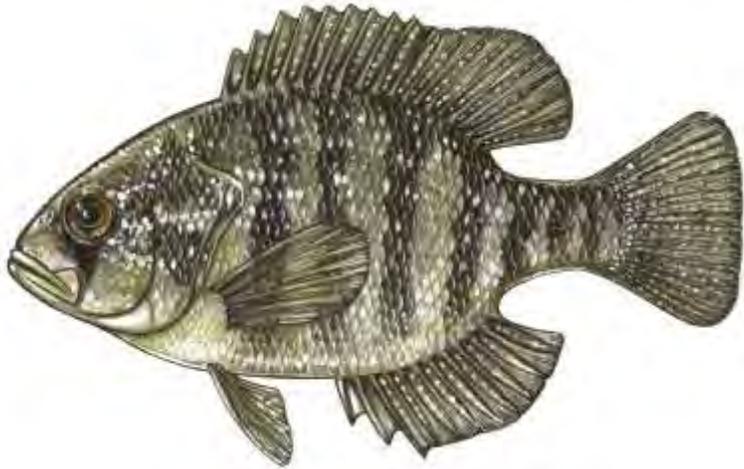
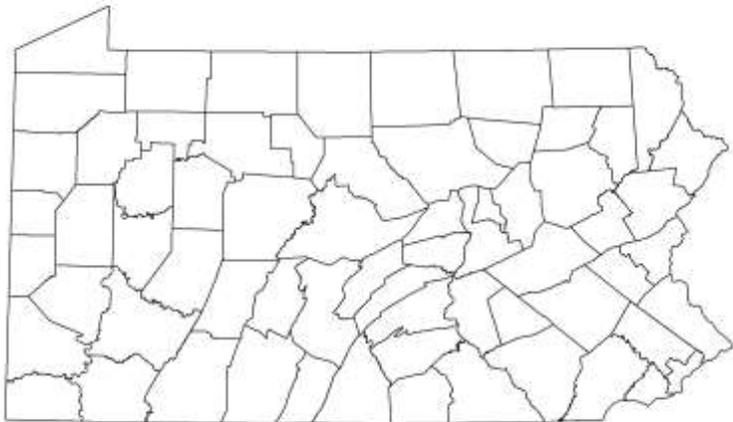


Illustration: Ted Walke



No Current Records

CONSERVATION PROFILE

Global Rank	G5	State Rank	SH
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Very High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	

Conservation Goal:

Not able to determine conservation target at this time, more information needed about species in Pennsylvania; however it is likely extirpated.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Tidal Large Rivers	Tidal Headwaters and Creeks

Habitat

Specific Habitat Requirements:

Delaware estuary; sluggish, calm streams, rivers, lakes, ponds with dense stands of rooted and suspended aquatic vegetation over substrates of silt, sand, mud, and detritus.

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

Warmouth

Lepomis gulosus

PA Fish & Boat Commission

PA Fish & Boat Commission

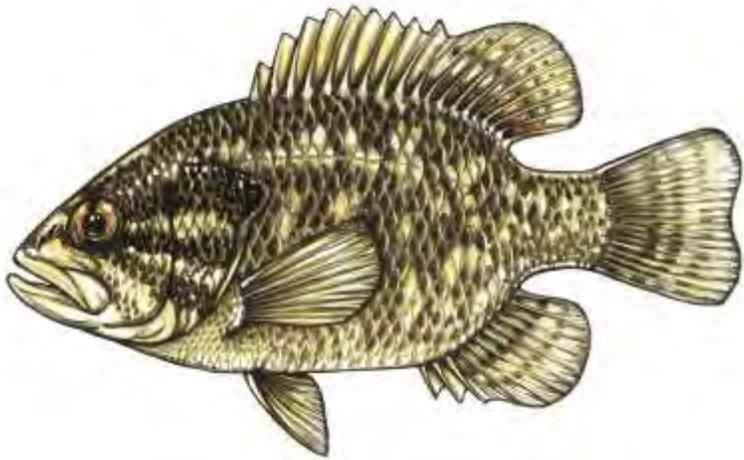
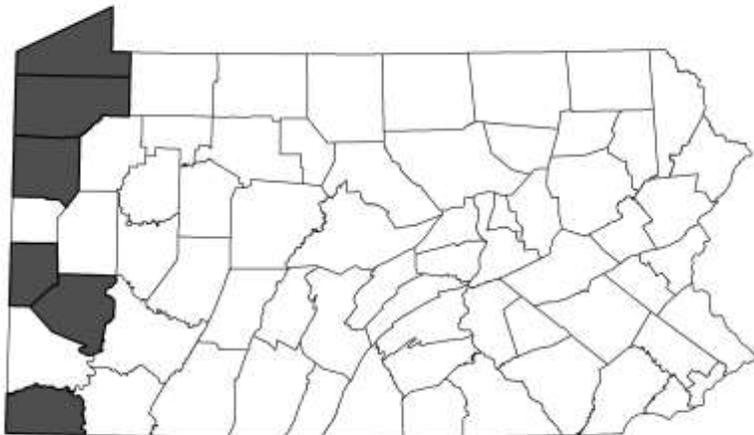


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S3
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes and Ponds	Lakes and Ponds

Habitat

Specific Habitat Requirements:

Natural lakes, ponds, marshes, impoundments, and sluggish, low-gradient sections of creeks and rivers; prefers substrates of sand, gravel, mud and detritus, dense growths of aquatic vegetation, and relatively clear waters.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Discharge and non-point from Erie into Presque Isle Bay; nitrification, biological oxygen demand (BOD).

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC6 Watershed: Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

IUCN Threat: 9.0 Pollution

Specific Threat: Discharge and non-point from Erie into Presque Isle Bay; localized water quality degradation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC6 Watershed: Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Minor impacts due to introduced mussels (habitat) and gobies (predation on young) may be occurring in Presque Isle Bay.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0	Direct Management of Natural Resources	Protect extant populaitons	Fish community surveys	Fish community survey results. 3

Measures to prevent further introduction of aquatic invasive species.

Action Location: HUC6 Watershed: Lake Erie

Associated Species: All species in drainage

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys at this time. Status fairly well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Longear Sunfish

Lepomis megalotis

PA Fish & Boat Commission

PA Fish & Boat Commission

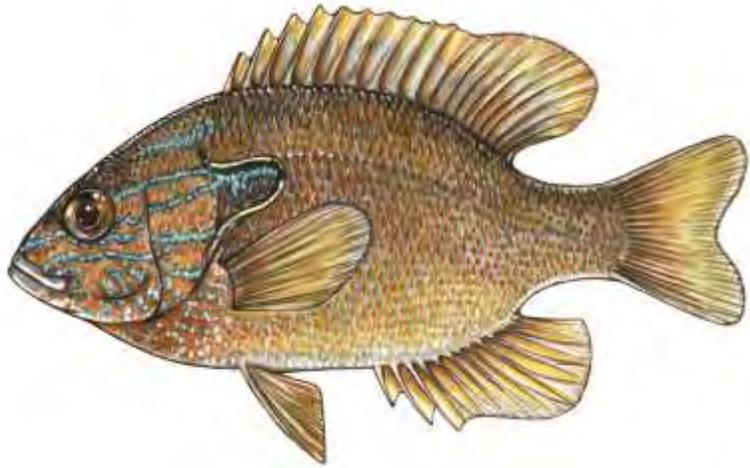
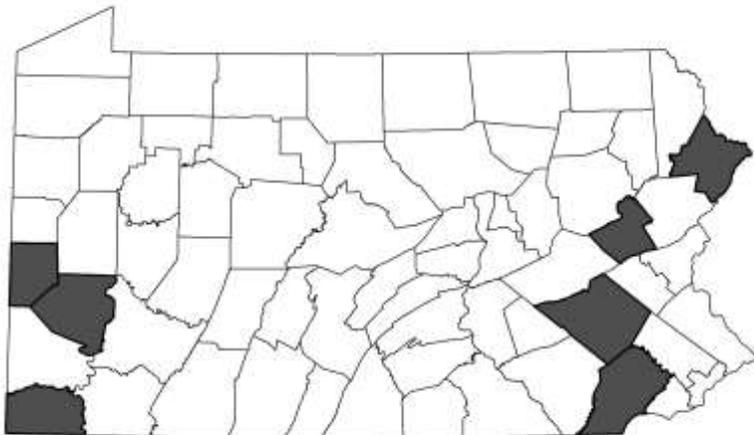


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S1
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Large Rivers	
Habitat	Warm, Large River	

Specific Habitat Requirements:

Warmwater lakes, ponds, streams, and rivers under a variety of circumstances.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Turbidity, presumably a limiting factor for Monongahela & Ohio River populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: U. Ohio

Associated Species: All species occupying waterway.

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in habitat or water quality.	Water quality and silt deposition monitoring.	Monitor sites and streams as per stipulations of permit.	1

Action Location: HUC8 Watershed: U. Ohio-Wheeling

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Mining activity in Greene County results in erosion, sedimentation, and altered hydrology.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Remediate existing discharges, ensure current and future mining operations do not affect habitat and water quality.	Restore water quality.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: U. Ohio-Wheeling

Associated Species: All species occupying waterway.

RESEARCH NEEDS

1. What is the distribution of the longear sunfish within the Ohio River and Beaver River drainages?

SURVEY NEEDS

1. Status survey under way and should be completed in 2015; however, this will not address populations in river environments. Surveys in the Ohio River and Beaver Drainage are recommended even if part of other initiatives.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Eastern Sand Darter

Ammocrypta pellucida

PA Fish & Boat Commission

PA Fish & Boat Commission

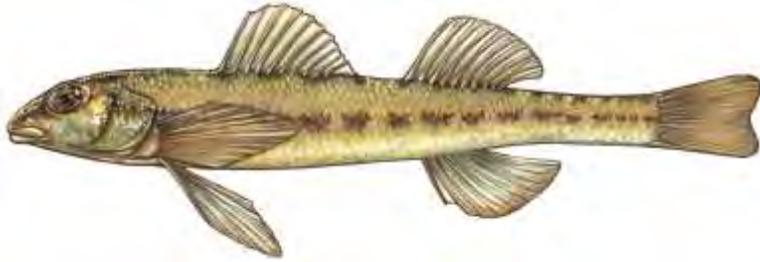
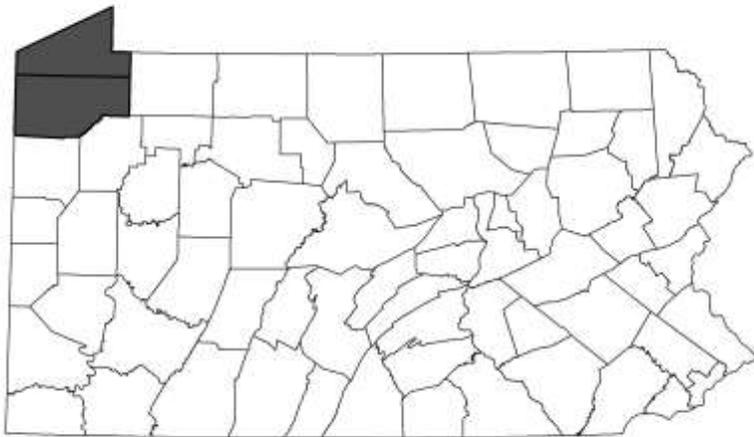


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G4	State Rank	S1
IUCN Red List	VU Vulnerable	PA Legal Status	Endangered
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes and Ponds	Small Rivers

Habitat

Specific Habitat Requirements:

Medium-large streams, rivers, lakes, w/ substrates of 90-95 percent clean sand and fine gravel.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Predation and/or competition from introduced gobies and mussels in Presque Isle Bay.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources	N/A	N/A	N/A	

No actions are feasible which Pennsylvania can undertake to significantly reduce invasive animal species populations; however, measures for the prevention of further introductions should be undertaken.

Action Location: HUC4 Watershed: E. Lake Erie-Lake Erie

IUCN Threat: 9.0 Pollution

Specific Threat: Sections of Muddy Creek and French Creek affected by siltation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	1

Action Location: HUC4 Watershed: Allegheny, E. Lake Erie-Lake Erie

Associated Species: All species occupying waterway.

THREATS AND ACTIONS

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Increased storm severity and flows may destroy sand beds or smother them with silt.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Only legislation and regulation reducing greenhouse emissions will prevent this threat from occurring.	Maintain habitat.	Emission concentrations.	To be developed as part of climate change action model. Water samples annually or as appropriate at reference sites. Sample fish community at reference sites as appropriate.	1

Action Location: HUC8 Watershed: Chautauqua-Conneaut, Shenango, French, U. Ohio-Wheeling

Associated Species: All species in drainage

IUCN Threat: 9.0 Pollution

Specific Threat: Discharge and non-point from Erie into Presque Isle Bay; nutrification, biological oxygen demand (BOD).

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1

Action Location: HUC6 Watershed: Lake Erie

Associated Species: Potentially impacts all organisms in near-shore environment.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Discharge and non-point from Erie into Presque Isle Bay; localized water quality degradation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1

Action Location: HUC6 Watershed: Lake Erie

Associated Species: Potentially impacts all organisms in near-shore environment.

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Iowa Darter

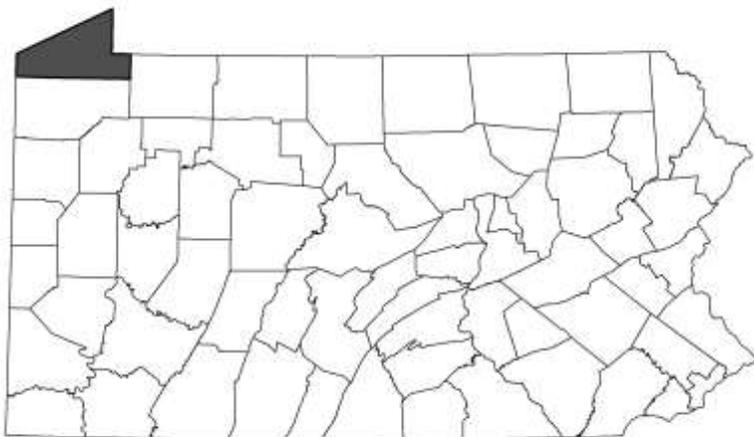
Etheostoma exile

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Wikimedia Commons, BenitoJuarez98



Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S2
IUCN Red List	LC Least Concern	PA Legal Status	Endangered
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Unknown

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; continue to protect the ecology of Lake Pleasant and Presque Isle, the only known extant populations.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Lakes	
Habitat	Mesotrophic, High Alkalinity Lake	

Specific Habitat Requirements:

Less than 1.5-meter deep areas of natural lakes with substrates of sand, muck, and organic debris, and with dense aquatic vegetation.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Discharge and non-point from Erie into Presque Isle Bay; nitrification, biological oxygen demand (BOD).

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC6 Watershed: Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

IUCN Threat: 9.0 Pollution

Specific Threat: Discharge and non-point from Erie into Presque Isle Bay; localized water quality degradation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Ensure discharge and runoff standards are adequate and enforced.	Cessation of algal blooms and other water quality degradation.	Nutrient concentrations.	Sample nutrient concentrations periodically during warm months.	1
Action Location: HUC6 Watershed: Lake Erie				
Associated Species: Potentially impacts all organisms in near-shore environment.				

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Predation and/or competition from introduced gobies and mussels in Presque Isle Bay.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources	Protect extant populaitons	Fish community surveys	Fish community survey results.	3
Measures to prevent further introduction of aquatic invasive species.				
Action Location: HUC6 Watershed: Lake Erie				
Associated Species: All species in drainage				

RESEARCH NEEDS

1. In Lake Erie, what threat do gobies pose to the Iowa darter?

SURVEY NEEDS

1. Monitoring recommended, given potential long term impacts from gobies, but no additional surveys. Status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Spotted Darter

Etheostoma maculatum

PA Fish & Boat Commission

PA Fish & Boat Commission

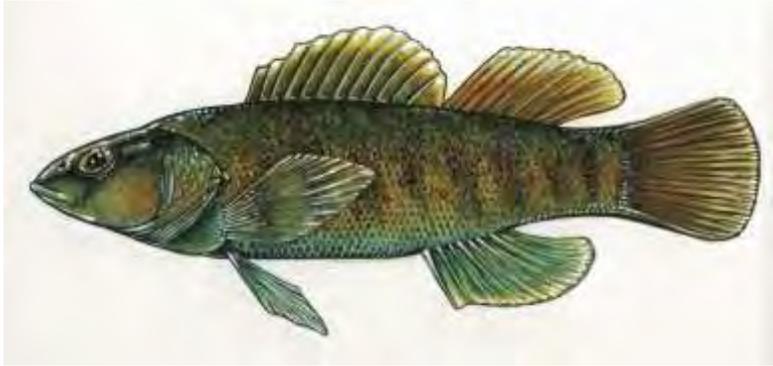
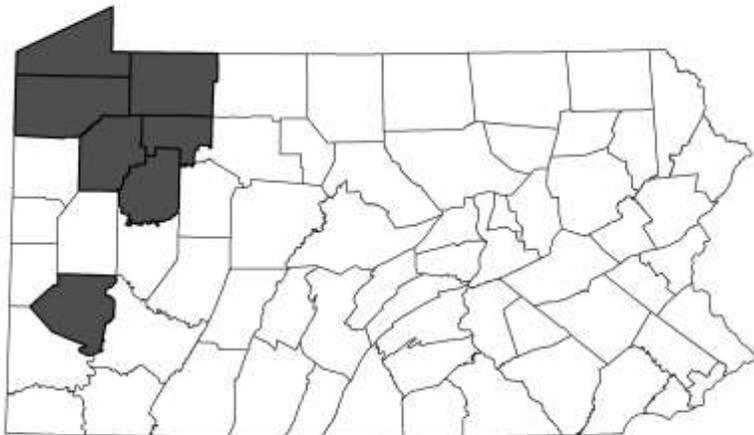


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G2G3	State Rank	S4
IUCN Red List	VU Vulnerable	PA Legal Status	Threatened
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; establish new populations above barriers.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Large Rivers
Habitat	Warm, Medium River	Warm, Large River

Specific Habitat Requirements:

Large streams and rivers; faster, deeper portions of riffles possessing gravel and rubble substrates.

THREATS AND ACTIONS

IUCN Threat: 0.0 No known threats

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. Can populations of the spotted darter be established above barriers in recolonized waters?
2. Within its historic range, are suitable waters available for reintroduction of the spotted darter?

SURVEY NEEDS

1. No surveys recommended. Status survey recently completed. Population appears stable to increasing.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Tessellated Darter

Etheostoma olmstedii

PA Fish & Boat Commission

PA Fish & Boat Commission

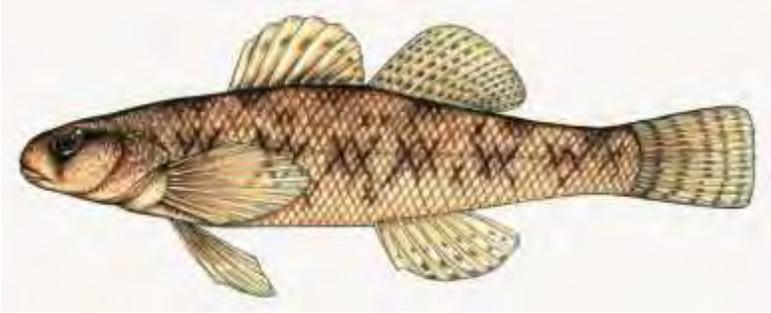
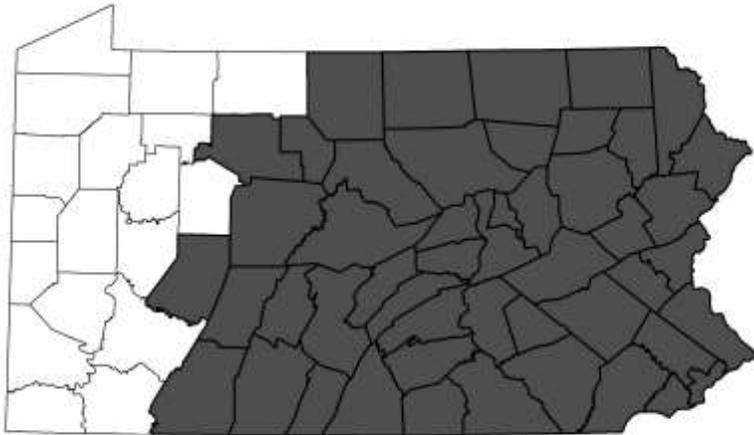


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S5
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Small Rivers

Habitat

Specific Habitat Requirements:

Riffles and pools of creeks and rivers, occupies a wide array of habitats.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Siltation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Ensure adherence to Erosion & Sedimentation plans; maintain riparian buffers.	No increase in pollution events or turbidity.	Water samples- chemical & physical analyses.	Water samples annually or as appropriate at reference sites and during projects. Sample fish community at reference sites as appropriate.	3

Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal, Susquehanna, U. Chesapeake, Potomac

Associated Species: All species occupying waterway.

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Resource and habitat competition from banded darter, greenside darter, and mimic shiner.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 2.0 Direct Management of Natural Resources Measures to prevent further introduction of aquatic invasive species.	Protect extant populations	Fish community surveys	Fish community survey results.	3

Action Location: HUC4 Watershed: Delaware-Mid Atlantic Coastal, Susquehanna, U. Chesapeake, Potomac

Associated Species: All species in drainage

RESEARCH NEEDS

- 1. None

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Tippecanoe Darter

Etheostoma tippecanoe

PA Fish & Boat Commission

PA Fish & Boat Commission

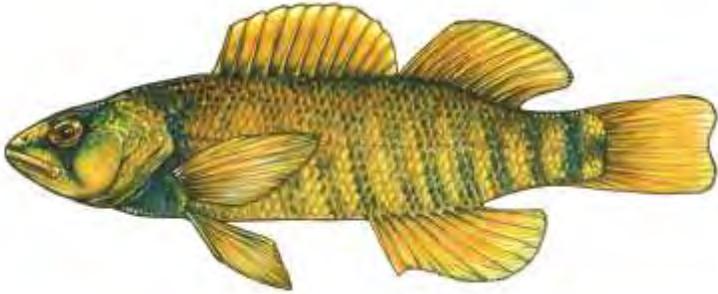
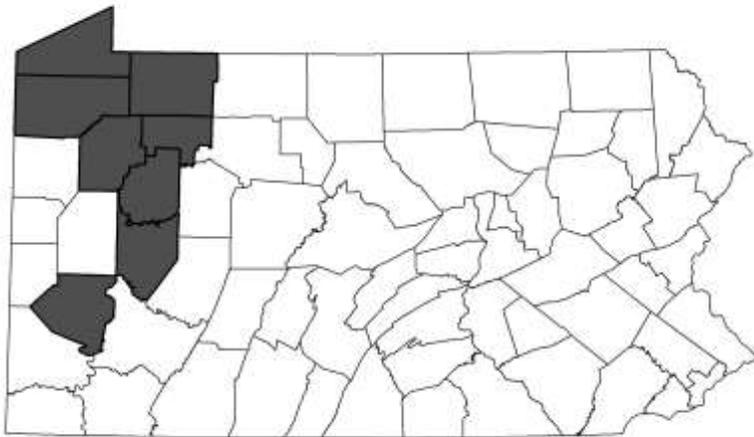


Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3G4	State Rank	S4
IUCN Red List		PA Legal Status	Threatened
Northeast Region	Very High Concern / Low Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Increase of 10 - 25%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels; establish new populations above barriers.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Large Rivers	
Habitat	Warm, Large River	

Specific Habitat Requirements:

Riffles of large creeks and rivers w/ clean gravel or sand/gravel substrates.

THREATS AND ACTIONS

IUCN Threat: 0.0 No known threats

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. Can populations of the Tippecanoe darter be established above barriers in recolonized waters?
2. Within its historic range, are suitable waters available for reintroduction of the Tippecanoe darter?

SURVEY NEEDS

1. No surveys recommended. Status survey recently completed. Population appears stable-to-increasing.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Variegate Darter

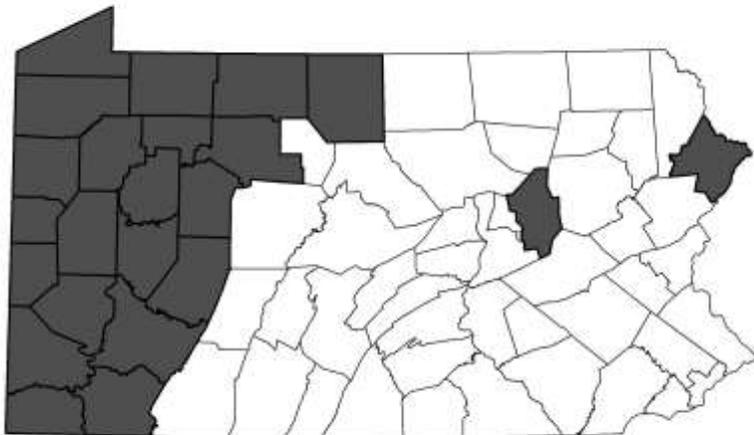
Etheostoma variatum

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Rob Criswell



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G5	State Rank	S5
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	Moderate Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Increase of 10 - 25%

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Small Rivers

Habitat

Specific Habitat Requirements:

Riffles of creeks and rivers w/ clean gravel, rubble, boulder substrates.

THREATS AND ACTIONS

IUCN Threat: 0.0 No known threats

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

Chesapeake Logperch

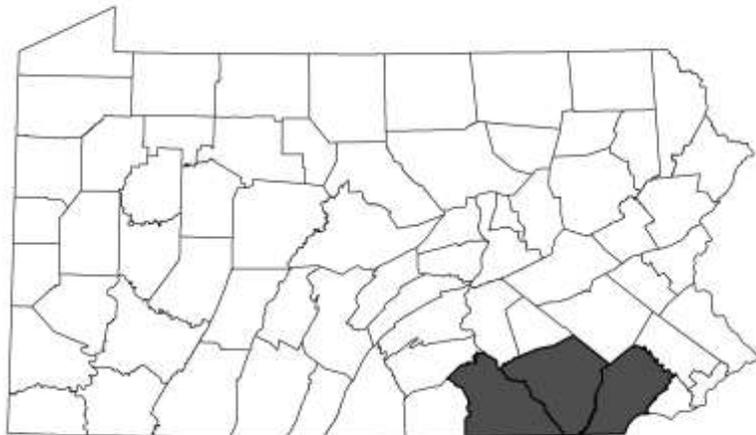
Percina bimaculata

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Doug Fischer



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G1G2	State Rank	S1
IUCN Red List	VU Vulnerable	PA Legal Status	Threatened
Northeast Region	Not NE Regional SGCN	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Promote recolonization of Piedmont waters to include the Susquehanna River and tributaries.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Headwaters and Creeks	
Habitat	Moderate Gradient, Cool, Headwaters and Creeks	

Specific Habitat Requirements:

Small to large streams, rivers, and reservoirs with areas of sand or gravel for spawning.

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Sedimentation and nutrient loading is significant. Chlordane (pesticide/termiticide) has been documented in the fish community of Octoraro Creek.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Maintain water quality standards and habitat; best management practices.	Maintain water quality standards and habitat.	Water quality and silt deposition monitoring.	Unknown.	1
Action Location: HUC6 Watershed: Lwr Susquehanna				
Associated Species: All species in drainage				

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Dams prevent dispersal and recolonization of formerly occupied habitat and exclude individuals from potentially suitable habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 10.0 Species Reintroduction and Stocking Trap and transport fish above barriers to establish upstream populations, remove barriers when possible.	Restore native distribution.	Fish community sampling.	Fish community sampling.	1
Action Location: HUC6 Watershed: Lwr Susquehanna				

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Nearly 50% of fishes in occupied communities in Susquehanna River are introduced, including two widely distributed darters (banded darter and greenside darter). Effects undetermined at this time.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 10.0 Species Reintroduction and Stocking Take measures to prevent additional invasive species introductions. Reintroduce Chesapeake logperch above barriers that do not harbor non-native species.	Hedge survival by increasing Chesapeake logperch distribution into areas not occupied by non-native species.	Fish community surveys.	Fish community sampling.	1
Action Location: HUC6 Watershed: Lwr Susquehanna				

IUCN Threat: 9.0 Pollution
Specific Threat: Chemical releases, erosion and sedimentation from mining operations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Maintain water quality standards and habitat; best management practices.	Maintain water quality standards and habitat.	Water quality	Unknown.	1
Action Location: HUC6 Watershed: Lwr Susquehanna				
Associated Species: All species in drainage				

RESEARCH NEEDS

1. Describe the autecology of the Chesapeake logperch.
2. Can populations of the Chesapeake logperch be established above barriers in recolonized waters?
3. Within its historic range, are suitable waters available for reintroduction of the Chesapeake logperch?

SURVEY NEEDS

1. Monitoring recommended, but no additional surveys. Status survey recently completed and status sufficiently well-known.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Longhead Darter

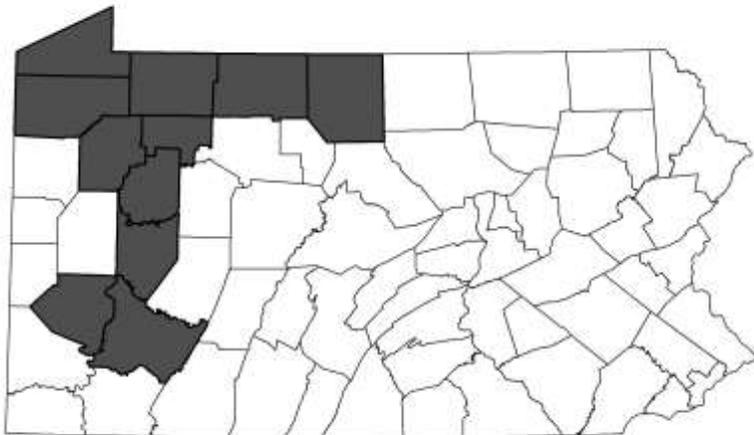
Percina macrocephala

PA Fish & Boat Commission

PA Fish & Boat Commission



Illustration: Ted Walke



■ Documented Presence

CONSERVATION PROFILE

Global Rank	G3	State Rank	S4
IUCN Red List	DD Data Deficient	PA Legal Status	Not Listed
Northeast Region	Very High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Increase of 10 - 25%

Conservation Goal:

Maintain species populations in the Allegheny River Basin at current levels and promote recolonization of recovering drainages (Monongahela River Basin and other Ohio River Basin tributaries).

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Large Rivers	Medium Rivers
Habitat	Warm, Large River	Warm, Medium River

Specific Habitat Requirements:

Warm rivers and large streams, and occupies a wide array of habitats.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Potential impacts from earth-moving activities and possible spills.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Require BMPs that protect occupied streams during permit review process; ensure compliance during construction and operation.	No reduction in habitat or water quality.	Water quality and silt deposition monitoring.	Monitor sites and streams as per stipulations of permit.	1

Action Location: HUC4 Watershed: Allegheny

Associated Species: All species occupying waterway.

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Chemical releases, erosion and sedimentation from mining operations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 100.0 Law and Policy Maintain water quality standards and habitat; best management practices.	Maintain water quality standards and habitat.	Unknown.	Unknown.	2

Action Location: HUC4 Watershed: Allegheny, Monongahela, U. Ohio

Associated Species: All species in drainage

RESEARCH NEEDS

1. Can populations of the longhead darter be established above barriers in recolonized waters?
2. Within its historic range, are suitable waters available for reintroduction of the longhead darter?

SURVEY NEEDS

1. No surveys recommended. Status survey recently completed. Population appears stable-to-increasing.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Data are received through the Scientific Collectors Program which allows for annual review survey work completed by entities other than PFBC.	Pennsylvania Fish and Boat Commission		Not a formal monitoring initiative, but provides the ability to consider available information.
No current monitoring program in place. A five-year standardized monitoring protocol at secure reference sites is recommended.	Pennsylvania Fish and Boat Commission		

Shield Darter

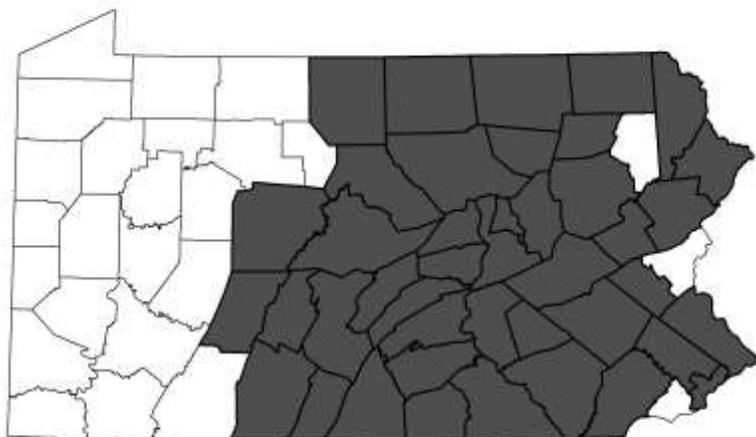
Percina peltata

PA Fish & Boat Commission

PA Fish & Boat Commission



Photo: Richard Horowitz



CONSERVATION PROFILE

Global Rank	G5	State Rank	S5
IUCN Red List	LC Least Concern	PA Legal Status	Not Listed
Northeast Region	High Concern / High Responsibility	PA Abundance	Unknown
Federal Status	Not Listed	PA Short-Term Trend (10year)	Relatively Stable (<=10% change)

Conservation Goal:

Maintain species populations in Pennsylvania at current levels.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	Medium Rivers	Small Rivers

Habitat

Specific Habitat Requirements:

Rivers and large streams, and occupies a wide array of habitats.

THREATS AND ACTIONS

IUCN Threat: 0.0 No known threats

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 0.0 No Action Specified	N/A	N/A	N/A	

No Action Specified

Action Location:

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. None

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
This species is common enough over most of its PA range that a specific monitoring program is not necessary. It can be monitored incidentally by PFBC Fisheries Managers' game fish surveys and Scientific Collectors Program.	Pennsylvania Fish and Boat Commission		

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Northern Brook Lamprey

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Mountain Brook Lamprey

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Margined Madtom

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