



## South Coast Salmon Bulletin

### October 1, 2021 Escapement Update

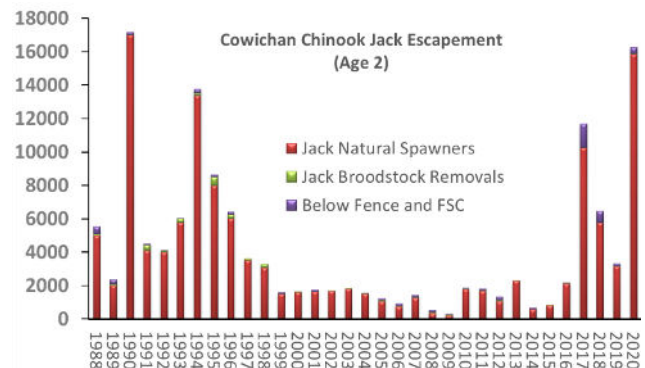
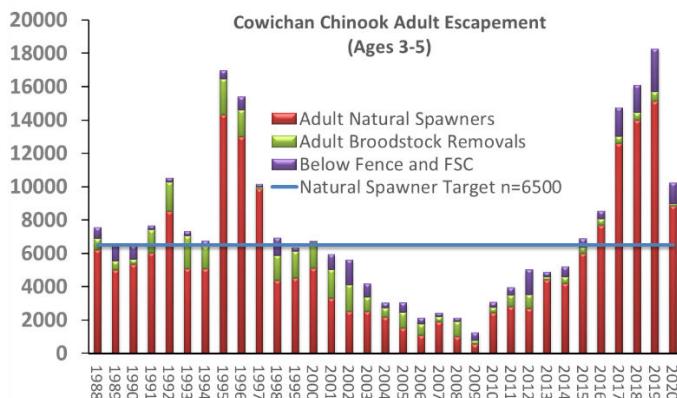
#### Chinook, Coho and Chum – Area 18 Cowichan River

#### 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. Estimates reported here are preliminary and should be interpreted with caution. Finalized estimates will be made available in the months following the escapement season.

#### 2021 Pre-Season Expectations

**Chinook:** There are no formal forecasts for Chinook returns to the Cowichan River. Returns in 2020 surpassed 10,000 adult fish for the fourth year in a row. Expectations are for continued rebuilding and to reach the target escapement for the system (6,500 naturally spawning adults). The peak of the run is expected past the fence around October 9 depending on river levels. Migration through the lower river is typically finished by November 10 when the peak of spawning activity is observed in the upper reaches. See graphs below for a summary of Chinook returns since the beginning of the indicator program in 1988.



**Coho:** Coho are expected to remain in a low productivity period throughout Southern BC. Marine survivals are forecast remain similar to 2020 levels for both wild and hatchery indicators. A new project to estimate Coho escapement and run timing for the Cowichan River was initiated in 2018 with the goal of building an annual data set. Preliminary data suggest Coho survival is higher than other Strait of Georgia systems and recent escapements (2019, 2020) are in excess of 10,000 adults. Skutz Falls is the primary enumeration site for this species as the fence is typically removed before the peak of migration.

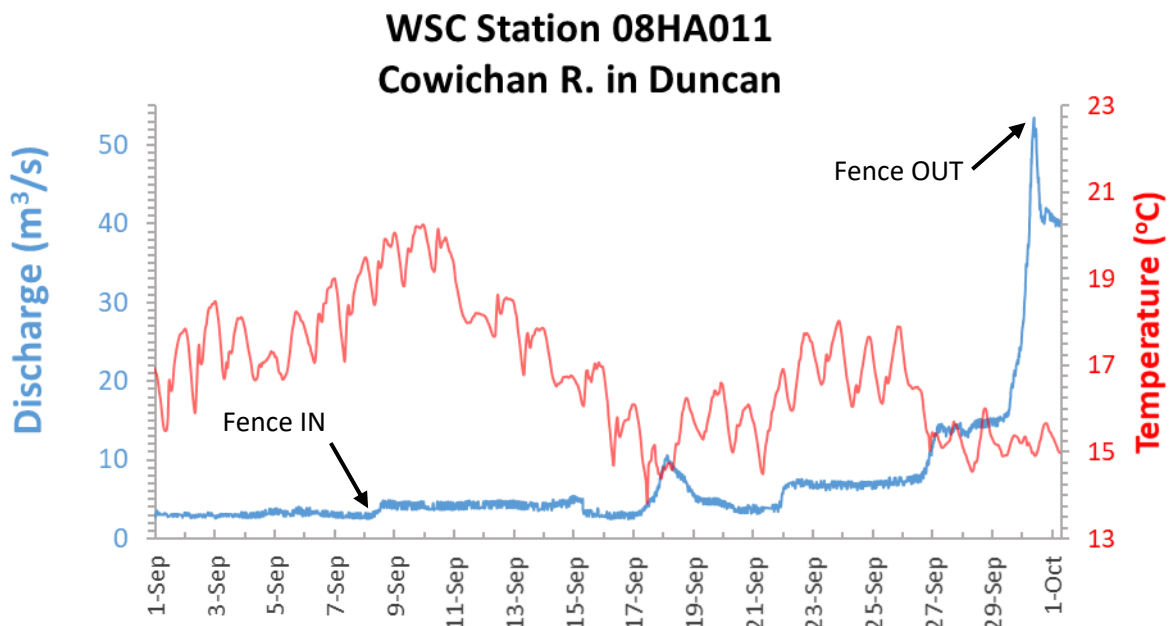
**Pink:** A small number of pinks (~100) are typically observed at the fence every fall.

**Chum:** Chum returns in 2021 are forecast to be higher than the escapement target of 160,000 for Cowichan at 239,200. However, if recent low survivals persist in 2021 and escapement is “like last year” then we expect to see around 157,300 chum return. Forecasts for chum are highly uncertain and will be revised in-season as returns are enumerated using a DIDSON. The peak of the run is expected to occur near November 1.

**Sockeye:** Although the Cowichan is not considered a Sockeye system a handful of fish are observed in most years but migration likely occurs before the fence is installed.

**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.



**2021 Adult Enumeration**

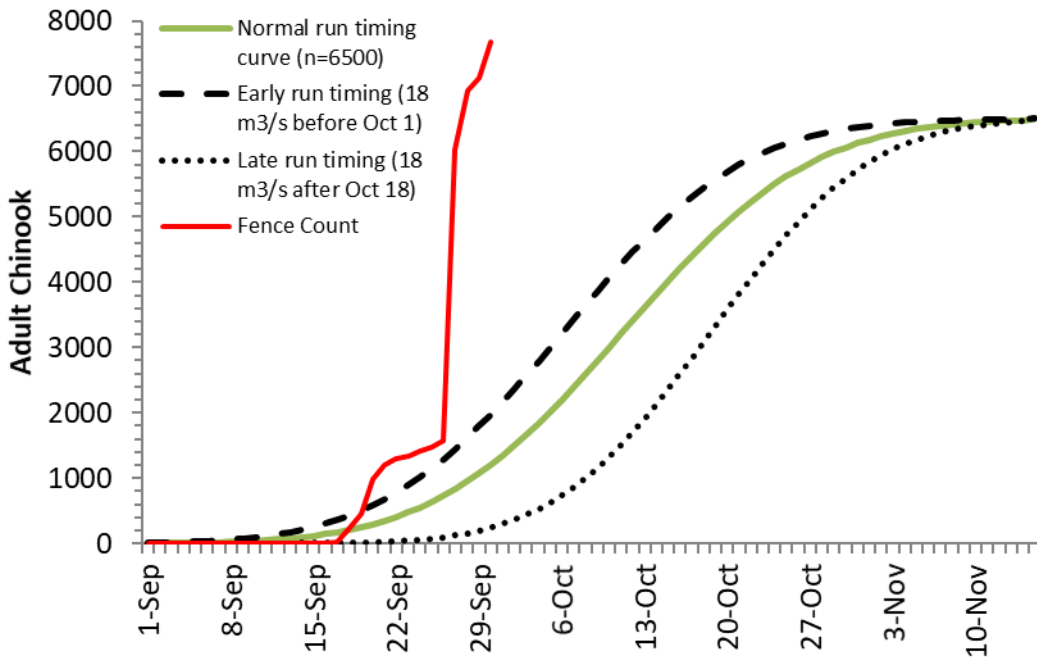
**Counting Fence**

Chinook enumeration at the counting fence began on September 8<sup>th</sup> at 16:00 and ended on September 30<sup>th</sup> at 12:00. Totals from video based counts are presented below and will be reviewed post season to produce a final escapement estimate for 2021.

**Chinook:** Cumulative totals for 2021 Chinook migration past the fence, up to September 30<sup>th</sup> at 12:00 PM are:

	<b>Wild</b>	<b>Hatchery</b>	<b>Unknown</b>	<b>Total</b>
Adults	3,503	124	4,054	7,681
Jacks	3,453	48	1,044	4,545
<b>Total</b>	<b>6,956</b>	<b>172</b>	<b>5,098</b>	<b>12,226</b>

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



**Coho, Chum and Pink:** Cumulative totals for 2021 migration past the fence, up to September 30<sup>th</sup> at 12:00 PM are:

	<b>Coho</b>	<b>Chum</b>	<b>Pink</b>	<b>Unknown</b>
Adults	68	18	118	35
Jacks	10			
<b>Total</b>	<b>78</b>	<b>18</b>	<b>118</b>	<b>35</b>

## In-Season Photos

Below are photos of the fence from installation and removal. The top two photos are from September 8<sup>th</sup> when the fence was installed (left) and operational (right). The bottom two photos are from September 30<sup>th</sup> when the fence was underwater from flows exceeding 50m<sup>3</sup>/s (left) and during removal (right).



## 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

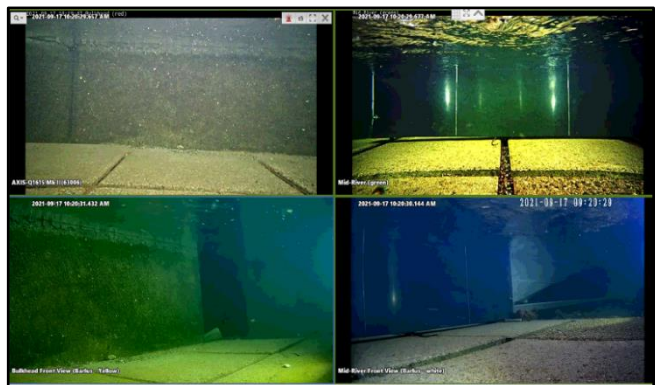
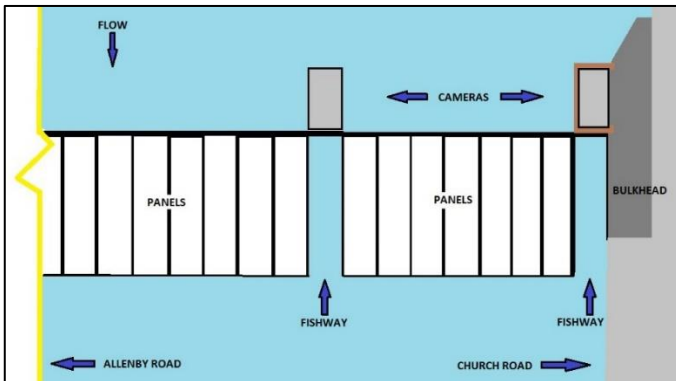
have been reduced with the highest single day migration totals observed in 2019 for the 32 year program. Each passageway is instrumented with two under water cameras with motion detection capability as well as LED lights for night time operation.



## Escapement Monitoring Methods

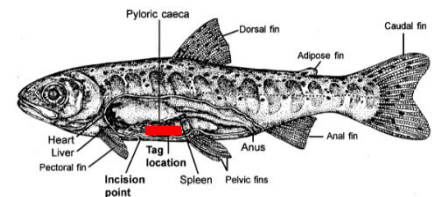
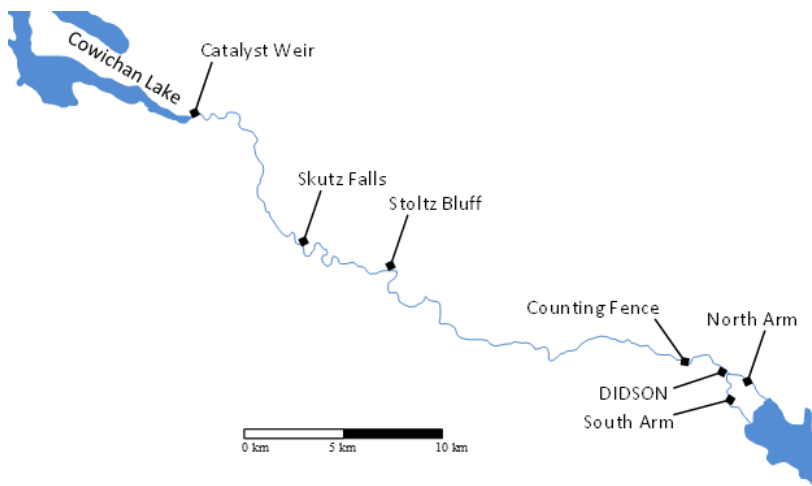
### Counting Fence

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.

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