



# Alewife

*Alosa pseudoharengus* (Wilson, 1811)  
syn. *Pomolobus pseudoharengus*

ALBERTA REGULATION:  
FISHERIES ACT

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## Overview:

Alewife is a ray-finned fish in the same Family as herrings, sardines, and shads. They are native to the East coast of North America, from Labrador down to South Carolina.<sup>1</sup> It is an anadromous fish meaning that adults migrate upstream into freshwater for spawning, but spend most of their time in coastal waters<sup>1</sup>. However, this fish can also complete its life cycle entirely in freshwater.<sup>1</sup>

Historically the alewife was restricted from migrating Westward by Niagara Falls, but canal improvements allowed this species to bypass the Falls.<sup>1</sup> In addition, climatic conditions and a collapse of the native piscivorous (fish-eating) fishes facilitated the spread of *A. pseudoharengus* into the Western Great Lakes in the mid 1900s. Cold winter water temperatures limit survival, but relatively warmer deep waters can

provide refuge.<sup>1</sup>

Water temperatures lower than 3°C severely stress the alewife as its lack of lipid-process adaptations causes osmoregulatory failures. This can be affected by diet; therefore, similar winters may have dissimilar mortalities.<sup>1</sup>

Alewife form large schools and are sensitive to light.<sup>1</sup> The alewife feeds primarily on zooplankton throughout their life cycle, focusing on the largest organisms.<sup>1</sup> Adults will also feed on insects, and the eggs and larvae of other fish species, including their own at times.<sup>2</sup> The females of land-locked populations can produce between 13,200 and 49,200 eggs, whereas oceanic females can produce up to 360,000 eggs.<sup>2</sup> High populations of alewife cause detrimental impacts to zooplankton size, abundance, and

community structure.<sup>2</sup>

*A. pseudoharengus* have periodic mass mortalities where large numbers of dead fish will accumulate on shores and beaches. Any predatory fish utilizing alewife as a food source will suffer declines after these mass die-offs.<sup>2</sup>

Alewife naturally contain high concentrations of the enzyme that breaks down thiamine. Consumption of alewife by other fish species causes thiamine deficiency, which lowers reproductive success.<sup>1</sup> Females consuming alewife can produce thiamine-deficient eggs causing the young from these eggs to develop Early Mortality Syndrome (EMS), characterized by, physical and behavior abnormalities as well as increased mortalities.<sup>1</sup> It is possible that the disappearance of land-locked



# Alewife *(continued)*

salmon from Lake Ontario soon after the alewife proliferated may be due to this thiamin deficiency.<sup>1</sup>

*A. pseudoharengus* is similar in appearance to the blueback herring (*Alosa aestivalis*). The diameter of the alewife's eye is greater than the length of the snout, whereas the blueback's eye diameter is equal to or less than the length of the snout.<sup>1</sup>

As of January 1, 2016, the possession, sale, or transport of this species in Alberta is illegal under the Fisheries Act.

## Habitat:

In the ocean the alewife overwinters in deep, offshore waters and then migrates to shallower waters for spawning.<sup>1</sup> Inland populations will occupy all strata of a lake over the course of a year. They stay in open water until spawning and then prefer shores with rocky substrate. Warmer waters are preferred.<sup>2</sup>

## Identification:

The alewife is overall silvery in color with a greyish-brown back. The body is deep and strongly compressed laterally. Scales are algae and deciduous. The lateral line is not well developed but adults have longitudinal lines that run along the scales lines above the midline. Scales along the midline of the belly form scutes, creating a distinctly serrated surface.<sup>1</sup>

There is a black spot behind the eye. The upper jaw extends to below the middle of the large eye. The front of the lower jaw is thick and extends past the upper jaw when the mouth is closed. A

few small teeth are present.<sup>1</sup>

A single dorsal fin with 13-14 soft rays (sometimes 12-16) and the caudal tail is forked. The anal fin is short, wide and has 15-19 rays (usually 17-18). The small pelvic fins have 10 rays. Pectoral fins have 16 rays (sometimes 14) and are low on the sides.<sup>1</sup>

In land-locked populations adult alewife average total length is 125-175 mm. Anadromous, oceanic alewife reach 360-380 mm.<sup>1</sup>

## Ecology:

Inland populations spawn from April to August in shallow waters.<sup>2</sup> In Lake Michigan spawning begins at water temperatures over 15°C. The eggs are broadcast at random and sink to the bottom. Larvae from eggs hatched at water temperatures less than 10.6°C are deformed.<sup>1</sup> Larvae are about 3.8mm, but reach 5.1mm by the time the yolk sac is absorbed. Young alewife prefer temperatures between 21 to 31°C.<sup>1</sup> They must reach at least 60mm in length to survive winter. Alewife feed by filtering, gulping, and catching prey individually, and can feed in the dark.<sup>1</sup>

## Economic Impacts:

Alewife consumption of zooplankton competes directly with native fish for food.<sup>1</sup> The consumption of other species eggs and larvae negatively impacts the populations of native fishes.<sup>1</sup> The decline of native sportfish populations could have impacts on recreation and tourism.

## Environmental Impacts:

The high percentage of zooplankton in the alewife's diet disrupts the abundance and structure of zooplankton communities.<sup>1</sup> Consumption of zooplankton competes directly with native fish for food. Consumption of other fish species' eggs and larvae negatively impacts native fish populations.<sup>1</sup> Thiamin deficiencies in native fishes, such as trout or salmon, which consume alewife can cause Early Mortality Syndrome (EMS) in fry, negatively impacting their overall populations.<sup>2</sup>

## Sociological Impacts:

The accumulation of dead alewife from mass die-offs creates foul odors and sanitation issues.<sup>1</sup> The transformation of native aquatic communities results in the intrinsic loss of natural capital and enjoyment of natural areas.

## Prevention:

Learn how to identify alewife and how to prevent spread. Do not use alewife as bait.<sup>1</sup> Never empty your aquarium into natural water bodies.

## Control:

Once established alewife cannot be eradicated. Populations can be reduced by stocking alewife predator species, such as brown trout (*Salmo trutta*).<sup>2</sup> Aggressive netting can be used in areas where alewife are vulnerable.<sup>2</sup> If caught, alewife should be killed and not released.



# Alewife (continued)



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## REFERENCES:

1. Datasheet report for *Alosa pseudoharengus* (alewife). Invasive Species Compendium. <https://www.cabi.org/isc/datasheet/94217> Accessed: January 25, 2018.
2. Global Invasive Species Database (GISD) 2015. Species profile *Alosa pseudoharengus*. Available from: <http://www.iucngisd.org/gisd/speciesname/Alosa+pseudoharengus> Accessed: January 25, 2018.