FISHERY RESEARCH

A GENETIC ANALYSIS OF THE SUMMER STEELHEAD STOCK COMPOSITION IN THE COLUMBIA RIVER AND SNAKE RIVER TRIBAL AND SPORT FISHERIES

JUNE 16, 2013 TO MARCH 31, 2014

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ABBREVIATIONS AND ACRONYMS

BON	Bonneville Dam
BWSALM	Big White Salmon River
BY	Brood Year
CI	Confidence Interval
CRITFC	Columbia River Inter-Tribal Fish Commission
CWT	Coded Wire Tag
DPS	Distinct Population Segment
EF	East Fork
GSI	Genetic Stock Identification
IDFG	Idaho Department of Fish and Game
JSR	Joint Staff Report
KLICKR	Klickitat River
LOWCOL	Lower Columbia River
LCI	Lower 90% Confidence Interval
MCN	McNary Dam
MFSALM	Middle Fork Salmon River
MY	Migration Year
MGILCS	Mid Columbia-Grande Ronde-Imnaha-Lower Snake-Lower Clearwater-Lower Salmon
NMFS	National Marine Fisheries Service
ODFW	Oregon Department of Fish and Wildlife
PBT	Parentage Based Tagging
PIT	Passive Integrated Transponder
PSMFC	Pacific States Marine Fish Commission
SBT	Shoshone Bannock Tribe
SFCLWR	South Fork Clearwater River
SFSALM	South Fork Salmon River
SKAMAN	Skamania
TAC	*U.S. v Oregon* Technical Advisory Committee
UCI	Upper 90% Confidence Interval
UPCLWR	Upper Clearwater (Lochsa River and Selway River)
UPPCOL	Upper Columbia River
UPSALM	Upper Salmon River
WILLAM	Willamette River
WDFW	Washington Department of Fish and Wildlife
YAKIMA	Yakima River
YN	Yakama Nation

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ABSTRACT

We estimated the stock composition of steelhead harvested in the Columbia River sport fisheries downstream of McNary Dam and tribal Zone 6 fisheries from June 16 to October 31, 2013. We also estimated the stock composition in the Snake River sport fishery downstream of the Idaho/Washington border from September 1, 2013 to March 31, 2014. Steelhead from the Snake River basin hatcheries made up 66% of the Columbia River sport harvest downstream of Bonneville Dam, 81% of the clipped Zone 6 tribal harvest, 11% of the unclipped Zone 6 tribal harvest, and 55% of the total Zone 6 tribal harvest. We estimate that Snake River basin wild fish made up at least 15% of the unclipped steelhead and 6% of the total steelhead caught in the Zone 6 tribal fishery. Snake River basin hatchery stocks made up 96% of the harvest in the Snake River downstream of the Idaho/Washington border. The Snake River hatchery stocks made up a larger percentage of the harvest as the season progressed in the Columbia River sport fishery downstream of Bonneville Dam and in the tribal Zone 6 fishery.

INTRODUCTION

This is the third year that we have estimated the stock composition in the sport and tribal summer steelhead harvest in the Columbia River and the second year in the lower Snake River (Byrne et. al 2014a and Byrne et. al 2014b). Until this study was initiated, there were no estimates of the harvest contribution of hatchery and wild stocks in the tribal and non-tribal fisheries in the Columbia River. The Snake River basin hatchery stocks were expected to contribute a large portion of the sport and clipped tribal harvest since most of the summer steelhead smolt releases in the Columbia River basin were from the Snake River basin (Table 1). In 2013 we began sampling fisheries in the Columbia River earlier than we had in the previous two years. The Idaho Department of Fish and Game (IDFG) coordinated the sampling of steelhead harvested in the lower Columbia River sport fishery downstream of Bonneville Dam (Figure 1) from June 16 to October 31 and the tribal Zone 6 fishery from Bonneville Dam to McNary Dam from June 16 until its closure on October 9 (Figure 2). Samples were also obtained from steelhead kept by sport anglers upstream of Bonneville Dam in the Bonneville pool, Drano Lake, and in the Columbia River near the mouth of the Deschutes River. The Washington Department of Fish and Wildlife (WDFW) sampled steelhead from September 1, 2013 to March 31, 2014 that were caught in the sport fishery in the Snake River from the mouth to the Idaho/Washington border near Lewiston, Idaho (Figure 3). The primary cooperators in this effort were IDFG, Columbia River Inter-Tribal Fish Commission (CRITFC), WDFW, Yakama Nation (YN), Pacific States Marine Fish Commission (PSMFC), and Oregon Department of Fish and Wildlife (ODFW).

Steelhead are present in the Columbia River the entire year and populations contributing to adult returns are managed based on run-timing as outlined in the *U.S. v Oregon* Management Agreement (*U.S. v Oregon)* from the mouth to McNary Dam. All steelhead handled in fisheries downstream of Bonneville Dam from November 1 through April 30 are managed as winter steelhead. The steelhead populations of concern in this report are the summer run fish. The Columbia River summer steelhead run includes populations from tributaries upstream and downstream of Bonneville Dam. The majority of the summer steelhead enter the river from May through October. All steelhead handled in fisheries downstream of Bonneville Dam from May 1 to June 30 are managed as lower river summer run Skamania stock steelhead. Steelhead that pass Bonneville Dam between April 1 and June 30 are counted as summer run up-river Skamania stock steelhead. The Skamania hatchery summer steelhead stock are released in the lower Columbia tributaries, including the Willamette basin and in the Little White Salmon and Klickitat rivers. Skamania stock steelhead releases were ended in the White Salmon River after the 2010 Brood Year. Wild lower river summer steelhead are present in the Kalama, Lewis, Washougal, and Wind rivers in Washington, and in the Hood River in Oregon. The lower Columbia River steelhead Distinct Population Segment (DPS) was listed as threatened by the NMFS in May 1999. The recent five-year average return (2008 – 2012) of Skamania steelhead at Bonneville Dam was 15,939 total fish of which 4,844 were wild origin (JSR 2014a).

All steelhead handled in fisheries downstream of Bonneville Dam from July 1 to October 31 are managed as summer run upriver-stock steelhead. It has been assumed that there are no lower river steelhead stocks present in the main stem during this time period. Summer run upriver steelhead passing Bonneville Dam between July 1 and October 31 are defined to be either Group A or Group B based on fork length. Group A steelhead are destined for all tributaries throughout the Columbia basin and are defined as fish <78 cm fork length. Group B steelhead are primarily bound for the rivers in Idaho and are defined as fish ≥78 cm fork length. The NMFS has divided the upriver wild summer steelhead run into three DPSs: 1) the middle Columbia DPS which includes all naturally spawned populations of steelhead in streams from

the Wind River in Washington and the Hood River in Oregon, upstream to and including the Yakima River in Washington, excluding steelhead from the Snake River basin (listed as threatened in May 1999), 2) the upper Columbia DPS which includes steelhead destined for Columbia River tributaries upstream of the Yakima River (listed as endangered in May 1999 and then changed to threatened in June 2009), and 3) the Snake River DPS which includes steelhead returning to the Snake River basin (listed as threatened in October 1997). The recent five-year average return (2008 – 2012) of Group A steelhead at Bonneville Dam was 320,656 total fish of which 102,590 were wild origin and 42,126 total Group B of which 13,841 were wild origin (JSR 2014a).

The run-timing of summer steelhead into the Columbia River overlaps the run-timing of spring, summer, and fall Chinook, sockeye, and to a lesser extent coho. Spring, summer, and fall Chinook are targeted by non-Indian commercial fisheries downstream of Bonneville Dam, tribal commercial, ceremonial, and platform fisheries upstream of Bonneville Dam, and sport fisheries downstream and upstream of Bonneville Dam. All steelhead caught in non-Indian commercial fisheries must be released. Only steelhead with a clipped adipose fin (hereafter referred to as clipped) may be kept in sport fisheries. Steelhead, both clipped and those with an intact adipose fin (hereafter referred to as unclipped) may be retained in any tribal fishery.

As defined in *U.S. v Oregon*, Chinook fisheries in the Columbia River are managed for three time periods: Upriver spring and Snake River summer Chinook from January 1 to June 15; Upper Columbia River summer Chinook from June 16 to July 31; and fall Chinook from August 1 to December 31. Harvest quotas and ESA impact rates are determined for each time period. Steelhead harvest is estimated for all tribal and non-Indian fisheries. In sport fisheries, steelhead harvest is estimated with creel surveys on a monthly basis downstream of Bonneville Dam in the lower Columbia River. Sport catch upstream of Bonneville Dam is estimated monthly from catch record cards and may not be available for several years. Sport steelhead harvest is reported as the number of fish kept. Preliminary steelhead and Chinook harvest estimates in the tribal Zone 6 fishery are made on a weekly basis beginning June 16. This allows managers to adjust seasons to keep steelhead impacts and harvest of summer and fall Chinook within the limits that are outlined in *U.S. v Oregon*. Final harvest estimates are reported by *U.S. v. Oregon* Technical Advisory Committee (TAC) at the conclusion of the tribal fishery. Tribal fall season steelhead harvest estimates are reported as the number of clipped and unclipped fish kept that were <78 cm (Group A) and ≥78 cm (Group B). The tribal summer season steelhead harvest was not always separated into Group A and Group B in past years, however estimates for both groups were made in 2013.

The number of fish each hatchery and stock contributes to fisheries downstream of the Idaho border in the Snake and Columbia rivers is necessary to fully evaluate the performance of Idaho's hatchery program. Idaho Department of Fish and Game began sampling hatchery steelhead used for broodstock starting with Brood Year (BY) 2008 at all hatcheries in Idaho (Steele et al. 2011). Beginning with BY09 and continuing each year afterward, all hatchery steelhead used for broodstock in the Snake River basin have been sampled by IDFG, WDFW, and ODFW. All samples were genotyped allowing managers to identify the origin and age of all offspring using Parental Based Tagging (PBT) methods.

All adipose clipped fish are known to be hatchery origin. Clipped hatchery fish from the Snake River could be assigned to a hatchery stock and release group using PBT markers. Clipped steelhead that did not assign using PBT markers were a hatchery fish from outside the Snake River basin or a Snake River basin adult whose parents were not genotyped. Steelhead with an intact adipose fin could be a wild fish or hatchery origin fish released without a clipped

adipose fin. Samples from unclipped steelhead were analyzed using PBT markers to determine if the fish was of Snake River hatchery origin. Unclipped samples that did not assign to a Snake River hatchery (putative wild fish) were assigned to a Columbia River reporting group developed by CRITFC using Genetic Stock Identification (GSI) markers (Hess et al. 2013). The GSI reporting groups outside of the Snake River basin contain wild and hatchery origin steelhead. GSI reporting groups within the Snake River basin (excluding the MGILCS group) are comprised of wild fish only.

The objectives of this study are to use the steelhead harvest estimates that TAC, ODFW, and WDFW publishes for main stem sport and tribal fisheries in the Columbia River downstream of the Highway 395 bridge at Pasco (near the mouth of the Snake River), the Snake River sport fishery downstream of the Washington/Idaho border, and the results of the genetic analysis of collected samples to:

1. Estimate the contribution by the Snake River basin and each Snake River hatchery release group to sport harvest in the Columbia River downstream of Bonneville Dam (Sections 1 – 10) and the Snake River downstream of the Washington/Idaho border (Sections 640, 642, 644, 646, and 648).

2. Estimate the contribution by the Snake River basin and each Snake River hatchery release group in the Columbia River sport harvest from Bonneville Dam upstream to the Highway 395 bridge near Pasco, Washington.

3. Estimate the percent of the unclipped hatchery origin and wild origin steelhead caught in the Zone 6 tribal fishery.

4. Estimate the Snake River basin wild and hatchery contribution in the Zone 6 tribal harvest.

5. Estimate the contribution of each Snake River hatchery release group (clipped and unclipped) in the Zone 6 tribal harvest.

6. Assign putative wild steelhead into reporting groups using GSI and estimate the percentage of harvest from each reporting group in the Zone 6 tribal unclipped harvest.

METHODS

Steelhead passage at Bonneville, McNary and Ice Harbor dams

The daily count of clipped and unclipped steelhead at Bonneville Dam, McNary Dam, and Ice Harbor Dam was obtained from the Army Corp of Engineers website (available at http://www.nwp.usace.army.mil/Missions/Environment/Fish/Data.aspx). The Bonneville and McNary counts were from July 1, 2013 to October 31, 2013. The Ice Harbor counts were from July 1, 2013 to December 31, 2013. CRITFC personnel sampled steelhead at Bonneville Dam and recorded the fork length and the presence or absence of the adipose fin. Steelhead were designated as hatchery or wild origin primarily based on the presence of a fin clip or an eroded dorsal fin. If either was observed, the default designation was hatchery and if both were absent, the default designation was wild origin. However, when aging scales a small proportion of unclipped fish initially categorized as wild were changed to hatchery origin if rapid freshwater scale growth was observed with the absence of any hard freshwater annuli checks (Jeff Fryer,

CRITFC, personal communication). TAC used this data to estimate the percentage of Group A and Group B hatchery fish of clipped steelhead and the percentage of Group A and Group B wild and hatchery fish of the unclipped samples. These percentages were estimated biweekly between July 1 and October 6. For the October 7 to October 31 time period, TAC used all samples collected after October 6 to estimate the percentages. The clipped percentages were multiplied by the clipped steelhead dam count and the unclipped percentages were multiplied by the unclipped steelhead dam count in each time period to estimate the number of wild and hatchery origin Group A and Group B fish that passed the dam. The total Group A and Group B wild and hatchery passage at Bonneville Dam was the sum of all time periods.

Steelhead Run-timing at Bonneville, McNary, Ice Harbor, and Lower Granite dams

All hatchery steelhead stocks in the Snake River basin and several stocks in the Upper Columbia River are representatively PIT tagged prior to release as smolts. Wild juvenile steelhead are also PIT tagged throughout the basin. We obtained the daily number of adult summer steelhead detections of each stock at Bonneville Dam from March 1, 2013 to December 31, 2013. We obtained the daily adult detections at McNary Dam from March 1, 2013 to May 31, 2014. At Ice Harbor and Lower Granite dams we obtained adult detections from June 1, 2013 to May 31, 2014 (detection data obtained from *http://www.ptagis.org*). We only used adult detection data of hatchery and wild fish that were tagged as juveniles, that migrated to the ocean in the spring of 2012 or earlier, and were returning to spawn in the spring of 2014 (adults spawning in the spring of 2013 would not be available to the fisheries we sampled). Some of the fish that were detected from March 1 to June 1 in 2013 and 2014 were determined to be kelts based on their detection history at main stem dams and tributary PIT arrays and were removed from the analysis. The run-timing of each Snake River hatchery stock, except the Upper Salmon and EF Salmon, was calculated by combining detections from all of the stock's release groups and BYs. All Upper Salmon and EF Salmon release groups and BY detections were combined to calculate their combined run-timing. The Upper Columbia hatchery run-timing was calculated by combining detections of all hatchery stocks and BYs upstream of the Yakima River. The run-timing of wild steelhead at Bonneville Dam from the Middle Columbia (Bonneville Dam to Yakima River, excluding the Snake River basin), Upper Columbia (all rivers upstream of the Yakima River), and Snake (all rivers in the Snake River basin upstream of Lower Granite Dam) regions was calculated by combining detections from all release sites in each region. The Middle Columbia wild run-timing at McNary Dam was calculated using only those fish from that region that were tagged upstream of McNary Dam. We estimated the cumulative passage proportion for each date of the wild and hatchery stocks at Bonneville Dam. The McNary Dam run-timing for the Upper and Middle Columbia stocks was determined using all detections at McNary Dam from those groups. The Snake River wild and hatchery run-timing at McNary, Ice Harbor, and Lower Granite dams was calculated using fish that were detected at all three dams. We only calculated the run-timing of the Snake River hatchery stocks and Snake River wild fish at Ice Harbor. At Lower Granite Dam, we excluded fish tagged downstream of that dam when we calculated the run-timing. We did not calculate the run-timing of a stock if there were less than 20 detections from that stock at the dam.

Lower Columbia River sport harvest estimates

Sport anglers could retain two adult salmon or hatchery steelhead per day or one of each species in the Columbia River from Buoy 10 to Bonneville Dam from June 16 to October 31, 2013. Only steelhead with a clipped adipose fin could be kept. Sport fisheries, in the Columbia River from Buoy 10 upstream to the Highway 395 bridge near Pasco, Washington, were allowed a 2% impact rate on wild A-run and 2% on wild B-run steelhead in July and an

additional 2% impact on A-run and B-run fish from August 1 to October 31. There was no catch quota on the harvest of clipped fish. The recreational sport fishery downstream of Bonneville Dam is divided into ten sampling sections (Figure 1). Personnel from ODFW and WDFW conduct random angler interviews at their respective boat ramps, beaches, and on the river to determine catch rates for each species in each section. The total number of fish caught and released for each species, month, and section is estimated by combining total angler effort estimates derived from aerial surveys and bank angler counts with the observed angler catch rates in each section (Watts 2013 and TAC 2008). No attempt was made to parse the harvest into hatchery stocks.

Columbia River upstream of Bonneville Dam sport harvest estimates

Sport anglers could retain two clipped steelhead per day in the main stem Columbia River between Bonneville Dam and the Highway 395 bridge near Pasco, Washington. Tributaries, including Drano Lake (impoundment of the lower Little White Salmon River at its mouth) and the John Day arm (impoundment of John Day River at its mouth) were also open to fishing and anglers could retain two clipped steelhead per day. Wild B steelhead impacts from tributary fisheries between Bonneville Dam and McNary Dam are included in the allowed 2% wild B impacts for main stem Columbia River sport fisheries. Steelhead harvest in the Columbia River and tributaries upstream of Bonneville Dam are estimated using catch record cards (limited creel data are available primarily for salmonid catches in association with sturgeon fishing). The final monthly harvest estimates are posted on the WDFW website (available at: http://wdfw.wa.gov/fishing/harvest) when available. The wild impacts from sport fishing upstream of Bonneville Dam, are modeled based on stock proportions and abundance at Bonneville Dam.

Tribal Zone 6 harvest estimates

There were six time periods open for commercial set net fishing during the summer management period from June 16 to July 31, 2013 that primarily targeted summer Chinook and sockeye salmon. There are no steelhead harvest limits during the summer season. The steelhead catch in the summer management period have not always been separated into A and B groups although A and B estimates were made in 2013. In the fall management period, which began on August 1, 2013, there were seven time periods open for commercial set net fishing from August 19 to October 3, 2013 that primarily targeted fall Chinook salmon. In addition to the commercial set net seasons, platform and hook and line fisheries were open daily from June 16 to October 9, 2013. Fisheries during the fall management period catch significant numbers of steelhead as both species are abundant in Zone 6 during the time period the commercial seasons are open (Figure 4).

The harvest rate for treaty fisheries for the fall management season (August 1 to October 31) is based on a sliding scale of the abundance of upriver fall Chinook and total B-run steelhead counted at Bonneville Dam as outlined in *U.S. v. Oregon*. There is no specific harvest rate limit on A-run steelhead. In 2013, the total B-run steelhead allowable harvest rate in the treaty fishery was 13% (1,496 B-run fish).

Tribal monitors from the YN sample catch at landing points (often at in-lieu fishing sites). Data are collected on number of fish per net, number of nets sampled, numbers of times per day nets are checked, and number of nets each sampled crew are fishing. Steelhead are measured and classified as Group A (<78 cm) or Group B (≥78 cm) fish and presence or absence of an adipose fin-clip is noted.

WDFW crews sample the tribal catch for biological data at commercial buying stations (ticketed catch). Fork length and presence or absence of the adipose fin was recorded. In cases where the non-ticket catch is a large proportion of the total catch, the TAC uses information from the WDFW sampled ticketed catch combined with the YN sampling data to estimate the number of steelhead that were harvested. All tribal steelhead harvest estimates are reviewed and then reported by TAC. Steelhead harvest is reported for clipped and unclipped Group A and Group B fish (JSR 2014b and TAC 2008).

Lower Snake River sport harvest estimates

Sport anglers could retain three hatchery steelhead per day in the Snake River from its mouth to the Washington/Idaho border. Only steelhead with a clipped adipose fin could be kept. The recreational sport fishery downstream of the Washington/Idaho border is divided into five sampling sections (Figure 3). We estimated harvest from the mouth of the Snake River to the Idaho/Washington border (Sections 640, 642, 644, 646, and 648). Steelhead harvested in the Snake River upstream of the Idaho/Washington border were excluded from this report. The harvest estimates used in this report were provided by WDFW regional staff and were based on preliminary analysis of the catch record card data. The final monthly harvest estimates are made for each section from the catch record cards and are posted on the WDFW website (available at: http://wdfw.wa.gov/fishing/harvest/) when available.

Sample collection in the lower Columbia River sport fishery

Sport anglers were sampled by the WDFW creel survey crews that were used to estimate harvest from Buoy 10 upstream to Bonneville Dam. All steelhead that were encountered had a small piece of tissue removed for the genetic analysis. In addition to a tissue sample, crews also checked the fish for a CWT (Coded Wire Tag), PIT tag, measured the fork length, and recorded the river section and date the fish was caught. The first samples were obtained on June 16 and the last sample was collected on September 26, 2013. A total of 1,788 samples were collected from the sport fishery. Crews collected 69 samples in June, 995 samples in July, 710 samples in August, and 14 samples after September 1, 2012.

We estimated the stock composition for the entire period from June 16 to October 31, 2012. We drew a random subsample of 1,070 from the 1,788 samples we collected for genotyping. We allocated the subsample in proportion to the monthly harvest estimates as closely as possible. Ideally, we would have chosen 81 samples from June, 400 samples from July, 566 samples from August, and 15 samples after September 1. However, we only collected 69 samples in June. After we chose the July samples, we then chose additional samples from the first week of July to represent fish caught in June. Eight of the 1,070 samples were omitted from the analysis because they failed to meet the criteria used to make assignments or were determined to be a duplicate sample from the same fish. The final sample used for the analysis was 1,062 and included 66 fish from June, 418 fish from July, 564 fish from August, and 14 fish after September 1 (Table 2). We estimated the stock composition of the harvest separately during three time periods: (1) June 16 to June 30, (2) July 1 to July 31, and (3) August 1 to October 31.

Sample collection in the Columbia River upstream of Bonneville Dam sport fishery

WDFW crews sampled anglers between Bonneville Dam and The Dalles Dam on the Washington shore between July 15 and October 6, 2013. ODFW crews sampled anglers fishing

in the Columbia River near the mouth of the Deschutes River from mid-August until October 19, 2013. In addition to a tissue sample, crews measured the fork length and recorded the location and date the fish was caught. Sampling of sport anglers in Zone 6 was of an opportunistic nature and did not occur in the entire section(s) of the Columbia River that are used to report harvest. Crews collected a total of 196 samples. Five samples were omitted because they failed to meet the criteria used to make assignments or were determined to be duplicate samples from the same fish. The final sample size used for the analysis was 173. The samples were collected from the Bonneville Pool (n=12), Drano Lake (n=135), near the mouth of the Deschutes River (n=18), near the mouth of the Wind River (n=7), and one sample from The Dalles pool (Table 3). Since our sampling did not occur throughout the geographic and temporal range of the harvest estimates for the Bonneville Dam to Highway 395 bridge fisheries (Table 4), we only report the stock composition of the samples we collected.

Sample collection in the Columbia River Zone 6 tribal fishery

Tribal Zone 6 harvest in the main stem Columbia River was sampled by Yakama Nation crews in the Bonneville Pool, The Dalles Pool, John Day Pool, and at commercial buyers. The commercial samples were obtained by randomly choosing totes of steelhead and sampling all fish in the tote. In addition to a tissue sample, crews also checked the fish for a PIT tag, measured the fork length, recorded whether the fish had a clipped adipose fin, and the river section and date the fish was caught. The first samples were obtained on June 17 and the last sample collected on October 3, 2013. A total of 2,122 samples from clipped steelhead and 1,636 samples from unclipped steelhead were collected.

The harvest contribution was estimated separately for clipped and unclipped steelhead. We drew a random subsample of 1,023 clipped and 651 unclipped fish from all samples collected. We allocated the samples as closely as possible in proportion to the weekly harvest estimate for clipped and unclipped fish. We did not have enough clipped or unclipped samples from the platform fisheries from July 26 to August 18 (Stat Weeks 30 to 33); hence, we had to use samples that were collected the week prior to July 26 (Stat Week 29) and the week after August 18 (Stat Week 34) to make up the difference. We assumed that samples in weeks 29 and 34 were representative of the stock composition in Zone 6 during weeks 30 to 33. Twelve clipped samples and 23 unclipped samples were omitted from the analysis because they failed to meet the criteria used to make assignments or were determined to be duplicate samples from the same fish. The final sample size used to make estimates of the clipped harvest contribution was 1,011 and 628 for the unclipped samples (Table 5).

We estimated the stock composition of the clipped and unclipped harvest separately during the summer Chinook management period from June 16 to July 31 and the fall Chinook management period from August 1 to October 9.

Sample collection in the lower Snake River sport fishery

WDFW creel crews sampled fish caught by sport anglers in the Snake River downstream of the Idaho/Washington border. All steelhead that were encountered had a small piece of tissue removed for the genetic analysis. In addition to a tissue sample, crews also checked the fish for a CWT, PIT tag, measured the fork length, and recorded the river section and date the fish was caught. The first fish was sampled on September 1, 2013 and the last fish was sampled on March 25, 2014. A total of 986 samples were obtained. Sixty-five percent of the harvest occurred and 70% of the samples were collected from October 1 to November 30 (Table 6).

We estimated the stock composition from the mouth of the Snake River to the Idaho/Washington border for the entire period from September 1, 2013 to March 31, 2014. We drew a random subsample of 712 from the 986 samples we collected for genotyping. We allocated the subsample in proportion to the preliminary monthly harvest estimates that were available in August 2014 in each section as closely as possible (Table 6). Two samples were omitted because they failed to meet the criteria used to make assignments or were determined to be duplicate samples from the same fish. The final sample size used for the analysis was 710. The final harvest estimates became available in February 2015, after the samples were genotyped.

Estimating stock proportions and harvest contribution for clipped steelhead

Clipped steelhead samples were analyzed using the PBT panel as described in Steele et al. 2013. Fish were assigned to a release group and BY (Table 7). Samples that were not assigned by PBT screening to a Snake River hatchery release group were put in the Other group. The Other reporting group contains fish from non-Snake River hatcheries. The number of samples that were assigned to a release group and BY were expanded using the release group and BY mark rate (Table 7) as:

$$Cpe_{jtib} = {}^{C_{jtib}}/_{m_{ib}} \quad (1)$$

Where:

j = fishery (1=sport, 2=tribal)
t = sample stratum (t=1 for all fisheries analyzed this year)
i = number of release groups (19)
b = Brood Year (1=BY09, 2=BY10, and 3=BY11)
C_{jtib} = number of clipped fish sampled from fishery (*j*) and stratum (*t*) that assigned to release group (*i*) and Brood Year (*b*)
m_{ib} = the PBT mark rate for release group (*i*) in Brood year (*b*).

The expanded count represents the expected number of fish in the sample from each group if all groups had a tag rate = 1. The total of expanded samples from clipped fish in fishery (*j*) and stratum (*t*) that originate from all release groups (*i*) and both brood years (*b*) was:

$$Cpe_{jt} = \sum_{b=1}^{3} \sum_{i=1}^{20} Cpe_{jtib} \quad (2)$$

The number of clipped fish sampled from fishery (*j*) and stratum (*t*) that did not assign to a release group was:

$$Cn_{jt} = Fc_{jt} - Cpe_{jt} \quad (3)$$

Where:

Fc_{jt} = the number of clipped samples that were genotyped from fishery (*j*) and stratum (*t*) and used for the PBT analysis.

The proportion of the sampled clipped fish from fishery (*j*) and stratum (*t*) from release group (*i*) and brood year (*b*) was:

$$qc_{jtib} = {Cpe_{jtib}}/{Fc_{jt}} \quad (4)$$

The proportion of clipped fish sampled from fishery (*j*) and stratum (*t*) in the Other group is:

$$qu_{jt} = {Cn_{jt}}/{Fc_{jt}} \quad (5)$$

The number of harvested clipped fish by hatchery release group (*i*) and BY (*b*) in fishery (*j*) and stratum (*t*) was:

$$Hc_{jtib} = Hc_{jt} * qc_{jtib} \quad (6)$$

Where:

Hc_{jt} = total harvest of clipped fish from stratum (*t*) in fishery (*j*)

The total harvest of clipped fish from release group (*i*) and BY (*b*) in fishery (*j*) was estimated by summing all strata:

$$Hc_{jib} = \sum_{t=1}^{2} Hc_{jtib} \quad (7)$$

The number of harvested clipped fish in fishery (*j*) and stratum (*t*) from the Other group was:

$$Hu_{jt} = Hc_{jt} * qu_{jt} \quad (8)$$

The total harvest of clipped fish in fishery (*j*) from the Other group was:

$$Hu_{j} = \sum_{t=1}^{2} Hu_{jt} \quad (9)$$

Sex ratios were calculated for the Snake River release groups identified with PBT using the results of a genetic sex marker that was run on each sample during genotyping (Campbell et al. 2012). The percent of large fish (≥78 cm fork length) was calculated using only those samples with a length measurement in the lower Columbia River sport, Zone 6 sport, tribal Zone 6, and lower Snake River sport fisheries. We calculated the percent of large fish ≥78 cm within

each Snake River release group (L_i) identified with PBT by dividing the sum of fish ≥78 cm in each BY by the number of fish measured for length in all BYs.

$$Li = \sum_{b=1}^{3} l_{ib} \; / \sum_{b=1}^{3} n_{ib} \tag{10}$$

where l_{ib} = number of fish ≥78 cm in release group *i*, brood year *b* and
n_{ib} = number of fish sampled for length in release group *i*, brood year *b.*

To calculate the percent of the total large fish from each release group (T_i) we: (1) expanded the number of fish sampled for length in each release group by the appropriate PBT mark rate,

$$Expand_i = \sum_{b=1}^{3} n_{ib}/m_{ib} \tag{11}$$

where m_{ib} = PBT tag rate for release group *i*, brood year *b.*

(2) calculated the expected number of large fish in each release group ($Expect_i$) by multiplying the expanded total by the within release group large percent (from Equation 10),

$$Expect_i = Expand_i * L_i \tag{12}$$

and (3) divided the expected number of large fish by the total sample size.

$$T_i = Expect_i \; / \; N_t \tag{13}$$

where N_t total number of fish sampled for length.

The within percent large of the Other group (O_i) was the total number of large fish sampled minus the expected number of large fish from all release groups divided by the total sample size minus the sum of the expanded sample size of all release groups.

$$O_i = \left(N_l \; - \sum_{i=1}^{19} Expect_i \right) \; / \; \left(N_t \; - \sum_{i=1}^{19} Expand_i \right) \tag{14}$$

where N_l total number of large fish sampled.

The percentage of the total large fish from the Other group (O_t) was:

$$O_t = \left(N_l \; - \sum_{i=1}^{19} Expect_i \right) \; / \; N_t \tag{15}$$

Confidence Intervals for clipped sample percentages

Confidence intervals for the clipped stock composition estimates in each stratum (*t*) were generated using the script *Rsampit.r* (M. Ackerman, IDFG Eagle Fish Genetics Lab) performed in the R programming environment (R Development Core Team 2009). *Rsampit.r* resampled (bootstrapped) with replacement s number of times where s = 1 to Fc_{jt} (number of samples in fishery *j* and stratum *t*) from the actual data series of 'stock/brood year' assignments and unassigned fish. Within each iteration (s) the pool of samples with known release group (*i*) and brood year (*b*) assignments were expanded to Cpe_{jtib} (Equation 1) and the sum of the expanded estimates Cpe_{jt} (Equation 2) were subtracted from the sample size Fc_{jt} and to estimate the number of fish that were not assigned Cn_{jt} (Equation 3). The expanded release group/BY assignments and estimated number of unassigned fish were divided by the sample size (Fc_{jt}) to estimate their respective proportions $qc_{ji}$and qu_{ji} in the sample (Equations 4 and 5). These proportions were multiplied by the total harvest to estimate harvest contribution of each group (Equations 6 and 8). We performed 10,000 iterations and sorted the values in ascending order. The 100(1-α)% confidence intervals in each stratum for the proportions and harvest estimates were the (10,000 * α/2) and (10,000 * (1 - α/2)) values of the ordered bootstrap values. The CIs for the total Snake River basin proportion in each fishery was found by summing all Snake River release group and BY proportions in each bootstrap iteration and choosing the (10,000 * α/2) and (10,000 * (1 - α/2)) ordered values. The CIs for the total harvest in each release group was found by summing the harvest estimate of all BYs in each bootstrap iteration and choosing the (10,000 * α/2) and (10,000 * (1 - α/2)) ordered values.

Estimating stock proportions and harvest contribution for unclipped steelhead

Unclipped steelhead that were harvested were composed of unclipped hatchery fish and wild fish. The unclipped samples were analyzed using the GSI and PBT panels (Ackerman et al. 2012, Hess et al. 2013, Steele et al. 2013). The GSI panel was used to assign all fish to a GSI reporting group (Figure 5) developed by CRITFC as described in Hess et al. 2013. The PBT panel was used to assign unclipped hatchery origin steelhead to release groups and Brood Year (Table 7). Unclipped fish that were identified with the PBT panel were placed in the same release group (i) and Brood Year (b) categories as those used for used for clipped fish. Unclipped fish that did not assign to a hatchery group using the PBT panel were assigned to a GSI reporting group (k) using the best (most likely) assignment regardless of its probability. Unclipped steelhead were only harvested in the tribal Zone 6 fishery. The number of unclipped samples used in the analysis (Fu_t) was:

$$Fu_t = U_{tib} + G_{tk} \quad (16)$$

where

t = sample stratum (t=1 for all fisheries analyzed this year)

U_{ib} = number of samples assigning to hatchery release group *i* and Brood Year *b* in stratum *t*

G_k = number of samples that did not assign using the PBT panel and were assigned to a GSI report group (k) in stratum *t* using the GSI panel.

The number of known hatchery origin samples in stratum *t* was expanded by the PBT mark rate:

$$Ue_{tib} = {}^{U_{tib}}/_{m_{ib}} \quad (17)$$

where

m_{ib} = PBT mark rate of hatchery release group *i* and Brood Year *b.*

The proportion of samples in hatchery release group *i* and Brood Year b in stratum *t* was:

$$qh_{tib} = {}^{Ue_{tib}}/_{Fu_t} \quad (18)$$

The number of fish harvested from release group *i* and Brood Year *b* in stratum *t* was:

$$Hh_{tib} = qh_{tib} * Hu_t \quad (19)$$

where

Hu_t = total unclipped harvest in stratum *t*.

Since fish were added to hatchery release groups after expanding for the mark rate, an equal number of fish must be subtracted from the GSI reporting groups. The subtraction to adjust the GSI reporting group counts was done as:

The difference between the expanded and actual count of hatchery release group *i* and Brood Year b in stratum *t* was:

$$D_{tib} = Ue_{tib} - U_{tib} \quad (20)$$

The difference between the expanded and actual count in stratum *t* for each reporting group *i* was:

$$D_{ti} = D_{ti1} + D_{ti2} + D_{ti3} \quad (21)$$

where

1, 2, and 3 are Brood Year 2009, 2010, and 2011.

The number of samples to subtract from GSI reporting group k in stratum *t* was:

$$n_{tk} = \sum_{i=1}^{19} p_{ik} * D_{ti} \quad (22)$$

where

p_{ik} = proportion of hatchery release group *i* that assign to GSI reporting group *k* (see Table 8). Each p_{ik} represents the percentage of hatchery release group *i* that would assign to GSI reporting group *k* if PBT was not used. Release groups that were combined to increase sample size were (a) Wallowa and Cottonwood and (b) Sawtooth and SBT_Yankee.

The adjusted number of samples in GSI reporting group *k* in stratum *t* was:

$$A_{tk} = G_{tk} - n_{tk} \quad (23)$$

The proportion of samples in GSI reporting group *k* in stratum *t* was:

$$qg_{tk} = {}^{A_{tk}}/_{Fu_t} \quad (24)$$

The number of fish harvested from GSI reporting group *k* in stratum *t* was:

$$Hg_{tk} = qg_{tk} * Hu_t \quad (25)$$

The total harvest from hatchery release group *i* and Brood year *b* was:

$$\sum_{t=1}^{2} Hh_{tib} \quad (26)$$

The total harvest of GSI reporting group *k* was:

$$\sum_{t=1}^{2} Hg_{tk} \quad (27)$$

Sex ratios were calculated using the results of a genetic sex marker that was run on each sample during genotyping (Campbell et al. 2012). The percent of fish ≥78 cm fork length were calculated using the samples that were measured for length. We estimated the sex ratio and percent of fish ≥78 cm of the unclipped fish in each release and reporting group. For the release groups (hatchery origin fish) we used the actual count of each group that were identified with PBT. For the reporting groups, we used the actual count using the best GSI assignment for those fish that were not identified with PBT.

Confidence Intervals for unclipped sample percentages

Confidence intervals for the unclipped stock composition estimates were generated using the script *bootstock.r* (M. Ackerman, IDFG Eagle Fish Genetics Lab) performed in the R programming environment (R Development Core Team 2009). *Bootstock.r* resamples (bootstraps) with replacement from an original sample or set of data. The original stock assignments were resampled with replacement *s* number of times where s = 1 to F_u (the number of unclipped samples). Within each iteration, we then calculated the expanded Hatchery release group/Brood year (qh_{ib})and adjusted GSI reporting group assignment (qn_k) proportions and harvest contribution (Hh_{ib} and Hn_k) as outlined in equations 11 through 19. We performed 10,000 iterations and sorted the values in ascending order. The 100(1-α)% confidence intervals for the proportions and harvest estimates in each stratum were the (10,000 * α/2) and (10,000 *

(1 – α/2)) values of the ordered bootstrap values. The CIs for the total harvest in each reporting group was found by summing the harvest estimate of all BYs in each bootstrap iteration and choosing the (10,000 * α/2) and (10,000 * (1 - α/2)) ordered values.

RESULTS

Steelhead passage at Bonneville, McNary, and Ice Harbor dams

During the period from July 1 to October 31, 2013 a total of 225,586 and 141,709 steelhead were counted at Bonneville and McNary dams, respectively (Figure 4). At Bonneville Dam, 129,045 of the fish were clipped and 96,541 were unclipped. The unclipped fish were a mixture of wild origin and unclipped hatchery origin fish. TAC, using sampling data obtained at Bonneville Dam by CRITFC, estimated that there were 214,075 Group A steelhead of which 90,497 were wild. TAC estimated that the total Group B run was 11,511 of which 2,907 were wild fish (Table 9). A total of 111,393 (80,289 clipped and 31,104 unclipped) steelhead were counted at Ice Harbor Dam from July 1 to December 31, 2013.

Steelhead Run-timing at Bonneville, McNary, Ice Harbor, and Lower Granite dams

The earliest arriving stock at Bonneville Dam was the Skamania stock released in the Klickitat River followed by the Lyons Ferry stock. The 50% arrival date at Bonneville Dam was June 25 and July 27 for the Skamania and Lyons Ferry stocks, respectfully. The Skamania stock passage was more than 50% complete on the date the Lyons Ferry stock attained its 10% passage date. All stocks except Dworshak and the combined EF Salmon and Upper Salmon stock attained their 50% arrival date at Bonneville Dam by August 17. The Dworshak stock was the latest to arrive at Bonneville Dam and did not attain its 50% arrival date until September 19. The Dworshak run-timing most closely resembled the run-timing of fall Chinook at Bonneville Dam. The 50% arrival date for the Upper Columbia (August 5) and mid-Columbia (August 1) wild stocks was earlier than all hatchery stocks except the Skamania and Lyons Ferry stocks. Snake River wild fish attained their 50% arrival date on August 8. The average duration from the 10% to 90% passage date of all hatchery stocks except the Skamania was 44 days and ranged from 37 to 53 days. The Skamania stock duration from its 10% to 90% date was 93 days. The average duration from the 10% to 90% passage date of all wild stocks was 45 days and ranged from 37 to 54 days (Figure 6).

The earliest arriving stock at McNary Dam was Lyons Ferry followed by the Upper Columbia wild and hatchery stocks. The 50% arrival date at McNary was August 4 for Lyons Ferry stock and August 18 for the Upper Columbia wild stock. The latest 50% arrival date was the Dworshak stock (October 6) and the combined EF and Upper Salmon stock (September 27). Most of the other stocks attained their 50% arrival date between September 22 and September 27. The average duration from the 10% to 90% passage date of all hatchery stocks was 55 days and ranged from 34 to 70 days. The average duration from the 10% to 90% passage date of the three wild stocks was 67 days and ranged from 58 to 75 days (Figure 7).

The earliest arriving stock at Ice Harbor Dam was Lyons Ferry followed by the Imnaha and Oxbow stocks. The 50% arrival date at Ice Harbor was August 12 for Lyons Ferry stock, September 14 for Imnaha stock, and September 18 for Oxbow stock. The 50% arrival date at Ice Harbor for Snake River wild fish was September 25. The latest 50% arrival date was October 8 for the Dworshak stock and October 1 for the combined EF and Upper Salmon stock and the Wallowa stock. Most of the other stocks attained their 50% arrival date during the last

week of September. The duration from the 10% to 90% passage date of all hatchery stocks was 51 days and ranged from 37 to 68 days. The duration from the 10% to 90% passage date of the Snake River wild fish was 73 days (Figure 8a).

The stocks arrived at Lower Granite Dam in nearly the same order as they did at Ice Harbor Dam about 7 to 10 days later. All of the Lyons Ferry adults were released as smolts downstream of Lower Granite Dam, yet we detected this stock passing the dam from July 13 to October 24. The earliest 50% arrival date was Lyons Ferry on September 22 followed by the Imnaha stock on September 23. The Dworshak stock had the latest 50% arrival date (October 13). All stocks released upstream of Lower Granite Dam attained their 50% arrival date at Lower Granite Dam within nine days of their 50% arrival date at Ice Harbor except the combined EF and Upper Salmon stock (11 days) and all stocks surpassed their 75% arrival date by November 1 (Figure 8b).

Lower Columbia River sport harvest estimates

ODFW estimated that 11,212 steelhead were harvested in the lower Columbia River sport fishery from June 16 to October 31, 2103 (Jimmy Watts, personal communication). About 8% of the harvest occurred in June, 38% in July, and 53% in August. Less than 2% of the harvest occurred after September 1 (Table 2). The sport harvest in 2013 from July 1 to October 31, 2013 was about 5,500 fish less than the same period in 2012 (Appendix A).

Columbia River upstream of Bonneville Dam sport harvest estimates

WDFW estimated that 2,050 steelhead were harvested in the Columbia River between Bonneville Dam and the Highway 395 bridge from June 1 to October 31, 2013. Most of the Columbia River harvest occurred in the Bonneville Pool and between McNary Dam and Highway 395 (Table 4). WDFW estimated that 4,642 steelhead were harvested in the Little White Salmon River and Drano Lake from June 1 to October 31, 2013—and that 62% of the fish were kept in August.

Tribal Zone 6 harvest estimates

The total tribal steelhead harvest in Zone 6 fishery from June 16 to October 3, 2013 was 13,508 clipped fish and 8,938 unclipped fish (Table 5). About 23% of the clipped harvest and 26% of the unclipped harvest were caught in the summer management period from June 16 to July 31. About 25% of the clipped harvest and 22% of the unclipped harvest occurred in the Platform fisheries from July 26 to August 18. (JSR 2014b and personal communication Roger Dick II, Yakama Nation). The tribal harvest during the fall management period from August 1 to October 3, 2013 was 10,447 clipped fish and 6,629 unclipped fish. Tribal fishers harvested about 1,800 more steelhead in the fall management period in 2013 compared to the fall of 2012 (Appendix B).

Lower Snake River Sport harvest estimates

WDFW estimated that 7,558 steelhead were harvested in the lower Snake River sport fishery from September 1, 2013 to March 31, 2014 (Table 6). About 85% of the harvest occurred from September 1 to December 31, 2013. The sport harvest in 2013-14 was about 400 more fish than the 2012-13 harvest (Appendix C) in the areas we sampled each season. In 2013-14 we sampled anglers from Lower Granite Dam to the Idaho/Washington border but this section was not sampled the previous season. WDFW estimated that 5,690 steelhead were kept

from the mouth to Lower Granite Dam in the 2013-14 season compared with a harvest in this section of 7,104 fish in the 2012-13 season.

Estimating stock proportions and harvest contribution for clipped steelhead

Lower Columbia River sport fishery

We assigned over 68% (90% CI 65.7% to 71.0%) of the sport harvest from June 16 to October 31 in the lower Columbia River to hatcheries in the Snake River basin. One-ocean adults made up about 52% and two-ocean adults made up about 16% of the total harvest. Three-ocean adults made up about 0.3% of the total harvest. About 32% of the harvest was assigned to non-Snake River hatchery fish of unknown adult age (Table 10 and 11). The largest contribution to the harvest from the Snake River basin was from the Pahsimeroi, Sawtooth, Lyons Ferry, and Wallowa (all groups and BYs combined) release groups. These four hatchery stocks made up nearly 55% of the harvest (Table 10 and Figure 9). The contribution of the Dworshak release groups was estimated to be 2%. The largest contribution to harvest was from the Other (31.7%, 3,553 fish), BY11 Pahsimeroi (17.1%, 1,916 fish), and BY11 Sawtooth (10.4%, 1,165 fish) release groups. The percent of harvest and harvest estimates with the 90% CI for all release groups are shown in Tables 11 and 12.

The stock composition in this fishery differed during the season. From June 16 to June 30, we estimated that 80% of the harvest was from non-Snake River hatcheries. In this period only three Snake River stocks were identified in the harvest: 17% from Lyons Ferry and 2% each from Wallowa and Sawtooth (Figure 10a). In July, the Snake River basin contribution increased to 56%, with the Pahsimeroi, Sawtooth, and Wallowa stocks making up 36% of the harvest. The Dworshak stock made up 0.2% of the July harvest (Figure 10b). From August 1 to October 31, the Snake River stocks contributed 83% of the harvest. The Pahsimeroi, Sawtooth, and Wallowa stocks made up 58% of the harvest in this period. The Dworshak stock made up 4% of the harvest after August 1 (Figure 10c).

We were able to identify the sex of 1,021 fish using the genetic sex marker. We found that females made up 48.1% of the harvest. The percentage of female by release group ranged from 27.8% to 67.8% for groups with a sample size >10 (Table 13). We used all samples to calculate that 3.2% of the harvested fish were ≥78 cm fork length. We found that 88% of the large fish were either from the Dworshak or Other groups.

Columbia River upstream of Bonneville Dam sport fishery

We assigned about 84% (90% CI 79.0% to 89.6%) of the samples to hatcheries in the Snake River basin (Figure 11). One-ocean adults made up about 25% and two-ocean adults made up about 59% of the total harvest. About 16% of the harvest was assigned to non-Snake River hatchery fish of unknown adult age. The largest contribution from the Snake River hatchery stocks was from the Sawtooth (23.8%), Pahsimeroi (15.8%), and Wallowa (17.7%) stocks. The largest contribution from release groups came from the Other (15.7%), BY11 Sawtooth (15.1%), BY11 Pahsimeroi (11.7%), and BY11 Wallowa (10.0%) release groups (Tables 14 and 15).

We were able to identify the sex of 168 fish using the genetic sex marker. We found that females made up 37.5% of the harvest. The percentage of female by release group ranged from 30.4% to 41.7% for groups with a sample size >10 (Table 16). We used all samples to calculate

that 6.4% of the harvested fish in the areas sampled were ≥78 cm fork length. Over 85% of the large fish were from Dworshak release groups.

Tribal Columbia River Zone 6 fishery

We estimate that about 84% (90% CI 81.6% to 86.2%) of the clipped steelhead harvested in the tribal Zone 6 fishery from June 16 to October 9 came from hatcheries in the Snake River basin (Table 17 and Figure 12). One-ocean adults made up about 57% and two-ocean adults made up about 26% of the total harvest. Three- and four-ocean adults made up about 0.3% of the total harvest. About 16% of the harvest was assigned to non-Snake River hatchery fish of unknown adult age (Table 17 and 18). About 60% of the clipped harvest came from release groups of the Pahsimeroi (23%), Wallowa (19%), and Sawtooth (18%) stocks. The Dworshak stock contributed about 10% of the total harvest (Table 18 and Figure 12). The largest contribution to the harvest by release group was 2,374 fish from BY11 Pahsimeroi, 2,176 fish from the Other group, and 1,392 fish from BY10 Dworshak (Table 19).

We found a difference in the stock composition of the harvest in the summer management period compared to the fall management period. In the summer period, the Snake River basin made up about 63% of the harvest. The largest contribution from the Snake River was from the Wallowa (18%), Lyons Ferry (17%), and Sawtooth (13%) release groups. We did not sample any fish from the Dworshak release groups during the summer period (Figure 13a). During the fall management period, the Snake River basin made up about 89% of the harvest. The largest contribution from the Snake River was from the Pahsimeroi (25%), Wallowa (20%), and Sawtooth (19%) release groups. The Dworshak release groups made up 12% of the harvest in the fall period (Figure 13b).

We were able to identify the sex of 952 fish using the genetic sex marker. We found that females made up 42.5% of the harvest. The percentage of female by release group ranged from 29% to 61.5% for groups with a sample size >10 (Table 20). We used all samples to calculate that 8.3% of the harvested fish were ≥78 cm fork length. About 81% of the large fish came from Dworshak release groups and 12% from the Other group.

Lower Snake River sport fishery

We estimate that over 96% (90% CI 94.6% to 98.0%) of the harvest was from hatcheries in the Snake River basin (Table 21 and Figure 14). One-ocean adults made up about 63% and two-ocean adults made up about 33% of the total harvest. About 4% of the harvest was assigned to non-Snake River hatchery fish of unknown adult age (Table 21 and 22). Over 75% of the harvest came from the Lyons Ferry (42%), Dworshak (20%), and Pahsimeroi (13%) stocks (Table 22). The number of fish kept from these three stocks was: 3,871 from Lyons Ferry; 1,791 from Dworshak; and 1,209 from Pahsimeroi (Table 23). All other stocks each contributed less than 10% of the harvest (Figure 14).

The stock composition in this fishery differed during the season. From September 1 to December 31, 2013, we estimated that 97% of the harvest was from Snake River hatcheries. The largest contribution came from the Lyons Ferry (41%), Dworshak (20%), and Pahsimeroi (14%) release groups (Figure 15a). From January 1 to March 31, 2014 we estimated that 92% of the harvest came from Snake River hatcheries. The largest contribution was from the Lyons Ferry (54%), Dworshak (15%), Pahsimeroi (8%), and Sawtooth (8%) release groups (Figure 15b).

We were able to identify the sex of 710 fish using the genetic sex marker. We found that females made up 39.2% of the harvest. The percentage of female by release group ranged from 30.1% to 47.4% for groups with a sample size >10 (Table 24). We estimate that nearly 13% of the harvested fish were ≥78 cm fork length. About 90% of the large fish came from Dworshak release groups and 8% from the Lyons Ferry groups.

Estimating stock proportions and harvest contribution for unclipped steelhead

Tribal Columbia River Zone 6 fishery

We estimate that a minimum of 26% of the total unclipped harvest came from the Snake River basin (Figure 16). The largest contribution (63%) was from the MGILCS reporting group. The MGILCS group extends into the Snake River basin; hence the percentage of the total harvest that came from the Snake River basin is likely more than 26%. We estimated that about 11% of the total unclipped harvest was Snake River basin hatchery origin (Table 25 and Figure 16). Dworshak release groups (3.9%) were the largest contributor to total harvest of unclipped hatchery fish (Table 26). We estimate that 5,661 steelhead were harvested from the MGILCS, 760 from the UPSALM, and 522 from the UPPCOL reporting groups. We estimate that 347 fish were harvested from all Dworshak release groups. The remaining hatchery and GSI groups each contributed less than 230 fish to the unclipped harvest. (Table 27).

We found a difference in the stock composition of the harvest in the summer management period compared to the fall management period. In the summer period, the Snake River basin made up a minimum of 11% of the harvest. The MGILCS group contributed 72% of the harvest and Idaho wild groups 10%. We did not sample any unclipped Dworshak origin fish in the summer period (Figure 17a). During the fall management period, the Snake River basin made up a minimum of 27% of the harvest. The MGILCS group contributed 60% of the harvest and Idaho wild groups 18%. Unclipped Dworshak origin fish made up 5% of the harvest in the fall period (Figure 17b).

We were able to identify the sex of 615 fish using the genetic sex marker. We found that females made up 50.4% of the harvest. The percentage of female by release group ranged from 27.3% to 72.7% for groups with a sample size >10 (Table 28). We estimate that 8.2% of the harvested fish were ≥78 cm fork length. About 40% and 20% of the large fish came from Dworshak and MGILCS groups, respectively.

DISCUSSION

The majority of summer steelhead smolts released in the Columbia River basin are produced in the Snake River basin. Snake River basin hatcheries released 74% and 87% of the total BY11 (1-ocean adults) summer steelhead smolts released in the Columbia River basin and upstream of Bonneville Dam, respectively. The Snake River basin hatcheries released 72% and 84% of the total BY10 (2-ocean returns) summer steelhead smolts released in the Columbia River basin and upstream of Bonneville Dam, respectively. We found that steelhead from Snake River basin hatcheries made up about 68% of the sport harvest in the lower Columbia River, 84% of the sport harvest in Zone 6, 84% of the tribal Zone 6 clipped harvest, and 11% of the tribal Zone 6 unclipped harvest. We were able to assign 15% of the tribal Zone 6 unclipped harvest to GSI reporting groups within Idaho. We assigned the lower Columbia River sport harvest (Tables 10 and 11) and the Tribal Zone 6 clipped harvest (Tables 17 and 18) to 11 Snake River hatchery release groups that included three BYs. We assigned the sport Zone 6

harvest to nine Snake River hatchery release groups that included two BYs (Table 15). In the tribal Zone 6 unclipped harvest, we assigned part of the harvest to 13 Snake River hatchery release groups that included two BYs (Tables 25 and 26).

The total sport harvest in the lower Columbia River was the lowest it has been since the inception of genetic sampling in 2011 (Appendix A). Harvest in 2013 was about 4,700 fish less than 2012 and about 9,400 less than the 2011 harvest. In 2013, we began sampling the lower Columbia sport fishery on June 16—two weeks earlier than 2012 and six weeks earlier than 2011. We were able to detect differences in the stock composition of the harvest as the fishery progressed that we attribute to run-timing differences among the hatchery stocks. Although we cannot be certain of run-timing at the mouth of the Columbia River, if we assume that the run-timing of stocks at Bonneville Dam reflect their arrival at the mouth of the river, the stock composition differences we observed in the sport fishery could be explained by run-timing differences among the stocks (Figure 6). In June, the Other group made up 80% of the harvest and Lyons Ferry 17% (Figure 10a). The Sawtooth and Wallowa stocks each made up about 2% of the harvest (less than 20 fish). At Bonneville Dam the Skamania stock released in the Klickitat River attained its 10% arrival date on April 25 and the 25% arrival date on June 3. This stock is also released in Columbia River tributaries downstream of Bonneville Dam and likely has the same run-timing as those fish released in the Klickitat River. The Lyons Ferry fish attained their 10% arrival date on July 3 and the Upper Columbia hatchery group attained their 10% date on July 17. Since steelhead from the Skamania and Upper Columbia stocks were not in the PBT baseline, fish from these groups would be placed in the Other group. The catch of summer steelhead in the Cowlitz, Lewis, and Kalama rivers was highest in July and August and it is likely that fish from these rivers were caught in the main stem Columbia River before they entered the terminal fisheries. Fish returning to the Cowlitz, Lewis, and Kalama rivers, if caught in the Columbia River and sampled, would have been placed in the Other group. The presence of most Snake River stocks was observed in the July stock composition of the harvest. In July, the Other group was 44% of the harvest, and the Lyons Ferry, Pahsimeroi, Sawtooth, and Wallowa stocks each contributed more than 10% each to the July harvest. The Dworshak contribution was only 0.2% (Figure 10b). The Pahsimeroi, Sawtooth, and Wallowa stocks all attained their 10% arrival date at Bonneville Dam between July 26 and July 29. The Lyons Ferry stocks reached its 50% arrival date on July 28. During the period August 1 to October 31, Snake River stocks made up 83% of the harvest with the Pahsimeroi, Sawtooth, and Wallowa stocks making up 58% of the harvest. Dworshak made up 4% of the harvest in this time period (Figure 10c). All Snake River stocks attained their 50% and 75% arrival date at Bonneville dam by August 17 and August 30, respectively except the Dworshak, and combined EF and Upper Salmon stocks. Dworshak attained its 10% arrival date at Bonneville Dam on August 29 and its 50% arrival date on September 19.

In 2013 we expanded the time period of our stock composition estimates of the tribal harvest to include the summer management period from June 16 to July 31. The tribal steelhead harvest in the summer period of 2013 was more than 2011 and 2012. The 2013 fall period steelhead harvest was about 1,900 fish more than 2012 but 9,000 fish less than in 2011. We detected stock composition differences in between the summer and fall periods that likely reflect run-timing differences among the stocks at Bonneville Dam. In the summer period, the Other group contributed 37% to the clipped harvest followed by Wallowa (18%) and Lyons Ferry (17%). The Pahsimeroi and Sawtooth stocks made up another 23% of the clipped harvest. We did not sample any fish from the Dworshak stock during the summer period (Figure 13a). As discussed in the previous paragraph, Lyons Ferry was the earliest arriving Snake River stock at Bonneville Dam followed by Wallowa, Pahsimeroi, and Sawtooth. During the fall fishery, the Other group declined to 11% of the clipped harvest and the Pahsimeroi, Wallowa, and Sawtooth

stocks made up 64% of the clipped harvest. The Dworshak stock made up 12% of the clipped harvest in the fall period (Figure 13b). The appearance of Dworshak stock in the fall fishery and lack of it in the summer fishery is consistent with its run-timing at Bonneville Dam. The first PIT detection of Dworshak at Bonneville occurred on July 27 but the 5% arrival date at Bonneville was not attained until August 22, nearly one month later. The Dworshak stock did not reach its 50% date until September 19. We also observed a stock composition difference between the summer and fall periods in the unclipped tribal Zone 6 harvest. During the summer period we did not sample any Dworshak fish and estimated the Snake River hatchery contribution be about 2% in the unclipped harvest. Most of the unclipped harvest during the summer was from the MGILCS (72%) group with all Idaho GSI reporting groups contributing nearly 10% of the harvest (Figure 17a). During the fall period, the Snake River hatchery contribution to unclipped harvest rose to 14%, with Dworshak providing 5% of the harvest. The MGILCS GSI group was still the largest contributor to harvest but its share declined to 60% while the Idaho GSI groups share of harvest rose to 17% (Figure 17b). The MGILCS group includes fish from a wide geographic area from the Snake and middle Columbia tributaries and includes the Deschutes, John Day, Umatilla, and Walla Walla basins. Wild steelhead from non-Snake River basins tend to arrive earlier at Bonneville Dam than wild fish from the Snake River basin (Figure 6). As has been the case since 2011, the majority of the fall Chinook and steelhead were harvested during a three-week period in September. In 2013, nearly 69% of the fall Chinook and 33% of the steelhead were caught between September 2 and September 22 (Statistical weeks 36 to 38). However in 2013 the largest three-week percentage of steelhead harvested during the fall period occurred during the last three weeks of the season (Statistical weeks 38 to 40) and the largest percentage for a week occurred in Week 40. In the previous two years the largest three-week percent and largest weekly percentage of steelhead harvest occurred during the three-week peak Chinook harvest period (Appendix B, Table B.3.).

In the 2013-14 season, the lower Snake River harvest estimate was made from the mouth to the Idaho/Washington border, whereas the previous season we estimated the harvest from the mouth to Lower Granite Dam. This years' total harvest was about 400 fish more than the 2012-13 season (Appendix C, Table C. 1.). However, 1,868 fish were caught between Lower Granite Dam and the Idaho/Washington border this season. We found similar contributions to the total harvest from the hatchery stocks in both years. Lyons Ferry made the largest contribution (42% this season and 37% in 2012-13), followed by Dworshak (20% this season and 24% in 2012-13), and Pahsimeroi (13% in both seasons). We noted a difference in the stock composition of the catch during the fall and winter. In the fall, Lyons Ferry made up 41% of the harvest, other Snake River stocks made up 56% of the harvest, and non-Snake River hatchery stocks made up 3% of the harvest. In the winter season the Lyons Ferry contribution rose to 54% of the harvest, other Snake River hatchery stocks declined to 38% of the harvest, and non-Snake River hatchery stocks increased to 8% of the harvest (Figure 15). A higher percent of the Lyons Ferry stock in the winter harvest is likely due to the other Snake River stocks continuing their migration upstream and exiting the fishery. The Lyons Ferry stock is released in the Snake River downstream of Lower Granite Dam and in the Tucannon River. Adults from these smolt releases likely remain in the fishery throughout the fall and winter season. Excluding the Lyons Ferry stock, the passage of all Snake River hatchery stocks was at least 95% complete at Lower Granite Dam by November 21, 2013 except for Dworshak. The Dworshak stock passage at Lower Granite was 89% complete on January 1, 2014 and 95% complete on March 14, 2014 (Appendix D). The catch of non-Snake River hatchery stocks in this fishery was higher this season than in 2012-13. Non-Snake River hatchery stocks made up 3.7% of the 2013-14 harvest whereas they made up less than 1% of the 2012-13 harvest.

The number of Dworshak steelhead caught and its percentage of the total tribal Zone 6 fall fishery was lower this year than it was the previous two years. In 2011 and 2012 the Dworshak stock was the largest contributor to harvest providing nearly 40% and 20% of the harvest in 2011 and 2102, respectively. In 2013, Dworshak made of about 8% of the harvest. The abundance of Dworshak fish at Bonneville Dam has declined in each of the past three years. In 2011, Dworshak abundance was estimated to be 45,000 fish, in 2012 it was 29,200 fish, and in 2013 it was 19,400 fish (Appendix D, Figure D. 2.). Four other hatchery stocks and the MGILCS reporting group all had more fish harvested than Dworshak (Appendix B, Table B. 4.). Some of the decline could be explained by Dworshak having a later run-timing than fall Chinook in 2013 (Appendix D, Figure D. 1.). However, the 2013 run was not as late as the 2012 return, yet the Dworshak harvest share declined from 20% to 8%. IDFG sampled known 2-ocean Dworshak steelhead at Lower Granite Dam during the fall 2013 and found that about 63% of the fish were ≥78 cm and that the mean length was 79 cm (IDFG, unpublished data). The recent five-year average (2008 – 2012) mean length of Dworshak 2-ocean steelhead was 82 cm and the five-year average percentage of 2-ocean adults ≥78 cm was 81%. Most of the tribal catch was in the set and drift net gear. In 2013, the tribal fishery used an 8" minimum mesh[1] net. The majority of the set and drift net gear used in the fishery measured between 8" and 9.25". If Dworshak fish were smaller than average then more of them would likely pass through the set and drift net gear they encountered. The lower contribution of the Dworshak stock in 2013 is likely due to its later run-timing than fall Chinook, the smaller size of the 2-ocean adults (which is the dominant age of ocean return for this stock), and the lower abundance of the stock compared to the previous two years.

Despite the smaller size of Dworshak steelhead, this stock was the major contributor of large fish (≥78 cm, Group B) in all fisheries. In the lower Columbia River sport fishery Dworshak made up 21% of the large fish harvested despite only contributing 2% to the total harvest. In the tribal Zone 6 fishery Dworshak provided 81% of the clipped large fish harvested and 10% of total clipped harvest. Unclipped Dworshak origin hatchery fish provided 40% of the Zone 6 unclipped large harvest and only 4% of total unclipped harvest. In the Snake River sport fishery, nearly 20% of the total harvest and nearly 90% of the large fish harvested were Dworshak stock. This result has been consistent in each of the three years we have estimated the stock composition of harvest in the Columbia and Snake rivers. It illustrates the importance of the Dworshak stock in determining the total Group B run size at Bonneville Dam and the resultant allowable harvest rate of group B steelhead in the Zone 6 tribal fisheries.

[1] Mesh size is measured by holding opposite corners of a mesh opening in a net panel and pulling apart to close the opening. An 8" mesh net will have square or diamond shaped openings measuring 4" on a side. The total opening will be 16" in circumference if the opening is stretched into a circle. Fish with a body circumference smaller than the mesh opening may be able to get through the mesh easier than a larger fish although the nets do stretch and any size fish can be caught by tangling in the net.

REFERENCES

Ackerman, M.W., J. McCane, C.A. Steele, M.R. Campbell, A.P. Matala, J.E. Hess, and S.R. Narum. 2012. Chinook and steelhead Genotyping for Genetic Stock Identification at Lower Granite Dam. Idaho Department of Fish and Game Report 12-15. Annual Report, BPA Project 2010-026-00.

Byrne, A, J. Hymer, S. Ellis, R. Dick II, K. Keller, C.A. Steele , J.E. Hess, M.W. Ackerman. 2014a. A genetic analysis of the summer steelhead stock composition in the 2011 Columbia River tribal and sport fisheries. Idaho Department of Fish and Game Report 14-11. Boise.

Byrne, A, J. Hymer, S. Ellis, R. Dick II, K. Keller, C.A. Steele , J.E. Hess, M. Begay, J.D. Bumgarner. 2014b. A genetic analysis of the summer steelhead stock composition in the 2011 Columbia River and Snake River tribal and sport fisheries from July 1, 2012 to March 31, 2013. Idaho Department of Fish and Game Report 14-12. Boise.

Campbell, M.R., C.C. Kozfkay, T. Copeland, W.C. Schrader, M.W. Ackerman, and S.R. Narum. 2012. Estimating Abundance and Life History Characteristics of Threatened Wild Snake River Steelhead Stocks by Using Genetic Stock Identification. Transactions of the American Fisheries Society 141(5):1310–1327.

Hess, J.E., N.R. Campbell, A.P. Matala, and S.R. Narum. 2013. 2012 Annual Report: Genetic Assessment of Columbia River Stocks. U.S. Department of Energy Bonneville Power Administration Report Project #2008-907-00.

JSR (Joint Staff Report) 2014a. 2014 Joint Staff Report: Stock Status and Fisheries for Spring Chinook, Summer Chinook, Sockeye, Steelhead, and other species, and miscellaneous regulations. Joint Columbia River Management Staff. January 22, 2014.

JSR (Joint Staff Report) 2014b. 2014 Joint Staff Report: Stock Status and Fisheries for Fall Chinook Salmon, Coho Salmon, Chum Salmon, Summer Steelhead, and White Sturgeon. Joint Columbia River Management Staff. July 14, 2014.

R Development Core Team. 2009. The comprehensive R archive network. Available: http://cran.r-project.org/ (February 2013).

Steele, C. A., M. Ackerman, J. McCane, M. Hess, N. Campbell, S.R. Narum, M.R. Campbell. 2011. Parentage Based Tagging Snake River hatchery steelhead and Chinook salmon. Annual Report. BPA (Project No. 2010-031-00 Contract Number 48348). United States Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife, P. O. Box 3621, Portland, Oregon 97208.

Steele, C.A., E.C. Anderson, M.W. Ackerman, M.A. Hess, N.R. Campbell, S.R. Narum, and M.R. Campbell. 2013. A validation of parentage-based tagging using hatchery steelhead in the Snake River basin. Canadian Journal of Fisheries and Aquatic Sciences. 70: 1046–1054.

TAC 2008. *U.S. v Oregon* Technical Advisory Committee. Biological Assessment of Incidental Impacts on Salmon Species Listed Under the Endangered Species Act in

the 2008-2017 Non-Indian and Treaty Indian Fisheries in the Columbia River Basin. April 21, 2008.

Watts, James W. February 2013 (in draft). The 2011 Lower Columbia River and Buoy 10 Recreational Fisheries. Oregon Department of Fish and Wildlife. Columbia River Management. Clackamas.

Table 1. Summer steelhead smolt releases by Region and Brood Year (BY) in the Columbia River basin. BY09 releases were the 3-ocean adult returns, BY10 were the 2-ocean adult returns, and BY11 were the 1-ocean returns in the fall 2013. Data were downloaded from Fish Passage Center website (*http://www.fpc.org*) on January 25, 2013. Clipped and unclipped refer to the adipose fin.

	Unclipped smolts	Clipped smolts	Total smolts
BY11	**1,827,239**	**11,073,706**	**12,900,945**
Downstream of Bonneville Dam [a]	9,217	1,960,507	1,969,724
Bonneville Dam to McNary Dam	70,948	645,974	716,922
Upstream of McNary Dam [b]	145,942	519,490	665,432
Snake River basin	1,601,132	7,947,735	9,548,867
BY10	**1,765,550**	**11,554,036**	**13,319,586**
Downstream of Bonneville Dam [a]	17,370	1,912,749	1,930,119
Bonneville Dam to McNary Dam	91,437	620,978	712,415
Upstream of McNary Dam [b]	333,577	768,822	1,102,399
Snake River basin	1,323,166	8,251,487	9,574,653
BY09	**1,504,803**	**10,246,195**	**11,750,998**
Downstream of Bonneville Dam [a]	14,213	1,811,609	1,825,822
Bonneville Dam to McNary Dam	64,697	676,495	741,192
Upstream of McNary Dam [b]	362,883	777,353	1,140,236
Snake River basin	1,063,010	6,980,738	8,043,748

[a] Includes the Willamette River basin
[b] Excluding the Snake River basin.

Table 2. Monthly steelhead harvest estimates and the number of samples analyzed for stock composition in the lower Columbia River sport fishery from June 16 to October 31, 2013.

Month	Harvest	Percent of harvest	Samples analyzed	Percent of samples
June 16 -30	854	7.6%	66	6.2%
July	4,219	37.6%	418	39.4%
August	5,988	53.4%	564	53.1%
September	135	1.2%	14	1.3%
October	16	0.1%	0	0
Total:	**11,212**		**1,062**	

Table 3. Number of samples used for the stock composition estimate in the sport fishery upstream of Bonneville Dam in 2013. BON = Bonneville; TDA = The Dalles.

Monday start	Stat week	BON Pool	TDA Pool	Mouth of Deschutes	Drano Lake	Mouth of Wind	Weekly Total
7/15	29				1		1
7/22	30				4		4
7/29	31	1			46		47
8/5	32	8	1		45	4	58
8/12	33			5	15	3	23
8/19	34	2			13		15
8/26	35			2			2
9/2	36				11		11
9/9	37						0
9/16	38			2			2
9/23	39			1			1
9/30	40	1		2			3
10/7	41			2			2
10/14	42			4			4
Total		**12**	**1**	**18**	**135**	**7**	**173**

Table 4. Monthly sport harvest estimates in the Columbia River upstream of Bonneville Dam from June 1, 2013 to October 31, 2013.

River Section	June	July	August	Sept	October	Total
Bonneville Dam to The Dalles Dam	14	120	573	35	39	781
The Dalles Dam to John Day Dam	0	21	32	39	25	117
John Day Dam to McNary Dam	21	32	21	14	110	198
McNary Dam to Highway 395	4	39	60	78	773	954
Columbia River total: Bonneville Dam to Highway 395 bridge	***39***	***212***	***686***	***166***	***947***	***2,050***
Little White Salmon and Drano Lake	11	266	2,898	1,435	32	4,642

Table 5. Tribal Steelhead harvest and the number of samples used in the analysis of the Zone 6 tribal fishery in 2013. The dates for Stat weeks 25 through 30 and Stat weeks 34 to 40 were the open dates for treaty commercial gillnets. Platform fisheries were open daily from June 16 to October 9, 2013.

									Clipped			Unclipped		
Stat	Start	End	Clipped Harvest			Unclipped Harvest			Percent	Samples	Percent	Percent	Samples	Percent
Week	Date	Date	Platform	Net	Total	Platform	Net	Total	harvest	analyzed	samples	harvest	analyzed	samples
25	6/17	6/21	99	3	102	0	5	5	0.8%	10	1.0%	0.1%	4	0.6%
26	6/24	6/27	121	5	126	0	38	38	0.9%	7	0.7%	0.4%	3	0.5%
27	7/1	7/3	154	19	173	110	10	120	1.3%	16	1.6%	1.3%	4	0.6%
28	7/8	7/11	319	40	359	220	48	268	2.7%	16	1.6%	3.0%	41	6.5%
29	7/15	7/18	374	125	499	198	99	297	3.7%	1	0.1%	3.3%	2	0.3%
30	7/22	7/25	704	394	1,098	605	371	976	8.1%	105	10.4%	10.9%	117	18.6%
30-31	7/26	7/31	704	0	704	605	0	605	5.2%	13	1.3%	6.8%	17	2.7%
Summer period total			***2,475***	***586***	***3,061***	***1,738***	***571***	***2,309***	***22.7%***	***168***	***16.6%***	***25.8%***	***188***	***29.9%***
31 - 33	8/1	8/18	2,715	0	2,715	1,385	0	1,385	20.1%	0	0.0%	15.5%	2	0.3%
34	8/19	8/21	444	134	578	336	101	437	4.3%	279	27.6%	4.9%	78	12.4%
35	8/26	8/30	252	678	930	118	317	435	6.9%	73	7.2%	4.9%	31	4.9%
36	9/3	9/7	123	1,165	1,288	77	733	810	9.5%	101	10.0%	9.1%	62	9.9%
37	9/10	9/14	68	1,253	1,321	42	770	812	9.8%	102	10.1%	9.1%	59	9.4%
38	9/16	9/20	67	732	799	43	476	519	5.9%	63	6.2%	5.8%	39	6.2%
39	9/24	9/27	95	1,001	1,096	65	694	759	8.1%	88	8.7%	8.5%	58	9.2%
40	9/30	10/3	43	1,677	1,720	37	1,435	1,472	12.7%	137	13.6%	16.5%	111	17.7%
Fall period total			***3,807***	***6,640***	***10,447***	***2,103***	***4,526***	***6,629***	***77.3%***	***843***	***83.4%***	***74.2%***	***440***	***70.1%***
Total			**6,282**	**7,226**	**13,508**	**3,841**	**5,097**	**8,938**		**1,011**			**628**	

Table 6. Monthly harvest and sample allocation for the lower Snake River sport fishery from September 1, 2013 to March 31, 2014. Percentage may not sum to 100% due to rounding error.

	Harvest estimates			Samples collected		Samples analyzed	
Month	**Prelim**	**Final**	**% of Final**	**Number**	**% of total**	**Number**	**% of total**
September	922	897	11.9%	114	11.6%	100	14.1%
October	3,756	3,658	48.4%	503	51.0%	333	46.9%
November	1,273	1,237	16.4%	213	21.6%	120	16.9%
December	613	597	7.9%	64	6.5%	64	9.0%
January	691	673	8.9%	56	5.7%	57	8.0%
February	274	264	3.5%	23	2.3%	23	3.2%
March	238	232	3.1%	13	1.3%	13	1.8%
Total	**7,767**	**7,558**		**986**		**710**	

Table 7. Description of hatchery stocks, release groups, and tag rates for Brood Years 2009 (3-ocean adults), 2010 (2-ocean adults), and 2011 (1-ocean adults) that were included in the PBT parental baseline used to make assignments for steelhead returning to the Columbia River in 2013. SBT = Shoshone –Bannock Tribe. na = no fish in this BY release group.

Hatchery Stock--program	Release group	BY09	BY10	BY11
Dworshak	Dworshak	0.9776	0.9827	0.9851
SF Clearwater	SF Clearwater	na	1.0000	0.8571
EF Salmon - spawned at Sawtooth	EF Salmon[a]	1.0000	1.0000	1.0000
EF Salmon released in-river at weir	EFS_Nat	1.0000	NS	NS
Imnaha	Imnaha	1.0000	0.8836	1.0000
Lyons Ferry	Lyons Ferry[b]	0.9906	1.0000	1.0000
Oxbow	Oxbow	0.8750	0.9121	0.9202
Pahsimeroi - general production	Pahsimeroi	0.9483	0.9698	0.7936
Pahsimeroi - SBT Beaver Creek egg box	SBT_Beaver	na	na	0.7979
Pahsimeroi - SBT Indian Creek egg box	SBT_Indian	0.9107	0.9520	0.8095
Pahsimeroi - SBT Panther Creek egg box	SBT_Panther	0.9540	0.9620	na
Pahsimeroi - SBT programs	SBT_Pah	na	0.8125	na
Sawtooth - general production	Sawtooth	1.0000	0.9977	0.9967
Sawtooth - SBT Basin Creek egg box	SBT_Basin	0.9832	na	na
Sawtooth - SBT Yankee Fork egg box	SBT_YF_Egg	na	1.0000	1.0000
Sawtooth - Egg box program	SBT_Egg	na	na	na
Sawtooth - SBT Yankee Fork smolt release	SBT_Yankee	1.0000	1.0000	0.9898
Touchet endemic	Touchet	0.8889	0.6429	1.0000
Tucannon endemic	Tucannon	0.8750	0.6944	0.6861
Upper Salmon	Upper Salmon	1.0000	0.9474	1.0000
Wallowa - Cottonwood release	Cottonwood	0.9583	1.0000	0.9598
Wallowa	Wallowa	0.9094	0.9761	0.9833

[a] In the 2011 and 2012 reports this group was called EF_Sawtooth.
[b] Includes releases in the Walla Walla River basin.

Table 8. Re-allocation table used to subtract samples from GSI reporting groups after expanding hatchery release groups by their PBT tag rate.

		GSI Reporting Group						
Release group	**n**	**KLICKR**	**MFSALM**	**MGILCS**	**SFCLWR**	**UPCLWR**	**UPPCOL**	**UPSALM**
Dworshak	197	0	0	0.041	0.939	0.020	0	0
EF Salmon	28	0.036	0	0.321	0.071	0.036	0	0.536
Imnaha	3	0	0	1	0	0	0	0
Lyons Ferry	3	0	0	1	0	0	0	0
Oxbow	10	0	0	0.400	0	0	0	0.600
Pahsimeroi	23	0	0	0.435	0	0	0.043	0.522
Sawtooth	48	0	0.021	0.292	0	0	0	0.688
SBT_Yankee		0	0.021	0.292	0	0	0	0.688
Touchet	1	0	0	1	0	0	0	0
Tucannon	10	0	0	0.600	0	0	0.300	0.100
Upper Salmon	8	0	0	0.250	0.625	0.125	0	0
Wallowa	9	0	0	1	0	0	0	0
Cottonwood		0	0	1	0	0	0	0

Table 9. The number of clipped and unclipped steelhead counted and sampled at Bonneville Dam and the estimated passage of hatchery (Hat) and wild Group A and Group B steelhead from July 1 to October 31, 2013.

Bonneville Dam count					Fish sampled		Percent of clip		Percent of Unclip				Estimated weekly passage			
Start	**End**	**Clip**	**Unclip**	**Total**	**Clip**	**Unclip**	**Hat A**	**Hat B**	**Hat A**	**Hat B**	**Wild A**	**Wild B**	**Hat A**	**Hat B**	**Wild A**	**Wild B**
7/1	7/14	4,013	5,059	9,072	22	34	100.0%	0.0%	2.9%	0.0%	97.1%	0.0%	4,162	0	4,910	0
7/15	7/28	14,458	23,030	37,488	121	231	100.0%	0.0%	3.9%	0.0%	95.7%	0.4%	15,355	0	22,033	100
7/29	8/11	41,998	35,079	77,077	106	87	99.1%	0.9%	2.3%	0.0%	97.7%	0.0%	42,407	396	34,273	0
8/12	8/25	24,753	14,132	38,885	123	94	100.0%	0.0%	3.2%	0.0%	96.8%	0.0%	25,204	0	13,681	0
8/26	9/8	17,697	8,303	26,000	94	41	95.7%	4.3%	2.4%	0.0%	95.1%	2.4%	17,146	753	7,898	203
9/9	9/22	15,179	6,150	21,329	51	19	70.6%	29.4%	0.0%	0.0%	84.2%	15.8%	10,715	4,464	5,179	971
9/23	10/6	8,110	3,493	11,603	75	39	78.7%	21.3%	12.8%	0.0%	59.0%	28.2%	6,828	1,730	2,060	985
10/7	10/31	2,837	1,295	4,132	45	14	55.6%	44.4%	14.3%	0.0%	35.7%	50.0%	1,761	1,261	463	648
Total		**129,045**	**96,541**	**225,586**									**123,578**	**8,604**	**90,497**	**2,907**

Table 10. Actual, expanded, and percent of samples that assigned to hatchery release groups that was used to estimate the steelhead harvest in the lower Columbia River sport fishery from June 16 to October 31, 2013.

		PBT Assignments											
		Actual Count				Expanded for Tag rate				Percent of expanded sample			
Hatchery stock	**Release group**	**BY09**	**BY10**	**BY11**	**Total**	**BY09**	**BY10**	**BY11**	**Total**	**BY09**	**BY10**	**BY11**	**Total**
Wallowa	Cottonwood	0	9	28	37	0.0	9.0	29.2	38.2	0.0%	0.8%	2.7%	3.6%
Dworshak	Dworshak	1	14	7	22	1.0	14.2	7.1	22.4	0.1%	1.3%	0.7%	2.1%
EF Salmon	EF Salmon	0	0	1	1	0.0	0.0	1.0	1.0	0.0%	0.0%	0.1%	0.1%
Imnaha	Imnaha	0	4	43	47	0.0	4.5	43.0	47.5	0.0%	0.4%	4.0%	4.5%
Lyons Ferry	Lyons Ferry	0	23	61	84	0.0	23.0	61.0	84.0	0.0%	2.2%	5.7%	7.9%
Oxbow	Oxbow	1	17	49	67	1.1	18.6	53.2	73.0	0.1%	1.8%	5.0%	6.9%
Pahsimeroi	Pahsimeroi	0	40	144	184	0.0	41.2	181.5	222.7	0.0%	3.9%	17.1%	21.0%
Sawtooth	Sawtooth	1	25	110	136	1.0	25.1	110.4	136.4	0.1%	2.4%	10.4%	12.8%
Sawtooth	SBT_Yankee	0	5	11	16	0.0	5.0	11.1	16.1	0.0%	0.5%	1.0%	1.5%
Touchet	Touchet	0	1	0	1	0.0	1.6	0.0	1.6	0.0%	0.1%	0.0%	0.1%
Wallowa	Wallowa	0	26	55	81	0.0	26.6	55.9	82.6	0.0%	2.5%	5.3%	7.8%
Snake River total:		***3***	***164***	***509***	***676***	***3.2***	***168.9***	***553.4***	***725.5***	***0.3%***	***15.9%***	***52.1%***	***68.3%***
	Other				386				336.5				31.7%
	Total:	**3**	**164**	**509**	**1,062**	**3.2**	**168.9**	**553.4**	**1,062**				

Table 11. Estimated stock percentages and 90% bootstrap CIs by release group and BY in the lower Columbia River sport fishery from June 16 to October 31, 2013. LCI – lower 90% CI; UCI = upper 90% CI.

Hatchery stock	Release group	BY09			BY10			BY11			Total		
		Percent	LCI	UCI	Percent	LCI	UCI	Percent	LCI	UCI	Percent	LCI	UCI
Wallowa	Cottonwood	--	--	--	0.8%	0.4%	1.3%	2.7%	2.0%	3.6%	3.6%	2.6%	4.6%
Dworshak	Dworshak	0.1%	0.0%	0.3%	1.3%	0.8%	2.0%	0.7%	0.3%	1.1%	2.1%	1.4%	2.9%
EF Salmon	EF Salmon	--	--	--	--	--	--	0.1%	0.0%	0.3%	0.1%	0.0%	0.3%
Imnaha	Imnaha	--	--	--	0.4%	0.1%	0.9%	4.0%	3.1%	5.1%	4.5%	3.4%	5.5%
Lyons Ferry	Lyons Ferry	--	--	--	2.2%	1.5%	2.9%	5.7%	4.6%	7.0%	7.9%	6.6%	9.3%
Oxbow	Oxbow	0.1%	0.0%	0.3%	1.8%	1.1%	2.5%	5.0%	3.9%	6.1%	6.9%	5.5%	8.1%
Pahsimeroi	Pahsimeroi	--	--	--	3.9%	2.9%	4.9%	17.1%	15.0%	19.3%	21.0%	16.3%	20.3%
Sawtooth	Sawtooth	0.1%	0.0%	0.3%	2.4%	1.6%	3.1%	10.4%	8.9%	12.0%	12.8%	11.1%	14.5%
Sawtooth	SBT_Yankee	--	--	--	0.5%	0.2%	0.8%	1.0%	0.6%	1.6%	1.5%	0.9%	2.2%
Touchet	Touchet	--	--	--	0.1%	0.0%	0.4%	--	--	--	0.1%	0.0%	0.4%
Wallowa	Wallowa	--	--	--	2.5%	1.7%	3.4%	5.3%	4.1%	6.4%	7.8%	6.4%	9.1%
Snake River total					**15.1%**			**49.4%**			**68.3%**	**65.7%**	**71.0%**
Other											31.7%	29.0%	34.3%

Table 12. Estimated harvest and 90% bootstrap CIs by release group and BY in the lower Columbia River sport fishery from June 16 to October 31, 2013. LCI – lower 90% CI; UCI = upper 90% CI.

Hatchery stock	Release group	BY09			BY10			BY11			Total		
		Harvest	LCI	UCI	Harvest	LCI	UCI	Harvest	LCI	UCI	Harvest	LCI	UCI
Wallowa	Cottonwood	0	0	0	95	42	148	308	220	407	403	296	513
Dworshak	Dworshak	11	0	32	150	86	226	75	32	129	236	162	325
EF Salmon	EF Salmon	0	0	0	0	0	0	11	0	32	11	0	32
Imnaha	Imnaha	0	0	0	48	12	96	454	348	570	502	386	622
Lyons Ferry	Lyons Ferry	0	0	0	243	169	327	644	517	781	887	739	1,045
Oxbow	Oxbow	12	0	36	197	127	278	562	436	688	771	617	913
Pahsimeroi	Pahsimeroi	0	0	0	435	327	544	1,916	1,676	2,168	2,351	1,823	2,276
Sawtooth	Sawtooth	11	0	32	265	180	349	1,165	996	1,345	1,440	1,247	1,627
Sawtooth	SBT_Yankee	0	0	0	53	21	95	117	64	181	170	106	244
Touchet	Touchet	0	0	0	16	0	49	0	0	0	16	0	49
Wallowa	Wallowa	0	0	0	281	195	379	591	462	719	872	721	1,023
Snake River total		***34***			***1,783***			***5,843***			***7,659***	***7,064***	***7,627***
	Other										3,553	3,255	3,850
	Total										**11,212**		

Table 13. Percent of female and large fish (fork length ≥78 cm) by release group in the lower Columbia River sport harvest. All brood years were combined for this analysis. The percent large - all samples column is the percent the total number of large fish sampled (34) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 20.9% of all large fish sampled came from the Dworshak groups and 31.8% of the Dworshak release groups were large.

	Actual Count					Count expanded for PBT Tag rate			
Release group (all BYs)	**Sample size (sex)**	**Percent female**	**Sample size (length)**	**Number of large fish**	**Percent large within group**	**Sample size (length)**	**Expected number of large fish**	**Percent large - all samples**	**Percent large within group**
All samples	**1,021**	**48.1%**	**1,061**	**34**	**--**	**1,061**	**34**	**3.2%**	--
Cottonwood	36	27.8%	37	1	2.7%	38.2	1.0	3.0%	
Dworshak	21	57.1%	22	7	31.8%	22.4	7.1	20.9%	
Imnaha	45	42.2%	47	0	0.0%	47.5	0.0	0.0%	
Lyons Ferry	79	53.2%	84	1	1.2%	84.0	1.0	2.9%	
Oxbow	66	39.4%	67	0	0.0%	73.0	0.0	0.0%	
Pahsimeroi	177	54.2%	184	1	0.5%	222.7	1.2	3.6%	
Sawtooth	132	54.5%	135	1	0.7%	136.4	0.9	2.7%	
SBT_Yankee	16	68.8%	16	0	0.0%	16.1	0.1	0.3%	
Wallowa	79	31.6%	81	0	0.0%	82.6	0.0	0.0%	
EF Salmon	1	0%	1	0	0.0%	1.0	0.0	0.0%	
Touchet	1	100%	1	0	0.0%	1.6	0.0	0.0%	
All Snake River			**675**	**11**	**1.6%**	**725.5**	**11.4**	**33.4%**	
Other	368	48.1%	386	23		335.5	22.6	66.6%	6.7%

Table 14. Actual, expanded, and percent of samples that assigned to hatchery release groups in the Columbia River sport fishery upstream of Bonneville Dam from July 21 to October 19, 2013.

		PBT Assignments								
		Actual Count			Expanded for Tag rate			Percent of expanded sample		
Hatchery stock	**Release group**	**BY10**	**BY11**	**Total**	**BY10**	**BY11**	**Total**	**BY10**	**BY11**	**Total**
Wallowa	Cottonwood	3	6	9	3.0	6.3	9.3	1.7%	3.6%	5.3%
Dworshak	Dworshak	9	0	9	9.2	0.0	9.2	5.3%	0.0%	5.3%
Imnaha	Imnaha	1	11	12	1.1	11.0	12.1	0.7%	6.4%	7.0%
Lyons Ferry	Lyons Ferry	4	4	8	4.0	4.0	8.0	2.3%	2.3%	4.6%
Oxbow	Oxbow	4	12	16	4.4	13.0	17.4	2.5%	7.5%	10.1%
Pahsimeroi	Pahsimeroi	7	16	23	7.2	20.2	27.4	4.2%	11.7%	15.8%
Sawtooth	Sawtooth	10	26	36	10.0	26.1	36.1	5.8%	15.1%	20.9%
Sawtooth	SBT_Yankee	1	4	5	1.0	4.0	5.0	0.6%	2.3%	2.9%
Wallowa	Wallowa	4	17	21	4.1	17.3	21.4	2.4%	10.0%	12.4%
	Snake River total:	***43***	***96***	***139***	***44.0***	***101.9***	***145.9***	***25.4%***	***58.9%***	***84.3%***
	Other			34			27.1			15.7%
	Total:	**43**	**96**	**173**	**44.0**	**101.9**	**173**			

Table 15. Estimated stock percentages and 90% bootstrap CIs by release group in the Columbia River sport fishery upstream of Bonneville Dam from July 21 to October 19, 2013. LCI – lower 90% CI; UCI = upper 90% CI.

		BY10			BY11			Total		
Hatchery stock	**Release group**	**Percent**	**LCI**	**UCI**	**Percent**	**LCI**	**UCI**	**Percent**	**LCI**	**UCI**
Wallowa	Cottonwood	1.7%	0.6%	3.5%	3.6%	1.2%	6.0%	5.3%	2.9%	8.3%
Dworshak	Dworshak	5.3%	2.9%	8.2%	--	--	--	5.3%	2.4%	8.4%
Imnaha	Imnaha	0.7%	0.0%	2.0%	6.4%	3.5%	9.8%	7.0%	4.0%	10.5%
Lyons Ferry	Lyons Ferry	2.3%	0.6%	4.0%	2.3%	0.6%	4.0%	4.6%	2.3%	7.5%
Oxbow	Oxbow	2.5%	0.6%	5.1%	7.5%	4.4%	11.3%	10.1%	6.2%	14.3%
Pahsimeroi	Pahsimeroi	4.2%	1.8%	7.2%	11.7%	7.3%	16.0%	15.8%	9.7%	18.3%
Sawtooth	Sawtooth	5.8%	2.9%	8.7%	15.1%	10.4%	19.7%	20.9%	16.2%	26.0%
Sawtooth	SBT_Yankee	0.6%	0.0%	1.7%	2.3%	0.6%	4.1%	2.9%	1.2%	5.2%
Wallowa	Wallowa	2.4%	0.6%	4.1%	10.0%	6.5%	14.1%	12.4%	8.2%	16.5%
	Snake River total	**25.4%**			**58.9%**			**84.3%**	**79.0%**	**89.6%**
	Other							15.7%	12.5%	22.8%

Table 16. Percent of female and large fish (fork length ≥78 cm) by release group in the Columbia River sport harvest upstream of Bonneville Dam. All brood years were combined for this analysis. The percent large - all samples column is the percent the total number of large fish sampled (11) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 83.3% of all large fish sampled came from the Dworshak groups and 100% of the Dworshak release groups were large.

	Actual Count					Count expanded for Tag rate			
Release group (all BYs)	**Sample size (sex)**	**Percent female**	**Sample size (length)**	**Number of large fish**	**Percent large within group**	**Expanded sample size (length)**	**Expected number of large fish**	**Percent large - all samples**	**Percent large within group**
All samples	**168**	**37.5%**	**173**	**11**	**--**	**173**	**11**	**6.4%**	--
Cottonwood	8	0.0%	9	1	11.1%	9.3	1.03	9.3%	
Dworshak	9	55.6%	9	9	100.0%	9.2	9.2	83.3%	
Imnaha	12	41.7%	12	0	0.0%	12.1	0.0	0.0%	
Lyons Ferry	8	37.5%	8	0	0.0%	8.0	0.0	0.0%	
Oxbow	16	37.5%	16	0	0.0%	17.4	0.0	0.0%	
Pahsimeroi	23	30.4%	23	0	0.0%	27.4	0.0	0.0%	
Sawtooth	35	45.7%	36	0	0.0%	36.1	0.0	0.0%	
SBT_Yankee	5	20.0%	5	0	0.0%	5.0	0.0	0.0%	
Wallowa	20	35.0%	21	0	0.0%	21.4	0.0	0.0%	
All Snake River			**139**	**10**		**145.9**	**10.19**	**92.6%**	
Other	32	40.6%	34	1		27.1	0.8	7.4%	3.0%

Table 17. Actual, expanded, and percent of samples that assigned to hatchery release groups that was used to estimate the clipped steelhead harvest in the tribal Zone 6 fishery from June 16 to October 9, 2013. The sum of the expanded BY columns may not equal the total sample size due to rounding error.

		PBT Assignments											
		Actual Count				Expanded for Tag rate				Percent of expanded sample			
Hatchery stock	**Release group**	**BY09**	**BY10**	**BY11**	**Total**	**BY09**	**BY10**	**BY11**	**Total**	**BY09**	**BY10**	**BY11**	**Total**
Wallowa	Cottonwood	1	22	56	79	1.0	22.0	58.3	81.4	0.1%	2.2%	5.8%	8.1%
Dworshak	Dworshak	1	80	21	102	1.5	81.4	21.3	104.2	0.1%	8.1%	2.1%	10.3%
EF Salmon	EF Salmon	0	0	1	1	0.0	0.0	1.0	1.0	0.0%	0.0%	0.1%	0.1%
Imnaha	Imnaha	0	1	18	19	0.0	1.1	18.0	19.1	0.0%	0.1%	1.8%	1.9%
Lyons Ferry	Lyons Ferry	0	19	39	58	0.0	19.0	39.0	58.0	0.0%	1.9%	3.9%	5.7%
Oxbow	Oxbow	0	11	52	63	0.0	12.1	56.5	68.6	0.0%	1.2%	5.6%	6.8%
Pahsimeroi	Pahsimeroi	0	50	141	191	0.0	51.6	177.7	229.2	0.0%	5.1%	17.6%	22.7%
Sawtooth	Sawtooth	1	39	123	163	1.0	39.1	123.4	163.5	0.1%	3.9%	12.2%	16.2%
Sawtooth	SBT_Yankee	0	9	5	14	0.0	9.0	5.1	14.1	0.0%	0.9%	0.5%	1.4%
Touchet	Touchet	0	0	1	1	0.0	0.0	1.0	1.0	0.0%	0.0%	0.1%	0.1%
Wallowa	Wallowa	0	31	75	106	0.0	31.76	76.27	108	0.0%	3.1%	7.5%	10.7%
	Snake River total	***3***	***262***	***532***	***797***	***3.5***	***267.0***	***577.6***	***848.1***	***0.3%***	***26.4%***	***57.1%***	***83.9%***
	Other				214				162.9				16.1%
	Total:	**3**	**262**	**532**	**1,011**	**3.5**	**267.7**	**549.0**	**1,011**				

[a] The data in the BY09 column for Dworshak is BY08. There were no BY09 Dworshak fish sampled.

Table 18. Estimated stock percentages and 90% bootstrap CIs by release group and BY for clipped steelhead in the tribal Zone 6 fishery from June 16 to October 9, 2013. LCI – lower 90% CI; UCI = upper 90% CI. Percentages may not total to 100% due to rounding error.

		BY09			BY10			BY11			Total		
Hatchery stock	**Release group**	**Percent**	**LCI**	**UCI**	**Percent**	**LCI**	**UCI**	**Percent**	**LCI**	**UCI**	**Percent**	**LCI**	**UCI**
Wallowa	Cottonwood	0.1%	0.0%	0.3%	2.2%	1.4%	3.0%	5.8%	4.5%	7.0%	8.1%	6.6%	9.6%
Dworshak	Dworshak[a]	0.1%	0.0%	0.4%	8.1%	6.7%	9.5%	2.1%	1.4%	2.9%	10.3%	8.8%	11.9%
EF Salmon	EF Salmon	--	--	--	--	--	--	0.1%	0.0%	0.3%	0.1%	0.0%	0.3%
Imnaha	Imnaha	--	--	--	0.1%	0.0%	0.3%	1.8%	1.1%	2.5%	1.9%	1.2%	2.6%
Lyons Ferry	Lyons Ferry	--	--	--	1.9%	1.2%	2.6%	3.9%	2.9%	4.8%	5.7%	4.5%	6.9%
Oxbow	Oxbow	--	--	--	1.2%	0.7%	1.8%	5.6%	4.4%	6.9%	6.8%	5.5%	8.2%
Pahsimeroi	Pahsimeroi	--	--	--	5.1%	4.0%	6.2%	17.6%	15.3%	19.8%	22.7%	20.3%	25.1%
Sawtooth	Sawtooth	0.1%	0.0%	0.3%	3.9%	2.9%	4.9%	12.2%	10.5%	13.9%	16.2%	14.3%	18.1%
Sawtooth	SBT_Yankee	--	--	--	0.9%	0.5%	1.4%	0.5%	0.2%	0.9%	1.4%	0.8%	2.0%
Touchet	Touchet	--	--	--	--	--	--	0.1%	0.0%	0.3%	0.1%	0.0%	0.3%
Wallowa	Wallowa	--	--	--	3.1%	2.2%	4.1%	7.5%	6.2%	9.0%	10.7%	9.1%	12.3%
	Snake River total	**0.3%**			**26.4%**			**57.1%**			**83.9%**	**81.6%**	**86.2%**
	Other										16.1%	13.8%	18.4%

[a] The data in BY09 column for the Dworshak release group is BY08. There were no BY09 Dworshak fish sampled.

Table 19. Estimated harvest and 90% bootstrap CIs by release group and BY for clipped steelhead in the tribal Zone 6 fishery from June 16 to October 9, 2013 LCI – lower 90% CI; UCI = upper 90% CI. The sum of Release group harvest may not equal the total harvest due to rounding error.

		BY09			BY10			BY11			Total		
Hatchery stock	**Release group**	**Harvest**	**LCI**	**UCI**	**Harvest**	**LCI**	**UCI**	**Harvest**	**LCI**	**UCI**	**Harvest**	**LCI**	**UCI**
Wallowa	Cottonwood	14	0	42	294	187	401	780	613	947	1,087	741	1,071
Dworshak	Dworshak[a]	20	0	59	1,088	911	1,278	285	190	393	1,392	981	1,336
EF Salmon	EF Salmon	0	0	0	0	0	0	13	0	40	13	0	33
Imnaha	Imnaha	0	0	0	15	0	45	240	147	334	256	135	294
Lyons Ferry	Lyons Ferry	0	0	0	254	160	347	521	387	655	775	510	776
Oxbow	Oxbow	0	0	0	161	88	249	755	595	929	916	615	917
Pahsimeroi	Pahsimeroi	0	0	0	689	537	840	2,374	2,071	2,677	3,063	2,273	2,816
Sawtooth	Sawtooth	13	0	40	522	388	656	1,649	1,421	1,877	2,184	1,602	2,035
Sawtooth	SBT_Yankee	0	0	0	120	67	187	67	27	121	188	89	223
Touchet	Touchet	0	0	0	0	0	0	13	0	40	13	0	33
Wallowa	Wallowa	0	0	0	424	301	548	1,019	842	1,209	1,443	1,017	1,380
	Snake River total	***47***			***3,567***			***7,716***			***11,330***	***10,664***	***11,258***
	Other										2,176	1,868	2,491
	Total										**13,508**		

[a] The data in BY09 column for the Dworshak release group is BY08. There were no BY09 Dworshak fish sampled.

Table 20. Percent of female and large fish (fork length ≥78 cm) by release group in the tribal Zone 6 clipped harvest. All brood years were combined for this analysis. The percent large - all samples column is the percent of the total number of large fish sampled (75) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 80.4% of all large fish sampled came from the Dworshak groups and 60.8% of the Dworshak release groups were large.

	Actual Count					Count expanded for Tag rate			
Release group (all BYs)	**Sample size (sex)**	**Percent female**	**Sample size (length)**	**Number of large fish**	**Percent large - within group**	**Expanded sample size (length)**	**Expected number of large fish**	**Percent large - all samples**	**Percent large - within group**
All samples	**952**	**42.5%**	**903**	**75**	**--**	**903**	**75**	**8.3%**	--
Cottonwood	75	38.7%	76	0	0.0%	78.3	0.0	0.0%	
Dworshak	98	43.9%	97	59	60.8%	99.1	60.3	80.4%	
Imnaha	18	33.3%	16	0	0.0%	16.0	0.0	0.0%	
Lyons Ferry	51	45.1%	43	1	2.3%	43.0	1.0	1.3%	
Oxbow	62	29.0%	62	2	3.2%	67.5	2.2	2.9%	
Pahsimeroi	177	41.2%	178	1	0.6%	213.5	1.2	1.6%	
Sawtooth	150	48.0%	140	0	0.0%	140.4	0.0	0.0%	
SBT_Yankee	13	61.5%	12	0	0.0%	12.1	0.0	0.0%	
Wallowa	104	34.6%	98	1	1.0%	99.9	1.0	1.4%	
EF Salmon	0	--	1	0	0.0%	1.0	0.0	0.0%	
Touchet	1	100.0%	1	0	0.0%	1.0	0.0	0.0%	
All Snake River			**724**	**64**		**769.8**	**65.7**	**87.6%**	
Other	203	47.3%	179	11		133.2	9.3	12.4%	7.0%

Table 21. Actual, expanded, and percent of samples that assigned to hatchery release groups that was used to estimate the steelhead harvest in the lower Snake River sport fishery from September 1, 2013 to March 31, 2014.

		PBT Assignments								
		Actual Count			Expanded for Tag rate			Percent of expanded samples		
Hatchery stock	**Release Group**	**BY10**	**BY11**	**Total**	**BY10**	**BY11**	**Total**	**BY10**	**BY11**	**Total**
Wallowa	Cottonwood	3	15	18	3.0	15.6	18.6	0.4%	2.2%	2.6%
Dworshak	Dworshak	94	43	137	95.7	43.7	139.3	13.5%	6.1%	19.6%
EF Salmon	EF Salmon	0	1	1	0.0	1.0	1.0	0.0%	0.1%	0.1%
Imnaha	Imnaha	1	13	14	1.1	13.0	14.1	0.2%	1.8%	2.0%
Lyons Ferry	Lyons Ferry	99	202	301	99.0	202.0	301.0	13.9%	28.5%	42.4%
Oxbow	Oxbow	4	24	28	4.4	26.1	30.5	0.6%	3.7%	4.3%
Pahsimeroi	Pahsimeroi	13	64	77	13.4	80.6	94.0	1.9%	11.4%	13.2%
Sawtooth	Sawtooth	9	38	47	9.0	38.1	47.1	1.3%	5.4%	6.6%
Sawtooth	SBT_Indian	0	1	1	0.0	1.2	1.2	0.0%	0.2%	0.2%
Sawtooth	SBT_Yankee	0	7	7	0.0	7.1	7.1	0.0%	1.0%	1.0%
Tucannon	Tucannon	0	1	1	0.0	1.5	1.5	0.0%	0.2%	0.2%
Wallowa	Wallowa	8	20	28	8.2	20.3	28.5	1.2%	2.9%	4.0%
	Snake River total	**231**	**429**	**660**	**233.8**	**450.2**	**684.0**	**32.9%**	**63.4%**	**96.3%**
	Other			50			26.0			3.7%

Table 22. Estimated harvest and 90% bootstrap CIs by release group and BY in the lower Snake River sport fishery from September 1, 2013 to March 31, 2014. LCI = lower 90% CI; UCI = upper 90% CI.

Hatchery stock	Release group	BY10			BY11			Total		
		Percent	LCI	UCI	Percent	LCI	UCI	Percent	LCI	UCI
Wallowa	Cottonwood	0.4%	0.1%	0.8%	2.2%	1.3%	3.2%	2.6%	1.6%	3.7%
Dworshak	Dworshak	13.5%	11.3%	15.6%	6.1%	4.7%	7.7%	19.6%	17.2%	22.1%
EF Salmon	EF Salmon				0.1%	0.0%	0.4%	0.1%	0.0%	0.4%
Imnaha	Imnaha	0.2%	0.0%	0.5%	1.8%	1.0%	2.7%	2.0%	1.1%	2.9%
Lyons Ferry	Lyons Ferry	13.9%	11.8%	16.2%	28.5%	25.8%	31.3%	42.4%	39.4%	45.5%
Oxbow	Oxbow	0.6%	0.2%	1.1%	3.7%	2.4%	4.9%	4.3%	3.1%	5.7%
Pahsimeroi	Pahsimeroi	1.9%	1.0%	2.8%	11.4%	9.2%	13.7%	13.2%	11.0%	15.6%
Sawtooth	Sawtooth	1.3%	0.6%	2.0%	5.4%	4.0%	6.8%	6.6%	5.1%	8.2%
Sawtooth	SBT_Indian				0.2%	0.0%	0.5%	0.2%	0.0%	0.5%
Sawtooth	SBT_Yankee				1.0%	0.4%	1.7%	1.0%	0.4%	1.7%
Tucannon	Tucannon				0.2%	0.0%	0.6%	0.2%	0.0%	0.6%
Wallowa	Wallowa	1.2%	0.6%	1.9%	2.9%	1.9%	3.9%	4.0%	2.9%	5.3%
	Snake River total	**32.9%**			**63.4%**			**96.3%**	**94.6%**	**98.0%**
	Other							3.7%	2.0%	5.4%

Table 23. Estimated harvest and 90% bootstrap CIs by release group and BY in the lower Snake River sport fishery from September 1, 2013 to March 31, 2014. LCI = lower 90% CI; UCI = upper 90% CI.

Hatchery stock	Release group	BY10			BY10			Total		
		Harvest	LCI	UCI	Harvest	LCI	UCI	Harvest	LCI	UCI
Wallowa	Cottonwood	32	11	64	166	100	244	198	122	276
Dworshak	Dworshak	1,018	856	1,181	465	357	584	1,483	1,299	1,667
EF Salmon	EF Salmon	0	0	0	11	0	32	11	0	32
Imnaha	Imnaha	12	0	36	138	75	202	150	87	216
Lyons Ferry	Lyons Ferry	1,054	894	1,224	2,150	1,948	2,363	3,205[a]	2,981	3,438
Oxbow	Oxbow	47	12	82	278	185	370	324	232	429
Pahsimeroi	Pahsimeroi	143	77	209	858	698	1,033	1,001	829	1,179
Sawtooth	Sawtooth	96	43	149	406	299	513	502	384	619
Sawtooth	SBT_Indian	0	0	0	13	0	39	13	0	39
Sawtooth	SBT_Yankee	0	0	0	75	32	129	75	32	129
Tucannon	Tucannon	0	0	0	16	0	47	16	0	47
Wallowa	Wallowa	87	44	142	217	141	292	304	217	401
Snake River hatcheries		**2,489**			**4,793**			**7,282**		
	Other							276	149	407

[a] Add one fish to account for rounding error.

Table 24. Percent of female and large fish (fork length ≥78 cm) by release group in the Snake River sport harvest. All brood years were combined for this analysis. The percent large - all samples column is the percent of the total number of large fish sampled (33) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 88.3% of all large fish sampled came from the Dworshak groups and 57.7% of the Dworshak release groups were large.

	Actual Count					Count expanded for Tag rate			
Release group	Sample size (sex)	Percent female	Sample size (length)	Number of large fish	Percent large within group	Expanded sample size (length)	Expected number of large fish	Percent large - all samples	Percent large within group
All samples	**708**	**39.2%**	**710**	**91**		**710**	**91**	**12.8%**	
Cottonwood	18	38.9%	18	0	0.0%	18.6	0.0	0.0%	
Dworshak	136	30.1%	137	79	57.7%	139.3	80.3	88.3%	
EF Salmon	1	100.0%	1	0	0.0%	1.0	0.0	0.0%	
Imnaha	14	50.0%	14	0	0.0%	14.1	0.0	0.0%	
Lyons Ferry	301	42.5%	301	7	2.3%	301.0	7.0	7.7%	
Oxbow	28	35.7%	28	0	0.0%	30.5	0.0	0.0%	
Pahsimeroi	76	47.4%	77	0	0.0%	94.0	0.0	0.0%	
Sawtooth	47	38.3%	47	0	0.0%	47.1	0.0	0.0%	
SBT_Indian	1	100.0%	1	0	0.0%	1.2	0.0	0.0%	
SBT_Yankee	7	57.1%	7	0	0.0%	7.1	0.0	0.0%	
Tucannon	1	0.0%	1	0	0.0%	1.5	0.0	0.0%	
Wallowa	28	32.1%	28	0	0.0%	28.5	0.0	0.0%	
All Snake River			**660**	**86**		**684.0**	**87.3**	**96.0%**	
Other	50	32.0%	50	5		26.0	3.7	4.0%	14.1%

Table 25. Actual, expanded, adjusted, and percent of samples that assigned to hatchery (above dashed line) release groups and GSI (below dashed line) reporting groups that were used to estimate the unclipped harvest contribution in the Tribal Zone 6 fishery from June 16 to October 9, 2013.

Group	Hatchery stock	Actual Count			Expand and Adjust for tag rate			Percent of adjusted samples		
		BY10	BY11	Total	BY10	BY11	Total	BY10	BY11	Total
Cottonwood	Wallowa	0	1	1	0.0	1.0	1.0	0.0%	0.2%	0.2%
Dworshak	Dworshak	23	1	24	23.4	1.0	24.4	3.7%	0.2%	3.9%
EF Salmon	EF Salmon	6	5	11	6.0	5.0	11.0	1.0%	0.8%	1.8%
Imnaha	Imnaha	1	1	2	1.1	1.0	2.1	0.2%	0.2%	0.3%
Lyons Ferry	Lyons Ferry	0	1	1	0.0	1.0	1.0	0.0%	0.2%	0.2%
Oxbow	Oxbow	0	1	1	0.0	1.1	1.1	0.0%	0.2%	0.2%
Pahsimeroi	Pahsimeroi	1	3	4	1.0	3.8	4.8	0.2%	0.6%	0.8%
Sawtooth	Sawtooth	0	1	1	0.0	1.0	1.0	0.0%	0.2%	0.2%
SBT_Yankee	Sawtooth	3	7	10	3.0	7.1	10.1	0.5%	1.1%	1.6%
Touchet	Touchet	0	1	1	0.0	1.0	1.0	0.0%	0.2%	0.2%
Tucannon	Tucannon	2	0	2	2.9	0.0	2.9	0.5%	0.0%	0.5%
Upper Salmon	Upper Salmon	4	0	4	4.2	0.0	4.2	0.7%	0.0%	0.7%
Wallowa	Wallowa	1	3	4	1.0	3.1	4.1	0.2%	0.5%	0.6%
Snake River Hatchery total		***41***	***25***	***66***	***42.7***	***26.1***	***68.7***	***6.8%***	***4.1%***	***10.9%***
BWSALM				1			1.0			0.2%
KLICKR				13			13.0			2.1%
MFSALM				16			16.0			2.5%
MGILCS				399			397.7			63.3%
SFCLWR				10			9.5			1.5%
SFSALM				6			6.0			1.0%
SKAMAN				5			5.0			0.8%
UPCLWR				10			10.0			1.6%
UPPCOL				37			36.7			5.8%
UPSALM				54			53.4			8.5%
YAKIMA				11			11.0			1.8%
GSI total:				***562***			***559.3***			***89.1%***
Grand total				**628**			**628**			

Table 26. Estimated unclipped steelhead stock percentages and the 90% lower (LCI) and upper (UCI) bootstrap confidence intervals in the Zone 6 tribal fishery from June 16 to October 9, 2013. Mid-C = Bonneville Dam upstream to and including the Yakima River. Upper-C = upstream of the Yakima River.

	Hatchery	BY10			BY11			Total		
Group	**stock**	**Percent**	**LCI**	**UCI**	**Percent**	**LCI**	**UCI**	**Percent**	**LCI**	**UCI**
Cottonwood	Wallowa	--	--	--	0.2%	0.0%	0.5%	0.2%	0.0%	0.5%
Dworshak	Dworshak	3.8%	2.6%	5.1%	0.2%	0.0%	0.5%	3.9%	2.8%	5.3%
EF Salmon	EF Salmon	1.0%	0.3%	1.6%	0.8%	0.3%	1.4%	1.8%	1.0%	2.7%
Imnaha	Imnaha	0.2%	0.0%	0.5%	0.2%	0.0%	0.5%	0.3%	0.0%	0.8%
Lyons Ferry	Lyons Ferry	--	--	--	0.2%	0.0%	0.5%	0.2%	0.0%	0.5%
Oxbow	Oxbow	--	--	--	0.2%	0.0%	0.5%	0.2%	0.0%	0.5%
Pahsimeroi	Pahsimeroi	0.2%	0.0%	0.5%	0.5%	0.0%	1.0%	0.7%	0.2%	1.2%
Sawtooth	Sawtooth	--	--	--	0.2%	0.0%	0.5%	0.2%	0.0%	0.5%
SBT_Yankee	Sawtooth	0.5%	0.0%	1.0%	1.1%	0.5%	1.9%	1.6%	0.8%	2.4%
Tucannon	Touchet	0.5%	0.0%	1.1%	--	--	--	0.5%	0.0%	1.1%
Touchet	Tucannon	--	--	--	0.2%	0.0%	0.5%	0.2%	0.0%	0.5%
Upper Salmon	Upper Salmon	0.7%	0.2%	1.3%	--	--	--	0.7%	0.2%	1.3%
Wallowa	Wallowa	0.2%	0.0%	0.5%	0.5%	0.2%	1.0%	0.6%	0.2%	1.3%
Snake River Hatchery total		***6.8%***			***4.1%***			***10.9%***		
GSI group	**Region**									
BWSALM	Mid-C							0.2%	0.0%	0.5%
KLICKR	Mid-C							2.1%	1.1%	3.0%
MFSALM	Snake							2.5%	1.6%	3.7%
MGILCS	Mid-C and Snake							63.4%	60.2%	66.5%
SFCLWR	Snake							1.5%	0.7%	2.3%
SFSALM	Snake							1.0%	0.3%	1.6%
SKAMAN	Mid-C							0.8%	0.3%	1.4%
UPCLWR	Snake							1.6%	0.8%	2.4%
UPPCOL	Upper-C							5.8%	4.4%	7.4%
UPSALM	Snake							8.6%	6.8%	10.5%
YAKIMA	Mid-C							1.8%	1.0%	2.7%
GSI total								***89.1%***		

Table 27. Estimated unclipped steelhead harvest and the 90% lower (LCI) and upper (UCI) bootstrap confidence intervals in the Zone 6 tribal fishery from June 16 to October 9, 2013. Up = Upper.

	Hatchery	BY10			BY11			Total		
Group	**stock**	**Harvest**	**LCI**	**UCI**	**Harvest**	**LCI**	**UCI**	**Harvest**	**LCI**	**UCI**
Cottonwood	Wallowa	0	0	0	15	0	44	15	0	44
Dworshak	Dworshak	333	217	449	14	0	43	347	232	463
EF Salmon	EF Salmon	85	28	142	71	28	128	156	85	242
Imnaha	Imnaha	16	0	48	14	0	43	30	0	71
Lyons Ferry	Lyons Ferry	0	0	0	14	0	43	14	0	43
Oxbow	Oxbow	0	0	0	15	0	46	15	0	46
Pahsimeroi	Pahsimeroi	15	0	44	54	18	108	69	18	134
Sawtooth	Sawtooth	0	0	0	14	0	43	14	0	43
SBT_Yankee	Sawtooth	43	0	85	101	43	173	144	72	215
Tucannon	Tucannon	41	0	102	0	0	0	41	0	102
Touchet	Touchet	0	0	0	14	0	43	14	0	43
Upper Salmon	Upper Salmon	60	15	105	0	0	0	60	15	105
Wallowa	Wallowa	15	0	44	43	14	87	58	14	116
Snake River Hatchery total		***608***			***369***			***977***	**795**	**1,169**
GSI group	**Region**									
SKAMAN	Low-C and Mid-C							71	28	128
MGILCS	Mid-C and Snake							5,661	5,379	5,945
BWSALM	Mid-C							14	0	43
KLICKR	Mid-C							185	100	270
YAKIMA	Mid-C							157	85	228
MFSALM	Snake							228	142	327
SFCLWR	Snake							135	64	207
SFSALM	Snake							85	28	142
UPCLWR	Snake							142	71	213
UPSALM	Snake							760	602	929
UPPCOL	Upper-C							522	392	663
GSI total								***7,960***	***7,769***	***8,143***
Grand total								**8,937**		

Table 28. Percent of female and large fish (fork length ≥78 cm) by release group in the tribal Zone 6 unclipped harvest. All brood years were combined for this analysis. The percent large - all samples column is the percent of the total number of large fish sampled (45) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 40% of all large fish sampled came from the Dworshak groups and 75% of the Dworshak release groups were large.

Group	Sample size (sex)	Percent female	Sample size (length)	Number of large fish	Percent large - all samples	Percent large - within group
All samples	**615**	**50.4%**	**550**	**45**	**8.2%**	
Hatchery release group						
Dworshak	23	39.1%	24	18	40.0%	75.0%
EF and Upper Salmon	15	0.0%	12	2	4.4%	16.7%
SBT_Yankee	10	30.0%	9	0	0.0%	0.0%
Other Snake groups[a]	18	50.0%	18	0	0.0%	0.0%
GSI reporting group						
KLICKR	13	69.2%	12	1	2.2%	8.3%
MFSALM	14	71.4%	12	3	6.7%	25.0%
MGILCS	392	48.5%	353	9	20.0%	2.5%
SFCLWR	10	40.0%	8	3	6.7%	37.5%
SFSALM	6	66.7%	5	2	4.4%	40.0%
SKAMAN	5	40.0%	4	1	2.2%	25.0%
UPCLWR	10	60.0%	10	3	6.7%	30.0%
UPPCOL	35	60.0%	29	2	4.4%	6.9%
UPSALM	53	56.6%	43	1	2.2%	2.3%
YAKIMA	11	72.7%	11	0	0.0%	0.0%

[a] All Snake River basin hatchery release groups except Dworshak, EF Salmon, and SBT_Yankee.

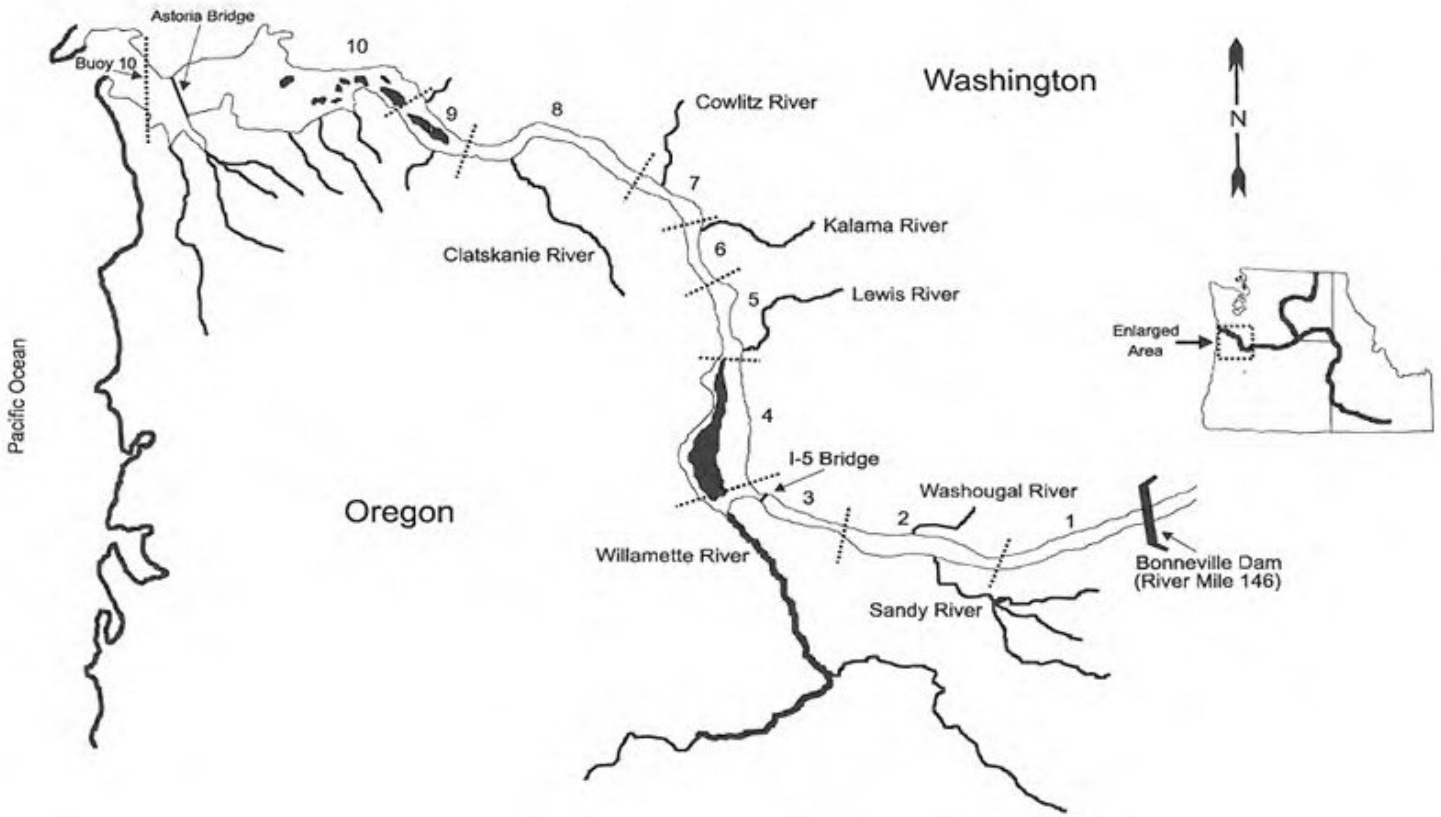


Figure 1. Map of the Columbia River, downstream of Bonneville Dam, showing the sport fishing sections used for creel surveys.

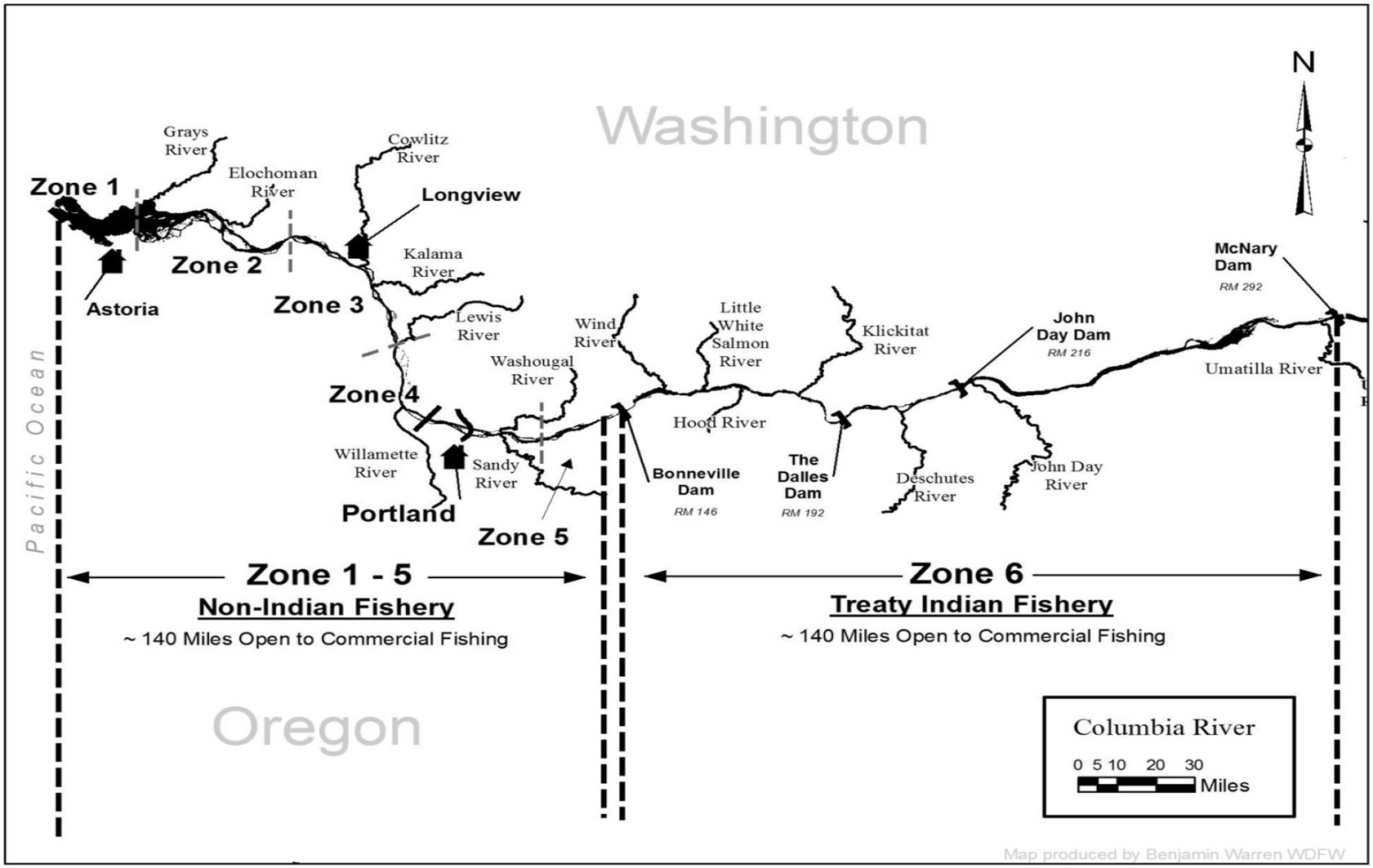


Figure 2. Map of the Columbia River, downstream of McNary Dam, showing the commercial fishing areas.

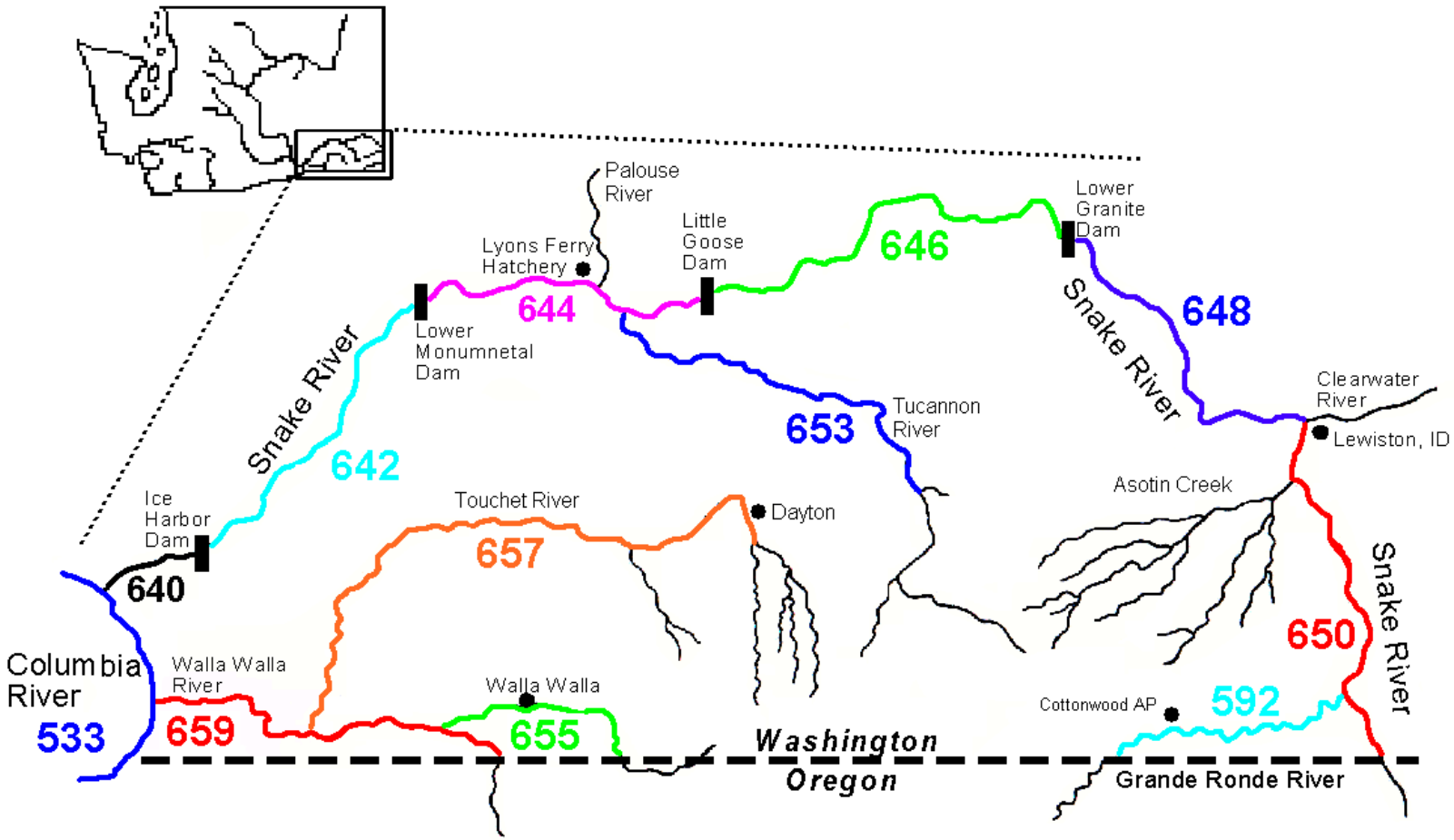


Figure 3. Map of the lower Snake River showing boundaries of the sections used by WDFW to estimate the monthly steelhead harvest. We estimated the steelhead stock composition from samples obtained in Sections 640, 642, 644, 646, and 648.

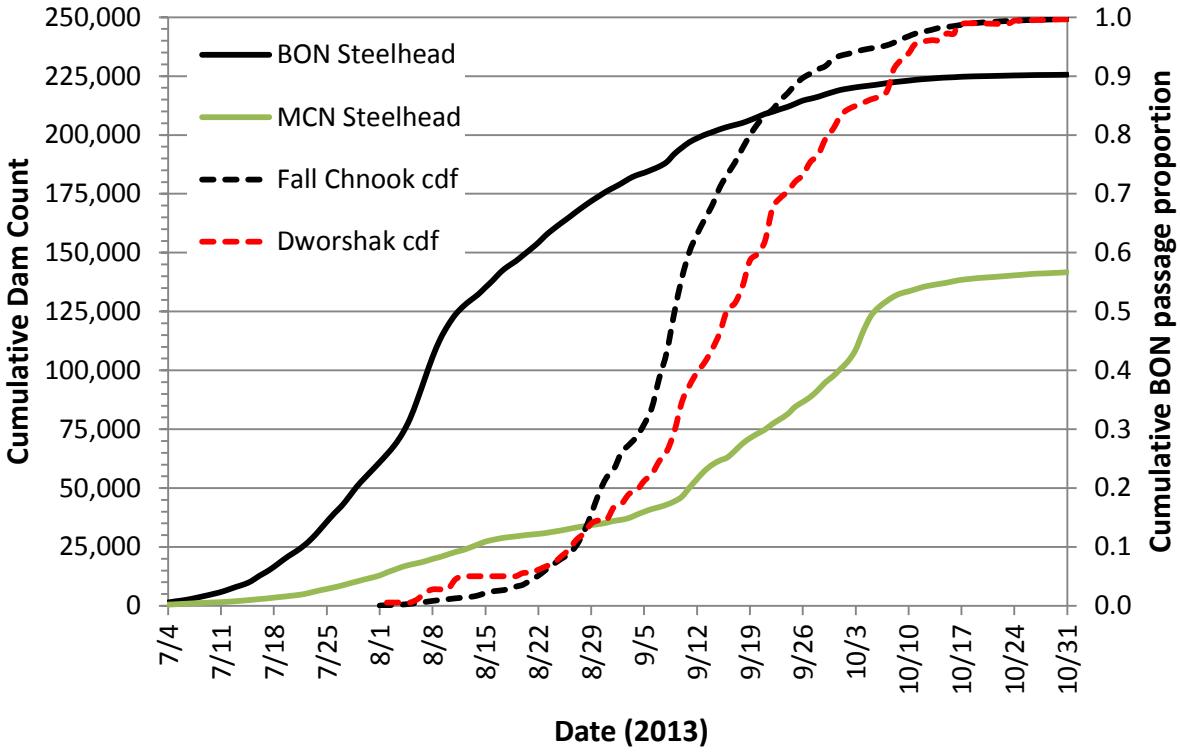


Figure 4. Total cumulative steelhead passage at Bonneville Dam (BON) and McNary Dam (MCN) from July 1 to October 31, 2013 on the left y-axis. The cumulative proportion of passage of the Dworshak steelhead stock and Fall Chinook at Bonneville Dam is shown on the right y-axis. The total count of adult Fall Chinook at Bonneville Dam from August 1 to October 31 was 950,087.

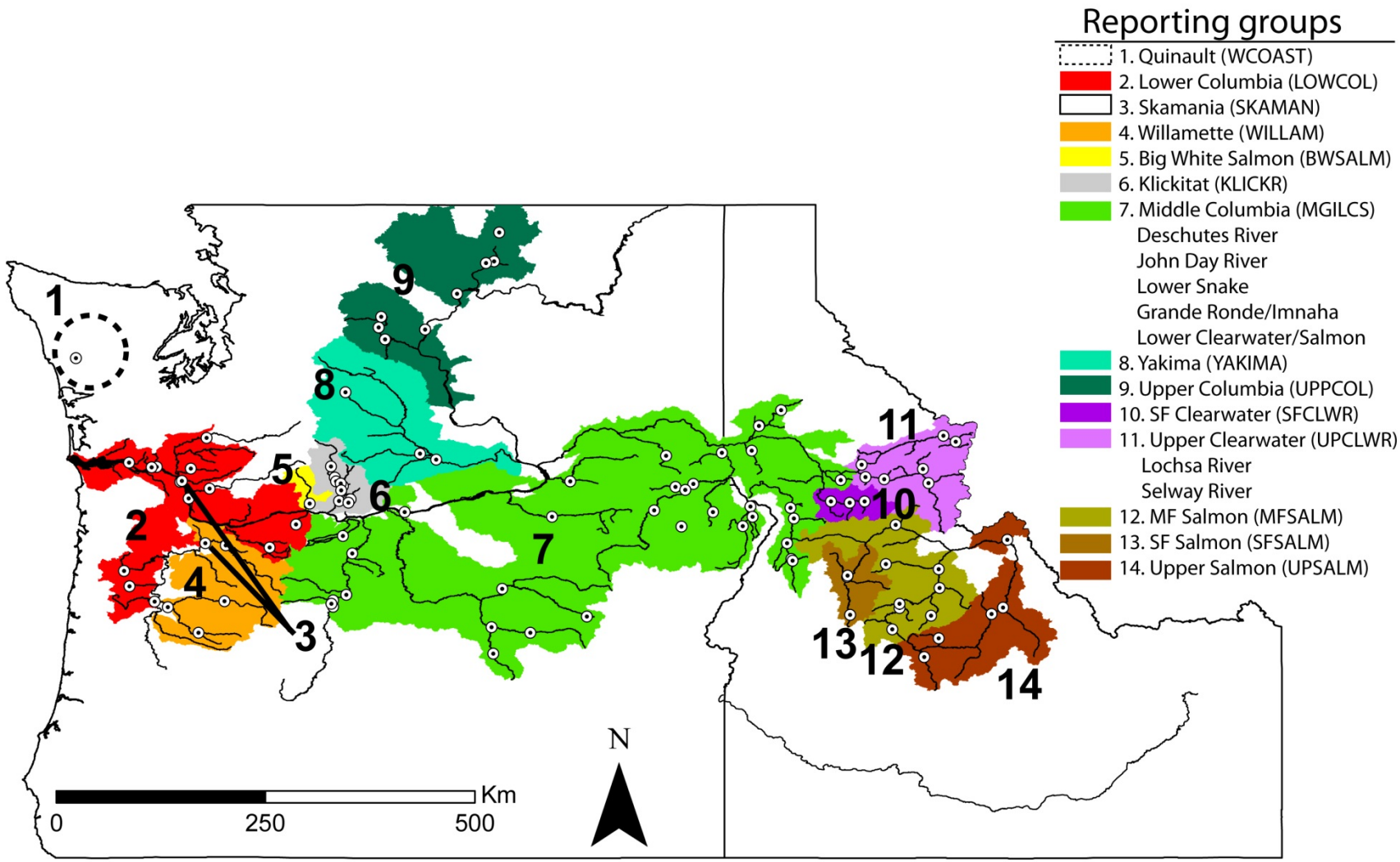


Figure 5. Map showing the GSI reporting groups that have been developed by CRITFC. These groups were used to assign unclipped steelhead that were not identified with PBT.

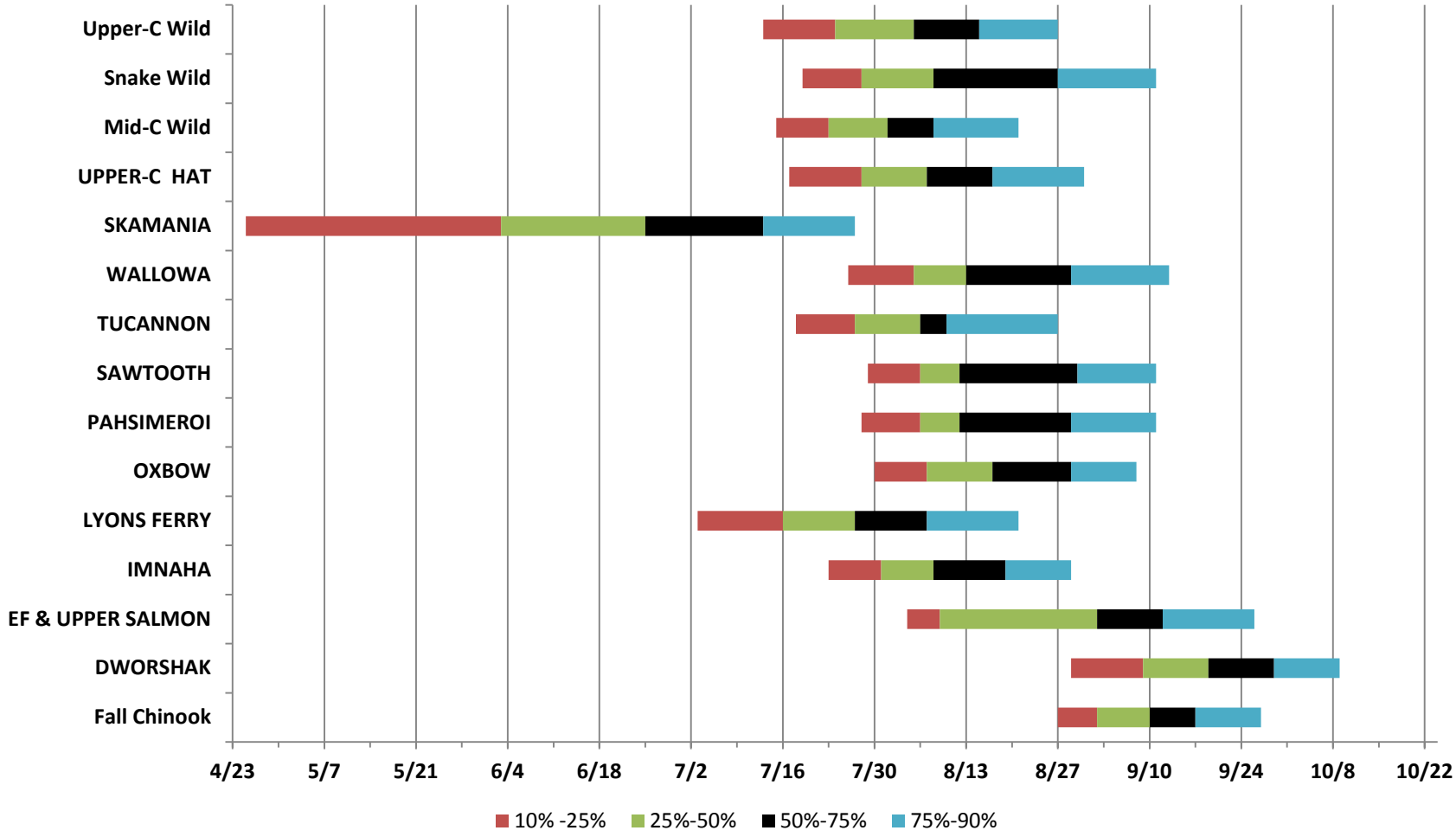


Figure 6. Arrival quantiles of Fall Chinook, Snake River, and Upper Columbia steelhead hatchery stocks (in upper case), wild steelhead from the Snake, mid-Columbia (Mid-C, Bonneville Dam to Yakima River), and Upper Columbia (Upper-C, upstream of the Yakima River) regions at Bonneville Dam in 2013. UPPER-C HAT is all hatchery stocks upstream of the Yakima River combined. The Skamania stock run-timing is for fish released in the Klickitat River only. Wild run-timing was calculated by combining all adult detections from all release sites in each region.

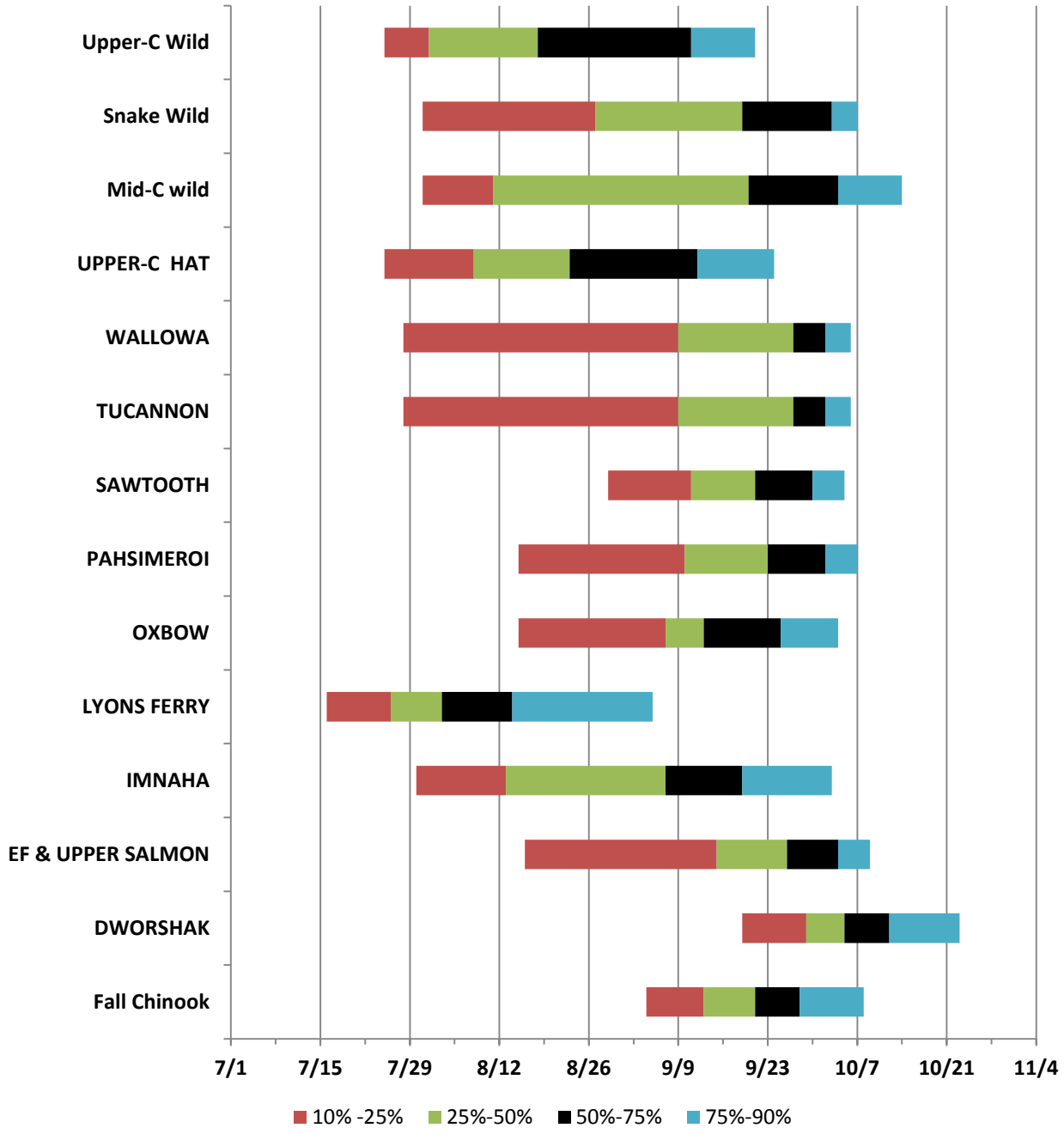


Figure 7. Arrival quantiles of Snake River and Upper Columbia hatchery (in upper case) and wild steelhead stocks at McNary Dam in 2013. UPPER-C is all hatchery stocks upstream of the Yakima River combined. Wild run-timing was calculated by combining all adult detections from all release sites in the three regions. Mid-C wild calculated from release sites upstream of McNary Dam only.

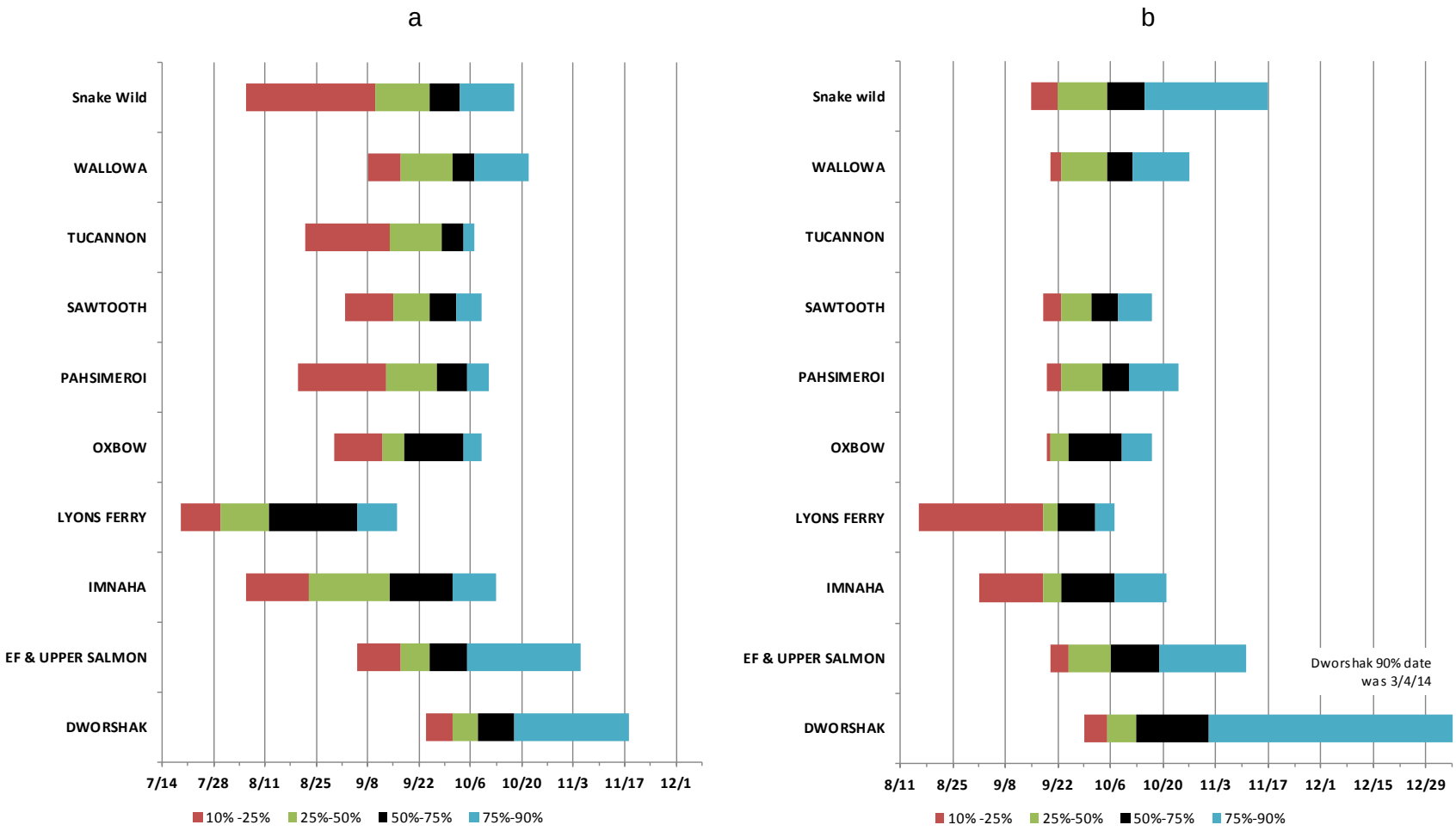


Figure 8. Arrival quantiles of Snake River hatchery (upper case) and wild steelhead stocks at (a) Ice Harbor Dam and (b) Lower Granite Dam in 2013.

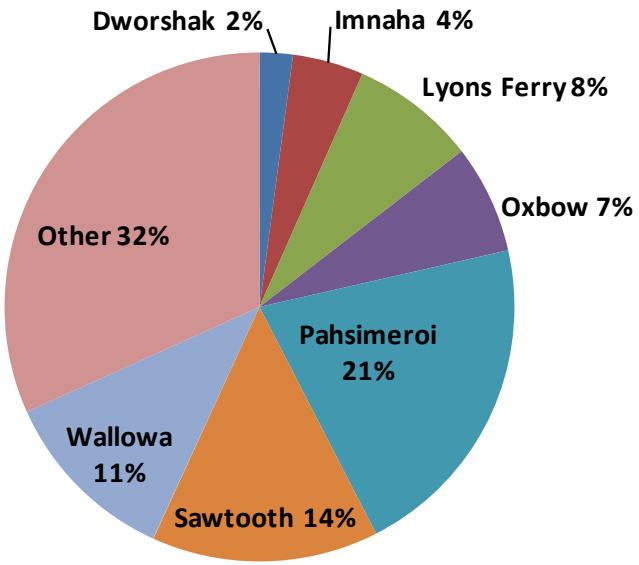


Figure 9. Contribution to the steelhead sport harvest, by hatchery stock, in the lower Columbia River from June 16 to October 31, 2013.

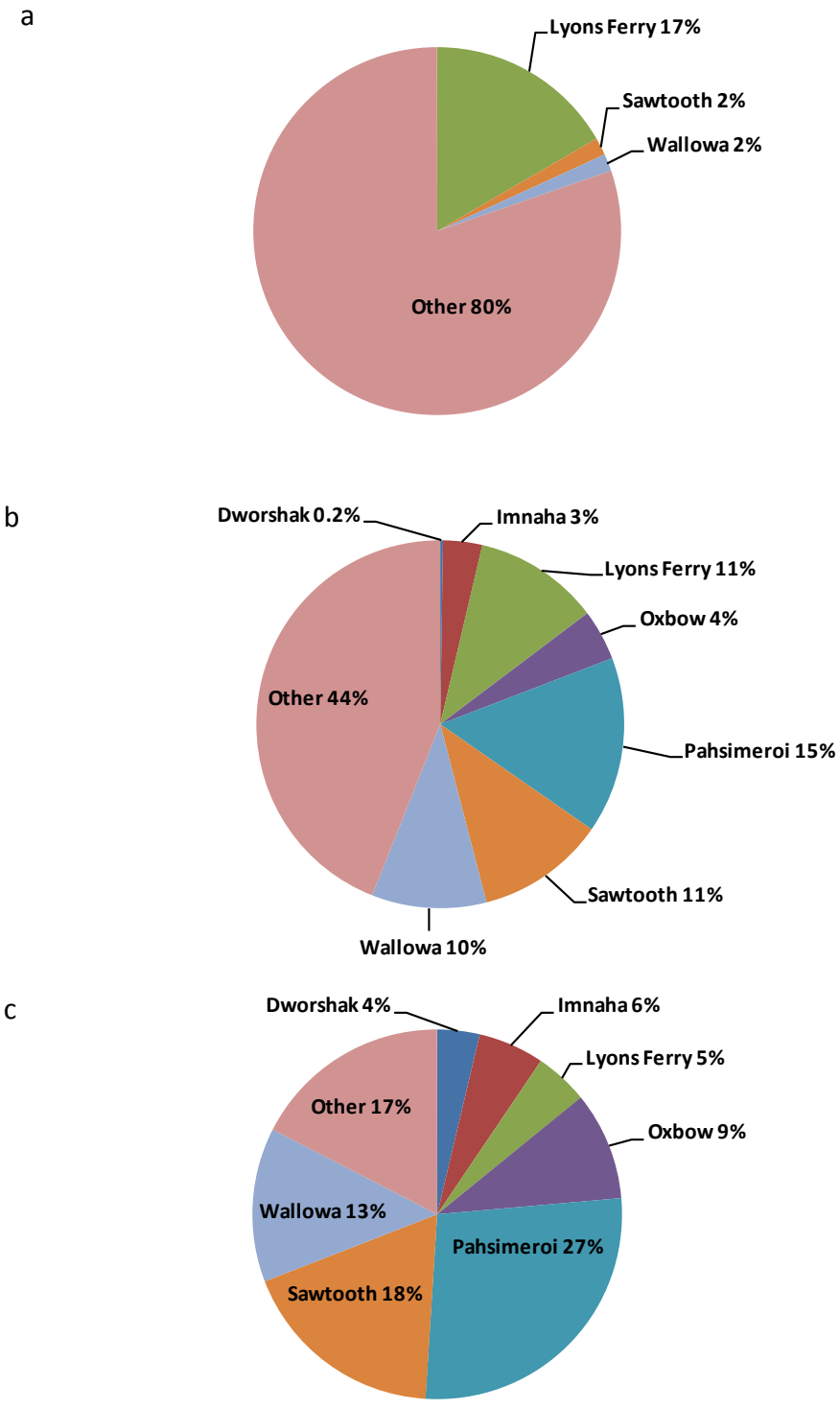


Figure 10. Stock composition of the steelhead harvest in the lower Columbia River sport fishery in 2013 from (a) June 16 to June 30; (b) July 1 to July 31; and (c) August 1 to October 31.

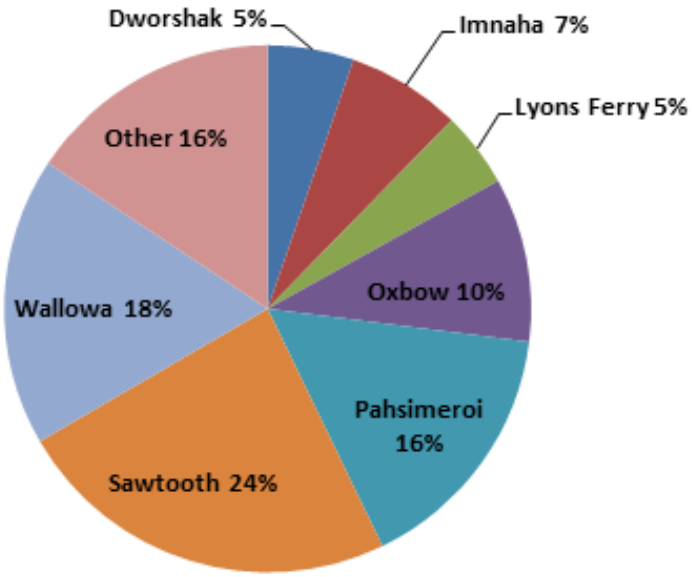


Figure 11. Contribution to the steelhead sport harvest by hatchery stock in the Columbia River upstream of Bonneville Dam from July 21 to October 19, 2013.

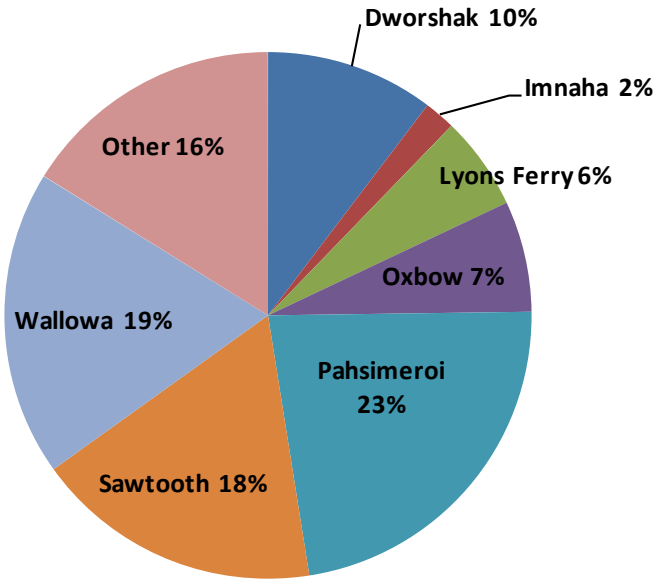
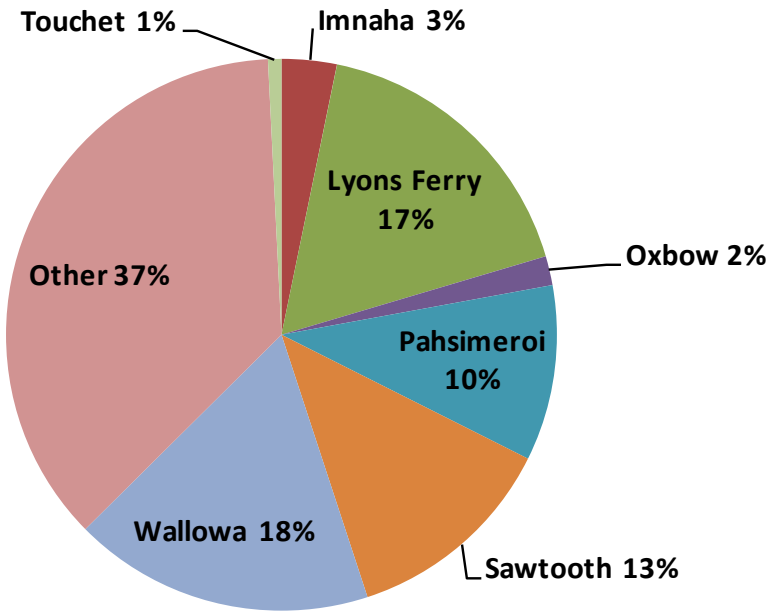


Figure 12. Contribution to the tribal clipped steelhead harvest in the Columbia River Zone 6 fishery by hatchery stock from June 16 to October 9, 2013.

a



b

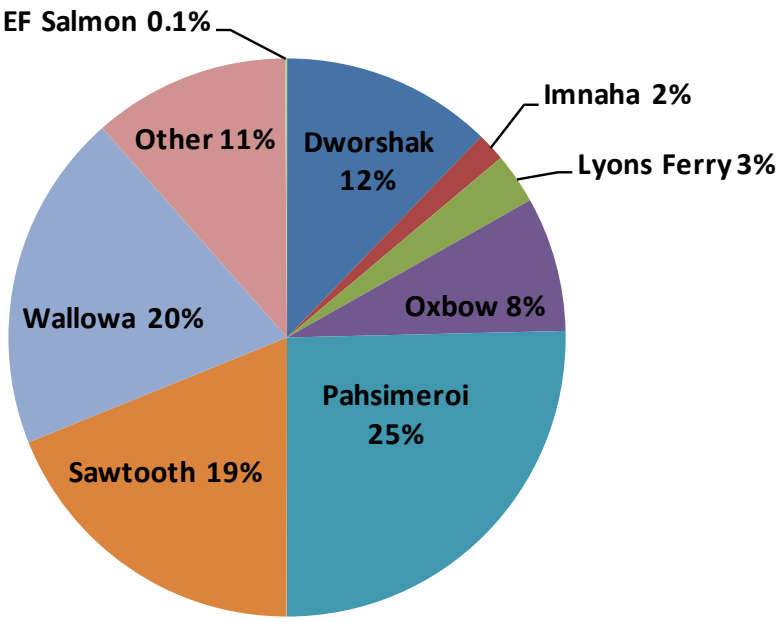


Figure 13. Contribution to the tribal clipped steelhead harvest in the Columbia River Zone 6 fishery by hatchery stock from (a) June 16 to July 31 and (b) August 1 to October 9, 2013.

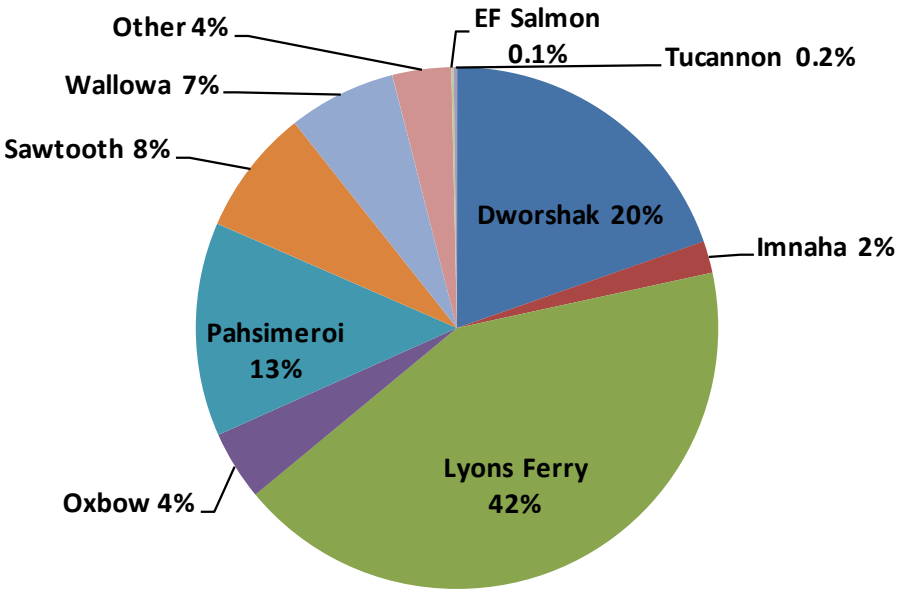


Figure 14. Contribution to the lower Snake River steelhead sport harvest by hatchery stock from September 1, 2013 to March 31, 2014.

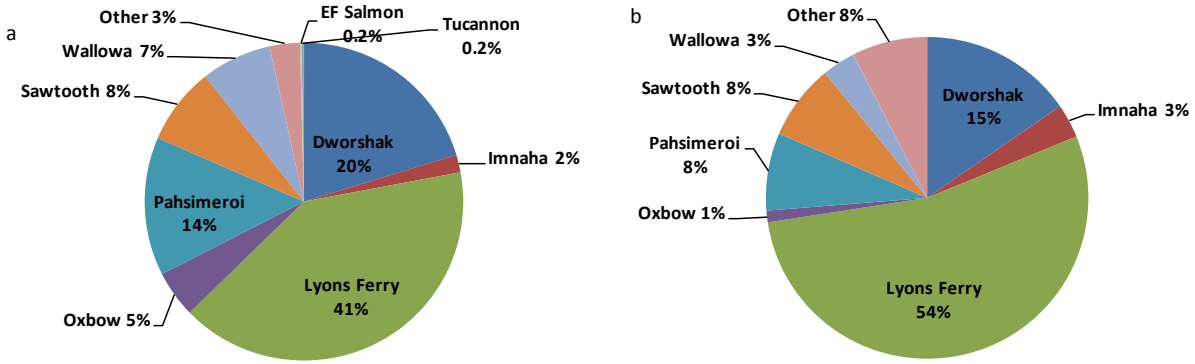


Figure 15. Contribution to the lower Snake River steelhead sport harvest by hatchery stock from (a) September 1 to December 31, 2013 and (b) January 1 to March 31, 2014.

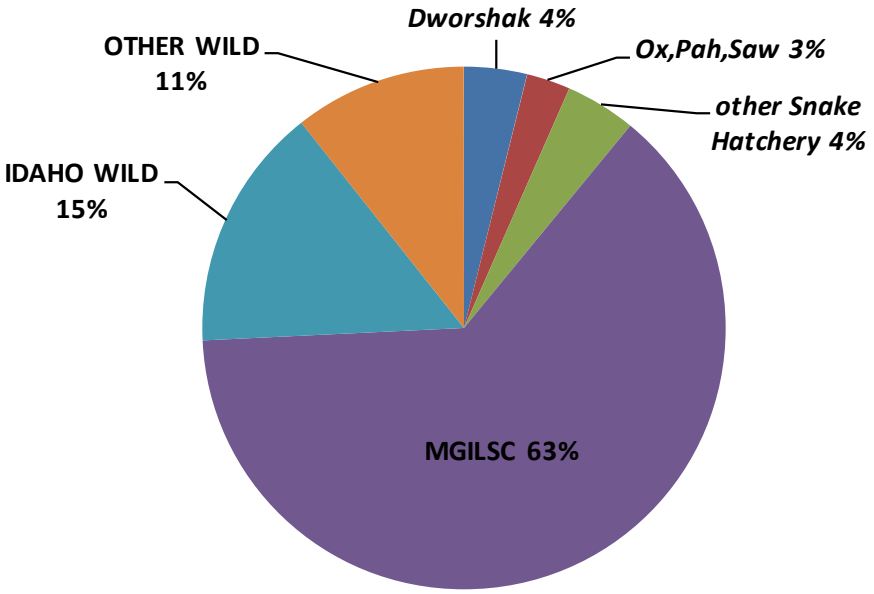


Figure 16. Contribution to the tribal Zone 6 unclipped steelhead harvest by hatchery stock (in italic font) and GSI reporting group from June 16 to October 9, 2013. *Ox, Pah, Saw* = all Oxbow, Pahsimeroi, and Sawtooth hatchery release groups combined. Idaho Wild include fish assigned to the MF Salmon, SF Salmon, SF Clearwater, Upper Clearwater, and Upper Salmon reporting groups. Other Wild include fish that assigned to Big White Salmon, Klickitat, Skamania, Upper Columbia, and Yakima reporting groups.

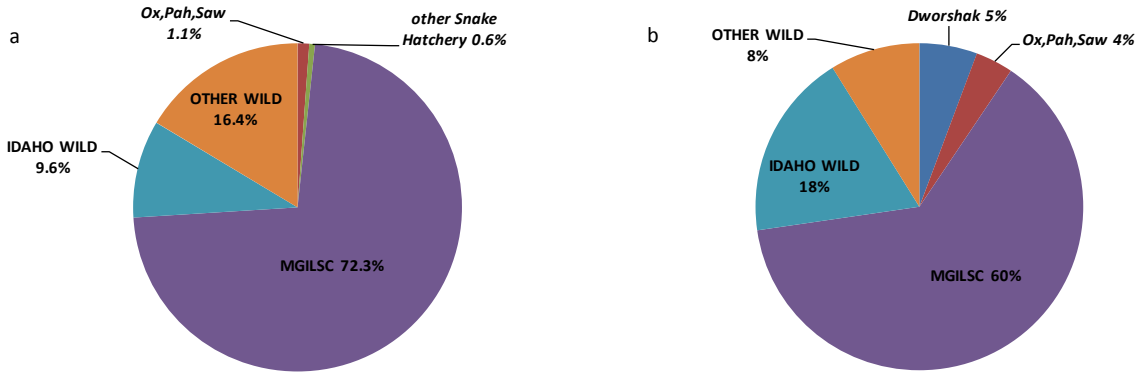


Figure 17. Contribution to the tribal Zone 6 unclipped steelhead harvest by hatchery stock (in italic font) and GSI reporting group from (a) June 16 to July 31 and (b) August 1 to October 9, 2013. Hatchery stocks and GSI reporting groups are the same as defined in Figure 16.

APPENDIX A

Table A. 1. The estimated harvest by hatchery stock (all release groups and BYs combined) in the lower Columbia sport fishery from 2011 to 2013. The 2011 and 2012 estimates were for July 1 to October 31. The 2013 estimate was from June 16 to October 31. The estimated harvest from June 16 to June 30, 2013 was 854.

Hatchery	Harvest			Percent of harvest		
stock	2011	2012	2013	2011	2012	2013
Dworshak	1,289	600	236	6%	4%	2%
Imnaha	448	197	502	2%	1%	4%
Lyons Ferry	1,469	964	887	7%	6%	8%
Oxbow	3,129	2,720	771	15%	17%	7%
Pahsimeroi	5,454	2,581	2,351	26%	16%	21%
Sawtooth	2,953	2,200	1,610	14%	14%	14%
Wallowa	1,272	1,662	1,275	6%	10%	11%
Upper & EF Salmon	19	19	11	0.1%	0.1%	0.1%
Touchet	0	22	16	0	0	0.1%
All Snake River	***16,033***	***10,965***	***7,659***	***78%***	***69%***	***68%***
Other	4,569	4,958	3,553	22%	31%	32%
Total	***20,602***	***15,923***	***11,212***			

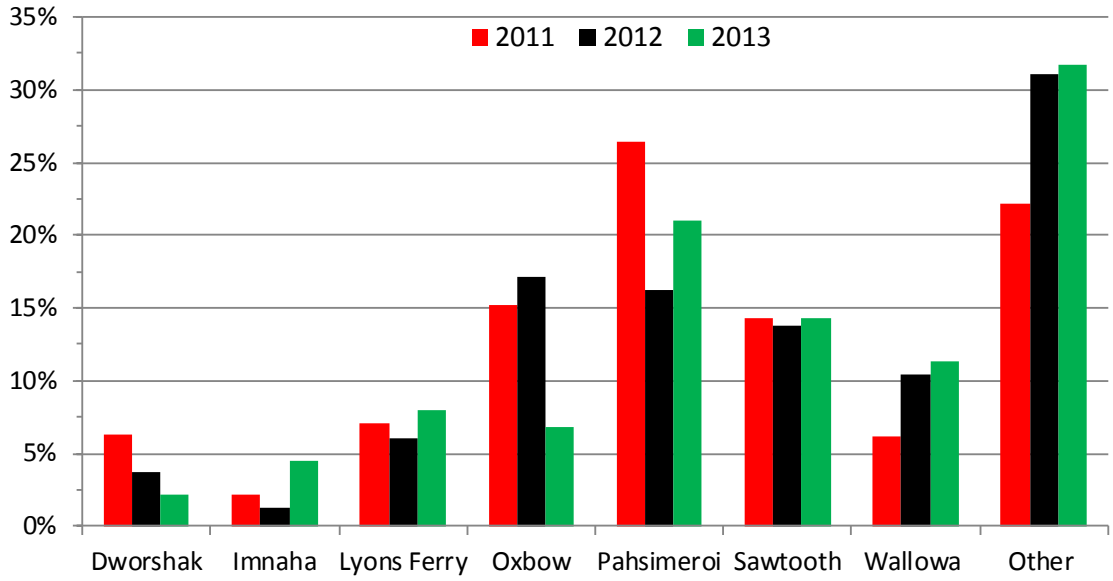


Figure A. 1. The percent of the total harvest by hatchery stock in the in the lower Columbia River sport fishery from 2011 to 2013.

APPENDIX B

Tribal Zone 6 steelhead harvest in the years' 2011 and 2012 was estimated from August 1 to the end of the fishing season. In 2103, we estimated tribal Zone 6 harvest from June 16 to the end of the fishing season. The expanded time period of sampling in 2013 allowed us to determine the stock composition during the summer management period (June 16 to July 31). Many Snake River hatchery steelhead stocks and wild steelhead from throughout the Columbia River basin enter Zone 6 in July (Figure 6) and would be expected to contribute to harvest. The expansion of sampling steelhead harvest from June 16 to July 31 in 2013 allows a more accurate assessment of the harvest of Snake River stocks in the tribal Zone 6 fishery. About 24% of the total steelhead harvest from June 16, 2013 to end of the season on October 3, 2013 occurred during the summer management period. This was the highest percentage of steelhead harvested in the summer period in the past three years (Table B. 1.). The harvest of fall Chinook in 2013 was nearly 100,000 and 140,000 more fish than in 2011 and 2012, respectively. The 2013 sockeye and coho harvest was the lowest observed in the past three years (Table B. 2.).

Table B. 1. Harvest of clipped, unclipped, and total steelhead in the tribal Zone 6 fishery during the summer management period (June 16 to July 31) and fall management period (August 1 to end of season) from 2011 to 2013.

	Summer Period				Fall Period			Grand
Year	Clip	Unclip	Total	Percent	Clip	Unclip	Total	total
2011	2,569	1,424	3,993	12.7%	18,204	9,295	27,499	**31,492**
2012	661	314	975	6.0%	9,718	5,493	15,211	**16,186**
2013	3,061	2,309	5,370	23.9%	10,447	6,629	17,076	**22,446**

Table B. 2. Harvest of Chinook, coho, and sockeye salmon in the tribal Zone 6 summer and fall management periods from 2011 to 2013. Some of the sockeye harvest may have occurred in August.

	Summer period		Fall period		Total harvest		
Year	Chinook	Sockeye	Chinook	Coho	Chinook	Sockeye	Coho
2011	22,763	12,849	135,930	25,998	158,693	12,849	25,998
2012	8,383	45,352	92,218	6,783	100,601	45,352	6,783
2013	16,278	8,132	234,285	5,763	250,563	8,132	5,763

Table B. 3. Harvest of clipped and unclipped Steelhead (Sthd) and Chinook salmon (Chin) by statistical week during the fall management period from 2011 to 2013. The start and end dates for weeks 35 to 41 in 2011 and 2012 and weeks 34 to 40 in 2013 were the dates open for commercial set net fishing. Platform fishing was allowed daily from August 1 to the end of the season each year. The % of Chin and % of Sthd columns were the percent of the total catch that occurred that week.

2011 Zone 6 Fall Tribal Harvest							2012 Zone 6 Fall Tribal Harvest							2013 Zone 6 Fall Tribal Harvest						
Stat Week	**Start Date**	**End Date**	**Chin**	**Sthd**	**% of Chin**	**% of Sthd**	**Stat Week**	**Start Date**	**End Date**	**Chin**	**Sthd**	**% of Chin**	**% of Sthd**	**Stat Week**	**Start Date**	**End Date**	**Chin**	**Sthd**	**% of Chin**	**% of Sthd**
31 - 34	8/1	8/20	239	2,240	0.2%	8.1%	32 - 34	8/1	8/20	378	4,490	0.4%	29.5%	31 - 33	8/1	8/18	1,479	4,100	0.6%	24.0%
35	8/22	8/25	5,880	2,679	4.3%	9.7%	35	8/21	8/23	3,351	1,132	3.6%	7.4%	34	8/19	8/21	5,082	1,015	2.2%	5.9%
36	8/29	9/2	12,216	2,873	9.0%	10.4%	36	8/27	8/30	9,002	924	9.7%	6.1%	35	8/26	8/30	28,886	1,365	12.3%	8.0%
37	9/6	9/10	39,907	2,885	29.4%	10.5%	37	9/4	9/8	29,102	2,249	31.3%	14.8%	36	9/3	9/7	49,022	2,098	20.9%	12.3%
38	9/12	9/16	33,342	3,657	24.5%	13.3%	38	9/11	9/14	27,798	1,834	29.9%	12.1%	37	9/10	9/14	71,295	2,133	30.4%	12.5%
39	9/19	9/23	26,669	7,538	19.6%	27.4%	39	9/18	9/21	16,065	2,230	17.3%	14.7%	38	9/16	9/20	40,822	1,318	17.4%	7.7%
40	9/26	9/29	11,426	2,884	8.4%	10.5%	40	9/26	9/28	4,184	1,016	4.5%	6.7%	39	9/24	9/27	25,044	1,855	10.7%	10.9%
41	10/3	10/6	5,932	2,217	4.4%	8.1%	41	10/2	10/4	2,716	935	2.9%	6.2%	40	9/30	10/3	12,655	3,192	5.4%	18.7%
42+	10/7	11/26	321	526	0.2%	1.9%	42+	10/5	11/10	275	400	0.3%	2.6%							
Total:			**135,932**	**27,499**						**92,871**	**15,211**						**234,285**	**17,076**		

Table B. 4. The estimated harvest by hatchery stocks (all release groups and BYs combined) and GSI reporting groups in the tribal Zone 6 fishery from 2011 to 2013. The harvest estimates for 2011 and 2012 were from August 1 to the end of the fishing season. The 2013 estimate was from June 16, 2013 to the end of the season.

	2011 Harvest			2012 Harvest			2013			Percent of total harvest		
Group	**Clip**	**Unclip**	**Total**	**Clip**	**Unclip**	**Total**	**Clip**	**Unclip**	**Total**	**2011**	**2012**	**2013**
Hatchery stocks												
Dworshak	8,875	2,081	10,956	2,322	708	3,030	1,392	348	1,740	39.8%	19.9%	7.8%
Lyons Ferry	939	0	939	784	18	802	775	14	789	3.4%	5.3%	3.5%
Oxbow	1,703	49	1,752	1,415	90	1,505	916	15	931	6.4%	9.9%	4.1%
Pahsimeroi	2,753	167	2,920	1,340	137	1,477	3,063	68	3,131	10.6%	9.7%	14.0%
Sawtooth	1,814	361	2,175	1,273	151	1,424	2,372	157	2,529	7.9%	9.4%	11.3%
Tucannon	0	49	49	0	88	88	0	41	41	0.2%	0.6%	0.2%
Touchet	0	0	0	0	0	0	13	14	27	0.0%	0.0%	0.1%
Wallowa	772	0	772	1,061	58	1,119	2,530	73	2,603	2.8%	7.4%	11.6%
Imnaha	183	0	183	86	39	125	256	30	286	0.7%	0.8%	1.3%
Upper & EF Salmon	156	201	357	12	64	76	13	217	230	1.3%	0.5%	1.0%
Other Hatchery	1,009	--	1,009	1,425	--	1,425	2,176	--	2,176	3.7%	9.4%	9.7%
GSI reporting group												
BWSALM		14	14		35	35		14	14	0.1%	0.2%	0.1%
KLICKR		215	215		62	62		185	185	0.8%	0.4%	0.8%
LOWCOL		43	43		0	0		0	0	0.2%	0.0%	0.0%
MFSALM		287	287		167	167		228	228	1.0%	1.1%	1.0%
MGILCS		3417	3417		2,747	2,747		5,661	5,661	12.4%	18.1%	25.2%
SFCLWR		616	616		141	141		135	135	2.2%	0.9%	0.6%
SFSALM		416	416		108	108		85	85	1.5%	0.7%	0.4%
SKAMAN		72	72		70	70		71	71	0.3%	0.5%	0.3%
UPCLWR		504	504		249	249		142	142	1.8%	1.6%	0.6%
UPPCOL		327	327		232	232		522	522	1.2%	1.5%	2.3%
UPSALM		433	433		267	267		760	760	1.6%	1.8%	3.4%
YAKIMA		43	43		62	62		157	157	0.2%	0.4%	0.7%
Snake R hatchery	***17,195***	***2,908***	***20,103***	***8,293***	***1,353***	***9,646***	***11,330***	***977***	***12,307***	***73.1%***	***63.4%***	***54.8%***
Total Hatchery	**18,204**		**21,112**	**9,718**		**11,071**	**13,506**		**14,483**	**76.8%**	**72.8%**	**64.5%**
GSI total:	***0***	***6,387***	***6,387***	***0***	***4,140***	***4,140***	***0***	***7,960***	***7,960***	***23.2%***	***27.2%***	***35.5%***
Grand total:	**18,204**	**9,295**	**27,499**	**9,718**	**5,493**	**15,211**	**13,506**	**8,937**	**22,443**			

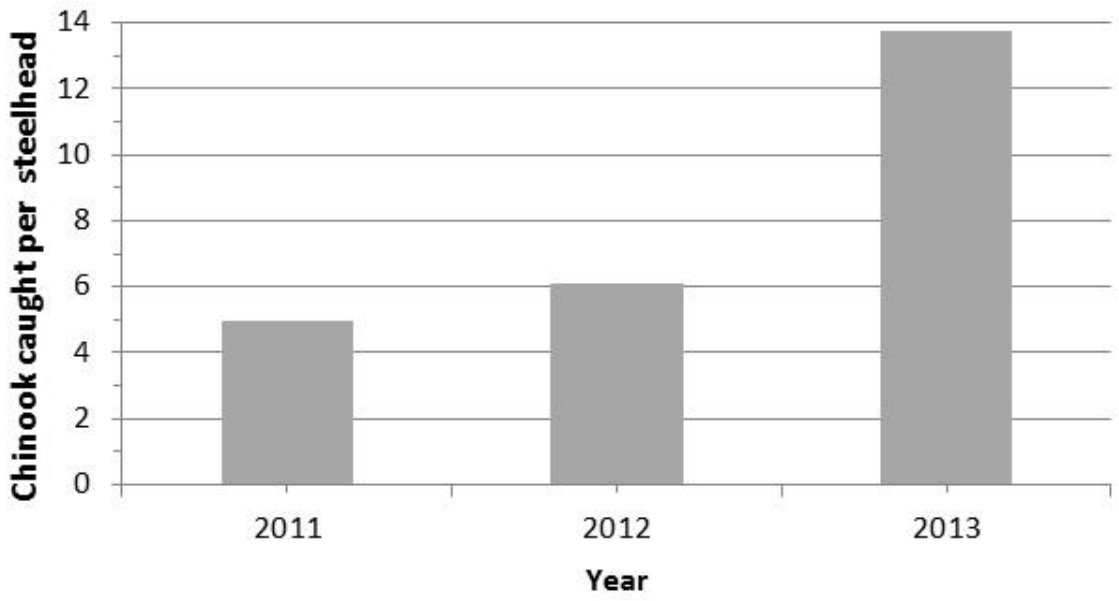


Figure B. 1. The number of Chinook (clipped and unclipped) harvested per steelhead (clipped and unclipped) harvested in the tribal Zone 6 fishery from August 1 to the end of the fishing season.

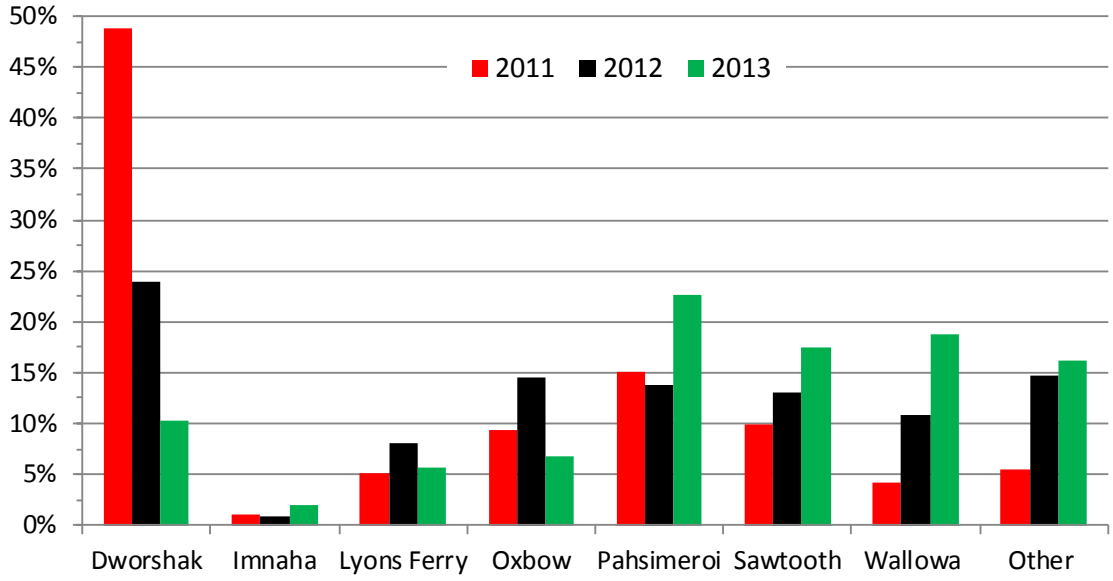


Figure B. 2. The percent of the total clipped harvest by hatchery stock in the tribal Zone 6 clipped steelhead harvest from 2011 to 2013.

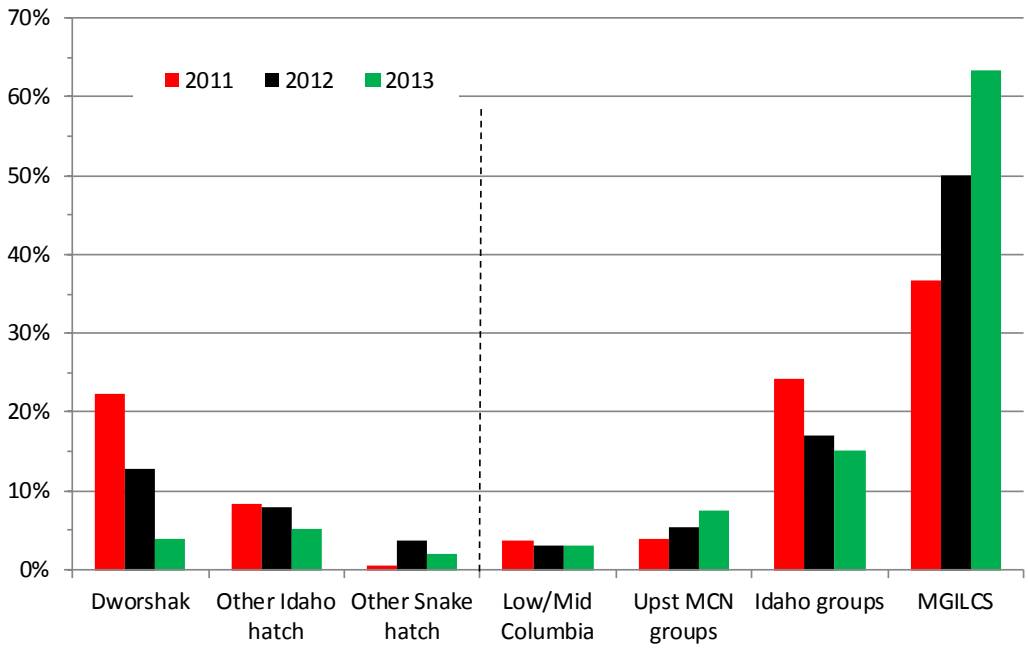


Figure B. 3. The percent of the total unclipped harvest by hatchery stock and GSI group in the tribal Zone 6 unclipped steelhead harvest from 2011 to 2013. Groups to the left of the dashed line are hatchery origin.

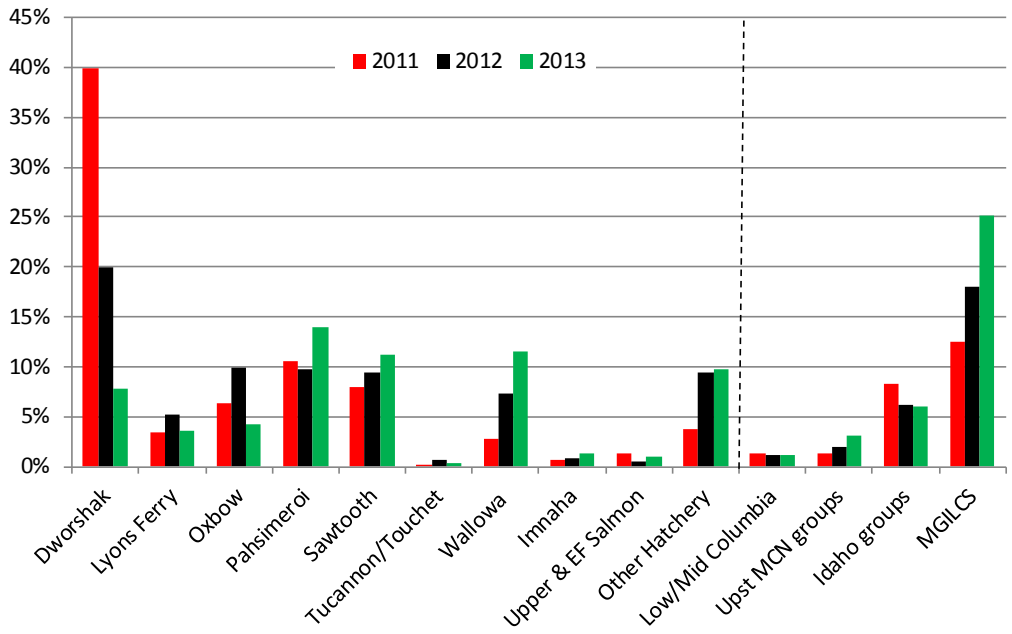


Figure B. 4. The percent of the total harvest by hatchery stock and GSI groups in the tribal Zone 6 total steelhead harvest (clipped and unclipped) from 2011 to 2013. Groups to the left of the dashed line are hatchery origin.

APPENDIX C

Table C. 1. The estimated harvest by hatchery stock (all release groups and BYs combined) in the lower Snake River sport fishery in the 2012-13 and 2013-14 seasons. Sport fishing for steelhead is open from September 1 to March 31 of the following year. The boundaries of the survey in 2012-13 were from the mouth to Lower Granite Dam and in 2013-14 the boundaries were from the mouth to the Idaho/Washington border.

	Harvest		Percent of harvest	
Hatchery stock	**2012-13**	**2013-14[a]**	**2012-13**	**2013-14**
Dworshak	1,741	1,483	24%	20%
Imnaha	45	150	1%	2%
Lyons Ferry	2,673	3,204	37%	42%
Oxbow	342	325	5%	4%
Pahsimeroi	960	1,001	13%	13%
Sawtooth	692	590	10%	8%
Wallowa	651	502	9%	7%
EF Salmon	0	11	0%	0.1%
Tucannon	0	16	0%	0.2%
All Snake River	***7,104***	***7,282***	***99.2%***	**96.3%**
Other	56	276	0.8%	3.7%
Total harvest	**7,160**	**7,558**		
9/1 to 12/31 harvest	5,591	6,389	78.1%	84.5%
1/1 to 3/31 harvest	1,569	1,169	21.9%	15.5%

[a] 1,868 fish were caught between Lower Granite Dam and the Idaho/Washington border. In the 2013-14 season, 5,690 fish were caught between the mouth and Lower Granite Dam.

APPENDIX D

The 2013 fall Chinook return at Bonneville Dam was the largest since counting began at the dam in 1938. Over 950,000 adult Chinook passed Bonneville Dam between August 1 and December 31, 2013. The 2013 steelhead return was about 8,000 fish more than the 2012 return but nearly 130,000 fish less than the 2011 return.

Table D. 1. Count of Steelhead (July 1 to October 31), adult summer Chinook (June 16 to July 31), adult fall Chinook (August 1 to December 31), sockeye (May 1 to December 31), and all coho (July 1 to December 31) at Bonneville Dam.

Year	Clipped Steelhead	Unclipped Steelhead	Total Steelhead	Summer Chinook	Fall Chinook	Sockeye	Coho
2011	230,966	124,155	355,121	69,994	401,746	185,795	149,883
2012	139,441	80,416	219,857	53,304	350,149	515,673	60,009
2013	129,045	96,541	225,586	63,508	952,380	185,505	65,440

The run-timing of Dworshak hatchery steelhead in 2013 was similar to fall Chinook until August 29, then it became later timed. Both Dworshak and fall Chinook attained the 10% arrival date at Bonneville Dam on August 27. Dworshak reached its 25% arrival date on September 8, which was six days later than fall Chinook; its 50% arrival date on September 16, which was also six days later than fall Chinook; and its 75% arrival date on September 27, which was 10 days later than fall Chinook. The duration from the 10% arrival date to the 90% arrival date was 42 days for Dworshak steelhead and 31 days for fall Chinook. The 2013 Dworshak run-timing was more similar to its 2012 timing than its 2011 timing, but it was not as late as the 2012 run.

The abundance of Dworshak adult steelhead at Bonneville Dam has been estimated by IDFG the past three years using PIT detections and expanding for tag rates of various release groups (IDFG, unpublished data). There has been a decline in the total Dworshak return and the 2-ocean component of the return since 2011. In 2013, IDFG estimated the total return of Dworshak steelhead at Bonneville Dam was 11,847 of which 11,817 were 2-ocean adults.

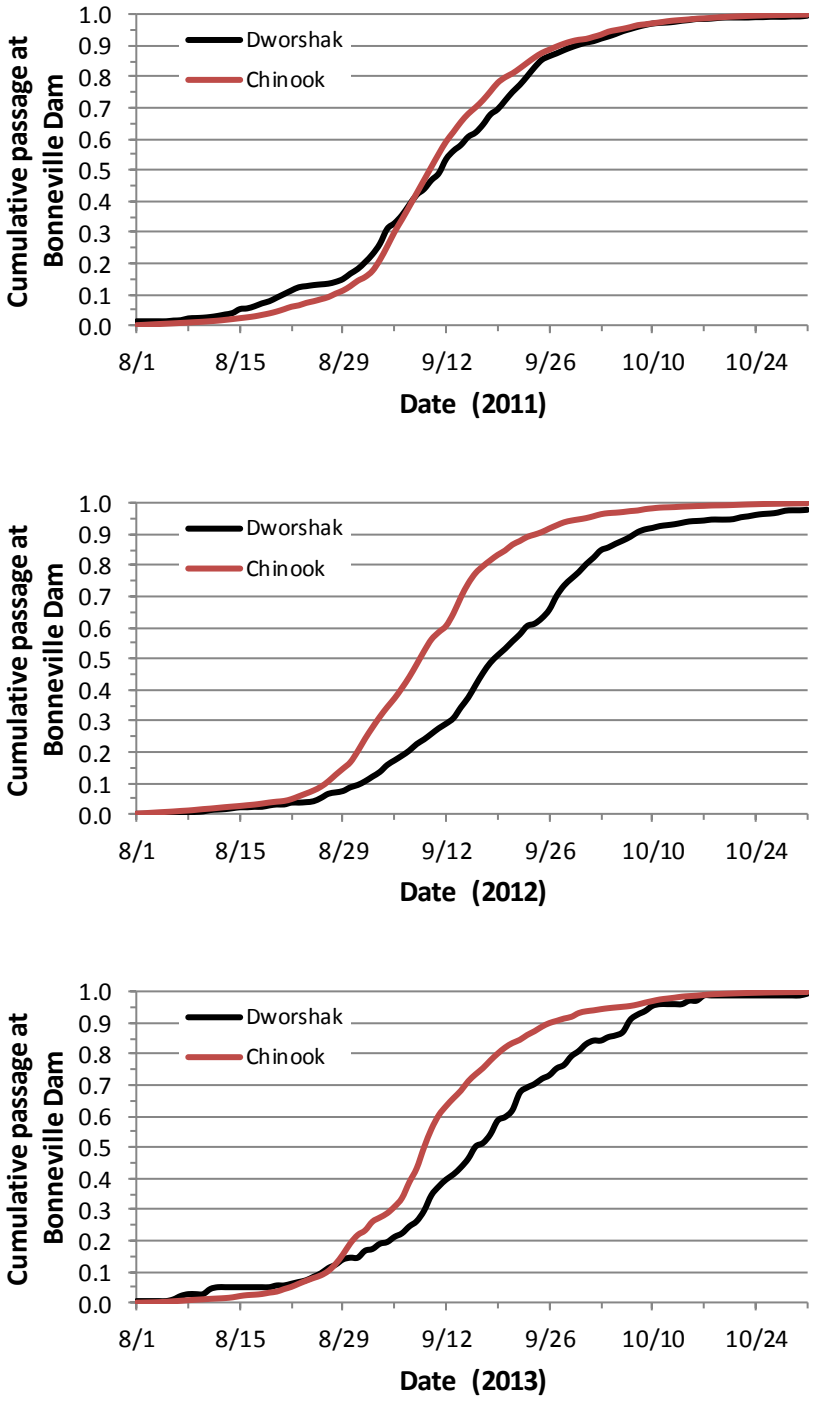


Figure D. 1. Run-timing of Dworshak steelhead and adult fall Chinook at Bonneville Dam in 2011, 2012, and 2013.

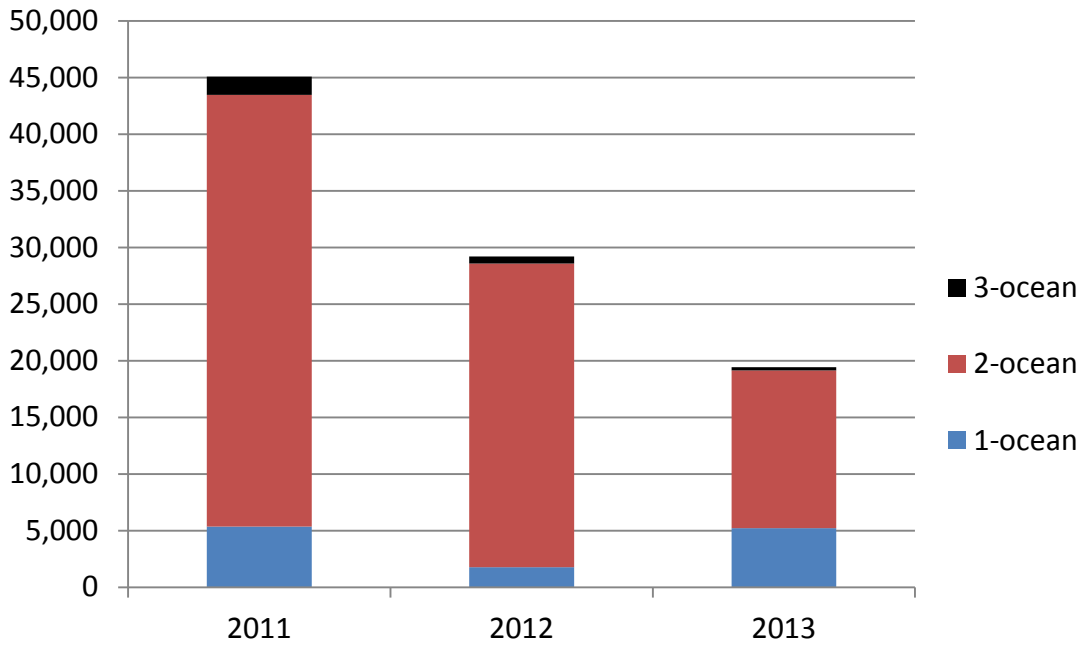


Figure D. 2. The estimated return of Dworshak hatchery adults at Bonneville Dam from 2011 to 2013 based on PIT tag expansions. The estimates were adjusted upward to account for PIT tags underestimating abundance by 15%.

Table D. 2. The number of detections (N) and the date that the first, 5th%, 10th%, 25th%, 50th%, 75th%, 90th%, 95th%, and last summer steelhead arrived at Bonneville Dam (BON) in 2013 for hatchery and wild (grey shading) stocks. The percentage past Bonneville Dam on June 16, 2013 (start of summer management period) and August 1, 2013 (start of fall management period) are also shown. The Skamania stock only includes those smolts released in the Klickitat River.

Percent of BON passage	Fall Chinook	Dworshak	EF & Upper Salmon	Imnaha	Lyons Ferry	Oxbow	Pahsimeroi	Sawtooth	Tucannon	Wallowa	Skamania	Upper Columbia Hatchery	Mid Columbia Wild	Snake Wild	Upper Columbia Wild
First	--	7/27	7/19	7/2	5/22	7/11	7/4	7/1	6/29	7/11	3/18	4/17	6/22	5/26	7/3
5%	8/22	8/24	7/24	7/17	6/23	7/26	7/23	7/24	7/13	7/22	4/18	7/7	7/10	7/13	7/4
10%	8/27	8/29	8/4	7/23	7/3	7/30	7/28	7/29	7/18	7/26	4/25	7/17	7/15	7/19	7/13
25%	9/2	9/9	8/9	7/31	7/16	8/7	8/6	8/6	7/27	8/5	6/3	7/28	7/23	7/28	7/24
50%	**9/10**	**9/19**	**9/2**	**8/8**	**7/27**	**8/17**	**8/12**	**8/12**	**8/6**	**8/13**	**6/25**	**8/7**	**8/1**	**8/8**	**8/5**
75%	9/17	9/29	9/12	8/19	8/7	8/29	8/29	8/30	8/10	8/29	7/13	8/17	8/8	8/27	8/15
90%	9/27	10/9	9/26	8/29	8/21	9/8	9/11	9/11	8/27	9/13	7/27	8/31	8/21	9/11	8/27
95%	10/7	10/11	9/30	9/8	8/30	9/14	9/21	9/20	9/4	9/27	8/7	9/7	9/3	9/20	9/3
Last	--	11/19	9/30	9/30	9/15	9/25	10/25	9/30	8/29	10/23	9/27	10/7	9/25	10/14	9/4
N	--	307	79	337	170	104	479	327	43	371	185	612	565	931	136
16-Jun	--	0.0%	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.8%	40.0%	1.0%	0.0%	0.2%	0.0%
1-Aug	--	0.3%	8.9%	28.5%	65.3%	12.5%	16.9%	17.4%	27.9%	19.9%	92.4%	34.6%	49.4%	31.3%	39.7%

Table D. 3. The number of detections (N) and the date that the first, 5th%, 10th%, 25th%, 50th%, 75th%, 90th%, 95th%, and last summer steelhead from Spawn Year 2014 arrived at McNary Dam (MCN) for hatchery and wild (grey shading) stocks. The percentage past McNary Dam August 1, 2013 (start of fall management period) and January 1, 2014 are also shown. The Mid Columbia Wild only includes fish tagged upstream of McNary Dam up to and including the Yakima River basin (excluding the Snake River basin).

Percent of MCN passage	Fall Chinook	Dworshak	EF & Upper Salmon	Imnaha	Lyons Ferry	Oxbow	Pahsimeroi	Sawtooth	Tucannon	Wallowa	Upper Columbia Hatchery	Mid Columbia Wild	Snake Wild	Upper Columbia Wild
First		9/2/13	7/30/13	7/10/13	6/16/13	7/29/13	7/11/13	7/14/13	7/22/13	7/18/13	5/12/13	7/8/13	6/15/13	6/26/13
5%	8/30/13	9/13/13	8/5/13	7/25/13	6/29/13	8/3/13	8/3/13	8/9/13	7/22/13	7/22/13	7/12/13	7/25/13	7/25/13	7/25/13
10%	9/4/13	9/19/13	8/16/13	7/30/13	7/16/13	8/15/13	8/15/13	8/29/13	7/28/13	7/28/13	7/25/13	7/31/13	7/31/13	7/25/13
25%	9/13/13	9/29/13	9/15/13	8/13/13	7/26/13	9/7/13	9/10/13	9/11/13	9/9/13	9/9/13	8/8/13	8/11/13	8/27/13	8/1/13
50%	**9/21/13**	**10/5/13**	**9/26/13**	**9/7/13**	**8/3/13**	**9/13/13**	**9/23/13**	**9/21/13**	**9/27/13**	**9/27/13**	**8/23/13**	**9/20/13**	9/19/13	**8/18/13**
75%	9/28/13	10/12/13	10/4/13	9/19/13	8/14/13	9/25/13	10/2/13	9/30/13	10/2/13	10/2/13	9/12/13	10/4/13	10/3/13	9/11/13
90%	10/8/13	10/23/13	10/9/13	10/3/13	9/5/13	10/4/13	10/7/13	10/5/13	10/6/13	10/6/13	9/24/13	10/14/13	10/7/13	9/21/13
95%	10/15/13	11/16/13	11/2/13	10/5/13	9/12/13	10/4/13	10/13/13	10/7/13	10/7/13	10/7/13	9/30/13	11/16/13	10/16/13	9/28/13
Last		3/17/14	3/17/14	3/1/14	4/21/14	10/8/14	3/25/14	3/10/14	3/10/14	3/18/14	11/9/13	4/13/14	3/26/14	10/17/13
n =		193	57	230	108	60	303	236	19	19	447	233	610	94
1-Aug		0.0%	3.5%	13.9%	45.4%	3.3%	4.6%	1.3%	10.5%	10.5%	0.0%	15.0%	11.5%	25.5%
1-Jan		96.4%	98.2%	99.6%	99.1%	100.0%	99.0%	99.6%	100.0%	100.0%	0.0%	98.3%	99.0%	100.0%

Table D. 4. The number of detections (N) and the date that the first, 5th%, 10th%, 25th%, 50th%, 75th%, 90th%, 95th%, and last summer steelhead from Spawn Year 2014 arrived at Ice Harbor Dam (ICE) for hatchery and wild (grey shading) stocks. The percentage past Ice Harbor Dam on January 1, 2014 is also shown.

Percent of ICE passage	Dworshak	EF & Upper Salmon	Imnaha	Lyons Ferry	Oxbow	Pahsimeroi	Sawtooth	Tucannon	Wallowa	Snake Wild
First	9/6/13	8/2/13	7/15/13	6/20/13	8/1/13	7/13/13	7/16/13	8/1/13	7/20/13	6/17/13
0.05	9/17/13	8/16/13	7/30/13	7/6/13	8/14/13	8/9/13	8/13/13	8/17/13	9/1/13	7/30/13
0.10	9/24/13	9/5/13	8/6/13	7/19/13	8/30/13	8/20/13	9/2/13	8/22/13	9/8/13	8/6/13
0.25	10/1/13	9/17/13	8/23/13	7/30/13	9/12/13	9/13/13	9/15/13	9/14/13	9/17/13	9/10/13
0.50	**10/8/13**	**9/25/13**	**9/14/13**	**8/12/13**	**9/18/13**	**9/27/13**	**9/25/13**	**9/28/13**	**10/1/13**	**9/25/13**
0.75	10/18/13	10/5/13	10/1/13	9/5/13	10/4/13	10/5/13	10/2/13	10/4/13	10/7/13	10/3/13
0.90	11/18/13	11/5/13	10/13/13	9/16/13	10/9/13	10/11/13	10/9/13	10/7/13	10/22/13	10/18/13
0.95	3/4/14	11/27/13	11/1/13	9/21/13	10/17/13	11/8/13	10/17/13	11/2/13	11/9/13	11/12/13
Last	3/22/14	3/21/14	4/29/14	4/13/14	10/31/13	3/27/14	3/14/14	11/2/13	3/20/14	4/18/14
n =	193	57	220	108	60	303	236	19	214	612
1-Jan	93.8%	96.5%	98.2%	99.1%	100.0%	98.0%	98.8%	100.0%	98.6%	96.1%

Table D. 5. The number of detections (N) and the date that the first, 5th%, 10th%, 25th%, 50th%, 75th%, 90th%, 95th%, and last summer steelhead from Spawn Year 2014 arrived at Lower Granite Dam (LGR) for hatchery and wild (grey shading) stocks. The percentage past Lower Granite Dam on October 1, 2103, November 1, 2013, and January 1, 2014 are also shown. Fish that were tagged downstream of Lower Granite Dam were omitted from the Snake Wild group.

Percent of LGR passage	Dworshak	EF & Upper Salmon	Imnaha	Oxbow	Pahsimeroi	Sawtooth	Wallowa	Snake Wild
First	9/17/13	8/17/13	7/25/13	9/6/13	7/20/13	8/18/13	8/3/13	7/4/13
0.05	9/21/13	9/11/13	8/17/13	9/17/13	9/13/13	9/17/13	9/18/13	8/14/13
0.10	9/29/13	9/20/13	9/1/13	9/19/13	9/19/13	9/18/13	9/20/13	9/15/13
0.25	10/5/13	9/25/13	9/18/13	9/20/13	9/23/13	9/23/13	9/23/13	9/22/13
0.50	**10/13/13**	**10/6/13**	**9/23/13**	**9/25/13**	**10/4/13**	**10/1/13**	**10/5/13**	**10/5/13**
0.75	11/1/13	10/19/13	10/7/13	10/9/13	10/11/13	10/8/13	10/12/13	10/15/13
0.90	3/4/14	11/11/13	10/21/13	10/17/13	10/24/13	10/17/13	10/27/13	11/17/13
0.95	3/18/14	11/17/13	11/20/13	10/27/13	11/17/13	10/27/13	11/16/13	3/14/14
Last	3/31/14	3/23/14	5/8/14	10/29/13	4/5/14	4/19/14	4/1/14	5/30/14
n =	182	54	204	56	288	230	202	562
1-Oct	14.3%	40.7%	62.7%	58.9%	44.8%	51.3%	38.6%	44.1%
1-Nov	76.4%	85.2%	92.2%	100.0%	91.7%	95.7%	92.1%	86.1%
1-Jan	88.5%	98.1%	95.6%	100.0%	96.9%	97.4%	100.0%	92.0%

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