Ministry of the Environment, Conservation and Parks
2024

Pugnose Minnow

Ontario Government Response Statement

Photo: Fisheries and Oceans Canada

Protecting and Recovering Species at Risk in Ontario

Species at risk recovery is a key part of protecting Ontario's biodiversity. The *Endangered Species Act, 2007* (ESA) is the Ontario government's legislative commitment to protecting and recovering species at risk and their habitats.

Under the ESA, the government must ensure that a recovery strategy is prepared for each species that is listed as endangered or threatened. A recovery strategy provides science-based advice to government on what is required to achieve recovery of a species.

Generally, within nine months after a recovery strategy is prepared, the ESA requires the government to publish a statement summarizing the government's intended actions and priorities in response to the recovery strategy. The response statement is the government's policy response to the scientific advice provided in the recovery strategy. In addition to the strategy, the government response statement considers (where available) input from Indigenous communities and organizations, stakeholders, other jurisdictions, and members of the public. It reflects the best available local and scientific knowledge, including Indigenous Knowledge where it has been shared by communities and Knowledge Holders, as appropriate, and may be adapted if new information becomes available. In implementing the actions in the response statement, the ESA allows the government to determine what is feasible, taking into account social, cultural and economic factors.

The Recovery Strategy for the Pugnose Minnow (*Opsopoeodus emiliae*) in Ontario was completed on July 12, 2023.

Protecting and Recovering Pugnose MInnow

Pugnose Minnow is listed as a threatened species under the ESA, which protects both the animal and its habitat. The ESA prohibits harm or harassment of the species and damage or destruction of its habitat without authorization or complying with the requirements of a regulatory exemption.

Pugnose Minnow is a small freshwater fish that grows to approximately 5 cm long in Ontario. It has a white belly, pale yellow to olive green back with darkly outlined scales, and a black stripe along its side from tail to snout.

Pugnose Minnow is the only species belonging to the genus *Opsopoeodus*. The species is found throughout the east-central United States, with a small portion of the range extending into southwestern Ontario. In the United States, Florida and Texas mark the southern and western edges of the range, which expands northward throughout the Mississippi River system as far north as Wisconsin. Extant Ontario populations occur in the Detroit River and its tributary, the Canard River, Lake St. Clair and Chenail Ecarté, and several Lake St. Clair tributaries including North Sydenham River, East Sydenham River, East Otter Creek, Little Bear Creek, Maxwell Creek, and Whitebread Drain/Grape Run. The species also historically occurred in the McDougall Drain (possibly extirpated) and Thames River (extirpated), where it was last observed in 1968 and 1984, respectively. It is possible that other populations exist in areas with suitable habitat.

Pugnose Minnow occupies lakes, rivers and streams associated with wetlands in slow moving water. While Pugnose Minnow has often been documented in clear water with abundant aquatic vegetation, recent surveys in Ontario have captured most individuals in turbid (murky) water with various levels of aquatic vegetation. It is unclear whether turbid environments are preferred or if the species is persisting in less suitable habitat at these locations. Spawning is thought to occur between May and June, and females have been observed depositing eggs under flat surfaces, such as rocks, during laboratory studies. Further research is needed to better understand the species' biological requirements and preferences at all life stages, as well as how climate change may impact Pugnose Minnow habitat and distribution in the future.

Currently, there are no population size or trend estimates for Pugnose Minnow populations in Ontario. While large numbers of Pugnose Minnow have been collected from the Canard River and it is believed to support a higher abundance than other occupied areas, survey results are inconsistent and the population status for this area is still considered "poor" by experts. In other occupied areas, Pugnose Minnow are caught infrequently and in low numbers. This makes it challenging to implement an inventory and monitoring program and determine population trends.

The main threats to the species include habitat loss, degradation and alteration from sediment and nutrient loading, contaminants and toxic substances, drain maintenance, and shoreline development. Lands surrounding Pugnose Minnow habitat are primarily agricultural and urban areas where practices such as removal of riparian areas, unrestricted livestock access to rivers, improper use of fertilizers and pesticides, and substandard septic and sewage treatment systems can contribute to sedimentation and nutrient loading. Contaminant spills are also an issue in these areas. Further to this, some areas occupied by Pugnose Minnow are municipal drains that are subject to regular maintenance, which may reduce habitat quality or availability when flow rates and/or characteristics are altered. Shoreline development and dredging for shipping lanes has already altered Pugnose Minnow habitat in the Detroit River and Lake St. Clair, and shoreline development and dredging for marinas is also expected to have negative impacts on Pugnose Minnow habitat and food sources.

Invasive species, such as Common Carp (*Cyprinus carpio*), Round Goby (*Neogobius melanostomus*) and Tubenose Goby (*Proterorhinus semilunaris*) may compete with Pugnose Minnow for resources or alter food web dynamics. European Common Reed, also known as invasive Phragmites (*Phragmites australis* ssp. *australis*) and dreissenid mussels (i.e. Zebra

Mussels (*Dreissena polymorpha*) and Quagga Mussels (*Dreissena bugensis*)) may reduce habitat availability for the species by significantly altering wetland habitat and limiting spawning surfaces, respectively. Incidental harvest is another potential threat as the species may be found in areas of Ontario where baitfish are commercially harvested. However, studies have shown that bycatch of species at risk in Ontario's bait industry is extremely low, and harvesters are required by law to release any fish species at risk that they catch.

The extent and severity of threats to Pugnose Minnow and its habitat require further investigation, including their cumulative effects.

Insufficient information on life history, population characteristics, and the extent and magnitude of threats presents a challenge for developing specific population and distribution targets. Research and monitoring are required to gain a better understanding of species-specific life history characteristics, demographic traits, population size and range, and tolerance for habitat alteration in order to implement effective strategies to protect known populations and their habitat, and to refine recovery efforts and objectives. Accordingly, the government supports investigating the necessity and feasibility of population augmentation. Raising awareness of the species and its threats is also important for promoting protection and recovery efforts of Pugnose Minnow and its habitat.

Government's Recovery Goal

The government's goal for the recovery of Pugnose Minnow is to stabilize or increase populations in currently occupied locations in Ontario, and maintain or expand the species' distribution within its natural range.

Actions

Protecting and recovering species at risk is a shared responsibility. No single agency or organization has the knowledge, authority or financial resources to protect and recover all of Ontario's species at risk. Successful recovery requires inter-governmental co-operation and the involvement of many individuals, organizations and communities. In developing the government response statement, the government considered what actions are feasible for the government to lead directly and what actions are feasible for the government to support its conservation partners to undertake.

Government-led Actions

To help protect and recover Pugnose Minnow, the government will directly undertake the following actions:

- Continue to protect Pugnose Minnow and its habitat through the ESA.
- Undertake communications and outreach to increase public awareness of species at risk in Ontario (e.g., through the Ontario Parks Discovery Program, where appropriate).
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.

- Encourage the submission of Pugnose Minnow data to Ontario's central repository through the NHIC (Rare species of Ontario) project in iNaturalist or directly through the Natural Heritage Information Centre.
- Continue to support conservation, agency, municipal and industry partners, and Indigenous communities and organizations to undertake activities to protect and recover Pugnose Minnow. Support will be provided where appropriate through funding, agreements, permits and/or advisory services.
- Continue to implement Ontario's *Invasive Species Act, 2015* to:
  - prevent the introduction and spread of invasive species (e.g. invasive Phragmites) that threaten Pugnose Minnow and its habitat by applying the prohibitions as prescribed through the associated Regulations.
  - prevent the introduction and spread of invasive species (e.g. dreissenid mussels) that threaten Pugnose Minnow and its habitat by requiring boaters to take mandatory precautions to remove aquatic organisms and drain water from watercraft and watercraft equipment prior to transporting overland or launching into any waterbody in Ontario.
- Continue to implement the Aquatic Invasive Species Regulations made under the federal *Fisheries Act, 1985* to control the spread of invasive species that threaten Pugnose Minnow and its habitat by prohibiting the transportation, possession, and release of live Round Goby and Tubenose Goby in Ontario.
- Continue to implement the Ontario Invasive Species Strategic Plan (2012) to address the invasive species (e.g. dreissenid mussels, invasive Phragmites, and Round Goby) that threaten Pugnose Minnow and its habitat.
- Continue to implement Ontario's Sustainable Bait Management Strategy, 2020 to address potential risks to species at risk and the spread of invasive species.

Government-supported Actions

The government endorses the following actions as being necessary for the protection and recovery of Pugnose Minnow. Actions identified as "high" may be given priority consideration for funding under the Species at Risk Stewardship Program. Where reasonable, the government will also consider the priority assigned to these actions when reviewing and issuing authorizations under the ESA. Other organizations are encouraged to consider these priorities when developing projects or mitigation plans related to species at risk.

Focus Area:	**Management**
Objective:	Maintain or improve the quality of Pugnose Minnow habitat and reduce threats to the species through habitat rehabilitation and threat mitigation.

Pugnose Minnow occurs in southern Ontario, where limited habitat availability and reduced habitat quality present ongoing threats to the species. The removal of riparian areas, unrestricted livestock access to rivers, improper use of fertilizers and pesticides, contaminant spills and

substandard septic and sewage treatment systems contribute to increased levels of sediment and nutrients in the watershed. Collaborating with Indigenous groups, landowners, ecosystem recovery teams, conservation groups, local industries, and other relevant groups to manage habitat and threats will help to improve water quality conditions at the watershed scale.

Actions:

1. Minimize threats in and around the species' habitat by undertaking activities and completing effectiveness monitoring for these activities, including:
   i. **(High)** implementing natural shoreline stabilization techniques (e.g. riparian buffers) to prevent erosion
   ii. **(High)** developing and implementing Environmental Farm Plans and Nutrient Management Plans
   iii. **(High)** developing, implementing and updating best management practices to reduce siltation, turbidity, nutrient loading, and runoff of pollutants and to minimize the impact of altered flow regimes and drain maintenance activities
   iv. managing or controlling invasive species, such as invasive Phragmites
2. If determined necessary and feasible, implement, monitor and adapt augmentation actions for local populations with a focus on those at a higher risk of extirpation.

Focus Area: **Research and Monitoring**

Objective: Improve understanding of Pugnose Minnow biology, habitat requirements, population trends, threats to the species and its habitat, and necessity and feasibility of population management actions (i.e. augmentation).

In order to ensure that recovery efforts for Pugnose Minnow are effective, it is necessary to gain a more thorough understanding of the species and its habitat in Ontario. There are knowledge gaps regarding life history, habitat requirements, distribution and abundance, population demographics and trends, and the extent and severity of threats. Filling these knowledge gaps will provide information to determine the feasibility of maintaining, expanding or restoring self-sustaining populations at the local scale and will help determine where recovery efforts should be focused. The necessity and feasibility of augmenting existing populations through additional population management techniques such as captive rearing and release programs, should be explored where threats have been mitigated.

Actions:

3. **(High)** Develop and implement standardized inventory and monitoring protocols for Pugnose Minnow, with consideration for challenges with detectability, as well as for other species at risk fish that occur in the same habitat, where appropriate. Actions may include:
   i. surveying extant populations to determine species abundance and demographic, life history and habitat characteristics
   ii. monitoring population and habitat characteristics of extant populations
4. **(High)** Research habitat needs and life history characteristics of all life-stages to support the refinement of the recovery goal and habitat protection.

5. Investigate the severity, extent and source of threats to Pugnose Minnow, such as siltation and sedimentation, nutrient loading, runoff of pollutants, dredging, invasive species, and incidental harvest, as well as how climate change and severe weather may impact the species.
6. Conduct surveys within the historical distribution where suitable habitat exists, and in other targeted areas where there is reason to believe the species may be present to confirm whether populations exist.
7. Investigate the necessity and feasibility of augmenting Pugnose Minnow where it is presently found. Actions may include:
    i. assessing whether current threats can be sufficiently mitigated or reversed in order to enable successful augmentation
    ii. undertaking population viability analysis for extant populations
    iii. evaluating the feasibility of captive rearing and release, including identifying potential source populations

Focus Area: **Awareness**

Objective: Increase public awareness and promote the protection and stewardship of Pugnose Minnow in Ontario.

Due to the nature of aquatic systems, the Pugnose Minnow habitat may be impacted by activities occurring on terrestrial areas adjacent to occupied habitat, as well as in areas upstream of occupied habitat. As such, promoting public awareness of Pugnose Minnow and its threats across the watersheds in which it occurs is important for supporting the protection and recovery of the species and their habitat in Ontario.

Actions:

8. Collaborate with Indigenous communities and organizations, landowners, land managers and conservation partners to promote awareness of Pugnose Minnow and its threats among people engaged in agriculture, stewardship, fishing, bait harvesting and shoreline modification activities within the species' range by sharing information on:
    i. how to identify the species
    ii. the species' habitat requirements
    iii. protection afforded to the species and their habitat under the ESA
    iv. how to report observations of the species
    v. actions that can be taken to avoid or minimize the impacts to the species and their habitats (e.g. harvest techniques and timing windows, practices to prevent the introduction and spread of invasive species
    vi. actions that can be taken to promote the species' protection and recovery
9. Undertake work consistent with existing provincial programs and policies (e.g. Ontario's Invading Species Awareness Program and Ontario's Sustainable Bait Management Strategy) to promote responsible baitfish harvesting and awareness of invasive species and their impacts in Ontario, and to implement actions to prevent, respond to, and manage the spread of invasive species.

Implementing Actions

Financial support for the implementation of actions may be available through the Species at Risk Stewardship Program. Conservation partners are encouraged to discuss project proposals related to the actions in this response statement with Ministry of the Environment, Conservation and Parks staff. The Ontario government can also provide guidance about the requirements of the ESA, whether an authorization or regulatory exemption may be required for the project and, if so, the authorization types and/or conditional exemptions for which the activity may be eligible. Implementation of the actions may be subject to changing priorities across the multitude of species at risk, available resources and the capacity of partners to undertake recovery activities. Where appropriate, the implementation of actions for multiple species will be co-ordinated across government response statements.

Performance Measures

Progress towards achieving the government's goal for the recovery of Pugnose Minnow will be measured against the following performance measures:

- By 2028, all known Pugnose Minnow populations are persisting.
- By 2038, all known Pugnose Minnow populations are stabilizing or increasing.

Reviewing Progress

The ESA requires the Ontario government to conduct a review of progress towards protecting and recovering a species no later than the time specified in the species' government response statement, which has been identified as 5 years. The review will help identify if adjustments are needed to achieve the protection and recovery of Pugnose Minnow.

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategies and Government Response Statement for the Pugnose Minnow (*Opsopoeodus emiliae)* in Ontario for their dedication to protecting and recovering species at risk.

For Additional Information:
Visit the species at risk website at ontario.ca/speciesatrisk
Contact the Ministry of the Environment, Conservation and Parks
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