

# TWINNED WATERSHEDS PROJECT

Chemainus and  
Koksilah Rivers

# 2021

**TWO RIVERS, BOTH IN PERIL.** The Koksilah and Chemainus Rivers, on Eastern Vancouver Island, BC, have been similarly and severely impacted by climate change and land use. Low summer water flows and degraded stream habitats are a threat to salmon and salmon communities.

The Twinned Watersheds Project is an innovative and efficient way of sharing resources to give decision-makers the best information possible to turn this situation around, and restore health and resiliency to these watersheds. For the Koksilah, the findings will support the creation of an enforceable local water sustainability plan under BC's new *Water Sustainability Act*.

The first phase of this unique partnership between Cowichan Tribes, Halalt First Nation and the Cowichan Watershed Board began in 2021. Local field crews gathered previously unavailable data about water flows, fish habitat, and riverbank ecology. Experts then analysed this data to understand the relationships between these elements. The project is also incorporating traditional environmental knowledge to improve understanding of what has changed, and how to restore the health and resilience of both rivers. Over the next two years, the project will also assess how many salmon are currently dependent on these river habitats.

“*There’s a lot to do. We are supporting each other by the sharing of resources, sharing of time and being able to get the work done a bit more efficiently than it would be if just the one system was being worked on.*”  
(Larry George, Cowichan Tribes)



Field crews measured how in-stream fish habitats were impacted as water flows declined throughout the summer.

A 50-metre deep riparian zone was studied along some stream reaches to learn how the health of the forests is affecting the health of fish habitat.

By hiring and training local field crews, the project is building community capacity and resilience. We are learning how to heal our local watersheds.





Historic water supply data was combined with fish and fish habitat requirements to understand the environmental flows needs of these two rivers. Five diverse approaches were utilized to create “environmental flow” recommendations to plan for sustainable fish populations. Interviews with indigenous knowledge holders helped to verify the models.

The project also created a fish habitat inventory and is studying how those habitats are impacted by extreme weather events.

Measuring and quantifying salmon habitat in these rivers will provide an important baseline and template for identifying short- and long-term restoration goals.

***“We’ve never been able to collect this kind of information. The objective of this study is to understand what fish need in the river and how those flows are or aren’t supporting fish.”***  
(Cheri Ayers, Local Fisheries Biologist)

**SALMON ARE A GOOD MEASURE OF WATERSHED HEALTH.** For the first time, this project enabled robust research to determine the necessary water levels and habitat conditions for salmon and other species to thrive, or at least survive, in the Koksilah and Chemainus Rivers.

Throughout the summer of 2021, as water levels dropped, field crews walked the two rivers to monitor how various habitats were impacted by declining flow rates. Pool, riffle, and glide habitats were inventoried to see if there was enough water for fish – specifically juvenile Coho and Steelhead fry, and returning adult Chinook.

***The environmental flow needs (EFN) of a stream are defined as the volume and timing of water flow required for proper functioning of the aquatic ecosystem.***  
(BC Water Sustainability Act)



Important fish habitat diversity has been lost in both rivers. Of the lower river reaches surveyed, deep glides are now dominant, with far fewer deep cooling pools, less riffle habitat, and a lack of woody debris.

From July to September 2021, water deficits in the Koksilah River were between 250 and 900 percent shy of meeting the ecological needs of the river. A similar trend has been observed on the Chemainus River.

The loss of watershed integrity has destabilized key ecological functions: regulating water supply, stream temperature, sediment supply, the provision of habitat, or hydrologic connectivity.

## RIPARIAN ECOSYSTEMS, WHERE THE LAND MEETS THE WATER:

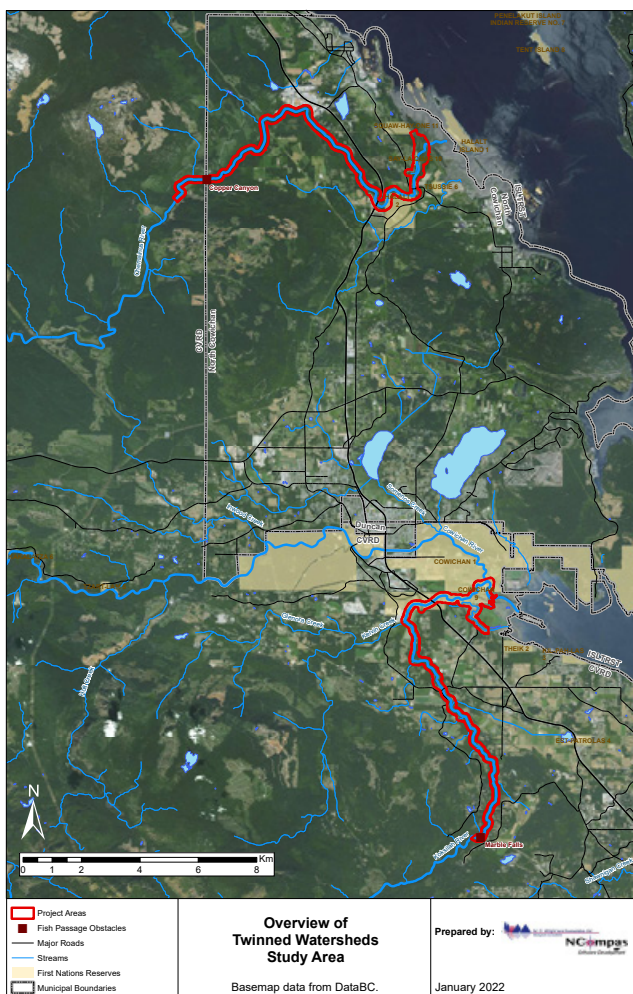
In 2021, the Twinned Watersheds Project studied how the riparian zones, the terrestrial part of river ecosystems, are impacting fish habitat. Riparian field crews assessed sites along lower reaches of the Koksilah and Chemainus Rivers to see how well the trees and shrubs are doing at preventing streambank erosion and filtering surface water, as well as providing fish refuge when they fall in the river. They also assessed culturally significant plants such as Xpey' (western redcedar), a keystone species in Indigenous culture. Land use along the rivers was mapped and several priority sites were identified for invasive plant removal and planting native species. Riparian restoration work was also done at three local farms.



**INDIGENOUS FLOW NEEDS:** To ground this project in traditional knowledge, both Cowichan Tribes and Halalt First Nation conducted interviews with indigenous knowledge holders about key features of the rivers when they were in a healthier state.

This initial work will inform a more in-depth process to identify the environmental, cultural and intrinsic values that the water & the river represents. This preliminary work also helped to inform and validate the low-flow study phase of the Twinned Watersheds Project.

*Protecting healthy riparian ecosystems now is more affordable and effective than extensive restoration efforts in the future.*  
(Heather Pritchard, RPF)



The lower reaches of the Chemainus and Koksilah Rivers have relatively high riparian functionality, although lacking old forest structure. Research is recommended further upslope throughout the two watersheds.

Common disturbances within the riparian ecosystems along the lower rivers include land clearing for crops and residential development, invasive plants, and soil erosion caused by recreation activities.

Very few original or old trees remain along the Chemainus and Koksilah Rivers overall. Large trees are needed to shape fish habitat, such as pools and riffles, when they fall in.





**BIG DANCING FISH!** Have you seen Stth'aqwi' do her happy dance? Cowichan's new Chinook salmon mascot drew attention to watershed concerns throughout the summer of 2021. "Roving River Reporters" interviewed watershed stewards, sharing short videos of their conversations on social media(#BigDancingFish). A 10-minute video tells the story of the Twinned Watersheds Project, thanks to Salish Eye Productions, while a second short video – "Why Fish Need Trees" -- dives deeper into the interconnections of riparian ecology.

*“Everything is connected in how it works: fauna, flora, sunlight, shade, large woody debris. The streams we are talking about for salmon - they can't survive without those five things.”*  
(Chief Thomas, Halalt First Nation.)

More information, including all research reports, maps, videos, and project team information, is available here: [www.cowichanwatershedboard.ca/TwinnedWatersheds](http://www.cowichanwatershedboard.ca/TwinnedWatersheds)



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