



# South Coast Salmon Strait of Georgia Stock Assessment Final 2021 Escapement Bulletin– Area 18 Cowichan River

Updated September 2022

## Summary

This bulletin summarizes salmon stock assessment and research activities conducted in the Cowichan River watershed by a variety of organizations including Cowichan Tribes, DFO, contractors and academic institutions.

## Final 2021 Escapement Summary

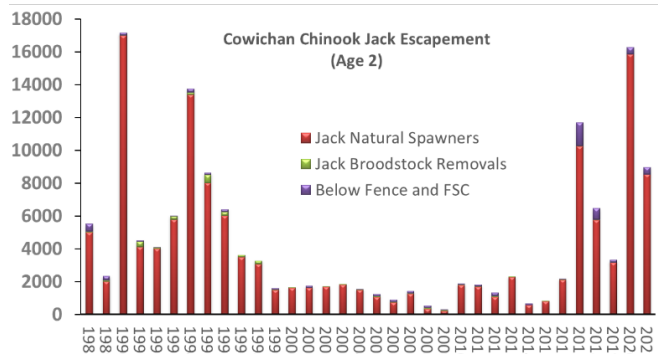
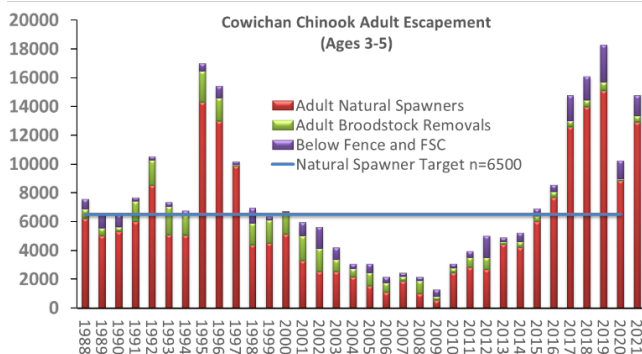
### Chinook

The fence in the 2021 season ran from 16:00 on September 8<sup>th</sup> to 12:00 on September 30<sup>th</sup>, one of the shortest operational periods since the PST indicator program began in 1988. A total of **10,197 Chinook (6,249 adults and 3,948 jacks)** were recorded through the fence during operations. **30 adult PIT tags and 18 jack PIT tags** were detected while the fence was operational, resulting in a mark rate of 1 in 208 adults and 1 in 219 jacks. Using PIT tag detections following fence removal (33 adults and 22 jacks) we estimated that **47.6%** of adults and **45.0%** of jacks passed through the fence between September 8<sup>th</sup> and 30<sup>th</sup>. Post-season expansions produced a total escapement estimate of **23,745 Chinook (14,770 adults and 8,975 jacks) including 21,863 natural spawners (13,336 adults and 8,527 jacks)**. Hatchery contribution to the natural spawning population was estimated at 6.1% for jacks and 12.1% for adults based on adipose clips.

### Coho, Chum & Pink

In addition to Chinook, a total of **148 Coho (92 adults, 56 Jacks)** were recorded through the fence in 2021 along with **20 Chum and 120 Pink**. Counts from the third full season operation of the Skutz Falls fishway camera were **3,547 Chinook (3,087 adults, 460 jacks), 5,169 Coho (4,832 adults and 307 jacks) and 312 Chum**. The camera was operational from August 18<sup>th</sup> to October 25<sup>th</sup>. Expanded estimates for **Coho Adults were 31,716 ± 7,070 (SD) (CV: 22.3%)** using an expansion of Skutz Falls camera counts based on PIT tags detected at the fence site (104 Adults) and re-detections at Skutz Falls (15 Adults). Please note that the Coefficient of Variation (CV) for this estimate is higher than the benchmark of 15% due to fewer juvenile tags in 2020 (1,500 instead of 5,000) and a shorter operating season (high flows). Too few tagged jacks were detected at Skutz Falls to produce a reliable estimate.

The lower-river DIDSON was installed on October 12<sup>th</sup> and removed on November 18<sup>th</sup>. As with many other East Coast Vancouver Island systems, **Chum** were well below target (160,000) in 2021 with a total estimate of **23,531**.



## 2021 Operations

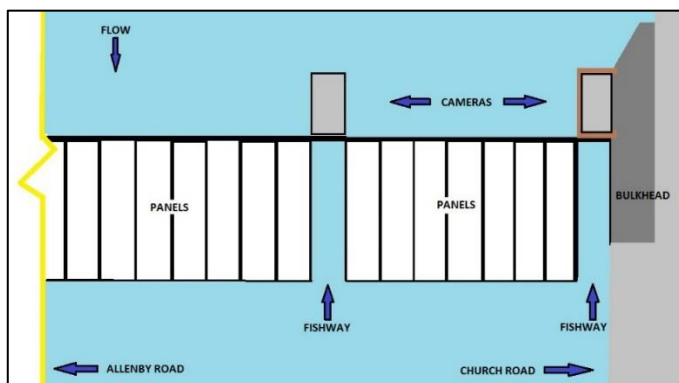
Operations in 2021 remain unchanged from 2020 and only basic maintenance activities were required prior to fence installation. Key infrastructure upgrades at the enumeration fence in 2020 included new Passive Integrated Transponder (PIT) in-river arrays. Utilization of two passageways at the fence was first piloted in 2019. The passageways, one located against the bulkhead and one mid-river, have replaced traditional camera boxes to improve fish migration. Results from 2018 and 2019 indicate that fish strongly prefer the wider passages compared to the traditional camera tunnels. Delays below the fence have been reduced with the highest single day migration totals observed in 2019 for the 32 year program. Each passageway is instrumented with two under water cameras with motion detection capability as well as LED lights for night time operation.



## Escapement Monitoring Methods

### Counting Fence

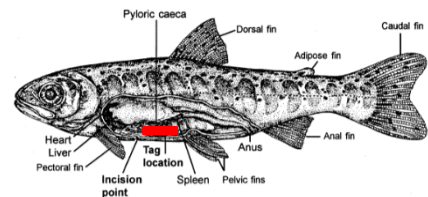
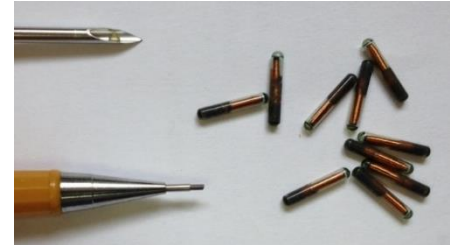
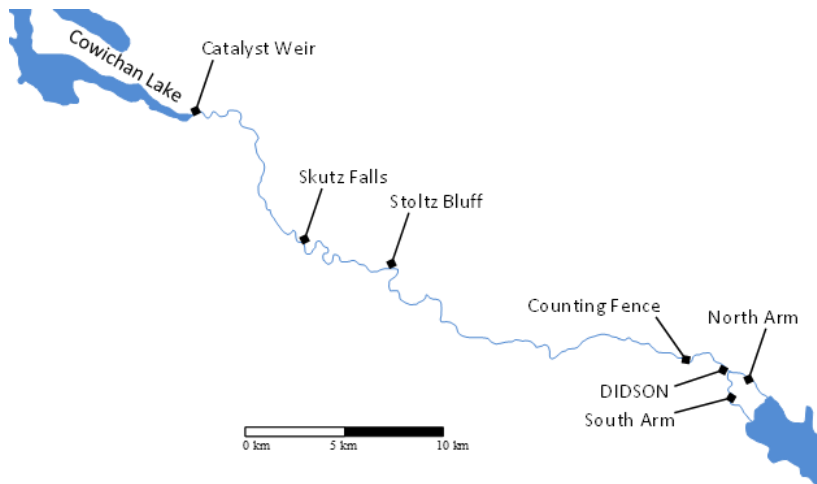
The counting fence is located 150 m downstream of the Allenby Road bridge crossing and is accessed via Church Road on Cowichan Tribes land. The fence funnels migrating fish through two passages where species, size and origin can be evaluated. Cameras are set to record each migration event based on a motion trigger such that periods of inactivity can be skipped efficiently. Crews are present at the fence 24 hours per day to enumerate fish as they move past the cameras as well as to clear debris and maintain equipment as required. The floating panels pivot based on water levels and are expected to remain operational through mid-October. The fence is not designed to withstand high flows and will be removed when the discharge exceeds 30 m<sup>3</sup>/s.



### PIT Tags

Returning chinook will also continue to be scanned for PIT tags using the in-river arrays at the counting fence and Skutz Falls, as well as during brood stock collection. Temporary arrays have also been installed in the south and north arm channels in order to better understand lower river migration behavior. Over 75,000

juveniles have been implanted with tags since 2014 with funding from the Pacific Salmon Foundation as part of the Salish Sea Marine Survival Project (2013-2018) and more recently the Pacific Salmon Commission. Due in part to the success of this tagging work, a new project has been funded through BCSRIF (BC Salmon Restoration and Innovation Fund) to investigate marine survival Bottlenecks through the first marine winter. PIT tag arrays and tag deployments have now occurred in other ECVI Chinook systems such as Nanaimo, Big Qualicum, Puntledge and Quinsam in addition to ongoing work in Cowichan.



PIT tags operate on Radio Frequency Identification (RFID) technology and do not have a battery. They can be read at short distances (50-150 cm) with an antenna that both charges the tag with a magnetic field and listens for the response. Tag detections are linked to a tagging data base which provides information on the time, location, origin and size of each fish on the day it was tagged. The proportion of tags in the population passing through the fence and/or in brood sets can be used to expand the number of detections on the permanent arrays to a total run size. This can particularly useful in years when the operation of the fence does not cover the entire run time (installed late or removed due to high water).

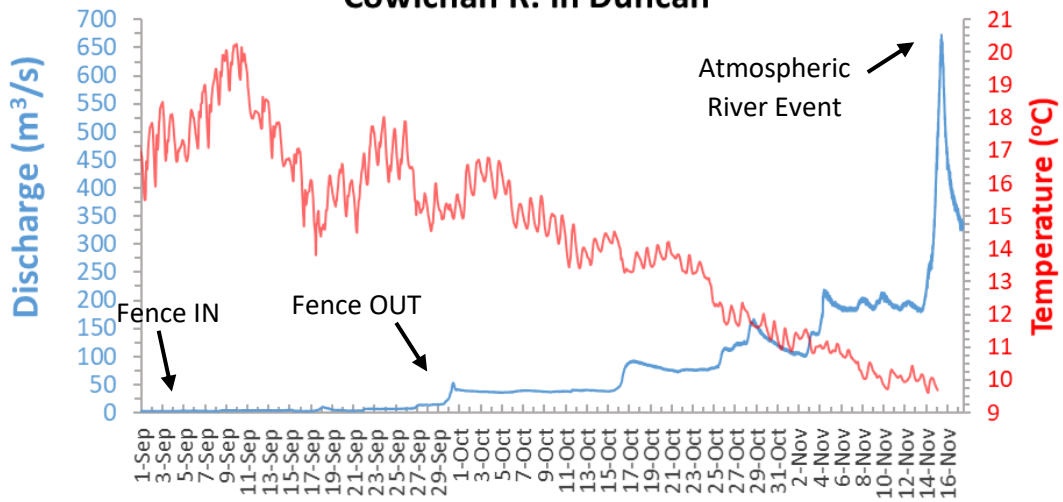
## DIDSON

Dual-frequency Identification Sonar (DIDSON) technology uses high frequency sound waves to visualize and count fish in a wide range of stream conditions. DIDSONs are especially useful when water is turbid and traditional video cameras would not be able to capture a clear image. The images produced can tell us the size of fish, how many pass through and which direction they are going. This information, combined with species composition information, helps us count how many fish are moving upstream to spawn.

## Environmental Conditions

Low flow conditions and fairly high water temperatures were recorded on the river this summer, as the province experienced record high air temperatures and low rainfall. Discharge out of Lake Cowichan was reduced to 5.5 m<sup>3</sup>/s on July 30<sup>th</sup> then 4.5 m<sup>3</sup>/s on August 18<sup>th</sup> due to low storage levels. Discharge began to increase with each rain event that occurred throughout September and reached above 50 m<sup>3</sup>/s on September 30<sup>th</sup>. Due to the high flow conditions the fence was removed on September 30<sup>th</sup> to prevent the fence panels from being blown out. On November 15<sup>th</sup> an "Atmospheric River" event brought significant rainfall to the area, which resulted in peak flows of 673 m<sup>3</sup>/s at the Duncan WSC Station.

### WSC Station 08HA011 Cowichan R. in Duncan



### In-Season Photo

Fence Site, Nov 15



DIDSON, Nov 16



Skutz Falls, Nov 16



Skutz Falls, Nov 16



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