

# Enhanced Monitoring of Recreational Chinook Salmon Mark-Selective Fisheries in South Coast BC Tidal Waters: Reference Fishery, 2024

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## ABSTRACT

Rechisky, E.L., Lemp, P.R., Woodliffe, S.L., Pellett, K.A., Porter, A.D. 2025. Enhanced Monitoring of Recreational Chinook Salmon Mark-Selective Fisheries in South Coast BC Tidal Waters: Reference Fishery, 2024. Can. Data Rep. Fish. Aquat. Sci. 1429: iv + 37 p.

The Department of Fisheries and Oceans Canada (DFO) launched a short-term monitoring program in 2023 to assess recreational Chinook Salmon mark-selective fisheries (MSFs) in British Columbia. The objective of the Chinook reference fishery program is to independently verify Chinook catch (number of Chinook caught and released at sea by size class) and mark rate (the percentage of hatchery-marked Chinook encountered by size class) estimates from the recreational catch monitoring program (creel program), as well as to evaluate stock composition (with a focus on unmarked stocks that are typically released at sea and not available for dockside sampling in a pure MSF). This data report presents a summary of 1) mark rates for Chinook salmon intercepted in the Chinook reference fishery, and 2) stock composition, as encountered in each MSF for each reference fishery by month. The data summarized in this report can be accessed here: [South Coast Chinook Reference Fishery Biological Samples - Open Government Portal](#).

## RÉSUMÉ

Rechisky, E.L., Lemp, P.R., Woodliffe, S.L., Pellett, K.A., Porter, A.D. 2025. Enhanced Monitoring of Recreational Chinook Salmon Mark-Selective Fisheries in South Coast BC Tidal Waters: Reference Fishery, 2024. Can. Data Rep. Fish. Aquat. Sci. 1429: iv + 37 p.

Pêches et Océans Canada (MPO) a lancé en 2023 un programme de surveillance à court terme afin d'évaluer les pêches récréatives au saumon chinook avec sélection selon la marque (PSM) en Colombie-Britannique. L'objectif du programme de pêche de référence au chinook est de vérifier de manière indépendante les estimations de la capture de chinook (nombre de chinook capturés et remis à l'eau en mer, selon la classe de taille) et du taux de marquage (pourcentage de chinook marqués d'écloserie observés, selon la classe de taille) provenant du programme de surveillance de la pêche récréative, ainsi que d'évaluer la composition des stocks (en mettant l'accent sur les stocks non marqués, qui sont habituellement remis à l'eau en mer et qui ne sont pas disponibles pour l'échantillonnage à quai dans le cadre d'une PSM pure). Le présent rapport de données résume : 1) les taux de marquage des saumons chinook interceptés dans le cadre de la pêche de référence au chinook; et 2) la composition des stocks observée dans chaque PSM pour chaque pêche de référence, par mois. Les données résumées dans le présent rapport peuvent être consultées ici : [Données biologiques de référence sur la pêche au saumon quinnat de région de la côte sud de la C.-B. - Portail du gouvernement ouvert](#).

## INTRODUCTION

Mark-selective fisheries (MSFs) have emerged as a management tool designed to shift exploitation of natural-origin salmon stocks to hatchery-origin salmon (Pacific Salmon Commission, 2023). Hatchery-origin Chinook salmon (*Oncorhynchus tshawytscha*) are often “marked” at the hatchery by removing the adipose fin, so they are easily identifiable. Not all Chinook from Canadian hatcheries are marked with a clipped adipose fin; therefore, Chinook with an intact adipose fin cannot be assumed to be of natural origin and are referred to here as unmarked Chinook. In addition, a proportion of hatchery fish that are externally marked with an adipose fin clip are also implanted with a coded wire tag (CWT) for stock management purposes (<https://www.pac.dfo-mpo.gc.ca/pacific-smon-pacifique/science/research-recherche/cwt-mmc-eng.html>).

Mark-selective fisheries operate under two primary models: 1) pure MSFs where only hatchery-marked fish above a minimum size are allowed to be retained, and 2) mixed-bag MSFs that have different retention regulations associated with marked and unmarked fish, but unmarked fish can still be retained under specific conditions (see Table 1 for examples of both types). In pure MSFs, unmarked stocks are legally required to be released at sea and are unavailable to dockside sampling; a reference fishery addresses this data gap. Further, since MSFs disproportionately harvest hatchery Chinook, the Pacific Salmon Commission issued a technical report in 2023, providing recommendations for estimating exploitation rates for Chinook salmon CWT indicator stocks affected by MSFs (Pacific Salmon Commission, 2023). Recommendation 3.1 urged management entities to monitor at-sea releases and mark rates in MSFs (Pacific Salmon Commission, 2023).

Following widespread recreational Chinook fishery closures in 2019, pilot mixed-bag Chinook MSFs were introduced in 2020 in the South Coast Area of British Columbia (portions of Pacific Fishery Management Areas [PFMA] 12, 13, 15, and 20). These were reopened in 2021, and with a new mixed-bag MSF in portions of PFMA 16. These continued unchanged in 2022. In 2023, pure MSFs were added (portions of PFMA 17, 18, and 19), and the mixed-bag MSF in PFMA 16 was changed to a pure MSF. The only changes to MSF regulations in 2024 were opening dates (See Table 1 for regulations and Appendix A for 2024 maps).

During DFO consultations on MSFs, several First Nations and stakeholder groups expressed concern regarding potential impacts on Chinook stocks of concern being encountered by these fisheries. To address these issues, the Pacific Salmon Strategy Initiative (PSSI) supported enhanced monitoring of

MSFs by DFO through two key approaches under the Harvest Transformation pillar (Government of Canada, 2021). First, an expansion of the DFO South Coast Area recreational catch monitoring program to increase the frequency of dockside interviews (i.e., creel surveys) and flight surveys to estimate fishing effort within MSFs. Second, the development of a Chinook reference fishery to independently verify creel estimates including catch (number of Chinook caught and released at sea by size class), mark rate (the proportion of hatchery-marked Chinook encountered by the fishery), and stock composition particularly for unmarked stocks that would otherwise be released at sea in a pure MSF. In addition to support from PSSSI, the Chinook reference fishery would not have been possible without the partnership of the Sport Fishing Institute of BC (SFI). Through a BC Salmon Restoration and Innovation Fund (BCSRIF) grant, SFI contracted the charter vessels and enabled DFO to leverage expertise of local sport fishing guides.

The first pilot Chinook reference fishery was conducted in 2023. The data report for the 2023 study can be found here: [https://publications.gc.ca/collections/collection\\_2024/mpo-dfo/Fs97-13-1401-eng.pdf](https://publications.gc.ca/collections/collection_2024/mpo-dfo/Fs97-13-1401-eng.pdf) (Rechisky et al., 2024). This data report for 2024 continues that series. It describes the sampling methods employed for the reference fishery and presents a summary of the data collected for all Chinook sampled in 2024. The data summarized for both years are located here: [South Coast Chinook Reference Fishery Biological Samples - Open Government Portal](#).

## METHODS

### Study Area

In 2023, Chinook reference fisheries were run in pure MSFs including Victoria and Haro Strait (portions of Pacific Fishery Management Area [PFMA] 19), the Gulf Islands and Saanich Inlet (portions of PFMA 17, 18, and 19), Becher Bay (portions of PFMA 20), and Sechelt Inlet (portions of PFMA 16). In 2024, all pure MSFs were sampled (Figures A2-A5) as well as the mixed-bag MSFs in Bute Inlet (portions of PFMA 13, Figure A6) and Toba Inlet (portions of PFMA 15; Figure A7). Additionally, Chinook reference fisheries were implemented in areas without MSFs, including Howe

Sound (portions of PFMA 28; Figure A8) and Nootka Sound and Esperanza Inlet (portions of PFMA 25<sup>1</sup>; Figure A9) to explore the potential for an MSF.

In 2024, we were able to expand the reference fishery sampling more broadly to include multiple MSFs simultaneously and sample the majority of the opening periods (Table 1). The mark-selective fishery (MSF) in Area 12, the Broughton Archipelago, was not monitored due to low fishing effort. In the Bute and Toba Inlet MSFs, the reference fisheries each operated throughout June (April 1–July 14 opening). In the Sechelt Inlet MSF, the reference fishery operated from May through early July (April 1–July 14 opening). In the Gulf Islands/Saanich Inlet MSF, the reference fishery operated from May through July (April 1–July 31 opening). For the Victoria and Haro Strait MSF, the Chinook reference fishery operated throughout the opening (April 1–May 31 opening). For the Becher Bay MSF, the reference fishery operated from April through June (April 1–July 31 opening). The Nootka Sound and Esperanza Inlet reference fishery ran from July through August. The Howe Sound Chinook reference fishery took place from April through May.

## **Fishing Operations**

The fishing methods were designed to mirror typical recreational Chinook salmon fishing techniques. The approach ensured that sampling accurately reflected typical fishing depths and gear types in known locations for each region and season. Experienced guides were tasked with conducting these trips as they would standard chartered excursions, applying their knowledge to determine optimal fishing locations and departure times. While guided trips generally yield higher catch per unit effort (CPUE) compared to unguided outings, the primary goal of this Chinook reference fishery was to assess the composition of fish susceptible to capture in the recreational fishery rather than to measure fishing effort.

All fishing was conducted by trolling with electric downriggers, with guides choosing terminal tackle at their discretion. The most common setup involved an inline flasher followed by a spoon or hoochie. All fishing activities were confined to MSF open areas (see Figures A2 to A7) or predefined sampling boundaries for areas without MSFs (see Figures A8 to A9). Guides were instructed to avoid fishing

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<sup>1</sup> This reference fishery, as well as additional mass marking at Conuma Hatchery, was funded by the Pacific Salmon Commission Mark-Selective Fishery Fund to explore the potential of a MSF in PFMA 25.

near boundary lines to prevent accidental drift outside of the designated zones during sampling. Reference fishing took place on Tuesdays, Wednesdays, and Thursdays during the months indicated.

## **Sampling Protocols**

A trained DFO sampler was assigned to each participating fishing vessel in the Chinook reference fishery. The objective was to document and sample every Chinook salmon encountered during each expedition. Regardless of fishing success, DFO samplers were required to complete a standard vessel trip summary log (VTSL) for every day on the water. The VTSL captured essential details including the date, specific fishing locations, designated creel-sub areas, and precise times of gear deployment and retrieval. This documentation procedure was repeated each time the fishing gear was hauled in and the vessel relocated to a new fishing spot.

Upon catching a fish, species identification was conducted at the boat's side while the fish remained in the water. Only Chinook salmon were brought aboard for sampling and immediately placed in a cooler filled with fresh seawater. To reduce damage to smaller Chinook, the use of landing nets was avoided when possible, especially with Chinook that were perceived to be sub-legal (Hinch et al. 2024). Fish were released immediately following sampling. To maintain optimal conditions, the cooler water was refreshed between each fish, ensuring a cool, oxygenated environment. All non-Chinook species were promptly released at the boat's side and recorded on the VTSL. Throughout the entire process, best practices for fish handling were followed with concerted efforts to minimize handling time. These practices align with DFO's guidelines for catching and releasing Pacific salmon (<https://www.pac.dfo-mpo.gc.ca/fm-gp/rec/salmon-saumon-eng.html>).

For each Chinook captured, the following information was recorded:

- catch location (creel sub-area),
- time to landing in minutes from the time of the strike,
- nose to fork length (FL) to the nearest millimeter,
- adipose fin clip status (clipped, unclipped, or “unknown” recorded for fish with a partial fin),
- sample number for DNA-based stock identification.

Catch locations were documented using creel-sub areas which are spatial strata within Pacific Fishery Management Areas (PFMA), but often differ from PFMA sub-areas in their boundaries and purpose; creel sub-areas are designed to capture recreational fishing activity in popular locations,

while PFMA sub-areas are legally defined for regulatory purposes. The differences between these two types of sub-areas are illustrated in Figures A2 to A9.

Fork length measurements were used to classify fish as legal or sub-legal size with sub-legal Chinook salmon defined as those less than 62 cm on the East Coast of Vancouver Island and 45 cm on the South and West Coast of Vancouver Island (Victoria and Haro Strait MSF, the Becher Bay MSF (specifically 19-1 through 19-4 and 20-5), and in Nootka Sound/Esperanza Inlet). Legal-size fish met or exceeded these minimum length requirements.

Adipose fin clip status was used to assess mark rate which was calculated as the number of marked fish divided by the number of sampled fish (marked plus unmarked excluding “unknown”, which was rare) and 95% confidence intervals were calculated using the standard error of a proportion.

$$\hat{p} \pm 1.96 \times \sqrt{\frac{p(1-p)}{n}}$$

## Genetic Stock Identification

During sampling, a tissue sample was taken from each Chinook at the thinnest part of the fork of the caudal fin using a hole punch. Samples were analyzed by the DFO Molecular Genetics Laboratory in Nanaimo B.C. and stock was determined using genetic stock identification (GSI) and parentage-based tagging (PBT; Beacham et al 2021).

For this report, stock identification results are presented at the stock region level where confidence is highest and stocks of concern can be identified (Beacham et al., 2018). The stock region is the scale at which DNA results most closely align with the stock management units (SMUs) in Canada, which represent stock aggregates that are used to inform Canadian integrated fisheries management plans (IFMPs). See Table 2 for how each stock region identified in the DNA samples aligns with the SMUs. Finer scale population level stock identification can be found here: [South Coast Area BC Chinook Reference Fishery Biological Data - Open Government Portal](#) and a description of the data can be found in Appendix B.

# RESULTS

## Overview

The 2024 Chinook reference fishery conducted a total of 316 boat (sampling) days across all MSFs from April to August. Specifically, Victoria and Haro Strait (portions of PFMA 19) accounted for 54 boat days: 27 in April, and 27 in May. The Gulf Islands and Saanich Inlet (portions of PFMA 17, 18, and 19) had the greatest number of boat days at 126 with 9 in April, 40 in May, 36 in June, and 41 in July. Becher Bay (portions of PFMA 20) had 13 boat days in April, 14 in May, and 12 in June. Sechelt Inlet (portions of PFMA 16) had 14, 11, and 6 days in May, June, and July respectively with a total of 31 boat days. Bute and Toba Inlet (portions of PFMA 13 and 15) both had 12 boat days for the month of June. Howe Sound (portions of PFMA 28) ran for two months with a total of 54 boat days: 26 in April and 28 in May. Nootka Sound (portions of PFMA 25) accounted for 42 boat days of which 24 were in July and 18 in August.

A total of 2582 Chinook salmon were sampled, of which 1306 were legal-sized and 1276 were sub-legal samples. Genetic stock identification was determined for 2443 fish. The remaining samples either failed to amplify in the molecular genetics lab or were lost due to tissue detachment from the sample sheet.

Mark rates of legal-sized Chinook ranged from less than 15% in Bute and Toba Inlets to over 70% in Victoria and Haro Strait (Figure 1). Sechelt Inlet had relatively low mark rates between 15% and 30%. The Gulf Islands and Saanich Inlet showed mark rates ranging from approximately 43% to 62%. In Becher Bay, mark rates exceeded 60% in April and May before declining below 40% in June. Nootka Sound and Esperanza Inlet had moderate mark rates of around 30%–40%, with Howe Sound falling within a similar range.

Puget Sound Chinook were the most prevalent stock encountered across all samples, followed by East Coast Vancouver Island Fall Chinook and Fraser Fall Chinook for both legal and sub-legal fish (Figure 2). Nootka Sound and Esperanza Inlet were exceptions, where North West Vancouver Island and South West Vancouver Island Chinook dominated the samples (Figure 18).

Detailed information for each individual sample from both the 2023 and 2024 reference fisheries is available on the Government of Canada Open Data portal and can be accessed through the following link: [South Coast Area BC Chinook Reference Fishery Biological Data - Open Government Portal](#). A comprehensive description of the online data structure and definitions for each column is provided in Appendix B. Please note that some column names have been updated for clarity compared to those used in the report titled “Enhanced Monitoring of Recreational Chinook Salmon Mark-Selective

Fisheries in South Coast BC Tidal Waters: Reference Fishery, 2023.” The version of the 2023 reference fishery dataset available on Open Data reflects these updated column names.

### **Victoria and Haro Strait (portions of PFMA 19)**

The Victoria and Haro Strait reference fishery sampled 183 legal and 101 sub-legal Chinook in April, and 108 legal plus 22 sub-legal Chinook in May. The associated hatchery mark rates were 70.5% (95% CI: [62.6%, 78.4%]) for legal and 66.3% (95% CI: [55.0%, 77.6%]) for sub-legal samples in April, and 73.1% (95% CI: [63.3%, 82.9%]) for legal and 50.0% (95% CI: [20.5%, 79.6%]) for sub-legal samples in May (Figure 3). The stock composition was dominated by Puget Sound Chinook with 88.7% (95% CI: [85.0%, 92.5%]) of legal samples and 80.5% (95% CI: [73.4%, 87.7%]) sub-legal samples (Figure 4).

### **Gulf Islands & Saanich Inlet (portions of PFMA 17, 18, and 19)**

The Gulf Islands and Saanich Inlet reference fishery sampled 15 legal and 17 sub-legal Chinook in April, 47 legal and 114 sub-legal Chinook in May, 21 legal and 205 sub-legal Chinook in June, and 45 legal and 297 sub-legal Chinook in July. The associated hatchery mark rates were 60.0% (95% CI: [28.0%, 92.0%]) for legal and 82.4% (95% CI: [62.4%, 100.0%]) for sub-legal samples in April; 61.7% (95% CI: [44.0%, 79.4%]) for legal and 55.3% (95% CI: [43.0%, 67.6%]) for sub-legal samples in May; 42.9% (95% CI: [10.6%, 75.2%]) for legal and 43.4% (95% CI: [33.1%, 53.7%]) for sub-legal samples in June; and 55.6% (95% CI: [36.1%, 75.1%]) for legal and 46.8% (95% CI: [38.5%, 55.1%]) for sub-legal samples in July (Figure 5). Similar to the Victoria/Haro MSF, stock composition was dominated by Puget Sound Chinook with 72.4% (95% CI: [64.5%, 80.3%]) of legal samples and 48.6% (95% CI: [44.4%, 52.7%]) of sub-legal samples. East Coast Vancouver Island Fall Chinook represented a high proportion of sub-legal samples with 47.0% (95% CI: [42.8%, 51.1%]) and 14.6% (95% CI: [8.4%, 20.9%]) of legal samples (Figure 6).

### **Becher Bay (portions of PFMA 20)**

The Becher Bay reference fishery sampled 22 legal and 14 sub-legal Chinook in April, 23 legal Chinook in May, and 24 legal and 4 sub-legal Chinook in June. The associated hatchery mark rates were 68.2% (95% CI: [44.6%, 91.8%]) for legal and 85.7% (95% CI: [65.9%, 100.0%]) for sub-legal samples in April; 60.9% (95% CI: [35.3%, 86.5%]) for legal samples in May; and 37.5% (95% CI: [5.9%, 69.1%]) for legal and 50.0% (95% CI: [0.0%, 100.0%]) for sub-legal samples in June (Figure

7). The stock composition was dominated by Puget Sound Chinook with 65.7% (95% CI: [54.3%, 77.0%]) of legal and 83.3% (95% CI: [66.1%, 100.0%]) sub-legal samples identified (Figure 8).

### **Sechelt Inlet (portions of PFMA 16)**

The Sechelt Inlet reference fishery sampled 54 legal and 28 sub-legal Chinook in May, 41 legal and 21 sub-legal Chinook in June, and 20 legal and 12 sub-legal Chinook in July. The associated hatchery mark rates were 24.1% (95% CI: [0.8%, 47.4%]) for legal and 28.6% (95% CI: [0.0%, 59.9%]) for sub-legal samples in May; 29.3% (95% CI: [3.5%, 55.0%]) for legal and 52.4% (95% CI: [22.9%, 81.9%]) for sub-legal samples in June; and 15.0% (95% CI: [0.0%, 55.4%]) for legal and 41.7% (95% CI: [0.0%, 84.9%]) for sub-legal samples in July (Figure 9). Stock composition favored East Coast Vancouver Island Fall populations with 49.6% (95% CI: [40.3%, 58.8%]) of legal and 37.3% (95% CI: [24.9%, 49.6%]) of sub-legal samples and Puget Sound with 28.3% (95% CI: [20.0%, 36.6%]) of legal and 27.1% (95% CI: [15.8%, 38.5%]) of sub-legal samples identified (Figure 10).

### **Bute Inlet (portions of PFMA 13)**

The Bute Inlet reference fishery sampled 43 legal and 93 sub-legal Chinook in June. The associated hatchery mark rates were 11.6% (95% CI: [0.0%, 39.7%]) for legal and 21.5% (95% CI: [3.5%, 39.5%]) for sub-legal samples (Figure 11). The stock composition was dominated by East Vancouver Island Chinook with 66.7% (95% CI: [52.4%, 80.9%]) of legal samples and 60.2% (95% CI: [50.3%, 70.2%]) of sub-legal samples (Figure 12).

### **Toba Inlet (portions of PFMA 15)**

The Toba Inlet reference fishery sampled 86 legal and 55 sub-legal Chinook in June. The associated mark rates were 14.0% (95% CI: [0.0%, 33.6%]) for legal and 30.9% (95% CI: [8.9%, 52.9%]) for sub-legal samples (Figure 13). Similar to Bute Inlet, the stock composition was dominated by East Vancouver Island Fall Chinook, with 62.9% (95% CI: [52.4%, 73.5%]) of legal samples and 53.7% (95% CI: [40.4%, 67.0%]) of sub-legal samples (Figure 14).

### **Howe Sound (portions of PFMA 28)**

The Howe Sound reference fishery sampled 67 legal and 98 sub-legal Chinook in April, and 289 legal and 86 sub-legal Chinook in May. The associated mark rates were 43.3% (95% CI: [25.3%, 61.3%]) for legal and 58.2% (95% CI: [45.4%, 71.0%]) for sub-legal samples in April, and 33.9% (95% CI:

[24.5%, 43.3%]) for legal and 45.3% (95% CI: [29.7%, 60.9%]) for sub-legal samples in May (Figure 15). The stock composition was dominated by Fraser Fall Chinook with 57.2% (95% CI: [52.1%, 62.4%]) of legal samples and 20.9% (95% CI: [15.0%, 26.8%]) of sub-legal samples, and Puget Sound Chinook with 27.8% (95% CI: [23.1%, 32.4%]) of legal samples and 50.5% (95% CI: [43.3%, 57.8%]) of sub-legal samples (Figure 16).

### **Nootka Sound & Esperanza Inlet (portions of PFMA 25)**

The Nootka Sound and Esperanza Inlet reference fishery sampled 147 legal and 19 sub-legal Chinook in July, and 71 legal and 90 sub-legal Chinook in August. The associated mark rates were 40.8% (95% CI: [28.4%, 53.2%]) for legal and 42.1% (95% CI: [7.9%, 76.3%]) for sub-legal samples in July, and 31.0% (95% CI: [11.7%, 50.3%]) for legal and 44.4% (95% CI: [29.0%, 59.8%]) for sub-legal samples in August (Figure 17). Stock composition of legal-size samples was dominated by Northwest Vancouver Island Chinook at 41.7% (95% CI: [35.0%, 48.5%]) and Southwest Vancouver Island Chinook at 33.9% (95% CI: [27.5%, 40.3%]). The majority of sub-legal samples were Puget Sound Chinook at 69.1% (95% CI: [59.9%, 78.3%]; Figure 18).

### **Fraser River Stocks of Concern**

Of the 2436 Chinook where stock was identified in the 2024 reference fishery, a total of 12 samples were identified as Fraser River stocks of concern (i.e., Chinook from Spring 4<sub>2</sub>, Spring 5<sub>2</sub>, and Summer 5<sub>2</sub>, Stock Management Units). Of those, six were legal size but unmarked, one was sub-legal and hatchery marked, and five were sub-legal unmarked. Seven were captured across the Gulf Islands/Saanich inlet, Victoria and Haro Strait, and Becher Bay MSFs; three were caught in the Bute and Toba Inlet MSFs; one was caught in Howe Sound; and one was caught in Nootka Sound and Esperanza Inlet. None would have been legal to retain as they were either under the legal-size limit or not hatchery marked; however, they would still be subject to incidental release mortality. Note that although these are small numbers, they are not expanded by the creel catch estimates and thus do not represent impacts to Fraser River stocks of concern.

## **ACKNOWLEDGMENTS**

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## TABLES

Table 1. Summary of 2024 Chinook reference fisheries and associated MSF openings when applicable. Minimum size for legal-size Chinook is 62 cm except 45 cm in 19-1– 19-4, 20-5, and 25-1– 25-16. PFMA = Pacific Fishery Management Area. Annual limit is 10 Chinook (CK).

PFMA	PFMA Sub Areas	MSF Dates	Reference Fishery	Limits/Sizes
12 (Broughton)	12-26,12-27, 12-28, 12-35, 12-38, 12-39, 12-40, 12-41	April 1 – July 14	None	Unmarked CK retention w/ maximum 80 cm size limit. Marked CK retention, minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
13 and 15 (Bute and Toba Inlets)	13-19, 13-21 15-5, 15-6	April 1 – July 14	June 4 – June 27	Unmarked CK retention w/ maximum 80 cm size limit. Marked CK retention, minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
16 (Sechart Inlet)	16-6, 16-7, 16-8,16-9, 16-10, 16-11 16-12,16-13	April 1 – July 14	May 1 – July 11	Hatchery CK retention only, minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
17	17-6, 17-9	April 1 –July 14	May 1 – July 11	Hatchery CK retention only, minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
18 and 19 (Gulf Is. /Saanich Inlet)	18-6*, 18-7, 18-10, 19-7, 19-8	April 1 – July 31 (*18-6 open area decreases June 1)	May 1 – July 31	
19 (Victoria/Haro Strait)	19-1, 19-3, 19-4, 19-5, 19-6	April 1 – May 31	April 2 – May 30	Hatchery CK retention only, minimum 45 cm fork length (except 62 cm in 19-5 and 19-6; no maximum). Limits: 1/day, 2 possession.
20 (Becher Bay)	Portion of 20-5	April 1 – July 31	April 2 – June 27	Hatchery CK retention only, minimum 45 cm fork length (no maximum). Limits: 1/day, 2 possession.
25 (Nootka Sound and Esperanza Inlet)	25-1, 25-2, 25-3, 25-4, 25-5, 25-6, 25-7, 25-8, 25-9, 25-10, 25-11, 25-12, 25-13, 25-14, 25-16	NA	July 3 – August 29	Minimum 45 cm fork length (no maximum). Limits: 2/day, 4 possession.
28 (Howe Sound)	28-1, 28-2, 28-3, 28-4, 28-5	NA	April 2 – May 30	Minimum 62 cm fork length (no maximum). Limits: 0/day, 0 possession.

Table 2: Index of alignment between Canadian GSI Stock Rollup Regions identified in the 2023 reference fishery with Designatable Units (DU), Conservation Unites (CU), and Stock Management Units (SMU). FA = fall run timing, SP = spring run timing, SU = summer run timing.

DU #	Population/DU (COSEWIC)	CU (Conservation Unit) ID and Name	CU Index	SMU (Stock Management Unit)	GSI – Stock Rollup
1	Southern Mainland Boundary Bay, Ocean, Fall	Boundary Bay_FA_0.3	CK-02	Southern BC Chinook	Boundary Bay
2	Lower Fraser, Ocean, Fall	Lower Fraser River_FA_0.3	CK-03	Southern BC Chinook, Fraser Fall 4(1)	Fraser Fall
3	Lower Fraser, Stream, Spring	Lower Fraser River_SP_1.3	CK-04	Southern BC Chinook, Fraser Spring 5(2)	Fraser Spring 5.2
4	Lower Fraser, Stream, Summer (Upper Pitt)	Lower Fraser River-Upper Pitt_SU_1.3	CK-05	Southern BC Chinook, Fraser Spring 5(2)	Fraser Spring 5.2
5	Lower Fraser, Stream, Summer	Lower Fraser River_SU_1.3	CK-06	Southern BC Chinook, Fraser Summer 5(2)	Fraser Summer 5.2
6	Lower Fraser, Ocean, Summer	Maria Slough_SU_0.3	CK-07	Southern BC Chinook, Fraser Summer 4(1)	Fraser Summer 4.1
7	Middle Fraser, Stream, Spring	Middle Fraser-Fraser Canyon-Nahatlatch_SP_1.3	CK-08	Southern BC Chinook, Fraser Spring 5(2)	Fraser Spring 5.2
8	Middle Fraser, Stream, Fall	Middle Fraser River - Portage_FA_1.3	CK-09	Southern BC Chinook, Fraser Summer 5(2)	Fraser Summer 5.2
9	Middle Fraser, Stream, Spring (MFR+GStr)	Middle Fraser River_SP_1.3	CK-10	Southern BC Chinook, Fraser Spring 5(2)	Fraser Spring 5.2
10	Middle Fraser, Stream, Summer	Middle Fraser River-SU_1.3	CK-11	Southern BC Chinook, Fraser Summer 5(2)	Fraser Summer 5.2
11	Upper Fraser, Stream, Spring	Upper Fraser River_SP_1.3	CK-12	Southern BC Chinook, Fraser Spring 5(2)	Fraser Spring 5.2
12	South Thompson, Ocean, Summer	South Thompson_SU_age_4(1)_0.3; Shuswap River_SU_0.3	CK-13 CK-15	Southern BC Chinook, Fraser Summer 4(1)	Fraser Summer 4.1
13	South Thompson, Stream, Summer 1.3	South Thompson_SU_age_5(2)_1.3	CK-14	Southern BC Chinook, Fraser Summer 5(2)	Fraser Summer 5.2
14	South Thompson, Stream, Summer 1.2	South Thompson-Bessette Creek_SU_1.2	CK-16	Southern BC Chinook, Fraser Spring 4(2)	Fraser Spring 4.2
15	Lower Thompson, Stream, Spring	Lower Thompson_SP_1.2	CK-17	Southern BC Chinook, Fraser Spring 4(2)	Fraser Spring 4.2
16	North Thompson, Stream, Spring	North Thompson_SP_1.3	CK-18	Southern BC Chinook, Fraser Spring 5(2)	Fraser Spring 5.2
17	North Thompson, Stream, Summer	North Thompson_SU_1.3	CK-19	Southern BC Chinook, Fraser Summer 5(2)	Fraser Summer 5.2

<b>DU #</b>	<b>Population/DU (COSEWIC)</b>	<b>CU (Conservation Unit) ID and Name</b>	<b>CU Index</b>	<b>SMU (Stock Management Unit)</b>	<b>GSI – Stock Rollup</b>
18	South Coast Georgia Strait, Ocean, Fall	Southern Mainland-Georgia Strait_FA_0.x	CK-20	Southern BC Chinook	S Mainland Inlets
19	East Vancouver Island, Stream, Spring	East Vancouver Island-Nanaimo_SP_1.x	CK-23	Southern BC Chinook	ECVI Summer
20	East Vancouver Island, Ocean, Summer	Vancouver Island-Georgia Strait_SU_0.3	CK-83	Southern BC Chinook	ECVI Summer
21	East Vancouver Island, Ocean, Fall	East Vancouver Island-Goldstream_FA_0.x; East Vancouver Island-Cowichan & Koksilah_FA_0.x; East Vancouver Island-Nanaimo & Chemainus_FA_0.x; East Vancouver Island-Qualicum & Puntledge_FA_0.x	CK-21 CK-22 CK-25 CK-27	Southern BC Chinook, Lower Georgia Strait (CK22, CK25), Upper Georgia Strait (CK27)	ECVI Fall
22	South Coast – Southern Fjords, Ocean, Fall	Southern Mainland-Southern Fjords_FA_0.x	CK-28	Southern BC Chinook, Upper Georgia Strait	S Mainland Inlets
23	East Vancouver Island, Ocean, Fall (EVI + SFj)	East Vancouver Island-North_FA_0.x	CK-29	Southern BC Chinook, Upper Georgia Strait	NEVI
24	West Vancouver Island, Ocean, Fall (South)	West Vancouver Island-South_FA_0.x	CK-31	Southern BC Chinook, West Coast Vancouver Island	SWVI
25	West Vancouver Island, Ocean, Fall (Nootka & Kyuquot)	West Vancouver Island-Nootka & Kyuquot_FA_0.x	CK-32	Southern BC Chinook, West Coast Vancouver Island	NWVI
26	West Vancouver Island, Ocean, Fall (WVI + WQCI)	West Vancouver Island-North_FA_0.x	CK-33	Southern BC Chinook, West Coast Vancouver Island	NWVI
27	Southern Mainland, Ocean, Summer	Homathko_SU_x.x	CK-34	Southern BC Chinook	S Mainland Inlets
28	Southern Mainland, Stream, Summer	Klinaklini_SU_1.3	CK-35	Southern BC Chinook	S Mainland Inlets

## FIGURES

### Mark Rate Summary Across All Pacific Fishery Management Areas with Reference Fisheries

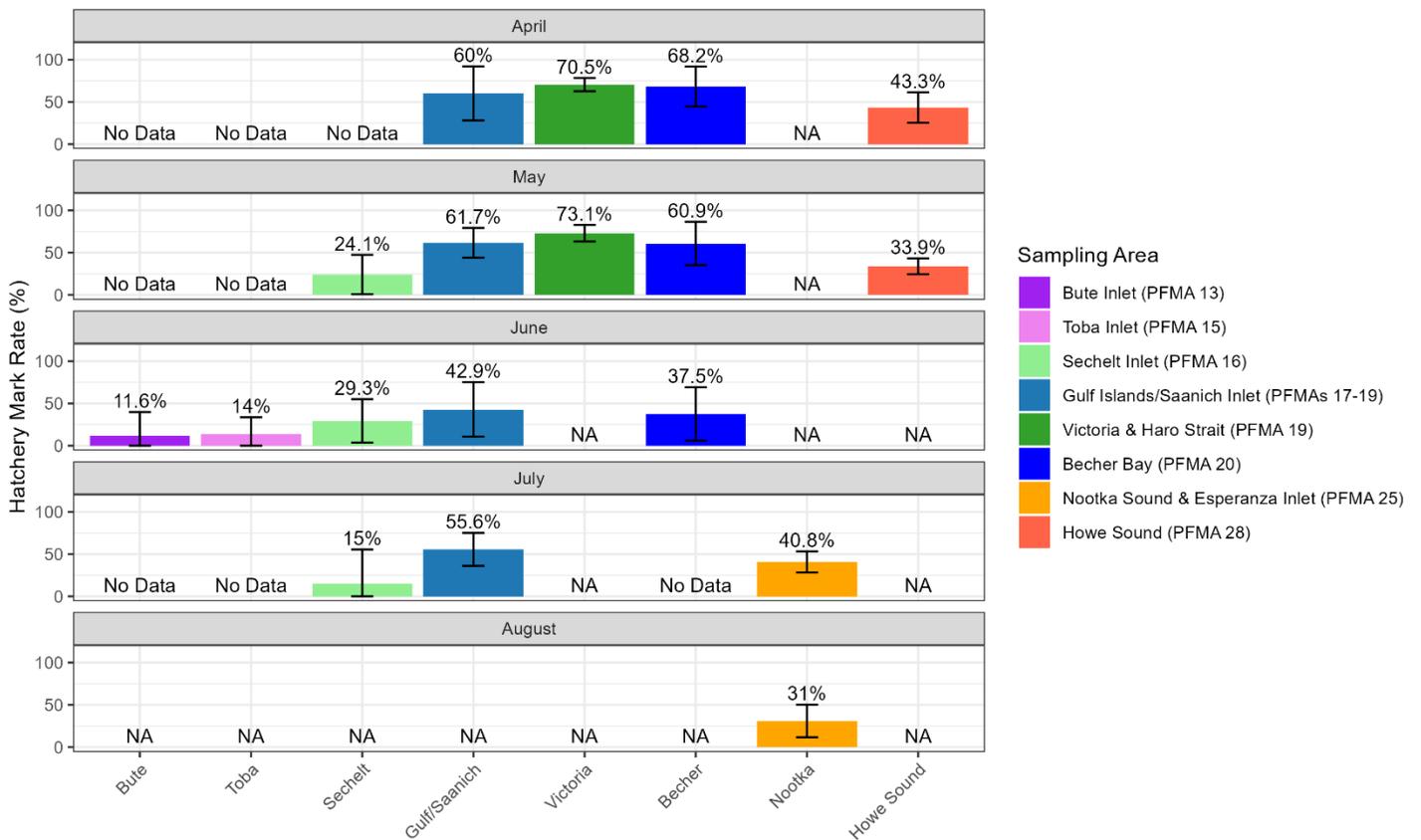


Figure 1. Mark rate of legal-sized Chinook salmon by month and MSF for the all 2024 reference fisheries (N=1306). An *NA* indicates the MSF was not open, and a *No Data* indicates the MSF was open but there was no Chinook reference fishery in operation. Error bars represent 95% confidence intervals.

## Stock Composition Summary MSF Areas with Reference Fisheries

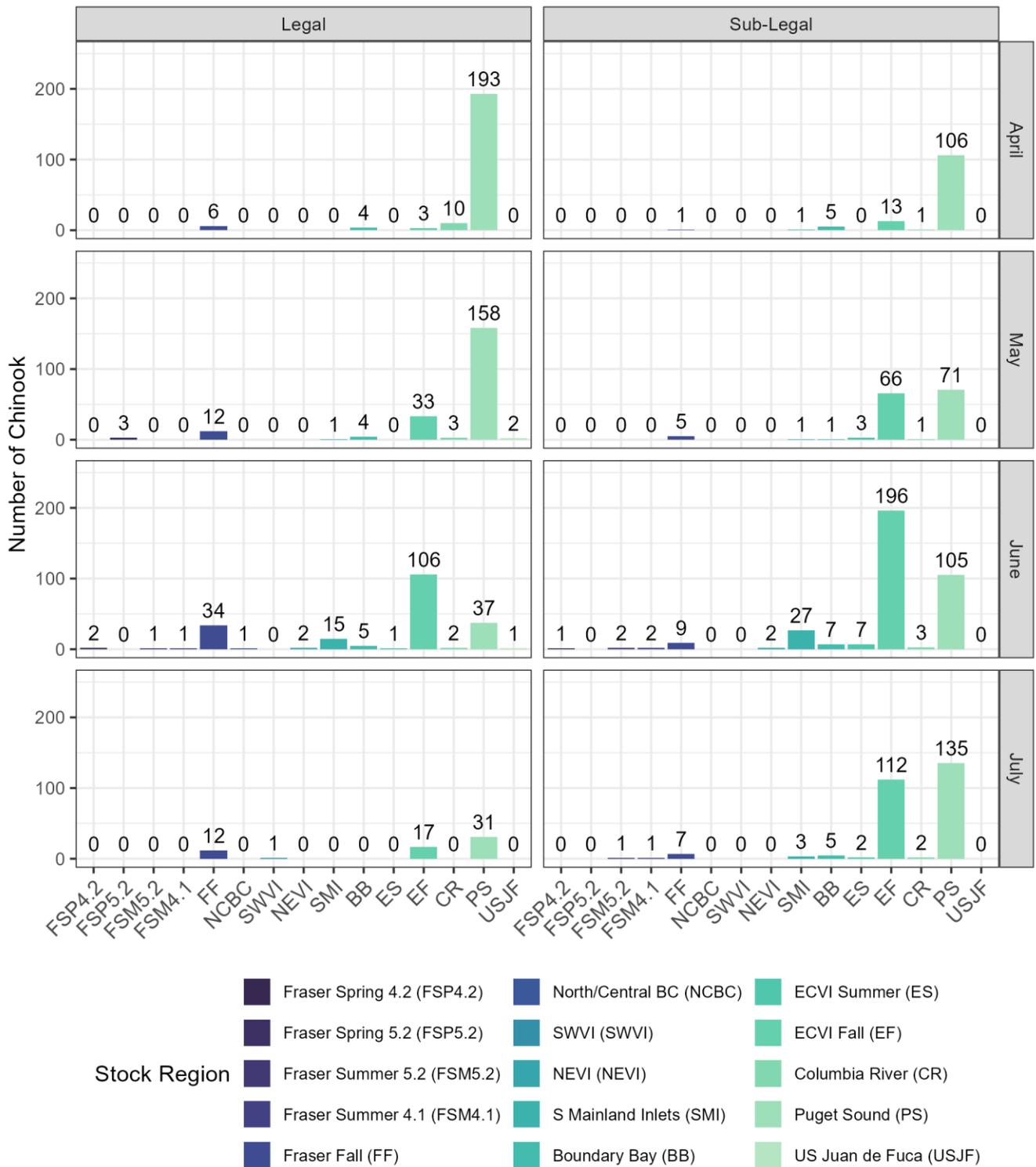


Figure 2: Stock composition of legal and sub-legal sized Chinook salmon by month in all reference fisheries conducted within active MSFs combined in 2024 (n= 1605). See Methods for legal and sub-

legal definitions. Numbers at the top of each bar are the sample size of Chinook caught in the reference fishery in each category.

**Victoria and Haro Strait (portions of PFMA 19)**

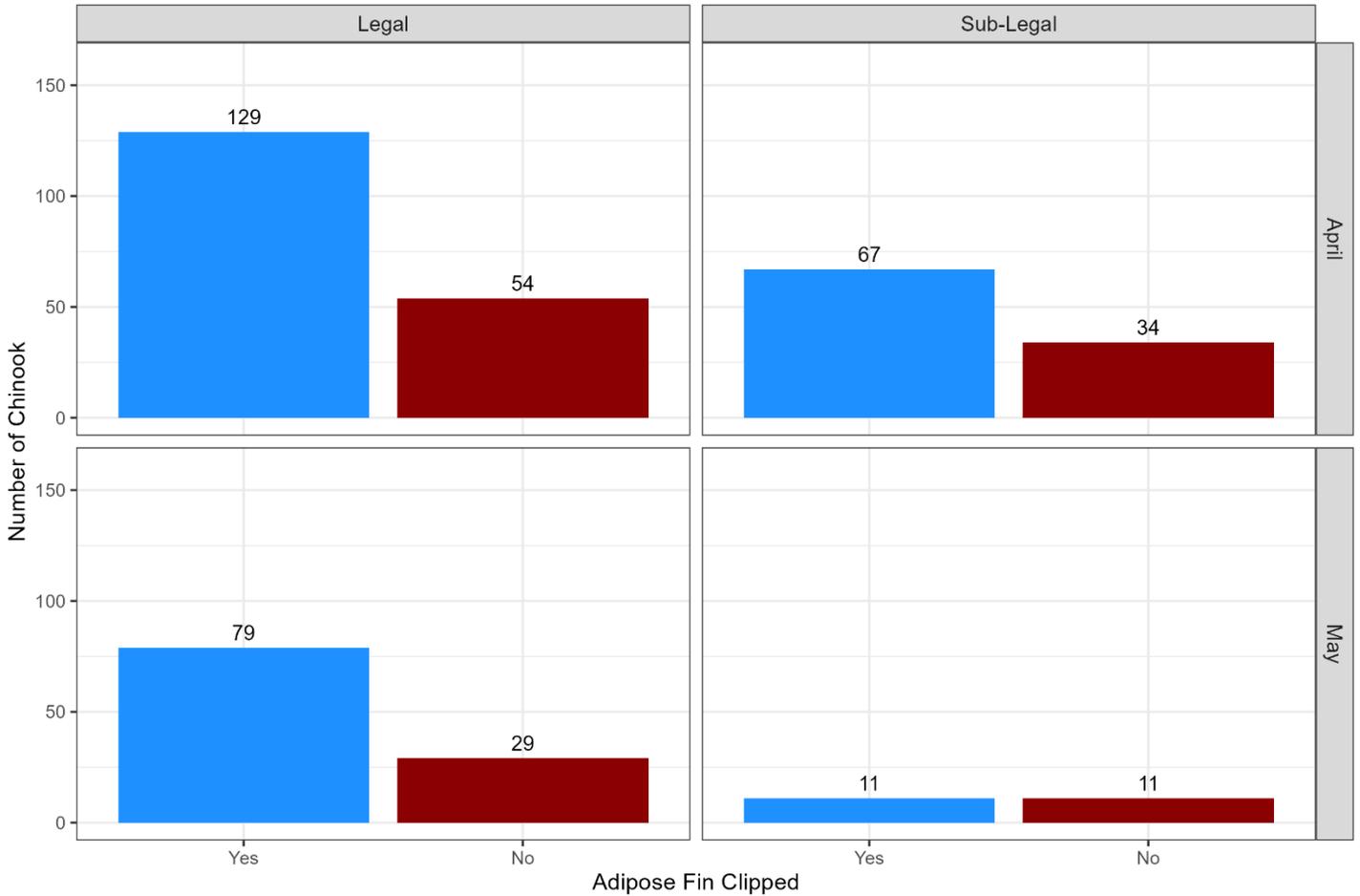


Figure 3: Mark rate of legal and sub-legal sized Chinook salmon by month sampled in the Victoria and Haro Strait (portions of PFMA 19) MSF 2024.

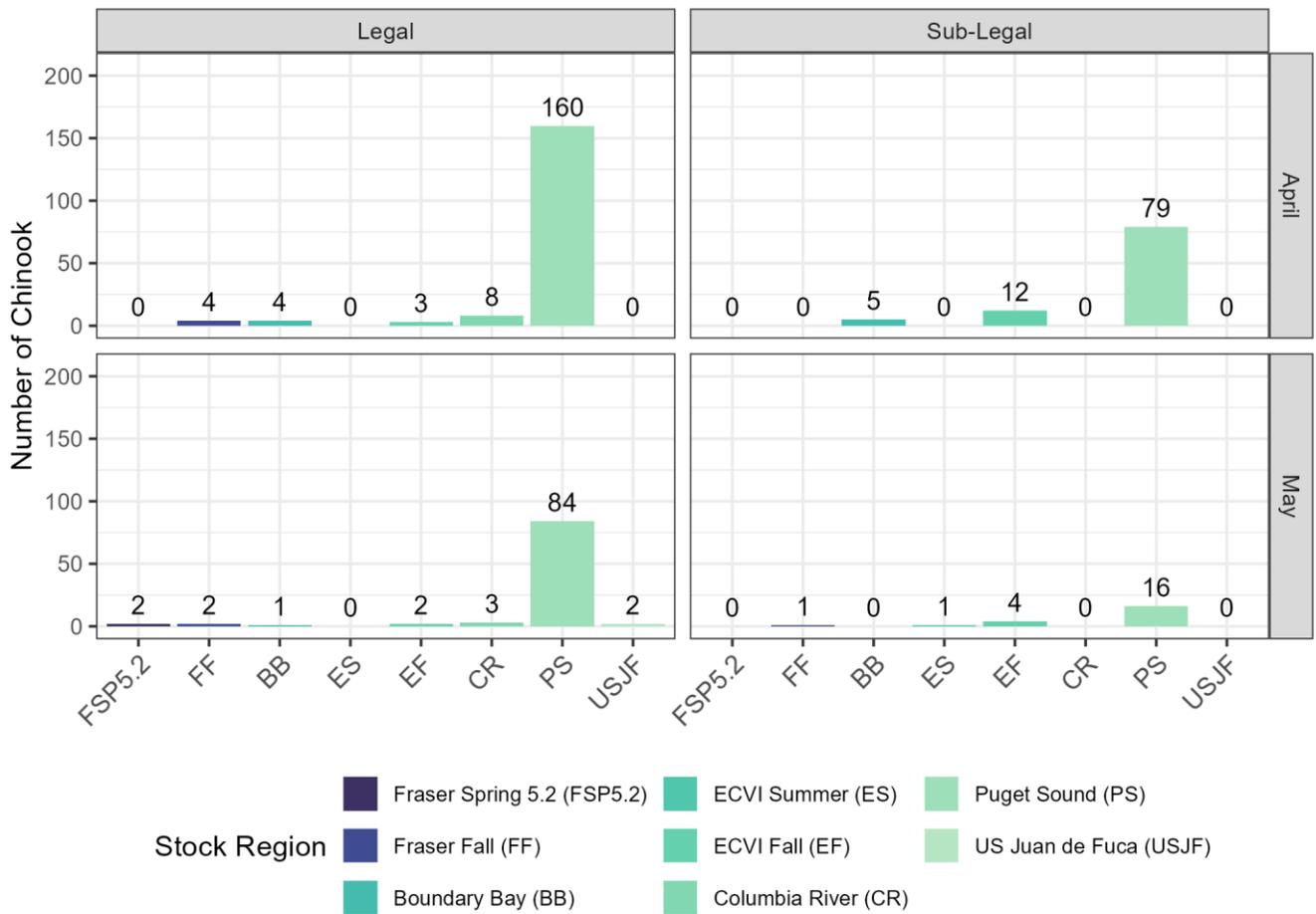


Figure 4: Stock composition of Chinook salmon by month in the Victoria and Haro Strait (portions of PFMA 19) MSF in 2024. See methods for legal and sub-legal definitions.

### Gulf Islands & Saanich Inlet (portions of PFMA 17, 18, and 19)

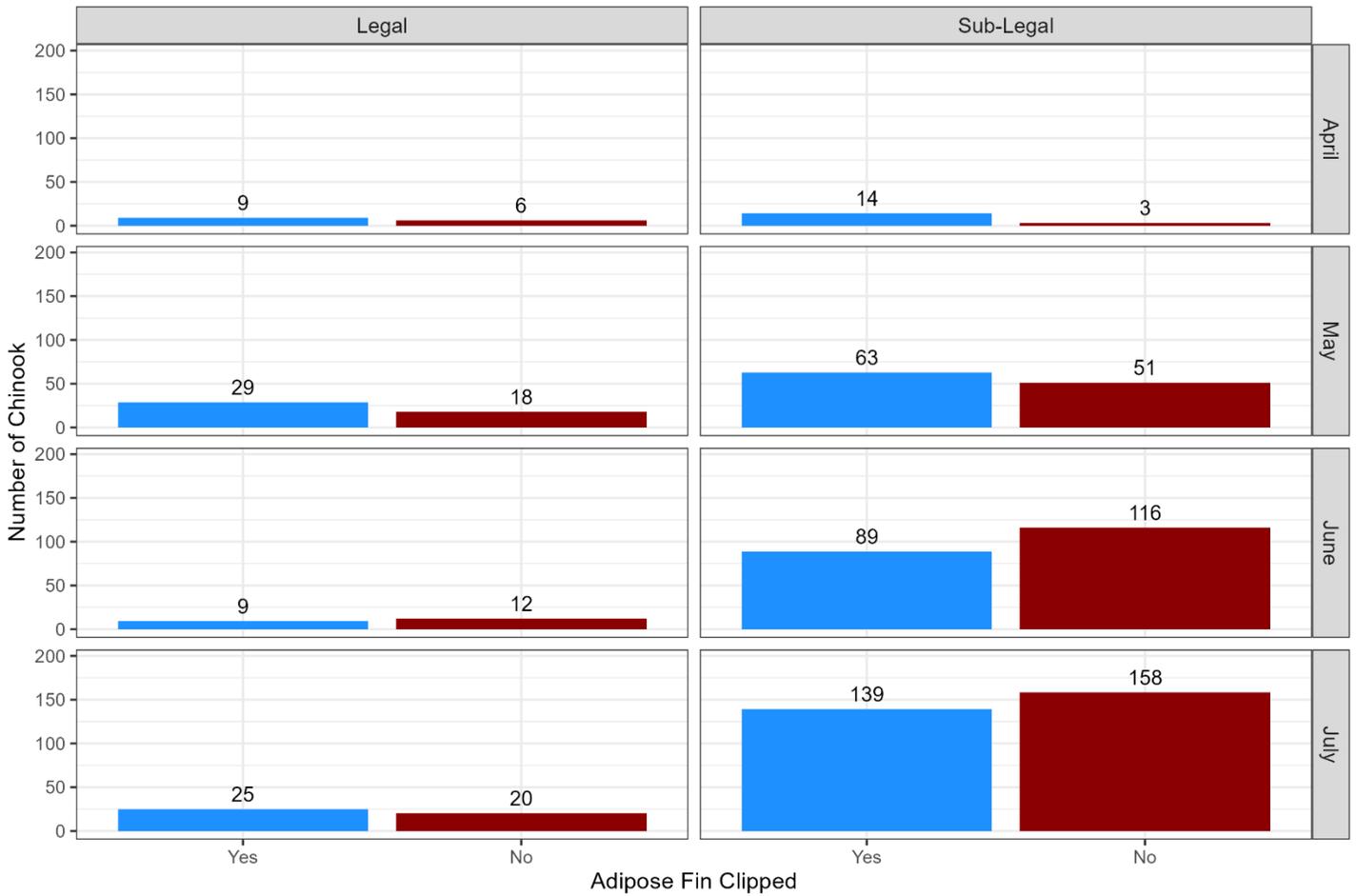


Figure 5: Mark rate of legal and sub-legal sized Chinook salmon by month in the Gulf Islands and Saanich Inlet (portions of PFMA 17, 18, and 19) MSF in 2024.

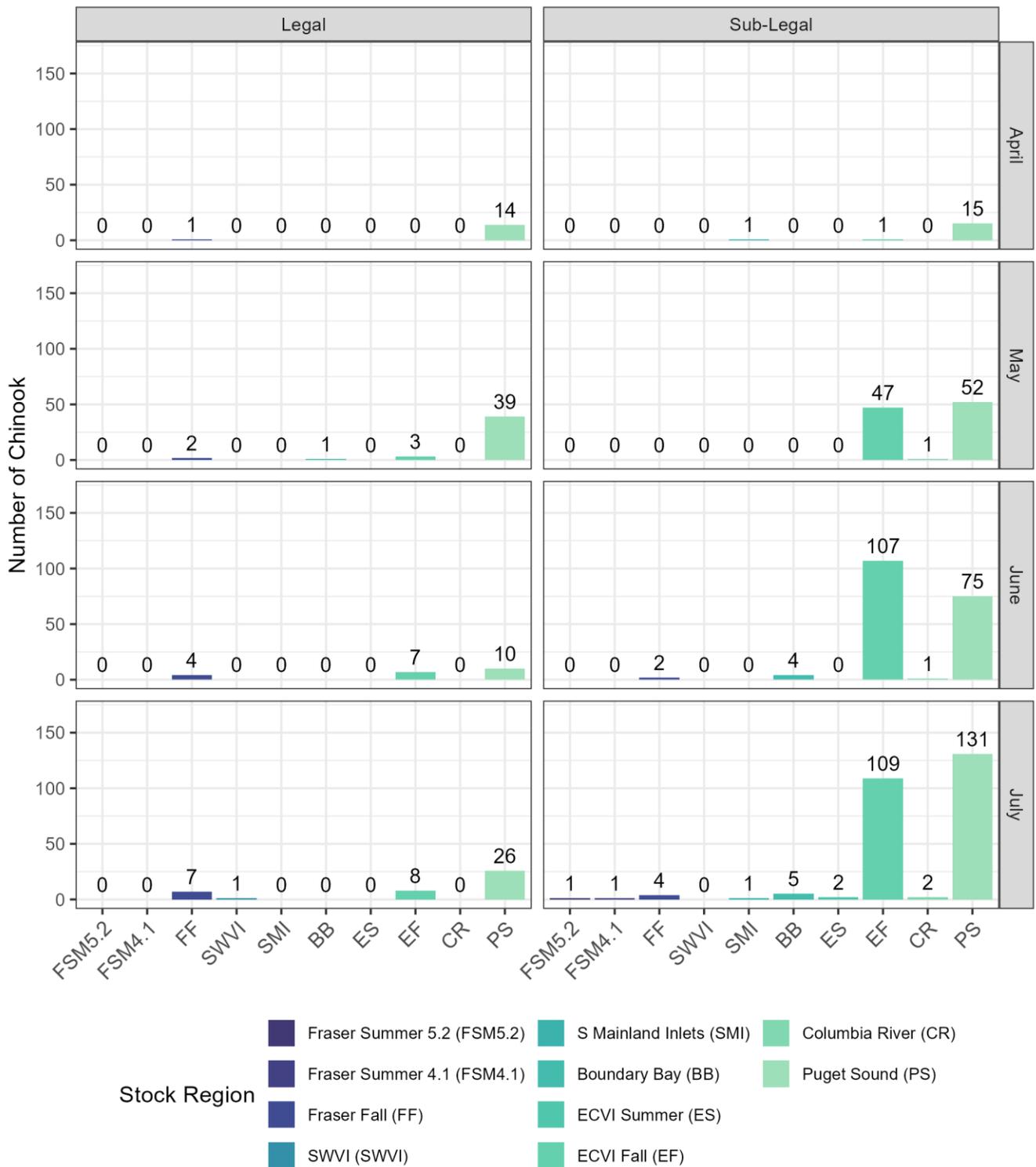


Figure 6: Stock composition of Chinook salmon by month in the Gulf Islands and Saanich Inlet (portions of PFMA 17, 18, and 19) MSF in 2024. See methods for legal and sub-legal definitions.

**Becher Bay (Portions of PFMA 20)**

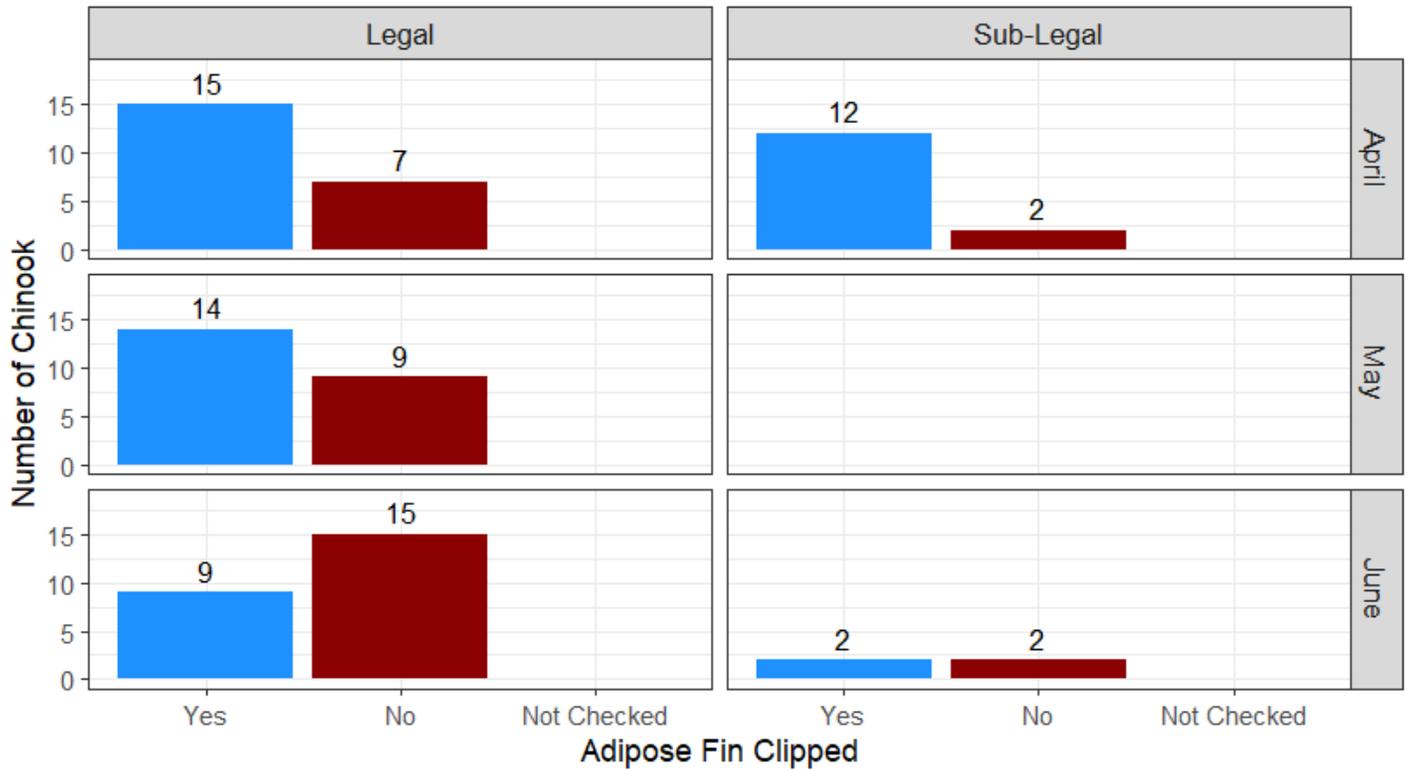


Figure 7: Mark rate of legal and sub-legal sized Chinook salmon by month in the Becher Bay (Portion of PFMA 20) MSF in 2024.

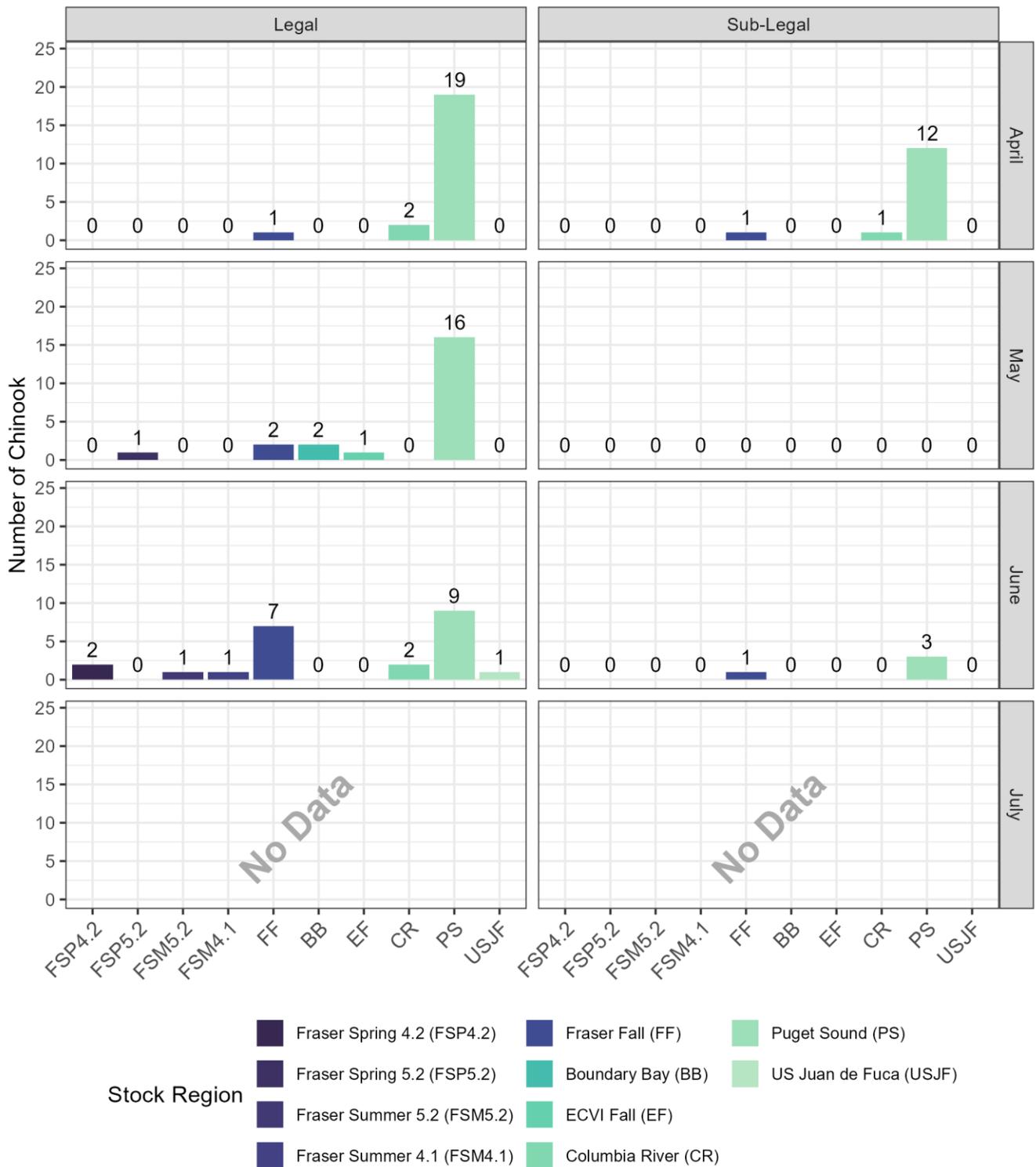


Figure 8: Stock composition of Chinook salmon by month in the Becher Bay (portions of PFMA 20) MSF in 2024. See methods for legal and sub-legal definitions. “No Data” indicates that the MSF was active during the month, but the Chinook reference fishery was not in operation.

### Sechelt Inlet (portions of PFMA 16)

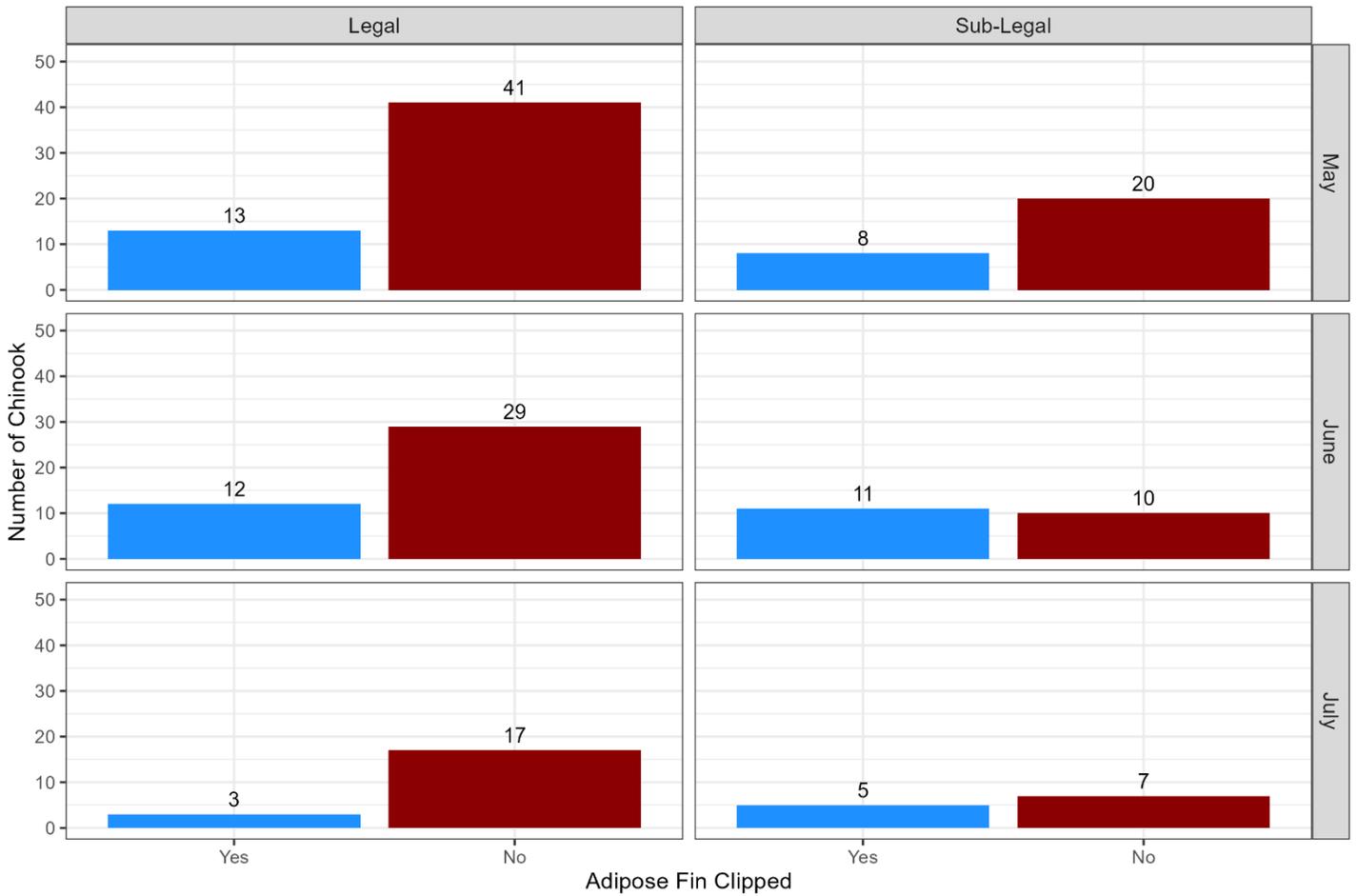


Figure 9: Mark rate of legal and sub-legal sized Chinook salmon by month in Sechelt Inlet (portions of PFMA 16) MSF in 2024.

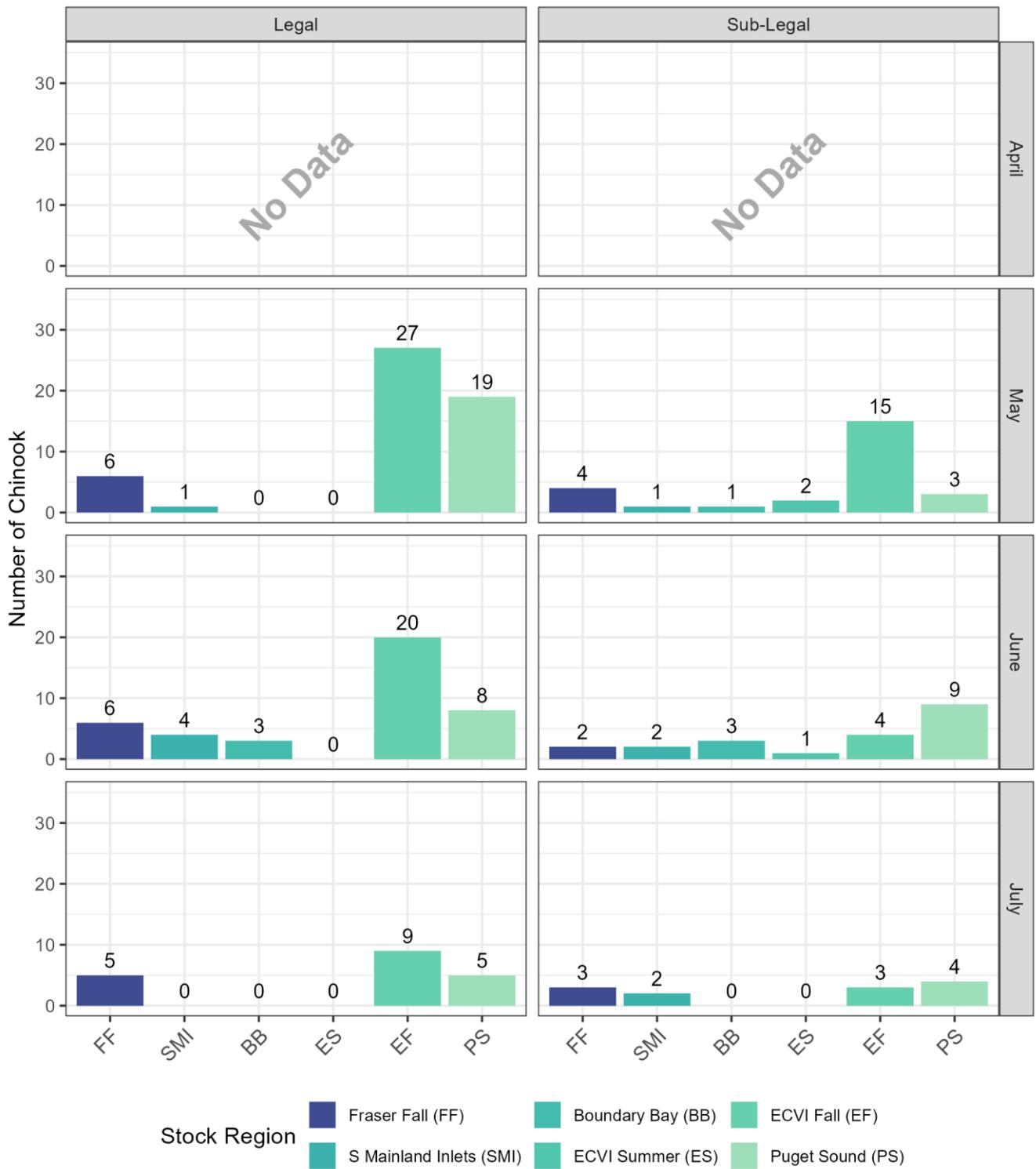


Figure 10: Stock composition of Chinook salmon by month in the Sechelt Inlet (portions of PFMA 16) MSF in 2024. See methods for legal and sub-legal definitions. “No Data” indicates that the MSF was active during the month, but the Chinook reference fishery was not in operation.

### Bute Inlet (Portions of PFMA 13)

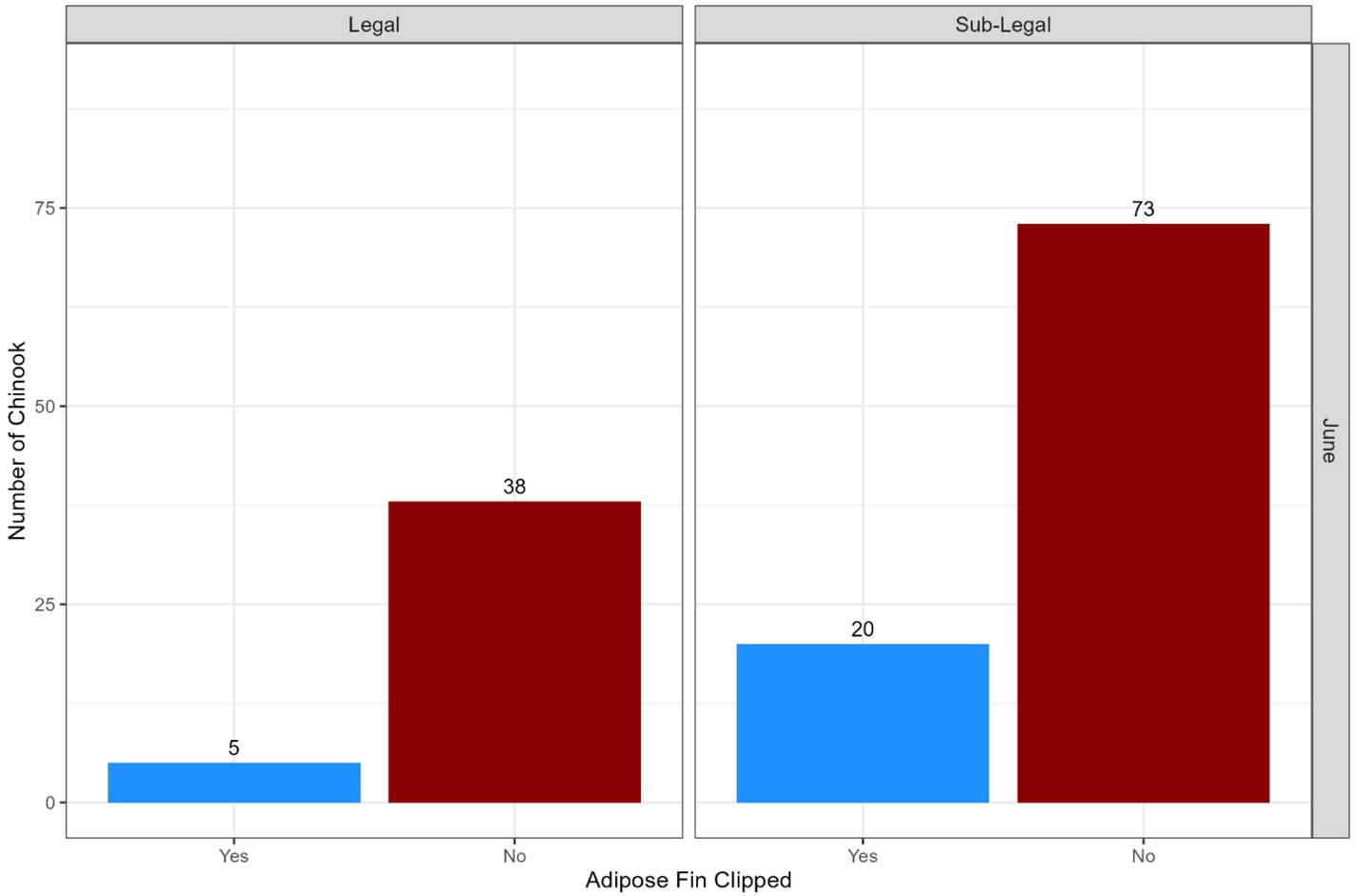


Figure 11: Mark rate of legal and sub-legal sized Chinook salmon in the Bute Inlet (Portion of PFMA 13) MSF in June 2024.

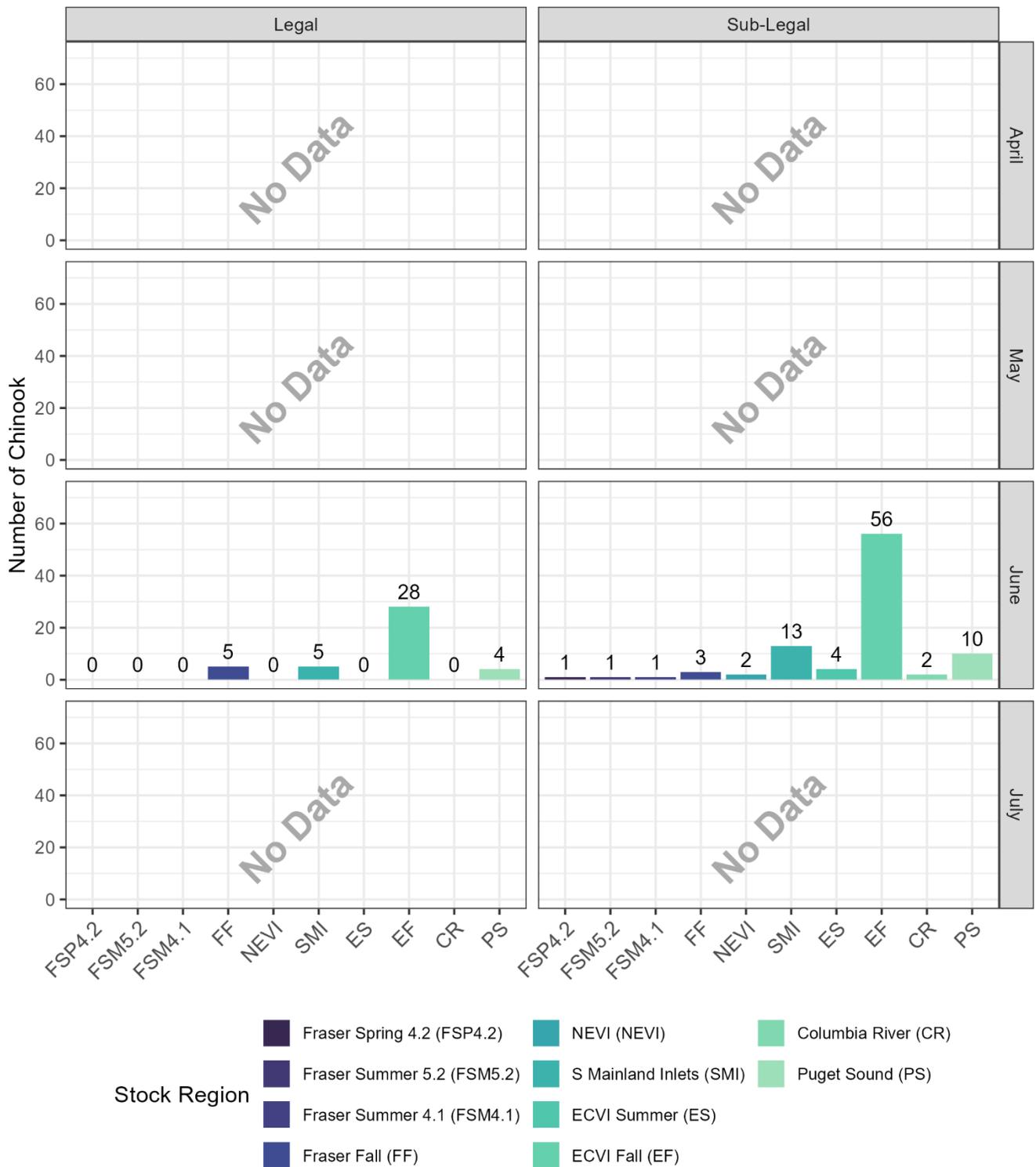


Figure 12: Stock composition of Chinook salmon by month in Bute Inlet (Portions of PFMA 13) MSF in June 2024. See methods for legal and sub-legal definitions. “No Data” indicates that the MSF was active during the month, but the Chinook reference fishery was not in operation.

### Toba Inlet (Portions of PFMA 15)

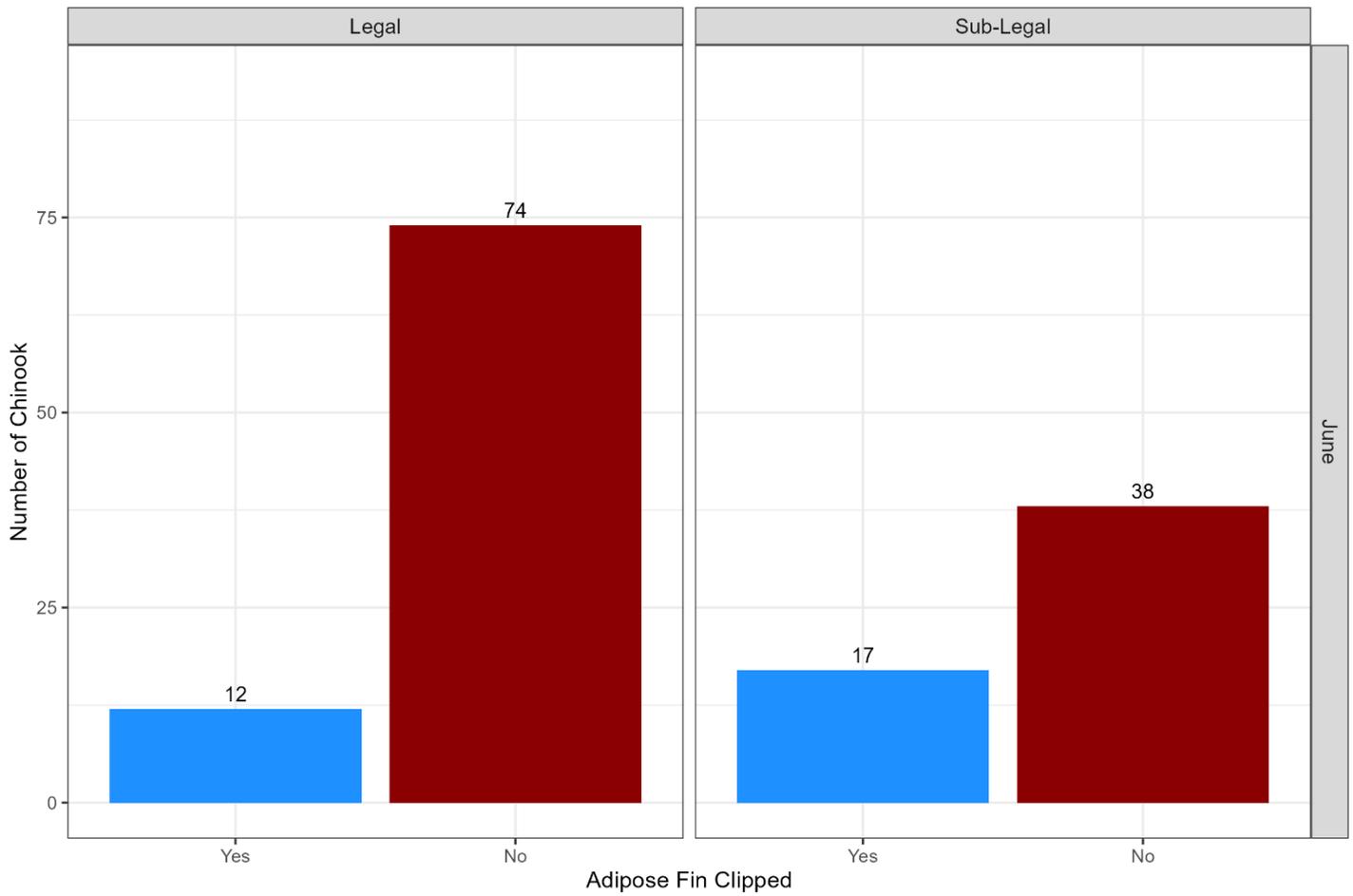


Figure 13: Mark rate of legal and sub-legal sized Chinook salmon in the Toba Inlet (portion of PFMA 15) MSF in June 2024.

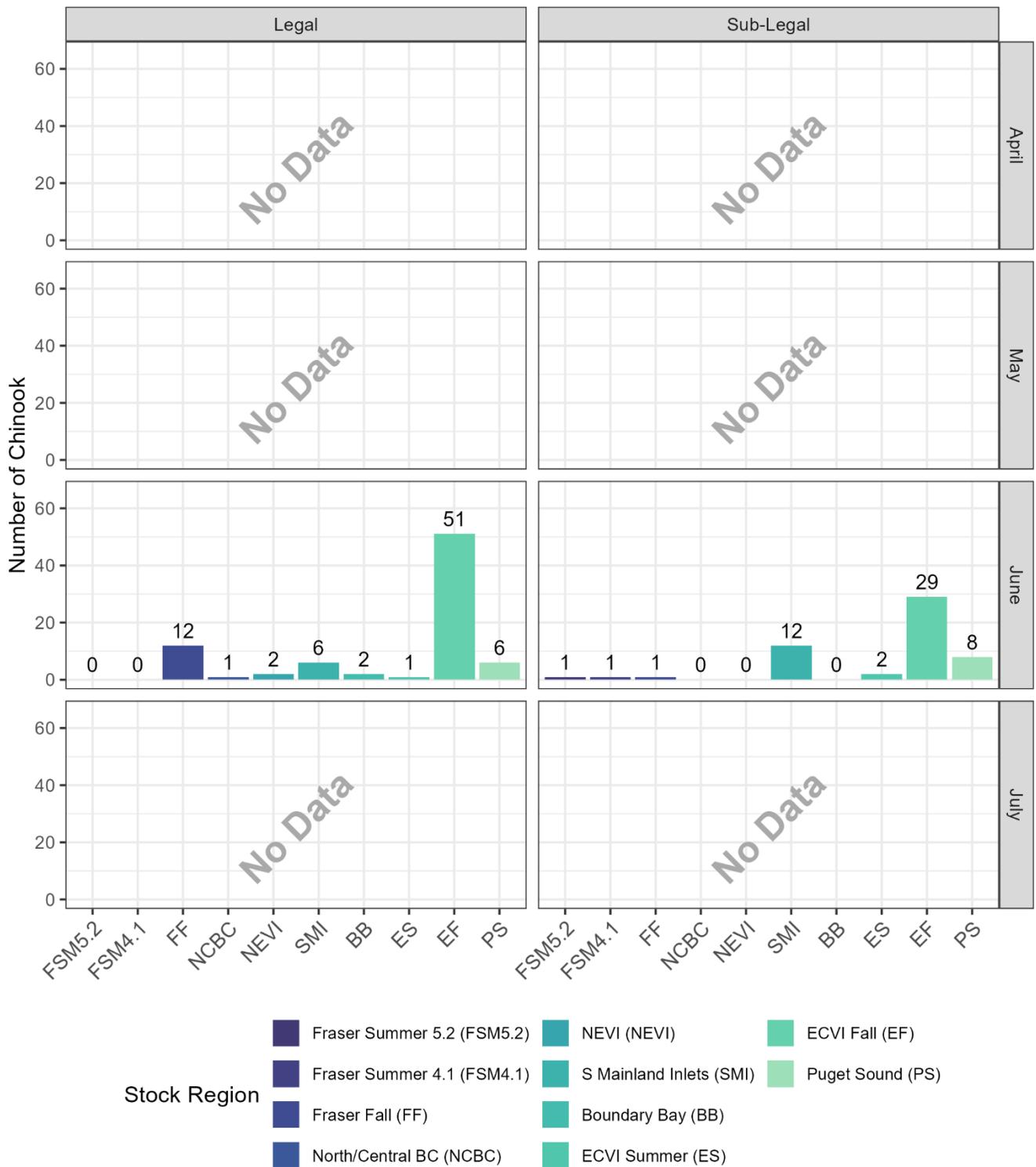


Figure 14: Stock composition of Chinook salmon by month in Toba Inlet (portions of PFMA 15) MSF in 2024. See methods for legal and sub-legal definitions. “No Data” indicates that the MSF was active during the month, but the Chinook reference fishery was not in operation.

## Howe Sound (Portions of PFMA 28)

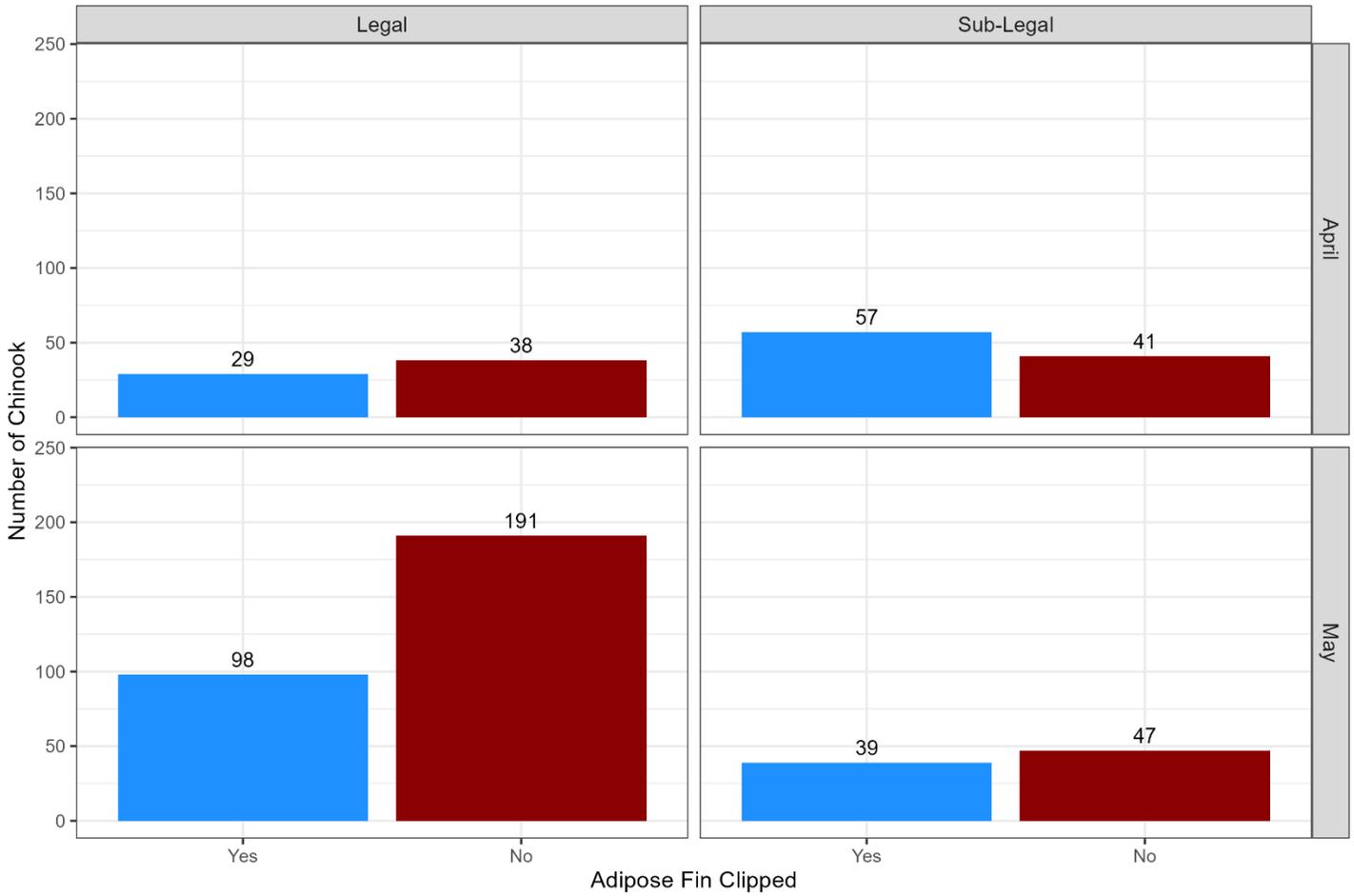


Figure 15: Mark rate of legal and sub-legal sized Chinook salmon by month in the Howe Sound (portion of PFMA 28) MSF in 2024.

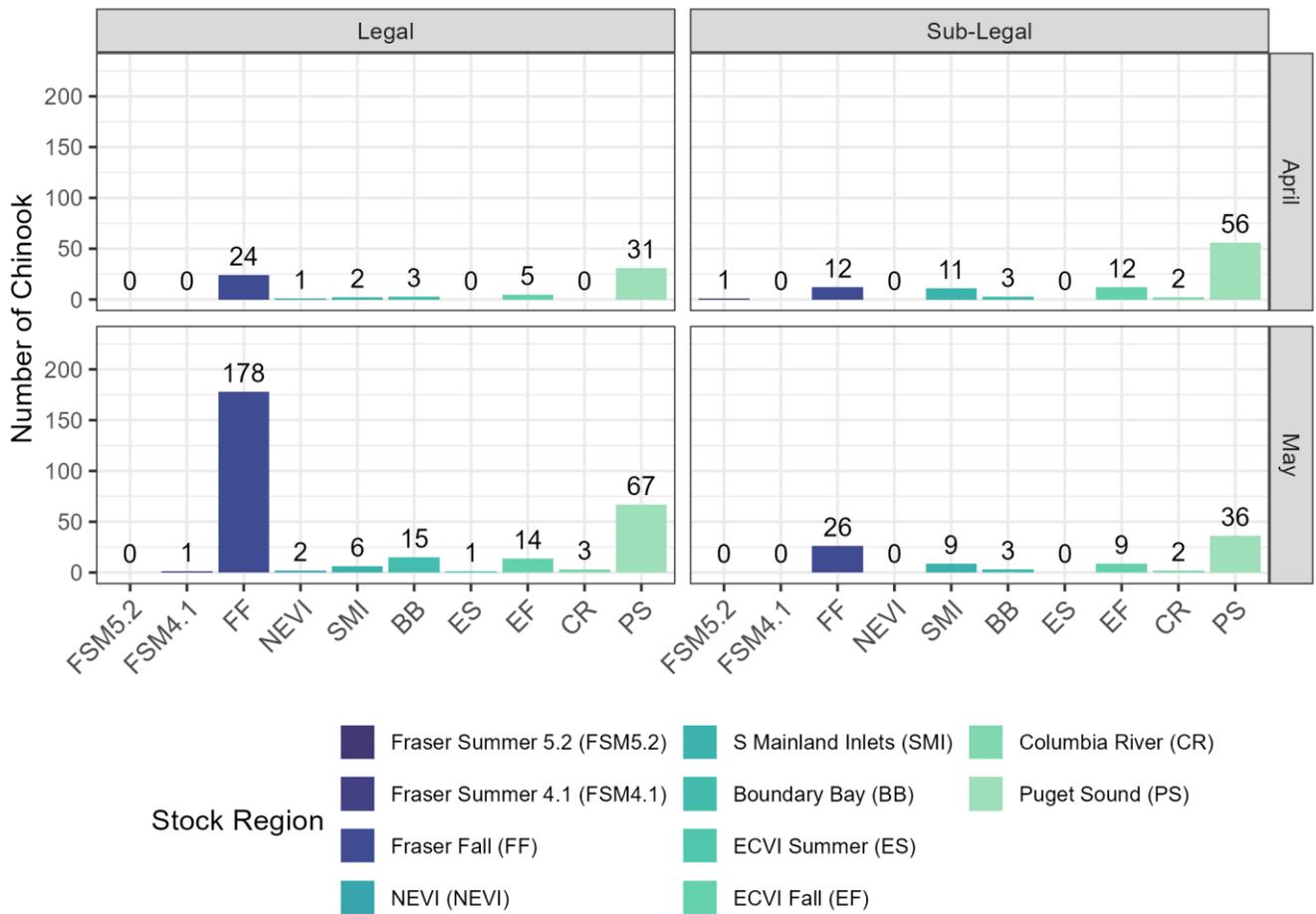


Figure 16: Stock composition of Chinook salmon by month in Howe Sound (portions of PFMA 28) MSF in 2024. See methods for legal and sub-legal definitions.

## Nootka Sound (Portions of PFMA 25)

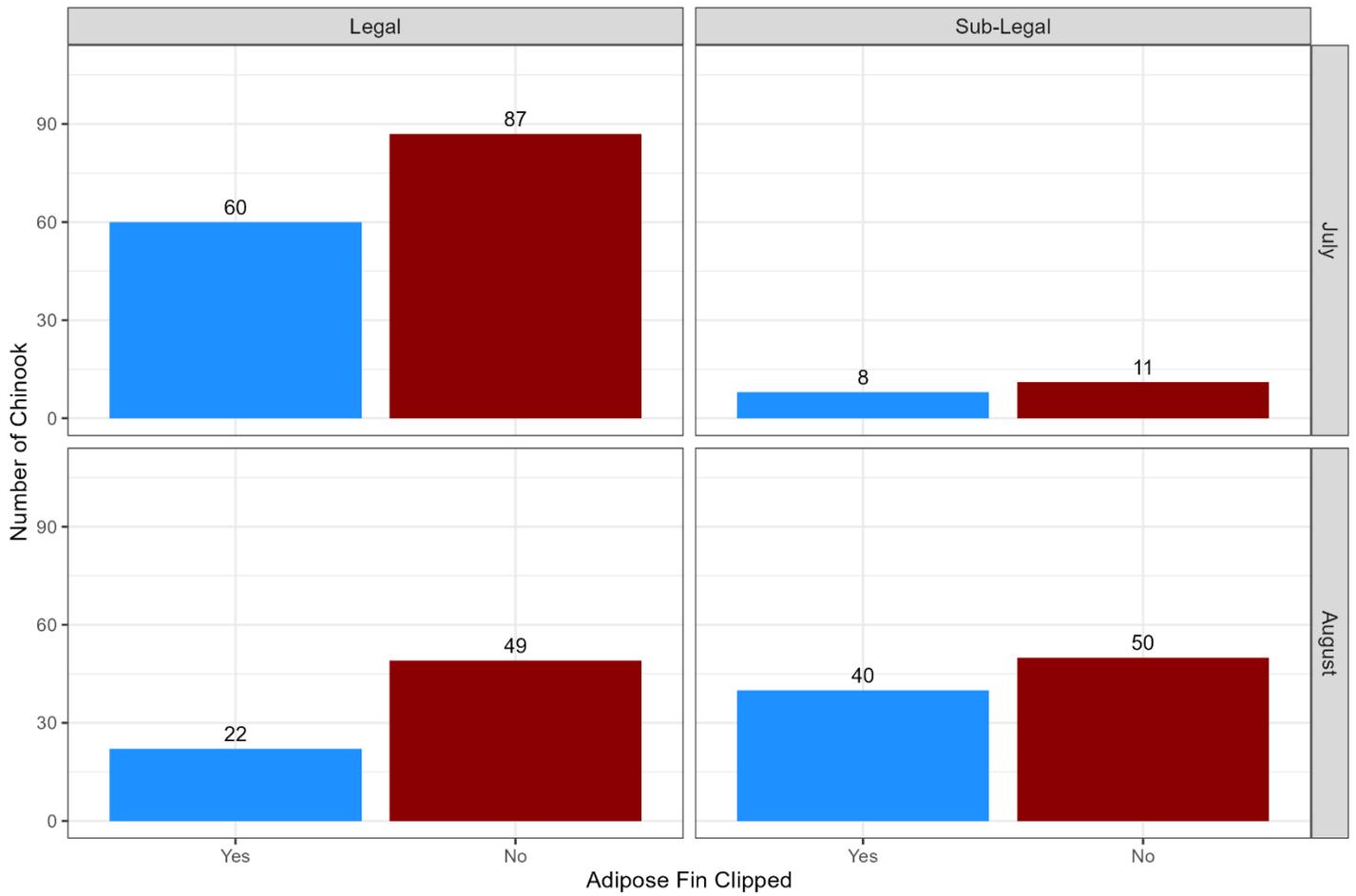


Figure 17: Mark rate of legal and sub-legal sized Chinook salmon by month in the Nootka Sound (Portion of PFMA 25) MSF in 2024.

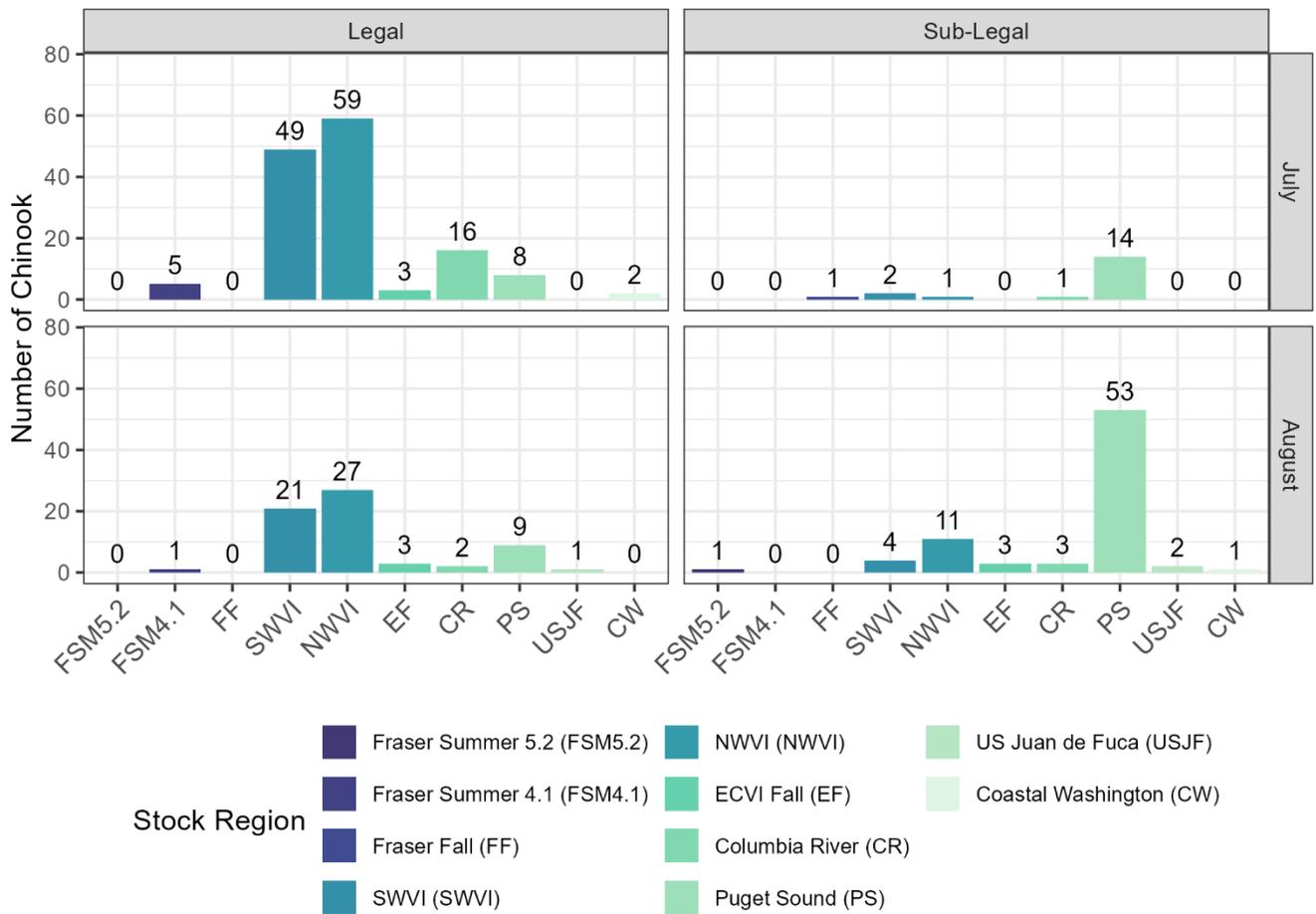


Figure 18: Stock composition of Chinook salmon by month in Nootka Sound (portions of PFMA 25) MSF in 2024. See methods for legal and sub-legal definitions.

## APPENDIX A – MAPS

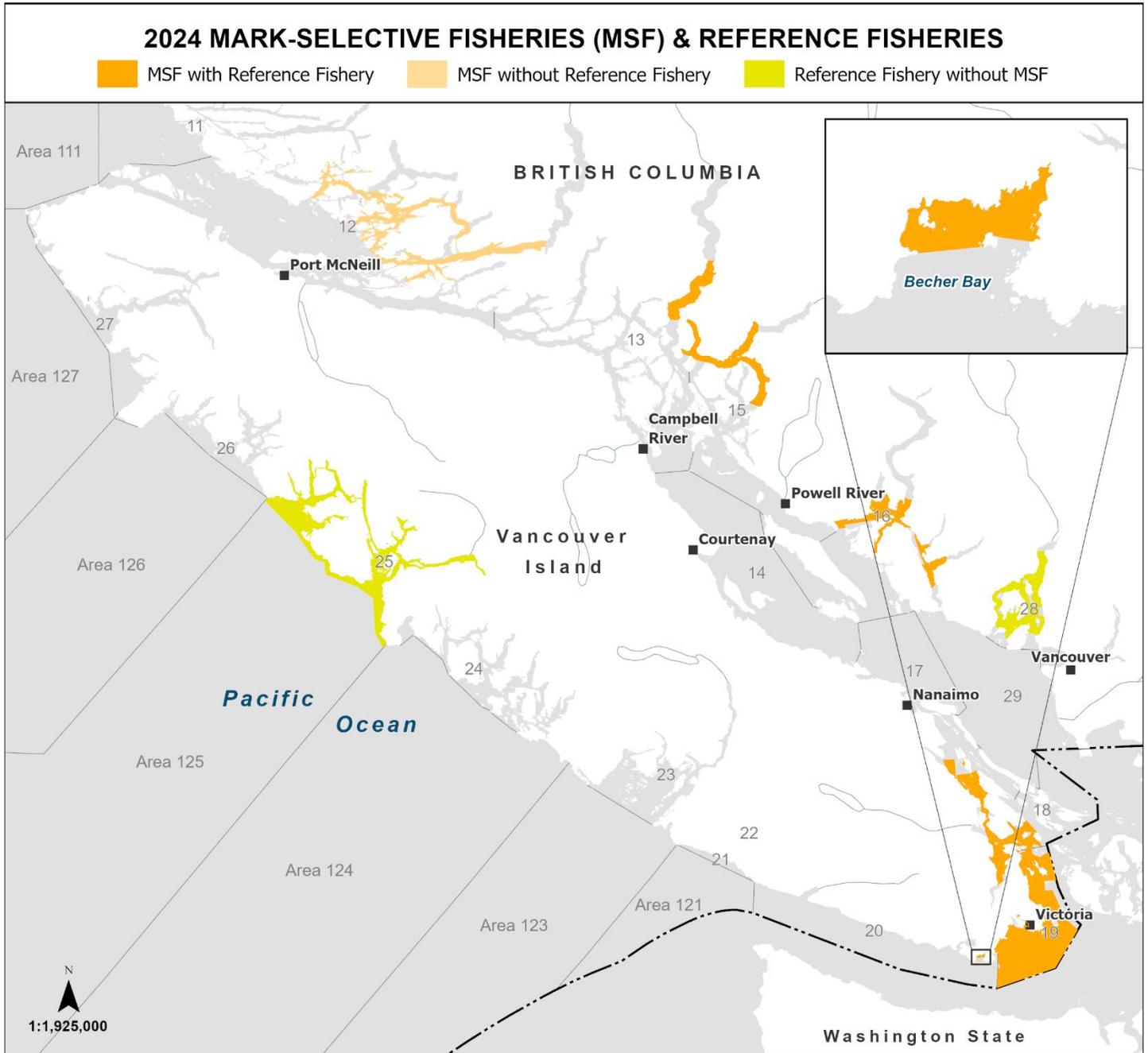


Figure A1: Map of MSFs with Chinook reference fisheries, MSFs without Chinook reference fisheries and areas without MSFs but with Chinook reference fisheries in the DFO South Coast Area in 2024.

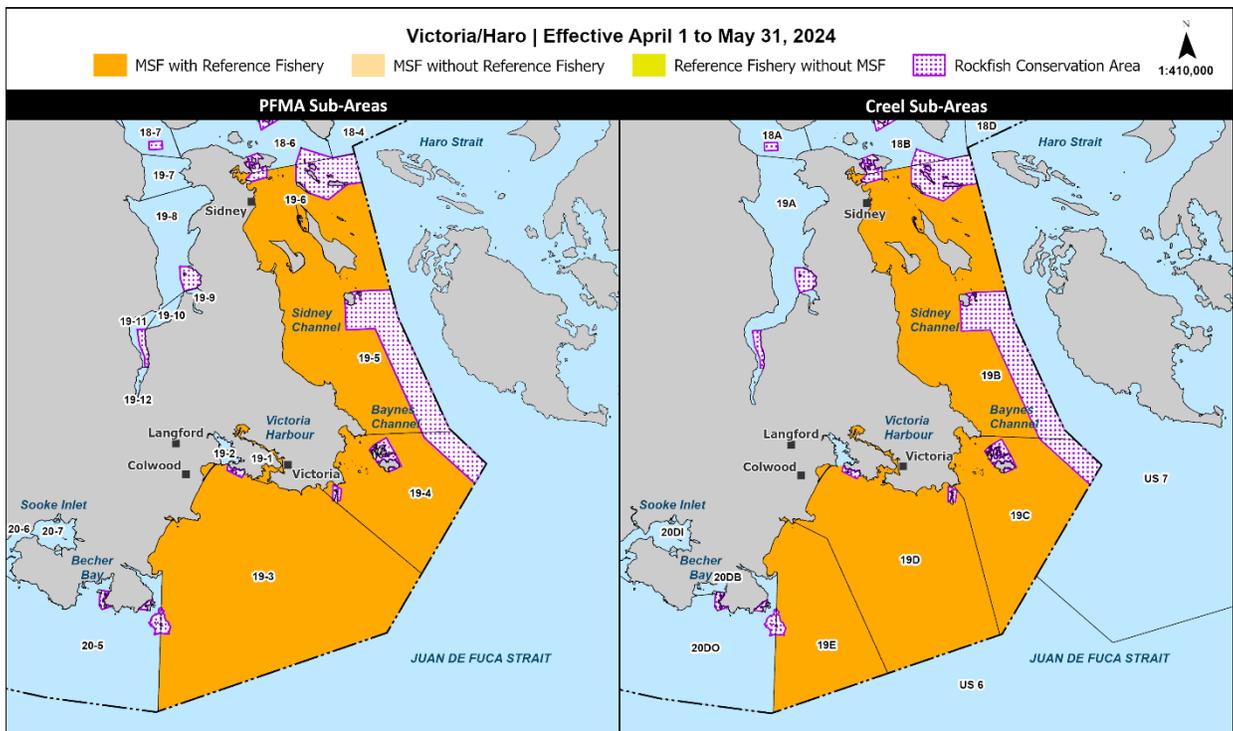


Figure A2: Map of the MSF in Victoria/Haro Strait MSF (Portions of PFMA 19). PFMA sub-areas are shown on the left and creel sub-areas are shown on the right.

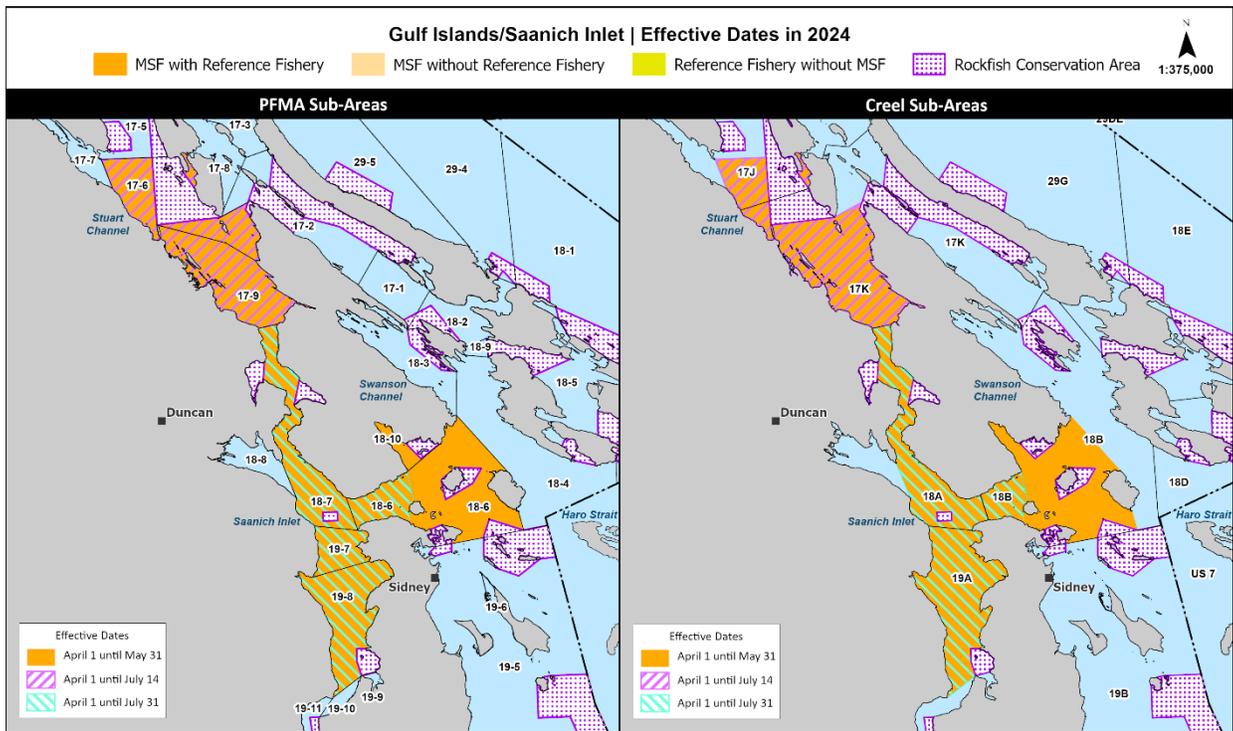


Figure A3: Map of the MSF in the Gulf Islands/Saanich Inlet (Portions of PFMA 17, 18, and 19). PFMA sub-areas are shown on the left and creel sub-areas are shown on the right.

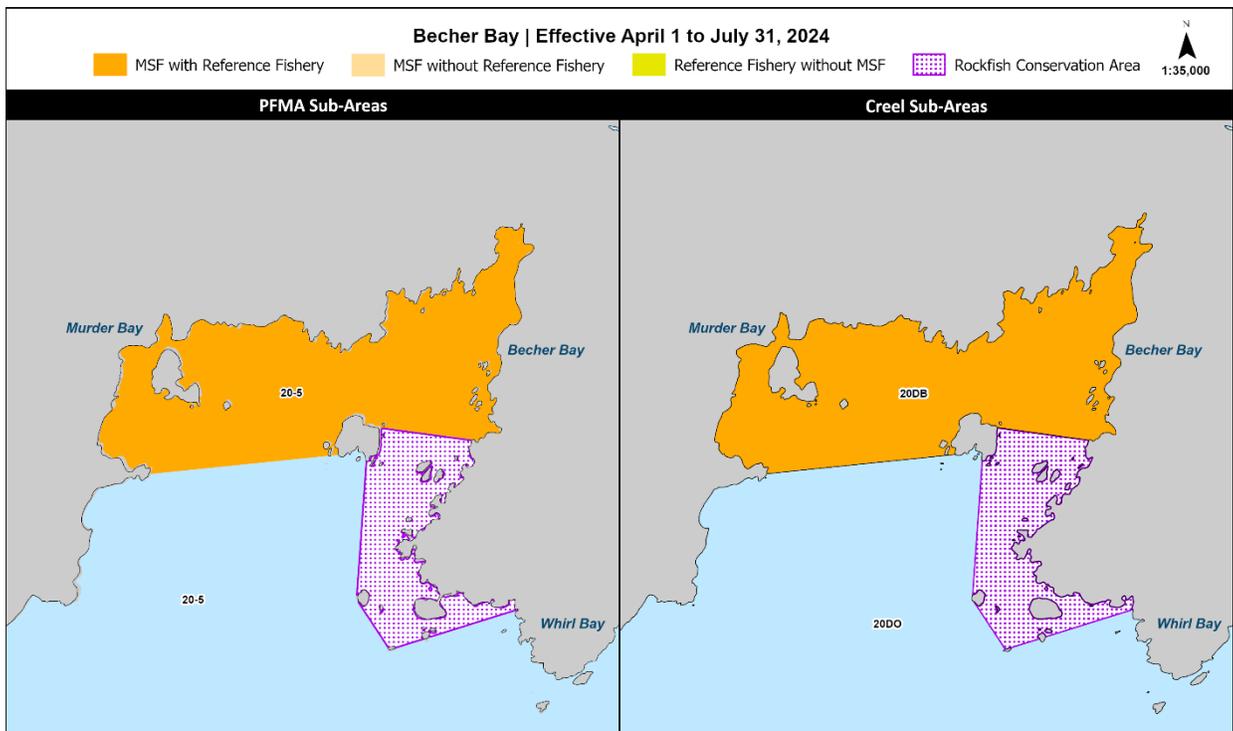
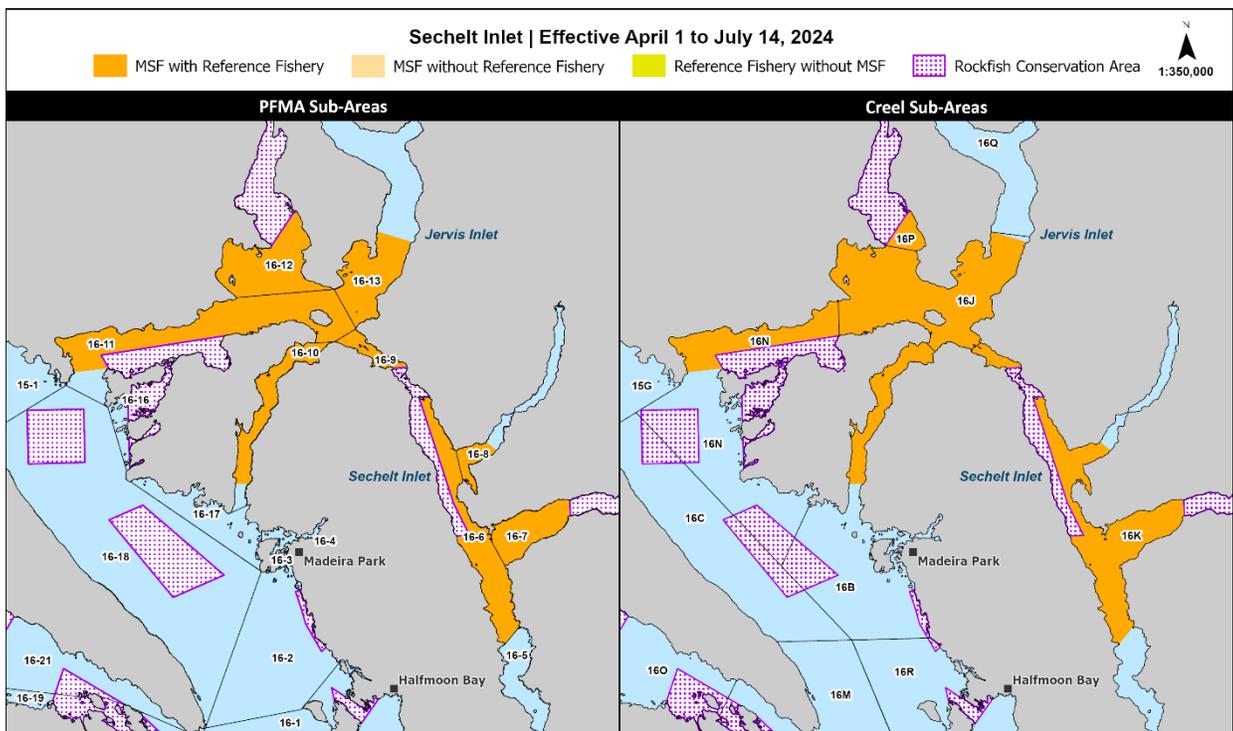


Figure A4: Map of the MSF in Becher Bay MSF (Portions of PFMA 20). PFMA sub-areas are shown on the left and creel sub-areas are shown on the right.







## APPENDIX B – ONLINE DATA DESCRIPTORS

This dataset ([found here](#)) contains detailed information for each Chinook sampled during the reference fishery. Each record includes catch date, catch location (at the creel sub-area level), fork length (in cm), size class, resolved stock region (aligned with the Stock Management Unit or SMU), the probability associated with that region, and up to five DNA stock assignments. Each DNA stock assignment includes the stock name, the region, and its associated probability.

DNA Stocks 1 through 5 represent the five most likely stock-level assignments for each Chinook sampled, ranked by decreasing probability. These assignments are typically at the scale of individual rivers or hatcheries. A value of 1.0 in the “Probability 1” column followed by “NA” in Probability 2–5 indicates that the stock assignment was probably made through parentage-based tagging, which is a definitive method with no associated uncertainty.

The Resolved Stock Region is the broader stock region with the highest cumulative probability across all five DNA assignments. This level of identification provides the greatest confidence and is best suited for identifying stocks of concern. These regions generally correspond to Canada’s SMUs, which are used in Integrated Fisheries Management Plans (IFMPs).

### Column Descriptions:

- **Catch Date:** Date the fish was captured and sampled.
- **Creel Sub-Area:** The creel sub-area (geographic unit) where the fish was caught.
- **Adipose Fin Clipped:** Indicates whether the fish is hatchery-marked. “Y” means the adipose fin is missing and healed (i.e., clipped); “N” means the fin is present.
- **Length (cm):** Fork length of the fish (from nose to tail fork) measured in centimeters.
- **Resolved Stock Region:** The stock region (aligned with SMUs) with the highest total probability summed across the five DNA stock assignments. This is considered the most reliable regional-level assignment.
- **Resolved Stock Region Probability:** The total (summed) probability of all DNA assignments that belong to the resolved stock region.
- **DNA Stock 1:** The most likely individual stock assignment, based on DNA, with the highest probability.
- **DNA Stock Region 1:** The broader stock region associated with DNA Stock 1.
- **Probability 1:** The probability that the fish belongs to DNA Stock 1.
- **DNA Stock 2:** The second most likely individual stock assignment.
- **DNA Stock Region 2:** The broader stock region associated with DNA Stock 2.
- **Probability 2:** The probability that the fish belongs to DNA Stock 2.
- **DNA Stock 3:** The third most likely individual stock assignment.
- **DNA Stock Region 3:** The broader stock region associated with DNA Stock 3.
- **Probability 3:** The probability that the fish belongs to DNA Stock 3.
- **DNA Stock 4:** The fourth most likely individual stock assignment.
- **DNA Stock Region 4:** The broader stock region associated with DNA Stock 4.
- **Probability 4:** The probability that the fish belongs to DNA Stock 4.
- **DNA Stock 5:** The fifth most likely individual stock assignment.
- **DNA Stock Region 5:** The broader stock region associated with DNA Stock 5.
- **Probability 5:** The probability that the fish belongs to DNA Stock 5.