

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

Quatsino Cave Amphipod (*Stygobromus quatsinensis*)

Global: G2G3 Provincial S2S3: COSEWIC: Not Listed, BC List: Blue, Identified Wildlife



Female with eggs

Notes on *Stygobromus quatsinensis*: A member of the Crangonyctidae family of amphipods (crustaceans with variable size and shaped limb appendages), Quatsino cave amphipod lives exclusively in freshwater systems that flow through karst caves. There are 151 recognized *Stygobromus* species in North America. A survivor of the Pleistocene glaciation period, this species is part of a largely western group of unique freshwater invertebrates known as the “Hubbsi Group.”

Description

Length: 5-7 mm. As with many other troglodyte (deep cave dwelling) species, this amphipod is translucent, without pigment and completely blind. The Quatsino species is typical of amphipods, with a body composed of 13 segments which can roughly be grouped into the head, pereon (thorax) and pleon (abdomen). The legs and antennae are of various lengths with numerous sensory hair-like structures. The longer antenna of both sexes equals approximately 50% of the body length. Males are similar to females except the frontal section of the gnathopod (claw like structures used for grasping and feeding) of the males are larger. Females carry eggs in a ventral brood pouch formed by projections in the first segment of the first five of seven legs. Juveniles hatch as miniatures of adults.

Diet

Caves tend to have low nutrient loading and lowered productivity which limits food resources. Quatsino cave amphipod feeds on organic matter by scavenging on organic matter or other organisms which wash through and settle in the underground aquatic environments they utilize.

Look's Like?

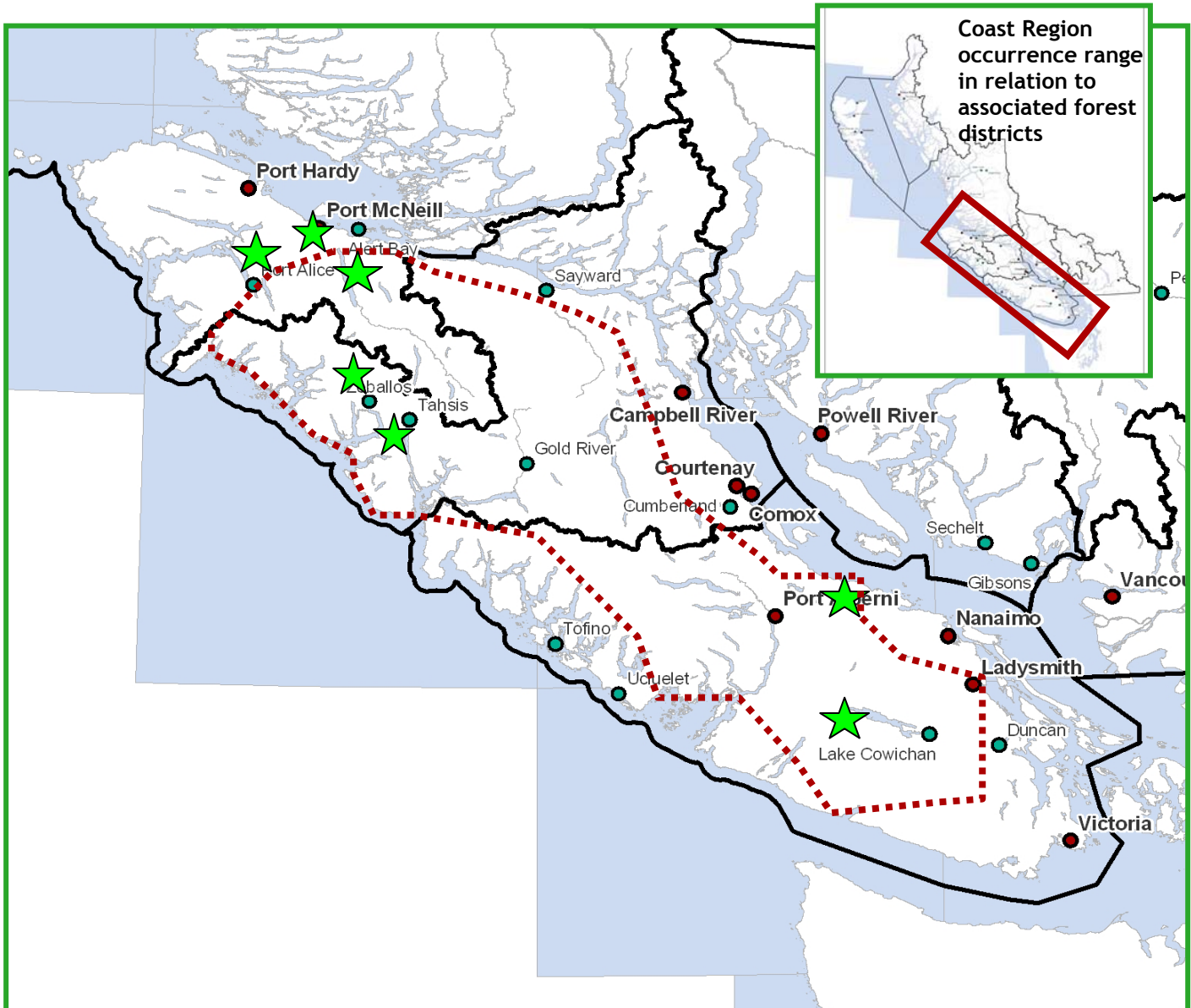
There are a number of similar looking freshwater amphipods found in surface lakes and streams throughout the Coast Region including *Gammarus* species (also known as “sideswimmers” or “scuds”). However these species, which inhabit surficial waters typically have pigmentation and possess eye structures. The Quatsino species is the only one likely to be found in the harsh underground aquatic environments of karst systems.



Gammarid (Gammarus lacustris)

Distribution

Elevations: 100-800 m. While there are a number of representatives of this genus in North America, in BC this species is presently only known from the following underground streams flowing through karst cave systems on Vancouver Island: Artlish Caves (north of Zeballos), Hollow Cave southeast of Port Alice, Thanksgiving Cave (near Tahsis), Euclataws Cave (near Horne Lake), Hanging Sump Cave (near Nimpkish Lake), Tsulton River Rising (Port McNeill) and Hourglass Cave (near Lake Cowichan). This species has also been discovered in disjunct populations to the north in the outer portion of the Alexander Archipelago of southeast Alaska (Dall, Coronation, Heceta and Sumez Islands).



Quatsino Cave Amphipod (*Stygobromus quatsinensis*), potential occurrence range (approximate range of karst cave systems on Vancouver Island - red-dotted line), for the Coast Region (known major cave systems and occurrences - green stars).

Habitat Preferences

This species is associated with underground streams and pools flowing through unique landscape systems known as karst. These systems are a result of water percolating through carbonate bedrock (limestone, marble or dolomite), creating underground cave and stream networks. The amphipod uses the subsurface flows to disperse through the labyrinth of openings in the karst system. Well-developed karst occurs typically in regions with high precipitation and rough terrain overlain with surface vegetation communities of old growth or mature coniferous forest with dense understory communities of epiphytic species (mosses, lichens, liverworts).



Critical Features

This species is restricted to the substrates of streams, pools or springs associated with karst cave systems. Water temperature is typically low (3.0 to 8.5 °C) with a somewhat alkaline pH (-7.5-8.0) with low nutrient availability other than materials which flow in from surficial areas.

Karst systems can be hard to detect from the surface, often evident only from small streams flowing in and out of mossy covered openings, or sinkholes in the forest floor. Some form extensive exposed crevice or cave structures.



Seasonal Life Cycle

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
									Gravid females detected in October		
Active throughout the year											

Actual spawning cycle is unknown, young hatch from eggs stored in brood pouch in thorax of female. There is no apparent larval stage, hatchlings are identical to adults, increasing in size gradually through direct growth.

Threats

- ◆ Small population size, limited distribution in BC (and globally), as well as narrow threshold tolerances for pH reduce the ability for this species to easily colonize or recolonize sites and make it highly vulnerable to localized extirpations.
- ◆ This species is not thought to be mobile over large distances, natural drift colonization is reduced by flow and terrain barriers further increasing extirpation risk.
- ◆ Human disturbance including direct mortality and damage to aquatic environments from recreational caving activities.
- ◆ Alterations to hydrology and water quality regimes from forestry, road construction and other development or extractive activities.
- ◆ Sedimentation and infilling of caves and other connected cavities from surficial soil erosion, sub-surface slides and cave collapse due to surface clearing activities.

Conservation & Management Objectives

- ◆ Apply conservation goals and objectives as set out in the Accounts and Measures for Managing Identified Wildlife - Accounts V. Quatsino Cave Amphipod *Stygobromus quatsinensis*
- ◆ Apply best practices and inventory guidelines and approaches to identify and protect karst features and terrain as set out through the Provincial Forest Practices Branch Karst Management Handbook for BC and the Karst Inventory Standards and Vulnerability Assessment Procedures for BC.

Specific activities should include:

- ◆ Further inventory is required, this species may occur in sub-surface aquatic environments in other areas yet identified (e.g., karst areas on Haida Gwaii or the Lower Mainland).
- ◆ Greater understanding of this species basic life history is needed; information on typical population densities, home range requirements and knowledge of life cycle biology are still poorly understood.
- ◆ Detailed genetic study is needed to establish likely patterns of colonization and divergence between Vancouver Island and southeast Alaskan populations.
- ◆ Create management zones or buffers around sensitive karst features and terrain to maintain priority amphipod populations and reduce disturbance impacts.
- ◆ Engage caving and recreational users to become involved in stewardship, inventory and conservation efforts for rare karst system and other cave associated species.

This species is Identified wildlife under the Forest and Range Practices Act 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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