

BACKGROUND

Sturgeon Bank Sediment Enhancement Pilot Project

Project partners: Ducks Unlimited Canada (DUC), Raincoast Conservation Foundation (RCF), Tsawwassen First Nation, Lower Fraser Fisheries Alliance

Goals:

- Restore areas of receded tidal marsh and facilitate ecological resilience of the existing marsh to withstand sea-level rise.
- Create innovative green infrastructure to help rebuild Fraser salmon stocks of concern.



The Sturgeon Bank Sediment Enhancement Pilot will be led by DUC biologist Eric Balke.

Balke's research shows that since the 1980s, approximately 160 hectares of tidal marsh has died off at Sturgeon Bank. This pilot project is an opportunity to test and evaluate a local, customized approach to address large-scale tidal marsh loss.

Every year, approximately 1.6 million cubic metres of sediment dredged from the Fraser River is disposed of at sea, rather than re-used for habitat restoration projects. Balke and his team will use a temporary sediment delivery pipeline to pump dredged sediment from the Fraser River directly onto the southern Lulu Island foreshore incrementally over two years within the Sturgeon Bank Wildlife Management Area.

By restoring degraded tidal marsh, DUC anticipates that this project will also help to protect the adjacent community of Richmond from coastal flooding as sea levels rise. This pilot project is a "win-win-win" opportunity to beneficially re-use dredged sediment to support ecological resilience and coastal flood protection.

The design and lessons learned from this pilot project may be applied to other areas of the Fraser River Delta and other estuaries in B.C.

Alaksen National Wildlife Area Tidal Marsh Restoration

Project partners: Ducks Unlimited Canada (DUC), Raincoast Conservation Foundation (RCF), Tsawwassen First Nation, and the Lower Fraser Fisheries Alliance

Goals:

- Restore about 21 hectares of tidal marsh in the northwest portion within the NWA.
- Increase marine survival rates for juvenile salmon by facilitating increased growth and better condition upon marine entry.

Continuing to build off its work with the DFO's Coastal Restoration Fund project, DUC will expand its work in the Alaksen National Wildlife Area. DUC is restoring salmon habitat by breaching dikes to restore critical brackish tidal marsh habitat for juvenile salmon and other fish species.

Located 10 kilometres west of Ladner in the Municipality of Delta, the Alaksen NWA sits just east of the George C. Reifel Migratory Bird Sanctuary. The NWA covers 349 hectares, and the region is a hub of biodiversity for wildlife. It attracts up

to 1.4 million birds migrating from Siberia to South America yearly and supports Canada's most diverse number of birds each winter, including thousands of snow geese.

DUC will join with its partners at Raincoast Conservation Foundation, Tsawwassen First Nation, and the Lower Fraser Fisheries Alliance to complete the project that will restore about 21 hectares of tidal marsh in the northwest portion within the NWA.

Increasing habitat benefits to juvenile salmon, particularly juvenile Chinook, which are heavily dependent on the tidal marsh for growth and development, is welcome news for an industry that has seen deep declines in stock and closures of commercial fishers in recent years. The project will significantly increase the foraging habitat for juvenile salmon in an area where the vast majority of estuary habitat has been lost. The work is expected to increase marine survival rates for juvenile salmon by facilitating increased growth and better condition upon marine entry.

DUC also plans to partner with Simon Fraser University/B.C. Institute of Technology's Ecological Restoration Master of Science program. It will conduct a predictive modelling study of the physical habitat and geographic extent of tidal marsh to the proposed restoration actions, including the effects of rising sea levels. DUC and RCF will jointly develop and implement a thorough effectiveness monitoring program to characterize juvenile salmon usage of restored marsh habitats and monitor changes in vegetation communities post-construction.



North Arm Jetty Breaches

Project partners: Raincoast Conservation Foundation (RCF), Ducks Unlimited Canada (DUC), Tsawwassen First Nation (TFN), Lower Fraser Fisheries Alliance

Goals:

- Restore natural migration pathways for juvenile salmon and other fish species.
- Restore the natural movement of freshwater and fine sediments and associated natural processes that create a healthy and resilient estuary.

Raincoast Conservation Foundation will also continue to build on their Coastal Restoration Fund work, as they move forward with three additional breaches in the North Arm Jetty in the Fraser River Estuary to restore natural migration pathways for juvenile salmon and other fish species. This ambitious project will restore the natural movement of freshwater and fine sediments and associated natural processes that create a healthy and resilient estuary.

The North Arm Jetty was constructed in 1916, creating a 6.8-kilometre-long barrier that completely disconnects the North Arm of the Fraser River from its estuary. This barrier interrupts the natural movement of juvenile salmon, forcing them directly from freshwater areas into deeper waters of the Salish Sea, bypassing the brackish marsh, and sand and mudflat habitats upon which they rely during the transition to saline ocean water. RCF-led research in the Fraser estuary over the past five years has demonstrated relatively high densities of juvenile salmon in the North Arm. The newly announced North Arm Jetty project will create three, 30-metre-wide breaches that would create flow connectivity in most tidal levels, allowing juvenile salmon access to brackish marsh, sand flat and mudflat habitats on Sturgeon Bank.

RCF will conduct effectiveness monitoring programs annually including directly monitoring passage at breach locations post-construction. RCF will work with TFN and other local Indigenous communities to incorporate indigenous field monitors into the field sampling program. RCF will also collaborate with graduate students in the UBC Pacific Salmon Ecology and Conservation Lab to conduct research projects to build upon our understanding of juvenile salmon estuary ecology, including movement patterns.