FISHERY RESEARCH

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

## JUNE 16, 2014 TO MARCH 31, 2015

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# SUMMER STEELHEAD STOCK COMPOSITION IN THE COLUMBIA RIVER AND SNAKE RIVER TRIBAL AND SPORT FISHERIES

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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

This is the fourth year that we have reported the summer steelhead stock composition in sport and tribal fisheries in the Columbia River using genetic techniques. We estimated the stock composition of steelhead harvested in the Columbia River sport fisheries downstream of the Highway 395 bridge near Pasco, Washington from June 16 to October 31, 2014 and the tribal Zone 6 fisheries from June 16 to November 16, 2014. We also estimated the stock composition in the Snake River sport fishery downstream of the Idaho/Washington border from September 1, 2014 to March 31, 2015. Steelhead from the Snake River basin hatcheries made up 59% of the Columbia River sport harvest downstream of Bonneville Dam, 72% of the clipped Zone 6 tribal harvest, 12% of the unclipped Zone 6 tribal harvest, and 54% of the total Zone 6 tribal harvest. We estimate that Snake River basin wild fish made up at least 17% of the unclipped steelhead and 7% of the total steelhead caught in the Zone 6 tribal fishery. Snake River basin hatchery stocks made up 97% 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 fourth 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. 2015, 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). 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 from June 16 to October 31 and in the tribal Zone 6 fishery from Bonneville Dam to McNary Dam from June 16 until its closure on November 16 (Figure 1). Samples were also obtained from steelhead kept by sport anglers upstream of Bonneville Dam in the Bonneville pool, Drano Lake, in the Columbia River near the mouth of the Deschutes River, and from McNary Dam to the Highway 395 bridge near Pasco, Washington. The Washington Department of Fish and Wildlife (WDFW) sampled steelhead from September 1, 2014 to March 31, 2015 that were caught in the sport fishery in the Snake River from the mouth to the Idaho/Washington border near Lewiston, Idaho (Figure 2). 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 the Highway 395 bridge just upstream of the mouth of the Snake River. All steelhead handled in fisheries downstream of The Dallas 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 summer run Skamania stock steelhead. Steelhead that pass Bonneville Dam between April 1 and June 30 are counted as summer run Skamania stock steelhead. The Skamania hatchery summer steelhead stock is released in the lower Columbia tributaries, including the Willamette basin and in the Little White Salmon and Klickitat River. The lower Columbia River steelhead Distinct Population Segment (DPS) was listed as threatened by the NMFS in May 1999. Wild summer steelhead in the lower Columbia DPS are present in the Kalama, Lewis, Washougal, and Wind rivers in Washington, and in the Hood River in Oregon. The recent five-year average return (2009 – 2013) of Skamania steelhead at Bonneville Dam was 13,920 fish of which 4,278 were wild origin (JSR 2015a).

All steelhead handled in fisheries downstream of Bonneville Dam from July 1 to October 31 are managed as summer run upriver-stock steelhead. Steelhead handled in fisheries upstream of Bonneville Dam to the Highway 395 bridge from July 1 to October 31 and from The Dalles Dam to the Highway 395 bridge in November and December 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 as 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 (2009 – 2013) of Group A steelhead at Bonneville Dam was 314,306 total fish of which 104,360 were wild origin and 39,583 total Group B of which 10,716 were wild origin (JSR 2015a).

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 rates (which are converted to allowed catch depending on run size) 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 in the lower Columbia River downstream of Bonneville Dam. 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 2014.

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 were 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 fishery 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 from July 1 to October 31, 2014 was obtained from the Army Corp of Engineers website (available at http://www.nwp.usace.army.mil/Missions/Environment/Fish/Data.aspx). 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 weekly between July 1 and August 10 and from September 8 to October 12. We estimated the percentages biweekly for the periods August 11 to August 24 and August 25 to September 7. We estimated the percentages from October 13 to October 31 by combining all samples collected during that time period. 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, McNary, Ice Harbor, and Lower Granite dams from April 1, 2014 to March 31, 2015 (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 2013 or earlier, and were returning to spawn in the spring of 2015 (adults spawning in the spring of 2014 would not be available to the fisheries we sampled). Some of the fish that were detected in March 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 Dworshak stock, was calculated by combining detections from all of the stock's release groups and BYs. The Dworshak stock was split into two groups: fish reared at Dworshak or Clearwater hatcheries and released in the Clearwater drainage (Dwor_C) and those fish reared in the Hagerman Valley hatcheries and released in the Salmon drainage (Dwor_S). The parents of both Dwor_C and Dwor_S groups were trapped and spawned at Dworshak Hatchery. The Lyons Ferry stock run-timing was calculated using only those fish that were released in the Snake River basin. The Skamania stock run-timing was calculated using only fish that were released in the Klickitat River. 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 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. We estimated the cumulative passage proportion for each date of all wild and hatchery stocks at Bonneville Dam.

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 (most of the adults were from the Walla Walla and Yakima drainages). The McNary Dam run-timing for the wild and hatchery stocks from the Upper Columbia and Snake River basin was calculated using all detections at McNary Dam from those stocks. We calculated the run-timing of the Snake River basin hatchery stocks and wild fish at Ice Harbor Dam using fish that were detected at McNary Dam. The Lower Granite Dam run-timing was calculated using adults that were tagged upstream of the dam that were detected at McNary and Ice Harbor dams. We did not report the run-timing of a stock if there were less than 40 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, 2014. 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 December 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 by fishery managers 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) and the ODFW website (available at:

http://www.dfw.state.or.us/resources/fishing/sportcatch.asp) when surveys are finalized. The wild impacts from sport fishing upstream of Bonneville Dam are modeled in-season using the estimated stock proportions and abundance at Bonneville Dam.

## Columbia River Tribal Zone 6 Harvest Estimates

There were seven time periods open for commercial set net fishing during the summer management period from June 16 to July 31, 2014 that primarily targeted summer Chinook and sockeye salmon. There were no steelhead harvest limits during the summer season, however steelhead harvest was estimated using the same methods that were used in the fall management period. In the fall management period, which began on August 1, 2014, there were nine time periods open for commercial set net fishing from August 18 to October 16, 2014 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 November 16, 2014. 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.

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 2014, the total B-run steelhead allowable harvest rate in the treaty fishery was 20%.

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 were reviewed and then reported by TAC. Steelhead harvest was reported weekly for clipped and unclipped Group A and Group B fish (JSR 2015b and TAC 2008).

## Drano Lake Tribal Harvest Estimates

There were five commercial set net fishing openings each lasting one day that were held weekly from October 7 to November 4, 2014 in Drano Lake that targeted fall Chinook salmon. These fisheries were monitored by YN crews using the methods outlined in the previous section.

## 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 2). 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 Coded Wire Tag (CWT), 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 30, 2014. A total of 1,714 samples were collected from the sport fishery. Crews collected 166 samples in June, 819 samples in July, 700 samples in August, and 29 samples in September.

We estimated the stock composition for the entire period from June 16 to October 31, 2012. We drew a random subsample of 1,116 from the 1,714 samples we collected for genotyping. We allocated the subsample in proportion to the monthly harvest estimates as closely as possible. We were able to do this for all months except September and October. Ideally we would have chosen 38 samples from September and two from October. However, we only collected 29 samples after September 1. After we chose the August samples, we then chose additional samples from the last week of August to represent fish caught in September and October. Eleven of the 1,116 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 1,105 and included 143 fish from June, 436 fish from July, 500 fish from August, and 26 fish after September 1 (Table 2). We also 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 August 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 1 and September 30, 2014 and from McNary Dam to the Highway 395 bridge from September 1 to November 3, 2014. ODFW crews sampled anglers fishing in the Columbia River near the mouth of the Deschutes River from June 30 until October 20, 2014. 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 501 samples. Nine 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 492. The samples were collected from the Bonneville Pool (n = 45), Drano Lake (n = 254), near the

mouth of the Deschutes River (n = 113), and 80 samples from McNary Dam to Highway 395 bridge (Table 3). Since our sampling did not occur throughout the geographic and temporal range that the harvest estimates were made in this area, 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 16, 2014. A total of 2,740 samples from clipped steelhead and 2,144 samples from unclipped steelhead were collected.

The harvest contribution was estimated separately for clipped and unclipped steelhead. We drew a random subsample of 1,116 clipped and 1,116 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 August 1 to August 17 (Stat Weeks 31 to 33); hence, we had to use samples that were collected in Stat Week 31 prior to August 1 and the week after August 17 (Stat Week 34) to make up the difference. We assumed that samples in those weeks were representative of the stock composition caught in Zone 6 from August 1 to August 17. Forty four unclipped and three clipped 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 1,113 and 1,072 for the unclipped samples (Table 4).

We also 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 beginning on August 1 using samples collected in those time periods.

## Sample Collection in the Drano Lake Tribal Fishery

YN crews sampled 55 clipped and 55 unclipped steelhead. The harvest contribution was estimated separately for clipped and unclipped steelhead using all samples collected. Two 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 55 and 53 for the unclipped samples.

## 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 August 31, 2014 and the last fish was sampled on March 29, 2015. A total of 735 samples were obtained. About 78% of the harvest occurred and 78% of the samples were collected between September 1 and December 31, 2014 (Table 5).

We estimated the stock composition from the mouth of the Snake River to the Idaho/Washington border for the entire period from September 1, 2014 to March 31, 2015 using all samples that were collected. Eight 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 720.

We also estimated the stock composition of the harvest separately during the fall period (September 1 to December 31, 2014) and the spring period (January 1 to March 31, 2015) using samples collected in those time periods.

## 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. 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 6) 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=BY10, 2=BY11, and 3=BY12)

$C_{jtib}$ = 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:

$$Cpe_{jt} = \sum_{b=1}^{3} \sum_{i=1}^{19} Cpe_{jtib} \quad (2)$$

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

$$Hu_{jt} = Hc_{jt} * qu_{jt} \quad (7)$$

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.

$$Li = \sum_{b=1}^{3} l_{ib} \; / \sum_{b=1}^{3} n_{ib} \tag{8}$$

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,

$$Expand_i = \sum_{b=1}^{3} n_{ib}/m_{ib} \tag{9}$$

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),

$$Expect_i = Expand_i * L_i \tag{10}$$

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

$$T_i = Expect_i \; / \; N_t \tag{11}$$

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.

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

(12)

where $N_l$ total number of large fish sampled.

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

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

(13)

## 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 7). 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 were 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 were 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 3) 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 6). 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:

$$Fu_t = U_{tib} + G_{tk} \quad (14)$$

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:

$$Ue_{tib} = {}^{U_{tib}}/_{m_{ib}} \quad (15)$$

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:

$$qh_{tib} = {}^{Ue_{tib}}/_{Fu_t} \quad (16)$$

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

$$Hh_{tib} = qh_{tib} * Hu_t$$

(17)

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:

$$D_{tib} = Ue_{tib} - U_{tib}$$

(18)

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

$$D_{ti} = D_{ti1} + D_{ti2} + D_{ti3}$$

(19)

where

1, 2, and 3 are Brood Year 2010, 2011, and 2012.

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

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

(20)

Where:

$p_{ik}$ = proportion of hatchery release group *i* that assign to GSI reporting group *k* (see Table 7). 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; (b) Sawtooth, SBT_Indian and SBT_Yankee; (c) Dwor_C and Dwor_S.

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

$$A_{tk} = G_{tk} - n_{tk}$$

(21)

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

$$qg_{tk} = {}^{A_{tk}}/_{Fu_t}$$

(22)

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

$$Hg_{tk} = qg_{tk} * Hu_t$$

(23)

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 ($qg_k$) proportions and harvest contribution ($Hh_{ib}$ and $Hg_k$) as outlined in equations 16 through 23. 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 were 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, 2014 a total of 307,187 and 206,643 steelhead were counted at Bonneville and McNary dams, respectively (Figure 4). At Bonneville Dam, 183,332 of the fish were clipped and 123,855 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 260,130 Group A steelhead of which 109,279 were wild. TAC estimated that the total Group B run was 47,057 of which 13,341 were wild fish (Table 8). A total of 148,913 (105,511 clipped and 47,057 unclipped) steelhead were counted at Ice Harbor Dam from July 1 to October 31, 2014. Fall Chinook salmon passage from August 1 to October 31, 2014 was 853,133 at Bonneville Dam and 414,089 at McNary Dam.

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

The Skamania stock released in the Klickitat River was the earliest arriving stock at Bonneville Dam. The 50% arrival date for Skamania stock was on June 25, more than six weeks earlier than the Lyons Ferry stock. The 90% arrival date for the Skamania stock was July 30 and was attained before any other stock reached its 50% arrival date. All Snake River basin and the Upper Columbia hatchery stocks attained their 50% arrival date between August 8 and August 21 except for the Dworshak stock released in the Salmon drainage (Dwor_S) and Clearwater drainage (Dwor_C) and the SF Clearwater stocks. The 50% date for these three stocks ranged from September 15 to September 23. The 50% arrival date for the Snake River hatchery stocks, except Lyons Ferry, spanned 44 days and ranged from August 10 to September 23. Although Dworshak and SF Clearwater stocks were the latest to arrive the duration from their 10% to 90% date of passage ranged from 28 to 34 days whereas most hatchery and all wild stocks took over 50 days. The passage of Dwor_C and Dwor_S groups when the first fall season commercial tribal net fishery opened on August 18 was 3% and 1% complete, respectively. The passage of the Wallowa, Imnaha, Oxbow, Pahsimeroi, and Sawtooth stocks on August 18 ranged from 45% to 72% complete. The run-timing of fall Chinook salmon at Bonneville Dam was most similar to that of the two Dworshak groups, SF Clearwater, and Upper Salmon (Figure 4 and Figure 5). The wild stocks from the Upper and Middle Columbia attained their 50% arrival date on July 28 and July 31, respectively, which was at least 10 days before all hatchery stocks except Skamania. The Snake wild stock reached its 50% passage date on August 15, more than two weeks later than the Upper and Middle Columbia wild fish. The Snake wild stock passage on the first tribal commercial set net fishing date on August 18 was 53% compared to 83% for both the Middle and Upper Columbia wild stocks. (Figure 5).

The earliest arriving stock at McNary Dam was the Upper Columbia wild stock which attained its 50% date on August 14 followed by the Lyons Ferry stock (August 17) and Middle Columbia hatchery (August 28). The latest arriving stock was the Middle Columbia wild stock which attained its 50% date on October 8. The 50% arrival date for the Snake River hatchery stocks, except Lyons Ferry, spanned 26 days and ranged from September 10 to October 6. The Snake River wild stock attained its 50% date on September 19, which was within a few days of the 50% date for most Snake River hatchery stocks. The run timing of fall Chinook salmon at McNary Dam was most similar to the Dwor_C group although it did reach its 50% passage date 10 earlier (September 16) than the Dwor_C group (Figure 6).

The earliest arriving stock at Ice Harbor Dam was Lyons Ferry which attained its 50% arrival date on August 23, nearly four weeks before the Oxbow stock which attained its 50% arrival date on September 17. Most stocks, including the wild fish, attained their 50% date between September 17 and September 26. The latest arriving stock was the Dwor_S group which reached its 50% passage date on October 10. The 50% arrival date for the Snake River hatchery stocks, except Lyons Ferry, spanned 23 days and ranged from September 17 to October 10. The passage of all hatchery and wild stocks was >93% complete and the Lyons Ferry and Oxbow stocks were 100% complete on December 31, 2014 (Figure 7).

The earliest arriving stock at Lower Granite Dam was the Oxbow stock which attained its 50% date on September 24 followed by the Imnaha stock (September 28) and EF Salmon and Sawtooth stocks (September 29). The latest arriving stock was the Dwor_S group which reached its 50% passage date on October 15. The 50% arrival date for all stocks spanned 21 days and ranged from September 24 to October 15. The passage of all hatchery and wild stocks was >92% on December 31, 2014 except the Upper Salmon (86%). The Oxbow and Sawtooth stock passage on December 31, 2014 was 100% complete (Figure 8).

## Lower Columbia River Sport Harvest Estimates

The estimated sport harvest in the lower Columbia River from June 16 to October 31, 2014 was 13,336 (Jimmy Watts, ODFW, personnel communication). Nearly 84% of the harvest occurred in July and August, while less than 4% occurred after September 1 (Table 2).

## Columbia River Upstream of Bonneville Dam Sport Harvest Estimates

At the time this report was written there were harvest estimates available from WDFW. An estimate of harvest by Oregon anglers was not available. The WDFW estimated steelhead catch from July 1 to December 31, 2014 in the Columbia River from Bonneville Dam to McNary Dam was 1,720. An estimated 1,375 steelhead were caught in the Columbia River between McNary Dam and the Highway 395 bridge near Pasco, Washington from July 1 to December 31, 2014. WDFW estimated that 6,071 steelhead were harvested in Drano Lake and the Little White Salmon River from July 1 to October 31, 2014.

## Columbia River Zone 6 Tribal Harvest Estimates

Tribal fishers harvested 20,142 clipped steelhead, 14,107 unclipped steelhead, and 299,255 Chinook salmon from June 16 to November 16, 2014 (JSR 2015b and Roger Dick II, YN, personnel communication). During the summer management period they harvested 5,245 clipped steelhead (26% of total clipped), 3,545 unclipped steelhead (26% of total unclipped), and 20,827 Chinook salmon (Table 4).

## Drano Lake Tribal Harvest Estimates

Tribal fishers harvested 396 steelhead and 14,434 Chinook salmon during the five nights of fishing in Drano Lake (Roger Dick II, YN, personnel communication).

## Lower Snake River Sport Harvest Estimates

The estimated harvest from the mouth to the Idaho/Washington border was 11,329 steelhead. About 78% of the harvest occurred between September 1 and December 31, 2014 (Table 5).

## Estimating Stock Proportions and Harvest Contribution for Clipped Steelhead

### Lower Columbia River sport fishery

We assigned 58.8% (90% CI, 56.1% to 61.2%) of the sport harvest from June 16 to October 31, 2014 to hatchery fish from the Snake River basin. Snake River basin one-ocean adults made up 24.7%, Snake River basin two-ocean adults made up 34%, and non-Snake River basin fish of unknown age made up 41.2 % of the harvest, respectively. We did not sample any three-ocean hatchery fish from the Snake River basin (Table 9). The Snake River basin hatchery stocks that provided the most harvest were the Pahsimeroi (15.2%), Wallowa (12.8%), Sawtooth (9.9%), Lyons Ferry (7.8%), and Oxbow (7.3%) stocks. The Dworshak stock contribution was estimated at 3.1% (Figure 9 and Table 9). The largest number of fish were harvested from the Other (41.2%, 5,499 fish), Pahsimeroi BY12 (12%, 1,500 fish), and Lyons Ferry BY12 (5.3%, 712 fish) release groups. The percent of harvest and harvest estimates with 90% confidence intervals for all release groups are shown in Tables 10 and 11.

The stock composition in this fishery changed as the season progressed. During the first two weeks, from June 16 to June 30, the Other group made up 92% of the harvest and Lyons Ferry about 6%. Sawtooth and Wallowa each made up about 1%. We did not sample any other Snake River hatchery stocks during this time period. In July the percentage of the catch from the Other group declined to 46%, and all of the Snake hatchery stocks, except the Upper Salmon and SF Clearwater were sampled. We did not sample any EF Salmon fish, but this stock is unclipped and could not be retained by sport anglers. The largest contribution came from the Wallowa (15%) and Pahsimeroi (13%) stocks. The Sawtooth, Oxbow, and Lyons Ferry stock each contributed 8% of the July harvest. Although we sampled Dworshak fish, its contribution to the July fishery was only 0.2%. In August, the Other group declined to 27% of the harvest, while the percentage of the Snake River hatchery stocks increased from their July value. In August the Pahsimeroi (25%), Wallowa (16%), and Sawtooth (16%) had the largest contribution to harvest and the percentage of Dworshak fish in the harvest increased to 5% (Figure 10).

We were able to identify the sex of 1,038 fish using the genetic marker. We estimated that females made up 43.9% of the harvest. The percentage of females harvested by release group (all BYs combined, with at least 20 fish sampled) ranged from 29.6% in the Imnaha group up to 63.5% in the SBT_Yankee group. We used all samples (1,105) to calculate that 5.6% of the sampled fish were $\geq$78 cm. About 48% of the large fish were from the Other group and 26% for the Dwor_C group. The percent of large fish within each release group ranged from 64% in the Dwor_C group to 0% in the Sawtooth and SBT_Yankee groups. The percent large within the Other group was estimated to be 6.6% (Table 12).

## Columbia River upstream of Bonneville Dam sport fishery

### Bonneville Pool

We assigned 66.8% (90% CI 54.7% to 78.6%) of the samples to Snake River basin hatchery stocks. Snake River hatchery one ocean fish made up 28.6%, Snake River two ocean fish 38.2%, and non-Snake River hatchery fish of unknown age 33.2% of the sampled fish (Tables 13 and 14). The largest stock contribution from Snake River hatcheries was from Wallowa (20.4%),Oxbow (16.6%), and Pahsimeroi (14.1%). The Dworshak stock made up 2.3% of the sampled fish (Figure 11 and Table 13). The estimated percentages and 90% CIs for each release group is shown in Table 14.

### Drano Lake

We assigned 74.8% (90% CI 69.8% to 79.5%) of the samples to Snake River basin hatchery stocks. Snake River hatchery one ocean fish made up 43.4%, Snake River two ocean fish 31.4%, and non-Snake River hatchery fish of unknown age 25.2% of the sampled fish (Tables 15 and 16). The largest stock contribution from Snake River hatcheries was from Wallowa (18%), Pahsimeroi (16.7%), and Oxbow (12.8%). The Dworshak stock made up 1.2% of the sampled fish (Figure 12 and Table 15). The estimated percentages and 90% CIs for each release group is shown in Table 16.

### Mouth of the Deschutes River

We assigned 72.4% (90% CI 65% to 79.9%) of the samples to Snake River basin hatchery stocks. Snake River hatchery one ocean fish made up 47.3%, Snake River two ocean fish 25.1%, and non-Snake River hatchery fish of unknown age 27.6% of the sampled fish (Tables 17 and 18). The largest stock contribution from Snake River hatcheries was from Wallowa (22.5%), Pahsimeroi (17.3%), and Dworshak (12.6%) (Figure 13 and Table 17). The estimated percentages and 90% CIs for each release group is shown in Table 18.

### Columbia River section 533

We assigned 95.2% (90% CI 90.2% to 99.3%) of the samples to Snake River basin hatchery stocks. Snake River hatchery one ocean fish made up 42.2%, Snake River two ocean fish 53%, and non-Snake River hatchery fish of unknown age 4.8% of the sampled fish (Tables 19 and 20). The largest stock contribution from Snake River hatcheries was from Lyons Ferry (33.8%), Dworshak (28%), and Pahsimeroi (12.7%) (Figure 14 and Table 19). The estimated percentages and 90% CIs for each release group is shown in Table 20.

## Columbia River Zone 6 Tribal fishery

We assigned 81.7% (90% CI, 79.6% to 83.9%) of the clipped tribal harvest from June 16 to November 16, 2014 to hatchery fish from the Snake River basin. Snake River basin one-ocean adults made up 29.8%, Snake River basin two-ocean adults made up 51.7%, Snake River basin three ocean adults made up 0.3%, and non-Snake River basin fish of unknown age made up 18.3% of the harvest, respectively (Table 21 and 22). The Snake River basin hatchery stocks that provided the most harvest were the Dworshak (20.6%), Pahsimeroi (16.3%), Wallowa (13.4%), and Sawtooth (12%) stocks. The remaining Snake basin hatchery stocks each contributed less than 8.5% of the harvest (Figure 15 and Table 21). The largest number of fish were harvested from the Dwor_C BY11 (18.4%, 3,665 fish), Other (18.3%, 3,644 fish), Oxbow BY11 (7%, 1,403 fish), and Pahsimeroi BY11 (6.5%, 1,288 fish) release groups. The

percent of harvest and harvest estimates with 90% confidence intervals for all release groups are shown in Tables 22 and 23.

The stock composition during the summer management period differed from that in the fall period. During the summer period, from June 16 to July 31, the Other group made up 37% of the harvest and Lyons Ferry 22%. The Wallowa stock made up 13% and Sawtooth and Oxbow each made up 7% of the harvest. The Dworshak stock made up 0.3% of the summer period harvest (Figure 16). In the fall period, from August 1 to November 16, 2014, the Other group and Lyons Ferry stock declined to 11% and 3% of the harvest, respectively. The harvest contribution of all Snake River stocks, except Lyons Ferry and Imnaha increased in the fall period compared to the summer period (Figure 17). In the fall, Dworshak was the largest contributor to harvest (28%), followed by Pahsimeroi (18%), Wallowa, and Sawtooth (14% each).

We were able to identify the sex of 1,052 fish using the genetic marker. We estimated that females made up 44.3% of the harvest. The percentage of females harvested by release group (all BYs combined, with at least 20 fish sampled) ranged from 28.1% in the SBT_Yankee group up to 50.3% in the Pahsimeroi group. We used all samples (1,113) to calculate that 22.6% of the sampled fish were $\geq$78 cm. About 77.1% of the large fish were from the Dwor_C group and 10.2% from the Other group. The percent of large fish within each release group ranged from 90.9% in the Dwor_C group to 0% in the Cottonwood, Imnaha, Pahsimeroi, and SBT_Yankee and SBT_Yankee groups. The percent large within the Other group was estimated to be 12.6% (Table 24).

**Drano Lake Tribal fishery**

We estimate that 84.8% (90% CI, 75.6% to 93.5%) of the harvested fish were from Snake River hatcheries. The majority of the fish (59.2%) came from the BY11 Dwor_C release group. All other Snake River release groups contributed less than 9% when all BYs were summed (Table 25). The estimated release group percentages and 90% CI are shown in Table 26. Of the 55 sampled fish, 22.6% were female and 76.4% were $\geq$78 cm. All of the sampled fish from the Dwor_C and Dwor_S (n = 33) were $\geq$78 cm.

**Lower Snake River sport fishery**

We assigned 97% (90% CI, 95.6% to 98.3%) of the sport harvest from September 1, 2014 to March 31, 2015 to hatchery fish from the Snake River basin. Snake River basin one-ocean adults made up 37.2%, Snake River basin two-ocean adults made up 59%, Snake River basin three ocean adults made up 0.7%, and non-Snake River basin fish of unknown age made up 3% of the harvest, respectively (Table 27 and 28). The Snake River basin hatchery stocks that provided the most harvest were the Dworshak (33.5%), Lyons Ferry (33.1%), and Pahsimeroi (8%). The remaining Snake basin hatchery stocks each contributed less than 8% of the harvest (Figure 18 and Table 27). The stock composition estimates with 90% confidence intervals for all release groups are shown in Tables 28.

The stock composition during the fall period from September 1 to December 31, 2014 differed from that in the spring period from January 1 to March 31, 2015. During the fall period the Dworshak stock made up 33%, Lyons Ferry 32%, and Pahsimeroi 11% of the harvest. All remaining Snake River hatchery stocks each made up $\leq$8% of the harvest (Figure 19). In the

spring period the Lyons Ferry stock increased to 47% of the harvest, Dworshak was 31%, and Wallowa 8% of the harvest. The Pahsimeroi stock declined to 6% of the harvest (Figure 20).

We were able to identify the sex of 705 fish using the genetic marker. We estimated that females made up 47.4% of the harvest. The percentage of females harvested by release group (all BYs combined, with at least 14 fish sampled) ranged from 31.3% in the Wallowa group up to 71.4% in the Oxbow group. We used 719 samples to calculate that 30.7% of the sampled fish were ≥78 cm. About 75% of the large fish were from the Dwor_C group and 12.3% from the Dwor_S group. No other group contributed more than 5% of the large fish sampled. The percent of large fish within each release group ranged from 81% in the Dwor_C group to 0% in the Cottonwood group. The percent large within the Other group was estimated to be 25.9% (Table 30).

## Estimating Stock Proportions and Harvest Contribution for Unclipped Steelhead

### Columbia River Zone 6 Tribal fishery

We estimate that a minimum of nearly 12% of the total unclipped harvest were Snake River basin hatchery origin fish. We estimated that wild fish from Idaho made up at least 17% of the harvest (Table 31 and 32, Figure 21), making the total contribution to the harvest from the Snake River basin at least 29%. The largest contribution (63.6%) was from the MGILCS reporting group. The MGILCS group extends into the Snake River basin; hence the percentage of the wild harvest (and hence the total harvest) that came from the Snake River basin is likely more than 29%. Dworshak release groups (647 fish) were the largest contributor of unclipped hatchery fish (Table 33). We estimate that 8,848 steelhead were harvested from the MGILCS, 703 from the UPSALM, 571 from the UPCLWR, 545 from the MFSALM, and 363 from the SFCLWR reporting groups. The remaining hatchery and GSI groups each contributed less than 350 fish to the unclipped harvest (Table 33). The 90% confidence intervals for stock composition and harvest for the release and reporting groups are shown in Tables 32 and 33.

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 8% of the total harvest. The MGILCS group contributed 83% of the harvest and Idaho GSI groups 6%. We did not sample any unclipped Dworshak origin fish in the summer period (Figure 22). During the fall management period, the Snake River basin made up a minimum of 36% of the harvest. The MGILCS group contributed 56% of the harvest and Idaho GSI groups 22%. Unclipped Dworshak origin fish made up 7% of the harvest in the fall period (Figure 23).

We were able to identify the sex of 1,123 fish using the genetic sex marker. We found that females made up 60.2% of the harvest. The percentage of female by release group ranged from 30.9% from the Dwor_C to 66.7% from the MGILCS for groups with a sample size >10 (Table 34). We used the length from 1,125 fish to estimate that 20.7% of the harvested fish were ≥78 cm fork length. Most of the large fish came from Dworshak (24%) and MGILCS (23%) groups, respectively. The UPCLWR contributed 15% and the SFCLWR about 13% of the large fish that were harvested. All other groups each contributed ≤6% of the large fish harvest. The percent of large fish within each release/reporting group ranged from 94.6% in the Dwor_C group to 0% in the other Snake River hatchery group. The largest within percentage of large fish

in GSI groups were from the Idaho groups SFCLWR (86%), UPCLWR (76%), SFSALM (74%), and MFSALM (31%). The percent large within the MGILCSr group was estimated to be 7.9% (Table 34).

**Drano Lake Tribal fishery**

We estimate that 19.7% (90% CI, 11.4% to 29.5%) of the harvested fish were unclipped fish from Snake River hatcheries. Most of the fish were from the Dwor_C BY11 (13.4% of total and 68% of hatchery) release group. The only other Snake River hatchery fish we sampled were from the SF Clearwater and Upper Salmon BY11 groups. The MGILCS GSI group made up 52.8% of the sampled fish. We sampled fish from six other GSI groups which each made up less than 10% of the sampled fish (Table 35). We estimated that 30.8% were female and 50.9% of the fish were $\geq$78 cm. Nine of the 10 hatchery fish and all fish from the SFCLWR, UPCLWR, and UPSALM GSI groups were $\geq$78 cm.

## 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 73% of the total BY12 (1-ocean adults) summer steelhead smolts released in the Columbia River basin and 86% of the BY12 smolts released upstream of Bonneville Dam. The Snake River basin hatcheries released 74% and of the total BY11 (2-ocean adults) summer steelhead smolts released in the Columbia River basin and 87% of the BY11 smolts released upstream of Bonneville Dam. We found that steelhead from Snake River basin hatcheries made up about 59% of the sport harvest in the lower Columbia River, 82% of the tribal Zone 6 clipped harvest, and 12% of the tribal Zone 6 unclipped harvest. We were able to assign 17% of the tribal Zone 6 unclipped harvest to GSI reporting groups within Idaho. We assigned the lower Columbia River sport harvest, the Tribal Zone 6 clipped harvest, and the sport Zone 6 harvest to 11 Snake River hatchery release groups that included two BYs. We did not sample any three ocean adults from the Snake River in these three fisheries. In the tribal Zone 6 unclipped harvest, we assigned part of the harvest to 13 Snake River hatchery release groups that included three BYs, however three ocean adults were only sampled in two release groups.

The sport harvest in the lower Columbia River in 2014 increased by about 2,100 fish from the previous year but was lower than the harvest in 2012 and 2011 (Table A.1). We detected differences in stock composition of the catch as the season progressed. From June 16 to June 30, 92% of the harvest was unassigned and placed in the Other group. Lyons Ferry made up 6% of the harvest and the remaining 2% was assigned to Sawtooth and Wallowa stocks. In July, the percentage of the Other group declined to 46% and the contribution of Snake River hatcheries increased to 54% of the catch. Wallowa (15%) and Pahsimeroi (13%) had the highest Snake River contribution followed by Lyons Ferry, Oxbow, and Sawtooth (8% for each). The Dworshak stock was sampled but it only contributed 0.2% of the July harvest. In August, the Other group declined to 27% of the harvest. Pahsimeroi (25%), Wallowa (16%), and Sawtooth (16%) had the largest contribution of the Snake River hatcheries. The Dworshak stock made up 5% of the August harvest. These patterns of increased harvest contribution from Snake River hatchery stocks was also observed in 2013. 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 5). On June 16, the Lyons Ferry run was 11% complete at Bonneville Dam and it was the only Snake River hatchery stock that had been detected. On August 1, all Snake River hatchery stocks except, Dwor_S, SF Clearwater, and Upper Salmon were detected at Bonneville Dam. However, the Dwor_C release group was only 0.6% complete on August 1, whereas all other Snake River stocks ranged from 19% to 46% complete. By September 1, all Snake River stocks except the two Dworshak groups, SF Clearwater, and Upper Salmon were 52% to 83% complete at Bonneville Dam. The Skamania stock run-timing at Bonneville Dam was 33% complete on June 16 and 95% complete on August 1. In 2014, the percentage of the Other (non-Snake River) hatchery stocks was the highest we have observed since monitoring began in 2011. This year the Other stock made up 41% of the sport harvest compared to about 32% and 31% in 2013 and 2012, respectively. 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 from June to September was the highest it has been since 2011 (Table A.2) and it is likely that fish from these rivers were caught in the main stem Columbia River before they entered the terminal fisheries. Since the return of steelhead to the Cowlitz, Lewis, and Kalama rivers was much larger than the previous three years, we speculate that they contributed a larger amount of mainstem Columbia River harvest than the previous three years. Steelhead from these rivers that were caught in the Columbia River and sampled and would have been placed in the Other group. Steelhead less than 78 cm (Group A) made up nearly 94% of the lower Columbia sport fishery harvest. Most of the large fish harvested were from the Other and Dworshak release groups (Table 12 and A.3). The Dworshak release group made up 3% of the total harvest yet contributed 32% of the large steelhead kept. This disproportionate contribution of large steelhead in the harvest from Dworshak release groups has been consistent throughout the last four years. The Dworshak release groups have contributed between 2% and 6% of the total harvest and between 21% and 59% of the large fish harvested in the last four years (Tables A.1, A.3 and Figures A.1, A.2, and D.1).

The tribal steelhead harvest in the 2014 summer and fall management periods was the highest in the past four years, however the fall period harvest was about 2,000 less than the fall period harvest in 2011 (Tables B.1 and B.2). The 2014 harvest was about 12,000 fish more than the 2013 steelhead harvest. We detected stock composition differences between the summer and fall periods that were similar to that observed in 2013. These were likely reflective of run-timing differences among the stocks. In the summer period the Other group made up 37% of the clipped harvest and all Snake River stocks were sampled, however the Dworshak groups only made up 0.3% of the harvest (Figures 16 and 17). During the fall period, the Other group declined to 11% of the harvest and all the Snake River hatchery stocks increased their contribution except the Lyons Ferry and Imnaha stocks. The Dworshak stock increased to 29% of the harvest and was the largest contributor to the clipped harvest. As discussed in the lower Columbia River sport section, the Dworshak stock was the latest of the Snake River hatchery stocks to arrive at Bonneville Dam and would not be expected to contribute much during summer period because they were not abundant in Zone 6. At the start of the first set net fall fishing period (August 18), only 2.5% of the Dworshak fish had passed Bonneville Dam,

whereas at least 45% of all other stocks (except SF Clearwater, 3.4%) had passed Bonneville Dam. The stock composition of the unclipped steelhead also differed in the summer and fall periods (Figures 22 and 23). In the summer period 83% of the unclipped harvest was from the MGILCS reporting group, 6% from Idaho GSI reporting groups, and about 2.3% from Snake basin hatchery groups. In the fall period, the MGILCS reporting group was 56% of the unclipped harvest, 22% from Idaho GSI reporting groups, and 14% from Snake basin hatchery groups. We suggest that the increase of unclipped Snake River steelhead in the fall period compared to the summer period can be explained by their later run-timing. Snake River wild steelhead attained their 50% at Bonneville Dam on August 15, more than two weeks later than wild fish from the mid and upper Columbia regions (Figure 5). The hatchery stocks that were caught in the fall period—Dworshak, SF Clearwater, EF Salmon, and Upper Salmon all have later run-timing than the other Snake basin hatchery stocks. The percent of the Dworshak, SF Clearwater, and Upper Salmon stocks that had passed Bonneville Dam on August 18 ranged from 0% to 3.4% and would not be expected to contribute much of the summer period harvest. We estimated that 6,962 of the 25,461 (26.8%) total steelhead harvested in the fall period were large Group B fish (Tables B.2 and B.3). The Dworshak stock provided 63.3% of the large fish that were harvested, despite making up only 19.4% of the total fall harvest. The SF Clearwater stock, a new stock being locally adapted by IDFG that was derived primarily from Dworshak hatchery fish, contributed 3% of the large harvest and 1% of the total harvest. The UPCLWR and MGILCS GSI reporting groups contributed about 9% and 7% of the large harvest respectively, however, the MGILCS group made up 23% of the total fall harvest while the UPCLWR made up only 2% of the total harvest. About 85% of the large fish that were harvested in 2014 came from the Snake River basin (Table B.4 and Figure B.2). In 2014, nearly 65% of the putative wild large Group B steelhead harvested in the tribal fall Zone 6 fishery were from Idaho GSI reporting groups. Idaho GSI reporting groups have contributed the largest percentage of the putative wild large harvest in this fishery each year from 2011 to 2014 (Figure B.3).

Harvest in the Snake River sport fishery downstream of the Idaho/Washington border increased from the previous year and was the highest in the three years we have genetically sampled this fishery (Table C.1). The majority of the harvest in the Snake River sport fishery came from the Lyons Ferry and Dworshak stocks (33% each). Out-of-basin stocks made up about 3% of the harvest (Figure 18). The Lyons Ferry stock had a higher percentage in the harvest during the winter period than the fall (47% versus 33%). All of the other Snake River basin stock contribution was lower, except Wallowa stock, in the winter period compared to the fall period. This change in stock composition was also observed in the 2013-14 fishery. All of the Lyons Ferry release sites were downstream of Lower Granite Dam so we expect most of those adults to remain in the Snake River downstream of Lower Granite and be available for harvest throughout the entire season. The Lyons Ferry stock was the earliest to arrive at Ice Harbor Dam, having attained its 50% passage date nearly one month earlier than all other Snake basin hatchery stocks (Figure 7). The early arrival in the Snake River and having their terminal area downstream of Lower Granite Dam likely exposes Lyons Ferry fish to a prolonged period of harvest compared to the upriver Snake basin hatchery stocks. All of the other Snake River hatchery stocks were released upstream of Lower Granite Dam and use the lower Snake River as a migration route. The percent of the run that passed Lower Granite Dam was 0% to 3% complete on September 1 but increased to 86% to 100% complete on December 31, 2014 (Figure 8) for all hatchery stocks released upstream of Lower Granite Dam.

Hatcheries in the Snake River basin provide the majority of steelhead harvested in sport and tribal fisheries in the Columbia River downstream of the Highway 395 bridge and in the Snake River. Sport and tribal steelhead fisheries in the Columbia River are not quota based but are limited by ESA impacts on wild Group A and B steelhead in the sport fishery and impacts on the total Group B passage at Bonneville Dam in the tribal fishery. The Snake River sport fishery is limited by impacts on total wild steelhead. Because all sport fisheries are mark selective we have not sampled any wild steelhead that were caught and released in those fisheries. However, we have sampled unclipped (putative wild) steelhead in the tribal Zone 6 fishery and were able to account for unclipped Snake River basin hatchery fish. We then could calculate the percentage of wild fish from each GSI reporting group that were classified as Group B. The Idaho GSI groups contain only wild fish, however the remaining GSI groups may contain unclipped hatchery origin fish (which would under-estimate the percent of wild fish from Idaho GSI groups). We have found that the majority of wild Group B steelhead in the tribal harvest were from Idaho GSI reporting groups in the four years of this study (Table B.4 and Figure B.3). In all years, Idaho GSI reporting groups made up at least 55% of the wild tribal large harvest. The next biggest contributor was the MGILCS group which ranged from about 17% to 37% of the wild large harvest. The MGILCS group is the biggest contributor to the total unclipped harvest of the 11 GSI reporting groups (Table B.2 and Figure B.4) but its contribution of large unclipped fish is less than its contribution to the total harvest. The Idaho GSI reporting groups were the only GSI grouping whose percentage of large harvest exceed it's percentage of the total harvest (Figure D.2). The percentage of large wild steelhead originating in Idaho is likely more than the Idaho GSI group since the MGILCS reporting group includes rivers within Idaho and some of the large fish that assigned to the MGILCS group were probably wild fish from Idaho rivers.

In the lower Columbia River sport fishery, the Other hatchery group had the most large fish harvested from 2012 to 2014 and the Dworshak stock had the most harvested in 2011. All other Snake River basin hatchery stocks each made up less than 5% of the large harvest except for Oxbow (14%) and Wallowa (8%) in 2012 (Table A.3). Dworshak and the Other hatchery group were the only stocks that had a higher percentage of large fish harvested than total fish harvested (Figure D.4).

The Dworshak stock was the biggest source of large hatchery origin steelhead in the fall period tribal Zone 6 harvest in all years and made up between 66% and 76% of the total large harvest in this fishery. The only hatchery stock that exceeded a 5% contribution in the large harvest was the Other (non-Snake) hatchery group in 2014. Most of the Snake basin hatchery stocks each made up less than 2% of the total large harvest in all years (Table B.4). The Dworshak stock was the only hatchery stock whose percent large contribution exceed it's percentage of the total harvest in the tribal fishery each year. In fact, all the other hatchery stock's contribution to the large harvest was always less than their contribution to the total harvest (Figure D.3).

The Dworshak hatchery stock is the most abundant group in the tribal Zone 6 harvest of large Group B steelhead and its contribution to the large harvest exceeds its contribution to the total harvest. The tribal Zone 6 fall Chinook fishery must remain under the allowed Group B impact rate, which ranges from 13% to 20% depending on the Group B passage at Bonneville Dam. It should be noted that Group B impact rate is not directed on a stock but rather the size of the fish. We have shown that Dworshak hatchery stock and Idaho GSI reporting groups make

up most of the large fish harvested in the tribal fishery. Besides the abundance of Dworshak and Idaho GSI fish, their growth in the ocean is another factor that determines Group B abundance in the Columbia River. The abundance of Dworshak steelhead is a major component of Group B passage at Bonneville Dam as no other hatchery or wild stock has consistently provided as many large fish in the tribal harvest.

The percentage of large fish in the non-Snake hatchery group (Other) exceeded its percentage in the total harvest in the lower Columbia River sport fishery but not in the tribal clipped harvest in 2014. We speculate that the stock composition of the non-Snake group is different in the lower Columbia River than it was in the Columbia River upstream of Bonneville Dam. Downstream of Bonneville Dam, sport fisheries are able access steelhead returning to lower Columbia River tributaries, especially the Cowlitz, Kalama, and Lewis rivers. Fish returning to these rivers would not be encountered in the tribal Zone 6 fishery. Because most tribal harvest occurs in set nets and set nets select larger fish (because of the large mesh size) one could assume that set net gear would catch a higher proportion of large fish than sport fishers. If this is true, then the proportion of large fish in the tribal Zone 6 clipped harvest should be equal to or greater than the proportion of large fish caught in the sport fishery. However, we found that it was much lower in Zone 6 than in the lower Columbia River (Table A.3 and B.4). In the sport fishery the percent large fish from the non-Snake hatcheries ranged from about 38% to 66% of the total large fish caught. However, in the fall tribal Zone 6 fishery (clipped harvest only) it ranged from 2% to 10%. This difference can be partially explained by the run-timing of the Dworshak stock. Dworshak fish make up a much smaller percentage of the total harvest and large harvest in the lower Columbia sport fishery than in the tribal fishery. As discussed earlier Dworshak fish were not available to sport anglers due to their later entry into the river. If we compare the non-Snake percentages in these fisheries after removing all large Dworshak fish, the percentage non-Snake in the sport is higher than that in the tribal fishery from 2012 to 2014. It should also be noted that the harvest of Cowlitz, Lewis, and Kalama steelhead was much lower in 2013 compared to 2012 and 2014 (Table A.2). In 2013, the percent non-Snake large was most similar in the sport and tribal fishery. We propose that this is due to the lack of lower river steelhead stocks in Zone 6, which we propose have a higher percentage of large fish than the non-Snake River steelhead from rivers upstream of Bonneville Dam, that were encountered in the Zone 6 fishery.

## 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 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.

Byrne, A, J. Hymer, S. Ellis, R. Dick II, K. Keller, C.A. Steele , J.E. Hess, M. Begay, T. Miller. 2015. A genetic analysis of the summer steelhead stock composition in the Columbia River and Snake River tribal and sport fisheries from July 1, 2013 to March 31, 2014. Idaho Department of Fish and Game Report 15-06. 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) 2015a. 2015 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 21, 2015.

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, 2015.

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. BY10 were the 3-ocean, BY11 the 2-ocean, and BY12 the 1-ocean adult returns to the Columbia River in the summer and fall 2014. Upst = Upstream; BON = Bonneville Dam.

| | | | | Percent of | |
|---|---|---|---|---|---|
| | **Clipped** | **Unclipped** | **Total** | **Total** | **Upst BON** |
| **BY 2010** | **11,760,181** | **1,759,113** | **13,519,294** | | |
| Downstream of Bonneville Dam [a] | 1,920,732 | 17,387 | 1,938,119 | 14.3% | -- |
| Bonneville Dam to McNary Dam | 435,921 | 21,032 | 456,953 | 3.4% | 3.9% |
| Upstream of McNary Dam [b] | 970,041 | 397,528 | 1,367,569 | 10.1% | 11.8% |
| Snake River Basin | 8,433,487 | 1,323,166 | 9,756,653 | 72.2% | 84.2% |
| **BY 2011** | **11,065,535** | **1,885,579** | **12,951,114** | | |
| Downstream of Bonneville Dam | 1,952,524 | 9,200 | 1,961,724 | 15.1% | -- |
| Bonneville Dam to McNary Dam | 456,181 | 14,856 | 471,037 | 3.6% | 4.3% |
| Upstream of McNary Dam | 709,095 | 202,034 | 911,129 | 7.0% | 8.3% |
| Snake River Basin | 7,947,735 | 1,659,489 | 9,607,224 | 74.2% | 87.4% |
| **BY 2012** | **11,360,927** | **1,337,908** | **12,698,835** | | |
| Downstream of Bonneville Dam | 1,981,048 | 15,243 | 1,996,291 | 15.7% | -- |
| Bonneville Dam to McNary Dam | 417,258 | 16,074 | 433,332 | 3.4% | 4.0% |
| Upstream of McNary Dam | 838,483 | 192,644 | 1,031,127 | 8.1% | 9.6% |
| Snake River Basin | 8,124,138 | 1,113,947 | 9,238,085 | 72.7% | 86.3% |

[a] Includes the Willamette River basin.

[b] Excludes the Snake River basin.

Table 2. Monthly steelhead harvest estimates and the number of samples analyzed for stock composition in the lower Columbia sport fishery from June 16 to October 31, 2014.

| Month | Harvest | Percent of harvest | Ideal sample allocation | Samples used in analysis | Percent of samples |
|---|---|---|---|---|---|
| June 16 - 30 | 1,707 | 12.8% | 143 | 143 | 12.9% |
| July | 5,254 | 39.4% | 440 | 436 | 39.5% |
| August | 5,893 | 44.2% | 493 | 500 | 45.2% |
| September | 456 | 3.4% | 38 | 26 | 2.4% |
| October | 26 | 0.2% | 2 | 0 | 0.0% |
| **Total** | **13,336** | | **1,116** | **1,105** | |

Table 3. The number of samples used for stock composition estimates in the Columbia River sport fishery upstream of Bonneville Dam in 2014.

| Monday start | Stat Week | BON Pool | Mouth of Deschutes | Drano Lake | McNary Dam to Highway 395 bridge | Weekly total |
|---|---|---|---|---|---|---|
| 6/30/14 | 27 | 0 | 1 | 0 | 0 | 1 |
| 7/7/14 | 28 | 0 | 1 | 5 | 0 | 6 |
| 7/14/14 | 29 | 1 | 4 | 0 | 0 | 5 |
| 7/21/14 | 30 | 0 | 7 | 18 | 0 | 25 |
| 7/28/14 | 31 | 2 | 11 | 13 | 0 | 26 |
| 8/4/14 | 32 | 11 | 8 | 70 | 0 | 89 |
| 8/11/14 | 33 | 20 | 18 | 84 | 0 | 122 |
| 8/18/14 | 34 | 5 | 16 | 27 | 0 | 48 |
| 8/25/14 | 35 | 3 | 11 | 19 | 0 | 33 |
| 9/1/14 | 36 | 3 | 4 | 10 | 0 | 17 |
| 9/8/14 | 37 | 0 | 8 | 4 | 11 | 23 |
| 9/15/14 | 38 | 0 | 9 | 3 | 15 | 27 |
| 9/22/14 | 39 | 0 | 10 | 1 | 20 | 31 |
| 9/29/14 | 40 | 0 | 2 | 0 | 16 | 18 |
| 10/6/14 | 41 | 0 | 1 | 0 | 10 | 11 |
| 10/13/14 | 42 | 0 | 1 | 0 | 5 | 6 |
| 10/20/14 | 43 | 0 | 1 | 0 | 0 | 1 |
| 10/27/14 | 44 | 0 | 0 | 0 | 1 | 1 |
| 11/3/14 | 45 | 0 | 0 | 0 | 2 | 2 |
| **Total** | | **45** | **113** | **254** | **80** | **492** |

Table 4. Harvest estimates of Chinook salmon, clipped steelhead, and unclipped steelhead in tribal Zone 6 fisheries from June 16 to November 16, 2014. The weekly percentage of total harvest and samples used for the analysis in the clipped and unclipped steelhead fisheries is also shown. An estimated 31,052 sockeye were also harvested in tribal fisheries between June 16 and August 15, 2014.

| | | | | | | Clipped steelhead | | | Unclipped steelhead | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stat | Chinook | Steelhead Harvest | | | Percent | Samples | Percent | Percent | Samples | Percent |
| Start date | Week | Harvest | Clip | Unclip | Total | harvest | analyzed | samples | harvest | analyzed | samples |
| 6/16 | 25 | 4,226 | 280 | 102 | 382 | 1.4% | 13 | 1.2% | 0.7% | 2 | 0.2% |
| 6/23 | 26 | 4,256 | 245 | 126 | 371 | 1.2% | 9 | 0.8% | 0.9% | 8 | 0.7% |
| 6/30 | 27 | 2,688 | 318 | 97 | 415 | 1.6% | 13 | 1.2% | 0.7% | 15 | 1.4% |
| 7/7 | 28 | 2,783 | 593 | 368 | 961 | 2.9% | 39 | 3.5% | 2.6% | 28 | 2.6% |
| 7/14 | 29 | 3,232 | 1,200 | 925 | 2,125 | 6.0% | 74 | 6.6% | 6.6% | 75 | 7.0% |
| 7/21 | 30 | 2,440 | 1,415 | 1,125 | 2,540 | 7.0% | 81 | 7.3% | 8.0% | 79 | 7.4% |
| 7/28 | 31 | 1,203 | 1,194 | 799 | 1,994 | 5.9% | 79 | 7.1% | 5.7% | 105 | 9.8% |
| **Summer Total:** | | **20,827** | **5,245** | **3,543** | **8,788** | **26.0%** | **308** | **27.7%** | **25.1%** | **312** | **29.1%** |
| 8/1 to 8/17 | 31 - 33 | 1,086 | 1,490 | 1,040 | 2,530 | 7.4% | 0 | 0.0% | 7.4% | 0 | 0.0% |
| 8/18 | 34 | 5,280 | 1,146 | 795 | 1,941 | 5.7% | 131 | 11.8% | 5.6% | 97 | 9.0% |
| 8/25 | 35 | 14,666 | 1,488 | 944 | 2,432 | 7.4% | 78 | 7.0% | 6.7% | 68 | 6.3% |
| 9/1 | 36 | 42,101 | 2,018 | 1,488 | 3,506 | 10.0% | 113 | 10.2% | 10.5% | 116 | 10.8% |
| 9/8 | 37 | 91,198 | 1,915 | 1,393 | 3,308 | 9.5% | 105 | 9.4% | 9.9% | 103 | 9.6% |
| 9/15 | 38 | 62,344 | 2,276 | 1,607 | 3,882 | 11.3% | 127 | 11.4% | 11.4% | 124 | 11.6% |
| 9/22 | 39 | 36,641 | 1,888 | 1,329 | 3,217 | 9.4% | 106 | 9.5% | 9.4% | 105 | 9.8% |
| 9/29 | 40 | 15,893 | 1,437 | 993 | 2,430 | 7.1% | 80 | 7.2% | 7.0% | 77 | 7.2% |
| 10/6 | 41 | 5,555 | 440 | 356 | 796 | 2.2% | 52 | 4.7% | 2.5% | 45 | 4.2% |
| 10/13 | 42 | 3,465 | 418 | 340 | 758 | 2.1% | 13 | 1.2% | 2.4% | 25 | 2.3% |
| 10/17 to end of season | | 198 | 380 | 280 | 660 | 1.9% | 0 | 0.0% | 2.0% | 0 | 0.0% |
| **Fall Total:** | | **278,428** | **14,897** | **10,564** | **25,461** | **74.0%** | **805** | **72.3%** | **74.9%** | **760** | **70.9%** |
| **Grand total:** | | **299,255** | **20,142** | **14,107** | **34,249** | | **1,113** | | | **1,072** | |

Table 5. Estimated harvest in the lower Snake River sections 640 to 648 and the number of samples analyzed for the stock composition estimates.

| | Harvest | | Samples analyzed | |
|---|---|---|---|---|
| **Month** | **Estimate** | **% of total** | **Number** | **% of total** |
| September 2014 | 2,224 | 19.6% | 219 | 30.4% |
| October 2014 | 2,359 | 20.8% | 172 | 23.9% |
| November 2014 | 2,266 | 20.0% | 86 | 11.9% |
| December 2014 | 1,974 | 17.4% | 85 | 11.8% |
| January 2015 | 1,275 | 11.3% | 73 | 10.1% |
| February 2015 | 623 | 5.5% | 39 | 5.4% |
| March 2015 | 608 | 5.4% | 46 | 6.4% |
| **Total** | **11,329** | | **720** | |

Table 6. Description of hatchery stocks, release groups, and tag rates for Brood Year (BY) 2010 to 2012 that were included in the PBT parental baseline used to make assignments for steelhead returning to the Columbia River in 2014. Three ocean adults were from BY10, two ocean adults from BY11, and one ocean adults from BY12. SBT = Shoshone-Bannock Tribe. na = no fish in this BY release group.

| Hatchery Stock--program | Release group | BY10 | BY11 | BY12 |
|---|---|---|---|---|
| Dworshak-Clearwater basin releases | Dwor_C | 0.9678 | 0.9832 | 0.9544 |
| Dworshak-Salmon basin releases | Dwor_S | 0.9639 | 0.9913 | 0.9835 |
| SF Clearwater | SF Clearwater | 1.0000 | 0.8571 | 0.9875 |
| EF Salmon | EF Salmon | 1.0000 | 1.0000 | 0.9412 |
| Imnaha | Imnaha | 0.8836 | 1.0000 | 0.9557 |
| Lyons Ferry | Lyons Ferry | 1.0000 | 1.0000 | 1.0000 |
| Oxbow | Oxbow | 0.9407 | 0.9202 | 0.9841 |
| Pahsimeroi - general production | Pahsimeroi | 0.9703 | 0.7936 | 0.9813 |
| Pahsimeroi - SBT Beaver Creek egg box | SBT_Beaver | na | 0.7979 | na |
| Pahsimeroi - SBT Indian Creek egg box | SBT_Indian | 0.9524 | 0.8095 | na |
| Pahsimeroi - SBT Panther Creek egg box | SBT_Panther | 0.9615 | na | 0.9667 |
| Sawtooth - general production | Sawtooth | 0.9968 | 0.9967 | 1.0000 |
| Sawtooth - SBT Yankee Fork egg box | SBT_YF_Egg | 1.0000 | 1.0000 | 1.0000 |
| Sawtooth - SBT Yankee Fork smolt release | SBT_Yankee | 1.0000 | 0.9897 | 1.0000 |
| Touchet | Touchet | 0.6429 | 1.0000 | 1.0000 |
| Tucannon | Tucannon | 0.6944 | 0.6861 | 0.7647 |
| Upper Salmon | Upper Salmon | 0.9474 | 1.0000 | 1.0000 |
| Wallowa - Cottonwood Pond release | Cottonwood | 1.0000 | 0.9598 | 1.0000 |
| Wallowa—all releases except Cottonwood Pond | Wallowa | 0.9761 | 0.9833 | 0.9918 |

Table 7. Re-allocation table used to subtract samples from GSI reporting groups after expanding hatchery release groups by their PBT tag rate in the unclipped fish analysis. The Dwor_C and Dwor_S; Sawtooth, SBT_Indian, SBT_Yankee; Cottonwood and Wallowa groups were combined (shaded rows).

| Hatchery | | GSI Reporting group | | | | | | |
|---|---|---|---|---|---|---|---|---|
| release group | n | KLICKR | MFSALM | MGILCS | SFCLWR | UPCLWR | UPPCOL | UPSALM |
| Dwor_C | 256 | 0.000 | 0.000 | 0.039 | 0.945 | 0.016 | 0.000 | 0.000 |
| Dwor_S | | 0.000 | 0.000 | 0.039 | 0.945 | 0.016 | 0.000 | 0.000 |
| EF Salmon | 48 | 0.021 | 0.000 | 0.396 | 0.063 | 0.021 | 0.000 | 0.500 |
| Imnaha | 3 | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lyons Ferry | 6 | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oxbow | 12 | 0.000 | 0.000 | 0.417 | 0.000 | 0.000 | 0.000 | 0.583 |
| Pahsimeroi | 26 | 0.000 | 0.000 | 0.500 | 0.000 | 0.000 | 0.038 | 0.462 |
| Sawtooth | 9 | 0.000 | 0.018 | 0.263 | 0.000 | 0.000 | 0.000 | 0.719 |
| SBT_Indian | 1 | 0.000 | 0.018 | 0.263 | 0.000 | 0.000 | 0.000 | 0.719 |
| SBT_Yankee | 47 | 0.000 | 0.018 | 0.263 | 0.000 | 0.000 | 0.000 | 0.719 |
| SF Clearwater | 14 | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 |
| Touchet | 5 | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tucannon | 16 | 0.000 | 0.000 | 0.750 | 0.000 | 0.000 | 0.188 | 0.063 |
| Upper Salmon | 12 | 0.000 | 0.000 | 0.167 | 0.750 | 0.083 | 0.000 | 0.000 |
| Cottonwood | 3 | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wallowa | 12 | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Table 8. TAC estimates of hatchery and wild origin Group A and Group B steelhead passage at Bonneville Dam in 2014.

| Stat Week | Start Date | End Date | Hatchery A | Wild A | Hatchery B | Wild B | Total |
|---|---|---|---|---|---|---|---|
| 25-26 | 6/16 | 6/30 | 4,079 | 3,393 | 135 | 0 | 7,607 |
| 27 | 7/1 | 7/6 | 2,858 | 4,085 | 318 | 0 | 7,261 |
| 28 | 7/7 | 7/13 | 6,734 | 8,955 | 0 | 0 | 15,689 |
| 29 | 7/14 | 7/20 | 9,415 | 10,741 | 0 | 0 | 20,156 |
| 30 | 7/21 | 7/27 | 11,286 | 13,207 | 81 | 289 | 24,863 |
| 31 | 7/28 | 8/3 | 16,859 | 14,084 | 0 | 96 | 31,039 |
| 32 | 8/4 | 8/10 | 12,565 | 11,000 | 0 | 0 | 23,565 |
| 33-34 | 8/11 | 8/24 | 35,607 | 21,489 | 0 | 421 | 57,518 |
| 35-36 | 8/25 | 9/7 | 21,189 | 12,649 | 4,785 | 843 | 39,466 |
| 37 | 9/8 | 9/14 | 16,162 | 5,816 | 6,061 | 2,908 | 30,947 |
| 38 | 9/15 | 9/21 | 9,191 | 3,464 | 9,702 | 3,811 | 26,168 |
| 39 | 9/22 | 9/28 | 4,685 | 1,692 | 7,289 | 2,769 | 16,435 |
| 40 | 9/29 | 10/5 | 2,289 | 821 | 2,373 | 821 | 6,304 |
| 41 | 10/6 | 10/12 | 908 | 392 | 1,371 | 499 | 3,169 |
| 42-44 | 10/13 | 10/31 | 1,100 | 885 | 1,738 | 885 | 4,607 |
| | **7/1 to 10/31** | | **150,851** | **109,279** | **33,716** | **13,341** | **307,187** |
| | **6/16 to 10/31** | | **154,930** | **112,672** | **33,851** | **13,341** | **314,794** |

Table 9. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate steelhead harvest in the lower Columbia River sport fishery from June 16 to October 31, 2014.

| | | PBT Assignments | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual count | | | Expanded for tag rate | | | Percent of expanded count | | |
| **Hatchery stock** | **Release group** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 9 | 19 | 28 | 9.4 | 19.0 | 28.4 | 0.8% | 1.7% | 2.6% |
| Dworshak | Dwor_C | 22 | 3 | 25 | 22.4 | 3.1 | 25.5 | 2.0% | 0.3% | 2.3% |
| Dworshak | Dwor_S | 7 | 2 | 9 | 7.1 | 2.0 | 9.1 | 0.6% | 0.2% | 0.8% |
| Imnaha | Imnaha | 6 | 21 | 27 | 6.0 | 22.0 | 28.0 | 0.5% | 2.0% | 2.5% |
| Lyons Ferry | Lyons Ferry | 27 | 59 | 86 | 27.0 | 59.0 | 86.0 | 2.4% | 5.3% | 7.8% |
| Oxbow | Oxbow | 62 | 13 | 75 | 67.4 | 13.2 | 80.6 | 6.1% | 1.2% | 7.3% |
| Pahsimeroi | Pahsimeroi | 28 | 130 | 158 | 35.3 | 132.5 | 167.8 | 3.2% | 12.0% | 15.2% |
| Sawtooth | Sawtooth | 25 | 53 | 78 | 25.1 | 53.0 | 78.1 | 2.3% | 4.8% | 7.1% |
| Sawtooth | SBT_Yankee | 3 | 28 | 31 | 3.0 | 28.0 | 31.0 | 0.3% | 2.5% | 2.8% |
| SF Clearwater | SF Clearwater | 2 | 0 | 2 | 2.3 | 0.0 | 2.3 | 0.2% | 0.0% | 0.2% |
| Wallowa | Wallowa | 67 | 44 | 111 | 68.1 | 44.4 | 112.5 | 6.2% | 4.0% | 10.2% |
| | ***Snake River total*** | ***258*** | ***372*** | ***630*** | ***273.1*** | ***376.2*** | ***649.3*** | ***24.7%*** | ***34.0%*** | ***58.8%*** |
| | Other | | | 475 | | | 455.7 | | | 41.2% |
| | **Total** | | | **1,105** | | | **1,105** | | | |

Table 10. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY in the lower Columbia River sport fishery, June 16 to October 31, 2014.

| | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release Group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 0.8% | 0.4% | 1.3% | 1.7% | 1.1% | 2.4% | 2.6% | 1.8% | 3.4% |
| Dworshak | Dwor_C | 2.0% | 1.4% | 2.8% | 0.3% | 0.1% | 0.6% | 2.3% | 1.6% | 3.1% |
| Dworshak | Dwor_S | 0.6% | 0.3% | 1.1% | 0.2% | 0.0% | 0.4% | 0.8% | 0.4% | 1.3% |
| Imnaha | Imnaha | 0.5% | 0.2% | 0.9% | 2.0% | 1.3% | 2.7% | 2.5% | 1.8% | 3.4% |
| Lyons Ferry | Lyons Ferry | 2.4% | 1.7% | 3.3% | 5.3% | 4.3% | 6.5% | 7.8% | 6.4% | 9.1% |
| Oxbow | Oxbow | 6.1% | 4.9% | 7.4% | 1.2% | 0.6% | 1.7% | 7.3% | 6.0% | 8.6% |
| Pahsimeroi | Pahsimeroi | 3.2% | 2.3% | 4.2% | 12.0% | 10.3% | 13.6% | 15.2% | 13.4% | 17.0% |
| Sawtooth | Sawtooth | 2.3% | 1.5% | 3.0% | 4.8% | 3.8% | 5.9% | 7.1% | 5.8% | 8.4% |
| Sawtooth | SBT_Yankee | 0.3% | 0.1% | 0.5% | 2.5% | 1.8% | 3.3% | 2.8% | 2.0% | 3.6% |
| SF Clearwater | SF Clearwater | 0.2% | 0.0% | 0.5% | 0.0% | | | 0.2% | 0.0% | 0.5% |
| Wallowa | Wallowa | 6.2% | 5.0% | 7.4% | 4.0% | 3.1% | 5.0% | 10.2% | 8.7% | 11.7% |
| | ***Snake River total*** | ***24.7%*** | | | ***34.0%*** | | | ***58.8%*** | ***56.1%*** | ***61.2%*** |
| | Other | | | | | | | 41.2% | 38.8% | 43.9% |

Table 11. The estimated harvest and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY in the lower Columbia River sport fishery, June 16 to October 31, 2014.

| | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release Group** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 113 | 50 | 176 | 229 | 145 | 314 | 342 | 243 | 452 |
| Dworshak | Dwor_C | 270 | 184 | 368 | 38 | 13 | 76 | 308 | 209 | 407 |
| Dworshak | Dwor_S | 85 | 37 | 146 | 25 | 0 | 49 | 110 | 49 | 171 |
| Imnaha | Imnaha | 72 | 24 | 121 | 265 | 177 | 366 | 338 | 237 | 450 |
| Lyons Ferry | Lyons Ferry | 326 | 229 | 434 | 712 | 567 | 869 | 1,038 | 857 | 1,219 |
| Oxbow | Oxbow | 813 | 656 | 984 | 159 | 86 | 233 | 973 | 800 | 1,153 |
| Pahsimeroi | Pahsimeroi | 426 | 304 | 563 | 1,599 | 1,377 | 1,820 | 2,025 | 1,785 | 2,270 |
| Sawtooth | Sawtooth | 303 | 206 | 400 | 640 | 507 | 784 | 942 | 773 | 1,123 |
| Sawtooth | SBT_Yankee | 37 | 12 | 73 | 338 | 241 | 447 | 375 | 266 | 483 |
| SF Clearwater | SF Clearwater | 28 | 0 | 70 | 0 | | | 28 | 0 | 70 |
| Wallowa | Wallowa | 822 | 663 | 982 | 535 | 414 | 669 | 1,358 | 1,162 | 1,565 |
| | ***Snake River total*** | | | | | | | ***7,837*** | ***7,486*** | ***8,167*** |
| | Other | | | | | | | 5,499 | 5,169 | 5,850 |

Table 12. 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 (62) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 26.3% of all large fish sampled came from the Dwor_C groups and 64% of the fish in the Dwor_C 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** | **Sample size (length)** | **Expected number of large fish** | **Percent large - all samples** | **Percent large within group** |
| **All samples** | **1,038** | **43.9%** | **1,105** | **62** | **--** | **1,105** | **62** | **5.6%** | -- |
| Cottonwood | 24 | 54.2% | 28 | 2 | 7.1% | 28.4 | 2.0 | 3.3% | |
| Dwor_C | 22 | 36.4% | 25 | 16 | 64.0% | 25.5 | 16.3 | 26.3% | |
| Dwor_S | 9 | 55.6% | 9 | 3 | 33.3% | 9.1 | 3.0 | 4.9% | |
| Imnaha | 27 | 29.6% | 27 | 1 | 3.7% | 28.0 | 1.0 | 1.7% | |
| Lyons Ferry | 82 | 37.8% | 86 | 2 | 2.3% | 86.0 | 2.0 | 3.2% | |
| Oxbow | 70 | 44.3% | 75 | 4 | 5.3% | 80.6 | 4.3 | 6.9% | |
| Pahsimeroi | 145 | 37.2% | 158 | 1 | 0.6% | 167.8 | 1.1 | 1.7% | |
| Sawtooth | 68 | 44.1% | 78 | 0 | 0.0% | 78.1 | 0.0 | 0.0% | |
| SBT_Yankee | 30 | 63.3% | 31 | 0 | 0.0% | 31.0 | 0.0 | 0.0% | |
| SF Clearwater | 2 | 100.0% | 2 | 2 | 100.0% | 2.3 | 2.3 | 3.8% | |
| Wallowa | 105 | 45.7% | 111 | 0 | 0.0% | 112.5 | 0.0 | 0.0% | |
| **All Snake River** | | | **630** | **31** | | **649.3** | **32.1** | **51.8%** | |
| Other | 454 | 45.6% | 475 | 31 | | 455.7 | 29.9 | 48.2% | 6.6% |

Table 13. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate steelhead stock composition in the Bonneville Pool sport fishery in 2014.

| | | PBT Assignments | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual count | | | Expanded for tag rate | | | Percent of expanded count | | |
| **Hatchery stock** | **Release group** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 3 | 3 | 6 | 3.1 | 3.0 | 6.1 | 6.9% | 6.7% | 13.6% |
| Dworshak | Dwor_C | 1 | 0 | 1 | 1.0 | 0.0 | 1.0 | 2.3% | 0.0% | 2.3% |
| Imnaha | Imnaha | 0 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0% | 2.3% | 2.3% |
| Lyons Ferry | Lyons Ferry | 0 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0% | 2.2% | 2.2% |
| Oxbow | Oxbow | 5 | 2 | 7 | 5.4 | 2.0 | 7.5 | 12.1% | 4.5% | 16.6% |
| Pahsimeroi | Pahsimeroi | 1 | 5 | 6 | 1.3 | 5.1 | 6.4 | 2.8% | 11.3% | 14.1% |
| Sawtooth | Sawtooth | 0 | 2 | 2 | 0.0 | 2.0 | 2.0 | 0.0% | 4.4% | 4.4% |
| Sawtooth | SBT_Yankee | 0 | 2 | 2 | 0.0 | 2.0 | 2.0 | 0.0% | 4.4% | 4.4% |
| Wallowa | Wallowa | 2 | 1 | 3 | 2.0 | 1.0 | 3.0 | 4.5% | 2.2% | 6.8% |
| | ***Snake River total*** | ***12*** | ***17*** | ***29*** | ***12.9*** | ***17.2*** | ***30.1*** | ***28.6%*** | ***38.2%*** | ***66.8%*** |
| | Other | | | 16 | | | 14.9 | | | 33.2% |
| | **Total** | | | **45** | | | **45** | | | |

Table 14. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY in the Bonneville Pool sport fishery in 2014.

| | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 6.9% | 2.3% | 13.9% | 6.7% | 2.2% | 13.3% | 13.6% | 4.6% | 22.7% |
| Dworshak | Dwor_C | 2.3% | 0.0% | 6.8% | 0.0% | | | 2.3% | 0.0% | 6.8% |
| Imnaha | Imnaha | 0.0% | | | 2.3% | 0.0% | 7.0% | 2.3% | 0.0% | 7.0% |
| Lyons Ferry | Lyons Ferry | 0.0% | | | 2.2% | 0.0% | 6.7% | 2.2% | 0.0% | 6.7% |
| Oxbow | Oxbow | 12.1% | 4.8% | 21.7% | 4.5% | 0.0% | 9.0% | 16.6% | 7.2% | 26.3% |
| Pahsimeroi | Pahsimeroi | 2.8% | 0.0% | 8.4% | 11.3% | 4.5% | 20.4% | 14.1% | 5.6% | 23.2% |
| Sawtooth | Sawtooth | 0.0% | | | 4.4% | 0.0% | 8.9% | 4.4% | 0.0% | 8.9% |
| Sawtooth | SBT_Yankee | 0.0% | | | 4.4% | 0.0% | 8.9% | 4.4% | 0.0% | 8.9% |
| Wallowa | Wallowa | 4.5% | 0.0% | 11.3% | 2.2% | 0.0% | 6.7% | 6.8% | 2.2% | 13.5% |
| | ***Snake River total*** | | | | | | | ***66.8%*** | 54.7% | 78.6% |
| | Other | | | | | | | 33.2% | 21.4% | 45.3% |

Table 15. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate steelhead stock composition in the Drano Lake sport fishery in 2014.

| | | PBT Assignments | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual count | | | Expanded for tag rate | | | Percent of expanded count | | |
| **Hatchery stock** | **Release group** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 5 | 7 | 12 | 5.2 | 7.0 | 12.2 | 2.1% | 2.8% | 4.8% |
| Dworshak | Dwor_C | 2 | 0 | 2 | 2.0 | 0.0 | 2.0 | 0.8% | 0.0% | 0.8% |
| Dworshak | Dwor_S | 1 | 0 | 1 | 1.0 | 0.0 | 1.0 | 0.4% | 0.0% | 0.4% |
| EF Salmon | EF Salmon | 1 | 0 | 1 | 1.0 | 0.0 | 1.0 | 0.4% | 0.0% | 0.4% |
| Imnaha | Imnaha | 4 | 5 | 9 | 4.0 | 5.2 | 9.2 | 1.6% | 2.1% | 3.6% |
| Lyons Ferry | Lyons Ferry | 6 | 17 | 23 | 6.0 | 17.0 | 23.0 | 2.4% | 6.7% | 9.1% |
| Oxbow | Oxbow | 29 | 1 | 30 | 31.5 | 1.0 | 32.5 | 12.4% | 0.4% | 12.8% |
| Pahsimeroi | Pahsimeroi | 15 | 23 | 38 | 18.9 | 23.4 | 42.3 | 7.4% | 9.2% | 16.7% |
| Sawtooth | Sawtooth | 10 | 10 | 20 | 10.0 | 10.0 | 20.0 | 4.0% | 3.9% | 7.9% |
| Sawtooth | SBT_Yankee | 2 | 11 | 13 | 2.0 | 11.0 | 13.0 | 0.8% | 4.3% | 5.1% |
| Wallowa | Wallowa | 28 | 5 | 33 | 28.5 | 5.0 | 33.5 | 11.2% | 2.0% | 13.2% |
| | ***Snake River total*** | ***103*** | ***79*** | ***182*** | ***110.2*** | ***79.7*** | ***189.9*** | ***43.4%*** | ***31.4%*** | ***74.8%*** |
| | Other | | | 72 | | | 64.1 | | | 25.2% |
| | **Total** | | | **254** | | | **254** | | | |

Table 16. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY in the Drano Lake sport fishery in 2014.

| | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 2.1% | 0.8% | 3.7% | 2.8% | 1.2% | 4.3% | 4.8% | 2.8% | 7.2% |
| Dworshak | Dwor_C | 0.8% | 0.0% | 2.0% | 0.0% | | | 0.8% | 0.0% | 2.0% |
| Dworshak | Dwor_S | 0.4% | 0.0% | 1.2% | 0.0% | | | 0.4% | 0.0% | 1.2% |
| EF Salmon | EF Salmon | 0.4% | 0.0% | 1.2% | 0.0% | | | 0.4% | 0.0% | 1.2% |
| Imnaha | Imnaha | 1.6% | 0.4% | 3.1% | 2.1% | 0.8% | 3.7% | 3.6% | 1.6% | 5.7% |
| Lyons Ferry | Lyons Ferry | 2.4% | 0.8% | 3.9% | 6.7% | 4.3% | 9.4% | 9.1% | 6.3% | 12.2% |
| Oxbow | Oxbow | 12.4% | 9.0% | 16.3% | 0.4% | 0.0% | 1.2% | 12.8% | 9.4% | 16.6% |
| Pahsimeroi | Pahsimeroi | 7.4% | 4.5% | 10.9% | 9.2% | 6.4% | 12.0% | 16.7% | 12.7% | 20.8% |
| Sawtooth | Sawtooth | 4.0% | 2.0% | 5.9% | 3.9% | 2.0% | 5.9% | 7.9% | 5.1% | 10.6% |
| Sawtooth | SBT_Yankee | 0.8% | 0.0% | 2.0% | 4.3% | 2.4% | 6.7% | 5.1% | 3.1% | 7.5% |
| Wallowa | Wallowa | 11.2% | 8.0% | 14.4% | 2.0% | 0.8% | 3.6% | 13.2% | 9.6% | 16.8% |
| | ***Snake River total*** | | | | | | | ***74.8%*** | ***69.8%*** | ***79.5%*** |
| | Other | | | | | | | 25.2% | 20.5% | 30.2% |

Table 17. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate steelhead stock composition in the mouth of the Deschutes sport fishery in 2014.

| | | PBT Assignments | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual count | | | Expanded for tag rate | | | Percent of expanded count | | |
| **Hatchery stock** | **Release group** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 3 | 5 | 8 | 3.1 | 5.0 | 8.1 | 2.8% | 4.4% | 7.2% |
| Dworshak | Dwor_C | 11 | 0 | 11 | 11.2 | 0.0 | 11.2 | 9.9% | 0.0% | 9.9% |
| Dworshak | Dwor_S | 3 | 0 | 3 | 3.0 | 0.0 | 3.0 | 2.7% | 0.0% | 2.7% |
| Imnaha | Imnaha | 4 | 2 | 6 | 4.0 | 2.1 | 6.1 | 3.5% | 1.9% | 5.4% |
| Lyons Ferry | Lyons Ferry | 2 | 3 | 5 | 2.0 | 3.0 | 5.0 | 1.8% | 2.7% | 4.4% |
| Oxbow | Oxbow | 7 | 0 | 7 | 7.6 | 0.0 | 7.6 | 6.7% | 0.0% | 6.7% |
| Pahsimeroi | Pahsimeroi | 5 | 13 | 18 | 6.3 | 13.2 | 19.5 | 5.6% | 11.7% | 17.3% |
| Sawtooth | Sawtooth | 2 | 1 | 3 | 2.0 | 1.0 | 3.0 | 1.8% | 0.9% | 2.7% |
| Sawtooth | SBT_Yankee | 0 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0% | 0.9% | 0.9% |
| Wallowa | Wallowa | 14 | 3 | 17 | 14.2 | 3.0 | 17.3 | 12.6% | 2.7% | 15.3% |
| | ***Snake River total*** | ***51*** | ***28*** | ***79*** | ***53.5*** | ***28.4*** | ***81.9*** | ***47.3%*** | ***25.1%*** | ***72.4%*** |
| | Other | | | 34 | | | 31.1 | | | 27.6% |
| | **Total** | | | **113** | | | **113** | | | |

Table 18. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY in the mouth of the Deschutes sport fishery in 2014.

| | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 2.8% | 0.9% | 5.5% | 4.4% | 1.8% | 8.0% | 7.2% | 3.6% | 11.6% |
| Dworshak | Dwor_C | 9.9% | 5.4% | 14.4% | 0.0% | | | 9.9% | 5.4% | 14.4% |
| Dworshak | Dwor_S | 2.7% | 0.9% | 5.4% | 0.0% | | | 2.7% | 0.9% | 5.4% |
| Imnaha | Imnaha | 3.5% | 0.9% | 6.2% | 1.9% | 0.0% | 4.6% | 5.4% | 1.8% | 9.0% |
| Lyons Ferry | Lyons Ferry | 1.8% | 0.0% | 3.5% | 2.7% | 0.9% | 5.3% | 4.4% | 1.8% | 8.0% |
| Oxbow | Oxbow | 6.7% | 2.9% | 10.6% | 0.0% | | | 6.7% | 2.9% | 10.6% |
| Pahsimeroi | Pahsimeroi | 5.6% | 2.2% | 10.0% | 11.7% | 7.2% | 17.1% | 17.3% | 11.2% | 23.8% |
| Sawtooth | Sawtooth | 1.8% | 0.0% | 4.4% | 0.9% | 0.0% | 2.7% | 2.7% | 0.9% | 5.3% |
| Sawtooth | SBT_Yankee | 0.0% | | | 0.9% | 0.0% | 2.7% | 0.9% | 0.0% | 2.7% |
| Wallowa | Wallowa | 12.6% | 8.1% | 18.0% | 2.7% | 0.9% | 5.4% | 15.3% | 9.9% | 20.7% |
| | ***Snake River total*** | | | | | | | ***72.4%*** | ***65.0%*** | ***79.9%*** |
| | Other | | | | | | | 27.6% | 20.1% | 35.0% |

Table 19. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate steelhead stock composition in the Columbia River section 533 sport fishery in 2014.

| | | PBT Assignments | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual count | | | Expanded for tag rate | | | Percent of expanded count | | |
| **Hatchery stock** | **Release group** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 1 | 2 | 3 | 1.0 | 2.0 | 3.0 | 1.3% | 2.5% | 3.8% |
| Dworshak | Dwor_C | 15 | 2 | 17 | 15.3 | 2.1 | 17.4 | 19.1% | 2.6% | 21.7% |
| Dworshak | Dwor_S | 3 | 2 | 5 | 3.0 | 2.0 | 5.1 | 3.8% | 2.5% | 6.3% |
| Imnaha | Imnaha | 0 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0% | 1.3% | 1.3% |
| Lyons Ferry | Lyons Ferry | 9 | 18 | 27 | 9.0 | 18.0 | 27.0 | 11.3% | 22.5% | 33.8% |
| Oxbow | Oxbow | 3 | 1 | 4 | 3.3 | 1.0 | 4.3 | 4.1% | 1.3% | 5.3% |
| Pahsimeroi | Pahsimeroi | 0 | 10 | 10 | 0.0 | 10.2 | 10.2 | 0.0% | 12.7% | 12.7% |
| Sawtooth | Sawtooth | 1 | 5 | 6 | 1.0 | 5.0 | 6.0 | 1.3% | 6.3% | 7.5% |
| Sawtooth | SBT_Yankee | 0 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0% | 1.3% | 1.3% |
| SF Clearwater | SF Clearwater | 1 | 0 | 1 | 1.2 | 0.0 | 1.2 | 1.5% | 0.0% | 1.5% |
| | ***Snake River total*** | ***33*** | ***42*** | ***75*** | ***33.8*** | ***42.4*** | ***76.1*** | ***42.2%*** | ***53.0%*** | ***95.2%*** |
| | Other | | | 5 | | | 3.9 | | | 4.8% |
| | **Total** | | | **80** | | | **80** | | | |

Table 20. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY in the Columbia River section 533 sport fishery in 2014.

| | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 1.3% | 0.0% | 3.9% | 2.5% | 0.0% | 6.3% | 3.8% | 1.3% | 7.6% |
| Dworshak | Dwor_C | 19.1% | 11.4% | 26.7% | 2.6% | 0.0% | 6.5% | 21.7% | 14.0% | 29.4% |
| Dworshak | Dwor_S | 3.8% | 1.3% | 7.6% | 2.5% | 0.0% | 5.1% | 6.3% | 2.5% | 11.4% |
| Imnaha | Imnaha | 0.0% | | | 1.3% | 0.0% | 3.9% | 1.3% | 0.0% | 3.9% |
| Lyons Ferry | Lyons Ferry | 11.3% | 6.3% | 17.5% | 22.5% | 15.0% | 30.0% | 33.8% | 25.0% | 42.5% |
| Oxbow | Oxbow | 4.1% | 1.4% | 8.2% | 1.3% | 0.0% | 3.8% | 5.3% | 1.4% | 9.5% |
| Pahsimeroi | Pahsimeroi | 0.0% | | | 12.7% | 6.4% | 19.1% | 12.7% | 6.4% | 19.1% |
| Sawtooth | Sawtooth | 1.3% | 0.0% | 3.8% | 6.3% | 2.5% | 11.3% | 7.5% | 2.5% | 12.5% |
| Sawtooth | SBT_Yankee | 0.0% | | | 1.3% | 0.0% | 3.8% | 1.3% | 0.0% | 3.8% |
| SF Clearwater | SF Clearwater | 1.5% | 0.0% | 4.4% | 0.0% | | | 1.5% | 0.0% | 4.4% |
| | ***Snake River total*** | | | | | | | ***95.2%*** | ***90.2%*** | ***99.3%*** |
| | Other | | | | | | | 4.8% | 0.7% | 9.8% |

Table 21. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate clipped steelhead harvest in the tribal Zone 6 fishery from June 16 to November 16, 2014.

| | | PBT Assignments | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual Count | | | | Expanded for tag rate | | | | Percent of expanded count | | | |
| **Hatchery stock** | **Release group** | **BY10** | **BY11** | **BY12** | **Total** | **BY10** | **BY11** | **BY12** | **Total** | **BY10** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 0 | 31 | 29 | 60 | 0.0 | 32.3 | 29.0 | 61.3 | 0.0% | 2.9% | 2.6% | 5.5% |
| Dworshak | Dwor_C | 2 | 201 | 6 | 209 | 2.1 | 204.4 | 6.3 | 212.8 | 0.2% | 18.4% | 0.6% | 19.1% |
| Dworshak | Dwor_S | 0 | 17 | 0 | 17 | 0.0 | 17.1 | 0.0 | 17.1 | 0.0% | 1.5% | 0.0% | 1.5% |
| Imnaha | Imnaha | 0 | 20 | 12 | 32 | 0.0 | 20.0 | 12.6 | 32.6 | 0.0% | 1.8% | 1.1% | 2.9% |
| Lyons Ferry | Lyons Ferry | 0 | 45 | 48 | 93 | 0.0 | 45.0 | 48.0 | 93.0 | 0.0% | 4.0% | 4.3% | 8.4% |
| Oxbow | Oxbow | 0 | 72 | 10 | 82 | 0.0 | 78.2 | 10.2 | 88.4 | 0.0% | 7.0% | 0.9% | 7.9% |
| Pahsimeroi | Pahsimeroi | 1 | 57 | 106 | 164 | 1.0 | 71.8 | 108.0 | 180.9 | 0.1% | 6.5% | 9.7% | 16.3% |
| Sawtooth | Sawtooth | 0 | 45 | 55 | 100 | 0.0 | 45.1 | 55.0 | 100.1 | 0.0% | 4.1% | 4.9% | 9.0% |
| Sawtooth | SBT_Yankee | 0 | 2 | 30 | 32 | 0.0 | 2.0 | 30.0 | 32.0 | 0.0% | 0.2% | 2.7% | 2.9% |
| Sawtooth | SBT_YF_Egg | 0 | 1 | 0 | 1 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0% | 0.1% | 0.0% | 0.1% |
| SF Clearwater | SF Clearwater | 0 | 2 | 0 | 2 | 0.0 | 2.3 | 0.0 | 2.3 | 0.0% | 0.2% | 0.0% | 0.2% |
| Wallowa | Wallowa | 0 | 55 | 32 | 87 | 0.0 | 55.9 | 32.3 | 88.2 | 0.0% | 5.0% | 2.9% | 7.9% |
| | ***Snake River total*** | ***3*** | ***548*** | ***328*** | ***879*** | ***3.1*** | ***575.4*** | ***331.3*** | ***909.8*** | ***0.3%*** | ***51.7%*** | ***29.8%*** | ***81.7%*** |
| | Other | | | | 234 | | | | 203.2 | | | | 18.3% |
| | **Total** | | | | **1,113** | | | | **1,113** | | | | |

Table 22. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY for clipped steelhead in the tribal Zone 6 fishery, June 16 to November 16, 2014.

| | | BY10 | | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 0.0% | | | 2.9% | 2.1% | 3.8% | 2.6% | 1.9% | 3.4% | 5.5% | 4.4% | 6.7% |
| Dworshak | Dwor_C | 0.2% | 0.0% | 0.5% | 18.4% | 16.5% | 20.3% | 0.6% | 0.2% | 0.9% | 19.1% | 17.2% | 21.1% |
| Dworshak | Dwor_S | 0.0% | | | 1.5% | 1.0% | 2.2% | 0.0% | | | 1.5% | 1.0% | 2.2% |
| Imnaha | Imnaha | 0.0% | | | 1.8% | 1.2% | 2.4% | 1.1% | 0.7% | 1.7% | 2.9% | 2.1% | 3.8% |
| Lyons Ferry | Lyons Ferry | 0.0% | | | 4.0% | 3.1% | 5.0% | 4.3% | 3.3% | 5.3% | 8.4% | 7.0% | 9.7% |
| Oxbow | Oxbow | 0.0% | | | 7.0% | 5.8% | 8.4% | 0.9% | 0.5% | 1.4% | 7.9% | 6.6% | 9.4% |
| Pahsimeroi | Pahsimeroi | 0.1% | 0.0% | 0.3% | 6.5% | 5.1% | 7.9% | 9.7% | 8.2% | 11.2% | 16.3% | 14.3% | 18.2% |
| Sawtooth | Sawtooth | 0.0% | | | 4.1% | 3.1% | 5.0% | 4.9% | 3.9% | 6.0% | 9.0% | 7.6% | 10.4% |
| Sawtooth | SBT_Yankee | 0.0% | | | 0.2% | 0.0% | 0.5% | 2.7% | 2.0% | 3.5% | 2.9% | 2.1% | 3.7% |
| Sawtooth | SBT_YF_Egg | 0.0% | | | 0.1% | 0.0% | 0.3% | 0.0% | | | 0.1% | 0.0% | 0.3% |
| SF Clearwater | SF Clearwater | 0.0% | | | 0.2% | 0.0% | 0.5% | 0.0% | | | 0.2% | 0.0% | 0.5% |
| Wallowa | Wallowa | 0.0% | | | 5.0% | 3.9% | 6.1% | 2.9% | 2.1% | 3.7% | 7.9% | 6.6% | 9.3% |
| | ***Snake River total*** | ***0.3%*** | | | ***51.7%*** | | | ***29.8%*** | | | ***81.7%*** | ***79.6%*** | ***83.9%*** |
| | Other | | | | | | | | | | 18.3% | ***16.1%*** | ***20.4%*** |

Table 23. The estimated harvest and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY for clipped steelhead in the tribal Zone 6 fishery, June 16 to November 16, 2014.

| | | BY10 | | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 0 | | | 579 | 411 | 766 | 520 | 377 | 681 | 1,099 | 880 | 1,335 |
| Dworshak | Dwor_C | 37 | 0 | 93 | 3,665 | 3,301 | 4,048 | 113 | 38 | 188 | 3,815 | 3,431 | 4,215 |
| Dworshak | Dwor_S | 0 | | | 307 | 199 | 434 | 0 | | | 307 | 199 | 434 |
| Imnaha | Imnaha | 0 | | | 359 | 233 | 484 | 225 | 131 | 338 | 584 | 419 | 751 |
| Lyons Ferry | Lyons Ferry | 0 | | | 807 | 628 | 1,004 | 861 | 663 | 1,058 | 1,667 | 1,399 | 1,936 |
| Oxbow | Oxbow | 0 | | | 1,403 | 1,150 | 1,676 | 182 | 91 | 273 | 1,585 | 1,315 | 1,874 |
| Pahsimeroi | Pahsimeroi | 18 | 0 | 55 | 1,288 | 1,017 | 1,582 | 1,937 | 1,644 | 2,229 | 3,243 | 2,858 | 3,641 |
| Sawtooth | Sawtooth | 0 | | | 810 | 612 | 1,007 | 986 | 771 | 1,201 | 1,796 | 1,508 | 2,083 |
| Sawtooth | SBT_Yankee | 0 | | | 36 | 0 | 91 | 538 | 394 | 699 | 574 | 413 | 736 |
| Sawtooth | SBT_YF_Egg | 0 | | | 18 | 0 | 54 | 0 | | | 18 | 0 | 54 |
| SF Clearwater | SF Clearwater | 0 | | | 42 | 0 | 105 | 0 | | | 42 | 0 | 105 |
| Wallowa | Wallowa | 0 | | | 1,003 | 784 | 1,222 | 579 | 416 | 741 | 1,581 | 1,309 | 1,854 |
| | ***Snake River total*** | ***56*** | | | ***10,317*** | | | ***5,940*** | | | ***16,312*** | ***15,893*** | ***16,740*** |
| | Other | | | | | | | | | | 3,644 | 3,216 | 4,063 |
| | **Total** | | | | | | | | | | **19,956** | | |

Table 24 Percent of female and large fish (fork length ≥78 cm) by release group in the clipped tribal Zone 6 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 (251) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 77.1% of all large fish sampled came from the Dwor_C groups and 90.9% of the fish in the Dwor_C 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** | **Sample size (length)** | **Expected number of large fish** | **Percent large - all samples** | **Percent large within group** |
| **All samples** | **1,052** | **44.3%** | **1,113** | **251** | **--** | **1,113** | **251** | **22.6%** | -- |
| Cottonwood | 58 | 50.0% | 60 | 0 | 0.0% | 61.3 | 0.0 | 0.0% | |
| Dwor_C | 198 | 34.3% | 209 | 190 | 90.9% | 212.8 | 193.4 | 77.1% | |
| Dwor_S | 16 | 37.5% | 17 | 11 | 64.7% | 17.1 | 11.1 | 4.4% | |
| Imnaha | 31 | 45.2% | 32 | 0 | 0.0% | 32.6 | 0.0 | 0.0% | |
| Lyons Ferry | 88 | 44.3% | 93 | 9 | 9.7% | 93.0 | 9.0 | 3.6% | |
| Oxbow | 74 | 44.6% | 82 | 7 | 8.5% | 88.4 | 7.5 | 3.0% | |
| Pahsimeroi | 155 | 50.3% | 164 | 0 | 0.0% | 180.9 | 0.0 | 0.0% | |
| Sawtooth | 97 | 49.5% | 100 | 1 | 1.0% | 100.1 | 1.0 | 0.4% | |
| SBT_Yankee | 32 | 28.1% | 32 | 0 | 0.0% | 32.0 | 0.0 | 0.0% | |
| SBT_YF_Egg | 1 | 100.0% | 1 | 0 | 0.0% | 1.0 | 0.0 | 0.0% | |
| SF Clearwater | 2 | 50.0% | 2 | 2 | 100.0% | 2.3 | 2.3 | 0.9% | |
| Wallowa | 84 | 48.8% | 87 | 1 | 1.1% | 88.2 | 1.0 | 0.4% | |
| **All Snake River** | | | **792** | **220** | | **909.8** | **225.4** | **89.8%** | |
| Other | 216 | 45.8% | 234 | 30 | | 203.2 | 25.6 | 10.2% | 12.6% |

Table 25. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate the clipped steelhead stock composition in the tribal Drano Lake fishery, 2014.

| | | PBT Assignments | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual sample count | | | Expanded for tag ratet | | | Percent of expanded samples | | |
| **Hatchery stock** | **Release group** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** | **BY11** | **BY12** | **Total** |
| Dworshak | Dwor_C | 32 | 0 | 32 | 32.5 | 0.0 | 32.5 | 59.2% | 0.0% | 59.2% |
| Dworshak | Dwor_S | 1 | 0 | 1 | 1.0 | 0.0 | 1.0 | 1.8% | 0.0% | 1.8% |
| Oxbow | Oxbow | 3 | 0 | 3 | 3.3 | 0.0 | 3.3 | 5.9% | 0.0% | 5.9% |
| Pahsimeroi | Pahsimeroi | 3 | 1 | 4 | 3.8 | 1.0 | 4.8 | 6.9% | 1.9% | 8.7% |
| Sawtooth | Sawtooth | 0 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0% | 1.8% | 1.8% |
| Sawtooth | SBT_Yankee | 0 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0% | 1.8% | 1.8% |
| Wallowa | Wallowa | 2 | 1 | 3 | 2.0 | 1.0 | 3.0 | 3.7% | 1.8% | 5.5% |
| | ***Snake River total*** | ***41*** | ***4*** | ***45*** | ***42.6*** | ***4.0*** | ***46.7*** | ***77.5%*** | ***7.3%*** | ***84.8%*** |
| | Other | | | 10 | | | 8.3 | | | 15.2% |
| | **Total** | | | **55** | | | **55** | | | |

Table 26. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY for clipped steelhead in the tribal Drano Lake fishery, 2014.

| | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Dworshak | Dwor_C | 59.2% | 48.1% | 70.3% | 0.0% | | | 59.2% | 48.1% | 70.3% |
| Dworsahk | Dwor_S | 1.8% | 0.0% | 5.5% | 0.0% | | | 1.8% | 0.0% | 5.5% |
| Oxbow | Oxbow | 5.9% | 2.0% | 11.9% | 0.0% | | | 5.9% | 2.0% | 11.9% |
| Pahsimeroi | Pahsimeroi | 6.9% | 2.3% | 13.7% | 1.9% | 0.0% | 5.6% | 8.7% | 2.3% | 16.0% |
| Sawtooth | Sawtooth | 0.0% | | | 1.8% | 0.0% | 5.5% | 1.8% | 0.0% | 5.5% |
| Sawtooth | SBT_Yankee | 0.0% | | | 1.8% | 0.0% | 5.5% | 1.8% | 0.0% | 5.5% |
| Wallowa | Wallowa | 3.7% | 0.0% | 9.2% | 1.8% | 0.0% | 5.5% | 5.5% | 1.8% | 11.1% |
| | ***Snake River total*** | ***77.5%*** | | | ***7.3%*** | | | ***84.8%*** | ***75.6%*** | ***93.5%*** |
| | Other | | | | | | | 15.2% | 6.5% | 24.4% |

Table 27. Actual, expanded, and percent of samples that assigned to the hatchery release groups used to estimate the steelhead stock composition in the lower Snake River sport fishery from September 1, 2014 to March 31, 2015.

| PBT Assignments | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual sample count | | | | Expanded for tag rate | | | | Percent of expanded samples | | | |
| **Hatchery stock** | **Release group** | **BY10** | **BY11** | **BY12** | **Total** | **BY10** | **BY11** | **BY12** | **Total** | **BY10** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 0 | 11 | 6 | 17 | 0.0 | 11.5 | 6.0 | 17.5 | 0.0% | 1.6% | 0.8% | 2.4% |
| Dworshak | Dwor_C | 4 | 184 | 12 | 200 | 4.1 | 187.1 | 12.6 | 203.9 | 0.6% | 26.0% | 1.7% | 28.3% |
| Dworshak | Dwor_S | 0 | 35 | 2 | 37 | 0.0 | 35.3 | 2.0 | 37.3 | 0.0% | 4.9% | 0.3% | 5.2% |
| Imnaha | Imnaha | 0 | 10 | 6 | 16 | 0.0 | 10.0 | 6.3 | 16.3 | 0.0% | 1.4% | 0.9% | 2.3% |
| Lyons Ferry | Lyons Ferry | 0 | 110 | 128 | 238 | 0.0 | 110.0 | 128.0 | 238.0 | 0.0% | 15.3% | 17.8% | 33.1% |
| Oxbow | Oxbow | 0 | 11 | 4 | 15 | 0.0 | 12.0 | 4.1 | 16.0 | 0.0% | 1.7% | 0.6% | 2.2% |
| Pahsimeroi | Pahsimeroi | 1 | 15 | 55 | 71 | 1.0 | 18.9 | 56.0 | 76.0 | 0.1% | 2.6% | 7.8% | 10.6% |
| Sawtooth | Sawtooth | 0 | 13 | 38 | 51 | 0.0 | 13.0 | 38.0 | 51.0 | 0.0% | 1.8% | 5.3% | 7.1% |
| Sawtooth | SBT_Yankee | 0 | 1 | 1 | 2 | 0.0 | 1.0 | 1.0 | 2.0 | 0.0% | 0.1% | 0.1% | 0.3% |
| SF Clearwater | SF Clearwater | 0 | 5 | 0 | 5 | 0.0 | 5.8 | 0.0 | 5.8 | 0.0% | 0.8% | 0.0% | 0.8% |
| Touchet | Touchet | 0 | 1 | 0 | 1 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0% | 0.1% | 0.0% | 0.1% |
| Wallowa | Wallowa | 0 | 19 | 14 | 33 | 0.0 | 19.3 | 14.1 | 33.4 | 0.0% | 2.7% | 2.0% | 4.6% |
| | ***Snake River total*** | ***5*** | ***415*** | ***266*** | ***686*** | ***5.2*** | ***425.0*** | ***268.1*** | ***698.3*** | ***0.7%*** | ***59.0%*** | ***37.2%*** | ***97.0%*** |
| | Other | | | | 34 | | | | 21.7 | | | | 3.0% |
| | **Total** | | | | **720** | | | | **720** | | | | |

Table 28. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY in the Snake River sport fishery, September 1, 2014 to March 31, 2015.

| | | BY10 | | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 0.0% | | | 1.6% | 0.9% | 2.5% | 0.8% | 0.3% | 1.4% | 2.4% | 1.5% | 3.4% |
| Dworshak | Dwor_C | 0.6% | 0.1% | 1.0% | 26.0% | 23.3% | 28.8% | 1.7% | 1.0% | 2.6% | 28.3% | 25.6% | 31.2% |
| Dworshak | Dwor_S | 0.0% | | | 4.9% | 3.6% | 6.3% | 0.3% | 0.0% | 0.7% | 5.2% | 3.9% | 6.6% |
| Imnaha | Imnaha | 0.0% | | | 1.4% | 0.7% | 2.1% | 0.9% | 0.3% | 1.5% | 2.3% | 1.4% | 3.2% |
| Lyons Ferry | Lyons Ferry | 0.0% | | | 15.3% | 13.1% | 17.5% | 17.8% | 15.4% | 20.1% | 33.1% | 30.1% | 36.0% |
| Oxbow | Oxbow | 0.0% | | | 1.7% | 0.9% | 2.6% | 0.6% | 0.1% | 1.1% | 2.2% | 1.3% | 3.1% |
| Pahsimeroi | Pahsimeroi | 0.1% | 0.0% | 0.4% | 2.6% | 1.6% | 3.7% | 7.8% | 6.1% | 9.5% | 10.6% | 8.6% | 12.5% |
| Sawtooth | Sawtooth | 0.0% | | | 1.8% | 1.0% | 2.6% | 5.3% | 3.9% | 6.7% | 7.1% | 5.6% | 8.6% |
| Sawtooth | SBT_Yankee | 0.0% | | | 0.1% | 0.0% | 0.4% | 0.1% | 0.0% | 0.4% | 0.3% | 0.0% | 0.6% |
| SF Clearwater | SF Clearwater | 0.0% | | | 0.8% | 0.3% | 1.5% | 0.0% | | | 0.8% | 0.3% | 1.5% |
| Touchet | Touchet | 0.0% | | | 0.1% | 0.0% | 0.4% | 0.0% | | | 0.1% | 0.0% | 0.4% |
| Wallowa | Wallowa | 0.0% | | | 2.7% | 1.7% | 3.7% | 2.0% | 1.1% | 2.8% | 4.6% | 3.4% | 5.9% |
| | ***Snake River total*** | ***0.7%*** | | | ***59.0%*** | | | ***37.2%*** | | | ***97.0%*** | ***95.6%*** | ***98.3%*** |
| | Other | | | | | | | | | | 3.0% | 1.7% | 4.4% |

Table 29. The estimated harvest and 90% lower (LCI) and upper (UCI) confidence intervals by release group and BY for steelhead in the lower Snake River sport fishery from September 1, 2014 to March 31, 2015.

| | | BY10 | | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 0 | | | 180 | 98 | 279 | 94 | 31 | 157 | 275 | 175 | 388 |
| Dworshak | Dwor_C | 65 | 16 | 114 | 2,945 | 2,641 | 3,265 | 198 | 115 | 297 | 3,208 | 2,902 | 3,529 |
| Dworshak | Dwor_S | 0 | | | 556 | 413 | 714 | 32 | 0 | 80 | 588 | 444 | 746 |
| Imnaha | Imnaha | 0 | | | 157 | 79 | 236 | 99 | 33 | 165 | 256 | 160 | 366 |
| Lyons Ferry | Lyons Ferry | 0 | | | 1,731 | 1,479 | 1,983 | 2,014 | 1,747 | 2,282 | 3,745 | 3,414 | 4,075 |
| Oxbow | Oxbow | 0 | | | 188 | 103 | 291 | 64 | 16 | 128 | 252 | 151 | 357 |
| Pahsimeroi | Pahsimeroi | 16 | 0 | 49 | 297 | 178 | 416 | 882 | 689 | 1,074 | 1,196 | 975 | 1,416 |
| Sawtooth | Sawtooth | 0 | | | 205 | 111 | 300 | 598 | 441 | 755 | 803 | 630 | 977 |
| Sawtooth | SBT_Yankee | 0 | | | 16 | 0 | 48 | 16 | 0 | 47 | 32 | 0 | 64 |
| SF Clearwater | SF Clearwater | 0 | | | 92 | 37 | 165 | 0 | | | 92 | 37 | 165 |
| Touchet | Touchet | 0 | | | 16 | 0 | 47 | 0 | | | 16 | 0 | 47 |
| Wallowa | Wallowa | 0 | | | 304 | 192 | 416 | 222 | 127 | 317 | 526 | 383 | 671 |
| ***Snake River hatchery total*** | | ***81*** | | | ***6,687*** | | | ***4,219*** | | | ***10,989*** | ***10,830*** | ***11,136*** |
| | Other | | | | | | | | | | 340 | 193 | 499 |
| | **Total** | | | | | | | | | | **11,389** | | |

Table 30. Percent of female and large fish (fork length ≥78 cm) by release group in the Snake River 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 (221) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 74.7% of all large fish sampled came from the Dwor_C groups and 81% of the fish in the Dwor_C 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** | **Sample size (length)** | **Expected number of large fish** | **Percent large - all samples** | **Percent large within group** |
| **All samples** | **705** | **47.4%** | **719** | **221** | **--** | **719** | **221** | **30.7%** | -- |
| Cottonwood | 17 | 41.2% | 17 | 0 | 0.0% | 17.5 | 0.0 | 0.0% | |
| Dwor_C | 195 | 43.6% | 200 | 162 | 81.0% | 203.9 | 165.1 | 74.7% | |
| Dwor_S | 36 | 44.4% | 37 | 27 | 73.0% | 37.3 | 27.2 | 12.3% | |
| Imnaha | 16 | 50.0% | 16 | 1 | 6.3% | 16.3 | 1.0 | 0.5% | |
| Lyons Ferry | 234 | 56.8% | 238 | 10 | 4.2% | 238.0 | 10.0 | 4.5% | |
| Oxbow | 14 | 71.4% | 15 | 2 | 13.3% | 16.0 | 2.1 | 1.0% | |
| Pahsimeroi | 69 | 33.3% | 71 | 2 | 2.8% | 76.0 | 2.1 | 1.0% | |
| Sawtooth | 51 | 47.1% | 50 | 1 | 2.0% | 51.0 | 1.0 | 0.5% | |
| SBT_Yankee | 2 | 0.0% | 2 | 0 | 0.0% | 2.0 | 0.0 | 0.0% | |
| SF Clearwater | 5 | 60.0% | 5 | 4 | 80.0% | 5.8 | 4.7 | 2.1% | |
| Wallowa | 32 | 31.3% | 33 | 2 | 6.1% | 33.4 | 2.0 | 0.9% | |
| **All Snake River** | | | **684** | **211** | | **697.3** | **215.4** | **97.5%** | |
| Other | 33 | 42.4% | 34 | 10 | | 21.7 | 5.6 | 2.5% | 25.9% |

Table 31. Actual, expanded and adjusted, and percent of samples that assigned to the hatchery release groups and GSI reporting groups used to estimate the unclipped steelhead stock composition in the tribal Zone 6 fishery, 2014.

| PBT Assignments | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual Count | | | | Expand and adjust for tag rate | | | | Percent of samples | | | |
| **Hatchery stock** | **Release group** | **BY10** | **BY11** | **BY12** | **Total** | **BY10** | **BY11** | **BY12** | **Total** | **BY10** | **BY11** | **BY12** | **Total** |
| Wallowa | Cottonwood | 0 | 2 | 1 | 3 | 0.0 | 2.1 | 1.0 | 3.1 | 0.0% | 0.2% | 0.1% | 0.3% |
| Dworshak | Dwor_C | 1 | 48 | 0 | 49 | 1.0 | 48.8 | 0.0 | 49.9 | 0.1% | 4.6% | 0.0% | 4.7% |
| EF Salmon | EF Salmon | 0 | 14 | 6 | 20 | 0.0 | 14.0 | 6.4 | 20.4 | 0.0% | 1.3% | 0.6% | 1.9% |
| Oxbow | Oxbow | 0 | 2 | 0 | 2 | 0.0 | 2.2 | 0.0 | 2.2 | 0.0% | 0.2% | 0.0% | 0.2% |
| Pahsimeroi | Pahsimeroi | 0 | 1 | 2 | 3 | 0.0 | 1.3 | 2.0 | 3.3 | 0.0% | 0.1% | 0.2% | 0.3% |
| Pahsimeroi | SBT_Indian | 0 | 1 | 0 | 1 | 0.0 | 1.2 | 0.0 | 1.2 | 0.0% | 0.1% | 0.0% | 0.1% |
| Sawtooth | Sawtooth | 0 | 1 | 1 | 2 | 0.0 | 1.0 | 1.0 | 2.0 | 0.0% | 0.1% | 0.1% | 0.2% |
| Sawtooth | SBT_Yankee | 0 | 4 | 2 | 6 | 0.0 | 4.0 | 2.0 | 6.0 | 0.0% | 0.4% | 0.2% | 0.6% |
| SF Clearwater | SF Clearwater | 0 | 13 | 1 | 14 | 0.0 | 15.2 | 1.0 | 16.2 | 0.0% | 1.4% | 0.1% | 1.5% |
| Touchet | Touchet | 1 | 3 | 1 | 5 | 1.6 | 3.0 | 1.0 | 5.6 | 0.1% | 0.3% | 0.1% | 0.5% |
| Tucannon | Tucannon | 0 | 6 | 1 | 7 | 0.0 | 8.7 | 1.3 | 10.1 | 0.0% | 0.8% | 0.1% | 0.9% |
| Upper Salmon | Upper Salmon | 0 | 3 | 0 | 3 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0% | 0.3% | 0.0% | 0.3% |
| Wallowa | Wallowa | 0 | 4 | 0 | 4 | 0.0 | 4.1 | 0.0 | 4.1 | 0.0% | 0.4% | 0.0% | 0.4% |
| ***Snake River Hatchery total:*** | | ***2*** | ***102*** | ***15*** | ***119*** | ***2.6*** | ***108.6*** | ***15.7*** | ***126.9*** | ***0.2%*** | ***10.1%*** | ***1.5%*** | ***11.8%*** |
| **GSI Region** | | | | | | | | | | | | | |
| Mid-C | BWSALM | | | | 1 | | | | 1.0 | | | | 0.1% |
| Mid-C | KLICKR | | | | 26 | | | | 26.0 | | | | 2.4% |
| Low-C | LOWCOL | | | | 5 | | | | 5.0 | | | | 0.5% |
| Snake | MFSALM | | | | 42 | | | | 42.0 | | | | 3.9% |
| Mid-C & Snake | MGILCS | | | | 685 | | | | 681.5 | | | | 63.6% |
| Snake | SFCLWR | | | | 31 | | | | 28.0 | | | | 2.6% |
| Snake | SFSALM | | | | 19 | | | | 19.0 | | | | 1.8% |
| Mid & Low-C | SKAMAN | | | | 3 | | | | 3.0 | | | | 0.3% |
| Snake | UPCLWR | | | | 44 | | | | 44.0 | | | | 4.1% |
| Upper-C | UPPCOL | | | | 27 | | | | 26.4 | | | | 2.5% |
| Snake | UPSALM | | | | 55 | | | | 54.2 | | | | 5.1% |
| Mid-C | YAKIMA | | | | 15 | | | | 15.0 | | | | 1.4% |
| | ***GSI total:*** | | | | ***953*** | | | | ***945.08*** | | | | ***88.2%*** |
| | **Grand total:** | | | | **1,072** | | | | **1,072** | | | | |

Table 32. The estimated stock percentages and 90% lower (LCI) and upper (UCI) confidence intervals of unclipped steelhead in the tribal Zone 6 fishery, 2014. Mid-C = Bonneville Dam upstream to and including the Yakima River, except the Snake River basin. Upper-C = upstream of the Yakima River , Low-C = downstream of Bonneville Dam.

| | | BY10 | | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** | **Percent** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 0.0% | | | 0.2% | 0.0% | 0.5% | 0.1% | 0.0% | 0.3% | 0.3% | 0.1% | 0.6% |
| Dworshak | Dwor_C | 0.1% | 0.0% | 0.3% | 4.6% | 3.5% | 5.6% | 0.0% | | | 4.7% | 3.5% | 5.6% |
| EF Salmon | EF Salmon | 0.0% | | | 1.3% | 0.7% | 1.9% | 0.6% | 0.2% | 1.0% | 1.9% | 1.2% | 2.6% |
| Oxbow | Oxbow | 0.0% | | | 0.2% | 0.0% | 0.5% | 0.0% | | | 0.2% | 0.0% | 0.5% |
| Pahsimeroi | Pahsimeroi | 0.0% | | | 0.1% | 0.0% | 0.4% | 0.2% | 0.0% | 0.5% | 0.3% | 0.1% | 0.6% |
| Pahsimeroi | SBT_Indian | 0.0% | | | 0.1% | 0.0% | 0.3% | 0.0% | | | 0.1% | 0.0% | 0.3% |
| Sawtooth | Sawtooth | 0.0% | | | 0.1% | 0.0% | 0.3% | 0.1% | 0.0% | 0.3% | 0.2% | 0.0% | 0.4% |
| Sawtooth | SBT_Yankee | 0.0% | | | 0.4% | 0.1% | 0.7% | 0.2% | 0.0% | 0.5% | 0.6% | 0.2% | 0.9% |
| SF Clearwater | SF Clearwater | 0.0% | | | 1.4% | 0.8% | 2.1% | 0.1% | 0.0% | 0.3% | 1.5% | 0.9% | 2.2% |
| Touchet | Touchet | 0.1% | 0.0% | 0.4% | 0.3% | 0.1% | 0.6% | 0.1% | 0.0% | 0.3% | 0.5% | 0.2% | 0.9% |
| Tucannon | Tucannon | 0.0% | | | 0.8% | 0.3% | 1.4% | 0.1% | 0.0% | 0.4% | 0.9% | 0.4% | 1.6% |
| Upper Salmon | Upper Salmon | 0.0% | | | 0.3% | 0.0% | 0.6% | 0.0% | | | 0.3% | 0.0% | 0.6% |
| Wallowa | Wallowa | 0.0% | | | 0.4% | 0.1% | 0.8% | 0.0% | | | 0.4% | 0.1% | 0.8% |
| ***Snake River Hatchery total:*** | | ***0.2%*** | | | ***10.1%*** | | | ***1.5%*** | | | ***11.8%*** | ***10.2%*** | ***13.5%*** |
| **GSI Region** | | | | | | | | | | | | | |
| Mid-C | BWSALM | | | | | | | | | | 0.1% | 0.0% | 0.3% |
| Mid-C | KLICKR | | | | | | | | | | 2.4% | 1.7% | 3.3% |
| Low-C | LOWCOL | | | | | | | | | | 0.5% | 0.2% | 0.8% |
| Snake | MFSALM | | | | | | | | | | 3.9% | 3.0% | 4.9% |
| Mid-C, Snake | MGILCS | | | | | | | | | | 63.6% | 61.1% | 66.0% |
| Snake | SFCLWR | | | | | | | | | | 2.6% | 1.8% | 3.5% |
| Snake | SFSALM | | | | | | | | | | 1.8% | 1.1% | 2.4% |
| Mid & Low-C | SKAMAN | | | | | | | | | | 0.3% | 0.1% | 0.6% |
| Snake | UPCLWR | | | | | | | | | | 4.1% | 3.2% | 5.1% |
| Upper-C | UPPCOL | | | | | | | | | | 2.5% | 1.7% | 3.3% |
| Snake | UPSALM | | | | | | | | | | 5.1% | 4.0% | 6.2% |
| Mid-C | YAKIMA | | | | | | | | | | 1.4% | 0.8% | 2.1% |
| | ***GSI total:*** | | | | | | | | | | ***88.2%*** | ***86.5%*** | ***89.8%*** |

Table 33. The estimated harvest and 90% lower (LCI) and upper (UCI) confidence intervals of unclipped steelhead in the tribal Zone 6 fishery, 2014. Mid-C = Bonneville Dam upstream to and including the Yakima River, except the Snake River basin. Upper-C = upstream of the Yakima River , Low-C = downstream of Bonneville Dam.

| | | BY10 | | | BY11 | | | BY12 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **Release group** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** | **Harvest** | **LCI** | **UCI** |
| Wallowa | Cottonwood | 0 | | | 27 | 0 | 68 | 13 | 0 | 39 | 40 | 13 | 81 |
| Dworshak | Dwor_C | 13 | 0 | 40 | 634 | 488 | 779 | 0 | | | 647 | 488 | 779 |
| EF Salmon | EF Salmon | 0 | | | 182 | 104 | 260 | 83 | 28 | 138 | 265 | 171 | 366 |
| Oxbow | Oxbow | 0 | | | 28 | 0 | 71 | 0 | | | 28 | 0 | 71 |
| Pahsimeroi | Pahsimeroi | 0 | | | 16 | 0 | 49 | 26 | 0 | 66 | 42 | 13 | 89 |
| Pahsimeroi | SBT_Indian | 0 | | | 16 | 0 | 48 | 0 | | | 16 | 0 | 48 |
| Sawtooth | Sawtooth | 0 | | | 13 | 0 | 39 | 13 | 0 | 39 | 26 | 0 | 52 |
| Sawtooth | SBT_Yankee | 0 | | | 52 | 13 | 92 | 26 | 0 | 65 | 78 | 26 | 131 |
| SF Clearwater | SF Clearwater | 0 | | | 197 | 106 | 288 | 13 | 0 | 39 | 210 | 121 | 303 |
| Touchet | Touchet | 20 | 0 | 61 | 39 | 13 | 78 | 13 | 0 | 39 | 72 | 26 | 131 |
| Tucannon | Tucannon | 0 | | | 114 | 38 | 189 | 17 | 0 | 51 | 131 | 57 | 219 |
| Upper Salmon | Upper Salmon | 0 | | | 39 | 0 | 78 | 0 | | | 39 | 0 | 78 |
| Wallowa | Wallowa | 0 | | | 53 | 13 | 106 | 0 | | | 53 | 13 | 106 |
| ***Snake River Hatchery total:*** | | ***33*** | | | ***1,410*** | | | ***204*** | | | ***1,647*** | ***1,419*** | ***1,885*** |
| **GSI Region** | | | | | | | | | | | | | |
| Mid-C | BWSALM | | | | | | | | | | 13 | 0 | 39 |
| Mid-C | KLICKR | | | | | | | | | | 337 | 234 | 454 |
| Low-C | LOWCOL | | | | | | | | | | 65 | 26 | 117 |
| Snake | MFSALM | | | | | | | | | | 545 | 415 | 688 |
| Mid-C, Snake | MGILCS | | | | | | | | | | 8,848 | 8,507 | 9,183 |
| Snake | SFCLWR | | | | | | | | | | 363 | 248 | 485 |
| Snake | SFSALM | | | | | | | | | | 247 | 156 | 337 |
| Mid & Low-C | SKAMAN | | | | | | | | | | 39 | 13 | 78 |
| Snake | UPCLWR | | | | | | | | | | 571 | 441 | 714 |
| Upper-C | UPPCOL | | | | | | | | | | 343 | 238 | 455 |
| Snake | UPSALM | | | | | | | | | | 703 | 550 | 860 |
| Mid-C | YAKIMA | | | | | | | | | | 195 | 117 | 286 |
| | ***GSI total:*** | | | | | | | | | | ***12,269*** | ***12,030*** | ***12,496*** |

Table 34. Percent of female and large fish (fork length ≥78 cm) by hatchery release group and GSI reporting group in the unclipped tribal Zone 6 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 (251) that came from each release group. The percent large within group column is the percent of large fish within each release group. For example, 22.7% of all large fish sampled came from the Dwor_C groups and 94.69% of the fish in the Dwor_C 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** | **1,123** | **60.2%** | **1,125** | **233** | **20.7%** | **--** |
| Hatchery release group | | | | | | |
| Dwor_C | 55 | 30.9% | 56 | 53 | 22.7% | 94.6% |
| EF Salmon | 20 | 65.0% | 20 | 1 | 0.4% | 5.0% |
| SF Clearwater | 16 | 50.0% | 16 | 14 | 6.0% | 87.5% |
| Upper Salmon | 4 | 50.0% | 4 | 1 | 0.4% | 25.0% |
| all other hatchery | 33 | 72.7% | 33 | 0 | 0.0% | 0.0% |
| GSI Reporting group | | | | | | |
| BWSALM | 1 | 100.0% | 1 | 0 | 0.0% | 0.0% |
| KLICKR | 31 | 58.1% | 31 | 4 | 1.7% | 12.9% |
| LOWCOL | 6 | 66.7% | 6 | 0 | 0.0% | 0.0% |
| MFSALM | 42 | 71.4% | 42 | 13 | 5.6% | 31.0% |
| MGILCS | 712 | 63.5% | 713 | 56 | 24.0% | 7.9% |
| SFCLWR | 36 | 44.4% | 36 | 31 | 13.3% | 86.1% |
| SFSALM | 19 | 52.6% | 19 | 14 | 6.0% | 73.7% |
| SKAMAN | 4 | 25.0% | 4 | 1 | 0.4% | 25.0% |
| UPCLWR | 46 | 47.8% | 46 | 35 | 15.0% | 76.1% |
| UPPCOL | 27 | 51.9% | 27 | 5 | 2.1% | 18.5% |
| UPSALM | 56 | 60.7% | 56 | 4 | 1.7% | 7.1% |
| YAKIMA | 15 | 66.7% | 15 | 1 | 0.4% | 6.7% |

Table 35. Actual, expanded and adjusted, and percent of samples with 90% CI that assigned to the hatchery release groups and GSI reporting groups used to estimate the unclipped steelhead stock composition in the tribal Drano Lake fishery, 2014. LCI = lower 90% confidence interval; UCI = upper 90% confidence interval.

| | PBT/GSI Assignments | | | | Percent and CI of adjusted count | | |
|---|---|---|---|---|---|---|---|
| | Actual sample count | | Adjusted for tagrate | | | | |
| **Release group** | **BY11** | **Total** | **BY11** | **Total** | **Total** | **LCI** | **UCI** |
| Snake River hatchery groups | | | | | | | |
| Dwor_C | 7 | 7 | 7.1 | 7.1 | 13.4% | 5.8% | 21.1% |
| SF Clearwater | 2 | 2 | 2.3 | 2.3 | 4.4% | 0.0% | 8.8% |
| Upper Salmon | 1 | 1 | 1 | 1 | 1.9% | 0.0% | 5.7% |
| ***Hatchery total:*** | ***10*** | ***10*** | ***10.5*** | ***10.5*** | ***19.7%*** | **11.4%** | **29.5%** |
| GSI reporting groups | | | | | | | |
| KLICKR | | 5 | | 5 | 9.4% | 3.8% | 17.0% |
| LOWCOL | | 1 | | 1 | 1.9% | 0.0% | 5.7% |
| MGILCS | | 28 | | 28 | 52.8% | 41.5% | 64.1% |
| SFCLWR | | 5 | | 4.6 | 8.6% | 2.6% | 15.9% |
| SKAMAN | | 1 | | 1 | 1.9% | 0.0% | 5.7% |
| UPCLWR | | 2 | | 2 | 3.8% | 0.0% | 7.5% |
| UPSALM | | 1 | | 1 | 1.9% | 0.0% | 5.7% |
| ***GSI total:*** | | ***43*** | | ***42.5*** | ***80.3%*** | ***70.5%*** | ***88.6%*** |
| **Grand total:** | | **53** | | **53** | | | |

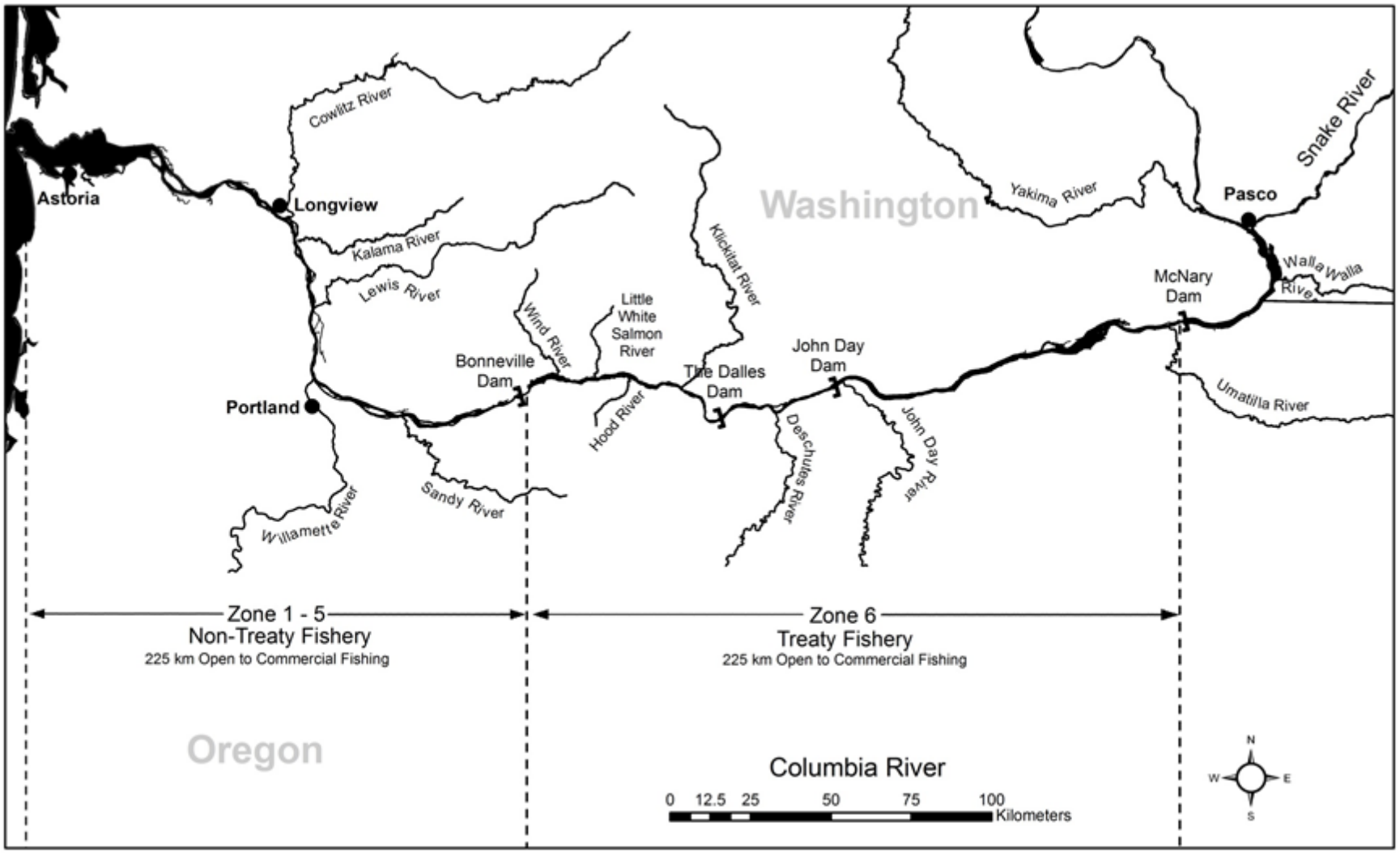


Figure 1. Map of the Columbia River where fisheries were sampled to determine steelhead stock composition. Sport anglers were sampled from Bonneville Dam downstream to Buoy 10, near Astoria and tribal fisheries were sampled upstream of Bonneville Dam in Zone 6.

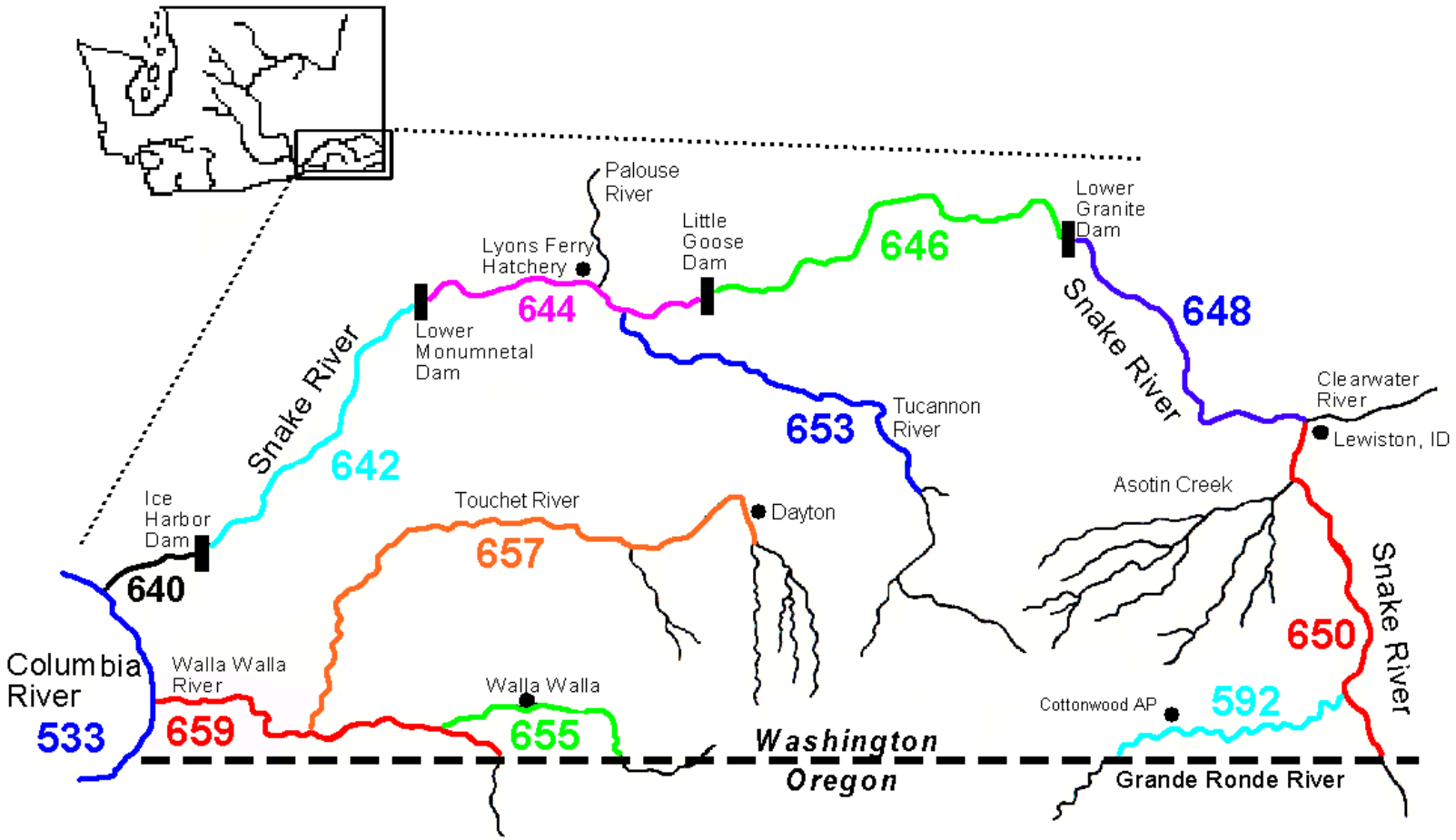


Figure 2. Map of the lower Snake River showing boundaries of the sections used by WDFW to estimate the monthly steelhead harvest. We estimated the steelhead stock composition from samples obtained in Sections 640, 642, 644, 646, and 648.

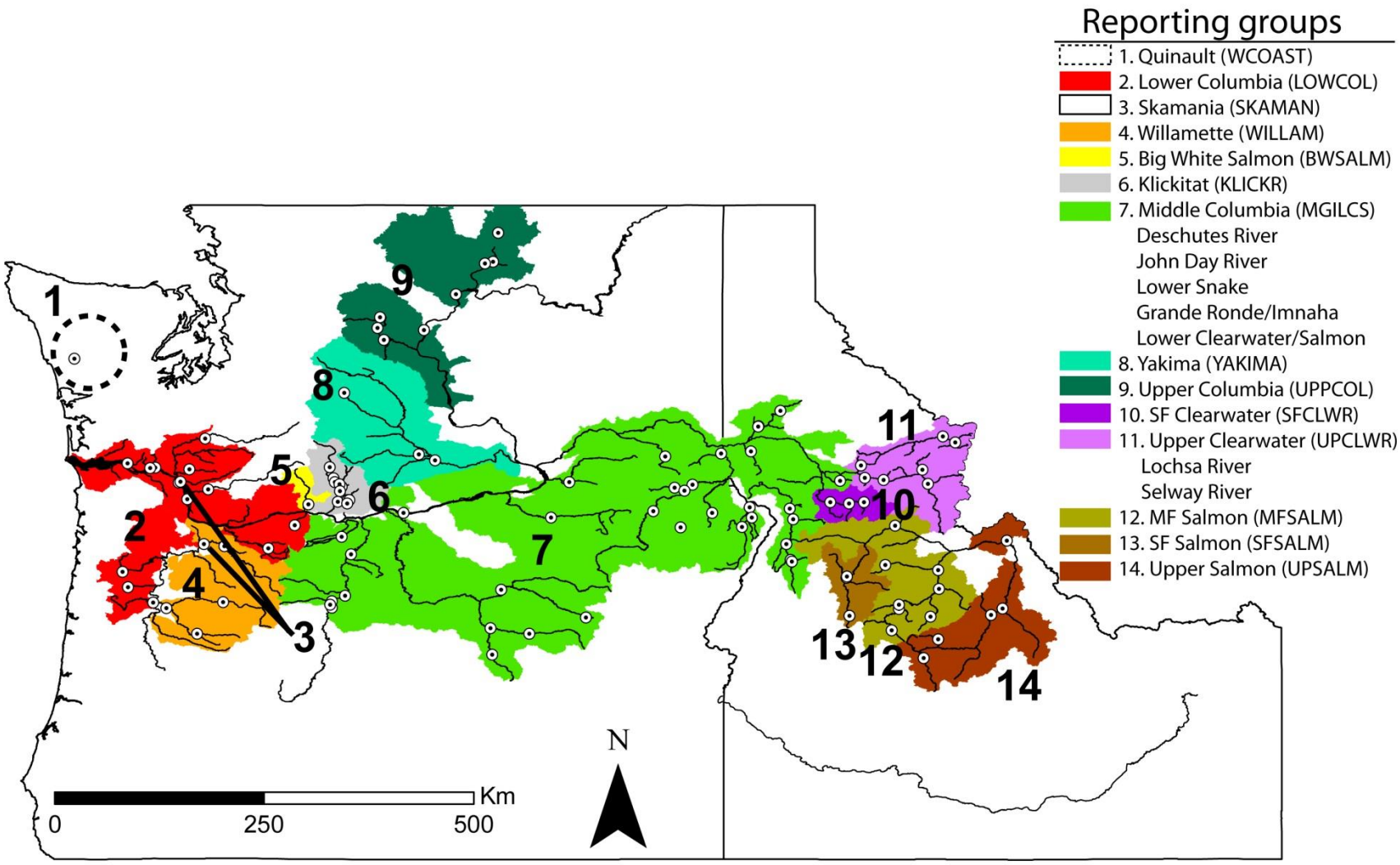


Figure 3. Map showing the GSI reporting groups that have been developed by CRITFC. These groups were used to assign unclipped steelhead that were not identified with PBT.

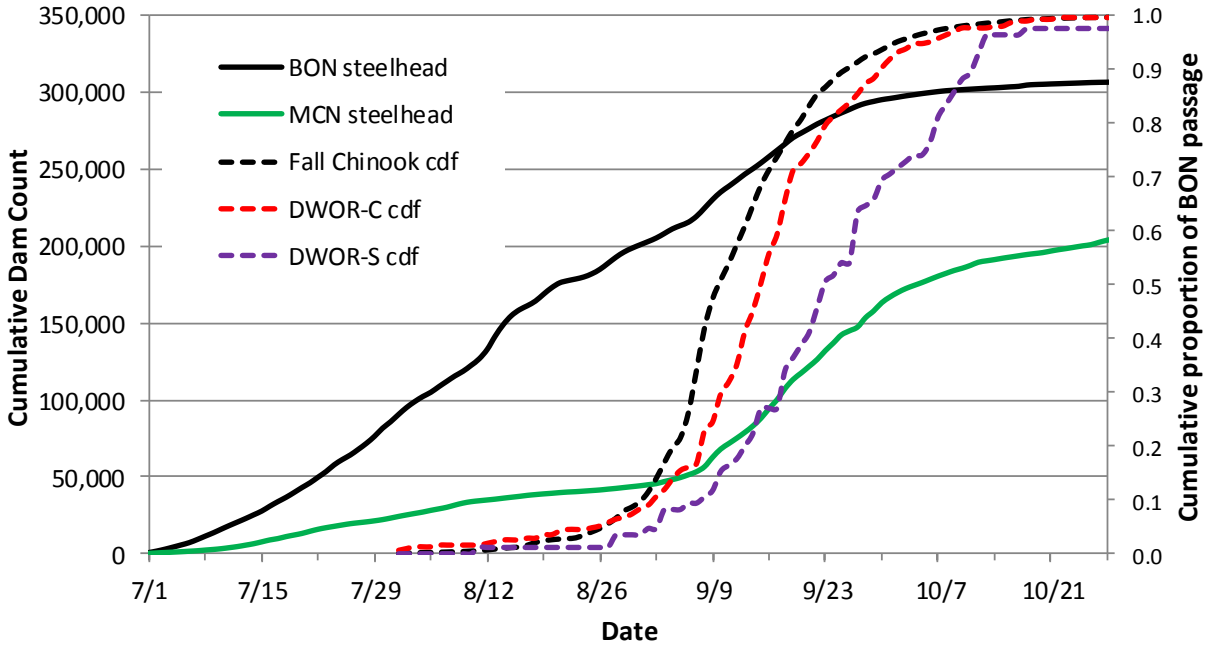


Figure 4 Total cumulative steelhead count at Bonneville (BON) and McNary (MCN) dams from July 1, 2014 to October 31, 2014 on the left axis. The cumulative proportion of passage at Bonneville Dam of Fall Chinook and the Dworshak steelhead stock released in the Clearwater drainage (DWOR-C) and Salmon drainage (DWOR-S) are shown on the right axis.

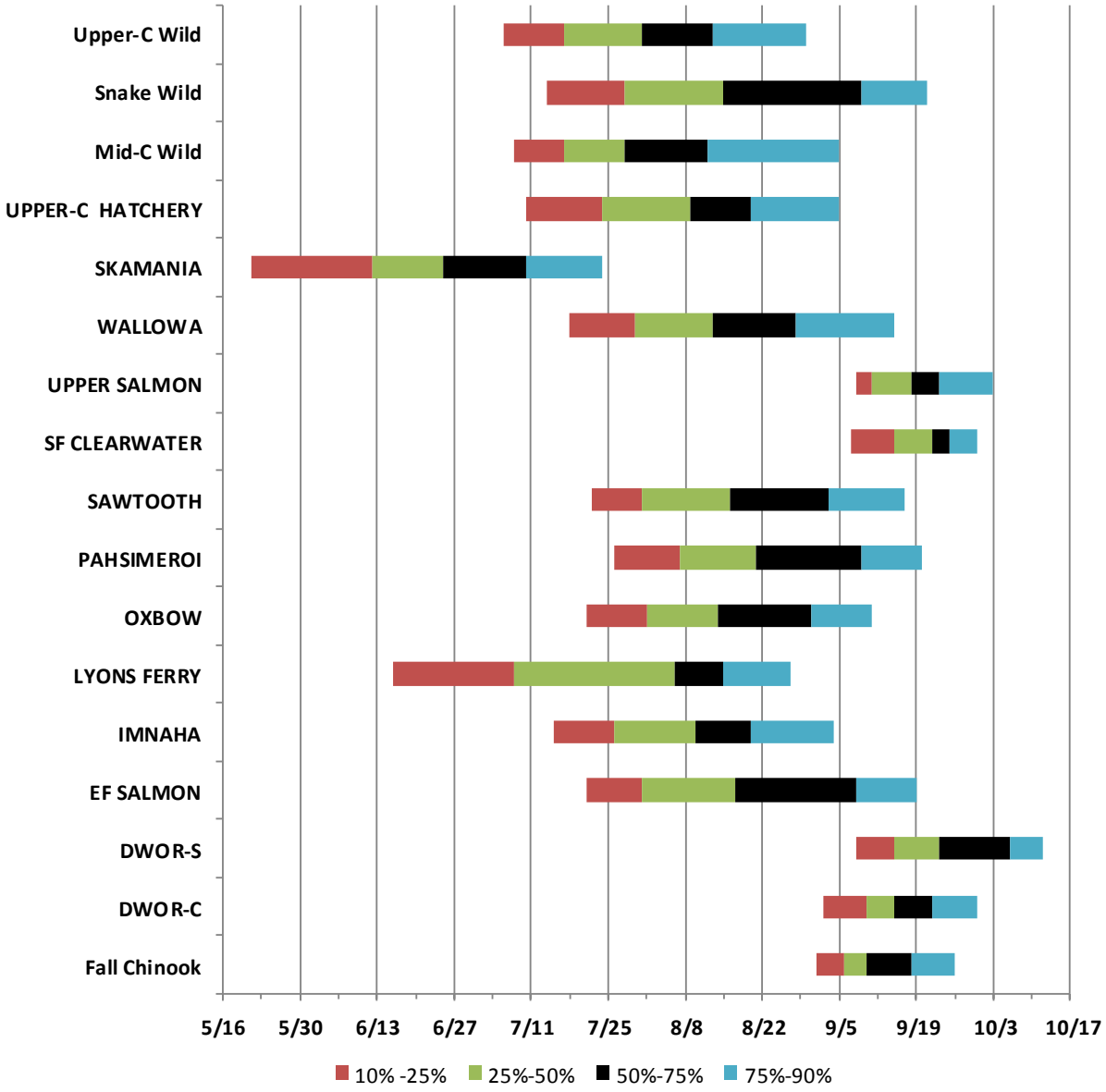


Figure 5. Arrival quantiles of Fall Chinook, Snake River, and Upper Columbia steelhead hatchery stocks (in upper case), wild steelhead from the Snake, mid-Columbia (Mid-C, Bonneville Dam to Yakima River), and Upper Columbia (Upper-C, upstream of the Yakima River) regions at Bonneville Dam in 2014. UPPER-C HATCHERY 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.

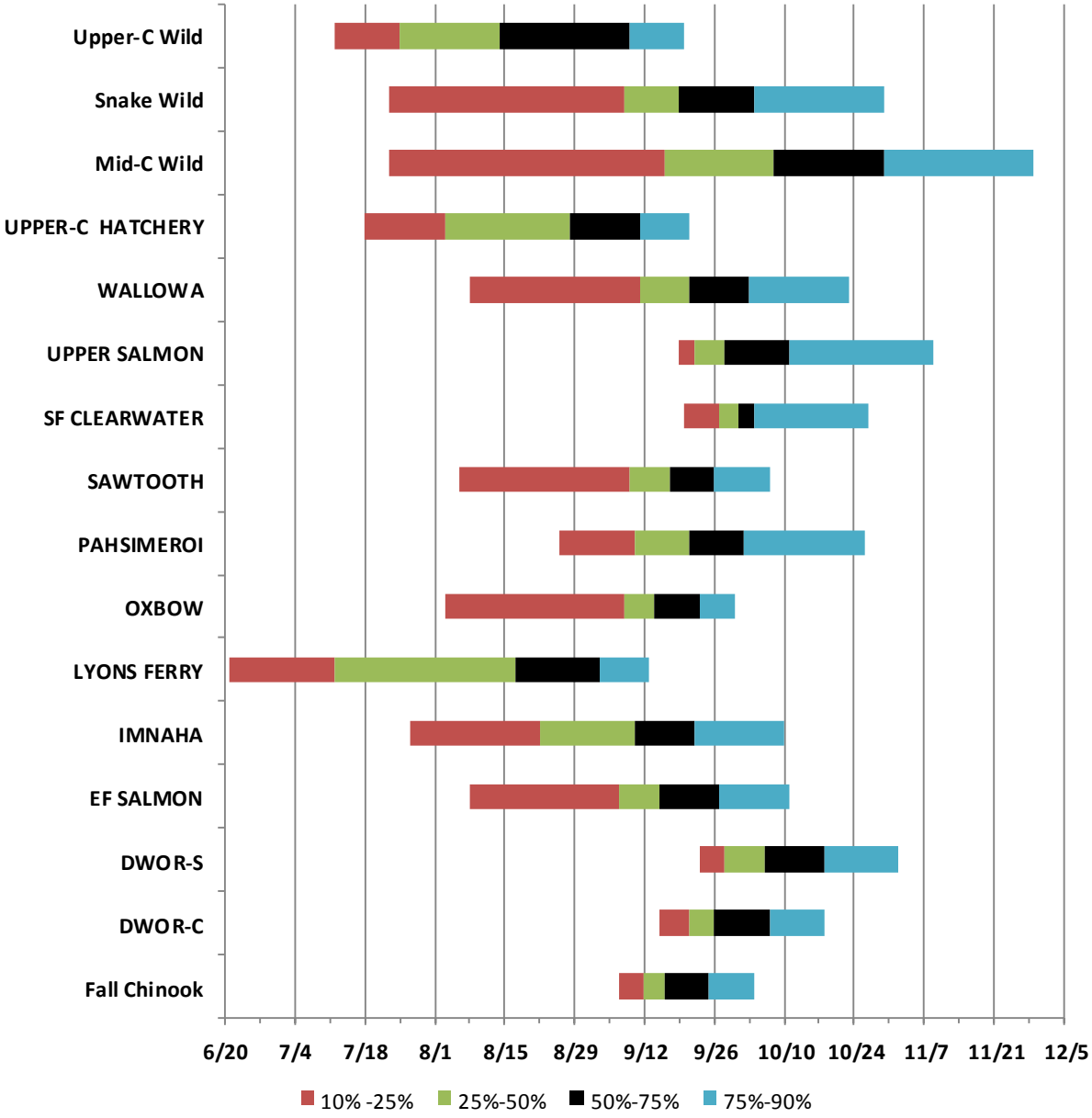


Figure 6. Arrival quantiles of Fall Chinook, Snake River, and Upper Columbia steelhead hatchery stocks (in upper case), wild steelhead from the Snake, mid-Columbia (Mid-C, stocks upstream of McNary Dam to Yakima River), and Upper Columbia (Upper-C, upstream of the Yakima River) regions at McNary Dam in 2014. UPPER-C HATCHERY 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 each region.

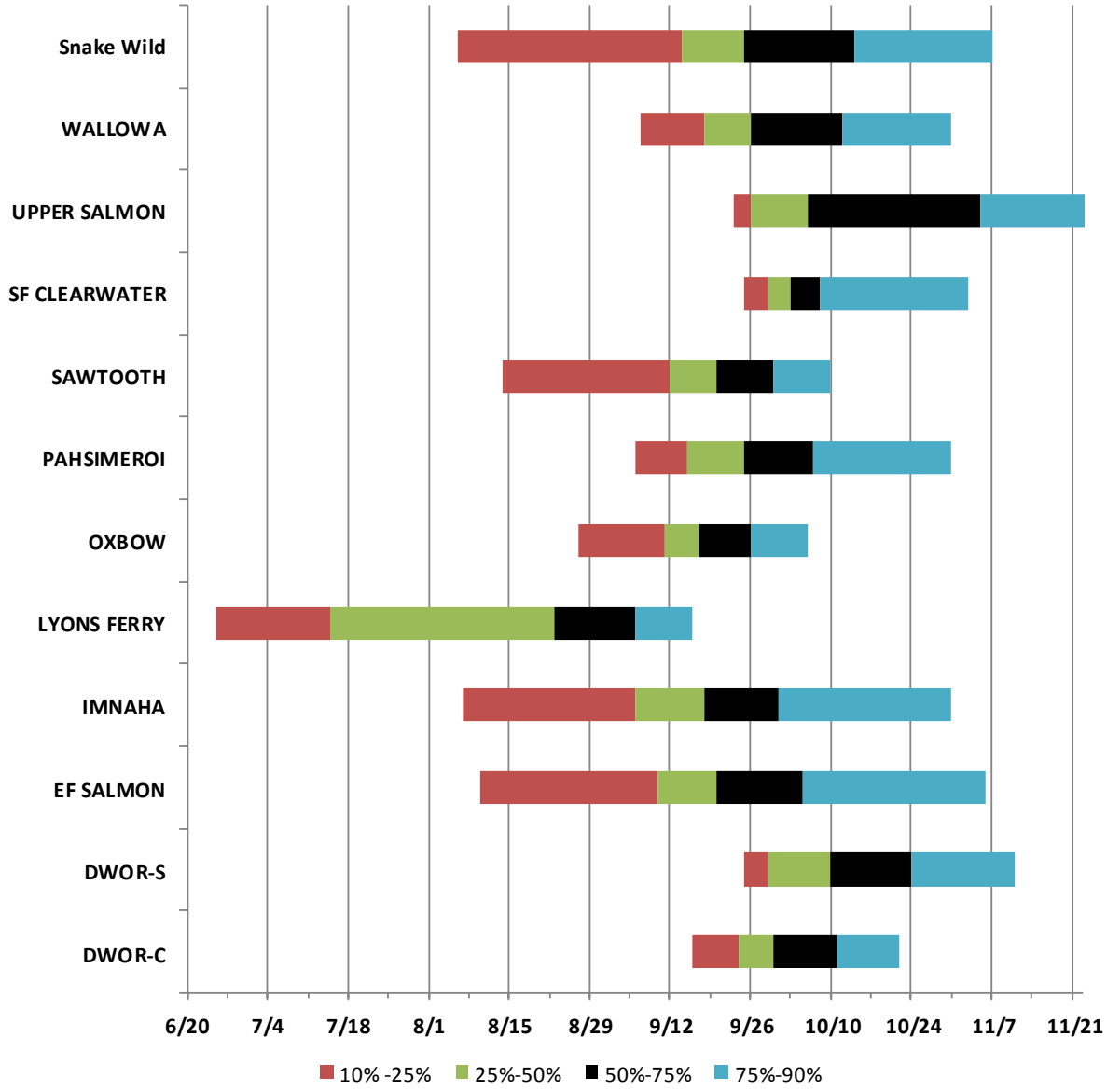


Figure 7. Arrival quantiles of Snake River steelhead hatchery stocks (in upper case), Snake River wild steelhead at Ice Harbor Dam in 2014. Wild run-timing was calculated by combining all adult detections from all release sites upstream of Lower Granite Dam. The 90% date for the Upper Salmon stock was December 27, 2014.

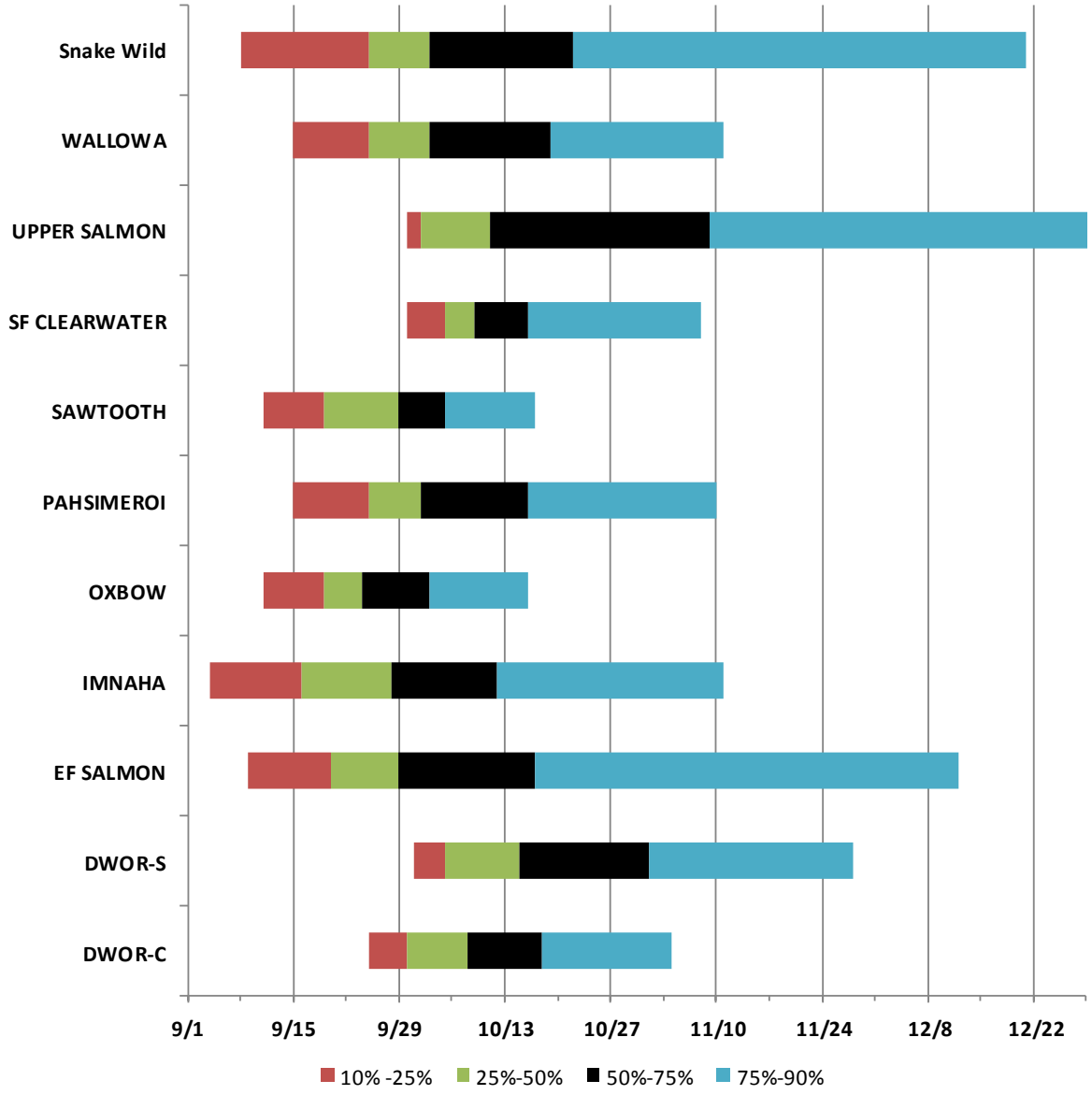


Figure 8. Arrival quantiles of Snake River steelhead hatchery stocks (in upper case) and Snake River wild steelhead at Lower Granite Dam in 2014. Wild run-timing was calculated by combining all adult detections from all release sites upstream of Lower Granite Dam. The 90% date for the Upper Salmon stock was March 13, 2015.

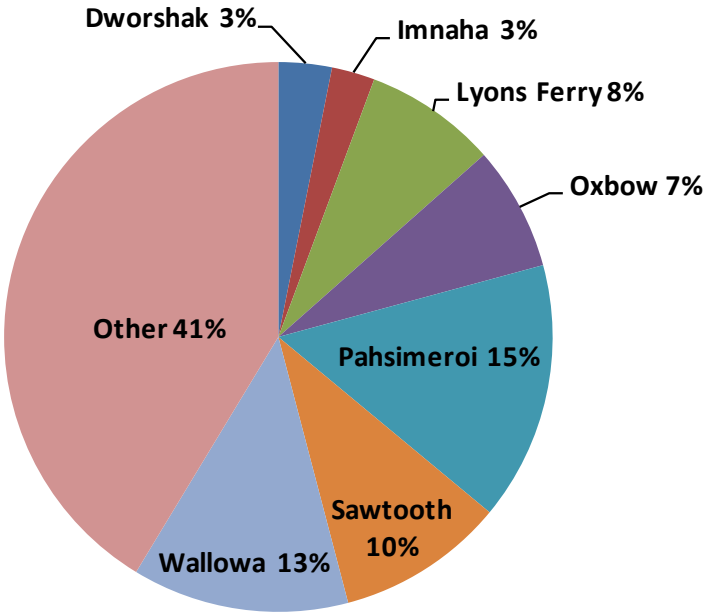


Figure 9. Stock composition in the lower Columbia River sport fishery, June 16 to October 31, 2014.

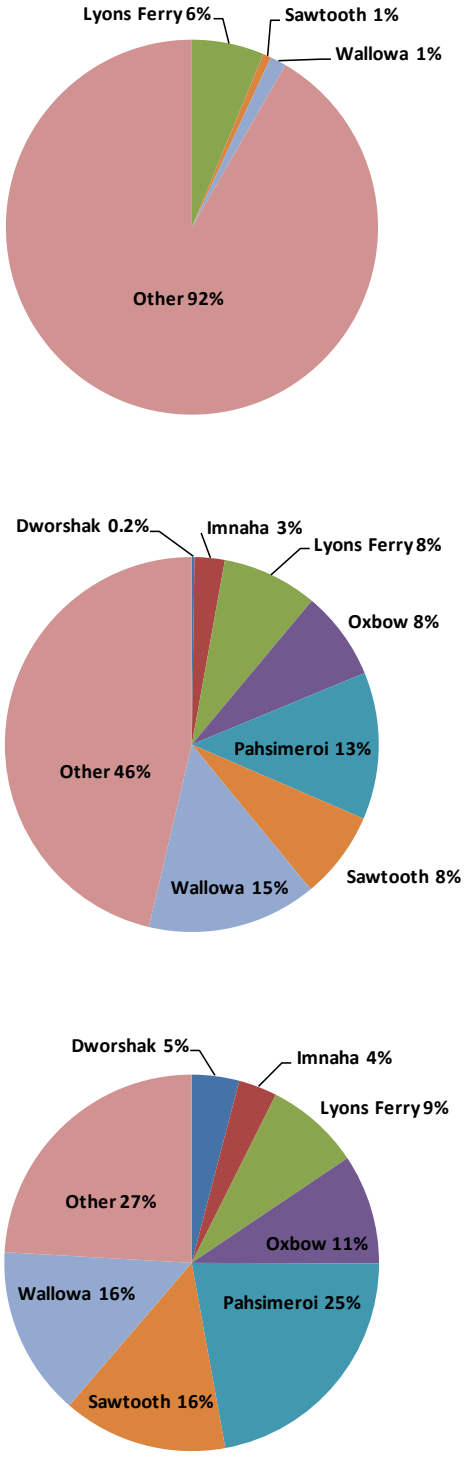


Figure 10. Stock composition in the lower Columbia River sport fishery from June 16 to June 30 (top), July 1 to July 31 (middle), and August 1 to August 31, 2014 (bottom).

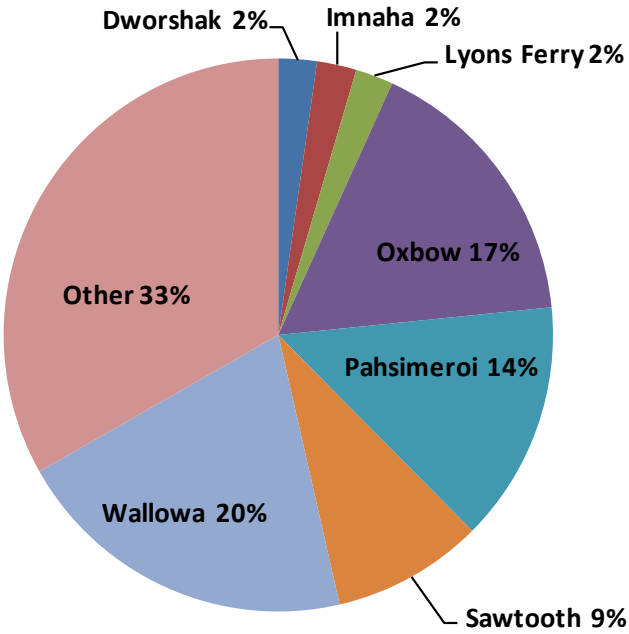


Figure 11. Stock composition in the Bonneville Pool sport fishery, 2014.

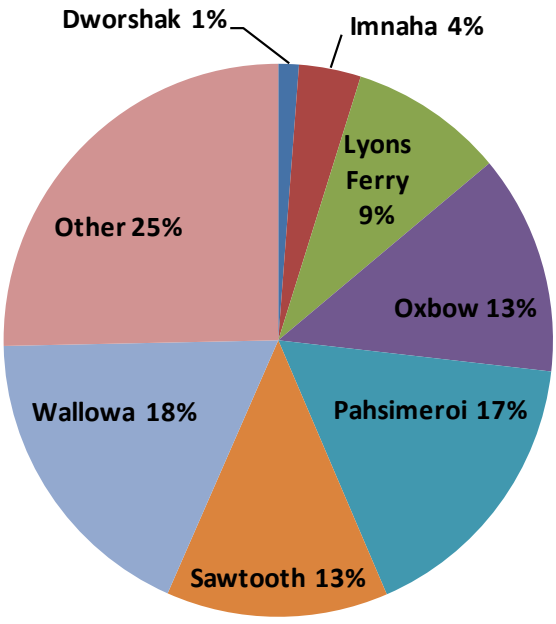


Figure 12. Stock composition in the Drano Lake sport fishery, 2014.

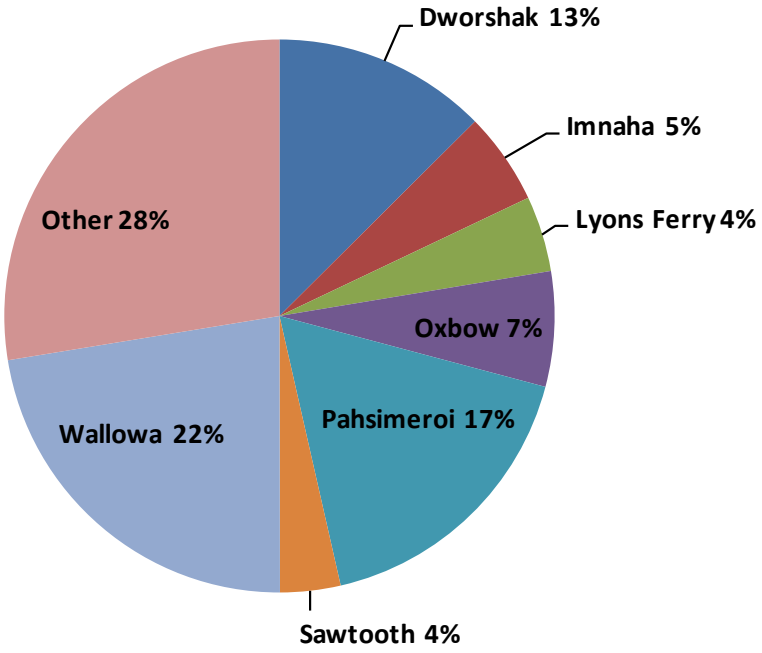


Figure 13. Stock composition in the mouth of Deschutes River sport fishery, 2014.

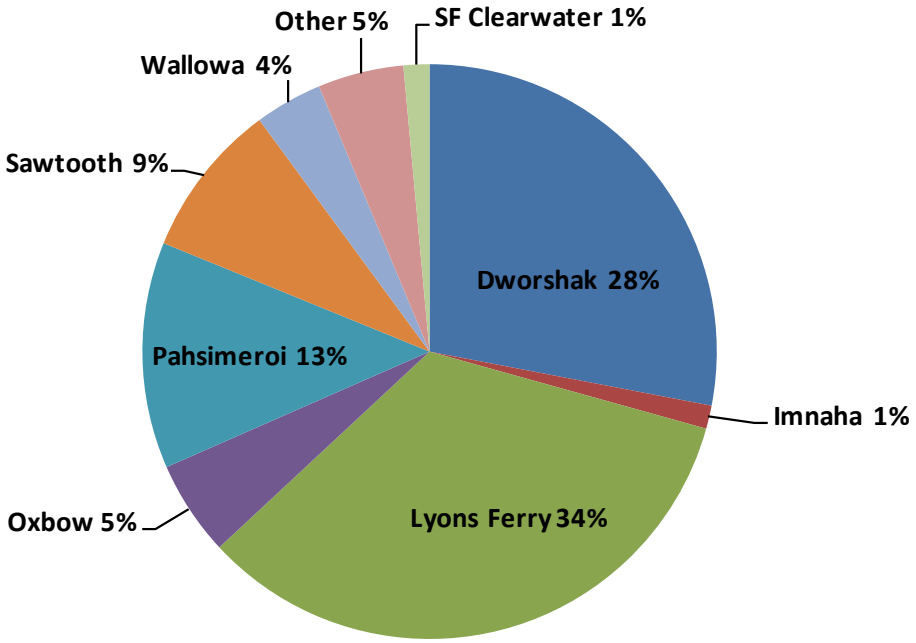


Figure 14. Stock composition in the Columbia River section 533 sport fishery, 2014.

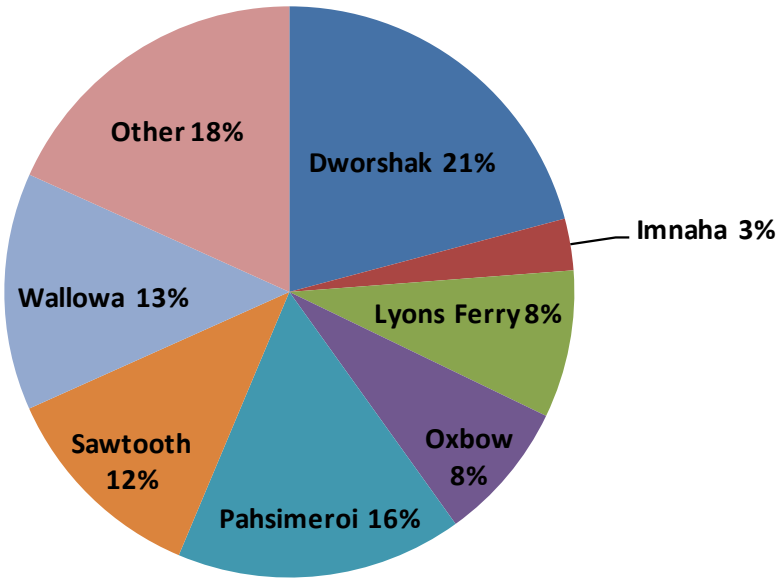


Figure 15. Stock composition of clipped steelhead in the tribal Zone 6 fishery from June 16 to November 16, 2014. The Dworshak stock includes the SF Clearwater release group (about 0.2% of total harvest).

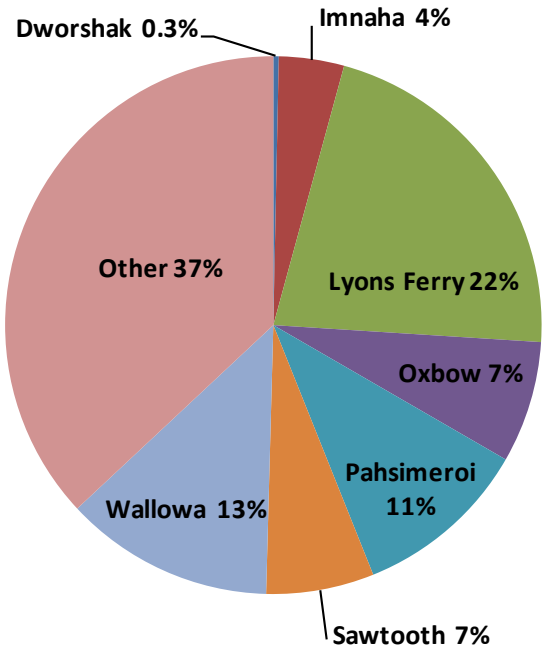


Figure 16. Stock composition of clipped steelhead in the tribal Zone 6 fishery from during the summer management period, June 16 to July, 31, 2014.

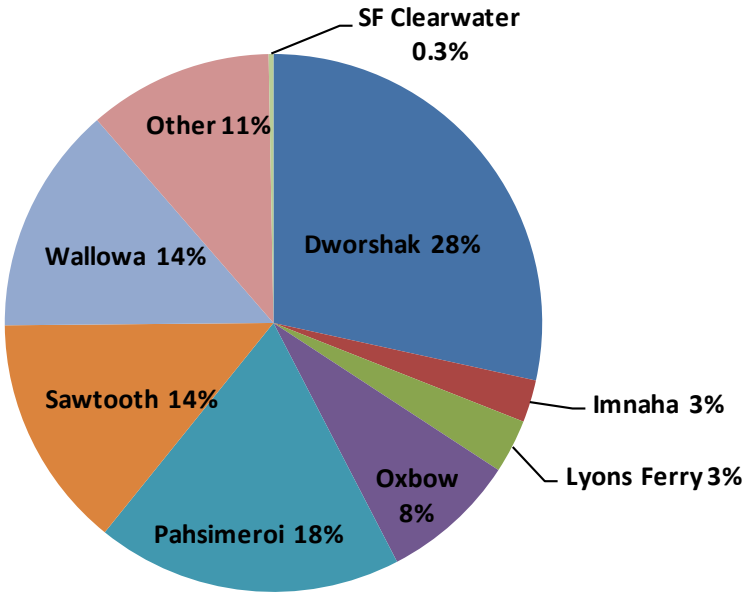


Figure 17. Stock composition of clipped steelhead in the tribal Zone 6 fishery from during the fall management period, August 1 to November 16, 2014.

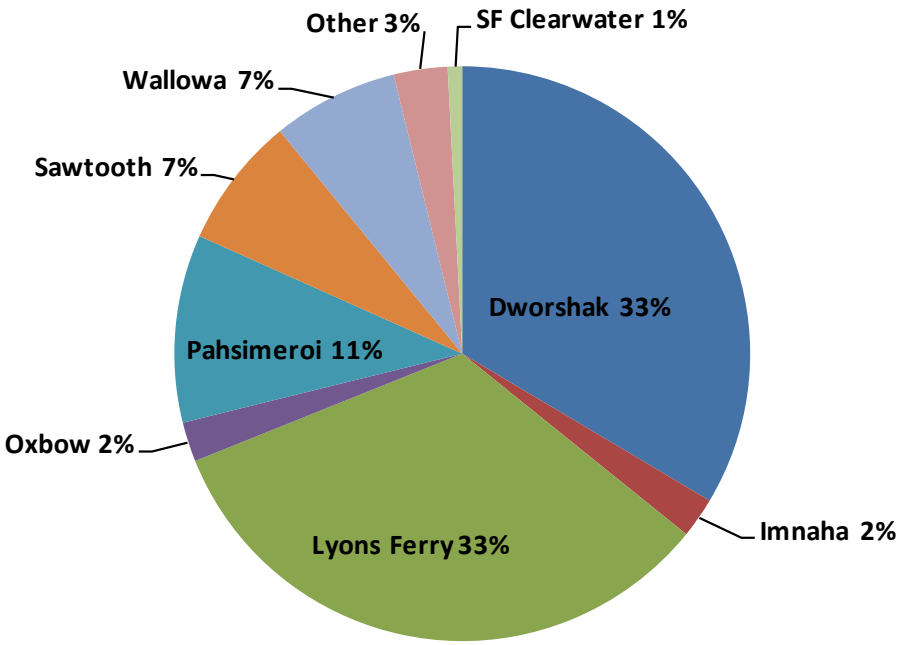


Figure 18. Stock composition in the lower Snake River sport fishery from September 1, 2014 to March 31, 2015.

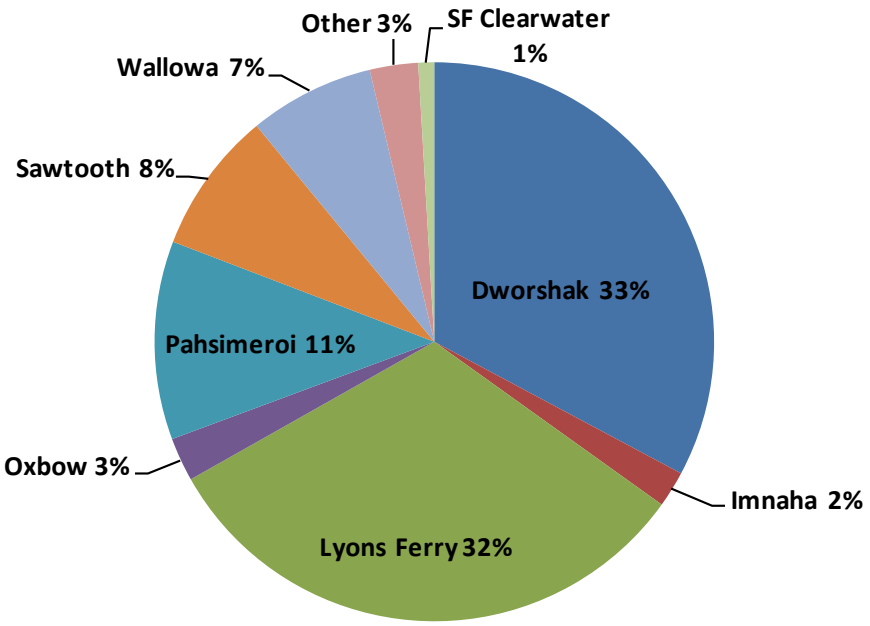


Figure 19. Stock composition in the lower Snake River sport fishery from September 1 to December 31, 2014.

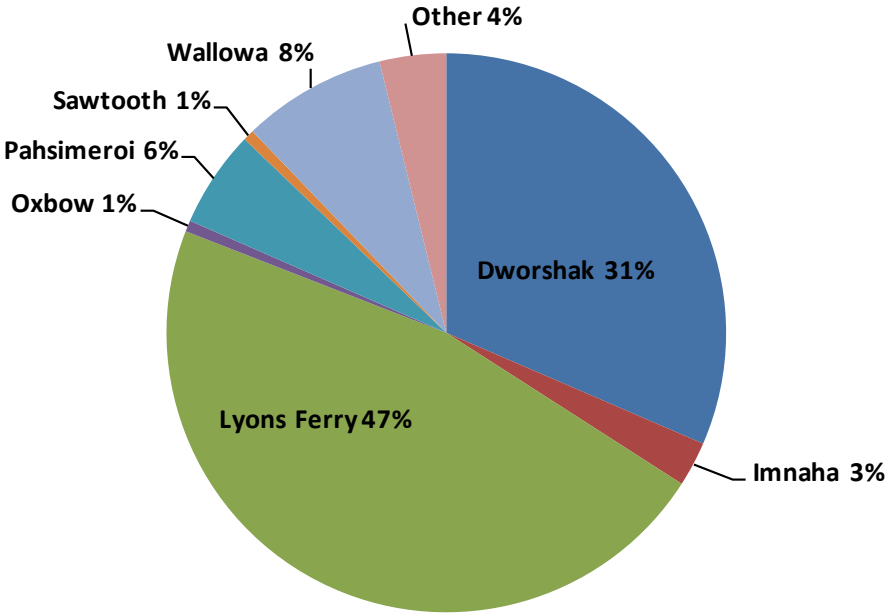


Figure 20. Stock composition in the lower Snake River sport fishery from January 1 to March 31, 2015.

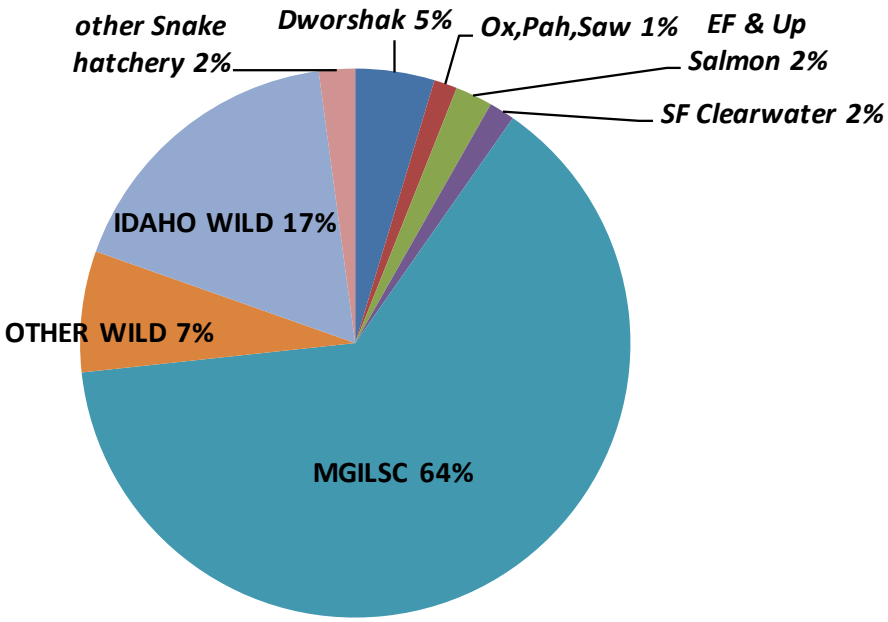


Figure 21. Stock composition of unclipped steelhead in the tribal Zone 6 fishery from June 16 to November 16, 2014. Hatchery stocks are shown with an italic font. OX = Oxbow, Pah = Pahsimeroi, Saw= Sawtooth.

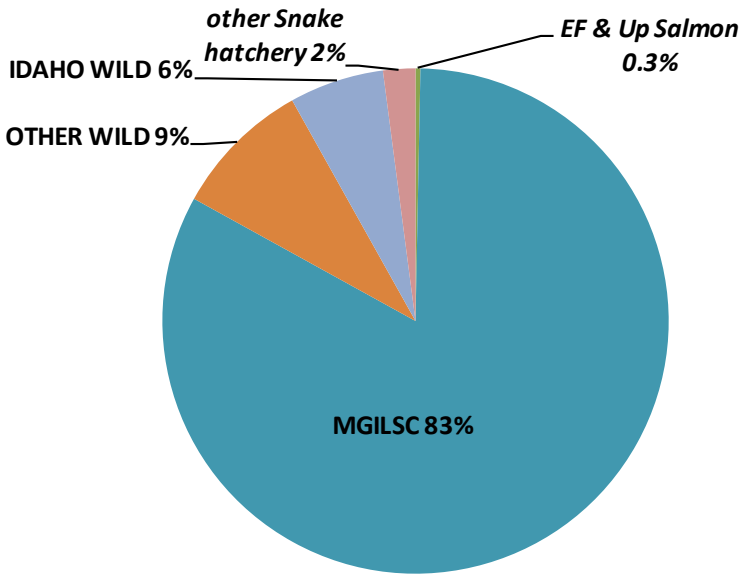


Figure 22. Stock composition of unclipped steelhead in the tribal Zone 6 fishery during the summer management period from June 16 to July 31, 2014. Hatchery stocks are shown using an italic font.

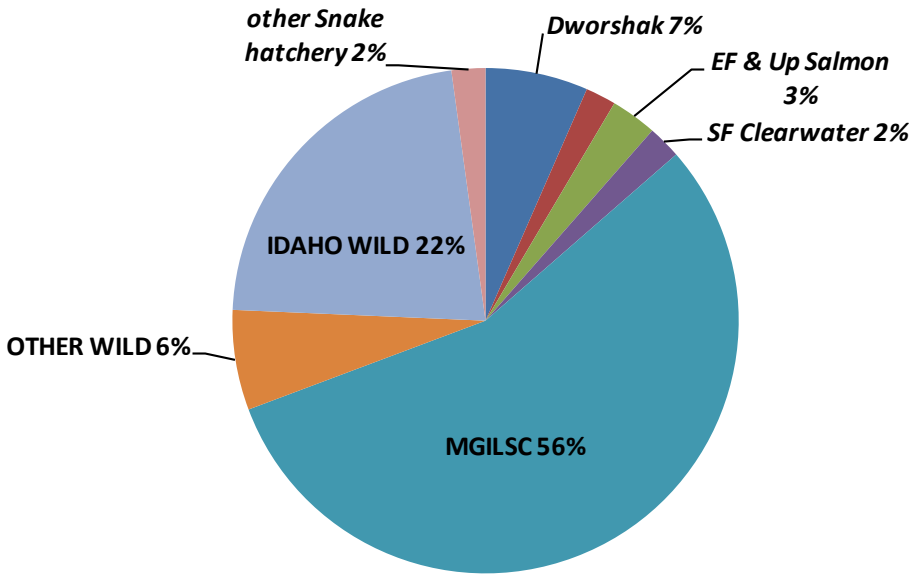


Figure 23. Stock composition of unclipped steelhead in the tribal Zone 6 fishery during the fall management period from August 1 to November 16, 2014. Hatchery stocks are shown using an italic font.

## APPENDIX A

This section summarizes harvest in the lower Columbia River sport fishery total harvest and harvest of large fish ≥78 cm (Group B) from 2011 to 2014.

Table A. 1 The estimated harvest by hatchery stock (all release groups and BYs combined) in the lower Columbia sport fishery from 2011 to 2014. The 2011 and 2012 estimates were for July 1 to October 31. The 2013 and 2014 estimates were from June 16 to October 31.

| | Harvest | | | | Percent of harvest | | | |
|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **2011** | **2012** | **2013** | **2014** | **2011** | **2012** | **2013** | **2014** |
| Dworshak | 1,289 | 600 | 236 | 418 | 6% | 4% | 2% | 3% |
| Imnaha | 448 | 197 | 502 | 338 | 2% | 1% | 4% | 3% |
| Lyons Ferry | 1,469 | 964 | 887 | 1038 | 7% | 6% | 8% | 8% |
| Oxbow | 3,129 | 2,720 | 771 | 973 | 15% | 17% | 7% | 7% |
| Pahsimeroi | 5,454 | 2,581 | 2,351 | 2,025 | 26% | 16% | 21% | 15% |
| Sawtooth | 2,953 | 2,200 | 1,610 | 1,317 | 14% | 14% | 14% | 10% |
| SF Clearwater | na | na | na | 28 | na | na | na | 0.2% |
| Wallowa | 1,272 | 1,662 | 1,275 | 1,700 | 6% | 10% | 11% | 13% |
| Upper & EF Salmon | 19 | 19 | 11 | 0 | 0.1% | 0.1% | 0.1% | 0.0% |
| Touchet | 0 | 22 | 16 | 0 | 0.0% | 0.0% | 0.1% | 0.0% |
| ***All Snake River*** | ***16,033*** | ***10,965*** | ***7,659*** | ***7,837*** | ***78%*** | ***69%*** | ***68%*** | ***59%*** |
| Other | 4,569 | 4,958 | 3,553 | 5,499 | 22% | 31% | 32% | 41% |
| ***Total*** | ***20,602*** | ***15,923*** | ***11,212*** | ***13,336*** | | | | |

Table A. 2. The estimated summer steelhead sport harvest from June 1 to September 30 in the Cowlitz, Kalama, and Lewis basins, 2011 to 2014.

| **River** | **2011** | **2012** | **2013** | **2014** |
|---|---|---|---|---|
| Cowlitz River | 8,524 | 9,777 | 5,757 | 15,615 |
| Kalama River | 2,255 | 1,920 | 765 | 2,361 |
| Lewis River | 3,977 | 3,560 | 2,180 | 4,037 |
| **Total** | **14,756** | **15,257** | **8,702** | **22,013** |

Table A. 3. The estimated harvest of large steelhead (Group B, ≥78 cm) by hatchery stock (all release groups and BYs combined) in the lower Columbia sport fishery from 2011 to 2014. Harvest was estimated by multiplying the percent of the total large samples from each stock by the harvest estimate. The 2011 and 2012 estimates were for July 1 to October 31. The 2013 and 2014 estimates were from June 16 to October 31. na = not applicable.

| | Harvest of large fish | | | | Percent of large harvest | | | |
|---|---|---|---|---|---|---|---|---|
| **Hatchery stock** | **2011** | **2012** | **2013** | **2014** | **2011** | **2012** | **2013** | **2014** |
| Dworshak | 786 | 500 | 75 | 234 | 67.8% | 32.1% | 20.9% | 31.3% |
| Imnaha | 0 | 0 | 0 | 12 | 0.0% | 0.0% | 0.0% | 1.6% |
| Lyons Ferry | 0 | 19 | 11 | 24 | 0.0% | 1.2% | 3.1% | 3.2% |
| Oxbow | 21 | 218 | 0 | 52 | 1.8% | 14.0% | 0.0% | 7.0% |
| Pahsimeroi | 59 | 40 | 13 | 13 | 5.1% | 2.6% | 3.6% | 1.7% |
| Sawtooth | 0 | 39 | 11 | 0 | 0.0% | 2.5% | 3.1% | 0.0% |
| SF Clearwater | na | na | na | 28 | na | na | na | 3.7% |
| Touchet | 0 | 0 | 0 | 0 | 0.0% | 0.0% | 0.0% | 0.0% |
| Tucannon | 0 | 0 | 0 | 0 | 0.0% | 0.0% | 0.0% | 0.0% |
| Upper & EF Salmon | 19 | 19 | 0 | 0 | 1.6% | 1.2% | 0.0% | 0.0% |
| Wallowa | 0 | 124 | 11 | 24 | 0.0% | 8.0% | 3.1% | 3.2% |
| Other | 274 | 599 | 238 | 361 | 23.6% | 38.4% | 66.3% | 48.3% |
| ***Snake River total*** | ***885*** | ***959*** | ***121*** | ***387*** | ***76.4%*** | ***61.6%*** | ***33.7%*** | ***51.7%*** |
| **Total large harvest** | **1,159** | **1,558** | **359** | **748** | | | | |

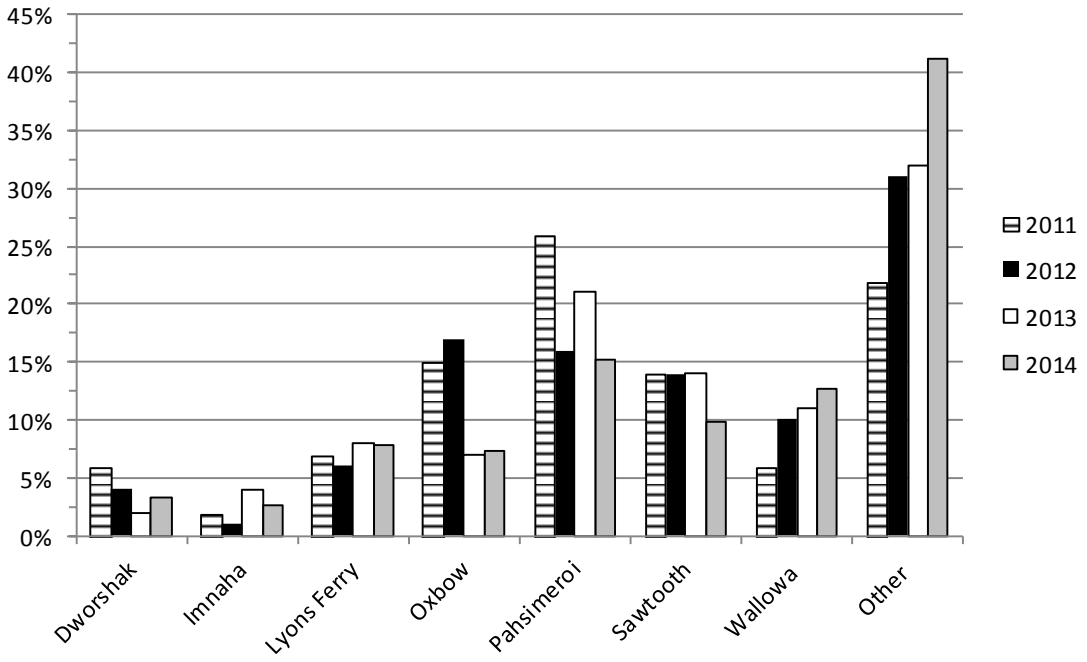


Figure A.1. The percent of the total harvest by hatchery stock in the lower Columbia River sport fishery from 2011 to 2014.

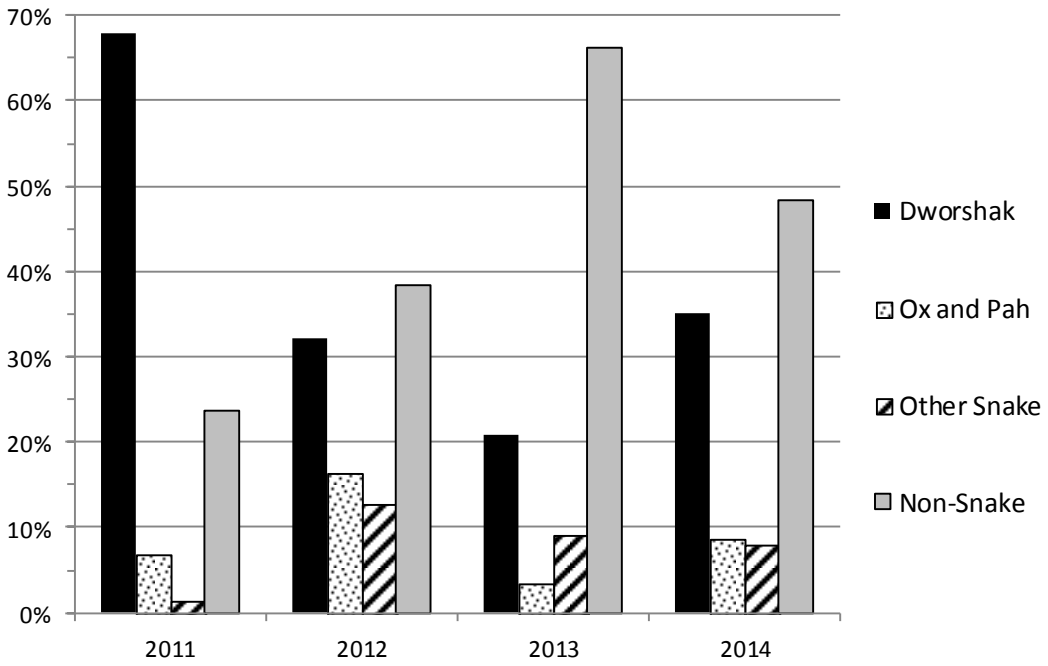


Figure A. 2. The percentage of large fish (≥78 cm) in the lower Columbia River sport harvest by hatchery stock from 2011 to 2014. Ox = Oxbow, Pah = Pahsimeroi.

## APPENDIX B

The tribal Zone 6 harvest in 2011 and 2012 was estimated from August 1 to the end of the fishing season. In 2013 and 2014 tribal harvest was estimated from June 16 to the end of the fishing season.

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 2014. The percent of the total steelhead harvest that occurred during the summer period is also shown.

| | Summer Period | | | | Fall Period | | | Total Harvest |
|---|---|---|---|---|---|---|---|---|
| Year | Clip | Unclip | Total | Percent | Clip | Unclip | 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** |
| 2014 | 5,245 | 3,543 | 8,788 | 26.0% | 14,897 | 10,564 | 25,461 | **34,249** |

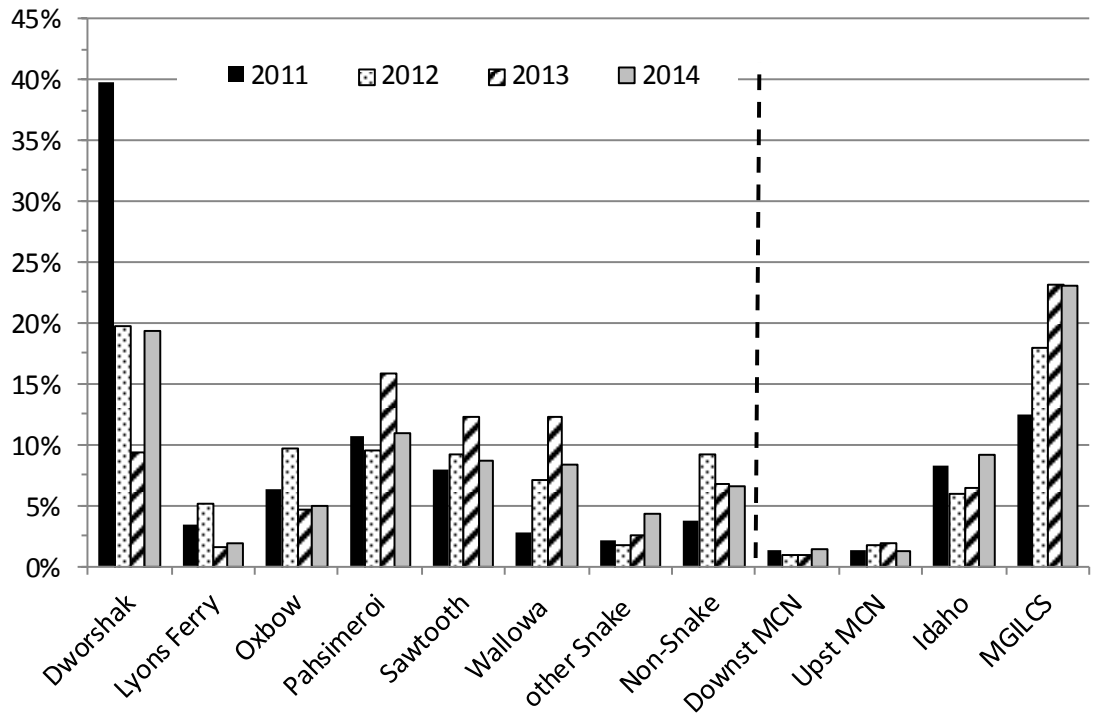


Figure B. 1. The percent of the total harvest (clipped and unclipped) by hatchery stock and GSI reporting groups in the tribal Zone 6 fishery from 2011 to 2014. Groups to the left of the dashed line are hatchery stocks and groups to the right of the dashed line are GSI reporting groups.

Table B. 2 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 2014. The harvest estimates for 2011 and 2012 were from August 1 to the end of the fishing season. The 2013 and 2014 estimates were from June 16 to the end of the season.

| | 2011 Harvest | | | 2012 Harvest | | | 2013 Harvest | | | 2014 Harvest | | | Percent of total harvest | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **2011** | **2012** | **2013** | **2014** |
| **Hatchery stocks** | | | | | | | | | | | | | | | | |
| Dworshak | 8,875 | 2,081 | 10,956 | 2,322 | 708 | 3,030 | 1,392 | 348 | 1,740 | 4,161 | 656 | 5,072 | 39.8% | 19.9% | 7.8% | 14.8% |
| Imnaha | 183 | 0 | 183 | 86 | 39 | 125 | 256 | 30 | 286 | 589 | 0 | 589 | 0.7% | 0.8% | 1.3% | 1.7% |
| Lyons Ferry | 939 | 0 | 939 | 784 | 18 | 802 | 775 | 14 | 789 | 1,683 | 0 | 1,683 | 3.4% | 5.3% | 3.5% | 4.9% |
| Oxbow | 1,703 | 49 | 1,752 | 1,415 | 90 | 1,505 | 916 | 15 | 931 | 1,600 | 29 | 1,629 | 6.4% | 9.9% | 4.1% | 4.8% |
| Pahsimeroi | 2,753 | 167 | 2,920 | 1,340 | 137 | 1,477 | 3,063 | 68 | 3,131 | 3,273 | 44 | 3,317 | 10.6% | 9.7% | 13.9% | 9.7% |
| Sawtooth | 1,814 | 361 | 2,175 | 1,273 | 151 | 1,424 | 2,372 | 157 | 2,529 | 2,409 | 121 | 2,530 | 7.9% | 9.4% | 11.3% | 7.4% |
| SF Clearwater | | | | | | | | | | 42 | 213 | 255 | | | | 0.7% |
| Touchet | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 14 | 27 | 0 | 72 | 72 | 0.0% | 0.0% | 0.1% | 0.2% |
| Tucannon | 0 | 49 | 49 | 0 | 88 | 88 | 0 | 41 | 41 | 0 | 132 | 132 | 0.2% | 0.6% | 0.2% | 0.4% |
| Wallowa | 772 | 0 | 772 | 1,061 | 58 | 1,119 | 2,530 | 73 | 2,603 | 2,705 | 94 | 2,799 | 2.8% | 7.4% | 11.6% | 8.2% |
| Upper & EF Salmon | 156 | 201 | 357 | 12 | 64 | 76 | 13 | 217 | 230 | 0 | 307 | 307 | 1.3% | 0.5% | 1.0% | 0.9% |
| Other Hatchery | 1,009 | -- | 1,009 | 1,425 | -- | 1,425 | 2,178 | -- | 2,178 | 3,680 | -- | 3,680 | 3.7% | 9.4% | 9.7% | 10.7% |
| **GSI reporting group** | | | | | | | | | | | | | | | | |
| BWSALM | | 14 | 14 | | 35 | 35 | | 14 | 14 | | 13 | 13 | 0.1% | 0.2% | 0.1% | 0.0% |
| KLICKR | | 215 | 215 | | 62 | 62 | | 185 | 185 | | 342 | 342 | 0.8% | 0.4% | 0.8% | 1.0% |
| LOWCOL | | 43 | 43 | | 0 | 0 | | 0 | 0 | | 66 | 66 | 0.2% | 0.0% | 0.0% | 0.2% |
| MFSALM | | 287 | 287 | | 167 | 167 | | 228 | 228 | | 553 | 553 | 1.0% | 1.1% | 1.0% | 1.6% |
| MGILCS | | 3,417 | 3,417 | | 2,747 | 2,747 | | 5,662 | 5,662 | | 8,971 | 8,970 | 12.4% | 18.1% | 25.2% | 26.2% |
| SFCLWR | | 616 | 616 | | 141 | 141 | | 135 | 135 | | 368 | 368 | 2.2% | 0.9% | 0.6% | 1.1% |
| SFSALM | | 416 | 416 | | 108 | 108 | | 85 | 85 | | 250 | 250 | 1.5% | 0.7% | 0.4% | 0.7% |
| SKAMAN | | 72 | 72 | | 70 | 70 | | 71 | 71 | | 39 | 39 | 0.3% | 0.5% | 0.3% | 0.1% |
| UPCLWR | | 504 | 504 | | 249 | 249 | | 142 | 142 | | 579 | 579 | 1.8% | 1.6% | 0.6% | 1.7% |
| UPPCOL | | 327 | 327 | | 232 | 232 | | 522 | 522 | | 348 | 348 | 1.2% | 1.5% | 2.3% | 1.0% |
| UPSALM | | 433 | 433 | | 267 | 267 | | 760 | 760 | | 713 | 713 | 1.6% | 1.8% | 3.4% | 2.1% |
| YAKIMA | | 43 | 43 | | 62 | 62 | | 157 | 157 | | 197 | 197 | 0.2% | 0.4% | 0.7% | 0.6% |
| ***Snake R hatchery*** | ***17,195*** | ***2,908*** | ***20,103*** | ***8,293*** | ***1,353*** | ***9,646*** | ***11,330*** | ***977*** | ***12,307*** | ***16,311*** | ***1,668*** | ***18,130*** | ***73.1%*** | ***63.4%*** | ***54.8%*** | ***53.5%*** |
| **Total Hatchery** | **18,204** | | **21,112** | **9,718** | | **11,071** | **13,508** | | **14,485** | **20,142** | | **21,810** | **76.8%** | **72.8%** | **64.5%** | ***64.4%*** |
| ***GSI total:*** | ***0*** | ***6,387*** | ***6,387*** | ***0*** | ***4,140*** | ***4,140*** | ***0*** | ***7,961*** | ***7,961*** | ***0*** | ***12,439*** | ***12,439*** | ***23.2%*** | ***27.2%*** | ***35.5%*** | ***36.7%*** |
| **Grand total:** | **18,204** | **9,295** | **27,499** | **9,718** | **5,493** | **15,211** | **13,508** | **8,938** | **22,446** | **20,142** | **14,107** | **34,249** | | | | |

Table B. 3 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 2014 during the Fall management period (August 1 to end of season).

| | 2011 Harvest | | | 2012 Harvest | | | 2013 | | | 2014 | | | Percent of total harvest | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **2011** | **2012** | **2013** | **2014** |
| **Hatchery stocks** | | | | | | | | | | | | | | | | |
| Dworshak | 8,875 | 2,081 | 10,956 | 2,322 | 708 | 3,030 | 1,279 | 359 | 1,638 | 4,236 | 693 | 4,929 | 39.8% | 19.9% | 9.6% | 19.4% |
| Imnaha | 183 | 0 | 183 | 86 | 39 | 125 | 172 | 31 | 203 | 379 | 0 | 379 | 0.7% | 0.8% | 1.2% | 1.5% |
| Lyons Ferry | 939 | 0 | 939 | 784 | 18 | 802 | 307 | 0 | 307 | 481 | 0 | 481 | 3.4% | 5.3% | 1.8% | 1.9% |
| Oxbow | 1,703 | 49 | 1,752 | 1,415 | 90 | 1,505 | 815 | 16 | 831 | 1,219 | 30 | 1,249 | 6.4% | 9.9% | 4.9% | 4.9% |
| Pahsimeroi | 2,753 | 167 | 2,920 | 1,340 | 137 | 1,477 | 2,652 | 71 | 2,723 | 2,743 | 46 | 2,789 | 10.6% | 9.7% | 15.9% | 11.0% |
| Sawtooth | 1,814 | 361 | 2,175 | 1,273 | 151 | 1,424 | 1,970 | 148 | 2,118 | 2,094 | 129 | 2,223 | 7.9% | 9.4% | 12.4% | 8.7% |
| SF Clearwater | -- | -- | -- | -- | -- | -- | -- | -- | - | 43 | 225 | 268 | - | - | - | 1.1% |
| Touchet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 | 0 | 64 | 64 | 0.0% | 0.0% | 0.1% | 0.3% |
| Tucannon | 0 | 49 | 49 | 0 | 88 | 88 | 0 | 42 | 42 | 0 | 79 | 79 | 0.2% | 0.6% | 0.2% | 0.3% |
| Wallowa | 772 | 0 | 772 | 1,061 | 58 | 1,119 | 2,048 | 75 | 2,123 | 2,047 | 85 | 2,132 | 2.8% | 7.4% | 12.4% | 8.4% |
| Upper & EF Salmon | 156 | 201 | 357 | 12 | 64 | 76 | 12 | 209 | 221 | 0 | 312 | 312 | 1.3% | 0.5% | 1.3% | 1.2% |
| Other Hatchery | 1,009 | -- | 1,009 | 1,425 | -- | 1,425 | 1,190 | -- | 1,190 | 1,655 | -- | 1,655 | 3.7% | 9.4% | 7.0% | 6.5% |
| **GSI reporting group** | | | | | | | | | | | | | 0.0% | 0.0% | 0.0% | 0.0% |
| BWSALM | | 14 | 14 | | 35 | 35 | | 15 | 15 | | 0 | 0 | 0.1% | 0.2% | 0.1% | 0.0% |
| KLICKR | | 215 | 215 | | 62 | 62 | | 132 | 132 | | 292 | 292 | 0.8% | 0.4% | 0.8% | 1.1% |
| LOWCOL | | 43 | 43 | | 0 | 0 | | 0 | 0 | | 56 | 56 | 0.2% | 0.0% | 0.0% | 0.2% |
| MFSALM | | 287 | 287 | | 167 | 167 | | 206 | 206 | | 500 | 500 | 1.0% | 1.1% | 1.2% | 2.0% |
| MGILCS | | 3,417 | 3,417 | | 2,747 | 2,747 | | 3,965 | 3,965 | | 5,884 | 5,884 | 12.4% | 18.1% | 23.2% | 23.1% |
| SFCLWR | | 616 | 616 | | 141 | 141 | | 139 | 139 | | 391 | 391 | 2.2% | 0.9% | 0.8% | 1.5% |
| SFSALM | | 416 | 416 | | 108 | 108 | | 88 | 88 | | 264 | 264 | 1.5% | 0.7% | 0.5% | 1.0% |
| SKAMAN | | 72 | 72 | | 70 | 70 | | 44 | 44 | | 28 | 28 | 0.3% | 0.5% | 0.3% | 0.1% |
| UPCLWR | | 504 | 504 | | 249 | 249 | | 146 | 146 | | 597 | 597 | 1.8% | 1.6% | 0.9% | 2.3% |
| UPPCOL | | 327 | 327 | | 232 | 232 | | 275 | 275 | | 218 | 218 | 1.2% | 1.5% | 1.6% | 0.9% |
| UPSALM | | 433 | 433 | | 267 | 267 | | 564 | 564 | | 588 | 588 | 1.6% | 1.8% | 3.3% | 2.3% |
| YAKIMA | | 43 | 43 | | 62 | 62 | | 88 | 88 | | 83 | 83 | 0.2% | 0.4% | 0.5% | 0.3% |
| ***Snake R hatchery*** | ***17,195*** | ***2,908*** | ***20,103*** | ***8,293*** | ***1,353*** | ***9,646*** | ***9,255*** | ***966*** | ***10,221*** | ***13,242*** | ***1,663*** | ***14,905*** | ***73.1%*** | ***63.4%*** | ***59.9%*** | ***58.5%*** |
| **Total Hatchery** | **18,204** | **2,908** | **21,112** | **9,718** | **1,353** | **11,071** | **10,445** | ***966*** | **11,411** | **14,897** | **1,663** | **16,560** | **76.8%** | **72.8%** | **66.8%** | **65.0%** |
| ***GSI total:*** | ***0*** | ***6,387*** | ***6,387*** | ***0*** | ***4,140*** | ***4,140*** | ***0*** | ***5,663*** | ***5,663*** | ***0*** | ***8,901*** | ***8,901*** | ***23.2%*** | ***27.2%*** | ***33.2%*** | ***35.0%*** |
| **Grand total:** | **18,204** | **9,295** | **27,499** | **9,718** | **5,493** | **15,211** | **10,445** | **6,629** | **17,074** | **14,897** | **10,564** | **25,461** | | | | |

Table B. 4. The harvest of large steelhead (Group "B", ≥78 m) by hatchery stock and GSI reporting group in the Tribal Zone 6 fall fishery from 2011 to 2014. Harvest of large steelhead (Group B) was estimated by multiplying the percent of the total large samples from each stock by the harvest estimate (clip and unclip done separately). na = not applicable.

| | 2011 Large Harvest | | | 2012 Large Harvest | | | 2013 Large Harvest | | | 2014 Large Harvest | | | Percent of total large harvest | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **Clip** | **Unclip** | **Total** | **2011** | **2012** | **2013** | **2014** |
| **Hatchery stocks** | | | | | | | | | | | | | | | | |
| Dworshak | 5,739 | 905 | 6,644 | 2,130 | 582 | 2,712 | 829 | 287 | 1,116 | 3,769 | 638 | 4,407 | 76.3% | 66.2% | 69.1% | 63.3% |
| Imnaha | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0.0% | 0.0% | 0.2% | 0.0% |
| Lyons Ferry | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 11 | 47 | 0 | 47 | 0.0% | 0.0% | 0.7% | 0.7% |
| Oxbow | 35 | 14 | 49 | 102 | 0 | 102 | 5 | 0 | 5 | 104 | 0 | 104 | 0.6% | 2.5% | 0.3% | 1.5% |
| Pahsimeroi | 12 | 0 | 12 | 93 | 0 | 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1% | 2.3% | 0.0% | 0.0% |
| Sawtooth | 11 | 0 | 11 | 36 | 0 | 36 | 2 | 0 | 2 | 15 | 0 | 15 | 0.1% | 0.9% | 0.1% | 0.2% |
| SF Clearwater | na | na | na | na | na | na | na | na | na | 43 | 167 | 210 | na | na | na | 3.0% |
| Touchet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% | 0.0% | 0.0% | 0.0% |
| Tucannon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% | 0.0% | 0.0% | 0.0% |
| Upper & EF Salmon | 66 | 0 | 66 | 18 | 0 | 18 | 0 | 32 | 32 | 0 | 14 | 14 | 0.8% | 0.4% | 2.0% | 0.2% |
| Wallowa | 10 | 0 | 10 | 37 | 0 | 37 | 0 | 0 | 0 | 14 | 0 | 14 | 0.1% | 0.9% | 0.0% | 0.2% |
| Other | 0 | na | 0 | 82 | na | 82 | 92 | na | 92 | 246 | na | 246 | 0.0% | 2.0% | 5.7% | 3.5% |
| **GSI reporting group** | | | | | | | | | | | | | | | | |
| BWSALM | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | 0.0% | 0.0% | 0.0% | 0.0% |
| KLICKR | | 57 | 57 | | 0 | 0 | | 16 | 16 | | 14 | 14 | 0.7% | 0.0% | 1.0% | 0.2% |
| LOWCOL | | 14 | 14 | | 0 | 0 | | 0 | 0 | | 0 | 0 | 0.2% | 0.0% | 0.0% | 0.0% |
| MFSALM | | 100 | 100 | | 30 | 30 | | 48 | 48 | | 167 | 167 | 1.1% | 0.7% | 3.0% | 2.4% |
| MGILCS | | 330 | 330 | | 383 | 383 | | 112 | 112 | | 611 | 611 | 3.8% | 9.3% | 6.9% | 8.8% |
| SFCLWR | | 846 | 846 | | 196 | 196 | | 48 | 48 | | 361 | 361 | 9.7% | 4.8% | 3.0% | 5.2% |
| SFSALM | | 273 | 273 | | 91 | 91 | | 32 | 32 | | 195 | 195 | 3.1% | 2.2% | 2.0% | 2.8% |
| SKAMAN | | 0 | 0 | | 0 | 0 | | 16 | 16 | | 0 | 0 | 0.0% | 0.0% | 1.0% | 0.0% |
| UPCLWR | | 229 | 229 | | 272 | 272 | | 48 | 48 | | 459 | 459 | 2.6% | 6.6% | 3.0% | 6.6% |
| UPPCOL | | 29 | 29 | | 45 | 45 | | 16 | 16 | | 56 | 56 | 0.3% | 1.1% | 1.0% | 0.8% |
| UPSALM | | 43 | 43 | | 0 | 0 | | 16 | 16 | | 42 | 42 | 0.5% | 0.0% | 1.0% | 0.6% |
| YAKIMA | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | 0.0% | 0.0% | 0.0% | 0.0% |
| ***Idaho GSI groups*** | | ***1,491*** | ***1,491*** | | ***589*** | ***589*** | | ***192*** | ***192*** | | ***1,224*** | ***1,224*** | ***17.1%*** | ***14.4%*** | ***11.9%*** | ***17.6%*** |
| **GSI total** | | ***1,921*** | ***1,921*** | | ***1,017*** | ***1,017*** | | ***352*** | ***352*** | | ***1,905*** | ***1,905*** | ***22.0%*** | ***24.8%*** | ***21.8%*** | ***27.4%*** |
| ***Snake River total*** | ***5,873*** | ***2,410*** | ***8,283*** | | ***1,171*** | ***3,587*** | | ***511*** | ***1,362*** | | ***2,043*** | ***6,035*** | ***95.1%*** | ***87.6%*** | ***84.4%*** | ***86.7%*** |
| **Total large harvest** | **5,873** | **2,840** | **8,713** | | **1,599** | **4,097** | | **671** | **1,614** | | **2,724** | **6,962** | | | | |

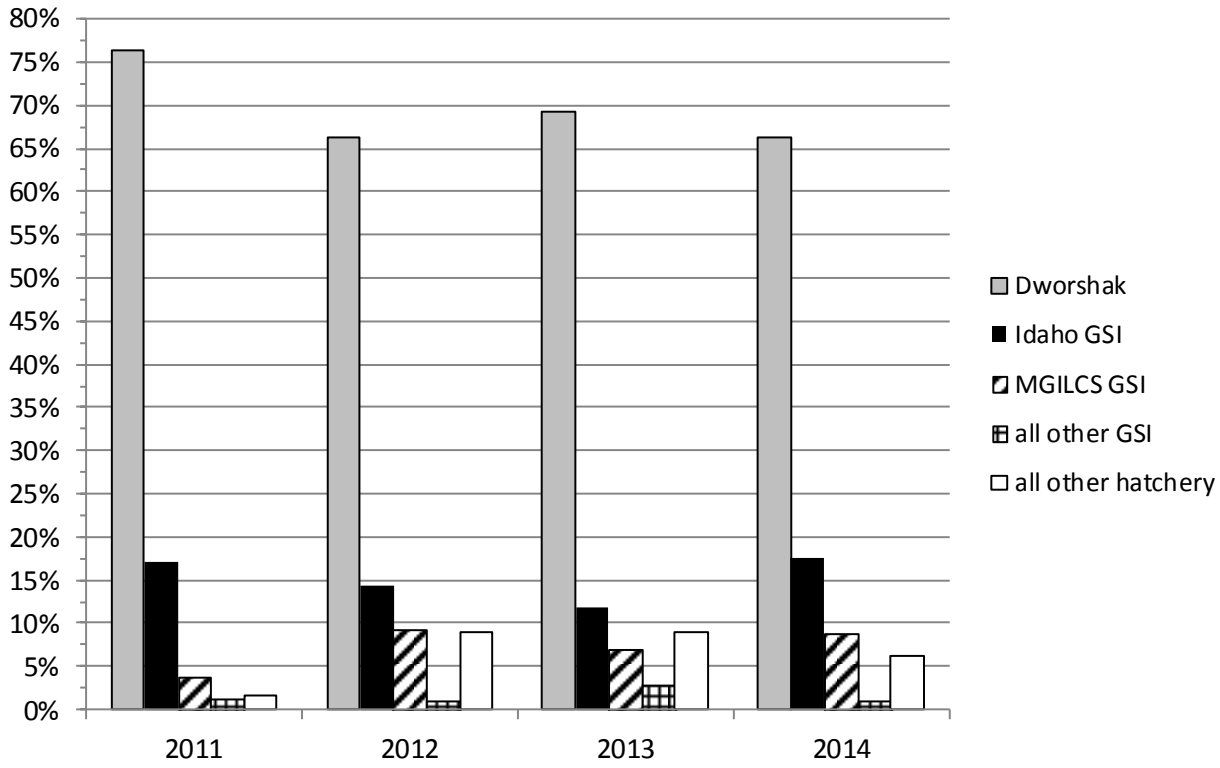


Figure B. 2 The percentage of large steelhead by hatchery stock and GSI reporting groups in the total tribal catch (clipped and unclipped) in the Zone 6 fall fishery from 2011 to 2014. The 2014 Dworshak value includes the SF Clearwater stock (3%).

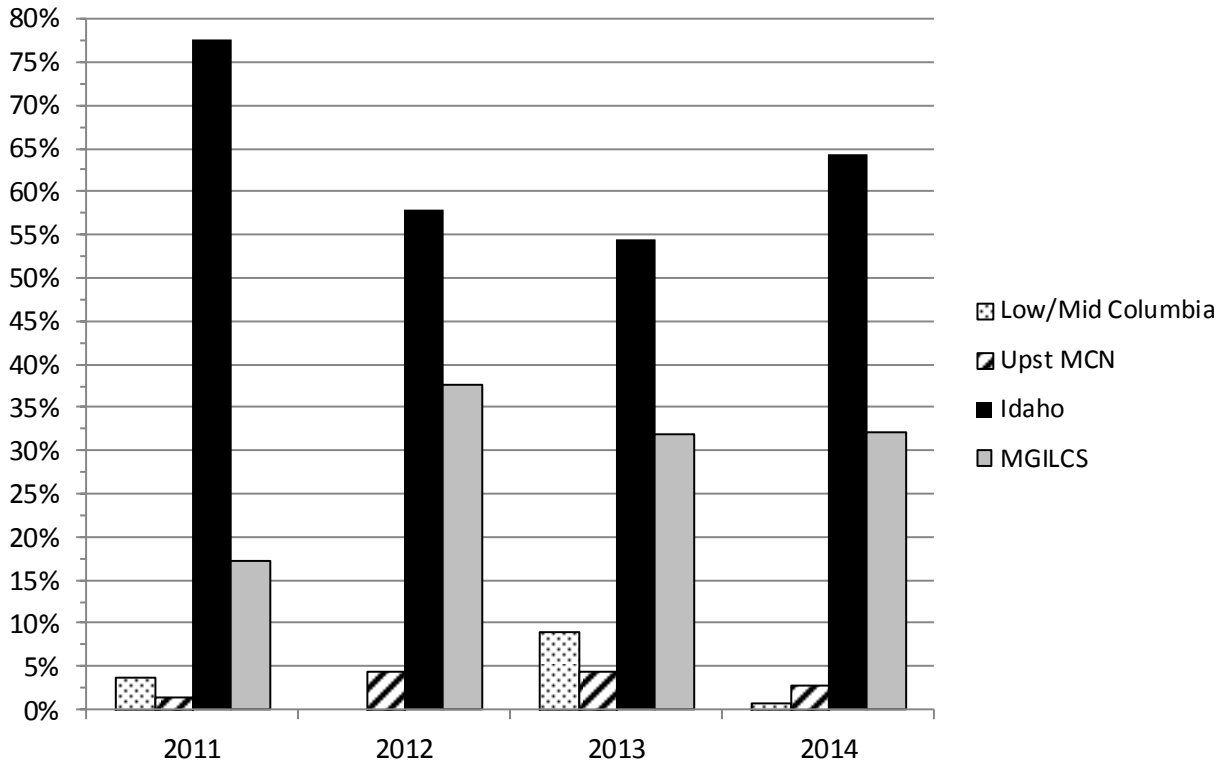


Figure B. 3 The percentage of large fish from the putative wild steelhead harvest (unclipped harvest after removing unclipped Snake River hatchery fish) in the tribal Zone 6 fall fisheries from 2011 to 2014. All Idaho GSI reporting groups only contain wild fish, whereas the other GSI groups may contain both wild and unclipped hatchery fish. The MGILCS reporting group includes rivers in Idaho.

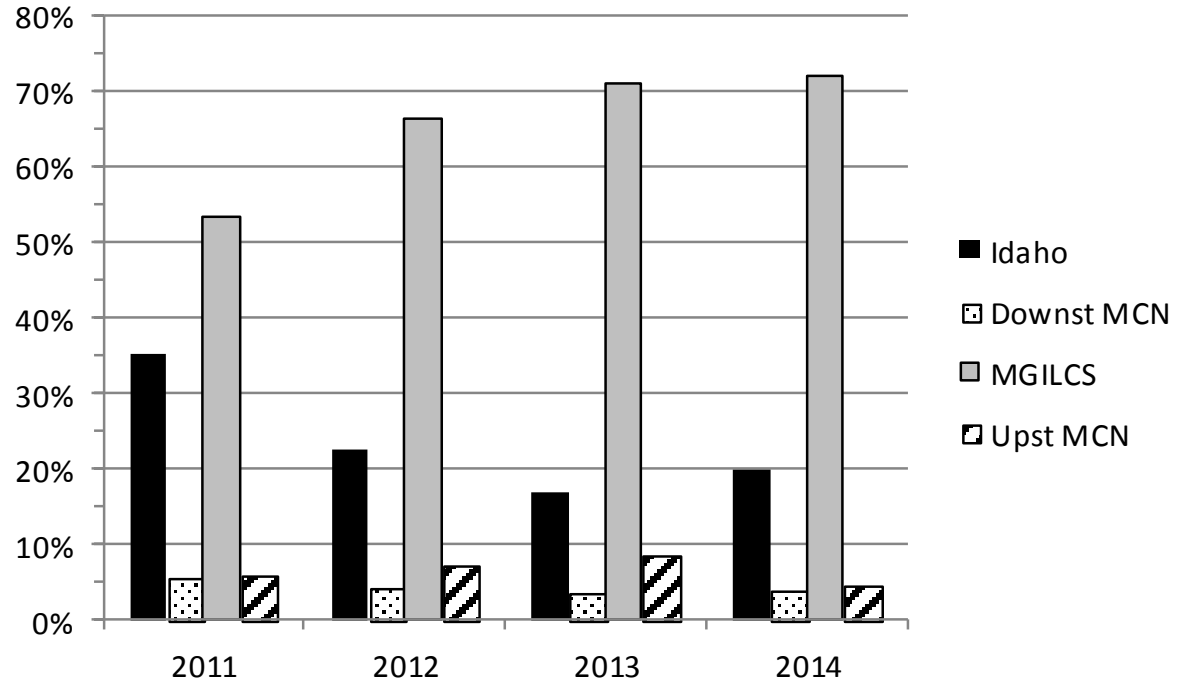


Figure B. 4 The percentage of the total harvest assigning to GSI reporting groups by GSI reporting groups. Idaho = all GSI groups in Idaho; Downst MCN = all GSI groups downstream of McNary Dam; Upst MCN = GSI groups upstream of McNary (except Snake River groups).

## APPENDIX C

Table C. 1. The estimated harvest by hatchery stock (all release groups and BYs combined) in the lower Snake River sport fishery from September 1 to March 31 of the following year. The 2012-13 harvest is from the mouth to Lower Granite Dam and all other years' the harvest is from the mouth to the Idaho/Washington border. The 2014-15 harvest estimates were based on preliminary data, other years were the final harvest estimates provided by WDFW.

| | Harvest | | | Percent of harvest | | |
|---|---|---|---|---|---|---|
| **Hatchery stock** | **2012-13[a]** | **2013-14** | **2014-15** | **2012-13** | **2013-14** | **2014-15** |
| Dworshak | 1,768 | 1,483 | 3,796 | 24% | 20% | 33% |
| Imnaha | 46 | 150 | 256 | 1% | 2% | 2% |
| Lyons Ferry | 2,713 | 3,204 | 3,745 | 37% | 42% | 33% |
| Oxbow | 347 | 325 | 252 | 5% | 4% | 2% |
| Pahsimeroi | 975 | 1,001 | 1,196 | 13% | 13% | 11% |
| Sawtooth | 702 | 590 | 835 | 10% | 8% | 7% |
| SF Clearwater | na | na | 92 | na | na | 1% |
| Wallowa | 661 | 502 | 801 | 9% | 7% | 7% |
| EF Salmon | 0 | 11 | 0 | 0% | 0.1% | 0% |
| Tucannon | 0 | 16 | 0 | 0% | 0.2% | 0% |
| Touchet | 0 | 0 | 16 | 0% | 0% | 0.1% |
| ***All Snake River*** | ***7,212*** | ***7,282*** | ***10,989*** | ***99%*** | **96%** | **97%** |
| Other | 56 | 276 | 340 | 1% | 4% | 3% |
| **Total harvest** | **7,268** | **7,558** | **11,329** | | | |
| 9/1 to 12/31 harvest | 5,681 | 6,389 | 8,823 | 78% | 84.5% | 78% |
| 1/1 to 3/31 harvest | 1,587 | 1,169 | 2,506 | 22% | 15.5% | 22% |

[a] A total of 9,153 steelhead were harvested from the mouth to the Idaho/Washington border.

## APPENDIX D

We calculated the percentage of fish from each group (for hatchery stocks, we combined all release groups and BYs) that were ≥78 cm each fishery. For the tribal fishery we calculated the value for the clipped harvest and the unclipped harvest separately in the fall management period only. For the lower Columbia River sport fishery we used the entire time period that we sampled the fishery. We then plotted the percentage of large harvest against the percentage of the total harvest for each group in the lower Columbia River sport fishery and the tribal fall management period Zone 6 fishery to generate Figures D.1 to D.4.

We compare the percentage of large clipped fish from the Non-Snake hatchery group in the sport and tribal fall period (clipped harvest only) fishery with the Dworshak stock included (Figure D.5) and excluded (Figure D.6).

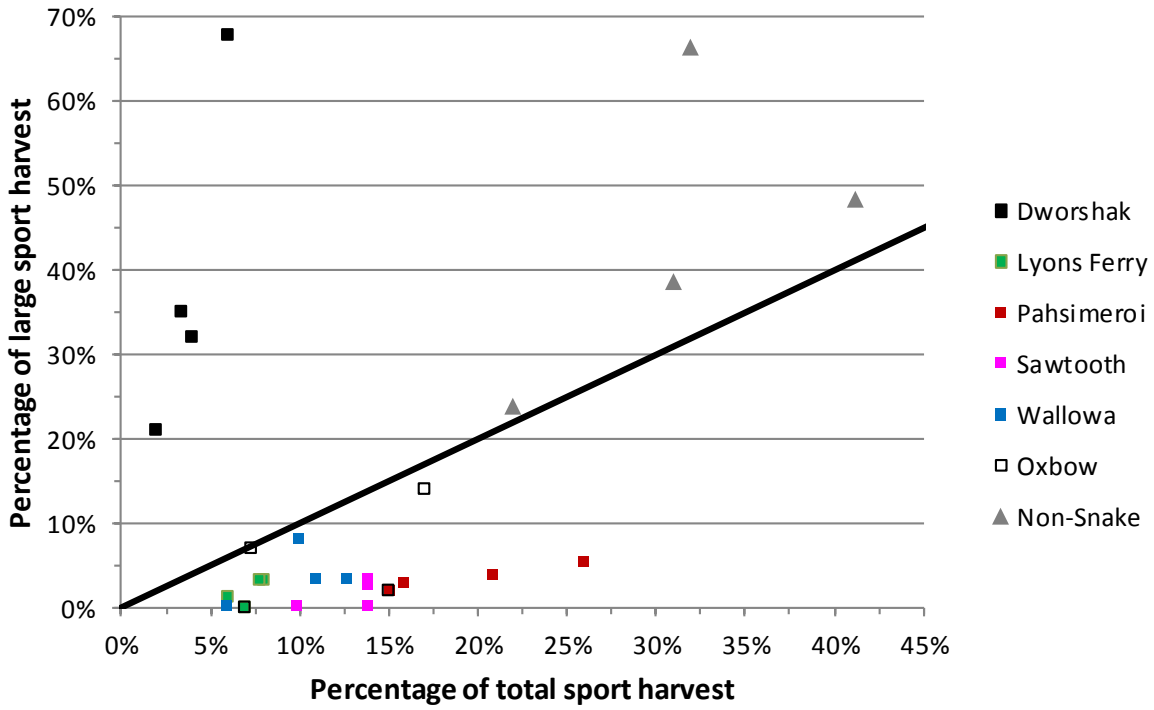


Figure D. 1. The percent contribution to the total harvest and large (≥78 cm or Group B) harvest in the lower Columbia River sport fishery by hatchery stock from 2011 to 2014. Each data point represents one year. The 2014 Dworshak value includes the SF Clearwater stock. The solid line is the 1:1 line; if data points are above this line then the percent of the large harvest from the stock exceeds the percent of that stock's contribution to the total harvest.

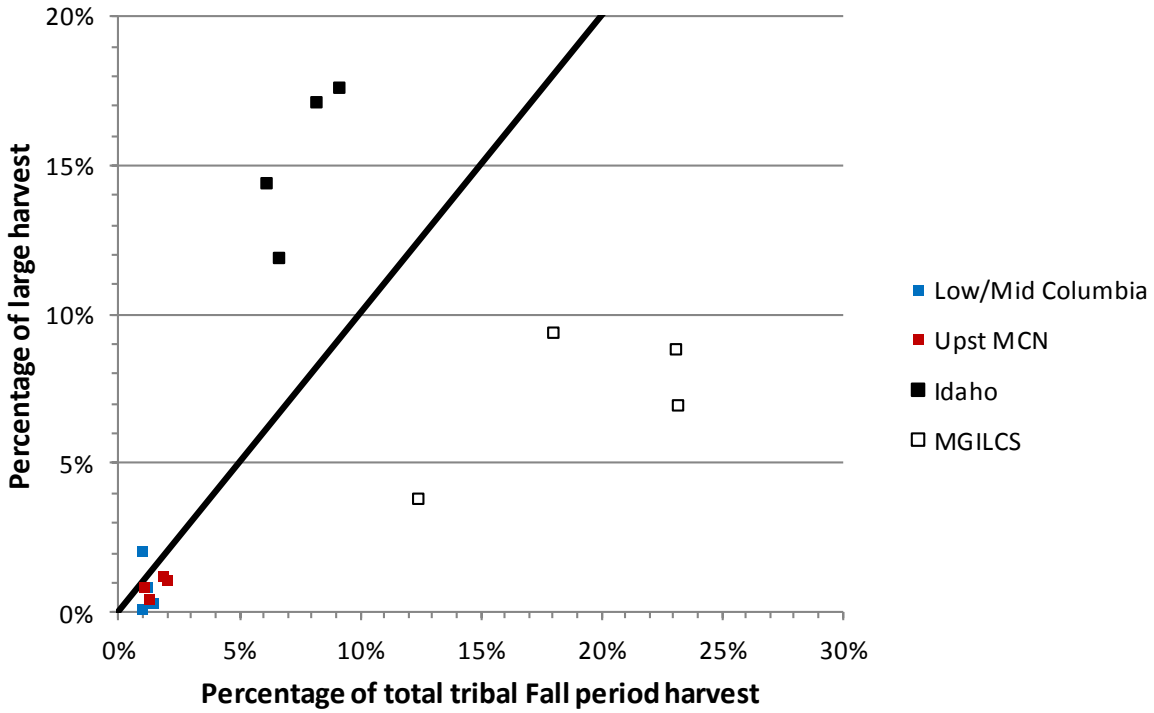


Figure D. 2 The percent contribution to the total harvest and large (≥78 cm or Group B) harvest in the tribal Zone 6 fall period fishery by GSI reporting group from 2011 to 2014. Each data point represents one year. The solid line is the 1:1 line; if data points are above this line then the percent of the large harvest from the group exceeds the percent of that group's contribution to the total harvest. Low/Mid Columbia includes BWSALM, KLICKR, LOWCOL, and SKAMAN; Upst MCN includes YAKIMA AND UPPCOL; Idaho includes MFSALM, SFCLWR, SFSALM, UPCLWR, and UPSALM.

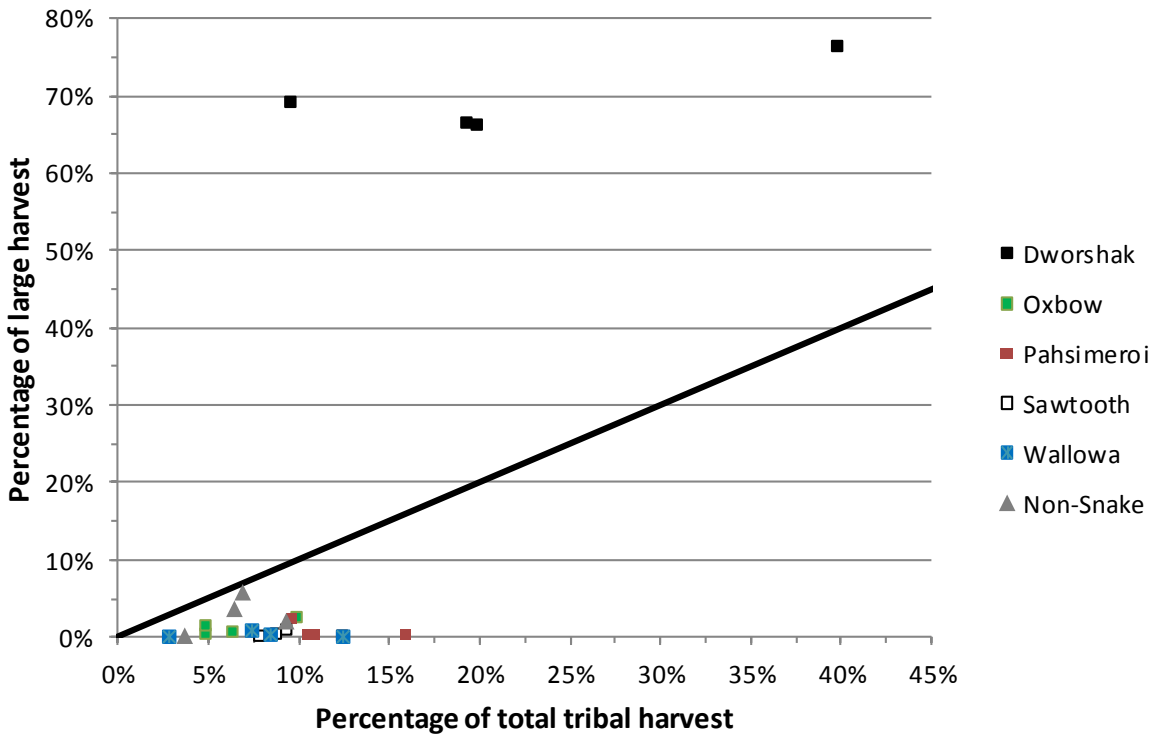


Figure D. 3. The percent contribution to the total harvest and large (≥78 cm or Group B) harvest in the tribal Zone 6 fall period fishery by hatchery stock from 2011 to 2014. Each data point represents one year. The 2014 Dworshak value includes the SF Clearwater stock. The solid line is the 1:1 line; if data points are above this line then the percent of the large harvest from the group exceeds the percent of that group's contribution to the total harvest.

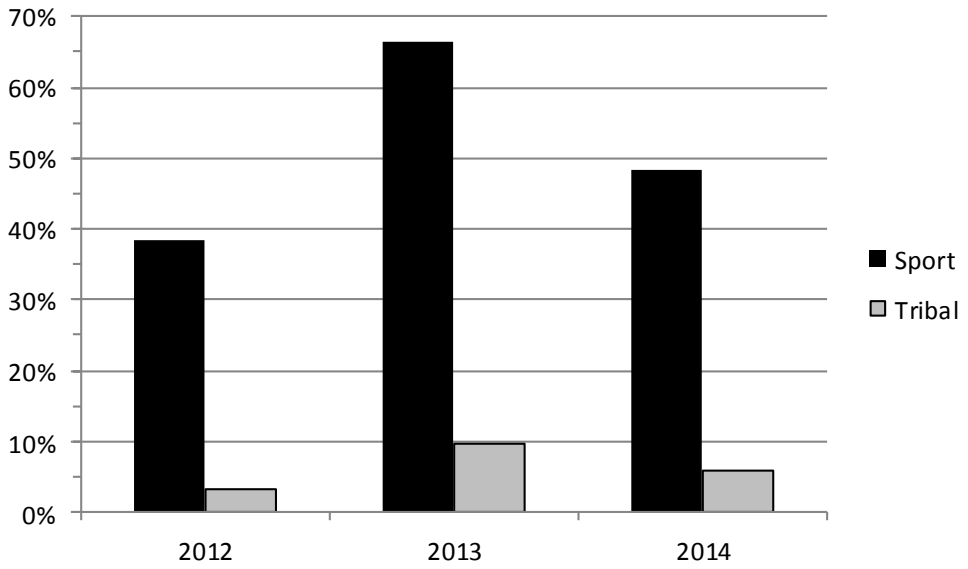


Figure D.4. The percentage of large fish from the non-Snake hatchery group (Other) in the lower Columbia River sport and the fall tribal Zone 6 clipped harvest. The harvest of Dworshak stock was included in both fisheries.

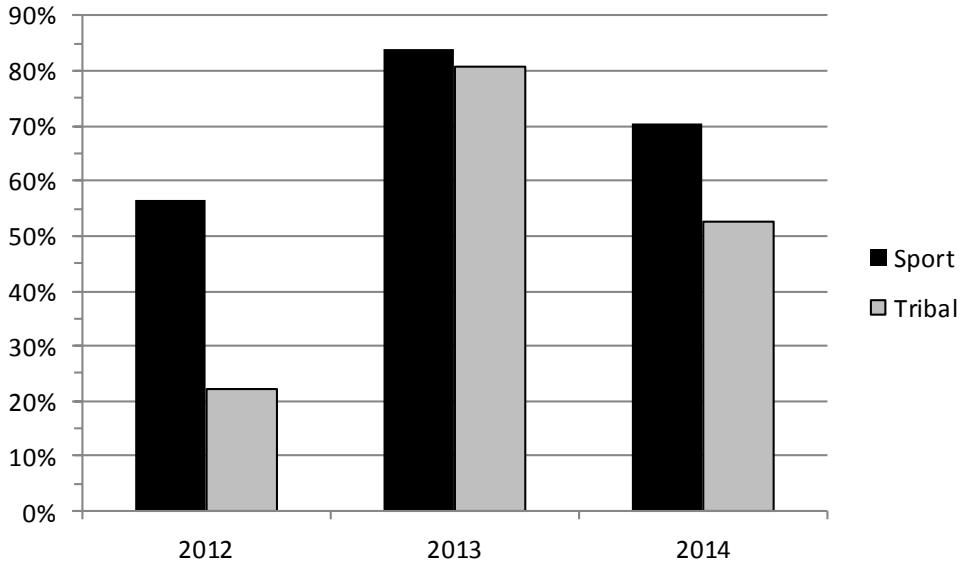


Figure D.5. The percentage of large fish from the non-Snake hatchery group (Other) in the lower Columbia River sport and the fall tribal Zone 6 clipped harvest. The harvest of Dworshak stock was excluded in both fisheries.

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