GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Alosa pseudoharengus***

Alosa pseudoharengus 正體中文

System: Freshwater

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Actinopterygii	Clupeiformes	Clupeidae

Common name kyack (English), gaspareau (French), white herring (English), bigeye herring (English), grayback (English), alewife (English), branch herring (English), gray herring (English), mooneye (English, northwest New York state), freshwater herring (English), sawbelly (English)

Synonym *Pomolobus pseudoharengus*

Similar species *Alosa aestivalis*

Summary Alosa pseudoharengus (alewife) is a small, fish species indigenous to the east coast of North America that causes several major effects in aquatic environments. Alewife migrate from the ocean to spawn in fresh water. It can occupy all strata of a land-locked body of water throughout the course of the year. A. pseudoharengus alters the zooplankton community as it is an extremely efficient feeder on zooplankton, competing with other fish species for food. Alewife feed on the eggs and larvae of other fish and thereby can cause other fish species to decline. It is often stocked as a forage fish.

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Species Description
Maine's Department of Marine Resources (1998) states that *A. pseudoharengus* is an iridescent gray green or violet shade on top that fades down their sides to a silver underbelly. It usually has a distinct dusky spot just behind the upper margin of the gill cover. Its strongly laterally compressed body is three and one-third times as long as it is deep and has a forked tail fin. The midline of their belly is sharp and saw edged. Serrations located on the midline of their belly are much stronger and sharper than the ones found on most other members of their family. Adult alewives normally grow to be 25cms to 28cms (10-11 inches) in length and 230grms- 255grms (8 to 9 ounces) in weight.\" Alewives in land-locked populations rarely exceed 20cms (8 inches) long and most are 13cms to 18cms (5 to 7 inches) long (O'Gorman *et al.* 1997).

Notes
Describing the distribution of alewife is difficult as native and invaded ranges overlap. For example, alewife is native along Atlantic coast of New York, however it is invasive in western New York outside of the Atlantic drainage (Robert O'Gorman., pers. comm 2004)

Lifecycle Stages
Maine's Department of Marine Resources (1998) report that \"every spring, adults ascend rivers and streams to spawn in freshwater lake and pond areas. After the eggs hatch, the young-of-the-year spend two to six months in the freshwater environment, growing 4cm to 12.5cms (1½ to 5 inches) in size before they begin to migrate to sea.\"

Uses
The Nova Scotia Department of Agriculture and Fisheries (2001) report that \"*A. pseudoharengus* eggs, or roe, are canned and sold as a delicacy. The catch is used for fish meal lobster bait, pet food, or it is smoked, canned, salted, or pickled.\"

Habitat Description
In lake habitats *Alosa pseudoharengus* are known to occupy all strata of a land-locked water body during the course of the year. Alewives have been found to prefer rocky habitats to sand sites along the Wisconsin shoreline. This may be related to their feeding on emerging insects associated with rocky areas (Janssen and Luebke, 2004). The majority of their time is spent in the limnetic zone (inhabiting fresh water). In late spring and summer they move into littoral areas (the region of the shore of a lake or sea or ocean) for spawning and move into deeper water during fall. Alewives have a preference for warmer waters. *A. pseudoharengus* move in large schools and are attracted to light. They move into shallow areas at night and return to deeper waters during the day. River populations of *A. pseudoharengus* are anadromous (meaning they migrate from the ocean to spawn in fresh water). They are found in river systems during spring migration, and are known to move further upstream than their close cousin, the American shad (*Alosa sapidissima*) (Chosid, Undated).

Reproduction
The Department of Fisheries and Wildlife Science at Virginia Tech (VT-FIW, 2001) states that \"in anadromous populations, females mature a year later than males. *A. pseudoharengus* matures between the ages of 3 and 5. The fecundity of oceanic female is 48,000 - 360,000 eggs. Landlocked fish mature between 1 and 3 years of age and their fecundity is between 13,200 and 49,200 eggs. Spawning occurs from March to May in tidal freshwater streams and ponds. After spawning, adults return to the sea. Inland populations spawn from April to August in the shallow areas of lakes and streams. Adults pair during spawning and swim in spirals to the surface. The eggs of *A. pseudoharengus* are non-adhesive and sink to the bottom of calm, still waters.\" Spawning occurs at night.

Nutrition
VTDEC (2002) states that *A. pseudoharengus* \"is planktivorous (their main food source is plankton), feeding predominantly on zooplankton as both juveniles and adults. However, large landlocked alewives also feed on the eggs and larvae of other fish species, as well as those of their own species\".

General Impacts
In the Laurentian Great Lakes, the alewife invasion has been associated with declines in abundance of emerald shiner (*Notropis atherinoides*), yellow perch (*Perca flavescens*), deepwater sculpin (*Myoxocephalus thompsoni*), and burbot (*Lota lota*). Alewives are suspected of interfering with reproduction of these fishes, most likely by preying upon the pelagic fry (Chuck Madenjian pers.comm., 2004).
Multiple impacts have been reported by the Vermont Department of Environmental Conservation (VTDEC, 2002). Alewives are extremely efficient feeders on zooplankton. They feed selectively on the larger species and the larger individuals within a species, causing drastic alterations in zooplankton size, abundance and community structure. *A. pseudoharengus* out-compete other fish species for food. Alewives compete directly for zooplankton with other planktivorous fish, including yellow perch (*Perca flavescens*) and rainbow smelt (*Osmerus mordax*), and with the young of many piscivorous species, such as bass, which are dependent on zooplankton during the early parts of their lives. *A. pseudoharengus* feed on the eggs and larvae of other fish. Predation on yellow perch and lake trout (*Salvelinus namaycush*) larvae appears to be a significant source of mortality in those species.*A. pseudoharengus* are the cause of major reproductive failures in landlocked Atlantic salmon (*Salmo salar*) and lake trout populations.
A. pseudoharengus undergoes periodic mass mortalities.The large numbers of alewives that die in these events wash up on beaches, causing foul odors and public health concerns. Any predator fish that utilises *A. pseudoharengus* populations as a main source of food will have difficulty finding enough to eat after an alewife mass mortality. This results in poor growth rates and declines in game fish. Land-locked alewives are high in thiaminase and Atlantic salmon and lake trout that eat mainly alewives produce thiamine deficient eggs which results in high mortality of fry from a syndrome linked to thiamine deficiency (O'Gorman and Stewart 1999).

Management Info
Biological: Several options for alewife management and control have been listed by VTDEC (2002). Population reduction can be achieved by the stocking of alewife predator species such as the brown trout (*Salmo trutta*) which feed predominately on alewives.
Physical: An aggressive netting project can be undertaken when the alewives are vulnerable. Construction of barriers could prevent the spread of alewives downstream.
Chemical: An extreme measure of using a piscicide which would kill all fish species within a lake is also suggested.

Pathway
Alewife were once purposely introduced into land-locked waterbodies to provide prey for piscivores although many such introductions were not sanctioned by management agencies.Lakes in the Adirondack Mountains and Otsego Lake, New York were illegally stocked with alewives for forage (Fuller *et al.* 2005)Fuller *et al.* (2005) brings up the possibility that alewife were introduced into Lake Ontario with American shad stockings in the 1880s, but he discounts this possibility in favour of the hypothesis that they reached the lake *via* the Erie Canal from the Hudson River.

Principal source: VTDEC, 2002 Alewife Species Account
\r\n Maine's Department of Marine Resources, 1998 Alewife Fact Sheet
Fuller *et al.* 2005.*Alosa pseudoharengus* Nonindigenous Aquatic Species Database, Gainesville, FL.

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review:

Pubblication date: 2005-03-21

ALIEN RANGE

[1] LAKE ERIE
[1] LAKE ONTARIO
[10] UNITED STATES
[1] LAKE MICHIGAN
[1] LAKE SUPERIOR

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Managment information

Bean, T. 2002. Alewife (*Alosa pseudoharengus*). Introduced Species Summary Project [Online Database].
Summary: Species fact sheet reporting common name, scientific name, classification, identification, original distribution, current distribution, site and date of introduction, modes of introduction, reasons why it has become established, ecological role, benefits, threats, control level diagnosis, and control method.
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Summary: The electronic tool kits made available on the Cefas page for free download are Crown Copyright (2007-2008). As such, these are freeware and may be freely distributed provided this notice is retained. No warranty, expressed or implied, is made and users should satisfy themselves as to the applicability of the results in any given circumstance. Toolkits available include 1) FISK- Freshwater Fish Invasiveness Scoring Kit (English and Spanish language version); 2) MFISK- Marine Fish Invasiveness Scoring Kit; 3) MI-ISK- Marine invertebrate Invasiveness Scoring Kit; 4) FI-ISK- Freshwater Invertebrate Invasiveness Scoring Kit and AmphISK- Amphibian Invasiveness Scoring Kit. These tool kits were developed by Cefas, with new VisualBasic and computational programming by Lorenzo Vilizzi, David Cooper, Andy South and Gordon H. Copp, based on VisualBasic code in the original Weed Risk Assessment (WRA) tool kit of P.C. Pheloung, P.A. Williams & S.R. Halloy (1999).
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