

DRAFT

Total Encounters and Mortality Estimates for Puget Sound Recreational Chinook Mark-Selective Fisheries Monitored using Baseline Sampling: 2014-2017

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TABLE OF CONTENTS

TABLE OF CONTENTS.....	iii
LIST OF TABLES.....	v
LIST OF FIGURES	xvii
INTRODUCTION	xix
RESULTS	1
Winter 2014-15	1
1) 2014-15 Marine Area 5 Winter Mark-Selective Chinook Fishery.....	1
2) 2014-15 Marine Area 11 Winter Mark-Selective Chinook Fishery.....	5
3) 2014-15 Marine Area 12 Winter Mark-Selective Chinook Fishery.....	9
4) 2014-15 Marine Area 13 Winter Mark-Selective Chinook Fishery.....	13
Summer 2015	17
5) 2015 Marine Area 6 Summer Mark-Selective Chinook Fishery.....	17
6) 2015 Marine Area 12 Summer Mark-Selective Chinook Fishery.....	21
7) 2015 Marine Area 13 Summer Mark-Selective Chinook Fishery.....	25
Winter 2015-16	29
8) 2015-16 Marine Area 5 Winter Mark-Selective Chinook Fishery.....	29
9) 2015-16 Marine Area 11 Winter Mark-Selective Chinook Fishery.....	33
10) 2015-16 Marine Area 12 Winter Mark-Selective Chinook Fishery.....	37
11) 2015-16 Marine Area 13 Winter Mark-Selective Chinook Fishery.....	41
Summer 2016	45
12) 2016 Marine Area 6 Summer Mark-Selective Chinook Fishery.....	45
13) 2016 Marine Area 12 Summer Mark-Selective Chinook Fishery.....	49
14) 2016 Marine Area 13 Summer Mark-Selective Chinook Fishery.....	53
Winter 2016-17	57
15) 2016-17 Marine Area 5 Winter Mark-Selective Chinook Fishery.....	57
16) 2016-17 Marine Area 11 Winter Mark-Selective Chinook Fishery.....	61
17) 2016-17 Marine Area 12 Winter Mark-Selective Chinook Fishery.....	65
18) 2016-17 Marine Area 13 Winter Mark-Selective Chinook Fishery.....	69
Summer 2017	73
19) 2017 Marine Area 6 Summer Mark-Selective Chinook Fishery.....	73
20) 2017 Marine Area 12 Summer Mark-Selective Fisher	77

21) 2017 Marine Area 13 Summer Mark-Selective Fishery 81
REFERENCES 85

LIST OF TABLES

Table 1.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 5 Chinook MSF from February 16 – April 10, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 1

Table 1.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 5 Chinook MSF from February 16 – April 10, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 1

Table 1.3 Summary of season-wide fishery impact estimates for the Area 5 Chinook MSF from February 16 - April 10, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 2

Table 1.4 Comparison of modeled and estimated total Chinook encounters for the Area 5 Chinook MSF from February 16 - April 10, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 2

Table 1.5 Comparison of modeled) and estimated total Chinook mortalities for the Area 5 Chinook MSF from February 16 - April 10, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 2

Table 1.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 5 Chinook MSF from February 16 - April 10, 2015. AD = marked (adipose-clipped), UM = unmarked. 3

Table 1.7 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 Area 5 Chinook MSF from February 16 - April 10, 2015. AD = marked (adipose-clipped), UM = unmarked. 4

Table 2.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 11 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 5

Table 2.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 5

Table 2.3 Summary of season-wide fishery impact estimates for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 5

Table 2.4 Comparison of modeled and estimated total Chinook encounters for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 6

Table 2.5 Comparison of modeled and estimated total Chinook mortalities for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 6

Table 2.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 11 Chinook MSF from October 1, 2014- April 30, 2015. AD = marked (adipose-clipped), UM = unmarked. 7

Table 2.7 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 Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. AD = marked (adipose-clipped), UM = unmarked. 8

Table 3.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 9

Table 3.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 9

Table 3.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. LM Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 9

Table 3.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 10

Table 3.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 10

Table 3.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked. 12

Table 3.7 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 Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked. 12

Table 3.8 Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all previous seasons of the Area 12 winter 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. 12

Table 4.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 13

Table 4.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 13

Table 4.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish.

Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 13

Table 4.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 14

Table 4.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 14

Table 4.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked. 15

Table 4.7 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 Area 13 Chinook MSF from October 1, 2014 - April 30, 2015. AD = marked (adipose-clipped), UM = unmarked. 16

Table 5.1 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 17

Table 5.2 Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 17

Table 5.3 Comparison of modeled and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 18

Table 5.4 Comparison of modeled and estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 18

Table 5.5 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2015. AD = marked (adipose-clipped), UM = unmarked. 19

Table 5.6 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 Area 6 Chinook MSF from July 1 - August 15, 2015. AD = marked (adipose-clipped), UM = unmarked. 20

Table 6.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 21

Table 6.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 - September 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 21

Table 6.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 - September 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values

may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.21

Table 6.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 - September 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.22

Table 6.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.22

Table 6.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from July 1 - September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.24

Table 6.7 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 Area 12 Chinook MSF from July 1 - September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.24

Table 7.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from May 1 – September 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.25

Table 7.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from May 1 - September 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.25

Table 7.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from May 1 - September 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.25

Table 7.4 Comparison of modeled estimated total Chinook encounters for the Area 13 Chinook MSF from May 1 - September 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.26

Table 7.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.26

Table 7.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from May 1 - September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.27

Table 7.7 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 Area 13 Chinook MSF from May 1 – September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.28

Table 8.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.29

Table 8.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 29

Table 8.3 Summary of season-wide fishery impact estimates for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 29

Table 8.4 Comparison of modeled and estimated total Chinook encounters for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 30

Table 8.5 Comparison of modeled and estimated total Chinook mortalities for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 30

Table 8.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked..... 31

Table 8.7 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 Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 32

Table 9.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark..... 33

Table 9.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 11 Chinook MSF October 1, 2015 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 33

Table 9.3 Summary of season-wide fishery impact estimates for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 33

Table 9.4 Comparison of modeled and estimated total Chinook encounters for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 34

Table 9.5 Comparison of modeled estimated total Chinook mortalities for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 34

Table 9.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 35

Table 9.7 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 Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked..... 36

Table 10.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark..... 37

Table 10.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 37

Table 10.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 37

Table 10.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 38

Table 10.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 38

Table 10.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked..... 39

Table 10.7 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 Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked..... 40

Table 11.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark..... 41

Table 11.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 41

Table 11.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from February October 1, 2015 – April 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 41

Table 11.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 42

Table 11.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 42

Table 11.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 43

Table 11.7 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 Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked..... 44

Table 12.1 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 45

Table 12.2 Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 45

Table 12.3 Comparison of modeled and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 46

Table 12.4 Comparison of modeled and estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 46

Table 12.5 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2016. AD = marked (adipose-clipped), UM = unmarked. 47

Table 12.6 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 Area 6 Chinook MSF from July 1 - August 15, 2016. AD = marked (adipose-clipped), UM = unmarked.... 48

Table 13.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark..... 49

Table 13.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 - September 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 49

Table 13.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 - September 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 49

Table 13.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 - September 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 50

Table 13.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 50

Table 13.6 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 Area 12 Chinook MSF from July 1 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 51

Table 13.7 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 Area 12 Chinook MSF from July 1 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 52

Table 14.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from June 24 – September 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 53

Table 14.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from June 24 - September 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 53

Table 14.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from June 24 - September 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 53

Table 14.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from June 24 - September 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 54

Table 14.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from June 24 - September 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 54

Table 14.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from June 24 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 55

Table 14.7 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 Area 13 Chinook MSF from June 24 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 56

Table 15.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 5 Chinook MSF from February 16 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 57

Table 15.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 5 Chinook MSF February 16 – April 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 57

Table 15.3 Summary of season-wide fishery impact estimates for the Area 5 Chinook MSF from February 16 – April 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 57

Table 15.4 Comparison of modeled and estimated total Chinook encounters for the Area 5 Chinook MSF from February 16 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 58

Table 15.5 Comparison of modeled and estimated total Chinook mortalities for the Area 5 Chinook MSF from February 16 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 58

Table 15.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 5 Chinook MSF from February 16 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked. 59

Table 15.7 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 Area 5 Chinook MSF from February 16 – April 30, 2017 AD = marked (adipose-clipped), UM = unmarked. 60

Table 16.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 11 Chinook MSF from October 1 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark..... 61

Table 16.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 61

Table 16.3 Summary of season-wide fishery impact estimates for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 61

Table 16.4 Comparison of modeled and estimated total Chinook encounters for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 62

Table 16.5 Comparison of modeled and estimated total Chinook mortalities for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 62

Table 16.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked..... 63

Table 16.7 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 Area 11 Chinook MSF from October 1 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked. 64

Table 17.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF

October 1, 2016 – April 30, 2017. . AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark..... 65

Table 17.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 65

Table 17.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 65

Table 17.4 Comparison of modeled estimated total Chinook encounters for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 66

Table 17.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 66

Table 17.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked..... 67

Table 17.7 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 Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked..... 68

Table 18.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark..... 69

Table 18.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 69

Table 18.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 69

Table 18.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 70

Table 18.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked..... 70

Table 18.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . AD = marked (adipose-clipped), UM = unmarked..... 71

Table 18.7 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 Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked..... 72

Table 19.1 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 73

Table 19.2 Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked..... 73

Table 19.3 Comparison of modeled and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 74

Table 19.4 Comparison of modeled estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 74

Table 19.5 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2017. AD = marked (adipose-clipped), UM = unmarked. 74

Table 19.6 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 Area 6 Chinook MSF from July 1 - August 15, 2017. AD = marked (adipose-clipped), UM = unmarked.... 76

Table 20.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 77

Table 20.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 – September 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 77

Table 20.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 – September 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 77

Table 20.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 – September 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 78

Table 20.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 – September 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 78

Table 20.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from July 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked. 79

Table 20.7 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 Area 12 Chinook MSF from July 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked 80

Table 21.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from May 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark. 81

Table 21.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from May 1 - September 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 81

Table 21.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from May 1 - September 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked. 81

Table 21.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from May 1 - September 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 82

Table 21.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked. 82

Table 21.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from May 1 - September 30, 2017. AD = marked (adipose-clipped), UM = unmarked. 83

Table 21.7 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 Area 13 Chinook MSF from May 1 - September 30, 2017. AD = marked (adipose-clipped), UM = unmarked. 84

LIST OF FIGURES

Figure 1 Beta regression results describing the relationship between released-to-retained ratio from dockside sampling data and proportion of legal Chinook from test fishery or VTR data, including parameters resulting from beta regression model. Dotted lines represent 95% confidence bounds.... xxi	
Figure 1.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 5 Chinook MSF from February 16 - April 10, 2015. Error bars represent 95% confidence intervals for field estimates..... 3	3
Figure 2.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Error bars represent 95% confidence intervals for field estimates. 7	7
Figure 3.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. Error bars represent 95% confidence intervals for field estimates. 11	11
Figure 4.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Error bars represent 95% confidence intervals for field estimates. 15	15
Figure 5.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2015. Error bars represent 95% confidence intervals for field estimates. 19	19
Figure 6.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2015. Error bars represent 95% confidence intervals for field estimates..... 23	23
Figure 7.1 Comparison of modeled) and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2015. Error bars represent 95% confidence intervals for field estimates..... 27	27
Figure 8.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates. 31	31
Figure 9.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates. 35	35
Figure 10.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates. 39	39
Figure 11.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF October 1, 2015 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates..... 43	43
Figure 12.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2016. Error bars represent 95% confidence intervals for field estimates. 47	47
Figure 13.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2016. Error bars represent 95% confidence intervals for field estimates..... 51	51

Figure 14.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from June 24 - September 30, 2016. Error bars represent 95% confidence intervals for field estimates..... 55

Figure 15.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 5 Chinook MSF from February 16 – April 30, 2017. Error bars represent 95% confidence intervals for field estimates..... 59

Figure 16.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Error bars represent 95% confidence intervals for field estimates. 63

Figure 17.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Error bars represent 95% confidence intervals for field estimates. 67

Figure 18.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . Error bars represent 95% confidence intervals for field estimates. 71

Figure 19.1 Comparison of and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2017. Error bars represent 95% confidence intervals for field estimates. 75

Figure 20.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 – September 30, 2017. Error bars represent 95% confidence intervals for field estimates..... 79

Figure 21.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2017. Error bars represent 95% confidence intervals for field estimates..... 83

INTRODUCTION

Based on agreements between the State of Washington and the northwest treaty Indian tribes, the Washington Department of Fish and Wildlife (WDFW) has been conducting pilot¹ recreational mark-selective Chinook fisheries (MSFs) in the marine catch areas of Puget Sound since 2003. The goal of these fisheries is to allow increased angling opportunities on hatchery-raised, marked (adipose fin-clipped) salmon while limiting impacts on unmarked (adipose fin intact; typically wild origin) stocks of conservation concern, particularly ESA-listed Puget Sound Chinook.

To monitor each fishery, WDFW's Puget Sound Sampling Unit (PSSU) implements one of the four following sampling designs: *i*) Full Murthy Estimate Design, *ii*) Reduced Murthy Estimate Design, *iii*) Aerial-Access Design or *iv*) Baseline Sampling Design. The design selected depends on area and season considerations, the magnitude of the fishery and State-Tribal agreements made prior to the start of the fishing season. For a complete description of the methods associated with these sampling designs, see WDFW's "Methods Report: Monitoring Mark-Selective Recreational Chinook Fisheries in the Marine Catch Areas of Puget Sound (Areas 5 through 13)" (WDFW 2012).

With the exception of Baseline Sampling, all above sampling designs are characterized as comprehensive, "intensive" monitoring programs and have been tailored to reliably estimate the critical parameters needed for evaluating mark-selective fisheries (WDFW 2012). In addition, PSSU has acquired and analyzed relevant data characterizing other aspects of the pilot MSFs, including descriptors of fishing effort, fishing success (catch [landed Chinook] per unit effort), recreational fishing methods, the length and age composition of encountered Chinook, and the overall intensity of our sampling efforts. As such, the data collected through these comprehensive monitoring programs allow biologists to produce weekly in-season estimates and to finalize post-season estimates of effort, catch, total encounters and fishery impacts in a timely manner.

Baseline Sampling, however, is a scaled-back monitoring program that is currently implemented in lower-magnitude MSFs and year-round in non-selective sport fisheries throughout Puget Sound. Samplers collect data on salmon catch (retained and released) and effort via dockside sampling and angler interviews and obtain on-water encounter rate data from voluntary trip reports (VTR) submitted by private anglers. In contrast to the three comprehensive monitoring programs, the data collected through Baseline Sampling does not allow for in-season or immediate post-season estimates of effort, landed catch, total encounters, or fishery impacts.

Between 2011 and 2013, a framework was developed to estimate total Chinook encounters for a given MSF relying only on Baseline Sampling data and Catch Record Card (CRC) estimates of Chinook harvest (WDFW and NWIFC 2013). Two methods were established to estimate total Chinook encounters. The first method, the "M2" approach, requires an estimate of legal-marked Chinook harvest and an estimate of the proportion of legal-marked Chinook (p_{LM}) in the target

¹ As stated in state-tribal agreement documents (e.g., WDFW and NWIFC 2009): "The purpose of the 'pilot' fishery is to collect information necessary to enable evaluation and planning of potential future mark-selective fisheries. The 'pilot' fishery provides a basis for determining if the data needed to estimate critical parameters can be collected and if the sample sizes needed to produce these estimates with agreed levels of precision can be realistically obtained."

population, derived from test fishing or VTR data. Total encounters are then partitioned into size and mark-status groups using size/mark-status proportions from the test fishing or VTR data. If the precision of total encounters estimates is too high due to small sample sizes in test fishing or VTR data, the “M1” approach should be employed, which estimates total encounters using CRC-based Chinook harvest estimates and the ratio of encountered Chinook to retained Chinook observed during dockside sampling efforts. In the absence of sufficient test fishing or VTR data, size/mark-status proportions are estimated using a “product method” where the mark-rate and legal proportion are estimated independently using dockside sampling data and combined to provide an estimate of the proportion for each group.

As of the date of this report, finalized CRC-based Chinook harvest estimates were available through the close of the 2017 summer season. Contained in the following sections is a full analysis of fishery-total encounters and mortalities associated with the four Puget Sound Chinook MSFs that occurred and were sampled on a Baseline level only during the time period covered by this report; October 1, 2014 through September 30, 2017 (Table 1). For previous Baseline-sampled fisheries, see WDFW 2013c. The appropriate estimation method was selected by referring to the decision support schematic provided in WDFW and NWIFC (2013).

Estimates of the following parameters are presented below:

- i)* total Chinook salmon harvested (by size [legal or sublegal] and mark-status [marked or unmarked] group),
- ii)* total Chinook salmon released (by size and mark-status group),
- iii)* total Chinook salmon mortalities (by size and mark-status group),
- iv)* comparisons of Chinook salmon encounters and mortalities with pre-season expectations (based on Fishery Regulation Assessment Model [FRAM] predictions),
- v)* *dockside* sample rate for harvested Chinook, and
- vi)* total mortality of marked and unmarked double index tag (DIT) CWT stocks.

The beta regression was updated to include data from all intensively monitored fisheries through the 2017-18 winter season (Figure 1) having more than twenty encounters in the fishery’s VTR or test-fishing program. Three parameters resulting from the beta regression were used to estimate the proportion of legal Chinook in the targeted population, based on the number of retained and released Chinook in the dockside sampling and interview data: the intercept (β_0) = 1.058, slope (β_1) = -1.061 and precision (Φ) = 13.93 (for further information see WDFW & NWIFC 2013).

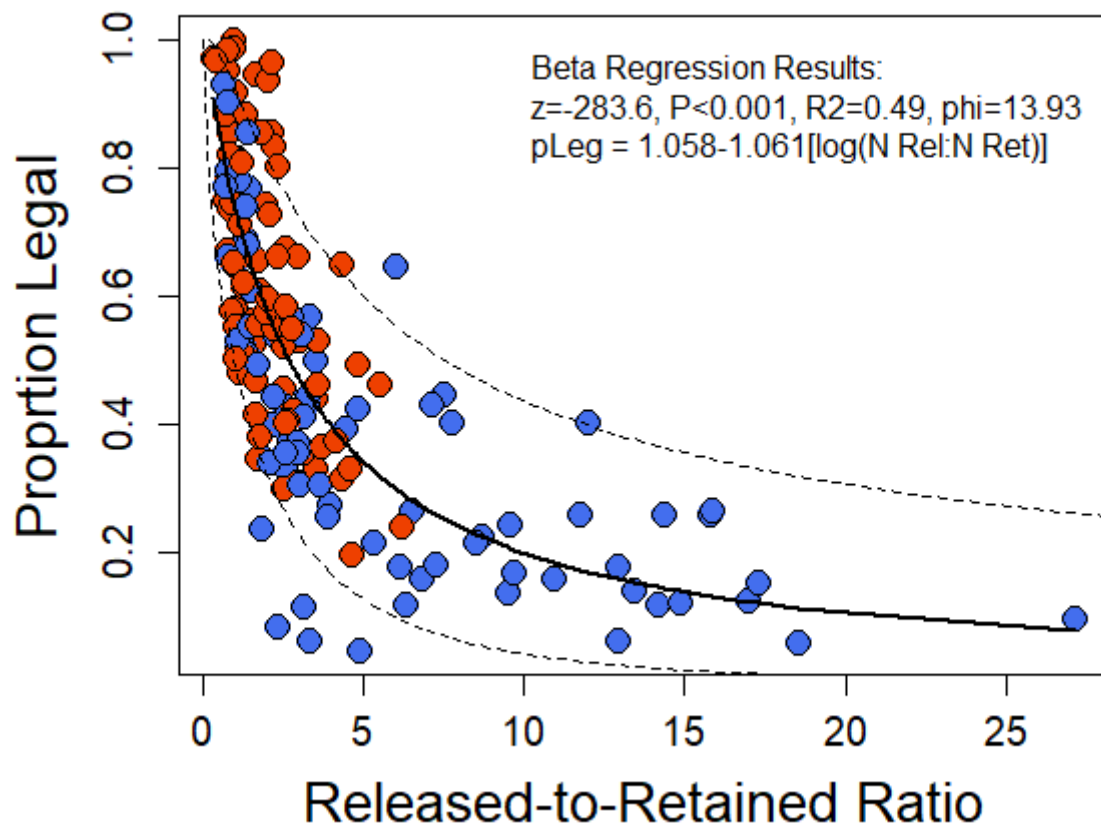


Figure 1 Beta regression results describing the relationship between released-to-retained ratio from dockside sampling data and proportion of legal Chinook from test fishery or VTR data, including parameters resulting from beta regression model. Dotted lines represent 95% confidence bounds.

RESULTS

Winter 2014-15

1) 2014-15 Marine Area 5 Winter Mark-Selective Chinook Fishery

WDFW implemented a first winter Chinook MSF in Marine Area 5 from February 16 through April 10, 2015, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 1 of the 2014-15 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 1.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 5 Chinook MSF from February 16 – April 10, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Feb. 16 – Apr. 10	147	1	50	131	62	5	0

Table 1.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 5 Chinook MSF from February 16 – April 10, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	0	0	0
Dockside Harvest	147	1	0	0	148

Table 1.3 Summary of season-wide fishery impact estimates for the Area 5 Chinook MSF from February 16 - April 10, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	412†	412	0†	0	412	11,348	107	203 - 621	26
LU	312	3	310	46	49	272	16	17 - 82	33
SM	222	0	222	44	44	347	19	8 - 81	42
SU	184	0	184	37	37	307	18	2 - 71	48
Total	1,130	415	715	128	543	12,274	111	325 - 760	20

†Methodology produced less legal-marked encounters than were sampled during dockside creeling. The number of legal-marked fish were set to zero from a negative number and encounters were set to numbers of retained legal-marked fish. Methodology for the legal-marked category needs to be revisited.

Table 1.4 Comparison of modeled and estimated total Chinook encounters for the Area 5 Chinook MSF from February 16 - April 10, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	439	124	315	7
	AD	1,553	570	983	496
	Total	1,992	694	1,298	503
	% Marked	78	82	76	99
Estimated (Creel) Encounters	UM	496	312	184	3
	AD	634	412	222	412
	Total	1,130	725	406	415
	% Marked	56	57	55	99

Table 1.5 Comparison of modeled and estimated total Chinook mortalities for the Area 5 Chinook MSF from February 16 - April 10, 2015. Values may not add up exactly 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)	88	729	817	86	457	543
Released Legal	18	36	54	46	0	46
Released Sublegal	63	197	260	37	44	81
Landed Only	7	496	503	3	412	415

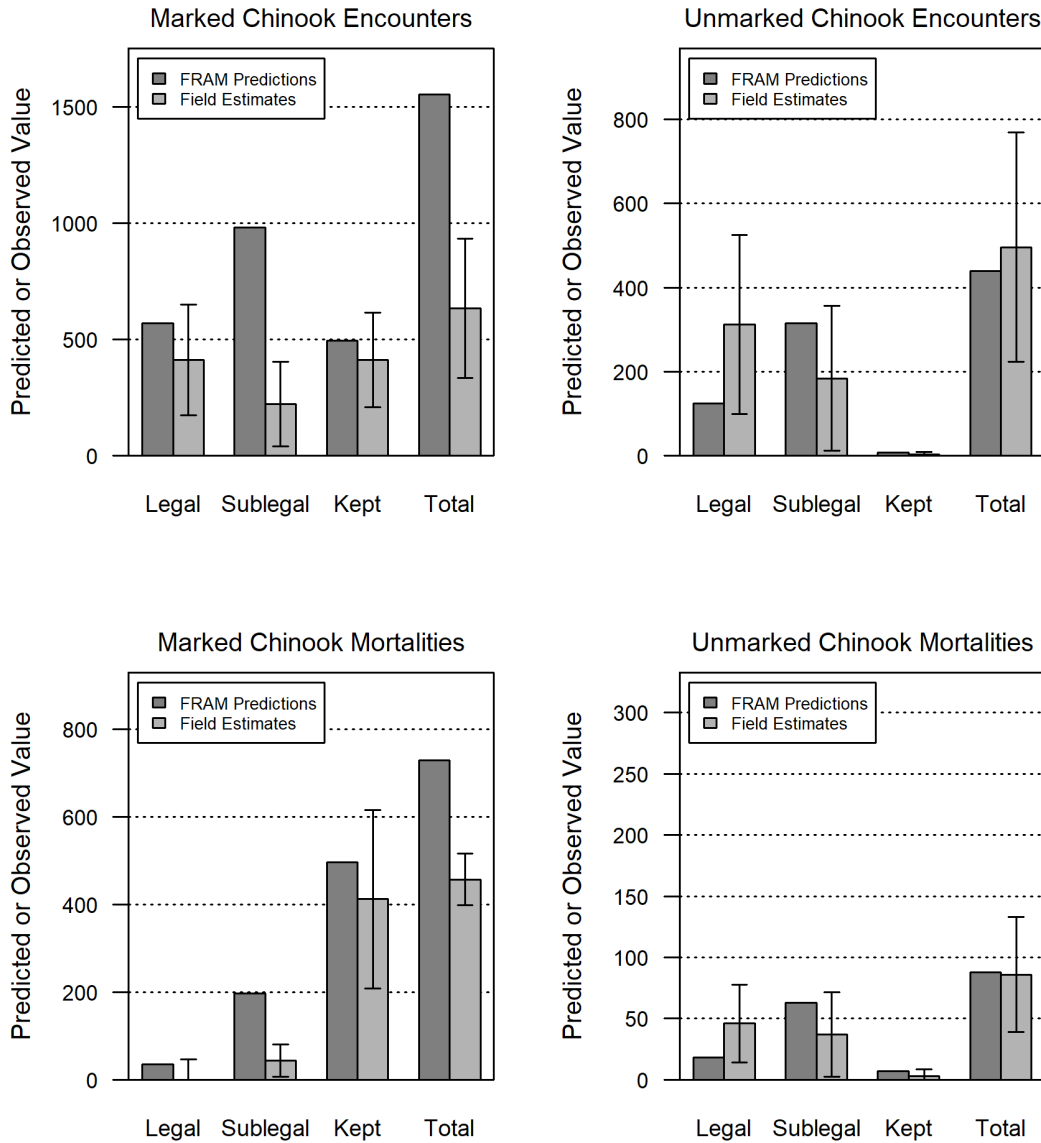


Figure 1.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 5 Chinook MSF from February 16 - April 10, 2015. Error bars represent 95% confidence intervals for field estimates.

Table 1.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 5 Chinook MSF from February 16 - April 10, 2015. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Feb. 16 – Apr. 10	412	3	415	147	1	148	35.70%

Table 1.7 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 Area 5 Chinook MSF from February 16 - April 10, 2015. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Big Cr Hatchery	2011	1	2.8	5.06	0.9	0.1	0.006	0.08
Clear Creek Hatchery	2011	1	2.8	5.06	2.8	0.3	0.051	0.23
Grovers Cr Hatchery	2011	1	2.8	5.06	2.8	0.3	0.05	0.22
Samish Hatchery	2011	2	5.6	10.12	5.6	0.6	0.1	0.45
Spring Cr Nfh	2012	1	2.8	5.06	3	0.3	0.057	0.24
Wallace R Hatchery	2011	1	2.8	5.06	2.8	0.3	0.05	0.22
Total		7	19.6	35.41	17.9	1.8	0.313	1.43

2) 2014-15 Marine Area 11 Winter Mark-Selective Chinook Fishery

WDFW implemented a fifth consecutive winter Chinook MSF in Marine Area 11 from October 1, 2014 through April 30, 2015, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 7 of the 2014-15 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 2.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 11 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1, 2014 – Apr. 30, 2015	45	0	34	40	42	22	8

Table 2.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	16	9	28	20	73
Dockside Harvest	38	0	2	0	40

Table 2.3 Summary of season-wide fishery impact estimates for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	297	251	46	7	258	5,162	72	117 - 399	28
LU	205	0	205	31	31	218	15	2 - 60	48
SM	339	13	326	65	78	700	26	27 - 130	34
SU	233	0	233	47	47	425	21	6 - 87	44
Total	1,074	264	810	149	413	6,840	83	251 - 576	20

Table 2.4 Comparison of modeled and estimated total Chinook encounters for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	506	183	323	4
	AD	1,643	582	1,061	507
	Total	2,149	765	1,384	511
	% Marked	76	76	77	99
Estimated (Creel) Encounters	UM	438	205	233	0
	AD	636	297	339	264
	Total	1,074	502	572	264
	% Marked	59	59	59	100

Table 2.5 Comparison of modeled and estimated total Chinook mortalities for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Values may not add up exactly 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)	96	755	851	77	336	413
Released Legal	27	36	63	31	7	38
Released Sublegal	65	212	277	47	65	112
Landed Only	4	507	511	0	264	264

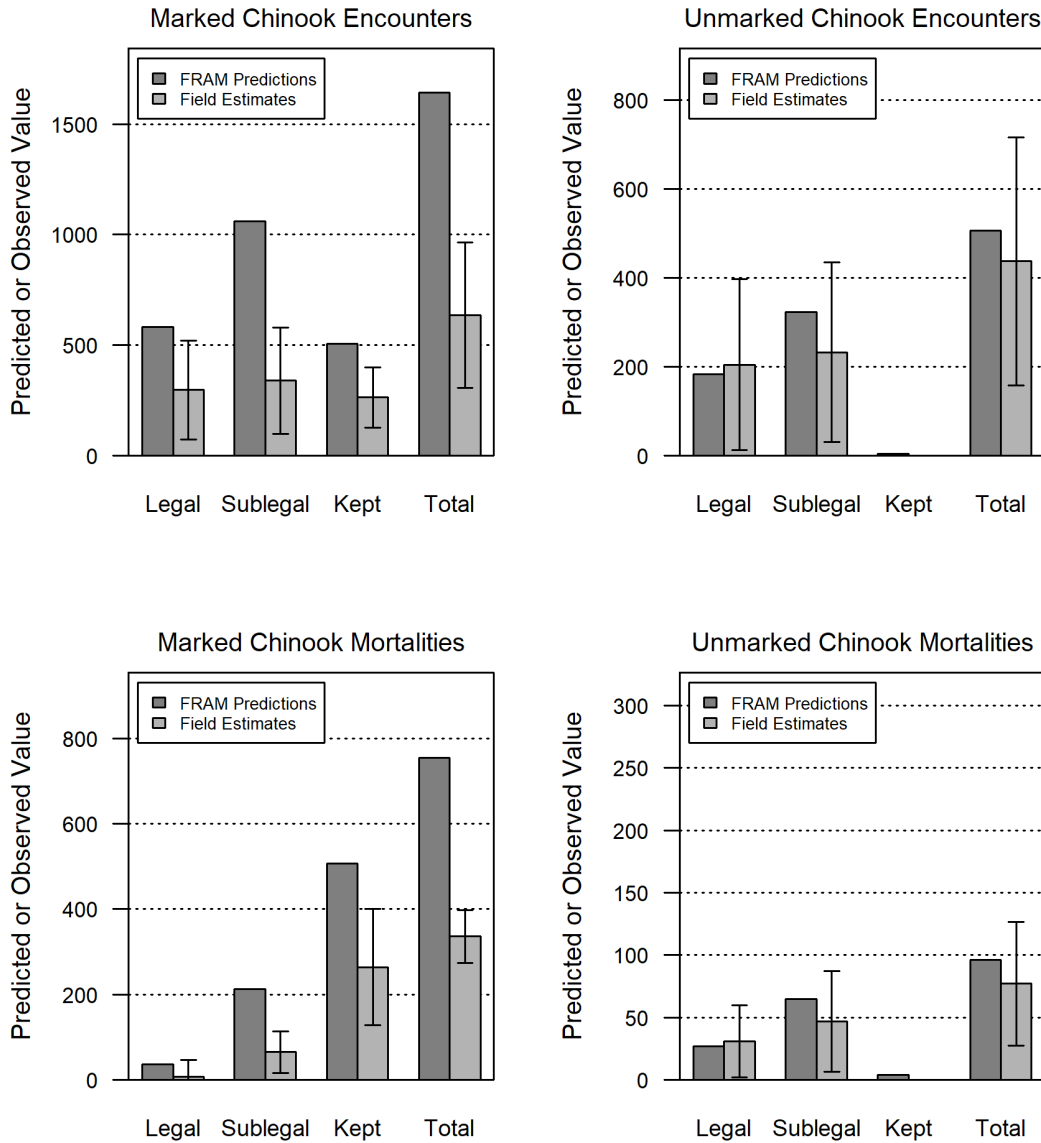


Figure 2.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. Error bars represent 95% confidence intervals for field estimates.

Table 2.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 11 Chinook MSF from October 1, 2014- April 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct 1, 2014 – Apr 30, 2015	264	0	264	40	0	40	15.20%

Table 2.7 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 Area 11 Chinook MSF from October 1, 2014 - April 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
No Double-Index Tags Recovered								
Total								

3) 2014-15 Marine Area 12 Winter Mark-Selective Chinook Fishery

WDFW implemented a sixth consecutive winter Chinook MSF in Marine Area 12 from October 1, 2014 through April 30, 2015, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 8 of the 2014-2015 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 3.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2014-15	53	0	185	45	30	332	0

Table 3.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	1	0	18	2	21
Dockside Harvest	49	0	4	0	53

Table 3.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. LM Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	179	96	83	12	109	1,252	35	39 - 178	33
LU	35	0	35	5	5	84	9	0 - 23	176
SM	336	8	328	66	73	676	26	22 - 124	35
SU	65	0	65	13	13	162	13	0 - 38	98
Total	614	104	510	96	200	2,320	48	106 - 295	24

Table 3.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	623	145	478	6
	AD	4,831	1146	3,685	997
	Total	5,454	1291	4,163	1003
	% Marked	89	89	89	99
Estimated (Creel) Encounters	UM	100	35	65	0
	AD	514	179	336	104
	Total	614	214	401	104
	% Marked	84	84	84	100

Table 3.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly 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)	123	1806	1929	18	182	200
Released Legal	21	72	93	5	12	18
Released Sublegal	96	737	833	13	66	79
Landed Only	6	997	1003	0	104	104

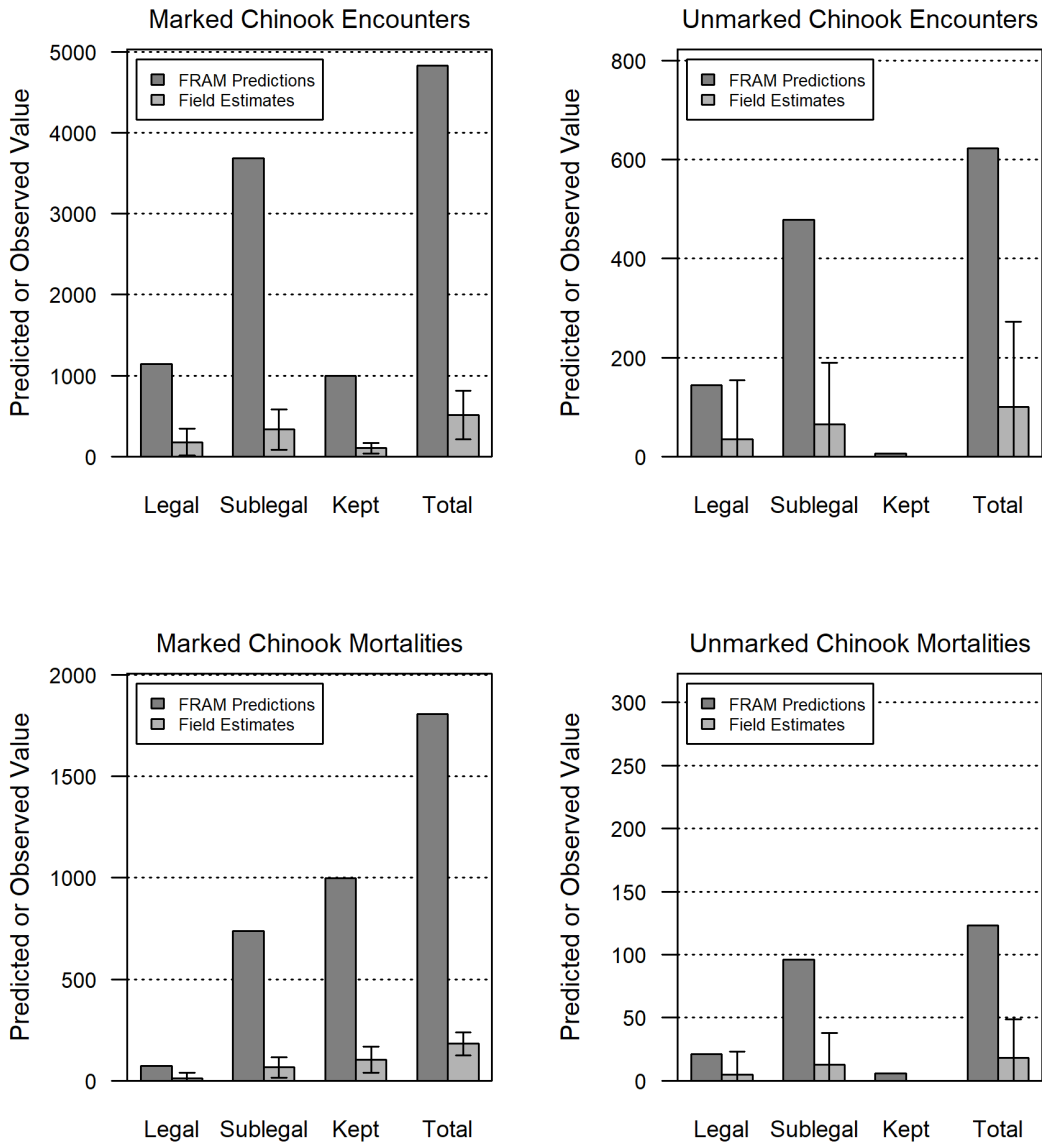


Figure 3.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. Error bars represent 95% confidence intervals for field estimates.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct. 1 – Apr. 30	403	0	403	78	0	78	19.4%

Table 3.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Feb. 1 – Apr. 30	104	0	104	53	0	53	51.00%

Table 3.7 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 Area 12 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
George Adams Hatchery	2012	2	3.9	3.78	4	0.4	0.038	0.28
Total		2	3.9	3.78	4	0.4	0.038	0.28

Table 3.8 Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all previous seasons of the Area 12 winter 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.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Feb 1 - Apr 30, 2010	1,736	244	0	8	0	176	79	262	51	818
Feb 1 - Apr 30, 2011	2,425	424	6	6	0	252	148	364	84	1,283
Feb 1 - Apr 30, 2012	2,299	398	0	5	0	293	165	777	186	1,824

4) 2014-15 Marine Area 13 Winter Mark-Selective Chinook Fishery

WDFW implemented the first winter Chinook MSF in Marine Area 13 from October 1, 2014 through April 30, 2015, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 9 of the 2014-2015 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 4.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1 – Apr. 30	5	0	14	4	13	1083	0

Table 4.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	0	0	0
Dockside Harvest	5	0	0	0	5

Table 4.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	38	22	16	2	24	181	13	0 - 51	55
LU	9	0	9	1	1	4	2	0 - 5	152
SM	90	0	90	18	18	117	11	0 - 39	60
SU	21	0	21	4	4	12	4	0 - 11	82
Total	158	22	136	26	48	315	18	13 - 83	37

Table 4.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	179	18	161	1
	AD	1,140	109	1,031	95
	Total	1,319	127	1,192	96
	% Marked	86	86	86	99
Estimated (Creel) Encounters	UM	30	9	21	0
	AD	128	38	90	22
	Total	158	47	112	22
	% Marked	81	81	81	100

Table 4.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Values may not add up exactly 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)	36	308	344	6	42	48
Released Legal	3	7	10	1	2	4
Released Sublegal	32	206	238	4	18	22
Landed Only	1	95	96	0	22	22

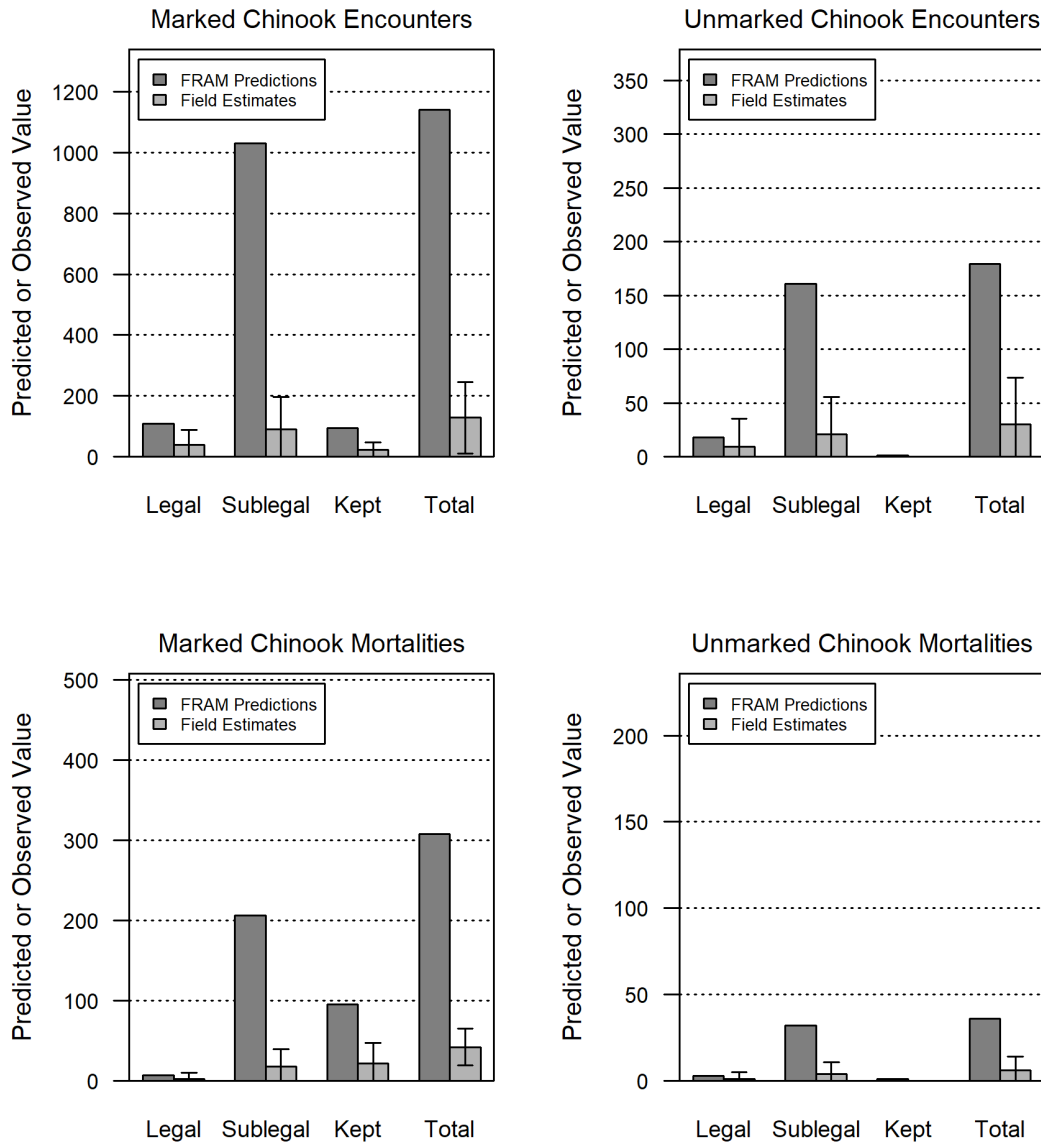


Figure 4.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. Error bars represent 95% confidence intervals for field estimates.

Table 4.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from October 1, 2014 – April 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct. 1 – Apr. 30	22	0	22	5	0	5	22.70%

Table 4.7 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 Area 13 Chinook MSF from October 1, 2014 - April 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
No Coded Wire Tag Recoveries.								
Total								

Summer 2015

5) 2015 Marine Area 6 Summer Mark-Selective Chinook Fishery

WDFW implemented a twelfth consecutive summer Chinook MSF in Marine Area 6 from July 1 through August 15, 2015. This fishery has been monitored using baseline sampling since 2008. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 2 of the 2015 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were sufficient to provide the desired level of precision in total encounters estimates allowing the use of the bias-corrected M2 approach (WDFW and NWIFC 2013).

Table 5.1 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	218	74	118	96	506
Dockside Harvest	633	5	8	1	647

Table 5.2 Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	4,249	3,696	552	83	3,779	280,240	529	2742 - 4817	14
LU	1,442	29	1,413	212	241	1,741	42	159 - 323	17
SM	2,300	47	2,253	451	497	6,302	79	342 - 653	16
SU	1,871	6	1,865	373	379	4,262	65	251 - 507	17
Total	9,861	3,778	6,083	1118	4,896	303,365	551	3817 - 5976	11

Table 5.3 Comparison of modeled and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	4,180	4002	178	40
	AD	5,302	4,909	393	4,271
	Total	9,482	8,911	571	4,311
	% Marked	56	55	69	99
Estimated (Creel) Encounters	UM	3,313	1,442	1,871	35
	AD	6,548	4,249	2,300	3,743
	Total	9,861	5,691	4,171	3,778
	% Marked	66	75	55	99

Table 5.4 Comparison of modeled and estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2015. Values may not add up exactly 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)	672	4,659	5,331	620	4,276	4,896
Released Legal	596	309	905	212	83	295
Released Sublegal	36	79	115	373	451	824
Landed Only	40	4,271	4,311	35	3,743	3,778

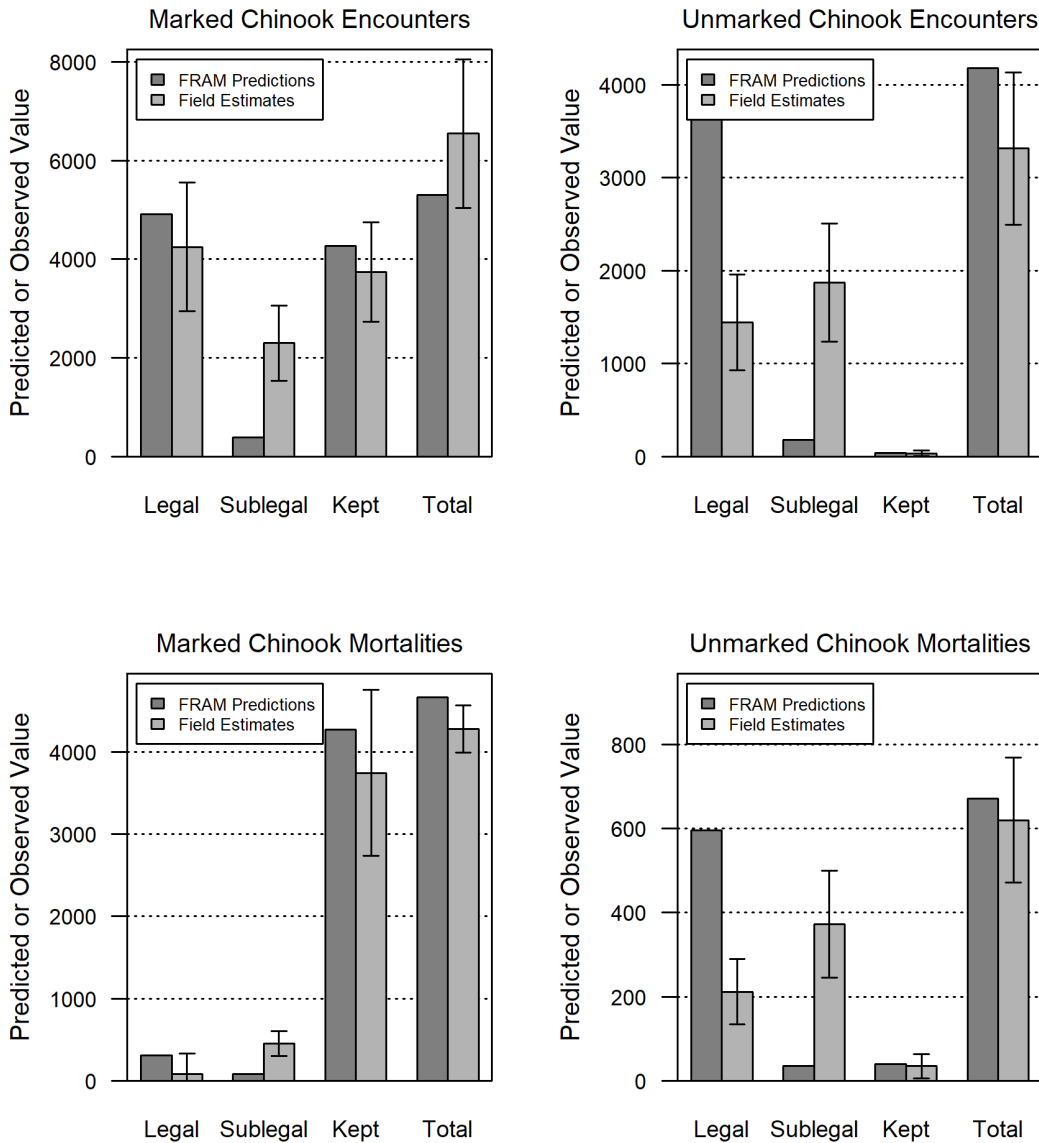


Figure 5.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2015. Error bars represent 95% confidence intervals for field estimates.

Table 5.5 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2015. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Aug. 15	3,743	35	3,778	641	6	647	17.10%

Table 5.6 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 Area 6 Chinook MSF from July 1 - August 15, 2015. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Big Cr Hatchery	2012	1	5.8	28.26	6.4	0.6	0.344	0.59
George Adams Hatchery	2011	1	5.8	28.26	5.9	0.6	0.287	0.54
	2012	2	11.7	56.52	11.8	1.2	0.574	1.07
Grovers Cr Hatchery	2010	1	5.8	28.26	5.8	0.6	0.282	0.53
	2011	4	17.5	84.77	23.2	7.6	29.092	6.9
	2012	4	23.4	113.03	23.2	2.3	1.117	2.11
Samish Hatchery	2011	3	17.5	84.77	17.4	1.7	0.834	1.58
	2012	2	11.7	56.52	11.7	1.2	0.571	1.07
Spring Cr Nfh	2012	2	11.7	56.52	12.7	1.3	0.672	1.16
Wallace R Hatchery	2011	2	11.7	56.52	11.6	1.2	0.556	1.05
	2012	1	5.8	28.26	5.8	0.6	0.283	0.53
Total		23	128.5	621.67	135.6	18.8	34.612	17.13

6) 2015 Marine Area 12 Summer Mark-Selective Chinook Fishery

WDFW implemented a third consecutive summer Chinook MSF, monitored using Baseline Sampling, South of Ayock Point in Marine Area 12 from July 1 through September 30, 2015 for the first time. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 5 of the 2015 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 6.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2015	3	0	1	4	3	39	1

Table 6.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 - September 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	0	0	0
Dockside Harvest	3	0	0	0	3

Table 6.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 - September 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	297†	297	0†	0	297	33,587	183	0 - 656	62
LU	323	0	323	48	48	1,005	32	0 - 111	65
SM	230	0	230	46	46	1,035	32	0 - 109	70
SU	324	0	324	65	65	1,801	42	0 - 148	65
Total	1,174	297	877	159	456	37,429	193	77 - 835	42

†Methodology produced less legal-marked encounters than were sampled during dockside creeling. The number of legal-marked fish were set to zero from a negative number and encounters were set to numbers of retained legal-marked fish. Methodology for the legal-marked category needs to be revisited.

Table 6.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 - September 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	512	184	328	15
	AD	2,275	787	1,488	684
	Total	2,787	971	1,816	699
	% Marked	82	81	82	98
Estimated (Creel) Encounters	UM	647	323	324	0
	AD	527	297	230	297
	Total	1,174	620	554	297
	% Marked	45	48	41	100

Table 6.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2015. Values may not add up exactly 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)	107	1032	1139	113	343	456
Released Legal	26	50	76	48	0	48
Released Sublegal	66	298	364	65	46	111
Landed Only	15	684	699	0	297	297

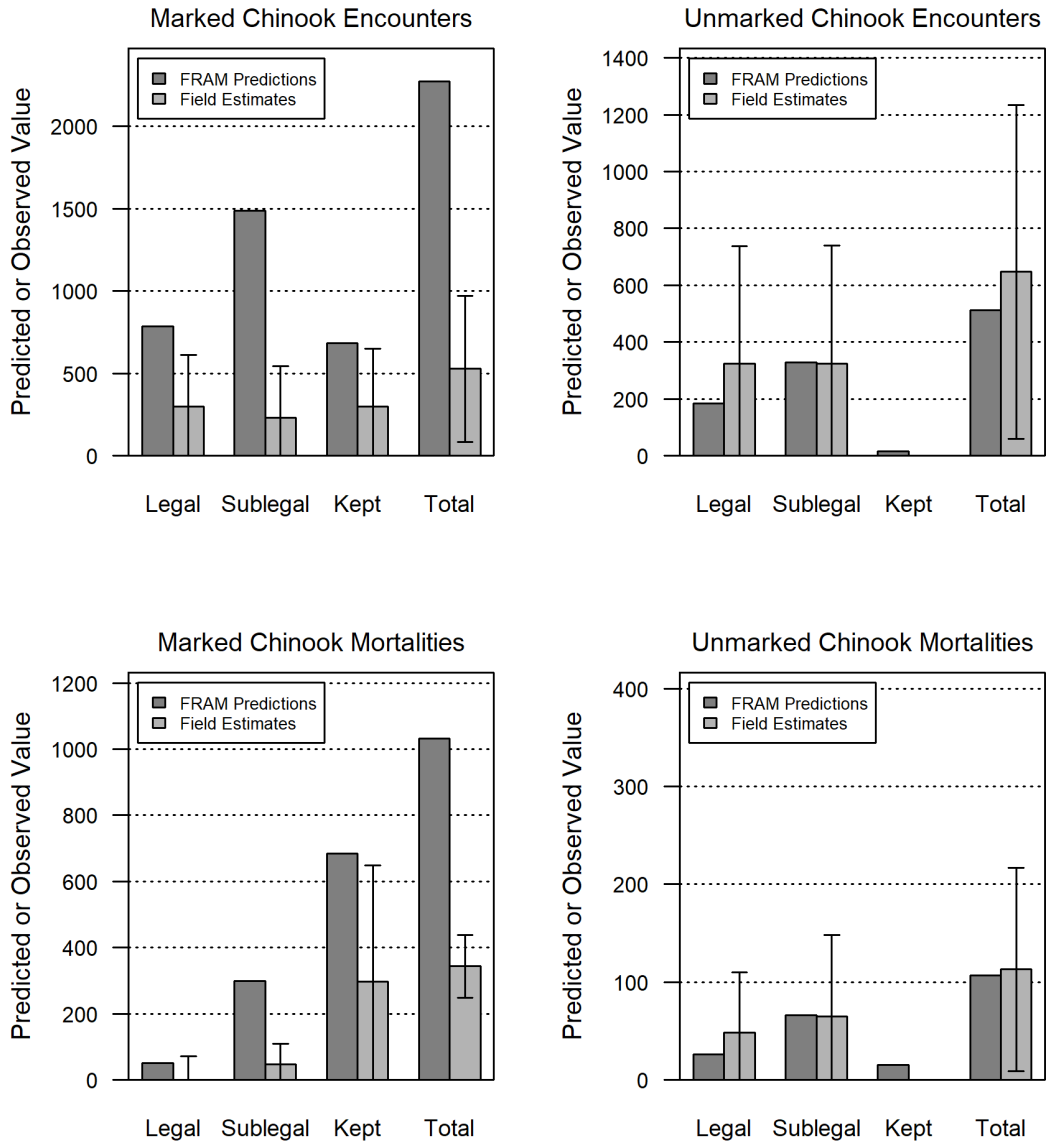


Figure 6.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2015. Error bars represent 95% confidence intervals for field estimates.

Table 6.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from July 1 - September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Sep. 30	297	0	297	3	0	3	1.00%

Table 6.7 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 Area 12 Chinook MSF from July 1 - September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
No Coded Wire Tag Recoveries								
Total								

7) 2015 Marine Area 13 Summer Mark-Selective Chinook Fishery

WDFW implemented an eighth consecutive summer Chinook MSF in Marine Area 13 from May 1 through September 30, 2015, monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 6 of the 2015 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 7.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from May 1 – September 30, 2015. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2015	133	2	38	25	54	32	14

Table 7.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from May 1 - September 30, 2015. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	15	4	5	1	25
Dockside Harvest	131	2	2	0	135

Table 7.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from May 1 - September 30, 2015. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	1,204	997	208	31	1028	43,797	209	618 - 1438	20
LU	302	15	287	43	58	923	30	0 - 118	52
SM	395	15	380	76	91	1,654	41	11 - 171	45
SU	99	0	99	20	20	1,290	36	0 - 90	181
Total	2,001	1027	974	170	1,197	49,726	223	760 - 1634	19

Table 7.4 Comparison of modeled estimated total Chinook encounters for the Area 13 Chinook MSF from May 1 - September 30, 2015. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	369	128	241	6
	AD	3,149	1,296	1,853	1,128
	Total	3,518	1,424	2,094	1,134
	% Marked	90	91	88	99
Estimated (Creel) Encounters	UM	402	302	99	15
	AD	1,599	1,204	395	1012
	Total	2,001	1,506	494	1027
	% Marked	80	80	80	99

Table 7.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2015. Values may not add up exactly 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)	73	1,580	1,653	78	1,119	1,197
Released Legal	19	81	100	43	31	74
Released Sublegal	48	371	419	20	76	96
Landed Only	6	1,128	1,134	15	1012	1027

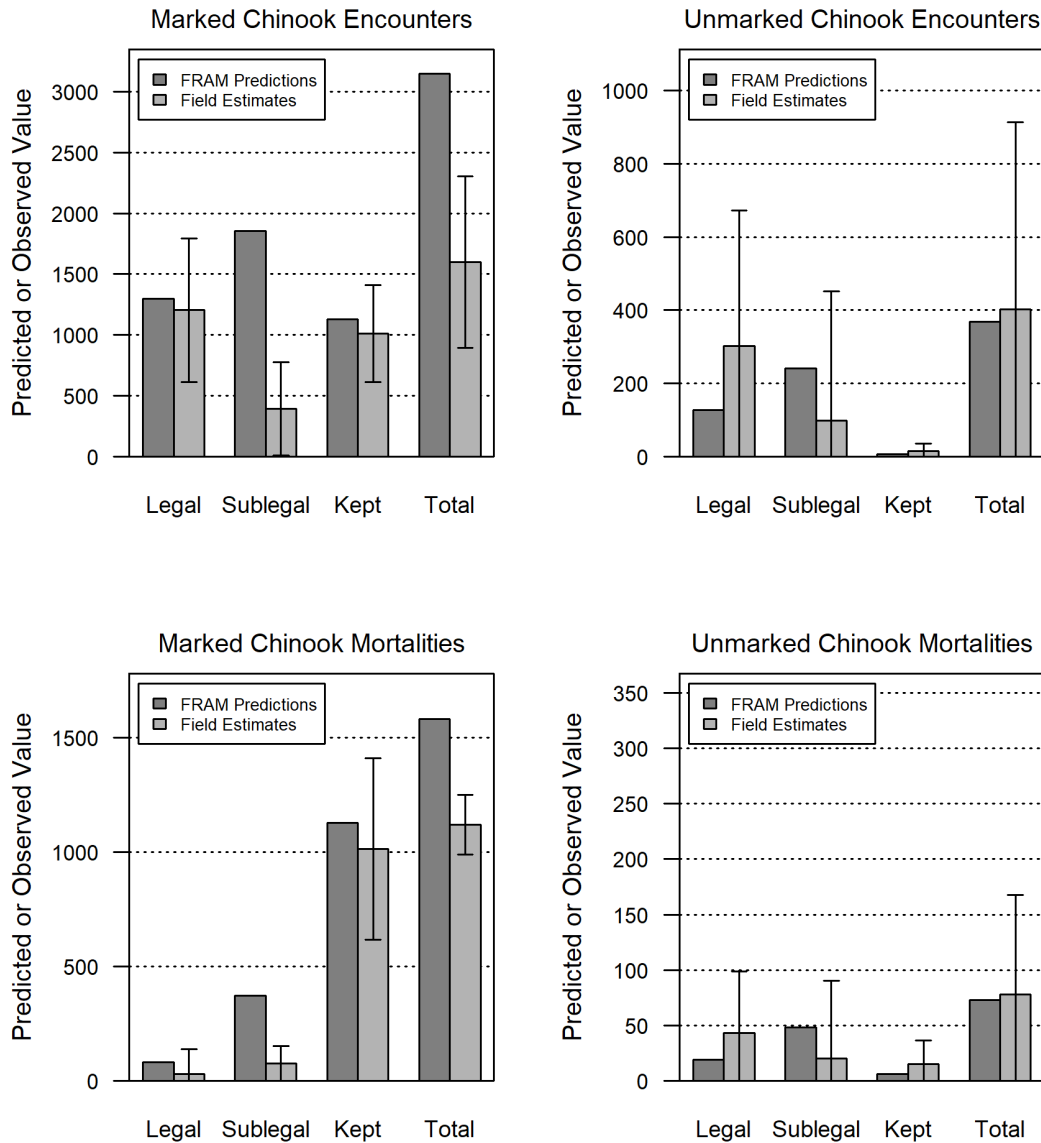


Figure 7.1 Comparison of modeled) and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2015. Error bars represent 95% confidence intervals for field estimates.

Table 7.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from May 1 - September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
May 1 – Sep. 30	1012	15	1027	133	2	135	13.10%

Table 7.7 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 Area 13 Chinook MSF from May 1 – September 30, 2015. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2011	1	7.6	50.27	7.6	0.8	0.506	0.71
Total		1	7.6	50.27	7.6	0.8	0.506	0.71

Winter 2015-16

8) 2015-16 Marine Area 5 Winter Mark-Selective Chinook Fishery

WDFW implemented a second consecutive winter Chinook MSF in Marine Area 5 from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 1 of the 2015-2016 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 8.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1 – Oct. 31, Feb. 16 -Apr. 30	126	2	182	154	113	1271	1503

Table 8.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	0	0	0
Dockside Harvest	117	1	8	0	126

Table 8.3 Summary of season-wide fishery impact estimates for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	605	439	166	25	464	8,491	92	283 - 645	20
LU	403	4	399	60	64	1531	39	0 - 140	62
SM	1575	30	1545	309	339	6,009	78	187 - 491	23
SU	1049	0	1049	210	210	3,979	63	86 - 333	30
Total	3,631	473	3,158	603	1076	20,795	144	794 - 1359	13

Table 8.4 Comparison of modeled and estimated total Chinook encounters for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	385	92	293	5
	AD	1,027	392	635	341
	Total	1,412	484	928	346
	% Marked	73	81	68	99
Estimated (Creel) Encounters	UM	1451	403	1049	4
	AD	2,180	605	1575	469
	Total	3,631	1008	2623	473
	% Marked	60	60	60	99

Table 8.5 Comparison of modeled and estimated total Chinook mortalities for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Values may not add up exactly 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)	77	493	570	273	803	1076
Released Legal	13	25	38	60	25	85
Released Sublegal	59	127	186	210	309	519
Landed Only	5	341	346	4	469	473

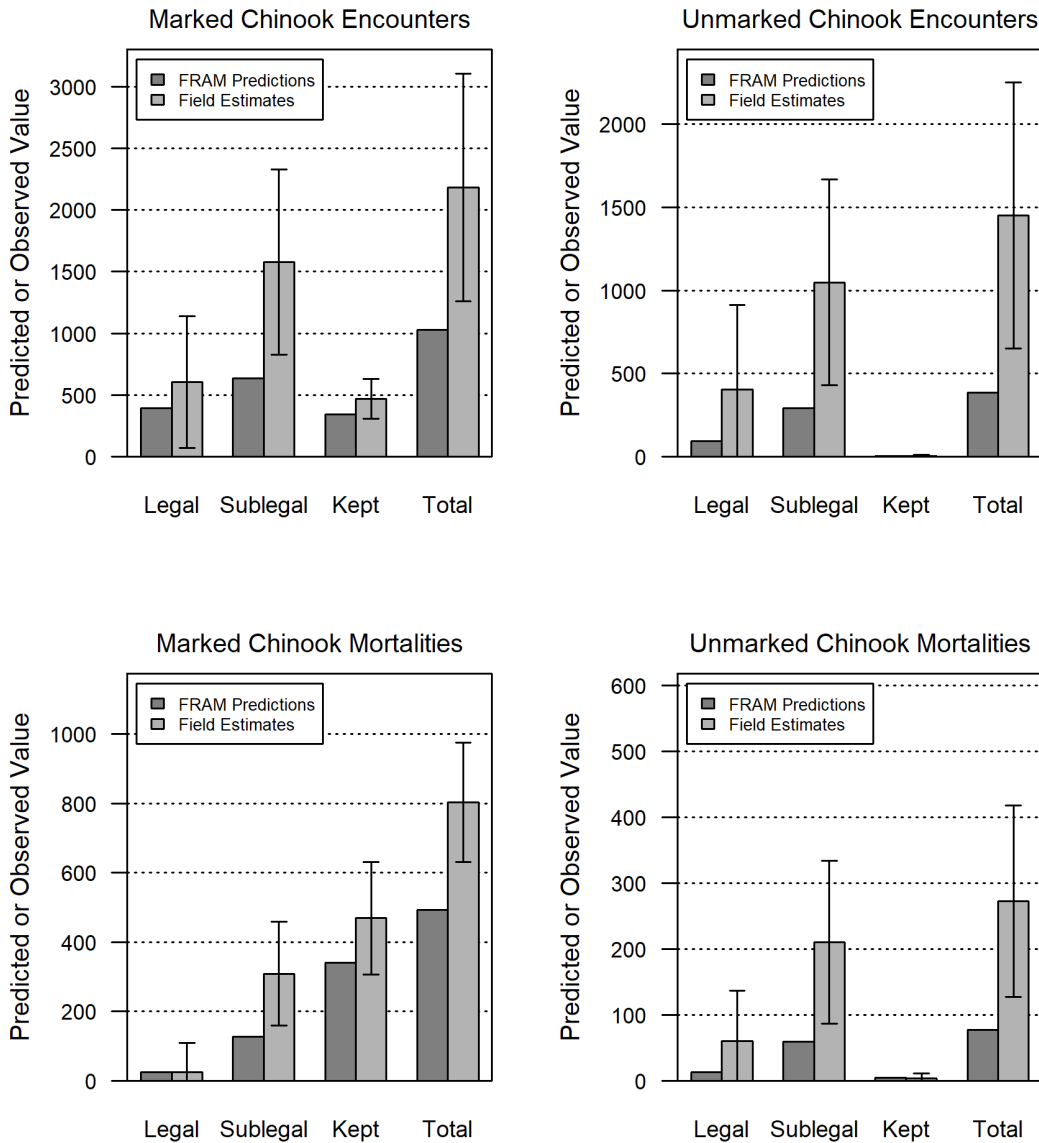


Figure 8.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates.

Table 8.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct. 1 – Oct. 31, Feb. 16 -Apr. 30	469	4	473	125	1	126	26.60%

Table 8.7 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 Area 5 Chinook MSF from October 1, 2015 – October 31, 2015 and February 16 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2013	1	0	0	3.8	3.8	10.338	3.22
George Adams Hatchery	2012	1	3.8	10.34	3.8	0.4	0.105	0.32
Marblemount Hatchery	2012	1	3.8	10.34	3.8	0.4	0.107	0.33
Wallace R Hatchery	2012	1	3.8	10.34	3.8	0.4	0.104	0.32
Wallace R Hatchery	2013	1	3.8	10.34	3.8	0.4	0.107	0.33
Total		5	15	41.35	18.9	5.3	10.761	4.52

9) 2015-16 Marine Area 11 Winter Mark-Selective Chinook Fishery

WDFW implemented a sixth consecutive winter Chinook MSF in Marine Area 11 from October 1, 2015 – April 30, 2016, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 7 of the 2015-2016 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 9.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Feb. 1 – Apr. 30	60	1	174	69	135	65	46

Table 9.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 11 Chinook MSF October 1, 2015 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	7	3	56	18	84
Dockside Harvest	52	0	0	0	52

Table 9.3 Summary of season-wide fishery impact estimates for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	710	438	272	41	479	8,587	93	297 - 660	19
LU	240	0	240	36	36	2374	49	0 - 131	135
SM	2245	0	2245	449	449	10,225	101	251 - 647	23
SU	758	0	758	152	152	4,844	70	15 - 288	46
Total	3,953	438	3,515	677	1115	26,030	161	799 - 1432	14

Table 9.4 Comparison of modeled and estimated total Chinook encounters for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	312	116	196	2
	AD	1,205	420	785	365
	Total	1,517	536	981	367
	% Marked	79	78	80	99
Estimated (Creel) Encounters	UM	998	240	758	0
	AD	2,955	710	2245	438
	Total	3,953	949	3003	438
	% Marked	75	75	75	100

Table 9.5 Comparison of modeled estimated total Chinook mortalities for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly 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)	58	549	607	188	928	1115
Released Legal	17	27	44	36	41	77
Released Sublegal	39	157	196	152	449	601
Landed Only	2	365	367	0	438	438

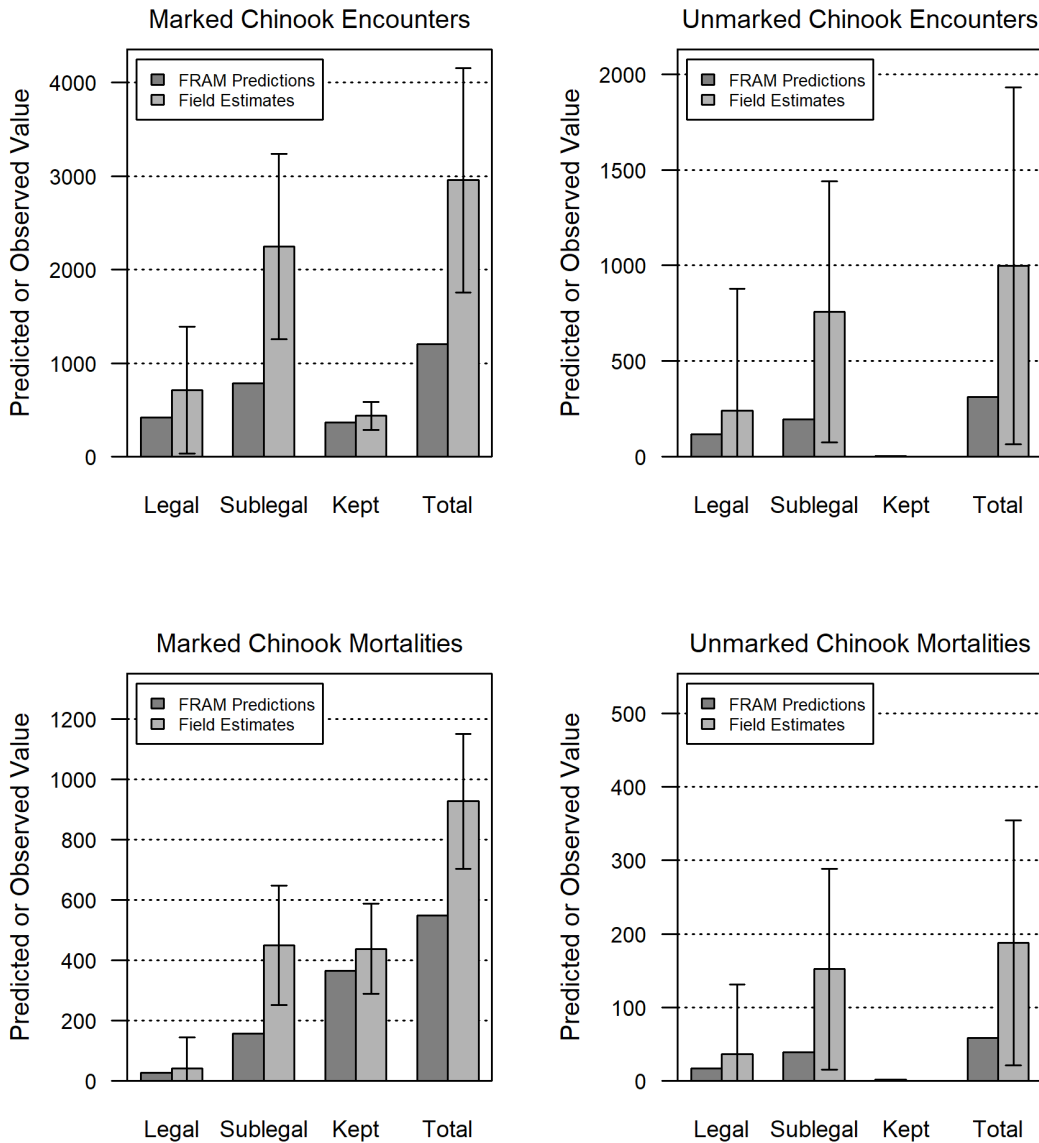


Figure 9.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates.

Table 9.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct. 1 – Apr. 30	438	0	438	52	0	52	11.90%

Table 9.7 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 Area 11 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Wallace R Hatchery	2012	1	8.4	62.53	8.4	0.8	0.627	0.79
Total		1	8.4	62.53	8.4	0.8	0.627	0.79

10) 2015-16 Marine Area 12 Winter Mark-Selective Chinook Fishery

WDFW implemented a seventh consecutive winter Chinook MSF in Marine Area 12 from October 1, 2015 through April 30, 2016, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 8 of the 2014-2015 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 10.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1 – Apr. 30	162	0	364	54	90	306	0

Table 10.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	1	0	1
Dockside Harvest	144	0	14	0	158

Table 10.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	878	463	415	62	525	6,594	81	366 - 684	15
LU	96	0	96	14	14	1369	37	0 - 87	257
SM	1052	45	1007	201	246	3,561	60	130 - 363	24
SU	115	0	115	23	23	2,438	49	0 - 120	215
Total	2,141	508	1,633	301	809	14,601	121	572 - 1046	15

Table 10.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	302	88	214	3
	AD	1,417	548	869	477
	Total	1,719	636	1,083	480
	% Marked	82	86	80	99
Estimated (Creel) Encounters	UM	211	96	115	0
	AD	1,930	878	1052	508
	Total	2,141	974	1167	508
	% Marked	90	90	90	100

Table 10.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly 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)	59	685	744	37	772	809
Released Legal	13	34	47	14	62	77
Released Sublegal	43	174	217	23	201	224
Landed Only	3	477	480	0	508	508

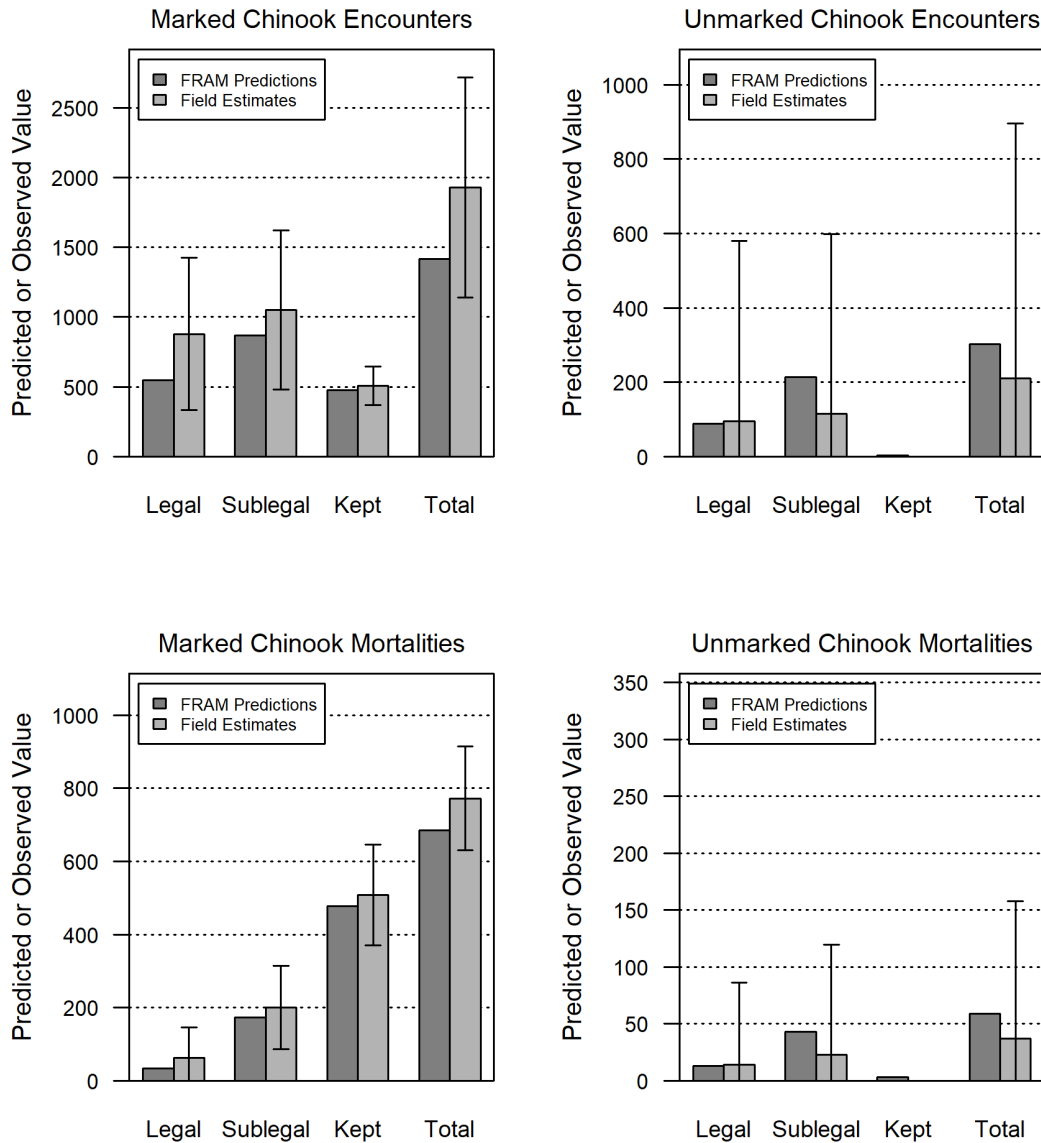


Figure 10.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates.

Table 10.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct. 1 – Apr. 30	508	0	508	158	0	158	31.10%

Table 10.7 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 Area 12 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Marblemount Hatchery	2013	1	3.2	7.12	3.2	0.3	0.072	0.27
Total		1	3.2	7.12	3.2	0.3	0.072	0.27

11) 2015-16 Marine Area 13 Winter Mark-Selective Chinook Fishery

WDFW implemented a second consecutive winter Chinook MSF in Marine Area 13 from October 1, 2015 – April 30, 2016, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 6 of the 2011-12 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 11.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1 – Apr. 30	5	0	27	1	10	325	0

Table 11.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	6	0	6
Dockside Harvest	3	0	0	0	3

Table 11.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from February October 1, 2015 – April 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	88	41	47	7	48	790	28	0 - 103	58
LU	3	0	3	0	0	36	6	0 - 12	1332
SM	453	0	453	91	91	3,336	58	0 - 204	64
SU	16	0	16	3	3	69	8	0 - 19	267
Total	560	41	519	101	142	4,231	65	15 - 270	46

Table 11.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	123	12	111	1
	AD	971	93	878	81
	Total	1,094	105	989	82
	% Marked	89	89	89	99
Estimated (Creel) Encounters	UM	19	3	16	0
	AD	542	88	453	41
	Total	560	91	469	41
	% Marked	97	97	97	100

Table 11.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. Values may not add up exactly 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)	116	723	839	62	602	664
Released Legal	15	26	41	25	44	69
Released Sublegal	92	338	430	37	155	193
Landed Only	9	359	368	0	403	403

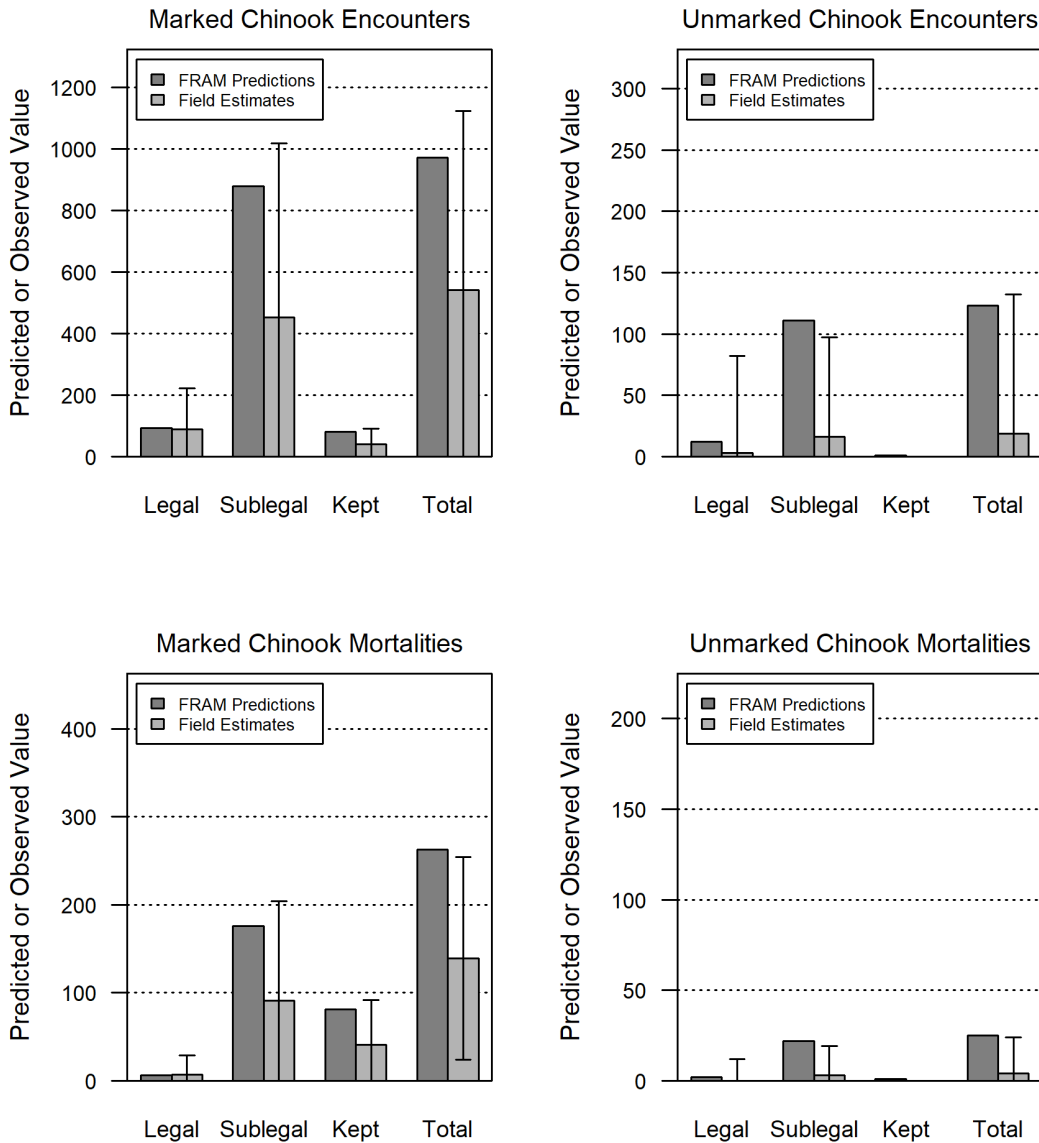


Figure 11.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF October 1, 2015 – April 30, 2016. Error bars represent 95% confidence intervals for field estimates.

Table 11.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct. 1 – Apr. 30	41	0	41	3	0	3	7.30%

Table 11.7 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 Area 13 Chinook MSF from October 1, 2015 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
No Coded-Wire Tags Recovered								
Total								

Summer 2016

12) 2016 Marine Area 6 Summer Mark-Selective Chinook Fishery

WDFW implemented a thirteenth consecutive summer Chinook MSF in Marine Area 6 from July 1 through August 15, 2016. This fishery has been monitored using baseline sampling since 2008. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 2 of the 2016 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were sufficient to provide the desired level of precision in total encounters estimates allowing the use of the bias-corrected M2 approach (WDFW and NWIFC 2013).

Table 12.1 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	56	35	23	28	142
Dockside Harvest	740	1	18	0	759

Table 12.2 Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	5,845	5,085	760	114	5,199	401,969	634	3957 - 6442	12
LU	3,653	7	3,646	547	554	13,876	118	323 - 785	21
SM	2,401	124	2,277	455	579	15,068	123	339 - 820	21
SU	2,923	0	2,923	585	585	18,130	135	321 - 848	23
Total	14,822	5,216	9,606	1701	6,917	466,109	683	5579 - 8255	10

Table 12.3 Comparison of modeled and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	4,537	3,658	879	37
	AD	5,555	3,875	1,680	3,371
	Total	10,092	7,533	2,559	3,408
	% Marked	55	51	66	99
Estimated (Creel) Encounters	UM	6,576	3,653	2,923	7
	AD	8,246	5,845	2,401	5,209
	Total	14,822	9,499	5,323	5,216
	% Marked	56	62	45	100

Table 12.4 Comparison of modeled and estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2016. Values may not add up exactly 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)	758	3,952	4,710	1138	5,779	6,917
Released Legal	545	245	790	547	114	661
Released Sublegal	176	336	512	585	455	1040
Landed Only	37	3,371	3,408	7	5,209	5,216

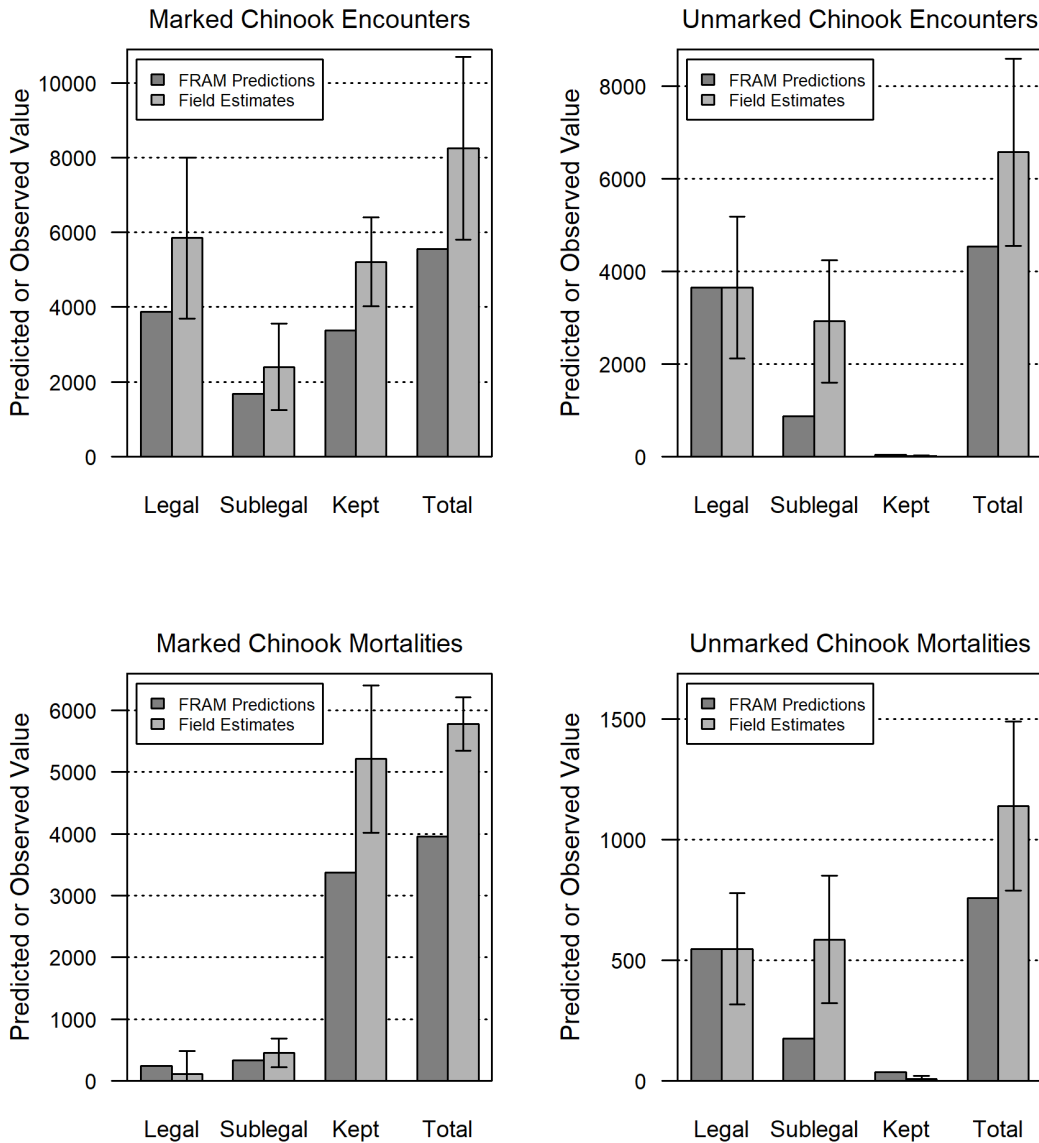


Figure 12.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2016. Error bars represent 95% confidence intervals for field estimates.

Table 12.5 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2016. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Aug. 15	5,209	7	5,216	758	1	759	14.60%

Table 12.6 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 Area 6 Chinook MSF from July 1 - August 15, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Bernie Gobin Hatch	2013	1	6.9	40.35	6.8	0.7	0.398	0.63
Clear Creek Hatchery	2013	1	6.9	40.35	6.8	0.7	0.398	0.63
Grovers Cr Hatchery	2012	3	20.6	121.06	20.5	2	1.196	1.89
	2013	7	48.1	282.48	47.5	4.7	2.752	4.39
	2014	2	13.7	80.71	14.1	1.4	0.854	1.31
Samish Hatchery	2012	1	6.9	40.35	6.9	0.7	0.408	0.64
Soos Creek Hatchery	2013	1	6.9	40.35	6.9	0.7	0.402	0.63
Spring Cr Nfh	2013	1	6.9	40.35	7	0.7	0.423	0.65
Wallace R Hatchery	2012	3	20.6	121.06	20.6	2.1	1.214	1.91
	2013	1	6.9	40.35	7	0.7	0.416	0.65
Total		21	144.3	847.45	144.2	14.4	8.463	13.33

13) 2016 Marine Area 12 Summer Mark-Selective Chinook Fishery

WDFW implemented a fourth consecutive summer Chinook MSF, monitored using Baseline Sampling, South of Ayock Point in Marine Area 12 from July 1 through September 30, 2016 for the first time. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 7 of the 2015 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 13.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2016	94	2	71	45	82	127	48

Table 13.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 - September 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	1	0	0	4	5
Dockside Harvest	54	0	21	2	77

Table 13.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 - September 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	1,635	864	771	116	980	34,182	185	617 - 1342	19
LU	689	0	689	103	103	4,682	68	0 - 237	66
SM	1,790	336	1,454	291	627	19,385	139	354 - 900	22
SU	754	32	722	144	176	8,983	95	0 - 362	54
Total	4,868	1,232	3,636	654	1,886	79,361	282	1334 - 2438	15

Table 13.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 - September 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	358	172	186	14
	AD	2,015	864	1,151	751
	Total	2,373	1036	1,337	765
	% Marked	85	83	86	98
Estimated (Creel) Encounters	UM	1,442	689	754	32
	AD	3,425	1,635	1,790	1,200
	Total	4,868	2,324	2,544	1,232
	% Marked	70	70	70	97

Table 13.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2016. Values may not add up exactly 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)	75	1036	1111	280	1,607	1,886
Released Legal	24	55	79	103	116	219
Released Sublegal	37	230	267	144	291	435
Landed Only	14	751	765	32	1,200	1,232

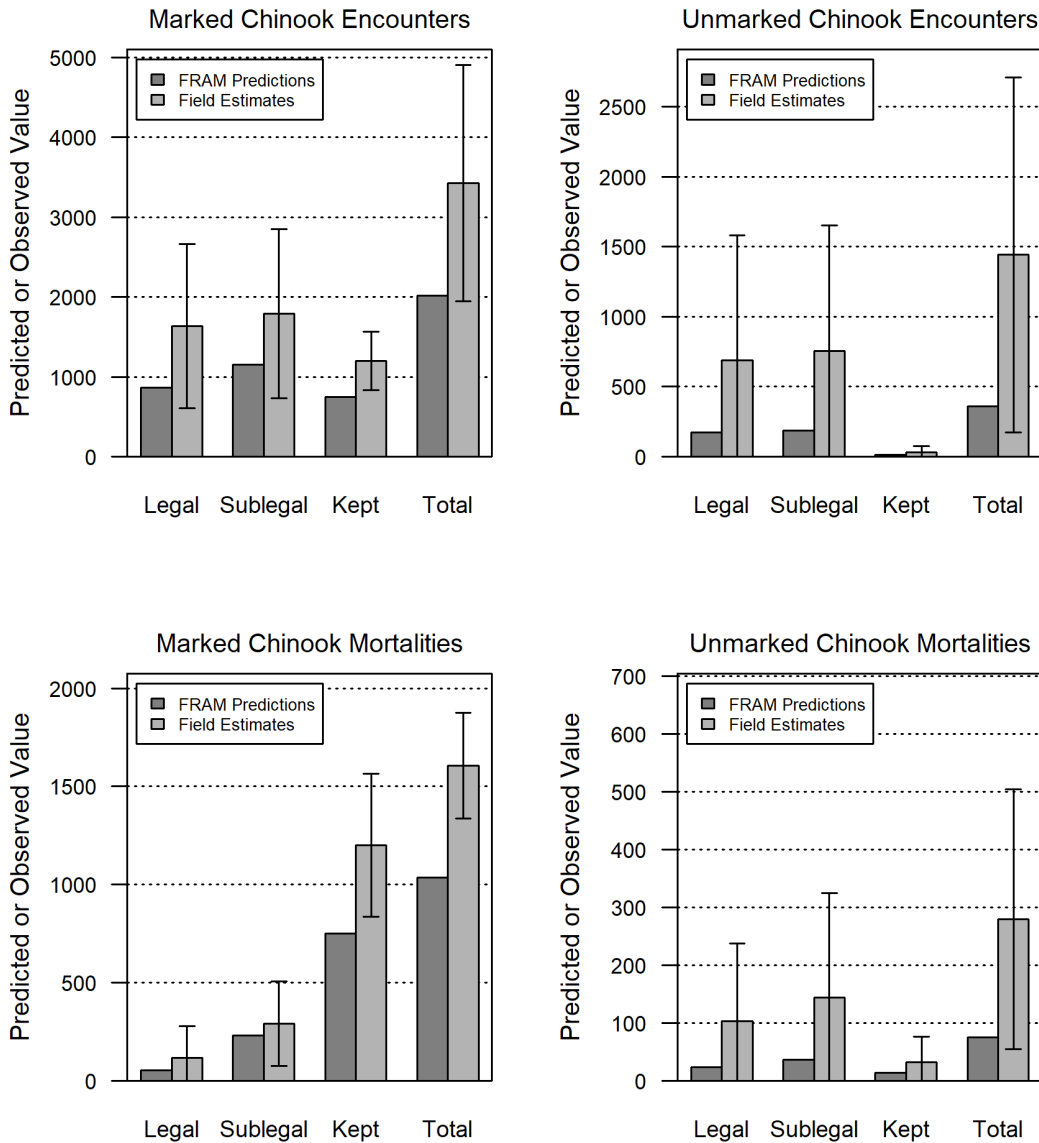


Figure 13.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2016. Error bars represent 95% confidence intervals for field estimates.

Table 13.6 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 Area 12 Chinook MSF from July 1 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Sep. 30	1,200	32	1,232	75	2	77	6.20%

Table 13.7 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 Area 12 Chinook MSF from July 1 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
No Coded-Wire Tags Recoverd								
Total								

14) 2016 Marine Area 13 Summer Mark-Selective Chinook Fishery

WDFW implemented a ninth consecutive summer Chinook MSF in Marine Area 13 from June 24 through September 30, 2016, monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 8 of the 2016 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 14.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from June 24 – September 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2016	238	0	70	29	13	22	0

Table 14.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from June 24 - September 30, 2016. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	26	5	13	2	46
Dockside Harvest	197	0	13	0	210

Table 14.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from June 24 - September 30, 2016. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	1,378	1106	272	41	1147	52,710	230	697 - 1597	20
LU	156	0	156	23	23	526	23	0 - 68	98
SM	246	73	173	35	107	1,600	40	29 - 186	37
SU	28	0	28	6	6	897	30	0 - 64	538
Total	1,808	1179	629	104	1,283	61,459	248	797 - 1769	19

Table 14.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from June 24 - September 30, 2016. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	55	36	19	2
	AD	383	294	89	256
	Total	438	330	108	258
	% Marked	87	89	82	99
Estimated (Creel) Encounters	UM	184	156	28	0
	AD	1,624	1,378	246	1179
	Total	1,808	1,534	273	1179
	% Marked	90	90	90	100

Table 14.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from June 24 - September 30, 2016. Values may not add up exactly 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)	11	293	304	29	1,254	1,283
Released Legal	5	19	24	23	41	64
Released Sublegal	4	18	22	6	35	40
Landed Only	2	256	258	0	1179	1179

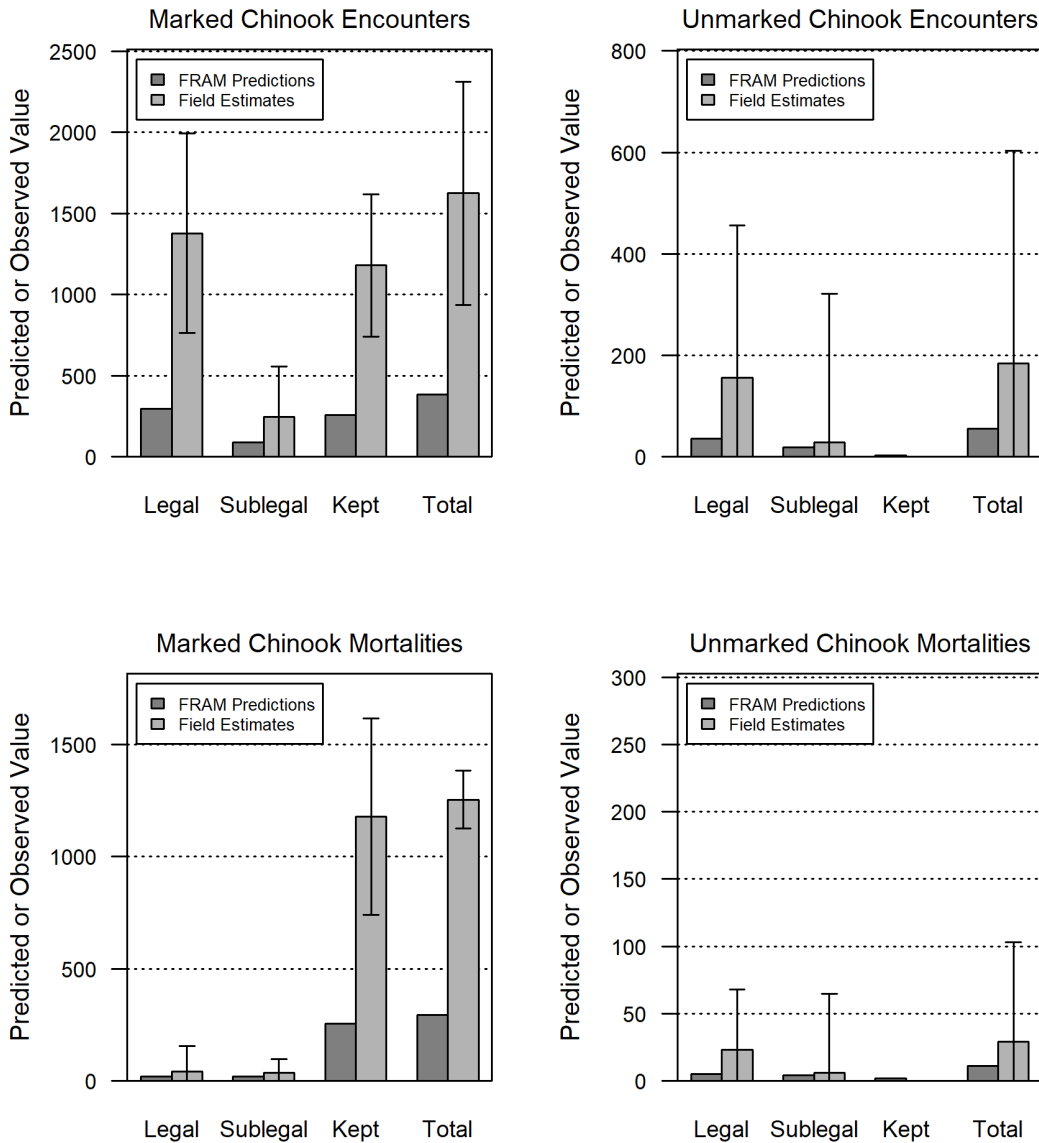


Figure 14.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from June 24 - September 30, 2016. Error bars represent 95% confidence intervals for field estimates.

Table 14.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from June 24 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
May 1 – Sep. 30	1179	0	1179	210	0	210	17.80%

Table 14.7 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 Area 13 Chinook MSF from June 24 - September 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2013	3	16.8	77.72	16.7	1.7	0.767	1.52
Clear Creek Hatchery	2014	2	11.2	51.81	11.4	1.1	0.532	1.03
Priest Rapids Hatchery	2013	1	5.6	25.91	5.7	0.6	0.264	0.51
Total		6	33.7	155.44	33.8	3.4	1.564	3.06

Winter 2016-17

15) 2016-17 Marine Area 5 Winter Mark-Selective Chinook Fishery

WDFW implemented a fourth consecutive winter Chinook MSF in Marine Area 5 from February 16 through April 30, 2017, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 1 of the 2016-2017 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 15.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 5 Chinook MSF from February 16 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Feb. 1 – Apr. 30	314	2	190	185	12	5	5

Table 15.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 5 Chinook MSF February 16 – April 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	0	0	0
Dockside Harvest	290	1	11	1	303

Table 15.3 Summary of season-wide fishery impact estimates for the Area 5 Chinook MSF from February 16 – April 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	1148	970	178	27	997	103,682	322	366 - 1628	32
LU	449	3	446	67	70	1308	36	0 - 141	52
SM	524	37	487	97	134	2,862	54	29 - 239	40
SU	205	3	201	40	44	1,655	41	0 - 123	93
Total	2,326	1014	1,312	231	1245	118,047	344	572 - 1919	28

Table 15.4 Comparison of modeled and estimated total Chinook encounters for the Area 5 Chinook MSF from February 16 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	321	70	251	3
	AD	729	252	477	219
	Total	1,050	322	728	222
	% Marked	69	78	66	99
Estimated (Creel) Encounters	UM	654	449	205	7
	AD	1,672	1148	524	1007
	Total	2,326	1597	729	1014
	% Marked	72	72	72	99

Table 15.5 Comparison of modeled and estimated total Chinook mortalities for the Area 5 Chinook MSF from February 16 – April 30, 2017. Values may not add up exactly 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)	63	330	393	114	1131	1245
Released Legal	10	16	26	67	27	93
Released Sublegal	50	95	145	40	97	138
Landed Only	3	219	222	7	1007	1014

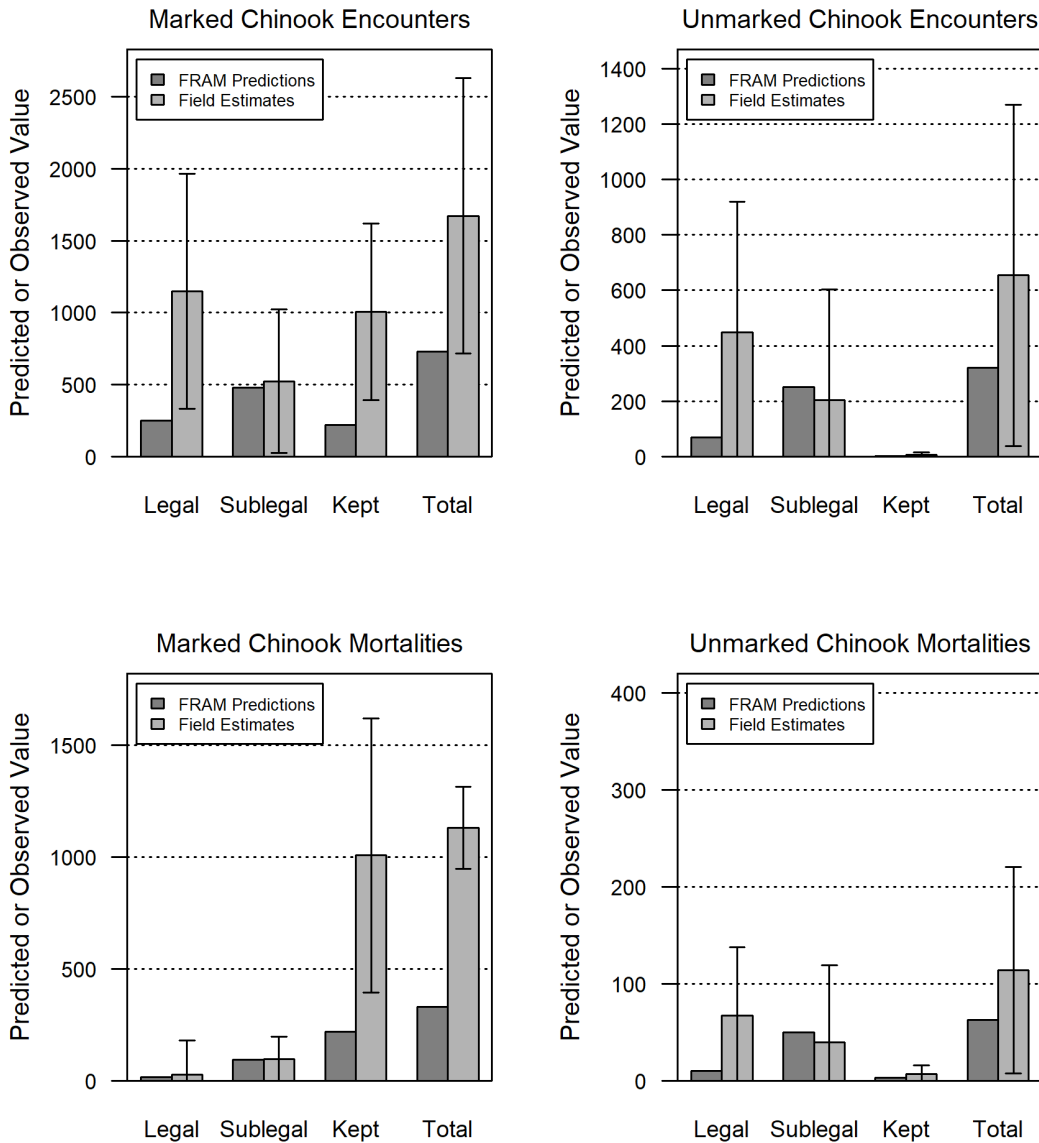


Figure 15.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 5 Chinook MSF from February 16 – April 30, 2017. Error bars represent 95% confidence intervals for field estimates.

Table 15.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 5 Chinook MSF from February 16 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Feb. 16 – Apr. 30	1007	7	1014	301	2	303	29.90%

Table 15.7 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 Area 5 Chinook MSF from February 16 – April 30, 2017 AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2014	1	3.3	7.85	3.4	0.3	0.081	0.28
George Adams Hatchery	2014	1	3.3	7.85	3.3	0.3	0.079	0.28
Grovers Cr Hatchery	2013	1	3.3	7.85	3.3	0.3	0.077	0.28
	2014	1	3.3	7.85	3.4	0.3	0.083	0.29
Samish Hatchery	2013	1	3.3	7.85	3.4	0.3	0.079	0.28
Total		5	16.7	39.26	16.8	1.7	0.398	1.41

16) 2016-17 Marine Area 11 Winter Mark-Selective Chinook Fishery

WDFW implemented a seventh consecutive winter Chinook MSF in Marine Area 11 from October 1, 2016 – April 30, 2017, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 7 of the 2016-2017 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 16.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 11 Chinook MSF from October 1 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1 – Apr. 30	53	0	64	27	32	5	1

Table 16.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	1	6	2	9
Dockside Harvest	47	0	1	0	48

Table 16.3 Summary of season-wide fishery impact estimates for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	189	128	61	9	137	1,582	40	59 - 215	29
LU	51	0	51	8	8	53	7	0 - 22	94
SM	180	3	177	35	38	205	14	10 - 66	38
SU	49	0	49	10	10	93	10	0 - 29	99
Total	469	131	338	62	193	1,980	45	106 - 280	23

Table 16.4 Comparison of modeled and estimated total Chinook encounters for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	185	48	137	1
	AD	459	112	347	98
	Total	644	160	484	99
	% Marked	71	70	72	99
Estimated (Creel) Encounters	UM	100	51	49	0
	AD	369	189	180	131
	Total	469	241	229	131
	% Marked	79	79	79	100

Table 16.5 Comparison of modeled and estimated total Chinook mortalities for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly 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)	35	174	209	18	176	193
Released Legal	7	7	14	8	9	17
Released Sublegal	27	69	96	10	35	45
Landed Only	1	98	99	0	131	131

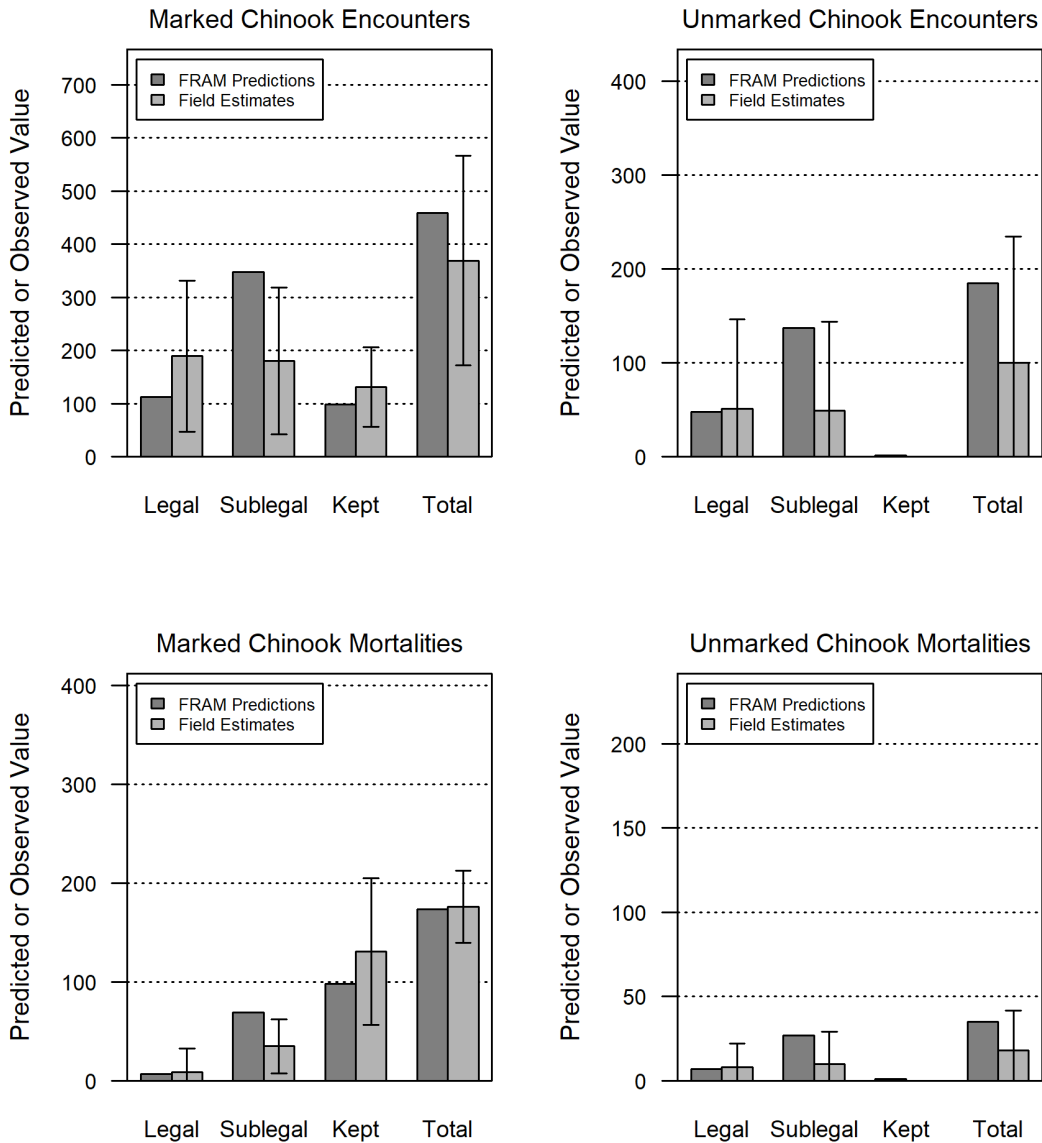


Figure 16.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. Error bars represent 95% confidence intervals for field estimates.

Table 16.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 11 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Feb. 1 – Apr. 30	131	0	131	48	0	48	36.60%

Table 16.7 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 Area 11 Chinook MSF from October 1 – April 30, 2016. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
No Double-Index Tags Recovered								
Total								

17) 2016-17 Marine Area 12 Winter Mark-Selective Chinook Fishery

WDFW implemented an eighth consecutive winter Chinook MSF in Marine Area 12 from October 1, 2016 – April 30, 2017, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 8 of the 2016-2017 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 17.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF October 1, 2016 – April 30, 2017. . AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1 – Apr. 30	54	0	270	72	169	39	0

Table 17.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	1	4	23	8	36
Dockside Harvest	50	0	1	0	51

Table 17.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	402	222	181	27	249	3,056	55	140 - 357	22
LU	95	0	95	14	14	948	31	0 - 75	215
SM	1611	4	1607	321	326	5,735	76	177 - 474	23
SU	381	0	381	76	76	1,898	44	0 - 162	57
Total	2,490	226	2,264	439	665	11,676	108	453 - 877	16

Table 17.4 Comparison of modeled estimated total Chinook encounters for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	184	81	103	2
	AD	1,183	574	609	449
	Total	1,367	655	712	451
	% Marked	87	88	86	100
Estimated (Creel) Encounters	UM	477	95	381	0
	AD	2,014	402	1611	226
	Total	2,490	498	1993	226
	% Marked	81	81	81	100

Table 17.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly 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)	35	657	692	91	574	665
Released Legal	12	86	98	14	27	41
Released Sublegal	21	122	143	76	321	398
Landed Only	2	449	451	0	226	226

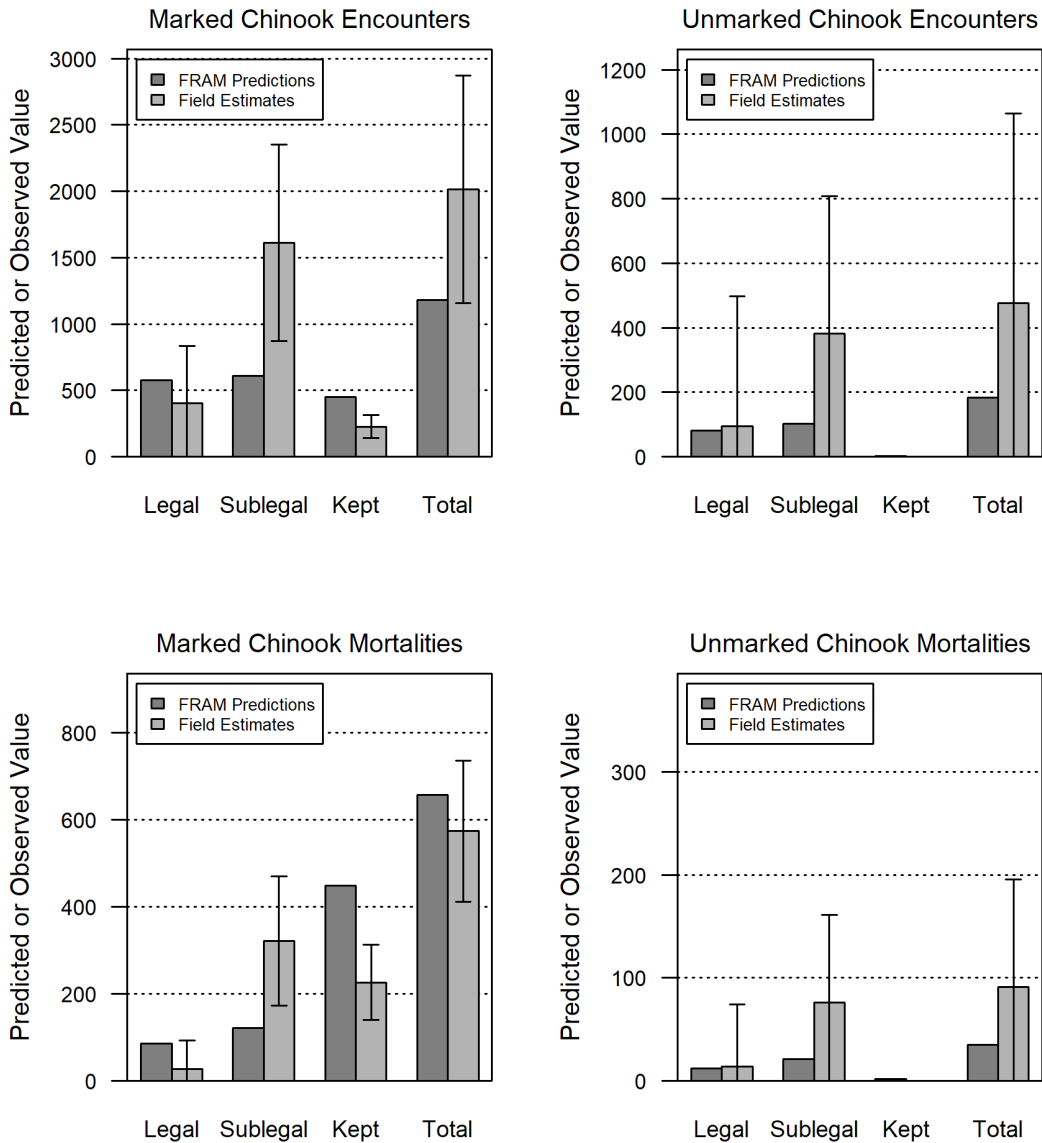


Figure 17.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. Error bars represent 95% confidence intervals for field estimates.

Table 17.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Feb. 1 – Apr. 30	226	0	226	51	0	51	22.60%

Table 17.7 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 Area 12 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Bernie Gobin Hatch	2014	1	4.4	15.21	4.3	0.4	0.143	0.38
Clear Creek Hatchery	2014	1	4.4	15.21	4.5	0.4	0.156	0.4
George Adams Hatchery	2014	2	8.9	30.41	8.9	0.9	0.304	0.78
Total		4	17.7	60.82	17.7	1.8	0.603	1.55

18) 2016-17 Marine Area 13 Winter Mark-Selective Chinook Fishery

WDFW implemented a third consecutive winter Chinook MSF in Marine Area 13 from October 1, 2016 through April 30, 2017, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 9 of the 2016-2017 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 18.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct. 1 – Apr. 30	13	0	54	17	70	764	13

Table 18.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	0	0	3	0	3
Dockside Harvest	8	0	2	0	10

Table 18.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	316	146	170	26	171	4,264	65	43 - 299	38
LU	91	0	91	14	14	796	28	0 - 69	206
SM	1846	36	1809	362	398	18,961	138	128 - 668	35
SU	532	0	532	106	106	2,777	53	3 - 210	50
Total	2,785	182	2,603	508	690	27,078	165	367 - 1012	24

Table 18.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	96	10	86	1
	AD	445	48	397	42
	Total	541	58	483	43
	% Marked	82	83	82	98
Estimated (Creel) Encounters	UM	623	91	532	0
	AD	2,162	316	1846	182
	Total	2,785	407	2378	182
	% Marked	78	78	78	100

Table 18.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. Values may not add up exactly 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)	19	124	143	120	569	690
Released Legal	1	3	4	14	26	39
Released Sublegal	17	79	96	106	362	468
Landed Only	1	42	43	0	182	182

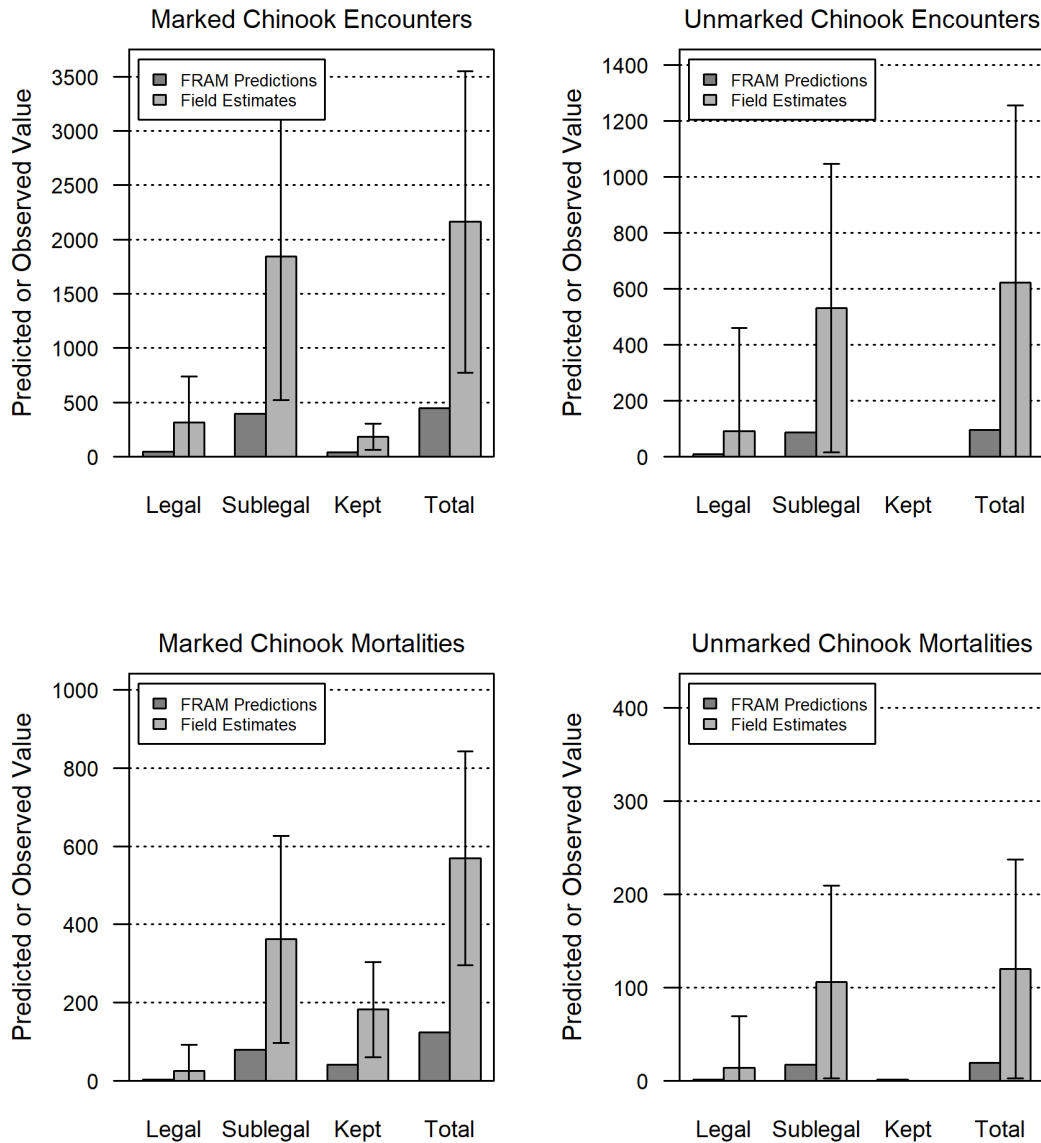


Figure 18.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . Error bars represent 95% confidence intervals for field estimates.

Table 18.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. . AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct. 1 – Apr. 30	182	0	182	10	0	10	5.50%

Table 18.7 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 Area 13 Chinook MSF from October 1, 2016 – April 30, 2017. AD = marked (adipose-clipped), UM = unmarked

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2014	1	0	0	18.2	18.2	313.04	17.69
Total		1	0	0	18.2	18.2	313.04	17.69

Summer 2017

19) 2017 Marine Area 6 Summer Mark-Selective Chinook Fishery

WDFW implemented a sixteenth consecutive summer Chinook MSF in Marine Area 6 from July 1 through August 15, 2017. This fishery has been monitored using baseline sampling since 2008. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 2 of the 2017 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were sufficient to provide the desired level of precision in total encounters estimates allowing the use of the bias-corrected M2 approach (WDFW and NWIFC 2013).

Table 19.1 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	93	17	35	4	149
Dockside Harvest	923	0	10	0	933

Table 19.2 Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	4,929	4,289	641	96	4,385	134,499	367	3666 - 5103	8
LU	901	0	901	135	135	1,145	34	69 - 201	25
SM	1,855	46	1809	362	408	4,715	69	274 - 543	17
SU	212	0	212	42	42	455	21	1-84	50
Total	7,898	4,335	3,563	635	4,970	143,063	378	4229 - 5712	8

Table 19.3 Comparison of modeled and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	2,052	1364	688	14
	AD	5,523	3,944	1,579	3,431
	Total	7,575	5,308	2,267	3,445
	% Marked	73	74	70	100
Estimated (Creel) Encounters	UM	1,113	901	212	0
	AD	6,784	4,929	1,855	4,335
	Total	7,898	5,830	2,067	4,335
	% Marked	86	85	90	100

Table 19.4 Comparison of modeled estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2017. Values may not add up exactly 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)	355	3,996	4,351	178	4,793	4,970
Released Legal	203	249	452	135	96	231
Released Sublegal	138	316	454	42	362	404
Landed Only	14	3,431	3,445	0	4,335	4,335

Table 19.5 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2017. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Aug. 15	4,335	0	4,335	933	0	933	21.50%

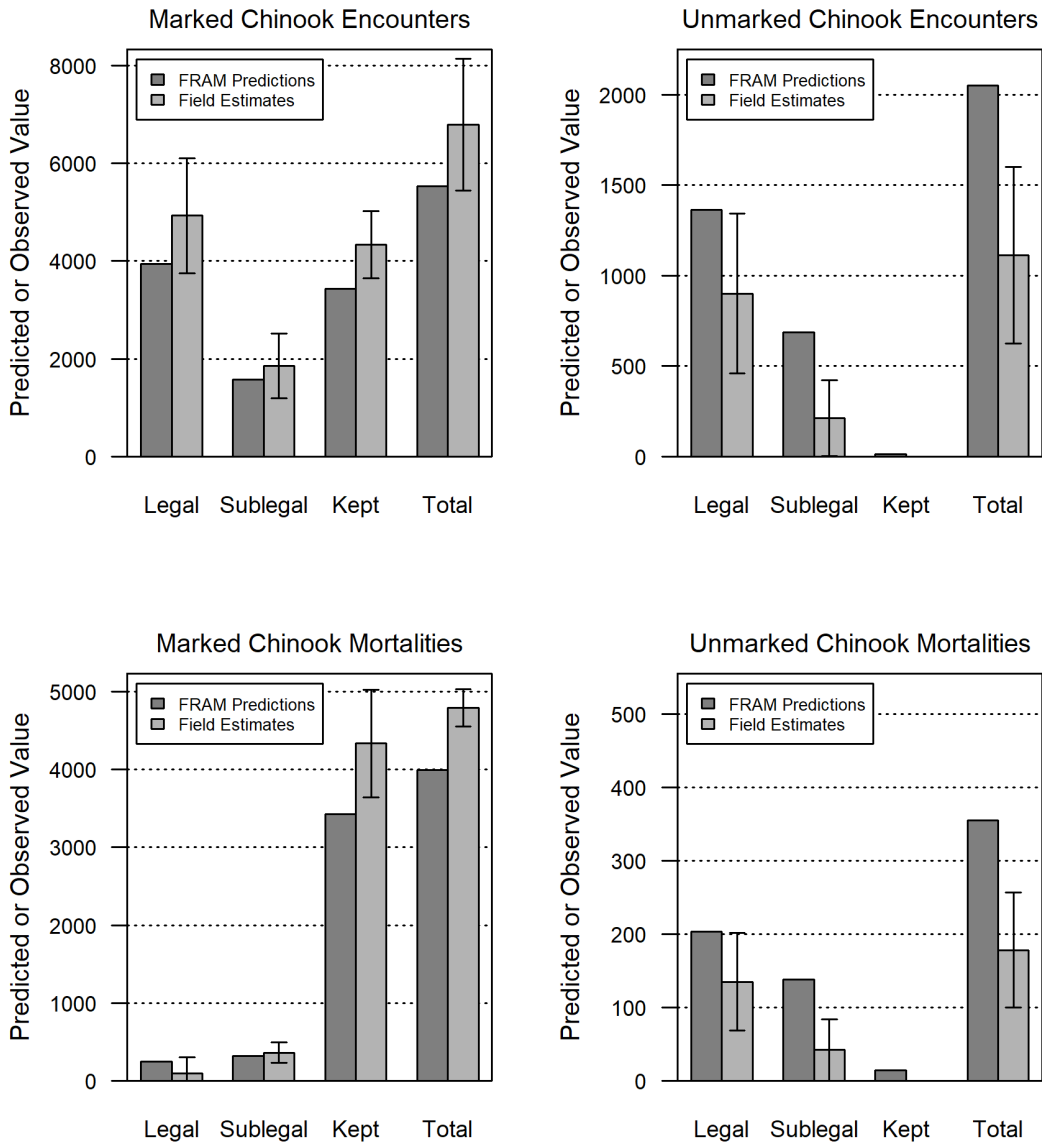


Figure 19.1 Comparison of and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2017. Error bars represent 95% confidence intervals for field estimates.

Table 19.6 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 Area 6 Chinook MSF from July 1 - August 15, 2017. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2013	1	4.6	16.94	4.6	0.5	0.167	0.41
	2014	1	4.6	16.94	4.7	0.5	0.174	0.42
George Adams Hatchery	2012	1	4.6	16.94	4.7	0.5	0.172	0.41
	2014	4	18.6	67.77	18.6	1.9	0.678	1.65
Grovers Cr Hatchery	2013	1	4.6	16.94	4.6	0.5	0.165	0.41
Soos Creek Hatchery	2013	1	4.6	16.94	4.6	0.5	0.169	0.41
Wallace R Hatchery	2013	2	9.3	33.88	9.4	0.9	0.35	0.84
	2014	1	4.6	16.94	4.7	0.5	0.173	0.42
Total		12	55.8	203.3	56	5.6	2.048	4.96

20) 2017 Marine Area 12 Summer Mark-Selective Fisher

WDFW implemented a fifth consecutive summer Chinook MSF in Marine Area 12 from July 1 through September 30, 2017, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 7 of the 2017 summer post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 20.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
July. 1 – Sept. 30	318	0	183	94	0	125	210

Table 20.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 – September 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	1	4	23	8	36
Dockside Harvest	305	0	8	0	313

Table 20.3 Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 – September 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	3,148	2,396	752	113	2,509	157,322	397	1732 - 3286	16
LU	762	0	762	114	114	7,330	86	0 - 282	75
SM	1,499	63	1,437	287	350	15,265	124	108 - 592	35
SU	363	0	363	73	73	12,589	112	0 - 292	155
Total	5,772	2,459	3,313	587	3,046	198,970	446	2172 - 3920	15

Table 20.4 Comparison of modeled and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 – September 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	106	86	20	7
	AD	1,362	1156	206	1006
	Total	1,468	1242	226	1013
	% Marked	93	93	91	99
Estimated (Creel) Encounters	UM	1,124	762	363	0
	AD	4,648	3,148	1,499	2,459
	Total	5,772	3,910	1,862	2,459
	% Marked	81	81	81	100

Table 20.5 Comparison of modeled and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 – September 30, 2017. Values may not add up exactly 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)	23	1120	1143	187	2,859	3,046
Released Legal	12	73	85	114	113	227
Released Sublegal	4	41	45	73	287	360
Landed Only	7	1006	1013	0	2,459	2,459

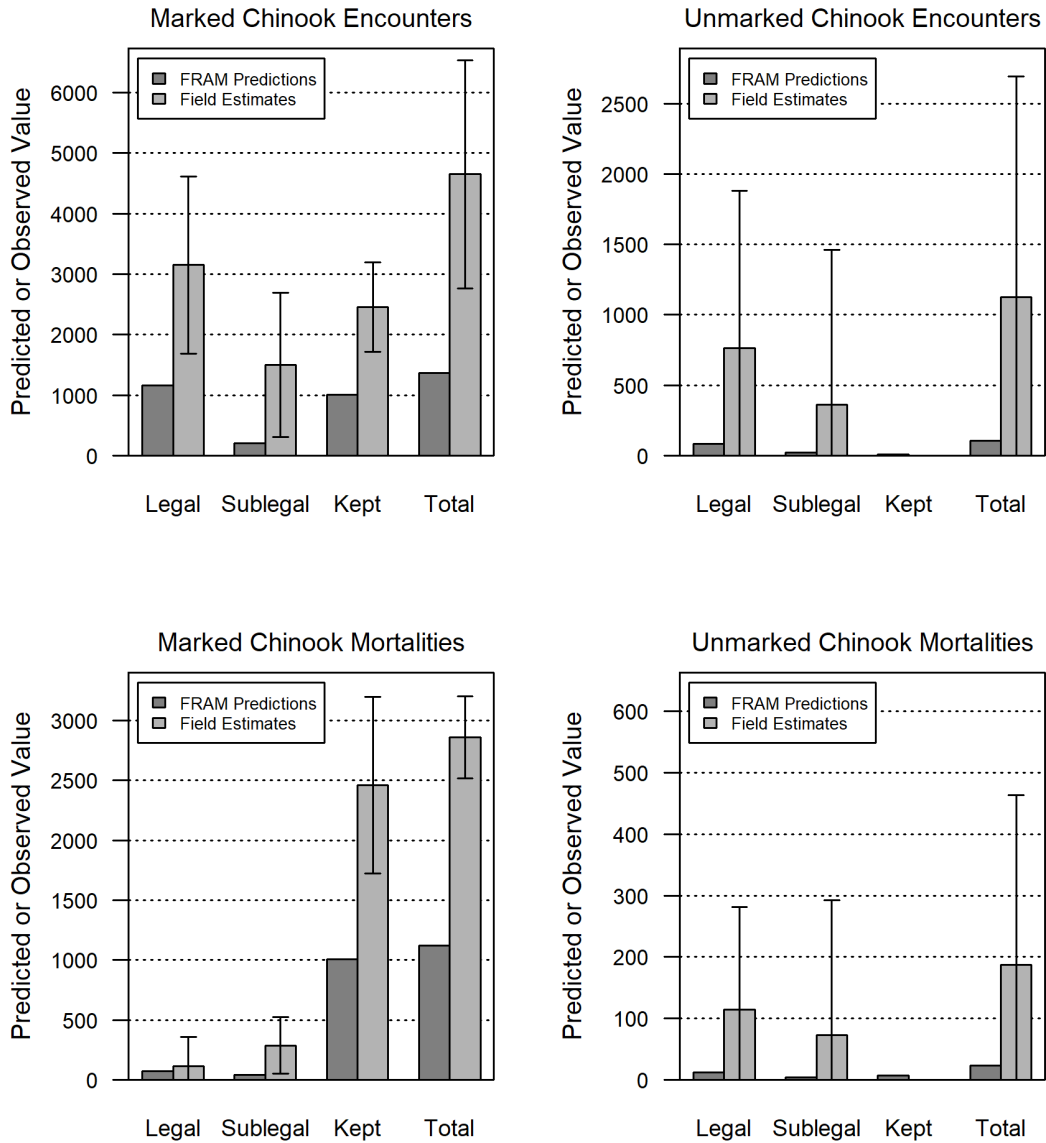


Figure 20.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 – September 30, 2017. Error bars represent 95% confidence intervals for field estimates.

Table 20.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from July 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Sep. 30	2,459	0	2,459	313	0	313	12.70%

Table 20.7 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 Area 12 Chinook MSF from July 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
George Adams Hatchery	2014	1	7.9	53.86	7.9	0.8	0.539	0.73
Total		1	7.9	53.86	7.9	0.8	0.539	0.73

21) 2017 Marine Area 13 Summer Mark-Selective Fishery

WDFW implemented a tenth consecutive summer Chinook MSF in Marine Area 13 from May 1 through September 30, 2012, monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 8 of the 2017 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

Table 21.1 Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from May 1 – September 30, 2017. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2017	351	1	301	54	0	61	11

Table 21.2 Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from May 1 - September 30, 2017. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	6	1	8	0	15
Dockside Harvest	332	1	7	0	340

Table 21.3 Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from May 1 - September 30, 2017. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	5,232	3682	1550	232	3915	60,705	246	3432 - 4398	6
LU	456	11	445	67	78	15,580	125	0 - 322	160
SM	1955	78	1877	375	453	28,812	170	120 - 786	37
SU	170	0	170	34	34	27,451	166	0 - 359	487
Total	7,812	3771	4,041	709	4,480	132,624	364	3766 - 5193	8

Table 21.4 Comparison of modeled and estimated total Chinook encounters for the Area 13 Chinook MSF from May 1 - September 30, 2017. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	99	75	24	1
	AD	1,483	1,094	389	952
	Total	1,582	1,169	413	953
	% Marked	94	94	94	100
Estimated (Creel) Encounters	UM	626	456	170	11
	AD	7,187	5,232	1955	3760
	Total	7,812	5,687	2125	3771
	% Marked	92	92	92	100

Table 21.5 Comparison of modeled and estimated total Chinook mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2017. Values may not add up exactly 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)	17	1,098	1,115	112	4,368	4,480
Released Legal	11	68	79	67	232	299
Released Sublegal	5	78	83	34	375	409
Landed Only	1	952	953	11	3760	3771

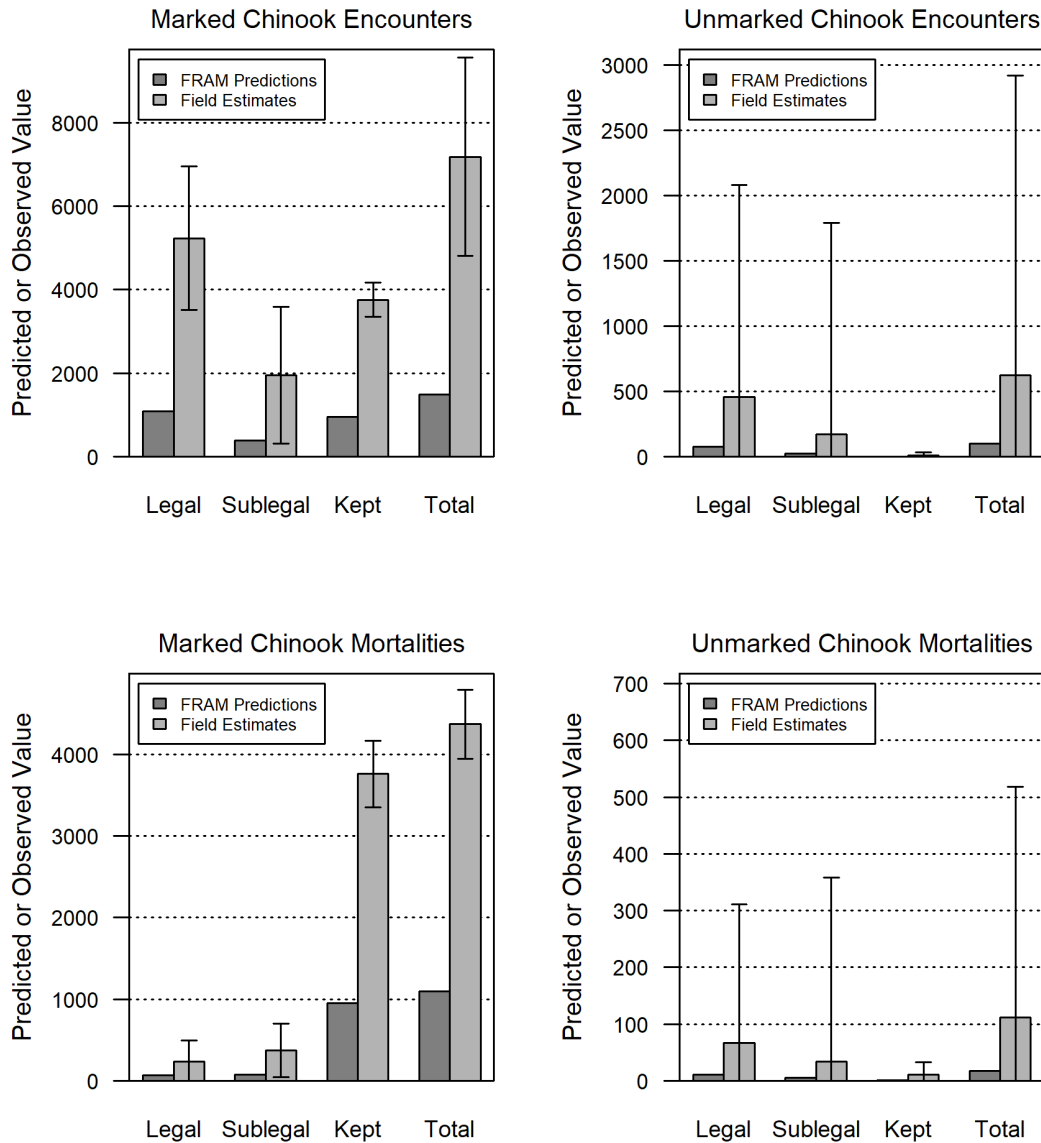


Figure 21.1 Comparison of modeled and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2017. Error bars represent 95% confidence intervals for field estimates.

Table 21.6 Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from May 1 - September 30, 2017. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
May 1 – Sep. 30	3760	11	3771	339	1	340	9.00%

Table 21.7 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 Area 13 Chinook MSF from May 1 - September 30, 2017. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2013	1	11.1	111.92	11	1.1	1.105	1.05
Clear Creek Hatchery	2014	2	22.2	223.85	22.5	2.2	2.3	2.14
Total		3	33.3	335.77	33.5	3.4	3.405	3.2

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