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**2019 Summer Mark-Selective Recreational Chinook Fisheries  
In Marine Areas 5, 6, 7, 9, 10, 11, 12 and 13**

**Post-season Report**

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## TABLE OF CONTENTS

TABLE OF CONTENTS.....	i
LIST OF TABLES.....	iii
LIST OF FIGURES.....	iii
LIST OF APPENDICIES.....	xiv
RESULTS.....	2
1) Marine Area 5 Summer Mark-Selective Chinook Fishery.....	2
2) Marine Area 6 Summer Mark-Selective Chinook Fishery.....	11
3) Marine Area 7 Summer Mark-Selective Chinook Fishery.....	17
4) Marine Area 9 Summer Mark-Selective Chinook Fishery.....	26
5) Marine Area 10 Summer Mark-Selective Chinook Fishery.....	37
6) Marine Area 11 Summer Mark-Selective Chinook Fishery.....	48
7) Marine Area 12 Summer Mark-Selective Chinook Fishery.....	59
8) Marine Area 13 Summer Mark-Selective Chinook Fishery.....	66
<b>ACKNOWLEDGEMENTS.....</b>	<b>72</b>
<b>REFERENCES.....</b>	<b>73</b>
APPENDICIES.....	78
1) SITE WEIGHTS.....	78
2) CWT RECOVERIES.....	81

## LIST OF TABLES

<b>Table 1.1</b> Sampling/estimation details on target parameters associated with the overall Area 5 summer mark-selective fishery monitoring program.....	3
<b>Table 1.2</b> Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 5. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.....	4
<b>Table 1.3</b> Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 5. ....	4
<b>Table 1.4</b> 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 2019 summer Chinook salmon MSF in Marine Area 5. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.....	4
<b>Table 1.5</b> Summary of season-wide fishery impact estimates for the 2019 summer Chinook MSF in Marine Area 5. 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. ....	6
<b>Table 1.6</b> Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook MSF in Marine Area 5. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. ....	6
<b>Table 1.7</b> Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook MSF in Marine Area 5. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. ....	6
<b>Table 1.8</b> Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2019 summer Chinook MSF in Marine Area 5. Sites in bold represent those included in the dockside sample frame. ....	8
<b>Table 1.9</b> Monthly sample rates (Total retained Chinook sampled <sup>1</sup> / Estimated retained Chinook) for the 2019 summer Chinook MSF in Marine Area 5. AD = marked (adipose-clipped), UM = unmarked. ....	8
<b>Table 1.10</b> Fishery-total estimates of retained and released salmon ( <i>other than Chinook</i> ) for the 2019 summer Chinook MSF in Marine Area 5. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. ....	8
<b>Table 1.11</b> Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 5. The field “Number DITs” corresponds to the number of tags that belonged to double-index tag groups.....	9
<b>Table 1.12</b> 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 2019 summer Chinook MSF in Marine Area 5. AD = marked (adipose-clipped), UM = unmarked.....	10

**Table 1.13** 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 5 summer Chinook MSF. Values may not add exactly due to rounding error. .... 10

**Table 2.1** Sampling/estimation details on target parameters associated with the overall Area 6 summer mark-selective fishery monitoring program..... 12

**Table 2.2** Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the summer Chinook salmon MSF in Marine Area 6. 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. .... 13

**Table 2.3** Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the summer 2019 Chinook salmon MSF in Marine Area 6. 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. .... 13

**Table 2.4** List of sites sampled with the number of sampling events (site-days) during the summer 2019 Chinook salmon MSF in Marine Area 6..... 13

**Table 2.5** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 6..... 15

**Table 2.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook MSF in Marine Area 6, 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..... 15

**Table 2.7** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 6. The field “Number DITs” corresponds to the number of tags that belonged to double-index tag groups..... 16

**Table 3.1** Sampling/estimation details on target parameters associated with the overall Marine Area 7 Chinook MSF monitoring program..... 18

**Table 3.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 Summer Chinook MSF in Marine Area 7. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 19

**Table 3.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the Marine Area 7 Chinook MSF..... 19

**Table 3.4** Total Chinook 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 2019 summer Chinook 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..... 19

**Table 3.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook 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. .... 21

**Table 3.6** Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook MSF in Marine Area 7. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. .... 21

**Table 3.7** Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook MSF in Marine Area 7. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. .... 21

**Table 3.8** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the three-site sample frame during the 2019 summer Chinook salmon MSF in Marine Area 7. See Methods Report (WDFW 2012a) for computational details and notation. .... 23

**Table 3.9** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) in the 2019 summer Chinook MSF in Marine Area 7. .... 23

**Table 3.10** Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates from the 2019 summer Chinook MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked. .... 23

**Table 3.11** Fishery-total estimates of retained and released salmon (other than Chinook) during the 2019 summer Chinook MSF in Marine Area 7. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status. .... 24

**Table 3.12** Summary of CWTs recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 7. The field “Number DITs” indicates the number of tags that belonged to double-index tag groups. .... 25

**Table 3.13** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2019 summer Chinook MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked ..... 25

**Table 3.14** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Marine Area 7 Summer Chinook 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. .... 25

**Table 4.1** Sampling/estimation details on target parameters associated with the overall Marine Area 9 summer mark-selective fishery monitoring program. .... 27

**Table 4.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 9. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. .... 28

**Table 4.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 9..... 28

**Table 4.4** Comparison of modeled and estimated total Chinook encounters for the 2019 summer Chinook MSF in Marine Area 9. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked..... 30

**Table 4.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook 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. .... 30

**Table 4.6** Comparison of modeled and estimated total Chinook mortalities for the 2019 summer Chinook MSF in Marine Area 9. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked..... 30

**Table 4.7** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the summer 2019 Chinook salmon MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked. .... 32

**Table 4.8** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs), with estimates of legal-size and overall (legal and sublegal) mark rates during the 2019 summer Chinook 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..... 33

**Table 4.9** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 9. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag groups. .... 33

**Table 4.10** 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 2019 summer Chinook MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked..... 33

**Table 4.11** Monthly sample rates (Total retained Chinook salmon sampled<sup>1</sup> / Estimated retained Chinook) in the 2019 summer Chinook MSF in Marine Area 9. .... 34

**Table 4.12** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) in the 2019 summer Chinook MSF in Marine Area 9. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status ..... 34

**Table 4.13** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2019 summer Chinook MSF in Marine Area 9. Sites in bold represent those included in the dockside sample frame. .... 35

**Table 4.14** 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 summer Chinook MSF. Values may not add exactly due to rounding error. .... 36

**Table 5.1** Sampling/estimation details on target parameters associated with the overall Marine Area 10 summer mark-selective fishery monitoring program. .... 38

**Table 5.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 10. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. .... 39

**Table 5.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 10. .. 39

**Table 5.4** Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked. .... 41

**Table 5.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook 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. .... 41

**Table 5.6** Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked. .... 41

**Table 5.7** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2019 summer Chinook 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. .... 43

**Table 5.8** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs), with estimates of legal-size and overall (legal and sublegal) mark rates during the 2019 summer Chinook 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. .... 44

**Table 5.9** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) in the 2019 summer Chinook MSF in Marine Area 10. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status. .... 44

**Table 5.10** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2019 summer Chinook MSF in Marine Area 10. Sites in bold represent those included in the dockside sample frame. .... 45

**Table 5.11** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 10. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag ..... 46

**Table 5.12** 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 2019 summer Chinook MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked. .... 46

**Table 5.13** Monthly sample rates (Total retained Chinook salmon sampled<sup>1</sup> / Estimated retained Chinook salmon) in the 2019 summer Chinook MSF in Marine Area 10..... 47

**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 10 summer Chinook MSF. Values may not add exactly due to rounding error. .... 47

**Table 6.1** Sampling/estimation details on target parameters associated with the overall Marine Area 11 summer mark-selective fishery monitoring program. .... 49

**Table 6.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 11. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 50

**Table 6.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 11. .. 50

**Table 6.4** Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. .... 52

**Table 6.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook MSF in Marine Area 11. 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. .... 52

**Table 6.6** Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. .... 52

**Table 6.7** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 11. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag ..... 54

**Table 6.8** 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 2019 summer Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked..... 54

**Table 6.9** Monthly sample rates (Total retained Chinook salmon sampled<sup>1</sup> / Estimated retained Chinook salmon) in the 2019 summer Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked..... 54

**Table 6.10** Summary of dockside creel observations of kept Chinook and reported releases of Chinook by mark status during the 2019 summer Chinook MSF in Marine Area 11 by mark-status. .... 55

**Table 6.11** Beta regression results for legal-mark status from the released-to-retained ratio during the 2019 summer Chinook MSF in Marine Area 11. .... 55

**Table 6.12** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2018 summer Chinook MSF in Marine Area 11. Sites in bold represent those included in the dockside sample frame. .... 56



**Table 6.13** Fishery-total estimates of retained and released salmon (other than Chinook salmon) for the 2019 summer Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status. Values may not add exactly due to rounding error. .... 57

**Table 6.14** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook 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..... 57

**Table 6.15** 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 11 summer Chinook MSF. Values may not add exactly due to rounding error. .... 58

**Table 7.1** Sampling/estimation details on target parameters associated with the overall Marine Area 12 summer mark-selective fishery monitoring program..... 60

**Table 7.2** Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the summer 2019 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..... 61

**Table 7.3** Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the summer 2019 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. .... 62

**Table 7.4** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 12. .. 64

**Table 7.5** List of sites sampled with the number of sampling events (site-days) during the 2019 summer Chinook MSF in Marine Area 12. .... 64

**Table 7.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook 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..... 64

**Table 7.7** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 12. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag ..... 65

**Table 8.1** Sampling/estimation details on target parameters associated with the overall Marine Area 13 mark-selective fishery monitoring program..... 67

**Table 8.2** Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2019 summer Chinook 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..... 68

**Table 8.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 13. .. 68

**Table 8.4** Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the summer 2019 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. .... 69

**Table 8.5** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook 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..... 71

**Table 8.6** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 13. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag groups. .... 71

## LIST OF FIGURES

<b>Figure 1.1</b> Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 5.....	5
<b>Figure 1.2</b> Temporal patterns in CPUE (landed Chinook per angler trip) during the 2019 summer Chinook MSF in Marine Area 5. ....	5
<b>Figure 1.3</b> Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 5. Note: displayed values are observations where lengths taken. ....	5
<b>Figure 1.4</b> Temporal patterns in CPUE (landed Chinook per angler trip) during the 2019 summer Chinook MSF in Marine Area 5. ....	5
<b>Figure 1.5</b> Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 5. Error bars represent approximate 95% confidence intervals for field estimates. ....	7
<b>Figure 2.1</b> Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. ....	14
<b>Figure 2.2</b> Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.....	14
<b>Figure 2.3</b> Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are observations where lengths taken. ....	14
<b>Figure 2.4</b> Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.....	14
<b>Figure 3.1</b> Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 7.....	20
<b>Figure 3.2</b> Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2019 summer Chinook MSF in Marine Area 7. ....	20
<b>Figure 3.3</b> Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 7. ....	20
<b>Figure 3.4</b> Temporal patterns in Chinook salmon encounters (number retained and released) during the 2019 summer Chinook MSF in Marine Area 7. ....	20
<b>Figure 3.5</b> Comparison of modeled and estimated total Chinook encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 7. Error bars represent approximate 95% confidence intervals for field estimates .....	22
<b>Figure 3.6</b> Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook encountered by test fishers during the 2019 summer Chinook MSF in Marine Area 7. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm). ....	24

<b>Figure 4.1</b> Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 9.....	29
<b>Figure 4.2</b> Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 9. ....	29
<b>Figure 4.3</b> Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 9. Note: displayed values are observations where lengths taken. ....	29
<b>Figure 4.4</b> Temporal patterns in Chinook salmon encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 9. ....	29
<b>Figure 4.5</b> Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 9. Error bars represent approximate 95% confidence intervals for field estimates. ....	31
<b>Figure 4.6</b> Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook salmon encountered by test fishers during the 2019 summer Chinook MSF in Marine Area 9. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm).....	32
<b>Figure 5.1</b> Temporal patterns in fishing effort during the 2108 summer Chinook MSF in Marine Area 10.....	40
<b>Figure 5.2</b> Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 10. ....	40
<b>Figure 5.3</b> Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 10. Note: displayed values are observations where lengths taken.....	40
<b>Figure 5.4</b> Temporal patterns in Chinook salmon encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 10. ....	40
<b>Figure 5.5</b> Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 10. Error bars represent approximate 95% confidence intervals for field estimates. ....	42
<b>Figure 5.6</b> Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook salmon encountered by test fishers during the 2019 summer Chinook MSF in Marine Area 10. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm).....	43
<b>Figure 6.1</b> Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 11.....	51
<b>Figure 6.2</b> Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 11. ....	51
<b>Figure 6.3</b> Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 11. Note: displayed values are observations where lengths taken.....	51

**Figure 6.4** Temporal patterns in Chinook salmon encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 11. .... 51

**Figure 6.5** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 11. Error bars represent approximate 95% confidence intervals for field estimates. .... 53

**Figure 6.6** Beta regression results displaying the relationship between the released-to-retained ratio from dockside sampling data and the proportion of legal Chinook from the test fishery or VTR data, including parameters resulting from the beta regression model. Red points represent summer fisheries, blue points represent winter fisheries. The dotted lines represent 95% confidence bounds. .... 55

**Figure 7.1** Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. .... 63

**Figure 7.2** Temporal patterns in CPUE (landed Chinook per angler trip) during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. .... 63

**Figure 7.3** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are observations where lengths taken. Note: displayed values are observations where lengths taken. .... 63

**Figure 7.4** Temporal patterns in Chinook encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates..... 63

**Figure 8.1** Temporal patterns in fishing effort during the 2019 summer Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. .... 70

**Figure 8.2** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates..... 70

**Figure 8.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 13. Note: displayed values are observations where lengths taken. .... 70

**Figure 8.4** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates..... 70

## LIST OF APPENDICIES

<b>Appendix 1.1</b> Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 5.....	78
<b>Appendix 1.2</b> Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 9.....	78
<b>Appendix 1.3</b> Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 10.....	79
<b>Appendix 1.4</b> Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 11.....	80
<b>Appendix 2.1</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 5.....	81
<b>Appendix 2.2</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 6.....	89
<b>Appendix 2.3</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 7.....	92
<b>Appendix 2.4</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 9.....	95
<b>Appendix 2.5</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 10.....	96
<b>Appendix 2.6</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 11.....	97
<b>Appendix 2.7</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 12.....	99
<b>Appendix 2.8</b> Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 13.....	99

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 runs 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<sup>1</sup>.

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 Catch 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 16 summer (May through September) seasons and the last 15 winter (October through April) seasons.

During the 2019 summer season, May through September, WDFW implemented eight mark-selective Chinook salmon fisheries in Areas 5, 6, 7, 9, 10, 11, 12 and 13. The Chinook MSF seasons in each area were scheduled per the List of Agreed Fisheries as follows:

- Areas 5 from July 1 through August 15, 2019;
- Areas 6 from July 1 through August 15, 2019;
- Area 7 from July 1 through July 31, 2019;
- Area 9 from July 25 through August 15, 2019;
- Area 10 from July 25 through August 31, 2019;
- Area 11 from July 1 through September 30, 2019;
- Area 12 from July 1 through September 30, 2019; and
- Area 13 from May 1 through September 30, 2019.

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<sup>1</sup>The regulations specific to summer mark-selective fisheries in Puget Sound Marine Catch Areas allowed for the retention of up to two legal-sized ( $\geq 22$  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 Summer Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a seventeenth consecutive summer Chinook MSF in Marine Area 5 from July 1 through August 15, 2019. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 5 throughout the season to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling and intensive efforts to distribute and collect voluntary trip reports (VTRs) from the angling public. During the summer 2019 mark-selective Chinook salmon fishery in Area 5 we maintained our enhanced VTR program to improve the return rate of VTRs, which provide estimates of Chinook salmon encounter rates by size class (legal or sublegal) and mark status (marked (adipose fin-clipped) or unmarked). **Table 1.1** 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 5 summer Chinook MSF.



**Table 1.1** Sampling/estimation details on target parameters associated with the overall Area 5 summer mark-selective fishery 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 <sup>1</sup>	Catch rates (CPUE); length, age, and CWT composition of harvest <sup>1</sup> ; 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	2 weekend boat surveys and 2 weekday surveys were conducted during the 2019 Area 5 summer Chinook MSF. As in-season observations suggested that sites and effort patterns did not change substantially in 2019 compared to past years, we incorporated data from these surveys into recent average site weights to compute catch and effort 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 salmon) that the angler may record on the VTR form	Fish encounter	Season	We used VTR data to estimate the size/mark-status proportions (LM = 32%, LU = 20%, SM = 28%, SU = 20%; <b>Table 1.4</b> ) 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.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

**Table 1.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 5. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

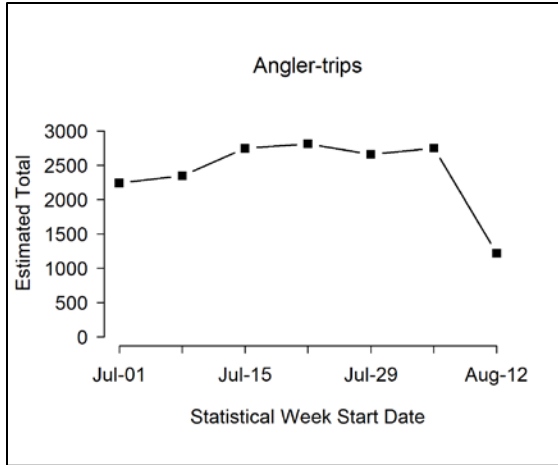
Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
July	27	1-Jul	7-Jul	947	2240	768	0	835	1075	2678
	28	8-Jul	14-Jul	1004	2,347	584	0	635	818	2,036
	29	15-Jul	21-Jul	1176	2,748	917	3	997	1281	3,198
	30	22-Jul	28-Jul	1175	2,811	787	3	856	1099	2,745
	31	29-Jul	4-Aug	997	2,658	647	0	703	906	2,255
August	32	5-Aug	11-Aug	1,107	2,749	675	3	733	942	2,353
	33	12-Aug	15-Aug	503	1215	181	0	197	254	632
<b>Season Total:</b>				<b>6,910</b>	<b>16,768</b>	<b>4,558</b>	<b>8</b>	<b>4,956</b>	<b>6,374</b>	<b>15,897</b>
<b>Variance:</b>				211,813	1,166,964	321,055	15	2,529,154	1,248,074	8,045,272
<b>SE:</b>				460	1080	567	4	1,590	1117	2,836
<b>CV (%):</b>				7	6	12	45	32	18	18
<b>95% CI:</b>				6,008 - 7,812	14,651 - 18,885	3,447 - 5,669	1 - 16	1,839 - 8,073	4,185 - 8,564	10,338 - 21,457

**Table 1.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 5.

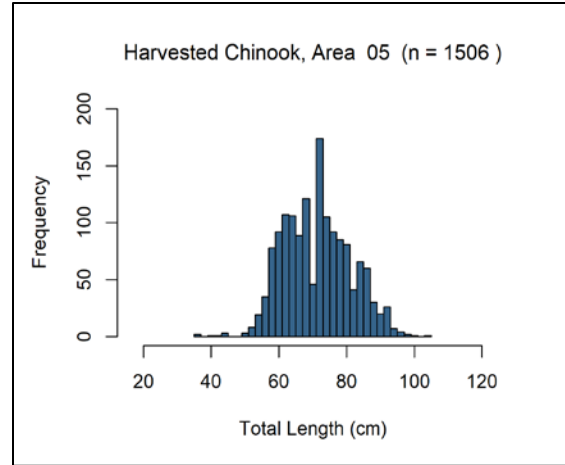
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	1454	52	1506
Unmarked	7	1	8
<b>Total</b>	<b>1461</b>	<b>53</b>	<b>1514</b>

**Table 1.4** 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 2019 summer Chinook salmon MSF in Marine Area 5. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

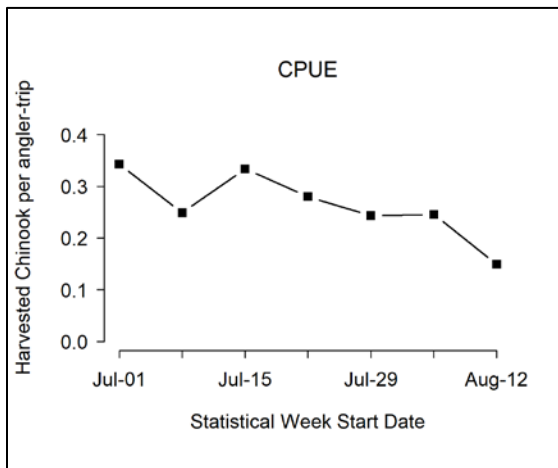
Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private VTR	39 1-trip VTRs	42	26	37	27	132	0.60	0.62
Size/mark-status composition:		0.32	0.20	0.28	0.20			
Variance:		(0.0017)	(0.0012)	(0.0015)	(0.0012)			



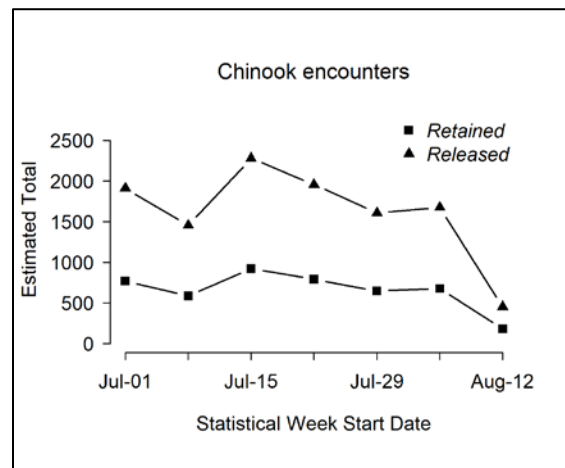
**Figure 1.1** Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 5.



**Figure 1.3** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 5. Note: displayed values are observations where lengths taken.



**Figure 1.2** Temporal patterns in CPUE (landed Chinook per angler trip) during the 2019 summer Chinook MSF in Marine Area 5.



**Figure 1.4** Temporal patterns in CPUE (landed Chinook per angler trip) during the 2019 summer Chinook MSF in Marine Area 5.

**Table 1.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook MSF in Marine Area 5. 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.

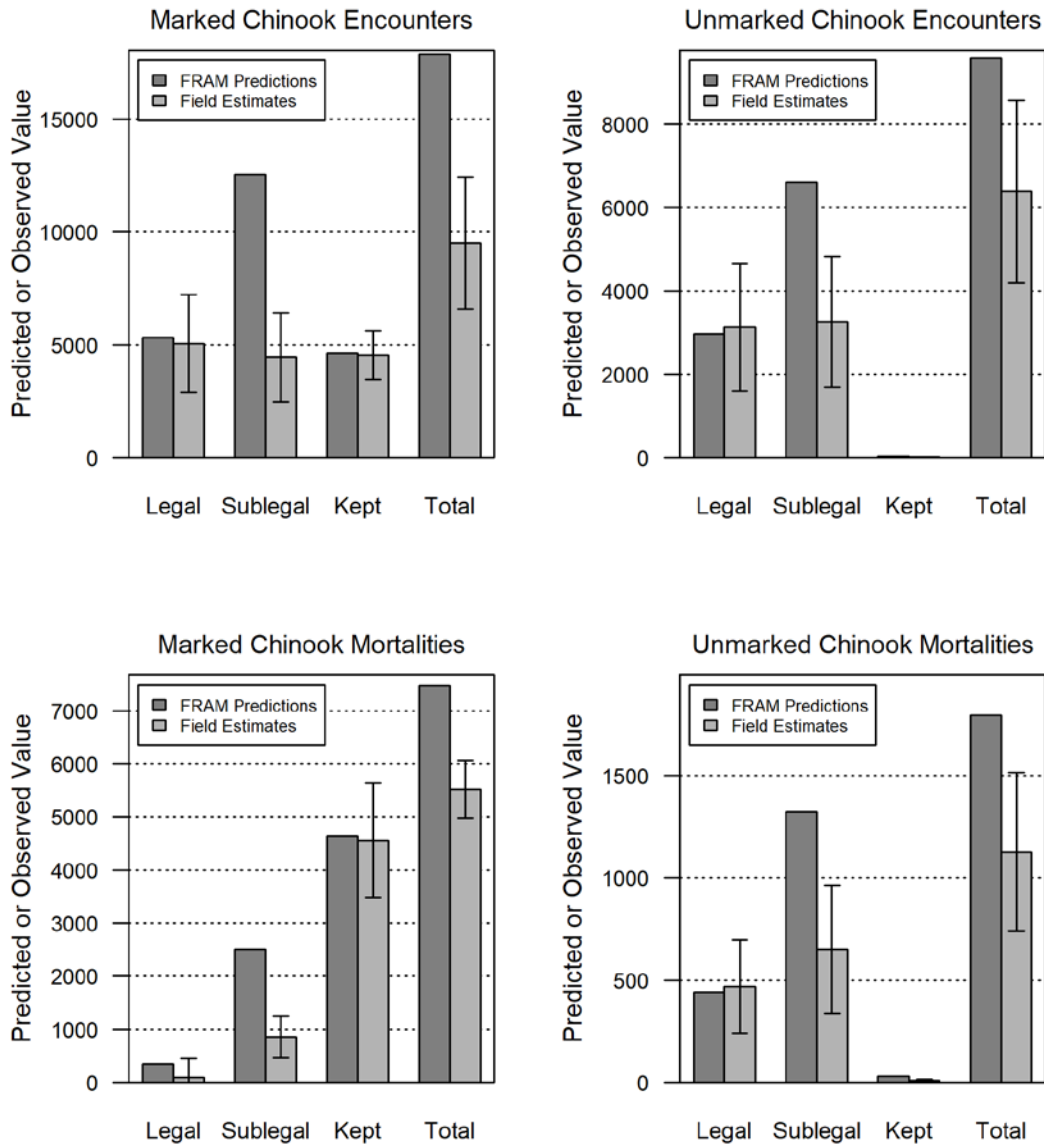
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	5,058	4,401	658	99	4,499	333,906	578	3,367 - 5,632	13
Legal UM	3,131	7	3,124	469	476	13,682	117	247 - 705	25
Sublegal AD	4,456	157	4,299	860	1,017	41,225	203	619 - 1,415	20
Sublegal UM	3,252	1	3,251	650	651	25,621	160	337 - 965	25
<b>Total</b>	<b>15,897</b>	<b>4,567</b>	<b>11,331</b>	<b>2,077</b>	<b>6,644</b>	<b>414,435</b>	<b>644</b>	<b>5,382 - 7,905</b>	<b>10</b>

**Table 1.6** Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook MSF in Marine Area 5. 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	9,583	2,965	6,618	30
	AD	17,865	5,329	12,536	4,636
	Total	27,448	8,294	19,154	4,666
	% Marked	65	64	65	99
Estimated (Creel) Encounters	UM	6,383	3,131	3,252	8
	AD	9,514	5,058	4,456	4,558
	Total	15,897	8,189	7,708	4,567
	% Marked	60	62	58	100

**Table 1.7** Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook MSF in Marine Area 5. 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)	1795	7,479	9,274	1,127	5,516	6,644
Released Legal	441	336	777	469	99	567
Released Sublegal	1324	2,507	3,831	650	860	1,510
Landed Only	30	4,636	4,666	8	4,558	4,567



**Figure 1.5** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 5. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 1.8** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2019 summer Chinook MSF in Marine Area 5. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Big Salmon Resort	0	0.0000	2	0.0051
Coho Resort	17	0.0550	22	0.0564
<b>Curleys Resort</b>	<b>12</b>	<b>0.0388</b>	<b>41</b>	<b>0.1051</b>
<b>Olson's East Docks</b>	<b>100</b>	<b>0.3236</b>	<b>99</b>	<b>0.2538</b>
<b>Olson's Ramp &amp; Docks</b>	<b>60</b>	<b>0.1942</b>	<b>102</b>	<b>0.2615</b>
<b>Olson's West Docks</b>	10	0.0324	9	0.0231
Olson's South Dock	9	0.0291	3	0.0077
Private	2	0.0065	2	0.0051
Unknown	20	0.0647	15	0.0385
<b>Van Riper's North</b>	<b>34</b>	<b>0.1100</b>	<b>52</b>	<b>0.1333</b>
<b>Van Riper's South</b>	<b>45</b>	<b>0.1456</b>	<b>43</b>	<b>0.1103</b>
<b>Total Anglers</b>	<b>309</b>	<b>1</b>	<b>390</b>	<b>1</b>

**Table 1.9** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) for the 2019 summer Chinook MSF in Marine Area 5. 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	
July	26 - 30	1 Jul - 30 Jul	3,056	6	3,061	1139	5	1144	37.40%
August	31 - 33	31 Jul - 15 Aug	1503	3	1505	432	3	435	28.90%
<b>Season Total</b>			<b>4,558</b>	<b>8</b>	<b>4,567</b>	<b>1571</b>	<b>8</b>	<b>1579</b>	<b>34.60%</b>

<sup>1</sup>/ Number of retained Chinook salmon sampled includes all retained Chinook salmon inspected for CWT's, from all sites sampled during the 2019 summer Chinook MSF in Marine Area 5 (creel estimates and fish sampled as part of baseline sampling).

**Table 1.10** Fishery-total estimates of retained and released salmon (*other than Chinook*) for the 2019 summer Chinook MSF in Marine Area 5. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Start Date	End Date	Retained Salmon					Released Salmon					
			Coho AD	Coho UM	Coho UK	Chum	Pink	Coho AD	Coho UM	Coho UK	Chum	Pink	Unknown
27	1-Jul	7-Jul	392	16	0	0	16	42	457	161	0	22	498
28	8-Jul	14-Jul	151	6	0	0	96	57	168	38	0	74	430
29	15-Jul	21-Jul	85	3	4	0	402	12	178	34	3	310	283
30	22-Jul	28-Jul	55	4	0	0	865	15	105	21	0	520	150
31	29-Jul	4-Aug	100	0	0	24	1176	3	192	79	0	704	558
32	5-Aug	11-Aug	227	0	0	24	1450	12	239	108	0	1143	651
33	12-Aug	15-Aug	68	11	0	0	413	12	33	22	0	89	77
<b>Season Total:</b>			<b>1077</b>	<b>40</b>	<b>4</b>	<b>49</b>	<b>4418</b>	<b>153</b>	<b>1373</b>	<b>463</b>	<b>3</b>	<b>2861</b>	<b>2647</b>
<b>Variance:</b>			20,298	245	9	2149	858943	2,736	67,067	31,480	5	479,302	148,380
<b>Standard Error:</b>			142	16	3	46	927	52	259	177	2	692	385
<b>CV (%):</b>			13	39	82	95	21	34	19	38	78	24	15
<b>95% CI:</b>			798 - 1,357	9 - 70	0 - 9	0 - 139	2,601 - 6,234	51 - 256	865 - 1,880	116 - 811	0 - 7	1,504 - 4,218	1,892 - 3,402

**Table 1.11** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 5. The field “Number DITs” corresponds to 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 (10.5%)	R-Nicola R	H-Spius Creek H	2 (0.9%)	0
		R-Shuswap R Low	H-Shuswap River, Middle.	3 (1.4%)	0
		R-Harrison R	H-Chehalis River H	5 (2.3%)	0
		R-Chilliwack R	H-Chilliwack River H	13 (5.9%)	0
	Georgia Strait (1.8%)	R-Capilano R Up	H-Capilano River H	1 (0.5%)	0
		R-Cowichan R	H-Cowichan River H	3 (1.4%)	0
	Johnstone Strait (0.5%)	R-Quinsam R	H-Quinsam River H	1 (0.5%)	0
WA	N Washington (3.6%)	Friday Cr 03.0017	Samish Hatchery	4 (1.8%)	0
		East Sound Bay (San)	Glenwood Springs	2 (0.9%)	0
		Kendall Cr 01.0406	Kendall Cr Hatchery	2 (0.9%)	0
	N Washington Coast (0.9%)	Tsoo-Yess R 20.0015	Makah Nfh On Tsoo-Yess R	2 (0.9%)	0
	Strait of Juan De Fuca (6.8%)	Elwha R 18.0272	Elwha Hatchery	4 (1.8%)	0
		Hoko R 19.0148	Hoko Falls Hatchery	11 (5%)	0
	Hood Canal (13.6%)	Purdy Cr 16.0005	George Adams Hatchery	17 (7.7%)	0
		Finch Cr 16.0222	Hoodsport Hatchery	13 (5.9%)	0
	N Puget Sound (2.3%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	1 (0.5%)	1
		Stillaguamish R -Sf	Brenner Hatchery	1 (0.5%)	0
		Wallace R 07.0940	Wallace R Hatchery	1 (0.5%)	0
		Whitehorse Springs	Whitehorse Pond	2 (0.9%)	0
	Skagit River (2.3%)	Cascade R 03.1411	Marblemount Hatchery	1 (0.5%)	0
		Co Line Pd2 03.1853B	Marblemount Hatchery	4 (1.8%)	0
	Mid Puget Sound (19.1%)	Grovers Cr Hatchery	Grovers Cr Hatchery	7 (3.2%)	7
		Gorst Cr 15.0216	Gorst Cr Rearing Pnd	14 (6.4%)	0
		Voight Cr 10.0414	Voights Cr Hatchery	1 (0.5%)	0
		Big Soos Cr 09.0072	Soos Creek Hatchery	8 (3.6%)	0
		Grovers Cr 15.0299	Grovers Cr Hatchery	6 (2.7%)	6
		Icy Cr 09.0125	Icy Cr Hatchery	5 (2.3%)	0
		Lk Washington (King)	Issaquah Hatchery	1 (0.5%)	0
	S Puget Sound (10.9%)	Minter Cr 15.0048	Hupp Springs Rearing	1 (0.5%)	0
		Clear Cr 11.0013C	Clear Creek Hatchery	6 (2.7%)	5
		Mcallister Springs Hatch	Clear Creek Hatchery	1 (0.5%)	0
Minter Cr 15.0048		Minter Cr Hatchery	9 (4.1%)	0	
Kalama Cr 11.0017		Kalama Cr Hatchery	3 (1.4%)	0	
Deschutes R 13.0028		Tumwater Falls Hatchery	4 (1.8%)	0	
Col. Riv.	Upper Columbia R (0.3%)	Springs Cr 36.0114	Ringold Springs Hatchery	1 (0.5%)	0
	Cen. Columbia River (3.2%)	Spring Cr 29.0159	Spring Cr Nfh	7 (3.2%)	7
	Lower Columbia River (5.5%)	Cowlitz R 26.0002	Cowlitz Salmon Hatchery	2 (0.9%)	0
		Fallert Cr 27.0017	Fallert Cr Hatchery	2 (0.9%)	0
		Bull Run R	Sandy Hatchery	2 (0.9%)	0
		Kalama R 27.0002	Kalama Falls Hatchery	2 (0.9%)	0
		Tanner Cr (Bnville)	Bonneville Hatchery	2 (0.9%)	0
		Big Cr (Lwr Col R)	Big Cr Hatchery	2 (0.9%)	0
	Snake River (2.7%)	Npt Hatchery	Npt Hatchery	1 (0.5%)	0
		Grande Ronde R 1	Irrigon Hatchery	2 (0.9%)	0
		Lyons Ferry Rel.Site	Lyons Ferry Hatchery	3 (1.4%)	0
CA	Cen. California Coast (5.5%)	Mare Island Net Pen	Nimbus Fish Hatchery	1 (0.5%)	0
			Feather R Hatchery	1 (0.5%)	0
		Half Moon Bay John Pr Net	Mok R Fish Ins	5 (2.3%)	0
		San Pablo Bay Net Pens	Feather R Hatchery	2 (0.9%)	0
	Sacramento River (9.1%)	Fort Baker Minor Pt	Mok R Fish Ins	3 (1.4%)	0
		Coleman Nfh	Coleman Nfh	15 (6.8%)	0
		Feather Boyds Pump Ramp	Feather R Hatchery	5 (2.3%)	0
		San Joaquin River (1.4%)	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	3 (1.4%)
<b>Total</b>				<b>220</b>	<b>26</b>

**Table 1.12** 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 2019 summer Chinook MSF in Marine Area 5. 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	3	6.08	3	0.3	0.061	0.25
Clear Creek Hatchery	2016	5	15.1	30.41	15.1	1.5	0.304	1.23
Grovers Cr Hatchery	2015	6	18.1	36.49	18	1.8	0.36	1.47
Grovers Cr Hatchery	2016	7	21.1	42.57	22.2	2.2	0.472	1.82
Spring Cr Nfh	2016	4	12.1	24.32	12.1	1.2	0.245	0.99
Spring Cr Nfh	2017	3	9	18.24	9	0.9	0.179	0.73
<b>Total</b>		<b>26</b>	<b>78.4</b>	<b>158.11</b>	<b>79.4</b>	<b>7.9</b>	<b>1.621</b>	<b>6.49</b>

**Table 1.13** 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 5 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 5 - Aug 3, 2003	19,398	2,251	53	225	0	336	3,435	1,656	5,174	13,131
Jul 1 - Aug 10, 2004	25,174	2,706	0	194	0	404	4,017	1,167	2,462	10,950
Jul 1 - Aug 10, 2005	30,115	1,520	23	100	26	227	1,418	1,210	1,459	5,984
Jul 1 - Aug 14, 18-21, 2006	23,177	3,105	10	196	7	464	3,125	1,010	2,212	10,129
Jul 1 - Aug 9, 2007	18,830	2,969	23	280	94	444	2,509	1,371	1,118	8,808
Jul 1 - Aug 10, 2008	13,004	2,773	0	45	0	414	1,869	65	330	5,496
Jul 1 - Aug 6, 2009	23,662	4,843	78	1,115	362	724	6,210	9,823	14,309	37,463
Jul 1 - Aug 15, 2010	16,806	5,461	14	242	0	816	4,961	3,163	4,140	18,796
Jul 1 - Aug 15, 2011	24,848	4,259	70	276	22	636	9,275	1,593	5,319	21,450
Jul 1 - Aug 15, 2012	21,074	5,437	9	242	9	812	4,617	3,105	4,765	18,996
Jul 1 - Aug 15, 2013	25,725	7,473	77	933	81	1,117	7,188	8,173	8,702	33,743
Jul 1 - Aug 15, 2014	23,310	4,684	41	401	8	700	3,005	3,707	7,359	19,905
Jul 1 - Aug 15, 2015	21,313	4,434	35	316	17	663	7,562	14,302	8,445	35,774
Jul 1 - Aug 15, 2016	14,684	3,113	2	230	0	465	1,248	14,903	6,122	26,083
Jul 1 - Aug 15, 2017	17,144	2,202	2	107	4	329	1,601	8,542	4,341	17,129
Jul 1 - Aug 15, 2018	13,967	3,630	0	208	0	542	2,562	9,437	4,264	20,645
Jul 1 - Aug 15, 2019	16,768	4,401	7	157	1	658	3,124	4,299	3,251	15,897



## 2) Marine Area 6 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a seventeenth consecutive summer Chinook MSF in Marine Area 6 from July 1 through August 15, 2019. WDFW's Puget Sound Sampling Unit (PSSU) implemented a "Baseline Sampling" program (see WDFW 2012a for details) consisting of dockside angler interviews with catch sampling along with intensive efforts to distribute and collect voluntary trip reports (VTRs) from the angling public. We maintained our enhanced VTR program to improve the return rate of voluntary trip reports, which provide estimates of Chinook salmon encounter rates by size class (legal or sublegal) and mark status (marked or unmarked).

Unlike the other survey designs, Baseline Sampling does not provide a means for generating in-season or immediate post-season estimates of fishery total catch and effort. These estimates will be available approximately one year after the close of the fishery through the WDFW Catch Record Card (CRC) program. Once available, CRC-based catch estimates will be used to generate estimates of total Chinook salmon encounters and mortalities by size and mark-status using the methods provided in WDFW & NWIFC (2013). Thus, while these descriptors of MSF impacts are not presented in the present document, they will be available at a future time.

**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 summer Chinook MSF, including relative catch and effort patterns over the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

**Table 2.1** Sampling/estimation details on target parameters associated with the overall Area 6 summer mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Angler Interviews (Baseline Sampling)	Observed (in-sample) fishing effort (boat & angler trips); kept and released fish.	Catch rates (CPUE); length, age, and CWT composition of harvest <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Week	Observed catch per angler trip and species composition data obtained from baseline sampling will ultimately be combined with Catch Record Card (CRC) data to produce fishery-total estimates at a later time (approximately one year following the fishery).
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook	Encounter data for non-Chinook species (e.g., coho) that the angler may record on the VTR form	Fish encounter	Season	When CRC-based retained Chinook salmon estimates become available VTR data will be used in the estimation of total Chinook salmon encounters by size/mark group (LM = 45%, LU = 49%, SM = 6%, SU = 0%; <b>Table 2.6</b> ), along with associated impacts, using the methods described in WDFW & NWIFC (2013).
Overall Fishery Impacts Estimation	Total Chinook salmon encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook salmon estimate, when it becomes available.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook salmon estimate, when it becomes available. The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

**Table 2.2** Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the summer Chinook salmon MSF in Marine Area 6. 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.

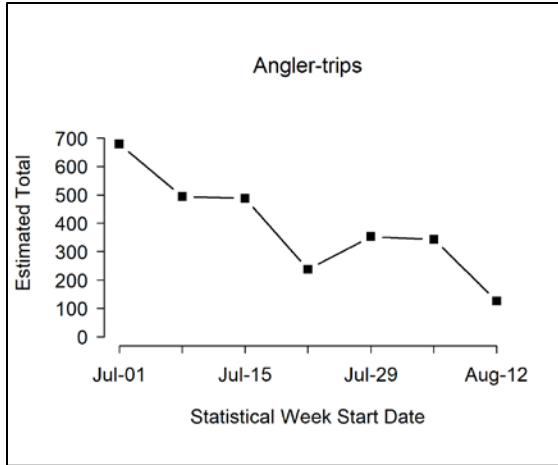
Stat Week	Start	End	Effort		Retained Fish				Released Fish		
			Boats	Anglers	Chin AD	Chin UM	Chin UD	Chin UK	Chin AD	Chin UM	Chin Unk
27	1-Jul	7-Jul	332	679	248	1	1	0	22	105	29
28	8-Jul	14-Jul	248	494	157	0	0	0	9	57	40
29	15-Jul	21-Jul	259	488	157	0	0	0	20	80	25
30	22-Jul	28-Jul	133	237	79	0	0	0	10	24	12
31	29-Jul	4-Aug	189	353	161	0	0	1	21	46	60
32	5-Aug	11-Aug	173	343	92	0	0	0	9	58	28
33	12-Aug	15-Aug	70	126	9	0	0	0	4	12	3
<b>Season Total</b>			<b>1404</b>	<b>2720</b>	<b>903</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>95</b>	<b>382</b>	<b>197</b>

**Table 2.3** Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the summer 2019 Chinook salmon MSF in Marine Area 6. 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.

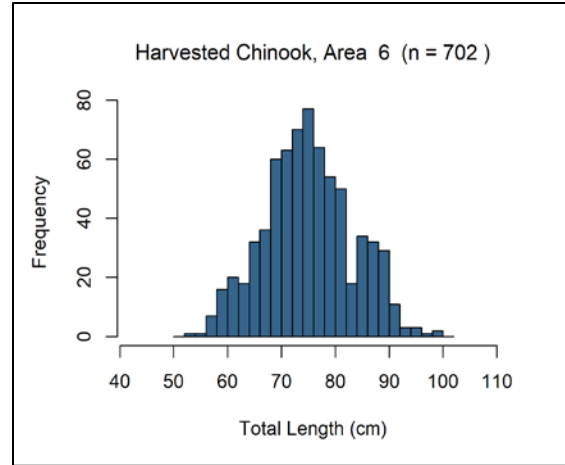
Stat Week	Start	End	Effort		Retained Fish		Released Fish				
			Boats	Anglers	Coho AD	Pink	Coho AD	Coho UM	Coho UN	Pink	Unknown
27	1-Jul	7-Jul	332	679	1	0	1	0	0	0	9
28	8-Jul	14-Jul	248	494	0	7	0	3	1	10	30
29	15-Jul	21-Jul	259	488	2	27	0	20	0	52	11
30	22-Jul	28-Jul	133	237	0	16	0	1	4	43	12
31	29-Jul	4-Aug	189	353	1	53	1	4	7	60	17
32	5-Aug	11-Aug	173	343	4	166	1	17	6	253	32
33	12-Aug	15-Aug	70	126	2	123	0	0	0	162	6
<b>Season Total</b>			<b>1404</b>	<b>2720</b>	<b>10</b>	<b>392</b>	<b>3</b>	<b>45</b>	<b>18</b>	<b>580</b>	<b>117</b>

**Table 2.4** List of sites sampled with the number of sampling events (site-days) during the summer 2019 Chinook salmon MSF in Marine Area 6.

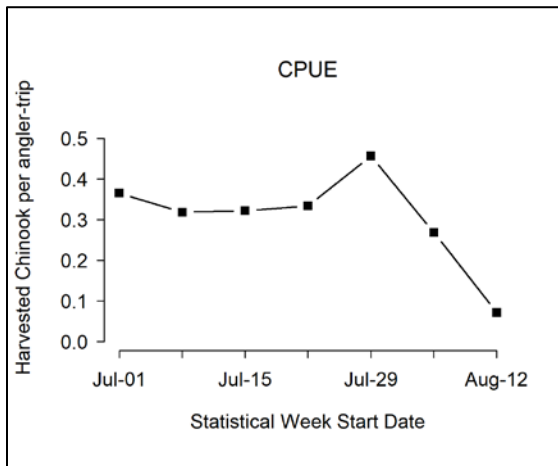
Location Name	Number of Site Days Sampled Per Month		Total Site-Days	% of Total
	July	August		
Ediz Hook, Port Angeles Public Ramp	28	13	41	51.25%
Freshwater Bay Ramp	9	1	10	12.50%
John Wayne Marina	5	0	5	6.25%
Port Angeles Boat Haven	1	0	1	1.25%
Port Angeles West Ramp	11	5	23	28.75%
<b>Grand Total</b>	<b>54</b>	<b>19</b>	<b>80</b>	<b>100.00%</b>



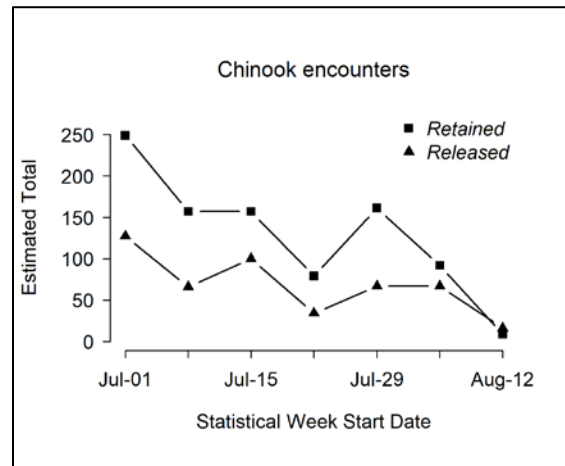
**Figure 2.1** Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 2.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are observations where lengths taken.



**Figure 2.2** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 2.4** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

**Table 2.5** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 6.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	700	2	702
Unmarked	0	0	0
<b>Total</b>	<b>700</b>	<b>2</b>	<b>702</b>

**Table 2.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook MSF in Marine Area 6, 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	66 1-trip VTRs	49	53	6	0	108	0.51	0.48
Size/mark-status composition:		0.45	0.49	0.06	0.00			
Variance:		(0.0023)	(0.0023)	(0.0005)	(0.0000)			

**Table 2.7** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 6. The field “Number DITs” corresponds to the number of tags that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
BC	Georgia Strait (1.3%)	R-Capilano R Up	H-Capilano River H	1 (1.3%)	0
WA	Northern Washington (1.3%)	Friday Cr 03.0017	Samish Hatchery	1 (1.3%)	0
	Strait of Juan De Fuca (21.3%)	Elwha R 18.0272	Elwha Hatchery	16 (21.3%)	0
		Hood Canal (22.7%)	Purdy Cr 16.0005	George Adams Hatchery	11 (14.7%)
	Finch Cr 16.0222		Hoodsport Hatchery	6 (8%)	0
	Northern Puget Sound (4%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	2 (2.7%)	2
		Wallace R 07.0940	Wallace R Hatchery	1 (1.3%)	0
	Skagit River (1.3%)	Co Line Pd2 03.1853B	Marblemount Hatchery	1 (1.3%)	0
	Mid Puget Sound (29.3%)	Portage Bay/Ship Cnl	Issaquah Hatchery	1 (1.3%)	0
		Big Soos Cr 09.0072	Soos Creek Hatchery	4 (5.3%)	0
		Icy Cr 09.0125	Icy Cr Hatchery	4 (5.3%)	0
		Gorst Cr 15.0216	Gorst Cr Rearing Pnd	8 (10.7%)	0
		Clarks Crk Hatchery	Clarks Crk Hatchery	2 (2.7%)	0
		Lk Washington (King)	Issaquah Hatchery	1 (1.3%)	0
		Grovers Cr 15.0299	Grovers Cr Hatchery	2 (2.7%)	2
		Southern Puget Sound (16%)	Clear Cr 11.0013C	Clear Creek Hatchery	5 (6.7%)
	Minter Cr 15.0048		Minter Cr Hatchery	4 (5.3%)	0
	Kalama Cr 11.0017		Kalama Cr Hatchery	1 (1.3%)	0
	Deschutes R 13.0028		Tumwater Falls Hatchery	1 (1.3%)	0
	Mcallister Springs Hatch		Clear Creek Hatchery	1 (1.3%)	0
Col. Riv.	Cen Columbia River (1.3%)	Umatilla R	Umatilla Hatchery	1 (1.3%)	0
CA	Cen California Coast (1.3%)	San Pablo Bay Net Pens	Feather R Hatchery	1 (1.3%)	0
<b>Total</b>				<b>75</b>	<b>7</b>

### **3) Marine Area 7 Summer Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a fourth consecutive summer Chinook MSF in Marine Area 7 from July 1 through July 31, 2019. WDFW's Puget Sound Sampling Unit (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 intensive dockside creel sampling, on-the-water effort surveys, test fishing and collection of voluntary trip reports (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 Marine Area 7 summer Chinook MSF.

**Table 3.1** Sampling/estimation details on target parameters associated with the overall Marine Area 7 Chinook 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 <sup>1</sup> ; 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, $f_{ij}$ ).	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 <b>Table 3.8</b> $n=5$ surveys conducted out of $N=31$ days available in the season). Season-wide sample fraction was calculated as the average sample fraction over the 5 individual aerial surveys.
Test Fishing	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Chinook length, age, and DNA-based <sup>2</sup> stock composition; species composition of non-Chinook encounters	Fish encounter	Season	Due to a short season and small sample size, testing fishing proportions (LM = 78%, LU = 17%, SM = 0%, SU = 6%; <b>Table 3.10</b> ) and Private VTR (LM = 46%, LU = 29%, SM = 18%, SU = 7%; <b>Table 3.4</b> ) proportions were combined to produce encounter and mortality estimates (p-value=.12)
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Encounter data for non-Chinook species (e.g., Coho) that the angler may record on the VTR form	Fish encounter	Season	VTR data ( <b>Table 3.4</b> ) were combined with test fishing data for encounter and mortality estimates. See comment in row above.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	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 3.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 Summer Chinook MSF in Marine Area 7. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

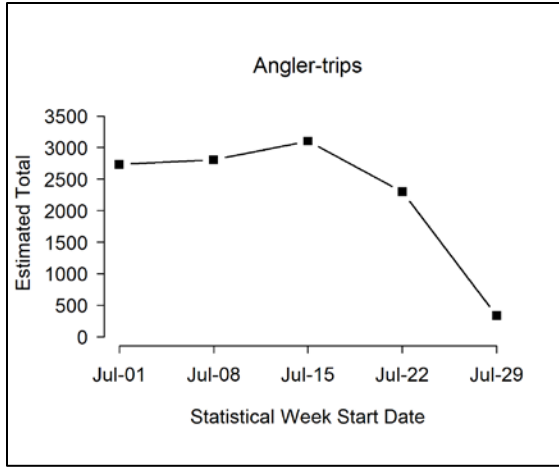
Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
July	27	1-Jul	3-Jul	1240	2,735	1156	0	383	674	2,213
	28	4-Jul	10-Jul	1237	2,804	667	3	221	385	1,276
	29	11-Jul	17-Jul	1415	3,101	569	7	189	324	1089
	30	18-Jul	24-Jul	1037	2300	363	0	120	211	694
	31	25-Jul	31-Jul	154	336	98	0	32	57	187
<b>Sub-Total</b>				5083	11,275	2852	10	946	1651	5,459
<b>Bellingham Derby</b>				224	463	163	0	54	95	312
<b>Season Total:</b>				<b>5,307</b>	<b>11,738</b>	<b>3,015</b>	<b>10</b>	<b>1,000</b>	<b>1,746</b>	<b>5,771</b>
<b>Variance:</b>				608,471	2,927,954	342,225	6	1,198,117	279,310	1,775,629
<b>SE:</b>				780	1711	585	2	1,095	528	1,333
<b>CV (%):</b>				15	15	19	24	110	30	23
<b>95% CI:</b>				3,778 - 6,836	8,384 - 15,092	1,869 - 4,162	6 - 15	0 - 3,145	710 - 2,782	3,160 - 8,383

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

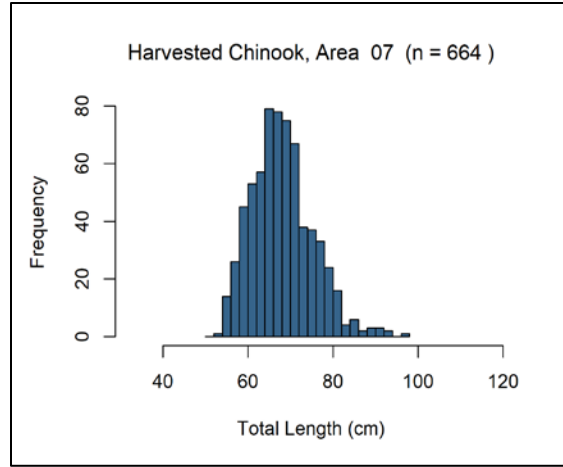
Marked Type	Number Sampled		
	Legal-size	Sublegal-Size	Total
Marked	649	15	664
Unmarked	3	0	3
<b>Total</b>	<b>652</b>	<b>15</b>	<b>667</b>

**Table 3.4** Total Chinook 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 2019 summer Chinook 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.

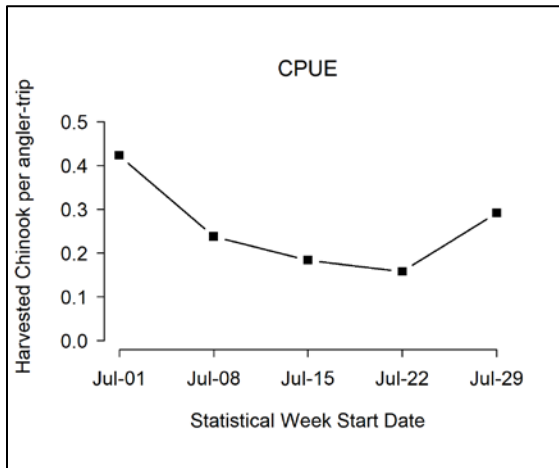
Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private VTR	11 1-trip VTRs	13	8	5	2	28	0.64	0.62
Size/mark-status composition:		0.46	0.29	0.18	0.07			
Variance:		(0.0092)	(0.0076)	(0.0054)	(0.0025)			
Charter VTR	20 1-trip VTRs	69	9	12	2	92	0.88	0.88
Size/mark-status composition:		0.75	0.10	0.13	0.02			
Variance:		(0.0021)	(0.0010)	(0.0012)	(0.0002)			



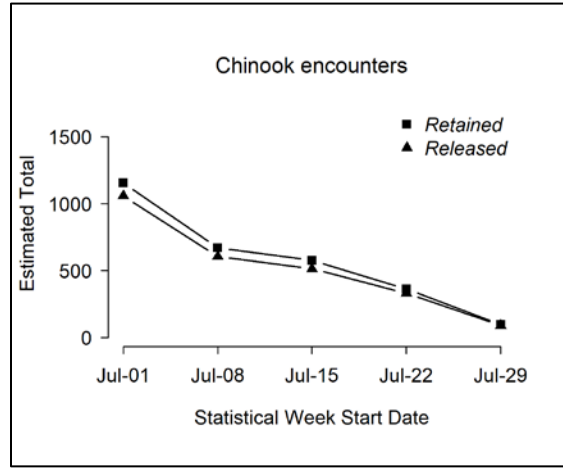
**Figure 3.1** Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 7.



**Figure 3.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 7.



**Figure 3.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2019 summer Chinook MSF in Marine Area 7.



**Figure 3.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2019 summer Chinook MSF in Marine Area 7.

**Table 3.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook 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.

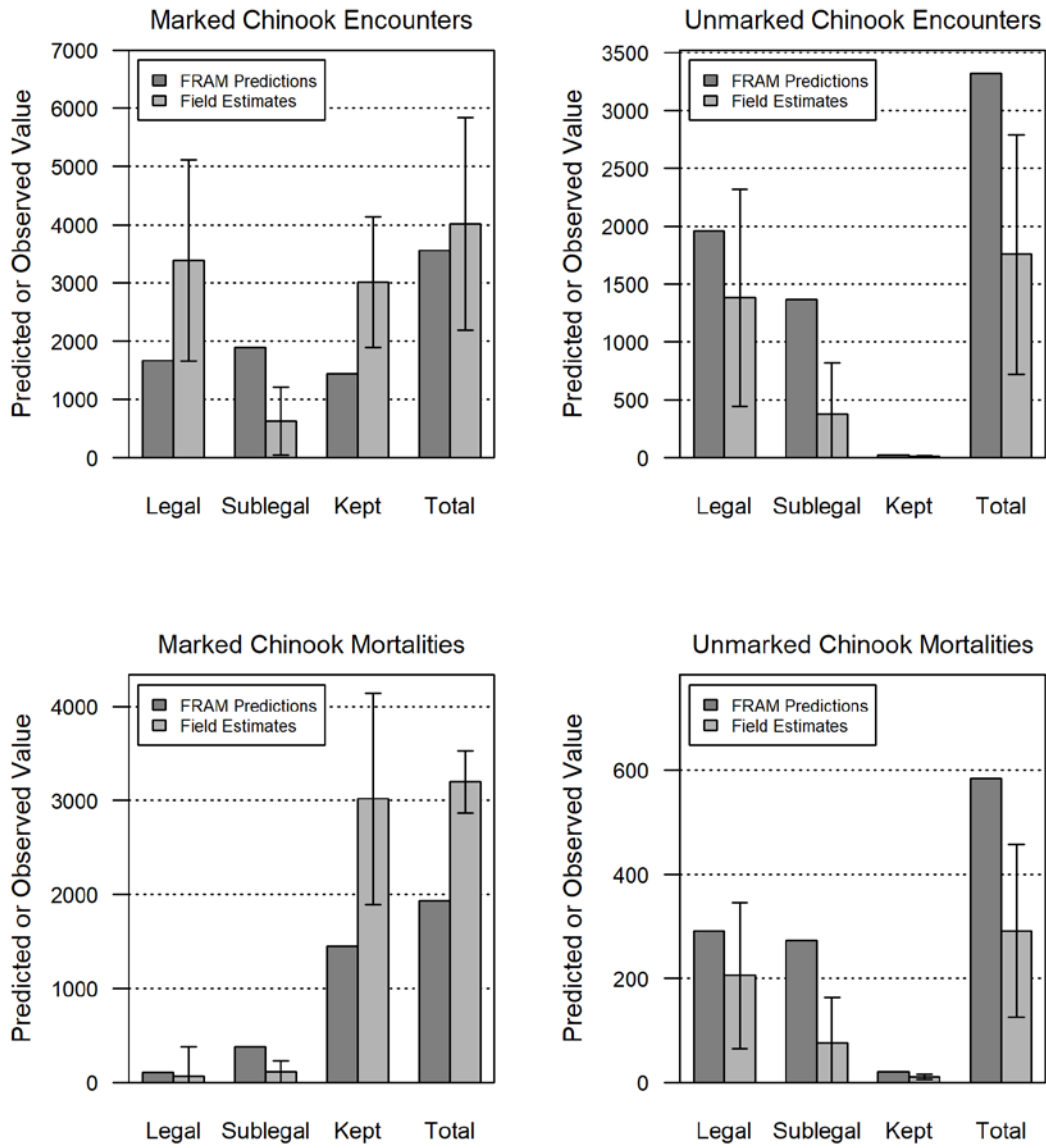
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	3,388	2,947	440	66	3,013	352,146	593	1,850 - 4,176	20%
Legal UM	1,380	10	1370	205	216	5159	72	75 - 357	33%
Sublegal AD	627	68	559	112	180	4,006	63	56 - 304	35%
Sublegal UM	376	0	376	75	75	2,011	45	0 - 163	60%
<b>Total</b>	<b>5,771</b>	<b>3,026</b>	<b>2,746</b>	<b>459</b>	<b>3,484</b>	<b>363,322</b>	<b>603</b>	<b>2,303 - 4,666</b>	<b>17%</b>

**Table 3.6** Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook 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	3325	1959	1366	20
	AD	3,558	1,663	1,895	1447
	Total	6,883	3,622	3,261	1467
	% Marked	52	46	58	99
Estimated (Creel) Encounters	UM	1,756	1380	376	10
	AD	4,015	3,388	627	3,015
	Total	5,771	4,768	1,004	3,026
	% Marked	70	71	63	100

**Table 3.7** Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook 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)	584	1,931	2,515	291	3193	3484
Released Legal	291	105	396	205	66	271
Released Sublegal	273	379	652	75	112	187
Landed Only	20	1447	1467	10	3015	3026



**Figure 3.5** Comparison of modeled and estimated total Chinook encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 7. Error bars represent approximate 95% confidence intervals for field estimates

**Table 3.8** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the three-site sample frame during the 2019 summer 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, $Sy_{ijk}$	
1-Jul	WD	9:05	10:04	161	137	94	235	0.584
6-Jul	WE	9:34	10:53	370	168	108	576	0.292
20-Jul	WE	9:39	10:59	359	277	168	592	0.468
21-Jul	WE	9:35	10:52	351	318	184	607	0.524
26-Jul	WE	8:42	9:46	202	163	56	588	0.277
<b>Season Totals:</b>				<b>1443</b>	<b>1063</b>	<b>610</b>	<b>2597</b>	
Mean:				289	213	122	519	0.429
St Dev:				99	80	53	160	0.138
CV(%):				34.3%	37.5%	43.6%	30.7%	32.2%

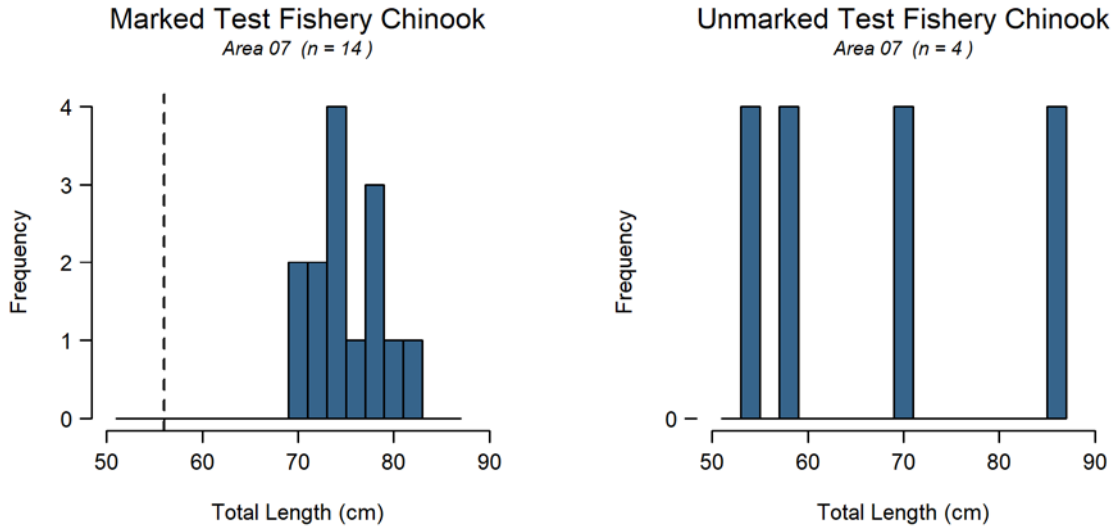
**Table 3.9** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) in the 2019 summer Chinook MSF in Marine Area 7.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
July	27 - 31	1 Jul - 31 Jul	3,015	10	3,026	709	3	712	23.5
<b>Season Total</b>			<b>3,015</b>	<b>10</b>	<b>3,026</b>	<b>709</b>	<b>3</b>	<b>712</b>	<b>23.5</b>

<sup>1</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the summer 2019 Marine Area 7 Chinook MSF (creel estimates and the fish sampled as part of baseline sampling).

**Table 3.10** Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates from the 2019 summer Chinook MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
27	3	22.7	1	1	0	1	3
28	3	22.5	3	0	0	0	3
29	5	37.0	3	1	0	0	4
30	3	19.3	4	0	0	0	4
31	3	21.0	3	1	0	0	4
<b>Total</b>	<b>17</b>	<b>122.6</b>	<b>14</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>18</b>
<b>Size/mark-status composition:</b>			0.78	0.17	0.00	0.06	
<b>Variance:</b>			(0.0102)	(0.0082)	(0.0000)	(0.0031)	
<b>Legal size mark rate:</b>			0.82				
<b>Overall mark rate:</b>			0.78				



**Figure 3.6** Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook encountered by test fishers during the 2019 summer Chinook 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 3.11** Fishery-total estimates of retained and released salmon (other than Chinook) during the 2019 summer Chinook MSF in Marine Area 7. 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	Retained Salmon					Released Salmon						
			Coho AD	Coho UM	Pink	Sockeye	Unknown	Coho AD	Coho UM	Coho UK	Chum	Pink	Dolly Varden	Unknown
27	1-Jul	7-Jul	0	0	3	0	13	0	0	3	0	3	0	0
28	8-Jul	14-Jul	10	3	35	7	13	0	7	0	3	24	0	0
29	15-Jul	21-Jul	0	10	160	0	0	3	8	17	0	149	5	3
30	22-Jul	28-Jul	0	0	289	0	0	0	8	7	3	139	8	0
31	29-Jul	31-Jul	0	28	14	0	0	0	0	0	0	70	0	0
<b>Season Total:</b>			<b>10</b>	<b>42</b>	<b>501</b>	<b>7</b>	<b>26</b>	<b>3</b>	<b>23</b>	<b>28</b>	<b>7</b>	<b>386</b>	<b>13</b>	<b>3</b>
<b>Variance:</b>			43	34	15839	1	278	5	78	143	10	5475	72	5
<b>Standard Error:</b>			7	6	126	1	17	2	9	12	3	74	8	2
<b>CV (%):</b>			62	14	25	17	65	62	38	43	44	19	66	62
<b>95% CI:</b>			0 - 23	31 - 53	255 - 748	5 - 9	0 - 58	0 - 8	6 - 41	5 - 51	1 - 13	241 - 531	0 - 29	0 - 8

**Table 3.12** Summary of CWTs recovered from Chinook salmon harvested during the 2019 summer Chinook 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	Georgia Strait (1.3%)	R-Capilano R Up	H-Capilano River H	1 (1.3%)	0
	N Washington (1.3%)	Friday Cr 03.0017	Samish Hatchery	1 (1.3%)	0
WA	Strait of Juan De Fuca (21.3%)	Elwha R 18.0272	Elwha Hatchery	16 (21.3%)	0
		Hood Canal (22.7%)	Purdy Cr 16.0005	George Adams Hatchery	11 (14.7%)
	N Puget Sound (4%)	Finch Cr 16.0222	Hoodsport Hatchery	6 (8%)	0
		Tulalip Cr 07.0001	Bernie Gobin Hatch	2 (2.7%)	2
	Skagit River (1.3%)	Wallace R 07.0940	Wallace R Hatchery	1 (1.3%)	0
		Co Line Pd2 03.1853B	Marblemount Hatchery	1 (1.3%)	0
	Mid Puget Sound (29.3%)	Portage Bay/Ship Cnl	Issaquah Hatchery	1 (1.3%)	0
		Big Soos Cr 09.0072	Soos Creek Hatchery	4 (5.3%)	0
		Icy Cr 09.0125	Icy Cr Hatchery	4 (5.3%)	0
		Gorst Cr 15.0216	Gorst Cr Rearing Pnd	8 (10.7%)	0
		Clarks Crk Hatchery	Clarks Crk Hatchery	2 (2.7%)	0
		Lk Washington (King)	Issaquah Hatchery	1 (1.3%)	0
		Grovers Cr 15.0299	Grovers Cr Hatchery	2 (2.7%)	2
	S Puget Sound (16%)	Clear Cr 11.0013C	Clear Creek Hatchery	5 (6.7%)	3
		Minter Cr 15.0048	Minter Cr Hatchery	4 (5.3%)	0
		Kalama Cr 11.0017	Kalama Cr Hatchery	1 (1.3%)	0
		Deschutes R 13.0028	Tumwater Falls Hatchery	1 (1.3%)	0
Mcallister Springs Hatch		Clear Creek Hatchery	1 (1.3%)	0	
Col. Riv.	Cen Columbia River (1.3%)	Umatilla R	Umatilla Hatchery	1 (1.3%)	0
CA	Cen California Coast (1.3%)	San Pablo Bay Net Pens	Feather R Hatchery	1 (1.3%)	0
<b>Total</b>				<b>75</b>	<b>7</b>

**Table 3.13** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2019 summer Chinook 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	1	4.5	16.04	4.6	0.5	0.162	0.4
Clear Creek Hatchery	2016	6	27.2	96.25	27.2	2.7	0.963	2.4
Grovers Cr Hatchery	2015	2	9.1	32.08	9	0.9	0.316	0.8
Grovers Cr Hatchery	2016	3	13.6	48.13	14.3	1.4	0.534	1.27
Spring Cr Nfh	2016	1	4.5	16.04	4.6	0.5	0.162	0.4
<b>Total</b>		<b>13</b>	<b>59</b>	<b>208.55</b>	<b>59.7</b>	<b>6</b>	<b>2.137</b>	<b>5.27</b>

**Table 3.14** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Marine Area 7 Summer Chinook 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	Jul 1, 2016 - Jul 31, 2016	9,553	1,292	0	42	0	193	1,485	1443	637	5,092
7	Jul 1, 2017 - Jul 31, 2017	17,535	3,608	22	7	0	539	2,941	4140	2370	13,627
7	Jul 1, 2018 - Jul 31, 2018	10,577	2,220	4	71	0	332	1,028	817	359	4,832
7	Jul 1, 2019 - Jul 31, 2019	11,738	2,947	10	68	0	440	1,370	559	376	5,771

#### **4) Marine Area 9 Summer Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a thirteenth consecutive summer Chinook MSF in Marine Area 9 from July 25 through August 15, 2019. The fishery closed early on August 9, 2019 to avoid exceeding the preseason modeled expected catch for that Area. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 9 throughout the season to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included intensive dockside creel sampling, on-the-water effort surveys, test fishing and collection of voluntary trip reports (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 this section we present results from our monitoring activities during the Marine Area 9 summer Chinook MSF.



**Table 4.1** Sampling/estimation details on target parameters associated with the overall Marine Area 9 summer mark-selective fishery 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 <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	One week	Within weeks, estimates were produced by day-type strata (weekday/weekend). Each week we sampled every Friday, Saturday and Sunday, and we randomly selected $n=2$ out of $N=4$ weekdays (Monday-Thursday) for sampling.
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	A total of 3 boat surveys (no weekday and 3 weekend) were conducted during the two week fishery.
Test Fishing	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Chinook salmon length, age, and DNA-based <sup>2</sup> stock composition; species composition of non-Chinook salmon encounters	Fish encounter	Season	Given sufficient sample size ( $n=36$ ) of fish caught in the test fishery, we used the test fishery data only to estimate the size/mark-status proportions (LM = 75%, LU = 11%, SM = 11%, SU = 3%; <b>Table 4.7</b> ) needed to produce encounter and mortality estimates.
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Encounter data for non-Chinook salmon species (e.g., coho) that the angler may record on the VTR form	Fish encounter	Season	The size/mark-status proportions of Private VTR data (LM = 60%, LU = 17%, SM = 10%, SU = 14%; <b>Table 4.8</b> ) were not significantly different than those of the test fishery data. However, VTR data were not used in impact estimation due to the assumed higher data quality and sufficient sample sizes of the test fishery data.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	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.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

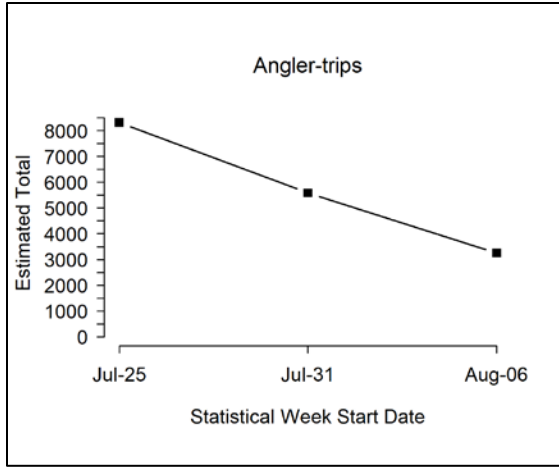
<sup>2</sup> Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery.

**Table 4.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 9. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

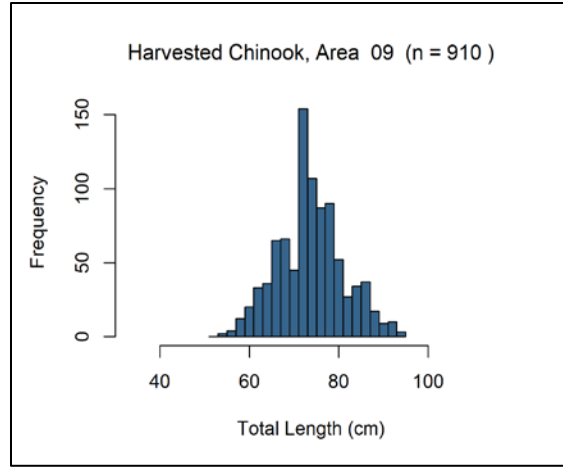
Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
July	30	25-Jul	28-Jul	3667	8,317	1958	3	617	412	2,991
	31	31-Jul	4-Aug	2577	5,583	1016	3	321	213	1,552
August	32	6-Aug	9-Aug	1534	3,247	471	0	149	100	720
<b>Season Total:</b>				<b>7,779</b>	<b>17,147</b>	<b>3,446</b>	<b>5</b>	<b>1,087</b>	<b>726</b>	<b>5,263</b>
<b>Variance:</b>				173,108	994,162	146,811	4	716,178	105,326	606,482
<b>SE:</b>				416	997	383	2	846	325	779
<b>CV (%):</b>				5	6	11	37	78	45	15
<b>95% CI:</b>				6,963 - 8,594	15,193 - 19,101	2,695 - 4,197	1 - 10	0 - 2,745	89 - 1,362	3,737 - 6,790

**Table 4.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 9.

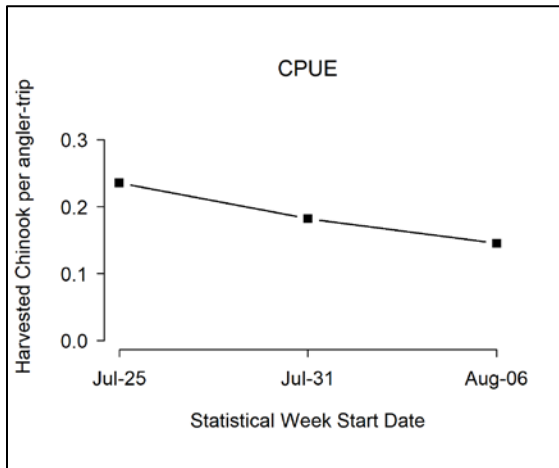
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	907	3	910
Unmarked	2	0	2
<b>Total</b>	<b>909</b>	<b>3</b>	<b>912</b>



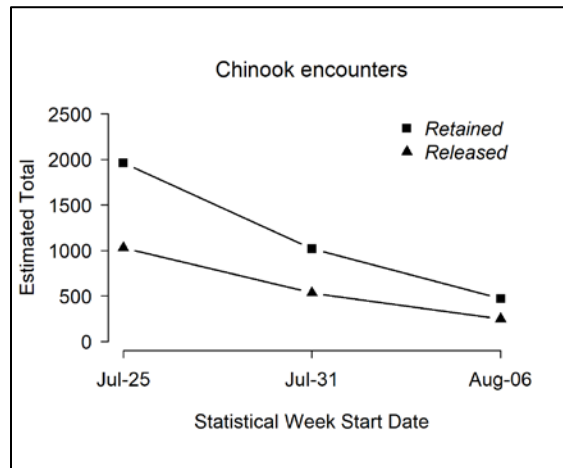
**Figure 4.1** Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 9.



**Figure 4.3** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 9. Note: displayed values are observations where lengths taken.



**Figure 4.2** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 9.



**Figure 4.4** Temporal patterns in Chinook salmon encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 9.

**Table 4.4** Comparison of modeled and estimated total Chinook encounters for the 2019 summer Chinook MSF in Marine Area 9. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

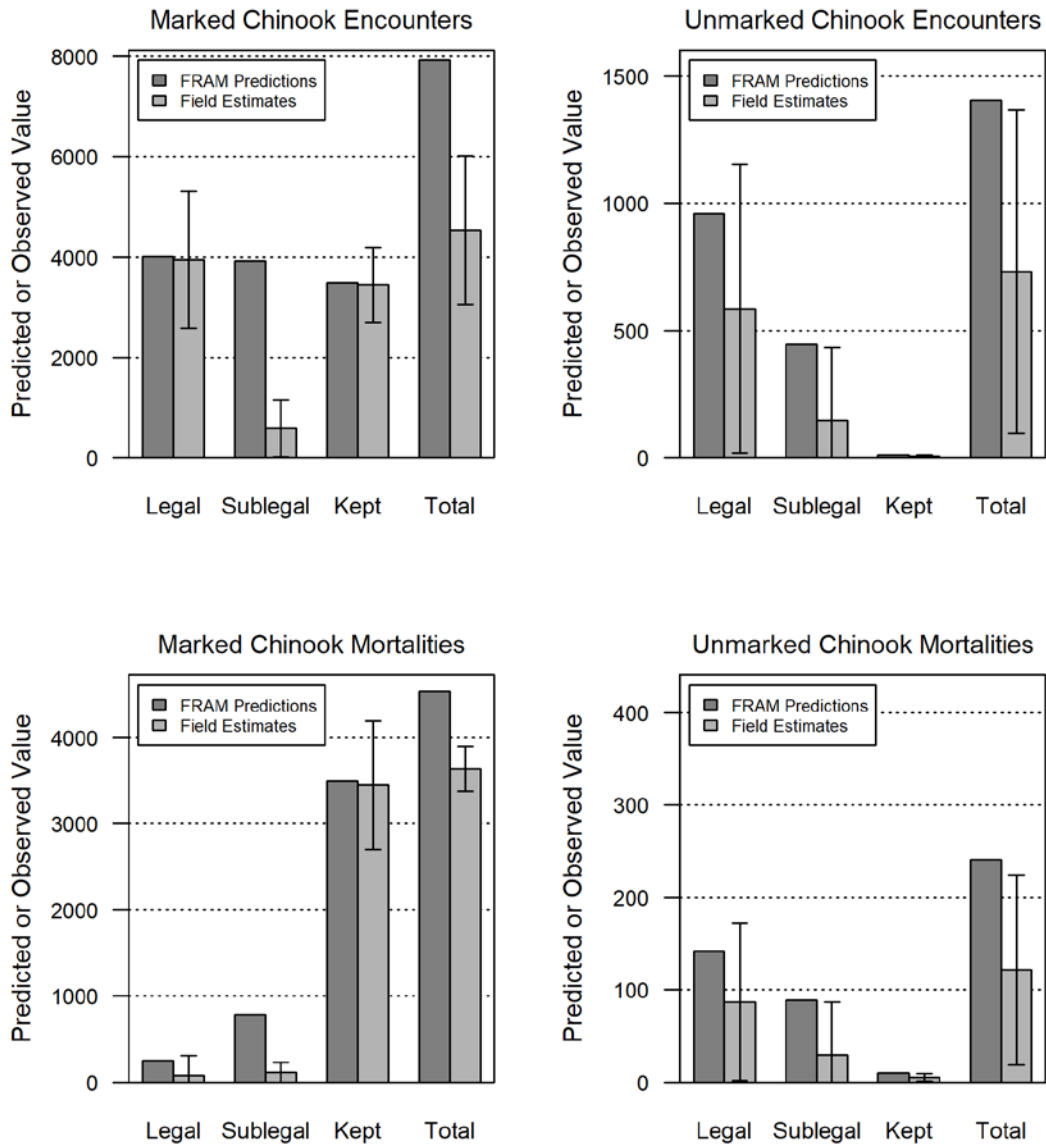
Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	1,403	959	444	10
	AD	7,932	4,013	3,919	3,491
	Total	9,335	4,972	4,363	3,501
	% Marked	85	81	90	100
Estimated (Creel) Encounters	UM	731	585	146	5
	AD	4,532	3,947	585	3,446
	Total	5,263	4,532	731	3,451
	% Marked	86	87	80	100

**Table 4.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook 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.

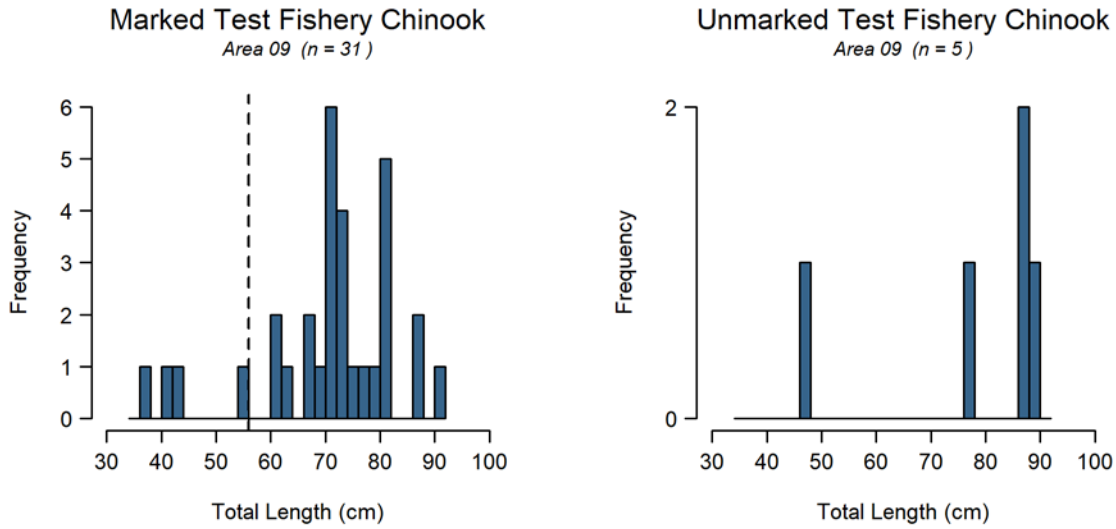
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	3,947	3,434	513	77	3,511	160,112	400	2,727 - 4,296	11
Legal UM	585	5	579	87	92	1,893	44	7 - 178	47
Sublegal AD	585	11	573	115	126	3,404	58	12 - 240	46
Sublegal UM	146	0	146	29	29	855	29	0 - 87	100
<b>Total</b>	<b>5,263</b>	<b>3,451</b>	<b>1,812</b>	<b>308</b>	<b>3,759</b>	<b>166,263</b>	<b>408</b>	<b>2,960 - 4,558</b>	<b>11</b>

**Table 4.6** Comparison of modeled and estimated total Chinook mortalities for the 2019 summer Chinook MSF in Marine Area 9. 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)	241	4,528	4,769	122	3,637	3,759
Released Legal	142	253	395	87	77	164
Released Sublegal	89	784	873	29	115	144
Landed Only	10	3,491	3,501	5	3,446	3,451



**Figure 4.5** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 9. Error bars represent approximate 95% confidence intervals for field estimates.



**Figure 4.6** Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook salmon encountered by test fishers during the 2019 summer Chinook 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 4.7** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the summer 2019 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	
27	4	35.3 <sup>1</sup>	14	1	2	0	17
28	4	20.7	5	2	0	0	7
29	4	25.6	8	1	2	1	12
<b>Total</b>	<b>12</b>	<b>81.6</b>	<b>27</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>36</b>
<b>Size/mark-status composition:</b>			0.75	0.11	0.11	0.03	
<b>Variance:</b>			(0.0054)	(0.0028)	(0.0028)	(0.0008)	
<b>Legal size mark rate:</b>			0.87				
<b>Overall mark rate:</b>			0.86				

<sup>1</sup>To ensure an adequate sample size in the expected short season, two test fishing boats were operated concurrently in Marine Area 9 July 25 – July 29, 2019.

**Table 4.8** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs), with estimates of legal-size and overall (legal and sublegal) mark rates during the 2019 summer Chinook 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	20 1-trip VTRs	25	7	4	6	42	0.69	0.78
Size/mark-status composition:		0.60	0.17	0.10	0.14			
Variance:		(0.0059)	(0.0034)	(0.0021)	(0.0030)			

**Table 4.9** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 9. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
BC	Thompson River (9.1%)	R-Chilliwack R	H-Chilliwack River H	1 (9.1%)	0
WA	Hood Canal (54.5%)	Finch Cr 16.0222	Hoodsport Hatchery	2 (18.2%)	0
		Purdy Cr 16.0005	George Adams Hatchery	4 (36.4%)	0
	Mid Puget Sound (27.3%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (9.1%)	0
		Gorst Cr 15.0216	Gorst Cr Rearing Pnd	1 (9.1%)	0
		Portage Bay/Ship Cnl	Issaquah Hatchery	1 (9.1%)	0
S Puget Sound (9.1%)	Minter Cr 15.0048	Minter Cr Hatchery	1 (9.1%)	0	
<b>Total</b>				<b>11</b>	<b>0</b>

**Note: Not all CWTs have been read for the Marine Area 9 Summer Chinook Fishery at the time of writing this report. Table 4.9 and Table 4.10 will be revised when the CWTs become available.**

**Table 4.10** 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 2019 summer Chinook 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)
No DITs recovered to date								
<b>Total</b>								

**Table 4.11** Monthly sample rates (Total retained Chinook salmon sampled<sup>1</sup> / Estimated retained Chinook) in the 2019 summer Chinook 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	
July	30 - 30	25 Jul - 28 Jul	1,958	3	1,961	710	1	711	36.30%
August	31 - 32	31 Jul - 9 Aug	1,488	3	1,490	388	1	389	26.10%
<b>Season Total</b>			<b>3,446</b>	<b>5</b>	<b>3,451</b>	<b>1098</b>	<b>2</b>	<b>1100</b>	<b>31.90%</b>

<sup>1</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the Marine Area 9 selective fishery

**Table 4.12** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) in the 2019 summer Chinook 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	Retained Salmon				Released Salmon				
			Coho AD	Coho UM	Coho UK	Pink	Coho AD	Coho UM	Coho UK	Pink	Unknown
30	25-Jul	28-Jul	389	12	12	50	76	201	160	23	609
31	31-Jul	4-Aug	98	3	0	342	22	264	44	100	274
32	6-Aug	9-Aug	183	8	0	1308	25	159	40	154	404
<b>Season Total:</b>			<b>670</b>	<b>22</b>	<b>12</b>	<b>1700</b>	<b>123</b>	<b>624</b>	<b>244</b>	<b>277</b>	<b>1287</b>
<b>Variance:</b>			15641	43	19	93206	757	5378	1863	1908	30102
<b>Standard Error:</b>			125	7	4	305	28	73	43	44	173
<b>CV (%):</b>			19	29	35	18	22	12	18	16	13
<b>95% CI:</b>			425 - 915	10 - 35	4 - 21	1,102 - 2,299	69 - 177	480 - 768	160 - 329	191 - 363	947 - 1,627



**Table 4.13** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2019 summer Chinook MSF in Marine Area 9. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Anacortes Marina			2	0.0025
Armeni Public Ramp			9	0.0112
Bayside Marina/Drystack			7	0.0087
Brownsville Marina/Dock/Ramp			2	0.0025
Bush Point Ramp and Beach			4	0.0050
Camano Island State Park Public			8	0.0100
Dagmar's Landing, Forklift Launch			18	0.0224
Des Moines Marina (Moorage)			2	0.0025
Driftwood Key Marina			21	0.0262
Edmonds Boat Basin			21	0.0262
<b>Edmonds Dry Storage</b>			<b>10</b>	<b>0.0125</b>
Edmonds Marina			67	0.0835
Eglon Public Ramp			8	0.0100
Elliott Bay Marina			3	0.0037
Everett Marina			56	0.0698
<b>Everett Ramp</b>			<b>214</b>	<b>0.2668</b>
<b>Fort Casey Public Ramp and Shore</b>			<b>37</b>	<b>0.0461</b>
Fort Worden Ramp			19	0.0237
Hadlock Public Ramp			12	0.0150
Kingston Marina			6	0.0075
<b>Kingston Public Ramp</b>		NA <sup>1</sup>	<b>24</b>	<b>0.0299</b>
Lagoon Point Ramp and Beach			9	0.0112
Mats Mats Bay Ramp			6	0.0075
<b>Mukilteo Lighthouse Park</b>			<b>47</b>	<b>0.0586</b>
Mutiny Bay Public Ramp			5	0.0062
Mutiny Bay Resort			4	0.0050
Mystery Bay Dock/Moorage			2	0.0025
Point Hudson Marina			2	0.0025
Point No Point Beach			1	0.0012
Port Ludlow Marina/Beach Launch			10	0.0125
Port Orchard Public Ramp			2	0.0025
Port Townsend Boat Haven (Docks)			19	0.0237
<b>Port Townsend Boat Haven Ramp</b>			<b>39</b>	<b>0.0486</b>
Possession Waterfront Beach Park			13	0.0162
Private			14	0.0175
Salmon Club Ramp			2	0.0025
Salsbury County Park Ramp			22	0.0274
Shilshole Marina			20	0.0249
Shilshole Public Ramp			33	0.0411
Unknown			2	0.0025
<b>Total Anglers</b>	<b>0</b>	<b>0</b>	<b>802</b>	<b>1</b>

<sup>1</sup>No weekday boat surveys were conducted during the Marine Area 9 2019 summer Chinook season.

**Table 4.14** 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 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 16 - Jul 31, 2007	18,160	5,094	13	146	20	711	1,111	1,286	317	8,697
Jul 16 - Aug 15, 2008	20,399	4,035	3	10	0	597	1,608	3,212	3,826	13,290
Jul 16 - Aug 31, 2009	42,219	3,090	20	139	0	462	1,272	8,256	2,905	16,143
Jul 16 - Aug 31, 2010	31,200	5,282	33	10	6	740	2,125	750	249	9,194
Jul 16 - Aug 31, 2011	37,862	2,285	19	78	6	339	1,142	2,150	1,070	7,090
Jul 16 - Aug 19, 2012	24,886	6,972	12	101	2	1,039	2,351	5,168	4,721	20,366
Jul 16 - Aug 4, 2013	20,501	4,667	18	39	0	697	1,174	1,750	397	8,742
Jul 16 - Aug 15, 2014	23,113	2,865	6	4	0	428	668	745	299	5,015
Jul 16 - Jul 26, 2015	14,118	2,277	13	35	7	340	1,502	1,481	131	5,786
Jul 16, 2016 - Aug 15, 2016	14,911	2,861	9	112	0	427	912	4,886	2104	11,311
Jul 16, 2017 - Jul 30, 2017	18,548	5,264	0	191	3	787	1261	9,388	2266	19,160
Jul 16, 2018 - Jul 29, 2018	17,356	5,935	1	93	1	887	1084	3,628	464	12,094
Jul 25, 2019 - Aug 9, 2019	17,147	3,434	5	11	0	513	579	573	146	5,263

## **5) Marine Area 10 Summer Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a twelfth summer Chinook MSF in Marine Area 10 from July 25 through August 31, 2019. The fishery closed early on August 16 to avoid exceeding the preseason modeled expected catch. WDFW's Puget Sound Sampling Unit (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 intensive dockside creel sampling, on-the-water effort surveys, test fishing and collection of voluntary trip reports (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 this section we present results from our monitoring activities during the Marine Area 10 summer Chinook MSF.

**Table 5.1** Sampling/estimation details on target parameters associated with the overall Marine Area 10 summer mark-selective fishery 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 <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release.	One week	Within weeks, estimates were produced by day-type strata (weekday/weekend). Each week we sampled every Friday, Saturday and Sunday, and we randomly selected $n=2$ out of $N=4$ weekdays (Monday-Thursday) for sampling.
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	A total of 8 boat surveys (5 weekday and 3 weekend) were conducted during the month long fishery.
Test Fishing	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook salmon	Chinook salmon length, age, and DNA-based <sup>2</sup> stock composition; species composition of non-Chinook salmon encounters	Fish encounter	Season	A sufficient number of fish caught in the test fishery ( $n=48$ ; LM=67%, LU=19%, SM=8%, SU=6 %; <b>Table 5.7</b> ) due to assumed higher accuracy only test fishing data was used to estimate encounters.
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 salmon) that the angler may record on the VTR form	Fish encounter	Season	The size/mark-status proportions of Private VTR data (LM = 85%, LU = 0%, SM = 0%, SU = 13%; <b>Table 5.8</b> ) were similar (p-value=.19) to those of the test fishery data, but with the sufficient size of the test fishing data set and the assumption that test fishing data was more accurate only test fishing data was used.
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.

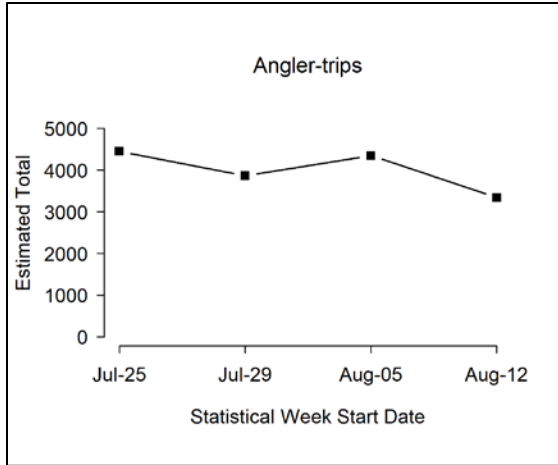
<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.<sup>2</sup> Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery.

**Table 5.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 10. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

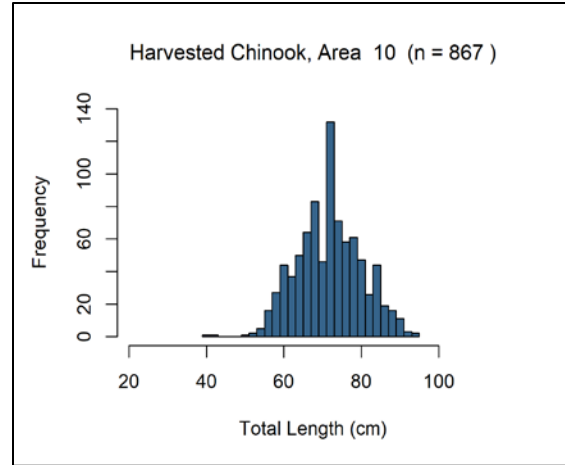
Month	Stat Week	Start Date	End Date	Estimated Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
<b>Jul</b>	30	25-Jul	28-Jul	1968	4451	831	12	223	339	1405
	31	29-Jul	4-Aug	1868	3,868	637	5	171	264	1077
<b>Aug</b>	32	5-Aug	11-Aug	2,154	4,350	905	0	242	382	1530
	33	12-Aug	16-Aug	1,693	3,338	868	0	232	367	1467
<b>Subtotal:</b>				<b>7,683</b>	<b>16,008</b>	<b>3,241</b>	<b>17</b>	<b>868</b>	<b>1352</b>	<b>5,479</b>
Poggie Club Derby				35	107	25	0	7	11	42
<b>Season Total</b>				<b>7,718</b>	<b>16,115</b>	<b>3,266</b>	<b>17</b>	<b>875</b>	<b>1363</b>	<b>5,521</b>
<b>Variance:</b>				40,716	140,456	11,558	46	364,547	149,226	357,976
<b>Standard Error:</b>				202	375	108	7	604	386	598
<b>CV (%):</b>				3	2	3	39	69	28	11
<b>95% CI:</b>				7,323 - 8,114	15,380 - 16,850	3,055 - 3,477	4 - 31	0 - 2,058	606 - 2,120	4,348 - 6,694

**Table 5.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 10.

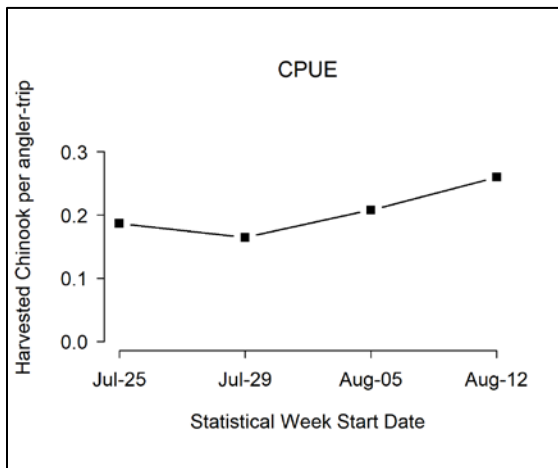
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	850	17	867
Unmarked	1	4	5
<b>Total</b>	<b>851</b>	<b>21</b>	<b>872</b>



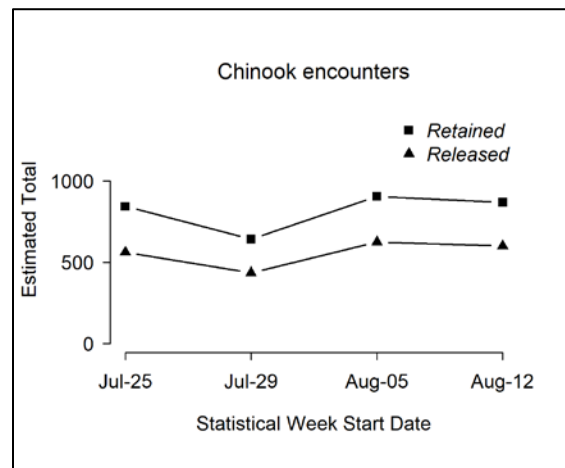
**Figure 5.1** Temporal patterns in fishing effort during the 2108 summer Chinook MSF in Marine Area 10.



**Figure 5.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 10. Note: displayed values are observations where lengths taken.



**Figure 5.2** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 10.



**Figure 5.4** Temporal patterns in Chinook salmon encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 10.

**Table 5.4** Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

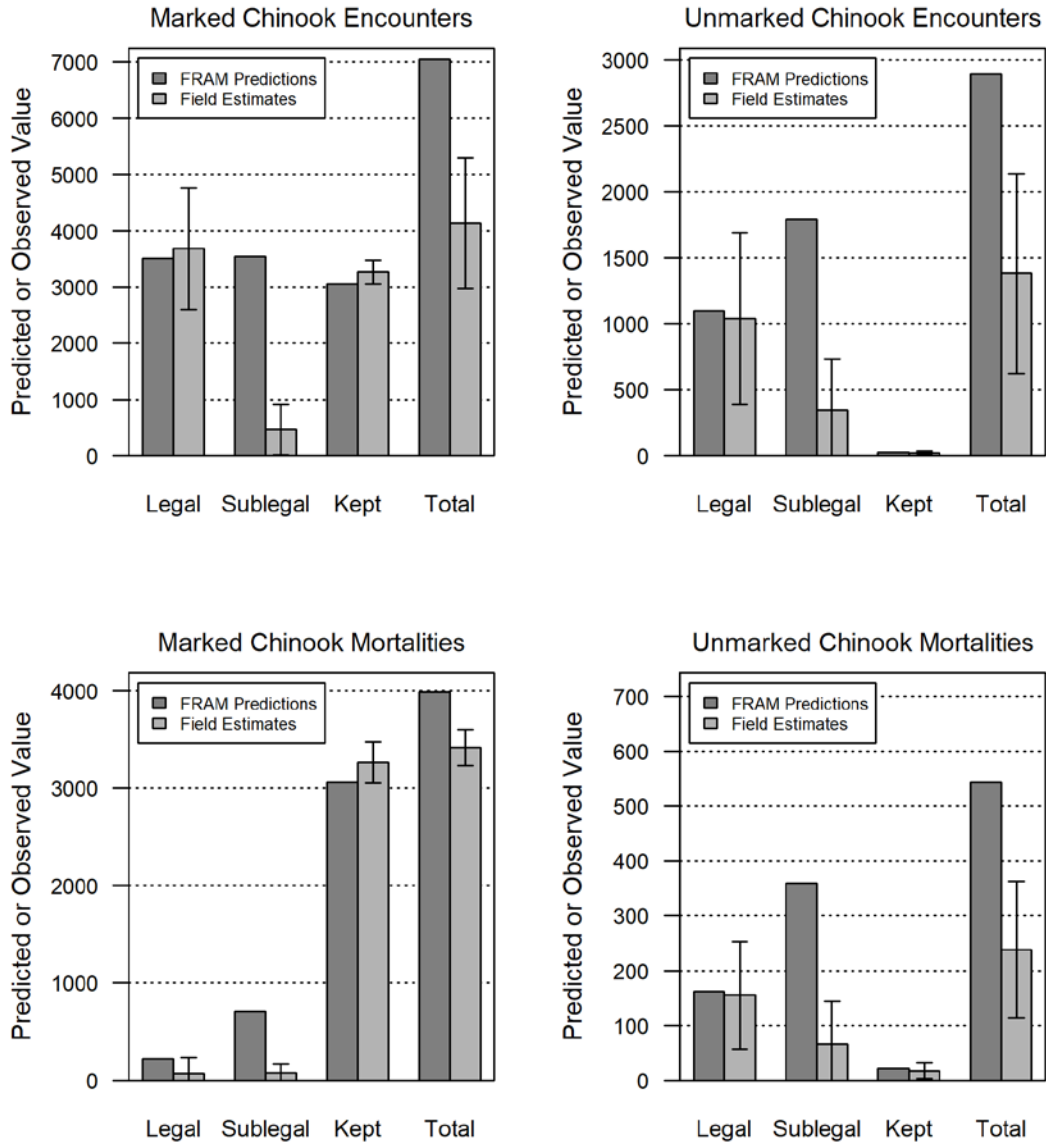
Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	2,890	1097	1793	22
	AD	7,052	3,513	3,539	3,057
	Total	9,942	4,610	5,332	3,079
	% Marked	71	76	66	99
Estimated (Creel) Encounters	UM	1380	1035	345	17
	AD	4,141	3,681	460	3,266
	Total	5,521	4,716	805	3,284
	% Marked	75	78	57	99

**Table 5.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook 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	3,681	3,202	478	72	3,274	18,382	136	3,008 - 3,540	4
Legal UM	1035	3	1032	155	158	2492	50	60 - 256	32
Sublegal AD	460	64	396	79	143	2,305	48	49 - 237	34
Sublegal UM	345	14	331	66	80	1,600	40	2 - 159	50
<b>Total</b>	<b>5,521</b>	<b>3,284</b>	<b>2,237</b>	<b>372</b>	<b>3,656</b>	<b>24,779</b>	<b>157</b>	<b>3,347 - 3,964</b>	<b>4</b>

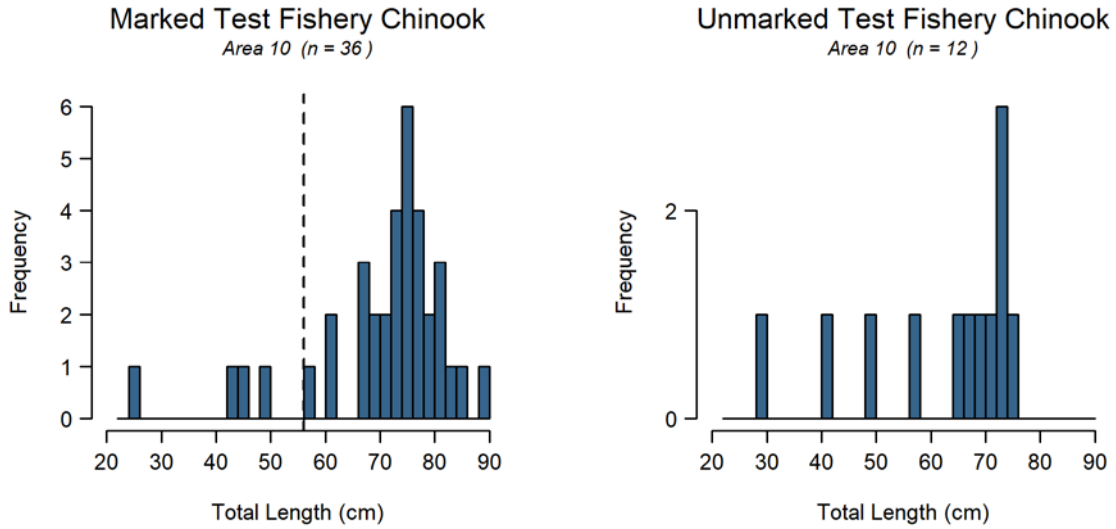
**Table 5.6** Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	543	3,986	4,529	238	3,417	3,656
Released Legal	162	221	383	155	72	227
Released Sublegal	359	708	1067	66	79	145
Landed Only	22	3,057	3,079	17	3,266	3,284



**Figure 5.5** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 10. Error bars represent approximate 95% confidence intervals for field estimates.





**Figure 5.6** Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook salmon encountered by test fishers during the 2019 summer Chinook 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 5.7** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2019 summer Chinook 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	
31	4	17.2	9	1	0	0	10
32	4	24.8	3	0	1	1	5
33	6	59.4	20	8	3	2	33
<b>Total</b>	<b>14</b>	<b>101.3</b>	<b>32</b>	<b>9</b>	<b>4</b>	<b>3</b>	<b>48</b>
<b>Size/mark-status composition:</b>			0.67	0.19	0.08	0.06	
<b>Variance:</b>			(0.0047)	(0.0032)	(0.0016)	(0.0012)	
<b>Legal size mark rate:</b>			0.78				
<b>Overall mark rate:</b>			0.75				

**Table 5.8** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs), with estimates of legal-size and overall (legal and sublegal) mark rates during the 2019 summer Chinook 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	12 1-trip VTRs	11	0	0	2	13	0.85	1.00
Size/mark-status composition: Variance:		0.85 (0.0108)	0.00 (0.0000)	0.00 (0.0000)	0.15 (0.0108)			
Charter VTR	3 1-trip VTRs	17	6	4	2	29	0.72	0.74
Size/mark-status composition: Variance:		0.59 (0.0087)	0.21 (0.0059)	0.14 (0.0042)	0.07 (0.0023)			

**Table 5.9** Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) in the 2019 summer Chinook 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 UM	Coho UK	Pink	Unknown	Coho AD	Coho UM	Coho UK	Chum	Pink	Cutthroat	Unknown
30	25-Jul	28-Jul	375	173	0	60	3	67	39	147	3	20	0	226
31	29-Jul	4-Aug	304	170	3	490	25	47	28	179	0	145	0	279
32	5-Aug	11-Aug	405	249	5	1752	0	58	109	295	0	802	3	407
33	12-Aug	16-Aug	196	165	0	987	0	57	62	156	0	705	0	456
<b>Season Total:</b>			<b>1280</b>	<b>757</b>	<b>8</b>	<b>3288</b>	<b>28</b>	<b>229</b>	<b>239</b>	<b>777</b>	<b>3</b>	<b>1672</b>	<b>3</b>	<b>1368</b>
<b>Variance:</b>			3552	2424	8	32804	390	760	788	5298	1	21899	2	24702
<b>Standard Error:</b>			60	49	3	181	20	28	28	73	1	148	1	157
<b>CV (%):</b>			5	7	37	6	70	12	12	9	45	9	49	11
<b>95% CI:</b>			1,16 3 - 1,39 6	661 - 854	2 - 13	2,933 - 3,643	0 - 67	175 - 283	184 - 294	635 - 920	0 - 5	1,382 - 1,962	0 - 5	1,060 - 1,676

**Table 5.10** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2019 summer Chinook MSF in Marine Area 10. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
<b>Armeni Public Ramp</b>	<b>50</b>	<b>0.0622</b>	<b>60</b>	<b>0.1015</b>
Bayside Marina/Drystack	3	0.0037	0	0.0000
Becket Point Ramp (private)	1	0.0012	0	0.0000
Blake Island	0	0.0000	2	0.0034
<b>Brownsville Marina/Dock/Ramp</b>	<b>28</b>	<b>0.0348</b>	<b>33</b>	<b>0.0558</b>
Commencement Bay Marina Services	0	0.0000	2	0.0034
Dagmar's Landing, Forklift Launch	2	0.0025	0	0.0000
Des Moines Marina (Moorage)	9	0.0112	3	0.0051
Driftwood Key Marina	5	0.0062	3	0.0051
Duwamish Is Marina	0	0.0000	2	0.0034
Eagle Harbor Waterfront Park	17	0.0211	13	0.0220
Edmonds Boat Basin (Public Sling)	36	0.0448	24	0.0406
Edmonds Dry Storage	59	0.0734	24	0.0406
Edmonds Marina	98	0.1219	76	0.1286
Elliott Bay Marina	3	0.0037	6	0.0102
Everett Marina	13	0.0162	20	0.0338
Everett Ramp	33	0.0410	23	0.0389
Evergreen Park Ramp	0	0.0000	2	0.0034
Keyport Ramp	4	0.0050	0	0.0000
Kingston Marina	20	0.0249	28	0.0474
<b>Kingston Public Ramp</b>	<b>66</b>	<b>0.0821</b>	<b>29</b>	<b>0.0491</b>
<b>Manchester Public Ramp</b>	<b>29</b>	<b>0.0361</b>	<b>13</b>	<b>0.0220</b>
Mukilteo Lighthouse Park	5	0.0062	7	0.0118
Port Orchard Public Ramp	3	0.0037	2	0.0034
Possession Waterfront Beach Park	3	0.0037	0	0.0000
Poulsbo Ramp/Marina	4	0.0050	3	0.0051
Private	57	0.0709	13	0.0220
Redondo Ramp	0	0.0000	2	0.0034
Shilshole Marina	107	0.1331	84	0.1421
<b>Shilshole Public Ramp</b>	<b>143</b>	<b>0.1779</b>	<b>112</b>	<b>0.1895</b>
Unknown	3	0.0037	0	0.0000
Winslow City Ramp	0	0.0000	4	0.0068
Winslow Marina	3	0.0037	1	0.0017
<b>Total Anglers</b>	<b>804</b>	<b>1</b>	<b>591</b>	<b>1</b>

**Table 5.11** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 10. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
No CWTs to Date					

**Note: Not all CWTs have been read for the Marine Area 10 Summer Chinook Fishery at the time of writing this report. Table 5.11 and Table 5.12 will be revised when the CWTs become available.**

**Table 5.12** 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 2019 summer Chinook 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)
No DITs to Date								

**Table 5.13** Monthly sample rates (Total retained Chinook salmon sampled <sup>1/</sup> Estimated retained Chinook salmon) in the 2019 summer Chinook 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	
July	30 - 30	25 Jul - 28 Jul	831	12	843	298	3	301	35.70%
August	31 - 33	29 Jul - 16 Aug	2435	5	2440	778	3	781	32.00%
<b>Season Total</b>			<b>3,266</b>	<b>17</b>	<b>3,284</b>	<b>1076</b>	<b>6</b>	<b>1082</b>	<b>33.00%</b>

<sup>1/</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the Marine Area 9 selective fishery

**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 10 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 16 - Jul 28, 2007	8,374	1,469	30	70	8	209	497	3,101	723	6,107
Jul 16 - Aug 15, 2008	13,808	1,027	3	4	0	128	510	189	385	2,246
Jul 16 - Aug 31, 2009	23,179	1,505	22	116	0	220	82	2,488	1,017	5,450
Jul 16 - Aug 31, 2010	21,636	2,950	33	37	9	432	1,026	1,024	1,665	7,178
Jul 16 - Aug 31, 2011	27,753	2,548	14	94	14	372	1,872	964	694	6,573
Jul 16 - Aug 19, 2012	17,823	2,976	17	88	17	443	377	6,343	1,950	12,212
Jul 16 - Aug 18, 2013	27,317	3,434	6	77	17	512	298	2,149	1,603	8,097
Jul 16 - Aug 7, 2014	11,892	1,063	4	0	4	159	322	1,629	322	3,503
Jul 16,- Aug 15, 2016	9,314	1,032	0	53	0	154	274	1,087	593	3,192
Jul 16,- Aug 15, 2017	13,466	2,072	0	153	0	310	741	4,134	1112	8,522
Jul 16 - Aug 16, 2018	19,622	4,695	21	155	14	702	1010	3,733	1097	11,428
Jul 25 - Aug 16, 2019	16,115	3,202	3	64	14	478	1032	396	331	5,521

## **6) Marine Area 11 Summer Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented its thirteenth consecutive summer Chinook MSF in Marine Area 11 from July 1 through September 30, 2019 five days a week (closed Thursday and Friday). Due to in-season action, the fishery was closed on August, 25 2019 when the quota was reached. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Marine Area 11 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 and collection of voluntary trip reports (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 this section, we present results from our monitoring activities during the Marine Area 11 summer Chinook MSF.

**Table 6.1** Sampling/estimation details on target parameters associated with the overall Marine Area 11 summer mark-selective fishery 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 <sup>1</sup> ; 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.-Weds.) and “weekend” (Sat.-Sun.) day-type strata within weeks. For the weekday stratum, we sampled $n=2$ days out of $N=6$ available weekdays per two-week period. For the weekend stratum, we sampled $n=2$ days out of $N=2$ 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	A total of 3 weekday and 5 weekend boat surveys were conducted during the three month fishery.
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	VTR data (LM = 29%, LU = 34%, SM = 16%, SU = 21%; <b>Table 6.14</b> ) was not used to estimate the size/mark-status proportions needed to produce encounter and mortality estimates due to low sample size. The CRC for Encounter <sup>2</sup> approach was used to estimate size/mark-status proportions ( <b>Table 6.11</b> ). Size/mark-status proportions provided by the CRC for Encounter methodology were similar to size/mark-status proportions observed from dockside creeling ( <b>Tables 6.10 and 6.11</b> ).
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.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation

<sup>2</sup><https://wdfw.wa.gov/publications/01620/wdfw01620.pdf>

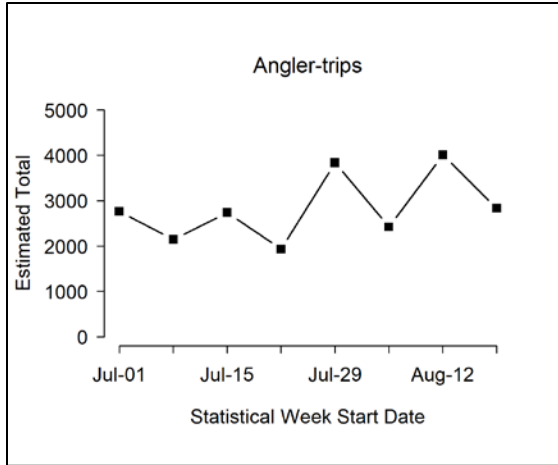
**Table 6.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Chinook MSF in Marine Area 11. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Est. Total Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
<b>July</b>	27	1-Jul	7-Jul	1507	2,768	518	0	328	339	1,184
	28	8-Jul	14-Jul	1,156	2,149	291	0	184	191	667
	29	15-Jul	21-Jul	1,499	2,735	229	5	145	145	524
	30	22-Jul	28-Jul	1,048	1,932	181	2	114	116	414
	31	29-Jul	4-Aug	2,120	3,837	338	2	214	219	773
<b>August</b>	32	5-Aug	11-Aug	1,357	2,424	274	0	173	179	626
	33	12-Aug	18-Aug	2132	4,008	434	3	275	281	993
	34	19-Aug	25-Aug	1401	2,834	213	0	135	139	487
<b>Subtotal</b>				<b>12,221</b>	<b>22,686</b>	<b>2477</b>	<b>12</b>	<b>1569</b>	<b>1610</b>	<b>5,668</b>
South King County PSA Derby				48	132	71	0	45	47	162
Gig Harbor Derby				54	117	58	0	37	38	133
<b>Season Total:</b>				<b>12,323</b>	<b>22,935</b>	<b>2,606</b>	<b>12</b>	<b>1,650</b>	<b>1694</b>	<b>5,963</b>
<b>Variance:</b>				576,815	1,794,284	168,060	39	1,225,478	583,895	1,938,204
<b>SE:</b>				759	1340	410	6	1107	764	1392
<b>CV (%):</b>				6	6	16	51	67	45	23
<b>95% CI:</b>				10,834 - 13,811	20,310 - 25,560	1,802 - 3,409	0 - 25	0 - 3,820	197 - 3,192	3,234 - 8,692

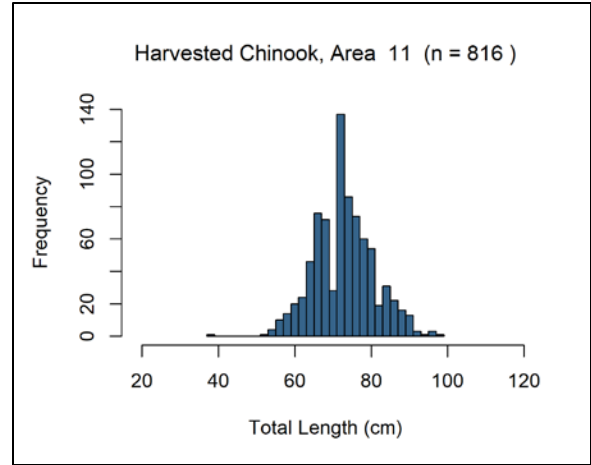
**Table 6.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 11.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	806	10	816
Unmarked	4	0	4
<b>Total</b>	<b>810</b>	<b>10</b>	<b>820</b>

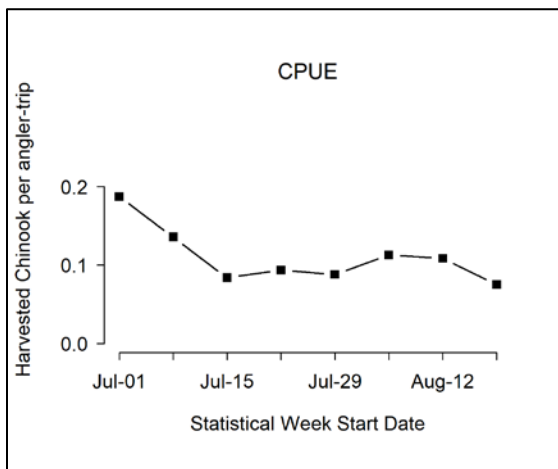




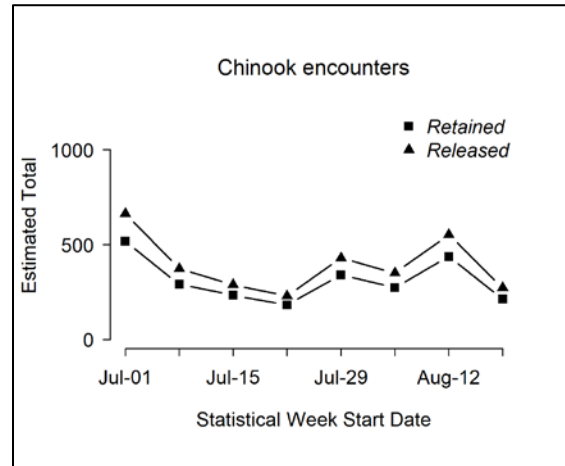
**Figure 6.1** Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 11.



**Figure 6.3** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 11. Note: displayed values are observations where lengths taken.



**Figure 6.2** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 11.



**Figure 6.4** Temporal patterns in Chinook salmon encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 11.

**Table 6.4** Comparison of modeled and estimated total Chinook salmon encounters for the 2019 summer Chinook MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

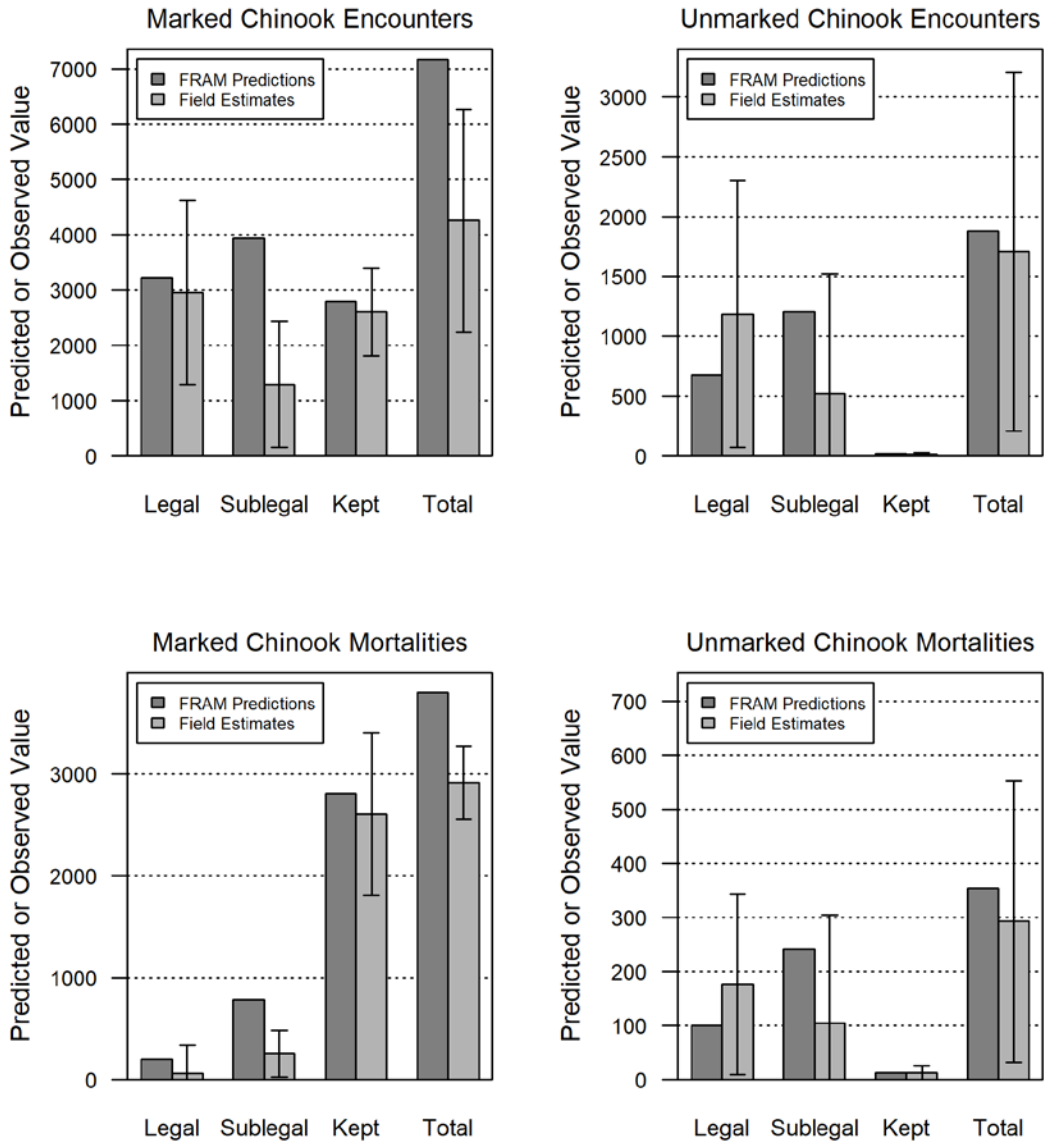
Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	1878	673	1205	13
	AD	7,169	3,224	3945	2,805
	Total	9,047	3,897	5,150	2,818
	% Marked	79	83	77	100
Estimated (Creel) Encounters	UM	1707	1186	520	12
	AD	4,256	2,959	1,298	2,606
	Total	5,963	4,145	1,818	2,618
	% Marked	71	71	71	100

**Table 6.5** Summary of season-wide fishery impact estimates for the 2019 summer Chinook MSF in Marine Area 11. 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	2,959	2,574	385	58	2,632	184,020	429	1,791 - 3,472	16
Legal UM	1186	12	1174	176	188	7306	85	21 - 356	45
Sublegal AD	1,298	32	1,266	253	285	13,638	117	56 - 514	41
Sublegal UM	520	0	520	104	104	10438	102	0 - 304	98
Total	5,963	2,618	3,345	591	3,209	215,402	464	2,300 - 4,119	14

**Table 6.6** Comparison of modeled and estimated total Chinook salmon mortalities for the 2019 summer Chinook MSF in Marine Area 11. 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)	354	3,797	4,151	293	2,917	3,209
Released Legal	100	203	303	176	58	234
Released Sublegal	241	789	1030	104	253	357
Landed Only	13	2,805	2,818	12	2,606	2,618



**Figure 6.5** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the 2019 summer Chinook MSF in Marine Area 11. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 6.7** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 11. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
BC	Thompson River (4.8%)	R-Chilliwack R	H-Chilliwack River H	2 (4.8%)	0
	Hood Canal (4.8%)	Finch Cr 16.0222	Hoodsport Hatchery	2 (4.8%)	0
WA	N Puget Sound (7.1%)	Stillaguamish R -Sf	Brenner Hatchery	1 (2.4%)	0
		Whitehorse Springs	Whitehorse Pond	2 (4.8%)	0
	Skagit River (2.4%)	Cascade R 03.1411	Marblemount Hatchery	1 (2.4%)	0
	Mid Puget Sound (28.6%)	Big Soos Cr 09.0072	Soos Creek Hatchery	4 (9.5%)	0
		Gorst Cr 15.0216	Gorst Cr Rearing Pnd	1 (2.4%)	0
		Grovers Cr Hatchery	Grovers Cr Hatchery	2 (4.8%)	2
		Icy Cr 09.0125	Icy Cr Hatchery	4 (9.5%)	0
		Lk Washington (King)	Issaquah Hatchery	1 (2.4%)	0
		Clear Cr 11.0013C	Clear Creek Hatchery	5 (11.9%)	4
	S Puget Sound (50%)	Deschutes R 13.0028	Tumwater Falls Hatchery	3 (7.1%)	0
		Mcallister Springs Hatch	Clear Creek Hatchery	1 (2.4%)	0
		Minter Cr 15.0048	Minter Cr Hatchery	11 (26.2%)	0
		Kalama Cr 11.0017	Kalama Cr Hatchery	1 (2.4%)	0
	Col. River	Upper Columbia R (2.4%)	Chief Joseph Hatchery	Chief Joseph Hatchery	1 (2.4%)
<b>Total</b>				<b>42</b>	<b>6</b>

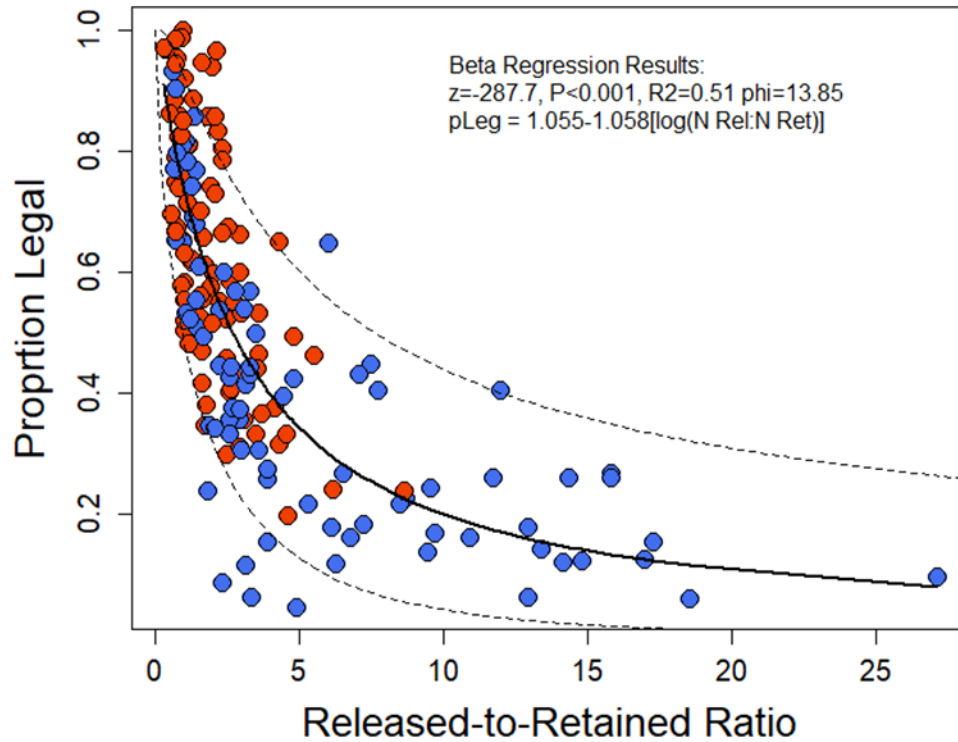
**Table 6.8** Summary of double-index tagged (DIT) Chinook salmon kept by anglers, and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2019 summer Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked.

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	9.6	21.01	9.6	1	0.21	0.79
Grovers Cr Hatchery	2016	2	6.4	14	6.7	0.7	0.155	0.56
<b>Total</b>		<b>6</b>	<b>16</b>	<b>35.01</b>	<b>16.3</b>	<b>1.6</b>	<b>0.365</b>	<b>1.35</b>

**Table 6.9** Monthly sample rates (Total retained Chinook salmon sampled<sup>1</sup> / Estimated retained Chinook salmon) in the 2019 summer Chinook MSF in Marine Area 11. 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	
July	27 - 30	1 Jul - 28 Jul	1219	7	1225	396	1	397	32.40%
August	31 - 34	29 Jul - 25 Aug	1387	6	1393	440	2	442	31.70%
<b>Season Total</b>			<b>2,606</b>	<b>12</b>	<b>2,618</b>	<b>836</b>	<b>3</b>	<b>839</b>	<b>32.00%</b>

<sup>1</sup> Number of retained Chinook salmon sampled includes all retained Chinook salmon inspected for CWT's, from all sites sampled during the summer 2019 Marine Area 11 Chinook MSF (creel estimates and the fish sampled as part of baseline sampling).



**Figure 6.6** Beta regression results displaying the relationship between the released-to-retained ratio from dockside sampling data and the proportion of legal Chinook from the test fishery or VTR data, including parameters resulting from the beta regression model. Red points represent summer fisheries, blue points represent winter fisheries. The dotted lines represent 95% confidence bounds.

**Table 6.10** Summary of dockside creel observations of kept Chinook and reported releases of Chinook by mark status during the 2019 summer Chinook MSF in Marine Area 11 by mark-status.

	Dockside Creel Legal Mark Proportions				
	LM	LU	SM	SU	Unknown
Kept	816	4	10	0	0
Released	18	209	297	122	187
Apportioned Unknown	5	61	86	35	
Total	839	274	393	157	
Size/mark-status composition:	50.46%	16.45%	23.63%	9.46%	

**Table 6.11** Beta regression results for legal-mark status from the released-to-retained ratio during the 2019 summer Chinook MSF in Marine Area 11.

	LM	LU	SM	SU
Size/mark-status composition:	49.62%	19.89%	21.76%	8.73%
Variance:	0.0073	0.0073	0.0073	0.0073

**Table 6.12** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2019 summer Chinook MSF in Marine Area 11. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
<b>Armeni Public Ramp</b>	<b>22</b>	<b>0.0460</b>	<b>68</b>	<b>0.0812</b>
Breakwater Marina (Warters)	13	0.0272	20	0.0239
Bremerton Yacht Club	0	0.0000	4	0.0048
Browns Point Ramp	5	0.0105	3	0.0036
Browns Point Shore	0	0.0000	1	0.0012
Chambers Bay Beach	0	0.0000	2	0.0024
Commencement Bay Marina	15	0.0314	13	0.0155
Day Island Marina	0	0.0000	1	0.0012
Des Moines Marina (Moorage)	22	0.0460	101	0.1207
Des Moines Marina (Slings & moorage)	21	0.0439	0	0.0000
Des Moines Yacht Club	3	0.0063	0	0.0000
Dockton Ramp, Vashon Is	7	0.0146	4	0.0048
Edmonds Dry Storage	1	0.0021	0	0.0000
Elliott Bay Marina	0	0.0000	4	0.0048
Foss Tug Dock	0	0.0000	2	0.0024
Gig Harbor Marina	9	0.0188	28	0.0335
<b>Gig Harbor Ramp</b>	<b>35</b>	<b>0.0732</b>	<b>50</b>	<b>0.0597</b>
Hartstene Is. Ramp	2	0.0042	0	0.0000
Home Public Ramp	2	0.0042	2	0.0024
Hylebos Boat Haven	2	0.0042	0	0.0000
Luhr Beach Ramp	0	0.0000	2	0.0024
Madrona Beach Resort	0	0.0000	1	0.0012
Manchester Public Ramp	16	0.0335	27	0.0323
Narrows Marina	14	0.0293	22	0.0263
Olalla Public Ramp	3	0.0063	2	0.0024
Point Defiance Beach	0	0.0000	2	0.0024
Point Defiance Boathouse Dock	1	0.0021	0	0.0000
<b>Point Defiance Boathouse</b>	<b>65</b>	<b>0.1360</b>	<b>68</b>	<b>0.0812</b>
<b>Point Defiance Public Ramp</b>	<b>103</b>	<b>0.2155</b>	<b>206</b>	<b>0.2461</b>
Point No Point Beach	1	0.0021	0	0.0000
Port Orchard Public Ramp	0	0.0000	2	0.0024
Poulsbo Ramp/Marina	1	0.0021	2	0.0024
Private	31	0.0649	39	0.0466
Quartermaster Marina	0	0.0000	1	0.0012
<b>Redondo Ramp</b>	<b>67</b>	<b>0.1402</b>	<b>124</b>	<b>0.1481</b>
Shilshole Marina	2	0.0042	2	0.0024
Shilshole Public Ramp	0	0.0000	8	0.0096
Silverdale Waterfront Ramp	0	0.0000	2	0.0024
Solo Point	1	0.0021	0	0.0000
Tacoma Outboard Association	1	0.0021	0	0.0000
Tyee Marina/Ramp	13	0.0272	19	0.0227
Vashon Yacht Club	0	0.0000	2	0.0024
Winslow City Ramp	0	0.0000	3	0.0036
<b>Total Anglers</b>	<b>478</b>	<b>1</b>	<b>837</b>	<b>1</b>

**Table 6.13** Fishery-total estimates of retained and released salmon (other than Chinook salmon) for the 2019 summer Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status. Values may not add exactly due to rounding error.

Stat Week	Start Date	End Date	Retained Salmon			Released Salmon					
			Coho AD	Coho UM	Pink	Coho AD	Coho UM	Coho UK	Pink	Cutthroat	Unknown
27	1-Jul	7-Jul	8	10	6	0	21	14	0	0	30
28	8-Jul	14-Jul	15	12	0	0	9	2	0	0	55
29	15-Jul	21-Jul	122	63	28	6	18	76	9	0	48
30	22-Jul	28-Jul	23	11	28	14	7	46	25	0	22
31	29-Jul	4-Aug	48	17	443	14	7	21	166	11	99
32	5-Aug	11-Aug	41	28	203	6	2	21	85	10	66
33	12-Aug	18-Aug	97	26	793	11	32	29	180	0	204
34	19-Aug	25-Aug	130	78	938	11	18	27	780	0	94
<b>Season Total:</b>			<b>483</b>	<b>245</b>	<b>2438</b>	<b>62</b>	<b>115</b>	<b>235</b>	<b>1244</b>	<b>21</b>	<b>618</b>
<b>Variance:</b>			4833	2098	99081	264	614	9602	106093	195	12244
<b>Standard Error:</b>			70	46	315	16	25	98	326	14	111
<b>CV (%):</b>			14	19	13	26	22	42	26	68	18
<b>95% CI:</b>			347 - 619	155 - 335	1,821 - 3,055	30 - 93	66 - 163	43 - 427	606 - 1,883	0 - 48	401 - 834

**Table 6.14** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook 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	31 1-trip VTRs	11	13	6	8	38	0.45	0.46
Size/mark-status composition:		0.29	0.34	0.16	0.21			
Variance:		(0.0056)	(0.0061)	(0.0036)	(0.0045)			

**Table 6.15** 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 11 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jun 1 - Sept 30, 2007	78,958	10,192	74	354	21	1,511	3,015	8,033	2,357	25,558
Jun 1 - Sept 30, 2008	65,728	7,277	18	100	5	1,087	1,999	1,969	248	12,703
Jun 1 - Sept 30, 2009	80,157	3,149	20	117	17	470	1,269	3,820	3,302	12,164
Jun 1 - Sept 30, 2010	54,594	3,883	64	27	0	580	1,105	900	405	6,965
Jun 1 - Sept 30, 2011	69,919	2,559	9	77	12	382	2,120	1,932	1,579	8,670
Jun 1 - Sept 30, 2012	56,065	4,894	57	72	14	731	2,665	2,649	1,157	12,240
Jun 1 - Sept 30, 2013	64,509	3,056	35	55	0	457	1,289	1,214	669	6,774
Jun 1 - Sept 30, 2014	39,426	2,912	20	11	0	435	1,585	2,142	861	7,966
Jun 1 - Sept 30, 2015	40,858	1,447	10	41	3	216	748	2,491	1599	6,556
Jun 24 - Aug 19, 2016	13,766	1,437	4	40	0	215	443	1,359	298	3,794
Jun 1 - Sep 30, 2017	35,899	3,276	20	265	36	489	1056	2,962	1685	9,789
Jun 1- Aug 25, 2018	32,041	5,476	26	164	7	818	2222	7,929	2690	19,333
Jul 1- Aug 25, 2019	22,935	2,574	12	32	0	385	1174	1,266	520	5,963



## 7) Marine Area 12 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented an eighth consecutive summer Chinook MSF in Marine Area 12 from July 1 through September 30, 2019. WDFW's Puget Sound Sampling Unit (PSSU) implemented a "Baseline Sampling" program (see WDFW 2012a for details) consisting of dockside angler interviews with catch sampling along with efforts to distribute and collect voluntary trip reports (VTRs) from the angling public.

Unlike the other survey designs, Baseline Sampling does not provide a means for generating in-season or immediate post-season estimates of fishery total catch and effort. These estimates will be available approximately one year after the close of the fishery through the WDFW Catch Record Card (CRC) program. Once available, CRC-based catch estimates will be used to generate estimates of total Chinook salmon encounters and mortalities by size and mark-status using the methods provided in WDFW & NWIFC (2013). While these descriptors of MSF impacts are not presented in the present document, they will be available at a future time.

**Table 7.1** 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 Marine Area 12 summer Chinook MSF, including relative catch and effort patterns over the course of the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

**Table 7.1** Sampling/estimation details on target parameters associated with the overall Marine Area 12 summer mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Angler Interviews (Baseline Sampling)	Observed (in-sample) fishing effort (boat & angler trips); kept and released fish.	Catch rates (CPUE); length, age, and CWT composition of harvest <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Week	Observed catch per angler trip and species composition data obtained from baseline sampling will ultimately be combined with Catch Record Card (CRC) data to produce fishery-total estimates at a later time (approximately one year following the fishery).
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook	Encounter data for non-Chinook species (e.g., coho) that the angler may record on the VTR form	Fish encounter	Season	When CRC-based retained Chinook estimates become available VTR data will be used in the estimation of total Chinook encounters by size/mark group (LM = 43%, LU = 0%, SM = 43%, SU = 14%; <b>Table 7.6</b> ), along with associated impacts, using the methods described in WDFW & NWIFC (2013).
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available. The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

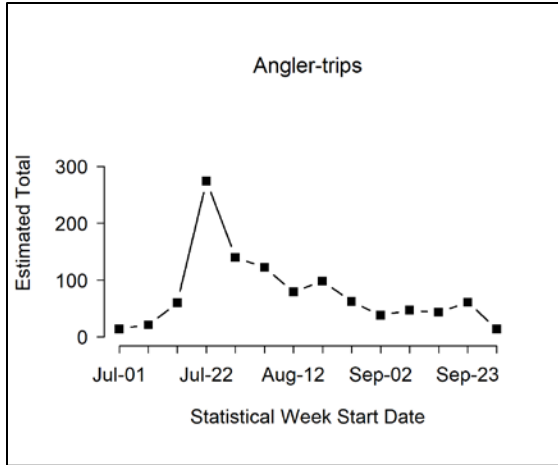
<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

**Table 7.2** Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the summer 2019 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.

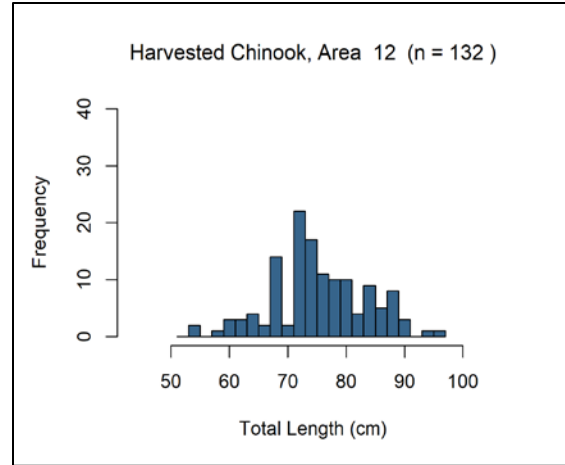
Stat Week	Start	End	Effort		Retained Fish				Released Fish		
			Boats	Anglers	Chin AD	Chin UM	Chin UD	Chin UK	Chin AD	Chin UM	Chin Unk
27	1-Jul	7-Jul	9	14	0	0	0	0	1	0	0
28	8-Jul	14-Jul	10	21	0	0	0	0	5	0	0
29	15-Jul	21-Jul	31	60	15	0	0	0	7	1	5
30	22-Jul	28-Jul	138	274	68	0	3	1	3	4	5
31	29-Jul	4-Aug	65	140	13	0	0	0	3	13	0
32	5-Aug	11-Aug	66	122	11	0	0	0	1	3	0
33	12-Aug	18-Aug	38	79	16	0	0	0	2	7	0
34	19-Aug	25-Aug	58	98	8	0	1	0	0	5	10
35	26-Aug	1-Sep	31	62	2	0	0	0	2	1	0
36	2-Sep	8-Sep	20	38	1	0	0	0	1	2	1
37	9-Sep	15-Sep	31	47	1	0	0	0	1	1	0
38	16-Sep	22-Sep	25	43	7	0	0	0	2	0	0
39	23-Sep	29-Sep	36	61	0	0	0	0	0	0	0
40	30-Sep	30-Sep	9	14	0	0	0	0	4	0	0
<b>Season Total</b>			<b>567</b>	<b>1073</b>	<b>142</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>32</b>	<b>37</b>	<b>21</b>

**Table 7.3** Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the summer 2019 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.

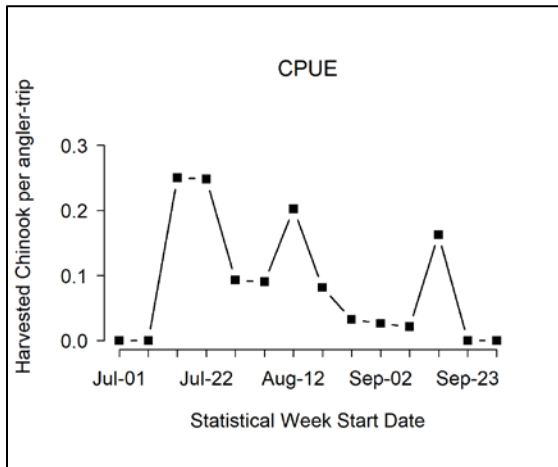
Stat Week	Start	End	Effort		Retained Fish				Released Fish							
			Boats	Anglers	Coho AD	Coho UM	Chum	Pink	Coho AD	Coho UM	Coho UK	Chum	Cutthroat	Pink	Sockeye	Unknown
27	1-Jul	7-Jul	9	14	0	0	0	0	0	0	0	0	0	0	0	0
28	8-Jul	14-Jul	10	21	0	0	0	0	0	0	0	0	0	0	0	0
29	15-Jul	21-Jul	31	60	0	0	0	4	0	0	0	0	1	1	3	0
30	22-Jul	28-Jul	138	274	0	0	0	48	0	0	0	0	3	7	0	6
31	29-Jul	4-Aug	65	140	0	0	0	13	1	0	0	0	1	0	0	1
32	5-Aug	11-Aug	66	122	2	1	0	0	9	0	0	0	13	0	0	1
33	12-Aug	18-Aug	38	79	3	0	0	0	0	0	0	0	0	0	0	0
34	19-Aug	25-Aug	58	98	2	0	0	1	0	0	2	0	0	0	0	0
35	26-Aug	1-Sep	31	62	0	1	0	0	0	0	0	1	12	1	0	1
36	2-Sep	8-Sep	20	38	0	0	0	0	0	0	1	0	0	0	0	0
37	9-Sep	15-Sep	31	47	8	5	0	0	1	2	1	0	22	4	0	0
38	16-Sep	22-Sep	25	43	3	3	0	0	1	0	0	0	10	0	0	0
39	23-Sep	29-Sep	36	61	2	89	1	0	0	2	1	5	21	0	0	0
40	30-Sep	30-Sep	9	14	0	23	0	0	1	0	0	2	4	0	0	0
<b>Season Total</b>			<b>567</b>	<b>1073</b>	<b>20</b>	<b>122</b>	<b>1</b>	<b>66</b>	<b>13</b>	<b>4</b>	<b>5</b>	<b>8</b>	<b>87</b>	<b>13</b>	<b>3</b>	<b>9</b>



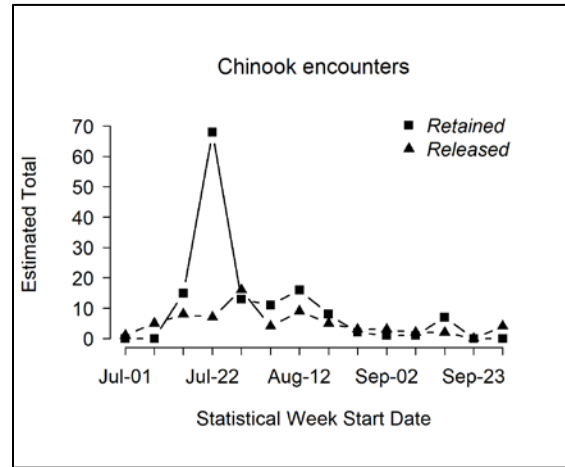
**Figure 7.1** Temporal patterns in fishing effort during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 7.3** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are observations where lengths taken. Note: displayed values are observations where lengths taken.



**Figure 7.2** Temporal patterns in CPUE (landed Chinook per angler trip) during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 7.4** Temporal patterns in Chinook encounters (retained and released) during the 2019 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

**Table 7.4** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 12.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	132	0	132
Unmarked	0	0	0
<b>Total</b>	<b>132</b>	<b>0</b>	<b>132</b>

**Table 7.5** List of sites sampled with the number of sampling events (site-days) during the 2019 summer Chinook MSF in Marine Area 12.

Location Name	Number of Site Days Sampled Per Month			Total Site-Days	% of Total
	July	August	September		
Big Beef Beach	0	0	2	2	0.90%
Dewatto Creek Watch	0	0	1	1	0.45%
Hoodsport Shore	7	3	10	20	8.97%
Misery Point Ramp	2	4	7	13	5.83%
Pleasant Harbor Boat Ramp	0	3	7	10	4.48%
Pleasant Harbor Marina	0	1	3	4	1.79%
Quilcene Bay Ramp	0	8	11	19	8.52%
Saltwater Park Ramp	21	23	19	63	28.25%
Skokomish Tide Flats	0	0	15	15	6.73%
Summertide Resort	0	1	0	1	0.45%
Tahuya Ramp	3	1	2	6	2.69%
Triton Cove State Park	1	2	8	11	4.93%
Twanoh State Park	1	0	0	1	0.45%
Union Ramp	18	22	17	57	25.56%
<b>Grand Total</b>	<b>53</b>	<b>68</b>	<b>102</b>	<b>223</b>	<b>100.00%</b>

**Table 7.6** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook 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	1 1-trip VTRs	1	0	0	0	1	1.00	1.00
Size/mark-status composition:		1.00	0.00	0.00	0.00			

**Table 7.7** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 12. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Hood Canal (100%)	Finch Cr 16.0222	Hoodsport Hatchery	4 (57.1%)	0
		Purdy Cr 16.0005	George Adams Hatchery	3 (42.9%)	0
<b>Total</b>				<b>7</b>	<b>0</b>

## 8) Marine Area 13 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a thirteenth consecutive summer Chinook MSF in Marine Area 13 from May 1 through September 30, 2019. WDFW's Puget Sound Sampling Unit (PSSU) implemented a "Baseline Sampling" program (see WDFW 2012a for details) consisting of dockside angler interviews with catch sampling along with efforts to distribute and collect voluntary trip reports (VTRs) from the angling public.

Unlike the other survey designs, Baseline Sampling does not provide a means for generating in-season or immediate post-season estimates of fishery total catch and effort. These estimates will be available approximately one year after the close of the fishery through the WDFW Catch Record Card (CRC) program. Once available, CRC-based catch estimates will be used to generate estimates of total Chinook salmon encounters and mortalities by size and mark-status using the methods provided in WDFW & NWIFC (2013). While these descriptors of MSF impacts are not presented in the present document, they will be available at a future time.

**Table 8.1** 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 Marine Area 13 summer Chinook MSF, including relative catch and effort patterns over the course of the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.



**Table 8.1** Sampling/estimation details on target parameters associated with the overall Marine Area 13 mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Angler Interviews (Baseline Sampling)	Observed (in-sample) fishing effort (boat & angler trips); kept and released fish.	Catch rates (CPUE); length, age, and CWT composition of harvest <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Week	Observed catch per angler trip and species composition data obtained from baseline sampling will ultimately be combined with Catch Record Card (CRC) data to produce fishery-total estimates at a later time (approximately one year following the fishery).
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 salmon) that the angler may record on the VTR form	Fish encounter	Season	When CRC-based retained Chinook salmon estimates become available VTR data may be used in the estimation of total Chinook salmon encounters by size/mark group (LM = 53%, LU = 14%, SM = 24%, SU = 9%; <b>Table 8.5</b> ), along with associated impacts, using the methods described in WDFW & NWIFC (2013).
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	Will be estimated at a later date using the CRC-based retained Chinook salmon estimate, when it becomes available.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook salmon estimate, when it becomes available. The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

**Table 8.2** Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2019 summer Chinook 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.

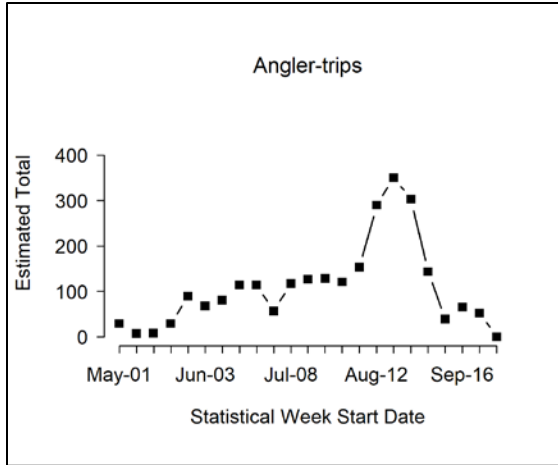
Stat Week	Start	End	Effort		Retained Fish				Released Fish		
			Boats	Anglers	Chin AD	Chin UM	Chin UD	Chin UK	Chin AD	Chin UM	Chin UK
18	1-May	5-May	15	29	1	0	0	0	1	1	0
19	6-May	12-May	4	7	0	0	0	0	0	0	0
20	13-May	19-May	6	8	4	0	0	0	3	2	0
21	20-May	26-May	14	29	4	0	0	0	2	0	0
22	27-May	2-Jun	51	89	15	0	0	0	6	2	0
23	3-Jun	9-Jun	41	68	13	0	0	0	6	5	0
24	10-Jun	16-Jun	50	81	22	0	0	0	6	11	1
25	17-Jun	23-Jun	65	114	8	0	0	0	10	6	1
26	24-Jun	30-Jun	84	114	27	0	0	0	4	4	3
27	1-Jul	7-Jul	37	57	25	0	0	0	1	2	1
28	8-Jul	14-Jul	67	117	5	0	0	1	16	2	2
29	15-Jul	21-Jul	62	127	9	0	0	0	18	5	0
30	22-Jul	28-Jul	68	128	11	0	0	1	6	3	1
31	29-Jul	4-Aug	62	121	11	0	0	0	4	3	4
32	5-Aug	11-Aug	87	153	25	0	0	1	18	5	0
33	12-Aug	18-Aug	145	290	45	0	0	0	14	7	0
34	19-Aug	25-Aug	185	350	69	0	4	1	20	7	3
35	26-Aug	1-Sep	159	303	43	0	0	0	16	4	2
36	2-Sep	8-Sep	78	143	4	0	0	0	6	1	3
37	9-Sep	15-Sep	22	39	0	0	0	0	0	0	0
38	16-Sep	22-Sep	39	65	0	0	0	0	2	0	0
39	23-Sep	29-Sep	30	52	0	0	0	0	1	0	0
40	30-Sep	30-Sep	0	0	0	0	0	0	0	0	0
<b>Season Total</b>			<b>1371</b>	<b>2484</b>	<b>341</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>160</b>	<b>70</b>	<b>21</b>

**Table 8.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the 2019 summer Chinook MSF in Marine Area 13.

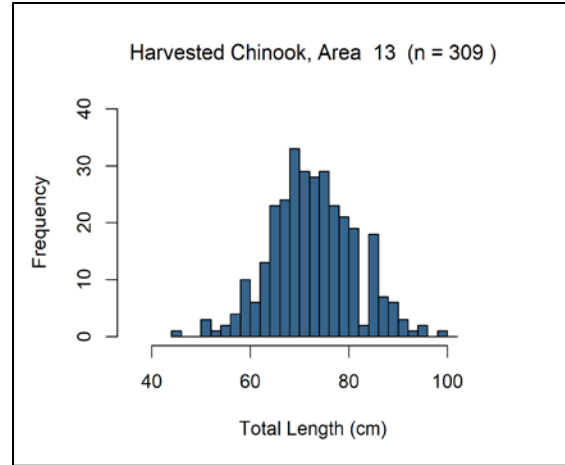
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	307	2	309
Unmarked	0	0	0
<b>Total</b>	<b>307</b>	<b>2</b>	<b>309</b>

**Table 8.4** Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the summer 2019 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.

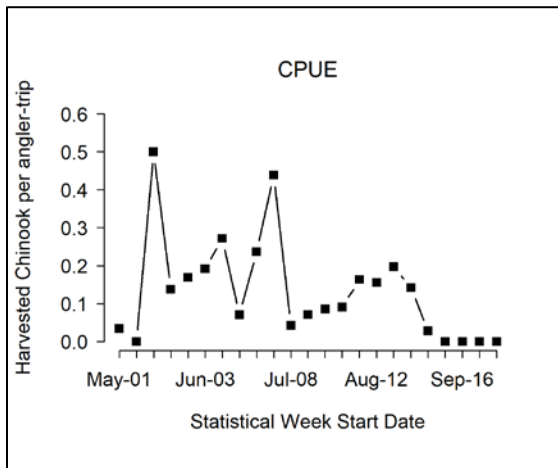
Stat Week	Start	End	Effort		Retained Fish				Released Fish						
			Boats	Anglers	Coho AD	Coho UD	Pink	Unknown	Coho AD	Coho UM	Coho UK	Cutthroat	Pink	Trout	Unknown
18	1-May	5-May	15	29	0	0	0	0	0	0	0	1	0	0	0
19	6-May	12-May	4	7	0	0	0	0	0	0	0	1	0	0	0
20	13-May	19-May	6	8	0	0	0	0	0	0	0	0	0	0	0
21	20-May	26-May	14	29	0	0	0	0	0	0	0	5	0	0	0
22	27-May	2-Jun	51	89	0	0	0	0	0	0	0	0	0	0	0
23	3-Jun	9-Jun	41	68	1	0	0	0	0	0	0	0	0	0	0
24	10-Jun	16-Jun	50	81	0	0	0	0	1	0	0	0	0	0	0
25	17-Jun	23-Jun	65	114	0	0	0	0	0	0	1	0	0	0	0
26	24-Jun	30-Jun	84	114	0	0	0	0	0	1	0	0	0	0	3
27	1-Jul	7-Jul	37	57	0	0	0	0	0	0	0	0	0	0	0
28	8-Jul	14-Jul	67	117	0	0	0	0	0	0	0	2	0	0	0
29	15-Jul	21-Jul	62	127	1	0	0	0	1	1	0	0	0	0	0
30	22-Jul	28-Jul	68	128	2	0	0	0	0	0	0	4	0	0	0
31	29-Jul	4-Aug	62	121	1	0	0	0	15	0	0	1	0	0	0
32	5-Aug	11-Aug	87	153	4	0	0	0	0	0	0	2	0	0	0
33	12-Aug	18-Aug	145	290	5	0	1	0	0	1	0	1	0	0	0
34	19-Aug	25-Aug	185	350	6	0	0	0	0	1	1	1	2	0	1
35	26-Aug	1-Sep	159	303	6	0	10	0	1	1	0	1	2	0	15
36	2-Sep	8-Sep	78	143	10	1	1	0	1	1	0	5	0	0	5
37	9-Sep	15-Sep	22	39	2	0	0	3	0	0	0	0	0	2	0
38	16-Sep	22-Sep	39	65	4	0	0	0	0	0	0	3	0	0	6
39	23-Sep	29-Sep	30	52	3	0	0	0	1	1	1	5	0	0	0
40	30-Sep	30-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Season Total</b>			<b>1371</b>	<b>2484</b>	<b>45</b>	<b>1</b>	<b>12</b>	<b>3</b>	<b>20</b>	<b>7</b>	<b>3</b>	<b>32</b>	<b>4</b>	<b>2</b>	<b>30</b>



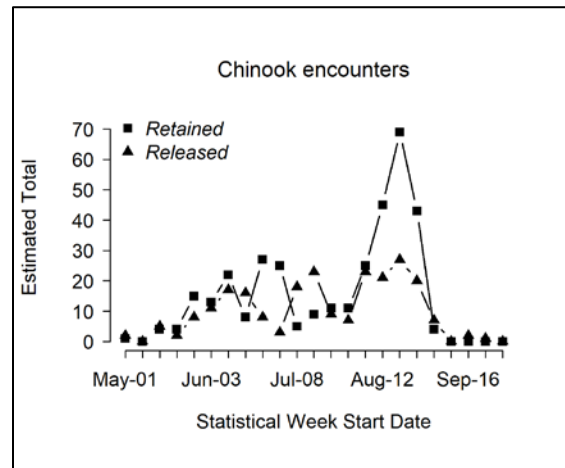
**Figure 8.1** Temporal patterns in fishing effort during the 2019 summer Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 8.3** Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2019 summer Chinook MSF in Marine Area 13. Note: displayed values are observations where lengths taken.



**Figure 8.2** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 8.4** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the 2019 summer Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

**Table 8.5** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2019 summer Chinook 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	41 1-trip VTRs	41	11	19	7	78	0.77	0.79
Size/mark-status composition:		0.53	0.14	0.24	0.09			
Variance:		(0.0032)	(0.0016)	(0.0024)	(0.0011)			

**Table 8.6** Summary of coded-wire tags recovered from Chinook salmon harvested during the 2019 summer Chinook MSF in Marine Area 13. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Hood Canal (21.1%)	Purdy Cr 16.0005	George Adams Hatchery	1 (5.3%)	0
		Finch Cr 16.0222	Hoodsport Hatchery	3 (15.8%)	0
	Mid Puget Sound (10.5%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (5.3%)	0
		Icy Cr 09.0125	Icy Cr Hatchery	1 (5.3%)	0
	S Puget Sound (68.4%)	Clear Cr 11.0013C	Clear Creek Hatchery	2 (10.5%)	1
		Deschutes R 13.0028	Tumwater Falls Hatchery	5 (26.3%)	0
		Kalama Cr 11.0017	Kalama Cr Hatchery	1 (5.3%)	0
		Mcallister Springs Hatch	Clear Creek Hatchery	1 (5.3%)	0
		Minter Cr 15.0048	Minter Cr Hatchery	4 (21.1%)	0
	<b>Total</b>				<b>19</b>

## 9) Marine Area 5 Summer Mark-Selective Coho Fishery

**Table 9.1** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2019 summer Coho MSF in Marine Area 5. 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 Coho		Est. Released Coho			Total Est. Coho Encounters
				Boats	Anglers	AD	UM	AD	UM	UNK	
July	27	1-Jul	7-Jul	947	2240	392	16	42	457	161	1067
	28	8-Jul	14-Jul	1004	2,347	151	6	57	168	38	422
	29	15-Jul	21-Jul	1176	2,748	85	3	12	178	34	312
	30	22-Jul	28-Jul	1175	2,811	55	4	15	105	21	201
	31	29-Jul	4-Aug	997	2,658	100	0	3	192	79	374
August	32	5-Aug	11-Aug	1,107	2,749	227	0	12	239	108	586
	33	12-Aug	15-Aug	503	1,215	68	11	12	33	22	145
	33	16-Aug	18-Aug	380	940	139	3	9	134	58	343
	34	19-Aug	25-Aug	920	2,368	1703	21	193	1705	139	3761
	35	26-Aug	1-Sep	1,212	3,251	2287	23	365	3071	459	6204
September	36	2-Sep	8-Sep	789	1,868	1674	0	178	2821	386	5060
	37	9-Sep	15-Sep	1,415	3,421	3968	31	458	10883	12	15352
	38	16-Sep	22-Sep	766	1,847	850	4	133	4277	378	5642
	39/40	23-Sep	30-Sep	519	1,227	429	5	126	2340	233	3132
<b>Season Total:</b>				<b>9421</b>	<b>23327</b>	<b>12128</b>	<b>125</b>	<b>1615</b>	<b>26603</b>	<b>2129</b>	<b>42601</b>
<b>Variance:</b>				211,813	1,166,964	863,839	524.09031	69,164	3,737,104	57,210	4,727,841
<b>SE:</b>				460	1080	929	23	263	1933	239	2174
<b>CV (%):</b>				6.70%	6.40%	7.66%	18.24%	16.28%	7.27%	11.24%	5.10%
<b>95% CI:</b>				6,008-7,812	14,651-18,885	10306 - 13950	81 - 170	1100 - 2131	22814 - 30392	1660 - 2598	38339 - 46862

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## APPENDICIES

### 1) SITE WEIGHTS

**Appendix 1.1** Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 5.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
7/1/2019	27	Olson's Ramp (1159)	0.2138	Van Riper's South	0.1618
7/6/2019	27	Olson's Ramp (1159)	0.3289	Van Riper's North	0.1247
7/7/2019	27	Olson's East Docks (1159)	0.2251	Van Riper's South	0.1722
7/10/2019	28	Olson's East Docks (1159)	0.2965	Van Riper's South	0.1618
7/12/2019	28	Olson's Ramp (1159)	0.3289	Van Riper's North	0.1247
7/14/2019	28	Olson's Ramp (1159)	0.3289	Olson's East Docks (1159)	0.2251
7/16/2019	29	Olson's East Docks (1159)	0.2965	Olson's West Docks (1159)	0.0929
7/20/2019	29	Olson's Ramp (1159)	0.3289	Olson's East Docks (1159)	0.2251
7/21/2019	29	Olson's Ramp (1159)	0.3289	Van Riper's South	0.1722
7/25/2019	30	Olson's East Docks (1159)	0.2965	Van Riper's North	0.1615
7/26/2019	30	Olson's East Docks (1159)	0.2251	Van Riper's South	0.1722
7/28/2019	30	Olson's Ramp (1159)	0.3289	Olson's East Docks (1159)	0.2251
7/30/2019	31	Van Riper's South	0.1618	Olson's East Docks (1159)	0.2965
8/2/2019	31	Olson's East Docks (1159)	0.1917	Van Riper's North	0.1644
8/3/2019	31	Olson's Ramp (1159)	0.3084	Van Riper's South	0.1944
8/7/2019	32	Olson's East Docks (1159)	0.1788	Van Riper's North	0.1789
8/9/2019	32	Olson's Ramp (1159)	0.3084	Van Riper's North	0.1644
8/10/2019	32	Olson's Ramp (1159)	0.3084	Olson's West Docks (1159)	0.0849
8/15/2019	33	Van Riper's North	0.1789	Van Riper's South	0.1944

**Appendix 1.2** Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 9.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
7/25/2019	30	Norton Street (Everett) Ramp	0.3778	Port Townsend Boat Haven Ramp	0.2023
7/26/2019	30	Norton Street (Everett) Ramp	0.3998	Fort Casey Public Ramp (Keystone)	0.1697
7/27/2019	30	Norton Street (Everett) Ramp	0.3998	Port Townsend Boat Haven Ramp	0.1626
7/28/2019	30	Norton Street (Everett) Ramp	0.3998	Port Townsend Boat Haven Ramp	0.1626
8/1/2019	31	Norton Street (Everett) Ramp	0.3428	Fort Casey Public Ramp (Keystone)	0.1276
8/2/2019	31	Norton Street (Everett) Ramp	0.4941	Fort Casey Public Ramp (Keystone)	0.1335
8/3/2019	31	Norton Street (Everett) Ramp	0.4941	Port Townsend Boat Haven Ramp	0.0666
8/4/2019	31	Norton Street (Everett) Ramp	0.4941	Port Townsend Boat Haven Ramp	0.0666
8/7/2019	32	Norton Street (Everett) Ramp	0.3428	Port Townsend Boat Haven Ramp	0.1179
8/8/2019	32	Norton Street (Everett) Ramp	0.3428	Fort Casey Public Ramp (Keystone)	0.1276
8/9/2019	32	Norton Street (Everett) Ramp	0.4941	Fort Casey Public Ramp (Keystone)	0.1335

**Appendix 1.3** Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 10.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
7/25/2019	30	Shilshole Public Ramp	0.5004	Armeni Public Ramp	0.1701
7/26/2019	30	Shilshole Public Ramp	0.4618	Armeni Public Ramp	0.2169
7/27/2019	30	Shilshole Public Ramp	0.4618	Armeni Public Ramp	0.2169
7/28/2019	30	Shilshole Public Ramp	0.4618	Kingston Public Ramp	0.1409
7/30/2019	31	Shilshole Public Ramp	0.5004	Armeni Public Ramp	0.1701
8/1/2019	31	Shilshole Public Ramp	0.4622	Armeni Public Ramp	0.2581
8/2/2019	31	Armeni Public Ramp	0.2748	Shilshole Public Ramp	0.421
8/3/2019	31	Armeni Public Ramp	0.2748	Shilshole Public Ramp	0.421
8/4/2019	31	Armeni Public Ramp	0.2748	Shilshole Public Ramp	0.421
8/7/2019	32	Shilshole Public Ramp	0.4622	Armeni Public Ramp	0.2581
8/8/2019	32	Shilshole Public Ramp	0.4622	Kingston Public Ramp	0.1372
8/9/2019	32	Shilshole Public Ramp	0.421	Armeni Public Ramp	0.2748
8/10/2019	32	Shilshole Public Ramp	0.421	Armeni Public Ramp	0.2748
8/11/2019	32	Shilshole Public Ramp	0.421	Armeni Public Ramp	0.2748
8/13/2019	33	Shilshole Public Ramp	0.4622	Armeni Public Ramp	0.2581
8/14/2019	33	Shilshole Public Ramp	0.4622	Armeni Public Ramp	0.2581
8/16/2019	33	Shilshole Public Ramp	0.421	Armeni Public Ramp	0.2748
8/17/2019	33	Shilshole Public Ramp	0.421	Kingston Public Ramp	0.1641
8/18/2019	33	Shilshole Public Ramp	0.421	Armeni Public Ramp	0.2748

**Appendix 1.4** Size measures by sample date, for sites sampled during dockside creel surveys for the 2019 summer Chinook MSF in Marine Area 11.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
7/1/2019	27	Point Defiance Public Ramp	0.5054	Point Defiance Boathouse	0.1806
7/6/2019	27	Point Defiance Public Ramp	0.4607	Point Defiance Boathouse	0.1712
7/7/2019	27	Point Defiance Public Ramp	0.4607	Redondo Ramp	0.2237
7/10/2019	28	Point Defiance Public Ramp	0.5054	Redondo Ramp	0.1333
7/13/2019	28	Point Defiance Public Ramp	0.4607	Redondo Ramp	0.2237
7/14/2019	28	Point Defiance Public Ramp	0.4607	Point Defiance Boathouse	0.1712
7/16/2019	29	Point Defiance Public Ramp	0.5054	Point Defiance Boathouse	0.1806
7/20/2019	29	Point Defiance Public Ramp	0.4607	Redondo Ramp	0.2237
7/21/2019	29	Point Defiance Public Ramp	0.4607	Redondo Ramp	0.2237
7/24/2019	30	Point Defiance Public Ramp	0.5054	Redondo Ramp	0.1333
7/27/2019	30	Point Defiance Public Ramp	0.4607	Gig Harbor Ramp	0.0846
7/28/2019	30	Point Defiance Public Ramp	0.4607	Redondo Ramp	0.2237
7/30/2019	31	Point Defiance Boathouse	0.1806	Point Defiance Public Ramp	0.5054
8/3/2019	31	Gig Harbor Ramp	0.0889	Point Defiance Public Ramp	0.4655
8/4/2019	31	Redondo Ramp	0.2495	Point Defiance Public Ramp	0.4655
8/7/2019	32	Point Defiance Boathouse	0.1575	Point Defiance Public Ramp	0.4
8/10/2019	32	Point Defiance Boathouse	0.1272	Point Defiance Public Ramp	0.4655
8/11/2019	32	Redondo Ramp	0.2495	Point Defiance Public Ramp	0.4655
8/14/2019	33	Point Defiance Public Ramp	0.4	Gig Harbor Ramp	0.1214
8/17/2019	33	Point Defiance Public Ramp	0.4655	Redondo Ramp	0.2495
8/18/2019	33	Point Defiance Public Ramp	0.4655	Point Defiance Boathouse	0.1272
8/21/2019	34	Point Defiance Public Ramp	0.4	Point Defiance Boathouse	0.1575
8/24/2019	34	Point Defiance Public Ramp	0.4655	Redondo Ramp	0.2495
8/25/2019	34	Point Defiance Public Ramp	0.4655	Redondo Ramp	0.2495

## 2) CWT RECOVERIES

**Appendix 2.1** Coded-wire tag (CWT) recoveries in the 2019 summer 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	1-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		69	CWT00042801	AD
5	1-Jul-19	184383	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		75	CWT00052205	AD
5	1-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		84	CWT00052208	AD
5	1-Jul-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		70	CWT00052301	AD
5	1-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		67	CWT00052302	AD
5	1-Jul-19	636822	2014	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		73	CWT00052507	AD
5	1-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		66	CWT00052508	AD
5	1-Jul-19	184382	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		69	CWT00052509	AD
5	2-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		59	CWT00042802	AD
5	2-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		66	CWT00042803	AD
5	2-Jul-19	637157	2016	Kendall Cr 01.0406	Kendall Cr Hatchery	WDFW		72	CWT00052102	AD
5	2-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		53	CWT00052103	AD
5	2-Jul-19	636813	2014	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		57	CWT00052404	AD
5	2-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		70	CWT00052405	AD
5	2-Jul-19	636954	2015	Wallace R 07.0940	Wallace R Hatchery	WDFW		58	CWT00052407	AD
5	2-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		60	CWT00052408	AD
5	2-Jul-19	637047	2015	East Sound Bay (San)	Glenwood Springs	COOP		66	CWT00052510	AD
5	2-Jul-19	184295	2016	R-Cowichan R	H-Cowichan River H	CDFO		65	CWT00052512	AD
5	2-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		67	CWT00052513	AD
5	3-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	63	CWT00042804	AD
5	3-Jul-19	184183	2015	R-Nicola R	H-Spius Creek H	CDFO		68	CWT00042805	AD
5	3-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		53	CWT00042806	AD
5	3-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	70	CWT00052105	AD
5	3-Jul-19	211155	2015	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211156	65	CWT00052106	AD
5	3-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		63	CWT00052107	AD
5	3-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		63	CWT00052398	AD

5	5-Jul-19	184182	2015	R-Nicola R	H-Spius Creek H	CDFO		67	CWT00052210	AD
5	5-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		65	CWT00052211	AD
5	5-Jul-19	56077	2016	Coleman Nfh	Coleman Nfh	USFWS		58	CWT00052213	AD
5	5-Jul-19	184168	2016	R-Capilano R Up	H-Capilano River H	CDFO		65	CWT00052409	AD
5	5-Jul-19	636916	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		68	CWT00052410	AD
5	5-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		57	CWT00052411	AD
5	5-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		73	CWT00052412	AD
5	5-Jul-19	184385	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		75	CWT00052413	AD
5	5-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		59	CWT00052515	AD
5	5-Jul-19	637157	2016	Kendall Cr 01.0406	Kendall Cr Hatchery	WDFW		49	CWT00052516	AD
5	5-Jul-19	91045	2015	Bull Run R	Sandy Hatchery	ODFW		81	CWT00052600	AD
5	6-Jul-19	184385	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		75	CWT00042892	AD
5	6-Jul-19	184385	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		68	CWT00052414	AD
5	6-Jul-19	60984	2016	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	CDFW		67	CWT00052416	AD
5	7-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		62	CWT00042888	AD
5	7-Jul-19	637189	2016	Cowlitz R 26.0002	Cowlitz Salmon Hatchery	WDFW		53	CWT00042889	AD
5	7-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	65	CWT00052216	AD
5	7-Jul-19	56072	2016	Coleman Nfh	Coleman Nfh	USFWS		57	CWT00052217	AD
5	7-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		64	CWT00052218	AD
5	7-Jul-19	637040	2015	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	WDFW		71	CWT00052219	AD
5	7-Jul-19	91045	2015	Bull Run R	Sandy Hatchery	ODFW		80	CWT00052418	AD
5	7-Jul-19	56076	2016	Coleman Nfh	Coleman Nfh	USFWS		82	CWT00052421	AD
5	7-Jul-19	56062	2016	Coleman Nfh	Coleman Nfh	USFWS		56	CWT00052525	AD
5	8-Jul-19	211213	2016	Whitehorse Springs	Whitehorse Pond	STIL		58	CWT00052400	AD
5	10-Jul-19	183973	2015	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		78	CWT00042813	AD
5	10-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		89	CWT00042814	AD
5	10-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		66	CWT00042887	AD
5	10-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		87	CWT00052220	AD
5	10-Jul-19	184365	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		76	CWT00052221	AD



5	10-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	66	CWT00052417	AD
5	10-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	59	CWT00052529	AD
5	10-Jul-19	636811	2014	Voight Cr 10.0414	Voights Cr Hatchery	WDFW		73	CWT00052530	AD
5	11-Jul-19	60968	2016	Feather Boyds Pump Ramp	Feather R Hatchery	CDFW		48	CWT00042815	AD
5	11-Jul-19	184375	2016	R-Harrison R	H-Chehalis River H	CDFO		59	CWT00042816	AD
5	11-Jul-19	184382	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		71	CWT00042886	AD
5	11-Jul-19	211213	2016	Whitehorse Springs	Whitehorse Pond	STIL		67	CWT00052214	AD
5	11-Jul-19	91137	2016	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW		70	CWT00052222	AD
5	11-Jul-19	184365	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		75	CWT00052423	AD
5	11-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		75	CWT00052531	AD
5	11-Jul-19	637147	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		58	CWT00052532	AD
5	11-Jul-19	184382	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		60	CWT00052534	AD
5	11-Jul-19	60967	2016	Feather Boyds Pump Ramp	Feather R Hatchery	CDFW		56	CWT00052536	AD
5	13-Jul-19	91009	2015	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW		70	CWT00052307	AD
5	13-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		67	CWT00052392	AD
5	13-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		70	CWT00052537	AD
5	13-Jul-19	211229	2016	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ		56	CWT00052567	AD
5	14-Jul-19	184373	2016	R-Harrison R	H-Chehalis River H	CDFO		55	CWT00052428	AD
5	15-Jul-19	636958	2015	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		66	CWT00052388	AD
5	15-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		68	CWT00052539	AD
5	15-Jul-19	636788	2015	Fallert Cr 27.0017	Fallert Cr Hatchery	WDFW		81	CWT00052540	AD
5	16-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		68	CWT00052429	AD
5	17-Jul-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		85	CWT00052231	AD
5	17-Jul-19	637040	2015	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	WDFW		82	CWT00052431	AD
5	17-Jul-19	211229	2016	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ		61	CWT00052542	AD
5	17-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		62	CWT00052543	AD
5	17-Jul-19	637214	2016	East Sound Bay (San)	Glenwood Springs	COOP		58	CWT00052599	AD
5	18-Jul-19	183177	2015	R-Quinsam R	H-Quinsam River H	CDFO		78	CWT00052299	AD
5	18-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		65	CWT00052300	AD

5	19-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		64	CWT00042819	AD
5	19-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		57	CWT00042820	AD
5	19-Jul-19	55894	2015	Tsoo-Yess R 20.0015	Makah Nfh On Tsoo-Yess R	USFWS		79	CWT00042821	AD
5	19-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		70	CWT00042883	AD
5	19-Jul-19	56084	2016	Coleman Nfh	Coleman Nfh	USFWS		56	CWT00042884	AD
5	19-Jul-19	637163	2016	Elwha R 18.0272	Elwha Hatchery	WDFW		64	CWT00052226	AD
5	19-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	77	CWT00052227	AD
5	19-Jul-19	55828	2016	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55829	58	CWT00052228	AD
5	19-Jul-19	183984	2015	R-Cowichan R	H-Cowichan River H	CDFO		77	CWT00052230	AD
5	19-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	68	CWT00052297	AD
5	19-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		82	CWT00052298	AD
5	20-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		68	CWT00042881	AD
5	20-Jul-19	220259	2016	Npt Hatchery	Npt Hatchery	NPT		54	CWT00042882	AD
5	20-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	56	CWT00052279	AD
5	20-Jul-19	56079	2016	Coleman Nfh	Coleman Nfh	USFWS		59	CWT00052280	AD
5	20-Jul-19	60967	2016	Feather Boyds Pump Ramp	Feather R Hatchery	CDFW		59	CWT00052432	AD
5	20-Jul-19	56077	2016	Coleman Nfh	Coleman Nfh	USFWS		60	CWT00052433	AD
5	20-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		78	CWT00052434	AD
5	20-Jul-19	56085	2016	Coleman Nfh	Coleman Nfh	USFWS		67	CWT00052435	AD
5	20-Jul-19	637082	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		58	CWT00052436	AD
5	20-Jul-19	56067	2016	Coleman Nfh	Coleman Nfh	USFWS		56	CWT00052437	AD
5	20-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		64	CWT00052544	AD
5	20-Jul-19	184385	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		73	CWT00052545	AD
5	20-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		55	CWT00052546	AD
5	20-Jul-19	636969	2015	Cowlitz R 26.0002	Cowlitz Salmon Hatchery	WDFW		77	CWT00052547	AD
5	20-Jul-19	56078	2016	Coleman Nfh	Coleman Nfh	USFWS		57	CWT00052548	AD
5	20-Jul-19	637199	2016	Grande Ronde R 1	Irrigon Hatchery	ODFW		60	CWT00052549	AD
5	20-Jul-19	61203	2016	Mare Island Net Pen	Nimbus Fish Hatchery	CDFW		61	CWT00052597	AD
5	21-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		56	CWT00042880	AD

5	21-Jul-19	60976	2016	San Pablo Bay Net Pens	Feather R Hatchery	CDFW		60	CWT00052206	AD
5	21-Jul-19	56066	2016	Coleman Nfh	Coleman Nfh	USFWS		59	CWT00052273	AD
5	21-Jul-19	56066	2016	Coleman Nfh	Coleman Nfh	USFWS		56	CWT00052274	AD
5	21-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		64	CWT00052281	AD
5	21-Jul-19	56067	2016	Coleman Nfh	Coleman Nfh	USFWS		58	CWT00052380	AD
5	21-Jul-19	636925	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		76	CWT00052381	AD
5	21-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	55	CWT00052438	AD
5	21-Jul-19	55928	2017	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55927	46	CWT00052551	AD
5	21-Jul-19	60952	2016	Half Moon Bay John Pr Net	Mok R Fish Ins	CDFW		57	CWT00052552	AD
5	21-Jul-19	184385	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		NA	CWT00052594	AD
5	21-Jul-19	60952	2016	Half Moon Bay John Pr Net	Mok R Fish Ins	CDFW		56	CWT00052595	AD
5	21-Jul-19	91012	2016	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW		87	CWT00052596	AD
5	22-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		76	CWT00052593	AD
5	24-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	75	CWT00052229	AD
5	24-Jul-19	183691	2015	R-Chilliwack R	H-Chilliwack River H	CDFO		75	CWT00052232	AD
5	24-Jul-19	60598	2016	Fort Baker Minor Pt	Mok R Fish Ins	CDFW		60	CWT00052377	AD
5	24-Jul-19	60950	2016	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	CDFW		58	CWT00052378	AD
5	24-Jul-19	637161	2016	Cascade R 03.1411	Marblemount Hatchery	WDFW		57	CWT00052379	AD
5	24-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	69	CWT00052440	AD
5	24-Jul-19	60952	2016	Half Moon Bay John Pr Net	Mok R Fish Ins	CDFW		76	OSP25602	AD
5	25-Jul-19	60598	2016	Fort Baker Minor Pt	Mok R Fish Ins	CDFW		56	CWT00042876	AD
5	25-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		88	CWT00042877	AD
5	25-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		79	CWT00042878	AD
5	25-Jul-19	56075	2016	Coleman Nfh	Coleman Nfh	USFWS		66	CWT00042879	AD
5	25-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		79	CWT00052276	AD
5	25-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		77	CWT00052278	AD
5	25-Jul-19	60598	2016	Fort Baker Minor Pt	Mok R Fish Ins	CDFW		55	CWT00052282	AD
5	25-Jul-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		80	CWT00052442	AD
5	26-Jul-19	55828	2016	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55829	79	CWT00052272	AD
5	26-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	73	CWT00052275	AD

5	26-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		82	CWT00052277	AD
5	26-Jul-19	211229	2016	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ		79	CWT00052283	AD
5	26-Jul-19	211215	2016	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		70	CWT00052284	AD
5	26-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		79	CWT00052443	AD
5	26-Jul-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		84	CWT00052444	AD
5	26-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		99	CWT00052446	AD
5	27-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		79	CWT00042826	AD
5	27-Jul-19	60972	2016	Mare Island Net Pen	Feather R Hatchery	CDFW		69	CWT00042827	AD
5	27-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	88	CWT00052233	AD
5	27-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		53	CWT00052374	AD
5	27-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		73	CWT00052375	AD
5	28-Jul-19	183967	2015	R-Harrison R	H-Chehalis River H	CDFO		69	CWT00042875	AD
5	28-Jul-19	636958	2015	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		83	CWT00052234	AD
5	28-Jul-19	636925	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		75	CWT00052235	AD
5	28-Jul-19	60952	2016	Half Moon Bay John Pr Net	Mok R Fish Ins	CDFW		65	CWT00052447	AD
5	28-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		53	CWT00052448	AD
5	28-Jul-19	636788	2015	Fallert Cr 27.0017	Fallert Cr Hatchery	WDFW		87	CWT00052449	AD
5	28-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		89	CWT00052450	AD
5	28-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		56	CWT00052452	AD
5	30-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		65	CWT00042828	AD
5	30-Jul-19	184293	2016	R-Cowichan R	H-Cowichan River H	CDFO		78	CWT00052372	AD
5	30-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	88	CWT00052373	AD
5	30-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		65	CWT00052453	AD
5	30-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		51	CWT00052455	AD
5	30-Jul-19	636923	2015	Kalama R 27.0002	Kalama Falls Hatchery	WDFW		73	CWT00052554	AD
5	30-Jul-19	211170	2015	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ		78	CWT00052555	AD
5	31-Jul-19	184383	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		64	CWT00052288	AD
5	31-Jul-19	55928	2017	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55927	56	CWT00052370	AD
5	1-Aug-19	184382	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		60	CWT00042872	AD
5	1-Aug-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		58	CWT00042873	AD

5	1-Aug-19	637127	2016	Lk Washington (King)	Issaquah Hatchery	WDFW		61	CWT00042874	AD
5	1-Aug-19	60967	2016	Feather Boyds Pump Ramp	Feather R Hatchery	CDFW		56	CWT00052295	AD
5	1-Aug-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		56	CWT00052456	AD
5	1-Aug-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	61	CWT00052457	AD
5	1-Aug-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	70	CWT00052556	AD
5	2-Aug-19	211163	2015	Mcallister Springs Hatch	Clear Creek Hatchery	NISQ		71	CWT00042871	AD
5	2-Aug-19	637165	2016	Minter Cr 15.0048	Hupp Springs Rearing	WDFW		56	CWT00052294	UM
5	2-Aug-19	637199	2016	Grande Ronde R 1	Irrigon Hatchery	ODFW		65	CWT00052459	AD
5	2-Aug-19	55824	2016	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55825	65	OSP10167	AD
5	3-Aug-19	60967	2016	Feather Boyds Pump Ramp	Feather R Hatchery	CDFW		59	CWT00052367	AD
5	3-Aug-19	184375	2016	R-Harrison R	H-Chehalis River H	CDFO		68	CWT00052557	AD
5	3-Aug-19	637094	2016	Kalama R 27.0002	Kalama Falls Hatchery	WDFW		68	CWT00052591	AD
5	4-Aug-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		57	CWT00042867	AD
5	4-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		70	CWT00042868	AD
5	4-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		58	CWT00042869	AD
5	4-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		80	CWT00052270	AD
5	7-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		77	CWT00052236	AD
5	7-Aug-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		59	CWT00052267	AD
5	7-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		79	CWT00052361	AD
5	7-Aug-19	637147	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		66	CWT00052560	AD
5	8-Aug-19	55928	2017	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55927	72	CWT00052461	AD
5	8-Aug-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		58	CWT00052462	AD
5	8-Aug-19	55824	2016	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55825	75	CWT00052463	AD
5	9-Aug-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	73	CWT00042829	AD
5	10-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		76	CWT00052237	AD
5	10-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		85	CWT00052239	AD
5	10-Aug-19	60982	2016	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	CDFW		63	CWT00052467	AD
5	10-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		61	CWT00052562	AD
5	10-Aug-19	211183	2015	Stillaguamish R -Sf	Brenner Hatchery	STIL		71	CWT00052563	AD
5	10-Aug-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	81	CWT00052589	AD

5	10-Aug-19	56085	2016	Coleman Nfh	Coleman Nfh	USFWS		57	CWT00052590	AD
5	11-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		93	CWT00052268	AD
5	11-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		74	CWT00052293	AD
5	11-Aug-19	211164	2015	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		80	CWT00052355	AD
5	11-Aug-19	637147	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		63	CWT00052565	AD
5	11-Aug-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		59	CWT00052588	AD
5	12-Aug-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		68	CWT00052559	AD
5	12-Aug-19	91112	2016	Springs Cr 36.0114	Ringold Springs Hatchery	WDFW		84	CWT00052586	AD
5	13-Aug-19	184383	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		65	CWT00052468	AD
5	14-Aug-19	91012	2016	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW		54	CWT00052259	AD
5	14-Aug-19	60792	2016	San Pablo Bay Net Pens	Feather R Hatchery	CDFW		54	CWT00052261	AD
5	14-Aug-19	184374	2016	R-Harrison R	H-Chehalis River H	CDFO		75	CWT00052263	AD
5	14-Aug-19	55894	2015	Tsoo-Yess R 20.0015	Makah Nfh On Tsoo-Yess R	USFWS		71	CWT00052353	AD
5	15-Aug-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		66	CWT00042830	AD
5	15-Aug-19	60952	2016	Half Moon Bay John Pr Net	Mok R Fish Ins	CDFW		56	CWT00052349	AD
5	15-Aug-19	637040	2015	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	WDFW		70	CWT00052350	AD
5	15-Aug-19	211214	2016	Hoko R 19.0148	Hoko Falls Hatchery	MAKAH		58	CWT00052469	AD

## Appendix 2.2 Coded-wire tag (CWT) recoveries in the 2019 summer 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-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		95	CWT00043101	AD
6	1-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		79	CWT00043201	AD
6	1-Jul-19	91014	2016	Umatilla R	Umatilla Hatchery	ODFW		77	CWT00043301	AD
6	1-Jul-19	211187	2015	Clarks Crk Hatchery	Clarks Crk Hatchery	PUYA		66	CWT00043302	AD
6	1-Jul-19	636925	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		68	CWT00043303	AD
6	1-Jul-19	636916	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		81	CWT00043304	AD
6	2-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		89	CWT00043102	AD
6	2-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		83	CWT00043305	AD
6	5-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ			CWT00042701	AD
6	6-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		84	CWT00042702	AD
6	6-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	72	CWT00042703	AD
6	6-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		68	CWT00043103	AD
6	6-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		85	CWT00043104	AD
6	6-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	59	CWT00043202	AD
6	7-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		88	CWT00042704	AD
6	7-Jul-19	211155	2015	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211156	70	CWT00043105	AD
6	7-Jul-19	637163	2016	Elwha R 18.0272	Elwha Hatchery	WDFW		79	CWT00043226	AD
6	7-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		67	CWT00043227	AD
6	7-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		69	CWT00043228	AD
6	7-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		66	CWT00043229	AD
6	7-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		60	CWT00043306	AD
6	7-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		70	CWT00043307	AD
6	7-Jul-19	637147	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		59	CWT00043308	AD
6	8-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		77	CWT00043310	AD
6	8-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		84	CWT00043311	AD
6	9-Jul-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		74	CWT00043312	AD
6	9-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		85	CWT00043313	AD
6	9-Jul-19	637127	2016	Lk Washington (King)	Issaquah Hatchery	WDFW		70	CWT00043400	AD
6	10-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		74	CWT00042705	AD
6	11-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		83	CWT00042706	AD
6	11-Jul-19	211155	2015	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211156	79	CWT00043008	AD
6	11-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	66	CWT00043230	AD
6	11-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		84	CWT00043231	AD
6	12-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		76	CWT00042707	AD

6	12-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		73	CWT00043314	AD
6	13-Jul-19	636958	2015	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		76	CWT00042708	AD
6	13-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		77	CWT00042709	AD
6	13-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		78	CWT00043232	AD
6	13-Jul-19	637125	2016	Portage Bay/Ship Cnl	Issaquah Hatchery	WDFW		62	CWT00052308	AD
6	14-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		70	CWT00042710	AD
6	15-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		67	CWT00043315	AD
6	15-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		79	CWT00043398	AD
6	17-Jul-19	637163	2016	Elwha R 18.0272	Elwha Hatchery	WDFW		85	CWT00043245	AD
6	19-Jul-19	211229	2016	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ		68	CWT00043106	AD
6	19-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		73	CWT00043316	AD
6	19-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		67	CWT00043317	AD
6	20-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	58	CWT00043003	AD
6	20-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		73	CWT00043318	AD
6	20-Jul-19	60938	2016	San Pablo Bay Net Pens	Feather R Hatchery	CDFW		73	CWT00043319	AD
6	20-Jul-19	637120	2016	Elwha R 18.0272	Elwha Hatchery	WDFW		77	CWT00043397	AD
6	21-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		68	CWT00043320	AD
6	21-Jul-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		63	CWT00043395	AD
6	24-Jul-19	636954	2015	Wallace R 07.0940	Wallace R Hatchery	WDFW		71	CWT00042714	AD
6	24-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		83	CWT00042715	AD
6	26-Jul-19	184168	2016	R-Capilano R Up	H-Capilano River H	CDFO		75	CWT00043321	AD
6	26-Jul-19	637120	2016	Elwha R 18.0272	Elwha Hatchery	WDFW		79	CWT00043394	AD
6	27-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		55	CWT00043392	AD
6	27-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		81	CWT00043393	AD
6	28-Jul-19	637163	2016	Elwha R 18.0272	Elwha Hatchery	WDFW		74	CWT00043391	AD
6	30-Jul-19	636925	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		65	CWT00043322	AD
6	31-Jul-19	211187	2015	Clarks Crk Hatchery	Clarks Crk Hatchery	PUYA		82	CWT00042716	AD
6	31-Jul-19	211170	2015	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ		78	CWT00042717	AD
6	1-Aug-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW			CWT00042718	AD
6	2-Aug-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		82	CWT00042723	AD
6	4-Aug-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		61	CWT00042720	AD
6	5-Aug-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		75	CWT00043324	AD
6	7-Aug-19	211230	2016	Mcallister Springs Hatch	Clear Creek Hatchery	NISQ		78	CWT00042721	AD
6	8-Aug-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		67	CWT00042722	AD
6	8-Aug-19	211170	2015	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ		76	CWT00042726	AD
6	9-Aug-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW			CWT00042724	AD
6	9-Aug-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	56	CWT00042727	AD



Draft January 31, 2019

6	9-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		61	CWT00043190	AD
6	9-Aug-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		73	CWT00043191	AD
6	10-Aug-19	636958	2015	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		68	CWT00042728	AD
6	10-Aug-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		75	CWT00042729	AD

## Appendix 2.3 Coded-wire tag (CWT) recoveries in the 2019 summer 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	1-Jul-19	637147	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		68	CWT00040201	AD
7	1-Jul-19	184395	2016	R-Cowichan R	H-Cowichan River H	CDFO		60	CWT00040504	AD
7	1-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		61	CWT00040601	AD
7	5-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		58	CWT00040402	AD
7	5-Jul-19	637193	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		71	CWT00040501	AD
7	5-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		67	CWT00040502	AD
7	5-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	60	CWT00040503	AD
7	6-Jul-19	637125	2016	Portage Bay/Ship Cnl	Issaquah Hatchery	WDFW		59	CWT00040304	AD
7	6-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		63	CWT00040506	AD
7	6-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		64	CWT00040508	AD
7	6-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		67	CWT00040509	AD
7	6-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		66	CWT00040512	AD
7	6-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		62	CWT00041001	AD
7	6-Jul-19	184166	2016	R-Burrard In	H-Sandy Cove Seapen	CDFO		71	CWT00041002	AD
7	6-Jul-19	637161	2016	Cascade R 03.1411	Marblemount Hatchery	WDFW		62	CWT00041003	AD
7	6-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	67	CWT00043007	AD
7	6-Jul-19	91001	2015	Mckenzie R 1	Mckenzie Hatchery	ODFW		79	CWT00043801	AD
7	6-Jul-19	184166	2016	R-Burrard In	H-Sandy Cove Seapen	CDFO		74	CWT00043802	AD
7	6-Jul-19	184364	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		67	CWT00043803	AD
7	7-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		65	CWT00040511	AD
7	7-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		63	CWT00040514	AD
7	7-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		61	CWT00040515	AD
7	7-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		64	CWT00040517	AD
7	7-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		61	CWT00040903	AD
7	7-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		56	CWT00040904	AD
7	7-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		57	CWT00040906	AD
7	7-Jul-19	184293	2016	R-Cowichan R	H-Cowichan River H	CDFO		55	CWT00040910	AD
7	7-Jul-19	183989	2016	R-Shuswap R Middle	H-Shuswap River, Middle,	CDFO		63	CWT00043713	AD
7	7-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		65	CWT00043714	AD
7	10-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		63	CWT00040909	AD
7	11-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		56	CWT00040203	AD
7	12-Jul-19	183989	2016	R-Shuswap R Middle	H-Shuswap River, Middle,	CDFO		62	97851	AD
7	12-Jul-19	184167	2016	R-Capilano R Up	H-Capilano River H	CDFO		67	97852	AD
7	12-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		72	97853	AD
7	12-Jul-19	55828	2016	Spring Cr 29.0159	Spring Cr Nfh	USFWS	55829	74	97854	AD

7	12-Jul-19	184298	2016	R-Cowichan R	H-Cowichan River H	CDFO		68	97857	AD
7	12-Jul-19	211170	2015	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ		60	97859	AD
7	12-Jul-19	637171	2016	Wallace R 07.0940	Wallace R Hatchery	WDFW		69	97860	AD
7	12-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		68	97866	AD
7	12-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	65	CWT00040202	AD
7	12-Jul-19	637135	2016	Cascade R 03.1411	Marblemount Hatchery	WDFW		61	CWT00040204	AD
7	12-Jul-19	211155	2015	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211156	64	CWT00040510	AD
7	12-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		55	CWT00040516	AD
7	12-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		66	CWT00040518	AD
7	12-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		88	CWT00040519	AD
7	12-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		59	CWT00040520	AD
7	13-Jul-19	636925	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		68	97855	AD
7	13-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	74	97856	AD
7	13-Jul-19	184367	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		63	97858	AD
7	13-Jul-19	183469	2015	R-Chilliwack R	H-Chilliwack River H	CDFO		79	97862	AD
7	13-Jul-19	636963	2015	Elwha R 18.0272	Elwha Hatchery	WDFW		90	97863	AD
7	13-Jul-19	91012	2016	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW		69	97867	AD
7	13-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	73	97868	AD
7	13-Jul-19	183969	2015	R-Chilko R	H-Chehalis River H	CDFO		71	97869	AD
7	13-Jul-19	184384	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		68	73357	AD
7	13-Jul-19	184294	2016	R-Cowichan R	H-Cowichan River H	CDFO		68	73358	AD
7	13-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		66	CWT00043603	AD
7	14-Jul-19	183991	2016	R-Shuswap R Middle	H-Shuswap River, Middle,	CDFO		63	73359	AD
7	14-Jul-19	211170	2015	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ		68	73360	AD
7	14-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		64	73361	AD
7	14-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		67	73362	AD
7	14-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		57	CWT00040521	AD
7	14-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	58	CWT00040618	AD
7	14-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	60	CWT00040619	AD
7	16-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	78	CWT00043804	AD
7	19-Jul-19	636924	2015	Wallace R 07.0940	Wallace R Hatchery	WDFW		80	CWT00040303	AD
7	19-Jul-19	211169	2015	Grovers Cr 15.0299	Grovers Cr Hatchery	SUQ	636943	71	CWT00040905	AD
7	19-Jul-19	184368	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		65	CWT00043604	AD
7	20-Jul-19	636917	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		61	CWT00040103	AD
7	20-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		83	CWT00040205	AD
7	20-Jul-19	637047	2015	East Sound Bay (San)	Glenwood Springs	COOP		71	CWT00040305	AD
7	20-Jul-19	184365	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		65	CWT00040908	AD
7	20-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	59	CWT00040912	AD

7	20-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		71	CWT00040914	AD
7	21-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		68	CWT00040101	AD
7	21-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		86	CWT00040102	AD
7	21-Jul-19	637214	2016	East Sound Bay (San)	Glenwood Springs	COOP		62	CWT00040524	AD
7	21-Jul-19	184368	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		63	CWT00040525	AD
7	21-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		62	CWT00043009	AD
7	21-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		66	CWT00043602	AD
7	24-Jul-19	184578	2016	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		66	CWT00040206	AD
7	25-Jul-19	636958	2015	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		80	CWT00040104	AD
7	25-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		65	CWT00040211	AD
7	25-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		52	CWT00040526	AD
7	25-Jul-19	637147	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		60	CWT00041004	AD
7	25-Jul-19	211229	2016	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ		62	CWT00043607	AD
7	25-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		87	CWT00043608	AD
7	25-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		65	CWT00043609	AD
7	27-Jul-19	637147	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		60	CWT00043805	AD
7	27-Jul-19	211165	2015	Co Line Pd2 03.1853B	Marblemount Hatchery	WDFW		93	CWT00043806	AD
7	28-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	54	CWT00040105	AD
7	28-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		67	CWT00040621	AD
7	28-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		61	CWT00040911	AD
7	30-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		57	CWT00040913	AD
7	30-Jul-19	637174	2016	Friday Cr 03.0017	Samish Hatchery	WDFW		76	CWT00043612	AD

**Appendix 2.4** Coded-wire tag (CWT) recoveries in the 2019 summer 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	28-Jul-19	637146	2016	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		69	CWT00043010	AD
9	28-Jul-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		83	CWT00043082	AD
9	31-Jul-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		65	CWT00043544	AD
9	31-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		76	CWT00043545	AD
9	31-Jul-19	184383	2016	R-Chilliwack R	H-Chilliwack River H	CDFO		65	CWT00043546	AD
9	3-Aug-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		58	CWT00043187	AD
9	3-Aug-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		77	CWT00043547	AD
9	3-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		78	CWT00043600	AD
9	4-Aug-19	637023	2015	Portage Bay/Ship Cnl	Issaquah Hatchery	WDFW		80	CWT00043188	AD
9	4-Aug-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		72	CWT00043189	AD
9	7-Aug-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		67	CWT00043548	AD

**Appendix 2.5** Coded-wire tag (CWT) recoveries in the 2019 summer 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
This table will be filled when CWTs from the Summer Marine Area 10 fishery are available.										

## Appendix 2.6 Coded-wire tag (CWT) recoveries in the 2019 summer 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	1-Jul-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		70	CWT00051901	AD
11	2-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		65	CWT00050701	AD
11	6-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		66	CWT00048502	AD
11	6-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		69	CWT00048503	AD
11	6-Jul-19	200131	2015	Chief Joseph Hatchery	Chief Joseph Hatchery	CCT		72	CWT00050804	AD
11	6-Jul-19	637170	2016	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		51	CWT00051006	AD
11	7-Jul-19	211213	2016	Whitehorse Springs	Whitehorse Pond	STIL		53	CWT00048525	AD
11	7-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	63	CWT00050805	AD
11	7-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		69	CWT00051048	AD
11	8-Jul-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		71	CWT00050703	AD
11	20-Jul-19	637127	2016	Lk Washington (King)	Issaquah Hatchery	WDFW		62	CWT00050901	AD
11	20-Jul-19	636916	2015	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		79	CWT00050902	AD
11	21-Jul-19	185293	2017	R-Chilliwack R	H-Chilliwack River H	CDFO		53	CWT00050704	AD
11	24-Jul-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		71	CWT00048524	AD
11	24-Jul-19	185292	2017	R-Chilliwack R	H-Chilliwack River H	CDFO		51	CWT00050705	AD
11	24-Jul-19	211229	2016	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ		65	CWT00051046	AD
11	27-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		61	CWT00051902	AD
11	27-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		69	CWT00051913	AD
11	28-Jul-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		73	CWT00047799	AD
11	28-Jul-19	211219	2016	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637158	69	CWT00047800	AD
11	28-Jul-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	64	CWT00048505	AD
11	30-Jul-19	637170	2016	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		58	CWT00050903	AD
11	3-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		68	62690	AD
11	3-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		63	62691	AD
11	3-Aug-19	637135	2016	Cascade R 03.1411	Marblemount Hatchery	WDFW		60	CWT00048523	AD
11	4-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		81	CWT00051542	AD
11	7-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		69	CWT00051045	AD
11	10-Aug-19	636950	2015	Finch Cr 16.0222	Hoodspport Hatchery	WDFW		81	70934	AD
11	10-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		66	CWT00050706	AD
11	10-Aug-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	59	CWT00050708	AD
11	10-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		63	CWT00051514	AD
11	10-Aug-19	637083	2016	Finch Cr 16.0222	Hoodspport Hatchery	WDFW		61	CWT00051552	AD
11	11-Aug-19	211230	2016	McAllister Springs Hatch	Clear Creek Hatchery	NISQ		69	CWT00050709	AD
11	11-Aug-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	63	CWT00051543	AD
11	12-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		70	CWT00051548	AD
11	17-Aug-19	211220	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637159	61	CWT00051050	Unknown

11	17-Aug-19	211279	2017	Whitehorse Springs	Whitehorse Pond	STIL		51	CWT00051051	AD
11	18-Aug-19	211170	2015	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ		57	CWT00048521	AD
11	21-Aug-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		66	CWT00050808	AD
11	21-Aug-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		60	CWT00051053	AD
11	21-Aug-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		67	CWT00051054	AD
11	24-Aug-19	211242	2016	Stillaguamish R -Sf	Brenner Hatchery	STIL		56	CWT00050713	AD



**Appendix 2.7** Coded-wire tag (CWT) recoveries in the 2019 summer 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	26-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		78	CWT00051553	AD
12	26-Jul-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		74	CWT00051554	AD
12	27-Jul-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		69	CWT00051555	AD
12	6-Aug-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		60	CWT00051556	AD
12	6-Aug-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		83	CWT00051557	AD
12	10-Aug-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		56	CWT00051245	AD
12	11-Aug-19	636960	2015	Purdy Cr 16.0005	George Adams Hatchery	WDFW		78	CWT00051558	AD

**Appendix 2.8** Coded-wire tag (CWT) recoveries in the 2019 summer Chinook MSF in Marine Area 13.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
13	1-Jun-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		59	CWT00050801	AD
13	1-Jun-19	637167	2016	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		71	CWT00050802	AD
13	8-Jun-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		60	CWT00051001	AD
13	8-Jun-19	636957	2015	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		70	CWT00051002	AD
13	29-Jun-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		75	CWT00048501	AD
13	29-Jun-19	637168	2016	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		65	CWT00051004	AD
13	30-Jun-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		72	CWT00051005	AD
13	7-Jul-19	637173	2016	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		65	CWT00051007	AD
13	4-Aug-19	211230	2016	Mcallister Springs Hatch	Clear Creek Hatchery	NISQ		67	CWT00051247	AD
13	17-Aug-19	637258	2017	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		47	CWT00048102	AD
13	17-Aug-19	637192	2016	Purdy Cr 16.0005	George Adams Hatchery	WDFW		84	CWT00051246	AD
13	18-Aug-19	211229	2016	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ		60	CWT00051052	AD
13	18-Aug-19	636950	2015	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		73	CWT00051544	AD
13	20-Aug-19	637159	2016	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	211220	50	CWT00048506	AD
13	24-Aug-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		71	CWT00051601	AD
13	25-Aug-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		71	CWT00051055	AD
13	30-Aug-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		72	CWT00051707	AD
13	31-Aug-19	637162	2016	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		80	CWT00051602	AD
13	1-Sep-19	211170	2015	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ		76	CWT00048504	AD