2013 OCEAN SELECTIVE FISHERY SAMPLING REPORT

SUBMITTED BY:

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
FISH MANAGEMENT PROGRAM
600 CAPITOL WAY NORTH
OLYMPIA, WASHINGTON 98501-1091

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1. INTRODUCTION

The Pacific Fishery Management Council (PFMC) adopted 2013 recreational and commercial troll fisheries for all salmon species in the area between Cape Falcon, Oregon and the U.S./Canada border. Mark-selective recreational fisheries for Chinook and coho and mark-selective coho commercial fisheries were included in all four Catch Record Card (CRC) areas of coastal Washington (Areas 1, 2, 3, and 4). Council-area fisheries were adopted based on assumptions regarding coho and Chinook abundance, distribution of stocks, Chinook age class distributions, coho mark rates, compliance with selective fishery regulations, and incidental mortality.

The PFMC adopted an ocean mark-selective Chinook fishery (MSF) in Marine Areas 1 through 4 for the fourth consecutive year, following state-tribal agreement during the North of Falcon process. The fishery was open for 11 total days in May and June in the northern coastal areas, and for 15 days in CRC Area 2 and 14 days in CRC Area 1 beginning June 8. Consistent with the Washington Department of Fish and Wildlife's (WDFW) intent of Puget Sound/Strait of Juan de Fuca mark-selective Chinook fisheries as well as the prior ocean mark-selective Chinook pilot fisheries, the primary goal for this selective fishery was to provide meaningful opportunity to the recreational angling public while minimally impacting ESA-listed Chinook salmon encountered in the mixed-stock ocean fisheries. WDFW's Ocean Sampling Program (OSP) continued its intensive monitoring program in all ocean ports during the season to collect data to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, on-water observation, and a Voluntary Trip Report (VTR) system. Among other parameters, sampling activities emphasized data collection needs for the estimation of: *i*) the mark rate of the targeted Chinook population, *ii*) the total number of Chinook salmon harvested (by size [legal or sublegal] and mark-status [marked or unmarked]), *iii*) the total number of Chinook salmon released (by size/mark-status), *iv*) the coded-wire tag- (CWT) and/or DNA-based stock composition of marked and unmarked Chinook mortalities, and *v*) the total mortality of marked and unmarked double index tag (DIT) CWT stocks.

Additionally, coho mark-selective fisheries were adopted in 2013 for the fifteenth consecutive year, and the OSP continued its intensive monitoring program in all ocean ports. Sampling activities were identical to those employed during the Chinook MSF. Sampling activities during the coho MSF emphasized data collection needs for the estimation of: *i*) the mark rate of the targeted coho population, *ii*) the total number of coho harvested by mark-status, including an estimate of angler compliance rate with coho MSF regulations, *iii*) the total number of coho released (by size/mark-status), *iv*) the coded-wire tag- (CWT) stock composition of landed coho, and *v*) the total mortality of marked and unmarked coho.

2. SEASON DESCRIPTION

2.1 Ocean Recreational Chinook MSF

Catch Record Card (CRC) Area 1 (from Cape Falcon, OR to Leadbetter Point, WA) was open for all salmon except coho seven days per week from June 8 through June 21. A daily bag limit of two salmon was in effect. All retained Chinook were required to have a healed adipose fin clip, and the minimum size limit was 24 inches total length for Chinook. A total of 14 fishing days were available during this fishery.

CRC Area 2 (from Leadbetter Point to the Queets River) was open for all salmon except coho seven days per week from June 8 through June 22. A daily bag limit of two salmon was in effect. All retained Chinook were required to have a healed adipose fin clip, and the minimum size limit was 24 inches total length for Chinook. A total of 15 fishing days were available during this fishery.

CRC Areas 3 (from the Queets River to Cape Alava) and 4 (from Cape Alava to the U.S./Canada border) were open for all salmon except coho May 10 and 11, May 17 and 18, then seven days per week from June 22 through June 28. A daily bag limit of two salmon was in effect. All retained Chinook were required to have a healed adipose fin clip, and the minimum size limit was 24 inches total length for Chinook. A total of 11 fishing days were available during this fishery.

The fishery was operating under a coastwide landed quota of 8,000 marked Chinook. **Figure 1** shows the Washington ocean Catch Record Card areas.

2.2 Ocean Recreational All-Species Fisheries (Coho Mark-Selective)

CRC Area 1: The ocean recreational fishery in CRC Area 1 was open for all salmon species seven days per week from June 22 through September 30. A daily bag limit of two salmon, one of which could be a Chinook, was in effect June 22 - August 22; the bag limit was modified in-season to two salmon from August 23 – September 30. All retained coho were required to have a healed adipose fin clip from June 22 – August 31. The fishery was modified to allow retention of unmarked coho beginning September 1 through the season with a bag limit of two salmon. The Columbia Control Zone was closed. A total of 101 fishing days were available in the area (71 days coho mark-selective, 30 days coho non-selective).

CRC Area 2: The ocean recreational fishery in CRC Area 2 was open for all salmon species Sunday through Thursday June 23 – July 18, and seven days per week thereafter. A daily bag limit of two salmon, one of which could be a Chinook, was in effect June 23 - August 3; the bag limit was modified in-season to two salmon from August 4 – September 30. From June 23-September 5, all retained coho were required to have a healed adipose fin clip. The fishery was modified to allow retention of unmarked coho beginning September 6 with a bag limit of two salmon. A total of 94 fishing days were available in the area (69 days coho mark-selective, 25 days coho non-selective).

CRC Area 3: The ocean recreational fishery in CRC Area 3 was open for all salmon species seven days per week from June 29 through September 22. From September 28 - October 13, salmon fishing was open and restricted to the part of Area 3 north of 47°50'00" north latitude and south of 48°00'00" north latitude, seven days per week. A daily bag limit of two salmon plus two additional pink was in effect June 29 – August 9 and from August 23 – October 13; the bag limit was modified in-season to two salmon, only one of which could be chinook, plus two additional pink, from August 10 – August 22. All retained coho were required to have a healed adipose fin clip. A total of 102 fishing days were available in the area.

CRC Area 4: The ocean recreational fishery in CRC Area 4 was open for all salmon species seven days per week from June 29 through September 22. A daily bag limit of two salmon plus two additional pink was in effect June 29 – August 9 and from August 23 – September 22; the bag limit was modified in-season to two salmon, only one of which could be chinook, plus two additional pink, from August 10 – August 22. Beginning August 1, Chinook retention east of the Bonilla-Tatoosh line and chum retention were prohibited. All retained coho were required to have a healed adipose fin clip. A total of 86 fishing days were available in the area.

The all-species fishery operated under preseason quotas of 40,000 landed Chinook and 74,760 landed marked coho.

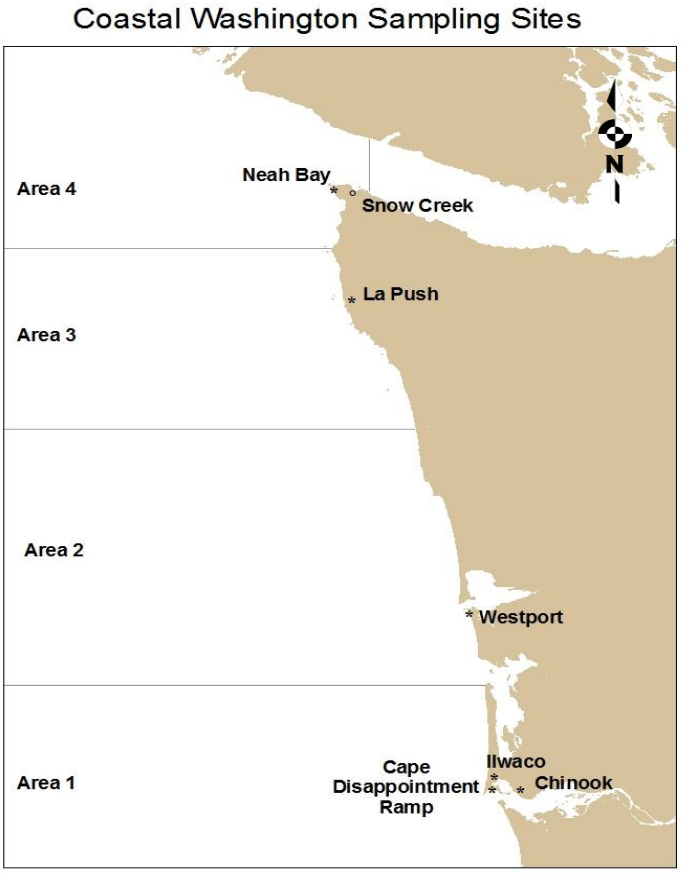

Figure 1. Map of coastal Washington showing the ocean catch record card areas (Areas 1 through 4) and major sampling sites**.**

2.3 Non-Treaty Commercial Troll Fisheries (Coho Mark-Selective)

The non-Treaty troll fishery was open from Cape Falcon, Oregon to the Queets River May 1-June 30 (61 days), and from the Queets River to the U.S.-Canada border May 1-20 and May 24-28 (25 days) for all salmon except coho. The fishery reopened from Cape Falcon to the Queets River July 1-9, 12-16, 19-23, 26-30, August 2-6, 9-13, 16-20, August 30-September 3, September 6-10, and September 13-17 (59 days) for all salmon species. The area from the Queets River to the U.S.-Canada border was open July 1-9, 12-16, 19-23, 26-30, August 2-6, and August 9-13 (34 days) for all salmon species except no chum retention north of Cape Alava, WA in August. All retained coho were required to have a healed adipose fin clip.

3. METHODS

WDFW's Ocean Sampling Program (OSP) implemented a comprehensive monitoring program in all ocean ports during the Chinook and coho selective fishery seasons in Washington ocean Areas 1-4. OSP collected the data needed to estimate key fishery parameters characterizing the ocean mark-selective fisheries and associated impacts on unmarked salmon. Sampling activities included dockside angler interviews (with catch sampling), total boat counts via exit or entrance counts at each major coastal port, direct on-the-water observations of salmon encounters during charter ride-along trips, and voluntary trip reports of completed trips provided by the angling public.

3.1 On-Board Observation

WDFW samplers conducted direct on-water observation of salmon encounters onboard charter vessels during both the recreational Chinook MSF and the recreational all-species coho MSF. Data collected onboard the charter boats were used to estimate the encounter rates of Chinook by size class and mark group (legal-size and marked [LM], legal-size and unmarked [LU], sublegal-size and marked [SM], and sublegal-size and unmarked [SU]), as well as encounter rates of marked and unmarked coho, and drop-offs. In addition, samplers collected DNA samples from legal sized and sublegal sized Chinook while onboard the charter vessels.

WDFW observers rode along on charter vessels and recorded all hook-ups aboard the vessel; for each hook-up, the following information was recorded: result of the hook-up (fish kept, released, or dropped off), species, mark status (marked or unmarked), and size class (legal or sublegal). A sampling protocol was established for the charter observers so that the most important information relative to this study was collected first. The first priority for the observers was to record the species, mark status, size category, and result of each hook-up aboard the vessel. Collection of these data enabled estimation of encounter rates for Chinook (by size/mark status) and coho (by mark status), and drop-off numbers. The second priority was to collect DNA samples (a small non-lethal clipping from the tip of the dorsal fin), lengths, and scale samples from all Chinook during the June Chinook MSF and from sublegal-sized Chinook during the all-species fishery. DNA from sublegal-sized Chinook was prioritized above that from legal-sized Chinook when Chinook retention was not mark-selective since legal-sized fish were available on the dock as well as at sea. The third priority was to collect DNA, lengths, and scale samples from legal-sized Chinook.

Direct on-water observation of salmon encounters was the primary method used in CRC Areas 1 and 2 to determine mark rates, encounter rates, and drop-off rates where charter vessel salmon fishing trips are numerous. The Voluntary Trip Report (VTR) system (see Section 3.2 below) was the secondary method used to collect encounter data in these two areas.

In CRC Areas 3 and 4, where few charter vessels take salmon fishing trips, and those who do are very small, the VTR system was the primary method used to collect on-water encounter data; the charter ride-along method was used secondarily in these areas.

3.2 Voluntary Trip Reports

Selective fishery encounter statistics were also acquired through Voluntary Trip Reports that WDFW samplers distributed and collected from the angling public in Areas 1 through 4. The VTR form is designed to capture information identical to that collected by on-board observers. Anglers complete the information on the form as they fish, minimizing recall error.

Samplers distributed VTRs beginning at 5:00 AM five days per week in La Push (CRC Area 3) and Neah Bay (CRC Area 4) during the Chinook MSF and the all-species fishery. In Ilwaco (CRC Area 1) and Westport (CRC Area 2), samplers were dedicated to distributing VTRs most weekend days and one to two days per week during weekdays. These samplers approached anglers as they prepared to depart for fishing, explained the purpose of the VTR and how to complete it, and encouraged anglers to record all encounters and return the form to a dockside sampler at the end of the day. Anglers could also mail these forms to the WDFW Region 6 office postage-paid.

In 2013, a new, simpler VTR form was developed to meet the needs of north coast charter boats that have not had sufficient time while fishing to complete the traditional VTR form. The new forms asks anglers simply to tally encountered salmon in the appropriate species/size class/mark status/result of encounter category, ie for each species, kept legal marked, kept legal unmarked, released legal marked, released legal unmarked, kept sublegal marked, kept sublegal unmarked, released sublegal marked, or released sublegal unmarked. They are also asked to tally drop offs and kept/released pink. The new form was distributed to north coast charter skippers and to a select group of private boat anglers with a history of completing traditional VTRs; traditional VTRs were distributed to all other anglers.

Collection of VTR data was the primary method used in CRC Areas 3 and 4 to estimate mark rates, encounter rates, and drop-off rates. The VTR method was the secondary method used in CRC Areas 1 and 2.

3.3 Dockside Sampling

Dockside samplers were stationed in the four major landing ports for the ocean fisheries: Neah Bay, La Push, Westport, and Ilwaco (including the port of Chinook). The recreational fisheries in each port were sampled a minimum of 4 to 5 days per week, with weekend (Saturday, Sunday, and holidays) and weekday days (non-holiday Monday through Friday) stratified. Typically, all weekend days and a randomly-selected 3 of 5 weekdays were sampled. Total fishery catch and effort estimates were generated by the OSP using three types of data obtained during dockside sampling: effort counts, interview data, and examination of catch. Each is described below.

Effort Counts

On each sample day, a total recreational boat count was obtained either by counting boats exiting the port or entering the port. A minimum of 20% of the boats returning to the port within each boat type (charter and private) was sampled. An exit count (a count of boats leaving the port) typically began at 4:30AM and continued through the end of the sampling day (exact time was

port-specific). An entrance count (a count of boats entering the port) usually began near 8:00AM and continued through dusk. Whether OSP samplers conducted exit or entrance counts varied based on specific considerations for each port. Regardless of the method used, this effort count, taken on every sampled day, provided the total counts of charter and private boats to which sample data were expanded.

Angler Interviews and Catch Sampling

WDFW samplers stationed in coastal ports collected catch and effort information during dockside angler interviews of boats exiting the fishery in Areas 1-4. Information collected during each sample included number of anglers, target species, area fished, landed catch by species, mark status of landed salmon, identification and recovery of coded wire tags, and angler estimates of released salmon by species and mark status and of released groundfish by species. Additionally, dockside samplers collected DNA samples, lengths, and scale samples from landed Chinook as time allowed.

3.4 Estimating Catch and Effort

3.4.i Estimated Stratum Totals (Primary Stage)

Combined (total) catch estimates are typically stratified by weekend/holiday and weekday. In some strata, every day is sampled. In those strata the combined estimates are simply sums of the daily catches. In other strata, where some days are not sampled, the average catch per day over all sampled days is multiplied by the number of days in the stratum to estimate the total catch.

Let:

a = the marine catch area,

i = trip type,

t = Weekend/holiday or Weekday stratum,

N_t = the number of days in stratum t,

T_t = collection of all days in stratum t,

n_t = the number of days sampled in stratum t,

S_t = collection of sampled days in stratum t (when S=T, n=N),

Y_{taik} = estimated catch (or effort) on day k for stratum t in area a from trip type i,

C_{tai} = catch for stratum t in area a from trip type i,

Then

$$\hat{C}_{tai} = N_t \frac{\sum_{k \in S_t} \hat{Y}_{taik}}{n_t}$$

with estimated variance (see Thompson 1992, p. 129):

$$\hat{V}\left(\hat{C}_{tai}\right) = \frac{N_t (N_t - n_t)}{n_t} \frac{\sum_{k \in S_t} \left(\hat{Y}_{taik} - \hat{\bar{Y}}_{tai}\right)^2}{n_t - 1} + \frac{N_t}{n_t} \sum_{k \in S_t} \hat{V}\left(\hat{Y}_{taik}\right)$$

where

$$\hat{\bar{Y}}_{tai} = \frac{\sum_{k \in S_t} \hat{Y}_{taik}}{n_t}.$$

For strata with all days sampled, $n_t = N_t$, and the catch and variance estimators reduce to:

$$\hat{C}_{tai} = \sum_{k \in T_t} \hat{Y}_{taik}$$

and

$$\hat{V}\left(\hat{C}_{tai}\right) = \sum_{k \in T_t} \hat{V}\left(\hat{Y}_{taik}\right).$$

3.4.ii Daily Catch and Effort Estimation (Secondary Stage)

Both catch and effort are post-stratified by trip-type and area fished. Effort in terms of boat-trips is simply the sample number of boats for each trip-type and area expanded by the appropriate boat-type (charter or private) exit/entrance count. Effort in terms of angler-trips is calculated as the mean number of anglers per boat (indexed by trip-type and area) expanded by the counted total population of boats.

The total catch for a given species on a sampled day is the product of the population of boats and the estimated catch per boat, again post-stratified by trip-type and area fished. Key assumptions in the current estimation procedures are that:

1) All boats exiting/entering a port are included in the exit/entrance count
2) Exit/entrance counts are made without error
3) The approximate systematic sample of boats can be treated as a simple random sample
4) Anglers answer questions accurately and do not conceal fish

In the following discussion, subscripts referring to port and boat-type are suppressed. Let:

M_t = total exit or entrance count for a given port on day *t* (assumed known without error),

m_t = total boats sampled on day *t*,

m_{tai} = number of boats sampled of trip type *i* fishing in area *a* on day *t*,

a_{taij} = number of anglers on the *j*th boat from trip type *i* fishing in area *a* on day *t*,

y_{taij} = number of species specific fish caught on the *j*th boat from trip type *i* in area *a* on day *t*, and

Y_{tai} = total catch of specific species caught from trip type *i* in area *a* on day *t*.

The estimate of the number of boat-trips of trip-type *i* and area *a* follows the procedure outlined in Lai et. al. (1991) where the proportion of boats in each category is estimated by:

$$\hat{p}_{tai} = \frac{m_{tai}}{m_t}$$

with estimated variance (see Cochran 1977, p. 52):

$$V(\hat{p}_{tai}) = \frac{\hat{p}_{tai} \cdot (1 - \hat{p}_{tai})}{(m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

The estimated total boat-trips is then obtained by:

$$\hat{M}_{tai} = M_t \cdot \hat{p}_{tai}$$

with estimated variance:

$$\hat{V}(\hat{M}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{p}_{tai})$$

Effort expressed in terms of angler-trips is the product of the average anglers per boat-trip times the total number of boat-trips. The mean number of anglers per boat-trip (for trip-type *i* and fishing area *a*) is estimated as:

$$\hat{\bar{a}}_{tai} = \frac{\sum_j a_{taij}}{m_t}$$

with variance:

$$\hat{V}(\hat{\bar{a}}_{tai}) = \frac{\sum_j (a_{taij} - \hat{\bar{a}}_{tai})^2}{m_t (m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

Thus the estimated total number of angler-trips is:

$$\hat{a}_{tai} = M_t \cdot \hat{\bar{a}}_{tai}$$

with variance:

$$\hat{V}(\hat{a}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{\bar{a}}_{tai})$$

The catch (or number released) for a specific species on sampled day *t* in area *a* from trip type *i* is similarly estimated by:

$$\hat{Y}_{tai} = \frac{\sum_j y_{taij}}{m_t} M_t$$

with estimated variance:

$$\hat{V}\left(\hat{Y}_{tai}\right) = \frac{\sum_j \left(y_{taij} - \hat{\bar{y}}_{tai}\right)^2}{m_t\left(m_t - 1\right)} M_t\left(M_t - m_t\right)$$

This estimate and its variance differs somewhat from that described in Lai et al. (1991) since the total count, M_t (assumed to be a known quantity), is used to expand the estimated CPUE (calculated over all sampled boats) rather than the estimated boat-trips by trip-type and area fished.

3.5 Estimating Chinook Encounters and Mortalities

The overall impacts of the May - June 2013 recreational mark-selective Chinook fishery in ocean Areas 1-4 are characterized in terms of grand-total estimates of Chinook encounters and mortalities and by using estimates specific to each of the four size/mark-status groups (i.e., legal-marked [LM], sublegal-marked [SM], legal-unmarked [LU], and sublegal-unmarked [SU]; **Table 1**). The method described above in section 3.4 was used to generate total estimates of angler effort, retained catch by species, and releases of all fish species except for Chinook salmon released during the Chinook MSF in Areas 1-4. To estimate Chinook salmon releases (and thus, total encounters) by size/mark group, we applied Conrad and McHugh's (2008) bias-corrected approach, the same method that the Puget Sound Sampling Unit (PSSU) has used since 2008 to estimate Chinook releases in Puget Sound mark-selective Chinook fisheries (e.g., WDFW 2011).

Prior to summer 2008, PSSU had generated two different Chinook encounters estimates based on two separate estimation methods ("Method 1" and "Method 2"; see WDFW 2011 and Conrad and McHugh 2008 for details). Method 1 estimates of total Chinook encounters were derived from the combination of dockside observations of landed catch and angler interview responses about salmon releases; thus, as Conrad and McHugh explain, the accuracy of Method 1 estimates depended heavily on the ability of anglers to correctly recall and report the number of Chinook they actually encountered and released. Method 2 estimates of Chinook encounters were obtained using the creel survey estimates of the total number of legal-size, marked Chinook harvested in combination with the on-water observation or VTR data to estimate both the total number of Chinook encounters and to apportion the encounters to four size/mark status categories (LM, LU, SM, SU). The Method 2 estimator was derived assuming that anglers retain all LM Chinook encountered; therefore, its accuracy depended on the extent to which angler behavior deviates from this idealized case. Based on their analyses and practical considerations

regarding the most feasible bias correction approaches, Conrad and McHugh ultimately recommended using Method 2 with a correction for the release of legal-size marked Chinook as the preferred method for estimating total Chinook encounters in mark-selective Chinook fisheries. After a thorough state-tribal technical review of Conrad and McHugh's method in August 2008, state and tribal technical representatives agreed to use this bias-corrected approach to produce a "best estimate" of Chinook encounters.

Thus, we estimated Chinook releases in the 2013 Chinook MSF as the difference between retained catch (i.e., from the dockside creel survey) and total Chinook encounters (i.e., releases = encounters – retained catch) generated using Conrad and McHugh (2008) approach. We first divided the creel estimate of legal-marked Chinook harvest by the onboard observer-based estimate of the proportion of the fishable Chinook population that was of legal size and marked (i.e., the former "Method 2" approach; WDFW 2011). Given that this approach yields negatively biased estimates if anglers release any of the legal-marked Chinook they encounter, we then applied Conrad and McHugh's bias correction factor to account for this phenomenon (13%) and incorporated it into the estimator (See **Appendix A** for complete computational details).

We estimated total Chinook mortality resulting from the 2013 Chinook MSF by applying assumed mortality rates to the total harvest and release estimates for the four size/mark-status groups (LM, LU, SM, and SU). For retained Chinook, the mortality estimate was equivalent to the total harvest estimate for the applicable size/mark-status group. We applied a selective fishing mortality (*sfm*) rate of 14% to legal (marked and unmarked) and sublegal (marked and unmarked) release totals, to estimate release mortality in the ocean (the same ocean *sfm* value used in FRAM). See **Appendix A** for a complete description of our impact estimation procedure, including formulae for total and variance estimators.

The final step of our overall impacts assessment involved comparing fishery outcomes to pre-season expectations. To do this, we compared season-total estimates of Chinook encounters and mortalities to pre-season modeled values (FRAM model run no. 1213) for each size and mark status category.

Table 1. Sampling/estimation details on target parameters associated with the overall mark-selective Chinook fishery monitoring program in Washington coastal Areas 1 through 4.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); retained and released fish[1]	Catch rates (CPUE); length, age, and CWT composition of harvest	Boat trip; kept fish; reported fish release	Week	Within weeks, estimates are also produced by strata (weekday/weekend).
Onboard observation and VTRs	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook	Chinook length, age, and DNA-based stock composition; species composition of non-Chinook encounters	Fish encounter	Season	Too few encounters occurred to assess mark rates on a finer time scale.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	N/A	Season	The temporal resolution of impact estimates is constrained by that of the observer encounters data.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

[1/] Under the "bias-corrected Method-2" approach, Chinook releases can be estimated only as finely as onboard observer data allow.

3.6 CWT Impacts

To understand the potential effects of the 2013 recreational mark-selective Chinook fishery in the ocean on the CWT program, we estimated the total number of unmarked-tagged Chinook mortalities that may have occurred during the course of the fishery. To do this, we acquired information for all marked CWT double index tag (DIT) groups present in landed catch from the Pacific States Marine Fisheries Commission's Regional Mark Information System (RMIS) and then applied the methods described by the Pacific Salmon Commission's Selective Fisheries Evaluation Committee–Analysis Work Group (SFEC-AWG 2002) to estimate the number of unmarked DIT fish encountered[1]. We subsequently estimated the number of these fish that may have died due to hook-and-release impacts using an *sfm* analogous to that used in FRAM modeling. Given our interest in characterizing the impacts of mark-selective regulations on the CWT program and not recreational fishing in general, we used an *sfm* of 14% in all unmarked-DIT mortality calculations. The *sfm* value of 14% did not include unseen drop-off mortality (assumed to be 5% in FRAM) because drop-off mortality occurs in both selective and non-selective recreational Chinook fisheries.

[1] For all unmarked-DIT encounters and mortalities calculations, we relied on the unmarked-to-marked abundance ratio (λ) estimated for DIT groups at the time of juvenile release.

We estimated Chinook encounters and mortalities for each recovered DIT individually and then summed estimates for each hatchery, brood year, and area based on the methods described by SFEC-AWG 2002. Thus, the estimated number of unmarked mortalities was calculated as:

$$\hat{U}_a^{MSF} = \lambda^{REL} \hat{M}_a^{MSF} sfm$$

with associated variance:

$$Var(\hat{U}_a^{MSF}) \approx \left(\lambda^{REL}\right)^2 sfm^2 \hat{M}_a^{MSF} \frac{1-s}{s}.$$

where:

sfm = selective fishing mortality rate (10%, *excludes drop-off mortality*),
$U_{a,i}^{MSF}$ = aged *a* unmarked DIT mortalities from stock *i* in the selective fishery,
$M_{a,i}^{MSF}$ = aged *a* marked DIT mortalities from stock *i* in the selective fishery,
s = sampling rate of the catch,
λ^{REL} = unmarked-to-marked ratio *at release* for fish in a DIT group
$Var(U_{a,i}^{MSF})$ = variance of $U_{a,i}^{MSF}$.

In addition to estimating unmarked-DIT mortalities, we pooled all CWTs (DIT and otherwise) recovered during the fishery and, based on this total, report the proportional contribution (unexpanded recoveries) of different hatcheries to the total Chinook harvest (See CWT Results below).

4. RESULTS IN 2013 CHINOOK MARK SELECTIVE RECREATIONAL FISHERY

4.1 Dockside Sampling Results

WDFW dockside samplers interviewed an estimated 38% of all anglers fishing in Washington coastal Areas 1 through 4 during the 2013 mark-selective Chinook fishery; a total of 3,015 anglers in 950 boats were enumerated in-sample (**Table 2**). In addition, an estimated 42% (1,078) of all Chinook harvested in Washington ocean Areas 1 through 4 were sampled, and 269 coded wire tags (CWTs) were collected in Washington's coastal ports. (**Table 2**).

Estimates of Fishing Effort and Chinook Catch

An estimated 8,383 angler trips (7,976 from Washington, 407 from Oregon) were completed by private and charter anglers during the 2013 coastwide Chinook MSF. These anglers harvested a total of 2,780 Chinook coastwide (2,586 WA, 194 OR) (**Table 3**). Landed Chinook catch totaled 35% of the overall fishery quota of 8,000.

A total of 9,087 Chinook encounters were estimated in Washington ocean waters during the 2013 mark-selective Chinook fishery, for CRC Areas 1 through 4 combined (**Table 4**). This total consisted of an estimated 2,586 retained (2,563 marked, 23 unmarked) and 6,501 released (2,467 marked, 4,034 unmarked) Chinook salmon.

CWT Samples

Of a total of 269 coded-wire tags recovered from Chinook salmon sampled dockside during the 2013 mark-selective Chinook fishery in Washington coastal Areas 1 through 4, a total of 246 proved readable. Observed (unexpanded) stock composition results for these in-sample tag recoveries are presented by area in **Tables 5A** through **5D** for Areas 1 through 4, respectively.

In Area 1, samplers recovered a total of 118 readable CWTs, 48% of the CWTs recovered in all four areas combined. The majority of these recoveries (56%) were from California. Columbia River hatcheries made up most of the remaining recoveries, with 19% from Upper Columbia River hatcheries, 14% from Snake River hatcheries, 8% from Lower Columbia River hatcheries and 3% from Central Columbia River hatcheries. The remaining recoveries were from Oregon (1%) hatcheries (**Table 5A**). Four of the CWT recoveries in Area 1 were from double index tag (DIT) release groups.

In Area 2, samplers recovered a total of 96 readable CWTs, 39% of the total tags recovered in all four ocean areas combined. The majority of these recoveries (58%) were from Columbia River hatcheries, with 24% from Upper Columbia River hatcheries, 19% from Snake River hatcheries, 9% from Central Columbia River hatcheries, and 6% from Lower Columbia River hatcheries. The remaining recoveries were from California (34%), Washington (2%) and British Columbia (5%) hatcheries (**Table 5B**). Fourteen of the CWT recoveries in Area 2 were from double index tag (DIT) release groups.

In Area 3, samplers recovered a total of 9 readable CWTs, 4% of the total tags recovered in all four ocean areas combined. The majority of these recoveries (44%) were from California hatcheries, 33% were from Columbia River hatcheries (11% from Upper Columbia River hatcheries, 22% from Snake River hatcheries) and 22% from British Columbia hatcheries (**Table 5C**). No CWT recoveries in Area 3 were from a double index tag (DIT) release group.

In Area 4, samplers recovered a total of 23 readable CWTs, 9% of the total tags recovered in all four ocean areas combined. The majority of these recoveries (52%) were from Columbia River hatcheries (17% from Upper Columbia River hatcheries, 26% from Central Columbia River hatcheries, 4% from Lower Columbia River hatcheries, and 4% from Snake River hatcheries). The remaining recoveries were from Washington (39%) California (4%), and British Columbia (4%) hatcheries (**Table 5D)**. Six of the CWT recoveries in Area 4 were from a double index tag (DIT) release group.

Table 2. Dockside sampling statistics during the 2013 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

	Boats Sampled	Sample Rate	Anglers Sampled	Sample Rate	Landed Chinook Sampled	Sample Rate	Coded wire tags collected
Area 4	217	38%	604	38%	180	45%	29
Area 3	51	58%	134	54%	31	79%	11
Area 2	541	34%	1,749	32%	531	31%	106
Area 1	141	71%	528	75%	336	76%	123
Total WA	**950**	**39%**	**3,015**	**38%**	**1,078**	**42%**	**269**

Table 3. Estimates of total fishing effort and number of Chinook retained during the 2013 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

	Total Boat Trips	Total Angler Trips	**Estimated Chinook Retained**		
			Marked	Unmarked	TOTAL
Area 4	565	1,595	399	0	399
Area 3	87	247	39	0	39
Area 2	1,592	5,431	1,687	21	1,708
Area 1	197	703	438	2	441
TOTAL WA	**2,442**	**7,976**	**2,563**	**23**	**2,586**
TOTAL OR	N/A	407	194	0	194
Season Total:	**2,442**	**8,383**	**2,757**	**23**	**2,780**
Variance: [1/]	6,170	48,275	22,684	70	22,473
WA Standard Error:	79	220	151	8	150
WA CV (%):	3%	3%	6%	36%	6%
WA 95% CI:	2,288-2,596	7,545-8,407	2,267-2,858	7-40	2,292-2,880

[1/] Variance estimates are unavailable for Oregon statistics.

Table 4. Total estimates of fishing effort and the number of Chinook retained and released by mark status and by week, during the 2013 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4 combined.

Open Dates	Stat Week	Stratum Start Date	Stratum End Date	Effort		Retained Chinook		Released Chinook 1/		Chinook Encounters Total
				Boats	Anglers	AD	UM	AD	UM	
May 10 - June 28, 2013 (See area-specific regs)	19	10-May	11-May	182	609	67	0	64	105	236
	20	17-May	18-May	114	341	64	0	62	101	227
	23	8-Jun	9-Jun	183	774	189	0	182	300	672
	24	10-Jun	16-Jun	1,001	3,313	1,166	6	1,122	1,840	4,134
	25	17-Jun	23-Jun	773	2,484	976	18	939	1,527	3,459
	26	24-Jun	28-Jun	189	455	101	0	97	160	358
Season Total:				2,442	7,976	2,563	23	2,467	4,034	9,087
Variance:				6,170	48,275	22,684	70	158,942	102,165	548,827
Standard Error:				79	220	151	8	399	320	741
CV (%):				3.2%	2.8%	5.9%	35.7%	16.2%	7.9%	8.2%
95% CI:				2,288-2,596	7,545-8,407	2,267-2,858	7-40	1,686-3,248	3,407-4,660	7,635-10,539

[1/] Released Chinook were estimated as the difference between total Chinook encounters generated using the bias-corrected "Method 2" estimator (see Conrad and McHugh 2008) and creel-based estimates of retained Chinook.

Table 5. Summary of coded-wire tags recovered from Chinook salmon harvested in Washington coastal areas during the 2013 mark-selective Chinook fishery. The field "Number DITs" corresponds to the number of tags that belonged to double-index tag groups. Percentages in parentheses indicate the proportional contribution (unexpanded recoveries) of different hatcheries to the total Chinook harvest.

Table 5A. Area 1 CWT recoveries.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
Columbia River (43.2%)	Upper Columbia R (above McNary Dam; excludes Snake River) (18.6%)	Wenatchee R 45.0030	Dryden Pond	4 (3.4%)	0
		Methow R 48.0002	Carlton Acclimation Pond	2 (1.7%)	0
		Chelan R 47.0052	Chelan River NP	1 (0.8%)	0
		Columbia Near Wells	Wells Hatchery	2 (1.7%)	0
		Col R @ Priest Rapids	Priest Rapids Hatchery	2 (1.7%)	2
		Col R @ Turtle Rock	Turtle Rock Hatchery	5 (4.2%)	0
		Similkameen R 490325	Similkameen Hatchery	4 (3.4%)	0
		Chelan R 47.0052	Chelan Falls Hatchery	1 (0.8%)	0
		Springs Cr 36.0114	Ringold Springs Hatchery	1 (0.8%)	0
	Central Columbia River (Bonneville Dam to McNary Dam) (3.4%)	Klickitat Hatchery (YKFP)	Klickitat Hatchery (YKFP)	1 (0.8%)	0
		Umatilla R	Bonneville Hatchery	1 (0.8%)	1
		Ltl White Salmon @ NFH	Ltl White Salmon NFH	2 (1.7%)	0
	Lower Columbia River (mouth to Bonneville Dam) (7.6%)	Cowlitz R 26.0002	Cowlitz Salmon Hatch	2 (1.7%)	0
		Lewis R - NF 27.0168	NA	1 (0.8%)	0
		Kalama R 27.0002	Kalama Falls Hatchery	1 (0.8%)	0
		Cedar Cr #1 (SANDY R)	Sandy Hatchery	1 (0.8%)	0
		Klaskanine R, S Fk	Klaskanine S Fk Pond	1 (0.8%)	0
		Mckenzie R 1	McKenzie Hatchery	1 (0.8%)	1
		Clackamas R	Clackamas Hatchery	1 (0.8%)	0
		Tanner Cr (Bonneville)	Bonneville Hatchery	1 (0.8%)	0
	Snake River (13.6%)	Luke's Gulch A F	NPT Hatchery	1 (0.8%)	0
		Big Canyon Accl Pond	Lyons Ferry Hatchery	2 (1.7%)	0
		Grande Ronde R 1	Irrigon Hatchery	1 (0.8%)	0
		Captain Johns Pd	Lyons Ferry Hatchery	4 (3.4%)	0
		Couse Cr 35.2147	Lyons Ferry Hatchery	1 (0.8%)	0
		Magrudor Corridor	NPT Hatchery	1 (0.8%)	0
		Snake R @ Pitt. Lndg	Lyons Ferry Hatchery	3 (2.5%)	0
		NPT Hatchery	NPT Hatchery	1 (0.8%)	0
		Lyons Ferry Rel.Site	Lyons Ferry Hatchery	2 (1.7%)	0
Oregon (0.8%)	Northern Oregon Coast (0.8%)	Nestucca R	Cedar Cr Hatchery	1 (0.8%)	0
California (55.9%)	Central California Coast (28.8%)	Santa Cruz Harbor Net Pen	Feather R Hatchery	4 (3.4%)	0
		San Pablo Bay Net Pens	Feather R Hatchery	12 (10.2%)	0
		Mare Island Net Pen	Coleman NFH	3 (2.5%)	0

		Mare Island Net Pen	Feather R Hatchery	1 (0.8%)	0
		Wickland Oil Net Pen	Nimbus Fish Hatchery	2 (1.7%)	0
		Wickland Oil Net Pen	Feather R Hatchery	12 (10.2%)	0
	Sacramento River (22%)	Coleman NFH	Coleman NFH	9 (7.6%)	0
		American R @ Sunrise	Nimbus Fish Hatchery	4 (3.4%)	0
		Feather Boyds Pump Ramp	Feather R Hatchery	8 (6.8%)	0
		Sac R @ Discovery Park	Nimbus Fish Hatchery	5 (4.2%)	0
	San Joaquin River (5.1%)	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	5 (4.2%)	0
		San Joaq Shrm Isl Op Jrsy	Mok R Fish Ins	1 (0.8%)	0
			Total	**118**	**4**

Table 5B. Area 2 CWT recoveries.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
B.C. (5.2%)	Fraser River – Thompson River (5.2%)	Shuswap R Middle	Shuswap River, Middle	1 (1%)	0
		Chilliwack R	Chilliwack River H	3 (3.1%)	3
		Shuswap R Low	Shuswap River, Middle	1 (1%)	0
WA (2.1%)	Hood Canal (2.1%)	Purdy Cr 16.0005	George Adams Hatchery	1 (1%)	1
		Finch Cr 16.0222	Hoodsport Hatchery	1 (1%)	0
Columbia River (58.3%)	Upper Columbia R (above McNary Dam; excludes Snake River) (24%)	Chelan R 47.0052	Chelan River NP	3 (3.1%)	0
		Col R @ Turtle Rock	Turtle Rock Hatchery	1 (1%)	0
		Columbia Near Wells	Wells Hatchery	2 (2.1%)	0
		Chelan R 47.0052	Chelan Falls Hatchery	2 (2.1%)	0
		Similkameen R 490325	Similkameen Hatchery	8 (8.3%)	0
		Wenatchee R 45.0030	Dryden Pond	6 (6.2%)	0
		Methow R 48.0002	Carlton Acclimation Pond	1 (1%)	0
	Central Columbia River (Bonneville Dam to McNary Dam) (9.4%)	Ltl White Salmon @ NFH	Ltl White Salmon NFH	2 (2.1%)	0
		Umatilla R	Bonneville Hatchery	1 (1%)	1
		Spring Cr 29.0159	Spring Cr NFH	5 (5.2%)	5
		Umatilla R	Umatilla Hatchery	1 (1%)	1
	Lower Columbia River (mouth to Bonneville Dam) (6.2%)	Big Cr (Lower Col R)	Big Cr Hatchery	2 (2.1%)	2
		Cedar Cr #1 (Sandy R)	Sandy Hatchery	1 (1%)	0
		Fallert Cr 27.0017	Fallert Cr Hatchery	1 (1%)	0
		McKenzie R 1	McKenzie Hatchery	1 (1%)	1
		Cowlitz R 26.0002	Cowlitz Salmon Hatchery	1 (1%)	0
	Snake River (18.8%)	Captain Johns Pd	Lyons Ferry Hatchery	3 (3.1%)	0
		Luke's Gulch A F	NPT Hatchery	2 (2.1%)	0
		Big Canyon Accl Pond	Lyons Ferry Hatchery	2 (2.1%)	0
		Snake L. Mon - Ltl Goos	Lyons Ferry Hatchery	3 (3.1%)	0
		Snake R @ Pitt. Landing	Lyons Ferry Hatchery	3 (3.1%)	0

		Snake @ Hells Canyon Dam	Oxbow Hatchery	1 (1%)	0
		Magrudor Corridor	NPT Hatchery	1 (1%)	0
		Lyons Ferry Rel. Site	Lyons Ferry Hatchery	1 (1%)	0
		Couse Cr 35.2147	Lyons Ferry Hatchery	2 (2.1%)	0
CA (34.4%)	Klamath River – Trinity River (1%)	Iron Gate Hatchery	Iron Gate Hatchery	1 (1%)	0
	Central California Coast (18.8%)	Wickland Oil Net Pen	Feather R Hatchery	5 (5.2%)	0
		Wickland Oil Net Pen	Nimbus Fish Hatchery	2 (2.1%)	0
		Mare Island Net Pen	Coleman NFH	1 (1%)	0
		San Pablo Bay Net Pens	Feather R Hatchery	5 (5.2%)	0
		Santa Cruz Harbor Net Pen	Feather R Hatchery	4 (4.2%)	0
		Tiburon Net Pens	Petaluma R United Ang Hat	1 (1%)	0
	Sacramento River (9.4%)	Coleman NFH	Coleman NFH	6 (6.2%)	0
		Feather Boyds Pump Ramp	Feather R Hatchery	1 (1%)	0
		Sac R @ Discovery Park	Nimbus Fish Hatchery	2 (2.1%)	0
	San Joaquin River (5.2%)	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	4 (4.2%)	0
		San Joaq Shrm Isl Op Jrsy	Mok R Fish Ins	1 (1%)	0
			Total	**96**	**14**

Table 5C. Area 3 CWT recoveries.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
B.C. (22.2%)	Fraser River – Thompson River (22.2%)	Harrison R	Chehalis River H	1 (11.1%)	0
		Shuswap R Low	Shuswap River, Middle	1 (11.1%)	0
Columbia River (33.3%)	Upper Columbia R (above McNary Dam; excludes Snake River) (11.1%)	Wenatchee R 45.0030	Dryden Pond	1 (11.1%)	0
	Snake River (22.2%)	Snake R @ Pitt. Landing	Lyons Ferry Hatchery	2 (22.2%)	0
CA (44.4%)	Central California Coast (33.3%)	Mare Island Net Pen	Nimbus Fish Hatchery	1 (11.1%)	0
		Wickland Oil Net Pen	Feather R Hatchery	2 (22.2%)	0
	San Joaquin River (11.1%)	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	1 (11.1%)	0
			Total	**9**	**0**

Table 5D. Area 4 CWT recoveries.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
B.C. (4.3%)	Fraser River – Thompson River (4.3%)	Harrison R	Chehalis River H	1 (4.3%)	0
WA (39.1%)	Northern Washington (8.7%)	Nooksack R NF 01.0120	Kendall Creek Hatchery	1 (4.3%)	1
		East Sound Bay (SAN)	Glenwood Springs	1 (4.3%)	0
	Hood Canal (13%)	John Cr 16.0253	RFEG 6 Hood Canal	1 (4.3%)	0
		Purdy Cr 16.0005	George Adams Hatchery	1 (4.3%)	1
		Finch Cr 16.0222	Hoodsport Hatchery	1 (4.3%)	0
	Mid Puget Sound (17.4%)	Gorst Cr 15.0216	Gorst Cr Rearing Pond	2 (8.7%)	0
		Grovers Cr Hatchery	Grovers Cr Hatchery	1 (4.3%)	1
		VoightCr Tr 10.0428	Voights Cr Hatchery	1 (4.3%)	0
Columbia River (52.2%)	Upper Columbia R (above McNary Dam; excludes Snake River) (17.4%)	Columbia Near Wells	Wells Hatchery	1 (4.3%)	0
		Col R @ Turtle Rock	Turtle Rock Hatchery	1 (4.3%)	0
		Chelan R 47.0052	Chelan Falls Hatchery	1 (4.3%)	0
		Wenatchee R 45.0030	Dryden Pond	1 (4.3%)	0
	Central Columbia River (Bonneville Dam to McNary Dam) (26.1%)	Spring Cr 29.0159	Spring Cr NFH	1 (4.3%)	1
		Ltl White Salmon @ NFH	Ltl White Salmon NFH	5 (21.7%)	2
	Lower Columbia River (mouth to Bonneville Dam) (4.3%)	Tanner Cr (Bonneville)	Bonneville Hatchery	1 (4.3%)	0
	Snake River (4.3%)	Couse Cr 35.2147	Lyons Ferry Hatchery	1 (4.3%)	0
CA (4.3%)	Central California Coast (4.3%)	Mare Island Net Pen	Colemans NFH	1 (4.3%)	0
			Total	**23**	**6**

4.2 On-water Observations of Chinook Encounters

On-Board Observer Data

WDFW's observer staff conducted 15 on-the-water catch surveys onboard charter boats during the 2013 selective Chinook fishery. Observers recorded a total of 257 encountered Chinook salmon in all four ocean areas combined. The size/mark status composition of these Chinook encounters is presented in **Table 6**. The following size/mark group composition was estimated from the 257 encounters: 26% LM, 31% LU, 25% SM, and 18% SU.

These estimated size/mark group proportions based on onboard observer data were combined with those estimated from our VTR data and used in subsequent impact estimation steps, as discussed further in the section below titled *Estimated Chinook Encounters and Mortalities* (see **Table 10** and **Appendix A)**. The decision to combine these data was based on *i)* the short duration of the fishery and the limited numbers of fish encountered during on-water observer trips, *ii)* the potential for differences in fishing patterns between charter and private vessels and the desire to represent both patterns, and *iii)* the lack of representation of catch in Areas 3 and 4 in the observer data.

DNA Results

Chinook DNA samples were collected only by onboard observers who had access to both marked and unmarked Chinook encounters during the 2013 Chinook MSF. A total of 127 DNA samples were collected from legal sized Chinook and 108 from sublegal sized Chinook during the fishery (**Table 7**).

VTR Data

Additional on-the-water encounters data was provided via angler-completed voluntary trip reports (VTRs). Dockside samplers collected 125 completed and useable VTRs containing 445 Chinook encounters (**Table 8**). Chinook encounters of unknown size and/or unknown mark status were excluded in determining the size/mark status composition results based on VTR data, yielding a useable sample size of 397 Chinook encounters for Areas 1-4 combined. The following size/mark group composition was estimated from these 397 useable encounters: 37% LM, 28% LU, 21% SM, and 14% SU. The VTR data were used in conjunction with observer data in subsequent fishery-wide impacts estimation steps (i.e., **Appendix A**).

We also combined the onboard observer- and VTR-based encounters data to compare observed (field-estimated) mark rates in each area with preseason FRAM-predicted values. The combined onboard observer and VTR data indicated mark rates of 53% for legal sized Chinook and 60% for sublegal sized Chinook coast-wide (**Table 9**).

Table 6. Summary of on-water Chinook encounters data by size and mark group, collected by WDFW observers sampling onboard charter boats during the 2013 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

	Total Observer Trips	OBSERVER DATA LEGAL SIZED			SUBLEGAL SIZED			UNKNOWN SIZE		
		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	3	19	20	0	13	13	0	0	0	0
Area 3	0	-	-	-	-	-	-	-	-	-
Area 2	7	19	22	0	13	6	0	0	0	0
Area 1	5	28	37	0	39	28	0	0	0	0
TOTAL	**15**	**66**	**79**	**0**	**65**	**47**	**0**	**0**	**0**	**0**
Size/Mark Comp 1/		25.7%	30.7%	-	25.3%	18.3%	-	-	-	-

1/ Chinook encounters of unknown size and/or unknown mark status were excluded in determining the overall size/mark status composition.

Table 7. Number of Chinook DNA samples collected by WDFW observers onboard charter vessels during the 2013 mark-selective Chinook fishery in Washington coastal Areas 1-4.

	LEGAL SIZED			SUBLEGAL SIZED		
	Marked	Unmarked	Total	Marked	Unmarked	Total
Area 4	14	18	32	9	12	21
Area 3	0	0	0	0	0	0
Area 2	19	19	38	13	6	19
Area 1	22	35	57	39	28	67
TOTAL	**56**	**71**	**127**	**64**	**44**	**108**

Table 8. Summary of on-water Chinook encounters by size class and mark status, as reported on angler-completed voluntary trip reports (VTRs) during the 2013 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

	Total VTRs Collected	VOLUNTARY TRIP REPORT DATA LEGAL SIZED			SUBLEGAL SIZED			UNKNOWN SIZE		
		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	23	22	13	0	3	12	0	0	0	0
Area 3	11	9	5	1	3	1	1	0	0	0
Area 2	69	84	51	3	55	26	9	2	2	1
Area 1	22	31	42	0	24	16	28	0	1	0
TOTAL	**125**	**146**	**111**	**4**	**85**	**55**	**38**	**2**	**3**	**1**
Size/Mark Comp 1/		36.8%	28.0%	-	21.4%	13.9%	-	-	-	-

1/ Chinook encounters of unknown size and/or unknown mark status were excluded in determining the overall size/mark status composition based on VTR data.

Table 9. Estimated mark rates for legal- and sublegal-sized Chinook during 2013 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4, based on onboard observer and VTR data combined, compared with FRAM preseason predicted values.

	LEGAL SIZED			SUBLEGAL SIZED			FRAM preseason projected mark rate (legal sized)
	Marked	Unmarked	Mark Rate	Marked	Unmarked	Mark Rate	
Area 4	41	33	55%	16	25	39%	89%
Area 3	9	5	64%	3	1	-	89%
Area 2	103	73	59%	68	32	68%	55%
Area 1	59	79	43%	63	44	59%	79%
TOTAL	**212**	**190**	**53%**	**150**	**102**	**60%**	

4.3 Overall Fishery Impacts

Estimated Total Chinook Encounters and Mortalities

We derived size/mark-status group-specific estimates of Chinook encounters from a combination of the dockside sampling results (i.e., retained harvest estimates presented in **Tables 2** and **4**) and the on-water observer and VTR based size/mark-status composition data (**Tables 6 and 8**; see **Appendix A** for computational details). In total, we estimated that anglers fishing in Washington coastal Areas 1 through 4 (combined) encountered 2,946 LM, 2,640 LU, 2,084 SM, and 1,417 SU Chinook during the 2013 selective Chinook fishery (**Table 10**). Given the estimates of harvest and the assumed selective fishing mortality (*sfm*) mortality rate of 0.14 for both legal-sized and sublegal-sized Chinook, these encounters translated into a total of 3,496 estimated Chinook mortalities (2,586 retained and 910 released; 2,616 LM, 390 LU, 292 SM, and 198 SU) in ocean Areas 1 through 4 combined (**Table 10**). Of the total estimated mortalities, 73% were attributed to retention of legal-size marked Chinook.

FRAM versus Creel Comparison

Field estimated Chinook encounters and mortalities are compared with those projected in the final preseason FRAM model run (FRAM number 1213) in **Tables 11** and **12**. These comparisons are illustrated in **Figure 2**. FRAM projections include encounters and mortalities in Oregon waters; however, field estimated total encounters and mortalities are not available for Oregon waters. Oregon landed catch comprised 7% of the total landed catch in the ocean Chinook MSF. Both field estimates of encounters and mortalities were less than those projected in preseason FRAM model run 1213 for both legal and sublegal marked and unmarked Chinook (**Tables 11** and **12**, **Figure 2**).

Estimated CWT-DIT Impacts

Of the 246 decoded coded-wire tags recovered during the 2013 ocean mark-selective Chinook fishery in Areas 1-4 combined, a total of 24 belonged to double-index tag (DIT) release groups (**Table 13**). Based on the release details associated with these tags and their unmarked sister groups, we obtained an estimate of the unmarked-to-marked ratio (λ) at juvenile release for each applicable hatchery of origin and brood year, and we used this value to estimate total unmarked DIT encounters for the entirety of the 2013 selective Chinook fishery in the four areas. In total, we estimated that 51 unmarked-DIT Chinook were encountered during the fishery. Given an

assumed *sfm* rate of 0.14 for the estimated unmarked DIT fish that were encountered and released, we estimate that 7 unmarked DIT fish may have died as a result of the 2013 ocean selective Chinook fishery (**Table 13**).

Table 10. Summary of the fishery impact estimates for the 2013 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

Size/Mark Group	Encounters	Number Retained	Number Released	Release Mortality Rate	Release Mortality	Total Mortality	Variance	SE	95% CI	CV (%)
Legal Marked	2,946	2,563	383	0.14	54	2,616	24,798	157	2,308-2,925	6%
Legal Unmarked	2,640	23	2,616	0.14	366	390	1,487	39	314-465	10%
Sublegal Marked	2,084	0	2,084	0.14	292	292	1,001	32	230-354	11%
Sublegal Unmarked	1,417	0	1,417	0.14	198	198	586	24	151-246	12%
TOTAL ALL GROUPS	9,087	2,586	6,501	0.14	910	3,496	27,871	167	3,169-3,823	5%

Table 11. Comparison of modeled (FRAM model run #1213) and estimated total Chinook encounters in the 2013 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

Data Source	Group	Total Encounters 1/	Legal	Sublegal	Landed Only (WA + OR)
FRAM Encounters (WA and OR)	Unmarked	9,122	6,293	2,829	126
	Marked	13,321	9,050	4,271	7,874
	Total	22,443	15,343	7,100	8,000
	% Marked	59%	59%	60%	98%
Estimated (Creel) Encounters (WA only)	Unmarked	4,057	2,640	1,417	23
	Marked	5,030	2,946	2,084	2,757
	Total	9,087	5,585	3,501	2,780
	% Marked	55%	53%	60%	99%

[1/] Field estimates of Chinook encounters by size class and mark status are not available for Oregon waters; landed catch includes Oregon.

Table 12. Comparison of modeled (FRAM model run #1213) and estimated total Chinook mortalities in the 2013 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

	FRAM Chinook Mortalities (WA + OR)			**Estimated Chinook Mortalities 1/ (WA only)**		
Mortality Category	Unmarked	Marked	Total	Unmarked	Marked	Total
Total (Landed + Released)	1,385	8,637	10,022	588	3,102	3,690
Released Legal	863	165	1,028	366	54	420
Released Sublegal	396	598	994	198	292	490
Landed Only (WA + OR)	126	7,874	8,000	23	2,757	2,780

[1/] Field estimates of Chinook mortalities by size class and mark status are not available for Oregon waters; landed catch includes Oregon.

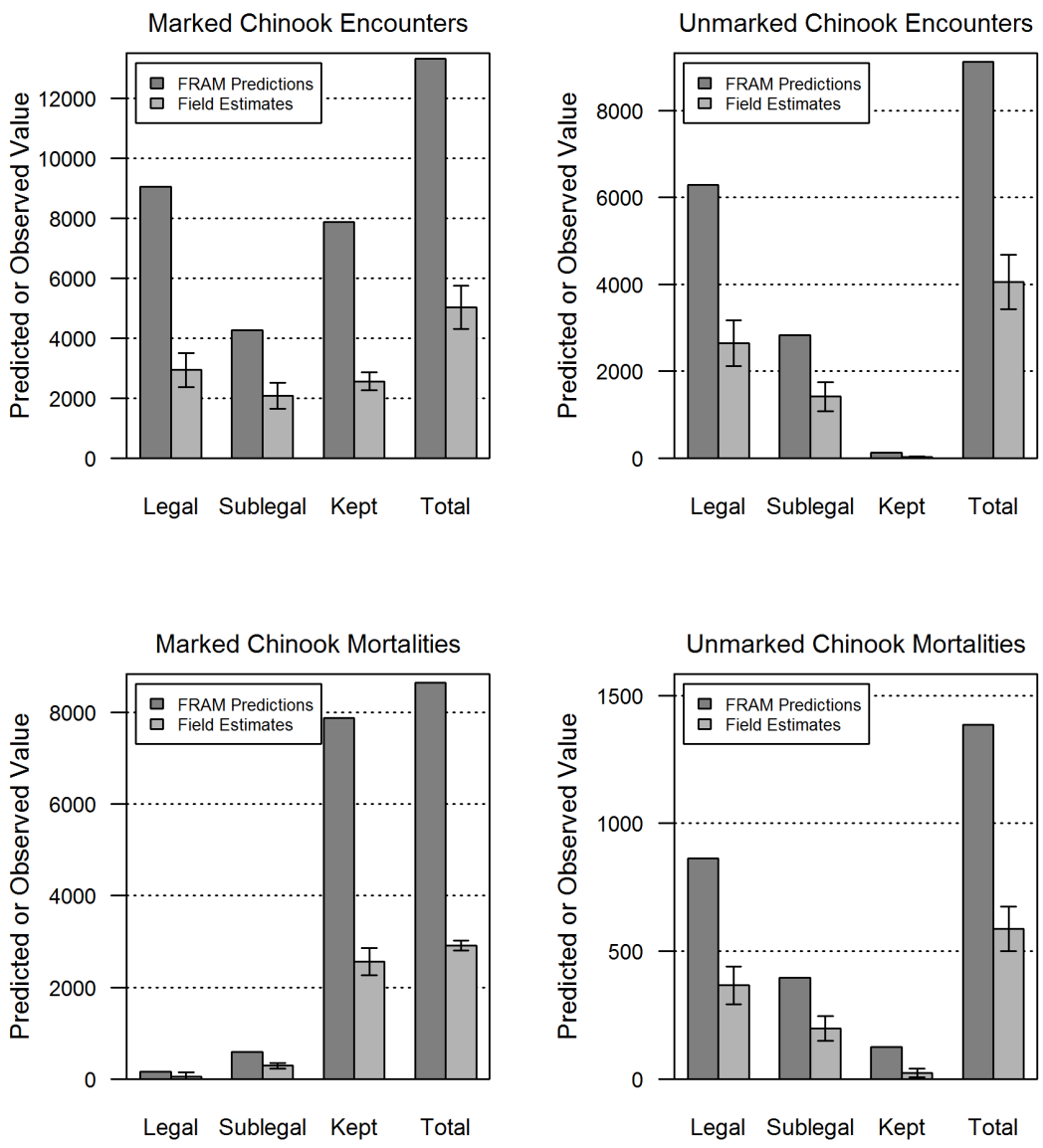

Figure 2. Comparison of modeled (i.e., using FRAM, model run 1213) and estimated total Chinook encounters (*top panel*) and mortalities (*bottom panel*) for the 2013 mark-selective Chinook fisheries in Washington coastal Areas 1-4.

Table 13. Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2013 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

Area	Hatchery	Brood Year	DITs Obs	AD DIT Harvest		UM DIT Enc	UM DIT Mortality		
				Est	var(Est)		Est	var(Est)	SE(Est)
1	Bonneville Hatchery	2009	1	1.3	0.4	1.8	0.2	0.015	0.1
	McKenzie Hatchery	2009	1	1.3	0.4	0.0	0.0	0.000	0.0
	Priest Rapids Hatchery	2010	2	2.6	0.8	2.6	0.4	0.016	0.2
	Total		**4**	**5.2**	**1.6**	**4.4**	**0.6**	**0.031**	**0.3**
2	Big Creek Hatchery	2010	1	3.2	7.1	3.2	0.5	0.140	0.4
	Big Creek Hatchery	2011	1	3.2	7.1	1.1	0.2	0.016	0.1
	Bonneville Hatchery	2008	1	3.2	7.1	5.3	0.7	0.384	0.6
	George Adams Hatchery	2010	1	3.2	7.1	3.3	0.5	0.145	0.4
	Chilliwack River Hatchery	2010	3	9.6	21.4	4.7	0.7	0.100	0.5
	McKenzie Hatchery	2009	1	3.2	7.1	0.05	0.01	0.000	0.0
	Spring Creek NFH	2010	4	12.9	28.5	12.8	1.8	0.556	1.5
	Spring Creek NFH	2011	1	3.2	7.1	3.1	0.4	0.134	0.4
	Umatilla Hatchery	2010	1	3.2	7.1	0.01	0.00	0.000	0.0
	Total		**14**	**45.0**	**99.8**	**33.7**	**4.7**	**1.475**	**3.9**
4	George Adams Hatchery	2010	1	2.2	2.7	2.3	0.3	0.055	0.2
	Grovers Creek Hatchery	2009	1	2.2	2.7	2.1	0.3	0.049	0.2
	Kendall Creek Hatchery	2010	1	2.2	2.7	2.1	0.3	0.050	0.2
	Ltl White Salmon NFH	2009	2	4.4	5.4	4.5	0.6	0.108	0.5
	Spring Creek NFH	2009	1	2.2	2.7	2.2	0.3	0.053	0.2
	Total		**6**	**13.3**	**16.2**	**13.2**	**1.9**	**0.314**	**1.4**
Grand Total (All WA Ocean Areas)			**24**	**63.5**	**117.6**	**51.3**	**7.2**	**1.820**	**5.6**

Table 14. Season-total estimates of Chinook encounters by size/mark status, and total estimates of angler effort, summarized for all seasons to date in the Spring mark-selective Chinook fisheries in Washington coastal Areas 1 through 4.

Year	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
2010	10,004	4,981	19	0	0	744	2,620	1,892	946	11,202
2011	4,895	2,301	35	0	0	344	1,247	2,759	1,462	8,146
2012	7,853	7,339	43	0	0	1,097	3,531	1,771	1,453	15,234
2013	7,976	2,563	23	0	0	383	2,616	2,084	1,417	9,087

5. RESULTS IN THE ALL-SPECIES COHO MARK SELECTIVE RECREATIONAL FISHERY

5.1 Dockside Sampling Results

An estimated 70,284 angler trips (64,888 from Washington, 5,396 from Oregon) were completed by private and charter anglers during the 2013 coastwide all-species coho MSF. These anglers harvested a total of 26,551 Chinook coastwide (24,896 WA, 1,655 OR) and 44,612 coho (40,763 WA, 3,849 OR). **Table 15** shows effort and catch by month and area during the 2013 coho MSF. Note that effort and catch from the non-mark-selective fishery in September in Areas 1 and 2 are not included in this analysis.

WDFW dockside samplers interviewed an estimated 37% of all anglers fishing from WA coastwide during the coho MSF. A total of 38% of all Chinook and 39% of all coho harvested in WA were sampled; 1,493 coded wire tags (CWTs) were collected from sampled Chinook and 1,931 were collected from sampled coho in WA ports (**Table 16**).

5.2 On-water Observation and VTR Results

OSP observer staff conducted a total of 38 on-the-water catch surveys during the all-species coho mark-selective fishery and encountered a total of 136 legal sized Chinook, 208 sublegal sized Chinook, 943 legal sized coho, and 36 sublegal sized coho. Dockside samplers also collected 469 completed and useable VTRs containing 1,184 legal sized Chinook encounters, 1,087 sublegal sized Chinook encounters, 3,458 legal sized coho encounters, and 159 sublegal sized coho encounters (**Tables 17 and 18**). Mark rates calculated from onboard observer and VTR data are shown in **Table 19** and compared to preseason FRAM coho mark rate projections.

5.3 Overall Fishery Impacts

Estimated Total Coho Encounters and Mortalities

FRAM pre-season projections of coho encounters (Washington and Oregon) in the 2013 ocean recreational all-species coho mark-selective fisheries are compared with field estimated encounters (Washington only) in **Table 20**. **Table 21** compares total coho mortality projected pre-season by FRAM (Washington and Oregon) with field estimated coho mortality (Washington only).

The overall impacts of the 2013 recreational mark-selective coho fishery in ocean Areas 1-4 are characterized in terms of grand-total estimates of coho encounters and mortalities and by using estimates specific to mark group (i.e., marked and unmarked). The method described in section 3.4 was used to generate total estimates of retained catch by mark group. To estimate coho salmon encounters and releases by mark group, we applied Conrad's (2012) proposed alternative method for estimating coho encounters and release mortalities in ocean mark-selective fisheries, which independently calculates charter and private vessel totals based on observer and VTR data. This method differs from that used prior to 2012.

Field estimated marked and unmarked coho retention is calculated from dockside sampling data as described in Section 3.4; note that since catch estimates are stratified by week, monthly total proportions of marked and unmarked retained estimated catch may vary slightly from monthly total proportions of marked and unmarked sampled coho. Encounters are calculated by boat type and area based on landed catch of legal sized marked coho, the proportion of observed encounters that were legal sized marked coho, and the proportion of observed encounters that were legal sized marked coho retained. Mortality was estimated for each mark group based on calculated encounters and the proportion of the legal sized coho of that mark status that were released multiplied by the PFMC ocean *sfm* rate of 14% (Conrad, 2012).

Figure 3 summarizes the projected and field estimated coho encounters and mortality by area in the all-species fishery. Note that projected encounters and mortality includes the Oregon portion of the fishery while estimated statistics do not.

Field estimates of both coho encounters and total mortality were lower than projected preseason in Catch Areas 1, 2 and 4. Estimated coho encounters and total mortality were higher than projected preseason in Catch Area 3, as in-season quota transfers allowed total catch in Area 3 greater than preseason expectations. Total coastwide estimates of encounters and mortality were less than those projected preseason.

Compliance

Table 22 reports compliance rates observed by dockside samplers for the recreational fisheries by area and month. Coastwide, compliance with selective fishery regulations averaged over 99%, similar to that observed in the last nine seasons.

5.4 DNA Data Collection

A total of 2,365 DNA samples were collected from Chinook by onboard and dockside samplers during the summer all-species recreational fishery. **Table 23** describes the numbers of samples by size class, mark status, and method of collection.

Table 15. Estimates of total fishing effort and number of Chinook and coho retained during the 2013 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	TOTAL ANGLER TRIPS						CHINOOK RETAINED						COHO RETAINED					
	June	July	August	Sept	Oct	**TOTAL**	June	July	August	Sept	Oct	**TOTAL**	June	July	August	Sept	Oct	**TOTAL**
Area 4	934	7,399	5,044	391	-	**13,768**	364	3,267	2,142	74		**5,846**	257	3,082	2,934	233		**6,506**
Area 3	123	971	2,267	420	236	**4,016**	64	693	1,288	152	119	**2,316**	57	439	2,015	269	18	**2,798**
Area 2	1,589	7,641	16,639	881	-	**26,750**	484	3,403	7,021	326		**11,234**	379	3,097	12,233	856		**16,566**
Area 1	2,140	4,833	13,381	-	-	**20,355**	859	1,356	3,284	-	-	**5,499**	2,287	4,007	8,599	-	-	**14,893**
TOTAL WA	**4,786**	**20,844**	**37,332**	**1,691**	**236**	**64,888**	**1,771**	**8,719**	**13,734**	**553**	**119**	**24,896**	**2,980**	**10,626**	**25,782**	**1,358**	**18**	**40,763**
OREGON (Area 1)	1,178	1,338	2,880	-	-	**5,396**	538	323	794	0	-	**1,655**	1,141	991	1,717	-	-	**3,849**
TOTAL NOF	**5,964**	**22,182**	**40,212**	**1,691**	**236**	**70,284**	**2,309**	**9,042**	**14,528**	**553**	**119**	**26,551**	**4,121**	**11,617**	**27,499**	**1,358**	**18**	**44,612**
WA Variance: 1/						637,172						366,518						467,714
WA SE:						798						605						684
WA CV (%):						1%						2%						2%
WA 95% CI:						63,324-66,453						23,709-26,082						39,422-42,103

[1/] Variance estimates are unavailable for Oregon statistics.

Table 16. WA dockside sampling statistics during the 2013 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	Anglers Sampled	Sample Rate	Landed Chinook Sampled	Sample Rate	Landed Coho Sampled	Sample Rate	Chinook CWTs collected	Coho CWTs collected
Area 4	4,937	36%	2,137	37%	2,483	38%	254	258
Area 3	2,680	67%	1,579	68%	1,830	65%	179	190
Area 2	9,117	34%	3,510	31%	4,824	29%	574	615
Area 1	7,500	37%	2,286	42%	6,943	47%	486	868
TOTAL WA	**24,234**	**37%**	**9,512**	**38%**	**16,080**	**39%**	**1,493**	**1,931**

Table 17. On-board and VTR Chinook encounters by size class and mark status in the 2013 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

		On-board observation							VTRs						
			LEGAL-SIZED			SUBLEGAL-SIZED				LEGAL-SIZED			SUBLEGAL-SIZED		
		Total Observer Trips	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Total VTRs Collected	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	June	0	0	0	0	0	0	0	4	8	20	0	8	9	1
	July	0	0	0	0	0	0	0	102	177	47	2	131	106	12
	August	0	0	0	0	0	0	0	45	130	128	2	58	2	2
	September	0	0	0	0	0	0	0	5	4	0	0	16	10	0
	TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**156**	**319**	**195**	**4**	**213**	**127**	**15**
Area 3	June	0	0	0	0	0	0	0	6	4	5	0	0	2	0
	July	0	0	0	0	0	0	0	44	80	82	0	58	53	0
	August	0	0	0	0	0	0	0	36	38	74	0	21	15	1
	September	0	0	0	0	0	0	0	17	2	10	0	11	11	0
	TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**103**	**124**	**171**	**0**	**90**	**81**	**1**
Area 2	June	1	1	1	0	2	4	0	14	20	9	1	0	2	0
	July	10	30	27	0	21	10	0	65	25	51	6	14	25	3
	August	9	17	24	0	11	11	0	59	33	44	0	11	15	5
	September	0	0	0	0	0	0	0	11	6	8	0	12	1	1
	TOTAL	**20**	**48**	**52**	**0**	**34**	**25**	**0**	**149**	**84**	**112**	**7**	**37**	**43**	**9**
Area 1	June	2	1	2	0	4	5	0	36	36	37	1	15	24	3
	July	9	9	12	0	37	39	0	14	15	16	2	65	107	10
	August	7	6	6	0	41	22	1	11	31	25	5	98	122	27
	September	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	**18**	**16**	**20**	**0**	**82**	**66**	**1**	**61**	**82**	**78**	**8**	**178**	**253**	**40**

Table 18. On-board and VTR coho encounters by size class and mark status in the 2013 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

		On-board observation							VTRs						
		Total Observer Trips	LEGAL-SIZED			SUBLEGAL-SIZED			Total VTRs Collected	LEGAL-SIZED			SUBLEGAL-SIZED		
			Marked	Unmarked	Unknown	Marked	Unmarked	Unknown		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	June	0	0	0	0	0	0	0	4	10	11	2	0	0	0
	July	0	0	0	0	0	0	0	102	252	390	1	5	9	0
	August	0	0	0	0	0	0	0	45	197	353	0	4	4	1
	September	0	0	0	0	0	0	0	5	6	25	0	5	2	0
	TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**156**	**465**	**779**	**3**	**14**	**15**	**1**
Area 3	June	0	0	0	0	0	0	0	6	10	15	0	1	1	0
	July	0	0	0	0	0	0	0	44	118	216	0	3	9	0
	August	0	0	0	0	0	0	0	36	156	271	0	2	7	0
	September	0	0	0	0	0	0	0	17	56	104	0	2	4	0
	TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**103**	**340**	**606**	**0**	**8**	**21**	**0**
Area 2	June	1	4	1	0	1	1	0	14	6	8	0	0	0	0
	July	10	100	134	0	2	3	0	65	75	101	1	2	2	3
	August	9	128	161	0	1	1	0	59	140	247	1	1	12	0
	September	0	0	0	0	0	0	0	11	20	26	0	2	0	0
	TOTAL	**20**	**232**	**296**	**0**	**4**	**5**	**0**	**149**	**241**	**382**	**2**	**5**	**14**	**3**
Area 1	June	2	36	14	0	0	0	0	36	84	34	0	10	4	4
	July	9	108	81	0	2	2	1	14	120	94	0	8	4	2
	August	7	83	93	0	20	1	1	11	164	143	1	32	13	1
	September	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	**18**	**227**	**188**	**0**	**22**	**3**	**2**	**61**	**368**	**271**	**1**	**50**	**21**	**7**

Table 19. Estimated Chinook and coho mark rates during the 2013 all-species recreational fishery (coho mark-selective) by size class using onboard observer and VTR encounters.

		LEGAL SIZED CHINOOK			SUBLEGAL SIZED CHINOOK			LEGAL SIZED COHO			FRAM Projected
		Observer	VTR	Combined	Observer	VTR	Combined	Observer	VTR	Combined	Coho Mark Rate
Area 4	June	-	-	-	-	-	-	-	-	-	
	July	-	79%	79%	-	55%	55%	-	39%	39%	44%
	August	-	50%	50%	-	97%	97%	-	36%	36%	41%
	September	-	100%	100%	-	62%	62%	-	19%	19%	41%
	TOTAL	**-**	**62%**	**62%**	**-**	**63%**	**63%**	**-**	**37%**	**37%**	**42%**
Area 3	June	-	-	-	-	-	-	-	-	-	
	July	-	49%	49%	-	52%	52%	-	35%	35%	47%
	August	-	34%	34%	-	58%	58%	-	37%	37%	48%
	September	-	17%	17%	-	50%	50%	-	35%	35%	38%
	TOTAL	**-**	**42%**	**42%**	**-**	**53%**	**53%**	**-**	**36%**	**36%**	**46%**
Area 2	June	50%	69%	68%	33%	0%	25%	80%	43%	53%	52%
	July	53%	33%	41%	68%	36%	50%	43%	43%	43%	51%
	August	41%	43%	42%	50%	42%	46%	44%	36%	40%	47%
	September	-	43%	43%	-	-	-	-	-	-	40%
	TOTAL	**48%**	**43%**	**45%**	**58%**	**46%**	**51%**	**44%**	**39%**	**41%**	**46%**
Area 1	June	33%	49%	49%	44%	38%	40%	72%	-	71%	58%
	July	43%	48%	46%	49%	38%	41%	57%	56%	57%	56%
	August	50%	55%	54%	65%	45%	49%	47%	53%	51%	52%
	September	-	-	-	-	-	-	-	-	-	51%
	TOTAL	**44%**	**51%**	**50%**	**55%**	**41%**	**45%**	**55%**	**58%**	**56%**	**53%**

Table 20. Comparison of modeled (FRAM model run #1323, includes Washington and Oregon) and estimated (Washington only) total coho encounters in the 2013 ocean coho mark-selective fishery.

Data Source	Area	Marked	Unmarked	Total Encounters	Landed Catch
FRAM (WA and OR)	Area 4	8,021	10,867	18,888	7,781
	Area 3	2,008	2,329	4,337	1,940
	Area 2	28,616	33,475	62,091	27,660
	Area 1	38,883	34,331	73,214	37,380
	TOTAL	**77,528**	**81,002**	**158,530**	**74,761**
Estimated Actual Encounters (WA only)	Area 4	6,731	10,774	17,505	6,506
	Area 3	3,088	6,370	9,458	2,798
	Area 2	17,477	25,080	42,557	16,566
	Area 1	14,946	11,641	26,587	14,893
	TOTAL	**42,242**	**53,865**	**96,107**	**40,763**
Variance:		1,349,048	2,657,604	7,676,488	467,714
Standard Error:		1,161	1,630	2,771	684
CV (%):		3%	3%	3%	2%
95% CI:		39,965-44,518	50,670-57,060	90,677-101,538	39,422-42,103

Table 21. Comparison of modeled (FRAM model run #1323, includes Washington and Oregon) and estimated (Washington only) total coho mortalities in the 2013 ocean coho mark-selective fishery.

		Release Mortality		**Drop Off Mortality a/**		**Landed Catch**		
Data Source	Area	Marked	Unmarked	Marked	Unmarked	Marked	Unmarked	Total Mortality
FRAM (WA and OR)	Area 4	67	1,550	403	564	7,555	226	10,365
	Area 3	17	331	101	120	1,893	47	2,509
	Area 2	241	4,754	1,435	1,732	26,966	694	35,822
	Area 1	328	4,923	1,950	1,794	36,661	719	46,375
	TOTAL	**653**	**11,558**	**3,889**	**4,210**	**73,075**	**1,686**	**95,071**
Estimated Actual Mortality (WA only)	Area 4	64	1,507	337	539	6,274	232	8,952
	Area 3	43	892	154	318	2,783	15	4,205
	Area 2	151	3,496	874	1,254	16,396	170	22,341
	Area 1	20	1,627	747	582	14,819	74	17,869
	TOTAL	**278**	**7,521**	**2,112**	**2,693**	**40,272**	**490**	**53,367**
Variance:		1,311	66,696	3,373	6,644	464,036	3,678	-
Standard Error:		36	258	58	82	681	61	-
CV (%):		13%	3%	3%	3%	2%	12%	-
95% CI:		207-349	7,014-8,027	1,998-2,226	2,533-2,853	38,937-41,608	372-609	-

a/ Observed drop off mortality calculated as 5% of observed encounters.

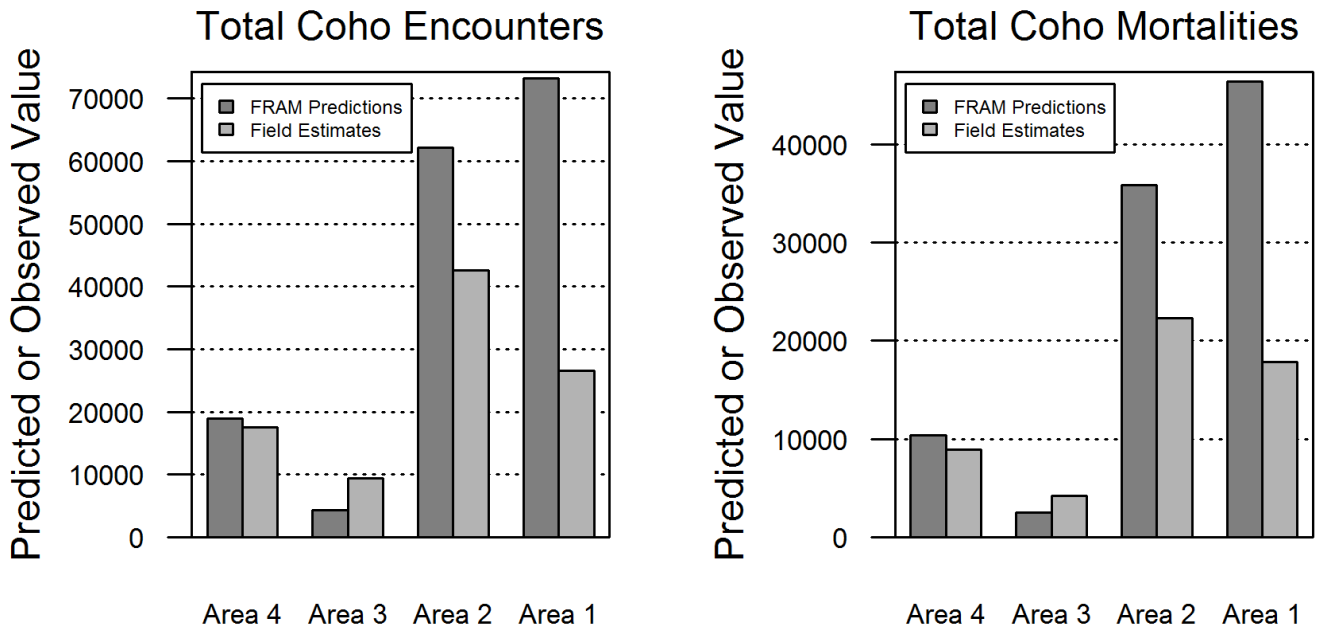

Figure 3. Comparison of modeled (FRAM model run #1323, includes Washington and Oregon) and estimated (Washington only) total coho encounters and mortality in the 2013 all-species recreational fishery (coho mark-selective).

Table 22. Compliance with coho selective fishery regulations observed during dockside sampling interviews in the 2013 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

		Total Coho Sampled	Marked Coho Sampled	Unmarked Coho Sampled	% Sampled Coho Marked
Area 4	June	91	79	12	86.8%
	July	1,201	1,164	37	96.9%
	August	1,050	1,025	25	97.6%
	September	141	135	6	95.7%
	Total	**2,483**	**2,403**	**80**	**96.8%**
Area 3	June	46	46	-	-
	July	357	354	3	99.2%
	August	1,146	1,142	4	99.7%
	Sept./Oct.	281	278	3	98.9%
	Total	**1,830**	**1,820**	**10**	**99.5%**
Area 2	June	113	112	1	99.1%
	July	1,134	1,126	8	99.3%
	August	3,084	3,060	24	99.2%
	September	493	490	-	-
	Total	**4,824**	**4,788**	**36**	**99.3%**
Area 1	June	1,377	1,374	3	99.8%
	July	2,846	2,830	16	99.4%
	August	2,720	2,710	10	99.6%
	September	-	-	-	-
	Total	**6,943**	**6,914**	**29**	**99.6%**

Table 23. Number of Chinook DNA samples collected by onboard and dockside samplers from the 2013 ocean recreational all-species fishery, by size class, mark status, and sample type.

		On-Board Sampling						Dockside Sampling			Total Number of DNA Samples
		Legal Sized			Sublegal Sized			Legal-Sized			
		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	
Area 4	June	-	-	-	-	-	-	9	5	0	14
	July	-	-	-	-	-	-	138	98	3	239
	August	-	-	-	-	-	-	48	57	1	106
	September	-	-	-	-	-	-	8	5	0	13
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**203**	**165**	**4**	**358**
Area 3	June	-	-	-	-	-	-	2	3	0	5
	July	-	-	-	-	-	-	54	55	0	109
	August	-	-	-	-	-	-	31	115	0	146
	Sept./Oct.	-	-	-	-	-	-	10	25	0	35
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**97**	**198**	**0**	**290**
Area 2	June	1	0	0	4	0	0	59	32	1	97
	July	30	27	0	20	9	0	181	119	0	386
	August	12	23	0	10	9	0	142	132	1	329
	September	-	-	-	-	-	-	41	52	0	93
	Total	**43**	**50**	**0**	**34**	**18**	**0**	**423**	**335**	**2**	**905**
Area 1	June	1	2	0	3	5	0	35	35	0	81
	July	13	14	0	51	49	0	108	115	0	350
	August	5	5	0	40	23	0	114	100	0	287
	September	-	-	-	-	-	-	30	45	0	75
	Total	**19**	**21**	**0**	**94**	**77**	**0**	**287**	**295**	**0**	**793**

6. RESULTS IN THE ALL-SPECIES COHO MARK SELECTIVE NON-TREATY COMMERCIAL TROLL FISHERY

The non-Treaty commercial troll fishery harvested a total of 17,968 Chinook (17,295 WA, 673 OR) and 6,467 coho (6,041 WA, 426 OR) during the 2013 coastwide all-species coho MSF operating July through September. **Table 24** shows catch by month and area.

WDFW dockside samplers sampled a total of 33% of all Chinook and 34% of all coho harvested and landed in WA. Coded wire tag collections totaled 696 from Chinook and 217 from coho in WA ports (**Table 25**).

Table 26 details numbers of Chinook DNA samples collected in WA by month and area, including during the non mark-selective spring Chinook fishery. A total of 1,846 DNA samples were collected from Chinook by dockside samplers throughout the May – September non-Treaty troll fishery (1,104 in May-June, 742 in July-September).

Table 24. Total Chinook and coho retained during the 2013 all-species non-Treaty commercial troll fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	Chinook				**Coho**			
	July	August	September	TOTAL	July	August	September	TOTAL
Area 4	1,900	87	-	1,987	279	30	-	309
Area 3	2,396	1,806	-	4,202	1,054	792	-	1,846
Area 2	3,520	6,796	690	11,006	559	2,942	258	3,759
Area 1	42	19	39	100	28	80	19	127
TOTAL WA	**7,858**	**8,708**	**729**	**17,295**	**1,920**	**3,844**	**277**	**6,041**
OREGON (Area 1)	136	224	313	673	39	269	118	426
TOTAL NOF	**7,994**	**8,932**	**1,042**	**17,968**	**1,959**	**4,113**	**395**	**6,467**

Table 25. Chinook and coho sampled in WA during the 2013 all-species non-Treaty commercial troll fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	Chinook			**Coho**		
	Total Sampled	Sample Rate	CWTs Collected	Total Sampled	Sample Rate	CWTs Collected
Area 4	698	35%	93	92	30%	9
Area 3	1,051	25%	103	583	32%	65
Area 2	3,812	35%	493	1,362	36%	141
Area 1	67	67%	7	29	23%	2
TOTAL WA	**5,628**	**33%**	**696**	**2,066**	**34%**	**217**

Table 26. Number of chinook DNA samples collected from the 2013 non-treaty troll fishery by size class, mark status.

AREA	MONTH	Dockside Sampling			Total Number of DNA Samples
		Legal-Sized			
		Marked	Unmarked	Unknown	
Area 4	May	85	136	0	221
	June	-	-	-	0
	July	30	105	0	135
	August	2	18	0	20
	September	-	-	-	0
	Total	**117**	**259**	**0**	**376**
Area 3	May	82	123	0	205
	June	-	-	-	0
	July	43	110	0	153
	August	8	24	0	32
	September	-	-	-	0
	Total	**133**	**257**	**0**	**390**
Area 2	May	27	32	0	59
	June	168	164	0	332
	July	75	74	0	149
	August	48	127	0	175
	September	3	16	0	19
	Total	**321**	**413**	**0**	**734**
Area 1	May	29	28	0	57
	June	103	127	0	230
	July	19	13	0	32
	August	5	1	0	6
	September	6	15	0	21
	Total	**162**	**184**	**0**	**346**

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APPENDICES

Appendix A. Mark-selective fishery impact estimation details for the pilot recreational selective Chinook fishery in Washington coastal Areas 1 through 4.

Below are definitions and equations for all quantities used in estimating mark-selective fishery impacts from the combination of dockside creel survey information, on-water observer data, and/or voluntary trip report (VTR) results as applicable. The estimation sequence builds from monthly[2] estimators of encounters-by-class (i.e., the four size [legal, sublegal] × mark-status [marked, unmarked] groups) to season-wide impact estimates.

A. Total and Class-specific Encounters Estimation

The first step towards quantifying mark-selective fishery impacts by size/mark-status class is to estimate total Chinook encounters ($\hat{E}_i$, includes retained + released Chinook; See *Monthly Encounters* below) for each month of the fishery. Secondarily, encounters are apportioned to the appropriate size/mark-status group using encounters-composition data collected from onboard sampling on charter boats (See *Estimating Chinook Encounter Composition* on following page).

Monthly Encounters

$\hat{E}_i$ = Total Chinook encounters for month *i*, which is estimated by combining creel estimates of legal-marked Chinook harvest ($\hat{K}_{LM\,i}$, defined on subsequent page) with an estimate of the proportion of the fishable Chinook population that is of legal size and marked ($\hat{p}_{LM\,i}$, defined on subsequent page). Given the potential for negative bias in $\hat{E}_i$ if anglers release any of the legal-marked Chinook that they encounter, the $\hat{E}_i$ estimator also includes a "correction" to account for this phenomenon (i.e., 1-$p_{\text{LM-R}}$, where $p_{\text{LM-R}}$ is the estimated legal-marked Chinook release rate)[3]. $\hat{E}_i$ and its variance are estimated as:

$$(1) \qquad \hat{E}_i = \frac{\hat{K}_{LM}}{\left[\hat{p}_{LM}(1-p_{LM-R})\right]}$$

$$(2) \qquad \text{var}(\hat{E}_i) = \frac{1}{[(1-p_{LM-R})^2]} * \left[\frac{\hat{K}_{LM\,i}{}^2}{\hat{p}_{LM\,i}{}^2} * \left(\frac{\text{var}(\hat{K}_{LM\,i})}{\hat{K}_{LM\,i}{}^2} + \frac{\text{var}(\hat{p}_{LM\,i})}{\hat{p}_{LM\,i}{}^2} \right) \right]$$

[2] **Note:** For fisheries characterized by short-duration seasons (i.e., ~ 1 month), the "monthly" estimators described in this appendix are synonymous season-total estimators.

[3] Equations 1 and 2 were modified based on a 2008 state–tribal evaluation of sources of bias in estimates of total Chinook encounters in mark-selective fisheries. Based on a review of relevant data, the current operational $p_{\text{LM-R}}$ (combined intentional and unintentional LM Chinook release rate) applied in the bias-corrected $\hat{E}_i$ estimator is 0.13. See Conrad and McHugh (2008) for further detail.

Estimating Chinook Encounter Composition

$\hat{p}_{LMi}$ = the onboard observer (charter ride-along)-based estimate of the proportion of Chinook encounters that are legal-sized (*L*) and marked (*M*) during month *i*

$\hat{p}_{LUi}$ = the estimated proportion of encounters that are legal-sized (*L*) and unmarked (*U*)

$\hat{p}_{SMi}$ = the estimated proportion of encounters that are sublegal-sized (*S*) and unmarked (*M*)

$\hat{p}_{LUi}$ = the estimated proportion of encounters that are sublegal-sized (*S*) and unmarked (*U*)

For each *XY* combination (where *X* = *L* or *S* and *Y* = *M* or *U*), $\hat{p}_{XYi}$ and its variance is estimated as:

(3) $\hat{p}_{XYi} = n_{XYi} / n_i$, and

(4) $\text{var}(\hat{p}_{XYi}) = [\hat{p}_{XYi}(1-\hat{p}_{XYi})]/(n_i - 1)$,

Where, n_i = the total number of fish encountered by the onboard observers during month *i*.

Encounters by Size/Mark-status Class

$\hat{E}_{LMi}$ = estimated legal (*L*), marked (*M*) encounters during month *i*

$\hat{E}_{LUi}$ = estimated legal (*L*), unmarked (*U*) encounters during month *i*

$\hat{E}_{SMi}$ = estimated sublegal (*S*), marked (*M*) encounters during month *i*

$\hat{E}_{SUi}$ = estimated sublegal (*S*), marked (*U*) encounters during month *i*

For each *XY* combination (where *X* = *L* or *S* and *Y* = *M* or *U*) $\hat{E}_{XYi}$ and an estimate of its variance are obtained from:

(5) $\hat{E}_{XYi} = \hat{E}_i * \hat{p}_{XYi}$

(6) $\text{var}(\hat{E}_{XYi}) = \text{var}(\hat{E}_i) * \hat{p}_{XYi}^{\,2} + \hat{E}_i^{\,2} * \text{var}(\hat{p}_{XYi}) - \text{var}(\hat{E}_i) * \text{var}(\hat{p}_{XYi})$

B. Estimating Retained and Released Numbers by Size/Mark-status Class

Before total mortality can be estimated for each class (LM, SM, LU, SU), class-specific encounters must be separated into retention and release categories. First, given that harvest is estimated only to mark-status class for creel survey purposes, estimates of marked and unmarked Chinook retention must be assigned to size classes (See *Apportioned Estimates of Retention to Size Classes* on subsequent page); this is done using mark-status-specific size composition data from dockside sampling (See *Dockside Observations for Apportioning Retained Catch to Class* on subsequent page). Subsequently, size/mark-status group-specific releases are estimated as the difference between class-specific encounters and retention (See *Estimating Release Numbers by Class* on subsequent page).

Dockside Observations for Apportioning Retained Catch to Class

$\hat{d}_{LMK}$ = the estimated proportion of retained (kept, *K*), marked (*M*) Chinook salmon that were legal (*L*); based on *season-wide*[4] dockside observations of marked Chinook (as is $\hat{d}_{SMK}$)

$\hat{d}_{SMK}$ = the estimated proportion of retained (kept, *K*), marked (*M*) Chinook that were sublegal (*S*)

The proportion of retained, marked fish in size class *X* (*X* = *L* or *S*) and its variance are estimated as:

$$(7) \qquad \hat{d}_{XMK} = n_{XMK} / n_{MK}$$

$$(8) \qquad \text{var}(\hat{d}_{XMK}) = [\hat{d}_{XMK} * (1 - \hat{d}_{XMK})] / (n_{MK} - 1),$$

where n_{MK} and n_{XMK} are *season-wide* total dockside counts of marked fish and the subset of marked fish in size-class *X*, respectively.

$\hat{d}_{LUK}$ = the estimated proportion of retained (kept, *K*), unmarked (*U*) Chinook salmon that are legal (*L*); estimated from *season-wide* dockside observations of unmarked Chinook (as is $\hat{d}_{SUK}$)

$\hat{d}_{SUK}$ = the estimated proportion of retained (kept, *K*), unmarked (*U*) Chinook that are sublegal (*S*)

The proportions of retained, unmarked fish belonging to legal and sublegal size classes and their respective variances are estimated as above (Eqns. 7 and 8) but using *season-wide* dockside observations on unmarked (*U*), not marked Chinook salmon.

Apportioned Estimates of Retention to Size Classes

$\hat{K}_{LMi}$ = the estimated number of legal (*L*), marked (*M*) Chinook kept in month *i*

$\hat{K}_{LUi}$ = the estimated number of legal (*L*), unmarked (*U*) Chinook kept in month *i*

The number of kept, marked encounters, marked fish in size class *X* (*L* or *S*) and its variance is estimated as:

$$(9) \qquad \hat{K}_{XMi} = \hat{d}_{XMK} * \hat{N}_{MKi}$$

$$(10) \qquad \text{var}(\hat{K}_{XMi}) = \text{var}(\hat{N}_{MKi}) * \hat{d}_{XMK}^{\,2} + \hat{N}_{MKi}^{\,2} * \text{var}(\hat{d}_{XMK}) - \text{var}(\hat{N}_{MKi}) * \text{var}(\hat{d}_{XMK})$$

where $\hat{d}_{XMK}$ and its variance are from 6 and 7 above and $\hat{N}_{MKi}$ is the survey estimate of retained marked fish for month *i* defined in Eqn. 1.

$\hat{K}_{SMi}$ = estimated number of sublegal (*S*), marked (*M*) Chinook kept in month *i*

$\hat{K}_{SUi}$ = estimated number of sublegal (*S*), unmarked (*U*) Chinook kept in month *i*

[4] Due to small sample sizes for observed, harvested Chinook—particularly for sublegal and/or unmarked classes—dockside length data are pooled across the season to estimate $\hat{d}_{XYK}$.

The number of retained, unmarked fish belonging to legal and sublegal size classes is estimated according to Eqns. 9 and 10 above but using unmarked fish proportions and monthly retention estimates.

Estimating Release Numbers by Class

$\hat{R}_{LM\,i}$ = the estimated number of legal (*L*), marked (*M*) Chinook released in month *i*

$\hat{R}_{LU\,i}$ = the estimated number of legal (*L*), unmarked (*U*) Chinook released in month *i*

$\hat{R}_{SM\,i}$ = the estimated number of sublegal (*S*), marked (*M*) Chinook released in month *i*

$\hat{R}_{SU\,i}$ = the estimated number of sublegal (*S*), unmarked (*U*) Chinook released in month *i*

For each size/mark-status class (i.e., *XY* combination [*X* = *L* or *S* and *Y* = *M* or *U*]), the number of fish encountered and released is estimated as the difference between total size/mark-status class encounters ($\hat{E}_{XY\,i}$) and retention ($\hat{K}_{XY\,i}$) during month *i*. The estimator and its variance are:

$$\hat{R}_{XY\,i} = \hat{E}_{XY\,i} - \hat{K}_{XY\,i} \qquad (11)$$

$$\mathrm{var}(\hat{R}_{XY\,i}) = \mathrm{var}(\hat{E}_{XY\,i}) + \mathrm{var}(\hat{K}_{XY\,i}) \qquad (12)$$

C. Estimating Total (and Class-specific) Monthly and Season-wide Mortality

The application of assumed mortality rates (See *Assumed Mortality Rates for Retained and Released Chinook* below) to class-specific estimates of total retention and releases constitutes the final step in quantifying mark-selective fishery impacts.

Assumed Mortality Rates for Retained and Released Chinook

m_K = retention mortality rate, 100% for all retained Chinook (reincarnation is rare among fishes)
sfm_L = release mortality rate for legal (*L*) Chinook, assumed to be a constant of 14% in ocean fisheries
sfm_S = release mortality rate for sublegal (*S*) Chinook, assumed to be a constant of 14% in ocean fisheries

Retention-mortality Estimates

$\hat{M}_{LMK\,i}$ = estimated mortality due to legal (*L*), marked (*M*) Chinook harvest in month *i* (= $\hat{K}_{LM\,i}$).

$\hat{M}_{LUK\,i}$ = estimated mortality due to harvest of legal (*L*), unmarked (*U*) Chinook in month *i* (= $\hat{K}_{LU\,i}$).

$\hat{M}_{SMK\,i}$ = estimated mortality due to harvest of sublegal (*S*), marked (*M*) Chinook in month *i* (= $\hat{K}_{SM\,i}$).

$\hat{M}_{SUK\,i}$ = estimated mortality due to harvest of sublegal (*S*), marked (*M*) Chinook in month *i* (= $\hat{K}_{SU\,i}$).

Release-mortality Estimates

$\hat{M}_{LMR\,i}$ = estimated post-release mortality for legal (*L*), marked (*M*) Chinook in month *i*

$\hat{M}_{LUR\,i}$ = estimated post-release mortality for legal (*L*), unmarked (*U*) Chinook in month *i*

$\hat{M}_{SMR_i}$ = estimated post-release mortality for sublegal (*S*), marked (*M*) Chinook in month *i*

$\hat{M}_{SUR_i}$ = estimated post-release mortality for sublegal (*S*), unmarked (*U*) Chinook in month *i*

All class-specific (*XY* [*X* = *L* or *S*, *Y* = *M* or *U*]) release mortality estimates are obtained from:

(13) $\hat{M}_{XYR_i} = \hat{R}_{XY_i} * sfm_Y$

(14) $\text{var}(\hat{M}_{XYR_i}) = \text{var}(\hat{R}_{XY_i}) * sfm_Y{}^2$

Season-wide Total and Class-specific Mortality Estimation

$\hat{M}_{total}$ = total season-wide Chinook salmon mortality; this parameter and its variance [$\text{var}(\hat{M}_{total})$] are computed as the sum of all monthly retention and release mortality estimates [i.e., $\hat{M}_{total} = \sum_{i=1}^{\max i} (\hat{M}_{XYK_i} + \hat{M}_{XYR_i})$] and variances [$\text{var}(\hat{M}_{total}) = \sum_{i=1}^{\max i} [\text{var}(\hat{M}_{XYK_i}) + \text{var}(\hat{M}_{XYR_i})]$], respectively, for all four size/mark-status groups (*X* = *L* or *S*, *Y* = *M* or *U*). Season total estimates for subgroups of interest (e.g., unmarked, sublegal Chinook, $\hat{M}_{SU-total}$) are obtained by summing monthly estimates (and variances) across the season for just that group.

D. Characterizing Precision of Estimates

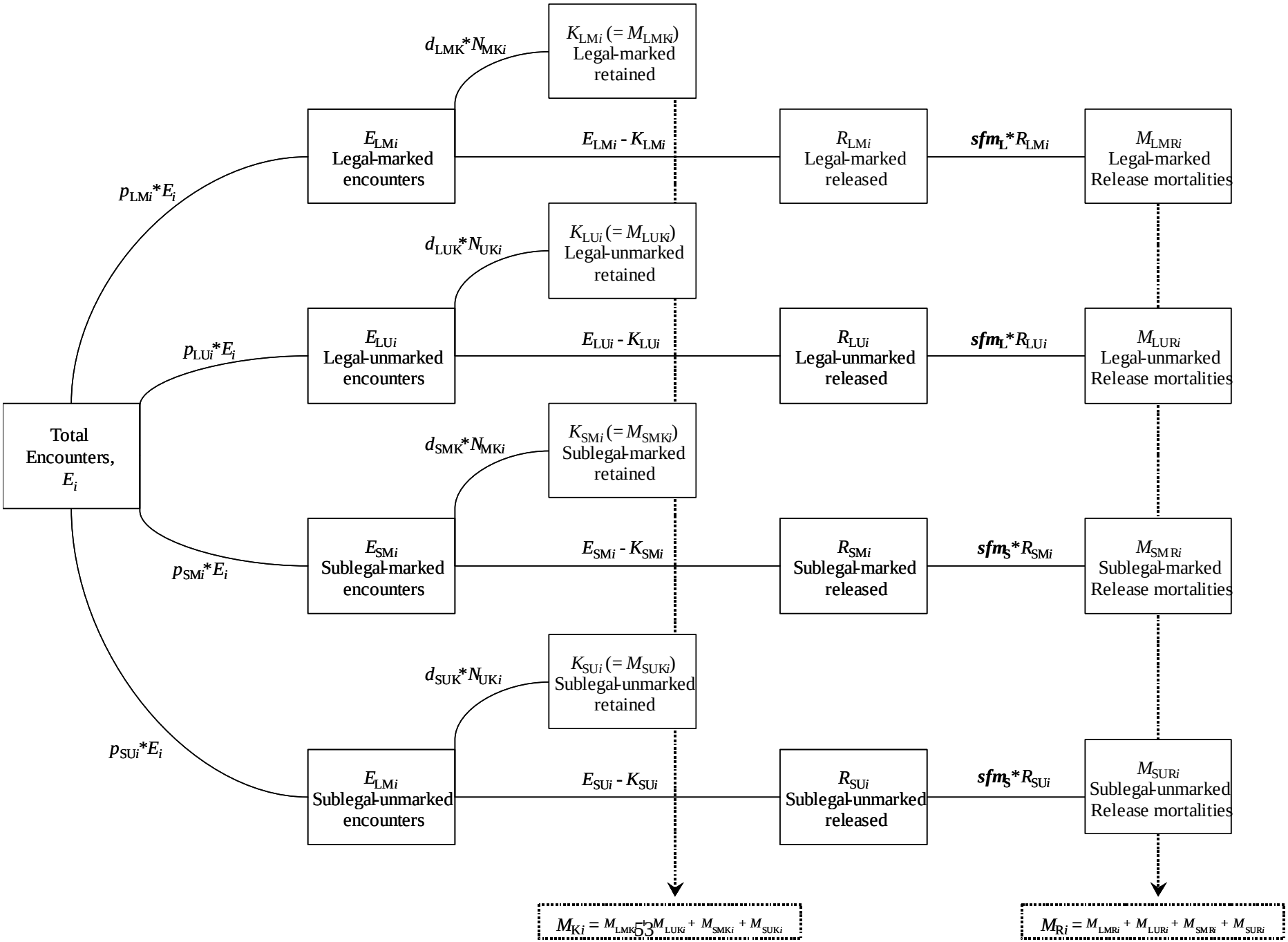
The precision of estimates generated from creel surveys and the preceding fishery impact estimation scheme is characterized using estimates of a parameter's standard error (*SE*), coefficient of variation (*CV* or relative standard error), and approximate 95% confidence interval. For any parameter estimate $\hat{\theta}$ (e.g., $\hat{M}_{total}$, $\hat{K}_{LM_i}$, $\hat{E}_i$, etc.), these metrics are estimated using:

(15) $SE(\hat{\theta}) = \sqrt{\text{var}(\hat{\theta})}$

(16) $CV(\hat{\theta}) = [SE(\hat{\theta}) / \hat{\theta}] * 100$

(17) $CI = \hat{\theta} \pm 1.96 * SE(\hat{\theta})$

Figure A1. (*On following page*) Graphical representation of the approach used to estimate monthly encounters and mortalities by size/mark-status category in mark-selective Chinook fisheries. Boxes depict abundance estimates (encounters, mortalities) whereas the mathematical operations depicted on intermediate connector lines are estimator formulae yielding quantities found in subsequent boxes (moving from left to right). Parameter definitions, complete formulae, and variances are defined in the preceding pages. For short-duration fisheries (~ 1 month or less), monthly and season-total values are equivalent; for all others, season-total impacts are equivalent to the sum of monthly impact estimates (and variances).


Total Encounters, E_i
$p_{LMi}*E_i$
E_{LMi} Legal-marked encounters
$E_{LMi} - K_{LMi}$
K_{LMi} (= M_{LMKi}) Legal-marked retained
$d_{LMK}*N_{MKi}$
R_{LMi} Legal-marked released
sfm_L*R_{LMi}
M_{LMRi} Legal-marked Release mortalities
$p_{LUi}*E_i$
E_{LUi} Legal-unmarked encounters
$E_{LUi} - K_{LUi}$
K_{LUi} (= M_{LUKi}) Legal-unmarked retained
$d_{LUK}*N_{UKi}$
R_{LUi} Legal-unmarked released
sfm_L*R_{LUi}
M_{LURi} Legal-unmarked Release mortalities
$p_{SMi}*E_i$
E_{SMi} Sublegal-marked encounters
$E_{SMi} - K_{SMi}$
K_{SMi} (= M_{SMKi}) Sublegal-marked retained
$d_{SMK}*N_{MKi}$
R_{SMi} Sublegal-marked released
sfm_S*R_{SMi}
M_{SMRi} Sublegal-marked Release mortalities
$p_{SUi}*E_i$
E_{LMi} Sublegal-unmarked encounters
$E_{SUi} - K_{SUi}$
K_{SUi} (= M_{SUKi}) Sublegal-unmarked retained
$d_{SUK}*N_{UKi}$
R_{SUi} Sublegal-unmarked released
sfm_S*R_{SUi}
M_{SURi} Sublegal-unmarked Release mortalities
$M_{Ki} = M_{LMKi} + M_{LUKi} + M_{SMKi} + M_{SUKi}$
$M_{Ri} = M_{LMRi} + M_{LURi} + M_{SMRi} + M_{SURi}$

Appendix B. Coded-wire tag (CWT) recovery data collected during dockside sampling activities in the June 2012 recreational mark-selective Chinook fishery in Washington coastal Marine Areas 1, 2, 3 and 4.

Area	Recovery Date	Tag Code	Brood Year	Release Site	RearingHatchery	Release Agency	DIT codes	FL (cm)	Label	Recovery Mark
1	6/8/2013	68768	2010	SAC R @ DISCOVERY PARK	NIMBUS FISH HATCHERY	CDFW		60	17590	AD
1	6/9/2013	635280	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		67	17001	AD
1	6/9/2013	55378	2010	MARE ISLAND NET PEN	COLEMAN NFH	FWS		62	17002	AD
1	6/9/2013	635087	2009	COL R @ TURTLE ROCK	TURTLE ROCK HATCHERY	WDFW		73	17003	AD
1	6/12/2013	635598	2010	WENATCHEE R 45.0030	DRYDEN POND	WDFW		59	7703	AD
1	6/12/2013	220315	2009	CAPTAIN JOHNS PD	LYONS FERRY HATCHERY	NEZP		68	7704	AD
1	6/12/2013	68769	2010	AMERICAN R @ SUNRISE	NIMBUS FISH HATCHERY	CDFW		65	7705	AD
1	6/12/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		64	7706	AD
1	6/12/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		62	7707	AD
1	6/12/2013	68752	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		59	17005	AD
1	6/12/2013	220321	2010	CAPTAIN JOHNS PD	LYONS FERRY HATCHERY	NEZP		60	17006	AD
1	6/12/2013	635579	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		64	17007	AD
1	6/13/2013	90390	2009	MCKENZIE R 1	MCKENZIE HATCHERY	ODFW		75	3335	AD
1	6/13/2013	68769	2010	AMERICAN R @ SUNRISE	NIMBUS FISH HATCHERY	CDFW		70	3336	AD
1	6/13/2013	68757	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		61	3337	AD
1	6/14/2013	68768	2010	SAC R @ DISCOVERY PARK	NIMBUS FISH HATCHERY	CDFW		71	3338	AD
1	6/15/2013	90324	2009	SPRINGS CR 36.0114	RINGOLD SPRINGS HATCHERY	WDFW		73	3339	AD
1	6/15/2013	635372	2009	METHOW R 48.0002	CARLTON ACCLIMATION POND	WDFW		74	3340	AD
1	6/15/2013	635273	2010	COWLITZ R 26.0002	COWLITZ SALMON HATCH	WDFW		58	3341	AD
1	6/15/2013	635095	2008	METHOW R 48.0002	CARLTON ACCLIMATION POND	WDFW		86	3342	AD
1	6/15/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		72	3343	AD
1	6/15/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		70	3344	AD
1	6/15/2013	635088	2009	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		76	3345	AD
1	6/15/2013	90348	2009	CLACKAMAS R	CLACKAMAS HATCHERY	ODFW		77	3346	AD
1	6/15/2013	55387	2010	COLEMAN NFH	COLEMAN NFH	FWS		64	3347	AD
1	6/15/2013	55394	2010	COLEMAN NFH	COLEMAN NFH	FWS		65	3348	AD

1	6/15/2013	68769	2010	AMERICAN R @ SUNRISE	NIMBUS FISH HATCHERY	CDFW		67	3349	AD
1	6/15/2013	68767	2010	SAC R @ DISCOVERY PARK	NIMBUS FISH HATCHERY	CDFW		65	3350	AD
1	6/15/2013	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		74	3351	AD
1	6/15/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		67	3352	AD
1	6/15/2013	635774	2010	CHELAN R 47.0052	CHELAN FALLS HATCHERY	WDFW		45	3353	AD
1	6/15/2013	220120	2010	CAPTAIN JOHNS PD	LYONS FERRY HATCHERY	NEZP		64	3354	UM
1	6/15/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		67	3355	AD
1	6/15/2013	68767	2010	SAC R @ DISCOVERY PARK	NIMBUS FISH HATCHERY	CDFW		66	3356	AD
1	6/15/2013	55437	2011	COLEMAN NFH	COLEMAN NFH	FWS		64	7022	AD
1	6/15/2013	635699	2010	COL R @ PRIEST RAPIDS	PRIEST RAPIDS HATCHERY	WDFW	635764, 635766, 635970, 635973, 635974	69	7708	AD
1	6/15/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		70	7709	AD
1	6/15/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		75	7711	AD
1	6/15/2013	68747	2010	MARE ISLAND NET PEN	FEATHER R HATCHERY	CDFW		67	7712	AD
1	6/15/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		62	7713	AD
1	6/15/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		65	7714	AD
1	6/15/2013	635577	2009	COL R @ TURTLE ROCK	TURTLE ROCK HATCHERY	WDFW		66	17008	AD
1	6/15/2013	90475	2010	CEDAR CR #1 (SANDY R)	SANDY HATCHERY	ODFW		56	17009	AD
1	6/15/2013	635979	2010	KLICKITAT HATCHERY (YKFP)	KLICKITAT HATCHERY (YKFP)	YAKA		68	17010	AD
1	6/15/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		66	17011	AD
1	6/15/2013	635196	2009	KALAMA R 27.0002	KALAMA FALLS HATCHRY	WDFW		73	17012	AD
1	6/15/2013	220322	2010	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		55	17013	AD
1	6/15/2013	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		79	17014	AD
1	6/15/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		64	17015	AD
1	6/15/2013	635371	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		63	17016	AD
1	6/15/2013	635694	2010	COWLITZ R 26.0002	COWLITZ SALMON HATCH	WDFW		60	17017	AD
1	6/15/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		63	17018	AD
1	6/15/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		68	17019	AD
1	6/15/2013	55395	2010	COLEMAN NFH	COLEMAN NFH	FWS		63	17020	AD
1	6/15/2013	68770	2010	WICKLAND OIL NET PEN	NIMBUS FISH HATCHERY	CDFW		68	17021	AD

1	6/15/2013	220316	2009	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		67	17023	AD
1	6/15/2013	54590	2010	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS		74	17301	AD
1	6/15/2013	90356	2009	UMATILLA R	BONNEVILLE HATCHERY	ODFW	090355	66	17302	AD
1	6/15/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		67	17303	AD
1	6/16/2013	220206	2010	MAGRUDOR CORRIDOR	NPT HATCHERY	NEZP		66	3357	AD
1	6/16/2013	90486	2010	TANNER CR (BNVILLE)	BONNEVILLE HATCHERY	ODFW		74	3358	AD
1	6/16/2013	68769	2010	AMERICAN R @ SUNRISE	NIMBUS FISH HATCHERY	CDFW		64	3359	AD
1	6/16/2013	55395	2010	COLEMAN NFH	COLEMAN NFH	FWS		72	3360	AD
1	6/16/2013	635999	2010	GRANDE RONDE R 1	IRRIGON HATCHERY	ODFW		61	3361	AD
1	6/16/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		64	3362	AD
1	6/16/2013	635997	2010	COUSE CR 35.2147	LYONS FERRY HATCHERY	WDFW		64	3363	AD
1	6/16/2013	220322	2010	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		56	3364	AD
1	6/16/2013	68674	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		61	3365	AD
1	6/16/2013	55380	2010	COLEMAN NFH	COLEMAN NFH	FWS		64	3366	AD
1	6/16/2013	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCHERY	WDFW		85	7715	AD
1	6/16/2013	55370	2010	COLEMAN NFH	COLEMAN NFH	FWS		68	7716	AD
1	6/16/2013	68752	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		66	7717	AD
1	6/16/2013	635578	2009	WENATCHEE R 45.0030	DRYDEN POND	WDFW		68	7718	AD
1	6/16/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		70	7719	AD
1	6/16/2013	55390	2010	COLEMAN NFH	COLEMAN NFH	FWS		72	7720	AD
1	6/16/2013	55371	2010	MARE ISLAND NET PEN	COLEMAN NFH	FWS		61	7721	AD
1	6/16/2013	68763	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		67	7722	AD
1	6/16/2013	68752	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		69	7723	AD
1	6/16/2013	90441	2010	KLASKANINE R S FK	KLASKANINE S FK POND	ODFW		63	7724	AD
1	6/16/2013	68770	2010	WICKLAND OIL NET PEN	NIMBUS FISH HATCHERY	CDFW		70	7725	AD
1	6/16/2013	635087	2009	COL R @ TURTLE ROCK	TURTLE ROCK HATCHERY	WDFW		63	17024	AD
1	6/16/2013	635699	2010	COL R @ PRIEST RAPIDS	PRIEST RAPIDS HATCHERY	WDFW	635764, 635766, 635970, 635973, 635974	57	17025	AD
1	6/16/2013	635897	2010	LEWIS R - NF 27.0168	NA	WDFW		58	17026	AD
1	6/16/2013	635375	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		77	17028	AD

1	6/16/2013	68767	2010	SAC R @ DISCOVERY PARK	NIMBUS FISH HATCHERY	CDFW		69	17029	AD
1	6/16/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		84	17308	AD
1	6/17/2013	93939	2010	NESTUCCA R	CEDAR CR HATCHERY	ODFW		61	3367	AD
1	6/17/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		61	3368	AD
1	6/17/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		58	3369	AD
1	6/17/2013	55373	2010	COLEMAN NFH	COLEMAN NFH	FWS		69	3370	AD
1	6/17/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		65	3371	AD
1	6/17/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		63	3372	AD
1	6/17/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		65	3373	AD
1	6/17/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		58	3374	AD
1	6/17/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		61	7727	AD
1	6/17/2013	220320	2010	CAPTAIN JOHNS PD	LYONS FERRY HATCHERY	NEZP		56	7728	AD
1	6/17/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		58	7729	AD
1	6/17/2013	55371	2010	MARE ISLAND NET PEN	COLEMAN NFH	FWS		72	17030	AD
1	6/17/2013	68674	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		65	17031	AD
1	6/17/2013	68752	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		67	17032	AD
1	6/17/2013	68752	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		66	17304	AD
1	6/17/2013	68763	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		68	17305	AD
1	6/18/2013	54590	2010	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS		68	17033	AD
1	6/18/2013	635579	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		75	17591	AD
1	6/21/2013	220117	2010	BIG CANYON ACCL POND	LYONS FERRY HATCHERY	NEZP		63	2919	AD
1	6/21/2013	220208	2010	LUKE'S GULCH A F	NPT HATCHERY	NEZP		71	2920	AD
1	6/21/2013	68763	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		67	2921	AD
1	6/21/2013	636080	2010	LYONS FERRY REL.SITE	LYONS FERRY HATCHERY	WDFW		56	3375	AD
1	6/21/2013	220209	2010	NPT HATCHERY	NPT HATCHERY	NEZP		60	3377	AD
1	6/21/2013	635272	2009	WENATCHEE R 45.0030	DRYDEN POND	WDFW		76	17034	AD
1	6/21/2013	68762	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		67	17035	AD
1	6/21/2013	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCHERY	WDFW		74	17036	AD
1	6/21/2013	68709	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		77	17037	AD
1	6/21/2013	68693	2010	SAN JOAQ SHRM ISL OP JRSY	MOK R FISH INS	CDFW		72	17038	AD

1	6/21/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		67	17039	AD
1	6/21/2013	220117	2010	BIG CANYON ACCL POND	LYONS FERRY HATCHERY	NEZP		64	17040	AD
1	6/21/2013	636080	2010	LYONS FERRY RELSITE	LYONS FERRY HATCHERY	WDFW		58	17041	AD
1	6/21/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		77	17043	AD
2	6/8/2013	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		87	3941	AD
2	6/8/2013	635510	2009	SNAKE L MON - LTL GOOS	LYONS FERRY HATCHERY	WDFW		57	3942	AD
2	6/8/2013	635271	2009	WENATCHEE R 45.0030	DRYDEN POND	WDFW		76	19201	AD
2	6/8/2013	55405	2010	SPRING CR 29.0159	SPRING CR NFH	FWS	055406	71	31879	AD
2	6/9/2013	635577	2009	COL R @ TURTLE ROCK	TURTLE ROCK HATCHERY	WDFW		68	10995	AD
2	6/9/2013	55371	2010	MARE ISLAND NET PEN	COLEMAN NFH	FWS		75	19202	AD
2	6/9/2013	68767	2010	SAC R @ DISCOVERY PARK	NIMBUS FISH HATCHERY	CDFW		71	19203	AD
2	6/9/2013	68748	2010	FEATHER BOYDS PUMP RAMP	FEATHER R HATCHERY	CDFW		66	19204	AD
2	6/9/2013	55374	2010	COLEMAN NFH	COLEMAN NFH	FWS		75	19205	AD
2	6/9/2013	635578	2009	WENATCHEE R 45.0030	DRYDEN POND	WDFW		63	19206	AD
2	6/9/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		66	19207	AD
2	6/9/2013	68770	2010	WICKLAND OIL NET PEN	NIMBUS FISH HATCHERY	CDFW		68	31880	AD
2	6/9/2013	635767	2010	PURDY CR 16.0005	GEORGE ADAMS HATCHRY	WDFW	635768	73	31881	AD
2	6/9/2013	69503	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		62	31882	AD
2	6/12/2013	635578	2009	WENATCHEE R 45.0030	DRYDEN POND	WDFW		73	10996	AD
2	6/12/2013	635998	2010	SNAKE L MON - LTL GOOS	LYONS FERRY HATCHERY	WDFW		62	10997	AD
2	6/12/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		63	10998	AD
2	6/12/2013	220321	2010	CAPTAIN JOHNS PD	LYONS FERRY HATCHERY	NEZP		56	10999	AD
2	6/12/2013	54590	2010	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS		84	11000	AD
2	6/12/2013	90436	2010	UMATILLA R	UMATILLA HATCHERY	ODFW		61	19208	AD
2	6/12/2013	635998	2010	SNAKE L MON - LTL GOOS	LYONS FERRY HATCHERY	WDFW		65	19209	AD
2	6/12/2013	181592	2010	CHILLIWACK R	H-Chilliwack River H	CDFO	181679, 181584, 181588, 181590	71	19210	AD
2	6/12/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		63	19212	AD
2	6/12/2013	220121	2010	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		56	19213	AD
2	6/12/2013	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		87	19214	AD

2	6/12/2013	55442	2011	COLEMAN NFH	COLEMAN NFH	FWS		63	31831	AD
2	6/12/2013	55372	2010	COLEMAN NFH	COLEMAN NFH	FWS		66	31832	AD
2	6/12/2013	220121	2010	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		66	31833	AD
2	6/12/2013	100153	2010	SNAKE @ HLLS CNYON DM	OXBOW HATCHERY	IDFG		68	31835	AD
2	6/13/2013	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		86	19401	AD
2	6/13/2013	220119	2010	CAPTAIN JOHNS PD	LYONS FERRY HATCHERY	NEZP		60	31162	AD
2	6/13/2013	55527	2011	SPRING CR 29.0159	SPRING CR NFH	FWS	055399, 055404, 055528	54	31163	AD
2	6/13/2013	220119	2010	CAPTAIN JOHNS PD	LYONS FERRY HATCHERY	NEZP		64	31701	AD
2	6/13/2013	635579	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		76	31837	AD
2	6/14/2013	68714	2009	IRON GATE HATCHERY	IRON GATE HATCHERY	CDFW		74	19215	AD
2	6/14/2013	68755	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		65	19216	AD
2	6/14/2013	635371	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		73	19217	AD
2	6/14/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		83	31164	AD
2	6/14/2013	635775	2010	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		62	31165	AD
2	6/15/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		63	3843	AD
2	6/15/2013	220208	2010	LUKE'S GULCH A F	NPT HATCHERY	NEZP		61	19220	AD
2	6/15/2013	55405	2010	SPRING CR 29.0159	SPRING CR NFH	FWS	055406	78	19221	AD
2	6/15/2013	54590	2010	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS		80	19402	AD
2	6/15/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		79	19403	AD
2	6/15/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		62	31166	AD
2	6/15/2013	635095	2008	METHOW R 48.0002	CARLTON ACCLIMATION POND	WDFW		82	31167	AD
2	6/15/2013	181590	2010	CHILLIWACK R	H-Chilliwack River H	CDFO	181679, 181584, 181592, 181588	73	31702	AD
2	6/15/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		71	31838	AD
2	6/15/2013	68709	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		65	31839	AD
2	6/15/2013	90245	2008	UMATILLA R	BONNEVILLE HATCHERY	ODFW	090246	85	31841	AD
2	6/15/2013	68047	2010	TIBURON NET PENS	PETALUMA R UNITED ANG HAT	TYEE		56	38140	AD
2	6/16/2013	68768	2010	SAC R @ DISCOVERY PARK	NIMBUS FISH HATCHERY	CDFW		75	16001	AD
2	6/16/2013	635273	2010	COWLITZ R 26.0002	COWLITZ SALMON HATCH	WDFW		57	16003	AD
2	6/16/2013	635579	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		70	16004	AD

2	6/16/2013	636080	2010	LYONS FERRY REL SITE	LYONS FERRY HATCHERY	WDFW		60	16005	AD
2	6/16/2013	68755	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		63	16006	AD
2	6/16/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		67	16008	AD
2	6/16/2013	55392	2010	COLEMAN NFH	COLEMAN NFH	FWS		71	19222	AD
2	6/16/2013	220206	2010	MAGRUDOR CORRIDOR	NPT HATCHERY	NEZP		71	19223	AD
2	6/16/2013	635371	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		73	19404	AD
2	6/16/2013	68753	2010	SANTA CRUZ HARBOR NET PEN	FEATHER R HATCHERY	CDFW		73	19405	AD
2	6/16/2013	90566	2011	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	090583, 090582, 090567	56	19406	AD
2	6/16/2013	181588	2010	CHILLIWACK R	H-Chilliwack River H	CDFO	181679, 181584, 181592, 181590	73	19407	AD
2	6/16/2013	55373	2010	COLEMAN NFH	COLEMAN NFH	FWS		68	19408	AD
2	6/16/2013	68709	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		68	31168	AD
2	6/16/2013	68770	2010	WICKLAND OIL NET PEN	NIMBUS FISH HATCHERY	CDFW		70	31169	AD
2	6/16/2013	635997	2010	COUSE CR 35.2147	LYONS FERRY HATCHERY	WDFW		65	31842	AD
2	6/17/2013	635187	2009	FALLERT CR 27.0017	FALLERT CR HATCHERY	WDFW		69	16009	AD
2	6/17/2013	181386	2010	SHUSWAP R LOW	H-Shuswap River, Middle,	CDFO		82	19409	AD
2	6/17/2013	635776	2010	WENATCHEE R 45.0030	DRYDEN POND	WDFW		57	19410	AD
2	6/17/2013	220316	2009	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		75	19411	AD
2	6/17/2013	635371	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		58	31703	AD
2	6/17/2013	635177	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		79	31704	AD
2	6/17/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		78	31705	AD
2	6/18/2013	69505	2010	SAN JOAQ SHRM ISL OP JRSY	MOK R FISH INS	CDFW		62	16010	AD
2	6/18/2013	55405	2010	SPRING CR 29.0159	SPRING CR NFH	FWS	055406	71	19224	AD
2	6/18/2013	90390	2009	MCKENZIE R 1	MCKENZIE HATCHERY	ODFW		79	19225	AD
2	6/18/2013	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		73	19226	AD
2	6/18/2013	635364	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		72	19227	AD
2	6/18/2013	635997	2010	COUSE CR 35.2147	LYONS FERRY HATCHERY	WDFW		74	19228	AD
2	6/18/2013	635774	2010	CHELAN R 47.0052	CHELAN FALLS HATCHERY	WDFW		55	19230	AD
2	6/18/2013	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		84	31708	AD
2	6/20/2013	55390	2010	COLEMAN NFH	COLEMAN NFH	FWS		70	19231	AD

2	6/20/2013	90347	2009	CEDAR CR #1 (SANDY R)	SANDY HATCHERY	ODFW		73	31170	AD
2	6/20/2013	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCHERY	WDFW		86	31171	AD
2	6/20/2013	635088	2009	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		74	31843	AD
2	6/22/2013	220117	2010	BIG CANYON ACCL POND	LYONS FERRY HATCHERY	NEZP		68	16501	AD
2	6/22/2013	181370	2010	SHUSWAP R MIDDLE	H-Shuswap River, Middle,	CDFO		76	16502	AD
2	6/22/2013	220208	2010	LUKE'S GULCH A F	NPT HATCHERY	NEZP		69	16503	AD
2	6/22/2013	90437	2010	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	090366	73	19232	AD
2	6/22/2013	635291	2009	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		74	19233	AD
2	6/22/2013	55405	2010	SPRING CR 29.0159	SPRING CR NFH	FWS	055406	75	19234	AD
2	6/22/2013	220117	2010	BIG CANYON ACCL POND	LYONS FERRY HATCHERY	NEZP		64	19235	AD
2	6/22/2013	68750	2010	SAN PABLO BAY NET PENS	FEATHER R HATCHERY	CDFW		62	31709	AD
2	6/22/2013	68756	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		65	31710	AD
2	6/22/2013	635774	2010	CHELAN R 47.0052	CHELAN FALLS HATCHERY	WDFW		64	31711	AD
3	6/22/2013	181585	2010	SHUSWAP R LOW	H-Shuswap River, Middle,	CDFO		70	8330	AD
3	6/22/2013	68756	2010	SAN JOAQ SHRM ISL NET PEN	MOK R FISH INS	CDFW		74	8331	AD
3	6/22/2013	220121	2010	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		69	8332	AD
3	6/23/2013	68680	2009	MARE ISLAND NET PEN	NIMBUS FISH HATCHERY	CDFW		81	8334	AD
3	6/23/2013	220122	2010	SNAKE R @ PITT LNDG	LYONS FERRY HATCHERY	NEZP		79	8335	AD
3	6/23/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		60	8336	AD
3	6/23/2013	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		70	8337	AD
3	6/23/2013	68751	2010	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		66	8338	AD
3	6/28/2013	181473	2010	HARRISON R	H-Chehalis River H	CDFO		66	3402	AD
4	5/17/2013	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		89	2801	AD
4	5/17/2013	635164	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCHERY	WDFW		83	2802	AD
4	5/17/2013	54596	2009	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS	053577, 054595, 054597	68	2803	AD
4	5/17/2013	210912	2009	GROVERS CR HATCHERY	GROVERS CR HATCHERY	SUQ	635089	61	3141	AD
4	5/18/2013	635264	2009	JOHN CR 16.0253	RFEG 6 HOOD CANAL	WREG		75	31258	AD
4	6/22/2013	54590	2010	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS		79	2751	AD
4	6/22/2013	54278	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	054283	85	2804	AD

4	6/22/2013	55378	2010	MARE ISLAND NET PEN	COLEMAN NFH	FWS		73	2806	AD
4	6/22/2013	181470	2010	HARRISON R	H-Chehalis River H	CDFO		57	31259	AD
4	6/22/2013	635683	2010	NOOKSACK R - NF 01.0120	KENDALL CR HATCHERY	WDFW	635682	66	71874	AD
4	6/23/2013	54590	2010	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS		60	3144	AD
4	6/23/2013	90486	2010	TANNER CR (BNVILLE)	BONNEVILLE HATCHERY	ODFW		61	3145	AD
4	6/23/2013	635291	2009	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		69	8652	AD
4	6/23/2013	635686	2010	CHELAN R 47.0052	CHELAN FALLS HATCHERY	WDFW		68	8653	AD
4	6/23/2013	635768	2010	PURDY CR 16.0005	GEORGE ADAMS HATCHRY	WDFW	635767	61	8654	AD
4	6/23/2013	635288	2009	VOIGHT CR TR 10.0428	VOIGHTS CR HATCHERY	WDFW		69	8655	AD
4	6/23/2013	54595	2009	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS	053577, 054596, 054597	82	19601	AD
4	6/25/2013	210973	2010	GORST CR 15.0216	GORST CR REARING PND	SUQ		59	8656	AD
4	6/25/2013	635776	2010	WENATCHEE R 45.0030	DRYDEN POND	WDFW		52	9231	AD
4	6/28/2013	54590	2010	LTL WHITE SALMON @ NFH	LTL WHITE SALMON NFH	FWS		78	3156	AD
4	6/28/2013	636069	2010	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		58	19602	AD
4	6/28/2013	210972	2010	GORST CR 15.0216	GORST CR REARING PND	SUQ		68	31260	AD
4	6/28/2013	635997	2010	COUSE CR 35.2147	LYONS FERRY HATCHERY	WDFW		61	31261	AD