

ALASKAN BROOK LAMPREY

TAXONOMY

Scientific name: *Lampetra alaskensis* (Vladykov and Kott, 1978)

Other related names: *Lampetra alaskense*; *Lethenteron alaskense*

Common name: Alaskan brook lamprey, darktail lamprey

Family: Petromyzontidae

Taxonomic comments:

Taxonomic status complex and unresolved. Has been variously treated as synonymous with *Lampetra camtschatica* or *L. appendix*, as well as a distinct subspecies of the latter (Mecklenburg et al. 2002). Considered by Robins et al. (1980) and others to be synonymous with American brook lamprey, *Lampetra appendix* (also known as *L. lamottenii*), which has similar life history and morphology but occurs only in eastern and southern North America, 2,400 km from the range of *L. alaskensis*. Formerly regarded as a dwarfed nonparasitic form of Arctic lamprey, *L. camtschatica* (also known as *L. japonica*) by Heard (1966) and McPhail and Lindsey (1970). Recognized as a distinct species by Vladykov and Kott (1978), Mecklenburg et al. (2002) and Eschmeyer (1998). Species name *alaskense* also used (Mecklenburg et al. 2002), but current naming convention indicates *alaskensis* is correct (Nelson et al. 2004).

Recent genetic (mitochondrial cytochrome b) data indicate *L. camtschatica* and *L. alaskensis* are genetically identical (*L. alaskensis* considered a derivative or satellite species of *L. camtschatica*; Lang pers. comm.). However, if life history is not a valid criterion for defining species, then on basis of morphology and genetic similarity all three species mentioned (*L. appendix*, *L. camtschatica* and *L. alaskensis*) may be referred to as *L. camtschatica* (Mecklenburg et al. 2002). Hardisty and Potter (1971) included *L. alaskensis* and *L. camtschatica* in the subgenus *Lethenteron*.

DESCRIPTION

Basic description: A nonparasitic, freshwater lamprey.

General description:

Body elongate and eel-like with two dorsal fins arising far back on the body, and caudal fin connected to anal fin-like fold (well-developed in female, weakly developed in male). Gray-brown above and white on underside of body, with a dark blotch on the second dorsal fin and a dark tail. Blunt teeth. Considered one of the smaller nonparasitic lampreys; adults typically measure 12 to 17 cm (Morrow 1980, Mecklenburg et al. 2002). Closely resembles American brook lamprey (Houston 1991).

Length (cm): range 12-17, max. 18.8

Reproduction:

Ammocoetes (larvae) metamorphose in fall, at about 4 years of age, then move downstream into lakes to overwinter; they spawn the following May-early July in shallows of lakes and rivers when water temperatures exceed 12°C (Heard 1966). Individuals spawn only once and die shortly afterward (Houston 1991). Nest built by both sexes, about 15-25 cm in diameter, and varies from a

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slight depression to 5-8 cm in depth (Houston 1991). Five or six spawners may use the same nest. Female lays 2,200 to 3,500 eggs that hatch within a few weeks (Vladykov and Kott 1978, Houston 1991, Mecklenburg et al. 2002). Ammocoetes burrow into sediment of pools and muddy backwaters.

Ecology:

Eggs, larvae and adults likely preyed upon by various fishes, birds and mammals, especially when adults occur in migratory concentrations in shallow streams; sculpins (*Cottus* spp.) may be egg predators in nesting areas (Heard 1966, Houston 1991).

Nonparasitic lampreys have evolved from extant, probably anadromous parasitic forms. The nonparasitic derivative is referred to as a satellite species (Mecklenburg et al. 2002). Alaska brook lamprey considered a satellite species of the parasitic and anadromous Arctic lamprey (Vladykov and Kott 1979, Renaud pers. comm.).

Migration:

Migration downstream to overwintering lakes occurs during fall, return to upper spawning streams in spring (Heard 1966, Mecklenburg et al. 2002).

Food:

Nonparasitic. Ammocoetes filter microscopic plants and animals from stream water while burrowed in sediment; adults do not feed.

Phenology:

Unknown, although ammocoetes of the related anadromous form Arctic lamprey are known to be more active at night when they may exit sediment burrows and change locations in stream; ammocoetes stay burrowed in sediment during the day.

Habitat:

Freshwater streams and lakes; specific habitat requirements or associations poorly known (Houston 1991). Reported to spawn in water temperatures above 12°C (Heard 1966).

STATUS

Global rank: GNR – suggested change to G3Q (01Dec2005)

Global rank reasons:

Virtually endemic to Alaska except for one known occurrence 1,800 km distant in N.W.T., Canada. Distribution restricted and disjunct; likely incompletely known. Abundance and trends unknown, but considered rare. Taxonomy complex and unresolved. Water pollution and destruction of spawning habitat are potential threats.

State rank: S3Q (01Dec2005)

State rank reasons:

Virtually endemic to Alaska except for one known occurrence 1,800 km distant in N.W.T., Canada. Distribution restricted and disjunct; likely incompletely known. Abundance and trends unknown,

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but considered rare. Taxonomy complex and unresolved. Water pollution and destruction of spawning habitat are potential threats.

DISTRIBUTION AND ABUNDANCE

Range:

Global range:

Alaska and Kenai Peninsulas to Chatanika and Chena rivers near Fairbanks (Mecklenburg et al. 2002). A single record from the Martin River, N.W.T., Canada, 1,800 km distant from the nearest known record in the Yukon system (Vladykov and Kott 1979, Houston 1991).

State range:

Alaskan endemic except for a single record 1,800 km distant in N.W.T., Canada. Alaska Peninsula: Brooks, Naknek, Kvichak, Egegik and Ugashik River systems and Kenai Peninsula. Interior Alaska: Chatanika and Chena Rivers, Yukon River (Heard 1966, Quast and Hall 1972, Vladykov and Kott 1978, Vladykov et al. in Lee et al. 1980, Renaud 1997, Mecklenburg et al. 2002, Mansfield 2004).

Abundance:

Global abundance:

Unknown, but considered rare with close to the entire population occurring in Alaska (Houston 1991).

State abundance:

Unknown, but considered rare with close to the entire population occurring in Alaska (Houston 1991).

Trends:

Global trend:

Unknown.

State trend:

Unknown.

PROTECTION

Global protection:

In Alaska, subsistence harvest of lamprey species is managed by the Alaska Department of Fish and Game (ADFG); however, harvest of *L. alaskensis* is probably minimal. No protective measures or legislation encompass this species in Canada except for the general protection offered by the Habitat Sections of the Fisheries Act (Houston 1991).

State protection:

Species afforded no formal protection in Alaska. Subsistence and commercial harvest of lampreys is regulated by ADFG; however, harvest of *L. alaskensis* is probably minimal.

CHALLENGES

Global challenges:

Factors limiting to this species are unknown. Generally vulnerable to disturbance and destruction of spawning habitat; could be affected by changes in water quality resulting from aquatic pollution (e.g., mining development) or river obstruction by dams and other associated construction (Houston 1991, Renaud 1997).

State challenges:

Factors limiting to this species are unknown. Generally vulnerable to disturbance and destruction of spawning habitat; possible threats include the pollution of streams from placer mining, oil drilling, dredging and hydroelectric dam development (Houston 1991). Stream habitat currently at low risk of development or pollution. Overharvest for subsistence use is currently not a threat.

RESEARCH AND INVENTORY NEEDS

Global research needs:

See State research needs.

State research needs:

Baseline information needed on population age structure, diet, migration, and species identification. Taxonomic status questionable; systematics need study to assess the relationship between *L. alaskensis*, *L. camtschatica* and *L. appendix*. Evaluation of systematics may help to explain the physical distance between Alaskan populations and the disjunct N.W.T. population (see Global inventory needs). Habitat requirements and migration patterns need study.

Global inventory needs:

Identity of Canadian specimens may be questionable; there is an apparent disjunction between Martin River, N.W.T. population and nearest Alaskan population on the Yukon River (about 1,800 km distant). Intervening areas, specifically around the Mackenzie River system, Great Slave Lake and Slave River, should be surveyed to verify historical occurrences and improve definition of distribution (Houston 1991).

State inventory needs:

Alaska population size and trend unknown. Document the spawning distribution of this species and identify representative index sites to be used for population monitoring. Perform surveys for ammocoetes in potential habitat. The 1,800 km disjunction between Alaskan population on the Yukon River and nearest Canadian population in the Martin River, N.W.T., suggests distribution information is likely incomplete.

CONSERVATION AND MANAGEMENT NEEDS

Global conservation and management needs:

See State conservation and management needs.

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State conservation and management needs:

Identify and protect important spawning habitat from pollution and habitat degradation. Develop unified protocols for fisheries researchers statewide to share data, coordinate sampling efforts, and collect specimens for genetic analysis (ADFG 2005).

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Acknowledgements

State Conservation Status, Element Ecology & Life History Author(s): McClory, J.G. and T.A. Gotthardt, Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage, 707 A Street, Anchorage, AK 99501, <http://aknhp.uaa.alaska.edu>.

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Reviewer(s): C. Renaud, Canadian Museum of Nature, University of Ottawa, Ottawa, ONT.

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