

***Fisherola nuttalli* (Haldeman 1841)**
Giant Columbia River limpet; shortface lanx
Gastropoda: Lymnaeidae

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SUMMARY

Fisherola nuttalli is a small pulmonate (lunged) snail in the family Lymnaeidae. It inhabits cold, unpolluted, medium to large streams with fast-flowing, well-oxygenated water and cobble-boulder substrate, and is generally found at the edges of rapids. It was historically present throughout much of the Columbia River drainage in Washington, Montana, Oregon, Idaho, and British Columbia, but most populations were extirpated due to habitat loss resulting from dams, impoundments, water removal, and pollution. Currently, large populations of *F. nuttalli* persist in only four streams: the lower Deschutes River in Oregon; the Okanogan River and the Hanford Reach of the Columbia River in Washington; and the Snake River in Oregon and Idaho. Additional small populations are found in Oregon in the John Day and Imnaha Rivers, and the lower Columbia River near Bonneville Dam; the Methow River, Washington; and the Grande Ronde River, Washington and Oregon. This species is threatened by habitat alteration and reduced water quality due to dams, impoundments, and siltation and pollution from agriculture, development, industry, and grazing.

CONSERVATION STATUS

Rankings:

Canada – Species at Risk Act: N/A

Canada – provincial status: British Columbia SH Possibly extirpated

Mexico: N/A

USA – Endangered Species Act: N/A

USA – state status: Idaho S1 Critically imperiled; Montana SX Presumed extirpated; Oregon

S1S2 Critically imperiled; Washington S2 Imperiled

NatureServe: G2 Imperiled

IUCN Red List: N/A

SPECIES PROFILE

DESCRIPTION

Fisherola nuttalli is a small pulmonate (lunged) snail in the family Lymnaeidae. It has a limpet-like appearance, with an uncoiled conical shell that has a wide oval base and a smooth, eccentric (off center) apex. The shells may reach up to 8 mm (0.3 in.) long, 6.25 mm (0.25 in.) wide, and 3 mm (0.12 in) high; they are rich brown in color and appear striped due to fine concentric growth rings (Neitzel & Frest 1992).

TAXONOMIC STATUS

Fisherola nuttalli Haldeman. The taxonomic status of this species is accepted as valid. This species was previously described as *Lanx nuttalli*, based on the resemblance of its conical shell to described *Lanx* species (Clarke 1981); however, the shell apex is eccentric (off-center) in *F. nuttalli*, while *Lanx* shells have a more centrally placed apex. It has also been described as *Ancylus crassus* (family Ancylidae) due to its limpet-like shell (ancylid species have shells that resemble low flat cones), but subsequent studies have resolved it in the family Lymnaeidae.

Burch (1989) recognized three subspecies of the shortface lanx: *F. nuttalli nuttalli* (Haldeman 1841), cited from the Snake River drainage in Idaho, the Columbia River drainage, and the Deschutes River in Oregon; *F. nuttalli kooteniensis* (Baird 1863), cited from the Spokane River, Washington, and the Kootenai River, British Columbia; and *F. nuttalli lancides* (Hannibel 1912), cited from the Snake River basin. Neitzel & Frest (1992) reject these subspecies and consider all specimens of *Fisherola* collected to be a single valid species, *F. nuttalli*, noting that subspecies designations appear to have been based on young specimens and confused by variable shell morphology.

LIFE HISTORY

Fisherola nuttalli is generally restricted to relatively large perennial streams ranging from 30-100 m (98-300 ft.) wide. Within such streams it is found primarily at the edges of rapids or immediately downstream from rapids in areas that have suitable substrate. This species requires clean, cold, well-oxygenated water with gravel, cobble, and boulder substrate. In an assessment of Hells Canyon Dam (Snake River, Idaho), *F. nuttalli* was found on cobbles in higher velocity areas of the stream much more frequently than any other mollusk species; this was considered to reflect the species' preference to attach themselves to hard surfaces in high velocities to avoid competition with other species (Richards *et al.* 2005). *Fisherola nuttalli* has not been found in areas with the following characteristics: slow flow; silt or mud substrates; extreme seasonal variations in discharge; an abundance of macrophytes (aquatic plants) or epiphytic algae; a bedrock substrate; or where dredging or mining occurs (Neitzel & Frest 1992; Frest & Johannes 1995; Frest 1999; Richards *et al.* 2005). The snails feed by scraping algae and diatoms from the surface of rocks and boulders.

Freshwater pulmonate snails generally reproduce sexually, laying their eggs from spring to fall in a gelatinous capsule attached to plants or stones. Egg capsules of *F. nuttalli* are usually laid on the undersides or sides of cobbles in protected areas where adults occur. *Fisherola* are hermaphrodites but do not appear to be self-fertilized, i.e. mating occurs between two individuals. Hatchlings are morphologically similar to adults, except that they lack a functional reproductive system. Young snails appear to grow rapidly and require only a few months to reach full size. Individual *F. nuttalli* generally live for only one year, as this species breeds once and dies afterwards (semelparous breeding) (comments by T. Frest in 5-year review and evaluation of Banbury Springs limpet, U.S. Fish and Wildlife Service 2006). Individuals are present year-round in the streams they inhabit, but are inactive during the winter. Dispersal of *F. nuttalli* occurs as snails crawl slowly across the substrate or are carried by the current.

DISTRIBUTION

Fisherola nuttalli was historically widespread, with populations scattered throughout the lower Columbia and Snake Rivers as well as some of their major tributaries, and was known from

Washington, Oregon, Idaho, and Montana. It has also been documented in the Columbia River drainage in British Columbia, Canada, although its presence there was assumed based on the discovery of a shell (Clarke 1981). Prior to 1987, collections of *F. nuttalli* are reported from Columbia and Spokane Rivers in Washington; the Snake and Salmon Rivers in Idaho; the Deschutes River in Oregon; and the Kootenai River in British Columbia. Columbia River sites extended from Portland, Oregon, to the Hanford Reach in Washington. Most of these sites no longer have suitable *F. nuttalli* habitat due to the effects of damming, impoundment, pollution, and water withdrawals for irrigation (Neitzel & Frest 1992), although one occurrence is known in Oregon near the Bonneville Dam. This species is now presumed extirpated in Montana and British Columbia, although it may persist in the Okanogan River drainage in British Columbia (Stagliano *et al.* 2007).

Currently, large populations of *F. nuttalli* persist in only four streams: the lower Deschutes River, Oregon; the Okanogan River and the Hanford Reach of the Columbia River, Washington; and the Snake River in Oregon and Idaho. Additional small populations are found in Oregon in the John Day and Imnaha Rivers, and the lower Columbia River near Bonneville Dam; the Methow River, Washington; and the Grande Ronde River, Washington and Oregon (Neitzel & Frest 1992; Frest & Johannes 1995, 2000; Frest 1999; Richards *et al.* 2005; Idaho Conservation Data Center 2006). Many of these areas are on federal lands, including the Hanford Reach (Department of Energy); Deschutes Wild and Scenic River; Hells Canyon National Recreation Area; Okanogan, Gifford Pinchot, and Mt. Hood National Forests; and the Bonneville Power Administration.

THREATS

Impaired water quality, habitat degradation and loss, and increasing fragmentation and isolation of the few remaining populations are the main threats to continued survival of *F. nuttalli*. This species has narrow habitat tolerances and requires cold, unpolluted, fast-flowing, well-oxygenated water in moderately large perennial streams with cobble-boulder substrate. Most historic populations of *F. nuttalli* were extirpated due to stream modifications resulting from dams, impoundments, loss of rocky substrate, increased sedimentation and siltation from farming and grazing practices, increased pollution and nutrient loading due to runoff from agricultural, development, and industry such as pulp mills and mining (Frest & Johannes 1995; Frest 1999).

Many of these factors continue to threaten remaining habitat for this species. A survey of the interior Columbia River basin conducted by the US Forest Service (1996) found that most streams in the region are fully or over-appropriated for water diversion, with irrigation as the primary usage. Changes in riparian vegetation were noted basin-wide, including a significant decline in riparian-associated species such as cottonwood and willow due to forest conversion, streamside disturbance, roads, and dams. Decreased riparian vegetation can destabilize stream banks and increase sedimentation and siltation, filling in the cobble substrate inhabited by *F. nuttalli*.

Additional potential threats such as disease and predation have not been assessed. However, small isolated populations such as the remnant *F. nuttalli* are extremely vulnerable to stochastic events, and are generally at greater risk of extirpation from normal population fluctuations due to predation, disease, and changing food supply, as well as from natural disasters such as floods or

droughts. They may also experience a loss of genetic variability and reduced fitness due to the unavoidable inbreeding that occurs in such small populations.

CONSERVATION STATUS

F. nuttalli was recommended as a candidate for federal Threatened Species status in 1995 by Frest and Johannes, but this species currently receives no federal protection. It is a U.S. Forest Service Species of Concern (SOC). It is considered imperiled in Washington, Idaho, and Oregon, and is a Washington State Candidate. In Montana, the status of *F. nuttalli* was recently changed from imperiled to presumed extirpated, as no collections have been documented for 50 years (Stagliano *et al.* 2007), and it is ranked as possibly extirpated in British Columbia. It is an ecoregional target species for The Nature Conservancy in the Deschutes and Grande Ronde Basins in Oregon.

CONSERVATION NEEDS

Protecting the remaining habitat and populations of this species is vital. One of the largest and most well-monitored populations of *F. nuttalli* occurs at the 51-mile long Hanford Reach, the only remaining undammed, non-tidal stretch of the Columbia River in the U. S. Habitat alteration or stream modification in that area could be severely detrimental to the survival of this species in Washington.

RESEARCH NEEDS

Research into effective habitat management in the area would be valuable, as well as targeted surveys for additional populations in areas of suitable habitat near existing populations.

RESOURCES

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