

Long Lake Pugnose Shiner and Permitting Update



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Outline

- Pugnose Shiner biology and status
- Legal considerations for vegetation control
- Long Lake experience (2024-spring 2026)
- Long Lake 2026 developments
- Landowner concerns from 2026
- Statewide strategy for Pugnose Shiner rehabilitation
- 2027 draft permit conditions
- Question and answer period

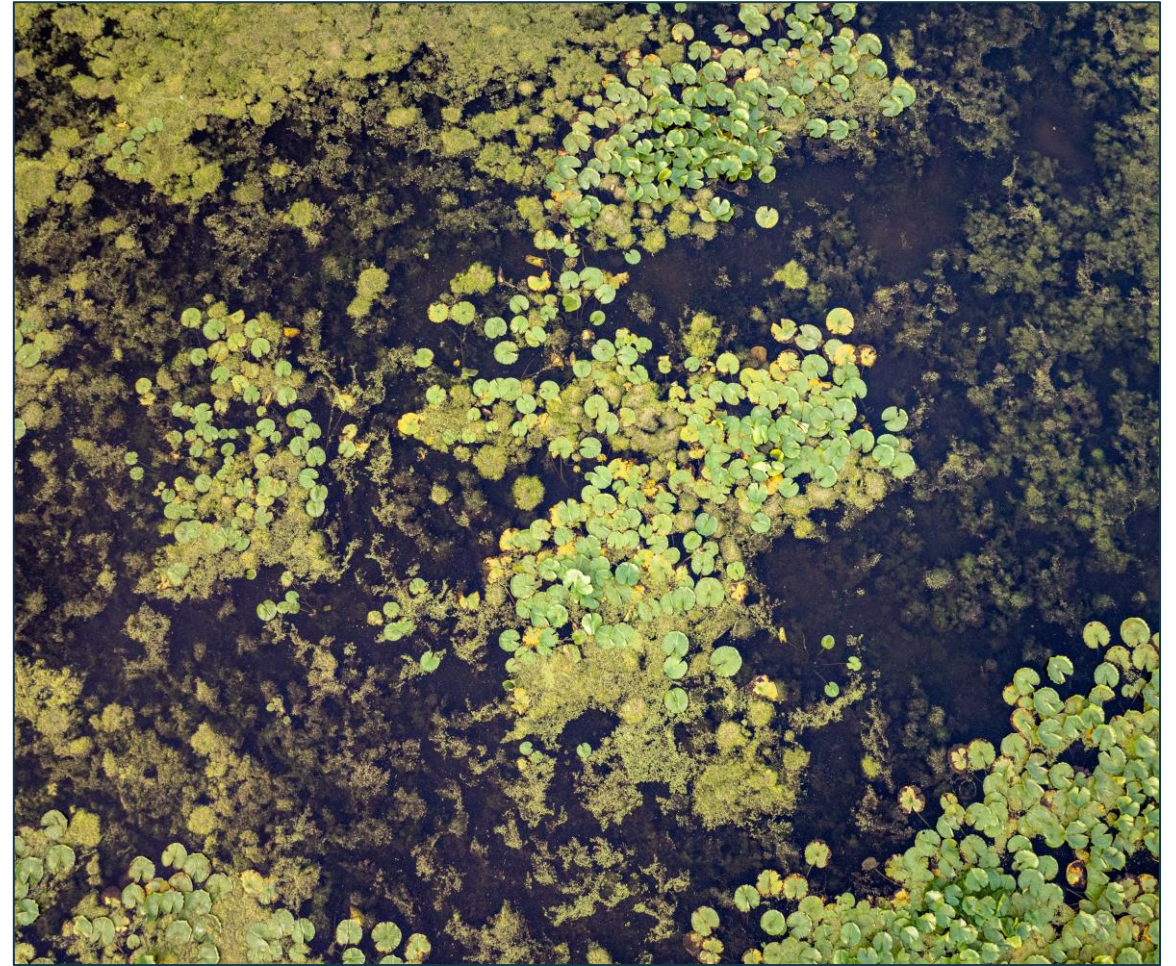
Pugnose Shiner Biology

- State endangered species present in Long Lake
- Size = 1.5 – 2 inches
- Small, nearly vertical mouth
- Eat invertebrates, plants, and algae



Pugnose Shiner Habitat

- Water depths of 8 feet or less
- Like clear water and dense vegetation
- Spawn in vegetation during June-July



Status and Distribution

- Historically in 18 watersheds in MI
- Only caught in 5 lakes in MI in last 20 years
- Endangered in MI and IL
- Threatened in WI and Ontario
- Special Concern in IN
- Extirpated in OH
- Globally considered vulnerable (G3)



Threats

- Habitat modification (e.g., dredging)
- Aquatic vegetation removal
- Sediment loading/increased turbidity
- Nutrient loading



From: Recovery Strategy for the Pugnose Shiner (*Notropis anogenus*)
In Canada (Fisheries and Oceans Canada 2024).

How did we get here?

????-2024: Mechanical harvesting & herbicides



Winter 2024-25: DNR learns of mechanical harvesting



Spring 2025: First T/E permit issued



2022-2025 ANC Permit Conditions

- Treatment is prohibited within 6 feet of the shoreline during June and July.
- Due to the toxicity of copper to spawning pugnose shiner, do not use copper products during June and July.
- Apply product from the shoreline out so fish are not trapped.
- Utilize the lowest effective application rate of algaecide to control the target species.
- Treatment in undeveloped shoreline areas and offshore areas for non-native species will be permitted pending submittal of a survey confirming locations of non-native species in the lake, and EGLE approval of the planned locations that specify areas to be treated. Treatment of non-native species is limited to areas approved by EGLE.

2022-2025 ANC Permit Conditions

- The normal expansion allowance covered in Section B.6. is not valid for treatment(s) under this permit.
- Due to the sensitive nature of the treatments, a mid-season Interim Treatment Report will be required to be submitted by August 8 to report all treatments that occurred before August 1



Endangered Species Protection Part 365 of Act 451 of 1994

Authorities; Prohibitions; Exceptions

Sec. 36505 (4)

“The department **may permit the taking**, possession, purchase, sale, transportation, exportation, or shipment of species of fish, plants, or wildlife which appear on the state list of endangered or threatened species compiled pursuant to section 36503 and subsection (3)”

“Take” under Part 365

Sec. 36501

Animals

“Take” means, in reference to fish and wildlife, to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.

Plants

“Take” means, in reference to plants, to collect, pick, cut, dig up, or destroy in any manner.”

Authorities; Justifications for Permitting Take of State T&E Species

1. **For scientific, zoological or educational purposes (Sec. 36505-4)**
2. For propagation in captivity of such fish, plants, or wildlife to ensure their survival (Sec. 36505-4)
3. To protect human health (Sec. 36505-5)
4. To alleviate damage to property (Sec. 36505-5)
5. For falconry (Sec. 36505-6)

2025 T/E Permit

- No permit fee
- Mostly status quo for 2025 treatments and weed harvesting
- Served as notification that changes would be coming in 2026
- No Hydrothol 191; Chemical treatment methods consistent with ANC requirement
- Required development of aquatic vegetation plan before next permit
 - Objectives for invasive, native, and T/E species
 - Protection of pugnose shiner
 - Maintenance of native vegetation
- Point intercept (PI) vegetation survey required

Mechanical Harvest Concerns

- No mechanical harvest has been allowed through T/E permitting process at any other lake in Michigan where pugnose shiner have been identified
- Published scientific research indicates that substantial numbers of small-bodied fishes that live in weeds are killed during harvesting
 - Results in **take** of Pugnose Shiners
- Fragments created can spread Starry Stonewort and Eurasian Watermilfoil

Dealing with Uncertainty

Unknowns

- Pugnose shiner abundance before vegetation control efforts were started
- Current pugnose shiner abundance
- Level of annual mortality (take) the population can sustain without declining
- Trends in aquatic vegetation community (i.e., shiner habitat)



2026 Permit Conditions

- No permit fee
- No more than 10 acres of mechanical harvesting
 - 5% of suitable Pugnose Shiner habitat
- Annual point intercept vegetation survey required
 - DNR/MSU assist and train consultant in 2026
 - Permittee responsibility in 2027
- No plant management in bay adjacent to state game area
- Permit expires March 31, 2028



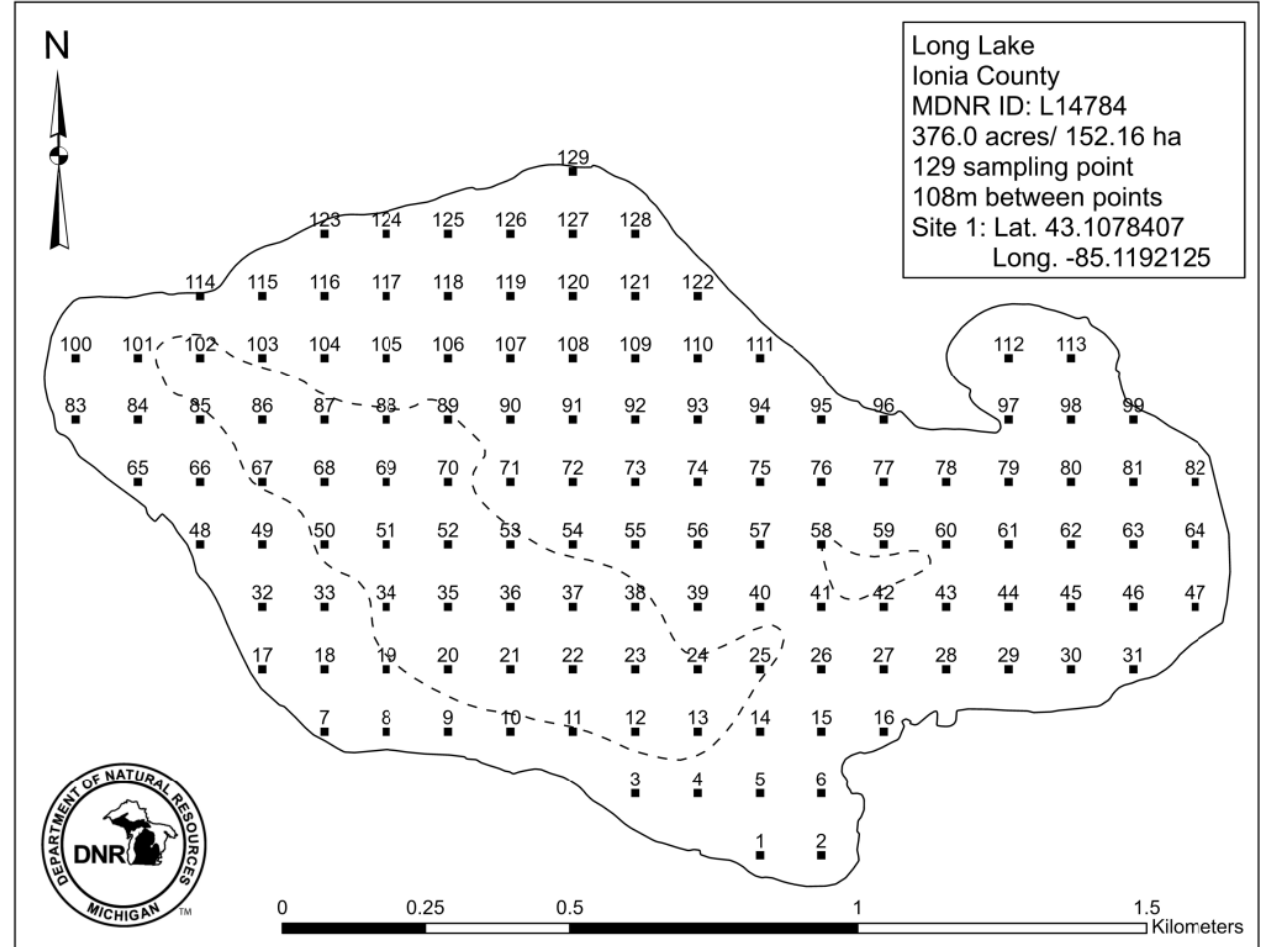
Pugnose Shiner Survey

- June 15-16, 2026
- 4 overnight sets with small-mesh fyke nets
- 2 seine hauls (25' each)
- 8 Pugnose Shiners caught
- Released back into lake



Vegetation Survey Methods

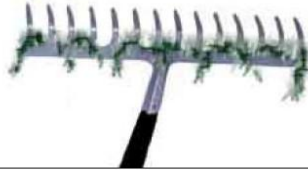
- Conducted 9/9/25 and 8/12/26
- Sample grid with 129 potential points
- 2 rake tosses at each point
- Ruled out some locations based on depth



Vegetation Results

- Plants at 90 sites in 2025 and 92 sites in 2026
- Rake fullness (102 paired sites)
 - 60 same
 - 33 higher in 2026
 - 9 lower in 2026

} Statistically significant difference

Fullness Rating	Coverage	Description
1		Only few plants. There are not enough plants to entirely cover the length of the rake head in a single layer.
2		There are enough plants to cover the length of the rake head in a single layer, but not enough to fully cover the tines.
3		The rake is completely covered and tines are not visible.

Hauxwell et al. 2010

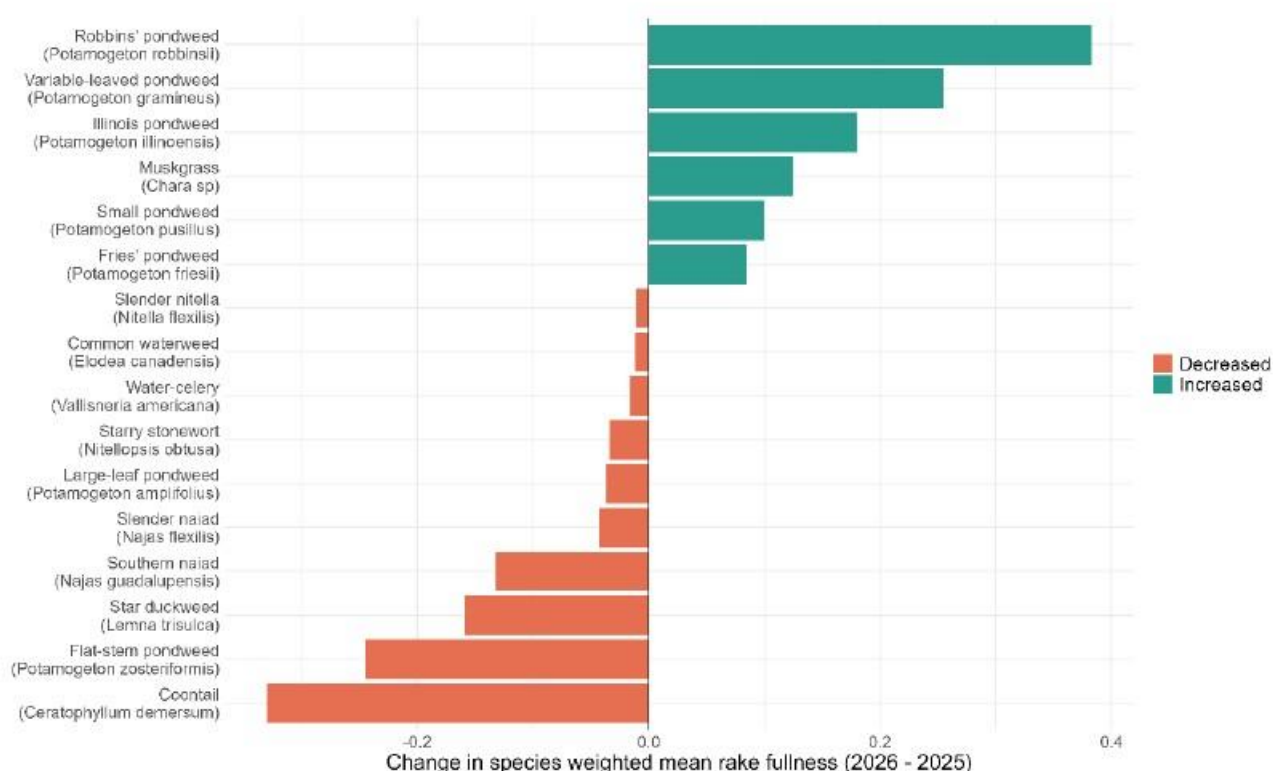
Rake Fullness by Species

Higher in 2026

- Robbin's Pondweed
- Variable Pondweed
- Illinois Pondweed
- Muskgrass (*Chara* sp.)

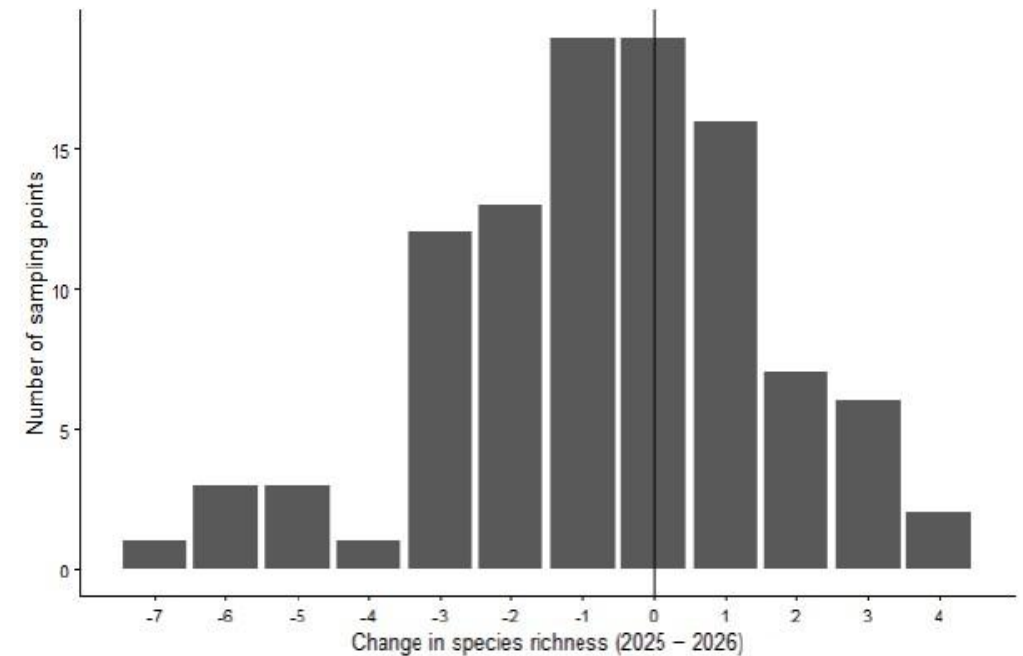
Lower in 2026

- Coontail
- Flat-stem Pondweed
- Star Duckweed
- Southern Naiad



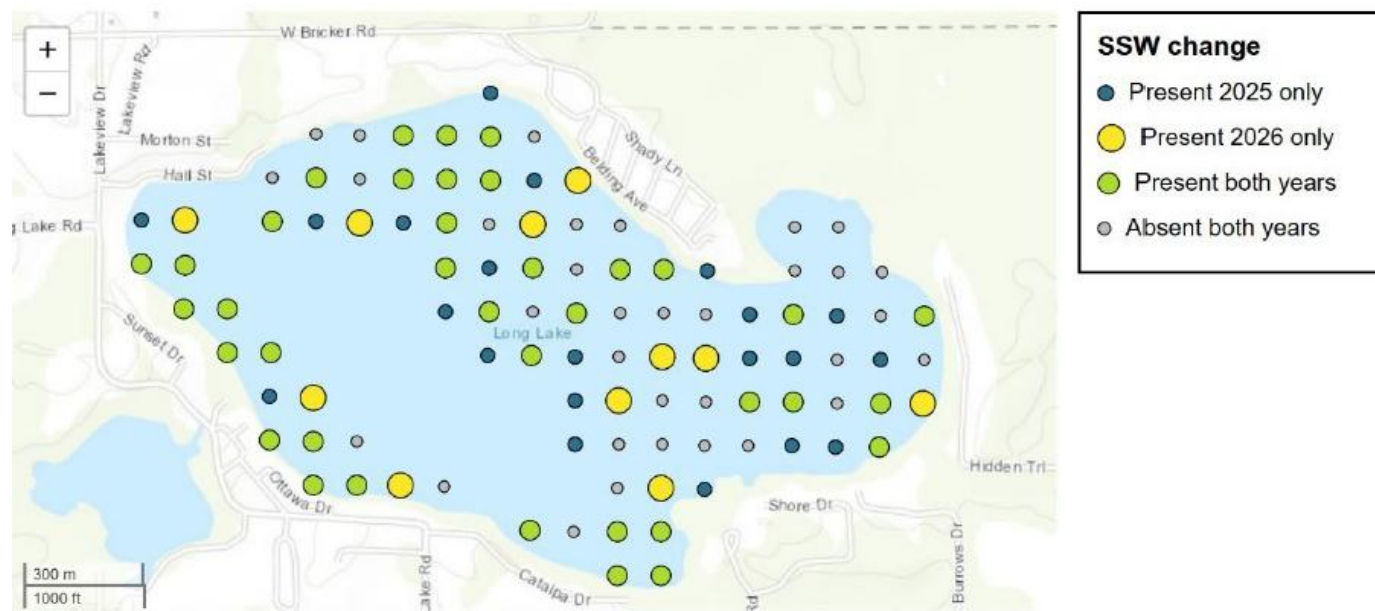
Species Richness

- 29 species total
- 3 only in 2025 and 6 only in 2026
- Average number of species per site
4.83 in 2025
4.16 in 2026 } Statistically significant difference



Starry Stonewort

- Observed at 58 sites in 2025 and 48 sites in 2026
- No rake fullness 3 ratings in either year
- Rake fullness 2 about same both years
- Fewer rake fullness 1 in 2026
- Influence of survey timing



Other Invasive Species

- Eurasian Watermilfoil
 - 3 sites in 2025
 - 0 sites in 2026
- Curlyleaf Pondweed
 - 0 sites in 2025
 - 1 site in 2026
- Influence of timing and treatments



Caveats to Vegetation Analysis

- Only two years of data
- Difference in survey timing
- Rake fullness limitations



Weed Rollers

Several observed in 2026

Requires EGLE Part 301
permit to install and
operate

T/E permit evaluation on
case-by-case basis



Riparian Landowner Concerns

- Navigation issues
- Property values
- Weeds washing on shore
- Weed rollers
- More flexibility
- Pugnose Shiner plans
 - Why recent permitting changes?
 - What about stocking?
 - Assessment?
 - Overall DNR plan?



Pugnose Shiner Rehabilitation

First Priority: Conserve existing populations by limiting direct mortality and habitat degradation.

As resources allow, DNR and partners will conduct surveys on lakes with historic Pugnose Shiner records but no recent captures to determine if they are still present.

Develop techniques for assessing relative abundance and habitat use of pugnose shiners.

Pugnose Shiner Rehabilitation (cont.)

Stocking would be a last resort. We need to eliminate the factors that led to extirpation first before reintroducing the species.



Questions?

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Additional Resources

Carlson, D. M., J. R. Foster, and B. Lehman. 2019. Pugnose Shiner restoration efforts in a Lake Ontario Bay in New York. *American Currents* 44(2):15-16.

Department of Fisheries and Oceans Canada. 2024. Recovery strategy for the Pugnose Shiner (*Notropis anogenus*) in Canada. Species at Risk Recovery Strategy Series, Fisheries and Oceans Canada, Ottawa, Publication #En3-4/129-2024E.

Engel, S. 1990. Ecological impacts of harvesting macrophytes in Halverson Lake, Wisconsin. *Journal of Aquatic Plant Management* 28:41-45.

Fortin-Hamel, L., and L. J. Chapman. 2024. Interactive effects of sedimentary turbidity and elevated water temperature on the Pugnose Shiner (*Miniellus anogenus*), a threatened freshwater fish. *Conservation Physiology* 12(1): coae053; <https://doi.org/10.1093/conphys/coae053>.

Foster, J. R., B. C. Lehman, D. M. Carlson, J. M. Ratchford, B. Robbins, and M. W. Soukup. 2021. Empirical support for a strategy for the restoration of Pugnose Shiner (*Notropis anogenus*). *Restoration Ecology* 29: e13431. <https://doi.org/10.1111/rec.13431>.

Additional Resources

Haller, W. T., J. V. Shireman, and D. F. Durant. 1980. Fish harvest resulting from mechanical control of Hydrilla. Transactions of the American Fisheries Society 109:517-520.

Haynes, J. M., J. J. Maharan, and K. L. Barrett. 2019. Population and habitat characteristics of the Pugnose Shiner, *Notropis anogenus*, in four bays of Lake Ontario and the St. Lawrence River, New York. Final report to the USFWS-NYFO, Fish Enhancement, Mitigation, and Research Fund.

LeBaron, A., and S. M. Reid. 2023. 2023. Targeted sampling for Pugnose Shiner (*Notropis anogenus*) in eastern Lake Ontario coastal wetlands, 2021. Canadian Data Report on Fisheries and Aquatic Sciences 1364.

Madsen, J. D. 2000. Advantages and disadvantages of aquatic plant management techniques. Publication ERDC/EL MP-00-1, United States Army Corps of Engineers – Engineer Research and Development Center, Vicksburg, Mississippi.

McCusker, M. R., N. E. Mandrak, S. Doka, E. L. Gertzen, J. F. van Wieren, J. E. McKenna, D. M. Carlson, and N. R. Lovejoy. 2014. Estimating the distribution of the imperiled Pugnose Shiner (*Notropis anogenus*) in the St. Lawrence River using a habitat model. Journal of Great Lakes Research 40:980-988.

McCusker, M. R., N. E. Mandrak, B. Egeh, and N. R. Lovejoy. 2014. Population structure and conservation genetic assessment of the endangered Pugnose Shiner, *Notropis anogenus*. Conservation Genetics 15:343-353.

Additional Resources

McDonnell, L. H., N. E. Mandrak, S. Kaur, and L. J. Chapman. 2021. Effects of acclimation to elevated water temperature and hypoxia on thermal tolerance of the threatened Pugnose Shiner (*Notropis anogenus*). Canadian Journal of Fisheries and Aquatic Sciences 78:1257-1267.

Mikol, G. F. 1984. Effects of mechanical control of aquatic vegetation on biomass, regrowth rates, and juvenile fish populations at Saratoga Lake, New York. Lake and Reservoir Management 1:456-462.

Potts, L. B., N. E. Mandrak, and L. J. Chapman. 2021. Fine-scale distribution and occupancy modelling of the threatened Pugnose Shiner (*Notropis anogenus*) in the St. Lawrence River, Ontario, Canada. Canadian Journal of Fisheries and Aquatic Sciences 78:1293-1304.

Vélez-Espino, L. A., R. G. Randall, and M. A. Koops. 2010. Quantifying habitat requirements of four freshwater species at risk in Canada: Northern Madtom, Spotted Gar, Lake Chubsucker, and Pugnose Shiner. Department of Fisheries and Oceans Canada Science Advisory Secretariat Research Document 2009/115.

Venturelli, P. A., L. A. Vélez-Espino, and M. A. Koops. 2010. Recovery potential modelling of Pugnose Shiner (*Notropis anogenus*) in Canada. Department of Fisheries and Oceans Canada Science Advisory Secretariat Research Document 2010/007.