

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

Cultus Pygmy Sculpin (*Cottus sp. 2*)

Global: G1, Provincial : S1S2, COSEWIC: T, BC List: Red



Notes on *Cottus sp. 2*: This diminutive member of the family Cottidae (“sculpins”), sometimes referred to as “bullheads” is part of a group of fishes usually associated with freshwater or marine benthic (substrate) habitats. Cultus Pygmy Sculpin, also referred to as “Cultus Lake” Sculpin has been classified as a dwarf version of the more common Coastrange Sculpin (*C. aleuticus*), but recent DNA work suggests it is likely a separate species. Only one other dwarf sculpin is known to occur, located in Lake Washington in Washington State. It is completely unrelated suggesting that the Cultus pygmy form likely evolved independently.

Description

Length 2.9-4.5 cm (maximum 5 cm). As with other sculpin species, Cultus Pygmy Sculpin have a large flat head, large fan-like pectoral fins, and a tapering body with small pelvic fins. The anal and dorsal fins are long, the segmented dorsal fin rays (cartilaginous, or bony, dermal rods which form the skeleton of the fins), along the back becoming erect when the fish is excited or stressed. Colouration is subtle, with the dorsal area being brown to grey, lightening to a white ventral area. Larvae and juveniles lack pigmentation on the fins, which become barred as the fish matures. Some enhanced colouration occurs during spawning, with males having an orange band on the first dorsal fin. Both sexes have 1-3 dark saddle-like blotches below the second dorsal fin. Sculpin lack a swim bladder which prevents them from rising vertically in the water column as other fish species can. This tends to restrict them to a benthic existence where their flat heads, streamlined bodies and broad pelvic fins allow for them to remain stationary in the streambeds of the often fast flowing waters they inhabit. The pygmy lake form however has evolved a number of adaptive features to an open water existence including lower bone density, high levels of subsurface fat to provide buoyancy and enlarged sensory pores on the head to assist in sensing the location of prey. These adaptations allow the pygmy lake form to pursue plankton food sources throughout the water column of the deeper, open waters of Cultus Lake.

Diet This species feeds in open water, migrating during the day through the water column to feed on a range of plankton species such as *Daphnia* (water flea).

Look's Like?

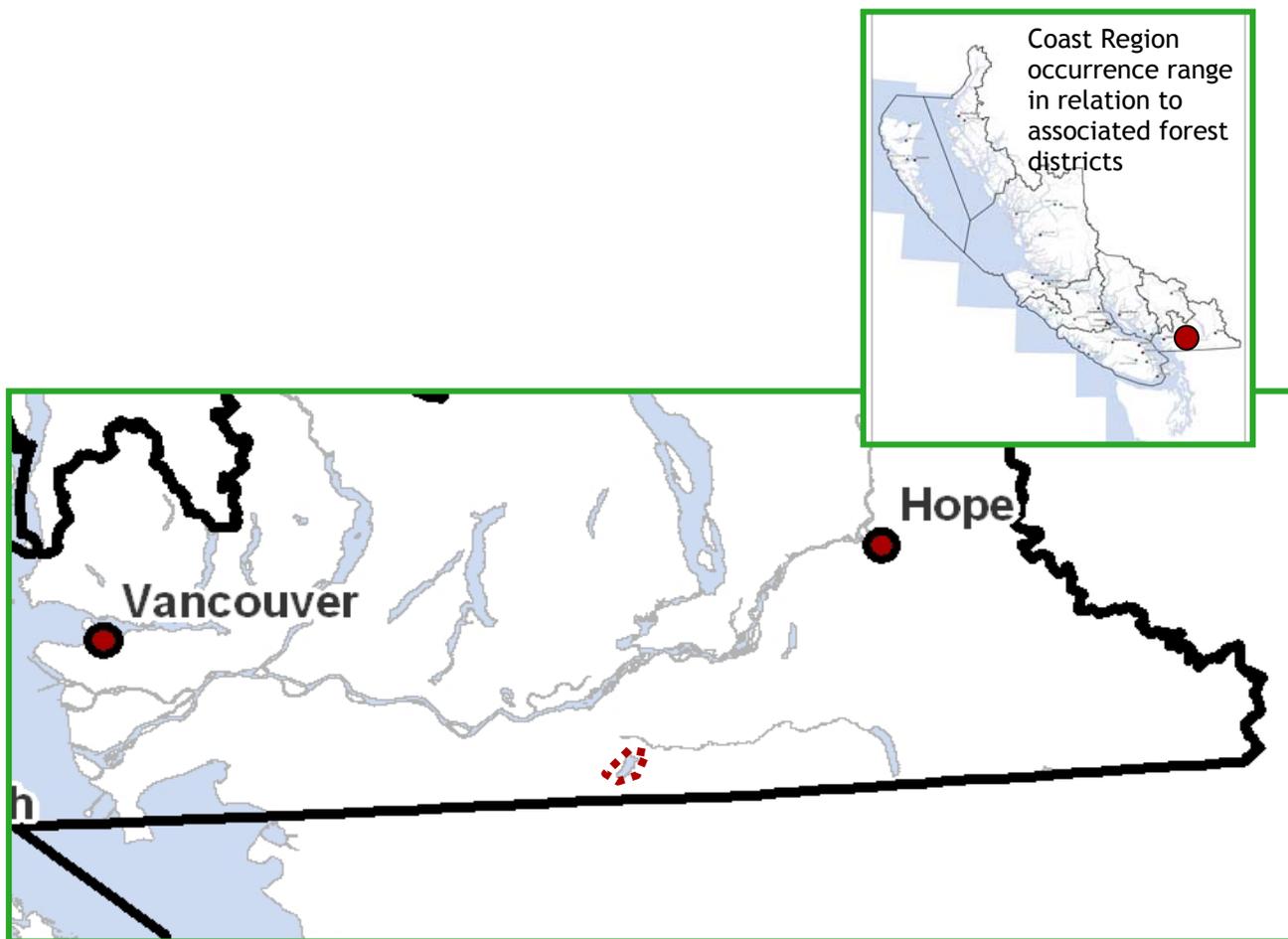
Cultus Pygmy Sculpin overlaps with two other sculpin species, Coastrange and Prickly Sculpin. These other two species are larger, have distinctly different body and fin pigmentation patterns, and generally do not occupy the same habitat niche as the pygmy form. Coastrange Sculpin is widespread in the substrate of the fast-flowing streams that drain into Cultus Lake while Prickly Sculpin is a benthic predator found along the lake bed.



Prickly Sculpin

Distribution

Elevations to 50 m. The Cultus Pygmy Sculpin is found entirely in the deep open waters of Cultus Lake, a headwater lake to Sweltzer Creek which feeds the Vedder River and subsequently Fraser River system.



Cultus Pygmy Sculpin (*Cottus sp. 2*), known occurrence range for the Coast Region

Habitat Preferences

Cultus Pygmy Sculpin is pelagic (found in deep, open water) for most of its life history.

Critical Features

Cultus Pygmy Sculpin appear to spend the majority of time during the day foraging on plankton in the deeper areas of Cultus Lake. The lake itself has been described as “exceptional” for its plankton productivity compared to other BC coastal lakes. This productivity combined with the presence of predatory Prickly Sculpin on the lake’s bottom may be important features that have promoted the evolution of the unique pelagic behaviour exhibited by the pygmy form.



Cultus Lake, a productive system in the Chilliwack watershed of the Fraser Lowlands is the only known location for this dwarf form of sculpin in BC.

Seasonal Life Cycle

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|--|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|
| | | | | Spawning late May to early September, peak spawning late June-July. | | | | | | | |
| Adults, fry and juveniles active all year (may go into torpor during low temperature or winter freeze-up). | | | | | | | | | | | |

Becomes sexually mature in its third year, lifespan five years. It is assumed that this species spawns in the substrate found in deeper areas of the shoreline depositing eggs under rocks and gravel where they are guarded by the male until hatching.

Threats

- ◆ Restricted distribution makes this species highly vulnerable to changes in the water quality and hydrological regime of the waterbody it occurs in. Water diversion and extraction, if it increases in the future (e.g. due to urbanization and development of the lake foreshore and surrounding watershed), may be an issue.
- ◆ There is a major gap in knowledge about this species life-history, habitat needs and ecological relationships with other species in Cultus Lake.
- ◆ While a natural component of the Cultus Lake ecosystem, native Dolly Varden char predate heavily on Cultus Pygmy Sculpin.
- ◆ Recovery of native Cultus Lake Sockeye, a species of conservation concern, may increase competition for food resources such as plankton, which juvenile sockeye feed on.
- ◆ Introduction and subsequent predation and competition from non-native or exotic species such as Brown and Black Bullhead (catfish species), Yellow Perch or Bass and Sunfish species are a significant concern.
- ◆ Sculpin (all species), may suffer mortality through angling as by-catch or be purposefully destroyed under the false perception they impact endangered Cultus Sockeye eggs and fry.

Conservation & Management Objectives

- ◆ Apply conservation and management objectives as set out through the “Recovery Strategy for Cultus Pygmy Sculpin (*Cottus sp.*) in Canada.”
- ◆ Inventory and monitor using methodology setout in the RISC “Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures.”

Specific activities should include:

- ◆ Further monitoring is needed to assess this species general biology including life history, dispersal patterns, population trends and habitat requirements in relation to Coastrange Sculpin and other sculpin populations in Cultus Lake.
- ◆ Management and recovery of Cultus Sockeye (also a species of conservation concern) may have implications for Cultus Pygmy Sculpin (and vice versa) as both species depend on similar food resources and have similar predators. Management of the two species should be coordinated and outcomes monitored to ensure that goals and actions for each species are complimentary.
- ◆ Reduce sediment entry and minimize loading of contaminants into ground and surface waters and infilling of spawning areas. Protection of spawning zones may be warranted.
- ◆ Clear-span crossings are preferred. Culvert crossings should be a minimum 2 m diameter with open bottoms with natural substrate, no longer than 30 m and should not have large drops that would impede small mammal (or fish) movement. On long culverts that are dark in the middle, consider the use of grates that will allow light and rain to enter.
- ◆ Encourage stewardship amongst private landowners, the general public and through land use decision making and associated maintenance activities.
- ◆ Increase awareness about the sensitivity and value of this species and its role in the health of the Cultus Lake ecosystem including efforts to reduce potential targeted mortality by anglers.

This species is listed under the Federal Species at Risk Act (SARA) and is 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 and Federal Fisheries Act and potentially Regional and local municipal bylaws.

Content for this Factsheet has been derived from the following sources

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- Woodruff, Patricia. 2010. [Internet]. A Genetic and Behavioural Analysis of the Distinctiveness of the Cultus Pygmy Sculpin (*Cottus Aleuticus*) and Implications for its Conservation. Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in the Faculty of Graduate Studies (Zoology) The University of British Columbia (Vancouver) BC.

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/>

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