Tatalu Watershed Report Card

3rd Edition

A ROCHA CANADA

Tatalu Watershed Context

The Tatalu (Little Campbell River) watershed in southern British Columbia is highly valued for its intact ecosystems, rare species, and seasonal salmon runs. It is located within the Fraser Valley Estuary Region, which is globally recognized as a Key Biodiversity Area (KBA). In particular, the Tatalu watershed forms the southern edge of the recently-updated KBA. This context is also politically unique, as the watershed spans Canadian, US, and Semiahmoo First Nation Reserve boundaries.

The land characteristics of the watershed range from forests, riparian zones, estuary, and wetlands to farmland and urban development. Although one of the smaller watersheds of the region, at 75 km2, it is unique in that it maintains much of its hydrological and biological structure. This groundwater-fed river has never been dyked or severely altered.

The Tatalu drops only 61m in elevation over its 30km journey from headwaters to Boundary Bay. It is one of three main rivers that drain into Boundary Bay, which is one of Canada's most important bird overwintering locations. Marine mammals, salmon, and Pacific Herring also depend upon the bay for critical habitat and feeding areas. Semiahmoo First Nation relies on the health of this bay and surrounding areas for food security and traditional practices.

Unfortunately, the Tatalu watershed faces a variety of threats. The shellfish beds of Boundary Bay have been closed to harvest since the 1970s due to contamination. Poor Tatalu water quality negatively affects the species both in the river and bay. Increasing industrial development in the region is causing rapid loss of habitat throughout the Tatalu watershed, threatening its health. We all have a role to play in addressing these challenges and in caring for the health of this place.

Watershed Health Goals and Indicators

The health goals for the Tatalu watershed were developed based on existing environmental stewardship policies and the priorities of stakeholders and rightsholders within the Tatalu watershed. Priorities and subsequent goals were identified in a variety of gatherings with partners and rightsholders including: Semiahmoo First Nation, City of Surrey, Township of Langley, City of White Rock, City of Blaine, Whatcom County, Little Campbell Watershed Society, Langley Environmental Partners Society, Friends of Semiahmoo Bay Society, Semiahmoo Fish and Game Club and A Rocha Canada.

This report card assesses the health of the Tatalu watershed based on a number of relevant indicators (see Waldrop, A. 2016). These indicators allow us to measure whether watershed health goals have been attained, and provide a framework within which to collate, synthesize and communicate watershed data. Using these indicators, we are able to calculate both individual grades and an overall watershed grade that represents the ecological health of this important and sensitive system.

Goal 1

Maintain water quality and quantity at levels that support healthy ecological systems and the needs of humans and wildlife

Indicators	Dissolved Oxygen	Temperature	River Flow	Water Extraction
Target	Meet provincial dissolved oxygen guidelines for the protection of all salmonid life stages	Meet provincial temperature guidelines for most sensitive fish species: Cutthroat Trout	Maintain at least 10% mean annual discharge (MAD) because less than 10% MAD can have major negative impacts on aquatic insects and fish	No current monitoring data available, so target not yet developed

Goal 2

Restore the populations and edible capability of native food sources

Indicators	Chinook Salmon	Shellfish Harvest
Target	Increasing or stable trend in Chinook returns through the Little Campbell Hatchery fish fence	Meet provincial water quality objectives for pathogens in the Tatalu. Upstream sites to meet objectives for irrigation and livestock use, estuary sites to meet objectives for shellfish.

Goal 3

Enhance watershed resilience to climate change

Indicators	Impervious Surface	Riparian Area Quality
Target	Maintain impervious surface cover below 10% to prevent the stream from becoming "impacted"	30 m buffer adjacent to Tatalu mainstem of native forest

Goal 4

Preserve and restore habitat for native species

Indicators	Invasive Species	Native Forest	Habitat Restoration
Target	Maintain <3% invasive species coverage in natural areas	Maintain >35% forest coverage across the watershed	Increased square meters of habitat restored

Goal 5

Increase community participation in stewardship & educational activities focused on watershed health

Indicators	Watershed stewardship or educational event attendance	Investment in ecological restoration
Target	Insufficient data to develop targets	Insufficient data to develop targets

Goal 6

Monitor and maintain populations of species at risk

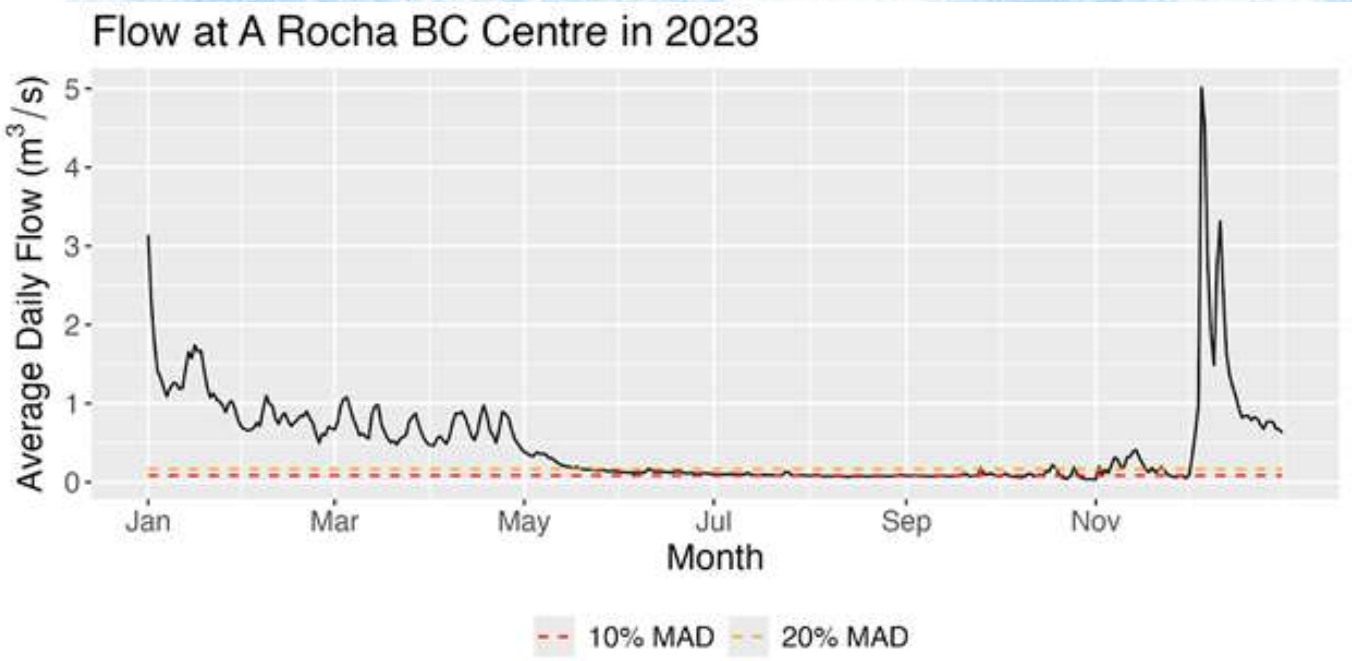
Indicators	Salish sucker population size	Oregon forestsnail population size
Target	Insufficient data to develop targets	Insufficient data to develop targets

What is the status of the watershed?

The Tatalu watershed receives an overall “C” grade . The circular figure below summarizes all of the individual Indicator grades. If the Indicator remains within the yellow circle on the figure it is receiving at least a “C”. The rest of this report card will step through each of the individual watershed Goals in more detail.

Goal 1

Water Quality and Quantity



The mean annual discharge (MAD) in the Tatalu at the A Rocha BC Centre from 2019 - 2025 was 0.8298379 m3/s. Like much of BC, 2023 was a significant drought year for the Tatalu. Daily mean discharge fell below 20% MAD (0.166 m3/s) for 177 days, and below 10% MAD (0.083 m3/s) for 71 days. Flows under 20% MAD are considered suboptimal for fish rearing, while those under 10% may severely hinder both fish and aquatic insects. The A Rocha BC Centre is located in key salmon spawning habitat that supports several species of salmonid through the summer.

While there were no major flood events noted in 2023, flooding remains a major concern in the Tatalu, especially around the river's mouth. While flooding and drought may seem like opposites, in fact they are linked- an increase in impervious surfaces (see Goal 3) can prevent rainfall from soaking into the ground, causing short-term flooding while also reducing the amount of groundwater available to feed the river during the summer.

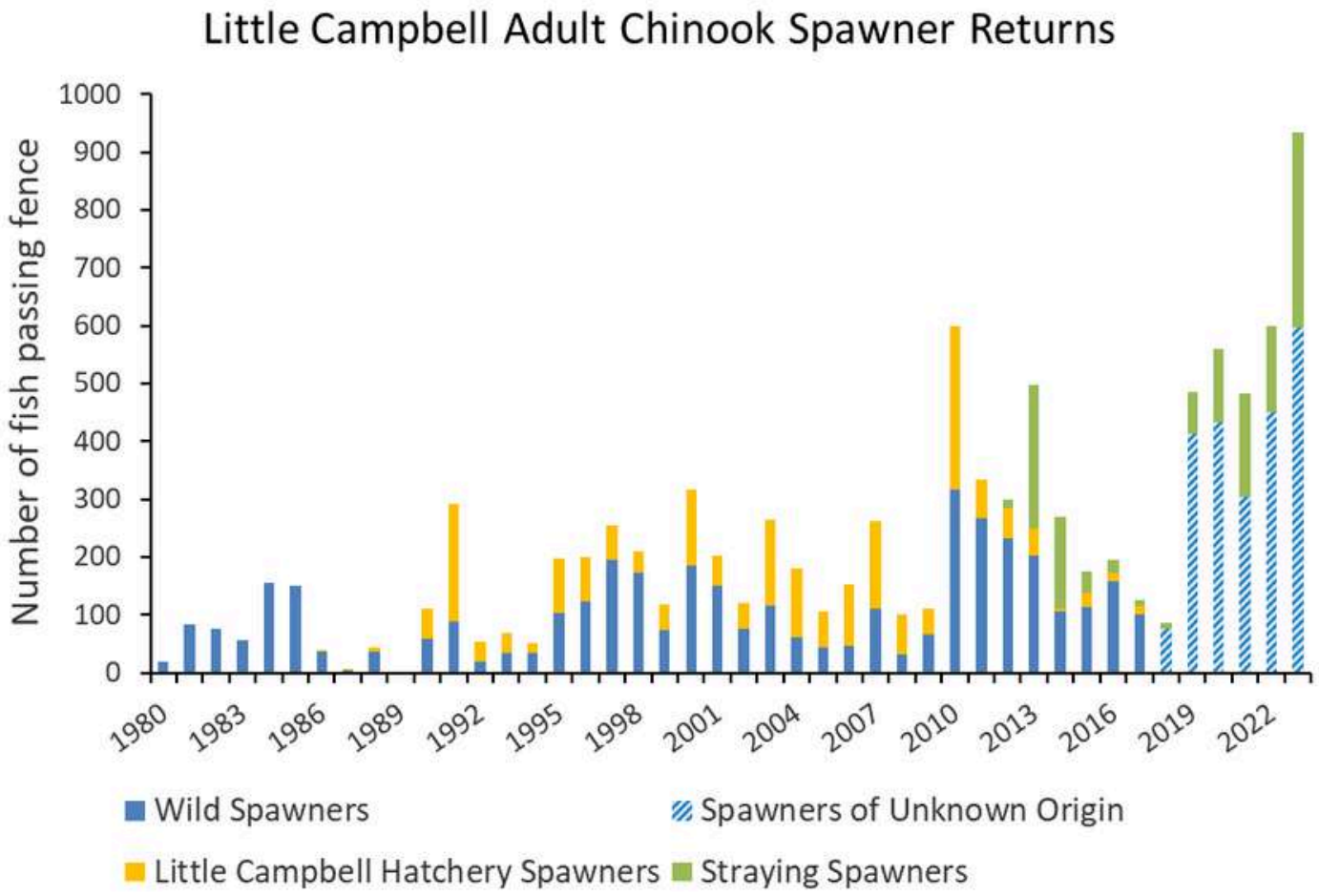
According to provincial water quality guidelines, temperatures equal to or less than 13.9 oC are optimal for chinook spawning, and temperatures equal to or less than 14 oC are necessary for incubation of eggs. Based on data from two continuous water quality monitoring sites established in the watershed, temperatures were optimal for aquatic life 59.7% of the time.

According to water quality guidelines (WQG) for dissolved oxygen (DO), the long-term chronic WQG for all aquatic life stages other than buried embryo/alevin in the water column is 8mg/L O2. The guidelines increase to 11 mg/L O2 for embryo/alevin life stages. The long term chronic WQG refers to a long term average for DO. The aim is to mitigate sublethal and lethal effects that can occur with repeated or indefinite exposure. At our upstream continuous water quality monitoring site, DO levels were acceptable for aquatic life only 11.5% of the time. While at the downstream site, DO levels were acceptable 51.7% of the time.

Goal 2

Restore Native Food Sources

Salmon are one of the most important traditional food sources to human and ecological communities along the Pacific coast of British Columbia. Therefore within our Indicator framework, we use Chinook salmon as an umbrella indicator species. Chinook rely on freshwater streams for their early development, estuaries for their juvenile development, the ocean during adulthood, and contribute to terrestrial systems during and after spawning, so their abundance indicates to us the status and trends of all these ecosystems. Southern Boundary Bay Chinook are “Threatened” (COSEWIC) due to their low population returns (<1000 returning individuals), but returns have been steady over recent years. Due to recent tagging programs, several more years of data are needed in order to determine how many of the returning fish are wild versus hatchery-raised.



Goal 2

Water Quality for Shellfish Harvest

The Canadian Shellfish Sanitation Program (responsible for regulating shellfish harvesting areas) has classified Semiahmoo Bay as “Prohibited” for the last 50 years due to concerns about fecal contamination. Bivalve shellfish in Semiahmoo Bay are a traditional food source of primary concern to Semiahmoo First Nation, and A Rocha Canada participates in efforts to improve water quality sufficiently to allow for safe harvest. In 2023, 42% of water samples collected in Semiahmoo Bay had over 14 colony forming units (CFU) / 100 mL of fecal coliform bacteria. Particularly high concentrations were obtained in parts of the bay during fall 2023. These bacteria occur in the guts of warm-blooded organisms, and can indicate the presence of dangerous pathogens that accumulate in shellfish. They enter the marine environment through problems with sewer infrastructure, improper manure application, and pet, livestock, and wild animal waste. The Tatalu watershed is considered a major contributor of fecal contamination to Semiahmoo Bay.

Goal 3

Climate Change Resilience

C

Impervious Surfaces

A	<10%
B	10-20%
C	20-30%
D	30-40%
F	>40%

Rainwater infiltrating and soaking into the ground is an important indicator of a healthy watershed. The more water that is able to soak into the ground, the more water that is able to be stored in the groundwater aquifer that will maintain/stabilize river levels during periods of drought.

However, as urbanization increases, surfaces like concrete and asphalt, and buildings that cover up the ground, reduce the amount of area that is able to soak up the water, and instead, the water flows as runoff directly into the river and ocean, and we lose a previous water resource.

The Tatalu Watershed was found to have an impervious surface area of 20.70% in 2023. This is a 2.42% since 2019 and a 5.74% increase since 2015.

The grading of impervious area is based on Fig.2 from Arnold Jr. and Gibbons, 1996, showing when the degree of impervious surface area impacts or degrades stream health.

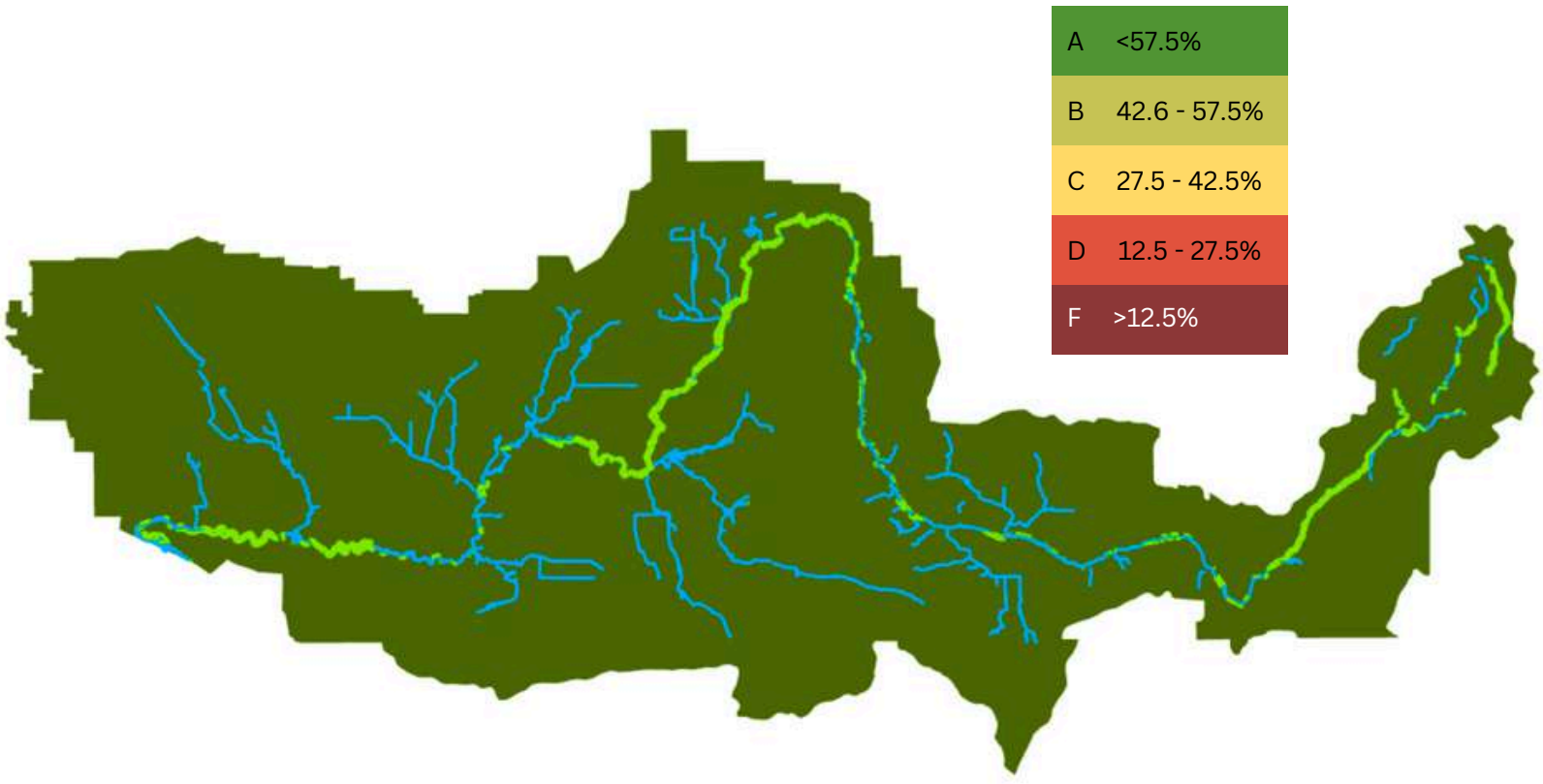
Goal 3

C

Riparian Area Quality

Forest cover is particularly important for areas adjacent to streams; these are natural wildlife corridors and run-off filters, providing shade and cover for fish. Thus, maintaining and expanding forest cover, particularly adjacent to watercourses is essential for mitigating climate change impacts in the watershed.

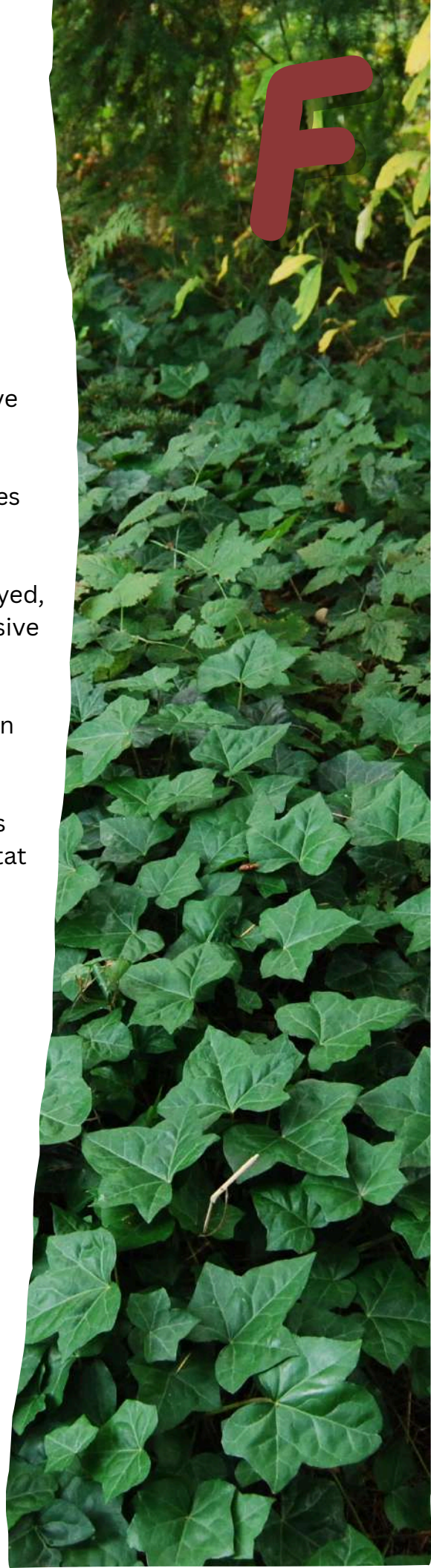
The total riparian area (30m buffer) along both sides of the river is 2.4 km2. The total area of riparian forest along the Tatalu mainstem in 2023 was 0.96km2. This equates to 40.8% of the 30m riparian buffer along the total length of the mainstem. This also equates to a 1.45% drop of riparian forest since 2020.



* Grading system based on 2011 Forest Conditions Scoring and Overall Grade Calculation in Conservation Ontario, 2011 Guide to Developing Conservation Authority Watershed Report

Goal 3

Invasive Species Coverage



Invasive plant species are plants that are non-native and introduced to an area, where they cause an outsized negative impact on native/indigenous plants and animals.

Across the riparian forest of the Tatalu, invasive plant species coverage ranges from 1-75%, with an average of 16.04% coverage. In our ground-truthing surveys, we observed 21 invasive plant species. Out of the twelve polygons we surveyed, five polygons had 1-10% invasive cover, six had 10-25% invasive cover, and one had 50-75% invasive cover.

The target for invasive plant species cover is <3% coverage in riparian forests. Invasive plant species, such as reed canary grass can increase streamside erosion, reduce dissolved oxygen, create slow stagnant warm areas in the river, factors that all reduce the health of the river and reduce good habitat for salmon,

The most common invasive plant species were found to be Himalayan blackberry, reed canary grass, English holly, and lamium.

A	<3% cover (sporadic)
B	3 - 5% (absolute cover)
C	5 - 7 % (absolute cover)
D	7-10% abundant (absolute cover)
F	>10% abundant (absolute cover)

*Grading system based on a similar grading system from Natural Heritage Report 2009–13; Monitoring Desired Ecological Conditions on Washington State Wildlife Areas Using an Ecological Assessment Framework, Washington Department of Fish and Wildlife Olympia, Washington, 2009.

Goal 4

B

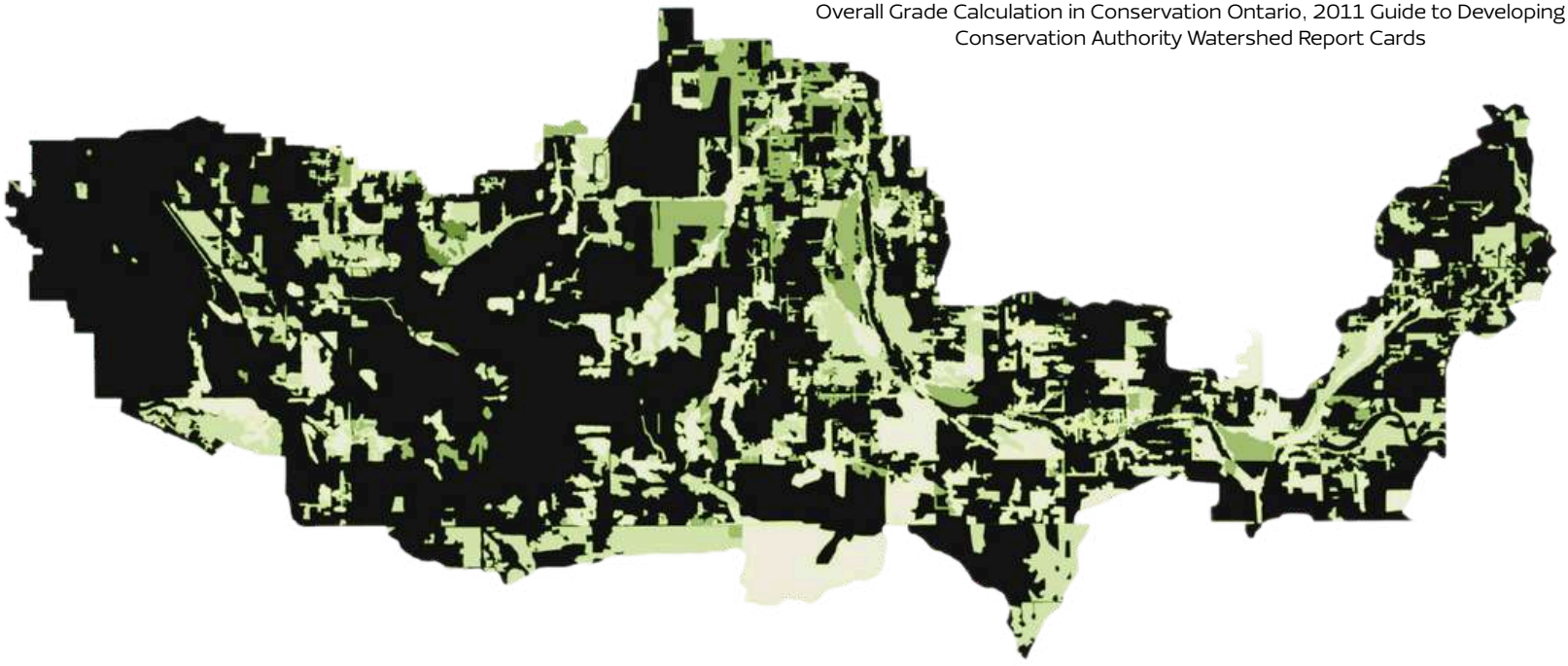
Native Forest Cover

27.97% of the Tatalu watershed is covered by forest. This is a significant decrease if we compare that to 1954, when 58% of the watershed was forested. This is also a 2.37% decrease since 2019 and a 5.03% decrease since 2012.

Forests are critical for the health the watershed. Forests provide refuge for native wildlife, act as carbon storage, regulate watershed hydrology, filter runoff, in addition to providing many other ecosystem services including climate cooling, food provisioning, and supporting biodiversity.

A	>35%
B	25 – 35%
C	15 – 25%
D	5 – 15%
F	< 5%

* This grading system is based on Table 8: 2011 Forest Conditions Scoring and Overall Grade Calculation in Conservation Ontario, 2011 Guide to Developing Conservation Authority Watershed Report Cards



Habitat Restoration

The Tatalu watershed has been degraded over time by modern land use practices. Habitat restoration is a way to improve and enhance these degraded ecosystems to be better homes for native wildlife. This includes critical habitat for Species-at-Risk including Salish Sucker and Oregon Forestsnail.

A Rocha Canada has conducted habitat restoration and enhancement projects on over 50,000 m2 of riparian forest, wetland, and estuarine habitat in the Tatalu Watershed. Since 2020, we have completed 12,000 m2 of habitat restoration work. The work involves removing invasive plant species, planting native species, creating fish passage where there were previously barriers, and streambank stabilization.

Partners in this work have included City of Surrey's Salmon Habitat and Restoration Program (SHaRP), Friends of Semiahmoo Bay Society, Little Campbell Watershed Society, Farmland Advantage, Investment Agriculture Foundation, along with private landowners and land managers. We are grateful to have like-minded partners in this work.

Goal 5

B-

Watershed Stewardship and Education

The Tatalu watershed is an area with an active watershed stewardship community that is both committed to practical action and educational outreach. At the same time, this community is relatively small in comparison with the growing population of the area. Educational activities are available to people of all ages, but many people are either unaware or choose to not participate in these activities. Similarly, investment in ecological restoration has been slowly increasing over recent years, and there are many more investments needed in order to address highly degraded parts of the landscape.

Goal 6

A Refuge for Rare Species

Vancouver Island Beggarticks (VIBT) is a unique wetland plant with 85% of its population located in BC. With the increased destruction of wetland habitat in BC, this species declines in population viability. A number of wetlands in the Tatalu watershed host populations of VIBT.

Since the 1970s, Barn Swallow populations have declined by 98%. These acrobatic and iconic birds can be seen nesting and rearing young throughout the Tatalu watershed. However, with increased development pressure in the watershed, barn swallows are at risk of losing precious habitat.

Goal 6

The Oregon Forestsnail is federally and provincially endangered and is only found in parts of the Lower Mainland and southeast Vancouver Island. It is critical to protect remaining habitat for this species because of its low dispersal ability. In the Tatalu watershed one small population is being monitored.

The Tatalu is one of only a few watercourses where the federally endangered Salish Sucker (*Catostomus* sp. cf. *catostomus*; Skwímeth in Halq'emeylem) is found. Thought to be locally extinct from the Tatalu, this bottom-feeding fish was re-discovered in 2011. Since that time, a small population of approximately 200 individuals has been successfully identified in the river. Because the Salish Sucker is limited to small streams within the Fraser Valley and Puget Sound area, it is of utmost importance to encourage land management practices that protect its habitat in this region. Nutrient runoff from urban and agricultural land can contribute to lower dissolved oxygen levels within the pools where the suckers live. If oxygen levels are too low, Salish Suckers may perish. Future monitoring will determine if this species is able to re-establish a healthy population within the Tatalu, despite increased human impact upon the watershed.

You can help care for this place!

How You Can Help	Watershed Impact
Remove invasive plants and plant native plants	Provides habitat for native species, re-establishes healthy vegetative corridors that can filter pollutants, lowers water temperatures, and raises dissolved oxygen levels.
Practice river-friendly farming	Water quality will benefit by applying precise amounts of fertilizer at appropriate times, maintaining vegetated buffers near watercourses, reducing farm runoff, and managing animal waste properly.
Encourage smart development	Organizing the community to promote low-impact development in the watershed can help protect critical habitat and decrease negative impacts from land use conversion.
Inspect and pump septic systems every 3-5 years	Reduces the discharge of excess nutrients and harmful bacteria into the Little Campbell.
Volunteer and collaborate with watershed stewardship groups	Many non-profits within the watershed need additional help restoring habitat and promoting ecologically healthy land use practices. See www.arocha.ca for their contact info.
Practice Water Conservation	Through water-saving irrigation techniques and reductions in water usage, citizens of the watershed will help keep the river flowing by decreasing groundwater depletion.

Thank you to those who supported this report card and to all who care for the Tatalu watershed!

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