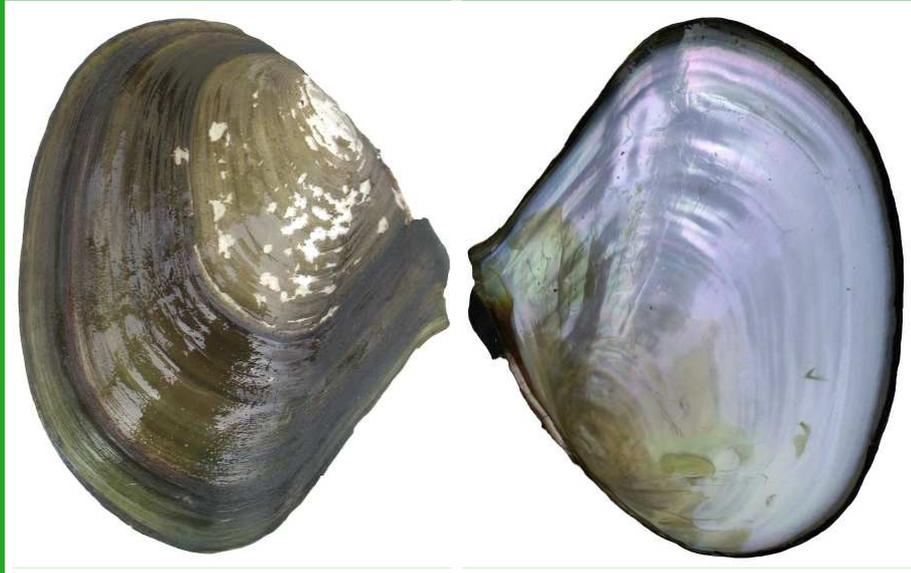


## BC's Coast Region: Species & Ecosystems of Conservation Concern

### Winged Floater (*Anodonta nuttalliana*)

Global: G4Q, Provincial: S4, COSEWIC: N/A BC List: Yellow



**Notes on *Anodonta nuttalliana*:** A member of the family Unionidae (freshwater mussels), winged floater is the least common of the Pacific Northwest's *Anodonta* species. Five native species of the genus *Anodonta* occur in western North America, of these three are found in BC. Winged floater, as with other freshwater mussels and clams in BC, is declining in terms of area occupied and number of sites and individuals.

#### Description

**Length Up to 9.5 cm.** Smaller than other western *Anodonta* species, the shell is elliptical and more circular than oval and fairly flat. The outer portion of the shell is yellowish-green, yellowish-brown, or brown, the interior (nacre) is white or bluish. The margin of the rear top of the shell is compressed and raised to form a high prominent wing (though some individuals may be wingless). The valves are very thin but slightly inflated (can be compressed in some individuals). The beak of the winged floater is flattened, not usually raised above the hinge line and contoured with up to 20 irregular single or double-looped concentric ridges. A key lifecycle feature of this and other freshwater mussel species is the need for a host (usually a fish species) to carry the larvae (glochidia). Floaters do not appear to be host specific and in most cases the host species is unknown. Larvae are relatively large, and attach themselves to the fins or gills of their host fish with hook-like projections on each valve. They remain attached to a fish for several weeks (depending on species and water temperature) before letting go and dropping to the bottom where they burrow into the sediment. All *Anodonta* species have thin fragile shells compared to most other native mussels. This enables them to 'float' on less solid substrates like silt and mud. They have also earned their name from colony die-offs that occur from seasonal low oxygen and temperature stress in the summer. The post mortem build-up of gases in the shell cavity may float the light shells to the water's surface.

#### Diet

As with many other shellfish, winged floater is a filter feeder, deriving food such as zooplankton and algae filaments from bottom sediment and the water column passing over their community beds.

#### Look's Like?

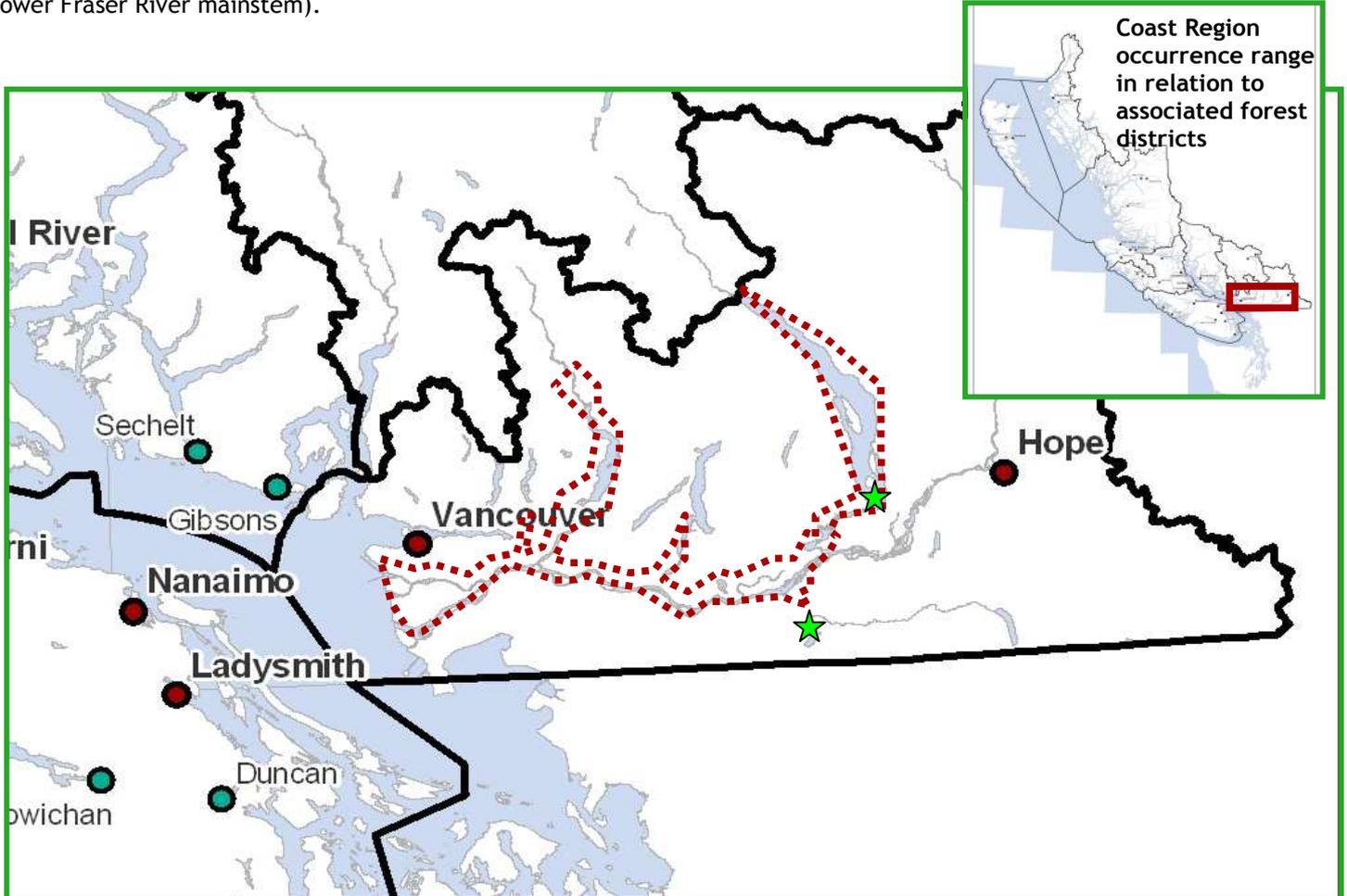
Four other floater species are native to the Pacific Northwest: California, Oregon, Western and Yukon floater. Of these California and Western floater can be found in BC, but have darker more oval shells, and lack the wing feature (however the wing feature is not found in all winged floater individuals). Misidentification can be easy, hence detailed keying is recommended when comparing freshwater mussel and clam species.



Western Floater

### Distribution

This species is distributed in low elevation watersheds from California, Oregon, Washington and southern BC (South Coast, Kootenay's and south Central Interior). Historical distribution for the Coast Region is difficult to assess because this species was often misidentified. On the South Coast, winged floater is considered to be eradicated over much of its original range. At present it is known from Cultus Lake and the constructed lagoon at Harrison Hot Springs and historically from the now in-filled Sumas Lake (now "Sumas Prairie"). Potentially this species may still be present in the remaining waters of the lower Sumas drainage and may occur in other Fraser Lowland watersheds which support freshwater shellfish populations (e.g. Stave watershed, Pitt watershed, Nicomen Slough, Lower Coquitlam watershed and areas of the Lower Fraser River mainstem).



Winged Floater (*Anodonta nuttalliana*), known and potential occurrence range (based on occurrence of other freshwater mussel populations and habitat suitability) for the Coast Region (known populations - green star).

### Habitat Preferences

Mussel species that inhabit lakes and ponds are usually more tolerant of muddy substrates, low dissolved oxygen, and warm water temperatures. These species can also be found in freshwater tidal habitats and can tolerate the cyclical exposure that occurs during low tide. Many mussels are sensitive to pollution and habitat disturbance, though some can tolerate moderate human disturbance and exist near densely populated areas. Even urban watersheds may support tolerant species where suitable habitat occurs and water quality perturbations are not excessive.

### Critical Features

Sandbars and submerged mudflats at the confluence of lakes and their tributaries or outlets (or similar areas of fine sediment deposition) are important habitats.



Freshwater mussels are confined to areas of permanent, generally slow moving waters, including creeks, rivers, ponds, and lakes. Flow and gradient are determining factors, as steep fast flowing systems with large, coarse substrate are usually too erosive and fast for glochidia to become established.

### Seasonal Life Cycle

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
							Spawning				
Glochidia released spring and summer, sexually mature 4-5 years							Embryos develop in female over winter				
Active depending on temperature. Lifespan 10-15 years (one of the shortest life spans of all freshwater mussels).											

### Threats

- ◆ Exposure during low flow periods from excessive drawdown or naturally occurring tidal fluctuations may make colonies vulnerable to predation or harvesting.
- ◆ Recreational uses on lakes on the South Coast tend to be heavy and frequent, especially along accessible, sensitive shoreline areas.
- ◆ The reliance of floaters on an unknown fish species host to complete their reproductive cycle makes them vulnerable to changes in fish species diversity, population dynamics and introduced fish species.
- ◆ As filter feeders freshwater mussels are susceptible to a range of impacts from dissolved pollutants from industry, agriculture and development runoff.
- ◆ Water diversion and fine sediment influx, dredging, infilling and shoreline development from various human settlement activities can contribute to loss of critical habitat features.
- ◆ Recreational land management activities such as game fish stocking or chemical treatments to rid lakes of non-desirable species can significantly impact freshwater shellfish communities.
- ◆ Introduced shellfish species (e.g. Asian clam) now found in many Pacific drainages, may compete with native mussels for food or space.
- ◆ Misidentification, or rather difficulty in identification makes management of this species problematic.
- ◆ Harvesting and non-permitted collection by the public.

### Conservation & Management Objectives

Direct management and conservation objectives for freshwater shellfish are presently under development in BC. The “Guide to Freshwater Mussels of the Pacific Northwest” provides a comprehensive collection of identification and inventory approaches. Management and conservation information is available through the Pacific Northwest Native Freshwater Mussel

Workgroup including the recently released “Critical Uncertainties for Native Freshwater Mussels (Bivalvia: Unionoidea) In the Pacific Northwest.”

**Specific activities should include:**

- ◆ Determine the full range extent of this species within Coast Region watersheds.
- ◆ Genetic analysis will be critical to identifying populations. Freshwater mussels have a broad geographic range but poor dispersal abilities, leading to a high degree of genetic variation across their range. This may affect their appearance, but may not change core genetic compatibility. Isolated populations may not be separate species even though they do not look alike.
- ◆ Host fish species are essential for this species survival. There is a need to establish which fish species act as preferred hosts for mussel reproduction and ensure their inclusion in management plans.
- ◆ Relocation and managed recovery may be necessary to re-establish this and other freshwater mussel species. Shellfish have variable ranges and tolerances for habitat changes and may require lengthy periods to colonize or recolonize preferred sites.
- ◆ Ensure the integrity of shoreline areas and lake littoral zones is maintained, degradation to preferred habitat is reduced, and the function of depositional areas such as freshwater mudflats and tidal/non-tidal deltas are restored.
- ◆ Implement protection and improved management guidelines for populations that may be subject to water quality, recreational use or harvesting impacts
- ◆ Reduce sediment entry and minimize loading of contaminants into ground and surface waters.
- ◆ Stormwater should be appropriately managed to attenuate and intercept runoff and pollution that may enter receiving waters.
- ◆ Maintain septic fields and other potential sources of contamination to freshwater receiving environments.
- ◆ Increase public awareness and recognition of the role that freshwater shellfish play in aquatic ecosystems.

Wild freshwater shellfish harvesting is presently not regulated where this species occurs on the Coast Region. However this species may be subject to protections and prohibitions under the BC Wildlife Act. Habitat for this species is also governed under other provincial and federal regulations including the Fish Protection Act, Federal Fisheries Act, Navigable Waters Act and potentially Regional and local municipal bylaws.

**Content for this Factsheet has been derived from the following sources**

- B.C. Conservation Data Centre. 2010. [Internet] [Updated June 3 2009] Conservation Status Report: *Anodonta nuttalliana*. B.C. MoE.
- Chong, Jer Pin et al. 2008. [Internet] Three deeply divided lineages of the freshwater mussel genus *Anodonta* in western North America. *Conserv. Genet.*
- Dawnport, Demorest and Maryanna Warmuth. [Internet] Notes on the Relationship Between the Freshwater Mussel *Anodonta Implicata* Say and the Alewife *Pomolobus Pseudoharengus*. University of California, Santa Barbara. Department of Biology, Harvard University.
- Howard, Jeanette and Jayne Brim Box. [Internet] Filter Feeding on the Western Frontiers: Freshwater Mussels in the Umatilla and John Day rivers. Confederated Tribes of the Umatilla Indian Reservation.
- Jiao, Yan et al. 2008. [Internet] Models and model selection uncertainty in estimating growth rates of endangered freshwater mussel populations. *Can. J. Fish. Aquat. Sci.* 65: 2389-2398 (2008) doi:10.1139/F08-141.
- Lee, Jacqueline. S. 2000. [Internet] Wildlife in British Columbia at Risk: Freshwater Mollusk. BC Ministry of Environment, Lands and Parks.
- Nadeau, Ethan et al. 2007. [Internet] Freshwater Mussels of the Pacific Northwest. US Fish & Wildlife Service.
- Pacific Northwest Native Freshwater Mussel Workgroup. [Internet] Freshwater mussel management and conservation resources.
- Xerces Society for Invertebrate Conservation. 2010. [Internet] Profile of *Anodonta californiensis* (Lea, 1852) / *Anodonta nuttalliana* (Lea, 1838) California Floater / Winged Floater Bivalvia: Unionidae

**Prepared by:** Pamela Zevit of Adamah Consultants for the South Coast Conservation Program (SCCP) in partnership with: International Forest Products (Interfor), Capacity Forestry (CapFor) and the BC Ministry of Environment (BC MoE), E-Flora and E-Fauna the Electronic Atlas of the Flora and Fauna of BC, Species at Risk & Local Government: A Primer for BC. Funding for this factsheet was made possible through the Sustainable Forestry Initiative (SFI): <http://www.sfiprogram.org/>

Every effort has been made to ensure content accuracy. Comments or corrections should be directed to the South Coast Conservation Program: [info@sccp.ca](mailto:info@sccp.ca). Content updated March 2012.

**Image Credits:** Winged Floater (outer and inner shell): Ethan Nadeau, Western Floater: North Island Explorer, Habitat Pamela Zevit. Only images sourced from “creative commons” sources (e.g. Wikipedia, Flickr, U.S. Government) can be used without permission and for non-commercial purposes only. All other images have been contributed for use by the SCCP and its partners/funders only.