

# Identified Research Needs for the Fisheries Division

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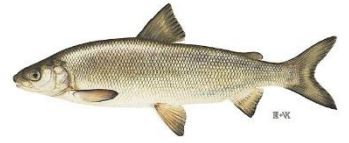
**Maine Department of Inland Fisheries & Wildlife**  
**Fisheries and Hatcheries Division**

This document is intended to provide awareness of identified research needs within the fisheries division across the entire state of Maine. While the fisheries division is divided into 7 regions within the state, many of our research needs span beyond regional boundaries depending on the species. The research needs listed below were identified from our statewide Strategic Management Plan (SMP), the State Wildlife Action Plan (SWAP), and additional statewide research needs that have been identified after planning efforts. Additional fisheries research needs exist at the regional level but are not captured in this document. For more localized fisheries research efforts please contact the respective regional biologists for more information on ongoing research efforts.

# **Statewide Research Needs**

## **Lake Whitefish (*Coregonus clupeaformis*)**

*Species of Greatest Conservation Need and Special Concern - Rare*



### **Research Needs**

- Develop a method to locate, identify, and characterize spawning habitat.
- Understand overall habitat use as it relates to complexes of interconnected lakes and waterways. Lake Whitefish may use some of these areas differently or seasonally.
- Identify what the biotic and abiotic influences are on larval survival and growth.
- Improve our understanding of the specific factors contributing to Lake Whitefish declines, focusing on recruitment failure.
- Differentiate between populations where low natural abundance with periodic recruitment success may be normal and populations that are experiencing long-term, persistent recruitment failure.
- Improve our understanding of why Rainbow Smelt and Lake Whitefish coexist in some waters and not others.
- Investigate factors that contribute to our most robust Lake Whitefish populations (e.g., Ross Lake, West Grand Lake, etc.)
- Increase our understanding of Whitefish lineage as a conservation consideration, while focusing on most at risk populations.

### **Suggestions to further explore**

- Recent evidence suggests that Lake Trout densities may directly influence Rainbow Smelt abundance and indirectly influence potential smelt-whitefish interactions where populations overlap.
- Predation by adult smelt on larval whitefish has not been documented in previous studies suggesting that smelt predation may not be the primary limiting factor, but this is speculative and based on very limited sampling.

## Arctic Charr (*Salvelinus alpinus*)

*Species of Greatest Conservation Need and Special Concern - Rare*



### Research Needs

- Develop a process to identify potential waters for refuge populations considerate of life history requirements, existing laws, and management implications.
- Collaborate with Quebec and New Brunswick and conduct research in Maine to increase our knowledge and understanding of habitat use and population statuses.
- Develop a method to locate, identify, and characterize spawning habitat and other potentially critical habitat that supports life history requirements.

## Brook Trout (*Salvelinus fontinalis*)

*Species of Greatest Conservation Need*



### Research Needs

- Identify and prioritize populations and habitats most resilient to climate change and develop strategies to mitigate potential increases in water temperatures, including the role of land management and land conservation.
- Understand the influence of land-based management practices on Brook Trout and their habitat and support appropriate advocacy.
- Investigate life history differences of lake and stream populations of both wild and stocked populations.
- Identify where Brook Trout use coastal waters and the relative importance of this behavior in maintaining healthy coastal stream populations.
- Improve understanding of direct and indirect influences hatchery stocking of Brook Trout have on wild brook trout populations.

## Rainbow Smelt (*Osmerus mordax*)



### Research needs

- Conduct a feasibility analysis to assess current options in hydroacoustic technology, and if appropriate and cost effective, explore opportunities to incorporate this method as an assessment procedure to monitor and assess population trends and availability as forage.

- Develop a better understanding of the effects of inter- and intra-specific competition on smelt abundance.
- Evaluate the effectiveness, feasibility, and risks associated with smelt egg and live smelt transfers to better understand how these methods could be used to temporarily augment depressed populations

## Lake Trout (*Salvelinus namaycush*)

*Species of Greatest Conservation Need (endemic populations)*



### Research needs

- Investigate the factors that allow Lake Trout populations to become overabundant to understand how to best manage these populations.
- Develop a process to determine which populations are of native origin. (ongoing)
- Investigate the influence that stocked or translocated Lake Trout may have on smelt populations within bodies of water where Lake Whitefish persist.
- Investigate safe release methods for anglers to use to increase survivability of regulatory protected (i.e., within protective slot limits) and trophy-sized individuals

## Landlocked Atlantic Salmon (*Salmo salar* Sebago)



### Research needs

- Monitor and assess the genetics of the wild LLS (Crooked River/Sebago Lake) and the integrity of the captive hatchery brood at Casco Hatchery to support brood management. Assess the need and value of continued hatchery salmon stocking in Sebago Lake. (ongoing)
- Assess and compare the genetics of the West Grand Strain salmon to monitor the long-term integrity and viability of this hatchery-maintained population that serves as one of our two hatchery salmon brood sources. (ongoing)
- Assess the influence that sea-run Alewife have on LLS growth and condition where populations traditionally forage on Rainbow Smelt in coastal drainages.
- Determine if Sebec Lake and Green Lake have remnant native stock persisting.

## Cusk (*Lota Lota*)



*Species of Greatest Conservation Need*

- Understand population level demographics and spatial distribution of the species.

## Nonnative Trout (Rainbow Trout, Brown Trout, Splake)

(*Oncorhynchus mykiss*, *Salmo trutta*, *Salvelinus fontinalis* × *Salvelinus namaycush*)



- Identify the conditions where all three species are most successful and where native species do not perform well.
- Evaluate post stocking performance coupled with angler return to develop standards or considerations in assessing stocking program success.

## Nonnative species

**White Catfish** (*Ameiurus catus*), **Northern Pike** (*Esox lucius*), **Muskellunge** (*Esox masquinongy*), **Smallmouth Bass** (*Micropterus dolomieu*), **Largemouth Bass** (*Micropterus salmoides*), **Black Crappie** (*Pomoxis nigromaculatus*), **Bluegill** (*Lepomis macrochirus*), **Rock Bass** (*Ambloplites rupestris*), **Central Mudminnow** (*Umbra limi*), **Green Sunfish** (*Lepomis cyanellus*), **Rudd** (*Scardinius erythrophthalmus*), **Spottail Shiner** (*Notropis hudsonius*), **Common Carp** (*Cyprinus carpio*)

- Risk assessment for range expansion of various species within and across watersheds.
- Develop a process to identify species that pose the greatest risk/threat with respect to native species conservation.

## Other Research Topics

PFOS Special dedicated funding is available to support research on PFOS in fish (FY24/25).

- Improve understanding of the relationship between PFOS levels in fish and other biological characteristics (age, sex, species, time of year, etc.) or nonbiological factors that may influence PFOS levels in fish tissue consumed by the public. The purpose of this work is to inform ongoing sampling design considerations, including sample size associated PFOS sampling by state agencies where sample results are used to inform fish consumption advisories. (ongoing)

## Chemical Reclamation Projects

- Develop low cost, logistically practical and effective permanent fish barriers in outlet streams below reclamation projects to prevent reinfestations of invasive fish species.

# Native Non-sportfish Research Objectives

## **Redfin Pickerel** (*Esox americanus americanus*)



*Species of Greatest Conservation Need, Priority Level: High*

- Conduct research to develop an improved understanding of general ecological requirements. (SWAP)

## **Swamp Darter** (*Etheostoma fusiforme*)



*Species of Greatest of Conservation Need, Priority Level: High*

- Conduct research to develop an improved understanding of general ecological requirements. (SWAP)