

**Proposed Thermal Marks for Salmon from Canada,
Brood Year 2020**

by

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Abstract

Thermal marking continues to play an important role for stock, hatchery, and fisheries management and research in Canada. Canada plans to thermally mark approximately 67 million Pacific salmon from the 2020 brood year for release in 2021/22. Thermal marking will include 67 different thermal marks applied at 19 hatcheries with marked salmon released at over 50 locations. The plan is similar to the 2019 brood year marking plan, fish planned for release in 2020/21 (Till 2019).

Introduction

Thermal marking in Canada continues to focus primarily on Chinook and chum stocks with increasing numbers of sockeye and pink but with limited marking of coho. Thermal marks are used to distinguish hatchery from naturally spawned (wild) salmon in terminal fisheries and in spawning populations. Thermal marks on sockeye, Chinook, coho and pink are also being used to assess different hatchery release strategies. For chum salmon the use of thermal marks has replaced finclips as a means for marking fish at some hatcheries. Thermal marks are also being used to validate information on the harvest, survival and straying rates of Chinook salmon estimated by coded-wire tag studies (Hankin et al. 2005).

Plan for 2020 Brood Year Stocks

The proposed thermal marking program for salmon in Canada for the 2020 brood year is shown in Table 1 using the Uniform Hatch Code notation (Johnson et al. 2006). However, due to practical application considerations the delimiters being used remain those described in Thermal Marking Of Otoliths. The "RBr" Coding Structure Of Thermal Marks (Munk and Geiger 1998). The bulk of the proposal is similar to that submitted for the marking of salmon in Canadian hatcheries for brood year 2019 (Till 2019), with a few modifications. Proposed marks remain the same except where prevented by operational constraints or where conflicts arose with marking proposals from other NPAFC members. One proposed change of note is from Robertson Creek Hatchery where Stamp River Chinook are a key contributor to fisheries from B.C. to Alaska and are of great importance to many communities. The main production mark for Chinook at Robertson Creek has been 3H for many years. We are proposing an experimental release using an improved pattern of 2-3H which will be easier to recognize during processing. Finding enough time, prior to hatch, to apply a longer duration mark at Robertson Creek has been accomplished by proposing to time the 'shocking' and 'picking' of eggs with ring application for the first (new) Band. This improved hatch mark pattern should ensure continued validation and assessment of this stock through thermal marking. Additional chum marks include a second mark for Nitinat River Hatchery to distinguish river from seapen releases. Continued application of thermal marks to Upper Fraser Early Stuart and Bowron sockeye stocks is of greater significance given the ongoing passage difficulties in the Fraser created by the Big Bar landslide in spring 2019. Other important components of the plan include the use of multiple thermal marks at Nitinat River Hatchery for both Chinook and coho, to permit continued assessment of traditional and enhanced (naturalization of rearing channels and ponds) rearing strategies, and different release locations. Additional pink marking is hoped for at Quinsam hatchery if a new chiller system can be installed in time for the 2020 season.

References

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Table 1. Proposed Canadian releases of thermal marked salmon from 2020 brood year.

| Brood Year | Species | Facility | Hatch Code | Proposed Release (Thousand's) | Release Site/Description |
|------------|---------|--|------------|-------------------------------|---|
| 2020 | Chinook | Chilliwack River Hatchery | H7 | 1,500 | Chilliwack River + Various Misc |
| 2020 | Chinook | Conuma River Hatchery | H2,4 | 500 | Muchalat Lake Pen |
| 2020 | Chinook | Conuma River Hatchery | H2,5 | 100 | Gold River Estuary Seapen |
| 2020 | Chinook | Conuma River Hatchery | H4,2 | 350 | Burman Estuary |
| 2020 | Chinook | Conuma River Hatchery | H5-2 | 1,350 | Conuma Estuary. Early seapen release |
| 2020 | Chinook | Conuma River Hatchery | H5-3 | 1,350 | Conuma Estuary. Late seapen release |
| 2020 | Chinook | Conuma River Hatchery | H5-4 | 500 | Conuma River |
| 2020 | Chinook | Cowichan River Hatchery | 4-2H | 700 | Cowichan River |
| 2020 | Chinook | Gwa'ni Hatchery | 3,3nH | 300 | Nimpkish River |
| 2020 | Chinook | Marble River Hatchery | 3,2,2H | 900 | Marble River |
| 2020 | Chinook | Marble River Hatchery | 3,2,3H | 90 | Quatsino Sound |
| 2020 | Chinook | Nanaimo River Hatchery | H2-3 | 400 | Nanaimo River (fall run) |
| 2020 | Chinook | Nanaimo River Hatchery | H5 | 220 | Nanaimo River (summer run) |
| 2020 | Chinook | Nitinat River Hatchery | H2,3,2 | 1,000 | Nitinat River Traditional Large |
| 2020 | Chinook | Nitinat River Hatchery | H2,3,2,2 | 1,000 | Nitinat River Traditional Small |
| 2020 | Chinook | Nitinat River Hatchery | H3,2,3,2 | 1,000 | Nitinat Enriched Large |
| 2020 | Chinook | Nitinat River Hatchery | H2,3,2,3 | 1,000 | Nitinat Enriched Small |
| 2020 | Chinook | Nitinat River Hatchery | H3,1,4 | 250 | Sarita River Enriched Small |
| 2020 | Chinook | Nitinat River Hatchery | H3,1,3 | 0 (2 year rotation) | Sarita River Enriched Small |
| 2020 | Chinook | Nitinat River Hatchery | H3,2,3 | 250 | Sarita River Traditional Large |
| 2020 | Chinook | Nitinat River Hatchery | H3,2,4 | 0 (2 year rotation) | Sarita River Traditional Large |
| 2020 | Chinook | Nitinat River Hatchery | 3,4H | 500 | Sooke Seapens (fry outplants) |
| 2020 | Chinook | Nitinat River Hatchery | 3,4H | 100 | Sooke Harbour Seapen (smolts) |
| | | Nitinat River Hatchery. Transferred to Jack Brooks Hatchery | | | |
| 2020 | Chinook | Jack Brooks Hatchery | 4H | 250 | Sooke River (egg transfers) |
| 2020 | Chinook | Quinsam River Hatchery | 2-4H | 150 | Upper Quinsam River. Eyed egg plant |
| 2020 | Chinook | Quinsam River Hatchery | 3-4H | 960 | Campbell River. Unfed fry |
| 2020 | Chinook | Quinsam River Hatchery | H2/2 | 650 | Quinsam River Seapens |
| 2020 | Chinook | Quinsam River Hatchery | H2/2/2 | 1,900 | Quinsam River |
| 2020 | Chinook | Quinsam River Hatchery | H2/2/2/2 | 120 | Salmon River |
| | | | | | Lower Quinsam Lake outplants. Late fed fry. |
| 2020 | Chinook | Quinsam River Hatchery | H2/2/4 | 250 | |
| 2020 | Chinook | Robertson Creek Hatchery | 3H | 5,000 | Stamp River |
| 2020 | Chinook | Robertson Creek Hatchery | 2-3H | 800 | Stamp River |
| 2020 | Chinook | Robertson Creek Hatchery | 3H3/2 | 100 | Stamp River accelerated |
| 2020 | Chinook | Robertson Creek Hatchery | 3H4 | 300 | Alberni Inlet Seapen - Underwood Cove |
| 2020 | Chinook | Robertson Creek Hatchery | H3/2 | 70 | Nahmint River |
| 2020 | Chinook | San Juan Enhancement Soc. | H4 | 500 | San Juan River |
| 2020 | Chinook | Sooke Enhancement Society | 5H | 500 | Sooke River |
| 2020 | Chinook | Spius Creek Hatchery | H3/3 | 65 | Spius Creek (fed fry) |
| 2020 | Chinook | Spius Creek Hatchery | H3/3,2 | 55 | Coldwater River (yearling) |
| 2020 | Chinook | Spius Creek Hatchery | H3/3,2 | 30 | Coldwater River (fed fry) |
| 2020 | Chinook | Spius Creek Hatchery | H4/4,2 | 70 | Salmon River (fed fry) |
| 2020 | Chinook | Tahsis River Hatchery | H7,3 | 160 | Leiner River |
| 2020 | Chinook | Tahsis River Hatchery | H9 | 160 | Tahsis River |

Table 1. Proposed Canadian releases of thermal marked salmon from 2020 brood year. (cont'd)

| Brood Year | Species | Facility | Hatch Code | Proposed Release (Thousand's) | Release Site/Description |
|-------------------------|---------|---------------------------|------------|----------------------------------|---|
| 2020 | Chum | Conuma River Hatchery | H2,2 | 500 | Canton River |
| 2020 | Chum | Conuma River Hatchery | H2,3 | 500 | Sucwoa River |
| 2020 | Chum | Conuma River Hatchery | H2,3 | 1,000 | Tlupana River |
| 2020 | Chum | Conuma River Hatchery | H5 | 1,500 | Conuma Estuary Seapen |
| 2020 | Chum | Conuma River Hatchery | H7 | 500 | Conuma Side Channel |
| 2020 | Chum | Gwa'ni Hatchery | H3,2 | 150 | Nimpkish River |
| 2020 | Chum | Gwa'ni Hatchery | H4,2 | 1,000 | Nimpkish River Release - Puntledge stock |
| 2020 | Chum | Gwa'ni Hatchery | H4-2 | 1,000 | Nimpkish Seapen Release - Puntledge stock |
| 2020 | Chum | Kitimat River Hatchery | H2,4 | 1,700 | Kitimat River |
| 2020 | Chum | Nitinat River Hatchery | 3,2H | 5,000 | Nitinat River |
| 2020 | Chum | Nitinat River Hatchery | 3-2H | 5,000 | Nitinat Lake |
| 2020 | Chum | Snootli River Hatchery | H3,3 | 4,968 | Snootli River. Thorsen Creek. Nookliklonnic Creek. |
| 2020 | Chum | Snootli River Hatchery | H4,3 | 0 (2 year rotation) | Snootli River. Thorsen Creek. Nookliklonnic Creek. |
| 2020 | Chum | Snootli River Hatchery | H3,4 | 1,656 | Saloompt River |
| 2020 | Chum | Snootli River Hatchery | H4,4 | 0 (2 year rotation) | Saloompt River |
| 2020 | Coho | Chilliwack River Hatchery | H4,2 | 100 | Vedder River + Tribs |
| 2020 | Coho | Chilliwack River Hatchery | H4,2 | 800 | Chilliwack River |
| 2020 | Coho | Nitinat River Hatchery | H2,3 | 50 | Nitinat Enriched Large Smolts (yearling) |
| 2020 | Coho | Nitinat River Hatchery | H2,4 | 50 | Nitinat BKD Unscreened Smolts (yearling) |
| 2020 | Coho | Nitinat River Hatchery | H3 | 50 | Nitinat Traditional Large Smolts (yearling) |
| 2020 | Coho | Nitinat River Hatchery | H4 | 50 | Nitinat Enriched Small Smolts (yearling) |
| 2020 | Pink | Nanaimo River Hatchery | H4 | 900 | Nanaimo River. Seapen |
| 2020 | Pink | Puntledge River Hatchery | 7H | 100 | Glendale Channel |
| 2020 | Pink | Quinsam River Hatchery | 2,2H | 3,000 | Chef Cr, Englishman R, Headquarters Cr, Wilfred Cr, Mohun Cr, Nile Cr. Eyed egg exports |
| 2020 | Pink | Quinsam River Hatchery | 2-2H | 6,000 | Quinsam River |
| 2020 | Sockeye | Inch Creek Hatchery | H4,2 | 500 | Pitt River |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,4 | 1,250 | Shingle Creek |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,3 | 0 (2 year rotation) | Shingle Creek |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,4,1 | 1,250 | Shingle Creek |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,3,1 | 0 (2 year rotation) | Shingle Creek |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,4,2 | 1,250 | Shingle Creek |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,3,2 | 0 (2 year rotation) | Shingle Creek |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,4,3 | 1,250 | Shingle Creek |
| 2020 | Sockeye | Kl cp'elk'stim Hatchery | H3,3,3 | 0 (2 year rotation) | Shingle Creek |
| 2020 | Sockeye | Shuswap River Hatchery | H3,1,2 | 200 | Bowron |
| 2020 | Sockeye | Shuswap River Hatchery | H3,1,3 | 0 (2 year rotation) | Bowron |
| 2020 | Sockeye | Shuswap River Hatchery | H3,2 | 200 | Early Stuart |
| 2020 | Sockeye | Shuswap River Hatchery | H3,2,2 | 0 (2 year rotation) | Early Stuart |
| | | | | Totals by Species | |
| | Chinook | | | 25,450,000 | |
| | Chum | | | 24,474,000 | |
| | Coho | | | 1,100,000 | |
| | Pink | | | 10,000,000 | |
| | Sockeye | | | 5,900,000 | |
| Grand Total 2020 | | | | 66,924,000 | |