



## South Coast Salmon

### Strait of Georgia Stock Assessment

### Final 2022 Escapement Bulletin– Area 18 Cowichan River

Updated September 2023

#### 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 2022 Escapement Summary

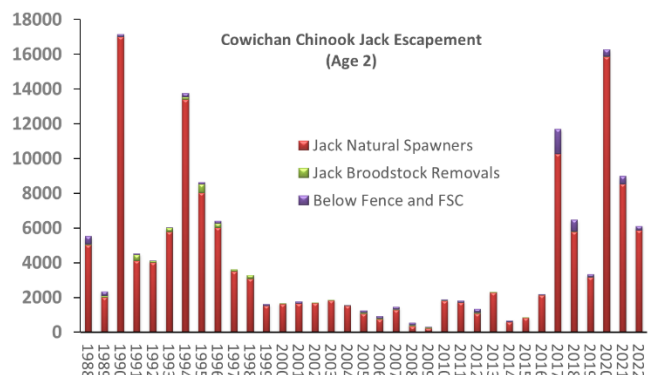
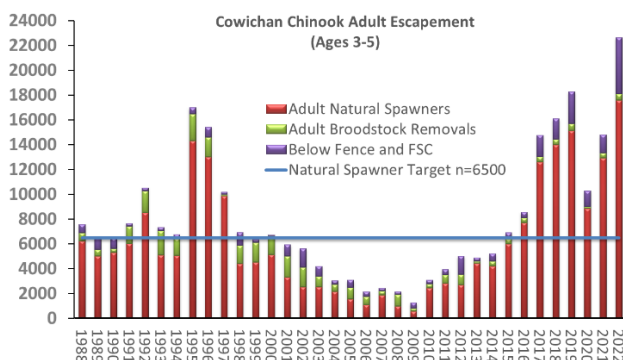
##### Chinook

In the 2022 season, the counting fence ran from 16:00 on September 9<sup>th</sup> to 21:45 on October 27<sup>th</sup>. A total of **11,571 Chinook (9,045 adults and 2,526 jacks)** were recorded through the fence during operations. **34 adult PIT tags** and **62 jack PIT tags** were detected while the fence was operational, resulting in a mark rate of 1 in 266 adults and 1 in 41 jacks. Using PIT tag detections following fence removal (33 adults and 83 jacks) we estimated that **50.7%** of adults and **42.8%** of jacks passed through the fence between September 9<sup>th</sup> and October 27<sup>th</sup>. Post-season expansions produced a total escapement estimate of **28,735 Chinook (22,631 adults and 6,105 jacks) including 23,429 natural spawners (17,574 adults and 5,855 jacks)**. Hatchery contribution to the natural spawning population was estimated at 3.6% for jacks and 6.0% for adults based on adipose clips.

##### Coho, Chum & Pink

In addition to Chinook, a total of **1,857 Coho (1,625 adults, 232 Jacks)** were recorded through the fence in 2022 along with **2,218 Chum** and **58 Pink**. Counts from the Skutz Falls fishway camera were **13,116 Chinook (12,261 adults, 855 jacks), 7,663 Coho (7,472 adults and 191 jacks) and 1,698 Chum**. The camera was operational from October 27<sup>th</sup> to December 7<sup>th</sup>. Expanded estimates for **Coho Adults** were **15,924** using an expansion of Skutz Falls camera counts based on PIT tags detected at the fence site (308 Adults) and re-detections at Skutz Falls (143 Adults).

The lower-river DIDSON was installed on October 13<sup>th</sup> and removed on November 30<sup>th</sup>. **Chum** were below target (160,000) again in 2022 with a total estimate of **102,617**, however, this is much higher than the estimate from 2021 (23,531).



## 2022 Operations

General operations at the counting fence in 2022 remain unchanged from 2021. Improvements were made to passageway infrastructure this year to improve durability and allow for a deflecting device to be inserted during turbid conditions. This insert encourages fish to swim closer to the camera to improve enumeration during lower visibility periods. Recent upgrades at the enumeration fence include: new fence rail (2017), building with internet (2018), concrete bulkhead (2019) utilization of two passageways and wider openings (2019), new Passive Integrated Transponder (PIT) in-river arrays (2020).

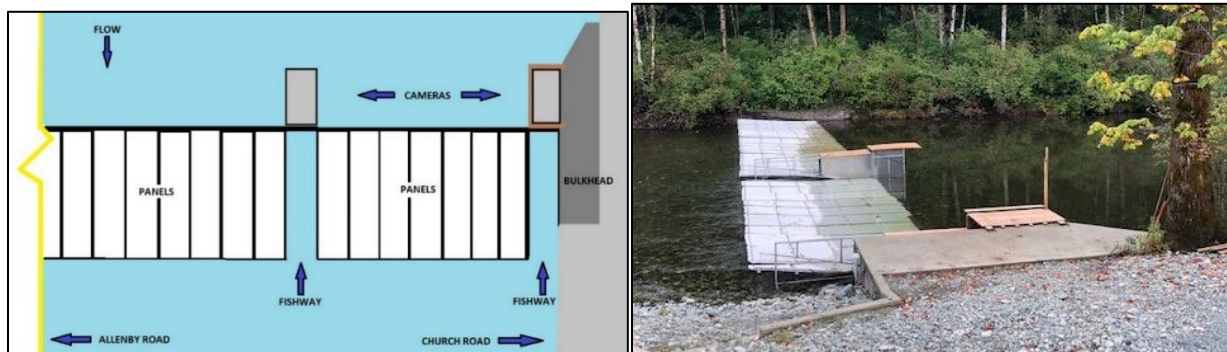
The passageways, one located against the bulkhead and one mid-river, have replaced traditional camera boxes to improve fish migration as of 2019. Each passageway is instrumented with two under water cameras with motion detection capability as well as LED lights for night time operation. Results from 2018-2021 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 33 year program.



## Escapement Monitoring Methods

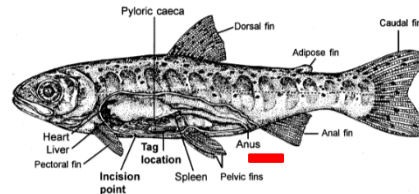
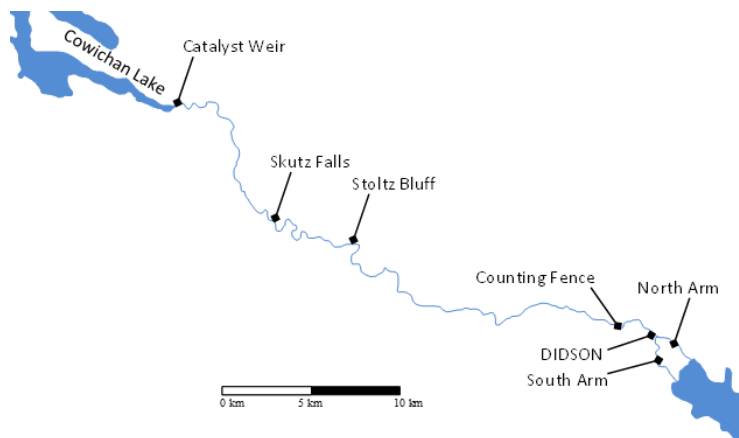
### Counting Fence

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 be 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).

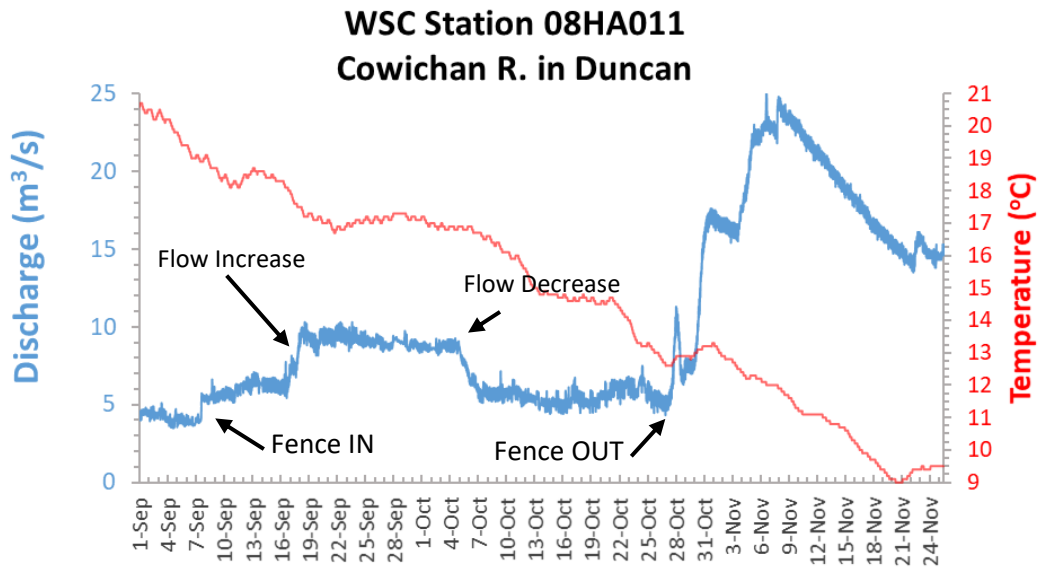
## DIDSON

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

Cowichan Lake levels were high throughout the summer months, allowing for Catalyst to maintain baseflow conditions of 7 m<sup>3</sup>/s and increase flow to 10 m<sup>3</sup>/s between September 16<sup>th</sup> and October 4<sup>th</sup>. The increased flow served to encourage Chinook movement into the river and reduce Lake storage levels in anticipation of fall rain. However, BC's South Coast experienced unseasonably dry weather, leading to concerns about low Lake storage levels. Following discussions with Cowichan Tribes and DFO, Catalyst began reducing flow back to 7m<sup>3</sup>/s on October 4<sup>th</sup>. Cowichan Tribes and DFO closely monitored fish movement and health, and decided to

remove panels from the counting fence as a mitigative measure on October 13<sup>th</sup> and 25<sup>th</sup>. The first significant rainfall on October 27<sup>th</sup> increased flows to 11 m<sup>3</sup>/s.



## 2022 Adult Enumeration

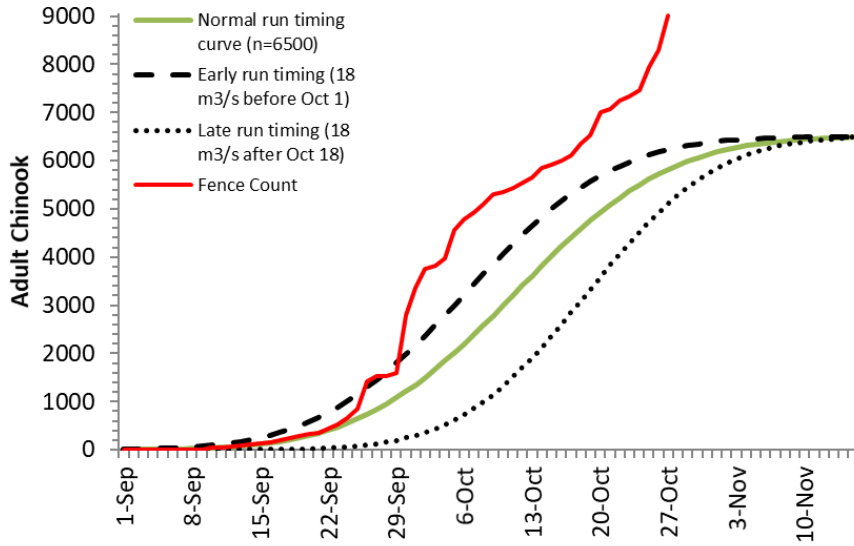
### Counting Fence

Chinook enumeration at the counting fence began on September 9<sup>th</sup> at 4:00 PM. The fence was closed for hatchery brood collection of Chinook on September 27<sup>th</sup> and was opened again on September 29<sup>th</sup>. On October 13<sup>th</sup> two fence panels in the mid-river were removed and modified to increase fish passage through the fence. Seven additional panels were removed on October 25<sup>th</sup>. The fence was removed on October 28<sup>th</sup> in anticipation of rainfall forecast over the weekend.

**Chinook:** Cumulative totals for 2022 Chinook migration past the fence, up to October 28<sup>th</sup> at 12:00 AM are:

	Wild (unclipped)	Hatchery (clipped)	Unknown	Total
Adults	8,513	291	241	9,045
Jacks	2,302	87	137	2,526
<b>Total</b>	<b>10,815</b>	<b>378</b>	<b>378</b>	<b>11,571</b>

The graph below compares the in-season adult counts to run timing curves based on river conditions.

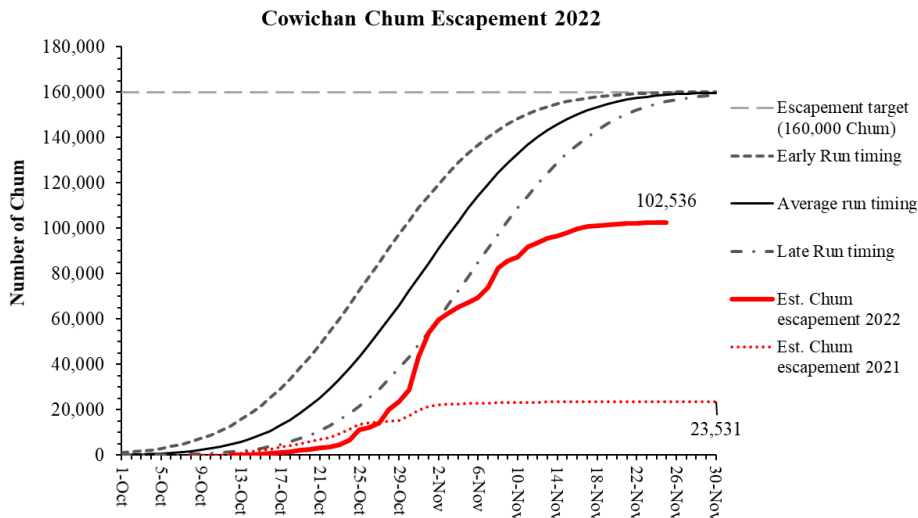


**Coho, Chum and Pink:** Cumulative totals for 2022 migration past the fence, up to October 28<sup>th</sup> at 12:00 AM are:

	<b>Coho</b>	<b>Chum</b>	<b>Pink</b>
Adults	1,625		
Jacks	232	2,218	58
<b>Total</b>	<b>1,857</b>	<b>2,218</b>	<b>58</b>

### Lower River DIDSON

A DIDSON was installed 5 km below the counting fence on October 13<sup>th</sup> as part of the annual Chum assessment program (since 2006). An in-season Chum escapement estimate is produced from on-site review by Cowichan Tribes Fisheries Staff. Data up to November 25<sup>th</sup> at 8:00 AM are presented below relative to a normal run timing curve for the escapement target of 160,000 fish.



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## **Cowichan Tribes**

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