

## Review of Mark-Selective Fisheries by FSMB Joint Technical Committee

Due to time constraints and limited availability of information, the following represents the best evaluation of the pilot MSFs that could be conducted by the JTC as of the report date. Further evaluation will occur as more information becomes available, and recommendations are thus subject to change.

### Results/Current Information

1. Results are summarized in the accompanying document “MSF pilot fisheries summary info for 2021-2023.xlsx”.
2. Post-season data is available from Chinook pilot MSF in 2021 and 2022, including mark rate, encounter size distribution, GSI samples, and kept to released estimates. Key information is summarized in the attached tables.
  - a. Preliminary data is available for 2023 but the JTC has not reviewed this information because GSI data hasn't been processed and is currently unavailable. The JTC has been provided the Reference Fishery data from some of the MSFs; current information is limited to mark rates and legal vs. sub-legal encounters, and GSI data is also outstanding.
3. Encounters and retention of Fraser Chinook stocks of concern (SoC) have been identified in some of these areas in previous years (2014-2019). Fishery regulations in some areas allowed for retention of both adipose-clipped and unclipped Chinook during this period. Retention typically limited to 2/day and only one could be over 67cm; opening dates varied annually between April and August. DFO-approved MSF openings for 2021-2024 are detailed in Table 1 below.
4. Due to small sample sizes in many areas, lack of identification of Fraser Chinook doesn't mean they aren't present in the fishery. Considering Sp 4<sub>2</sub>, Sp 5<sub>2</sub>, and Su 5<sub>2</sub> Fraser Chinook make up small proportions of the adult marine Chinook population targeted in the fishery, minimum sample sizes required to confidently detect them are likely in the 300-400 sample range. Note this is not a minimum sample size to confidently determine stock composition, which would be larger.
5. Post-season estimates of impacts (2021-2022) to Sp 4<sub>2</sub>, Sp 5<sub>2</sub>, and Su 5<sub>2</sub> Fraser Chinook are similar to when pre-season projections of these MSF occurred (2021), but note low sampling rate for some areas (PFMAs 15, 16, and 20-5) make these post-season results highly uncertain. Fraser Fall 4<sub>1</sub> impact was higher than projected in some areas.
6. The JTC is comparing the results of these fisheries against the management objectives for Sp 4<sub>2</sub>, Sp 5<sub>2</sub>, and Su 5<sub>2</sub> Fraser Chinook described in the 2023-24 IFMP of “a highly precautionary manner to allow as many fish to pass through to the spawning grounds as possible” and conclusions from the Recovery Potential Assessment that “any fishery mortalities will jeopardize survival and recovery unless productivity improves”.

### Uncertainties

1. Some MSF locations were assumed to be off the main migratory route of Fraser Chinook SoC, but there has not been verification of whether stock composition of Chinook present in MSF areas is different than assumed migratory route areas. There hasn't been a review of the current sampling program to evaluate if determining the stock composition differences is possible with current sample sizes and sampling programs.

- a. Chinook don't follow a consistent migratory path and may travel into other systems temporarily before reaching the Fraser River.
2. Fraser Fall 4<sub>1</sub> Chinook are present in the Salish Sea longer than other Fraser Chinook during their marine stage, and are therefore vulnerable to marine MSFs regardless of the time period they are opened. No estimate of impact on sublegal released Chinook has occurred to date, which is a significant contributor to the released Chinook catch.
3. There has been a change to the creel program between 2021 and 2022 to better estimate the catch and effort of the pilot MSF, which complicates comparisons of results between years.
4. True Chinook release mortality from recreational fisheries is uncertain, particularly for sublegal Chinook. The projection and analysis uses a rate of 20%.
5. During 2021 and 2022 the MSF catch sampling rate from encountered Chinook was low in most areas (ranged from 4% to 37% for legal-sized fish).
  - a. Catch sampling rates of sublegal Chinook is insufficient across all MSF to date to reliably detect or estimate impacts on Fraser Chinook SoC.
6. It's not possible to quantify the effect of the uncertainties on the estimated impact to Fraser SoC at this point. The JTC has concluded there isn't enough data to be reasonably certain a) that Fraser SoC are not impacted by the MSFs or, b) if the sampling rate is high enough to detect them reliably, how much the MSFs contribute to the overall fishery mortality on Fraser SoC.
7. There is no agreement on precautionary management of Fraser Chinook SoC. Without quantitative limits or targets it is challenging for the JTC to state whether or not management objectives have been achieved.
8. The Chinook Tech Committee (CTC) of the Pacific Salmon Commission defines Mark Selective Fisheries as those fisheries in which only adipose-clipped Chinook are allowed to be retained. Fisheries that allow for the retention of adipose-clipped and unclipped Chinook are defined as mixed-bag regulations. Mixed-bag regulations can increase uncertainty in analysis of impacts due to challenges with monitoring and enforcement.

## Recommendations

1. While the FMI analysis suggests there has been an overall reduction in the FMI for Fraser SoC compared to the base period, the 2021/2022 MSF preliminary results show Fraser Chinook SoC are present in the MSF in Areas 13, 15, and 20-5. Sample sizes are too low in the other areas to conclude whether or not Fraser stocks of concern are present. Given the low abundance of Fraser SoC and high uncertainty in estimated impacts, precautionary management actions should be taken in all fishing areas.
2. The FSMB should determine a quantitative limit of acceptable mortality by all fisheries on Fraser Chinook, beginning with a total allowable mortality that is agreed upon as highly precautionary.
3. Changing the proposed hybrid/mixed-bag MSFs (some retention of unclipped Chinook) to pure MSF (only retention of clipped Chinook) is unlikely to make a practical difference in overall impact to Fraser SoC.

4. The sampling program for all MSF should be bolstered to increase sample sizes and sampling rates. Collaborative development of a sampling program with the catch monitoring program and the JTC is recommended in order to build confidence in estimates of mortality of Fraser Chinook in the pilot MSF.

**Potential Future Work**

1. Review of all 2023 MSF and reference fishery data when available.
2. There is concern with the impact of MSF on the defensibility of the CWT program, particularly on the differential harvest rates from MSF on clipped Chinook that are part of CWT indicator stock programs. JTC could review solutions proposed by CTC/SFEC in more detail.

Table 1. DFO-approved Mark-Selective Fishery openings – adapted from draft Southern Salmon Integrated Fisheries Management Plan, page 293 (Table 13-12).

<b>Years DFO Approved</b>	<b>Location*</b>	<b>Fishery Type</b>	<b>Date Range</b>	<b>Size Restrictions</b>	<b>Daily Retention</b>	<b>Possession</b>
2021-2024	Area 12 (Broughton Archipelago)  Area 13 (Bute Inlet and Ramsay Arm)  Area 15 (Homfray Channel and Toba Inlet)  ^Area 16 (Sechelt and Jervis Inlets)	Mixed-bag MSF	April 1 to July 14	80 cm maximum unmarked; 62 cm minimum all	1 (Marked or unmarked)	2
2023-2024	Areas 17, 18 and 19 (Gulf Islands and Saanich Inlet)	Pure Mark Selective	April 1 to July 14 (Area 17) or July 31 (Areas 18 and 19)	62 cm minimum marked	1 (Marked only)	2
2023-2024	Area 19 (Haro Strait)	Pure Mark Selective	April 1 to May 31	45 cm minimum (Subareas 19-1, 19-3 to 19-4) or 62 cm minimum (Subareas 19-5 and 19-6)	1 (Marked only)	2
2021-2024	Area 20 (Beecher Bay)	Pure Mark Selective	April 1 to July 31	45 cm minimum marked	1 (Marked only)	2

\* Note: Fisheries have been grouped according to similar fishery characteristics. Each area represents a separate fishery and was evaluated independently.

^New for 2024/25: The Department is consulting on reverting the MSF regulation in portions of Area 16 back to the mixed-bag MSF regulation that was first introduced in 2021.