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Pacific Water Shrew

Sorex bendirii

Of the 12 species of the family Soricidae (“shrews”), in BC, *S. bendirii* is one of three aquatic specialist species known as “water shrews”. Also referred to as “Marsh Shrew” and “Bendire’s Shrew”, this species is at the northern end of its range in southwest BC and found nowhere else in Canada. Water shrews are the world's smallest diving mammal.



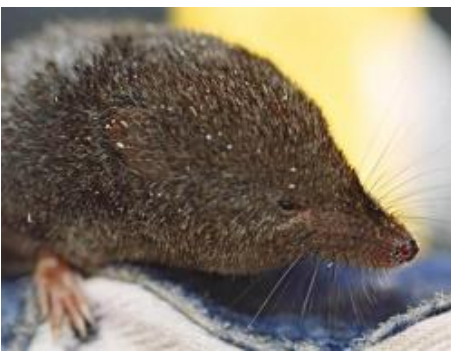
Pacific Water Shrew Denis Knopp



Pacific Water Shrew fringe hairs on
hindfoot



Pacific Water Shrew Chris Lee



Pacific Water Shrew Chris Schmidt



Pacific Water Shrew Denis Knopp

Characteristics

Length 13.7-17.9 cm (including 7cm tail), Weight 10-20 g. In North America this is the largest shrew in the genus *Sorex*. Fur (pelage) is a velvety dark-brown to black, only slightly paler on the ventral area than on the dorsal area; more brownish in summer than winter. The dark brown tail is uni-coloured. The pelage has a dual ability to repel water while trapping a layer of air. This acts as an insulation layer reducing heat loss by 50% while swimming (critical as most shrew species have a high metabolic rate and can stress from energy loss quickly). The skull is large with a ventrally curved rostrum (area where the snout extends from the top of the skull) and holds 32 teeth. As their name implies, Pacific Water Shrew are excellent swimmers. Air bubbles trapped beneath the unique fringe hairs of the front and hind feet provide enough buoyancy to enable them to run on the surface of the water for up to 5 seconds.

Status

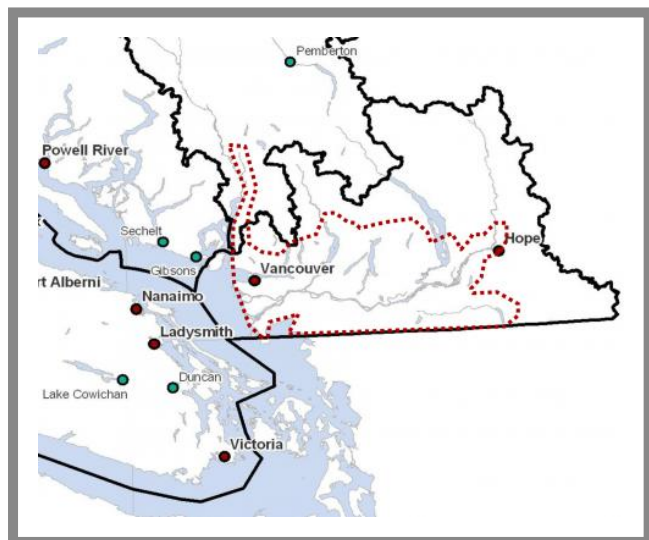
Global Status:	G4
Provincial Status:	S1S2
SARA Status:	Endangered
BC List Status:	Red (Candidates for- Extirpated, Endangered, or Threatened status)

Similar Species



Their relative large size and fringe hairs on the feet distinguish Pacific Water Shrew from all other shrew species except for American Water Shrew (*Sorex palustris* a.k.a. Common Water Shrew). American Water Shrew can be identified by grey to black dorsal fur with a silver-grey belly, a bi-coloured tail with a paler ventral surface, and a smaller skull with the rostrum not curved ventrally.

Range



Ecology

Elevation <1000 m (typically <850 m). Found from northern California to Oregon, Washington State and the extreme southwest of BC. In BC, Pacific Water Shrew is known to occur in the Fraser Valley out to Hope (perhaps further) and low-mid elevation areas, and the Howe Sound-Squamish area to the northwest (perhaps as far north as Whistler).

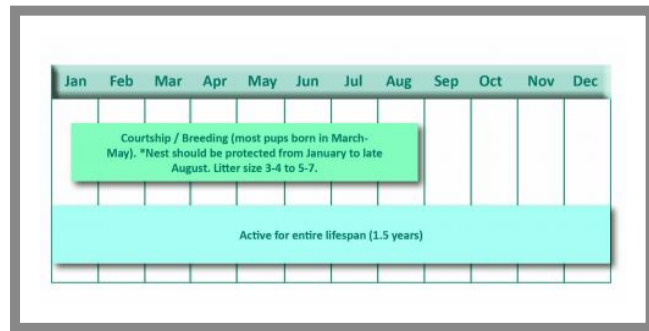
Habitat

Pacific Water Shrew is found in and around riparian areas, especially small systems (e.g. <10 m wide) as well as a variety of wetland classes. It has a marked preference for mature coniferous forests typically found in association with moist, coastal western hemlock communities. Dense understory vegetation with abundant downed wood are important habitat components for foraging and nesting. Nests and den sites found in downed wood were made up of shredded bark, soft grasses, mosses and available vegetation. As aquatic specialists, water shrews have a high fidelity for areas within 50 m of the water's edge. Upland forests may be required for overwintering/nesting and/or dispersal. This species has also been found in lowland channelized drainages (e.g. highway median stream crossings and ditches). Key habitat components for water shrew species (instream and in adjacent riparian areas) include high levels of structural diversity, low levels of disturbance and abundant invertebrate food sources.

Diet

Primarily an insectivore, this species feeds on terrestrial and aquatic insects, but also on small invertebrates such as, slugs, snails, and earthworms. Their semi-aquatic lifestyle provides access to a range of benthic invertebrates including worms and mollusks. When locating their prey under water, Pacific Water Shrew use their sensitive whiskers ("vibrissae") to detect sound and motion waves. Water shrews also emit air bubbles while swimming. The bubbles are pulled back in to the nasal cavity to test whether edible prey is nearby. Water shrews always consume their prey on land even if it is caught in water.

Life Cycle



Males do not breed their first summer.

Threats

- Habitat loss, degradation and fragmentation in riparian zones causing damage and destruction of nests/den sites, litter abandonment and possibly extirpation of local populations due to urban development, agriculture and logging.
- Loss of habitat components important to foraging and nesting due to removal of dead trees and down wood in riparian zones.
- Increase in vehicle mortalities and population fragmentation due to roadways that cut through core habitat areas and lack wildlife passage structures.
- Limited reproductive success and population sustainability due to short lifespan reducing the potential for 'backup' populations in the event of local population declines.
- Adverse effects of contaminated runoff from roads and other impervious surfaces on water quality and turbidity, affecting species aquatic prey base and potentially the insulating capability of the shrew's pelage.
- Direct mortality from by-catch in minnow traps or small mammal traps from inventory activities, as well as potential mortality from rodent pest control activities in developments adjacent to riparian areas.
- Predation from free ranging and feral domestic pets (i.e. cats).

Conservation and Management

Apply conservation and management objectives as set-out in the "Recovery Strategy for the Pacific Water Shrew *Sorex bendirii* in British Columbia" and "Best Management Practices Guidelines for Pacific Water Shrew in Urban and Rural Areas (BMP; working draft). Complementary objectives can be found in "Accounts and Measures for Managing Identified Wildlife – Accounts V. 2004 Pacific Water Shrew *Sorex bendirii*". This species is listed under the Federal Species At Risk Act (SARA), is Identified Wildlife under the BC Forest and Range Practices Act and subject to protections and prohibitions under the BC Wildlife Act. Habitat for this species may also be governed under provincial and federal regulations including the Fish Protection Act and Federal Fisheries Act as well as Regional and local municipal bylaws. Contact the Provincial regional species at risk biologist and/or the recovery team for the most up to date information.

Resources

Species Are Sacred - A Stó:l? World View on Species at Risk

Pacific Water Shrew ("heewahwt")

Best Management Practices Guidelines for Pacific Water Shrew (Draft)

The most recent draft (2010), please also refer to the more recent Pacific Water Shrew Recovery Strategy (2011) or contact the South Coast Regional Species at Risk Biologist in Surrey

Habitat Suitability/Capability Modelling for Pacific Water Shrew (2007)

Fish Traps Threaten Pacific Water Shrew Recovery

Lethal impacts and potential mortality for water shrew from submerged fish traps

Predation on the Coastal Tailed Frog (*Ascaphus truei*) by a Shrew (*Sorex* spp.) in Washington State

For further information see

Develop With Care 2014 Factsheet #20 Pacific Water Shrew

Scroll down the DWC site to access the factsheet at the bottom

Pacific water shrew disappearing from Lower Mainland

The Catania Lab - All about water shrews (videos and more!)

BC Species and Ecosystems Explorer: Species and Ecosystems Search

A source for authoritative conservation information on thousands of plants and animals and hundreds of ecological communities in BC. From here connect to all provincial and federal recovery plans (including the SARA Registry), COSEWIC (Committee on the Status of Endangered Wildlife in Canada), Identified Wildlife guidance and conservation requirements for specific species and ecological communities of conservation concern impacted by forestry activities) and links to E-Flora and E-Fauna (the Electronic Atlas of the Plants and Wildlife of British Columbia).

Develop With Care Guidelines (see Lower Mainland Region section)

Environmental guidelines for urban and rural land development in BC.

Species at Risk & Local Governments a Primer for BC

Learn what species are at risk in your area, search by name, habitat type, regional district and forest district.

Sources

BC Conservation Data Centre. 2015. [Internet] [Updated December 2009] Conservation Status Report: *Sorex bendirii*. BC MoE. - BC Conservation Data Centre. 2015. [Internet] Species Summary: *Sorex bendirii*. BC Ministry of Environment. Catania Kenneth C. et al. 2008. [Internet]. Water shrews detect movement, shape, and smell to find prey underwater. Proceedings of The National Academy of Sciences of the USA. PNAS vol. 105 no. 2 pp. 571–576. - BC Ministry of Water, Land and Air Protection. 2004. [internet] Accounts and Measures for Managing Identified Wildlife. Version 2004. Biodiversity Branch, Identified Wildlife Management Strategy, Victoria, BC. COSEWIC. 2006. [Internet] COSEWIC assessment and update status report on the Pacific water shrew *Sorex bendirii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 28 pp. - Craig, Vanessa and Ross Vennesland. 2010. [draft] Best Management Practices Guidelines for the Pacific Water Shrew in Urban and Rural Areas. Prepared for the BC Ministry of Environment. Victoria (BC). - Craig, Vanessa. 2007. [Internet] Habitat Suitability/Capability Modeling for Pacific Water Shrew. Prepared for the BC Ministry of Environment Surrey (BC). - Craig, Vanessa. 2007. [Internet] Species Account and Preliminary Habitat Ratings for Pacific Water Shrew (*Sorex bendirii*) Using TEM Data v. 2. Prepared for the BC Ministry of Environment Surrey (BC). - Environment Canada. 2014. Recovery Strategy for the Pacific Water Shrew (*Sorex bendirii*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. 35 pp. + Appendix. - Proulx, Gilbert et al. 2003. A Field Guide to Species at Risk in the Coast Forest Region of British Columbia. Published by International Forest Products and BC Ministry of Environment. Victoria (BC). Welstead, Kym, and Ross Vennesland. 2006. [Internet] Fish Traps Threaten Pacific Water Shrew Recovery. Streamline Watershed Management Bulletin Vol. 9/No. 2 Spring 2006. - Zuleta, G.A. and C. Galindo-Leal. 1994. Distribution and Abundance of Four Species of Small Mammals at Risk in a Fragmented Landscape. Ministry of Environment, lands and Parks Wildlife Working Report No. WR-64.

Credits

Species Profile prepared by: Pamela Zevit with Kym Welstead (FLNRO) for the South Coast Conservation Program (SCCP) in partnership with: International Forest Products (Interfor), Capacity Forestry (CapFor). Funding was made possible through the Sustainable Forestry Initiative (SFI): <http://www.sfiprogram.org/>

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Every effort has been made to ensure content accuracy. Comments or corrections should be directed to the South Coast Conservation Program: info@sccp.ca. Content updated March 2015.

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Source URL: <http://www.sccp.ca/species-habitat/pacific-water-shrew>

Links

[1] <http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare/index.html>

[2] <http://www.cbc.ca/news/canada/british-columbia/pacific-water-shrew-disappearing-from-lower-mainland-1.2694511>

[3] <http://as.vanderbilt.edu/catania/lab/research/water-shrews/>

[4] <http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre/explore-cdc-data/species-and-ecosystems-explorer>

[5] <http://www.speciesatrisk.bc.ca/>

[6] <http://www.sfiprogram.org/>

[7] <mailto:info@sccp.ca>