South Coast Salmon
Strait of Georgia Stock Assessment
Final 2024 Escapement Bulletin– Area 18 Cowichan River

Updated August 2025

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 2024 Escapement Summary

Chinook

In the 2024 season, the counting fence ran from 16:00 on September 6th to 09:00 on October 18th. A total of **15,002 Chinook (8,859 adults and 6,143 jacks)** were recorded through the fence during operations. **72 adult PIT tags** and **39 jack PIT tags** were detected while the fence was operational, resulting in a mark rate of 1 in 123 adults and 1 in 158 jacks. Using PIT tag detections following fence removal (188 adults and 101 jacks) we estimated that **38.3%** of adults and **38.2%** of jacks passed through the fence between September 6th and October 18th. Post-season expansions produced a total escapement estimate of **42,569 Chinook (25,914 adults and 16,655 jacks) including 38,758 natural spawners (22,938 adults and 15,820 jacks)** (Figure 1)**.** Hatchery contribution to the natural spawning population was estimated at 2.5% for jacks and 3.2% for adults based on adipose clips.

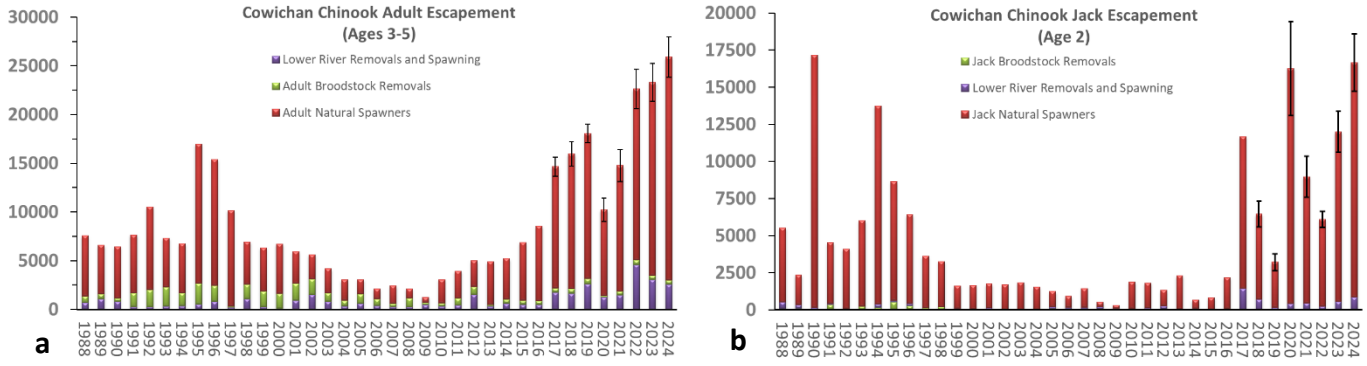

Figure 1: Cowichan Chinook escapement from the beginning of the indicator program to present (1988-2024). (a) Adult (age 3-5) returns are broken into natural spawners, broodstock removals and lower river (below- fence) removals and spawning. (b) Jack (age-2) returns are also broken down to natural spawners and lower river (below- fence) removals and spawning, with some broodstock removals.

Coho, Chum & Pink

In addition to Chinook, a total of **1,870 Coho (1,519 adults, 351 Jacks)** were recorded through the fence in 2024 along with **229 Chum** and **65 Pink**. Counts from the Skutz Falls fishway camera were **9,336 Chinook (8,383 adults, 953 jacks), 9,807 Coho (9,385 adults and 422 jacks) and 59,326 Chum**. The camera was operational from October 4th to December 17th. Expanded estimates for **Coho Adults** were **26,593** using an expansion of Skutz Falls camera counts based on PIT tags detected at the fence site (169 Adults) and re-detections at Skutz fishway and by-pass channel (59 Adults).

The lower-river DIDSON was installed on October 16th and removed on November 28th. **Chum** were above target (160,000) in 2024 with a total estimate of **214,719**, which was an increase from the 2023 estimate (31,095).

2024 Operations

General operations at the counting fence in 2024 continued implementation of the low-flow design at the start of the season to increase fish passage when discharge was low. The design incorporates four 8 ft passageways with underwater and overhead cameras in half the river, while the other side still utilizes the traditional fence panels. Once river flow increases the regular two-passage configuration is installed, with one passageway located against the bulkhead and one mid-river (Figure 2).

Past 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), and new Passive Integrated Transponder (PIT) in-river arrays (2020). Since 2019, the two-passage design replaced traditional camera boxes to improve fish migration. Each passageway is instrumented with two under water cameras with motion detection capability as well as LED lights for night time operation. Results from 2018-2022 indicate that fish strongly prefer the wider passages compared to the traditional camera tunnels.

Figure 2: Two-passage counting fence configuration with wide passageways located mid-river and at the bulkhead, first piloted in 2019.

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 passages where species, size and origin can be evaluated (Figure 3). 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^3/s.

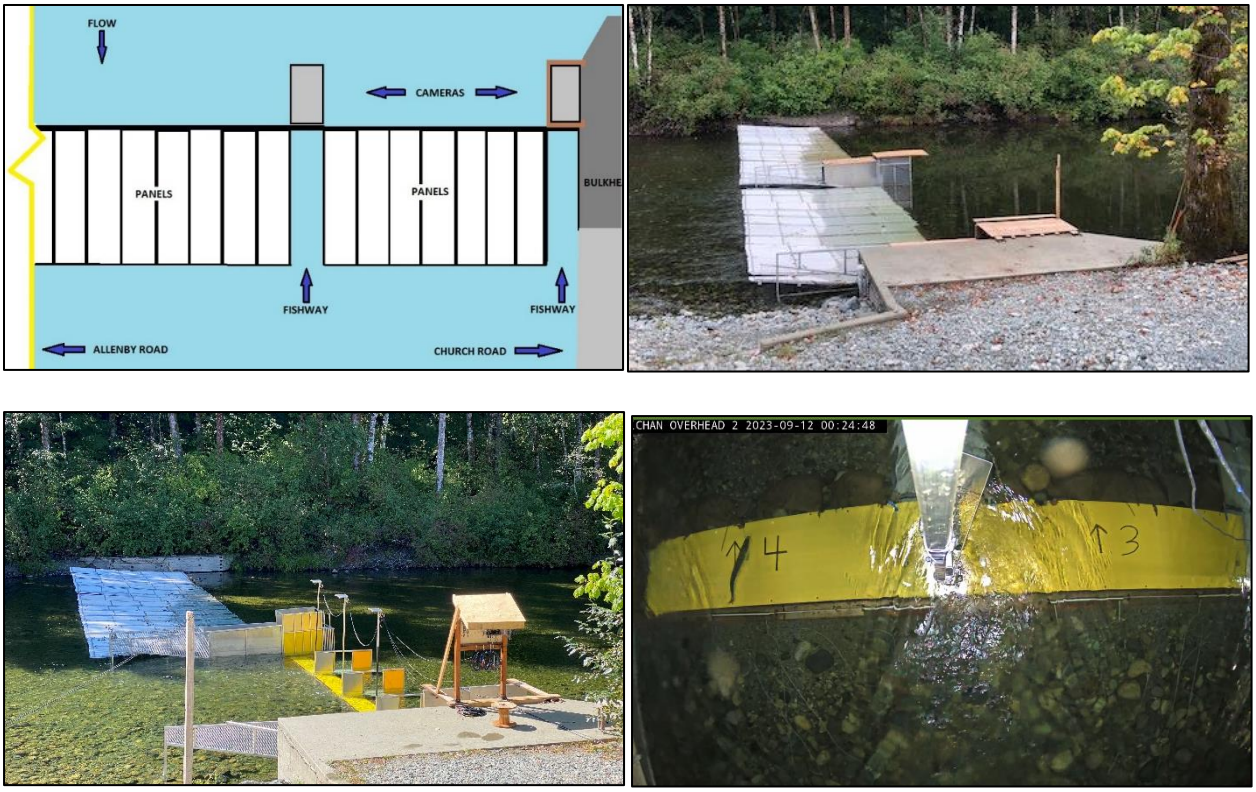

Figure 3: Traditional two-passage counting fence design used since 2019 (top) compared to the new low-flow design with four open passageways and overhead camera views (bottom).

PIT Tags

Returning chinook will also continue to be scanned for PIT tags using the in-river arrays at the counting fence, north arm, and Skutz Falls, as well as during brood stock collection. Temporary arrays have also been installed in the south arm channel in order to better understand lower river migration behavior (Figure 4). Over 85,000 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 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.

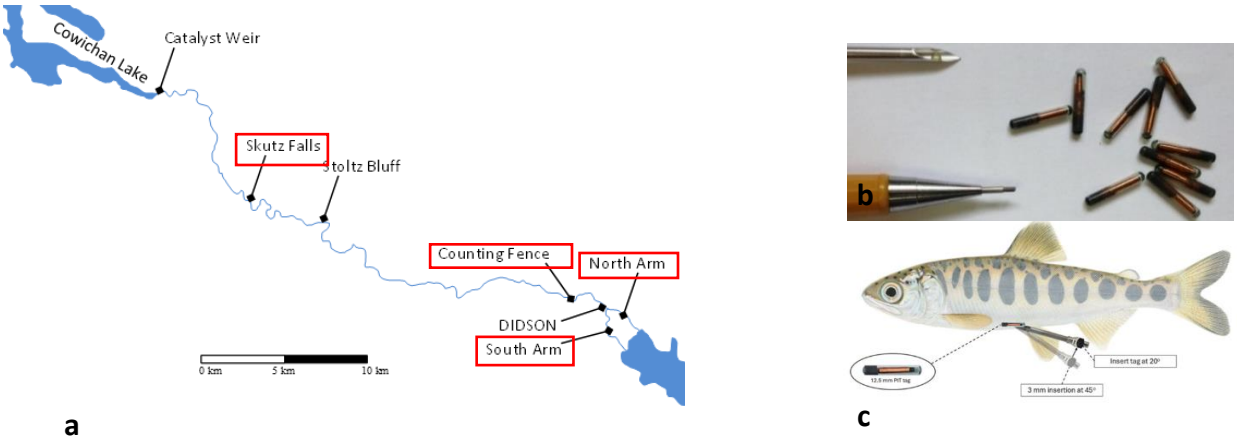

Figure 4: (a) Locations of PIT antennas (red) along with other places of interest in the Cowichan River. (b) PIT tags and implantation needle compared to the size of a mechanical pencil. (c) salmon smolt tag insertion location.

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 (Figure 4). 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).

ARIS

Adaptive Resolution Imaging Sonar (ARIS), formerly Dual-frequency Identification Sonar (DIDSON), technology uses high frequency sound waves to visualize and count fish in a wide range of stream conditions. ARIS 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.

Skutz

Underwater cameras and PIT arrays at Skutz allow for secondary detection of adult salmon during their migration past the falls. This is especially important for enumerating Coho whose later run-timing occurs mainly after the fence has to be removed. Video recording of salmon migrating through the fishway , reviewed by Cowichan Tribes staff, provides a count while the preceding PIT antennas supply detections for determining mark-rate. That mark-rate is compared to fence site PIT detections to estimate Coho escapement. Additionally, PIT tagged fish using the bypass channel route are detected on another PIT antenna adjacent to the fishway (Figure 5).

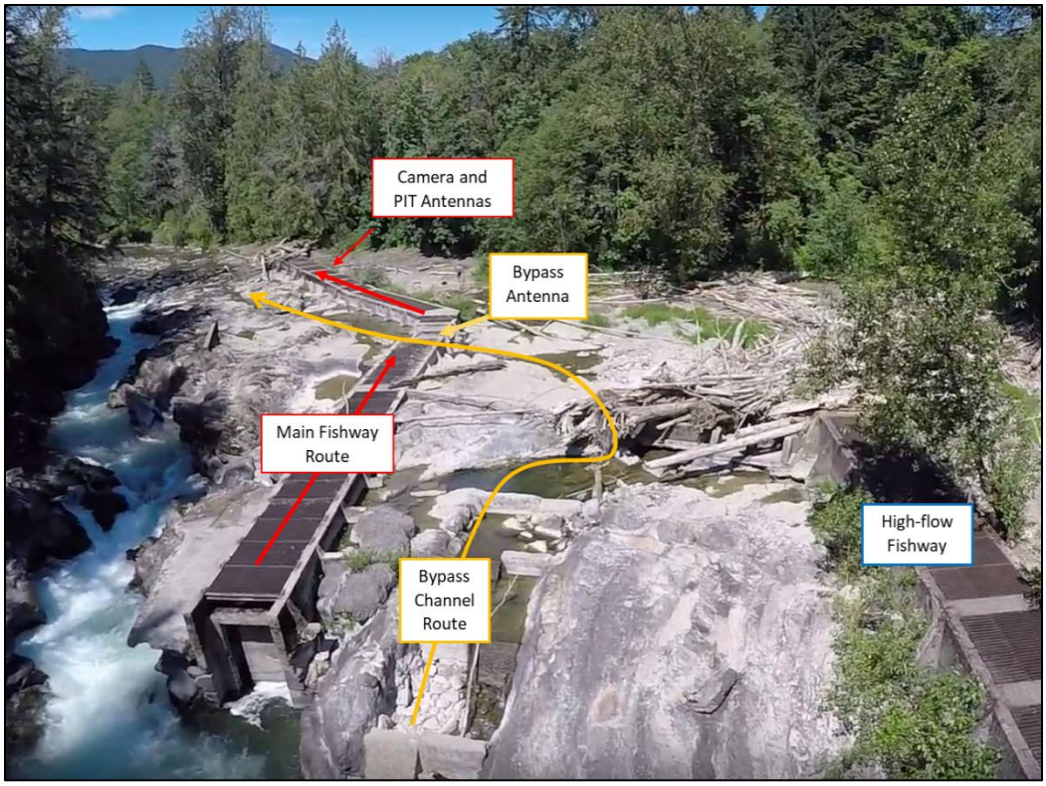

Figure 5: Skutz Fishways, bypass channel, migration routes, and monitoring equipment.

Environmental Conditions

Storage levels in Lake Cowichan were maintained in the spring to prioritize baseflow conditions through the summer and fall in response to the 2023 fish kill. Throughout April, flow was kept around 15 m^3/s with lake storage between 95-100% full. Flow was then reduced to baseflow of 7 m^3/s on May 24th to maintain full storage. Rainfall in early June resulted in the lake being over-full and subsequently increased flows to 17 m^3/s. On June 25th, flow was brought back to baseflow and the rule curve was followed for the rest of the summer. Conditions permitted two fish focused pulse flows of 10 m^3/s from September 25th to October 1st, and on October 17th. The fence was removed on October 18th in anticipation of a large rainfall event which increased flows to 70 m^3/s on October 19th and the weir went off control (Figure 6).

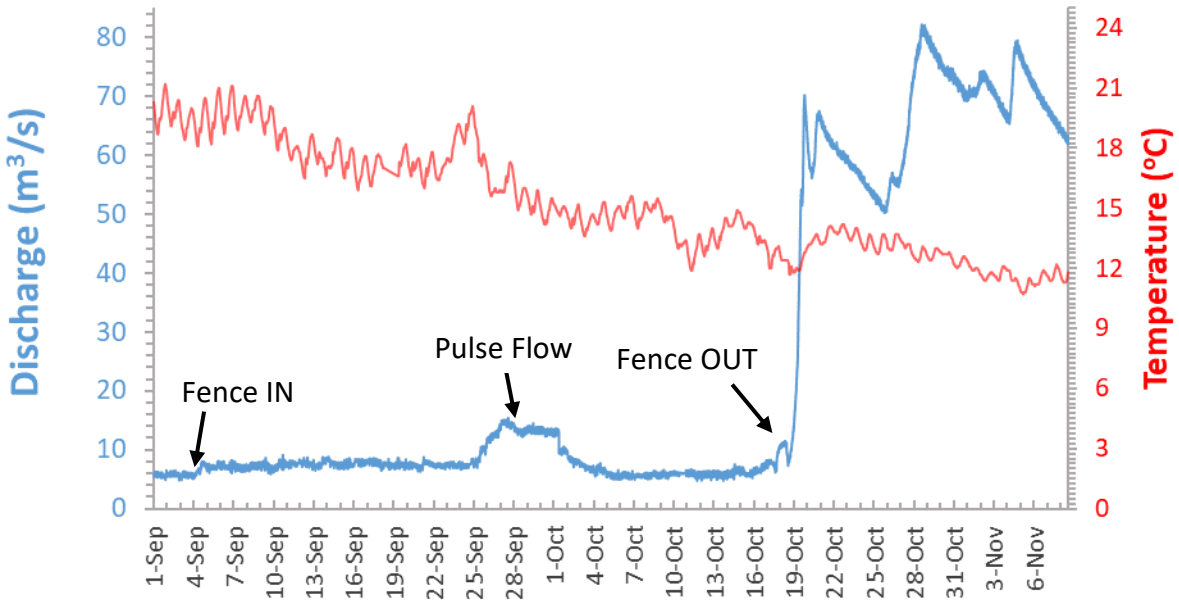

Figure 6: Discharge (m³/s) and Temperature (°C) at Water Survey of Canada Station 08HA011, Cowichan River in Duncan. Discharge levels when the salmon counting fence was installed and removed are indicated.

2024 Adult Enumeration

Counting Fence

Enumeration at the counting fence began on September 6th at 4:00 PM. Totals from video based counts are presented below. From September 30th to October 2nd , and October 7th to 8th the fence was closed to aid in brood stock collection for the Cowichan River Hatchery. On October 18th the fence was removed due to the increase in flows and turbidity.

Chinook

Chinook migrating past cameras at the counting fence are evaluated for size to determine if they are adults or jacks, and the presence of an adipose fin to determine if they are wild or hatchery origin. Counts from September 6th to October 18th at 9:00 AM are presented in Table 1.

Table 1: Cumulative totals for 2024 Chinook Migration past the fence by age and origin.

	Wild (unclipped)	Hatchery (clipped)	Unknown	Total
Adults	7,785	253	821	**8,859**
Jacks	4,837	123	1,183	**6,143**
Total	**12,622**	**376**	**2,004**	**15,002**

Adult Chinook in-season counts are compared to run-timing curves to determine if escapement is on track to meet the target of 6500, using early, normal and late run-timing based on historic escapement and flow conditions (Figure 7).

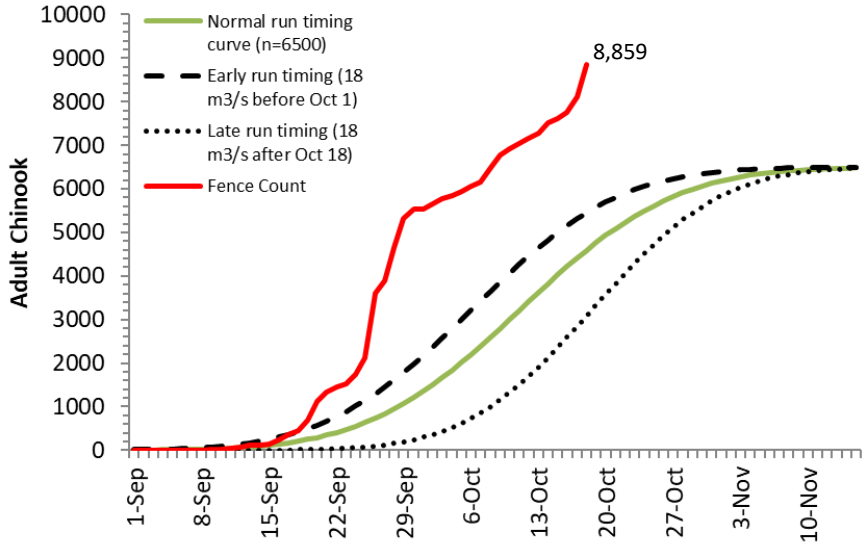

Figure 7: In-season adult Chinook counts compared to normal, early and late run-timing curves based on river conditions.

Coho, Chum and Pink

In addition to Chinook, all other salmon species are identified as they migrate past counting fence cameras. Counts for Coho, Chum and Pink from September 6th to October 18th at 9:00 AM are presented in Table 2.

Table 2: Cumulative totals for 2024 Coho, Chum and Pink migration past the fence, up to October 18th at 9:00 AM.

	Coho	Chum	Pink	Unknown
Adults	1,519	229	65	67
Jacks	351			
Total	**1,870**	**229**	**65**	**67**

PIT Tags

Passive Integrated Transponder (PIT) tags applied to juvenile or marine Chinook are detected when the tagged salmon return to Cowichan River. Detections are linked to a unique number that indicates the species and age at tagging. In 2024, 72 adults and 39 jack Chinook were detected during fence operations. By the end of the season, **188 adult** and **101 jack Chinook** passed the counting fence site (Figure 8).

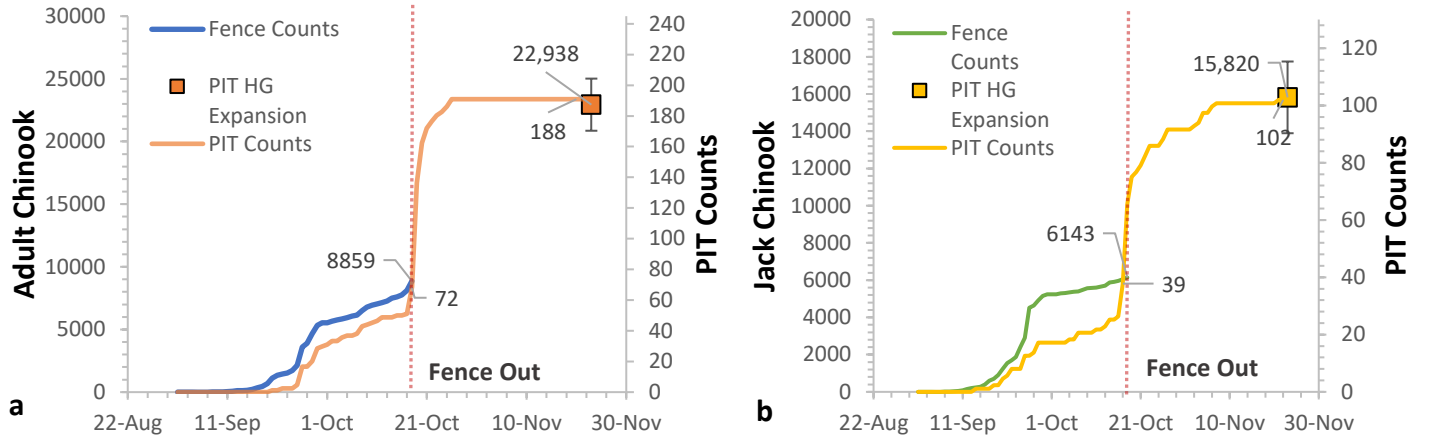

Figure 8: Passive Integrated Transponder (PIT) tags in Chinook (adults (a) & jacks (b)) detected at the salmon counting fence site in 2024 compared to video-based fence counts.

Skutz Fishway and Bypass Channel

The Skutz fishway camera was operational from October 4th to December 17th. Video was reviewed by a Cowichan Tribes staff member. Counts from the camera are presented below in Figure 9. Expanded estimates for **Coho Adults** were **26,593** using Skutz fishway camera counts (9,385 Adults), PIT tags detected at the fence site (169 Adults), and re-detections at Skutz fishway and by-pass channel (59 Adults).

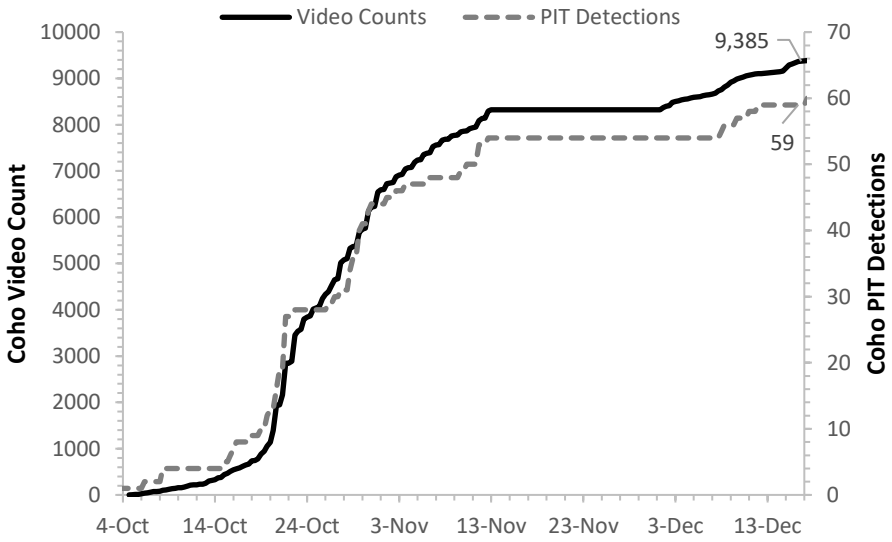

Figure 9: Skutz Fishway cumulative Coho video counts and PIT detections in 2024.

Lower River ARIS

Adaptive Resolution Imaging Sonar (ARIS) was installed 5 km below the counting fence on October 16th 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. In 2024 a total of **214,719 Chum** were counted at the ARIS site. The 2024 counts are presented below relative to run timing curves for the escapement target of 160,000 fish (Figure 10) and forecast models (Figure 11).

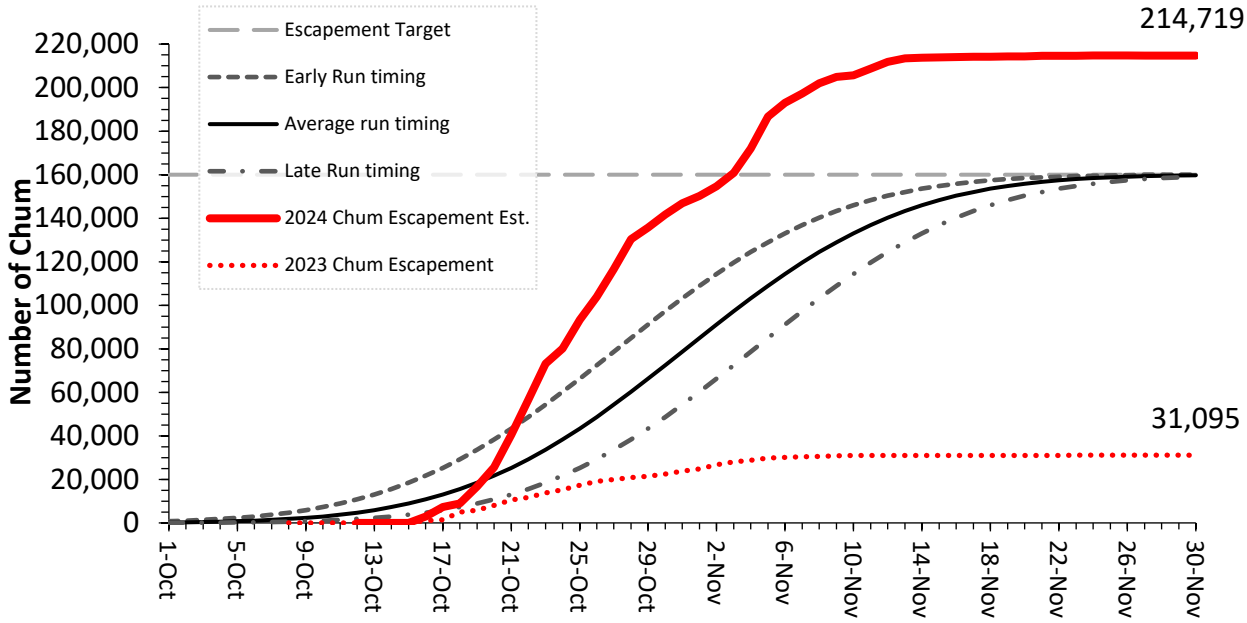

Figure 10: Chum escapement estimates from 2024 ARIS data compared to 2023 escapement, and run-timing curves for the escapement target of 160,000 Chum.

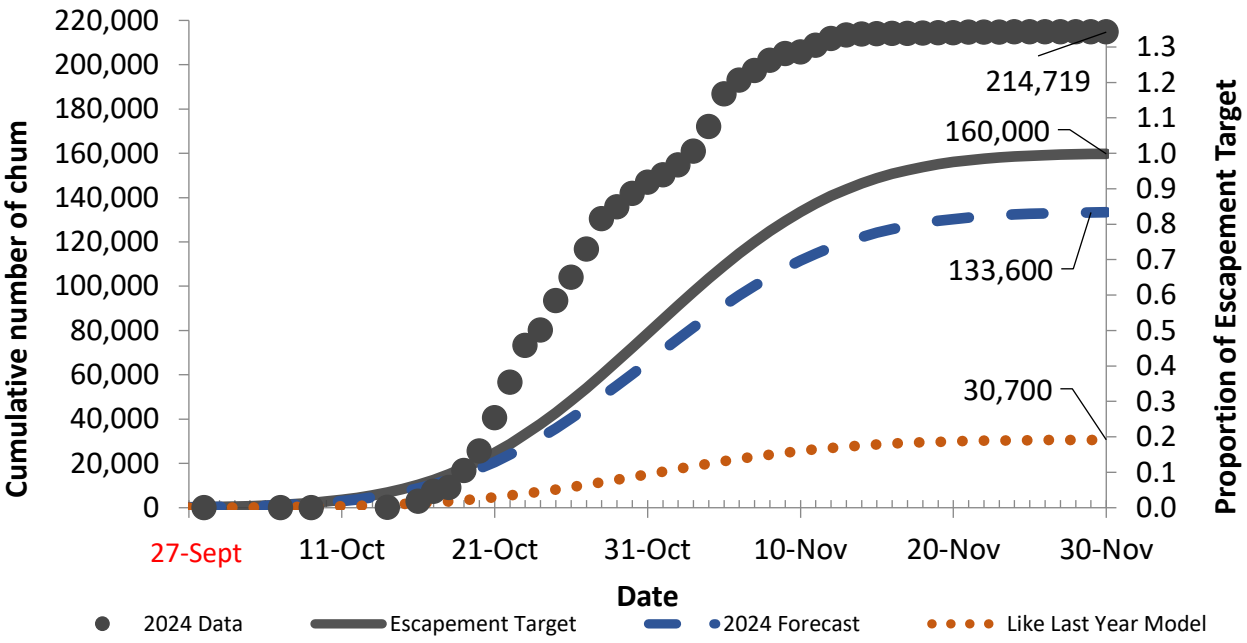

Figure 11: Cumulative Chum returns to Cowichan River and run-timing curves for the escapement target (160,000), 2024 Forecast and Like-Last-Year Forecast.

2024 Photos

Figure 12: Photos captured during salmon Stock Assessment activities in the Cowichan River in 2024. Including a) the lower river ARIS, b) Cowichan River Hatchery staff collecting brood stock, c) DFO stock assessment technicians sampling brood, and d) the counting fence with low flow passageways.

For more information contact:

Karalea Filipovic, Salmon Stock Assessment Biologist, Strait of Georgia
Karalea.Filipovic@dfo-mpo.gc.ca
778-268-2847

Wayne Paige Jr., Cowichan Tribes Aboriginal Fisheries Guardian
WaPaige@cowichantribes.com
778-422-2255

Don Elliott, Cowichan Hatchery Manager
Don.Elliott@cowichantribes.com
250-746-5741