



MONITORING CHINOOK MARK SELECTIVE FISHERIES – REFERENCE FISHERY: 2023 Results, 2024 Results

Erin Rechisky (erin.rechisky@dfo-mpo.gc.ca), Philip Lemp,
Nicholas Bohlender, Kevin Pellett, Aswea Porter

South Coast Area (salmon) Stock Assessment

Peter Hall

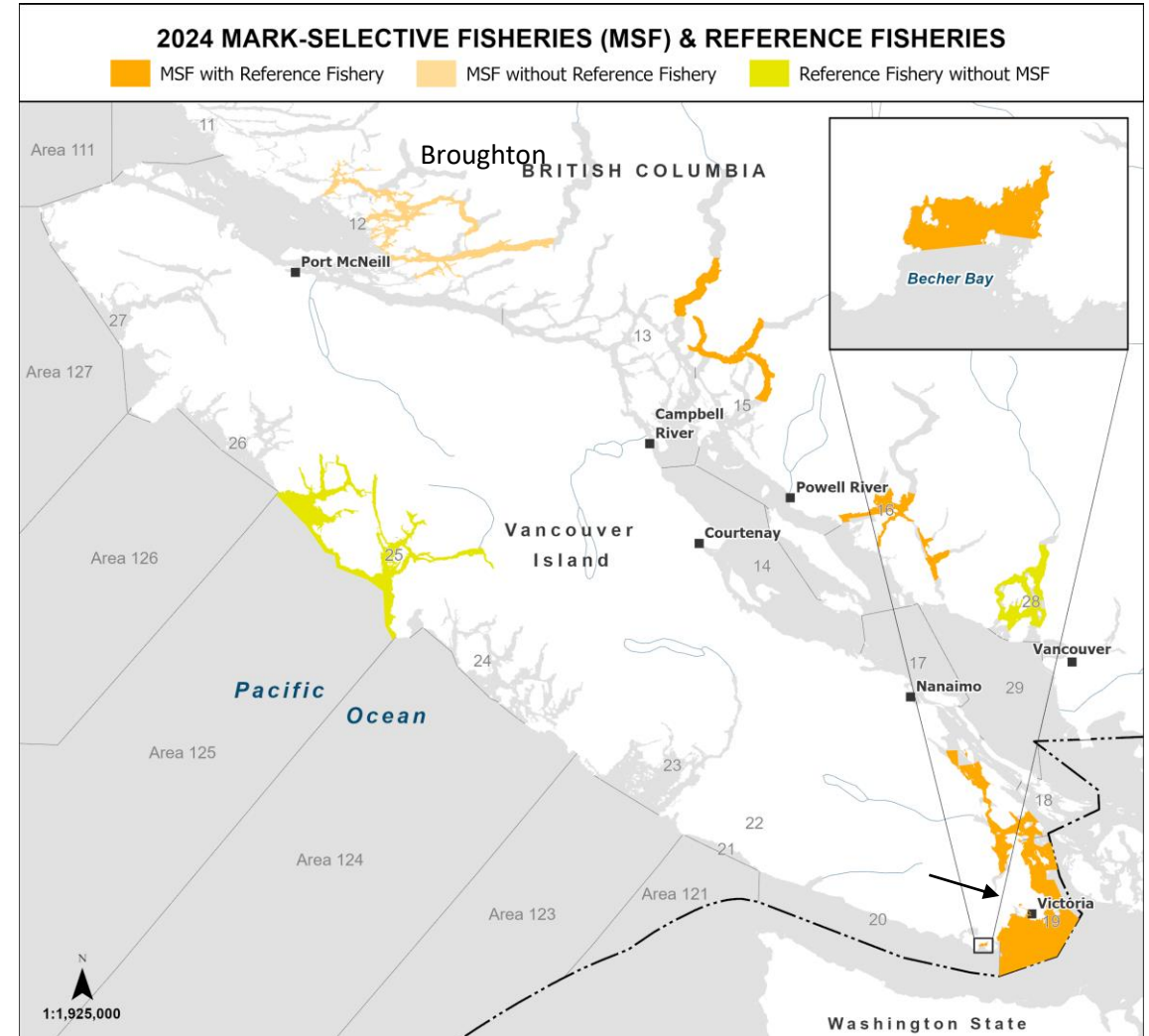
WCVI Resource Management

Pacific Region | Fisheries and Oceans Canada



Background

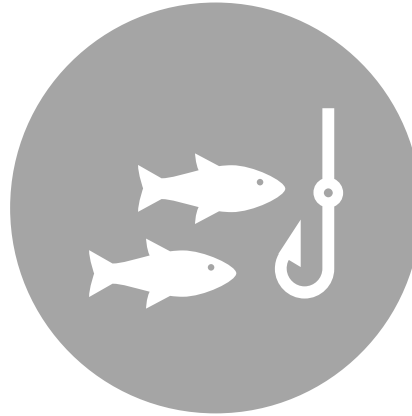
- Chinook recreational fishery closures were implemented to protect stocks of concern (2019).
- Chinook mark-selective fisheries (MSFs) were introduced in 2021.
- Additional MSFs were introduced in 2023, and reference fisheries were initiated in all pure MSFs.
- Pacific Salmon Strategy Initiative (PSSI) supported enhanced monitoring in 2023 & 2024 by:
 - Expanding dockside interviews and flights
 - **Initiating a DFO-led Chinook Reference Fishery**
- BC Salmon Restoration and Innovation Fund (BCSRIF) is supporting the Sport Fishing Institute of BC (SFI) to work collaboratively with DFO to provide guides and vessels (2023-2025).
- In 2024, a reference fishery was conducted in Area 28 (Howe Sound), which does not have an MSF.
- In addition, a reference fishery was conducted in Area 25 (Nootka) supported by the Pacific Salmon Commission, which does not have an MSF.



Reference Fishery Objectives



INDEPENDENTLY VERIFY AT-SEA
RELEASE ESTIMATES FROM DFO'S
RECREATIONAL CATCH
MONITORING PROGRAM



ESTIMATE PROPORTION OF
"MARKED" CHINOOK (ADIPOSE FIN
REMOVED)



IDENTIFY STOCK
IN A PURE MSF, NON-MARKED FISH
CANNOT BE OBTAINED DURING
DFO'S DOCKSIDE BIOSAMPLING

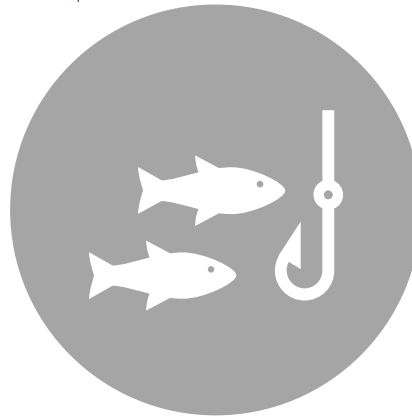
Reference Fishery Objectives

This analysis is underway:



INDEPENDENTLY VERIFY AT-SEA
RELEASE ESTIMATES FROM DFO'S
RECREATIONAL CATCH
MONITORING PROGRAM

This presentation addresses these elements:



ESTIMATE PROPORTION OF
"MARKED" CHINOOK (ADIPOSE FIN
REMOVED)



IDENTIFY STOCK
IN A PURE MSF, NON-MARKED FISH
CANNOT BE OBTAINED DURING
DFO'S DOCKSIDE BIOSAMPLING



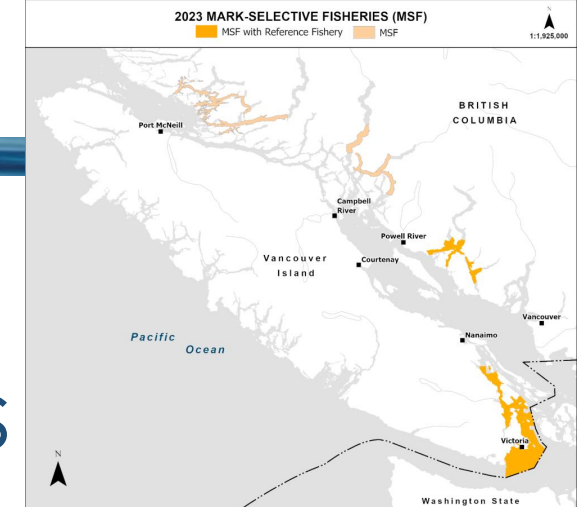
Reference Fishery Methods

- Vessels and guides were chartered to maximize catch per unit effort.
- Guides were directed to fish how and where they typically would within a designated MSF to simulate the recreational fishery.
- Data Collection
 - Adipose fin clip
 - Legal and sublegal size
 - Tissue sample for stock ID
 - Scan for PIT tag
 - Fish condition
- Handling was minimized and all fish were released.





2023 Pilot MSF openings and Associated Reference Fisheries

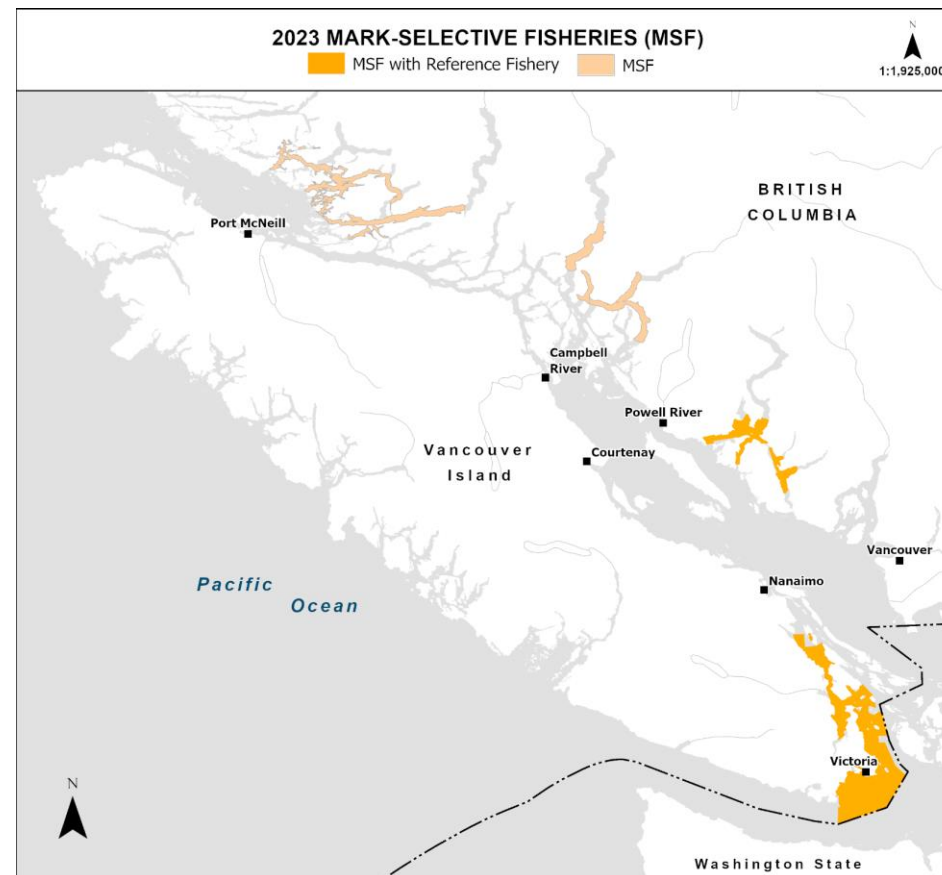


PFMA	PFMA Sub Areas	MSF Dates	Reference Fishery	Limits/Sizes
12 (Broughton)	12-26, 12-27, 12-28, 12-35, 12-38, 12-39, 12-40, 12-41	April 1 – July 14	None	Unmarked CN retention w/ maximum 80 cm size limit. Marked CN retention, , minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
13 and 15 (Bute and Toba Inlets)	13-19, 13-21 15-5 and 15-6	April 1 – July 14	None	Unmarked CN retention w/ maximum 80 cm size limit. Marked CN retention,, minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
16 (Sechelt Inlet)	16-6, 16-7, 16-8, 16-9, 16-10, 16-11 16-12, 16-13	April 1 – July 14	June 14 – July 13	Hatchery CN retention only, minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
17	17-6, 17-9	May 3 – July 14	May 4 – July 13	Hatchery CN 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	May 3 – July 31 (*18-6 open area decreases June 1)	May 4 – July 27	
19 (Victoria/Haro Strait)	19-1, 19-3, 19-4, 19-5, 19-6	May 3 – May 31	May 4 – 31	Hatchery CN 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	July 4 – 27	Hatchery CN retention only, minimum 45 cm fork length (no maximum). Limits: 1/day, 2 possession.



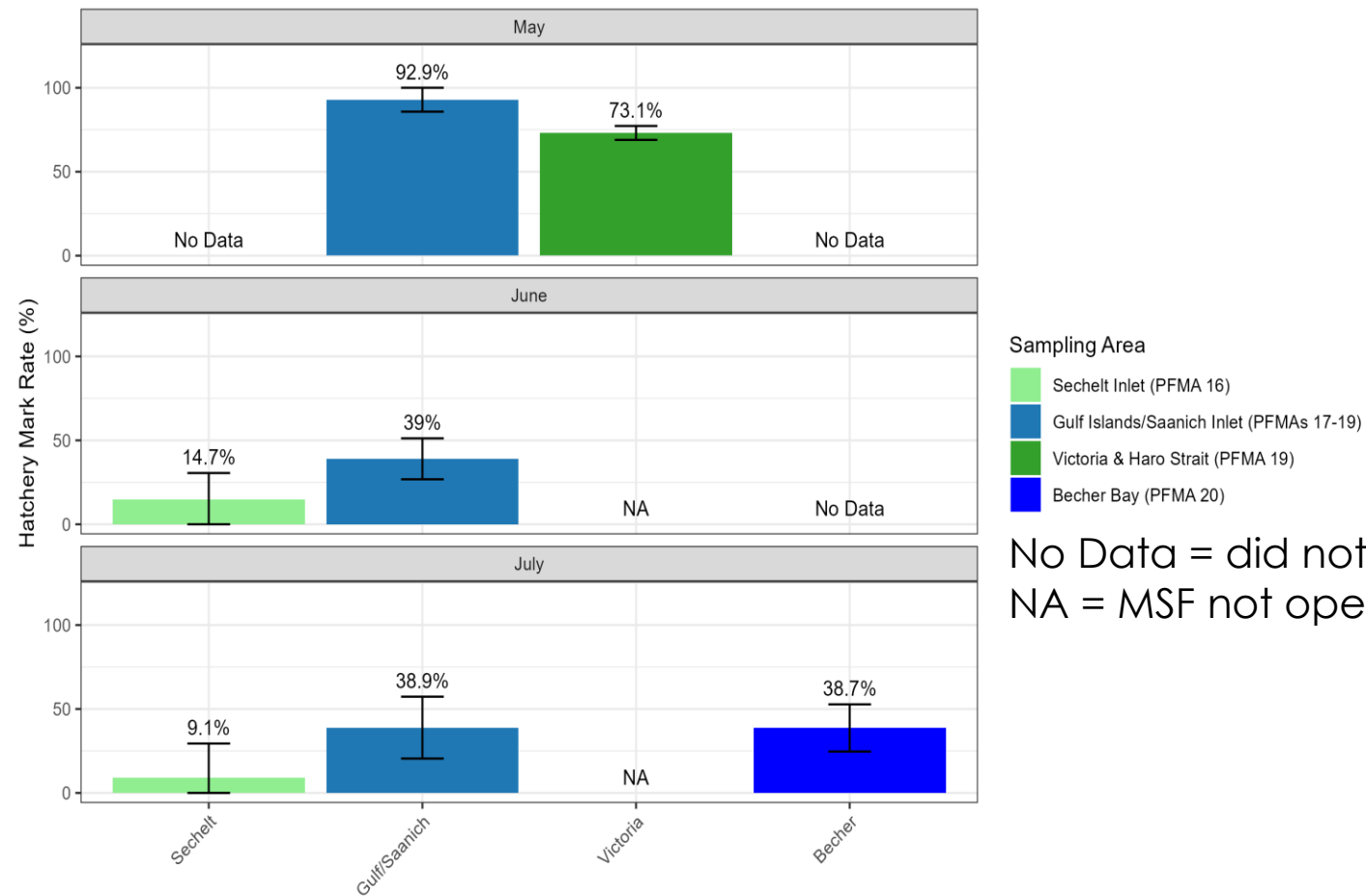
2023 Chinook Reference Fishery Data Summary

- 1084 Chinook were sampled across all reference fisheries
- Data are presented for:
 - All reference fisheries combined
 - Mark (adipose fin clip) rates
 - Stock composition
 - And by MSF/reference fishery
 - Mark (adipose fin clip) rates
 - Stock composition
- Full 2023 data report available at DFO Library <https://science-catalogue.canada.ca/record=4125419~S6>





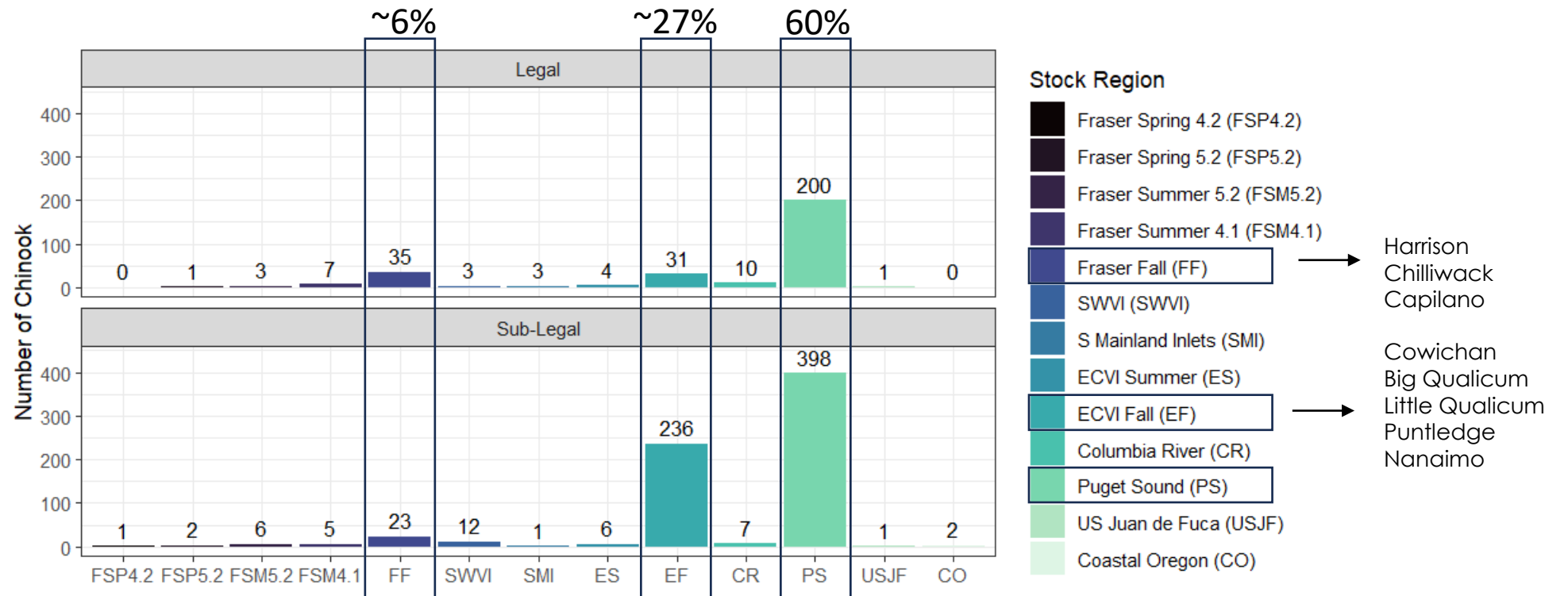
Mark rate of legal sized Chinook salmon sampled (N=1084) by month for all 2023 reference fisheries



No Data = did not sample
NA = MSF not open



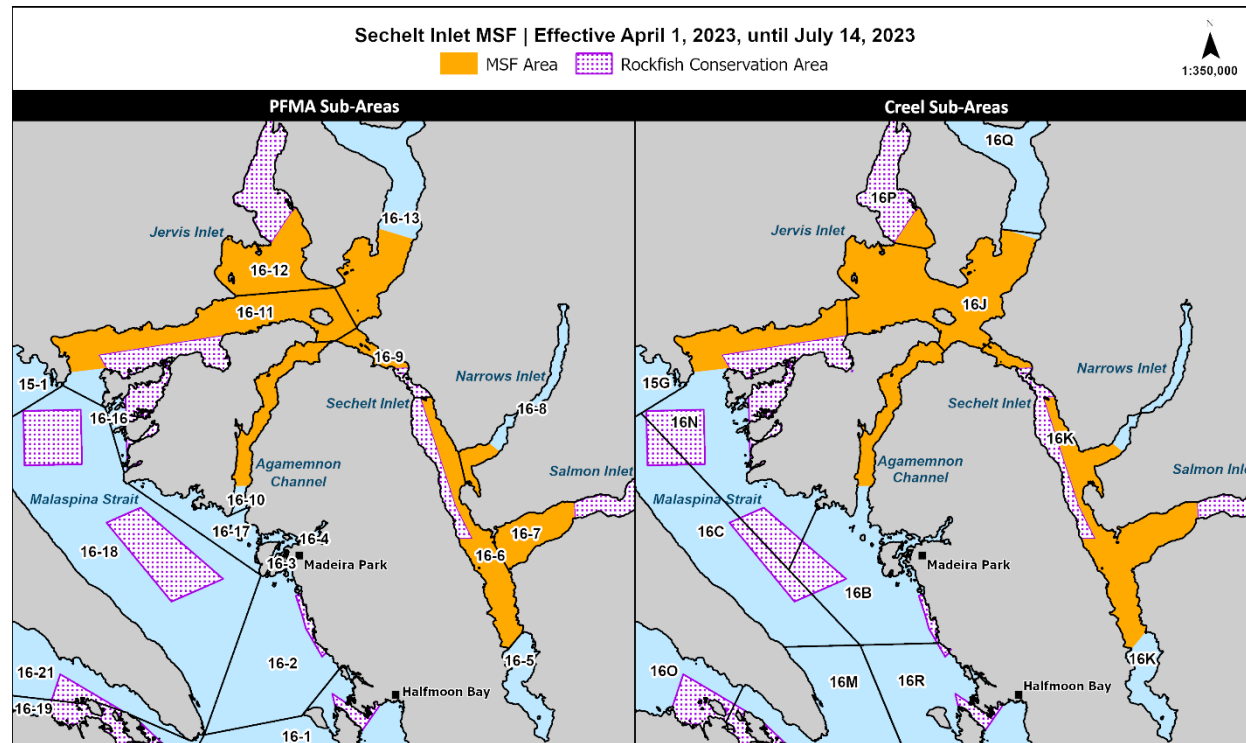
Stock composition of legal (upper) and sub-legal (lower) sized Chinook salmon genetically sampled in **all reference fisheries combined** in 2023 (n=992).



Fraser Fall Samples:
Harrison River : ~ 42%
Chilliwack River Fall: ~ 58%



Area 16 – Sechelt and Jervis Inlets Chinook Reference Fishery (only from June 14 – July 13, 2023)



Note: Catch locations were recorded at the **creel sub-area** level, which is slightly different from PFMA sub-areas.

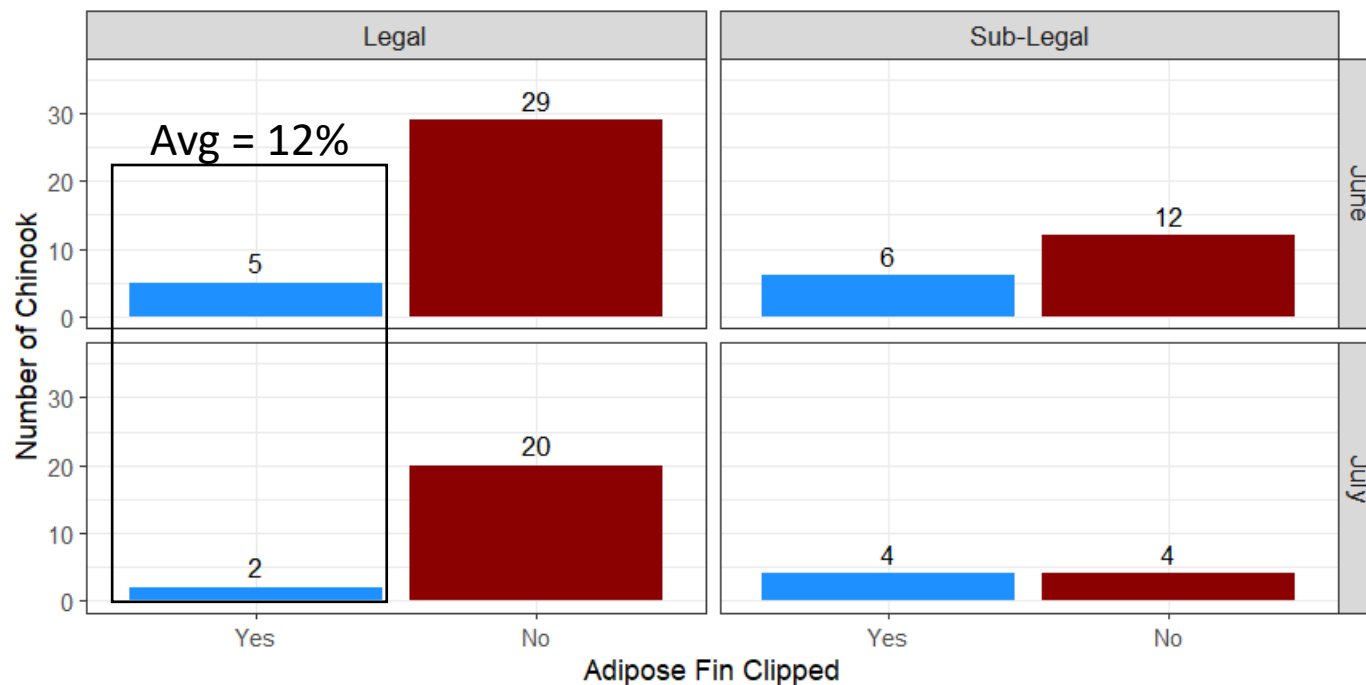
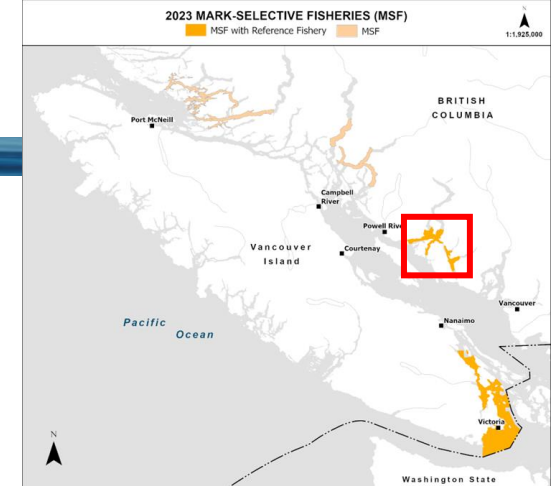
Creel sub-areas, while existing within the same PFMA area, differ from PFMA sub-areas in their purpose and boundaries.

PFMA sub-areas are legally defined boundaries used for enacting regulations, established based on distinct landmarks for easy identification.

Creel sub-areas serve as spatial units for monitoring recreational catch and effort. Creel sub-areas were strategically designed to encompass all recreational fishing activity at popular locations within the same sub-area, with division lines placed in less frequented locations

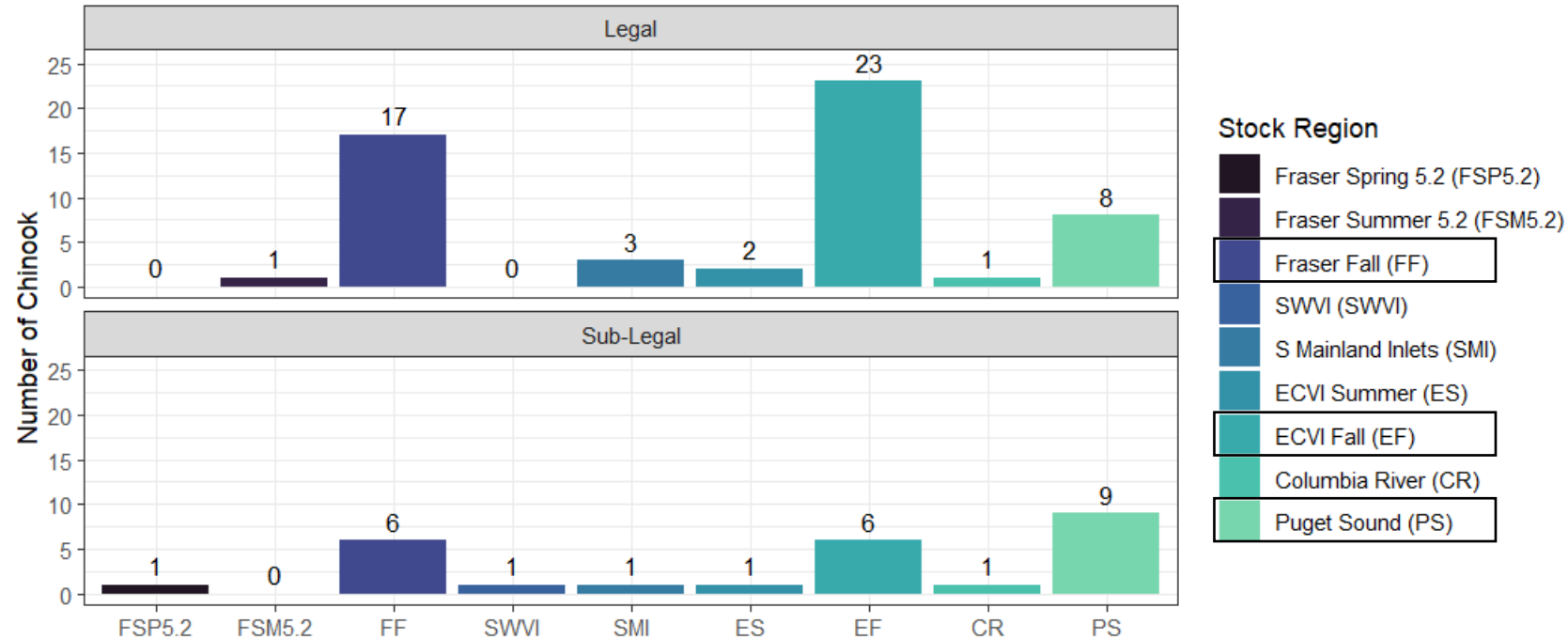
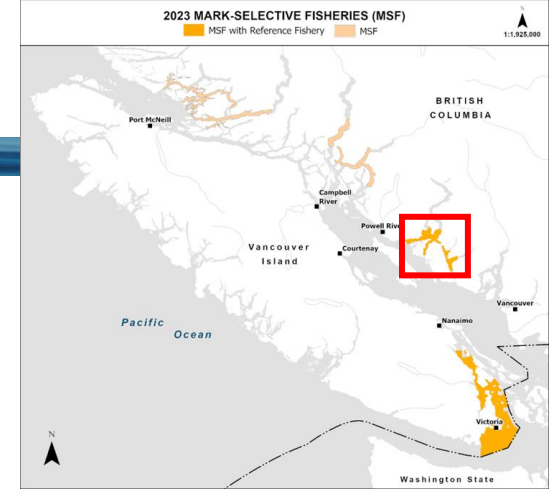


Area 16 – Sechelt and Jervis Inlets Chinook Mark Rate (n=82 from June 14 – July 13, 2023)



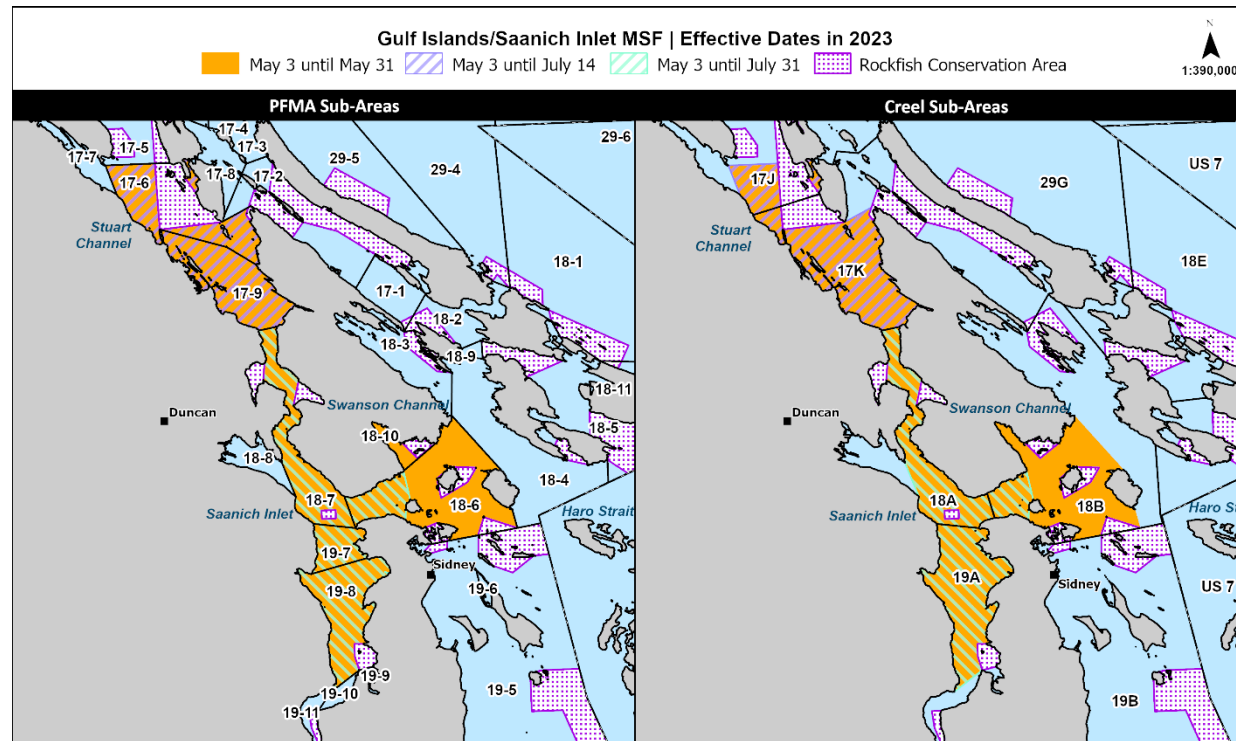


Area 16 – Sechelt and Jervis Inlets Chinook Stock Composition (June 14 – July 13, 2023)



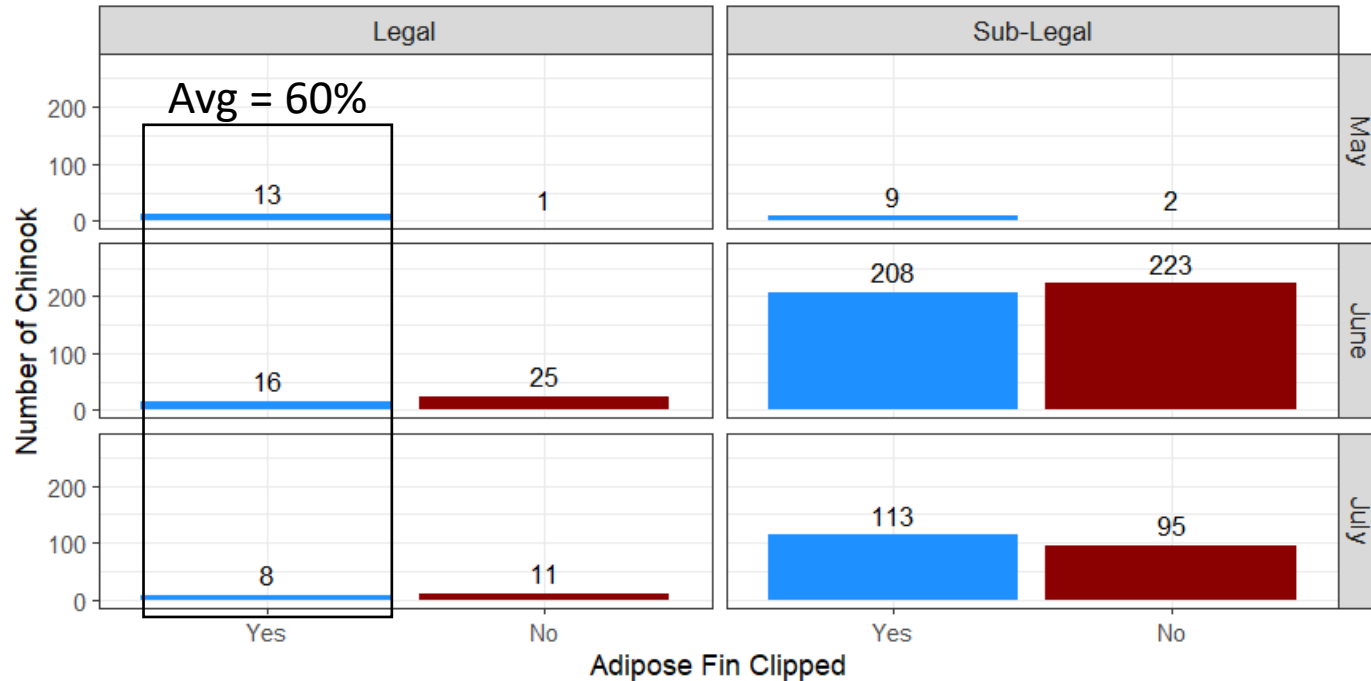
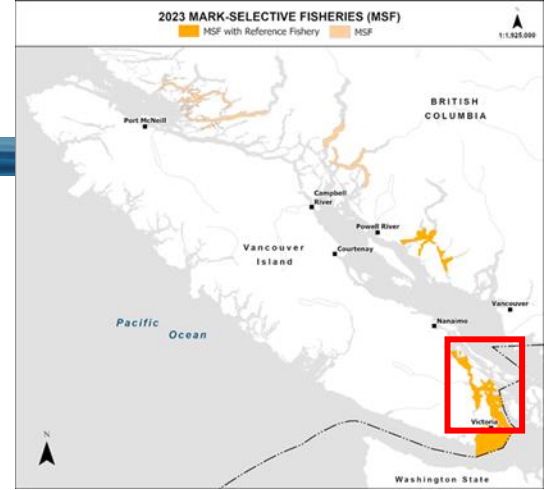


Areas 17-19 - Saanich Inlet/Gulf Islands Chinook Reference Fishery (May – July 2023)



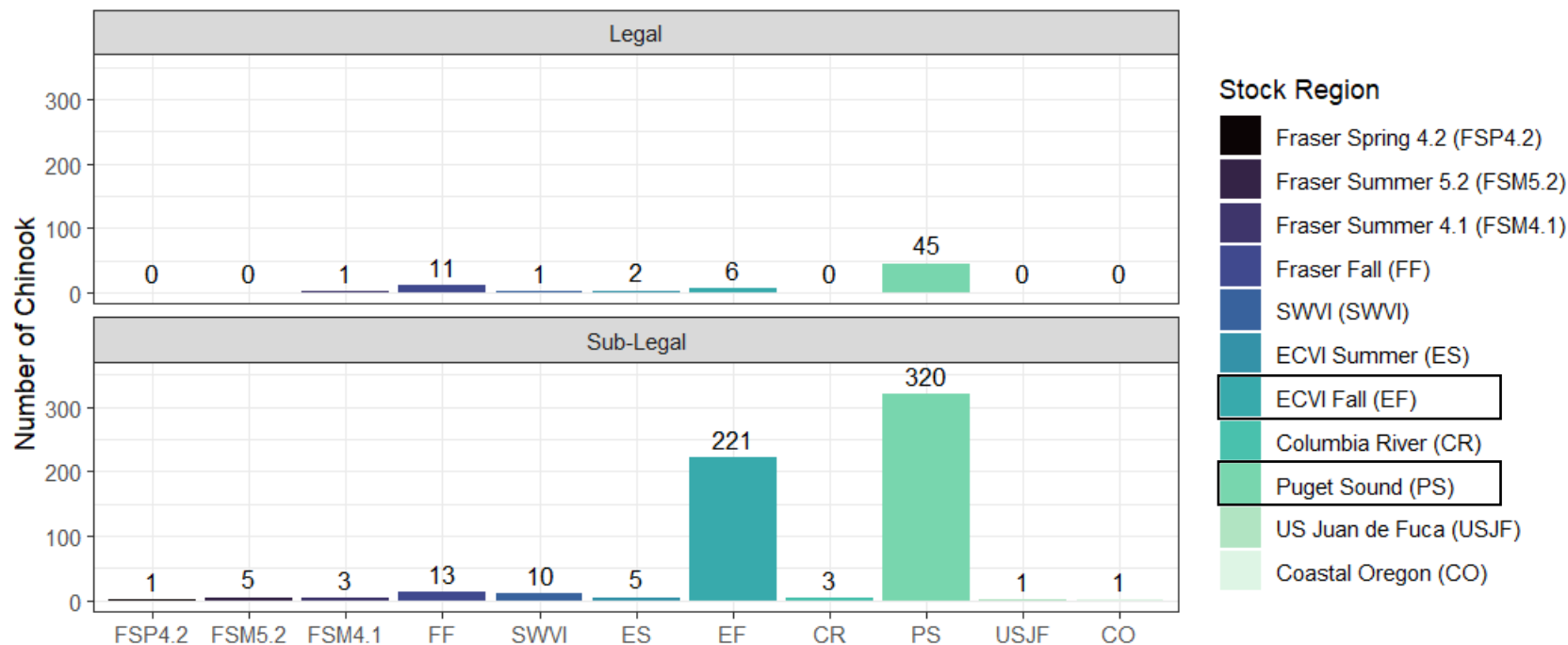
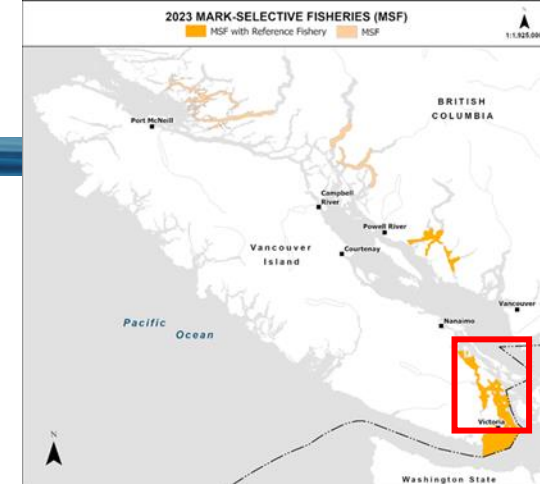


Areas 17-19 - Saanich Inlet/Gulf Islands Chinook Mark Rate (n=724 in 2023)



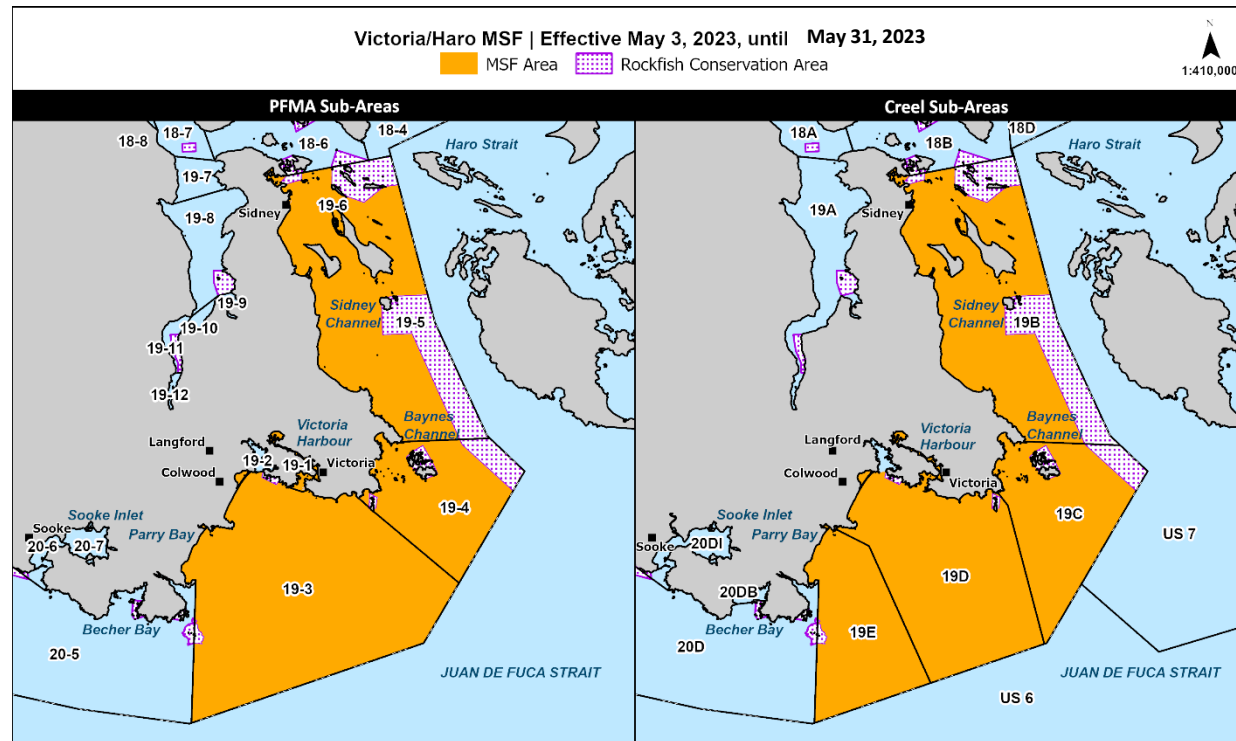


Areas 17-19 - Saanich Inlet/Gulf Islands Chinook Stock Composition (May – July 2023)



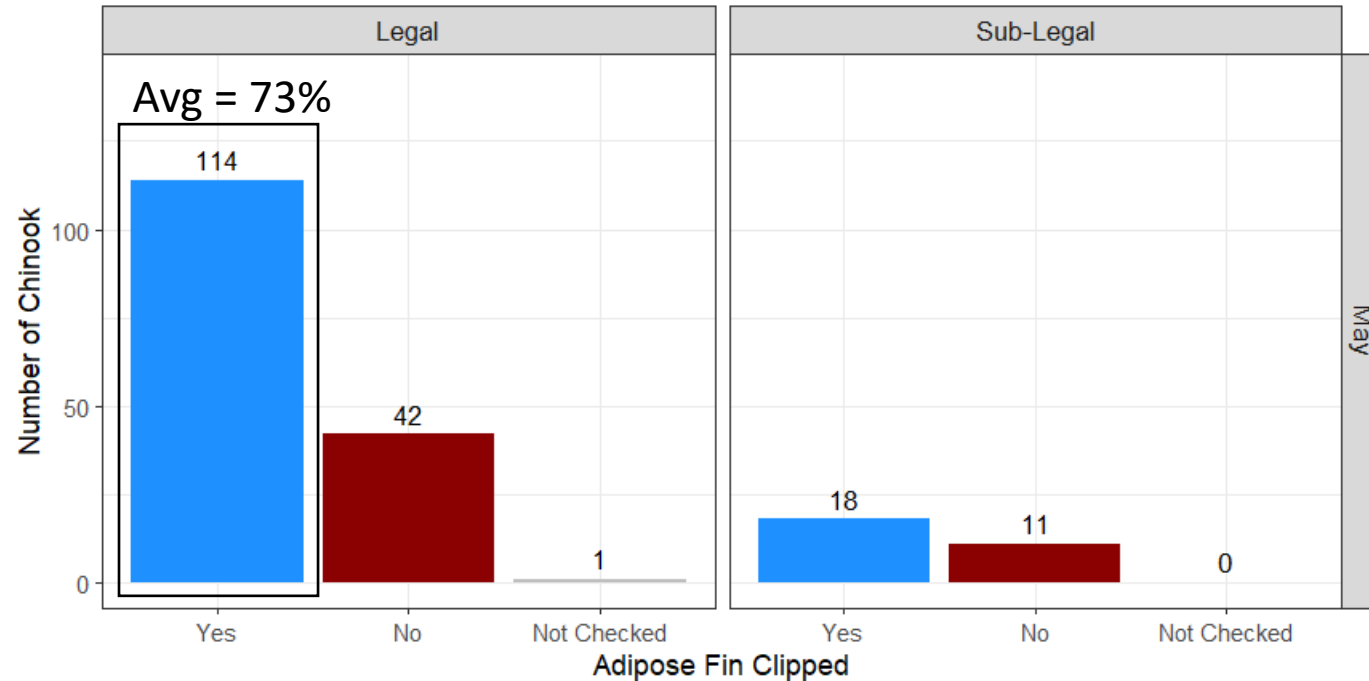
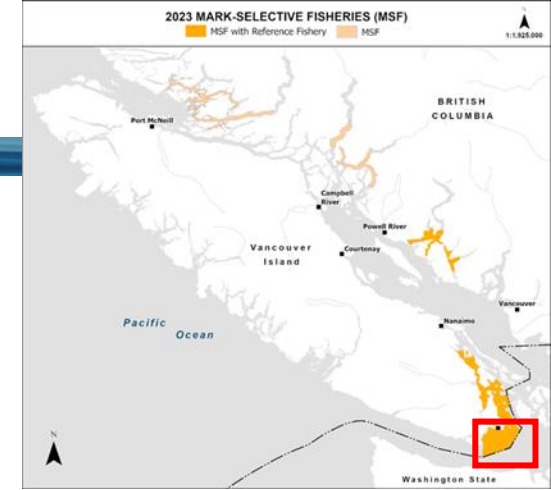


Area 19 - Victoria/Saanich Peninsula Chinook Reference Fishery (May 2023)



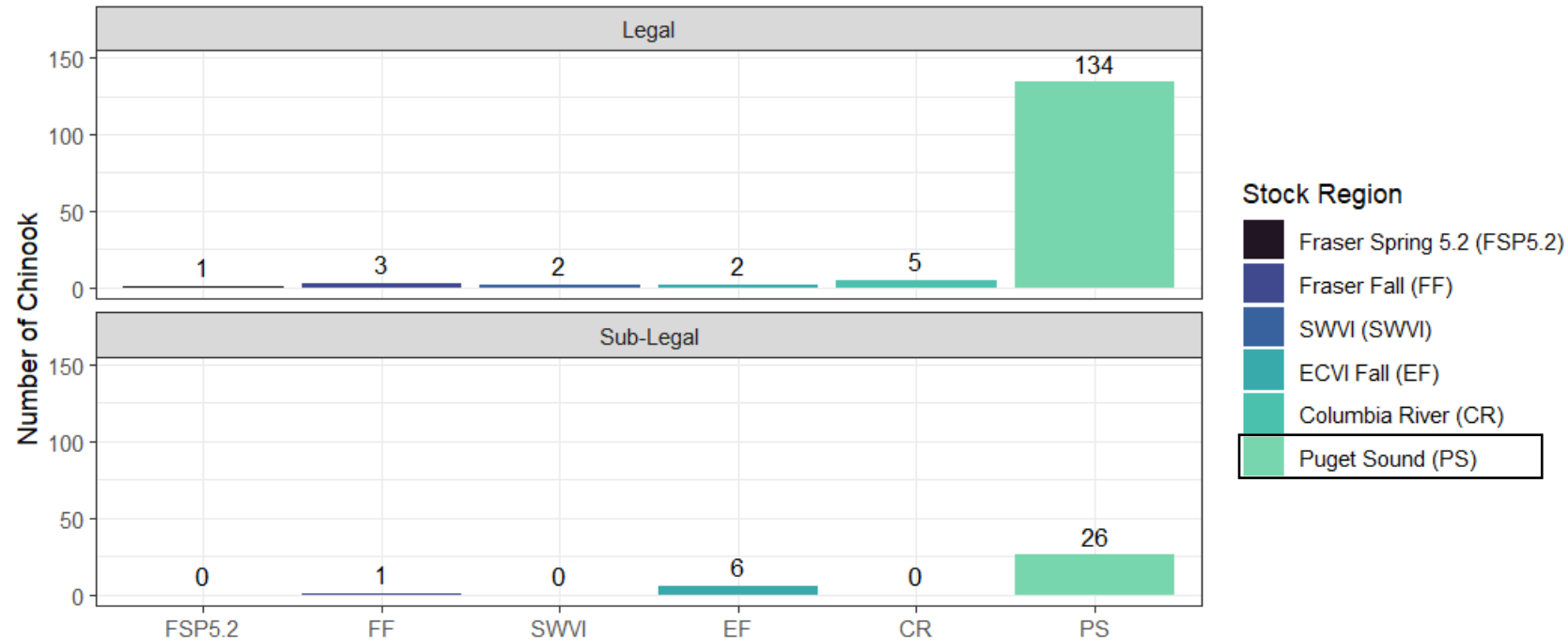
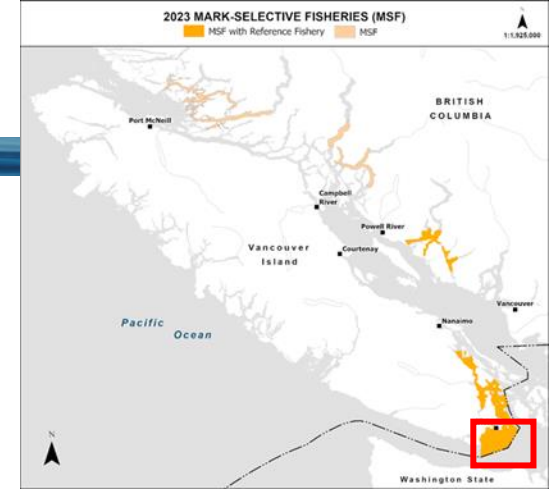


Area 19 - Victoria/Saanich Peninsula Chinook Mark Rate (n=186 in 2023)



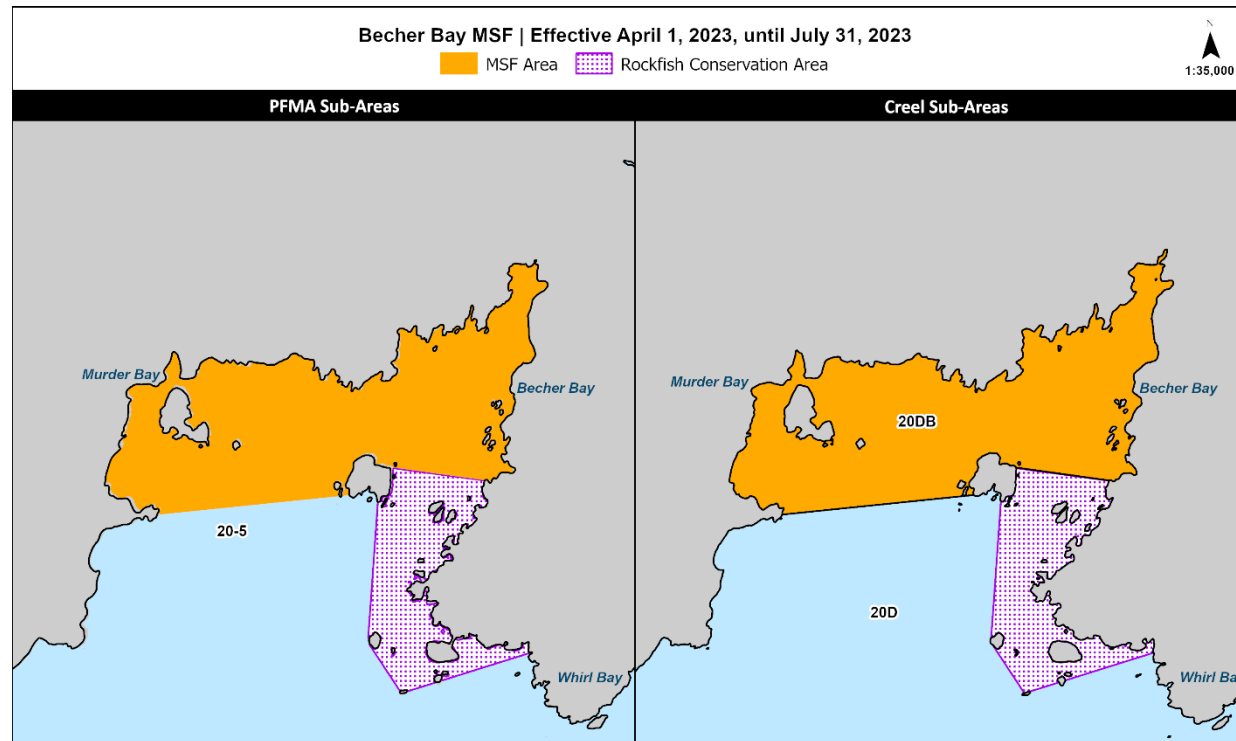


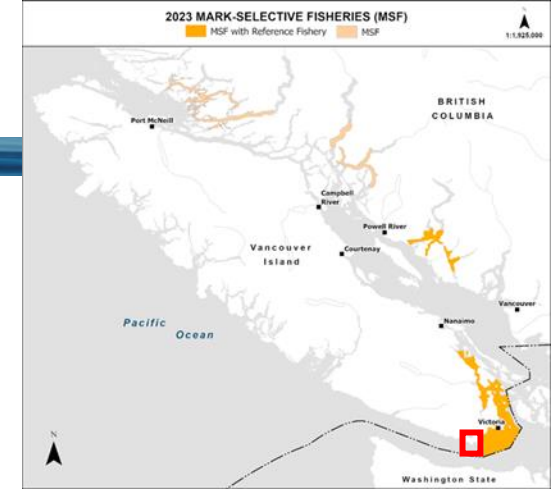
Area 19 - Victoria/Saanich Peninsula Chinook Stock Composition (May 2023)



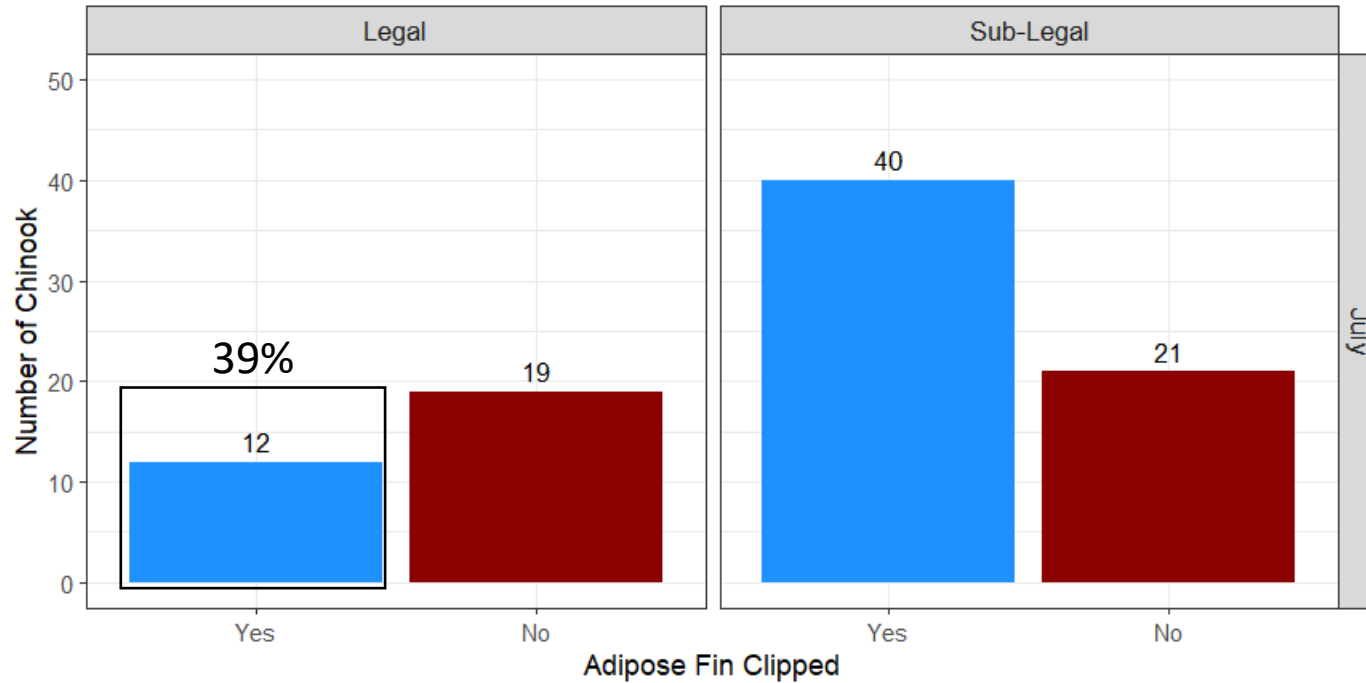


Area 20 - Becher Bay Chinook Reference Fishery (July only in 2023)



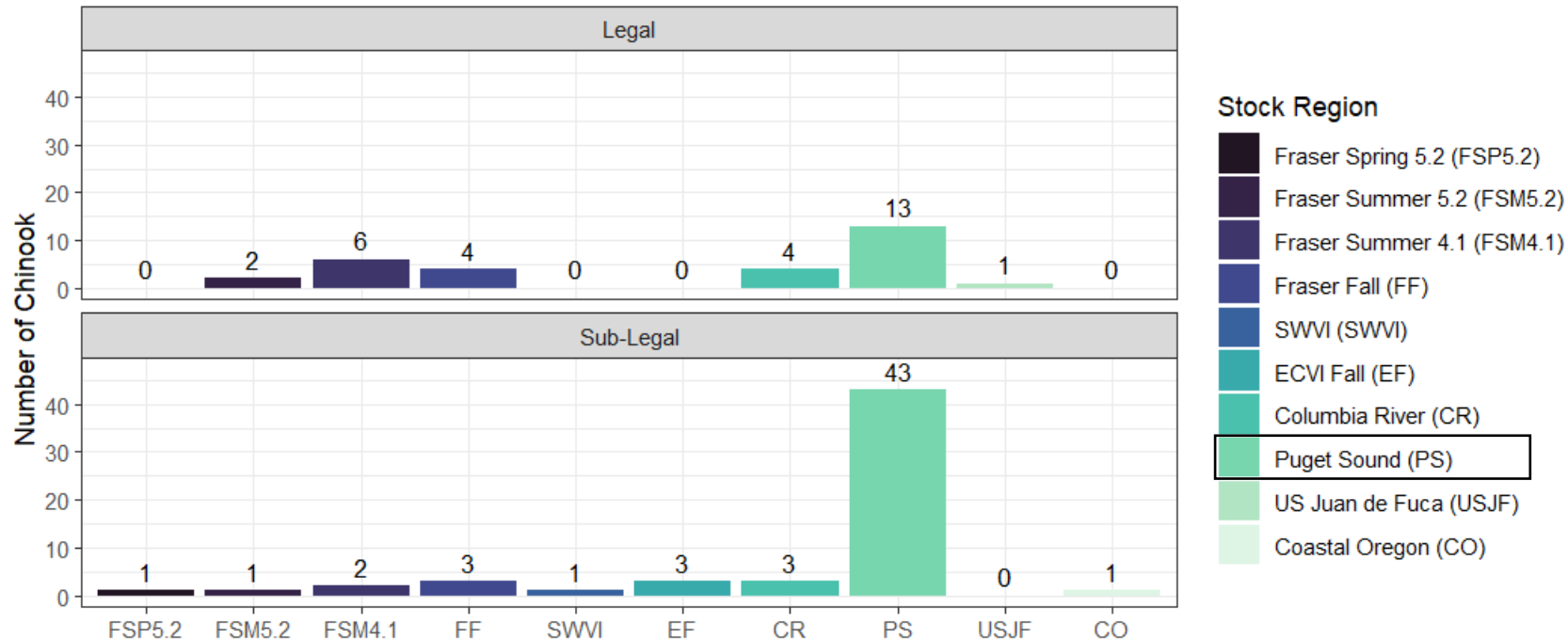
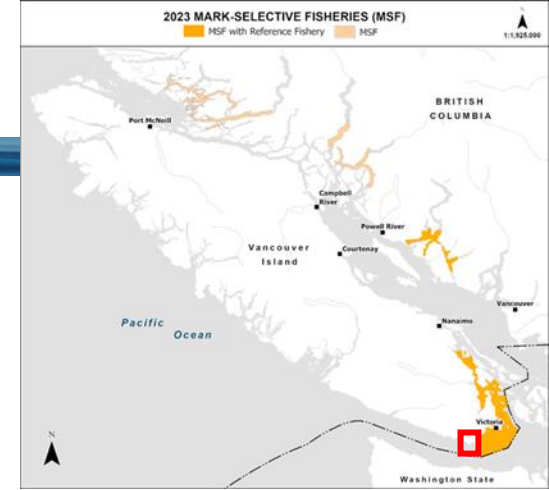


Area 20 - Becher Bay Chinook Mark Rate (n=92 in 2023)





Area 20 - Becher Bay Chinook Stock Composition (July 2023)



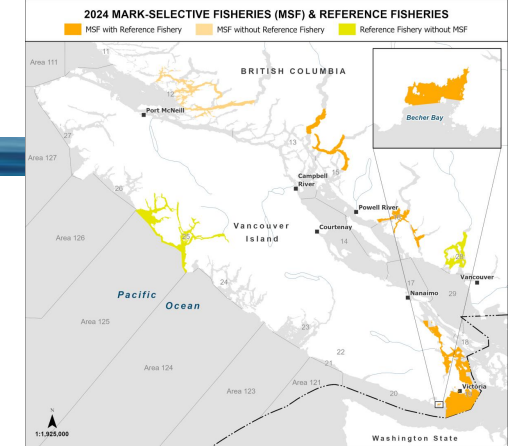


2023 Reference Fishery Summary

- 1084 Chinook caught and sampled on 128 Boat Trips between May 3 and July 31, 2023; higher than average catch per unit effort was expected for chartered guides
- Mark rates were high in the Victoria ref fishery, low in the Sechelt/Jervis reference fishery, intermediate for Saanich & Gulf Is. and Becher Bay.
- Sechelt/Jervis and Becher Bay reference fisheries may not have been representative of the MSF since they were sampled later in the season. Sampling in these areas was more extensive in 2024.
- A high proportion of legal-sized fish were caught in Victoria and Sechelt/Jervis ref fisheries; low in Saanich & Gulf Islands and Becher Bay
- Puget Sound, ECVI Fall and Fraser Fall Chinook were the most abundant stocks intercepted
- 13 (1.3%) Fraser Chinook stocks of concern intercepted (Fraser Spring 4.2, Fraser Spring 5.2, Fraser Summer 5.2)
 - Between 1-4 fish intercepted in each MSF
 - All were either unmarked or sub-legal and would have been released if caught in the rec fishery
- A data report for 2023 was published in 2024 on the DFO Library <https://science-catalogue.canada.ca/record=4125419~S6>



2024 Pilot MSF Openings and Associated Reference Fisheries

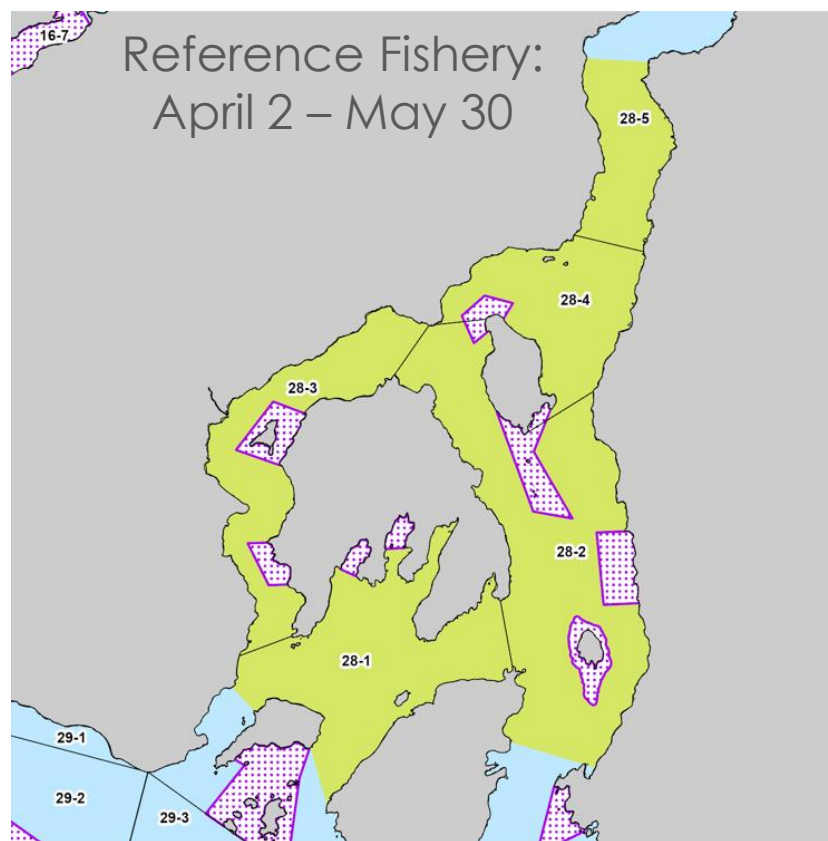


PFMA	PFMA Sub Areas	MSF Dates	Reference Fishery	Limits/Sizes
12 (Broughton)	12-26,12-27, 12-28, 12-35, 12-38, 12-39, 12-40, 12-41	April 1 – July 14	None	Unmarked CN retention w/ maximum 80 cm size limit. Marked CN retention, , minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
13 and 15 (Bute and Toba Inlets)	13-19, 13-21 15-5 and 15-6	April 1 – July 14	June 4 – June 27	Unmarked CN retention w/ maximum 80 cm size limit. Marked CN retention,, minimum 62 cm fork length (no maximum). Limits: 1/day, 2 possession.
16 (Sechelt 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 CN 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 CN retention only, minimum 62 cm fork length (no maximum).
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	Limits: 1/day, 2 possession.
19 (Victoria/Haro Strait)	19-1, 19-3, 19-4, 19-5, 19-6	April 1 – May 31	April 2 – May 30	Hatchery CN 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 CN retention only, minimum 45 cm fork length (no maximum). Limits: 1/day, 2 possession.

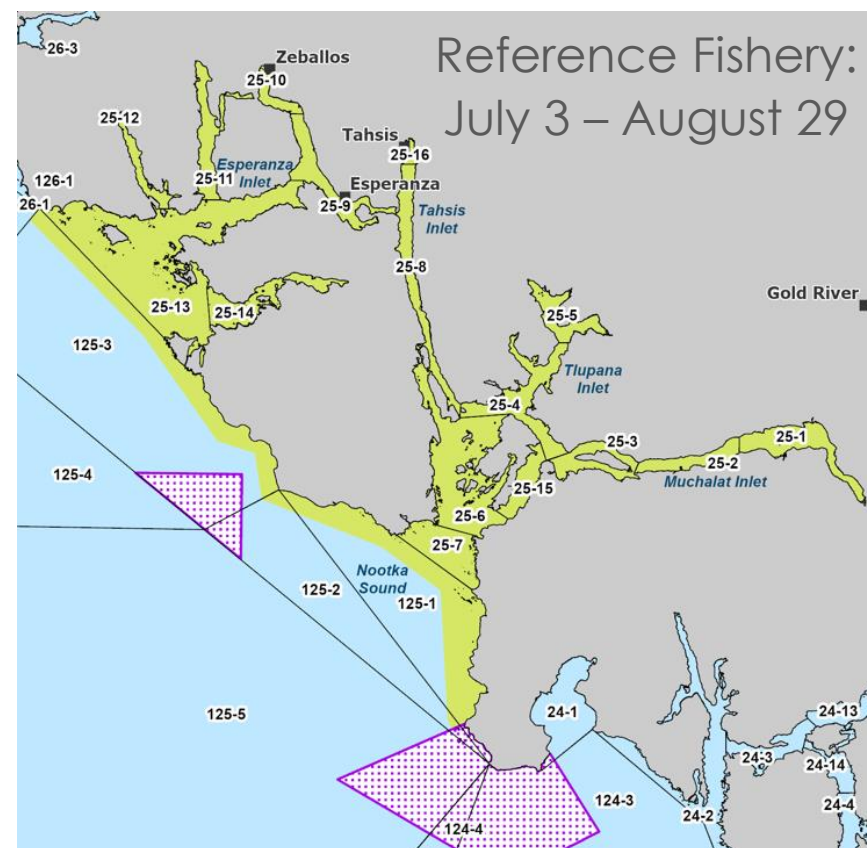


2024 Reference Fisheries In Areas With No MSF

Area 28: Howe Sound



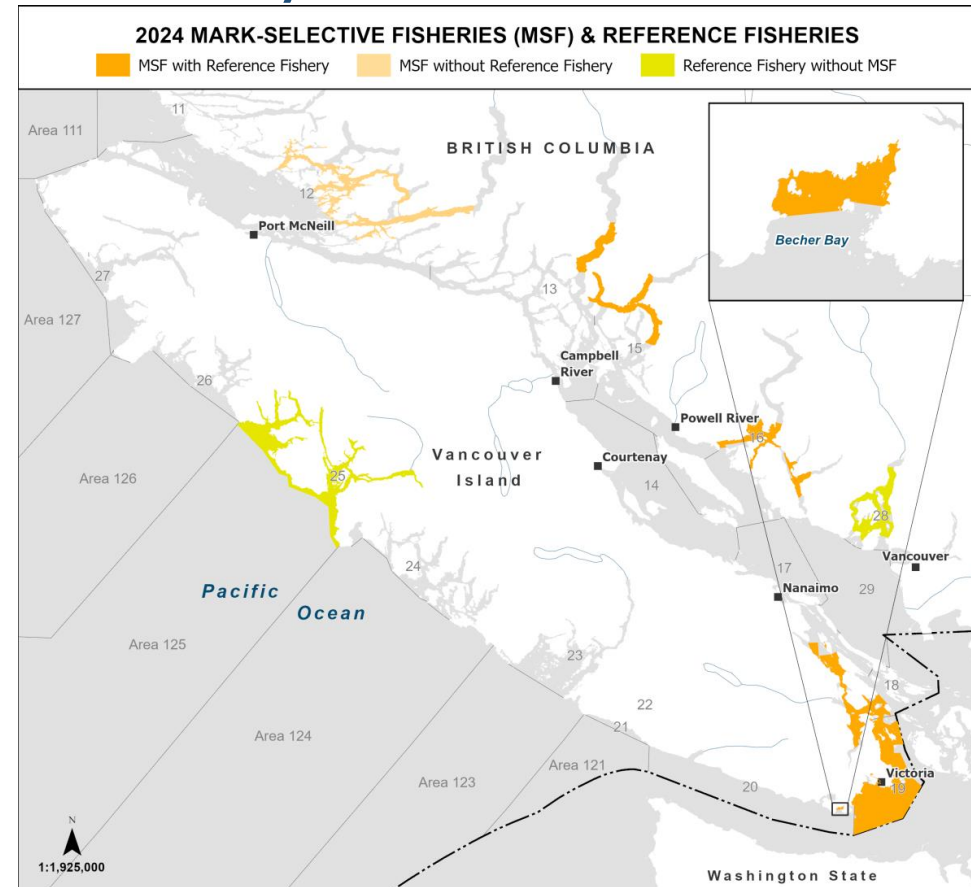
Area 25: Nootka Sound & Esperanza Inlet





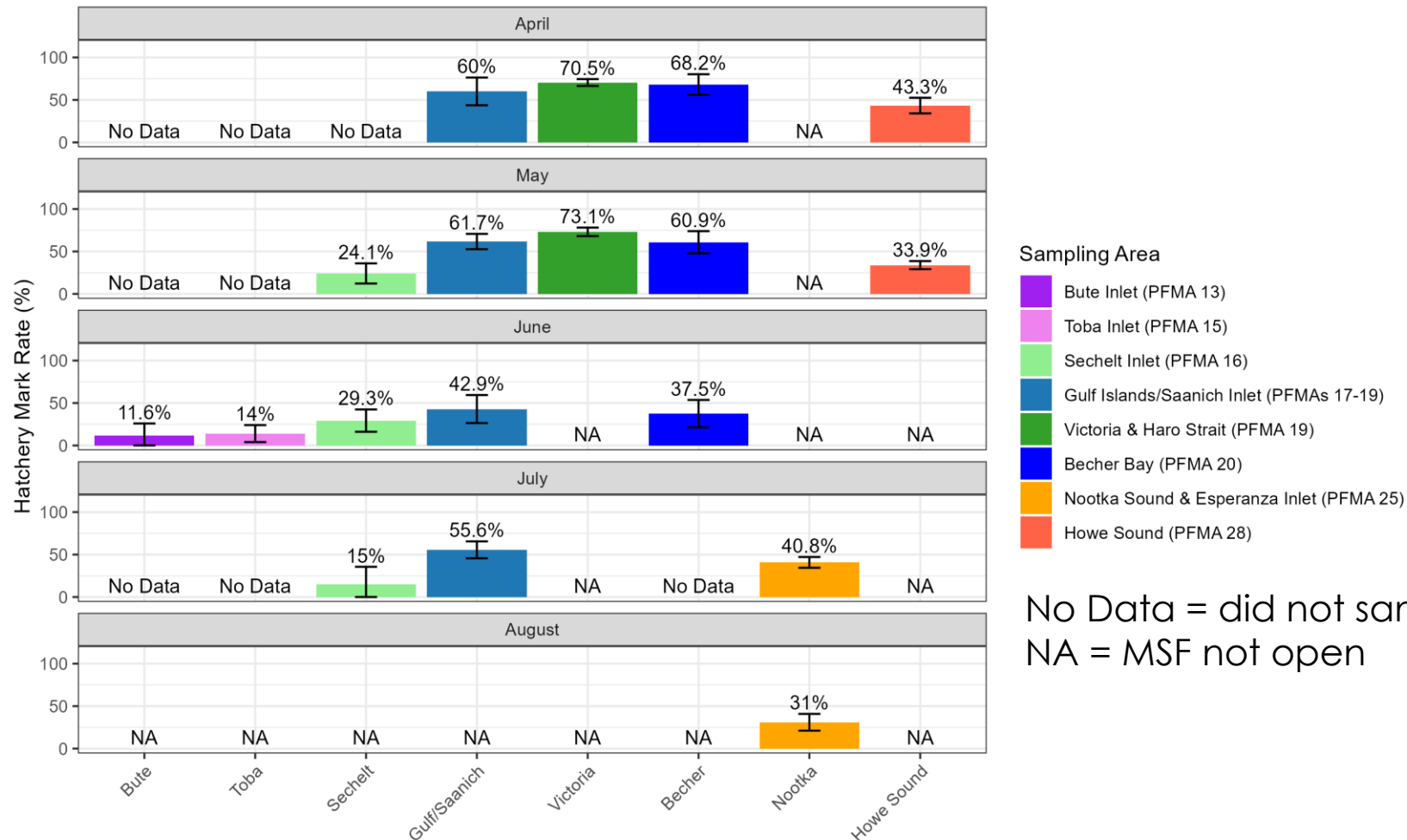
2024 Chinook Reference Fishery Data Summary

- For all reference fisheries:
 - 2582 Chinook were sampled
 - 2436 DNA samples ran successfully
 - 316 boat days averaging roughly 8 hours of sampling daily





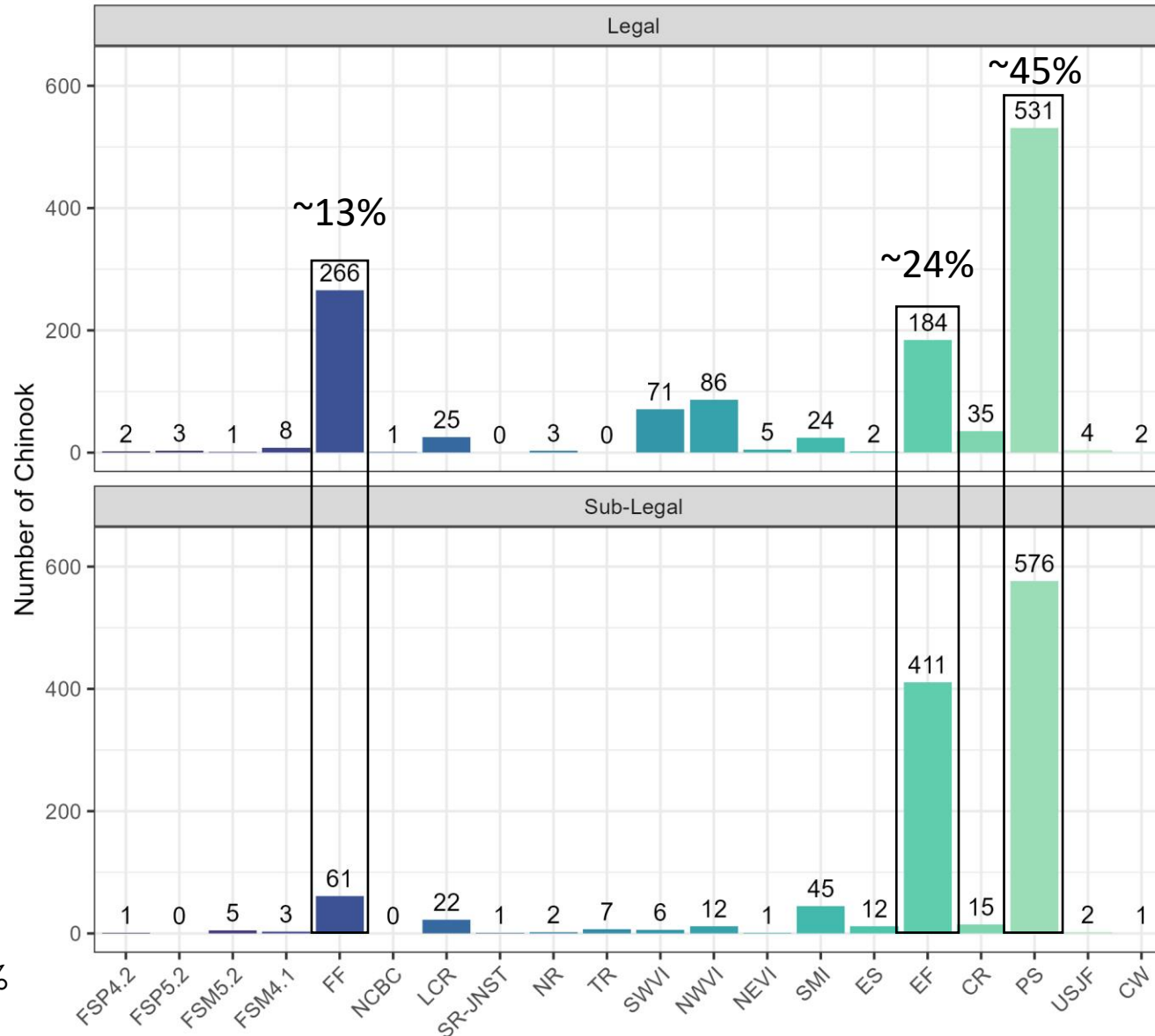
Mark rate of legal sized Chinook salmon sampled (N=1084) by month for all 2024 reference fisheries





Stock composition of legal (upper) and sub-legal (lower) sized Chinook salmon genetically sampled in all reference fisheries combined in 2024 (n=2436).

Fraser Fall Samples:
Harrison River : ~ 29%
Chilliwack River Fall: ~ 69%
Stave River: ~ 1%

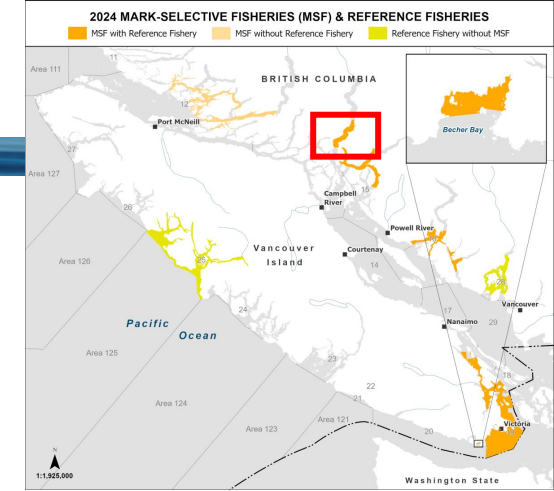
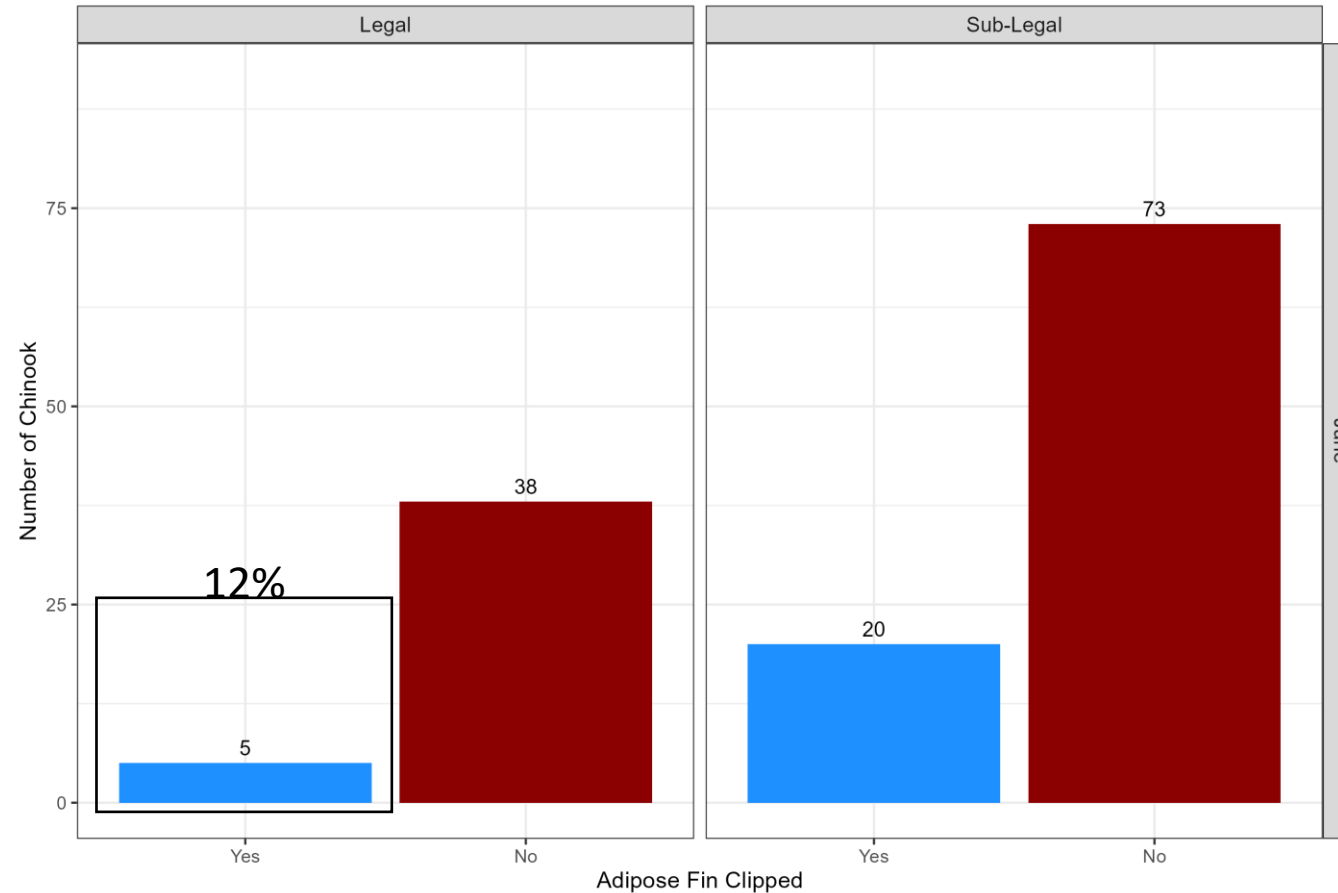


Stock Region

- Fraser Spring 4.2 (FSP4.2)
- Fraser Spring 5.2 (FSP5.2)
- Fraser Summer 5.2 (FSM5.2)
- Fraser Summer 4.1 (FSM4.1)
- Fraser Fall (FF) Harrison
Chilliwack
- North/Central BC (NCBC)
- Little Campbell River (LCR)
- Salmon River JNST (SR-JNST)
- Nicomekl River (NR)
- Toba River (TR)
- SWVI (SWVI)
- NWVI (NWVI)
- NEVI (NEVI)
- S Mainland Inlets (SMI)
- ECVI Summer (ES)
- ECVI Fall (EF) Cowichan
Big Qualicum
Little Qualicum
Puntledge
Nanaimo
- Columbia River (CR)
- Puget Sound (PS)
- US Juan de Fuca (USJF)
- Coastal Washington (CW)

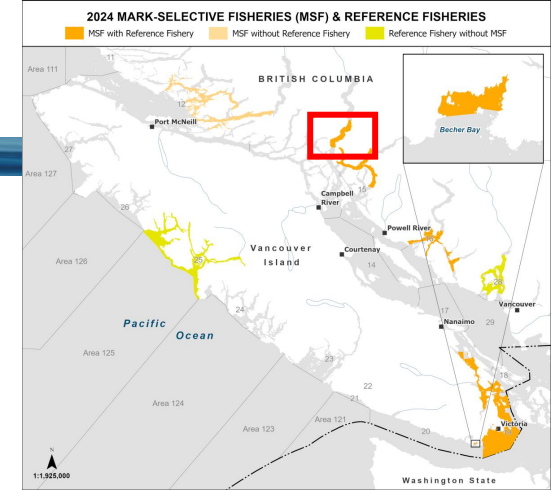
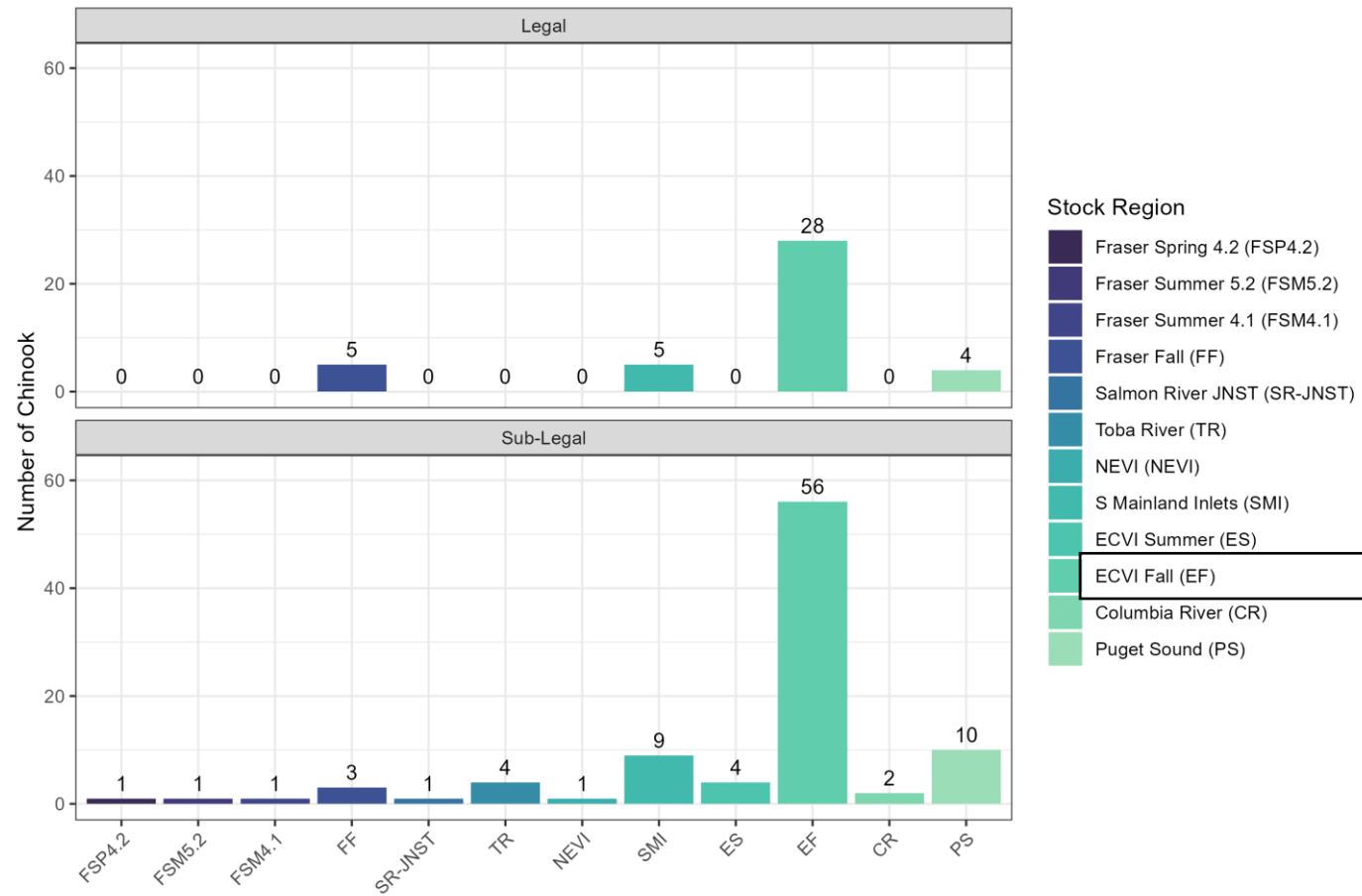


Area 13 - Bute Inlet Chinook Mark Rate (n=136 in 2024)





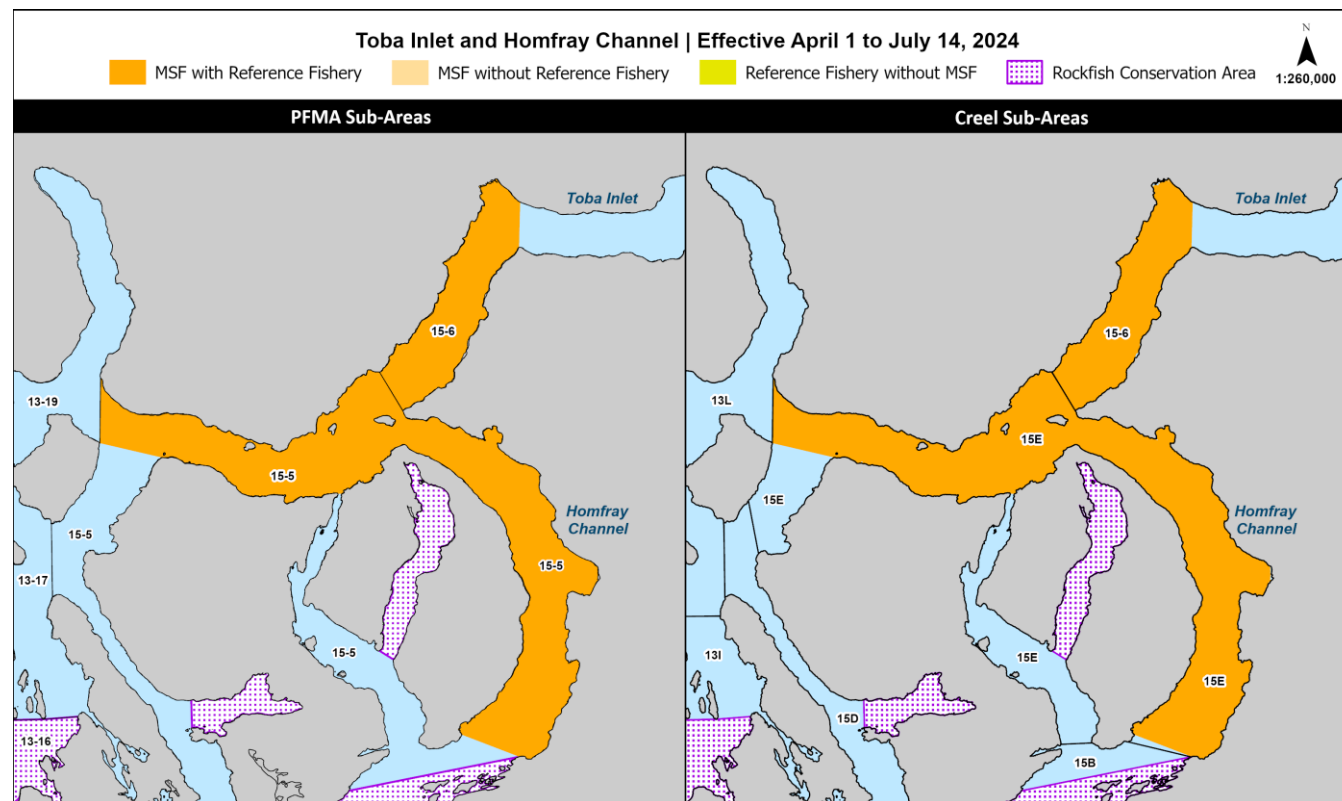
Area 13 - Bute Inlet Chinook Stock Composition (June 2024)





Area 15 – Toba Inlet Chinook Reference Fishery (June 2024)

- 141 Chinook sampled
 - 86 legal
 - 55 sub-legal
- 12 boat days in June



2024 MARK-SELECTIVE FISHERIES (MSF) & REFERENCE FISHERIES

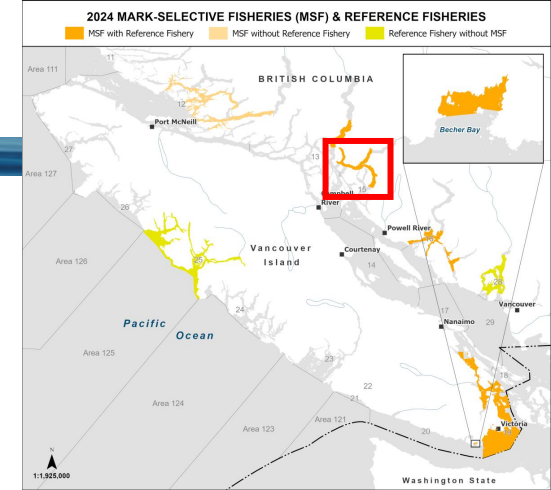
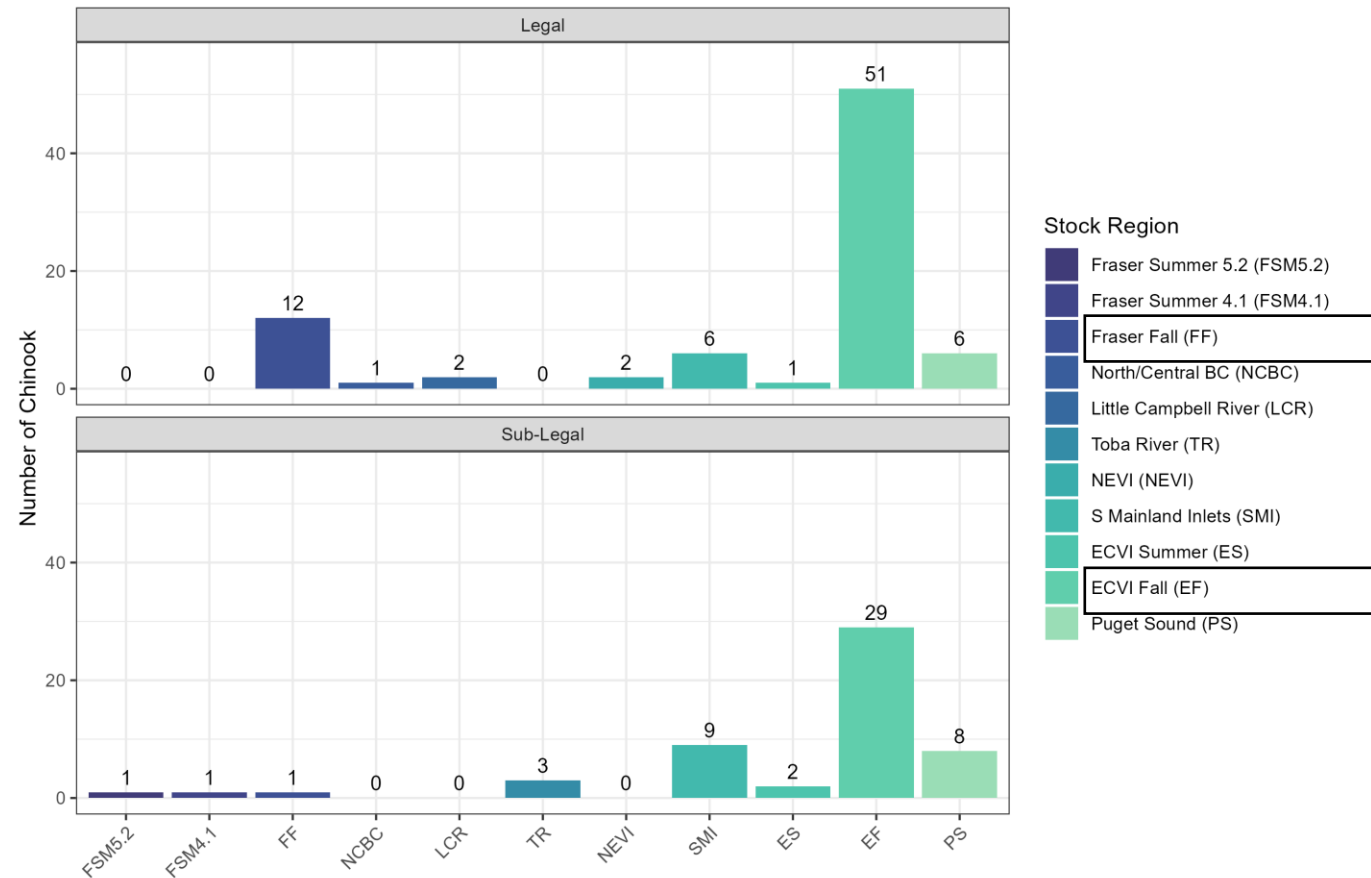
■ MSF with Reference Fishery
 ■ MSF without Reference Fishery
 ■ Reference Fishery without MSF

Map of British Columbia showing 2024 Mark-Selective Fisheries (MSF) and Reference Fisheries. The map includes a legend, a scale bar (1:1,925,000), and a north arrow. Key locations marked include Port McNeill, Courtenay, Powell River, Nanaimo, and Victoria. An inset map shows Bechoer Bay. The map is divided into numbered areas (11, 12, 13, 14, 17, 20, 21, 22, 23, 24, 29) and includes the Pacific Ocean.





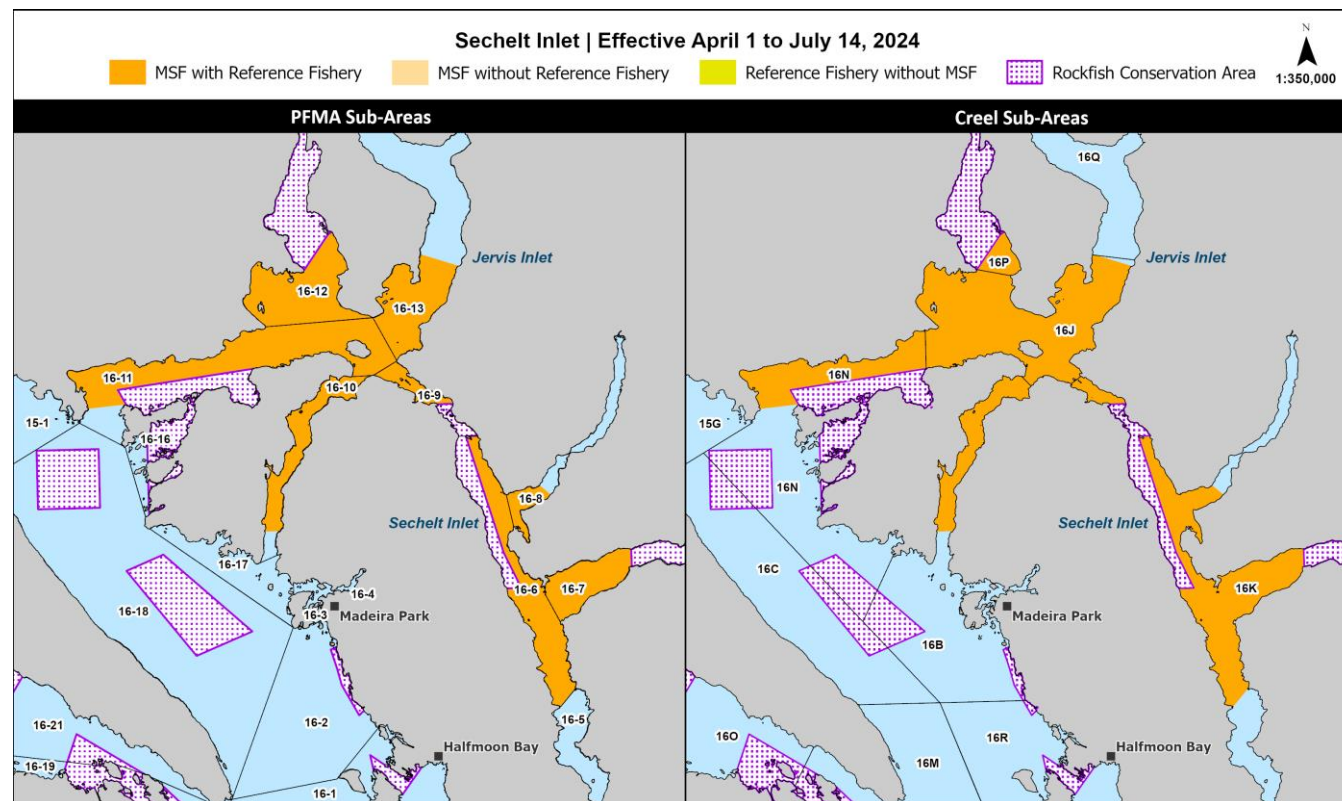
Area 15 - Toba Inlet Chinook Stock Composition (June 2024)





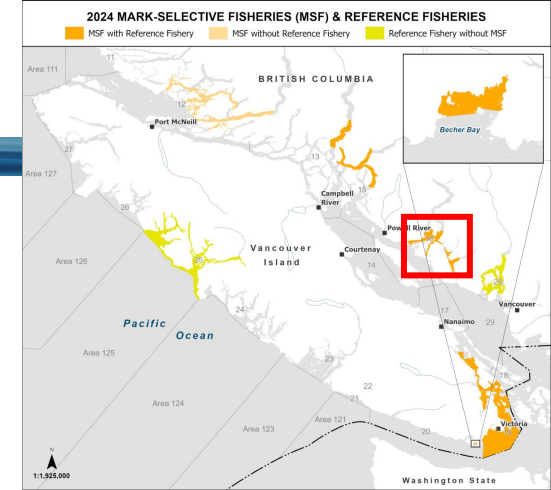
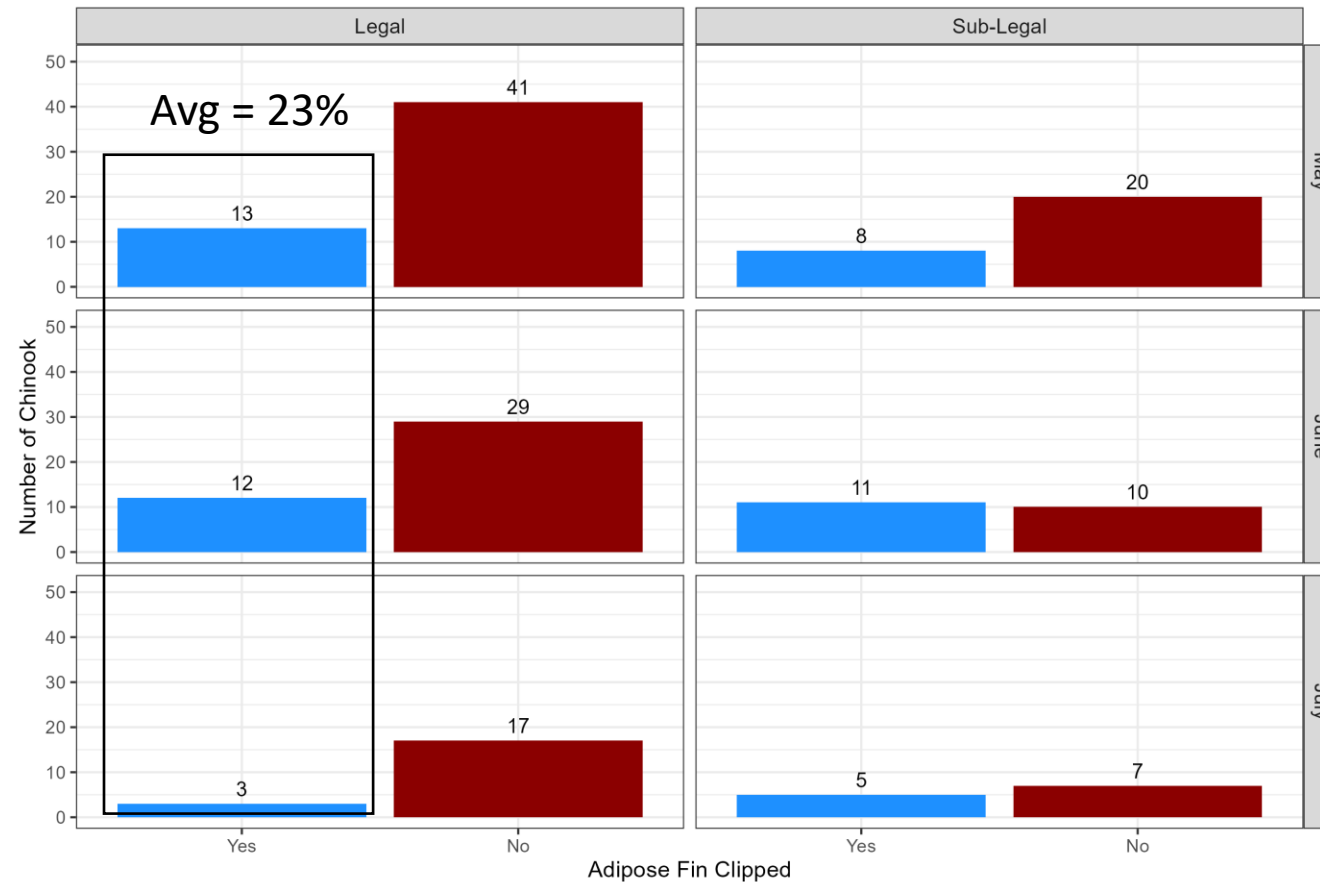
Area 16 – Sechelt and Jervis Inlets Chinook Reference Fishery (May 1 – July 11, 2024)

- 176 Chinook sampled
 - 115 legal
 - 61 sub-legal
- 31 boat days from May 1 to July 11

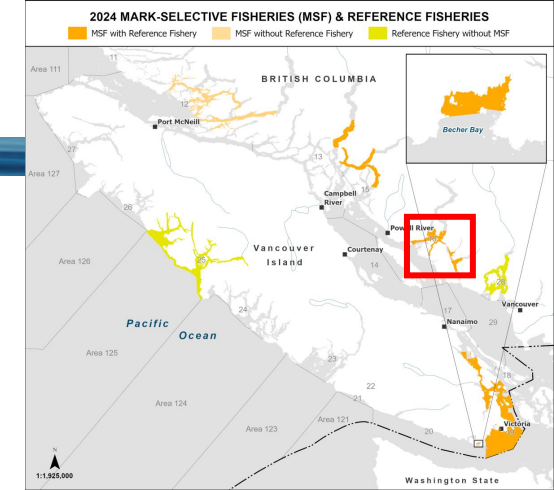
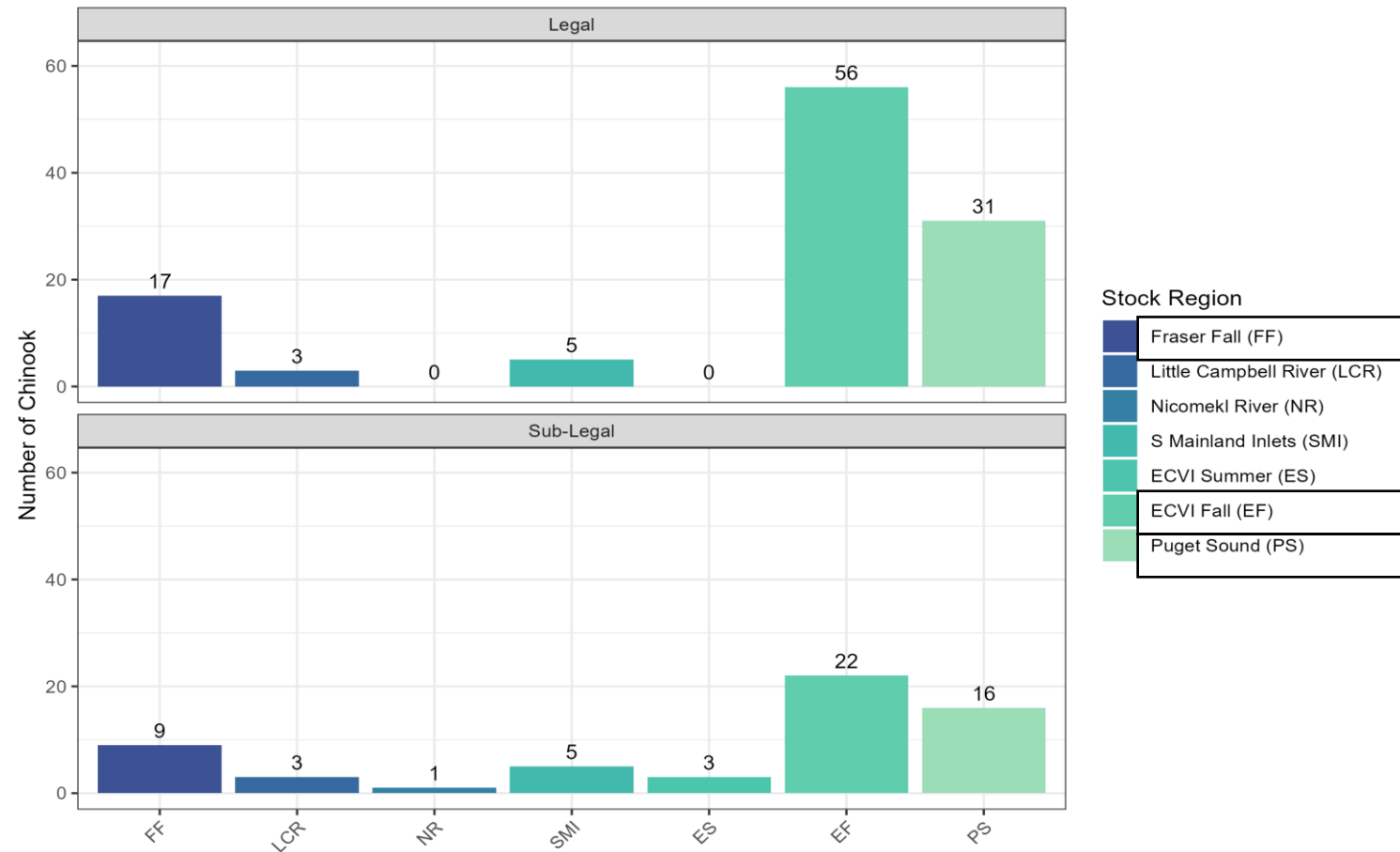




Area 16 – Sechelt and Jervis Inlets Chinook Mark Rate (n=176 in 2024)



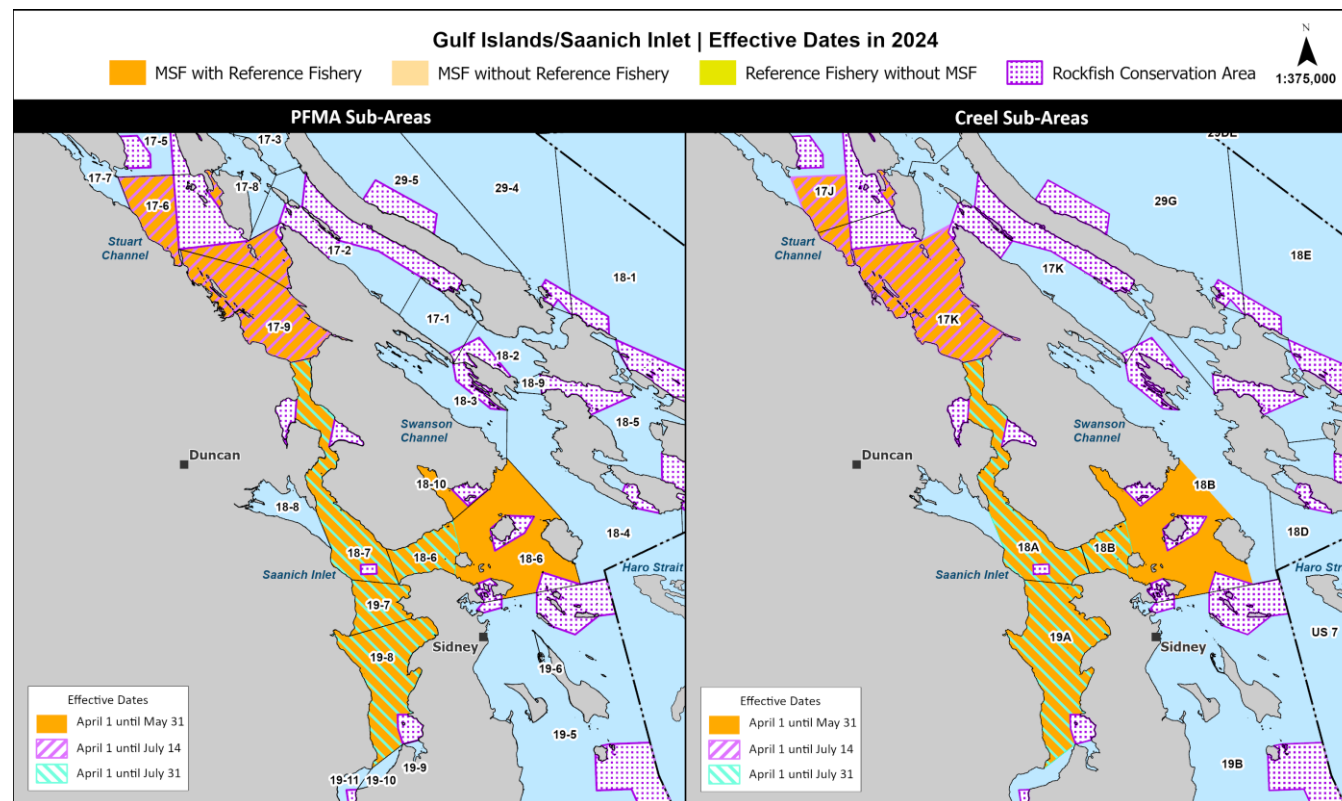
Area 16 - Sechelt and Jervis Inlets Chinook Stock Composition (May 1 – July 11 2024)





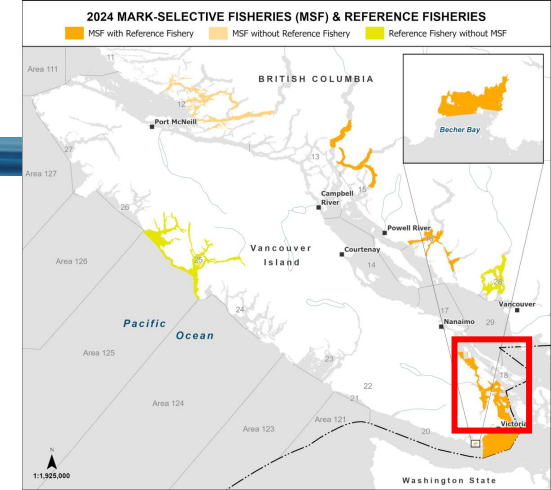
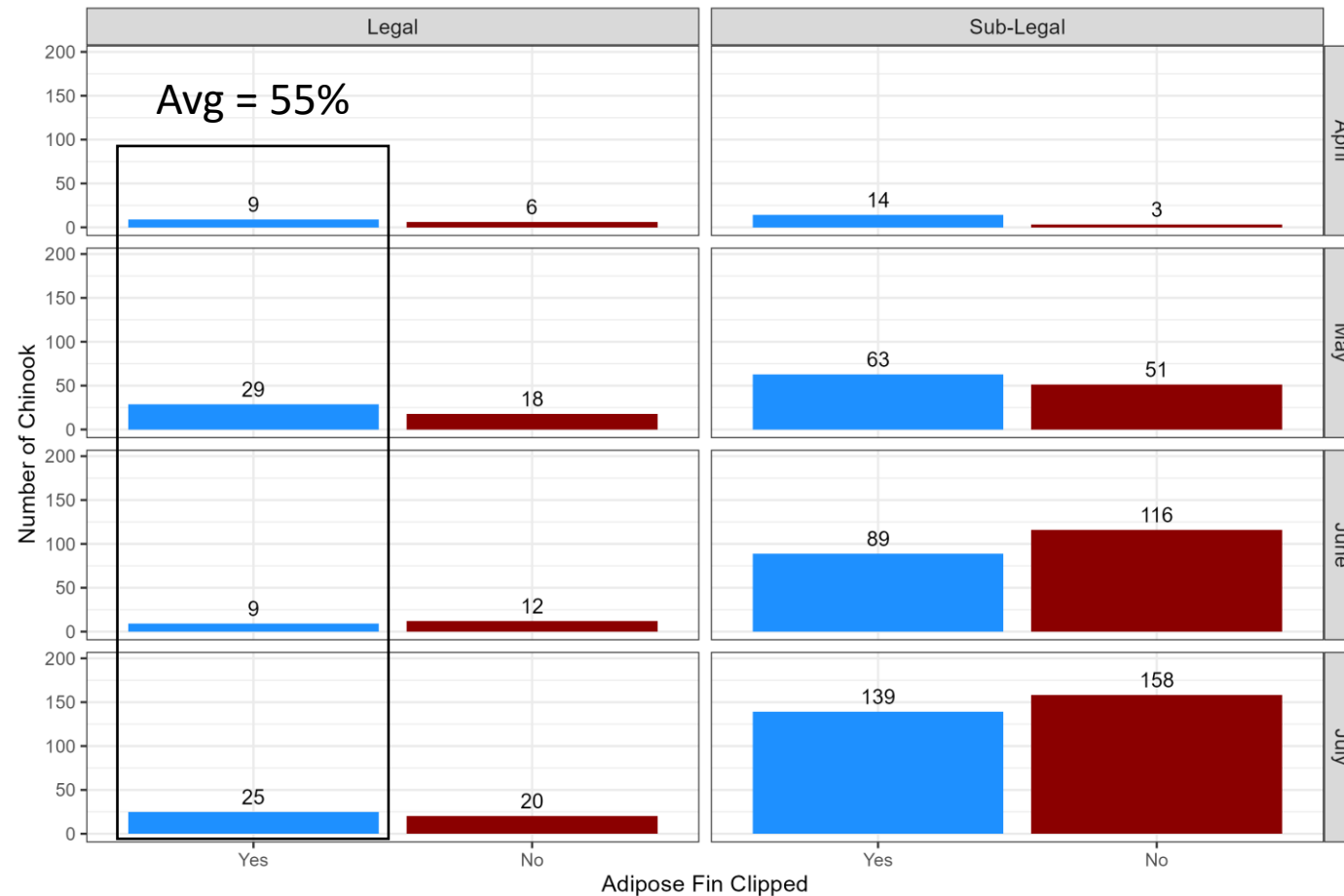
Areas 17-19 - Saanich Inlet/Gulf Islands Chinook Reference Fishery (May – July 2024)

- 761 Chinook sampled
 - 128 legal
 - 633 sub-legal
- 117 boat days for the duration of the MSF



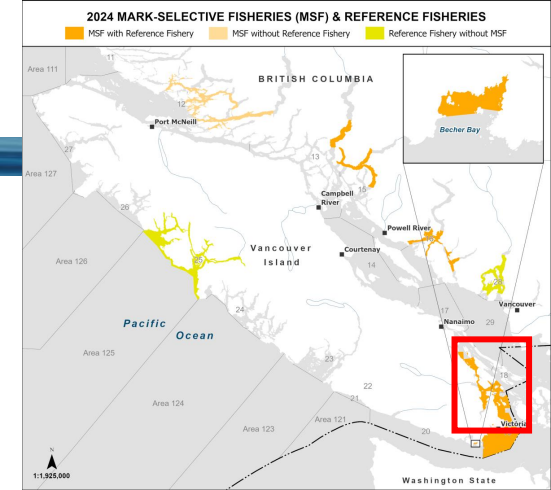
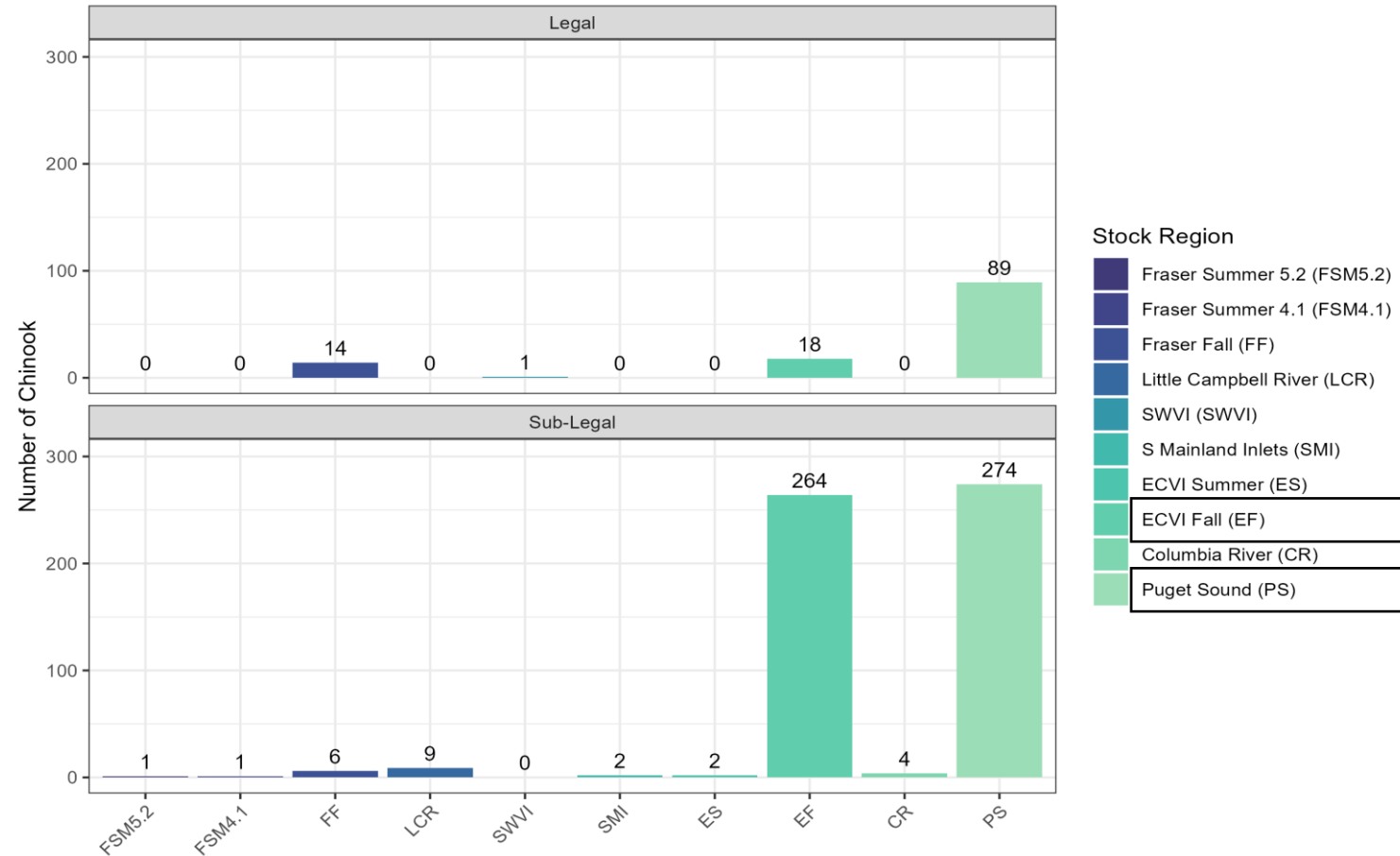


Areas 17-19 - Saanich Inlet/Gulf Islands Chinook Mark Rate (n=761 in 2024)





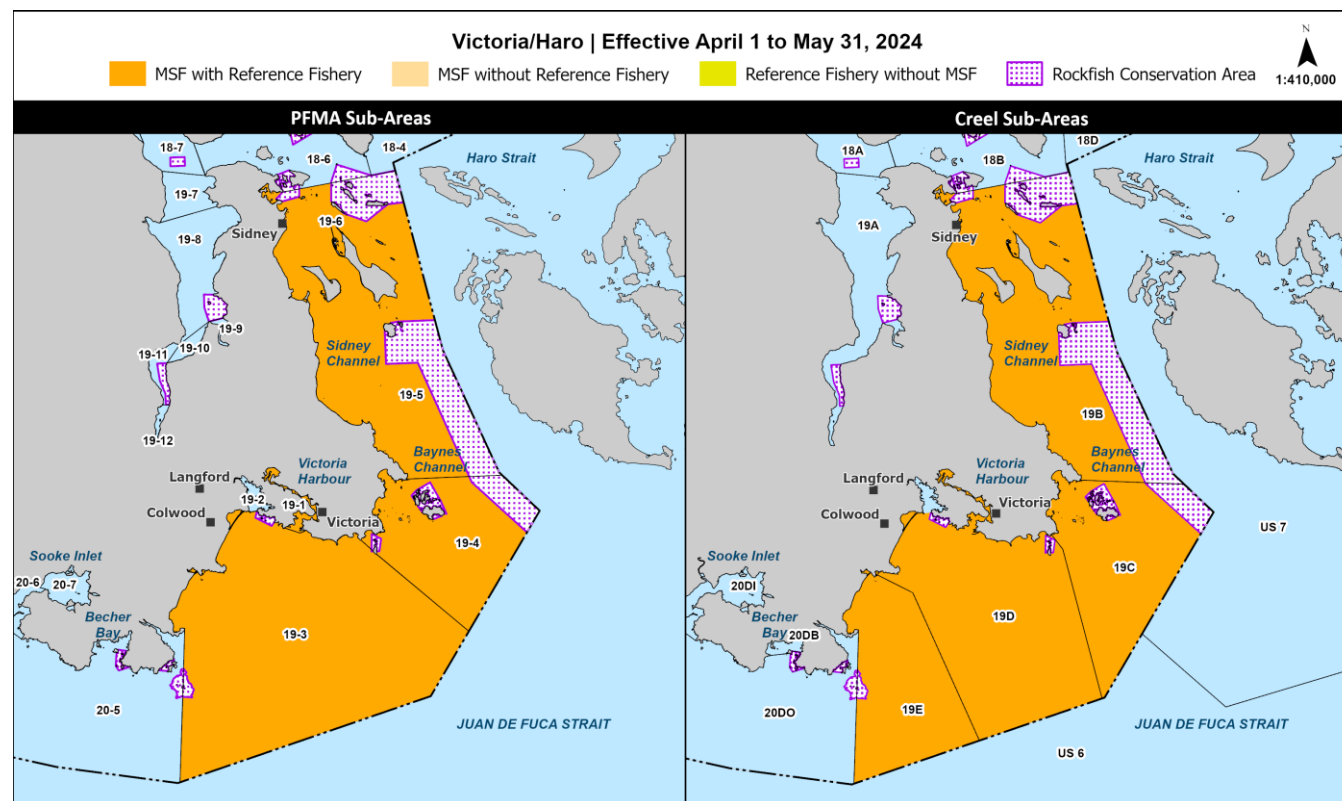
Areas 17-19 - Saanich Inlet/Gulf Islands Chinook Stock Composition (May – July 2024)





Area 19 - Victoria/Saanich Peninsula Chinook Reference Fishery (April & May 2024)

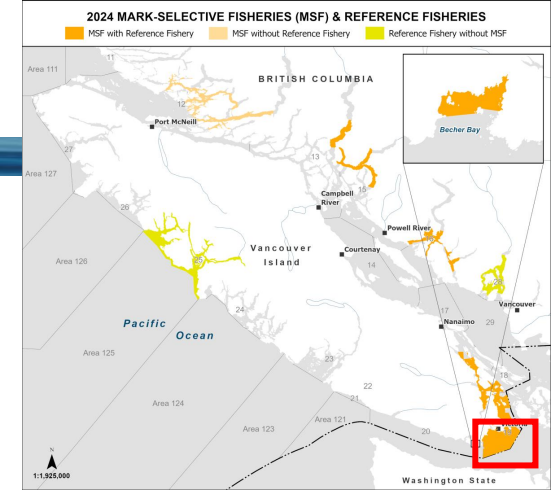
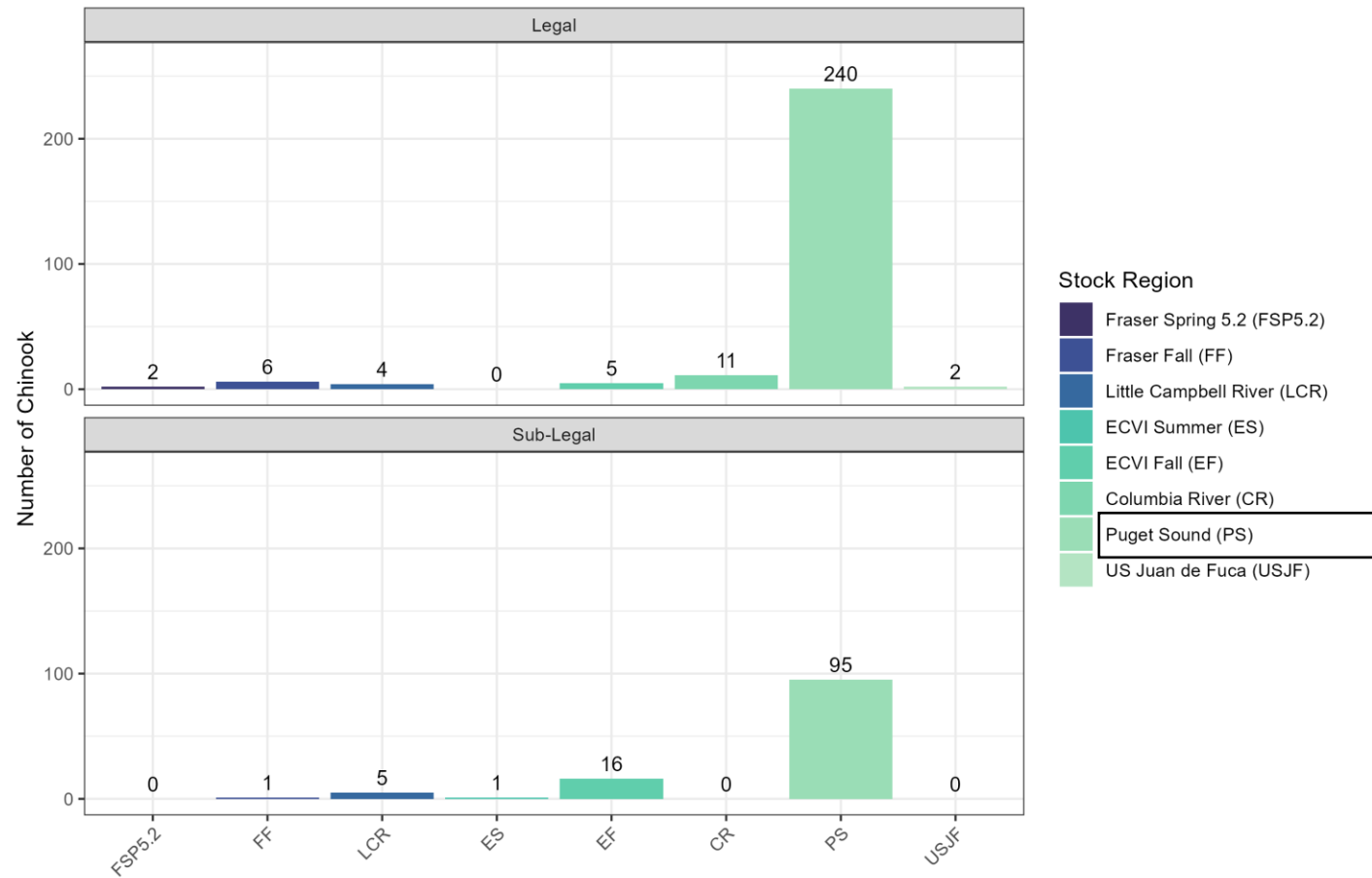
- 414 Chinook sampled across
 - 291 legal
 - 123 sub-legal
- 63 boat days for the duration of the MSF







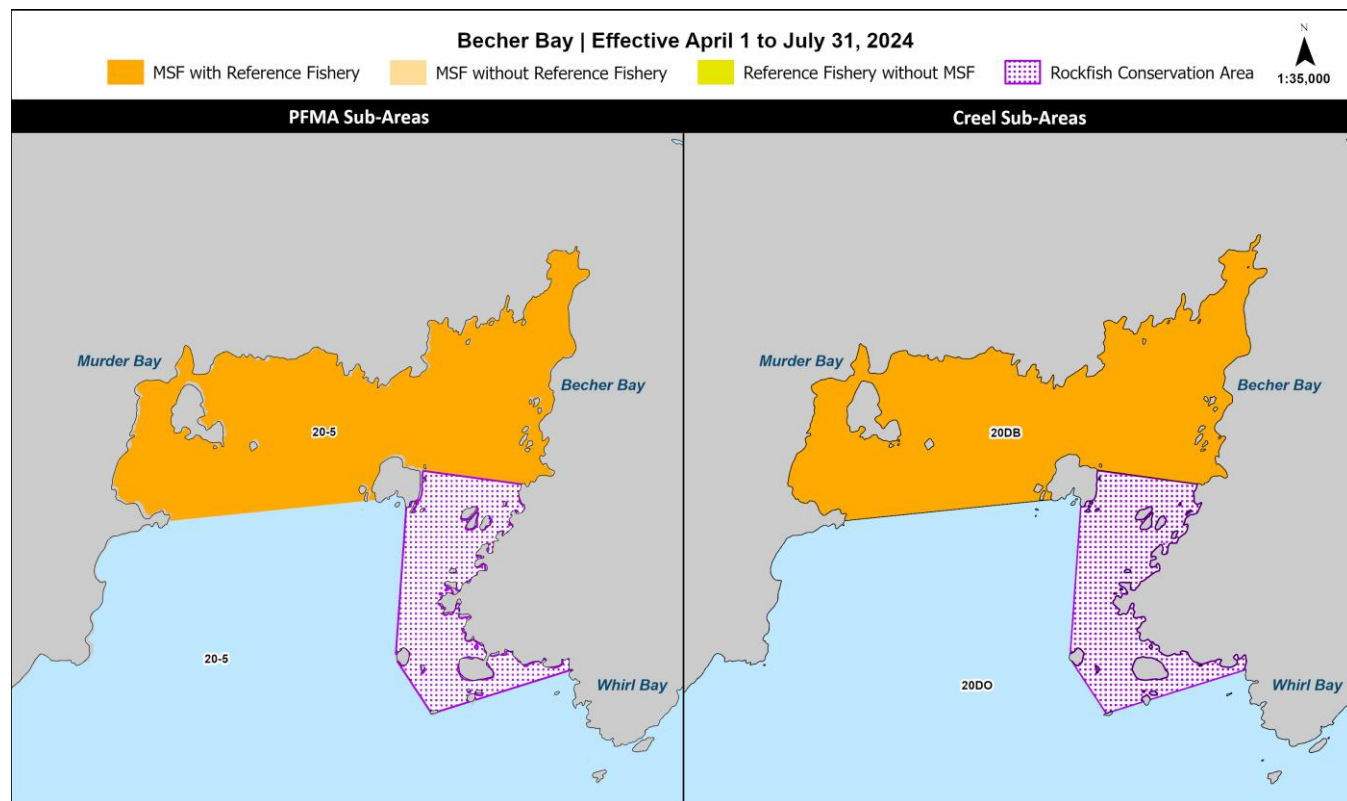
Area 19 - Victoria/Saanich Peninsula Chinook Stock Composition (April & May 2024)

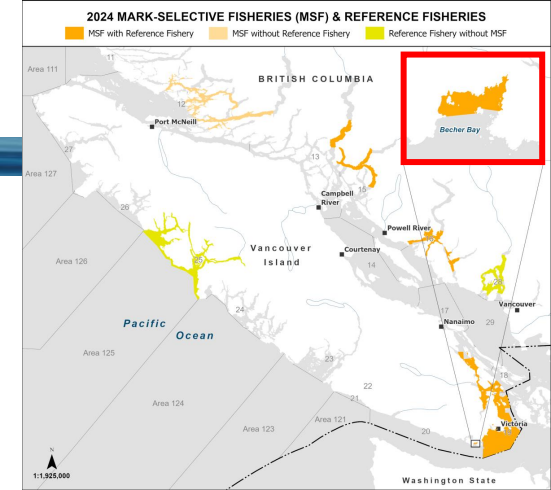




Area 20 - Becher Bay Chinook MSF (April – June 2024)

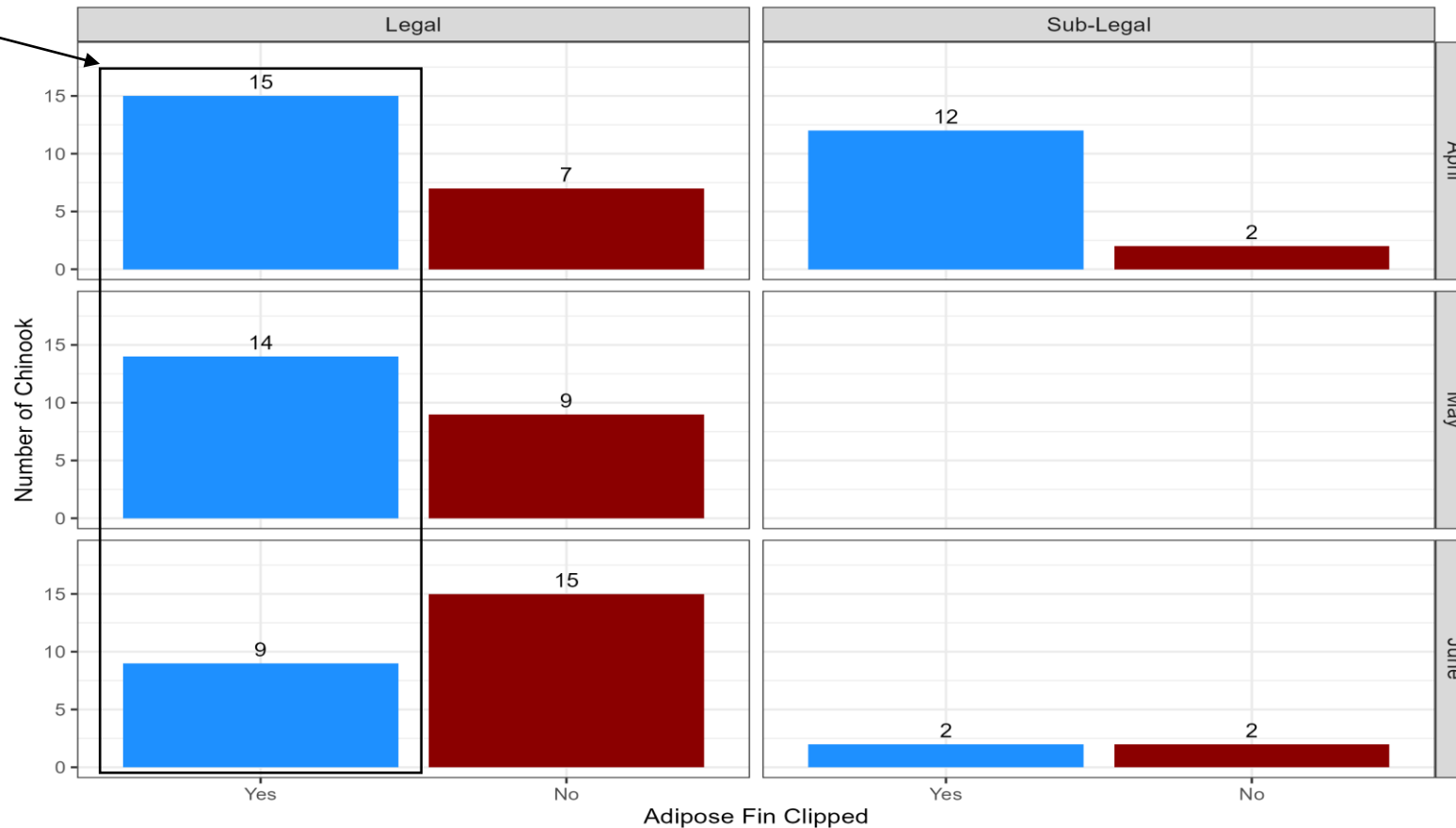
- 87 Chinook sampled across
 - 69 legal
 - 18 sub-legal
- 39 boat days for April through June





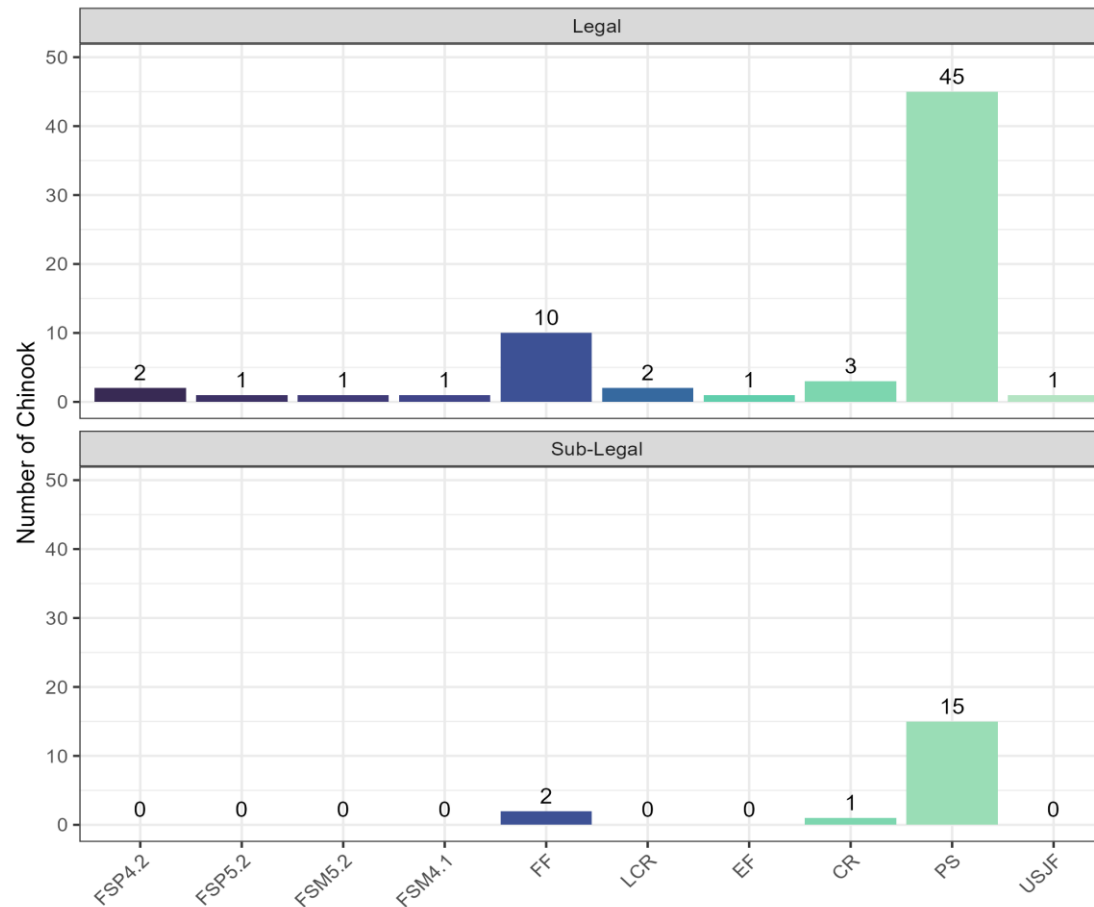
Area 20 - Becher Bay Chinook Mark Rate (n=87 in 2024)

Avg = 56%



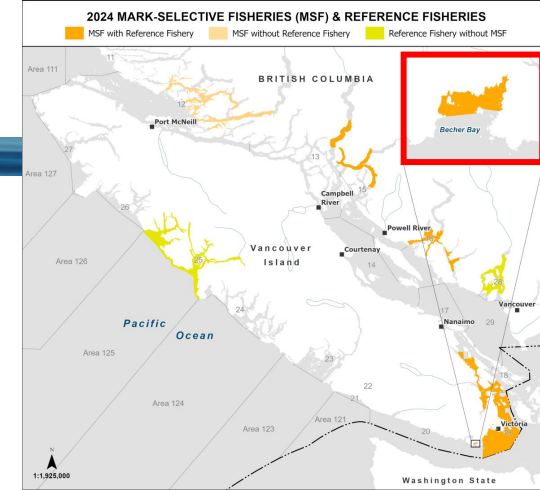


Area 20 - Becher Bay Chinook Stock Composition (April - June 2024)



Stock Region

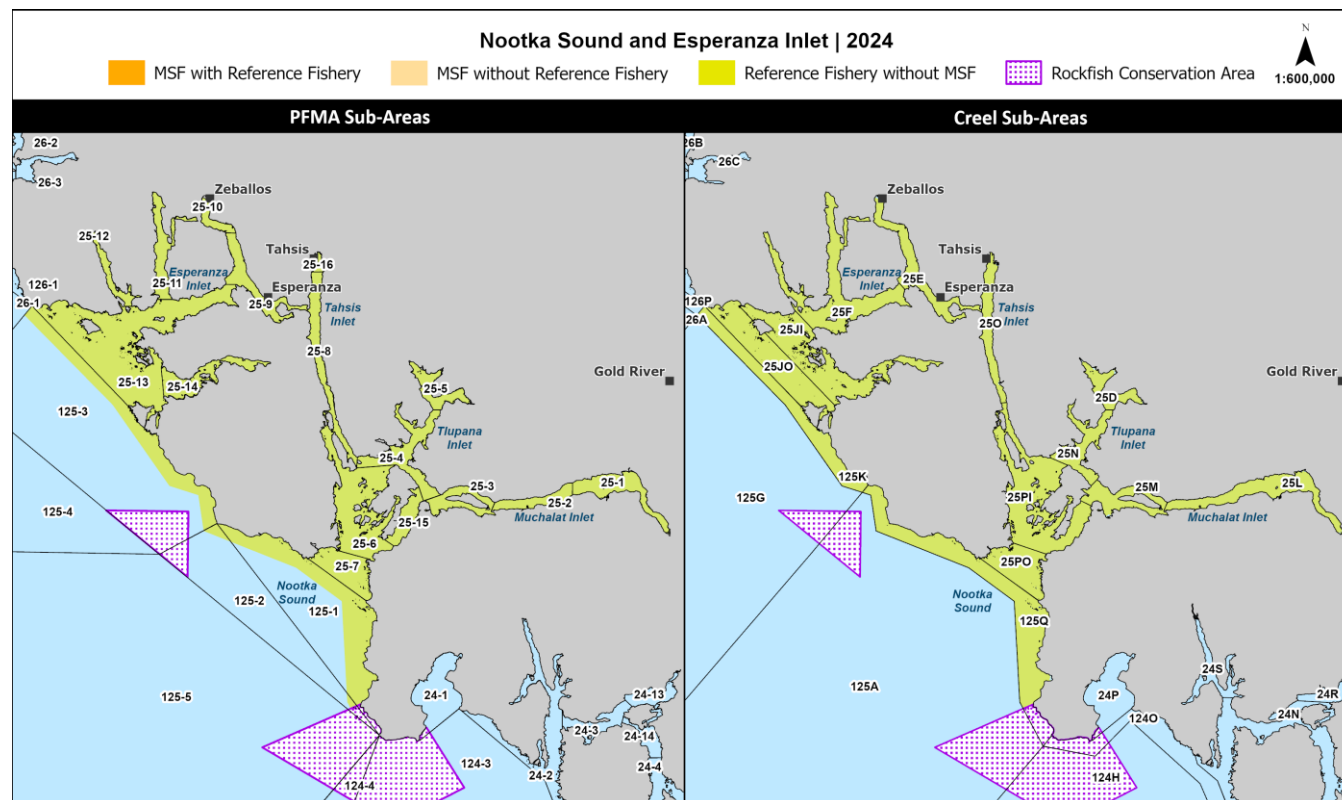
- Fraser Spring 4.2 (FSP4.2)
- Fraser Spring 5.2 (FSP5.2)
- Fraser Summer 5.2 (FSM5.2)
- Fraser Summer 4.1 (FSM4.1)
- Fraser Fall (FF)
- Little Campbell River (LCR)
- ECVI Fall (EF)
- Columbia River (CR)
- Puget Sound (PS)
- US Juan de Fuca (USJF)





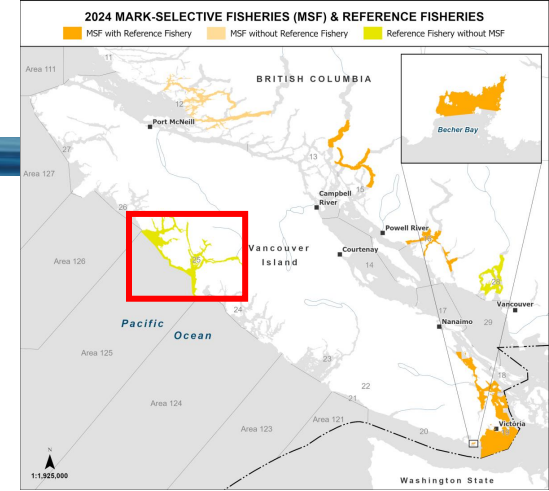
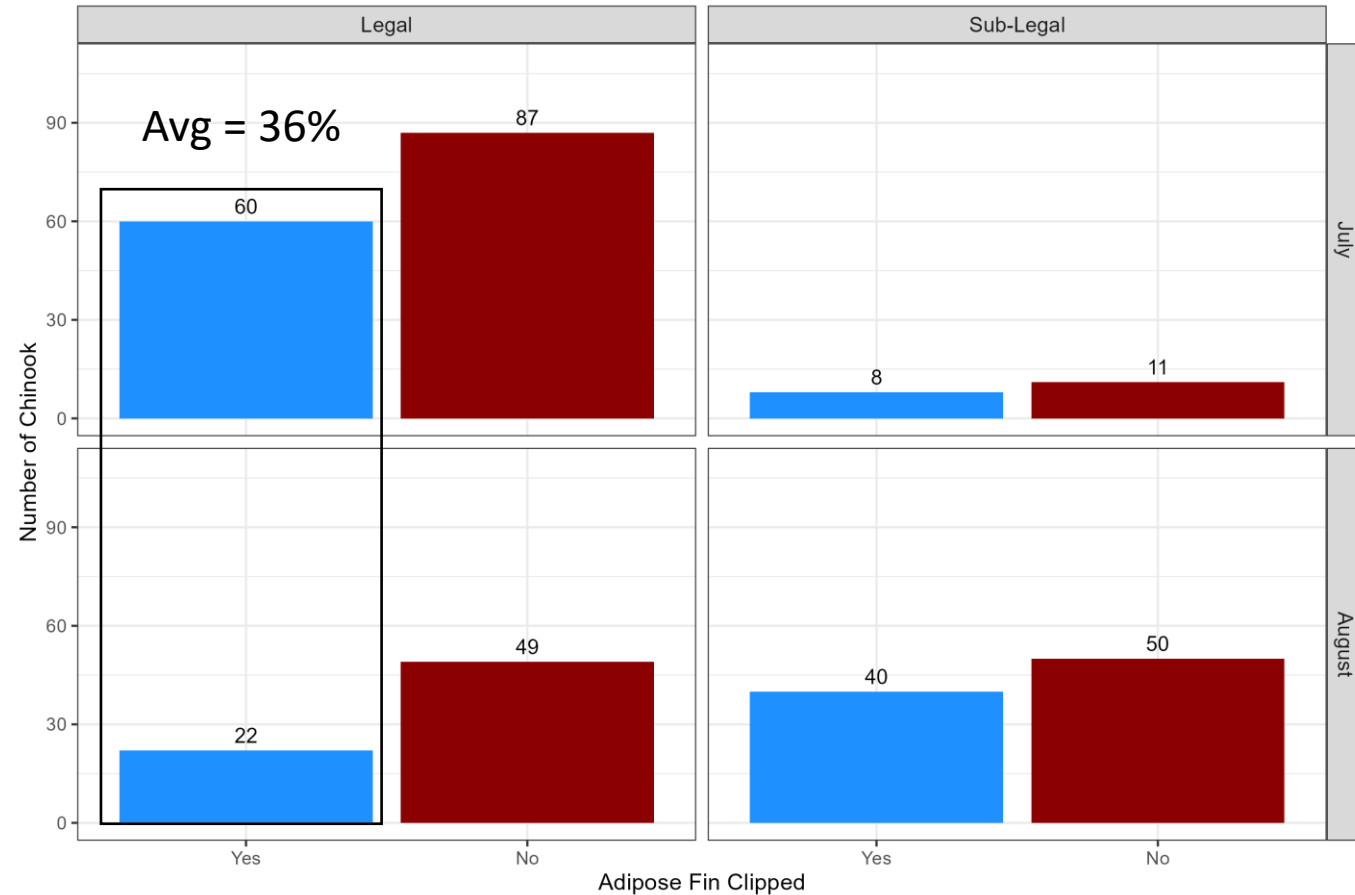
Area 25 – Nootka Sound & Esperanza Inlet Chinook Reference Fishery (July – August 2024)

- There is no MSF in Area 25
- 327 Chinook sampled across
 - 218 legal
 - 109 sub-legal
- 42 boat days





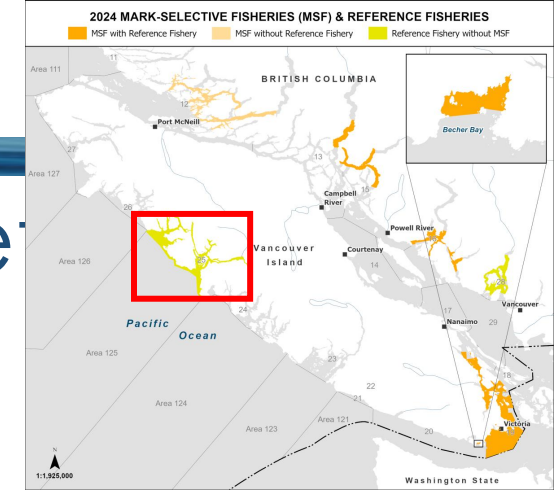
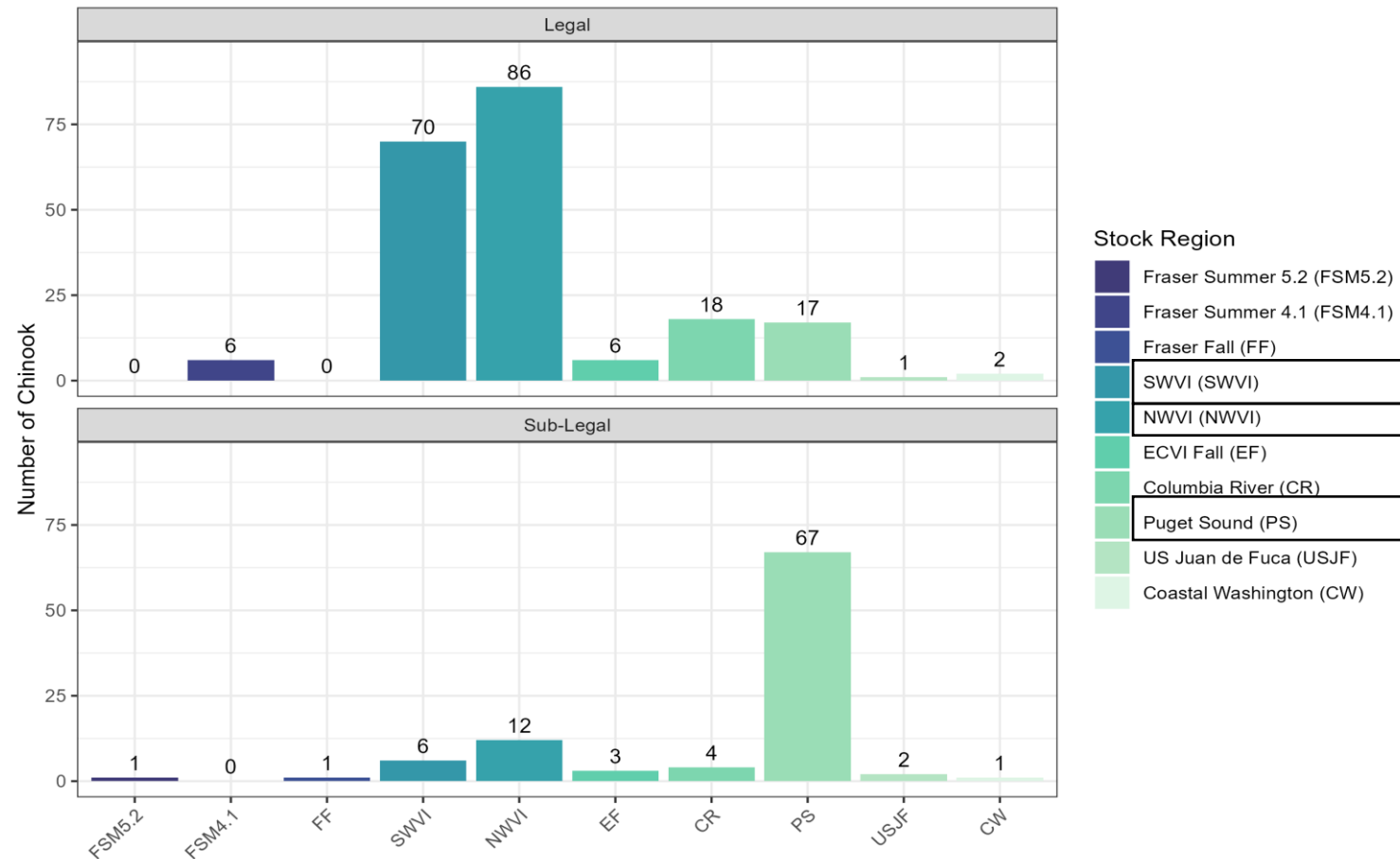
Area 25 – Chinook Mark Rate (n=327 in 2024)



Area 25 – Nootka Sound & Esperanza Inlet

Chinook Stock Composition

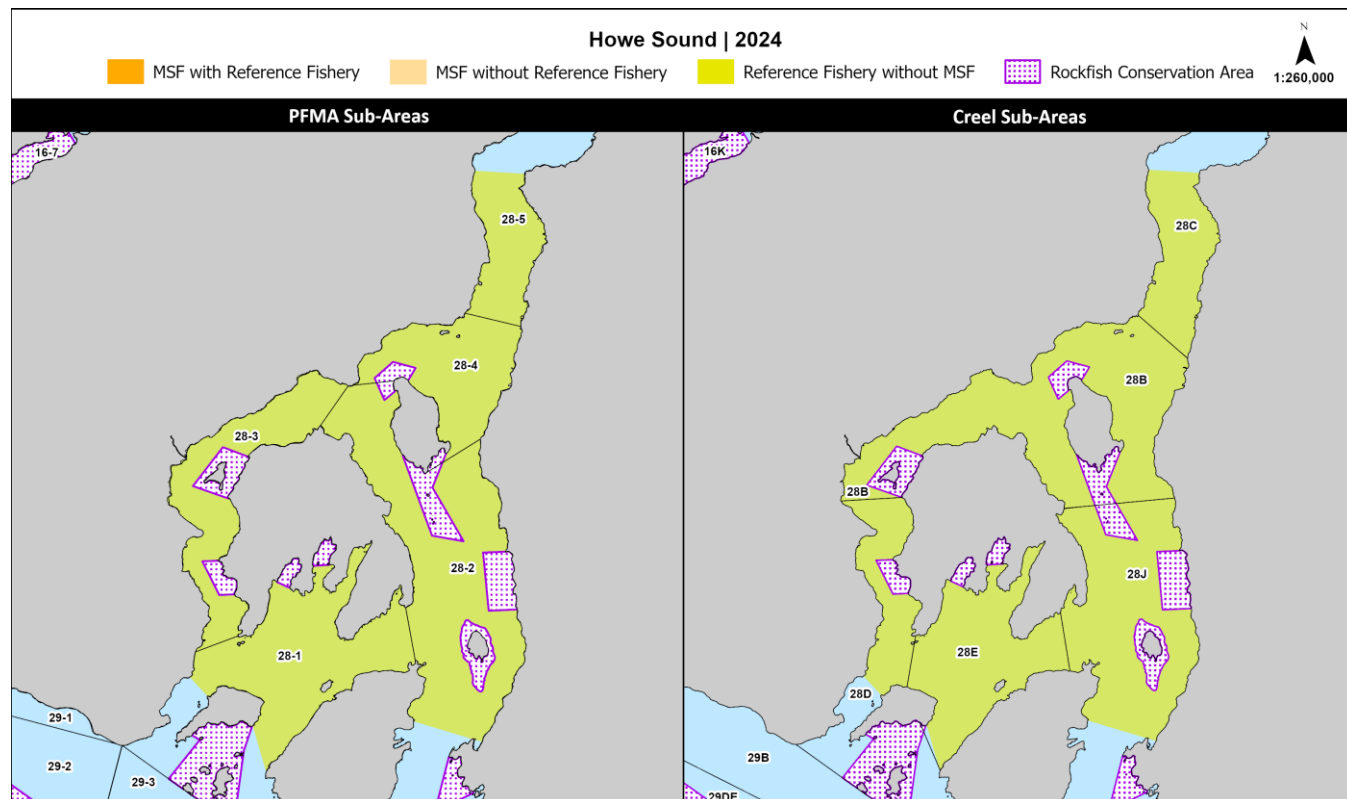
(July – August 2024)





Area 28 – Howe Sound Chinook Reference Fishery (April & May 2024)

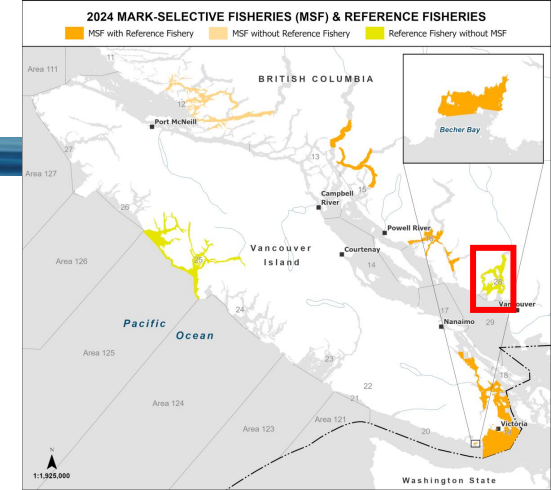
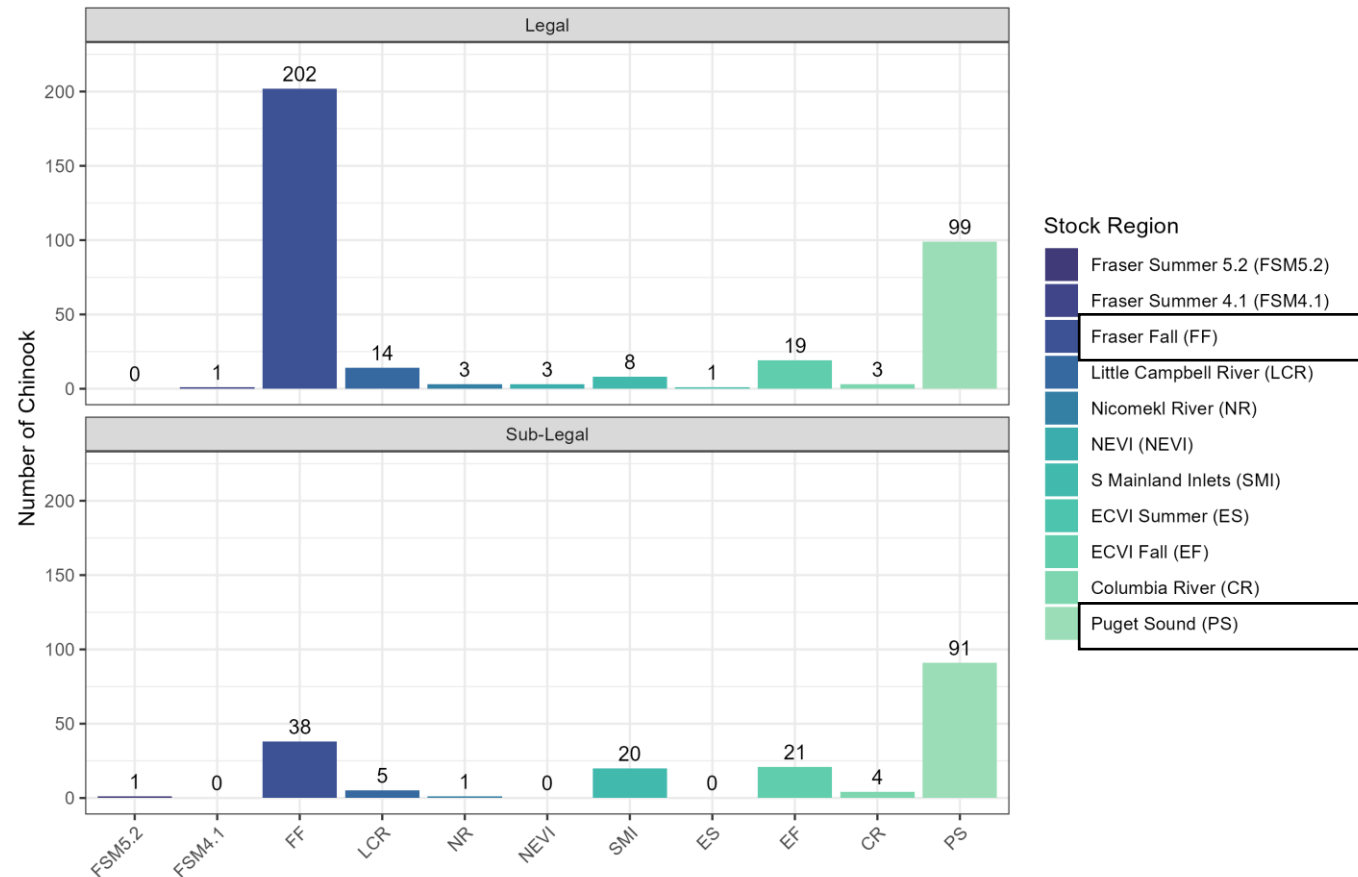
- There is no MSF in Area 28
- 540 Chinook sampled
 - 356 legal
 - 184 sub-legal
- 54 boat days







Area 28 – Howe Sound Chinook Stock Composition (April & May 2024)





2024 Reference Fishery Summary

- 2,582 Chinook were caught and sampled on 316 boat trips between April 2 and August 29, 2024; higher than average catch per unit effort was expected for chartered guides.
- We have stock ID for 2436 fish.
- Mark rates were **high** in the Victoria, Saanich & Gulf Is, and Becher reference fisheries.
- Mark Rates were **moderate** in Howe Sound and Nootka reference fisheries.
- Mark rates were **low** in the Sechelt/Jervis, Toba, Bute reference fisheries. (Bute and Toba are mixed-bag MSFs)
- Bute and Toba Inlets reference fisheries may not have been representative of the MSF since they were sampled later in the season. Sampling in these areas will be more extensive in 2025.
- Puget Sound, ECVI Fall and Fraser Fall Chinook were the most abundant stocks intercepted
- 12 (0.5%) Fraser Chinook stocks of concern intercepted (Fraser Spring 4.2, Fraser Spring 5.2, Fraser Summer 5.2)
 - All were either unmarked or sub-legal and would have been released if caught in the rec fishery.



Future Work

- Funding for PSSI reference fisheries in 2025 is pending.
- The plan for the 2025 reference fishery is to operate in the same locations as 2024 and cover either the same or more of the opening period (budget dependent).
- Funding for the Area 25 reference fishery is from the PSC and is for 3 years (2024-2026) so this will be continued.
- The 2024 data report will be available in Spring 2025.
- In addition, South Coast Stock Assessment is working on a comparative analysis to compare reference fishery results in 2023 and 2024 (mark rate and legal rate) with DFO recreational catch monitoring (creel) data.



Thank you!

- Lance Weber (Sport Fishing Institute)
- Charter Captains
- DFO Staff: Jerson Marroquin, Paul Winchell, Bryan Peak, Saige Woodliffe, Brianne Brand, Chris Burrows, Evan Devereaux, Jeremey Ross, Joelene Neumann, Kelly Borkowski, Nigel Marimuthu, Hanna Meyer, Darcy Dunstan, Cam Solda
- Judae Smith (Nuchatlaht)
- Jim Lane, Claudia Tersigni, Kayley Hollyer (NTC)

