South Coast Salmon
Strait of Georgia Stock Assessment
2025 Escapement Bulletin #1– Area 18 Cowichan River

September 12

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

2025 Pre-Season Expectations

Chinook

Returns in 2024 surpassed 10,000 adult fish for the eighth year in a row. Expectations are for continued rebuilding with a strong possibility of reaching the target escapement for the system (6,500 naturally spawning adults). Figure 1 shows recent and historic Chinook escapement in Cowichan River. The Chinook Technical Committee (CTC) of the Pacific Salmon Commission (PSC) now produces a forecast for Canadian Chinook Stocks, including the Lower Georgia Strait indicator- Cowichan River. In 2025, the return is forecast by the CTC to be 24,975 adult Chinook. Informal forecasts for Natural Spawners (including age-2) through *Forecast-R* modelling suggest a total natural spawner return of 34,754. Age-specific forecasts from *Sibling Regressions* for adults (Age-3 to 5) and a *Naïve* model for jacks (age-2) are shown in Figure 2.

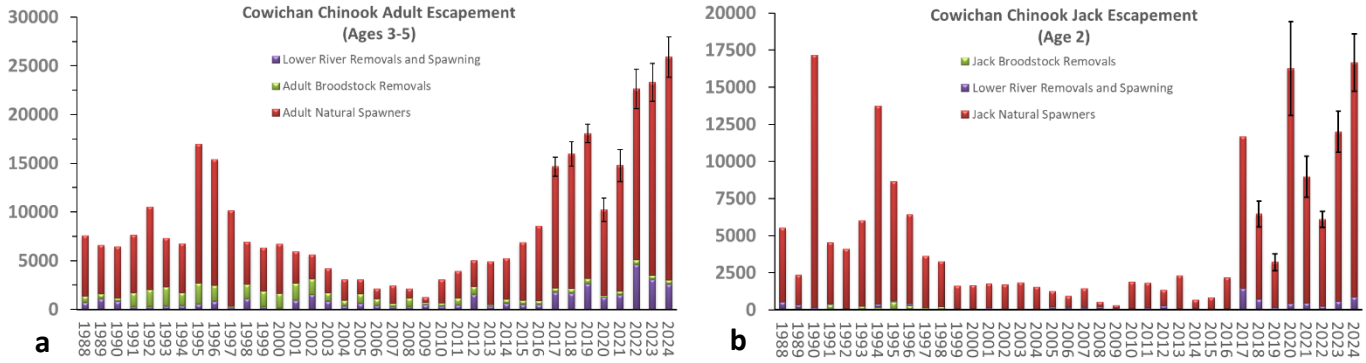

Figure 1: Cowichan Chinook escapement from the beginning of the indicator program to present (1988-2024). (a) Adult (age 3-5) returns are broken into natural spawners, broodstock removals and lower river (below- fence) removals and spawning. (b) Jack (age-2) returns are also broken down to natural spawners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

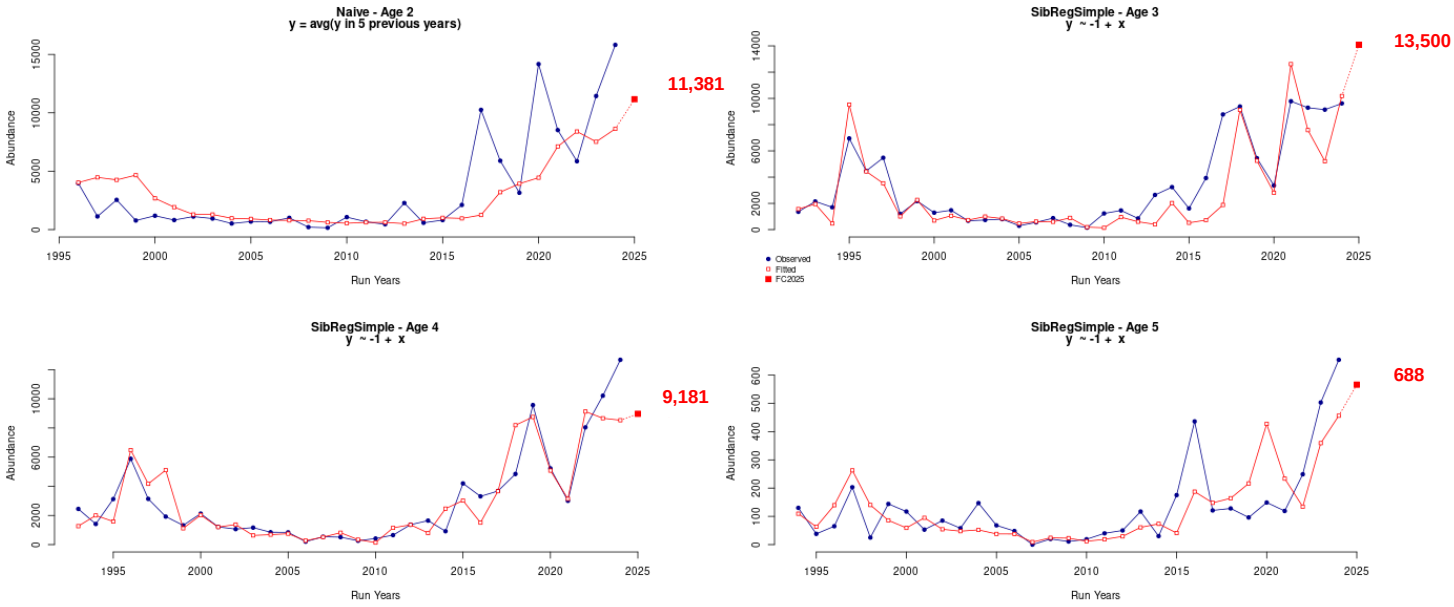

Figure 2: Observed (blue), fitted (red-circle), and 2025 forecast (red-square) for Age-2 to Age-5 naturally spawning Chinook in the Cowichan River. The age-2 forecast is a Naïve model using the last five years of returns for that age class. Forecasts for age-3 to age-5 are from Sibling Regression models. Cumulatively these models predict a return of 26,683 naturally spawning Chinook. Total return is predicted to be 34,754 from the highest-ranked model (Time-series exponential smoothing with Box-Cox transformation).

Coho, Chum & Pink

Coho productivity in 2024 has increased for Strait of Georgia indicators with observed marine survivals of 8.1% for wild and 3.7-4.3% for hatchery systems. Southern BC marine survivals are forecast remain similar to recent levels at 5.8% for wild and 2.4-2.7% for hatchery indicators in the Georgia Basin in 2025. A 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 (2019-2024) 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.

Chum returns in 2025 are forecast to be lower than the escapement target of 160,000 for Cowichan at 58,400 based on contributing brood year escapement and normal survival values (“normal forecast”). However, if recent survivals persist through 2025 then we expect to see around 93,900 chum return (“like last year model”). Forecasts for chum are highly uncertain and will be revised in-season as returns are enumerated using sonar enumeration. The peak of the run is expected to occur near November 1.

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

2025 Operations

General operations at the counting fence in 2025 will continue 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 3).

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 3: 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 4). 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.

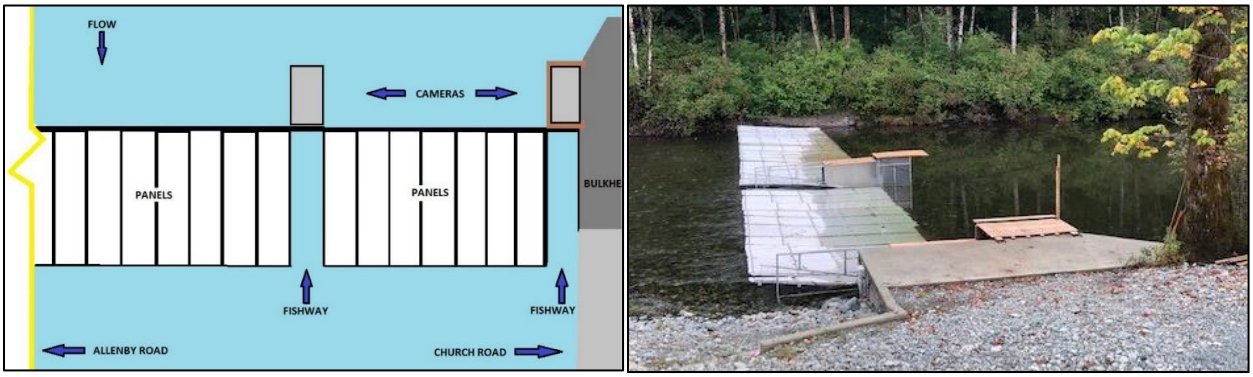

Figure 4: Traditional two-passage counting fence design used since 2019 (top) compared to the low-flow design with four open passageways and overhead camera views (bottom).

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 5). 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.

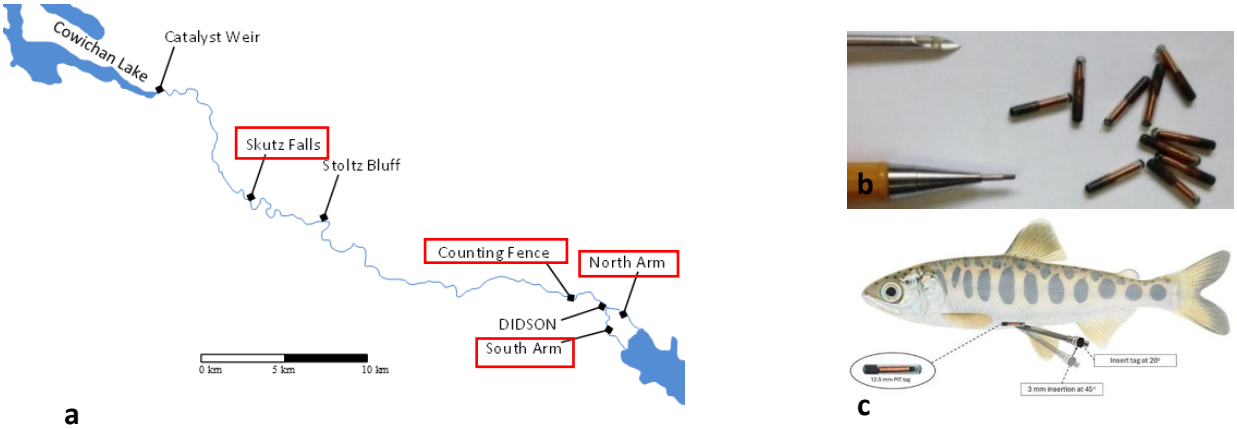

Figure 5: (a) Locations of PIT antennas (red) along with other places of interest in the Cowichan River. (b) PIT tags and implantation needle compared to the size of a mechanical pencil. (c) salmon smolt tag insertion location.

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 5). 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 Falls

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 6).

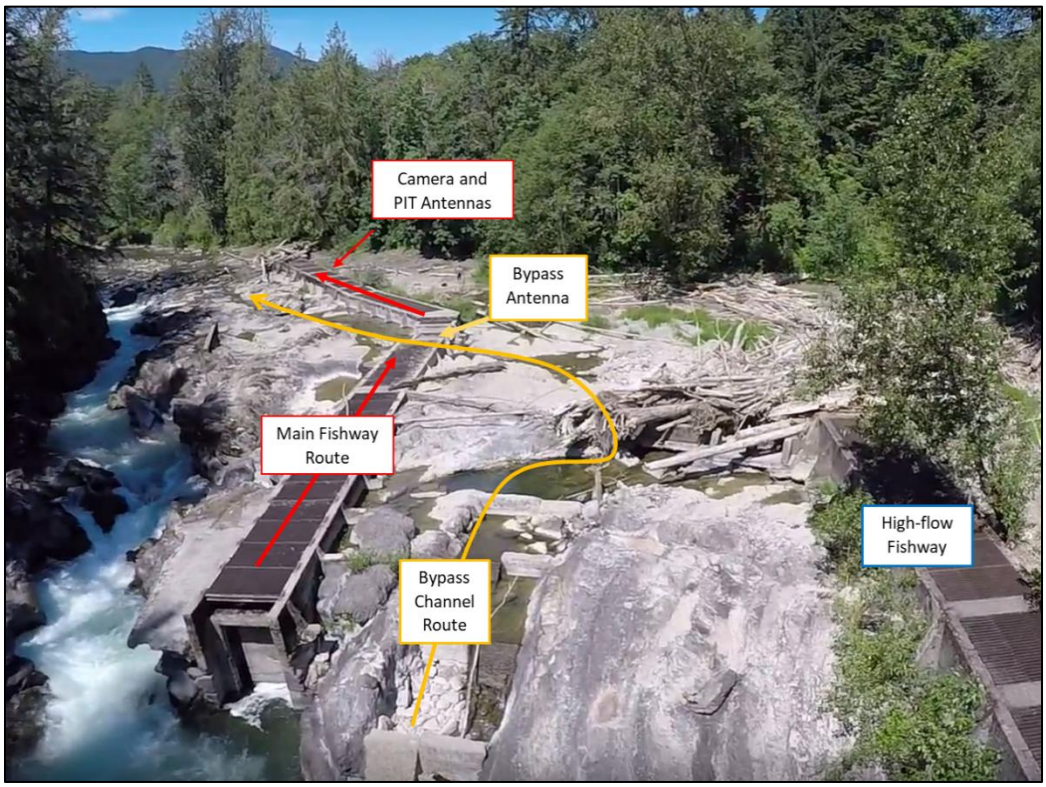

Figure 6: Skutz Fishways, bypass channel, migration routes, and monitoring equipment.

Environmental Conditions

Storage levels in Lake Cowichan remained relatively low in the spring and summer of 2025. To preserve water, flow was reduced from the rule-curve suggested 12 m^3/s to 10 m^3/s then 7 m^3/s in May, with lake storage around 70% full. Summer baseflow (7 m^3/s) was maintained in June due to water quality concerns similar to the fish-kill in 2023. Flow was reduced to 5.5 m^3/s on July 10th and 4.5 m^3/s on August 14th, where it is being held currently (Figure 7). Rainfall in August pushed back the timeline for potential pumping, however, Domtar has acquired pumps and will install them the last week of September if substantial rain does not materialize in the next few weeks.

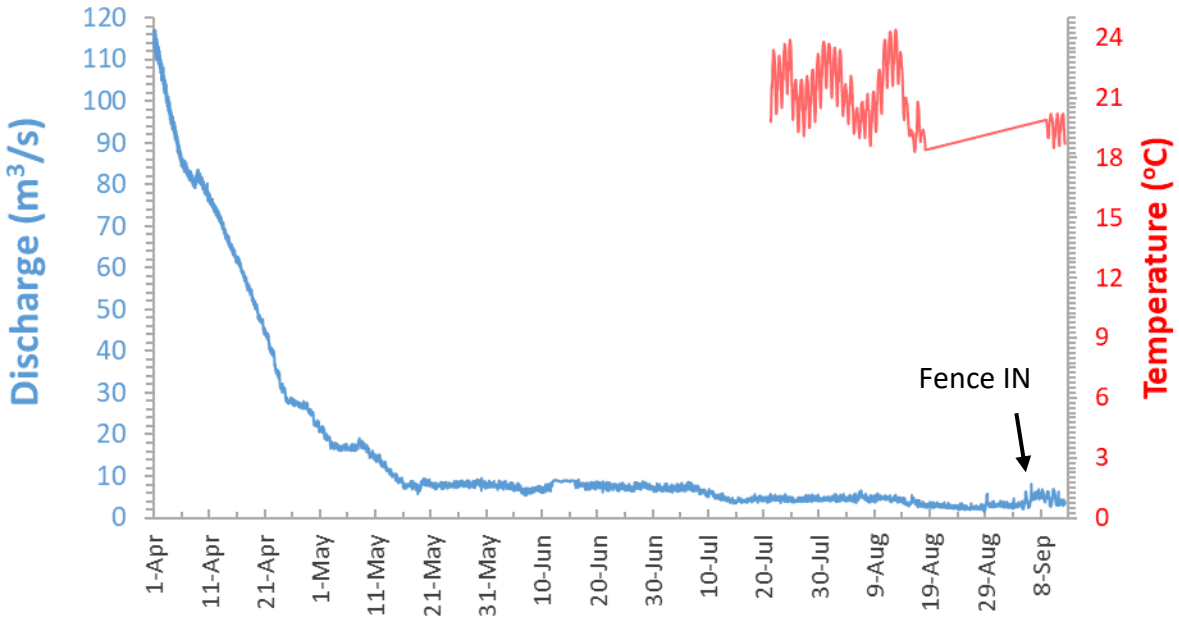

Figure 7: Discharge (m^3/s) and Temperature (°C) at Water Survey of Canada Station 08HA011, Cowichan River in Duncan. Discharge levels when the salmon counting fence was installed are indicated.

2025 Adult Enumeration

Counting Fence

Enumeration at the counting fence began on September 8th at 4:00 PM. Totals from video based counts are presented below.

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 8th to September 12th at 8:00 AM are presented in Table 1.

Table 1: Cumulative totals for 2025 Chinook Migration past the fence by age and origin.

	Wild (unclipped)	Hatchery (clipped)	Unknown	Total
Adults	10	-	2	**12**
Jacks	29	-	22	**51**
Total	**39**	**-**	**24**	**63**

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 8).

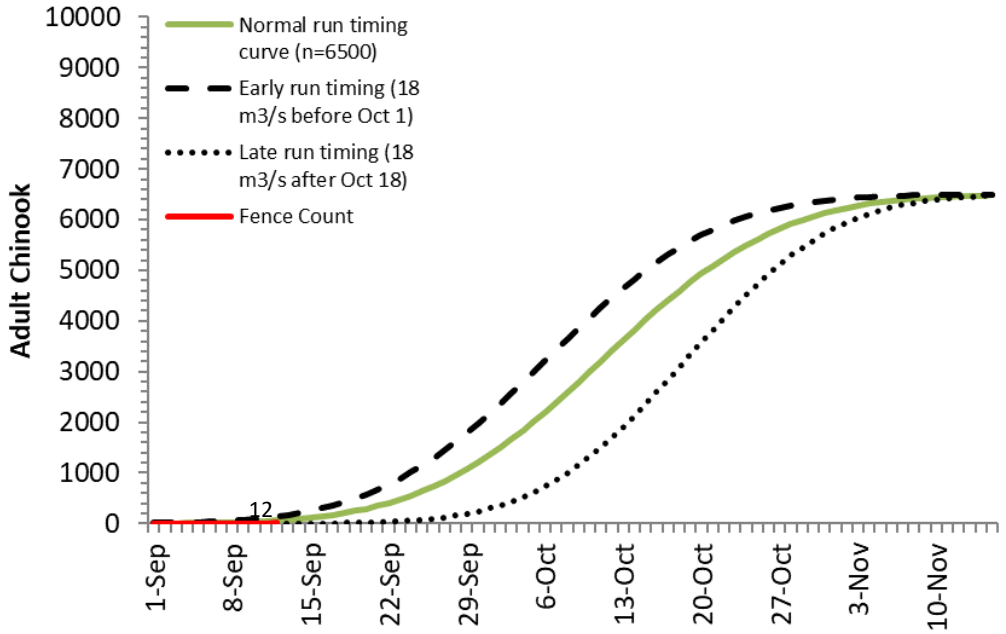

Figure 8: In-season adult Chinook counts compared to normal, early and late run-timing curves based on river conditions.

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 September 12th at 8:00 AM are presented in Table 2.

Table 2: Cumulative totals for 2025 Coho, Chum and Pink migration past the fence.

	Coho	Chum	Pink	Unknown
Adults	-	-	8	4
Jacks	-			
Total	**-**	**-**	**8**	**4**

2025 Photos

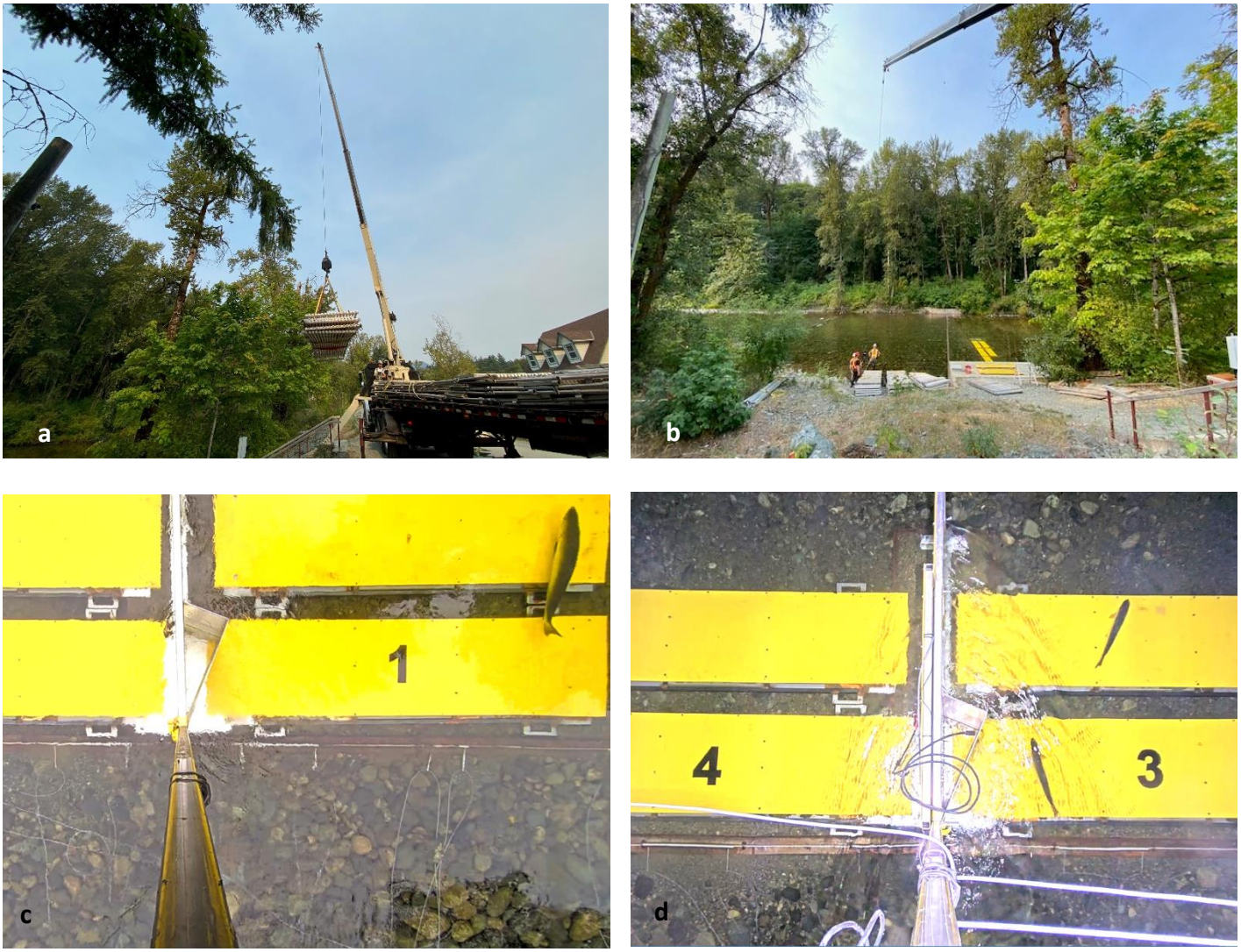

Figure 9: Photos captured during salmon Stock Assessment activities in the Cowichan River in 2025. Including a) fence panels being transported to the site via crane truck, b) fence panels being unloaded at the river bank c) overhead view of an adult Chinook salmon passing the fence, and d) overhead view of two jack Chinook salmon passing the fence.

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