# 2018-19 Winter Mark-Selective Recreational Chinook Fisheries In Marine Areas 5, 6, 7, 8-1, 8-2, 9, 10, 11, 12 and 13

## Post-season Report

## DRAFT

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# INTRODUCTION

In the marine environments of the Strait of Juan de Fuca and Puget Sound, abundant runs of hatchery Chinook salmon (*Oncorhynchus tshawytscha*) have been mixed with depressed stocks of natural-origin Chinook salmon. Providing recreational anglers with opportunities to harvest abundant hatchery stocks while simultaneously protecting weaker, natural-origin stocks has proven to be a significant conservation and management challenge. The combination of large-scale hatchery marking (i.e., fin clipping) programs and mark-selective harvest regulations makes it possible for anglers to pursue and harvest hatchery Chinook salmon while minimally impacting natural-origin salmon populations. In such "mark-selective fisheries" (MSFs), anglers are generally allowed to retain adipose-fin clipped ("marked") hatchery fish and are required to release unharmed any unclipped ("unmarked", predominantly natural-origin) salmon encountered[1].

Since the Washington Department of Fish and Wildlife (WDFW) implemented the first marine mark-selective Chinook salmon fisheries in Marine Areas 5 and 6 (Strait of Juan de Fuca) in 2003 based on state-tribal agreements (Thiesfeld and Hagen-Breaux 2005a,WDFW 2008a), mark-selective Chinook salmon fishing regulations have been implemented in multiple Puget Sound Marine Areas during both the summer and winter seasons. Including the 2019 management season, mark-selective fisheries for Chinook salmon have been conducted in Puget Sound for the last 15 summer (May through September) seasons and the last 14 winter (October through April) seasons.

During the 2018-19 winter season, October through April, WDFW implemented ten mark-selective Chinook salmon fisheries in Marine Areas 5, 6, 7, 8-1, 8-2, 9, 10, 11, 12 and 13. The Chinook MSF seasons in each area were scheduled as follows:

- Marine Area 5 from February 16 through April 30, 2019;
- Marine Area 6 from February 1 through April 15, 2019;
- Marine Area 7 from January 1 through April 15, 2019;
- Marine Areas 8-1 and 8-2 from December 1, 2018 through April 30, 2019;
- Marine Area 9 from January 1 through April 15, 2019;
- Marine Area 10 from January 1 through March 31, 2019;
- Marine Area 11 from October 1, 2018 through April 30, 2019;
- Marine Area 12 from October 1, 2018 through April 30, 2019; and
- Marine Area 13 from October 1, 2018 through April 30, 2019.

[1]The regulations specific to summer mark-selective fisheries in Puget Sound Marine Catch Areas allowed for the retention of up to two legal-sized (≥22 inches [56 cm]) marked Chinook salmon per day and required the immediate release of all unmarked or sublegal Chinook salmon. Additionally, anglers were: *i*) required to use single-point, barbless hooks while fishing for salmon, *ii*) held to a combined (all salmon species) two-fish daily limit, and *iii*) held to a handling rule that prevented them from bringing unmarked and/or sublegal Chinook aboard their vessels.

# RESULTS

## 1) Marine Area 5 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented the fourth winter Chinook MSF in Marine Area 5 from February 16, 2019 through April 30, 2019. Data collection methods used to monitor the Marine Area 5 Chinook MSF included dockside angler interviews with catch sampling.
WDFW dockside samplers conducted "Baseline Sampling" at selected access sites during the 2018-19 winter Chinook salmon MSF in Marine Area 5. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Briefly, baseline sampling is opportunistic in nature, with overall sampling effort allocated across space and time in a manner that maximizes the number of angler interviews obtained per sample effort. The Marine Area 5 baseline sample frame included two access sites (Table 1.3), and a total of 64 site visits during the two and a half month season. Site visits ranged from short (e.g., "no effort" samples) to full-day (8+ hours) sampling events. When present, samplers interviewed all anglers exiting the Marine Area 5 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Marine Area 5 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook salmon size (fork length) and age (scales were collected) composition. Samplers also inspected landed Chinook and Coho salmon for CWTs using wand detectors and acquired snouts when tags were present. Resulting tag data were used to estimate the unexpanded CWT-based composition of landed catch.

In contrast to the intensive "Murthy" survey design employed in some other areas, Marine Area 5 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook salmon impacts. However, Marine Area 5 baseline sampling observations, and VTRs (Volunary Trip Reports) will ultimately be combined with Catch Record Card (CRC) data, once they become available, to estimate catch and effort at the fishery-total level. While these descriptors of MSF impacts are not presented in this document, they will be available at a later date. In the following section, we present results from our monitoring activities during the Marine Area 5 winter 2018-19 Chinook salmon MSF.

**Table 1.1** Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | | | Released Fish | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Chinook AD | Chinook UM | Chinook Unk | Chin AD | Chin UM | Chin Unk |
| 7 | 16-Feb | 17-Feb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 18-Feb | 24-Feb | 2 | 4 | 7 | 0 | 0 | 8 | 1 | 0 |
| 9 | 25-Feb | 3-Mar | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 6 |
| 10 | 4-Mar | 10-Mar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 11-Mar | 17-Mar | 20 | 43 | 24 | 0 | 0 | 16 | 10 | 29 |
| 12 | 18-Mar | 24-Mar | 20 | 48 | 15 | 0 | 0 | 26 | 5 | 6 |
| 13 | 25-Mar | 31-Mar | 28 | 66 | 30 | 0 | 0 | 27 | 8 | 40 |
| 14 | 1-Apr | 7-Apr | 8 | 20 | 19 | 0 | 0 | 16 | 5 | 30 |
| 15 | 8-Apr | 14-Apr | 25 | 57 | 27 | 0 | 0 | 144 | 21 | 27 |
| 16 | 15-Apr | 21-Apr | 31 | 57 | 28 | 0 | 0 | 65 | 13 | 71 |
| 17 | 22-Apr | 28-Apr | 1 | 2 | 3 | 0 | 0 | 6 | 3 | 2 |
| 18 | 29-Apr | 30-Apr | 8 | 13 | 7 | 0 | 0 | 33 | 6 | 0 |
| **Season Total** | | | **146** | **316** | **160** | **0** | **0** | **341** | **72** | **211** |

**Table 1.2** Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | | | Released Fish | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Coho AD | Coho UM | Pink | Coho AD | Coho UM | Coho Unk | Pink | Unknown |
| 7 | 16-Feb | 17-Feb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 18-Feb | 24-Feb | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 25-Feb | 3-Mar | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 4-Mar | 10-Mar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 11-Mar | 17-Mar | 20 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 18-Mar | 24-Mar | 20 | 48 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 |
| 13 | 25-Mar | 31-Mar | 28 | 66 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 11 |
| 14 | 1-Apr | 7-Apr | 8 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 8-Apr | 14-Apr | 25 | 57 | 0 | 0 | 0 | 4 | 0 | 6 | 0 | 30 |
| 16 | 15-Apr | 21-Apr | 31 | 57 | 2 | 0 | 0 | 18 | 0 | 0 | 7 | 0 |
| 17 | 22-Apr | 28-Apr | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| 18 | 29-Apr | 30-Apr | 8 | 13 | 2 | 0 | 2 | 0 | 1 | 10 | 10 | 24 |
| **Season Total** | | | **146** | **316** | **4** | **0** | **2** | **29** | **1** | **17** | **17** | **67** |

**Table 1.3** List of sites sampled with the number of sampling events (site-days) during the winter Chinook salmon MSF in Marine Area 5.

| Location Name | Number of Site Days Sampled Per Month | | | Total Site-Days | % of Total |
|---|---|---|---|---|---|
| | February | March | April | | |
| Olson's Resort | 4 | 15 | 14 | 33 | 51.56% |
| Van Ripers Resort | 4 | 15 | 12 | 31 | 48.44% |
| **Grand Total** | **8** | **30** | **26** | **64** | **100.00%** |

**Table 1.4** Summary of CWTs recovered from Chinook salmon harvested during the 2018-19 winter Chinook salmon MSF in Marine Area 5. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| BC | Fraser River – Thompson River (15.4%) | R-Chilliwack R | H-Chilliwack River H | 1 (7.7%) | 0 |
| | | R-Harrison R | H-Chehalis River H | 1 (7.7%) | 0 |
| WA | Northern Washington (7.7%) | Friday Cr 03.0017 | Samish Hatchery | 1 (7.7%) | 0 |
| | Hood Canal (7.7%) | Finch Cr 16.0222 | Hoodsport Hatchery | 1 (7.7%) | 0 |
| | Mid Puget Sound (23.1%) | Big Soos Cr 09.0072 | Soos Creek Hatchery | 2 (15.4%) | 0 |
| | | Grovers Cr Hatchery | Grovers Cr Hatchery | 1 (7.7%) | 1 |
| | S Puget Sound (30.8%) | Clear Cr 11.0013C | Clear Creek Hatchery | 2 (15.4%) | 0 |
| | | Minter Cr 15.0048 | Minter Cr Hatchery | 2 (15.4%) | 0 |
| CA | Central California Coast (15.4%) | Mare Island Net Pen | Feather R Hatchery | 1 (7.7%) | 0 |
| | | Half Moon Bay John Pr Net | Mok R Fish Ins | 1 (7.7%) | 0 |
| | | | Total | 13 | 1 |

**Table 1.5** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the winter Chinook salmon MSF in Marine Area 5.

| Mark Type | Legal | Sublegal | Total |
|---|---|---|---|
| Marked | 156 | 4 | 160 |
| Unmarked | 0 | 0 | 0 |
| Total | 156 | 4 | 160 |

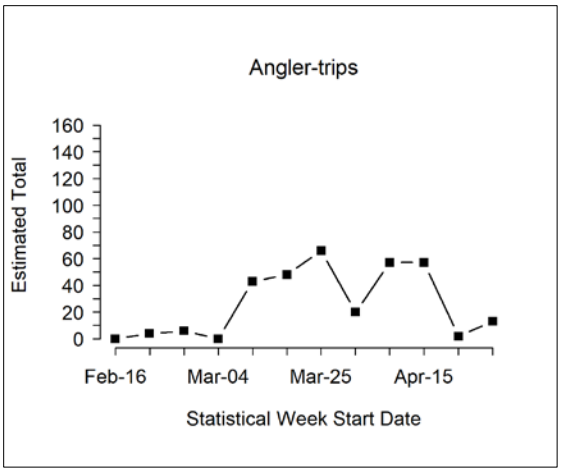


**Figure 1.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites)

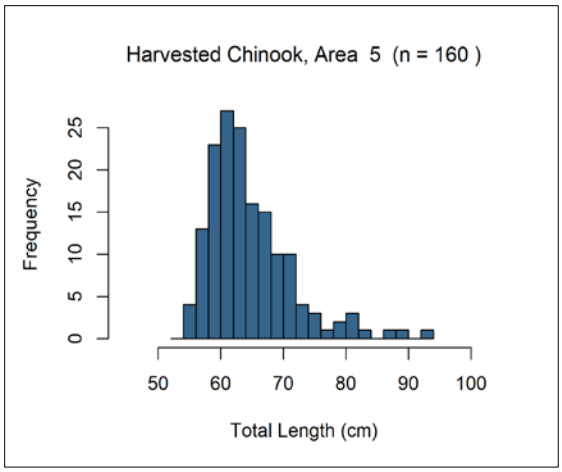


**Figure 1.3** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 5. Note: displayed values are observations where lengths taken.

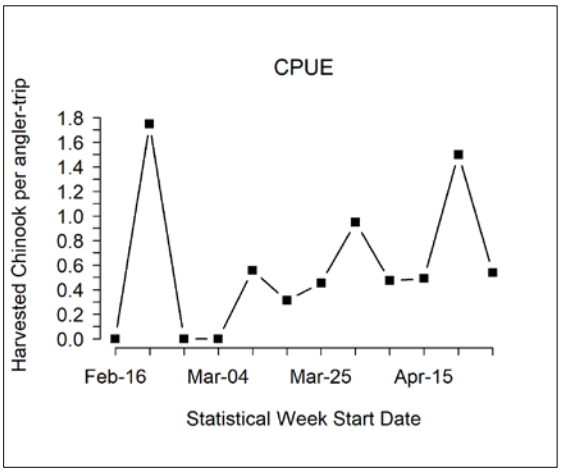


**Figure 1.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 5.

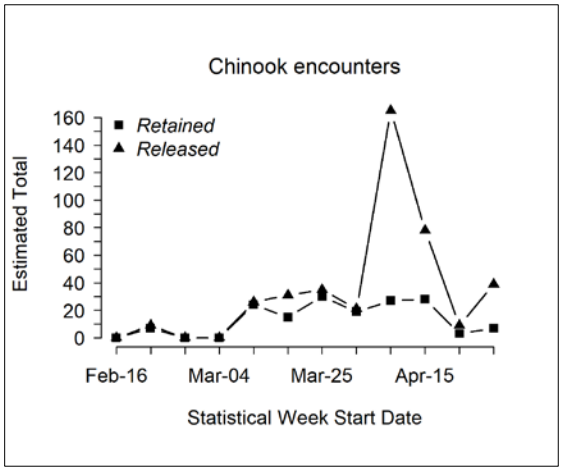


**Figure 1.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites)

**Table 1.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2018-19 winter Chinook salmon MSF in Marine Area 5, with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 2 1-trip VTRs, 3 Angler Trips | 4 | 0 | 22 | 0 | 26 | 1.00 | 1.00 |
| Size/mark-status composition: | | 0.15 | 0.00 | 0.85 | 0.00 | | | |
| Variance: | | (0.0052) | (0.0000) | (0.0052) | (0.0000) | | | |

## 2) Marine Area 6 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented an eighth winter MSF in Marine Area 6 from February 1, 2019 through April 15, 2019. The PSSU implemented an intensive monitoring program in Marine Area 6 throughout the season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, aerial effort surveys and collection of VTRs from the angling public. Table **2.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical data parameters are presented in detail in our separate Methods Report (WDFW 2012a). In this section we present results from our monitoring activities during the Area 6 winter Chinook salmon MSF. In addition to the major components of the results described previously (page 3), we present aerial survey and dockside data used to estimate the sample fraction in Marine Area 6 (see WDFW 2012a, Aerial-Access Design). The four sites included in the Marine Area 6 dockside sample frame are John Wayne Marina, Port Angeles Boat Haven, Ediz Hook and Cornet Ramp, which are assumed to be the highest-use access sites for Marine Area 6 anglers. The Olympic Peninsula Derby took place from March 8-10 over portions of Marine Areas 6 and 9. Total derby effort was allocated to each Marine Area using the proportion of effort that occurred in each area based on dockside sampling efforts at designated weigh-in stations during the derby. Total catch by Marine Area was obtained from the derby organizers.

**Table 2.1** Sampling/estimation details on target parameters associated with the overall Marine Area 6 Chinook salmon MSF monitoring program.

| Activity | Focal Parameter(s) | Secondary Parameter(s) | Sample Unit(s) | Finest Estimation Time Step | Comments |
|---|---|---|---|---|---|
| Dockside Creel Sampling | Fishing effort (boat & angler trips); kept and released fish | Catch rates (CPUE); length, age, and CWT composition of harvest[1]; collection of angler fishing methods. | Angler trip; kept fish; reported fish release | Two weeks | Creel estimates were produced for two-week estimation periods and stratified into "weekday" (Mon.-Thurs.) and "weekend" (Fri.-Sun.) day-type strata within weeks. For the weekday stratum we sampled $n$=2 days out of $N$=8 available weekdays per two-week period. For the weekend stratum we sampled $n$=2 days out of $N$=3 available weekend days per week. |
| Aerial Surveys | Fraction of Area 6 effort (boats) captured in the four-site sample frame via creel surveys (Sample Fraction, $\boldsymbol{f_{ij}}$). | Total boat counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area. | Boats | Season | The sample fraction was calculated for individual aerial survey dates (see **Table 2.11** $n$=7 surveys conducted out of $N$=74 days available in the season). Season-wide sample fraction was calculated as the average sample fraction over the five individual aerial surveys. |
| Voluntary Trip Reports (VTRs) | Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon | Encounter data for non-Chinook salmon species (e.g., Coho salmon) that the angler may record on the VTR form | Fish encounter | Season | Private VTR data (**Table 2.6)** were used to estimate the size/mark-status proportions (LM = 64%, LU = 5%, SM = 18%, SU = 13%) needed to produce encounter and mortality estimates. |
| Overall Fishery Impacts Estimation | Total Chinook salmon encounters and mortalities, by size/mark-status group | Ratios of encounters and mortalities per kept Chinook salmon | N/A | Season | Estimated on a monthly time step but considered at the season-total level. |
| Coded-wire tag (CWT) Impacts Estimation | Marked/unmarked double-index tag (DIT) encounters and mortalities | N/A | N/A | Season | The temporal resolution of DIT impacts is constrained by the total number of tags recovered. |

**Table 2.2** Estimates of total fishing effort and total Chinook salmon catch (retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 6. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked

| Month | Stat Week | Start Date | End Date | Est. Effort | | Est. Retained Chinook | | Est. Released Chinook | | Total Est. Chinook Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Boats | Anglers | AD | UM | AD | UM | |
| Feb | 5 | 1-Feb | 3-Feb | 184 | 368 | 178 | 0 | 76 | 55 | 309 |
| | 6 | 4-Feb | 10-Feb | 17 | 31 | 33 | 0 | 14 | 10 | 57 |
| | 7 | 11-Feb | 17-Feb | 88 | 152 | 172 | 0 | 73 | 53 | 299 |
| | 8 | 18-Feb | 24-Feb | 231 | 390 | 381 | 0 | 162 | 118 | 660 |
| | 9 | 25-Feb | 3-Mar | 165 | 317 | 99 | 0 | 42 | 31 | 172 |
| Mar | 10 | 4-Mar | 10-Mar | 209 | 396 | 192 | 0 | 82 | 60 | 333 |
| | 11 | 11-Mar | 17-Mar | 240 | 487 | 164 | 0 | 70 | 51 | 284 |
| | 12 | 18-Mar | 24-Mar | 311 | 533 | 302 | 0 | 128 | 93 | 524 |
| | 13 | 25-Mar | 31-Mar | 284 | 552 | 192 | 0 | 82 | 60 | 334 |
| Apr | 14 | 1-Apr | 7-Apr | 156 | 249 | 123 | 0 | 52 | 38 | 213 |
| | 15 | 12-Apr | 14-Apr | 81 | 123 | 88 | 0 | 38 | 27 | 153 |
| | 16 | 15-Apr | 15-Apr | 34 | 49 | 34 | 0 | 15 | 11 | 60 |
| **Sub-Total:** | | | | **2000** | **3,649** | **1959** | **0** | **831** | **607** | **3,396** |
| Olympic Peninsula Derby | | | | 257 | 572 | 87 | 0 | 37 | 27 | 151 |
| **Season Total:** | | | | **2,257** | **4,221** | **2,046** | **0** | **868** | **633** | **3,547** |
| **Variance:** | | | | 29,548 | 93,629 | 38,769 | 0 | 229,852 | 40,429 | 244,115 |
| **SE:** | | | | 172 | 306 | 197 | 0 | 479 | 201 | 494 |
| **CV (%):** | | | | 8% | 7% | 10% | 0% | 55% | 32% | 14% |
| **95% CI:** | | | | 1,920 - 2,594 | 3,622 - 4,821 | 1,660 - 2,431 | 0 - 0 | 0 - 1,808 | 239 - 1,028 | 2,579 - 4,516 |

**Table 2.3** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2018-19 winter Chinook salmon MSF in Marine Area 6.

| Mark Type | Number Sampled | | |
|---|---|---|---|
| | Legal-size | Sublegal-size | Total |
| Marked | 838 | 26 | 864 |
| Unmarked | 3 | 0 | 3 |
| **Total** | **841** | **26** | **867** |

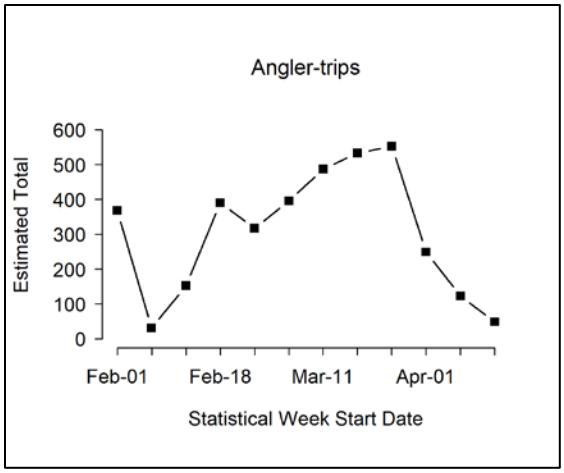


**Figure 2.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 6.

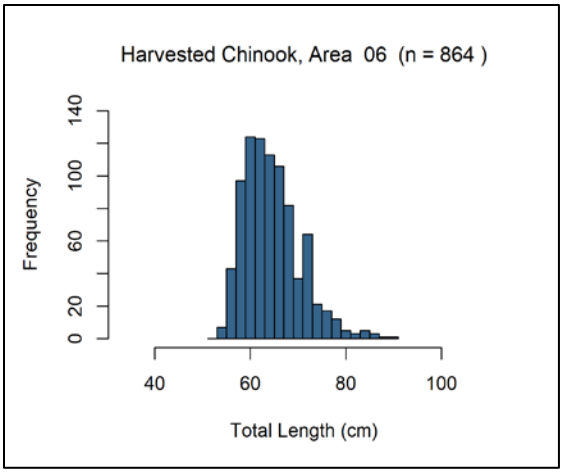


**Figure 2.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 6. Note: displayed values are observations where lengths were taken.

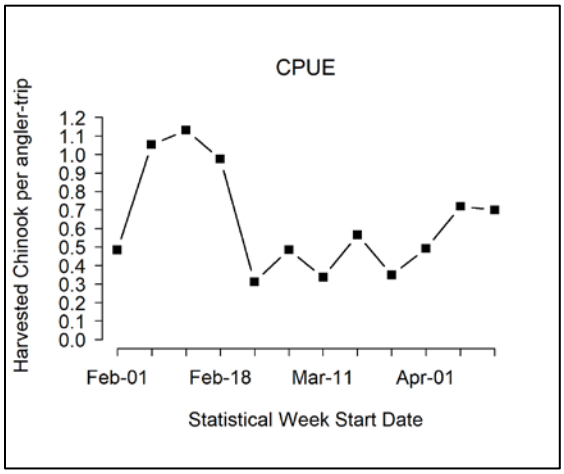


**Figure 2.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 6.

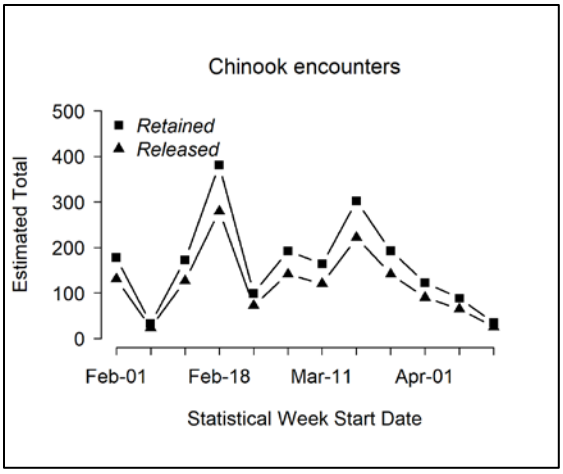


**Figure 2.4** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 6.

**Table 2.4** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSF in Marine Area 6. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| WA | N Washington (5%) | Friday Cr 03.0017 | Samish Hatchery | 3 (3%) | 0 |
| | | East Sound Bay (San) | Glenwood Springs | 1 (1%) | 0 |
| | | Kendall Cr 01.0406 | Kendall Cr Hatchery | 1 (1%) | 0 |
| | Hood Canal (15.8%) | Finch Cr 16.0222 | Hoodsport Hatchery | 6 (5.9%) | 0 |
| | | Purdy Cr 16.0005 | George Adams Hatchery | 10 (9.9%) | 0 |
| | N Puget Sound (9.9%) | Wallace R 07.0940 | Wallace R Hatchery | 5 (5%) | 0 |
| | | Whitehorse Springs | Whitehorse Pond | 5 (5%) | 0 |
| | Skagit River (3%) | Cascade R 03.1411 | Marblemount Hatchery | 3 (3%) | 0 |
| | Mid Puget Sound (37.6%) | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | 11 (10.9%) | 0 |
| | | Clarks Crk Hatchery | Clarks Crk Hatchery | 6 (5.9%) | 0 |
| | | Icy Cr 09.0125 | Icy Cr Hatchery | 10 (9.9%) | 0 |
| | | Grovers Cr 15.0299 | Grovers Cr Hatchery | 4 (4%) | 4 |
| | | Big Soos Cr 09.0072 | Soos Creek Hatchery | 3 (3%) | 0 |
| | | Portage Bay/Ship Cnl | Issaquah Hatchery | 2 (2%) | 0 |
| | | Grovers Cr Hatchery | Grovers Cr Hatchery | 2 (2%) | 2 |
| | S Puget Sound (25.7%) | Chambers Cr 12.0007 | Garrison Hatchery | 1 (1%) | 0 |
| | | Deschutes R 13.0028 | Tumwater Falls Hatchery | 1 (1%) | 0 |
| | | Minter Cr 15.0048 | Minter Cr Hatchery | 11 (10.9%) | 0 |
| | | Kalama Cr 11.0017 | Kalama Cr Hatchery | 2 (2%) | 0 |
| | | Clear Cr 11.0013C | Clear Creek Hatchery | 11 (10.9%) | 4 |
| Col Riv | Snake River (1%) | Lyons Ferry Rel.Site | Lyons Ferry Hatchery | 1 (1%) | 0 |
| CA | Central California (1%) | Half Moon Bay Net | Mok R Fish Ins | 1 (1%) | 0 |
| | Sacramento River (1%) | Coleman Nfh | Coleman Nfh | 1 (1%) | 0 |
| | | | **Total** | **101** | **10** |

**Table 2.5** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2018-19 winter Chinook salmon MSF in Marine Area 6. AD = marked (adipose-clipped), UM = unmarked.

| Hatchery | Brood Year | DITs Obs | Est.AD | var(Est.AD) | UM DIT Enc | Est.UM | var(Est.UM) | SE(Est.UM) |
|---|---|---|---|---|---|---|---|---|
| Clear Creek Hatchery | 2016 | 4 | 7.1 | 9.62 | 9.4 | 3.1 | 3.303 | 2.33 |
| Grovers Cr Hatchery | 2015 | 4 | 9.4 | 12.83 | 9.4 | 0.9 | 0.126 | 0.71 |
| Grovers Cr Hatchery | 2016 | 2 | 4.7 | 6.41 | 5 | 0.5 | 0.071 | 0.38 |
| **Total** | | **10** | **21.2** | **28.86** | **23.8** | **4.5** | **3.501** | **3.42** |

**Table 2.6** Total Chinook salmon encountered (retained and released) by charter and private-boat anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2018-19 winter Chinook salmon MSF in Marine Area 6. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 16 1-trip VTRs, 22 Angler Trips | 36 | 3 | 10 | 7 | 56 | 0.82 | 0.92 |
| Size/mark-status composition: | | 0.64 | 0.05 | 0.18 | 0.13 | | | |
| Variance: | | (0.0042) | (0.0009) | (0.0027) | (0.0020) | | | |

**Table 2.7** Summary of season-wide fishery impact estimates for the 2018-19 winter Chinook salmon MSF in Marine Area 6. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Size/mark group | Encounters | Retained | Released | Release Mortality | Total Mortality | Var | SE | 95% CI | CV (%) |
|---|---|---|---|---|---|---|---|---|---|
| Legal AD | 2,280 | 1,984 | 296 | 44 | 2,028 | 40,852 | 202 | 1,632 - 2,425 | 10 |
| Legal UM | 190 | 0 | 190 | 29 | 29 | 272 | 16 | 0 - 61 | 58 |
| Sublegal AD | 633 | 62 | 572 | 114 | 176 | 1798 | 42 | 93 - 259 | 24 |
| Sublegal UM | 443 | 0 | 443 | 89 | 89 | 1134 | 34 | 23 - 155 | 38 |
| **Total** | **3,547** | **2,046** | **1,502** | **276** | **2,322** | **44,056** | **210** | **1,910 - 2,733** | **9** |

**Table 2.8** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters for the 2018-19 winter Chinook salmon MSF in Marine Area 6. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Data Source | Group | Total Encounters | Legal | Sublegal | Landed Only |
|---|---|---|---|---|---|
| FRAM Encounters | UM | 1667 | 722 | 945 | 23 |
| | AD | 3,740 | 2276 | 1464 | 1980 |
| | Total | 5,407 | 2,998 | 2,409 | 2003 |
| | % Marked | 69 | 76 | 61 | 99 |
| Estimated (Creel) Encounters | UM | 633 | 190 | 443 | 0 |
| | AD | 2,914 | 2,280 | 633 | 2,046 |
| | Total | 3,547 | 2,470 | 1077 | 2,046 |
| | % Marked | 82 | 92 | 59 | 100 |

**Table 2.9** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon mortalities for the 2018-19 winter Chinook salmon MSF in Marine Area 6. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Mortality Category | FRAM Chinook Mortalities | | | Estimated Chinook Mortalities | | |
|---|---|---|---|---|---|---|
| | UM | AD | Total | UM | AD | Total |
| Total (Landed + Released) | 326 | 2,416 | 2,742 | 117 | 2,204 | 2,322 |
| Released Legal | 114 | 143 | 257 | 29 | 44 | 73 |
| Released Sublegal | 189 | 293 | 482 | 89 | 114 | 203 |
| Landed Only | 23 | 1980 | 2003 | 0 | 2,046 | 2,046 |

**Table 2.10** Monthly sample rates (Total retained Chinook salmon sampled / Estimated retained Chinook salmon) for the 2018-19 winter Chinook salmon MSF in Marine Area 6. AD = marked (adipose-clipped), UM = unmarked. Note: Observed retained fish may not have lengths recorded.

| Time period | | | Estimated Retained Chinook | | | Number of Chinook sampled | | | Sample Rate |
|---|---|---|---|---|---|---|---|---|---|
| Month | Stat Weeks | Dates | AD | UM | Total | AD | UM | Total | |
| February | 5 - 9 | 1 Feb - 3 Mar | 863 | 0 | 863 | 363 | 0 | 363 | 42.1 |
| March | 10 - 13 | 4 Mar - 31 Mar | 937 | 0 | 937 | 436 | 1 | 437 | 46.6 |
| April | 14 - 16 | 1 Apr - 15 Apr | 245 | 0 | 245 | 117 | 2 | 119 | 48.5 |
| **Season Total** | | | **2,046** | **0** | **2,046** | **916** | **3** | **919** | **44.9** |

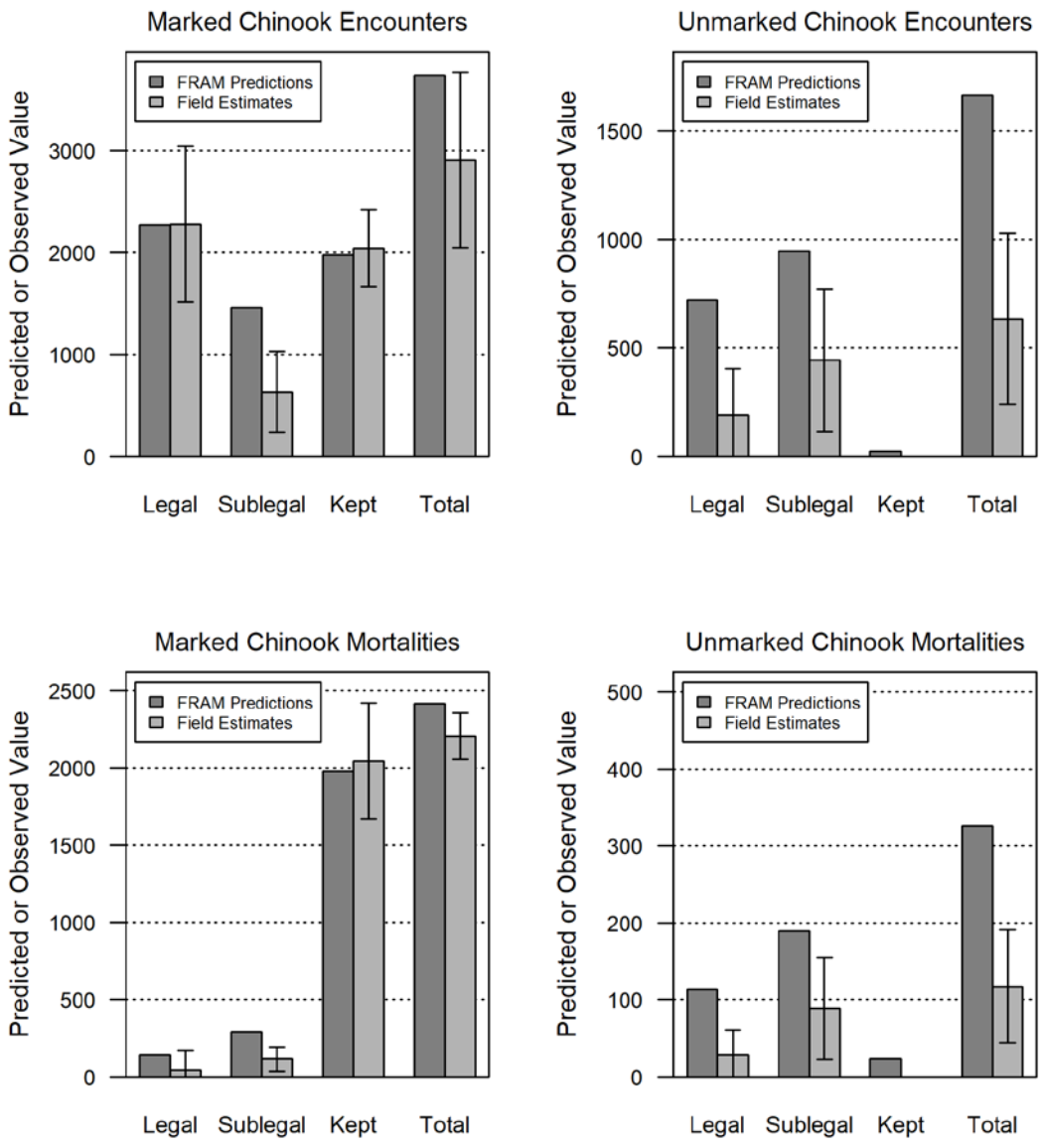


**Figure 2.5** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters and mortalities for the 2018-19 winter Chinook salmon MSF in Marine Area 6. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 2.11** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the four-site sample frame during the 2018-19 winter Chinook salmon MSF in Marine Area 6. See Methods Report (WDFW 2012a) for computational details and notation.

| Survey Date | Stratum | Aerial Survey Details | | | Dockside Sampling Details | | | Sample Fraction, $f_{ij}$ |
|---|---|---|---|---|---|---|---|---|
| | | Start Time | End Time | Total Boats, $m_{ij}$ | Sampled Boats | Active Boats, $X_{ij}$ | Total Boats, $Sy_{ijk}$ | |
| 21-Feb | WD | 9:32 | 10:39 | 20 | 26 | 17 | 31 | 0.850 |
| 3-Mar | WE | 10:15 | 11:13 | 17 | 15 | 12 | 21 | 0.706 |
| 5-Mar | WD | 9:32 | 10:19 | 19 | 23 | 15 | 29 | 0.790 |
| 15-Mar | WE | 10:07 | 10:53 | 31 | 27 | 26 | 32 | 0.839 |
| 9-Apr | WD | 11:33 | 12:20 | 4 | 1 | 1 | 4 | 0.250 |
| 12-Apr | WE | 12:12 | 12:57 | 27 | 28 | 13 | 58 | 0.482 |
| 14-Apr | WE | 10:21 | 11:06 | 11 | 10 | 4 | 28 | 0.364 |
| **Season Totals:** | | | | **129** | **130** | **88** | **203** | |
| Mean: | | | | 18 | 19 | 13 | 29 | 0.611 |
| St Dev: | | | | 9 | 10 | 8 | 16 | 0.244 |
| CV(%): | | | | 49.5% | 55.2% | 66.1% | 55.5% | 40.0% |

**Table 2.12** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) during the 2018-19 winter Chinook salmon MSF in Marine Area 6. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status

| Stat Week | Start Date | End Date | Released Salmon |
|---|---|---|---|
| | | | Coho AD |
| 5 | 1-Feb | 3-Feb | 0 |
| 6 | 4-Feb | 10-Feb | 0 |
| 7 | 11-Feb | 17-Feb | 0 |
| 8 | 18-Feb | 24-Feb | 0 |
| 9 | 25-Feb | 3-Mar | 0 |
| 10 | 4-Mar | 10-Mar | 0 |
| 11 | 11-Mar | 17-Mar | 5 |
| 12 | 18-Mar | 24-Mar | 0 |
| 13 | 25-Mar | 31-Mar | 0 |
| 14 | 1-Apr | 7-Apr | 0 |
| 15 | 12-Apr | 14-Apr | 0 |
| 16 | 15-Apr | 15-Apr | 0 |
| **Season Total:** | | | **5** |
| **Variance:** | | | 11 |
| **Standard Error:** | | | 3 |
| **CV (%):** | | | 65 |
| **95% CI:** | | | 2 - 12 |

**Table 2.13** Season-total estimates of Chinook salmon encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Marine Area 6 Winter Chinook salmon MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

| Area | Season Dates | Effort (Angler-trips) | Retained Chinook | | | | Released Chinook | | | | Total Encounters |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LM | LU | SM | SU | LM | LU | SM | SU | |
| 6 | Dec 1, 2012 - Apr 10, 2013 | 4,916 | 1,395 | 21 | 14 | 0 | 209 | 385 | 315 | 135 | 2,474 |
| 6 | Dec 1, 2013 - Apr 10, 2014 | 4,323 | 2,117 | 13 | 72 | 0 | 316 | 372 | 742 | 165 | 3,797 |
| 6 | Dec 1, 2014 - Apr 10, 2015 | 6,751 | 2,215 | 3 | 40 | 0 | 331 | 417 | 1,124 | 229 | 4,358 |
| 6 | Oct 1, 2015 - Apr 10, 2016 | 9,014 | 397 | 0 | 47 | 0 | 59 | 188 | 1,385 | 366 | 2,441 |
| 6 | Dec 1, 2016 - Apr 15, 2017 | 4,880 | 2,194 | 3 | 53 | 0 | 328 | 275 | 554 | 103 | 3,511 |
| 6 | Mar 1, 2018 - Apr 8, 2018 | 2,220 | 1,083 | 0 | 35 | 0 | 162 | 269 | 671 | 67 | 2,287 |
| 6 | Feb 1, 2019 - Apr 15, 2019 | 4,221 | 1,984 | 0 | 62 | 0 | 296 | 190 | 572 | 443 | 3,547 |

## 3) Marine Area 7 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented a twelfth consecutive winter MSF in Marine Area 7 from January 1, 2019 through April 15, 2019. The PSSU implemented an intensive monitoring program in Marine Area 7 throughout the season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, aerial effort surveys, test fishing and collection of VTRs from the angling public. **Table 3.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical data parameters are presented in detail in our separate Methods Report (WDFW 2012a). In this section we present results from our monitoring activities during the Area 7 winter fishery from January 1, 2019 through April 15, 2019. In addition to the major components of the results described previously, we present aerial survey and dockside data used to estimate the sample fraction in Marine Area 7 (see WDFW 2012a, Aerial-Access Design). The four sites included in the Marine Area 7 dockside sample frame are Washington Park Ramp, Bellingham Ramp, Cornet Ramp, and Friday Harbor which are assumed to be the highest-use access sites for Marine Area 7 anglers. Due to damages to the Washington Park Ramp on February 4$^{th}$, 2019 dockside sampling was moved to Skyline Marina for the remainder of the season. Due to safety concerns and in an effort to improve sampling efficiencies, we modified the flight path of Marine Area 7 aerial surveys to exclude the area of open water north of Patos Island beginning in December 2012. An examination of flight survey data from previous years suggests that approximately 5% of the boats observed during flights were located in this area. Given the limited amount of effort occurring in this area we assumed the effect on effort and harvest estimates would be negligible.

**Table 3.1** Sampling/estimation details on target parameters associated with the overall Marine Area 7 Chinook salmon MSF monitoring program.

| Activity | Focal Parameter(s) | Secondary Parameter(s) | Sample Unit(s) | Finest Estimation Time Step | Comments |
|---|---|---|---|---|---|
| Dockside Creel Sampling | Fishing effort (boat & angler trips); kept and released fish | Catch rates (CPUE); length, age, and CWT composition of harvest[1]; collection of angler fishing methods. | Angler trip; kept fish; reported fish release | Two weeks | Creel estimates were produced for two-week estimation periods and stratified into "weekday" (Mon.-Thurs.) and "weekend" (Fri.-Sun.) day-type strata within weeks. For the weekday stratum we sampled $n$=2 days out of $N$=8 available weekdays per two-week period. For the weekend stratum we sampled $n$=2 days out of $N$=3 available weekend days per week. |
| Aerial Surveys | Fraction of Marine Area 7 effort (boats) captured in the four-site sample frame via creel surveys (Sample Fraction, $\boldsymbol{f_{ij}}$). | Total boat counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area. | Boats | Season | The sample fraction was calculated for individual aerial survey dates (see **Table 3.13**; $n$=17 surveys conducted out of $N$=105 days available in the season). |
| Test Fishing | Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon | Chinook salmon length, age, and DNA-based[2] stock composition; species composition of non-Chinook salmon encounters | Fish encounter | Season | We used the test fishery data only to estimate the size/mark-status proportions (LM = 48%, LU = 17%, SM = 23%, SU = 17%; **Table 3.5**) needed to produce encounter and mortality estimates. |
| Voluntary Trip Reports (VTRs) | Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon | Encounter data for non-Chinook salmon species (e.g., Coho) that the angler may record on the VTR form | Fish encounter | Season | VTR data (**Table 3.6**) were not used for impact estimation steps due to the assumed higher data quality and sufficient sample size of test fishery data. See comment in row above. |
| Overall Fishery Impacts Estimation | Total Chinook salmon encounters and mortalities, by size/mark-status group | Ratios of encounters and mortalities per kept Chinook salmon | N/A | Season | Estimated on a monthly time step but considered at the season-total level. |
| Coded-wire tag (CWT) Impacts Estimation | Marked/unmarked double-index tag (DIT) encounters and mortalities | N/A | N/A | Season | The temporal resolution of DIT impacts is constrained by the total number of tags recovered. |

[1] The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.
[2] Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery.

**Table 3.2** Estimates of total fishing effort and total Chinook salmon catch (retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 7. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Month | Stat Week | Start Date | End Date | Est. Effort | | Est. Retained Chinook | | Est. Released Chinook | | Total Est. Chinook Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Boats | Anglers | AD | UM | AD | UM | |
| Jan | 1 | 1-Jan | 6-Jan | 425 | 999 | 396 | 5 | 269 | 266 | 936 |
| | 2 | 7-Jan | 13-Jan | 791 | 1785 | 582 | 0 | 395 | 399 | 1376 |
| | 3 | 14-Jan | 20-Jan | 503 | 1007 | 298 | 0 | 203 | 205 | 706 |
| | 4 | 21-Jan | 27-Jan | 735 | 1423 | 417 | 5 | 283 | 281 | 986 |
| | 5 | 28-Jan | 3-Feb | 353 | 767 | 186 | 0 | 127 | 128 | 441 |
| Feb | 6 | 4-Feb | 10-Feb | 224 | 450 | 92 | 0 | 63 | 63 | 218 |
| | 7 | 11-Feb | 17-Feb | 127 | 239 | 96 | 0 | 65 | 66 | 226 |
| | 8 | 18-Feb | 24-Feb | 236 | 496 | 150 | 0 | 102 | 103 | 355 |
| | 9 | 25-Feb | 3-Mar | 221 | 450 | 175 | 0 | 119 | 120 | 413 |
| Mar | 10 | 4-Mar | 10-Mar | 359 | 742 | 244 | 0 | 166 | 167 | 577 |
| | 11 | 11-Mar | 17-Mar | 472 | 920 | 206 | 5 | 140 | 136 | 487 |
| | 12 | 18-Mar | 24-Mar | 328 | 648 | 171 | 0 | 116 | 118 | 405 |
| | 13 | 25-Mar | 31-Mar | 668 | 1329 | 229 | 0 | 156 | 157 | 542 |
| Apr | 14 | 1-Apr | 7-Apr | 153 | 270 | 71 | 0 | 48 | 49 | 168 |
| | 15 | 8-Apr | 14-Apr | 325 | 658 | 109 | 0 | 74 | 75 | 257 |
| | 16 | 15-Apr | 15-Apr | 38 | 74 | 20 | 0 | 13 | 14 | 47 |
| **Sub-Total:** | | | | **5958** | **12,257** | **3442** | **15** | **2338** | **2345** | **8,140** |
| Olympic Peninsula | | | | 7 | 16 | 5 | 0 | 3 | 3 | 12 |
| Resurrection Salmon Derby | | | | 100 | 336 | 85 | 0 | 58 | 58 | 201 |
| Roche Harbor Salmon Derby | | | | 100 | 357 | 148 | 0 | 101 | 101 | 350 |
| Friday Harbor Classic | | | | 90 | 270 | 81 | 0 | 55 | 56 | 192 |
| **Season Total:** | | | | **6,255** | **13,236** | **3,761** | **15** | **2555** | **2563** | **8,894** |
| **Variance:** | | | | 418,443 | 1,916,734 | 191,289 | 35 | 907,909 | 213,444 | 1,701,022 |
| **SE:** | | | | 647 | 1384 | 437 | 6 | 953 | 462 | 1304 |
| **CV (%):** | | | | 10% | 10% | 12% | 40% | 37% | 18% | 15% |
| **95% CI:** | | | | 4,988 - 7,523 | 10,523 - 15,950 | 2,904 - 4,619 | 3 - 26 | 687 - 4,423 | 1,658 - 3,469 | 6,338 - 11,451 |

**Table 3.3** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the Area 7 Chinook salmon MSF.

| Mark Type | Number Sampled | | |
|---|---|---|---|
| | Legal-size | Sublegal-size | Total |
| Marked | 734 | 12 | 746 |
| Unmarked | 3 | 0 | 3 |
| Total | 737 | 12 | 749 |

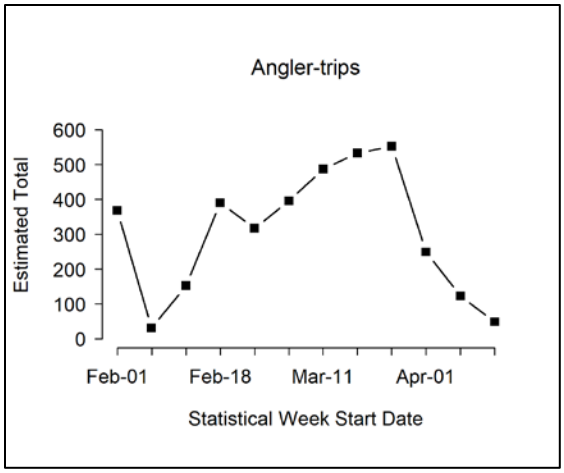


**Figure 3.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 7.

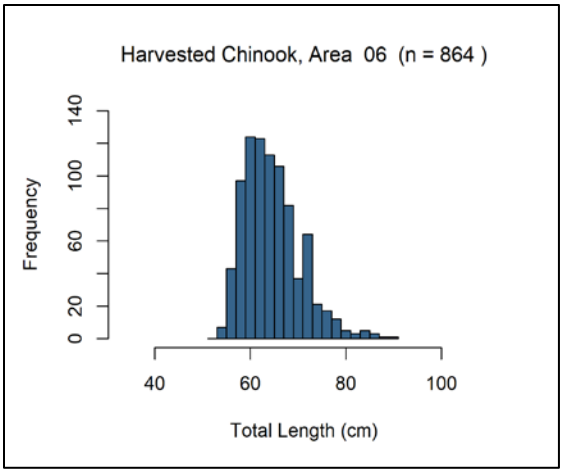


**Figure 3.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area. Note: displayed values are observations where lengths were taken.

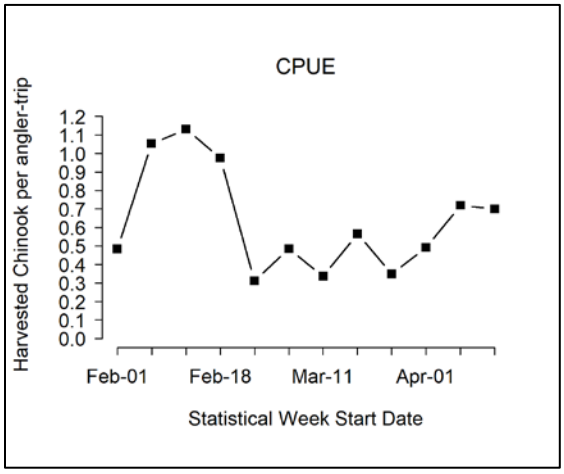


**Figure 3.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 7.

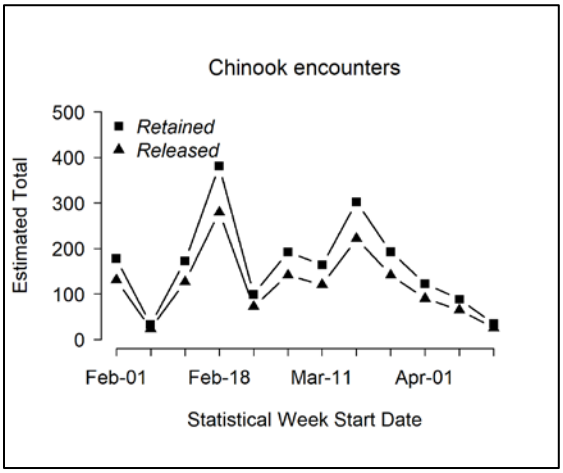


**Figure 3.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 7.

**Table 3.4** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSF in Marine Area 7. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| BC | Thompson River (2.9%) | R-Chilliwack R | H-Chilliwack River H | 2 (2.9%) | 0 |
| | Georgia Strait (2.9%) | R-Cowichan R | H-Cowichan River H | 1 (1.5%) | 0 |
| | | R-Capilano R Up | H-Capilano River H | 1 (1.5%) | 0 |
| WA | N Washington (8.8%) | Kendall Cr 01.0406 | Kendall Cr Hatchery | 4 (5.9%) | 0 |
| | | East Sound Bay (San) | Glenwood Springs | 1 (1.5%) | 0 |
| | | Friday Cr 03.0017 | Samish Hatchery | 1 (1.5%) | 0 |
| | Hood Canal (10.3%) | Finch Cr 16.0222 | Hoodsport Hatchery | 4 (5.9%) | 0 |
| | | Purdy Cr 16.0005 | George Adams Hatchery | 3 (4.4%) | 0 |
| | N Puget Sound (25%) | Stillaguamish R -Sf | Brenner Hatchery | 1 (1.5%) | 0 |
| | | Tulalip Cr 07.0001 | Bernie Gobin Hatch | 3 (4.4%) | 3 |
| | | Wallace R 07.0940 | Wallace R Hatchery | 8 (11.8%) | 0 |
| | | Whitehorse Springs | Whitehorse Pond | 5 (7.4%) | 0 |
| | Skagit River (17.6%) | Cascade R 03.1411 | Marblemount Hatchery | 12 (17.6%) | 0 |
| | Mid Puget Sound (27.9%) | Big Soos Cr 09.0072 | Soos Creek Hatchery | 5 (7.4%) | 0 |
| | | Clarks Crk Hatchery | Clarks Crk Hatchery | 1 (1.5%) | 0 |
| | | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | 7 (10.3%) | 0 |
| | | Grovers Cr 15.0299 | Grovers Cr Hatchery | 1 (1.5%) | 1 |
| | | Grovers Cr Hatchery | Grovers Cr Hatchery | 2 (2.9%) | 2 |
| | | Icy Cr 09.0125 | Icy Cr Hatchery | 3 (4.4%) | 0 |
| | S Puget Sound (4.4%) | Clear Cr 11.0013C | Clear Creek Hatchery | 1 (1.5%) | 0 |
| | | Minter Cr 15.0048 | Minter Cr Hatchery | 2 (2.9%) | 0 |
| | | | **Total** | **68** | **6** |

**Table 3.5** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2018-19 winter Chinook salmon MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Stat Week | Fishing Effort | | Legal | | Sublegal | | Total |
|---|---|---|---|---|---|---|---|
| | Days | Hrs Fished | AD | UM | AD | UM | |
| 2 | 2 | 10.0 | 4 | 0 | 1 | 2 | 7 |
| 3 | 5 | 28.2 | 4 | 0 | 1 | 1 | 6 |
| 4 | 4 | 25.8 | 5 | 0 | 1 | 4 | 10 |
| 5 | 5 | 18.5 | 1 | 1 | 3 | 3 | 8 |
| 6 | 3 | 21.2 | 17 | 3 | 9 | 4 | 33 |
| 7 | 2 | 13.5 | 3 | 1 | 0 | 0 | 4 |
| 8 | 1 | 5.5 | 0 | 0 | 0 | 0 | 0 |
| 10 | 4 | 24.0 | 7 | 2 | 4 | 2 | 15 |
| 11 | 4 | 28.8 | 2 | 2 | 1 | 0 | 5 |
| 12 | 4 | 24.0 | 8 | 4 | 7 | 0 | 19 |
| 13 | 4 | 27.7 | 8 | 4 | 3 | 0 | 15 |
| 14 | 4 | 25.5 | 2 | 2 | 0 | 0 | 4 |
| 15 | 4 | 27.8 | 5 | 4 | 2 | 0 | 11 |
| 16 | 1 | 5.0 | 0 | 1 | 0 | 0 | 1 |
| **Total** | **47** | **285.5** | **66** | **24** | **32** | **16** | **138** |
| **Size/mark-status composition:** | | | 0.48 | 0.17 | 0.23 | 0.12 | |
| **Variance:** | | | (0.0018) | (0.0010) | (0.0013) | (0.0007) | |
| **Legal-size mark rate:** | | | 0.73 | | | | |
| **Overall mark rate:** | | | 0.71 | | | | |

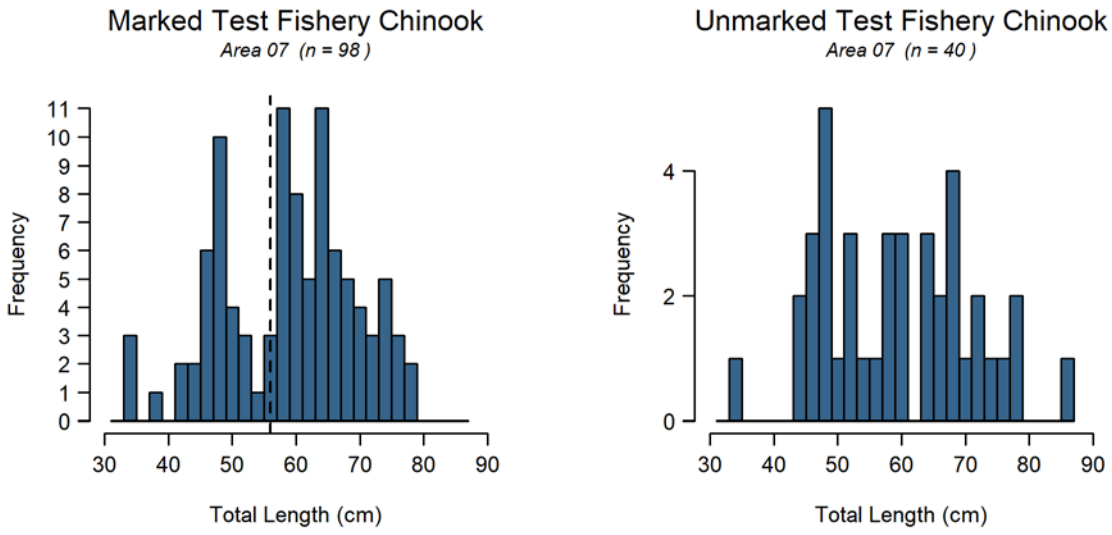


**Figure 3.5** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook salmon encountered by test fishers during the 2018-19 winter Chinook salmon MSF in Marine Area 7. The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm).

**Table 3.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2018-19 winter Chinook salmon MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 5 1-trip VTRs, 5 Angler Trips | 2 | 2 | 4 | 1 | 9 | 0.67 | 0.50 |
| Size/mark-status composition: | | 0.22 | 0.22 | 0.44 | 0.11 | | | |
| Variance: | | (0.0216) | (0.0216) | (0.0309) | (0.0123) | | | |
| Charter VTR | 2 1-trip VTRs, 5 Angler Trips | 4 | 0 | 0 | 2 | 6 | 0.67 | 1.00 |
| Size/mark-status composition: | | 0.44 | 0.00 | 0.00 | 0.22 | | | |
| Variance: | | (0.0444) | (0.0000) | (0.0000) | (0.0444) | | | |

**Table 3.7** Summary of season-wide fishery impact estimates for the 2018-19 winter Chinook salmon MSF in Marine Area 7. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Size/mark group | Encounters | Retained | Released | Release Mortality | Total Mortality | Var | SE | 95% CI | CV (%) |
|---|---|---|---|---|---|---|---|---|---|
| Legal AD | 4,254 | 3,701 | 553 | 83 | 3,784 | 201,531 | 449 | 2,904 - 4,664 | 12% |
| Legal UM | 1547 | 15 | 1532 | 230 | 245 | 3020 | 55 | 137 - 352 | 22% |
| Sublegal AD | 2,062 | 61 | 2,002 | 400 | 461 | 7,993 | 89 | 286 - 636 | 19% |
| Sublegal UM | 1031 | 0 | 1031 | 206 | 206 | 3,231 | 57 | 95 - 318 | 28% |
| **Total** | **8,894** | **3,776** | **5,118** | **919** | **4,696** | **215,776** | **465** | **3,785 - 5,606** | **10%** |

**Table 3.8** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters for the 2018-19 winter Chinook salmon MSF in Marine Area 7. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Data Source | Group | Total Encounters | Legal | Sublegal | Landed Only |
|---|---|---|---|---|---|
| FRAM Encounters | UM | 3635 | 1793 | 1842 | 18 |
| | AD | 7,100 | 4,277 | 2,823 | 3,721 |
| | Total | 10,735 | 6,070 | 4,665 | 3,739 |
| | % Marked | 66 | 70 | 61 | 100 |
| Estimated (Creel) Encounters | UM | 2,578 | 1547 | 1031 | 15 |
| | AD | 6,316 | 4,254 | 2,062 | 3,761 |
| | Total | 8,894 | 5,801 | 3,094 | 3,776 |
| | % Marked | 71 | 73 | 67 | 100 |

**Table 3.9** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon mortalities for the 2018-19 winter Chinook salmon MSF in Marine Area 7. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Mortality Category | FRAM Chinook Mortalities | | | Estimated Chinook Mortalities | | |
|---|---|---|---|---|---|---|
| | UM | AD | Total | UM | AD | Total |
| Total (Landed + Released) | 653 | 4,555 | 5,208 | 451 | 4,245 | 4,696 |
| Released Legal | 267 | 269 | 536 | 230 | 83 | 313 |
| Released Sublegal | 368 | 565 | 933 | 206 | 400 | 607 |
| Landed Only | 18 | 3,721 | 3,739 | 15 | 3,761 | 3,776 |

**Table 3.10** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2018-19 winter Chinook salmon MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked.

| Hatchery | Brood Year | DITs Obs | Est.AD | var(Est.AD) | UM DIT Enc | Est.UM | var(Est.UM) | SE(Est.UM) |
|---|---|---|---|---|---|---|---|---|
| Bernie Gobin Hatch | 2015 | 3 | 15.1 | 61.13 | 15.2 | 1.5 | 0.615 | 1.36 |
| Grovers Cr Hatchery | 2015 | 1 | 5 | 20.38 | 5 | 0.5 | 0.201 | 0.45 |
| Grovers Cr Hatchery | 2016 | 2 | 10.1 | 40.75 | 10.6 | 1.1 | 0.452 | 0.95 |
| **Total** | | **6** | **30.3** | **122.26** | **30.8** | **3.1** | **1.268** | **2.76** |

**Table 3.11** Monthly sample rates (Total retained Chinook salmon sampled[1] / Estimated retained Chinook salmon) for the 2018-19 winter Chinook salmon MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked.

| Time period | | | Estimated Retained Chinook | | | Number of Chinook sampled | | | Sample Rate |
|---|---|---|---|---|---|---|---|---|---|
| Month | Stat Weeks | Dates | AD | UM | Total | AD | UM | Total | |
| January | 1 - 5 | 1 Jan - 3 Feb | 2112 | 10 | 2122 | 348 | 2 | 350 | 16.5 |
| February | 6 - 9 | 4 Feb - 3 Mar | 594 | 0 | 594 | 148 | 0 | 148 | 24.9 |
| March | 10 - 13 | 4 Mar - 31 Mar | 856 | 5 | 861 | 234 | 1 | 235 | 27.3 |
| April | 14 - 16 | 1 Apr - 15 Apr | 199 | 0 | 199 | 26 | 0 | 26 | 13 |
| **Season Total** | | | **3,761** | **15** | **3,776** | **756** | **3** | **759** | **20.1** |

[1/] Number of retained Chinook salmon sampled includes all retained Chinook salmon inspected for CWTs, from all sites sampled during the winter 2018-19 MarineArea 7 Chinook salmon MSF (the sample-frame sites included in the creel estimates and the fish sampled as part of derbies and other baseline sampling in the Marine Area).

**Table 3.12** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) during the 2018-19 winter Chinook salmon MSF in Marine Area 7. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status

| Week | Start Date | End Date | Released Salmon |
|---|---|---|---|
| | | | Coho UK |
| 1 | 1-Jan | 6-Jan | 5 |
| 2 | 7-Jan | 13-Jan | 0 |
| 3 | 14-Jan | 20-Jan | 0 |
| 4 | 21-Jan | 27-Jan | 0 |
| 5 | 28-Jan | 3-Feb | 0 |
| 6 | 4-Feb | 10-Feb | 0 |
| 7 | 11-Feb | 17-Feb | 0 |
| 8 | 18-Feb | 24-Feb | 0 |
| 9 | 25-Feb | 3-Mar | 0 |
| 10 | 4-Mar | 10-Mar | 0 |
| 11 | 11-Mar | 17-Mar | 0 |
| 12 | 18-Mar | 24-Mar | 0 |
| 13 | 25-Mar | 31-Mar | 0 |
| 14 | 1-Apr | 7-Apr | 0 |
| 15 | 8-Apr | 14-Apr | 0 |
| 16 | 15-Apr | 15-Apr | 0 |
| **Season Total:** | | | **5** |
| **Variance:** | | | **12** |
| **Standard Error:** | | | **3** |
| **CV (%):** | | | **69** |
| **95% CI:** | | | **1 - 12** |

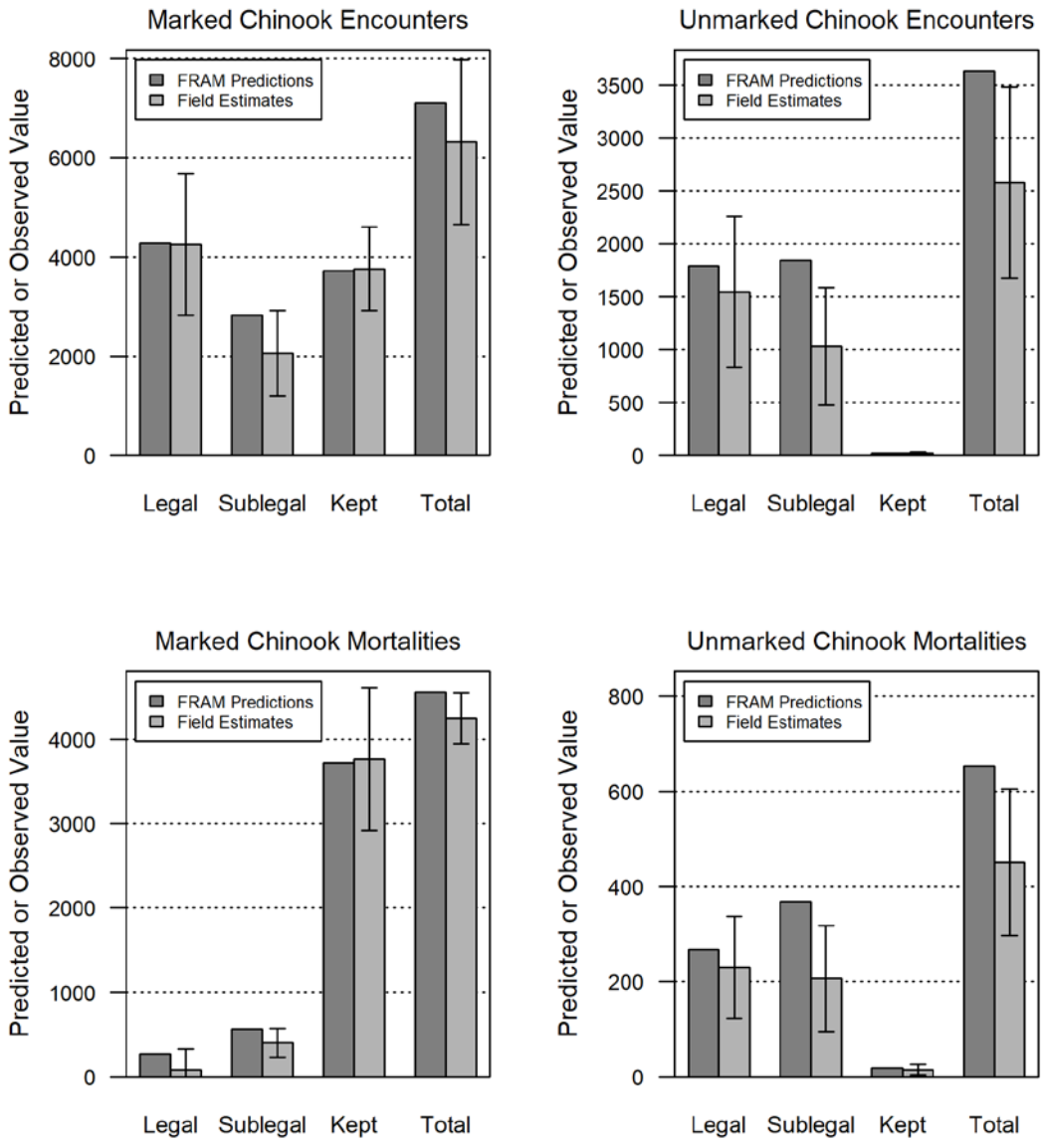


**Figure 3.6** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters and mortalities for the 2018-19 winter Chinook salmon MSF in Marine Area 7. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 3.13** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the three-site sample frame during the 2018-19 winter Chinook salmon MSF in Marine Area 7. See Methods Report (WDFW 2012a) for computational details and notation.

| Survey Date | Stratum | Aerial Survey Details | | | Dockside Sampling Details | | | Sample Fraction, $f_{ij}$ |
|---|---|---|---|---|---|---|---|---|
| | | Start Time | End Time | Total Boats, $m_{ij}$ | Sampled Boats | Active Boats, $X_{ij}$ | Total Boats, $Sy_{ijk}$ | |
| 12-Jan | WE | 12:16 | 13:22 | 138 | 70 | 53 | 182 | 0.384 |
| 13-Jan | WE | 13:43 | 15:08 | 144 | 120 | 74 | 234 | 0.514 |
| 16-Jan | WD | 9:35 | 10:40 | 45 | 17 | 9 | 85 | 0.200 |
| 24-Jan | WD | 12:37 | 13:39 | 60 | 33 | 25 | 79 | 0.417 |
| 25-Jan | WE | 13:43 | 14:51 | 52 | 38 | 22 | 90 | 0.423 |
| 5-Feb | WD | 10:43 | 11:43 | 10 | 1 | 0 | NA | 0.000 |
| 21-Feb | WD | 10:39 | 11:43 | 31 | 9 | 5 | 56 | 0.161 |
| 1-Mar | WE | 12:28 | 13:46 | 58 | 36 | 19 | 110 | 0.328 |
| 3-Mar | WE | 11:13 | 12:28 | 36 | 18 | 9 | 72 | 0.250 |
| 5-Mar | WD | 10:19 | 11:24 | 52 | 25 | 11 | 118 | 0.212 |
| 15-Mar | WE | 10:53 | 11:56 | 78 | 32 | 25 | 100 | 0.321 |
| 20-Mar | WD | 10:55 | 11:59 | 31 | 18 | 12 | 46 | 0.387 |
| 24-Mar | WE | 11:28 | 12:33 | 73 | 53 | 33 | 117 | 0.452 |
| 9-Apr | WD | 12:21 | 13:22 | 28 | 5 | 2 | 70 | 0.071 |
| 12-Apr | WE | 12:57 | 14:03 | 50 | 41 | 25 | 82 | 0.500 |
| 14-Apr | WE | 11:07 | 12:06 | 55 | 27 | 14 | 106 | 0.255 |
| 15-Apr | WD | 11:57 | 12:58 | 69 | 27 | 16 | 116 | 0.232 |
| **Season Totals:** | | | | **1010** | **570** | **354** | **1664** | |
| Mean: | | | | 59 | 34 | 21 | 104 | 0.300 |
| St Dev: | | | | 35 | 28 | 19 | 47 | 0.146 |
| CV(%): | | | | 59.5% | 83.9% | 90.1% | 45.1% | 48.7% |

**Table 3.14** Season-total estimates of Chinook salmon encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Marine Area 7 Winter Chinook salmon MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

| Area | Season Dates | Effort (Angler-trips) | Retained Chinook | | | | Released Chinook | | | | Total Encounters |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LM | LU | SM | SU | LM | LU | SM | SU | |
| 7 | Feb 1 - Feb 29, 2008 | 4,862 | 1,301 | 2 | 24 | 0 | 200 | 1,042 | 244 | 155 | 2,967 |
| 7 | Feb 1 - Apr 15, 2009 | 8,167 | 1,406 | 9 | 14 | 0 | 210 | 708 | 139 | 17 | 2,501 |
| 7 | Dec 1, 2009 - Apr 30, 2010 | 9,589 | 1,400 | 0 | 18 | 0 | 209 | 673 | 150 | 74 | 2,524 |
| 7 | Dec 1, 2010 - Apr 30, 2011 | 11,814 | 2,368 | 4 | 10 | 0 | 354 | 1,988 | 521 | 531 | 5,776 |
| 7 | Dec 1, 2011 - Apr 30, 2012 | 10,536 | 2,359 | 0 | 54 | 0 | 353 | 1,446 | 1,935 | 678 | 6,825 |
| 7 | Dec 1, 2012 - Apr 30, 2013 | 10,322 | 3,469 | 3 | 106 | 0 | 518 | 1,363 | 817 | 332 | 6,609 |
| 7 | Dec 1, 2013 - Apr 30, 2014 | 12,382 | 3,359 | 11 | 86 | 0 | 502 | 1,591 | 941 | 493 | 6,982 |
| 7 | Oct 1 2014 - Feb 15, 2015 | 9,092 | 3,423 | 16 | 47 | 0 | 511 | 1,062 | 3,857 | 1,077 | 9,992 |
| 7 | Oct 1 2015- April 30, 2016 | 11,242 | 2,523 | 3 | 143 | 0 | 377 | 2,147 | 5,843 | 2,525 | 13,562 |
| 7 | Oct 1 - Apr 21 2017 | 11,547 | 4,820 | 18 | 233 | 6 | 720 | 2,004 | 3,811 | 2,016 | 13,625 |
| 7 | Jan 1, 2018 - Apr 30, 2018 | 8,789 | 2,156 | 0 | 70 | 0 | 322 | 976 | 2,108 | 976 | 6,609 |
| 7 | Jan 1, 2019 - Apr 15, 2019 | 13,236 | 3,701 | 15 | 61 | 0 | 553 | 1,532 | 2,002 | 1,031 | 8,894 |

## 4) Marine Areas 8-1 & 8-2 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented a fourteenth consecutive winter Chinook salmon MSF in Marine Areas 8-1 and 8-2 from December 1, 2018 through April 30, 2019. The PSSU implemented an intensive monitoring program in Marine Areas 8-1 and 8-2 during the December-April season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, on-the-water effort surveys, and collection of VTRs from the angling public. **Table 4.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical data parameters are presented in detail in our separate Methods Report (WDFW 2012a). In the following section we present results from our monitoring activities during the Marine Areas 8-1 and 8-2 winter Chinook salmon MSF from December 1, 2018 through April 10, 2019, when the fishery occurred.

**Table 4.1** Sampling/estimation details on target parameters associated with the overall Marine Areas 8-1 and 8-2 Chinook salmon MSF monitoring program.

| Activity | Focal Parameter(s) | Secondary Parameter(s) | Sample Unit(s) | Finest Estimation Time Step | Comments |
|---|---|---|---|---|---|
| Dockside Creel Sampling | Fishing effort (boat & angler trips); kept and released fish | Catch rates (CPUE); length, age, and CWT composition of harvest[1]; collection of angler fishing methods. | Angler trip; kept fish; reported fish release | Two weeks | Creel estimates were produced for two-week estimation periods and stratified into "weekday" (Mon.-Thurs.) and "weekend" (Fri.-Sun.) day-type strata within weeks. For the weekday stratum we sampled $n$=2 days out of $N$=8 available weekdays per two-week period. For the weekend stratum we sampled $n$=2 days out of $N$=3 available weekend days per week. |
| On-the-water Surveys | Proportion of total angler effort that uses sample-frame sites (i.e., "size measures" or "weights" of sampled sites) versus out-of-frame sites. | Total on-water boat and angler counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area. | Boats and anglers. | Month | A total of 4 boat surveys were conducted during the six-month fishery. The results of these surveys were incorporated into multi-year site-weight averages. |
| Voluntary Trip Reports (VTRs) | Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon | Encounter data for non-Chinook salmon species (e.g., Coho) that the angler may record on the VTR form | Fish encounter | Season<br>(6 months) | We used the combined (p-value=.24) 8-1, 8-2 Dec-Apr VTR data to estimate the size/mark-status proportions. (LM = 47%, LU = 13%, SM = 33% and SU = 7%; see **Table 4.10**) needed to produce encounter and mortality estimates. |
| Overall Fishery Impacts Estimation | Total Chinook salmon encounters and mortalities, by size/mark-status group | Ratios of encounters and mortalities per kept Chinook salmon | N/A | Season<br>(6 months) | Estimated on a monthly time step but considered at the season-total level. |
| Coded-wire Tag (CWT) Impacts Estimation | Marked/unmarked double-index tag (DIT) encounters and mortalities | N/A | N/A | Season<br>(6 months) | The temporal resolution of DIT impacts is constrained by the total number of tags recovered. |

[1] The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

**Table 4.2** Estimates of total fishing effort and total Chinook salmon catch (retained and releases) during the 2018-19 winter Chinook salmon MSF in Marine Area 8-1. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Month | Stat Week | Start Date | End Date | Est. Effort | | Est. Retained Chinook | | Est. Released Chinook | | Total Est. Chinook Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Boats | Anglers | AD | UM | AD | UM | |
| **Dec** | 48 | 1-Dec | 2-Dec | 125 | 263 | 72 | 0 | 68 | 35 | 176 |
| | 49 | 3-Dec | 9-Dec | 66 | 118 | 7 | 0 | 7 | 4 | 18 |
| | 50 | 10-Dec | 16-Dec | 35 | 49 | 0 | 0 | 0 | 0 | 0 |
| | 51 | 17-Dec | 23-Dec | 47 | 115 | 24 | 0 | 22 | 11 | 57 |
| | 52 | 24-Dec | 30-Dec | 47 | 111 | 24 | 0 | 22 | 11 | 57 |
| **Jan** | 53 / 1 | 31-Dec | 6-Jan | 20 | 46 | 27 | 0 | 26 | 13 | 66 |
| | 2 | 7-Jan | 13-Jan | 32 | 58 | 11 | 0 | 10 | 5 | 26 |
| | 3 | 14-Jan | 20-Jan | 25 | 47 | 0 | 0 | 0 | 0 | 0 |
| | 4 | 21-Jan | 27-Jan | 28 | 49 | 12 | 0 | 11 | 6 | 29 |
| | 5 | 28-Jan | 3-Feb | 9 | 12 | 3 | 0 | 3 | 2 | 8 |
| **Feb** | 6 | 4-Feb | 10-Feb | 7 | 10 | 3 | 0 | 3 | 2 | 8 |
| | 7 | 11-Feb | 17-Feb | 13 | 28 | 10 | 0 | 10 | 5 | 25 |
| | 8 | 18-Feb | 24-Feb | 22 | 52 | 11 | 0 | 10 | 5 | 27 |
| | 9 | 25-Feb | 3-Mar | 74 | 143 | 43 | 0 | 41 | 21 | 106 |
| **Mar** | 10 | 4-Mar | 10-Mar | 57 | 105 | 37 | 0 | 35 | 18 | 90 |
| | 11 | 11-Mar | 17-Mar | 77 | 150 | 36 | 0 | 34 | 18 | 88 |
| | 12 | 18-Mar | 24-Mar | 57 | 116 | 20 | 0 | 19 | 10 | 48 |
| | 13 | 25-Mar | 31-Mar | 57 | 108 | 9 | 0 | 9 | 5 | 23 |
| **April** | 14 | 1-Apr | 7-Apr | 40 | 59 | 12 | 0 | 11 | 6 | 29 |
| | 15 | 8-Apr | 10-Apr | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sub-Total:** | | | | **836** | **1,638** | **361** | **0** | **342** | **176** | **880** |
| Everett Blackmouth Derby | | | | 21 | 46 | 15 | 0 | 14 | 7 | 37 |
| Hot Plug's Derby | | | | 180 | 360 | 15 | 0 | 14 | 7 | 37 |
| **Season Total:** | | | | **1,037** | **2,044** | **391** | **0** | **371** | **191** | **953** |
| **Variance:** | | | | 16,363 | 64,968 | 5,092 | 0 | 31,867 | 4,646 | 53,869 |
| **SE:** | | | | 128 | 255 | 71 | 0 | 179 | 68 | 232 |
| **CV (%):** | | | | 12 | 12 | 18 | 0 | 48 | 36 | 24 |
| **95% CI:** | | | | 786 - 1,288 | 1,544 - 2,543 | 251 - 531 | 0 - 0 | 21 - 721 | 57 - 324 | 498 - 1,408 |

**Table 4.3** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the Marine Area 8-1 Chinook salmon MSF.

| Mark Type | Number Sampled | | |
|---|---|---|---|
| | Legal-size | Sublegal-size | Total |
| Marked | 88 | 1 | 89 |
| Unmarked | 0 | 0 | 0 |
| **Total** | **88** | **1** | **89** |

**Table 4.4** Estimates of total fishing effort and total Chinook salmon catch (retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 8-2. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Month | Stat Week | Start Date | End Date | Est. Effort | | Est. Retained Chinook | | Est. Released Chinook | | Total Est. Chinook Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Boats | Anglers | AD | UM | AD | UM | |
| **Dec** | 48 | 1-Dec | 2-Dec | 268 | 563 | 165 | 0 | 147 | 78 | 390 |
| | 49 | 3-Dec | 9-Dec | 246 | 490 | 16 | 0 | 14 | 8 | 38 |
| | 50 | 10-Dec | 16-Dec | 109 | 189 | 5 | 0 | 5 | 3 | 13 |
| | 51 | 17-Dec | 23-Dec | 201 | 407 | 87 | 0 | 77 | 41 | 206 |
| | 52 | 24-Dec | 30-Dec | 177 | 353 | 60 | 0 | 54 | 28 | 142 |
| **Jan** | 53 / 1 | 31-Dec | 6-Jan | 60 | 121 | 18 | 0 | 16 | 9 | 43 |
| | 2 | 7-Jan | 13-Jan | 257 | 549 | 147 | 0 | 130 | 69 | 347 |
| | 3 | 14-Jan | 20-Jan | 182 | 363 | 58 | 2 | 52 | 25 | 138 |
| | 4 | 21-Jan | 27-Jan | 191 | 377 | 49 | 0 | 43 | 23 | 115 |
| | 5 | 28-Jan | 3-Feb | 158 | 317 | 59 | 0 | 52 | 28 | 138 |
| **Feb** | 6 | 4-Feb | 10-Feb | 45 | 83 | 10 | 0 | 9 | 5 | 25 |
| | 7 | 11-Feb | 17-Feb | 63 | 154 | 23 | 0 | 21 | 11 | 55 |
| | 8 | 18-Feb | 24-Feb | 155 | 350 | 72 | 0 | 64 | 34 | 170 |
| | 9 | 25-Feb | 3-Mar | 175 | 353 | 76 | 0 | 68 | 36 | 180 |
| **Mar** | 10 | 4-Mar | 10-Mar | 129 | 274 | 76 | 0 | 68 | 36 | 180 |
| | 11 | 11-Mar | 17-Mar | 192 | 368 | 98 | 0 | 87 | 46 | 231 |
| | 12 | 18-Mar | 24-Mar | 162 | 319 | 80 | 0 | 71 | 38 | 188 |
| | 13 | 25-Mar | 31-Mar | 223 | 463 | 87 | 0 | 77 | 41 | 205 |
| **April** | 14 | 1-Apr | 7-Apr | 70 | 116 | 25 | 0 | 22 | 12 | 58 |
| | 15 | 8-Apr | 10-Apr | 16 | 32 | 4 | 0 | 4 | 2 | 10 |
| **Sub-Total:** | | | | **3,080** | **6,241** | **1218** | **2** | **1078** | **572** | **2,870** |
| Everett Blackmouth Derby | | | | 73 | 159 | 50 | 0 | 44 | 24 | 118 |
| Hot Plug's Derby | | | | 180 | 360 | 19 | 0 | 17 | 9 | 45 |
| **Season Total:** | | | | **3,333** | **6,760** | **1287** | **2** | **1140** | **604** | **3,033** |
| **Variance:** | | | | 129,730 | 465,144 | 17,837 | 2 | 222,905 | 43,331 | 338,778 |
| **SE:** | | | | 360 | 682 | 134 | 1 | 472 | 208 | 582 |
| **CV (%):** | | | | 11 | 10 | 10 | 64 | 41 | 34 | 19 |
| **95% CI:** | | | | 2,611 - 4,023 | 5,391 - 8,065 | 1,021 - 1,544 | 0 - 5 | 215 - 2,063 | 196 - 1,010 | 1,887 - 4,166 |

**Table 4.5** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the Area 8-2 Chinook salmon MSF.

| Mark Type | Number Sampled | | |
|---|---|---|---|
| | Legal-size | Sublegal-size | Total |
| Marked | 466 | 21 | 487 |
| Unmarked | 0 | 0 | 0 |
| **Total** | **466** | **21** | **487** |

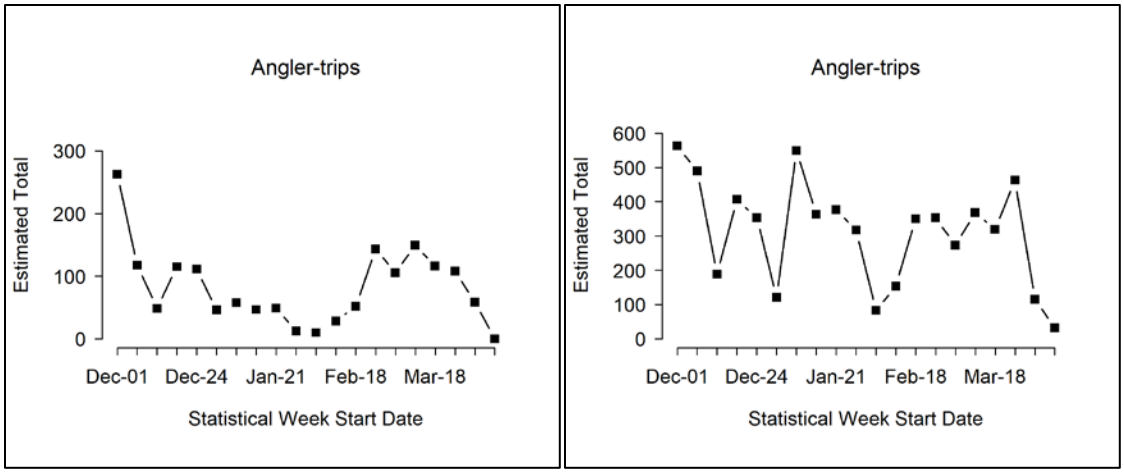


**Figure 4.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 (*left panel*) and 8-2 (*right panel*).

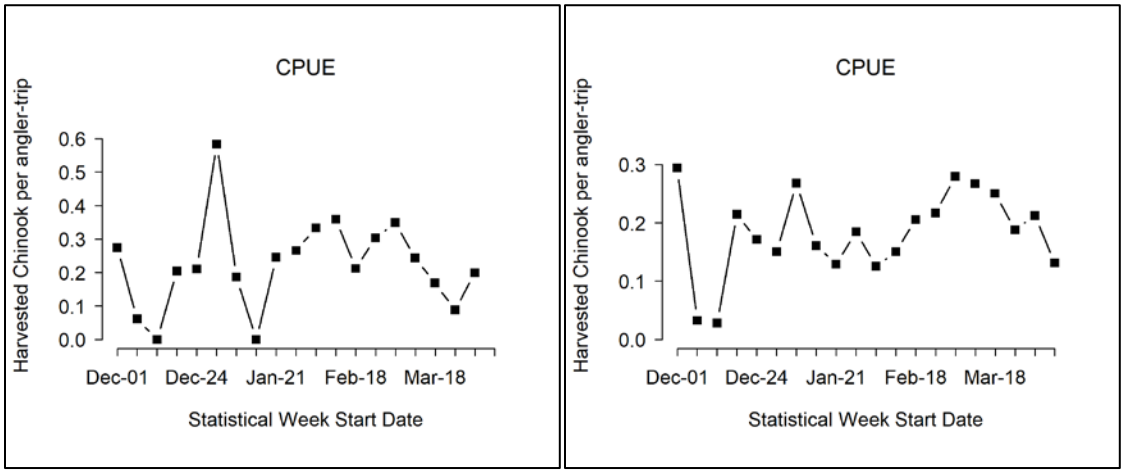


**Figure 4.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 (*left panel*) and 8-2 (*right panel*).

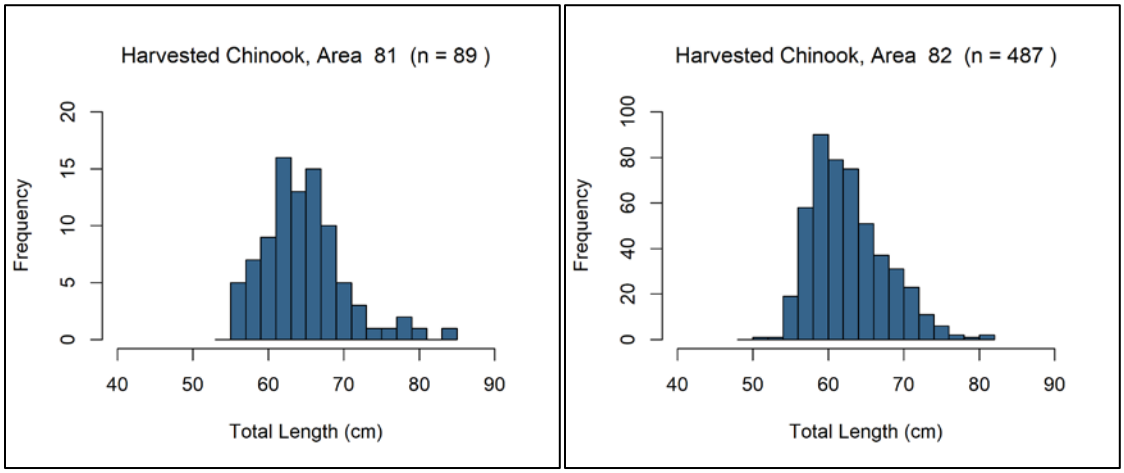


**Figure 4.3** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 (left panel) and 8-2 (right panel). Note: displayed values are observations where lengths were taken.

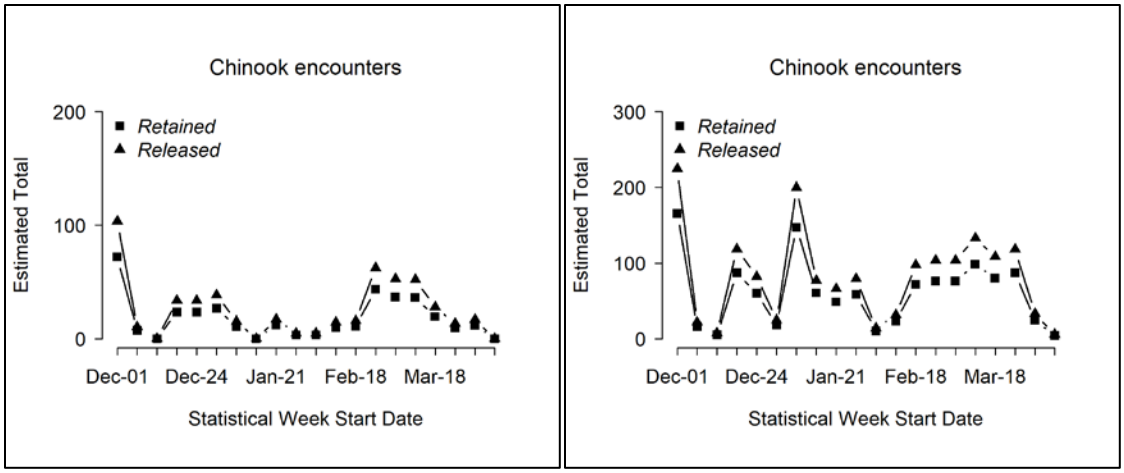


**Figure 4.4** Temporal patterns in Chinook encounters (retained and released) during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 (left panel) and 8-2 (right panel).

**Table 4.6** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| WA | N Washington (7.1%) | East Sound Bay (San) | Glenwood Springs | 1 (7.1%) | 0 |
| | Hood Canal (7.1%) | Finch Cr 16.0222 | Hoodsport Hatchery | 1 (7.1%) | 0 |
| | N Puget Sound (14.3%) | Wallace R 07.0940 | Wallace R Hatchery | 1 (7.1%) | 0 |
| | | Whitehorse Springs | Whitehorse Pond | 1 (7.1%) | 0 |
| | Mid Puget Sound (50%) | Big Soos Cr 09.0072 | Soos Creek Hatchery | 5 (35.7%) | 0 |
| | | Icy Cr 09.0125 | Icy Cr Hatchery | 2 (14.3%) | 0 |
| | S Puget Sound (21.4%) | Minter Cr 15.0048 | Minter Cr Hatchery | 3 (21.4%) | 0 |
| | | | **Total** | **14** | **0** |

**Table 4.7** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2018-19 winter Chinook salmon MSFs in Marine Area 8-1 AD = marked (adipose-clipped), UM = unmarked.

| Hatchery | Brood Year | DITs Obs | Est. AD | var(Est.AD) | UM DIT Enc | Est.UM | var(Est.UM) | SE(Est.UM) |
|---|---|---|---|---|---|---|---|---|
| No DIT's Recovered | | | | | | | | |
| Total | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table 4.8** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-2. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| WA | N Washington (3.5%) | Kendall Cr 01.0406 | Kendall Cr Hatchery | 1 (1.8%) | 0 |
| | | Friday Cr 03.0017 | Samish Hatchery | 1 (1.8%) | 0 |
| | Hood Canal (8.8%) | Finch Cr 16.0222 | Hoodsport Hatchery | 2 (3.5%) | 0 |
| | | Purdy Cr 16.0005 | George Adams Hatchery | 3 (5.3%) | 0 |
| | N Puget Sound (22.8%) | Tulalip Cr 07.0001 | Bernie Gobin Hatch | 2 (3.5%) | 2 |
| | | Wallace R 07.0940 | Wallace R Hatchery | 9 (15.8%) | 0 |
| | | Whitehorse Springs | Whitehorse Pond | 2 (3.5%) | 0 |
| | Mid Puget Sound (42.1%) | Clarks Crk Hatchery | Clarks Crk Hatchery | 1 (1.8%) | 0 |
| | | Grovers Cr Hatchery | Grovers Cr Hatchery | 3 (5.3%) | 3 |
| | | Big Soos Cr 09.0072 | Soos Creek Hatchery | 1 (1.8%) | 0 |
| | | Issaquah Cr 08.0178 | Issaquah Hatchery | 1 (1.8%) | 0 |
| | | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | 8 (14%) | 0 |
| | | Icy Cr 09.0125 | Icy Cr Hatchery | 10 (17.5%) | 0 |
| | S Puget Sound (22.8%) | Clear Cr 11.0013C | Clear Creek Hatchery | 3 (5.3%) | 3 |
| | | Deschutes R 13.0028 | Tumwater Falls Hatchery | 3 (5.3%) | 0 |
| | | Mcallister Springs Hatch | Clear Creek Hatchery | 1 (1.8%) | 0 |
| | | Minter Cr 15.0048 | Minter Cr Hatchery | 5 (8.8%) | 0 |
| | | Kalama Cr 11.0017 | Kalama Cr Hatchery | 1 (1.8%) | 0 |
| | | | **Total** | **57** | **8** |

**Table 4.9** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2018-19 winter Chinook salmon MSFs in Marine Area 8-2 AD = marked (adipose-clipped), UM = unmarked.

| Hatchery | Brood Year | DITs Obs | Est.AD | var(Est.AD) | UM DIT Enc | Est.UM | var(Est.UM) | SE(Est.UM) |
|---|---|---|---|---|---|---|---|---|
| Bernie Gobin Hatch | 2015 | 1 | 2.7 | 4.59 | 2.7 | 0.3 | 0.046 | 0.21 |
| Bernie Gobin Hatch | 2016 | 1 | 2.7 | 4.59 | 2.7 | 0.3 | 0.046 | 0.22 |
| Clear Creek Hatchery | 2016 | 3 | 8.1 | 13.76 | 8.1 | 0.8 | 0.138 | 0.64 |
| Grovers Cr Hatchery | 2016 | 3 | 8.1 | 13.76 | 8.5 | 0.9 | 0.153 | 0.68 |
| **Total** | | **8** | **21.6** | **36.7** | **22.1** | **2.2** | **0.383** | **1.75** |

**Table 4.10** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 (*upper panel)*, 8-2 (*middle panel*) and combined (*lower panel*) , with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| 8-1 Private VTR | 12 1-trip VTRs, 14 Angler Trips | 9 | 2 | 6 | 3 | 20 | 0.75 | 0.82 |
| Size/mark-status composition: | | 0.45 | 0.10 | 0.30 | 0.15 | | | |
| Variance: | | (0.0130) | (0.0047) | (0.0111) | (0.0067) | | | |
| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
| | | AD | UM | AD | UM | | Overall | Legal |
| 8-2 Private VTR | 14 1-trip VTRs, 15 Angler Trips | 12 | 4 | 9 | 0 | 25 | 0.84 | 0.75 |
| Size/mark-status composition: | | 0.48 | 0.16 | 0.36 | 0.00 | | | |
| Variance: | | (0.0104) | (0.0056) | (0.0096) | (0.0000) | | | |
| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
| | | AD | UM | AD | UM | | Overall | Legal |
| Combined Private VTR[1] | 26 1-trip VTRs, 29 Angler Trips | 21 | 6 | 15 | 3 | 45 | 0.80 | 0.78 |
| Size/mark-status composition: | | 0.47 | 0.13 | 0.33 | 0.07 | | | |
| Variance: | | (0.0057) | (0.0026) | (0.0051) | (0.0014) | | | |

[1]Combined 8-1 and 8-2 VTR legal-mark proportions showed no significant difference (p-value=0.24), and were used for encounter estimates for both Marine Area 8-1 and Marine Area 8-2.

**Table 4.11** Summary of season-wide fishery impact estimates for the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 (*upper panel*) and 8-2 (*lower panel*). Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Size/mark group | Encounters | Retained | Released | Release Mortality | Total Mortality | Var | SE | 95% CI | CV (%) |
|---|---|---|---|---|---|---|---|---|---|
| Legal AD | 445 | 387 | 58 | 9 | 395 | 5,479 | 74 | 250 -540 | 19 |
| Legal UM | 127 | 0 | 127 | 19 | 19 | 72 | 8 | 2 - 36 | 45 |
| Sublegal AD | 318 | 4 | 313 | 63 | 67 | 429 | 21 | 26 - 108 | 31 |
| Sublegal UM | 64 | 0 | 64 | 13 | 13 | 58 | 8 | 0 - 28 | 60 |
| **Total** | **953** | **391** | **561** | **103** | **494** | **6,038** | **78** | **342 - 646** | **16** |

| Size/mark group | Encounters | Retained | Released | Release Mortality | Total Mortality | Var | SE | 95% CI | CV (%) |
|---|---|---|---|---|---|---|---|---|---|
| Legal AD | 1415 | 1231 | 184 | 28 | 1259 | 19,614 | 140 | 985 - 1,534 | 11 |
| Legal UM | 404 | 0 | 404 | 61 | 61 | 659 | 26 | 10 - 111 | 42 |
| Sublegal AD | 1011 | 55 | 956 | 191 | 247 | 3460 | 59 | 131 - 362 | 24 |
| Sublegal UM | 202 | 2 | 200 | 40 | 42 | 564 | 24 | 0 - 89 | 56 |
| **Total** | **3033** | **1289** | **1744** | **319** | **1608** | **24,296** | **156** | **1,303 - 1,914** | **10** |

**Table 4.12** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters for the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 and 8-2, combined. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Data Source | Group | Total Encounters | Legal | Sublegal | Landed Only |
|---|---|---|---|---|---|
| FRAM Encounters | UM | 950 | 271 | 679 | 3 |
| | AD | 4,524 | 1118 | 3,406 | 972 |
| | Total | 5,474 | 1,389 | 4,085 | 975 |
| | % Marked | 83 | 80 | 83 | 100 |
| Estimated (Creel) Encounters | UM | 797 | 531 | 266 | 2 |
| | AD | 3189 | 1860 | 1329 | 1678 |
| | Total | 3,986 | 2391 | 1594 | 1680 |
| | % Marked | 80 | 78 | 83 | 100 |

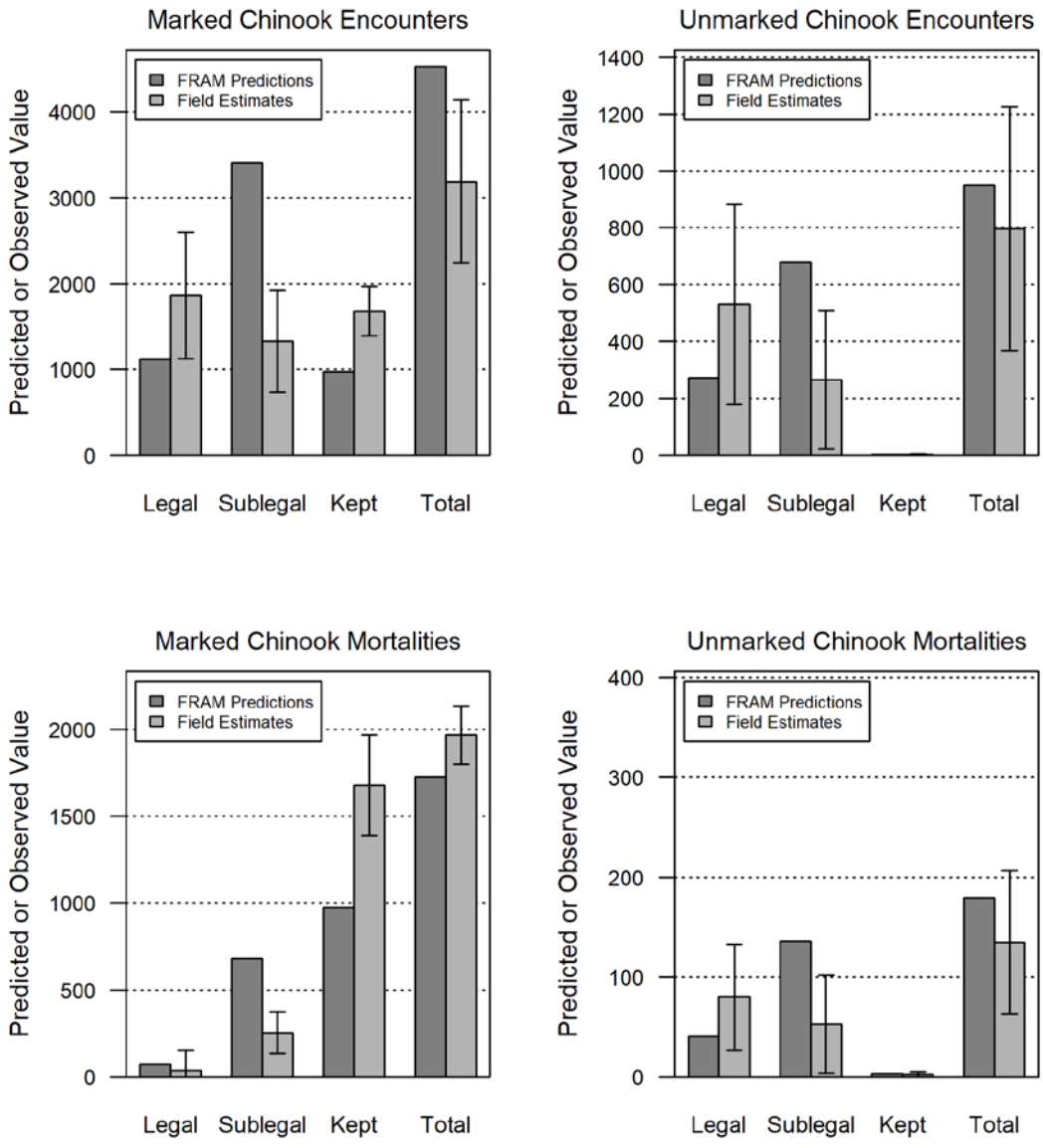


**Figure 4.5** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters and mortalities for the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 and 8-2, combined. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 4.13** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon mortalities for the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 and 8-2, combined. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Mortality Category | FRAM Chinook Mortalities | | | Estimated Chinook Mortalities | | |
|---|---|---|---|---|---|---|
| | UM | AD | Total | UM | AD | Total |
| Total (Landed + Released) | 179 | 1,724 | 1,903 | 135 | 1,968 | 2,103 |
| Released Legal | 40 | 71 | 111 | 80 | 36 | 116 |
| Released Sublegal | 136 | 681 | 817 | 53 | 254 | 306 |
| Landed Only | 3 | 972 | 975 | 2 | 1,678 | 1,680 |

**Table 4.14** Monthly sample rates (Total retained Chinook salmon sampled[1] / Estimated retained Chinook salmon) for the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 (upper panel) and 8-2 (lower panel).

| Time period | | | Estimated Retained Chinook | | | Number of Chinook sampled | | | Sample Rate |
|---|---|---|---|---|---|---|---|---|---|
| Month | Stat Weeks | Dates | AD | UM | Total | AD | UM | Total | |
| December | 48 - 52 | 1 Dec - 30 Dec | 126 | 0 | 126 | 17 | 0 | 17 | 13.50% |
| January | 53.1 - 5 | 31 Dec - 3 Feb | 53 | 0 | 53 | 15 | 0 | 15 | 28.30% |
| February | 6 - 9 | 4 Feb - 3 Mar | 68 | 0 | 68 | 18 | 0 | 18 | 26.50% |
| March | 10 - 13 | 4 Mar - 31 Mar | 132 | 0 | 132 | 40 | 0 | 40 | 30.30% |
| April | 14 - 15 | 1 Apr - 10 Apr | 12 | 0 | 12 | 2 | 0 | 2 | 17.10% |
| **Season Total** | | | **391** | **0** | **391** | **92** | **0** | **92** | **23.50%** |

| Time period | | | Estimated Retained Chinook | | | Number of Chinook sampled | | | Sample Rate |
|---|---|---|---|---|---|---|---|---|---|
| Month | Stat Weeks | Dates | AD | UM | Total | AD | UM | Total | |
| December | 48 - 52 | 1 Dec - 30 Dec | 335 | 0 | 335 | 119 | 0 | 119 | 35.60% |
| January | 53.1 - 5 | 31 Dec - x3 Feb | 331 | 2 | 333 | 163 | 1 | 164 | 49.20% |
| February | 6 - 9 | 4 Feb - 3 Mar | 182 | 0 | 182 | 55 | 0 | 55 | 30.20% |
| March | 10 - 13 | 4 Mar - 31 Mar | 342 | 0 | 342 | 167 | 0 | 167 | 48.90% |
| April | 14 - 15 | 1 Apr - 10 Apr | 29 | 0 | 29 | 27 | 0 | 27 | 94.00% |
| **Season Total** | | | **1218** | **2** | **1220** | **531** | **1** | **532** | **43.60%** |

[1/] Number of retained Chinook salmon sampled includes all retained Chinook salmon inspected for CWTs, from all sites sampled during the winter 2018-19 Marine Area 8-1, 8-2 Chinook salmon MSFs (the sample-frame sites included in the creel estimates and the fish sampled as part of derbies and other baseline sampling in the Marine Area).

**Table 4.15** Fishery-total estimates of retained and released salmon (other than Chinook salmon) during the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 and 8-2. AD = marked (adipose-clipped), UM = Unmarked, UK = unknown mark-status. Values may not add exactly due to rounding error.

| Month | Stat Week | Start Date | End Date | 8-1 Released | 8-2 Retained | 8-2 Released | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Coho UM | Chum | Coho AD | Coho UM | Coho UK |
| **Dec** | 48 | 1-Dec | 2-Dec | 0 | 0 | 0 | 0 | 0 |
| | 49 | 3-Dec | 9-Dec | 0 | 2 | 0 | 0 | 0 |
| | 50 | 10-Dec | 16-Dec | 0 | 0 | 0 | 0 | 0 |
| | 51 | 17-Dec | 23-Dec | 0 | 0 | 12 | 0 | 0 |
| | 52 | 24-Dec | 30-Dec | 0 | 0 | 12 | 0 | 0 |
| **Jan** | 53 / 1 | 31-Dec | 6-Jan | 0 | 0 | 1 | 0 | 0 |
| | 2 | 7-Jan | 13-Jan | 0 | 0 | 5 | 0 | 3 |
| | 3 | 14-Jan | 20-Jan | 0 | 0 | 0 | 2 | 3 |
| | 4 | 21-Jan | 27-Jan | 0 | 0 | 4 | 0 | 3 |
| | 5 | 28-Jan | 3-Feb | 0 | 0 | 0 | 0 | 0 |
| **Feb** | 6 | 4-Feb | 10-Feb | 0 | 0 | 0 | 0 | 0 |
| | 7 | 11-Feb | 17-Feb | 0 | 0 | 0 | 0 | 0 |
| | 8 | 18-Feb | 24-Feb | 3 | 0 | 0 | 0 | 0 |
| | 9 | 25-Feb | 3-Mar | 0 | 0 | 0 | 0 | 0 |
| **Mar** | 10 | 4-Mar | 10-Mar | 0 | 0 | 0 | 0 | 0 |
| | 11 | 11-Mar | 17-Mar | 0 | 0 | 3 | 0 | 0 |
| | 12 | 18-Mar | 24-Mar | 0 | 0 | 3 | 0 | 0 |
| | 13 | 25-Mar | 31-Mar | 0 | 0 | 0 | 0 | 0 |
| **April** | 14 | 1-Apr | 7-Apr | 0 | 0 | 0 | 0 | 0 |
| | 15 | 8-Apr | 10-Apr | 0 | 0 | 0 | 0 | 0 |
| **Season Total:** | | | | **3** | **2** | **40** | **2** | **9** |
| **Variance:** | | | | 4 | 2 | 495 | 2 | 33 |
| **SE:** | | | | 2 | 1 | 22 | 1 | 6 |
| **CV (%):** | | | | 75 | 62 | 56 | 64 | 63 |
| **95% CI:** | | | | 0 - 7 | 1 - 5 | 0 - 83 | 0 - 5 | 0 - 20 |

**Table 4.16** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2018-19 winter Chinook salmon MSFs in Marine Areas 8-1 and 8-2. Bold sites indicate those included in the dockside sample frame.

| Area | | Total Anglers | | Season Total (unadjusted) Size Measure | |
|---|---|---|---|---|---|
| | | WD | WE | WD | WE |
| **8-1** | **No completed boat surveys** | | | | |
| **Area 8-1 Total Anglers** | | | | | |
| **8-2** | Bayside Marina/Drystack | 4 | 3 | 0.0930 | 0.0176 |
| **8-2** | **Camano Island State Park** | **11** | **22** | **0.2558** | **0.1294** |
| **8-2** | Coupeville Public Ramp | 0 | 2 | 0.0000 | 0.0118 |
| **8-2** | **Dagmar's Landing** | **0** | **6** | **0.0000** | **0.0353** |
| **8-2** | Edmonds Marina | 1 | 0 | 0.0233 | 0.0000 |
| **8-2** | Everett Marina | 4 | 18 | 0.0930 | 0.1059 |
| **8-2** | **Everett Ramp** | **11** | **92** | **0.2558** | **0.5412** |
| **8-2** | Kayak State Park Public Ramp | 0 | 1 | 0.0000 | 0.0059 |
| **8-2** | Kingston Public Ramp | 0 | 3 | 0.0000 | 0.0176 |
| **8-2** | **Mukilteo Lighthouse Park** | **0** | **4** | **0.0000** | **0.0235** |
| **8-2** | New Marysville Public Ramp | 0 | 2 | 0.0000 | 0.0118 |
| **8-2** | **Oak Harbor Marina & Public Ramp** | **3** | **6** | **0.0698** | **0.0353** |
| **8-2** | Onamac (Private) | 0 | 2 | 0.0000 | 0.0118 |
| **8-2** | Private | 7 | 4 | 0.1628 | 0.0235 |
| **8-2** | Shilshole Marina | 0 | 5 | 0.0000 | 0.0294 |
| **8-2** | Unknown | 2 | 0 | 0.0465 | 0.0000 |
| **Area 8-2 Total Anglers** | | **43** | **170** | **1** | **1** |

**Table 4.17** Season-total estimates of Chinook salmon encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Marnie Areas 8-1 and 8-2 winter Chinook salmon MSFs. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

| Area | Season Dates | Effort (Angler-trips) | Retained | | | | Released Chinook | | | | Total Encounters |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LM | LU | SM | SU | LM | LU | SM | SU | |
| 8-1 | Oct 1, 2005 - Apr 30, 2006 | 3,976 | 303 | 0 | 39 | 0 | 45 | 188 | 763 | 575 | 1,914 |
| 8-1 | Oct 1, 2006 - Apr 30, 2007 | 3,454 | 278 | 8 | 37 | 4 | 42 | 118 | 1,437 | 857 | 2,781 |
| 8-1 | Nov1, 2007 - Apr 30, 2008 | 3,288 | 638 | 5 | 36 | 0 | 95 | 304 | 1,345 | 577 | 3,000 |
| 8-1 | Jan 1, 2009 - Apr 30, 2009 | 2,518 | 396 | 12 | 7 | 0 | 59 | 45 | 1,443 | 909 | 2,870 |
| 8-1 | Nov 1, 2009 - Apr 30, 2010 | 3,192 | 273 | 0 | 11 | 0 | 41 | 45 | 595 | 269 | 1,234 |
| 8-1 | Nov 1, 2010 - Apr 30, 2011 | 2,398 | 87 | 0 | 9 | 0 | 13 | 15 | 91 | 69 | 283 |
| 8-1 | Nov 1, 2011 - Apr 30, 2012 | 2,767 | 284 | 0 | 7 | 0 | 42 | 136 | 1,027 | 272 | 1,768 |
| 8-1 | Nov 1, 2012 - Apr 30,2013 | 2,046 | 268 | 0 | 14 | 0 | 40 | 88 | 955 | 793 | 2,158 |
| 8-1 | Nov 1, 2013 - Apr 30, 2014 | 1,579 | 97 | 0 | 3 | 0 | 15 | 34 | 70 | 37 | 255 |
| 8-1 | Nov 1, 2014 - Apr 30, 2015 | 1,927 | 151 | 0 | 0 | 0 | 23 | 35 | 416 | 658 | 1,282 |
| 8-1 | Nov 1, 2015 - Apr 30, 2016 | 2,312 | 448 | 2 | 44 | 0 | 67 | 150 | 1764 | 594 | 3,069 |
| 8-1 | Nov 1, 2016 - Apr 30, 2017 | 2774 | 452 | 0 | 17 | 0 | 68 | 243 | 295 | 104 | 1,179 |
| 8-1 | Nov 1, 2017 - Apr 30, 2018 | 2325 | 470 | 19 | 0 | 0 | 70 | 51 | 610 | 192 | 1,411 |
| 8-1 | Dec 1, 2018 - Apr 10, 2019 | 2044 | 387 | 0 | 4 | 0 | 58 | 127 | 313 | 64 | 953 |
| | | | | | | | | | | | |
| 8-2 | Oct 1, 2005 - Apr 30, 2006 | 8,521 | 735 | 40 | 35 | 0 | 106 | 618 | 1,706 | 876 | 4,116 |
| 8-2 | Oct 1, 2006 - Apr 30, 2007 | 7,848 | 766 | 18 | 95 | 3 | 113 | 183 | 10,486 | 5,407 | 17,071 |
| 8-2 | Nov 1, 2007 - Apr 30, 2008 | 5,678 | 795 | 15 | 74 | 3 | 114 | 181 | 942 | 303 | 2,428 |
| 8-2 | Jan 1, 2009 - Apr 30, 2009 | 5,946 | 495 | 15 | 14 | 0 | 74 | 18 | 1,557 | 468 | 2,641 |
| 8-2 | Nov 1, 2009 - Apr 30, 2010 | 6,732 | 814 | 4 | 10 | 0 | 122 | 164 | 1,300 | 487 | 2,902 |
| 8-2 | Nov 1, 2010 - Apr 30, 2011 | 3,505 | 111 | 0 | 5 | 0 | 17 | 20 | 122 | 88 | 363 |
| 8-2 | Nov 1, 2011 - Apr 30, 2012 | 5,197 | 470 | 2 | 27 | 0 | 70 | 223 | 1,683 | 450 | 2,925 |
| 8-2 | Nov 1, 2012 - Apr 30, 2013 | 4,260 | 346 | 0 | 17 | 0 | 52 | 113 | 1,231 | 1,021 | 2,780 |
| 8-2 | Nov 1, 2013 - Apr 30, 2014 | 4,076 | 369 | 0 | 13 | 0 | 55 | 127 | 266 | 139 | 970 |
| 8-2 | Nov 1, 2014 - Apr 30, 2015 | 3,953 | 186 | 0 | 2 | 0 | 28 | 43 | 510 | 810 | 1,578 |
| 8-2 | Nov 01, 2015 - Apr 30, 2016 | 4,525 | 486 | 0 | 42 | 0 | 73 | 165 | 1920 | 645 | 3,331 |
| 8-2 | Nov 1, 2016 - Apr 30, 2017 | 5850 | 823 | 0 | 27 | 0 | 123 | 149 | 1218 | 100 | 2,440 |
| 8-2 | Nov 1, 2017 - Apr 30, 2018 | 4,467 | 599 | 0 | 48 | 0 | 89 | 89 | 729 | 244 | 1,799 |
| 8-2 | Dec 1, 2018 - Apr 10, 2019 | 6730 | 1,231 | 0 | 55 | 2 | 184 | 404 | 956 | 200 | 3,033 |

## 5) Marine Area 9 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented a twelfth consecutive winter Chinook salmon MSF in Marine Area 9 from January 1, 2019 through April 15, 2019. The PSSU implemented an intensive monitoring program in Marine Area 9 throughout the season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, aerial effort surveys, test fishing and collection of VTRs from the angling public. **Table 5.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical data parameters are presented in detail in our separate Methods Report (WDFW 2012a). In the following section we present results from our monitoring activities during the Marine Area 9 winter Chinook salmon MSF. In addition to the major components of the results described previously (page 3), we present the aerial survey and dockside data used to estimate the sample fraction in Marine Area 9 (see WDFW 2012a, *Aerial-Access Design*). The four sites included in the Area 9 dockside sample frame are Port Townsend Ramp, Kingston Ramp, Everett Ramp and Edmonds Ramp, which are assumed to be the highest-use access sites for Area 9 anglers. The Olympic Peninsula Derby took place from March 8-10, 2019 over portions of Marine Areas 6 and 9. Total derby effort was allocated to each Marine Area using the proportion of effort that occurred in each area based on dockside sampling efforts at designated weigh-in stations during the derby. Total catch by Marine Area was obtained from the derby organizers.

**Table 5.1** Sampling/estimation details on target parameters associated with the overall Marine Area 9 winter Chinook salmon MSF monitoring program.

| Activity | Focal Parameter(s) | Secondary Parameter(s) | Sample Unit(s) | Finest Estimation Time Step | Comments |
|---|---|---|---|---|---|
| Dockside Creel Sampling | Fishing effort (boat & angler trips); kept and released fish | Catch rates (CPUE); length, age, and CWT composition of harvest[1]; collection of angler fishing methods. | Angler trip; kept fish; reported fish release | Two weeks | Creel estimates were produced for two-week estimation periods and stratified into "weekday" (Mon.-Thurs.) and "weekend" (Fri.-Sun.) day-type strata within weeks. For the weekday stratum we sampled $n$=2 days out of $N$=8 available weekdays per two-week period. For the weekend stratum we sampled $n$=2 days out of $N$=3 available weekend days per week. |
| Aerial Surveys | Fraction of Marine Area 9 effort (boats) captured in the four-site sample frame via creel surveys (Sample Fraction, $f_{ij}$). | Total boat counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area. | Boats | Month | The sample fraction was calculated for individual aerial survey dates (see **Table 5.12**; $n$=17 surveys conducted out of $N$=105 days available in the season).. |
| Test Fishing | Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon | Chinook salmon length, age, and DNA-based[2] stock composition; species composition of non-Chinook salmon encounters | Fish encounter | Season | We used the test fishery data only to estimate the size/mark-status proportions (LM = 58%, LU = 12%, SM = 23% and SU = 7%); see **Table 5.10**)/ needed to produce encounter and mortality estimates. |
| Voluntary Trip Reports (VTRs) | Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon | Encounter data for non-Chinook salmon species (e.g., Coho) that the angler may record on the VTR form | Fish encounter | Season | VTR data (**Table 5.9**) were not used for impact estimation steps due to the assumed higher data quality and sufficient sample size of the test fishery data. See comment in row above. |
| Overall Fishery Impacts Estimation | Total Chinook salmon encounters and mortalities, by size/mark-status group | Ratios of encounters and mortalities per kept Chinook salmon | N/A | Season | Estimated on a monthly time step but considered at the season-total level. |
| Coded-wire tag (CWT) Impacts Estimation | Marked/unmarked double-index tag (DIT) encounters and mortalities | N/A | N/A | Season | The temporal resolution of DIT impacts is constrained by the total number of tags recovered. |

[1] The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

[2] Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery.

**Table 5.2** Estimates of total fishing effort and total Chinook salmon catch (retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 9. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Month | Stat Week | Start Date | End Date | Est. Effort | | Est. Retained Chinook | | Est. Released Chinook | | Total Est. Chinook Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Boats | Anglers | AD | UM | AD | UM | |
| Jan | 1 | 1-Jan | 6-Jan | 285 | 588 | 191 | 0 | 107 | 67 | 366 |
| | 2 | 7-Jan | 13-Jan | 529 | 1177 | 428 | 0 | 240 | 151 | 819 |
| | 3 | 14-Jan | 20-Jan | 487 | 978 | 248 | 0 | 139 | 87 | 474 |
| | 4 | 21-Jan | 27-Jan | 570 | 1086 | 316 | 0 | 177 | 112 | 605 |
| | 5 | 28-Jan | 3-Feb | 213 | 425 | 65 | 0 | 36 | 23 | 124 |
| Feb | 6 | 4-Feb | 10-Feb | 79 | 159 | 29 | 0 | 16 | 10 | 55 |
| | 7 | 11-Feb | 17-Feb | 148 | 329 | 124 | 0 | 69 | 44 | 237 |
| | 8 | 18-Feb | 24-Feb | 238 | 470 | 108 | 0 | 60 | 38 | 206 |
| | 9 | 25-Feb | 3-Mar | 357 | 662 | 232 | 0 | 130 | 82 | 444 |
| Mar | 10 | 4-Mar | 10-Mar | 306 | 590 | 138 | 0 | 77 | 49 | 264 |
| | 11 | 11-Mar | 17-Mar | 441 | 848 | 159 | 4 | 89 | 52 | 304 |
| | 12 | 18-Mar | 24-Mar | 405 | 697 | 216 | 0 | 121 | 76 | 414 |
| | 13 | 25-Mar | 31-Mar | 785 | 1592 | 473 | 0 | 265 | 167 | 906 |
| Apr | 14 | 1-Apr | 7-Apr | 233 | 428 | 145 | 0 | 82 | 51 | 278 |
| | 15 | 8-Apr | 14-Apr | 815 | 1571 | 710 | 4 | 398 | 247 | 1359 |
| | 16 | 15-Apr | 15-Apr | 61 | 107 | 58 | 0 | 32 | 20 | 110 |
| **Sub-Total:** | | | | **5951** | **11,707** | **3640** | **7** | **2041** | **1277** | **6,965** |
| Olympic Peninsula Derby | | | | 78 | 174 | 54 | 0 | 30 | 19 | 103 |
| Everett Blackmouth Derby | | | | 78 | 170 | 52 | 0 | 29 | 18 | 99 |
| **Season Total:** | | | | **6,107** | **12,051** | **3,746** | **7** | **2100** | **1314** | **7,167** |
| **Variance:** | | | | 295,772 | 1,149,081 | 114,554 | 11 | 530,591 | 72,783 | 685,111 |
| **SE:** | | | | 544 | 1072 | 338 | 3 | 728 | 270 | 828 |
| **CV (%):** | | | | 9% | 9% | 9% | 46% | 35% | 21% | 12% |
| **95% CI:** | | | | 5,041 - 7,173 | 9,950 - 14,153 | 3,082 - 4,409 | 1 - 14 | 672 - 3,528 | 786 - 1,843 | 5,545 - 8,790 |

**Table 5.3** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the during the 2018-19 winter Chinook salmon MSF in Area 9.

| Mark Type | Number Sampled | | |
|---|---|---|---|
| | Legal-size | Sublegal-size | Total |
| Marked | 911 | 30 | 941 |
| Unmarked | 5 | 0 | 5 |
| Total | 916 | 30 | 946 |

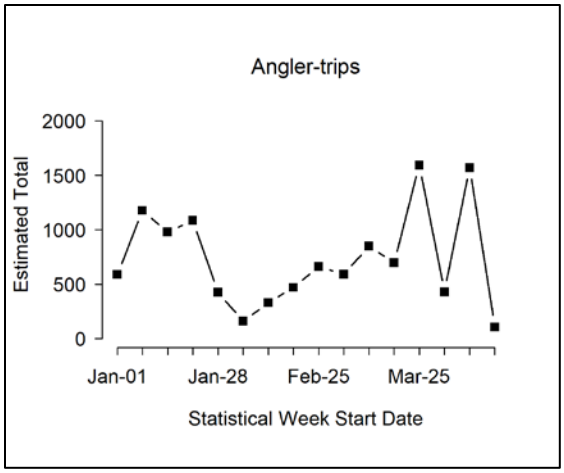


**Figure 5.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 9.

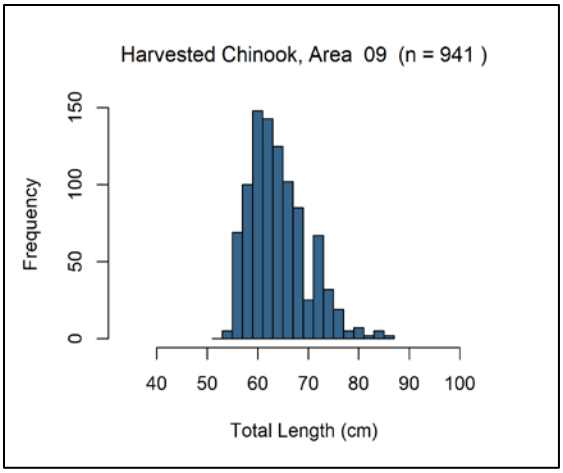


**Figure 5.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 9. Note: displayed values are observations where lengths were taken.

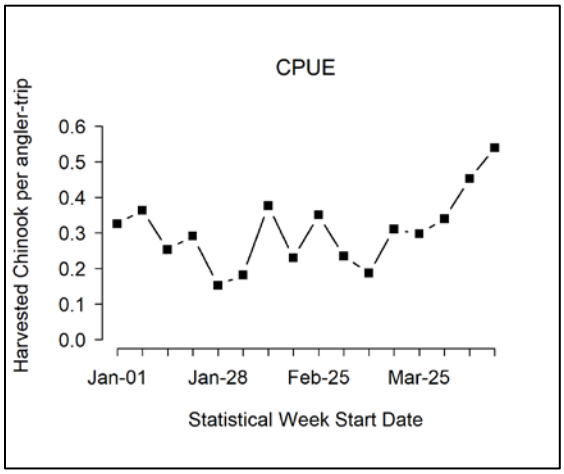


**Figure 5.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 9.

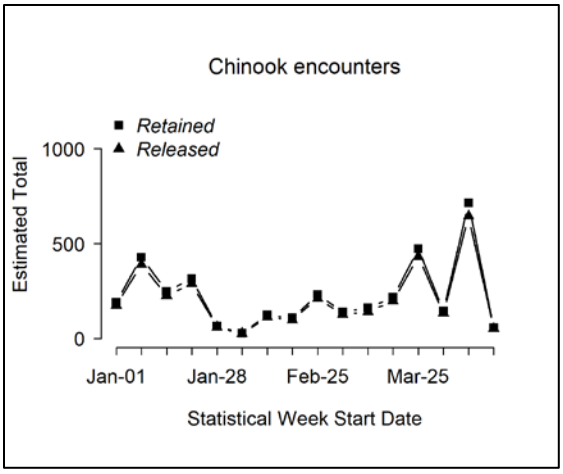


**Figure 5.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 9.

**Table 5.4** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSF in Marine Area 9. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| BC | Thompson River (2%) | R-Chilliwack R | H-Chilliwack River H | 2 (2%) | 0 |
| | Georgia Strait (1%) | R-Capilano R Up | H-Capilano River H | 1 (1%) | 0 |
| WA | N Washington (1%) | Kendall Cr 01.0406 | Kendall Cr Hatchery | 1 (1%) | 0 |
| | Strait of Juan De Fuca (1%) | Elwha R 18.0272 | Elwha Hatchery | 1 (1%) | 0 |
| | Hood Canal (12.2%) | Purdy Cr 16.0005 | George Adams Hatchery | 10 (10.2%) | 0 |
| | | Finch Cr 16.0222 | Hoodsport Hatchery | 2 (2%) | 0 |
| | N Puget Sound (12.2%) | Tulalip Cr 07.0001 | Bernie Gobin Hatch | 2 (2%) | 2 |
| | | Wallace R 07.0940 | Wallace R Hatchery | 4 (4.1%) | 0 |
| | | Whitehorse Springs | Whitehorse Pond | 6 (6.1%) | 0 |
| | Skagit River (3.1%) | Cascade R 03.1411 | Marblemount Hatchery | 3 (3.1%) | 0 |
| | Mid Puget Sound (27.6%) | Big Soos Cr 09.0072 | Soos Creek Hatchery | 2 (2%) | 0 |
| | | Grovers Cr Hatchery | Grovers Cr Hatchery | 4 (4.1%) | 4 |
| | | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | 7 (7.1%) | 0 |
| | | Portage Bay/Ship Cnl | Issaquah Hatchery | 1 (1%) | 0 |
| | | Icy Cr 09.0125 | Icy Cr Hatchery | 10 (10.2%) | 0 |
| | | Clarks Crk Hatchery | Clarks Crk Hatchery | 1 (1%) | 0 |
| | | Lk Washington (King) | Issaquah Hatchery | 2 (2%) | 0 |
| | S Puget Sound (38.8%) | Deschutes R 13.0028 | Tumwater Falls Hatchery | 3 (3.1%) | 0 |
| | | Kalama Cr 11.0017 | Kalama Cr Hatchery | 6 (6.1%) | 0 |
| | | Clear Cr 11.0013C | Clear Creek Hatchery | 5 (5.1%) | 4 |
| | | Mcallister Springs Hatch | Clear Creek Hatchery | 4 (4.1%) | 0 |
| | | Minter Cr 15.0048 | Minter Cr Hatchery | 20 (20.4%) | 0 |
| Col Riv | Lower Columbia River (1%) | Lewis River Hatchery | NA | 1 (1%) | 0 |
| | | | **Total** | **98** | **10** |

**Table 5.5** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2018-19 winter Chinook salmon MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked.

| Hatchery | Brood Year | DITs Obs | Est.AD | var(Est.AD) | UM DIT Enc | Est.UM | var(Est.UM) | SE(Est.UM) |
|---|---|---|---|---|---|---|---|---|
| Bernie Gobin Hatch | 2015 | 1 | 4 | 11.77 | 4 | 0.4 | 0.119 | 0.34 |
| Bernie Gobin Hatch | 2016 | 1 | 4 | 11.77 | 4 | 0.4 | 0.119 | 0.35 |
| Clear Creek Hatchery | 2016 | 4 | 15.9 | 47.09 | 15.9 | 1.6 | 0.471 | 1.37 |
| Grovers Cr Hatchery | 2016 | 4 | 15.9 | 47.09 | 16.7 | 1.7 | 0.522 | 1.45 |
| **Total** | | **10** | **39.7** | **117.72** | **40.6** | **4.1** | **1.231** | **3.51** |

**Table 5.6** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters for the 2018-19 winter Chinook salmon MSF in Marine Area 9. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

| Data Source | Group | Total Encounters | Legal | Sublegal | Landed Only |
|---|---|---|---|---|---|
| FRAM Encounters | UM | 2206 | 639 | 1567 | 6 |
| | AD | 6,130 | 2,394 | 3,736 | 2083 |
| | Total | 8,336 | 3,033 | 5,303 | 2089 |
| | % Marked | 74 | 79 | 70 | 100 |
| Estimated (Creel) Encounters | UM | 1,322 | 864 | 457 | 7 |
| | AD | 5,846 | 4,168 | 1,677 | 3,746 |
| | Total | 7,167 | 5,032 | 2,135 | 3,753 |
| | % Marked | 82 | 83 | 79 | 100 |

**Table 5.7** Summary of season-wide fishery impact estimates for the 2018-19 winter Chinook salmon MSF in Marine Area 9. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Size/mark group | Encounters | Retained | Released | Release Mortality | Total Mortality | Var | SE | 95% CI | CV (%) |
|---|---|---|---|---|---|---|---|---|---|
| Legal AD | 4,168 | 3,626 | 542 | 81 | 3,708 | 117,418 | 343 | 3,036 - 4,379 | 9 |
| Legal UM | 864 | 7 | 857 | 129 | 136 | 1099 | 33 | 71 - 201 | 24 |
| Sublegal AD | 1,677 | 119 | 1,558 | 312 | 431 | 4,667 | 68 | 297 - 565 | 16 |
| Sublegal UM | 457 | 0 | 457 | 91 | 91 | 977 | 31 | 30 - 153 | 34 |
| **Total** | **7,167** | **3,753** | **3,414** | **613** | **4,366** | **124,161** | **352** | **3,675 - 5,057** | **8** |

**Table 5.8** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2018-19 winter Chinook salmon MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked.

| Mortality Category | FRAM Chinook Mortalities | | | Estimated Chinook Mortalities | | |
|---|---|---|---|---|---|---|
| | UM | AD | Total | UM | AD | Total |
| Total (Landed + Released) | 415 | 2,981 | 3,396 | 227 | 4,139 | 4,366 |
| Released Legal | 96 | 151 | 247 | 129 | 81 | 210 |
| Released Sublegal | 313 | 747 | 1060 | 91 | 312 | 403 |
| Landed Only | 6 | 2,083 | 2089 | 7 | 3,746 | 3,753 |

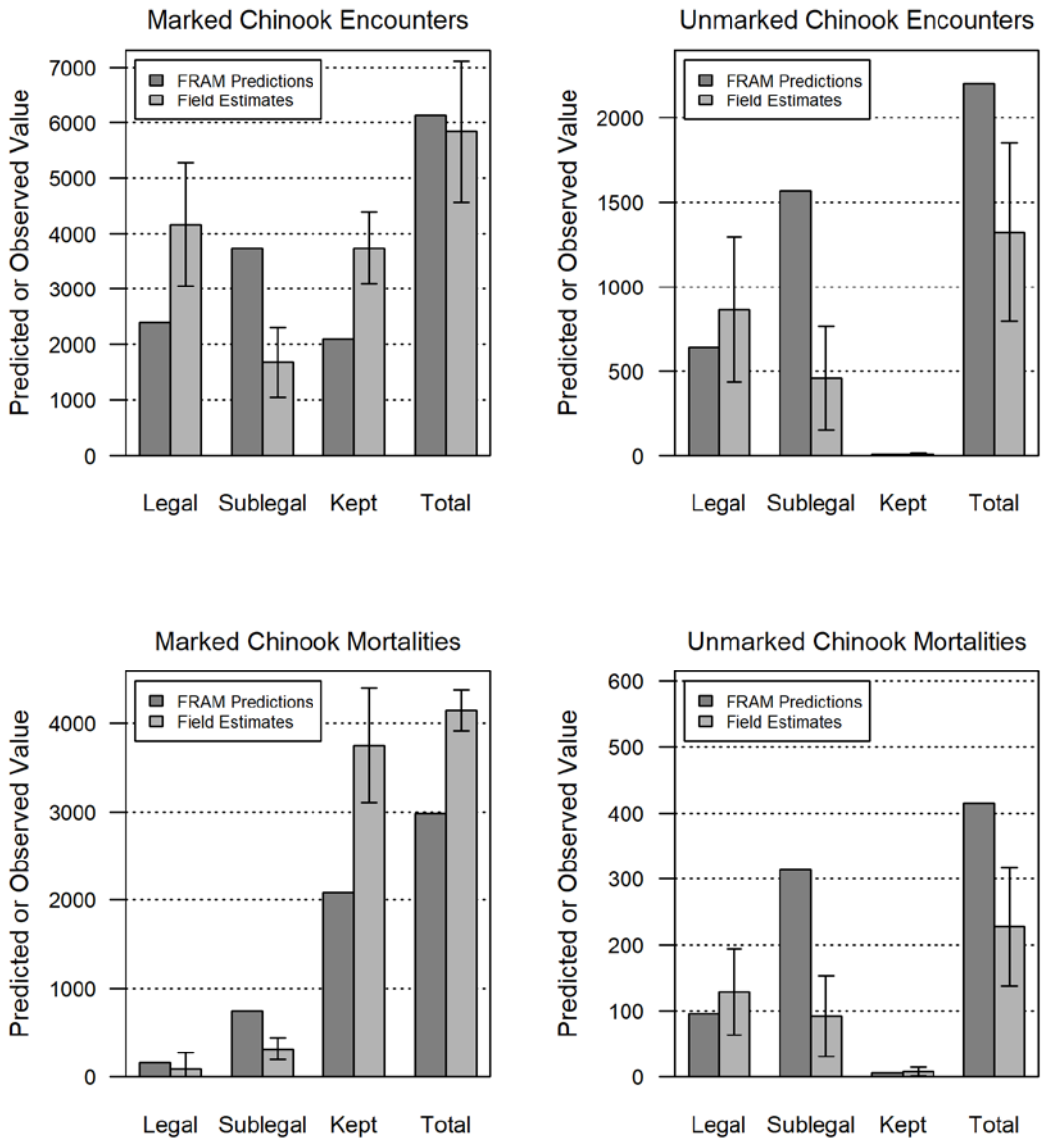


**Figure 5.5** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters and mortalities for the 2018-19 winter Chinook salmon MSF in Marine Area 9. Error bars represent approximate 95% confidence intervals for field estimates

**Table 5.9** Total Chinook salmon encountered (retained and released) by private-boat and charter anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2018-19 winter Chinook salmon MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 43 1-trip VTRs, 55 Angler Trips | 54 | 8 | 22 | 3 | 87 | 0.87 | 0.87 |
| Size/mark-status composition: | | 0.62 | 0.09 | 0.25 | 0.03 | | | |
| Variance: | | (0.0027) | (0.0010) | (0.0022) | (0.0004) | | | |
| Charter VTR | 8 1-trip VTRs, 20 Angler Trips | 12 | 2 | 6 | 1 | 21 | 0.86 | 0.86 |
| Size/mark-status composition: | | 0.57 | 0.10 | 0.29 | 0.05 | | | |
| Variance: | | (0.0122) | (0.0043) | (0.0102) | (0.0023) | | | |

**Table 5.10** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2018-19 winter Chinook salmon MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked.

| Stat Week | Fishing Effort | | Legal | | Sublegal | | Total |
|---|---|---|---|---|---|---|---|
| | Days | Hrs Fished | AD | UM | AD | UM | |
| 1 | 2 | 8.31 | 5 | 3 | 5 | 1 | 14 |
| 2 | 1 | 2.05 | 4 | 1 | 1 | 0 | 6 |
| 3 | 2 | 10.64 | 7 | 0 | 1 | 1 | 9 |
| 4 | 3 | 12.86 | 4 | 1 | 2 | 1 | 8 |
| 5 | 3 | 12.45 | 3 | 2 | 3 | 1 | 9 |
| 6 | 3 | 12.43 | 6 | 1 | 1 | 0 | 8 |
| 7 | 3 | 9.77 | 4 | 0 | 2 | 1 | 7 |
| 8 | 2 | 7.86 | 1 | 1 | 0 | 0 | 2 |
| 9 | 3 | 15.78 | 11 | 1 | 4 | 1 | 17 |
| 10 | 4 | 17.56 | 6 | 0 | 2 | 0 | 8 |
| 12 | 3 | 30.45 | 8 | 3 | 4 | 3 | 18 |
| 13 | 4 | 22.54 | 5 | 2 | 3 | 0 | 10 |
| 14 | 2 | 9.84 | 16 | 2 | 3 | 0 | 21 |
| 15 | 2 | 11.44 | 2 | 0 | 2 | 0 | 4 |
| **Total** | **37** | **183.99** | **82** | **17** | **33** | **9** | **141** |
| **Size/mark-status composition:** | | | 0.58 | 0.12 | 0.23 | 0.06 | |
| **Variance:** | | | (0.0017) | (0.0008) | (0.0013) | (0.0004) | |
| **Legal-size mark rate:** | | | 0.83 | | | | |
| **Overall mark rate:** | | | 0.82 | | | | |

**Table 5.11** Monthly sample rates (Total retained Chinook salmon sampled[1] / Estimated retained Chinook salmon) in the 2018-19 winter Chinook salmon MSF in Marine Area 9.

| Time period | | | Estimated Retained Chinook | | | Number of Chinook sampled | | | Sample Rate |
|---|---|---|---|---|---|---|---|---|---|
| Month | Stat Weeks | Dates | AD | UM | Total | AD | UM | Total | |
| January | 1 -5 | 1 Jan - 3 Feb | 1247 | 0 | 1247 | 374 | 1 | 375 | 30.10% |
| February | 6 - 9 | 4 Feb - 3 Mar | 492 | 0 | 492 | 130 | 1 | 131 | 26.60% |
| March | 10 - 13 | 4 Mar - 31 Mar | 1,093 | 4 | 1,096 | 317 | 2 | 319 | 29.10% |
| April | 14 - 16 | 1 Apr - 15 Apr | 913 | 4 | 917 | 255 | 1 | 256 | 27.90% |
| **Season Total** | | | **3,746** | **7** | **3,753** | **1076** | **5** | **1081** | **28.80%** |

[1/] Number of retained Chinook salmon sampled includes all retained Chinook salmon inspected for CWTs, from all sites sampled during the winter 2018-19 Marine Area 9 Chinook salmon MSF (the sample-frame sites included in the creel estimates and the fish sampled as part of derbies and other baseline sampling in the Marine Area).

**Table 5.12** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the four-site sample frame during the 2018-19 winter Chinook salmon MSF in Marine Area 9. See Methods Report (WDFW 2012a) for computational details and notation.

| Survey Date | Stratum | Aerial Survey Details | | | Dockside Sampling Details | | | Sample Fraction, $f_{ij}$ |
|---|---|---|---|---|---|---|---|---|
| | | Start Time | End Time | Total Boats, $m_{ij}$ | Sampled Boats | Active Boats, $X_{ij}$ | Total Boats, $Sy_{ijk}$ | |
| 12-Jan | WE | 11:49 | 12:12 | 84 | 89 | 43 | 174 | 0.512 |
| 13-Jan | WE | 13:03 | 13:39 | 76 | 129 | 44 | 223 | 0.579 |
| 16-Jan | WD | 9:09 | 9:31 | 18 | 18 | 8 | 41 | 0.444 |
| 24-Jan | WD | 12:07 | 12:32 | 42 | 36 | 21 | 72 | 0.500 |
| 25-Jan | WE | 13:01 | 13:37 | 47 | 32 | 16 | 94 | 0.340 |
| 5-Feb | WD | 9:34 | 9:55 | 1 | 1 | 0 | NA | 0.000 |
| 21-Feb | WD | 9:08 | 9:32 | 15 | 9 | 3 | 45 | 0.200 |
| 1-Mar | WE | 11:02 | 11:37 | 37 | 22 | 12 | 68 | 0.324 |
| 3-Mar | WE | 9:42 | 10:14 | 49 | 44 | 31 | 70 | 0.633 |
| 5-Mar | WD | 9:10 | 9:32 | 34 | 21 | 18 | 40 | 0.529 |
| 15-Mar | WE | 9:45 | 10:07 | 48 | 26 | 16 | 78 | 0.333 |
| 20-Mar | WD | 9:21 | 9:54 | 49 | 30 | 24 | 61 | 0.490 |
| 24-Mar | WE | 10:08 | 10:36 | 110 | 61 | 47 | 143 | 0.427 |
| 9-Apr | WD | 11:12 | 11:33 | 17 | 13 | 7 | 32 | 0.412 |
| 12-Apr | WE | 11:49 | 12:10 | 100 | 81 | 48 | 169 | 0.480 |
| 14-Apr | WE | 9:55 | 10:21 | 128 | 80 | 60 | 171 | 0.469 |
| 15-Apr | WD | 10:51 | 11:09 | 50 | 42 | 20 | 105 | 0.400 |
| **Season Totals:** | | | | **905** | **734** | **418** | **1586** | |
| Mean: | | | | 53 | 43 | 25 | 99 | 0.416 |
| St Dev: | | | | 35 | 34 | 18 | 59 | 0.149 |
| CV(%): | | | | 66.5% | 79.1% | 72.6% | 59.3% | 35.9% |

**Table 5.13** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) during the 2018-19 winter Chinook salmon MSF in Marine Area 9. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status

| Week | Start Date | End Date | Released Salmon | | |
|---|---|---|---|---|---|
| | | | Coho AD | Coho UM | Coho UK |
| 1 | 1-Jan | 6-Jan | 4 | 0 | 0 |
| 2 | 7-Jan | 13-Jan | 0 | 0 | 0 |
| 3 | 14-Jan | 20-Jan | 0 | 0 | 0 |
| 4 | 21-Jan | 27-Jan | 0 | 0 | 0 |
| 5 | 28-Jan | 3-Feb | 0 | 0 | 0 |
| 6 | 4-Feb | 10-Feb | 0 | 0 | 0 |
| 7 | 11-Feb | 17-Feb | 0 | 0 | 0 |
| 8 | 18-Feb | 24-Feb | 0 | 0 | 0 |
| 9 | 25-Feb | 3-Mar | 0 | 0 | 73 |
| 10 | 4-Mar | 10-Mar | 32 | 7 | 48 |
| 11 | 11-Mar | 17-Mar | 7 | 0 | 0 |
| 12 | 18-Mar | 24-Mar | 11 | 0 | 4 |
| 13 | 25-Mar | 31-Mar | 41 | 22 | 31 |
| 14 | 1-Apr | 7-Apr | 19 | 0 | 10 |
| 15 | 8-Apr | 14-Apr | 70 | 4 | 35 |
| 16 | 15-Apr | 15-Apr | 16 | 0 | 2 |
| **Season Total:** | | | **199** | **32** | **203** |
| **Variance:** | | | **1915** | **65** | **7913** |
| **Standard Error:** | | | **44** | **8** | **89** |
| **CV (%):** | | | **22%** | **25%** | **44%** |
| **95% CI:** | | | **114 - 285** | **17 - 48** | **29 - 377** |

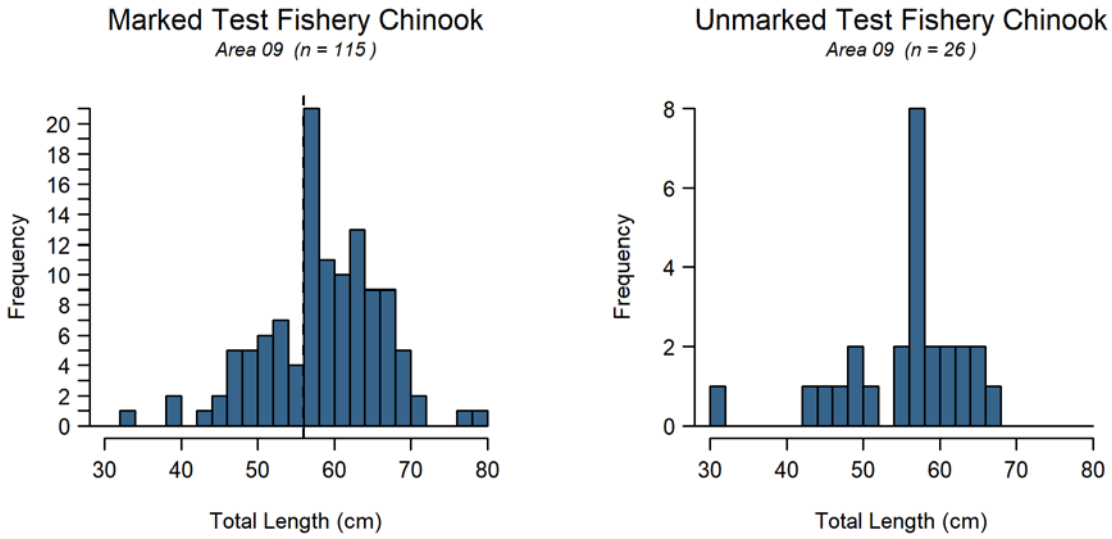


**Figure 5.6** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook salmon encountered by test fishers during the 2018-19 winter Chinook salmon MSF in Marine Area 9. The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm)

**Table 5.14** Season-total estimates of Chinook salmon encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Marine Area 9 Winter Chinook salmon MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

| Season Dates | Effort (Angler-trips) | Retained Chinook | | | | Released Chinook | | | | Total Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | LM | LU | SM | SU | LM | LU | SM | SU | |
| Jan 16, 2007 - Apr 15, 2008 | 6,887 | 1,333 | 3 | 72 | 0 | 195 | 304 | 1,288 | 375 | 3,570 |
| Nov 1-30, 2008 & Jan 16 - Apr 15, 2009 | 7,064 | 871 | 14 | 14 | 0 | 130 | 158 | 3,520 | 2,837 | *7,545* |
| Nov 1-30, 2009 & Jan 16 - Apr 15, 2010 | 6,823 | 1,450 | 18 | 106 | 10 | 217 | 353 | 2,166 | 615 | 4,934 |
| Nov 1-30, 2010 & Jan 16 - Apr 15, 2011 | 4,425 | 428 | 0 | 3 | 0 | 64 | 117 | 583 | 422 | 1,618 |
| Nov 1-30, 2011 & Jan 16 - Apr 15, 2012 | 4,361 | 421 | 0 | 34 | 3 | 63 | 140 | 1,433 | 548 | 2,642 |
| Nov 1-30, 2012 & Jan 16 - Apr 15, 2013 | 6,801 | 1,504 | 0 | 31 | 18 | 225 | 469 | 2,617 | 986 | 5,849 |
| Nov 1-30, 2013 & Jan 16 - Apr 15, 2014 | 7,910 | 2,003 | 0 | 61 | 19 | 299 | 767 | 2,460 | 611 | 6,221 |
| Nov 1-30, 2014 & Jan 16 - Apr 15, 2015 | 9,192 | 1,476 | 21 | 46 | 0 | 221 | 432 | 2,554 | 679 | 5,427 |
| Jan 16, 2016 - Apr 15, 2016 | 9,330 | 1,894 | 0 | 95 | 0 | 283 | 371 | 4,444 | 1,204 | 8,290 |
| Nov 1-12, 2017 & Feb 16 - Apr 15, 2018 | 7,954 | 2,688 | 6 | 189 | 0 | 402 | 1,136 | 4,378 | 739 | 9,539 |
| Jan 1, 2019 - Apr 15, 2019 | 12,051 | 3,626 | 7 | 119 | 0 | 542 | 857 | 1,558 | 457 | 7,167 |

## 6) Marine Area 10 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented a twelfth consecutive winter Chinook salmon MSF in Marine Area 10 from January 1, 2019 through March 30, 2019. The PSSU implemented an intensive monitoring program in Marine Area 10 throughout the season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, on-the-water effort surveys, test fishing and collection of VTRs from the angling public. **Table 6.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical data parameters are presented in detail in our separate Methods Report (WDFW 2012a). In the following section we present results from our monitoring activities during the Marine Area 10 winter Chinook salmon MSF which occurred from January 1, 2019 through January 19, 2019, the last day of the fishery.

**Table 6.1** Sampling/estimation details on target parameters associated with the overall Marine Area 10 winter Chinook salmon MSF monitoring program.

| Activity | Focal Parameter(s) | Secondary Parameter(s) | Sample Unit(s) | Finest Estimation Time Step | Comments |
|---|---|---|---|---|---|
| Dockside Creel Sampling | Fishing effort (boat & angler trips); kept and released fish | Catch rates (CPUE); length, age, and CWT composition of harvest[1]; collection of angler fishing methods. | Angler trip; kept fish; reported fish release. | Two weeks | Creel estimates were produced for two-week estimation periods and stratified into "weekday" (Mon.-Thurs.) and "weekend" (Fri.-Sun.) day-type strata within weeks. For the weekday stratum, we sampled $n$=2 days out of $N$=8 available weekdays per two-week period. For the weekend stratum, we sampled $n$=2 days out of $N$=3 available weekend days per week. |
| On-the-water Surveys | Proportion of total angler effort that uses sample-frame sites (i.e., site "size measures") versus out-of-frame sites. | Total on-water boat and angler counts at assumed peak effort time interval (instantaneous count); spatial distribution of recreational fishing boats in the area. | Boats and anglers | Month | No boat surveys were conducted during the nineteen-day fishery due to weather and short length of the season. Multi-year site-weight averages were used for calculating site-weights. |
| Test Fishing | Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook salmon | Chinook salmon length, age, and DNA-based[2] stock composition; species composition of non-Chinook salmon encounters | Fish encounter | Season | Season-total size/mark-status proportions from the test fishery data and charter VTR data (p-value=.65) were used to estimate total Chinook salmon encounters and associated impacts; LM=37%, LU=7%, SM=44%, SU=11%. (See **Table 6.4**). |
| Voluntary Trip Reports (VTRs) | Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook salmon | Encounter data for non-Chinook salmon species (e.g., Coho) that the angler may record on the VTR form | Fish encounter | Season | Charter VTR data (**Table 6.9**) were used in combination with test fishing data to estimate total Chinook impacts; LM=37%, LU=7%, SM=44%, SU=11%. |
| Overall Fishery Impacts Estimation | Total Chinook salmon encounters and mortalities, by size/mark-status group | Ratios of encounters and mortalities per kept Chinook salmon | N/A | Season | Estimated on a monthly time step but considered at the season-total level. |
| Coded-wire tag (CWT) Impacts Estimation | Marked/unmarked double-index tag (DIT) encounters and mortalities | N/A | N/A | Season | The temporal resolution of DIT impacts is constrained by the total number of tags recovered. |

[1] The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

[2] Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery.

**Table 6.2** Estimates of total fishing effort and total Chinook salmon catch (retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 10. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Month | Stat Week | Start Date | End Date | Est. Effort | | Est. Retained Chinook | | Est. Released Chinook | | Total Est. Chinook Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Boats | Anglers | AD | UM | AD | UM | |
| **Jan** | 1 | 1-Jan | 6-Jan | 193 | 437 | 261 | 0 | 344 | 138 | 743 |
| | 2 | 7-Jan | 13-Jan | 391 | 898 | 363 | 5 | 477 | 186 | 1031 |
| | 3 | 14-Jan | 19-Jan | 204 | 366 | 163 | 0 | 215 | 86 | 463 |
| **Season Total** | | | | **789** | **1,700** | **787** | **5** | **1036** | **410** | **2,237** |
| **Variance:** | | | | 15,895 | 87,647 | 38,150 | 12 | 230,909 | 22,715 | 469,941 |
| **SE:** | | | | 126 | 296 | 195 | 3 | 481 | 151 | 686 |
| **CV (%):** | | | | 16 | 17 | 25 | 77 | 46 | 37 | 31 |
| **95% CI:** | | | | 541 - 1,036 | 1,120 - 2,281 | 405 - 1,170 | 1 - 11 | 94 - 1,978 | 114 - 705 | 894 - 3,581 |

**Table 6.3** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2018-19 winter Chinook salmon MSF in Marine Area 10.

| Mark Type | Number Sampled | | |
|---|---|---|---|
| | Legal-size | Sublegal-size | Total |
| Marked | 304 | 28 | 332 |
| Unmarked | 2 | 0 | 2 |
| **Total** | **306** | **28** | **334** |

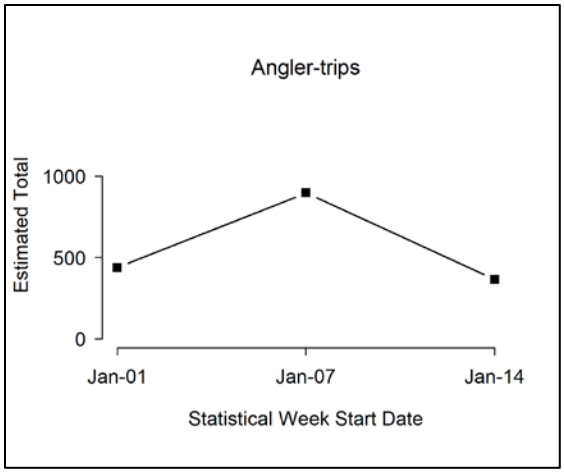


**Figure 6.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 10.

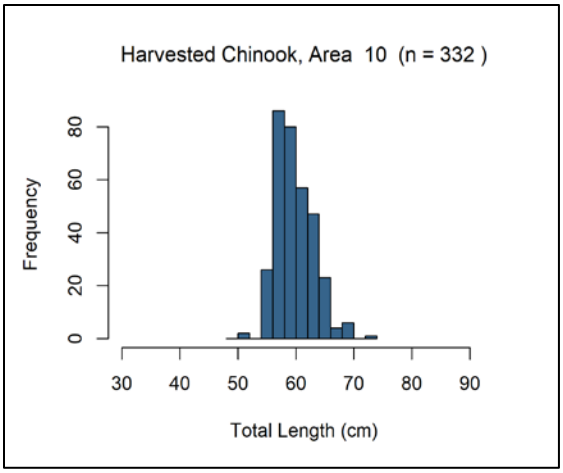


**Figure 6.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 10. Note: displayed values are observations where lengths were taken.

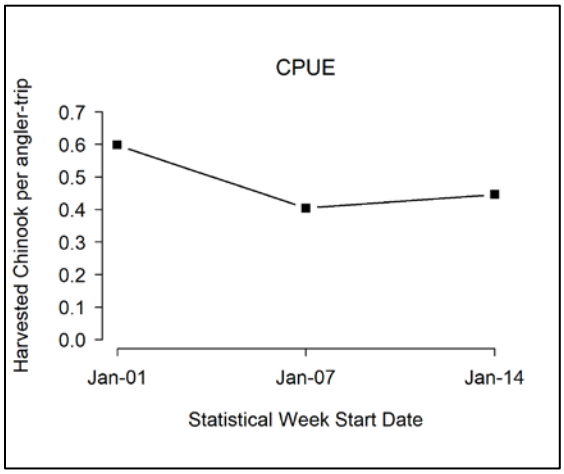


**Figure 6.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 10.

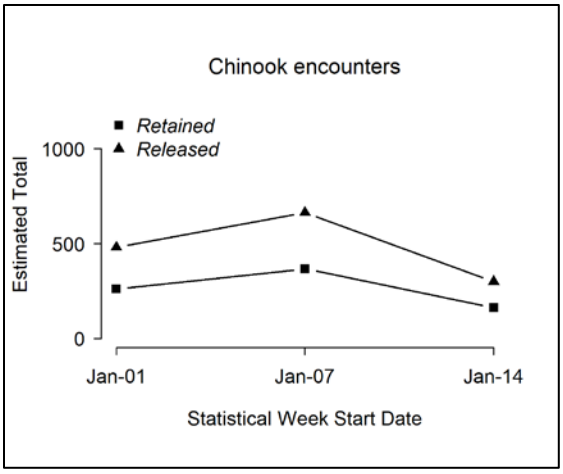


**Figure 6.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 10.

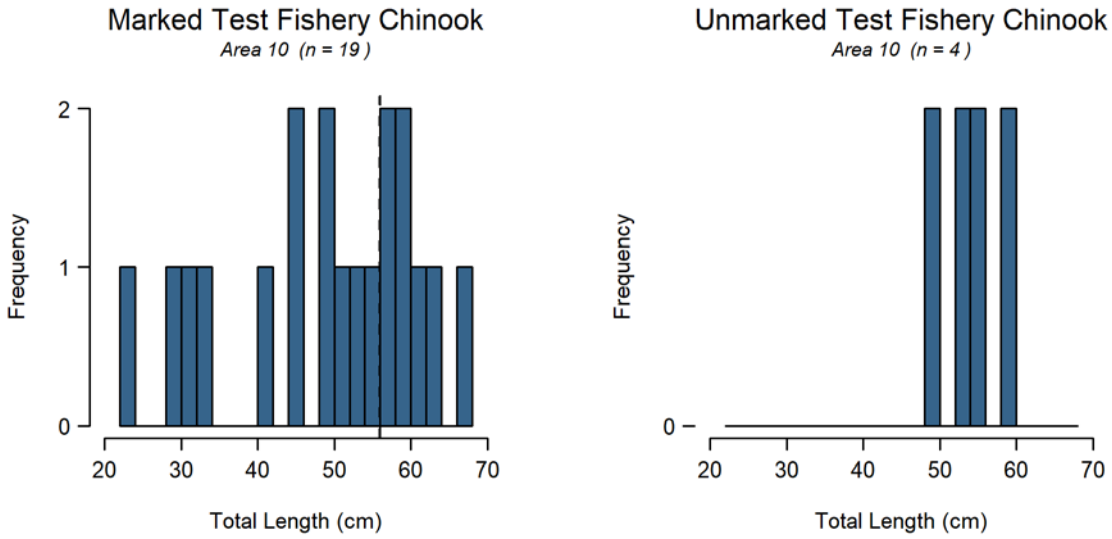


**Figure 6.5** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook salmon encountered by test fishers during the 2018-19 winter Chinook salmon MSF in Marine Area 10. The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm).

**Table 6.4** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2018-19 winter Chinook salmon MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked.

| Stat Week | Fishing Effort | | Legal | | Sublegal | | Total |
|---|---|---|---|---|---|---|---|
| | Days | Hrs Fished | AD | UM | AD | UM | |
| 2 | 3 | 17.67 | 5 | 1 | 7 | 3 | 16 |
| 3 | 2 | 7.29 | 2 | 0 | 5 | 0 | 7 |
| **Total** | **5** | **24.96** | **7** | **1** | **12** | **3** | **23** |
| **Size/mark-status composition:** | | | 0.30 | 0.04 | 0.52 | 0.13 | |
| **Variance:** | | | (0.0096) | (0.0019) | (0.0113) | (0.0052) | |
| **Legal-size mark rate:** | | | 0.88 | | | | |
| **Overall mark rate:** | | | 0.83 | | | | |

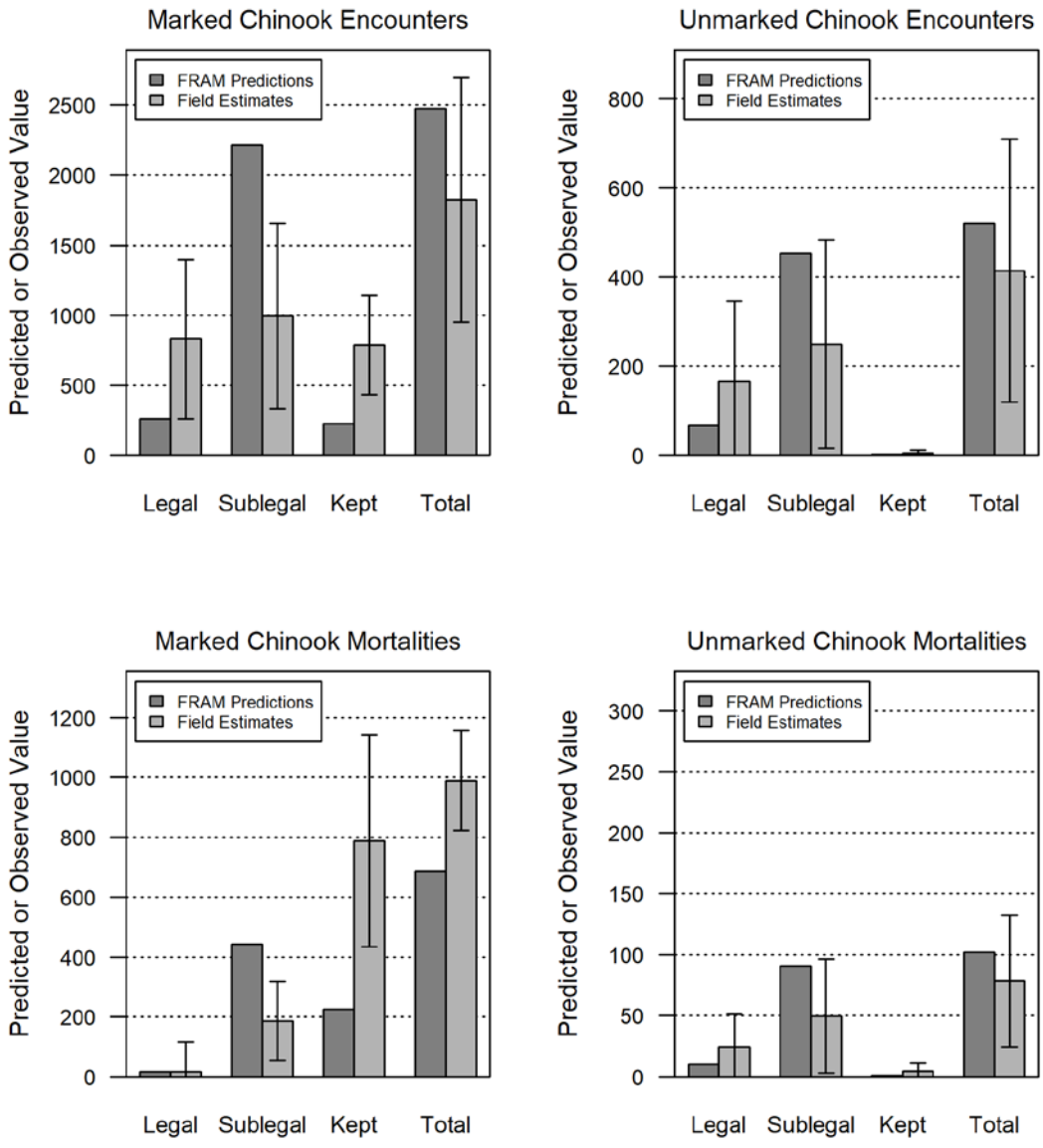


**Figure 6.6** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters and mortalities for the 2018-19 winter Chinook salmon MSFs in Marine Area 10. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 6.5** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon encounters for the 2018-19 winter Chinook salmon MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

| Data Source | Group | Total Encounters | Legal | Sublegal | Landed Only |
|---|---|---|---|---|---|
| FRAM Encounters | UM | 520 | 67 | 453 | 1 |
| | AD | 2,476 | 260 | 2,216 | 226 |
| | Total | 2,996 | 327 | 2,669 | 227 |
| | % Marked | 83 | 80 | 83 | 100 |
| Estimated (Creel) Encounters | UM | 414 | 166 | 249 | 5 |
| | AD | 1,823 | 829 | 994 | 787 |
| | Total | 2,237 | 994 | 1,243 | 792 |
| | % Marked | 81 | 83 | 80 | 99 |

**Table 6.6** Summary of season-wide fishery impact estimates for the 2018-19 winter Chinook salmon MSF in Marine Area 10. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

| Size/mark group | Encounters | Retained | Released | Release Mortality | Total Mortality | Var | SE | 95% CI | CV (%) |
|---|---|---|---|---|---|---|---|---|---|
| Legal AD | 829 | 721 | 108 | 16 | 737 | 34,744 | 186 | 372 - 1,102 | 25 |
| Legal UM | 166 | 5 | 161 | 24 | 29 | 202 | 14 | 1 - 57 | 50 |
| Sublegal AD | 994 | 66 | 928 | 186 | 252 | 4,982 | 71 | 114 - 390 | 28 |
| Sublegal UM | 249 | 0 | 249 | 50 | 50 | 570 | 24 | 3 - 97 | 48 |
| **Total** | **2,237** | **792** | **1,446** | **276** | **1068** | **40,498** | **201** | **673 - 1,462** | **19** |

**Table 6.7** Comparison of modeled (FRAM model run 3218) and estimated total Chinook salmon mortalities for the 2018-19 winter Chinook salmon MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

| Mortality Category | FRAM Chinook Mortalities | | | Estimated Chinook Mortalities | | |
|---|---|---|---|---|---|---|
| | UM | AD | Total | UM | AD | Total |
| Total (Landed + Released) | 102 | 686 | 788 | 78 | 989 | 1068 |
| Released Legal | 10 | 17 | 27 | 24 | 16 | 40 |
| Released Sublegal | 91 | 443 | 534 | 50 | 186 | 235 |
| Landed Only | 1 | 226 | 227 | 5 | 787 | 792 |

**Table 6.8** Monthly sample rates (Total retained Chinook salmon sampled[1] / Estimated retained Chinook salmon) in the 2018-19 winter Chinook salmon MSF in Marine Area 10.

| Time period | | | Estimated Retained Chinook | | | Number of Chinook sampled | | | Sample Rate |
|---|---|---|---|---|---|---|---|---|---|
| Month | Stat Weeks | Dates | AD | UM | Total | AD | UM | Total | |
| January | 1 - 3 | 1 Jan - 19 Jan | 787 | 5 | 792 | 389 | 2 | 391 | 49.40% |
| **Season Total** | | | **787** | **5** | **792** | **389** | **2** | **391** | **49.40%** |

Monthly sample rates (Total retained Chinook salmon sampled[1] / Estimated retained Chinook salmon) in the 2018-19 winter Chinook salmon MSF in Marine Area 10.

**Table 6.9** Total Chinook salmon encountered (retained and released) by private-boat and charter boat anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2018-19 winter Chinook salmon MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 0 1-trip VTRs, 0 Angler Trips | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| Size/mark-status composition: | | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| Variance: | | 0 | 0 | 0 | 0 | | | |
| Charter VTR | 2 1-trip VTRs, 9 Angler Trips | 13 | 3 | 12 | 3 | 31 | 0.81 | 0.81 |
| Size/mark-status composition: | | 0.42 | 0.10 | 0.39 | 0.10 | | | |
| Variance: | | (0.0081) | (0.0029) | (0.0079) | (0.0029) | | | |

**Table 6.10** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2018-19 winter Chinook salmon MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked.

| Hatchery | Brood Year | DITs Obs | Est.AD | var(Est.AD) | UM DIT Enc | Est.UM | var(Est.UM) | SE(Est.UM) |
|---|---|---|---|---|---|---|---|---|
| Bernie Gobin Hatch | 2016 | 1 | 2.4 | 3.25 | 2.4 | 0.2 | 0.033 | 0.18 |
| Clear Creek Hatchery | 2016 | 3 | 7.1 | 9.75 | 7.1 | 0.7 | 0.098 | 0.54 |
| **Total** | | **4** | **9.5** | **13** | **9.5** | **1** | **0.13** | **0.72** |

**Table 6.11** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSF in Marine Area 10. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| WA | N Washington (2.8%) | Friday Cr 03.0017 | Samish Hatchery | 1 (2.8%) | 0 |
| | Hood Canal (2.8%) | Purdy Cr 16.0005 | George Adams Hatchery | 1 (2.8%) | 0 |
| | N Puget Sound (22.2%) | Tulalip Cr 07.0001 | Bernie Gobin Hatch | 1 (2.8%) | 1 |
| | | Wallace R 07.0940 | Wallace R Hatchery | 2 (5.6%) | 0 |
| | | Whitehorse Springs | Whitehorse Pond | 5 (13.9%) | 0 |
| | Skagit River (2.8%) | Cascade R 03.1411 | Marblemount Hatchery | 1 (2.8%) | 0 |
| | Mid Puget Sound (22.2%) | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | 4 (11.1%) | 0 |
| | | Icy Cr 09.0125 | Icy Cr Hatchery | 4 (11.1%) | 0 |
| | S Puget Sound (47.2%) | Clear Cr 11.0013C | Clear Creek Hatchery | 3 (8.3%) | 3 |
| | | Deschutes R 13.0028 | Tumwater Falls Hatchery | 1 (2.8%) | 0 |
| | | Mcallister Springs | Clear Creek Hatchery | 1 (2.8%) | 0 |
| | | Minter Cr 15.0048 | Hupp Springs Rearing | 1 (2.8%) | 0 |
| | | Minter Cr 15.0048 | Minter Cr Hatchery | 9 (25%) | 0 |
| | | Kalama Cr 11.0017 | Kalama Cr Hatchery | 2 (5.6%) | 0 |
| | | | **Total** | **36** | **4** |

**Table 6.12** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) during the 2018-19 winter Chinook salmon MSF in Marine Area 10. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status

| Week | Start Date | End Date | Retained Salmon | Released Salmon | | |
|---|---|---|---|---|---|---|
| | | | Coho AD | Coho AD | Coho UM | Coho UK |
| 1 | 1-Jan | 6-Jan | 0 | 9 | 0 | 13 |
| 2 | 7-Jan | 13-Jan | 0 | 48 | 22 | 19 |
| 3 | 14-Jan | 19-Jan | 26 | 35 | 0 | 23 |
| **Season Total:** | | | **26** | **92** | **22** | **55** |
| **Variance:** | | | **232** | **612** | **280** | **384** |
| **Standard Error:** | | | **15** | **25** | **17** | **20** |
| **CV (%):** | | | **59%** | **27%** | **76%** | **36%** |
| **95% CI:** | | | **0 - 55** | **43 - 140** | **0 - 55** | **17 - 93** |

**Table 6.13** Season-total estimates of Chinook salmon encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Area 10 Winter Chinook salmon MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

| Season Dates | Effort (Angler-trips) | Retained Chinook | | | | Released Chinook | | | | Total Encounters |
|---|---|---|---|---|---|---|---|---|---|---|
| | | LM | LU | SM | SU | LM | LU | SM | SU | |
| Dec 1, 2007 - Jan 31, 2008 | 2,544 | 539 | 21 | 96 | 0 | 80 | 163 | 1,860 | 361 | 3,120 |
| Dec 1, 2008 - Jan 31, 2009 | 2,029 | 247 | 0 | 4 | 0 | 37 | 36 | 1,010 | 462 | 1,796 |
| Oct 1, 2009 - Jan 31 2010 | 5,560 | 354 | 2 | 42 | 0 | 53 | 83 | 2,531 | 898 | 3,962 |
| Oct 1, 2010 - Jan 31, 2011 | 4,461 | 150 | 0 | 13 | 0 | 22 | 53 | 814 | 740 | 1,792 |
| Oct 1, 2011 - Jan 31, 2012 | 4,615 | 227 | 5 | 15 | 9 | 34 | 183 | 2,870 | 1,230 | 4,573 |
| Oct 1, 2012 - Jan 31, 2013 | 5,321 | 121 | 0 | 0 | 0 | 18 | 27 | 1,183 | 549 | 1,897 |
| Oct 1, 2013 - Jan 31, 2014 | 6,216 | 328 | 4 | 22 | 4 | 49 | 122 | 1,852 | 584 | 2,964 |
| Oct 1, 2014 - Jan 31, 2015 | 7,109 | 215 | 0 | 0 | 0 | 32 | 87 | 622 | 314 | 1,270 |
| Oct 1, 2015 – Oct 18, 2016 | 4,110 | 63 | 0 | 55 | 25 | 9 | 29 | 1043 | 337 | 1,561 |
| Nov 1, 2016 - Jan 23, 2017 | 1,841 | 225 | 0 | 5 | 0 | 34 | 86 | 1806 | 690 | 2,846 |
| Nov 1, 2017 - Feb 28, 2018 | 1,836 | 235 | 0 | 82 | 0 | 35 | 48 | 1410 | 429 | 2,239 |
| Jan 1, 2019 - Jan 19, 2019 | 1,700 | 721 | 5 | 66 | 0 | 108 | 161 | 928 | 249 | 2,237 |

# 7) Marine Area 11 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented a ninth consecutive winter Chinook salmon MSF in Marine Area 11 from October 1, 2018 through April 30, 2019. Data collection methods used to monitor the Marine Area 11 Chinook salmon MSF included dockside angler interviews (with catch sampling) and voluntary trip reports provided by private anglers. From these activities, we were able to estimate catch rates (CPUE), mark rates (based on VTRs), and landed-catch composition (age, length, and CWT). Additionally, we described relative catch and effort patterns throughout the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

WDFW dockside samplers conducted "Baseline Sampling" at selected access sites during the 2018-19 winter Chinook salmon MSF in Marine Area 11. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Briefly, Baseline Sampling is opportunistic in nature, with overall sampling effort allocated across space and time in a manner that maximizes the number of angler interviews obtained per sample effort. The Marine Area 11 baseline sample frame included nine different access sites (**Table 7.3**), and a total of 374 site visits during the seven-month season. Site visits ranged from short (e.g., "no effort" samples) to full-day (8+ hours) sampling events. When present, samplers interviewed all anglers exiting the Marine Area 11 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Marine Area 11 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook salmon size (fork length) and age (scales were collected and ultimately read) composition. Samplers also inspected landed Chinook and Coho salmon for CWTs using wand detectors and acquired snouts when tags were present; resulting tag data were used to estimate the CWT-based composition (unexpanded) of landed catch.

In contrast to the intensive "Murthy" survey design employed in other areas, Marine Area 11 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook salmon impacts. However, Marine Area 11 baseline sampling observations will ultimately be combined with Catch Record Card (CRC) data, once they become available, to estimate catch and effort at the fishery-total level. While these descriptors of MSF impacts are not presented in this document, they will be available at a later date. In the following section we present results from our monitoring activities during the Marine Area 11 winter 2018-19 Chinook salmon MSF.

**Table 7.1** Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | | | Released Fish | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Chinook AD | Chinook UM | Chinook UD | Chin AD | Chin UM | Chin Unk |
| 40 | 1-Oct | 7-Oct | 82 | 134 | 14 | 0 | 0 | 53 | 6 | 7 |
| 41 | 8-Oct | 14-Oct | 50 | 84 | 4 | 0 | 0 | 25 | 2 | 11 |
| 42 | 15-Oct | 21-Oct | 88 | 128 | 23 | 0 | 0 | 76 | 16 | 20 |
| 43 | 22-Oct | 28-Oct | 50 | 68 | 16 | 1 | 0 | 40 | 6 | 6 |
| 44 | 29-Oct | 4-Nov | 43 | 53 | 9 | 0 | 0 | 24 | 5 | 5 |
| 45 | 5-Nov | 11-Nov | 81 | 112 | 34 | 0 | 0 | 76 | 28 | 20 |
| 46 | 12-Nov | 18-Nov | 71 | 97 | 18 | 0 | 0 | 64 | 22 | 13 |
| 47 | 19-Nov | 25-Nov | 82 | 130 | 60 | 0 | 0 | 134 | 33 | 2 |
| 48 | 26-Nov | 2-Dec | 105 | 151 | 44 | 0 | 0 | 59 | 28 | 23 |
| 49 | 3-Dec | 9-Dec | 79 | 123 | 27 | 0 | 0 | 48 | 19 | 28 |
| 50 | 10-Dec | 16-Dec | 62 | 86 | 18 | 0 | 0 | 16 | 12 | 19 |
| 51 | 17-Dec | 23-Dec | 57 | 78 | 9 | 0 | 0 | 14 | 6 | 3 |
| 52 | 24-Dec | 30-Dec | 39 | 57 | 4 | 0 | 0 | 16 | 4 | 0 |
| 53 | 31-Dec | 31-Dec | 7 | 16 | 0 | 0 | 0 | 2 | 3 | 0 |
| 1 | 1-Jan | 6-Jan | 22 | 41 | 2 | 0 | 0 | 18 | 4 | 0 |
| 2 | 7-Jan | 13-Jan | 43 | 69 | 8 | 0 | 0 | 32 | 6 | 21 |
| 3 | 14-Jan | 20-Jan | 50 | 78 | 5 | 0 | 0 | 21 | 5 | 8 |
| 4 | 21-Jan | 27-Jan | 52 | 73 | 8 | 0 | 0 | 20 | 4 | 4 |
| 5 | 28-Jan | 3-Feb | 31 | 38 | 0 | 0 | 0 | 8 | 1 | 3 |
| 6 | 4-Feb | 10-Feb | 4 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 11-Feb | 17-Feb | 31 | 39 | 6 | 0 | 0 | 10 | 5 | 5 |
| 8 | 18-Feb | 24-Feb | 39 | 64 | 2 | 0 | 0 | 12 | 1 | 2 |
| 9 | 25-Feb | 3-Mar | 44 | 62 | 6 | 0 | 0 | 8 | 2 | 1 |
| 10 | 4-Mar | 10-Mar | 35 | 48 | 6 | 0 | 0 | 4 | 0 | 0 |
| 11 | 11-Mar | 17-Mar | 40 | 61 | 2 | 0 | 0 | 7 | 2 | 7 |
| 12 | 18-Mar | 24-Mar | 63 | 97 | 24 | 0 | 1 | 18 | 10 | 2 |
| 13 | 25-Mar | 31-Mar | 101 | 135 | 35 | 0 | 0 | 12 | 6 | 3 |
| 14 | 1-Apr | 7-Apr | 78 | 100 | 29 | 0 | 0 | 8 | 7 | 1 |
| 15 | 8-Apr | 14-Apr | 84 | 111 | 37 | 0 | 0 | 8 | 16 | 4 |
| 16 | 15-Apr | 21-Apr | 109 | 147 | 30 | 0 | 1 | 11 | 5 | 2 |
| 17 | 22-Apr | 28-Apr | 183 | 244 | 90 | 0 | 1 | 24 | 18 | 5 |
| 18 | 29-Apr | 30-Apr | 45 | 56 | 11 | 0 | 0 | 2 | 2 | 0 |
| **Season Total** | | | **1950** | **2787** | **581** | **1** | **0** | **870** | **284** | **225** |

**Table 7.2** Observations of fishing effort, other than Chinook salmon retained, and reported other than Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | | | Released Fish | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Coho AD | Coho UM | Chum | Chum | Coho AD | Coho UM | Coho Unk | Cutthroat | Unknown |
| 40 | 1-Oct | 7-Oct | 82 | 134 | 0 | 7 | 0 | 0 | 0 | 2 | 3 | 0 | 3 |
| 41 | 8-Oct | 14-Oct | 50 | 84 | 1 | 4 | 0 | 0 | 2 | 0 | 9 | 0 | 18 |
| 42 | 15-Oct | 21-Oct | 88 | 128 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 |
| 43 | 22-Oct | 28-Oct | 50 | 68 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 44 | 29-Oct | 4-Nov | 43 | 53 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | 5-Nov | 11-Nov | 81 | 112 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 6 | 5 |
| 46 | 12-Nov | 18-Nov | 71 | 97 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 47 | 19-Nov | 25-Nov | 82 | 130 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 48 | 26-Nov | 2-Dec | 105 | 151 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 49 | 3-Dec | 9-Dec | 79 | 123 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 16 |
| 50 | 10-Dec | 16-Dec | 62 | 86 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 51 | 17-Dec | 23-Dec | 57 | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52 | 24-Dec | 30-Dec | 39 | 57 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 53 | 31-Dec | 31-Dec | 7 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1-Jan | 6-Jan | 22 | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 7-Jan | 13-Jan | 43 | 69 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 3 | 14-Jan | 20-Jan | 50 | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 21-Jan | 27-Jan | 52 | 73 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 28-Jan | 3-Feb | 31 | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 4-Feb | 10-Feb | 4 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 11-Feb | 17-Feb | 31 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 18-Feb | 24-Feb | 39 | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 9 | 25-Feb | 3-Mar | 44 | 62 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 10 | 4-Mar | 10-Mar | 35 | 48 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 11 | 11-Mar | 17-Mar | 40 | 61 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 12 | 18-Mar | 24-Mar | 63 | 97 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| 13 | 25-Mar | 31-Mar | 101 | 135 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 1-Apr | 7-Apr | 78 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 8-Apr | 14-Apr | 84 | 111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 15-Apr | 21-Apr | 109 | 147 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 22-Apr | 28-Apr | 183 | 244 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | 29-Apr | 30-Apr | 45 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Season Total** | | | **1950** | **2787** | **1** | **14** | **6** | **2** | **12** | **6** | **15** | **10** | **42** |

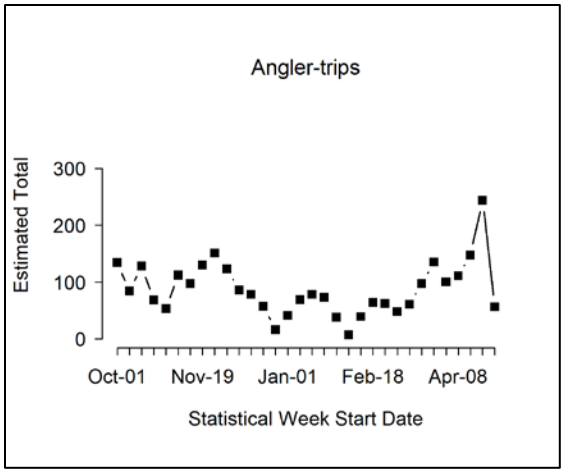


**Figure 7.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

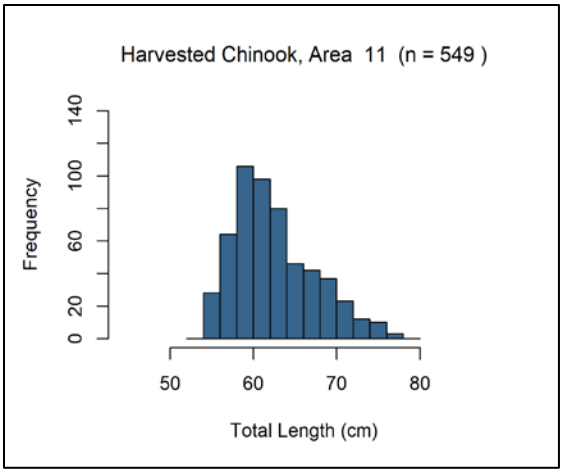


**Figure 7.3** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

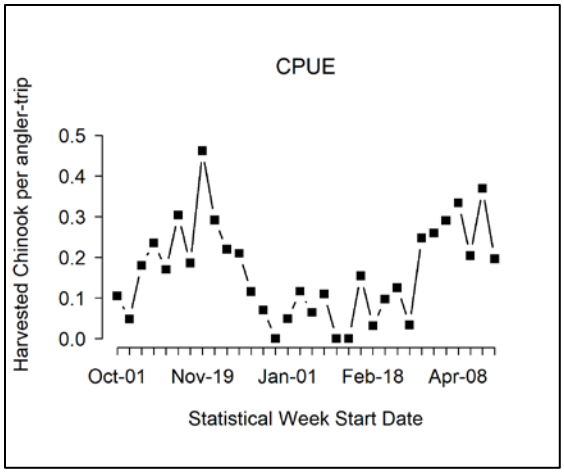


**Figure 7.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates

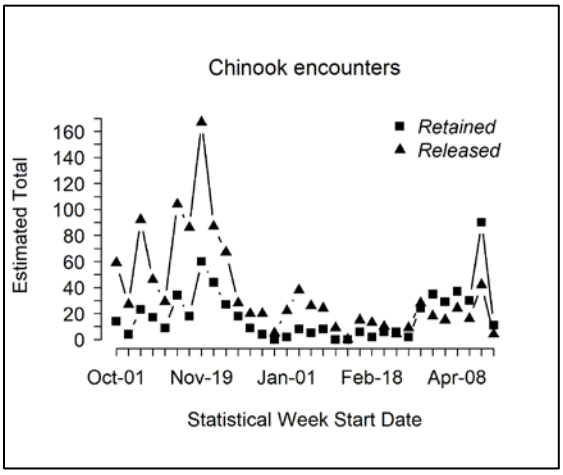


**Figure 7.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

**Table 7.3** List of sites sampled with the number of sampling events (site-days) during the winter Chinook salmon MSF in Marine Area 11.

| Location Name | Number of Site Days Sampled Per Month | | | | | | | Total Site-Days | % of Total |
|---|---|---|---|---|---|---|---|---|---|
| | October | November | December | January | February | March | April | | |
| Dash Point Dock | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0.53% |
| Gig Harbor Ramp | 8 | 9 | 13 | 4 | 8 | 5 | 6 | 53 | 14.17% |
| Les Davis Pier | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.27% |
| Olalla Public Ramp | 0 | 2 | 6 | 2 | 6 | 4 | 1 | 21 | 5.61% |
| Point Defiance Boathouse Dock | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 4 | 1.07% |
| Point Defiance Boathouse | 19 | 20 | 26 | 17 | 15 | 18 | 29 | 144 | 38.50% |
| Point Defiance Public Ramp | 18 | 14 | 26 | 18 | 15 | 20 | 26 | 137 | 36.63% |
| Redondo Pier | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0.27% |
| Redondo Ramp | 9 | 1 | 1 | 0 | 0 | 0 | 0 | 11 | 2.94% |
| **Grand Total** | **55** | **49** | **73** | **41** | **46** | **48** | **62** | **374** | **100.00%** |

**Table 7.4** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSF in Marine Area 11. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| WA | Hood Canal (2.6%) | Purdy Cr 16.0005 | George Adams Hatchery | 1 (2.6%) | 0 |
| | N Puget Sound (12.8%) | Whitehorse Springs | Whitehorse Pond | 5 (12.8%) | 0 |
| | Skagit River (5.1%) | Cascade R 03.1411 | Marblemount Hatchery | 2 (5.1%) | 0 |
| | Mid Puget Sound (30.8%) | Big Soos Cr 09.0072 | Soos Creek Hatchery | 1 (2.6%) | 0 |
| | | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | 3 (7.7%) | 0 |
| | | Clarks Crk Hatchery | Clarks Crk Hatchery | 1 (2.6%) | 0 |
| | | Icy Cr 09.0125 | Icy Cr Hatchery | 4 (10.3%) | 0 |
| | | Grovers Cr 15.0299 | Grovers Cr Hatchery | 1 (2.6%) | 1 |
| | | Grovers Cr Hatchery | Grovers Cr Hatchery | 2 (5.1%) | 2 |
| | S Puget Sound (48.7%) | Deschutes R 13.0028 | Tumwater Falls Hatchery | 1 (2.6%) | 0 |
| | | Kalama Cr 11.0017 | Kalama Cr Hatchery | 2 (5.1%) | 0 |
| | | Minter Cr 15.0048 | Minter Cr Hatchery | 10 (25.6%) | 0 |
| | | Clear Cr 11.0013C | Clear Creek Hatchery | 6 (15.4%) | 6 |
| | | | **Total** | **39** | **9** |

**Table 7.5** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2018-19 winter Chinook salmon MSF in Marine Area 11.

| Mark Type | Number Sampled | | Total |
|---|---|---|---|
| | Legal-size | Sublegal-size | |
| Marked | 521 | 28 | 549 |
| Unmarked | 1 | 0 | 1 |
| **Total** | **522** | **28** | **550** |

**Table 7.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2018-19 winter Chinook salmon MSF in Marine Area 11, with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 8 1-trip VTRs, 12 Angler Trips | 14 | 19 | 6 | 3 | 42 | 0.48 | 0.42 |
| Size/mark-status composition: | | 0.33 | 0.45 | 0.14 | 0.07 | | | |
| Variance: | | (0.0054) | (0.0060) | (0.0030) | (0.0016) | | | |

# 8) Marine Area 12 Winter Mark-Selective Chinook Salmon Fishery

WDFW implemented a ninth consecutive winter Chinook salmon MSF in Marine Area 12 from October 1, 2018 through April 30, 2019. Data collection methods used to monitor the Marine Area 12 Chinook salmon MSF included dockside angler interviews (with catch sampling) and voluntary trip reports provided by private anglers. From these activities, we were able to estimate catch rates (CPUE), mark rates (based on VTRs), and landed-catch composition (age, length, and CWT). Additionally, we described relative catch and effort patterns throughout the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

WDFW dockside samplers conducted "Baseline Sampling" at selected access sites during the 2018-19 winter Chinook salmon MSF in Marine 12. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Baseline Sampling is opportunistic in nature, with overall sampling effort allocated across space and time in a manner that maximizes the number of angler interviews obtained per sample effort. The Marine Area 12 baseline sample frame included 12 different access sites (**Table 8.2**), and a total of 311 site visits during the six-month season. Site visits ranged from short (e.g., "no effort" samples) to full-day (8+ hours) sampling events. When present, samplers interviewed all anglers exiting the Marine Area 12 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs Marine Area 12 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook salmon size (fork and total length) and age (scales were collected and ultimately read) composition. Samplers also inspected landed Chinook and Coho salmon for CWTs using wand detectors and acquired snouts when tags were present. Resulting tag data were used to estimate the CWT-based composition (unexpanded) of landed catch.

In contrast to the intensive "Murthy" survey design employed in other areas, Area 12 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook salmon impacts. However, Marine Area 12 baseline sampling observations will ultimately be combined with Catch Record Card (CRC) data, once they become available, to estimate catch and effort at the fishery-total level. While these descriptors of MSF impacts are not presented in this document, they will be available at a later date. In the following section we present results from our monitoring activities during the Area 12 winter 2018-19 Chinook salmon MSF.

**Table 8.1** Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the 2018-19 winter Chinook salmon MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | | | Released Fish | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Chinook AD | Chinook UM | Chinook UD | Chin AD | Chin UM | Chin Unk |
| 40 | 1-Oct | 7-Oct | 5 | 8 | 4 | 0 | 0 | 1 | 1 | 0 |
| 41 | 8-Oct | 14-Oct | 4 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42 | 15-Oct | 21-Oct | 12 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43 | 22-Oct | 28-Oct | 42 | 67 | 0 | 0 | 0 | 0 | 0 | 0 |
| 44 | 29-Oct | 4-Nov | 34 | 60 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | 5-Nov | 11-Nov | 173 | 324 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46 | 12-Nov | 18-Nov | 136 | 233 | 0 | 0 | 0 | 0 | 0 | 0 |
| 47 | 19-Nov | 25-Nov | 66 | 143 | 0 | 0 | 0 | 2 | 1 | 2 |
| 48 | 26-Nov | 2-Dec | 22 | 36 | 3 | 0 | 0 | 4 | 0 | 0 |
| 49 | 3-Dec | 9-Dec | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50 | 10-Dec | 16-Dec | 1 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| 51 | 17-Dec | 23-Dec | 2 | 3 | 0 | 0 | 0 | 9 | 1 | 0 |
| 52 | 24-Dec | 30-Dec | 4 | 8 | 2 | 1 | 0 | 0 | 0 | 5 |
| 53 | 31-Dec | 31-Dec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1-Jan | 6-Jan | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| 2 | 7-Jan | 13-Jan | 7 | 14 | 5 | 0 | 1 | 23 | 5 | 3 |
| 3 | 14-Jan | 20-Jan | 8 | 12 | 3 | 0 | 0 | 3 | 1 | 0 |
| 4 | 21-Jan | 27-Jan | 20 | 39 | 9 | 0 | 0 | 33 | 8 | 2 |
| 5 | 28-Jan | 3-Feb | 12 | 22 | 7 | 0 | 0 | 12 | 5 | 0 |
| 6 | 4-Feb | 10-Feb | 2 | 3 | 1 | 0 | 0 | 1 | 0 | 0 |
| 7 | 11-Feb | 17-Feb | 3 | 5 | 2 | 0 | 0 | 2 | 0 | 0 |
| 8 | 18-Feb | 24-Feb | 1 | 2 | 0 | 0 | 0 | 2 | 1 | 0 |
| 9 | 25-Feb | 3-Mar | 15 | 19 | 3 | 0 | 0 | 13 | 2 | 0 |
| 10 | 4-Mar | 10-Mar | 12 | 21 | 4 | 0 | 1 | 4 | 1 | 1 |
| 11 | 11-Mar | 17-Mar | 15 | 24 | 4 | 0 | 0 | 10 | 4 | 2 |
| 12 | 18-Mar | 24-Mar | 20 | 34 | 9 | 0 | 0 | 12 | 0 | 0 |
| 13 | 25-Mar | 31-Mar | 9 | 15 | 6 | 0 | 0 | 8 | 5 | 0 |
| 14 | 1-Apr | 7-Apr | 9 | 16 | 1 | 0 | 0 | 8 | 0 | 0 |
| 15 | 8-Apr | 14-Apr | 12 | 20 | 5 | 0 | 0 | 8 | 1 | 2 |
| 16 | 15-Apr | 21-Apr | 4 | 7 | 8 | 0 | 0 | 3 | 0 | 0 |
| 17 | 22-Apr | 28-Apr | 18 | 34 | 5 | 0 | 0 | 8 | 1 | 0 |
| 18 | 29-Apr | 30-Apr | 2 | 4 | 4 | 0 | 0 | 2 | 3 | 0 |
| **Season Total** | | | **675** | **1210** | **86** | **1** | **2** | **172** | **41** | **17** |

**Table 8.2** Observations of fishing effort, other than Chinook salmon retained, and reported other than Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | Released Fish | | |
|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Chum | Chum | Coho AD | Cutthroat |
| 40 | 1-Oct | 7-Oct | 5 | 8 | 0 | 0 | 0 | 0 |
| 41 | 8-Oct | 14-Oct | 4 | 8 | 0 | 0 | 0 | 36 |
| 42 | 15-Oct | 21-Oct | 12 | 20 | 1 | 0 | 0 | 8 |
| 43 | 22-Oct | 28-Oct | 42 | 67 | 42 | 7 | 0 | 0 |
| 44 | 29-Oct | 4-Nov | 34 | 60 | 86 | 12 | 0 | 0 |
| 45 | 5-Nov | 11-Nov | 173 | 324 | 610 | 264 | 0 | 0 |
| 46 | 12-Nov | 18-Nov | 136 | 233 | 702 | 258 | 0 | 16 |
| 47 | 19-Nov | 25-Nov | 66 | 143 | 343 | 120 | 0 | 13 |
| 48 | 26-Nov | 2-Dec | 22 | 36 | 56 | 59 | 0 | 22 |
| 49 | 3-Dec | 9-Dec | 4 | 5 | 0 | 0 | 2 | 25 |
| 50 | 10-Dec | 16-Dec | 1 | 2 | 0 | 0 | 0 | 0 |
| 51 | 17-Dec | 23-Dec | 2 | 3 | 0 | 0 | 0 | 0 |
| 52 | 24-Dec | 30-Dec | 4 | 8 | 0 | 0 | 0 | 0 |
| 53 | 31-Dec | 31-Dec | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1-Jan | 6-Jan | 1 | 2 | 0 | 0 | 0 | 0 |
| 2 | 7-Jan | 13-Jan | 7 | 14 | 0 | 0 | 0 | 0 |
| 3 | 14-Jan | 20-Jan | 8 | 12 | 0 | 0 | 2 | 27 |
| 4 | 21-Jan | 27-Jan | 20 | 39 | 0 | 0 | 0 | 1 |
| 5 | 28-Jan | 3-Feb | 12 | 22 | 0 | 0 | 0 | 0 |
| 6 | 4-Feb | 10-Feb | 2 | 3 | 0 | 0 | 0 | 2 |
| 7 | 11-Feb | 17-Feb | 3 | 5 | 0 | 0 | 0 | 0 |
| 8 | 18-Feb | 24-Feb | 1 | 2 | 0 | 0 | 0 | 0 |
| 9 | 25-Feb | 3-Mar | 15 | 19 | 0 | 0 | 0 | 0 |
| 10 | 4-Mar | 10-Mar | 12 | 21 | 0 | 0 | 0 | 0 |
| 11 | 11-Mar | 17-Mar | 15 | 24 | 0 | 0 | 0 | 0 |
| 12 | 18-Mar | 24-Mar | 20 | 34 | 0 | 0 | 0 | 0 |
| 13 | 25-Mar | 31-Mar | 9 | 15 | 0 | 0 | 0 | 0 |
| 14 | 1-Apr | 7-Apr | 9 | 16 | 0 | 0 | 0 | 0 |
| 15 | 8-Apr | 14-Apr | 12 | 20 | 0 | 0 | 0 | 0 |
| 16 | 15-Apr | 21-Apr | 4 | 7 | 0 | 0 | 0 | 0 |
| 17 | 22-Apr | 28-Apr | 18 | 34 | 0 | 0 | 0 | 0 |
| 18 | 29-Apr | 30-Apr | 2 | 4 | 0 | 0 | 0 | 0 |
| **Season Total** | | | **675** | **1210** | **1840** | **720** | **4** | **150** |

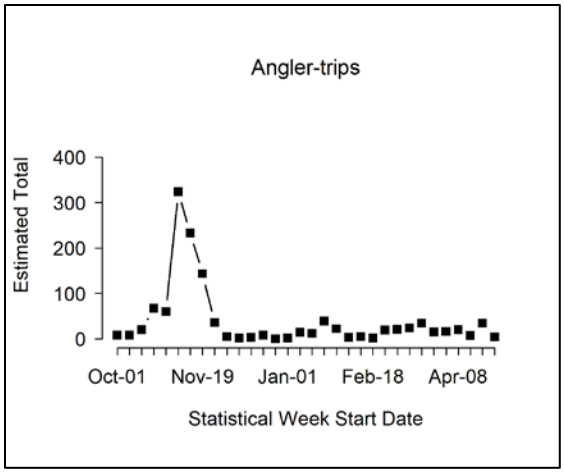


**Figure 8.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

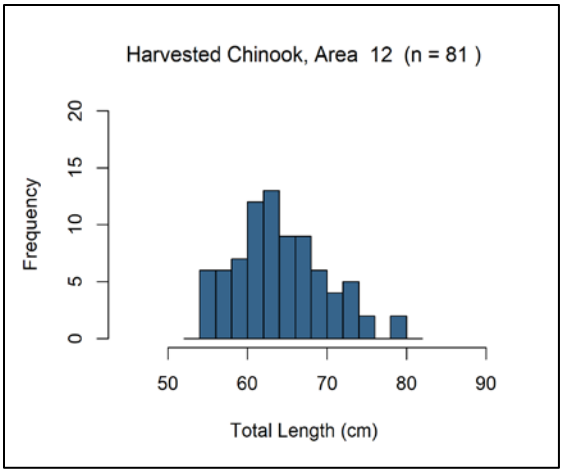


**Figure 8.3** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

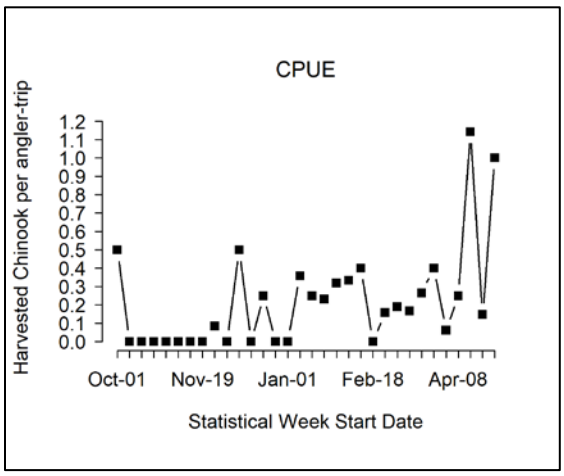


**Figure 8.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates

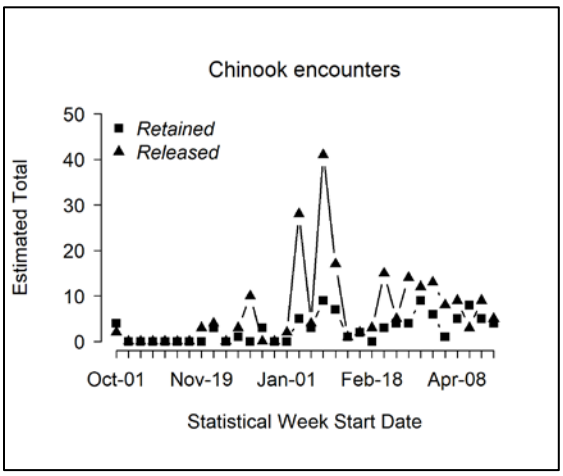


**Figure 8.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2018-19 winter Chinook salmon MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

**Table 8.3** List of sites sampled with the number of sampling events (site-days) during the 2018-19 winter Chinook salmon MSF in Marine Area 12.

| Location Name | Number of Site Days Sampled Per Month | | | | | | | Total Site-Days | % of Total |
|---|---|---|---|---|---|---|---|---|---|
| | October | November | December | January | February | March | April | | |
| Big Beef Beach | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0.32% |
| Hoodsport Shore | 5 | 13 | 7 | 0 | 0 | 0 | 0 | 25 | 8.04% |
| Misery Point Ramp | 5 | 4 | 14 | 12 | 12 | 15 | 13 | 75 | 24.12% |
| Pleasant Harbor Boat Ramp | 2 | 3 | 12 | 10 | 5 | 12 | 10 | 54 | 17.36% |
| Pleasant Harbor Marina | 3 | 1 | 1 | 2 | 1 | 0 | 0 | 8 | 2.57% |
| Quilcene Bay Ramp | 5 | 5 | 1 | 0 | 0 | 0 | 1 | 12 | 3.86% |
| Saltwater Park Ramp | 10 | 5 | 11 | 7 | 4 | 14 | 10 | 61 | 19.61% |
| Skokomish Tide Flats | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 1.29% |
| Tahuya Ramp | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 3 | 0.96% |
| Triton Cove State Park | 0 | 0 | 13 | 13 | 6 | 14 | 10 | 56 | 18.01% |
| Twanoh State Park | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 3 | 0.96% |
| Union Ramp | 3 | 0 | 3 | 0 | 0 | 2 | 1 | 9 | 2.89% |
| **Grand Total** | **35** | **31** | **67** | **44** | **28** | **60** | **46** | **311** | **100.00%** |

**Table 8.4** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2018-19 winter Chinook salmon MSF in Marine Area 12.

| Mark Type | Number Sampled | | Total |
|---|---|---|---|
| | Legal-size | Sublegal-size | |
| Marked | 75 | 6 | 81 |
| Unmarked | 1 | 0 | 1 |
| **Total** | **76** | **6** | **82** |

**Table 8.5** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSF in Marine Area 12. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| WA | Hood Canal (85.7%) | Finch Cr 16.0222 | Hoodsport Hatchery | 3 (42.9%) | 0 |
| | | Purdy Cr 16.0005 | George Adams Hatchery | 3 (42.9%) | 0 |
| | Mid Puget Sound (14.3%) | Icy Cr 09.0125 | Icy Cr Hatchery | 1 (14.3%) | 0 |
| | | | **Total** | **7** | **0** |

**Table 8.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2018-19 winter Chinook salmon MSF in Marine Area 12, with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 8 1-trip VTRs, 12 Angler Trips | 0 | 0 | 2 | 3 | 5 | 0.40 | NA |
| Size/mark-status composition: | | 0.00 | 0.00 | 0.40 | 0.60 | | | |
| | Variance: | (0.0000) | (0.0000) | (0.0600) | (0.0600) | | | |

# 9) Marine Area 13 Winter Mark-Selective Chinook Salmon Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented the fourth winter Chinook salmon MSF in Marine Area 13 from October 1, 2018 – April 30, 2019. Data collection methods used to monitor the Marine Area 13 Chinook salmon MSF included dockside angler interviews (with catch sampling) and voluntary trip reports provided by private anglers. From these activities, we were able to estimate catch rates (CPUE) and mark rates (based on VTRs). Additionally, we described relative catch and effort patterns throughout the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

WDFW dockside samplers conducted "Baseline Sampling" at selected access sites during the 2018-19 winter Chinook salmon MSF in Marine Area 13. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Briefly, Baseline Sampling is opportunistic in nature, with overall sampling effort allocated across space and time in a manner that maximizes the number of angler interviews obtained per sample effort. The Marine Area 13 baseline sample frame included 36 different access sites (**Table 9.3**), and a total of 748 site visits during the six-month season. Site visits ranged from short (e.g., "no effort" samples) to full-day (8+ hours) sampling events. When present, samplers interviewed all anglers exiting the Marine Area 13 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Marine Area 13 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook salmon size (fork length) and age (scales were collected and ultimately read) composition. Samplers also inspected landed Chinook and Coho salmon for CWTs using wand detectors and acquired snouts when tags were present. Resulting tag data were used to estimate the CWT-based composition (unexpanded) of landed catch.

In contrast to the intensive "Murthy" survey design employed in other areas, Marine Area 13 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook salmon impacts. However, Marine Area 13 Baseline Sampling observations will ultimately be combined with Catch Record Card (CRC) data, once they become available, to estimate catch and effort at the fishery-total level. While these descriptors of MSF impacts are not presented in this document, they will be available at a later date. In the following section we present results from our monitoring activities during the Marine Area 13 winter 2018-19 Chinook salmon MSF.

**Table 9.1** Observations of fishing effort, Chinook salmon retention, and Chinook reported salmon releases, by week, for the 2018-19 winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | | | Released Fish | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Chinook AD | Chinook UM | Chinook UD | Chin AD | Chin UM | Chin Unk |
| 40 | 1-Oct | 7-Oct | 24 | 31 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 | 8-Oct | 14-Oct | 15 | 20 | 0 | 0 | 0 | 1 | 0 | 0 |
| 42 | 15-Oct | 21-Oct | 46 | 51 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43 | 22-Oct | 28-Oct | 33 | 38 | 0 | 0 | 0 | 1 | 0 | 0 |
| 44 | 29-Oct | 4-Nov | 34 | 47 | 0 | 0 | 0 | 1 | 0 | 0 |
| 45 | 5-Nov | 11-Nov | 14 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46 | 12-Nov | 18-Nov | 19 | 29 | 0 | 0 | 0 | 0 | 0 | 0 |
| 47 | 19-Nov | 25-Nov | 12 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 48 | 26-Nov | 2-Dec | 51 | 66 | 0 | 0 | 0 | 0 | 0 | 0 |
| 49 | 3-Dec | 9-Dec | 57 | 71 | 0 | 0 | 0 | 1 | 2 | 0 |
| 50 | 10-Dec | 16-Dec | 34 | 41 | 0 | 0 | 0 | 1 | 1 | 0 |
| 51 | 17-Dec | 23-Dec | 10 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52 | 24-Dec | 30-Dec | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 53 | 31-Dec | 31-Dec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1-Jan | 6-Jan | 3 | 3 | 0 | 0 | 0 | 0 | 1 | 6 |
| 2 | 7-Jan | 13-Jan | 20 | 29 | 0 | 0 | 0 | 1 | 0 | 0 |
| 3 | 14-Jan | 20-Jan | 19 | 32 | 0 | 0 | 0 | 2 | 0 | 0 |
| 4 | 21-Jan | 27-Jan | 17 | 22 | 0 | 0 | 0 | 3 | 0 | 0 |
| 5 | 28-Jan | 3-Feb | 16 | 21 | 0 | 0 | 0 | 3 | 0 | 0 |
| 6 | 4-Feb | 10-Feb | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 11-Feb | 17-Feb | 16 | 18 | 0 | 0 | 0 | 0 | 1 | 0 |
| 8 | 18-Feb | 24-Feb | 10 | 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 25-Feb | 3-Mar | 5 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 4-Mar | 10-Mar | 10 | 15 | 0 | 0 | 0 | 18 | 0 | 2 |
| 11 | 11-Mar | 17-Mar | 14 | 18 | 0 | 0 | 0 | 1 | 0 | 0 |
| 12 | 18-Mar | 24-Mar | 13 | 19 | 1 | 0 | 0 | 14 | 1 | 0 |
| 13 | 25-Mar | 31-Mar | 9 | 16 | 0 | 0 | 0 | 2 | 0 | 0 |
| 14 | 1-Apr | 7-Apr | 3 | 4 | 0 | 0 | 0 | 0 | 1 | 0 |
| 15 | 8-Apr | 14-Apr | 5 | 7 | 0 | 0 | 0 | 1 | 0 | 0 |
| 16 | 15-Apr | 21-Apr | 12 | 15 | 1 | 0 | 0 | 0 | 0 | 0 |
| 17 | 22-Apr | 28-Apr | 6 | 9 | 6 | 0 | 0 | 4 | 0 | 0 |
| 18 | 29-Apr | 30-Apr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Season Total** | | | **536** | **705** | **8** | **0** | **0** | **54** | **7** | **8** |

**Table 9.2** Observations of fishing effort, other than Chinook salmon retained, and reported other than Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

| Stat Week | Start | End | Effort | | Retained Fish | | Released Fish | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boats | Anglers | Coho AD | Chum | Chum | Coho AD | Coho UM | Coho UD | Cutthroat |
| 40 | 1-Oct | 7-Oct | 24 | 31 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 | 8-Oct | 14-Oct | 15 | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| 42 | 15-Oct | 21-Oct | 46 | 51 | 0 | 2 | 2 | 1 | 1 | 0 | 0 |
| 43 | 22-Oct | 28-Oct | 33 | 38 | 0 | 18 | 13 | 0 | 0 | 0 | 0 |
| 44 | 29-Oct | 4-Nov | 34 | 47 | 0 | 12 | 9 | 0 | 0 | 0 | 0 |
| 45 | 5-Nov | 11-Nov | 14 | 19 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| 46 | 12-Nov | 18-Nov | 19 | 29 | 2 | 17 | 0 | 0 | 0 | 0 | 3 |
| 47 | 19-Nov | 25-Nov | 12 | 20 | 0 | 11 | 0 | 0 | 0 | 0 | 1 |
| 48 | 26-Nov | 2-Dec | 51 | 66 | 0 | 40 | 52 | 1 | 1 | 20 | 1 |
| 49 | 3-Dec | 9-Dec | 57 | 71 | 2 | 24 | 54 | 8 | 1 | 2 | 1 |
| 50 | 10-Dec | 16-Dec | 34 | 41 | 1 | 0 | 12 | 16 | 5 | 0 | 15 |
| 51 | 17-Dec | 23-Dec | 10 | 18 | 0 | 0 | 0 | 4 | 2 | 0 | 2 |
| 52 | 24-Dec | 30-Dec | 7 | 7 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 53 | 31-Dec | 31-Dec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1-Jan | 6-Jan | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 7-Jan | 13-Jan | 20 | 29 | 0 | 0 | 0 | 5 | 4 | 18 | 0 |
| 3 | 14-Jan | 20-Jan | 19 | 32 | 0 | 0 | 0 | 1 | 3 | 3 | 0 |
| 4 | 21-Jan | 27-Jan | 17 | 22 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 5 | 28-Jan | 3-Feb | 16 | 21 | 1 | 0 | 0 | 15 | 1 | 0 | 1 |
| 6 | 4-Feb | 10-Feb | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 11-Feb | 17-Feb | 16 | 18 | 0 | 0 | 0 | 4 | 3 | 0 | 0 |
| 8 | 18-Feb | 24-Feb | 10 | 11 | 1 | 0 | 0 | 2 | 2 | 0 | 0 |
| 9 | 25-Feb | 3-Mar | 5 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 4-Mar | 10-Mar | 10 | 15 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 11 | 11-Mar | 17-Mar | 14 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12 | 18-Mar | 24-Mar | 13 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | 25-Mar | 31-Mar | 9 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 1-Apr | 7-Apr | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 8-Apr | 14-Apr | 5 | 7 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| 16 | 15-Apr | 21-Apr | 12 | 15 | 0 | 0 | 0 | 3 | 2 | 0 | 6 |
| 17 | 22-Apr | 28-Apr | 6 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | 29-Apr | 30-Apr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Season Total** | | | **536** | **705** | **12** | **134** | **142** | **61** | **29** | **45** | **36** |

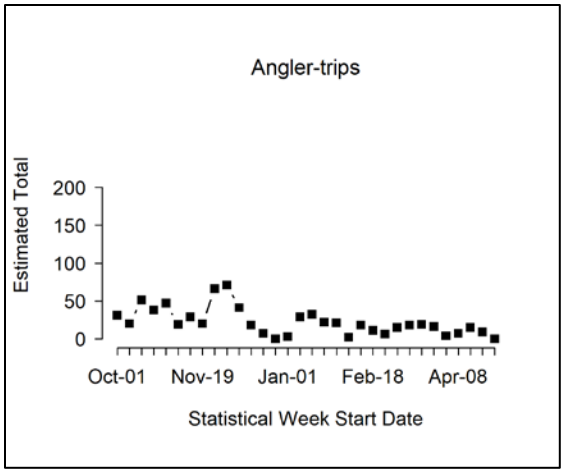


**Figure 9.1** Temporal patterns in fishing effort during the 2018-19 winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

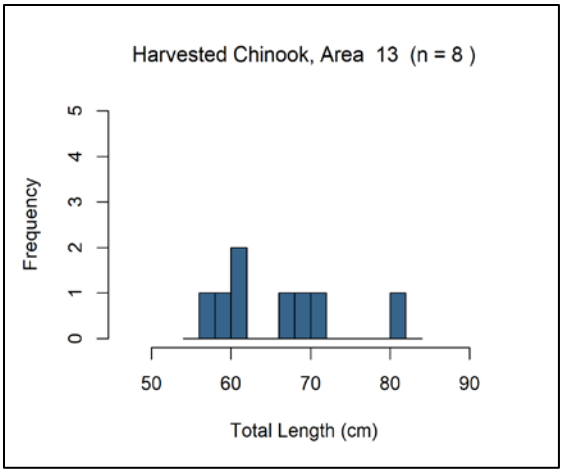


**Figure 9.3** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 13.

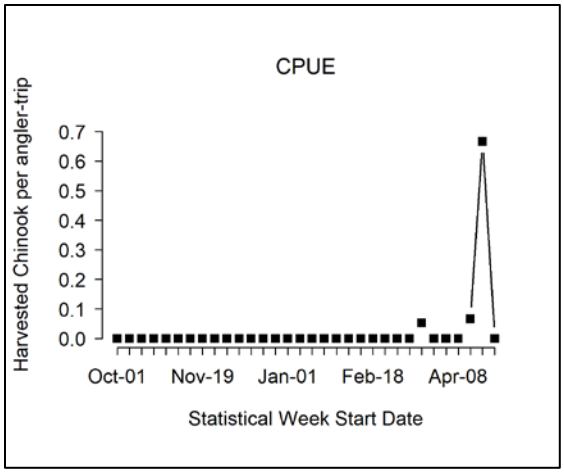


**Figure 9.2** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2018-19 winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

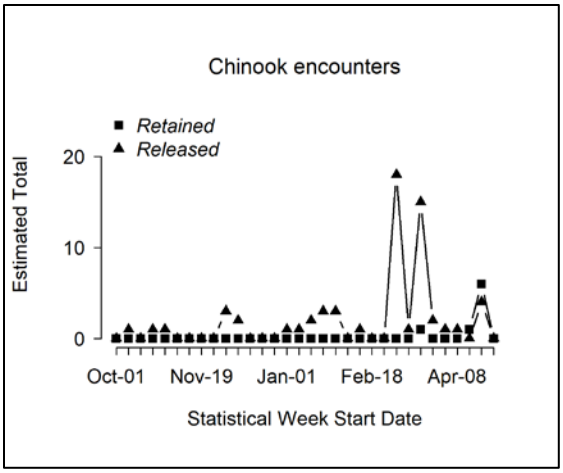


**Figure 9.4** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2018-19 winter Chinook salmon MSF in Marine Area 13.

**Table 9.3** List of sites sampled with the number of sampling events (site-days) during the 2018-19 winter Chinook salmon MSF in Marine Area 13.

| Location Name | Number of Site Days Sampled Per Month | | | | | | | Total Site-Days | % of Total |
|---|---|---|---|---|---|---|---|---|---|
| | October | November | December | January | February | March | April | | |
| Allyn Dock/Pier | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 4 | 0.53% |
| Allyn Public Ramp | 2 | 0 | 3 | 2 | 3 | 1 | 0 | 11 | 1.47% |
| Arcadia Ramp | 1 | 0 | 4 | 2 | 0 | 2 | 0 | 9 | 1.20% |
| Bayshore (John's Creek) | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0.94% |
| Boston Harbor Ramp/Marina | 12 | 4 | 9 | 12 | 6 | 5 | 8 | 56 | 7.49% |
| Burfoot Park Shore | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0.40% |
| Concrete Dock | 0 | 1 | 3 | 0 | 2 | 1 | 0 | 7 | 0.94% |
| East Bay Marina/Ramp (Oly. Isle) | 4 | 3 | 5 | 13 | 10 | 12 | 11 | 58 | 7.75% |
| Fox Island Public Ramp | 2 | 2 | 10 | 2 | 3 | 4 | 1 | 24 | 3.21% |
| Fox Island Sand Spit | 1 | 0 | 8 | 1 | 3 | 3 | 1 | 17 | 2.27% |
| Fox Island Shore | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0.13% |
| Grapeview Public Ramp | 0 | 0 | 1 | 4 | 3 | 2 | 0 | 10 | 1.34% |
| Hartstene Is. Ramp | 6 | 0 | 6 | 4 | 5 | 4 | 0 | 25 | 3.34% |
| Home Public Ramp | 1 | 1 | 1 | 2 | 0 | 4 | 4 | 13 | 1.74% |
| Horsehead Bay Ramp | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.27% |
| Joemma Beach Ramp | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0.13% |
| John's Creek | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 6 | 0.80% |
| Kennedy Creek Mouth | 10 | 12 | 4 | 0 | 0 | 0 | 0 | 26 | 3.48% |
| Landover | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0.27% |
| Longbranch Public Ramp | 1 | 1 | 1 | 2 | 0 | 4 | 4 | 13 | 1.74% |
| Luhr Beach Ramp | 12 | 4 | 7 | 15 | 8 | 17 | 15 | 78 | 10.43% |
| Luhr Beach Shore | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0.13% |
| Narrows Marina | 9 | 6 | 6 | 6 | 8 | 7 | 5 | 47 | 6.28% |
| Narrows Park | 6 | 2 | 12 | 5 | 10 | 3 | 2 | 40 | 5.35% |
| Narrows Ramp | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0.40% |
| Perry Creek | 4 | 13 | 13 | 0 | 0 | 0 | 0 | 30 | 4.01% |
| Priest Point Park | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0.80% |
| Solo Point | 9 | 7 | 5 | 11 | 4 | 4 | 9 | 49 | 6.55% |
| Steamboat Island Bridge | 14 | 7 | 3 | 0 | 1 | 0 | 0 | 25 | 3.34% |
| Steilacoom Public Ramp | 9 | 7 | 4 | 4 | 3 | 2 | 3 | 32 | 4.28% |
| Tolmie State Park | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0.53% |
| Vaughn Public Ramp | 1 | 1 | 1 | 2 | 0 | 3 | 4 | 12 | 1.60% |
| Wauna Ramp | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 4 | 0.53% |
| Wauna Shore | 2 | 4 | 10 | 2 | 7 | 7 | 5 | 37 | 4.95% |
| Wollochet Bay Public Ramp | 2 | 1 | 6 | 1 | 3 | 1 | 1 | 15 | 2.01% |
| Zittels Marina | 15 | 3 | 9 | 13 | 6 | 11 | 13 | 70 | 9.36% |
| **Grand Total** | **152** | **81** | **135** | **107** | **88** | **98** | **87** | **748** | **100.00%** |

**Table 9.4** Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2018-19 winter Chinook salmon MSF in Marine Area 13.

| Mark Type | Number Sampled | | |
|---|---|---|---|
| | Legal-size | Sublegal-size | Total |
| Marked | 8 | 0 | 8 |
| Unmarked | 0 | 0 | 0 |
| **Total** | **8** | **0** | **8** |

**Table 9.5** Summary of CWTs recovered from Chinook salmon retained during the 2018-19 winter Chinook salmon MSF in Marine Area 13. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

| Release Domain | Release Region | Release Site | Rearing Location | CWTs Recovered | No. DITs |
|---|---|---|---|---|---|
| No CWTs Recovered | | | | | |
| | | | **Total** | **0** | **0** |

**Table 9.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2018-19 winter Chinook salmon MSF in Marine Area 13, with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

| Data Source | Effort and Sample Size | Legal | | Sublegal | | Totals | Mark Rate | |
|---|---|---|---|---|---|---|---|---|
| | | AD | UM | AD | UM | | Overall | Legal |
| Private VTR | 11 1-trip VTRs, 11 Angler Trips | 3 | 3 | 15 | 4 | 25 | 0.72 | 0.50 |
| Size/mark-status composition: | | 0.12 | 0.12 | 0.60 | 0.16 | | | |
| | Variance: | (0.0044) | (0.0044) | (0.0100) | (0.0056) | | | |

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# REFERENCES

Conrad, R., and P. McHugh. 2008. Assessment of Two Methods for Estimating Total Chinook Salmon Encounters in Puget Sound/Strait of Juan de Fuca Mark-Selective Chinook Fisheries. Northwest Fishery Resource Bulletin Manuscript Series No. 2. http://wdfw.wa.gov/publications/00492/

Puget Sound Indian Tribes and WDFW. 2004. Comprehensive Management Plan for Puget Sound Chinook: Harvest Management Component. Olympia, WA. 253 pp.

Puget Sound Indian Tribes and WDFW. 2010. Comprehensive Management Plan for Puget Sound Chinook: Harvest Management Component. Olympia, WA. 230 pp.

Thiesfeld, S.L., and A. Hagen-Breaux. 2005a. 2003 Chinook Selective Fishery, Marine Areas 5 and 6. January 12, 2005. Washington Department of Fish and Wildlife. Olympia, Washington. http://wdfw.wa.gov/publications/00913/

Thiesfeld, S.L., and A. Hagen-Breaux. 2005b. 2004 Chinook Selective Fishery, Marine Areas 5 and 6. January 14, 2005. Washington Department of Fish and Wildlife. Olympia, Washington. http://wdfw.wa.gov/publications/00914/

Thiesfeld, S.L., and A. Hagen-Breaux. 2006. 2005 Chinook Selective Fishery, Marine Areas 5 and 6. March 21, 2006. Washington Department of Fish and Wildlife, Olympia, Washington. http://wdfw.wa.gov/publications/00915/

Washington Department of Fish and Wildlife (WDFW). 2007a. Marine Areas 9 and 10 Selective Chinook Fishery, July 16-31, 2007: Post-season Report. Draft Report: October 3, 2007. Washington Department of Fish and Wildlife. Olympia, Washington. 82 pp. http://wdfw.wa.gov/publications/00493/

Washington Department of Fish and Wildlife (WDFW). 2007b. Marine Areas 11 and 13 Selective Chinook Fishery, 2007: Post-season Report. Draft Report: October 30, 2007. Washington Department of Fish and Wildlife. Olympia, Washington. 80 pp. http://wdfw.wa.gov/publications/00494/

Washington Department of Fish and Wildlife (WDFW). 2008a. A Multi-year Assessment of the Marine Areas 5 and 6 Selective Chinook Fishery: 2003-2007. Final Report Draft: March 14, 2008. Washington Department of Fish and Wildlife. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00495/

Washington Department of Fish and Wildlife (WDFW). 2008b. A Multi-year Assessment of the Marine Areas 8-1 and 8-2 Selective Chinook Fishery: 2005-2007. Final Report Draft: February 25, 2008. Washington Department of Fish and Wildlife. Olympia, Washington. 149 pp. http://wdfw.wa.gov/publications/00496/

Washington Department of Fish and Wildlife (WDFW). 2009a. Marine Area 7 Mark-Selective Recreational Chinook Fishery, February 1-29, 2008: Post-season Report. Revised Draft Report: February 20, 2009. Washington Department of Fish and Wildlife. Olympia, Washington. 47 pp. http://wdfw.wa.gov/publications/00491/

Washington Department of Fish and Wildlife (WDFW). 2009b. Marine Areas 8-1 and 8-2 Mark-Selective Recreational Chinook Fishery, November 1, 2007-April 30 2008. Revised Draft

Report: February 20, 2009. Washington Department of Fish and Wildlife. Olympia, Washington. 62 pp. http://wdfw.wa.gov/publications/00486/

Washington Department of Fish and Wildlife (WDFW). 2009c. Marine Area 9 Mark-Selective Recreational Chinook Fishery, January 16 – April 15, 2008 Post-season Report: Revised Draft Report: February 20, 2009. Washington Department of Fish and Wildlife. Olympia, Washington. 49 pp. http://wdfw.wa.gov/publications/00490/

Washington Department of Fish and Wildlife (WDFW). 2009d. Marine Area 10 Mark-Selective Recreational Chinook Fishery, January 16 – April 15, 2008 Post-season Report: Revised Draft Report: February 23, 2009. Washington Department of Fish and Wildlife. Olympia, Washington. 47 pp. http://wdfw.wa.gov/publications/00489/

Washington Department of Fish and Wildlife (WDFW). 2009e. Marine Areas 5 and 6 Mark-Selective Recreational Chinook Fishery, Summer 2008: Post-season Report. Revised Draft Report: February 17, 2009. Washington Department of Fish and Wildlife. Olympia, Washington. 64 pp. http://wdfw.wa.gov/publications/00485/

Washington Department of Fish and Wildlife (WDFW). 2009f. Marine Areas 9 and 10 Mark-Selective Recreational Chinook Fishery, July 16-August 15, 2008. Revised Draft Report: February 23, 2009. Washington Department of Fish and Wildlife. Olympia, Washington. 60 pp. http://wdfw.wa.gov/publications/00487/

Washington Department of Fish and Wildlife (WDFW). 2009g. Marine Areas 11 and 13 Mark-Selective Recreational Chinook Fishery, Summer 2008. Revised Draft Report: February 24, 2009. Washington Department of Fish and Wildlife. Olympia, Washington. 64 pp. http://wdfw.wa.gov/publications/00488/

Washington Department of Fish and Wildlife (WDFW). 2010a. Marine Area 7 Mark-Selective Recreational Chinook Fishery, February 1–April 15, 2009: Post-season Report. Revised Draft Report: June 11, 2010. Washington Department of Fish and Wildlife. Olympia, Washington. 50 pp. http://wdfw.wa.gov/publications/01060/

Washington Department of Fish and Wildlife (WDFW). 2010b. Marine Areas 8-1 and 8-2 Mark-Selective Recreational Chinook Fishery, January 1-April 30, 2009: Post-season Report. Revised Draft Report: June 14, 2010. Washington Department of Fish and Wildlife. Olympia, Washington. 62 pp. http://wdfw.wa.gov/publications/01061/

Washington Department of Fish and Wildlife (WDFW). 2010c. Marine Area 9 Mark-Selective Recreational Chinook Fishery, November 1-30, 2008 and January 16-April 15, 2009: Post-season Report. Revised Draft Report: June 15, 2010. Washington Department of Fish and Wildlife. Olympia, Washington. 50 pp. http://wdfw.wa.gov/publications/01062/

Washington Department of Fish and Wildlife (WDFW). 2010d. Marine Area 10 Mark-Selective Recreational Chinook Fishery, December 1, 2008–January 31, 2009, Post-season Report. Revised Draft Report: June 17, 2010. Washington Department of Fish and Wildlife. Olympia, Washington. 48 pp. http://wdfw.wa.gov/publications/01059/

Washington Department of Fish and Wildlife (WDFW). 2010e. Marine Areas 5 and 6 Mark-Selective Recreational Chinook Fishery, Summer 2009: Post-season Report. Revised Draft Report: June 29, 2010. Washington Department of Fish and Wildlife. Olympia, Washington. 61 pp. http://wdfw.wa.gov/publications/01058/

Washington Department of Fish and Wildlife (WDFW). 2010f. Marine Areas 9 and 10 Mark-Selective Recreational Chinook Fishery, Summer 2009: Post-season Report. Revised Draft Report: June 28, 2010. Washington Department of Fish and Wildlife. Olympia, Washington. 64 pp. http://wdfw.wa.gov/publications/01057/

Washington Department of Fish and Wildlife (WDFW). 2010g. Marine Areas 11 and 13 Mark-Selective Recreational Chinook Fishery, Summer 2009: Post-season Report. Revised Draft Report: June 21, 2010. Washington Department of Fish and Wildlife. Olympia, Washington. 63 pp. http://wdfw.wa.gov/publications/01056/

Washington Department of Fish and Wildlife (WDFW). 2011a. 2009-2010 Winter Mark-Selective Recreational Chinook Fisheries in Marine Areas 7, 8-1, 8-2, 9, 10, 11, and 12: Post-season Report. Revised Draft Report: March 31, 2011. Washington Department of Fish and Wildlife. Olympia, Washington. 93 pp. http://wdfw.wa.gov/publications/01372/

Washington Department of Fish and Wildlife (WDFW). 2011b. 2010 Summer Mark-Selective Recreational Chinook Fisheries in Marine Areas 5, 6, 9, 10, 11, and 13: Post-season Report. Revised Draft Report: March 25, 2011. Washington Department of Fish and Wildlife. Olympia, Washington. 88 pp. http://wdfw.wa.gov/publications/01373/

Washington Department of Fish and Wildlife (WDFW). 2012a. Methods Report: Monitoring Mark-Selective Recreational Chinook Fisheries In the Marine Catch Areas of Puget Sound (Areas 5 through 13). Revised Draft Report: January 30, 2012. Washington Department of Fish and Wildlife. Olympia, Washington. 81 pp. http://wdfw.wa.gov/publications/01357/

Washington Department of Fish and Wildlife (WDFW). 2012b. 2010-2011 Winter Mark-Selective Recreational Chinook Fisheries In Marine Areas 7, 8-1, 8-2, 9, 10, 11 and 12: Post-season Report. Revised Draft Report: October 31, 2012. Washington Department of Fish and Wildlife. Olympia, Washington. 98 pp. http://wdfw.wa.gov/publications/01435/

Washington Department of Fish and Wildlife (WDFW). 2012c. 2011 Summer Mark-Selective Recreational Chinook Fisheries In Marine Areas 5, 6, 9, 10, 11 and 13: Post-season Report. Revised Draft Report: November 13, 2012. Washington Department of Fish and Wildlife. Olympia, Washington. 89 pp. http://wdfw.wa.gov/publications/01438/

Washington Department of Fish and Wildlife (WDFW). 2013a. 2011-2012 Winter Mark-Selective Recreational Chinook Fisheries In Marine Areas 7, 8-1, 8-2, 9, 10, 11 and 12 (Revised Draft Post-season Report; January 24, 2013). Washington Department of Fish and Wildlife. Olympia, Washington. 90 pp. http://wdfw.wa.gov/publications/01533/

Washington Department of Fish and Wildlife (WDFW). 2013b. 2012 Summer Mark-Selective Recreational Chinook Fisheries In Marine Areas 5, 6, 9, 10, 11, 12 and 13 (Revised Draft Post-season Report; February 26, 2013). Washington Department of Fish and Wildlife. Olympia, Washington. 91 pp. http://wdfw.wa.gov/publications/01534/

Washington Department of Fish and Wildlife (WDFW). 2013c. 2012-2013 Winter Mark-Selective Recreational Chinook Fisheries in Marine Areas 6, 7, 8-1, 8-2, 9, 10, 11 and 12 (Revised Draft Post-season Report; December 6, 2013). Washington Department of Fish and Wildlife. Olympia, Washington. 95 pp. http://wdfw.wa.gov/publications/01619/

Washington Department of Fish and Wildlife (WDFW). 2014. 2013 Summer Mark-Selective Recreational Chinook Fisheries in Marine Areas 5, 6, 9, 10, 11, 12 and 13. (Revised Draft Post-season Report; February 12, 2014). Washington Department of Fish and Wildlife. Olympia, Washington. 91 pp. http://wdfw.wa.gov/publications/01618/

Washington Department of Fish and Wildlife (WDFW). 2014. 2014 Summer Mark-Selective Recreational Chinook Fisheries in Marine Areas 5, 6, 9, 10, 11, 12 and 13. (Revised Draft Post-season Report; May 11, 2015). Washington Department of Fish and Wildlife. Olympia, Washington. 91 pp. http://wdfw.wa.gov/publications/01741/

Washington Department of Fish and Wildlife (WDFW). 2013c. 2013-2014 Winter Mark-Selective Recreational Chinook Fisheries in Marine Areas 6, 7, 8-1, 8-2, 9, 10, 11 and 12 (Revised Draft Post-season Report; December 19, 2014). Washington Department of Fish and Wildlife. Olympia, Washington. 95 pp. http://wdfw.wa.gov/publications/01739/

Washington Department of Fish and Wildlife (WDFW) and Northwest Indian Fisheries Commission (NWIFC). 2013. 2014-15 Co-managers' List of Agreed Fisheries. Olympia, Washington.

Washington Department of Fish and Wildlife (WDFW). 2016. 2015 Summer Mark-Selective Recreational Chinook Fisheries in Marine Areas 5, 6, 9, 10, 11, 12 and 13. (Revised Draft Post-season Report; May 11, 2016). Washington Department of Fish and Wildlife. Olympia, Washington. 91 pp.

Washington Department of Fish and Wildlife (WDFW). 2016c. 2015-2016 Winter Mark-Selective Recreational Chinook Fisheries in Marine Areas 6, 7, 8-1, 8-2, 9, 10, 11 and 12 (Revised Draft Post-season Report; December 19, 2014). Washington Department of Fish and Wildlife. Olympia, Washington. 95 pp.

# APPENDICIES

## 1) SITE WEIGHTS

**Appendix 1** Size measures by sample date, for sites sampled during dockside creel surveys for the 2018-19 winter Chinook MSF in Marine Area 8-1.

| Sample Date | Week | Location #1 | Site Size | Location #2 | Site Size |
|---|---|---|---|---|---|
| 12/1/2018 | 48 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/4/2018 | 49 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/7/2018 | 49 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/9/2018 | 49 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/12/2018 | 50 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/14/2018 | 50 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/16/2018 | 50 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/18/2018 | 51 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/21/2018 | 51 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/22/2018 | 51 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/27/2018 | 52 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/28/2018 | 52 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 12/29/2018 | 52 | Camano Island State Park Public Ramp | 0.1511 | Norton Street (Everett) Ramp | 0.2443 |
| 1/2/2019 | 1 | Camano Island State Park Public Ramp | 0.4682 | Maple Grove Ramp; Camano Is | 0.1612 |
| 1/4/2019 | 1 | Camano Island State Park Public Ramp | 0.4682 | Maple Grove Ramp; Camano Is | 0.1612 |
| 1/5/2019 | 1 | Camano Island State Park Public Ramp | 0.4682 | Maple Grove Ramp; Camano Is | 0.1612 |
| 1/8/2019 | 2 | Camano Island State Park Public Ramp | 0.4682 | Norton Street (Everett) Ramp | 0.1168 |
| 1/12/2019 | 2 | Camano Island State Park Public Ramp | 0.4682 | Oak Harbor Marina & Public Ramp | 0.1294 |
| 1/13/2019 | 2 | Camano Island State Park Public Ramp | 0.4682 | Oak Harbor Marina & Public Ramp | 0.1294 |
| 1/16/2019 | 3 | Camano Island State Park Public Ramp | 0.4682 | Maple Grove Ramp; Camano Is | 0.1612 |
| 1/18/2019 | 3 | Camano Island State Park Public Ramp | 0.4682 | Norton Street (Everett) Ramp | 0.1168 |
| 1/20/2019 | 3 | Camano Island State Park Public Ramp | 0.4682 | Norton Street (Everett) Ramp | 0.1168 |
| 1/24/2019 | 4 | Camano Island State Park Public Ramp | 0.4682 | Norton Street (Everett) Ramp | 0.1168 |
| 1/25/2019 | 4 | Camano Island State Park Public Ramp | 0.4682 | Oak Harbor Marina & Public Ramp | 0.1294 |
| 1/27/2019 | 4 | Camano Island State Park Public Ramp | 0.4682 | Norton Street (Everett) Ramp | 0.1168 |
| 1/31/2019 | 5 | Camano Island State Park Public Ramp | 0.4682 | Norton Street (Everett) Ramp | 0.1168 |
| 2/1/2019 | 5 | Camano Island State Park Public Ramp | 0.3876 | Norton Street (Everett) Ramp | 0.0691 |
| 2/2/2019 | 5 | Camano Island State Park Public Ramp | 0.3876 | Maple Grove Ramp; Camano Is | 0.2976 |
| 2/5/2019 | 6 | Camano Island State Park Public Ramp | 0.3876 | Norton Street (Everett) Ramp | 0.0691 |
| 2/8/2019 | 6 | Camano Island State Park Public Ramp | 0.3876 | Maple Grove Ramp; Camano Is | 0.2976 |
| 2/10/2019 | 6 | Camano Island State Park Public Ramp | 0.3876 | Oak Harbor Marina & Public Ramp | 0.1441 |
| 2/13/2019 | 7 | Camano Island State Park Public Ramp | 0.3876 | Norton Street (Everett) Ramp | 0.0691 |
| 2/15/2019 | 7 | Camano Island State Park Public Ramp | 0.3876 | Maple Grove Ramp; Camano Is | 0.2976 |

| | | | | | |
|---|---|---|---|---|---|
| 2/16/2019 | 7 | Camano Island State Park Public Ramp | 0.3876 | Maple Grove Ramp; Camano Is | 0.2976 |
| 2/21/2019 | 8 | Camano Island State Park Public Ramp | 0.3876 | Norton Street (Everett) Ramp | 0.0691 |
| 2/23/2019 | 8 | Camano Island State Park Public Ramp | 0.3876 | Oak Harbor Marina & Public Ramp | 0.1441 |
| 2/24/2019 | 8 | Camano Island State Park Public Ramp | 0.3876 | Oak Harbor Marina & Public Ramp | 0.1441 |
| 2/27/2019 | 9 | Camano Island State Park Public Ramp | 0.3876 | Maple Grove Ramp; Camano Is | 0.2976 |
| 3/1/2019 | 9 | Camano Island State Park Public Ramp | 0.5036 | Norton Street (Everett) Ramp | 0.1501 |
| 3/3/2019 | 9 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 3/5/2019 | 10 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 3/8/2019 | 10 | Camano Island State Park Public Ramp | 0.5036 | Oak Harbor Marina & Public Ramp | 0.0656 |
| 3/9/2019 | 10 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 3/12/2019 | 11 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 3/15/2019 | 11 | Camano Island State Park Public Ramp | 0.5036 | Norton Street (Everett) Ramp | 0.1501 |
| 3/16/2019 | 11 | Camano Island State Park Public Ramp | 0.5036 | Oak Harbor Marina & Public Ramp | 0.0656 |
| 3/20/2019 | 12 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 3/22/2019 | 12 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 3/24/2019 | 12 | Camano Island State Park Public Ramp | 0.5036 | Norton Street (Everett) Ramp | 0.1501 |
| 3/28/2019 | 13 | Camano Island State Park Public Ramp | 0.5036 | Oak Harbor Marina & Public Ramp | 0.0656 |
| 3/30/2019 | 13 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 3/31/2019 | 13 | Camano Island State Park Public Ramp | 0.5036 | Norton Street (Everett) Ramp | 0.1501 |
| 4/4/2019 | 14 | Camano Island State Park Public Ramp | 0.5036 | Oak Harbor Marina & Public Ramp | 0.0656 |
| 4/5/2019 | 14 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |
| 4/6/2019 | 14 | Camano Island State Park Public Ramp | 0.5036 | Maple Grove Ramp; Camano Is | 0.2161 |

**Appendix 2** Size measures by sample date, for sites sampled during dockside creel surveys for the 2018-19 winter Chinook MSF in Marine Area 8-2.

| Sample Date | Week | Location #1 | Site Size | Location #2 | Site Size |
|---|---|---|---|---|---|
| 12/1/2018 | 48 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/4/2018 | 49 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/7/2018 | 49 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/9/2018 | 49 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/12/2018 | 50 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/14/2018 | 50 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/16/2018 | 50 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/18/2018 | 51 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/21/2018 | 51 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/22/2018 | 51 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/27/2018 | 52 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/28/2018 | 52 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 12/29/2018 | 52 | Norton Street (Everett) Ramp | 0.6725 | Camano Island State Park Public Ramp | 0.1436 |
| 1/2/2019 | 1 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/4/2019 | 1 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/5/2019 | 1 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/8/2019 | 2 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/12/2019 | 2 | Norton Street (Everett) Ramp | 0.5789 | Dagmar's Landing; Forklift Launch | 0.055 |
| 1/13/2019 | 2 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/16/2019 | 3 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/18/2019 | 3 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/20/2019 | 3 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/24/2019 | 4 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/25/2019 | 4 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/27/2019 | 4 | Norton Street (Everett) Ramp | 0.5789 | Camano Island State Park Public Ramp | 0.2116 |
| 1/31/2019 | 5 | Norton Street (Everett) Ramp | 0.5649 | Camano Island State Park Public Ramp | 0.2099 |
| 2/1/2019 | 5 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/2/2019 | 5 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/5/2019 | 6 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/8/2019 | 6 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/10/2019 | 6 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/13/2019 | 7 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/15/2019 | 7 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/16/2019 | 7 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/21/2019 | 8 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |

| | | | | | |
|---|---|---|---|---|---|
| 2/23/2019 | 8 | Norton Street (Everett) Ramp | 0.1441 | Dagmar's Landing; Forklift Launch | 0.068 |
| 2/24/2019 | 8 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 2/27/2019 | 9 | Norton Street (Everett) Ramp | 0.6973 | Camano Island State Park Public Ramp | 0.1406 |
| 3/1/2019 | 9 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/3/2019 | 9 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/5/2019 | 10 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/8/2019 | 10 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/9/2019 | 10 | Norton Street (Everett) Ramp | 0.6329 | Dagmar's Landing; Forklift Launch | 0.0632 |
| 3/12/2019 | 11 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/15/2019 | 11 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/16/2019 | 11 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/20/2019 | 12 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/22/2019 | 12 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/24/2019 | 12 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/28/2019 | 13 | Norton Street (Everett) Ramp | 0.6329 | Bayside Marine | 0.07 |
| 3/30/2019 | 13 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 3/31/2019 | 13 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 4/4/2019 | 14 | Norton Street (Everett) Ramp | 0.6329 | Bayside Marine | 0.07 |
| 4/5/2019 | 14 | Norton Street (Everett) Ramp | 0.6329 | Camano Island State Park Public Ramp | 0.1503 |
| 4/6/2019 | 14 | Norton Street (Everett) Ramp | 0.6329 | Dagmar's Landing; Forklift Launch | 0.0601 |

**Appendix 3** Size measures by sample date, for sites sampled during dockside creel surveys for the 2018-19 winter Chinook MSF in Marine Area 10.

| Sample Date | Week | Location #1 | Site Size | Location #2 | Site Size |
|---|---|---|---|---|---|
| 1/2/2019 | 1 | Shilshole Public Ramp | 0.3539 | Armeni Public Ramp | 0.1439 |
| 1/4/2019 | 1 | Shilshole Public Ramp | 0.3539 | Kingston Public Ramp | 0.1726 |
| 1/5/2019 | 1 | Shilshole Public Ramp | 0.3539 | Manchester Public Ramp | 0.1908 |
| 1/8/2019 | 2 | Shilshole Public Ramp | 0.3539 | Kingston Public Ramp | 0.1726 |
| 1/12/2019 | 2 | Shilshole Public Ramp | 0.3539 | Armeni Public Ramp | 0.1439 |
| 1/13/2019 | 2 | Armeni Public Ramp | 0.7647 | Shilshole Public Ramp | 0.1176 |
| 1/16/2019 | 3 | Shilshole Public Ramp | 0.3539 | Manchester Public Ramp | 0.1908 |
| 1/18/2019 | 3 | Armeni Public Ramp | 0.1439 | Kingston Public Ramp | 0.1726 |

## 2) CWT RECOVERIES

**Appendix 4** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 5.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 15-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 52 | CWT00027215 | AD |
| 5 | 17-Mar-19 | 636958 | 2015 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 59 | CWT00027216 | AD |
| 5 | 21-Mar-19 | 636958 | 2015 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 64 | OSP08542 | AD |
| 5 | 30-Mar-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 60 | CWT00027217 | AD |
| 5 | 5-Apr-19 | 60972 | 2016 | Mare Island Net Pen | Feather R Hatchery | CDFW | | 54 | CWT00027219 | AD |
| 5 | 7-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00027220 | AD |
| 5 | 7-Apr-19 | 184374 | 2016 | R-Harrison R | H-Chehalis River H | CDFO | | 59 | CWT00027221 | AD |
| 5 | 10-Apr-19 | 184385 | 2016 | R-Chilliwack R | H-Chilliwack River H | CDFO | | 61 | CWT00027222 | AD |
| 5 | 14-Apr-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 54 | CWT00027223 | AD |
| 5 | 17-Apr-19 | 636946 | 2015 | Friday Cr 03.0017 | Samish Hatchery | WDFW | | 57 | CWT00027224 | AD |
| 5 | 19-Apr-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 62 | CWT00027225 | AD |
| 5 | 30-Apr-19 | 60952 | 2016 | Half Moon Bay John Pr Net | Mok R Fish Ins | CDFW | | 54 | CWT00027226 | AD |
| 5 | 30-Apr-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 56 | CWT00027228 | AD |

**Appendix 5** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 6.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1-Feb-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 55 | CWT00011785 | AD |
| 6 | 1-Feb-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 64 | CWT00011786 | AD |
| 6 | 1-Feb-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 54 | CWT00011787 | AD |
| 6 | 1-Feb-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 57 | CWT00011788 | AD |
| 6 | 1-Feb-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 63 | CWT00027103 | AD |
| 6 | 2-Feb-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 52 | CWT00011789 | AD |
| 6 | 2-Feb-19 | 637174 | 2016 | Friday Cr 03.0017 | Samish Hatchery | WDFW | | 52 | CWT00011790 | AD |
| 6 | 2-Feb-19 | 211162 | 2015 | Whitehorse Springs | Whitehorse Pond | STIL | | 79 | CWT00012249 | AD |
| 6 | 2-Feb-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 68 | CWT00012250 | AD |
| 6 | 2-Feb-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 63 | CWT00012251 | AD |
| 6 | 2-Feb-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 57 | CWT00012252 | AD |
| 6 | 5-Feb-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 60 | CWT00011791 | AD |
| 6 | 6-Feb-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 65 | CWT00012242 | AD |
| 6 | 6-Feb-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 61 | CWT00017310 | AD |
| 6 | 7-Feb-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 58 | CWT00017308 | AD |
| 6 | 7-Feb-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 54 | CWT00017309 | AD |
| 6 | 7-Feb-19 | 636958 | 2015 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 61 | CWT00020608 | AD |
| 6 | 7-Feb-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 54 | CWT00020901 | AD |
| 6 | 13-Feb-19 | 636944 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 80 | CWT00012253 | AD |
| 6 | 15-Feb-19 | 637157 | 2016 | Kendall Cr 01.0406 | Kendall Cr Hatchery | WDFW | | 60 | CWT00011792 | AD |
| 6 | 15-Feb-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 62 | CWT00011793 | AD |
| 6 | 16-Feb-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 67 | CWT00017811 | AD |
| 6 | 16-Feb-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 68 | CWT00017812 | AD |
| 6 | 16-Feb-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 66 | CWT00017813 | AD |
| 6 | 21-Feb-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 60 | CWT00011794 | AD |
| 6 | 21-Feb-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 67 | CWT00011795 | AD |
| 6 | 21-Feb-19 | 636946 | 2015 | Friday Cr 03.0017 | Samish Hatchery | WDFW | | 75 | CWT00017311 | AD |
| 6 | 21-Feb-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 71 | CWT00020607 | AD |
| 6 | 22-Feb-19 | 211169 | 2015 | Grovers Cr 15.0299 | Grovers Cr Hatchery | SUQ | 636943 | 60 | CWT00020610 | AD |
| 6 | 23-Feb-19 | 60952 | 2016 | Half Moon Bay John Pr Net | Mok R Fish Ins | CDFW | | 55 | CWT00011796 | AD |
| 6 | 23-Feb-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00027104 | AD |
| 6 | 24-Feb-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 67 | CWT00012254 | AD |
| 6 | 24-Feb-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 64 | CWT00025468 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 27-Feb-19 | 636951 | 2015 | Chambers Cr 12.0007 | Garrison Hatchery | WDFW | | 60 | CWT00011797 | AD |
| 6 | 28-Feb-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 60 | CWT00011798 | AD |
| 6 | 28-Feb-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 56 | CWT00011799 | AD |
| 6 | 28-Feb-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 59 | CWT00011800 | AD |
| 6 | 1-Mar-19 | 56079 | 2016 | Coleman Nfh | Coleman Nfh | USFWS | | 53 | CWT00011801 | AD |
| 6 | 2-Mar-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 65 | CWT00016637 | AD |
| 6 | 5-Mar-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 58 | CWT00021055 | AD |
| 6 | 7-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00020609 | AD |
| 6 | 8-Mar-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 63 | 26174 | AD |
| 6 | 8-Mar-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 68 | 85424 | AD |
| 6 | 8-Mar-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 64 | 85427 | AD |
| 6 | 8-Mar-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 68 | 85434 | AD |
| 6 | 8-Mar-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 56 | CWT00020611 | AD |
| 6 | 8-Mar-19 | 637147 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 53 | CWT00021057 | AD |
| 6 | 8-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 61 | CWT00021058 | AD |
| 6 | 9-Mar-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 74 | 96551 | AD |
| 6 | 9-Mar-19 | 636916 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 62 | 96792 | AD |
| 6 | 9-Mar-19 | 636946 | 2015 | Friday Cr 03.0017 | Samish Hatchery | WDFW | | 76 | 26175 | AD |
| 6 | 9-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 72 | 26176 | AD |
| 6 | 9-Mar-19 | 211169 | 2015 | Grovers Cr 15.0299 | Grovers Cr Hatchery | SUQ | 636943 | 75 | 85436 | AD |
| 6 | 9-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 58 | 85438 | AD |
| 6 | 9-Mar-19 | 211169 | 2015 | Grovers Cr 15.0299 | Grovers Cr Hatchery | SUQ | 636943 | 64 | 85439 | AD |
| 6 | 9-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 52 | CWT00021059 | AD |
| 6 | 9-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 61 | CWT00021060 | AD |
| 6 | 9-Mar-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 57 | CWT00021061 | AD |
| 6 | 9-Mar-19 | 211169 | 2015 | Grovers Cr 15.0299 | Grovers Cr Hatchery | SUQ | 636943 | 60 | CWT00021062 | AD |
| 6 | 9-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 54 | CWT00027105 | AD |
| 6 | 9-Mar-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 62 | CWT00027106 | AD |
| 6 | 9-Mar-19 | 637047 | 2015 | East Sound Bay (San) | Glenwood Springs | COOP | | 62 | CWT00027107 | AD |
| 6 | 9-Mar-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 71 | CWT00027108 | AD |
| 6 | 10-Mar-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 66 | 26177 | AD |
| 6 | 10-Mar-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 68 | CWT00011325 | AD |
| 6 | 10-Mar-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 66 | CWT00021064 | AD |
| 6 | 11-Mar-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 69 | CWT00020613 | AD |
| 6 | 15-Mar-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 56 | CWT00021065 | AD |
| 6 | 15-Mar-19 | 637125 | 2016 | Portage Bay/Ship Cnl | Issaquah Hatchery | WDFW | | 65 | CWT00021066 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 15-Mar-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 62 | CWT00021067 | AD |
| 6 | 16-Mar-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 56 | CWT00021068 | AD |
| 6 | 16-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 55 | CWT00021069 | AD |
| 6 | 17-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00021070 | AD |
| 6 | 20-Mar-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 64 | CWT00020612 | AD |
| 6 | 22-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 53 | CWT00021072 | AD |
| 6 | 22-Mar-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 53 | CWT00021073 | AD |
| 6 | 23-Mar-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 63 | CWT00012260 | AD |
| 6 | 23-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 52 | CWT00017507 | AD |
| 6 | 23-Mar-19 | 637023 | 2015 | Portage Bay/Ship Cnl | Issaquah Hatchery | WDFW | | 68 | CWT00017508 | AD |
| 6 | 24-Mar-19 | 637147 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 60 | CWT00011336 | AD |
| 6 | 24-Mar-19 | 636916 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 65 | CWT00021074 | AD |
| 6 | 24-Mar-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 56 | CWT00021075 | AD |
| 6 | 24-Mar-19 | 636916 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 71 | CWT00021076 | AD |
| 6 | 24-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 54 | CWT00021077 | AD |
| 6 | 24-Mar-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 61 | CWT00021078 | AD |
| 6 | 24-Mar-19 | 636958 | 2015 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 67 | CWT00021079 | AD |
| 6 | 24-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 57 | CWT00021080 | AD |
| 6 | 29-Mar-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 56 | CWT00021081 | AD |
| 6 | 30-Mar-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 62 | CWT00017510 | AD |
| 6 | 30-Mar-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 65 | CWT00021082 | AD |
| 6 | 31-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 62 | CWT00016641 | AD |
| 6 | 31-Mar-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 58 | CWT00016642 | AD |
| 6 | 31-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 52 | CWT00021083 | AD |
| 6 | 5-Apr-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 58 | CWT00021084 | AD |
| 6 | 5-Apr-19 | 637159 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 211220 | 58 | CWT00021085 | UM |
| 6 | 6-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 60 | CWT00021086 | AD |
| 6 | 8-Apr-19 | 637041 | 2015 | Lyons Ferry Rel.Site | Lyons Ferry Hatchery | WDFW | | 56 | CWT00021087 | UM |
| 6 | 11-Apr-19 | 636954 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 56 | CWT00011337 | AD |
| 6 | 12-Apr-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 60 | CWT00011335 | AD |
| 6 | 14-Apr-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 73 | CWT00027110 | AD |
| 6 | 15-Apr-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 60 | CWT00021088 | AD |

**Appendix 6** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 7.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 5-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 62 | CWT00016549 | AD |
| 7 | 5-Jan-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 69 | CWT00017017 | AD |
| 7 | 5-Jan-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 70 | CWT00017018 | AD |
| 7 | 5-Jan-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 72 | CWT00017019 | AD |
| 7 | 8-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 57 | CWT00017003 | AD |
| 7 | 11-Jan-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 66 | CWT00016634 | AD |
| 7 | 11-Jan-19 | 211155 | 2015 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211156 | 62 | CWT00017020 | AD |
| 7 | 11-Jan-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 64 | CWT00017021 | AD |
| 7 | 12-Jan-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 61 | CWT00011649 | AD |
| 7 | 12-Jan-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 57 | CWT00016548 | AD |
| 7 | 12-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 65 | CWT00016550 | AD |
| 7 | 12-Jan-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 74 | CWT00017022 | AD |
| 7 | 12-Jan-19 | 211155 | 2015 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211156 | 66 | CWT00017023 | AD |
| 7 | 12-Jan-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 64 | CWT00017024 | AD |
| 7 | 12-Jan-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 70 | CWT00017025 | AD |
| 7 | 13-Jan-19 | 636958 | 2015 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 56 | CWT00011622 | AD |
| 7 | 13-Jan-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 60 | CWT00011643 | AD |
| 7 | 13-Jan-19 | 636958 | 2015 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 69 | CWT00017026 | AD |
| 7 | 16-Jan-19 | 637161 | 2016 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 59 | CWT00017027 | AD |
| 7 | 20-Jan-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 77 | CWT00016815 | AD |
| 7 | 20-Jan-19 | 636912 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 63 | CWT00017028 | AD |
| 7 | 20-Jan-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 51 | CWT00017029 | AD |
| 7 | 24-Jan-19 | 636954 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 69 | CWT00016551 | AD |
| 7 | 24-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 56 | CWT00016635 | AD |
| 7 | 25-Jan-19 | 636912 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 75 | CWT00016817 | AD |
| 7 | 25-Jan-19 | 211183 | 2015 | Stillaguamish R -Sf | Brenner Hatchery | STIL | | 66 | CWT00017030 | AD |
| 7 | 27-Jan-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 63 | CWT00017031 | AD |
| 7 | 31-Jan-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 71 | CWT00011648 | AD |
| 7 | 31-Jan-19 | 211169 | 2015 | Grovers Cr 15.0299 | Grovers Cr Hatchery | SUQ | 636943 | 60 | CWT00011650 | AD |
| 7 | 31-Jan-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 60 | CWT00011651 | AD |
| 7 | 31-Jan-19 | 636954 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 69 | CWT00016553 | AD |
| 7 | 2-Feb-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 63 | CWT00016554 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 2-Feb-19 | 184384 | 2016 | R-Chilliwack R | H-Chilliwack River H | CDFO | | 62 | CWT00016555 | AD |
| 7 | 16-Feb-19 | 636897 | 2015 | Kendall Cr 01.0406 | Kendall Cr Hatchery | WDFW | | 72 | CWT00017810 | AD |
| 7 | 23-Feb-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 66 | CWT00017033 | AD |
| 7 | 23-Feb-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 66 | CWT00017037 | AD |
| 7 | 27-Feb-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 64 | CWT00011319 | AD |
| 7 | 3-Mar-19 | 637214 | 2016 | East Sound Bay (San) | Glenwood Springs | COOP | | 69 | CWT00011320 | AD |
| 7 | 5-Mar-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 62 | CWT00011321 | AD |
| 7 | 8-Mar-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 66 | CWT00017035 | AD |
| 7 | 9-Mar-19 | 637174 | 2016 | Friday Cr 03.0017 | Samish Hatchery | WDFW | | 65 | CWT00011322 | AD |
| 7 | 9-Mar-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 59 | CWT00011323 | AD |
| 7 | 9-Mar-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 64 | CWT00011646 | AD |
| 7 | 9-Mar-19 | 636897 | 2015 | Kendall Cr 01.0406 | Kendall Cr Hatchery | WDFW | | 68 | CWT00016722 | AD |
| 7 | 10-Mar-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 56 | CWT00011324 | AD |
| 7 | 10-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 59 | CWT00011326 | AD |
| 7 | 10-Mar-19 | 184384 | 2016 | R-Chilliwack R | H-Chilliwack River H | CDFO | | 61 | CWT00011327 | AD |
| 7 | 10-Mar-19 | 211155 | 2015 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211156 | 55 | CWT00017038 | AD |
| 7 | 10-Mar-19 | 636897 | 2015 | Kendall Cr 01.0406 | Kendall Cr Hatchery | WDFW | | 80 | CWT00017039 | AD |
| 7 | 10-Mar-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 59 | CWT00017040 | AD |
| 7 | 15-Mar-19 | 637161 | 2016 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 61 | CWT00017041 | AD |
| 7 | 16-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 58 | CWT00011328 | AD |
| 7 | 16-Mar-19 | 636954 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 76 | CWT00011329 | AD |
| 7 | 16-Mar-19 | 636897 | 2015 | Kendall Cr 01.0406 | Kendall Cr Hatchery | WDFW | | 88 | CWT00016721 | AD |
| 7 | 16-Mar-19 | 636950 | 2015 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 67 | CWT00017042 | AD |
| 7 | 16-Mar-19 | 636954 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 68 | CWT00017043 | AD |
| 7 | 17-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 58 | CWT00011332 | AD |
| 7 | 17-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 55 | CWT00011333 | AD |
| 7 | 17-Mar-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 63 | CWT00011334 | AD |
| 7 | 23-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 69 | CWT00016640 | AD |
| 7 | 24-Mar-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 57 | CWT00016720 | AD |
| 7 | 24-Mar-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 62 | CWT00017509 | AD |
| 7 | 30-Mar-19 | 184168 | 2016 | R-Capilano R Up | H-Capilano River H | CDFO | | 63 | CWT00016556 | AD |
| 7 | 12-Apr-19 | 184293 | 2016 | R-Cowichan R | H-Cowichan River H | CDFO | | 60 | CWT00011339 | AD |
| 7 | 15-Apr-19 | 636916 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 69 | CWT00017045 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 15-Apr-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 71 | CWT00017046 | AD |
| 7 | 15-Apr-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 62 | CWT00017729 | AD |
| 7 | 15-Apr-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | | CWT00017730 | AD |

**Appendix 7** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 8-1.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 81 | 27-Dec-18 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 54 | CWT00011645 | AD |
| 81 | 5-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 62 | CWT00016633 | AD |
| 81 | 27-Jan-19 | 637214 | 2016 | East Sound Bay (San) | Glenwood Springs | COOP | | 54 | CWT00025456 | AD |
| 81 | 1-Mar-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 59 | CWT00017716 | AD |
| 81 | 3-Mar-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 63 | CWT00017718 | AD |
| 81 | 5-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 63 | CWT00016638 | AD |
| 81 | 16-Mar-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 76 | 82069 | AD |
| 81 | 16-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 66 | 82071 | AD |
| 81 | 17-Mar-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 58 | 82078 | AD |
| 81 | 17-Mar-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 66 | CWT00017722 | AD |
| 81 | 24-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 63 | CWT00017725 | AD |
| 81 | 30-Mar-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 62 | 42625 | AD |
| 81 | 30-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 69 | 42627 | AD |
| 81 | 30-Mar-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 61 | 42629 | AD |

**Appendix 8** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 8-2.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 82 | 1-Dec-18 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 61 | CWT00008891 | AD |
| 82 | 1-Dec-18 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 70 | CWT00016630 | AD |
| 82 | 1-Dec-18 | 637174 | 2016 | Friday Cr 03.0017 | Samish Hatchery | WDFW | | 57 | CWT00016631 | AD |
| 82 | 1-Dec-18 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 55 | CWT00025434 | AD |
| 82 | 1-Dec-18 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 60 | CWT00025435 | AD |
| 82 | 1-Dec-18 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 55 | CWT00025436 | AD |
| 82 | 1-Dec-18 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 63 | CWT00025437 | AD |
| 82 | 1-Dec-18 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 64 | CWT00025438 | AD |
| 82 | 5-Dec-18 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 54 | CWT00009372 | AD |
| 82 | 5-Dec-18 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 51 | CWT00009373 | AD |
| 82 | 7-Dec-18 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 58 | CWT00009374 | AD |
| 82 | 15-Dec-18 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 57 | CWT00009376 | AD |
| 82 | 22-Dec-18 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 55 | CWT00009377 | AD |
| 82 | 22-Dec-18 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 56 | CWT00009378 | AD |
| 82 | 22-Dec-18 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 54 | CWT00025440 | AD |
| 82 | 27-Dec-18 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00011644 | AD |
| 82 | 5-Jan-19 | 637157 | 2016 | Kendall Cr 01.0406 | Kendall Cr Hatchery | WDFW | | 68 | CWT00016632 | AD |
| 82 | 11-Jan-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 56 | CWT00009383 | AD |
| 82 | 12-Jan-19 | 211231 | 2016 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211232 | 57 | CWT00009385 | AD |
| 82 | 12-Jan-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 58 | CWT00009386 | AD |
| 82 | 13-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 55 | CWT00017506 | AD |
| 82 | 20-Jan-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 66 | CWT00009392 | AD |
| 82 | 24-Jan-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 66 | CWT00009395 | AD |
| 82 | 26-Jan-19 | 211155 | 2015 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211156 | 70 | CWT00009398 | AD |
| 82 | 27-Jan-19 | 637147 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 61 | CWT00009400 | AD |
| 82 | 27-Jan-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 55 | CWT00025457 | AD |
| 82 | 30-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00025458 | AD |
| 82 | 2-Feb-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 58 | CWT00009597 | AD |
| 82 | 2-Feb-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 56 | CWT00025459 | AD |
| 82 | 21-Feb-19 | 211230 | 2016 | Mcallister Springs Hatch | Clear Creek Hatchery | NISQ | | 66 | CWT00009599 | AD |
| 82 | 23-Feb-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 58 | CWT00009600 | AD |
| 82 | 24-Feb-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 67 | CWT00017713 | AD |
| 82 | 24-Feb-19 | 637147 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 54 | CWT00017714 | AD |
| 82 | 27-Feb-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 66 | CWT00017715 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 82 | 2-Mar-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 60 | CWT00017717 | AD |
| 82 | 5-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 59 | CWT00025462 | AD |
| 82 | 8-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 77 | CWT00017719 | AD |
| 82 | 10-Mar-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 77 | CWT00017720 | AD |
| 82 | 10-Mar-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 53 | CWT00025470 | AD |
| 82 | 14-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 54 | CWT00025471 | AD |
| 82 | 16-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 66 | 82068 | AD |
| 82 | 16-Mar-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 56 | 82070 | AD |
| 82 | 16-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 63 | 82073 | AD |
| 82 | 16-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 56 | 82074 | AD |
| 82 | 16-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 73 | 82075 | AD |
| 82 | 16-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 66 | CWT00017721 | AD |
| 82 | 17-Mar-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 66 | 82082 | AD |
| 82 | 17-Mar-19 | 636916 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 70 | CWT00017723 | AD |
| 82 | 23-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 59 | CWT00025464 | AD |
| 82 | 24-Mar-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 55 | CWT00017724 | AD |
| 82 | 28-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 68 | CWT00017726 | AD |
| 82 | 28-Mar-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 60 | CWT00025467 | AD |
| 82 | 29-Mar-19 | 637126 | 2016 | Issaquah Cr 08.0178 | Issaquah Hatchery | WDFW | | 65 | CWT00025474 | AD |
| 82 | 29-Mar-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 58 | CWT00025476 | AD |
| 82 | 31-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 74 | CWT00025510 | AD |
| 82 | 7-Apr-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 64 | CWT00017727 | AD |
| 82 | 7-Apr-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 69 | CWT00017728 | AD |

**Appendix 9** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 9.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 5-Jan-19 | 211230 | 2016 | Mcallister Springs Hatch | Clear Creek Hatchery | NISQ | | 58 | CWT00009380 | AD |
| 9 | 5-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 63 | CWT00009382 | AD |
| 9 | 5-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 53 | CWT00009772 | AD |
| 9 | 5-Jan-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 63 | CWT00012238 | AD |
| 9 | 5-Jan-19 | 636958 | 2015 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 72 | CWT00012239 | AD |
| 9 | 5-Jan-19 | 211230 | 2016 | Mcallister Springs Hatch | Clear Creek Hatchery | NISQ | | 55 | CWT00015167 | AD |
| 9 | 5-Jan-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 62 | CWT00015168 | AD |
| 9 | 5-Jan-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 56 | CWT00025441 | AD |
| 9 | 5-Jan-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 59 | CWT00025442 | AD |
| 9 | 5-Jan-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 55 | CWT00025443 | AD |
| 9 | 5-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 59 | CWT00025444 | AD |
| 9 | 5-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00025445 | AD |
| 9 | 11-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 53 | CWT00009384 | AD |
| 9 | 12-Jan-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 60 | CWT00012240 | AD |
| 9 | 12-Jan-19 | 211230 | 2016 | Mcallister Springs Hatch | Clear Creek Hatchery | NISQ | | 53 | CWT00012241 | AD |
| 9 | 13-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | | CWT00009388 | AD |
| 9 | 13-Jan-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 56 | CWT00009389 | AD |
| 9 | 13-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 71 | CWT00009773 | AD |
| 9 | 13-Jan-19 | 211162 | 2015 | Whitehorse Springs | Whitehorse Pond | STIL | | 71 | CWT00015182 | AD |
| 9 | 13-Jan-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 59 | CWT00015183 | AD |
| 9 | 13-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 63 | CWT00015185 | AD |
| 9 | 13-Jan-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 65 | CWT00020148 | AD |
| 9 | 13-Jan-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 53 | CWT00025454 | AD |
| 9 | 16-Jan-19 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 58 | CWT00009390 | AD |
| 9 | 20-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 60 | CWT00009393 | AD |
| 9 | 20-Jan-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 62 | CWT00012244 | AD |
| 9 | 24-Jan-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 69 | CWT00009394 | AD |
| 9 | 24-Jan-19 | 184168 | 2016 | R-Capilano R Up | H-Capilano River H | CDFO | | 60 | CWT00009396 | AD |
| 9 | 25-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 61 | CWT00012245 | AD |
| 9 | 25-Jan-19 | 636963 | 2015 | Elwha R 18.0272 | Elwha Hatchery | WDFW | | 65 | CWT00012246 | AD |
| 9 | 25-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00015188 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 26-Jan-19 | 211170 | 2015 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | | 63 | CWT00009397 | AD |
| 9 | 26-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00009399 | AD |
| 9 | 26-Jan-19 | 637157 | 2016 | Kendall Cr 01.0406 | Kendall Cr Hatchery | WDFW | | 61 | CWT00012247 | AD |
| 9 | 26-Jan-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 59 | CWT00015189 | AD |
| 9 | 26-Jan-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 61 | CWT00015190 | AD |
| 9 | 26-Jan-19 | 637023 | 2015 | Portage Bay/Ship Cnl | Issaquah Hatchery | WDFW | | 62 | CWT00015191 | AD |
| 9 | 27-Jan-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 55 | CWT00009401 | AD |
| 9 | 27-Jan-19 | 637127 | 2016 | Lk Washington (King) | Issaquah Hatchery | WDFW | | 60 | CWT00015192 | AD |
| 9 | 27-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 59 | CWT00025455 | AD |
| 9 | 3-Feb-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 56 | CWT00009598 | AD |
| 9 | 7-Feb-19 | 184385 | 2016 | R-Chilliwack R | H-Chilliwack River H | CDFO | | 65 | CWT00021707 | AD |
| 9 | 24-Feb-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 56 | CWT00015193 | AD |
| 9 | 28-Feb-19 | 636912 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 78 | CWT00012256 | AD |
| 9 | 1-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 56 | CWT00009601 | AD |
| 9 | 3-Mar-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 72 | CWT00012257 | AD |
| 9 | 3-Mar-19 | 637127 | 2016 | Lk Washington (King) | Issaquah Hatchery | WDFW | | 66 | CWT00015194 | AD |
| 9 | 3-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 60 | CWT00025460 | AD |
| 9 | 3-Mar-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 55 | CWT00025461 | AD |
| 9 | 5-Mar-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 63 | CWT00025469 | AD |
| 9 | 8-Mar-19 | 637138 | 2016 | Lewis River Hatchery | | WDFW | | 63 | 85425 | AD |
| 9 | 8-Mar-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 65 | 85426 | AD |
| 9 | 8-Mar-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 72 | 85435 | AD |
| 9 | 8-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 54 | CWT00009775 | AD |
| 9 | 9-Mar-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 76 | 85437 | AD |
| 9 | 9-Mar-19 | 211230 | 2016 | Mcallister Springs Hatch | Clear Creek Hatchery | NISQ | | 63 | CWT00013015 | AD |
| 9 | 16-Mar-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 66 | 82072 | AD |
| 9 | 16-Mar-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 61 | 82076 | AD |
| 9 | 16-Mar-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 64 | 82077 | AD |
| 9 | 16-Mar-19 | 211162 | 2015 | Whitehorse Springs | Whitehorse Pond | STIL | | 76 | CWT00009776 | AD |
| 9 | 16-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 52 | CWT00015195 | AD |
| 9 | 16-Mar-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 61 | CWT00015196 | AD |
| 9 | 17-Mar-19 | 636960 | 2015 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 68 | 82079 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 17-Mar-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 64 | 82080 | AD |
| 9 | 17-Mar-19 | 636945 | 2015 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 62 | 82083 | AD |
| 9 | 17-Mar-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 57 | CWT00025463 | AD |
| 9 | 20-Mar-19 | 211155 | 2015 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211156 | 64 | CWT00021071 | AD |
| 9 | 22-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 54 | CWT00009676 | AD |
| 9 | 23-Mar-19 | 637166 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 57 | CWT00015197 | UM |
| 9 | 23-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 58 | CWT00015198 | AD |
| 9 | 24-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 65 | CWT00015199 | AD |
| 9 | 24-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 58 | CWT00015200 | AD |
| 9 | 24-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00015201 | AD |
| 9 | 24-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 63 | CWT00025465 | AD |
| 9 | 24-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 62 | CWT00025466 | AD |
| 9 | 28-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | 87621 | AD |
| 9 | 28-Mar-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 61 | CWT00007710 | AD |
| 9 | 29-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 63 | CWT00012261 | AD |
| 9 | 29-Mar-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 59 | CWT00025472 | AD |
| 9 | 29-Mar-19 | 637147 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 58 | CWT00025473 | AD |
| 9 | 29-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00025475 | AD |
| 9 | 30-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 63 | CWT00007711 | AD |
| 9 | 30-Mar-19 | 636924 | 2015 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 67 | CWT00025477 | AD |
| 9 | 30-Mar-19 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 67 | CWT00025507 | AD |
| 9 | 31-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 59 | CWT00007712 | AD |
| 9 | 31-Mar-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 67 | CWT00013426 | AD |
| 9 | 31-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 62 | CWT00025509 | AD |
| 9 | 4-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 62 | CWT00025511 | AD |
| 9 | 12-Apr-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 65 | CWT00009777 | AD |
| 9 | 12-Apr-19 | 211231 | 2016 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211232 | 58 | CWT00012262 | AD |
| 9 | 12-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 60 | CWT00025512 | AD |
| 9 | 12-Apr-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 60 | CWT00025513 | AD |
| 9 | 14-Apr-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 57 | CWT00009778 | AD |
| 9 | 14-Apr-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 62 | CWT00009779 | AD |
| 9 | 14-Apr-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 68 | CWT00012263 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 14-Apr-19 | 184384 | 2016 | R-Chilliwack R | H-Chilliwack River H | CDFO | | 65 | CWT00025514 | AD |
| 9 | 14-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 63 | CWT00025515 | AD |
| 9 | 15-Apr-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 56 | CWT00025505 | AD |

**Appendix 10** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 10.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 2-Jan-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 53 | CWT00015164 | AD |
| 10 | 5-Jan-19 | 211232 | 2016 | Tulalip Cr 07.0001 | Bernie Gobin Hatch | TULA | 211231 | 53 | CWT00008892 | AD |
| 10 | 5-Jan-19 | 637161 | 2016 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 60 | CWT00009036 | AD |
| 10 | 5-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 65 | CWT00009379 | AD |
| 10 | 5-Jan-19 | 211230 | 2016 | Mcallister Springs Hatch | Clear Creek Hatchery | NISQ | | 61 | CWT00009381 | AD |
| 10 | 5-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 57 | CWT00015165 | AD |
| 10 | 5-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 61 | CWT00015166 | AD |
| 10 | 5-Jan-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 54 | CWT00015169 | AD |
| 10 | 7-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 61 | CWT00015170 | AD |
| 10 | 8-Jan-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 59 | CWT00015171 | AD |
| 10 | 11-Jan-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 54 | CWT00015172 | AD |
| 10 | 11-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 60 | CWT00015173 | AD |
| 10 | 11-Jan-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 52 | CWT00015174 | AD |
| 10 | 11-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 57 | CWT00025446 | AD |
| 10 | 11-Jan-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 54 | CWT00025447 | AD |
| 10 | 12-Jan-19 | 637147 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 53 | CWT00009037 | AD |
| 10 | 12-Jan-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 62 | CWT00009387 | AD |
| 10 | 12-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 65 | CWT00015175 | AD |
| 10 | 12-Jan-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 57 | CWT00015176 | AD |
| 10 | 12-Jan-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 61 | CWT00015177 | AD |
| 10 | 12-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00015178 | AD |
| 10 | 12-Jan-19 | 637174 | 2016 | Friday Cr 03.0017 | Samish Hatchery | WDFW | | 58 | CWT00015179 | AD |
| 10 | 12-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 62 | CWT00015180 | AD |
| 10 | 12-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 54 | CWT00025448 | AD |
| 10 | 12-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 53 | CWT00025449 | AD |
| 10 | 12-Jan-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 55 | CWT00025450 | AD |
| 10 | 12-Jan-19 | 637165 | 2016 | Minter Cr 15.0048 | Hupp Springs Rearing | WDFW | | 59 | CWT00025451 | UM |
| 10 | 13-Jan-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | | CWT00009774 | AD |
| 10 | 13-Jan-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 58 | CWT00015181 | AD |
| 10 | 13-Jan-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 53 | CWT00015184 | AD |
| 10 | 13-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00015186 | AD |
| 10 | 13-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 58 | CWT00015187 | AD |
| 10 | 13-Jan-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00025452 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 13-Jan-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 58 | CWT00025453 | AD |
| 10 | 16-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 60 | CWT00009391 | AD |
| 10 | 18-Jan-19 | 637171 | 2016 | Wallace R 07.0940 | Wallace R Hatchery | WDFW | | 55 | CWT00009038 | AD |

**Appendix 11** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 11.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 18-Oct-18 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 61 | CWT00022243 | AD |
| 11 | 21-Oct-18 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 54 | CWT00010300 | AD |
| 11 | 27-Oct-18 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 62 | CWT00013743 | AD |
| 11 | 29-Oct-18 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 56 | CWT00010301 | AD |
| 11 | 9-Nov-18 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 52 | CWT00022102 | AD |
| 11 | 9-Nov-18 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 62 | CWT00022244 | AD |
| 11 | 11-Nov-18 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 54 | CWT00013742 | AD |
| 11 | 11-Nov-18 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 55 | CWT00022245 | AD |
| 11 | 11-Nov-18 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 53 | CWT00022246 | AD |
| 11 | 11-Nov-18 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 56 | CWT00027403 | AD |
| 11 | 17-Nov-18 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 59 | CWT00013749 | AD |
| 11 | 21-Nov-18 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 56 | 28956 | AD |
| 11 | 7-Dec-18 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 63 | CWT00013752 | AD |
| 11 | 8-Dec-18 | 636917 | 2015 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 59 | CWT00024502 | AD |
| 11 | 8-Dec-18 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 56 | CWT00024503 | AD |
| 11 | 9-Dec-18 | 211169 | 2015 | Grovers Cr 15.0299 | Grovers Cr Hatchery | SUQ | 636943 | 58 | CWT00025439 | AD |
| 11 | 16-Dec-18 | 637161 | 2016 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 61 | CWT00014887 | AD |
| 11 | 17-Dec-18 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 55 | CWT00014745 | AD |
| 11 | 17-Dec-18 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 54 | CWT00014746 | AD |
| 11 | 21-Dec-18 | 637168 | 2016 | Big Soos Cr 09.0072 | Soos Creek Hatchery | WDFW | | 56 | CWT00014886 | AD |
| 11 | 20-Jan-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 53 | CWT00017228 | AD |
| 11 | 27-Jan-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 60 | CWT00014747 | AD |
| 11 | 27-Jan-19 | 211213 | 2016 | Whitehorse Springs | Whitehorse Pond | STIL | | 55 | CWT00014748 | AD |
| 11 | 10-Mar-19 | 637146 | 2016 | Gorst Cr 15.0216 | Gorst Cr Rearing Pnd | SUQ | | 57 | CWT00017229 | AD |
| 11 | 30-Mar-19 | 637161 | 2016 | Cascade R 03.1411 | Marblemount Hatchery | WDFW | | 66 | CWT00014749 | AD |
| 11 | 31-Mar-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 67 | CWT00023003 | AD |
| 11 | 1-Apr-19 | 211187 | 2015 | Clarks Crk Hatchery | Clarks Crk Hatchery | PUYA | | 62 | CWT00014750 | AD |
| 11 | 8-Apr-19 | 211229 | 2016 | Kalama Cr 11.0017 | Kalama Cr Hatchery | NISQ | | 55 | CWT00014751 | AD |

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 8-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 56 | CWT00014752 | AD |
| 11 | 10-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 57 | CWT00014753 | AD |
| 11 | 10-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 61 | CWT00014754 | AD |
| 11 | 22-Apr-19 | 637162 | 2016 | Deschutes R 13.0028 | Tumwater Falls Hatchery | WDFW | | 66 | CWT00051701 | AD |
| 11 | 22-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 58 | CWT00051702 | AD |
| 11 | 23-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 64 | CWT00051703 | AD |
| 11 | 24-Apr-19 | 636925 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 71 | CWT00051704 | AD |
| 11 | 26-Apr-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 60 | CWT00022247 | AD |
| 11 | 27-Apr-19 | 637173 | 2016 | Minter Cr 15.0048 | Minter Cr Hatchery | WDFW | | 59 | CWT00022248 | AD |
| 11 | 28-Apr-19 | 211220 | 2016 | Clear Cr 11.0013C | Clear Creek Hatchery | NISQ | 637159 | 68 | CWT00051801 | AD |
| 11 | 30-Apr-19 | 211219 | 2016 | Grovers Cr Hatchery | Grovers Cr Hatchery | SUQ | 637158 | 54 | CWT00051705 | AD |

**Appendix 12** Coded-wire tag (CWT) recoveries from the 2018-19 winter Chinook MSF in Marine Area 12.

| Area | Recovery Date | Tag Code | Brood Year | Release Site | Rearing Hatchery | Release Agency | DIT Codes | FL(cm) | Label | Recovery Mark |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 6-Oct-18 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 52 | CWT00020254 | AD |
| 12 | 2-Mar-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 57 | 56847 | AD |
| 12 | 2-Mar-19 | 636957 | 2015 | Icy Cr 09.0125 | Icy Cr Hatchery | WDFW | | 69 | 56848 | AD |
| 12 | 2-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 51 | 56849 | AD |
| 12 | 3-Mar-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 64 | 56879 | AD |
| 12 | 21-Apr-19 | 637167 | 2016 | Finch Cr 16.0222 | Hoodsport Hatchery | WDFW | | 52 | CWT00052001 | AD |
| 12 | 22-Apr-19 | 637192 | 2016 | Purdy Cr 16.0005 | George Adams Hatchery | WDFW | | 68 | CWT00051201 | AD |