



South Coast Salmon Bulletin

October 15, 2019 Escapement Update

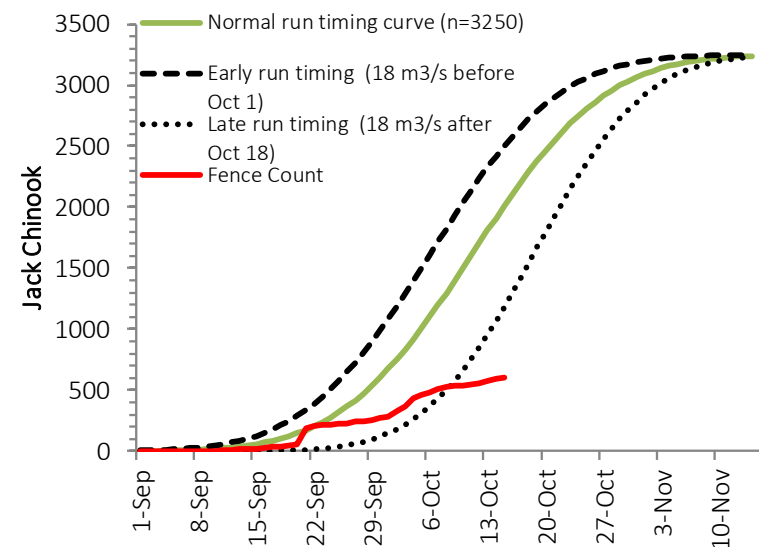
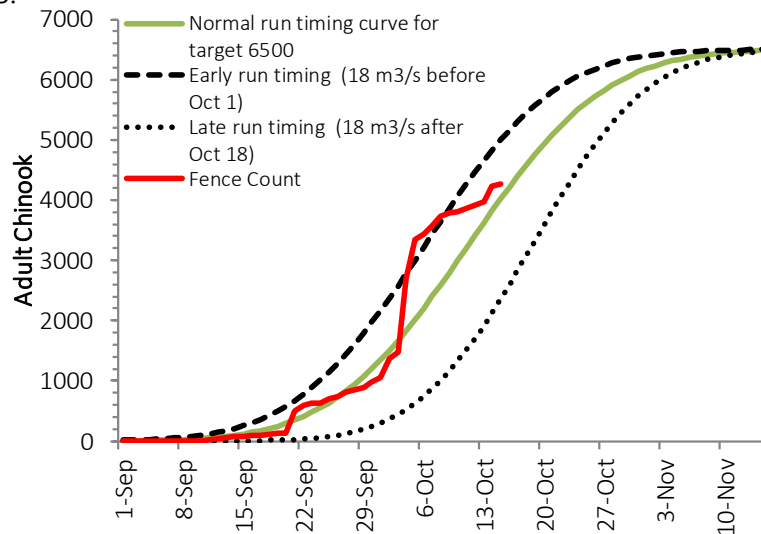
Chinook, Coho and Chum – Area 18 Cowichan River

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.

ESCAPEMENT ESTIMATES

Chinook: A total of 4,905 Chinook (4,298 adults, 607 jacks) have been recorded through the fence between 4:00 PM on September 9th and 8:00 AM on October 15th. 7.5% of the adults and 10.8% of the jacks were estimated to be of hatchery origin based on adipose clips observed on video. The graphs below compare the in-season counts to run timing curves based on river conditions. Migration is stimulated by increased river flow with an early run timing expected when discharge exceeds 18 m³/s before October 1. Under normal conditions, migration flows are observed between October 1 and October 18.



Coho: 174 adult Coho and 59 jacks have been observed to date. The majority of the run is expected to arrive between October 15 and November 15.

Chum: Six Chum have been observed so far. The majority of the run is expected to arrive between October 20 and November 10.

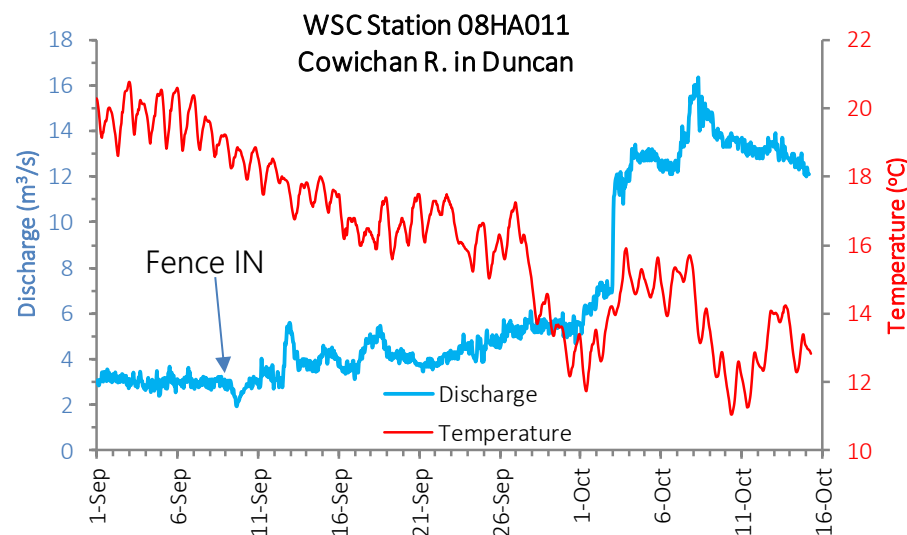
Pink: 61 Pinks have passed through the fence to date.

Sockeye: No Sockeye have been observed in 2019.

Unidentified: 58 unidentified salmon have been enumerated to date. These will be included in the final estimate based on the proportion of other species observed by day.

ENVIRONMENTAL CONDITIONS

Water levels in the Cowichan River near Duncan were below normal for much of the summer due to low lake levels. A lack of spring rainfall failed to recharge the lake resulting in a flow reduction to $4.5 \text{ m}^3/\text{s}$ in early June followed by pumping to sustain flows beginning in late August. Pumping ceased on the evening of September 18th following an increase in lake level due to rain. As lake level has continued to rise since, a pulse flow was initiated on the afternoon of October 2nd which reached the lower river early on October 3rd. Flows were sustained at $\sim 12\text{--}15 \text{ m}^3/\text{s}$ due to stabilization of lake levels and periodic rain events last week. All gates are currently open at the weir and river levels are expected to rise significantly with rain in the forecast. The fence may be removed later this week depending on river levels. Water temperature has followed a general decreasing trend over the season and is currently $13.0 \text{ }^\circ\text{C}$.

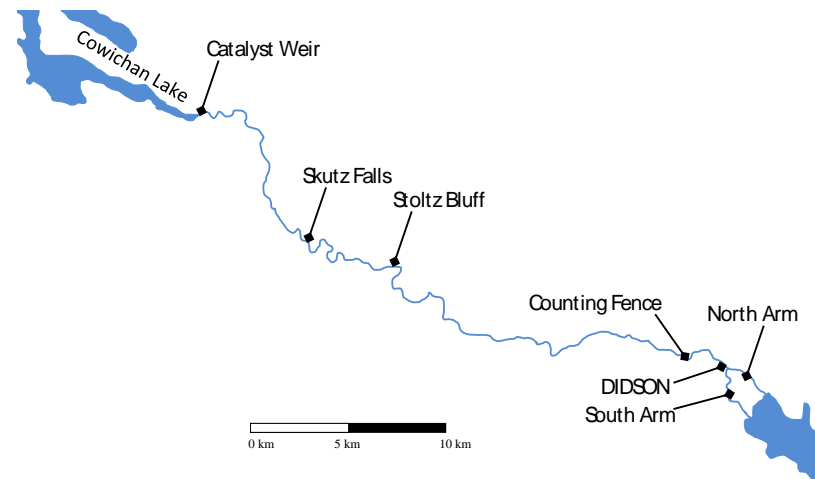


OPERATIONS

Following several key infrastructure upgrades including a new anchor rail in 2017 and building/bulkhead in 2018, modifications in 2019 were focused on enumeration equipment. The traditional camera boxes were exchanged for two passage ways each one panel width wide in order to improve fish migration. The first passage is located against the bulkhead as in previous years and the second is mid-river (see photo below). Results from 2018 indicated that fish strongly preferred the mid river passage compared to the camera tunnels. Each opening is now instrumented with two under water cameras with motion detection capability as well as LED lights for night time operation.

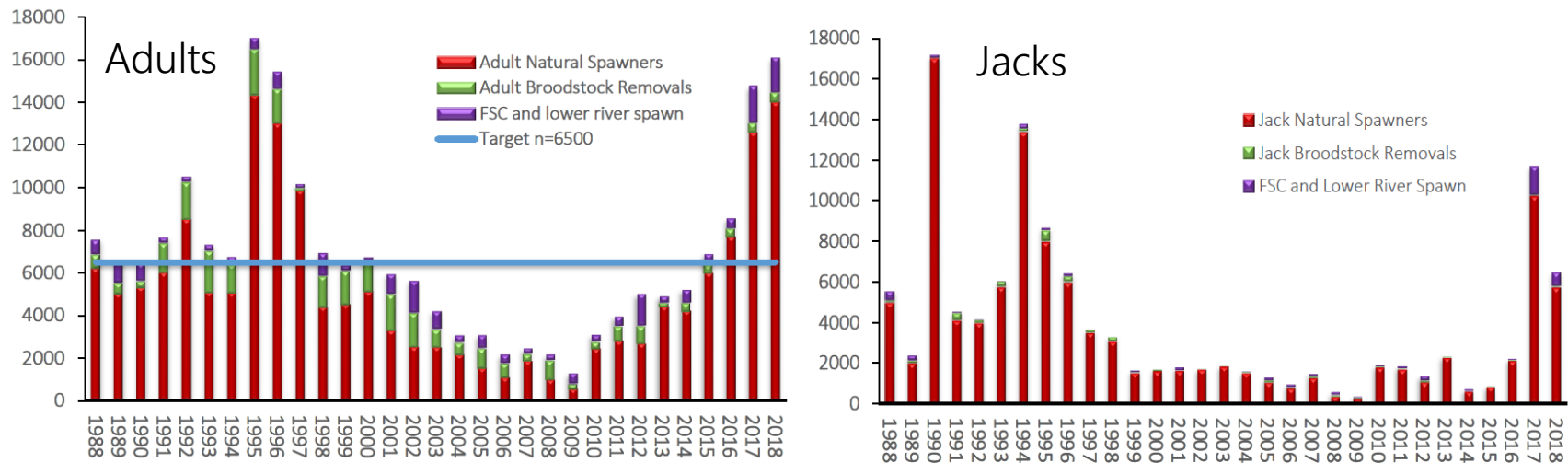


Returning Chinook will continue to be scanned for PIT tags using the in-river arrays at the counting fence and Skutz Falls as well as during brood stock collection. A temporary array has also been installed in the south arm channel in order to better understand lower river migration behavior. Over 60,000 juveniles have been implanted with tags since 2014 with funding from the Pacific Salmon Foundation as part of the Salish Sea Marine Survival Project. Tag detections will provide information on survival rates for groups tagged in the river, Cowichan Bay and the Gulf Islands throughout their first year of life. Tag detections may also be used to expand counts in the event the fence is removed early as the array remains functional year round.



2019 PRE-SEASON EXPECTATIONS

Chinook: There are no formal forecasts for Chinook returns to the Cowichan River. Returns in 2018 surpassed 10,000 fish for the third year in a row. Expectations are for continued rebuilding and may 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 2018 levels for both wild and hatchery indicators. Limited information is available on Coho escapement and run timing for the Cowichan River as the fence is usually removed prior to peak migration.

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

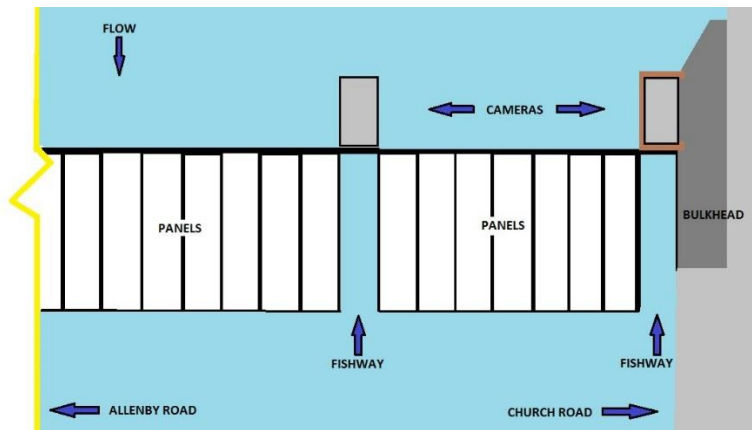
Chum: Chum returns in 2019 are expected to be near the escapement target of 160,000 for the Cowichan (130,000-194,000). Reduced fishing pressure in Johnstone Strait could increase terminal escapement by 10-20%. Forecasts for chum are highly uncertain and will be revised in-season as returns are enumerated 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.

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. The camera is set to record each migration event based on a motion trigger such that data can be reviewed. 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 m³/s.



PIT Tags

Passive Integrated Transponder (PIT) tags have been applied to groups of juvenile Cowichan River Chinook since 2014 and Coho since 2018. The 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 in the form of a unique 16 digit number. Two permanent antenna lines are located on the stream bed at the counting fence so that tagged fish can be tracked arriving and passing the site. An additional antenna is located in the Skutz Falls fishway and is used to estimate lower river detection efficiency (proportion of tags which are missed). Hatchery broodstock collected below the fence are also scanned for tags.

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).



OPERATIONAL RESULTS

The installation of the fence occurred on September 9th in order to capture the front end of the run (installed on the 7th last season). Modifications to the fish passage structures continued with the addition of a second passageway to improve migration. The traditional camera box setup was exchanged for two open passages each the width of a fence panel (~ 1.2 m). Specialized underwater cameras and waterproof LED lights have been installed in each opening to allow enumeration crews to monitor passage. In addition, continuous video has been recorded and motion events flagged automatically by software to allow for validation of counts. Motion trigger settings were fine-tuned during the first week of operation and are now working well. It is hoped that fish will find their way past the fence easier with the wider openings as was observed in late 2018. Daily counts are expected to increase over the next few weeks while peak migration is expected to occur in the first or second week of October.

A fully functional camera system has been installed in the Skutz Falls fishway and will be operational this week. This will allow for an independent estimate of Chinook abundance and build towards an adult Coho escapement estimate in 2020. Camera footage will be recorded continuously and motion events flagged for review similar to the fence. It is expected that the system will remain operational at flows approaching 50 m³/s thereby extending the monitoring window.

End of season expansions for the fence will be conducted with PIT tag detections in combination with video footage from Skutz Falls and dead pitch mark-recapture data.

Tagging Projects

A total of 123 unique PIT tags have been detected in the Cowichan River so far this fall. 97 have been at the lower river antennas in the North and South Arms as well as 65 at the counting fence (39 common between sites). Data collection from the fence is often delayed by several days as a real time connection to the system is not currently available.

A second tagging project is currently underway which uses both acoustic and PIT tags. Researchers from the University of Victoria in partnership with the BC Conservation Foundation, Cowichan Tribes and the Pacific Salmon Foundation are studying the movement and behavior of adult Chinook in Cowichan Bay. Fish will be tracked by a series of 12 acoustic receivers in the bay as well as PIT arrays in-river. Survival of Chinook from tagging to river entry is also a focus of the project. To date 8 of 17 tags have entered freshwater.

Skutz Falls

Over the winter a significant amount of debris accumulated on the Skutz Falls fishways yet again. As a result the DFO Resource Restoration Unit (RRU) was able to bring in a contractor to remove the woody debris from the ladders and the site. Work was completed by July 4th and both fishways are now functional; see photos below taken after the wood was removed. A longer term solution to debris accumulation at the site is currently under review.

After jam removal, before debris and wall removal



The concrete wall between the high water and main fishway was removed on October 3. It is believed that the wall triggered the formation of the main jam and contributed to sub-optimal fish passage conditions. The site will be periodically monitored for general fish passage conditions and debris accumulation this fall. The need for further modifications will be reviewed in advance of next season.

After debris and wall removal



Cowichan Hatchery

The Cowichan River hatchery began fall Chinook brood stock collection on September 30th. The target is unchanged at 500 adults or 735,000 eggs. As of noon today all of the brood has now been collected. Stock Assessment staff installed panels to restrict fish passage at the fence from October 2-4 to ensure brood targets were met. One of two passages were opened Friday and both will be opened by the end of today. The incubation room at the hatchery is currently under renovation and is set to be complete prior to the first egg take.

Hybrids in the News

For those that missed the story here is a link.

<https://www.cbc.ca/news/canada/british-columbia/hybrid-salmon-discovered-by-scientists-on-vancouver-island-1.5318092>

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