Results from the 2013 Fall Walleye Index Netting (FWIN) Surveys in Washington State

Washington Department of FISH and WILDLIFE

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Cover photos: Top, WDFW biologists retrieve a FWIN net. Bottom, WDFW biologists remove fish from FWIN net on Lake Roosevelt, Stevens County, WA. Inset, proud angler holds a Walleye caught under the ice.

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Introduction

Walleye *Sander vitreus* represents an important fishery resource in Washington and is an incredibly popular sport fish among recreational anglers. Since the 1980s there has been a growing demand for quality Walleye waters in Washington. Routine monitoring and evaluation of sport fisheries is essential in order to make effective and timely management decisions. One aspect of Walleye management is to maximize recreational opportunities for anglers while maintaining healthy, balanced fish communities. This includes recognizing when abundant harvest opportunities exist in Walleye fisheries and ensuring recreational anglers are made aware of these opportunities.

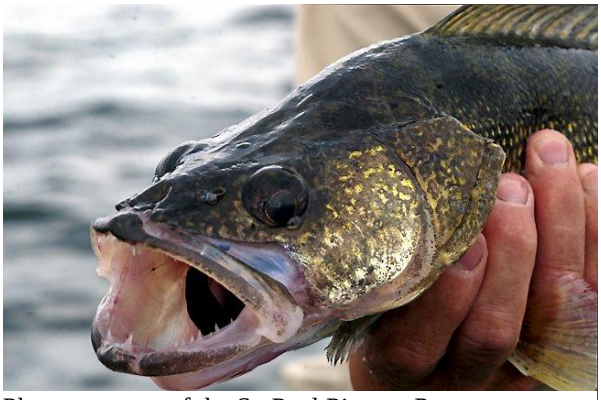
Photo courtesy of the St. Paul Pioneer Press

The Washington Department of Fish and Wildlife (WDFW) fisheries biologists began monitoring important Walleye populations in Washington in 2002 using the Fall Walleye Index Netting (FWIN) methodology (Morgan 2000). The FWIN methodology was developed in Ontario, Canada as a means of monitoring a wide variety of biological parameters in Walleye populations in a standardized fashion using gill nets.
This report summarizes our findings from the 2013 FWIN surveys in Washington and provides anglers with updates on popular fisheries on FWIN lakes in Washington.

Methods

We conduct FWIN surveys on five important Walleye lakes in eastern Washington: Lake Roosevelt (hereafter referred to as FDR) (*Stevens County*), Banks Lake, Moses Lake, Potholes Reservoir, (*Grant County*) and Scooteney Reservoir (*Franklin County*) annually (FIGURE 1). The FWIN surveys are conducted each fall when water temperatures are 50–59°F, a range at which Walleye are more equally distributed throughout lakes.

The number of nets set per lake was based on two factors: Lake surface area and the number of Walleye collected. The number of nets set during a FWIN survey influences the reliability of the catch-per-unit-effort (CPUE) statistic; therefore, the recommended number of net sets increases as a function of total lake acreage (TABLE 1). The status of Walleye populations, as determined from a detailed assessment of biological parameters, can often be assessed from a sample of 300 Walleye. We continued FWIN sampling until 300 Walleye were collected or the recommended number of net sets was achieved, whichever occurred first. For Moses Lake and Potholes Reservoir the 300 Walleye benchmark was achieved before the recommended number of nets were set. For Banks Lake and Scooteney Reservoir the recommended number of net sets was reached prior to collecting 300 Walleye. On FDR we set the recommended number of FWIN

nets despite having collected over 300 Walleye. This was necessary in order to make a detailed assessment of the Walleye population in this large reservoir.

Net set locations were randomly chosen in order to reduce sampling bias and each site was sampled once. Each FWIN net consisted of eight, 25 ft. x 6 ft. panels of differing mesh size (1, 1.5, 2, 2.5, 3, 4, 5 and 6 inch) sewn together in ascending order. The FWIN nets were set in either shallow (6–15 ft.), deep (15–45 ft.) or pelagic (45 + ft.) water, on the lake bottom, and soaked for 21–24 hours. The FWIN nets were set perpendicular to the shore from shallow to deep water and were set alternately with the small or large mesh end toward the shoreline. Nets were retrieved and returned to shore where fishes were removed, sorted and biological data were collected. Total length (mm) and weight (g) were recorded for each fish collected. Walleye were processed further and additional biological data collected included: sex, sexual maturity, gonad weight and visceral fat weight (for condition factor). Otoliths were removed from all Walleye for age determination. Sex and sexual maturity were determined by features described in Duffy et al. (2000).

Mean catch-per-unit-effort (CPUE ± 80% CI) was determined by calculating the mean number of Walleye collected per net and was a reliable index of Walleye abundance. The 80% confidence intervals were a measure of the precision of mean CPUE based on variation in the number of Walleye collected per net. Yearly CPUE data were compared to the long-term (2002–2013) mean CPUE for each lake.

Length frequency distribution was determined by enumerating the number of Walleye collected at each length category and expressing these values as a percent of the total. This distribution was compared with the previous year as well as the long-term average length frequency distribution and was used to determine the percent of harvestable Walleye in the population. In this document we refer to this as the percentage of fish at least 16 inches. We have found this to be the size at which anglers prefer to begin harvesting Walleye.

Walleye ages were determined from otoliths, which provide a precise age estimate. Otoliths are fish ear bones, which have growth rings analogous to growth rings in a tree. Age distribution was determined by enumerating the number of Walleye collected at each age-class and expressing these values as a percent of the total. This distribution was compared with the previous year as well as the long-term average age distribution.

Understanding the age at which the majority of fish in a population reach sexual maturity allows fisheries managers to set regulations to reduce harvest on juvenile fish. The percent of mature Walleye at a given age is an indication of how many of these fish will spawn in the following

year, not necessarily how many spawned the previous spring. Percent maturity was determined by calculating the percentage of male and female Walleye that were mature by fall at each year class. We are primarily interested in determining the age at which Walleye begin to mature and the age at which 50% of the Walleye of each sex are mature.

Length-at-age was determined by calculating the average length of Walleye at a given age. Comparisons were made to regional averages from northern and southern FWIN lakes. The northern lakes average is the regional length-at-age average for Walleye from FDR and Banks Lake from 2002–2013. Very few Walleye were collected above age-11 on either FDR or Banks Lake since 2002; therefore, length-at-age averages above age-11 from these lakes have inconsistent trends. Banks Lake and FDR are meso-oligotrophic reservoirs (Polacek 2013, McClellan et al. 1999). These lakes are characterized by moderately high transparency and low to moderate primary productivity which corresponds to slow growth of Walleye. The southern lakes average is the regional length-at-age average for Walleye from Moses Lake, Potholes Reservoir and Scooteney Reservoir. These lakes are eutrophic lakes characterized by low transparency and high primary productivity which corresponds to fast Walleye growth rates.

Relative abundance of other fish species are presented but may not be an accurate representation of those populations. Gill nets are used to collect fishes that have a fusiform body shape (spindle shaped; wide in the middle and tapered at each end) and that tend to be more active (e.g. Walleye and Yellow Perch). Low numbers of Largemouth Bass and Bluegill captured during a FWIN survey are not a cause for concern since these species tend to be more territorial and are more effectively captured using other sampling methods. In addition, lengths of Smallmouth Bass collected in gill nets tend to be higher than those collected via boat electrofishing.

TABLE 1. Recommended number of FWIN net sets based on lake surface area in acres (Morgan et al. 2000).

Water Body	Surface Area (Acres)	Recommended # of net sets
Scooteney Reservoir	710	12
Moses Lake	6,800	18
Potholes Reservoir	14,281	36
Banks Lake	26,866	48
Lake Roosevelt	80,000	150

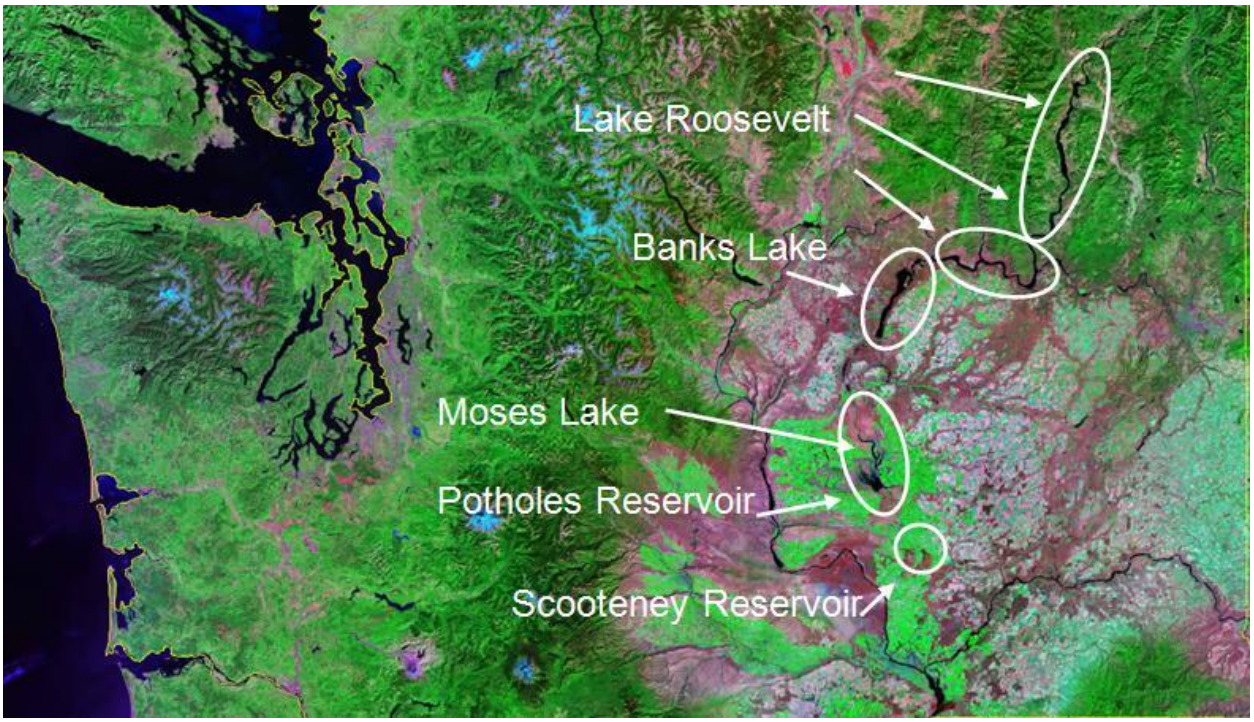

FIGURE 1. Map of FWIN lakes in Washington.

Results and Discussion

In 2013, the mean CPUE for all FWIN lakes combined was 17 Walleye per net. This is slightly less than that found in 2012 (18 Walleye per net) but is identical to the long-term mean. Both Moses Lake and FDR saw increases in mean Walleye CPUE in 2013 while Banks Lake, Potholes Reservoir and Scooteney Reservoir had slight declines (FIGURE 2). Moses Lake had the highest mean Walleye CPUE in 2013 at 38 fish/net, followed by Potholes Reservoir (21.9 fish/net), Scooteney Reservoir (15.7 fish/net), Banks Lake (6.5 fish/net) and FDR (4.4 fish/net).

Approximately 28% of the Walleye collected from all lakes were at least 16 inches. Potholes Reservoir, Scooteney Reservoir and FDR had the three highest percentages of Walleye at least 16 inches, respectively. Moses Lake and Banks Lake had the two lowest percentages, respectively (FIGURE 3).

In 2013 the age-1 Walleye year class was the most abundant collected in all lakes and represented approximately 80%, 62% and 68% of the Walleye collected in Banks Lake, Moses Lake and Potholes Reservoir, respectively. This year class should significantly contribute to the sport fishery in these waters in 2014–15. The 2009 year class (age-4 Walleye) was above the long term average in FDR and Moses Lake.

On average, 50% of male and female Walleye collected were mature by fall as age-2 and age-3, respectively. Female Walleye from FDR were the slowest to mature, reaching 50% maturity by fall as age-6. Male walleye from Potholes Reservoir reached 50% maturity by fall as age-1 fish.

Length-at-age of Walleye in Banks Lake, Moses Lake, Potholes Reservoir, and Scooteney Reservoir was above the regional average with Walleye reaching 16 inches by age-2. Length-at-age of Walleye in Lake Roosevelt (FDR) was below average with most Walleye reaching 16 inches by age-5.

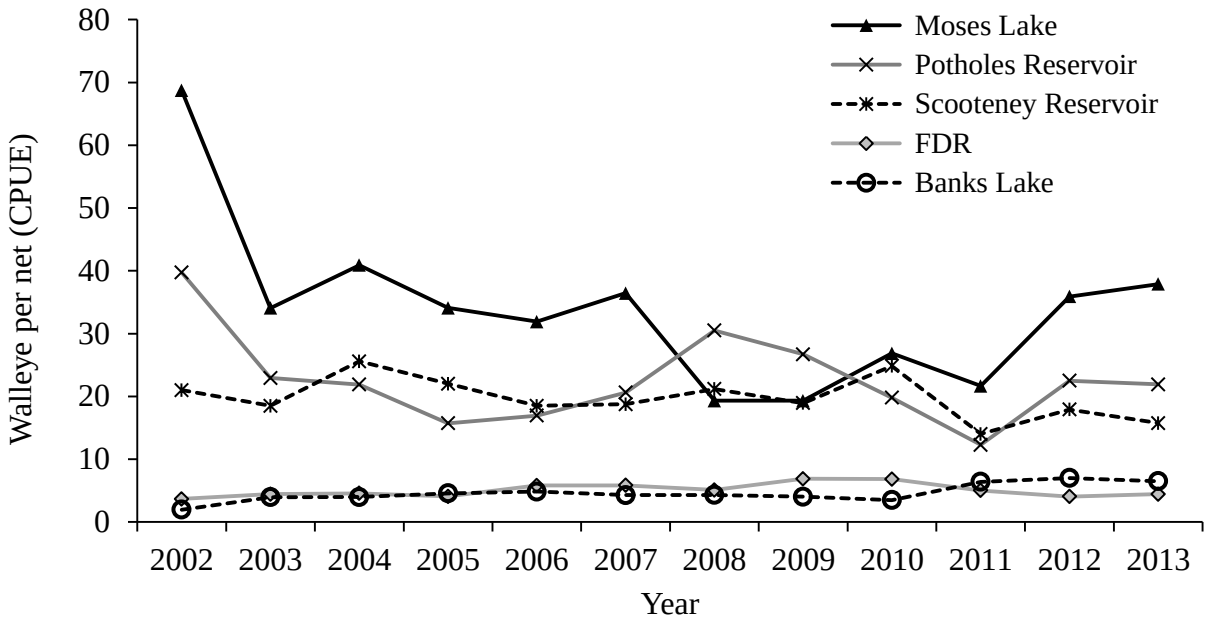

FIGURE 2. Distribution of Walleye CPUEs from FWIN surveys on Washington FWIN lakes 2002–2013.

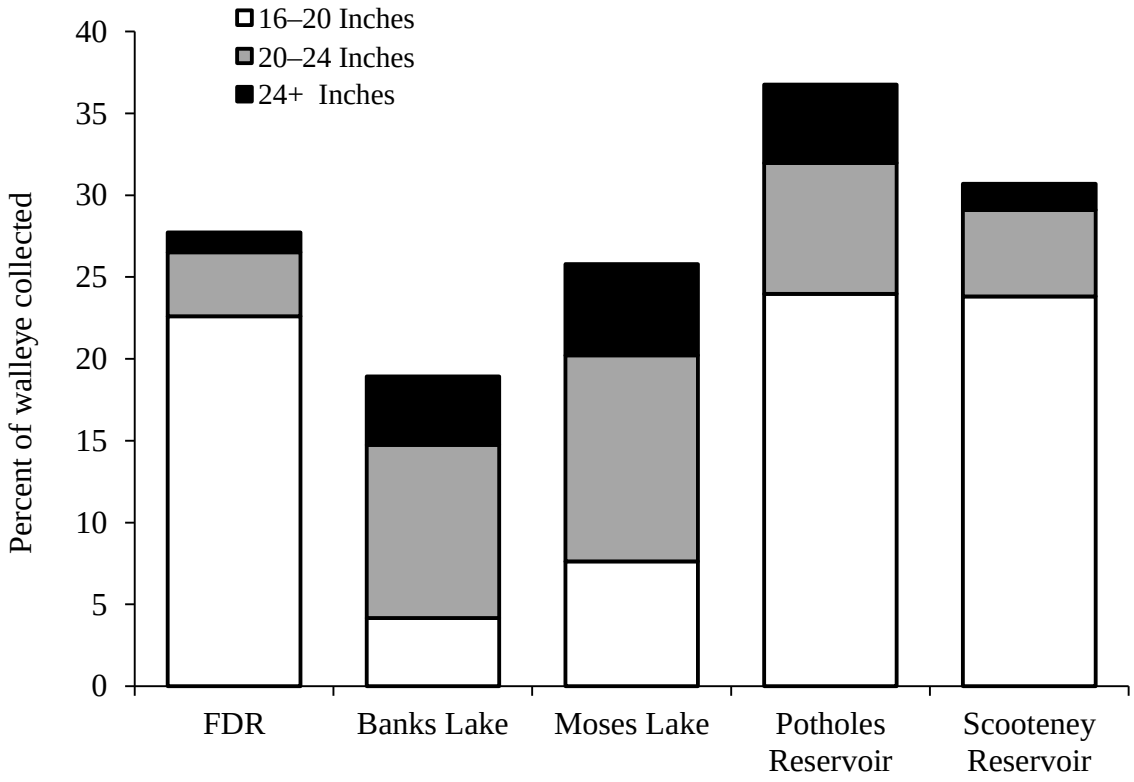

FIGURE 3. Percent of Walleye collected in three size classes during FWIN surveys in 2013. This figure excludes Walleye less than 16 inches.

Lake Roosevelt (FDR)

Walleye Population Sampling

We conducted the 2013 FDR FWIN survey November 3–8. A total of 150 FWIN nets were set throughout the lake and 663 Walleye were collected. The mean Walleye CPUE in 2013 on FDR was 4.4 fish per net (FIGURE 4). We saw our two highest Walleye CPUEs in 2009 and 2010. From 2010 to 2012 Walleye CPUE declined, and while we saw a slight increase in CPUE during 2013, this was still below the long-term mean (5.1 Walleye per net) (FIGURE 4). Lake Roosevelt, along with Banks Lake had the two lowest mean Walleye CPUEs of all Washington FWIN waters (FIGURE 2).

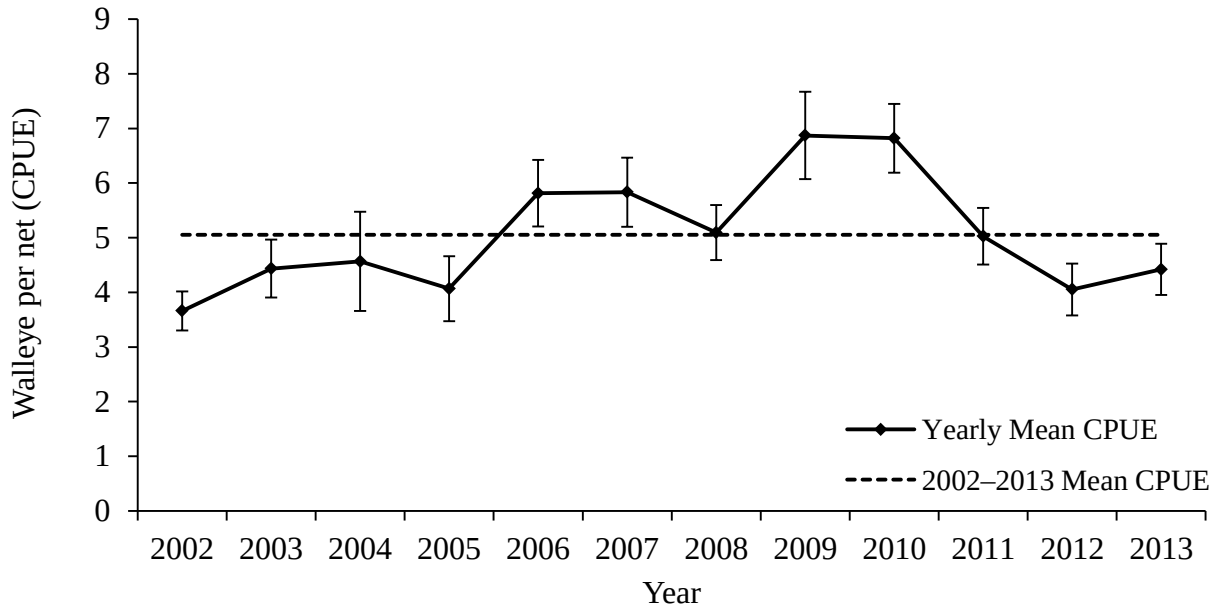

FIGURE 4. Mean (± 80% CI) CPUE for all FWIN surveys on FDR from 2002–2013 compared to the mean CPUE for all years 2002–2013.

Walleye collected during FWIN on FDR averaged 14 inches in 2013. This is a slight increase from 2012 (13 inches) but was equal to the long-term (2002–2013) average. Approximately 28% of the Walleye collected in 2013 were at least 16 inches. This was more than twice what we found in 2012 and was the highest percentage of Walleye at least 16 inches we have collected during FWIN on FDR since 2002. The increase in average size was due to an increase in relative abundance of Walleye 16–20 and 20–24 inches (FIGURE 5). While overall Walleye abundance was slightly below the long-term average (FIGURE 4) anglers should find larger Walleye in FDR in 2014.

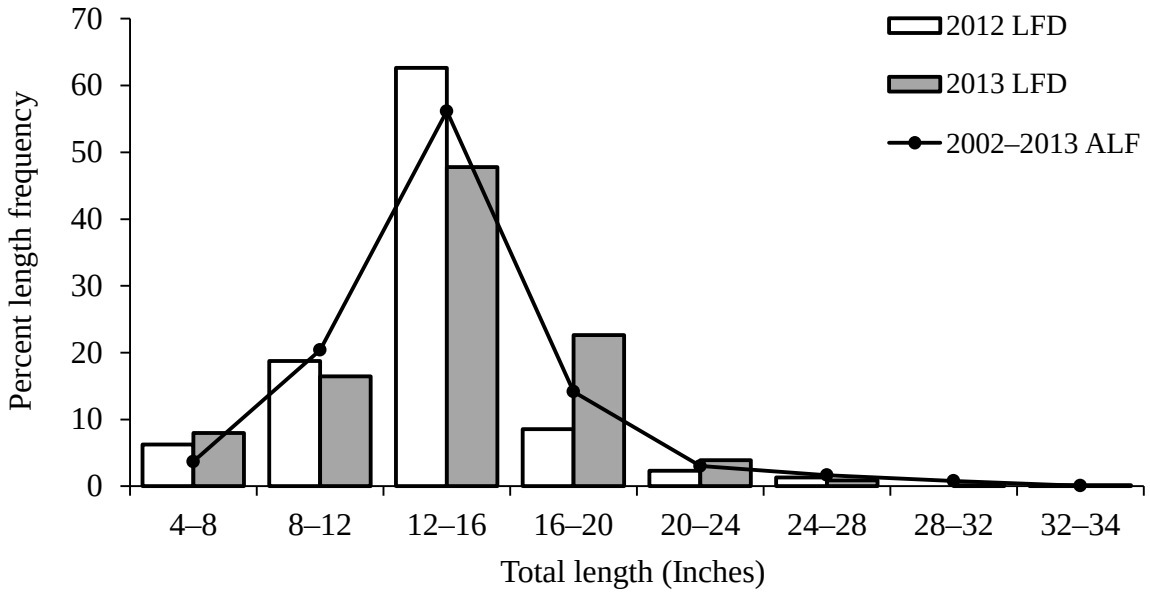

FIGURE 5. Percent length frequency distribution (LFD) of Walleye collected during FWIN on FDR in 2013 compared to 2012 and the average length frequency (ALF) from all FWIN surveys on FDR from 2002–2013.

Walleye ranged in age from 0 to 12 years and 13 year classes were collected. The age-1 and 4 year classes were the most abundant collected in 2013. Additionally, the age-0, 4 and 7 year classes were above the long-term average for abundance in FDR (FIGURE 6). The age-4 year class has been well represented in our sampling since 2010 (when these Walleye were age-1), and the age-7 year class has been well represented in our samples since 2006 (when these Walleye were age-0). Both of these were very strong year classes in 2013. Relative abundance of age-2, 3 and 5 Walleye was below the long-term average for FDR.

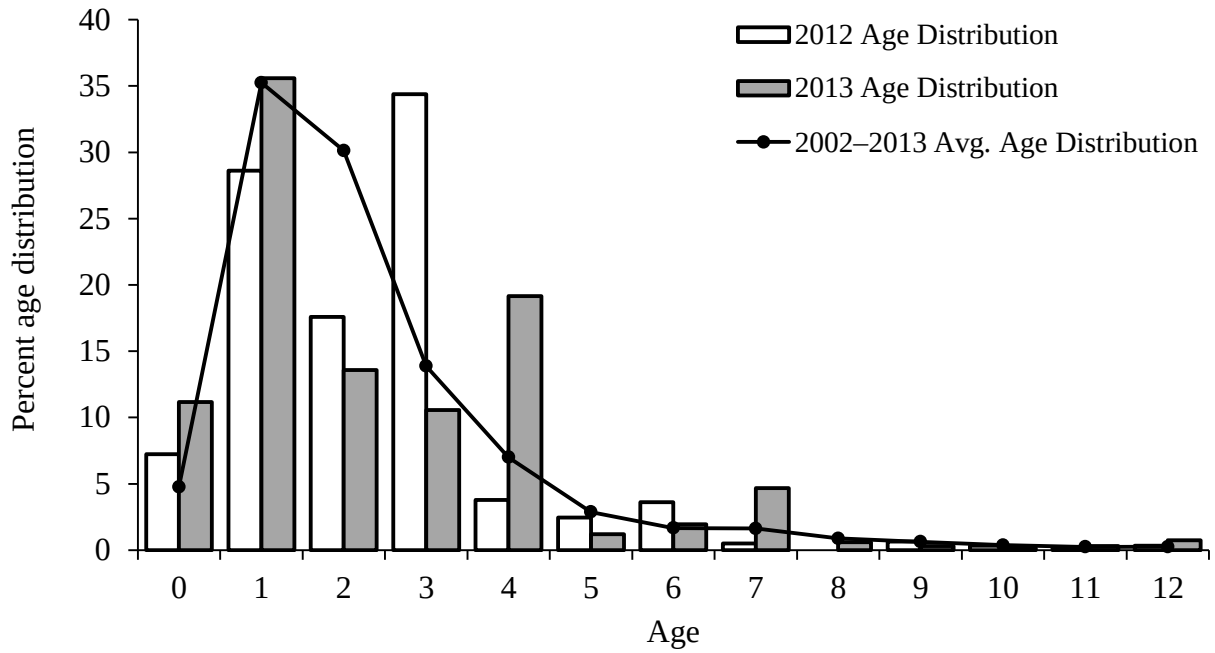

FIGURE 6. Percent age distribution of Walleye collected during FWIN on FDR in 2013 compared to 2012 and the average age distribution from all FWIN surveys on FDR from 2002–2013.

Of the 663 Walleye collected in FDR a total of 218 (33%) were mature. Of these, 179 were male and only 39 were female. A small percentage of Walleye in FDR began to mature by fall as age-1 fish. By fall as age-2, 50% of male Walleye were mature and by age-4 nearly 100% were mature. Female Walleye were much slower to mature reaching 50% maturity by fall as age-6 and 100% by age-7. When compared to other Washington FWIN waters female Walleye in FDR were the slowest to become sexually mature.

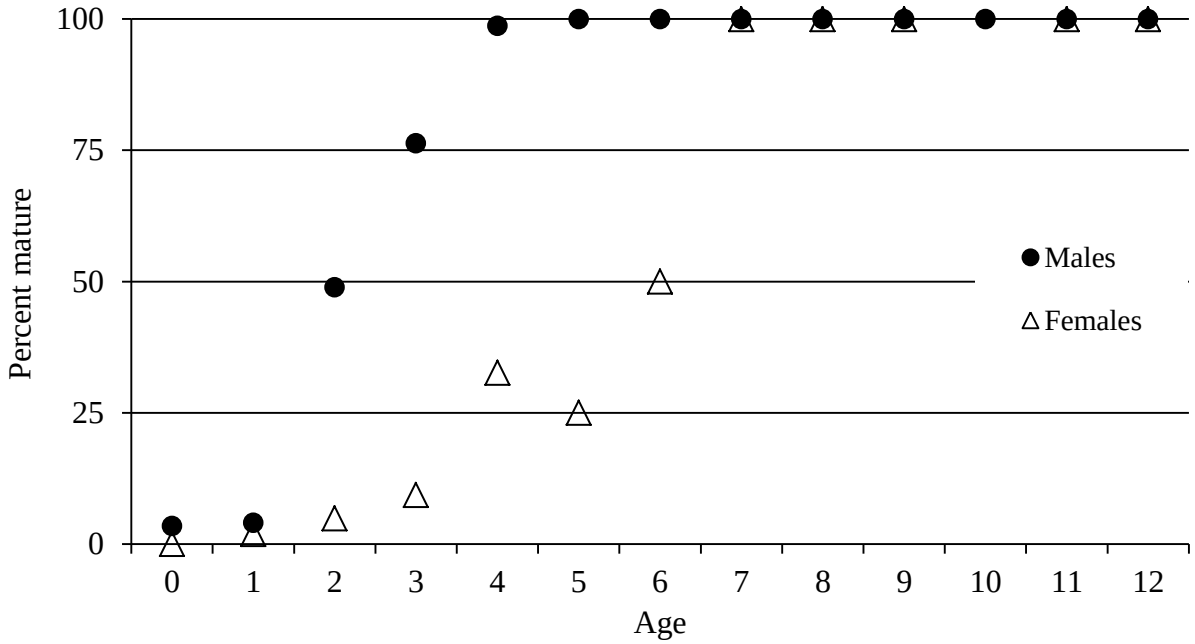

FIGURE 7. Percent of mature male and female Walleye at each age-class collected during FWIN on FDR in 2013. Note: No age-10 female Walleye were collected from FDR in 2013.

Length-at-age of Walleye collected from FDR in 2013 was at the northern lakes average for age-0, 1 and 2 Walleye, while age-3 and age-4 Walleye were below average. Beyond age-4 there was a great deal of variation in length-at-age data and no consistent trend was detected (FIGURE 8). We collected only nine age-5 Walleye and these fish ranged from 8–19 inches. We collected 31 age-7 Walleye; however, these fish ranged from 10–27 inches. The decline in length at age at age-10 was due to only one below average Walleye being collected at this age-class. Walleye in FDR had the slowest growth rates among all FWIN waters and had a high degree of variation in length-at-age. Without large numbers of fish at multiple age-classes and consistent growth it is difficult to generate precise length-at-age estimates. On average, Walleye in FDR reached 16 inches by fall as age-4 fish.

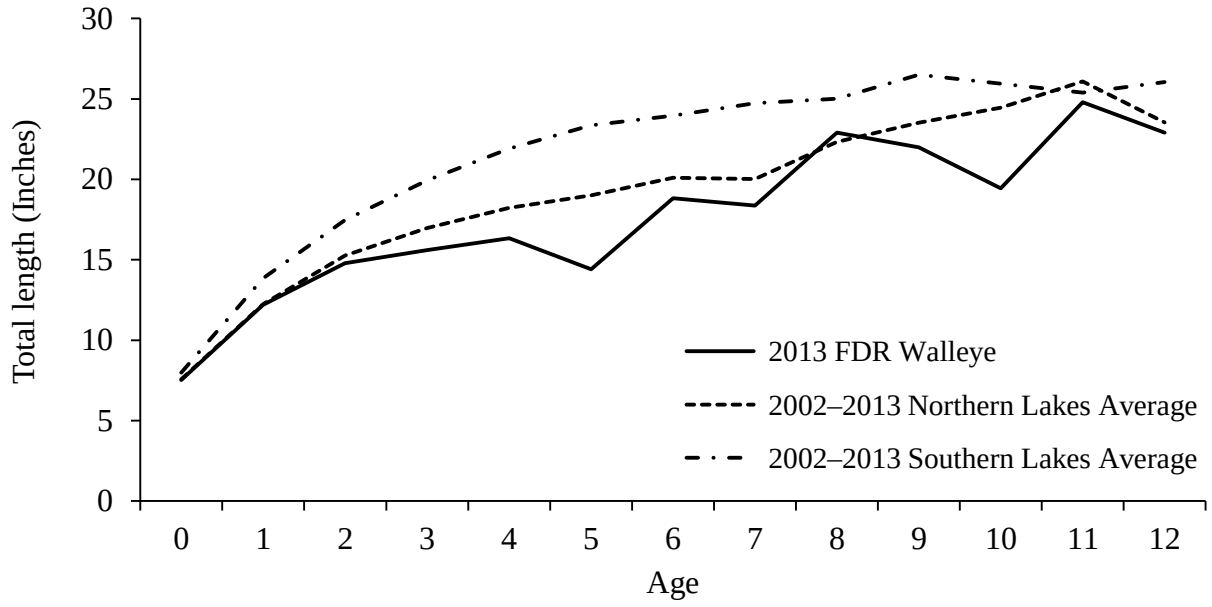

FIGURE 8. Average length-at-age of Walleye collected during FWIN on FDR in 2013 compared to the Northern and Southern Lakes Average determined from FWIN surveys conducted from 2002–2013.

Fish Community

In addition to Walleye, 16 other fish species were collected during the 2013 FWIN survey on FDR, and anglers can expect to find diverse fishing opportunities (FIGURE 9). Lake Whitefish represented approximately 24% of the total catch followed by Burbot (12%) and Yellow Perch (11%). The remaining species ranged from less than 1% to 9% of the total catch. Lake Whitefish are abundant in many of our lakes but this species is underutilized in Washington. This is likely a regional phenomenon but anglers should be aware that Lake Whitefish are a very popular food fish in the upper Midwestern United States since they make excellent table fare. Rainbow Trout fishing can be excellent, especially in winter, due to the cooperative net-pen

rearing projects at numerous locations along the reservoir. The net-pen project stocks approximately 750,000 catchable sized Rainbow Trout annually into Lake Roosevelt. Check the latest regulations pamphlet for special trout rules. In addition, please visit http://www.wdfw.wa.gov/fishing/washington/ for informational videos on fishing FDR as well as other lakes throughout Washington.

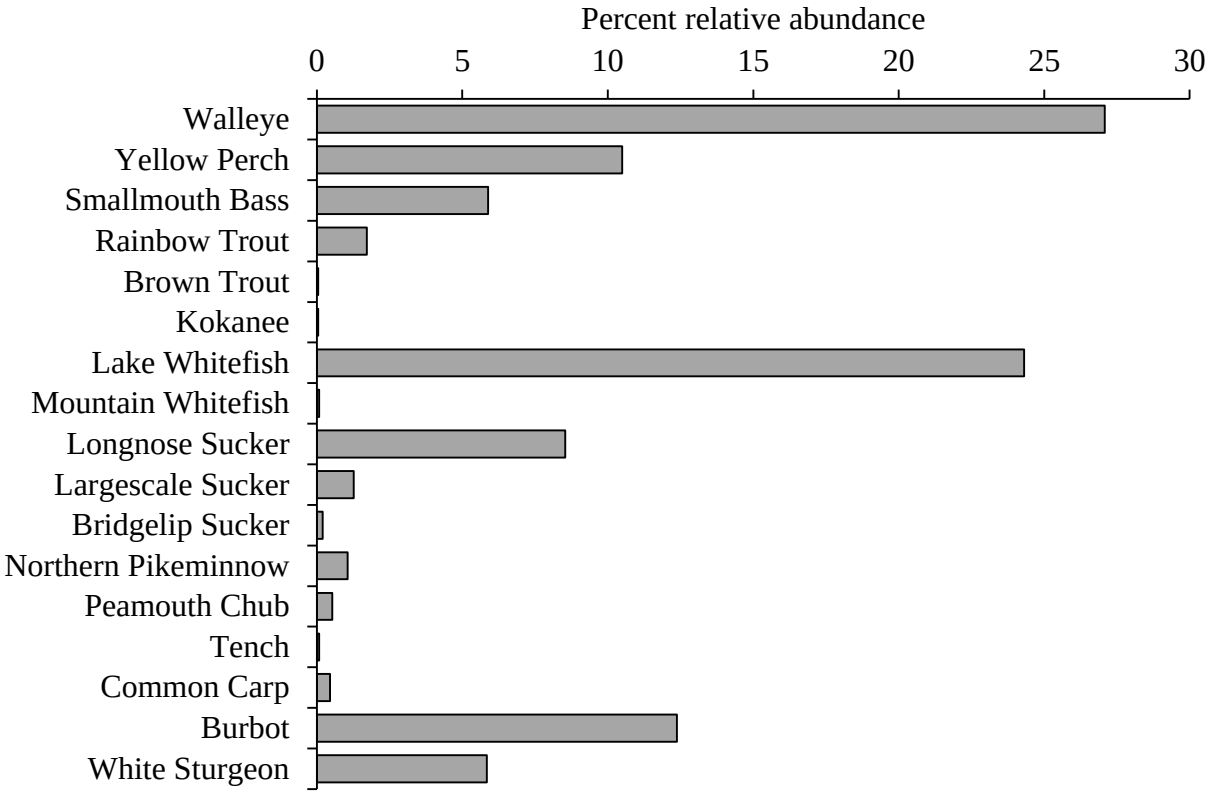

FIGURE 9. Percent relative abundance of the total number of fishes collected during FWIN on FDR in 2013.

Lake Roosevelt Recreational Opportunities

Lake Roosevelt is more than 150 miles in length, from Grand Coulee Dam to British Columbia, Canada. There are numerous access points along the 150 mile length of FDR on both sides. They are owned and operated by state, city, county and federal agencies, along with tribes and private businesses. There are both boat ramps and good shore angling opportunities. There are also numerous campgrounds, resorts and RV parking. The National Park Service operates 35 recreation areas along the 660 miles of shoreline. Maps are available at the Grand Coulee Dam visitor center and WDFW Spokane office. Water level fluctuations can be a problem for boat launching. For current water level information, call (800) 824–4916. For more information on Lake Roosevelt please visit http://www.wdfw.wa.gov/fishing/vacation/lake_roosevelt.html.

Banks Lake

Walleye Population Sampling

We conducted the 2013 Banks Lake FWIN survey October 14–18. A total of 48 FWIN nets were set throughout the lake and 312 Walleye were collected. The mean Walleye CPUE in 2013 on Banks Lake was 6.5 fish per net (FIGURE 10). Although this is a slight decrease from 2012 (7 Walleye per net), it is the second highest CPUE of all FWIN surveys on Banks Lake. Walleye CPUE increased from 2010 to 2012 and has been above the long-term average since 2011.

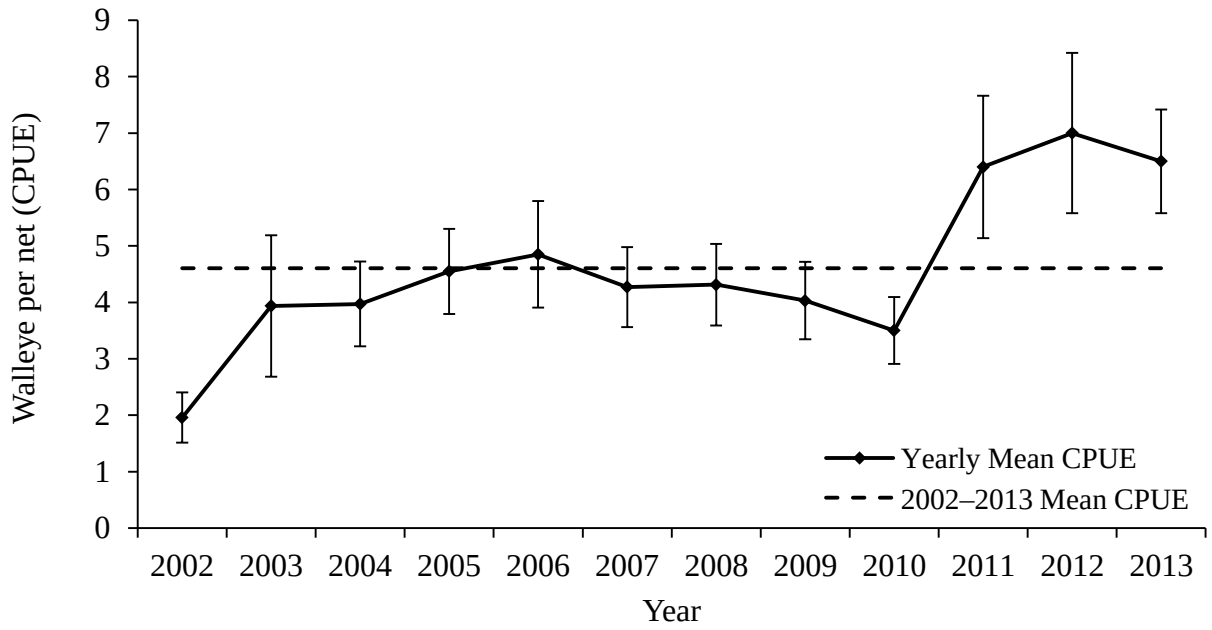

FIGURE 10. Mean (± 80% CI) CPUE for all FWIN surveys on Banks Lake from 2002–2013 compared to the mean CPUE for all years 2002–2013.

Walleye collected during FWIN on Banks Lake averaged 14 inches in 2013. This was higher than the 2012 average (12 inches) yet lower than the long-term average of 15 inches. We collected a higher than average number of Walleye in the 8–16 range (average length = 11.8 inches) which reduced the overall average length. These fish were primarily age-1 (FIGURE 12). In addition, we collected the lowest number of Walleye at least 16 inches in our samples since 2007. Only 19% of the Walleye collected in 2013 were at least 16 inches, which is down considerably from 2011 and 2012 (70% and 34% at least 16 inches, respectively) and below the long-term average (41%). The increase in abundance of small Walleye is positive in terms of Walleye production and indicates that there will likely be more Walleye recruiting to the sport fishery in 2014 and 2015; however, our results indicate that there will be fewer large Walleye for anglers to harvest in 2014 and 2015.

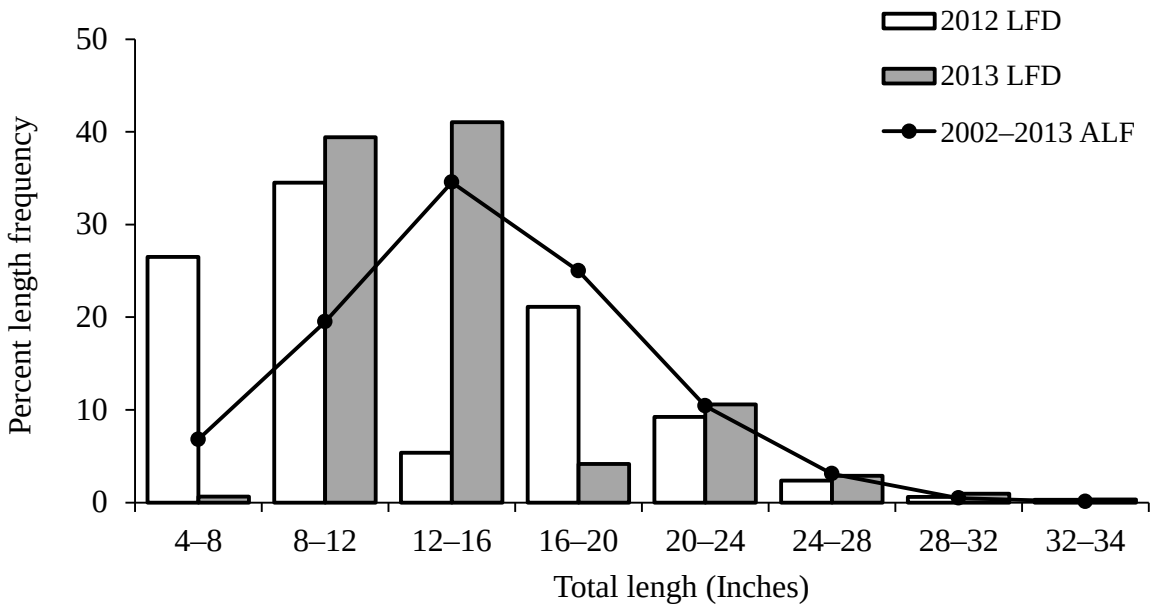

FIGURE 11. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Banks Lake in 2013 compared to 2012 and the average length frequency (ALF) from all FWIN surveys on Banks Lake from 2002–2013.

Walleye ranged in age from 0 to 11 years and 12 year classes were collected. As previously stated, the age-1 Walleye year class was the most abundant collected (FIGURE 12). In addition, although low in abundance, the age-5 and age-7 year classes were at and above the long-term average, respectively. The age-0, 2, 3, 4 year classes were well below the long-term average for relative abundance. Very few Walleye were collected older than age-5.

FIGURE 12. Percent age distribution of Walleye collected during FWIN on Banks Lake in 2013 compared to 2012 and the average age distribution from all FWIN surveys on Banks Lake from 2002–2013.

Of the 312 Walleye collected in Banks Lake a total of 52 (17%) were mature. Of these, 22 were female and 30 were male. A small percentage of male Walleye were mature by fall as age-1 fish. By fall as age-3 approximately 50% of male and female Walleye were mature. By age-5 100% of both male and female Walleye were mature (FIGURE 13).

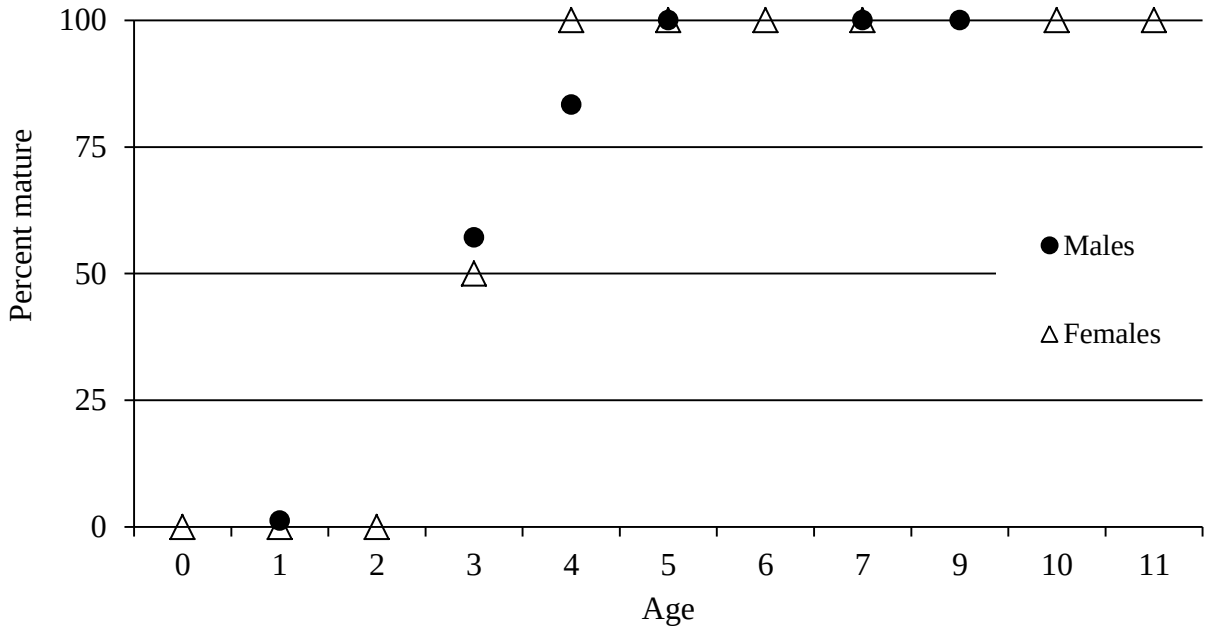

FIGURE 13. Percent of mature male and female Walleye at each age-class collected during FWIN on Banks Lake in 2013. Note: No age-0, 2, 6, 10 or 11 male Walleye and no age-9 female Walleye were collected from Banks Lake in 2013.

Length-at-age of Walleye collected from Banks Lake in 2013 was higher than the northern lakes average for most year classes with Walleye reaching 20 inches by fall as age-3 fish (FIGURE 14). Only one Walleye was collected at age-2 and age-9. The age-2 Walleye was above average for length (20 inches) while the age-9 Walleye was below average (15 inches). Small sample sizes of fish at these age-classes created erratic length-at-age trends that made comparisons with long-term regional averages difficult.

FIGURE 14. Average length-at-age of Walleye collected during FWIN on Banks Lake in 2013 compared to the Northern and Southern Lakes Average determined from FWIN surveys conducted from 2002–2013.

Fish Community

In addition to Walleye, which was third in abundance, 14 fish species were collected during our 2013 FWIN survey on Banks Lake. Similar to 2012, Yellow Perch dominated the catch in 2013 (Figure 15) and average size increased. The average size of Yellow Perch was 5 inches in 2012 and 7 inches in 2013. This increase in average size; however, was due to a reduction in the number of small Yellow Perch collected in 2013 rather than an increase in the catch of large Yellow Perch. The number of Yellow Perch over 8 inches collected in both years was similar.

Lake Whitefish represented 27% of the total catch in 2013. This is an increase from 2012 when Lake Whitefish represented 13% of the total catch. Other species ranged in abundance from 1% to 8% of the total catch. Despite their abundance, large size (average weight 1 ¾ pounds in 2013), and palatability, few anglers exploit Lake Whitefish in Banks Lake. Lake Whitefish are targeted by a small group of anglers in fall and winter; however, this is an underutilized resource and we encourage anglers to seek out, and harvest Lake Whitefish. Similar to FDR, Banks Lake is an important Smallmouth, and Largemouth Bass fishery hosting several bass tournaments each

year. While not known for trophy Smallmouth Bass Banks Lake hosts a healthy and consistent Smallmouth Bass fishery. In 2013, we collected 152 Smallmouth Bass averaging 1.8 pounds during our FWIN survey. While the relative abundance of Smallmouth Bass has remained stable on Banks Lake the average size has increased since 2011 and anglers should have opportunities to catch larger Smallmouth Bass in 2014. Banks Lake also contains very good opportunities for Yellow Perch, Rainbow Trout, Black Crappie and Kokanee. A Rainbow Trout net-pen rearing project in Coulee City helps provide excellent fishing for Rainbow Trout up to 5 pounds. Kokanee fishing can also be excellent on Banks Lake as approximately 1 million Kokanee have been stocked annually in recent years. Kokanee, which are landlocked Sockeye Salmon provide excellent angling and culinary opportunities.

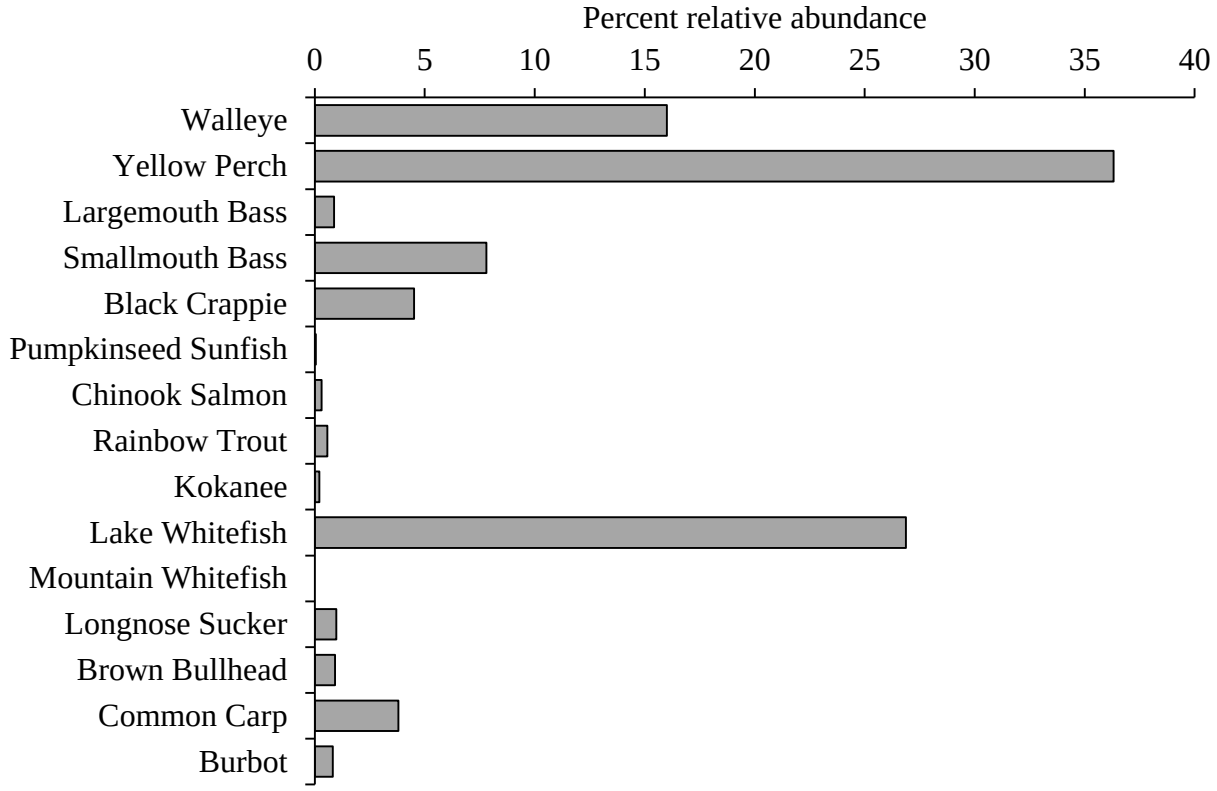

FIGURE 15. Percent relative abundance of the total number of fishes collected during FWIN on Banks Lake in 2013.

Banks Lake Recreational Opportunities

Banks Lake stretches almost 27 miles from Coulee City at the south end to Grand Coulee at the north end and has numerous access points for launching boats and shore angling. Restaurants, lodging as well as city-owned parks (some with water access) can be found in Coulee City, Electric City and Grand Coulee. Steamboat Rock State Park offers camping, trailer and RV hook-ups, well maintained boat ramps, shore angling and it surrounds the "Devil's Punch Bowl", which has very good Largemouth Bass and Black Crappie habitat.

Moses Lake

Walleye Population Sampling

We conducted the 2013 Moses Lake FWIN survey October 14–16. A total of nine FWIN nets were set throughout the lake and 341 Walleye were collected. The average Walleye CPUE in 2013 on Moses Lake was 38 fish per net (FIGURE 16). This is a slight increase from 2012 (34 Walleye per net average) and is the third highest Walleye CPUE recorded on Moses Lake. The Moses Lake Walleye CPUE has increased since 2009 with a slight decrease in 2011. Since 2011; however, the Walleye CPUE has been above the long-term average. With the exception of 2008 and 2009 the average Walleye CPUE was higher on Moses Lake than on any other FWIN water (FIGURE 2).

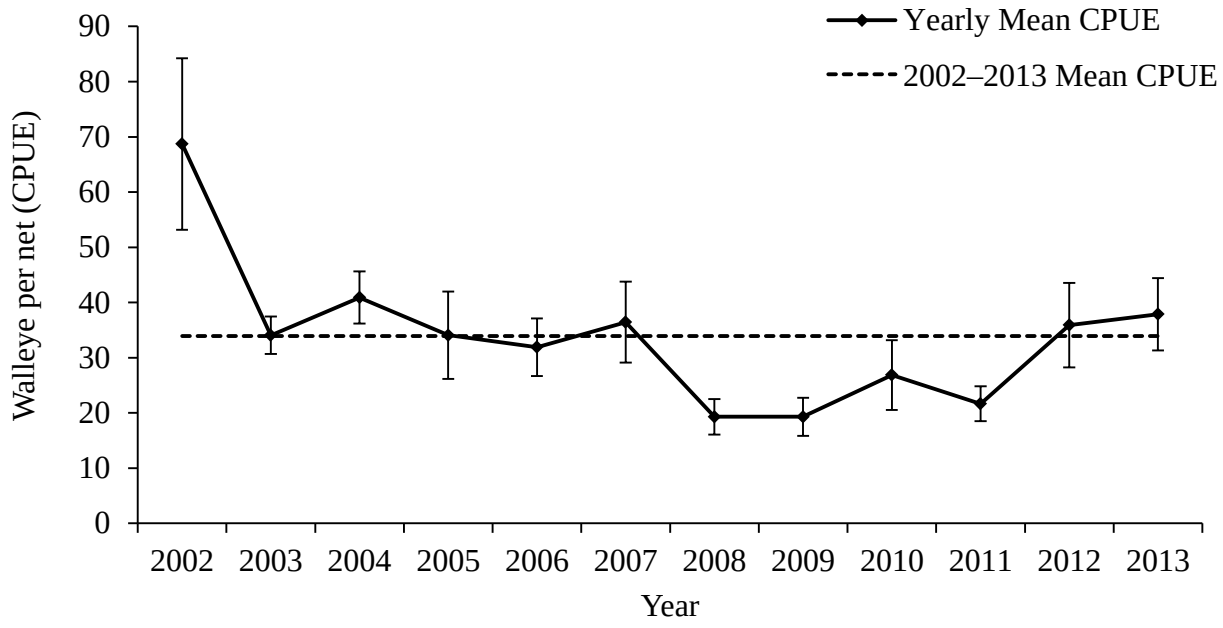

FIGURE 16. Mean (± 80% CI) CPUE for all FWIN surveys on Moses Lake from 2002–2013 compared to the mean CPUE for all years 2002–2013.

Walleye collected during FWIN sampling on Moses Lake averaged 15 inches in 2013. This is unchanged from 2012 but is slightly less than the long-term average (16 inches). Only 26% of the Walleye collected in 2013 were at least 16 inches (FIGURE 17). This is well below what we found in 2012 (40%) and approximately half of the long-term average (51%). Despite this decline, there will still be good opportunities for anglers to harvest large Walleye in Moses Lake. Walleye in the 12–16 inch range were well above the long-term average in 2013. These were predominantly age-1 fish which will likely dominate the Moses Lake sport fishery in 2014 (FIGURE 18).

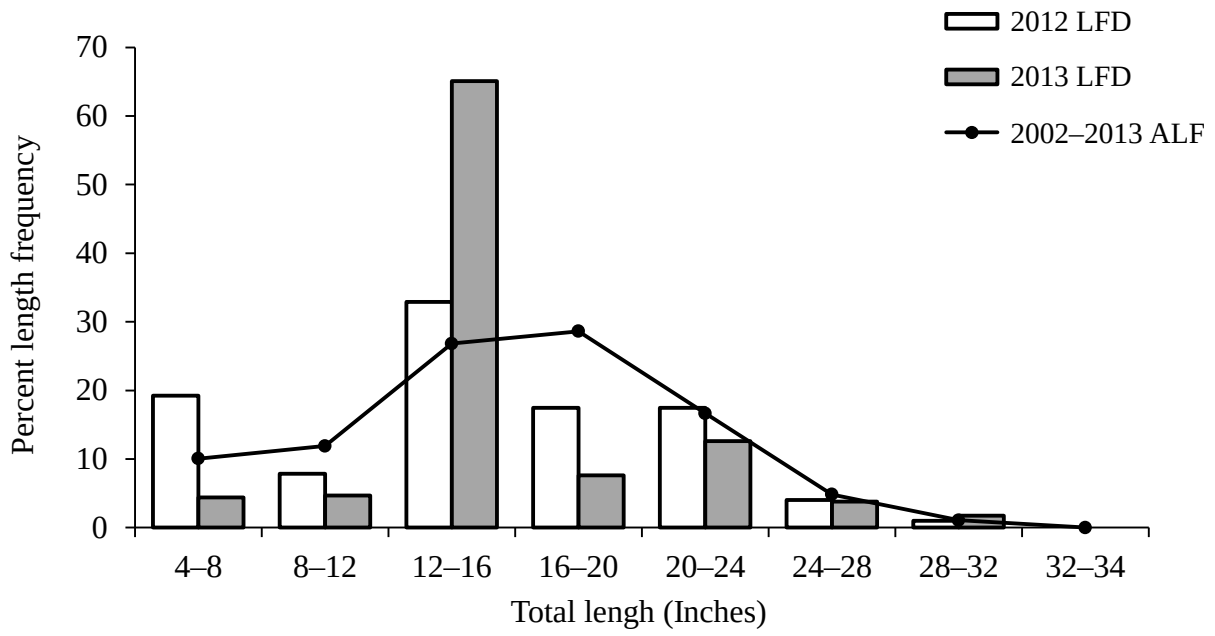

FIGURE 17. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Moses Lake in 2013 compared to 2012 and the average length frequency (ALF) from all FWIN surveys on Moses Lake from 2002–2013.

Walleye ranged in age from 0 to 13 years and 12 year classes were collected. No age-10 or age-12 Walleye were collected. The age-1 and 4 year classes were the most abundant collected and were above the long-term average for Moses Lake (FIGURE 18). The age-4 year class has been consistently strong since these fish were age-0 (in 2009). The age-1 year class should provide anglers with ample opportunity for harvest since these fish primarily ranged from 14–16 inches in fall 2013. By 2014, these Walleye should be in the 15–17 inch range. The weak age-2 and age-3 year classes should not affect angler success since there are multiple year classes within this population with plenty of harvestable fish.

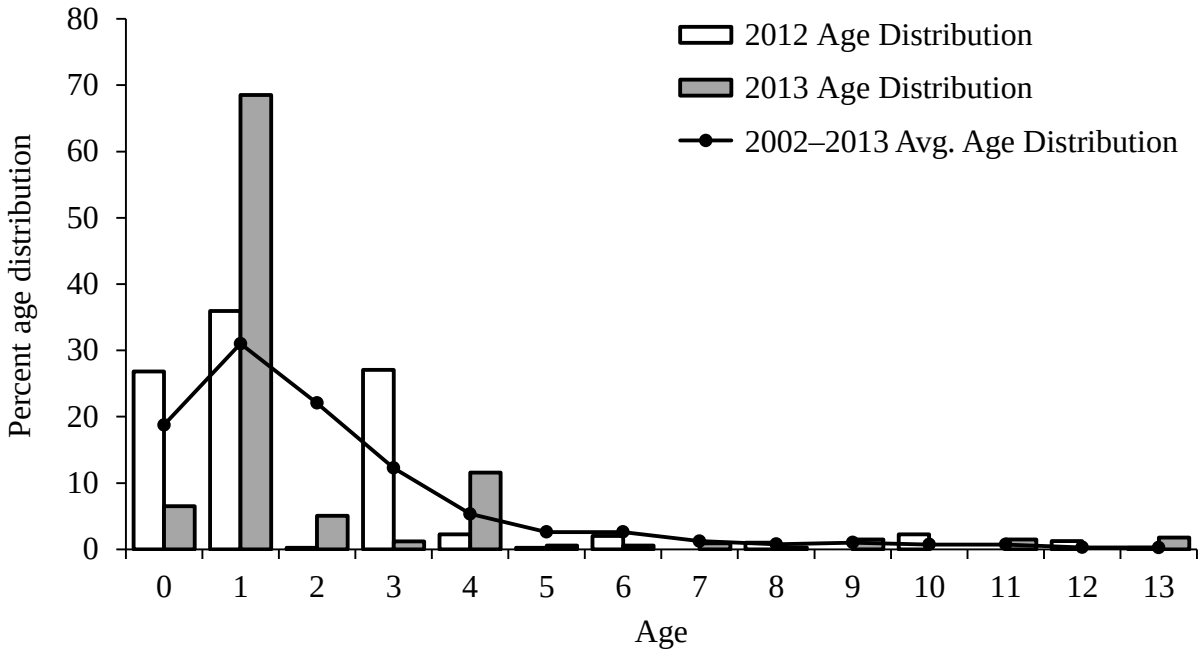

FIGURE 18. Percent age distribution of Walleye collected during FWIN on Moses Lake in 2013 compared to 2012 and the average age distribution from all FWIN surveys on Moses Lake from 2002–2013.

Of the 341 Walleye collected in Moses Lake a total of 99 (29%) were mature. Of these, 32 were female and 67 were male. Male Walleye began to mature by fall as age-1 fish. By fall as age-2, 80% of males and 42% of females were mature. By fall as age-3, 100% of both male and female Walleye were mature (FIGURE 19). The age-1 year class was the most abundant year class collected in 2013 on Moses Lake. Most of these fish will become mature in 2014 and will likely reproduce in spring 2015.

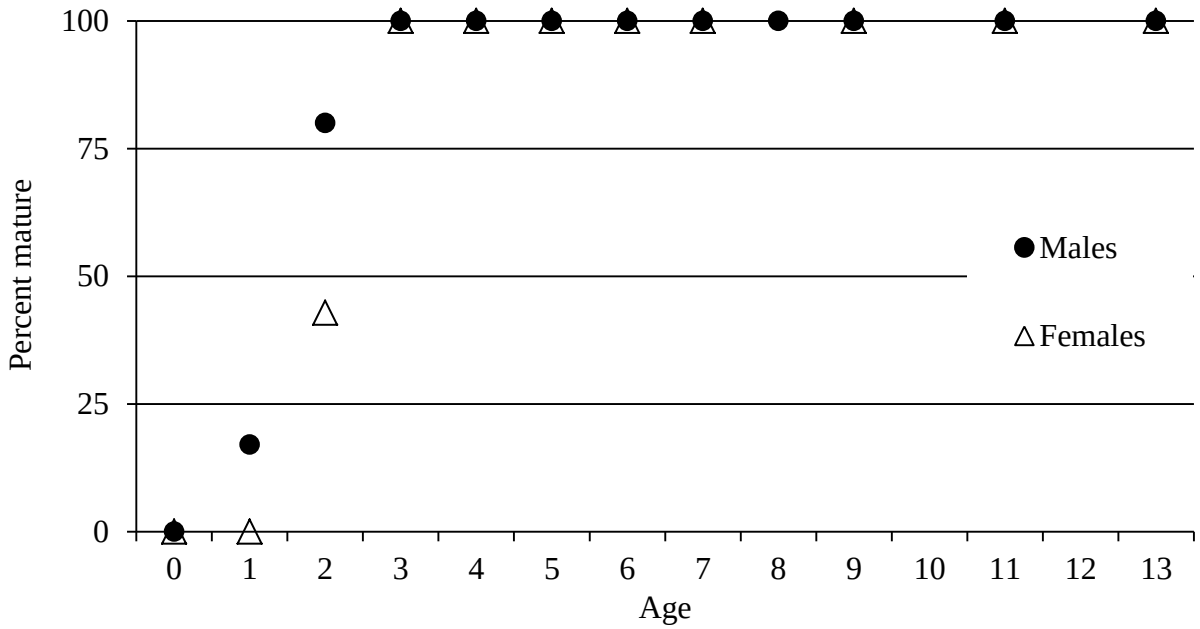

FIGURE 19. Percent of mature male and female Walleye at each age-class collected during FWIN on Moses Lake in 2013. Note: No age-8 female Walleye and no age-10 or age-12 Walleye of either sex were collected from Moses Lake in 2013.

Length-at-age of Walleye collected in Moses Lake was near the southern lakes average for most age-classes (FIGURE 20). Only 24 Walleye were collected between ages 5–13. Collecting very few fish in any particular age-class prevents us from making precise estimates of average length-at-age for that age-class; therefore, length-at-age estimates for Moses Lake Walleye older than age-4 should be viewed with caution. Overall, Walleye in Moses Lake exhibited fast growth, with most fish reaching 14–18 inches by fall as age-2. These growth rates were a good indication of abundant forage on Moses Lake and that Walleye will recruit to the sport fishery more quickly than on less productive waters such as FDR and Banks Lake.

FIGURE 20. Average length-at-age of Walleye collected during FWIN on Moses Lake in 2013 compared to the Southern and Northern Lakes Average determined from FWIN surveys conducted from 2002–2013.

Fish Community

In addition to Walleye 10 other fish species were collected during the 2013 FWIN survey on Moses Lake. With the exception of Yellow Perch; however, none represented more than 7% of the total number of fish collected. Similar to 2012, Yellow Perch dominated the catch during our 2013 FWIN survey on Moses Lake (FIGURE 21); however, the relative abundance of Yellow Perch declined from 71% of the total catch in 2012 to 42% of the total catch in 2013. This decline in abundance is probably linked to the increase in 12–16 inch Walleye from 2012 to 2013 which prey upon small Yellow Perch (FIGURE 17). While relative abundance of Yellow Perch declined in 2013, average length, and the percentage of large Yellow Perch in our samples increased. From 2012 to 2013 the percentage of Yellow Perch at least 8 inches went from 14% to 76%. The percentage of Yellow Perch at least 10 inches rose from 2.5% to 8%. The increase in average size of Yellow Perch is not simply due to a reduction in the number of small Yellow Perch collected. The number of Yellow Perch over 8 inches increased from 150 in 2012 to 244 in 2013 as well. This increase in average size of Yellow Perch should be a boon for anglers in 2014.

Historically, Moses Lake has been a popular Walleye and Smallmouth Bass fishery; however, in recent years it has become a well-respected Largemouth Bass fishery with anglers reporting catches of Largemouth Bass weighing 8–10 pounds. Yellow Perch fishing can be quite good on Moses Lake during winter near Blue Heron Park. Some anglers also target Common Carp with both hook and line or bow and arrow. Moses Lake has one of the most abundant Common Carp populations in the state and they can be both challenging to catch on hook and line and put up a fierce fight. Smaller Carp (2–5 pounds) can also be good table fare when properly prepared.

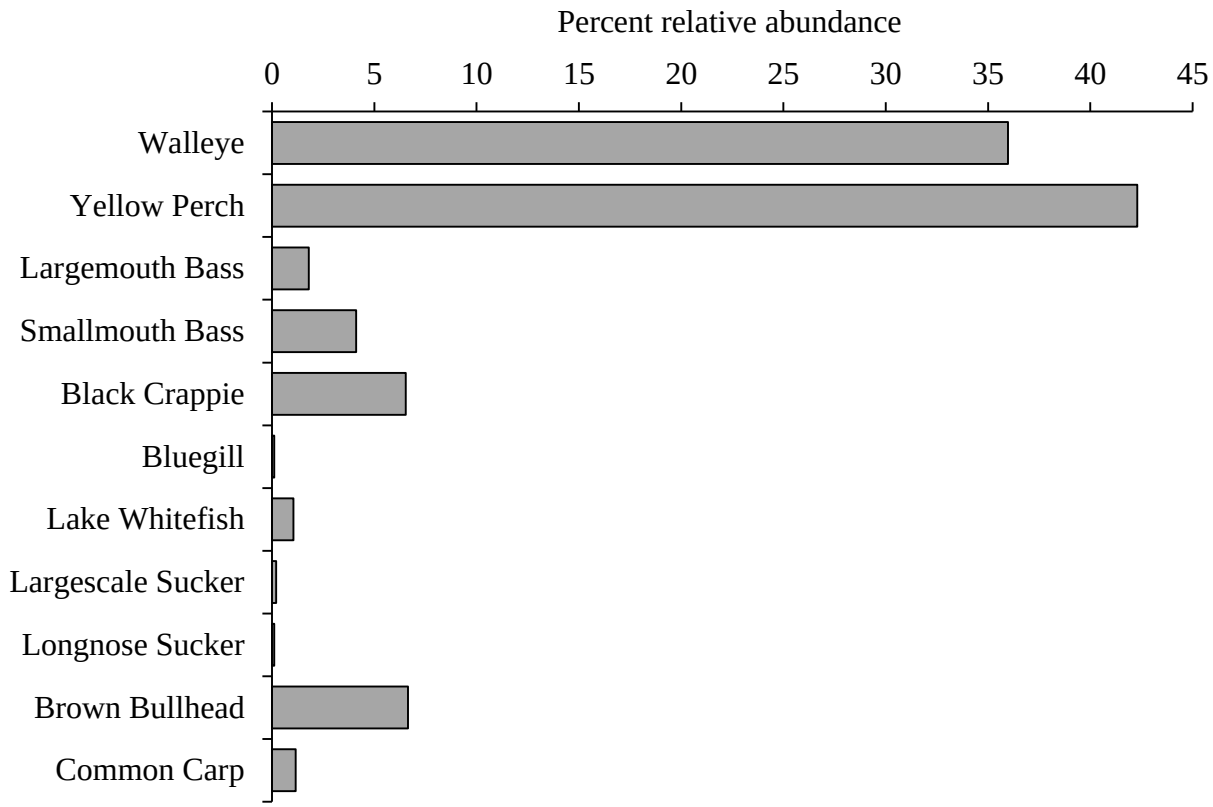

FIGURE 21. Percent relative abundance of the total number of fishes collected during FWIN on Moses Lake in 2013.

Moses Lake Recreational Opportunities

There are six improved public boat launches on Moses Lake and one gravel launch at the north end of the lake. The City of Moses Lake offers lodging downtown and on the shore of the lake. There are also two city-owned parks with boat ramps and docks. In addition to water access these parks offer grass day-use areas with picnic tables. Cascade Park also has camping facilities and boat moorage. An annual "Fishing Kids" derby, held at Cascade Park in early summer introduces youth ages 5–14 to sport fishing.

Potholes Reservoir

Walleye Population Sampling

We conducted the 2013 Potholes Reservoir FWIN survey October 21–23. A total of 20 FWIN nets were set throughout the reservoir and 438 Walleye were collected. The average Walleye CPUE in 2013 on Potholes Reservoir was 21.9 fish per net. This is a slight decrease from 2012 (22.5 Walleye per net average) and is below the long-term average (22.6 Walleye per net). From 2008 to 2011 CPUE declined steadily. From 2011 to 2012 CPUE nearly doubled. The mean Walleye CPUE for Potholes Reservoir is typically between that of Moses Lake and Scooteney Reservoir (FIGURE 2).

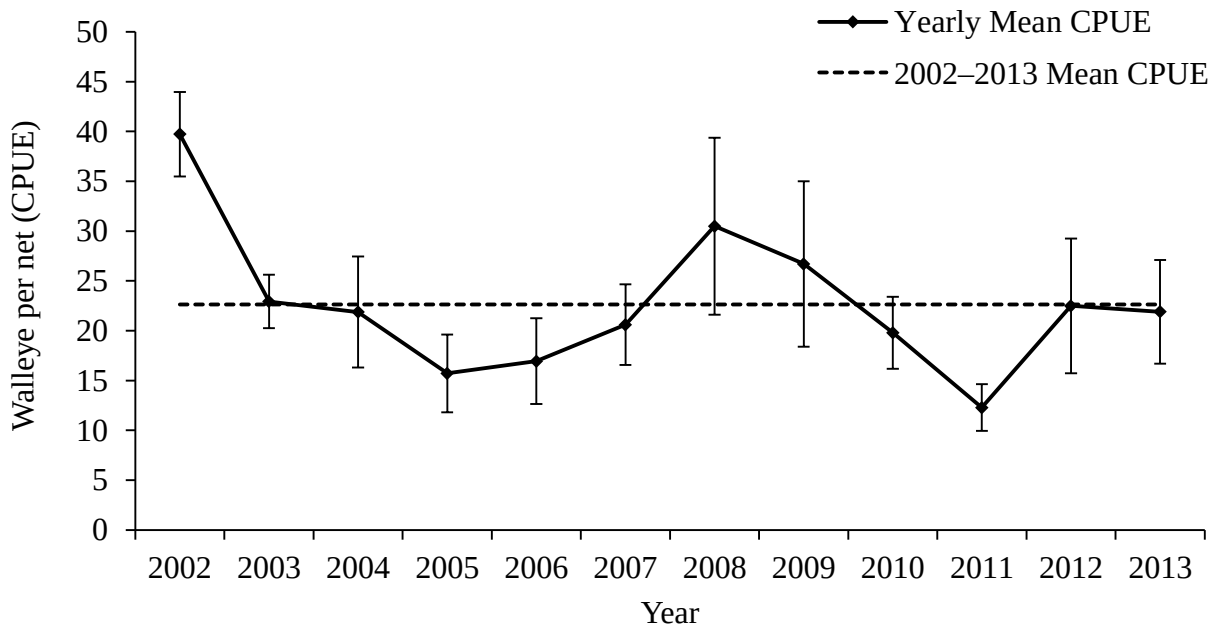

FIGURE 22. Mean (± 80% CI) CPUE for all FWIN surveys on Potholes Reservoir from 2002–2013 compared to the mean CPUE for all years 2002–2013.

Walleye collected during FWIN sampling on Potholes Reservoir averaged 15 inches in 2013, which is a decline from both 2012 and the long-term average (16 inches). The decrease in average length of Walleye in 2013 was due to a decline in the abundance of Walleye at least 20 inches as well as an increase in the abundance of Walleye 12–16 inches, which were primarily age-1 fish (FIGURE 23). Only 57 Walleye at least 20 inches were collected during this survey. This is the lowest number of Walleye at least 20 inches collected since FWIN sampling began in 2002. In addition, the number of Walleye less than 20 inches collected was the highest since 2002. While anglers may need to contend with a smaller average size the abundance of Walleye from 12–20 inches collected on Potholes Reservoir was above the long-term average in 2013 (FIGURE 23). This will be a boon for anglers since Walleye in this size range averaged 16 inches in 2013 and will provide anglers with plenty of opportunity for harvest in 2014.

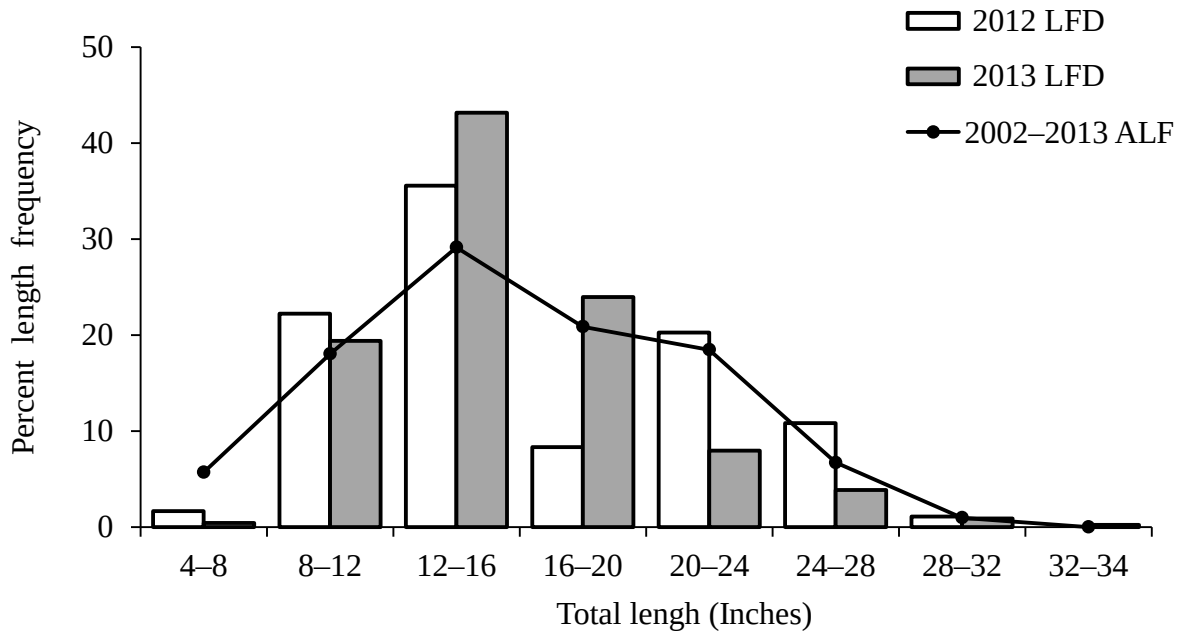

FIGURE 23. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Potholes Reservoir in 2013 compared to 2012 and the average length frequency (ALF) from all FWIN surveys on Potholes Reservoir from 2002–2013.

Walleye ranged in age from 0 to 15 years and 12 year classes were collected. No age-10, 12, 13 or 14 Walleye were collected on Potholes Reservoir in 2013. The age-1 year class was the most abundant collected and was well above the long-term average (FIGURE 24). The age-1 year class will provide the majority of the Walleye fishery in 2014-15 as most of these fish are between 14–17 inches. The remaining year classes were below the long term average with regard to abundance. Only 28 Walleye older than age-3 were collected on Potholes Reservoir in 2013. This is the fewest Walleye collected in these year classes since FWIN sampling began in 2002.

FIGURE 24. Percent age distribution of Walleye collected during FWIN on Potholes Reservoir in 2013 compared to 2012 and the average age distribution from all FWIN surveys on Potholes Reservoir from 2002–2013.

Of the 438 Walleye collected in Potholes Reservoir a total of 140 (32%) were mature. Of these, 28 were female and 112 were male. By fall, as age-1 fish, approximately 46% of male Walleye and 36% of female Walleye were mature. By fall, as age-3, 100% of both male and female Walleye collected were mature.

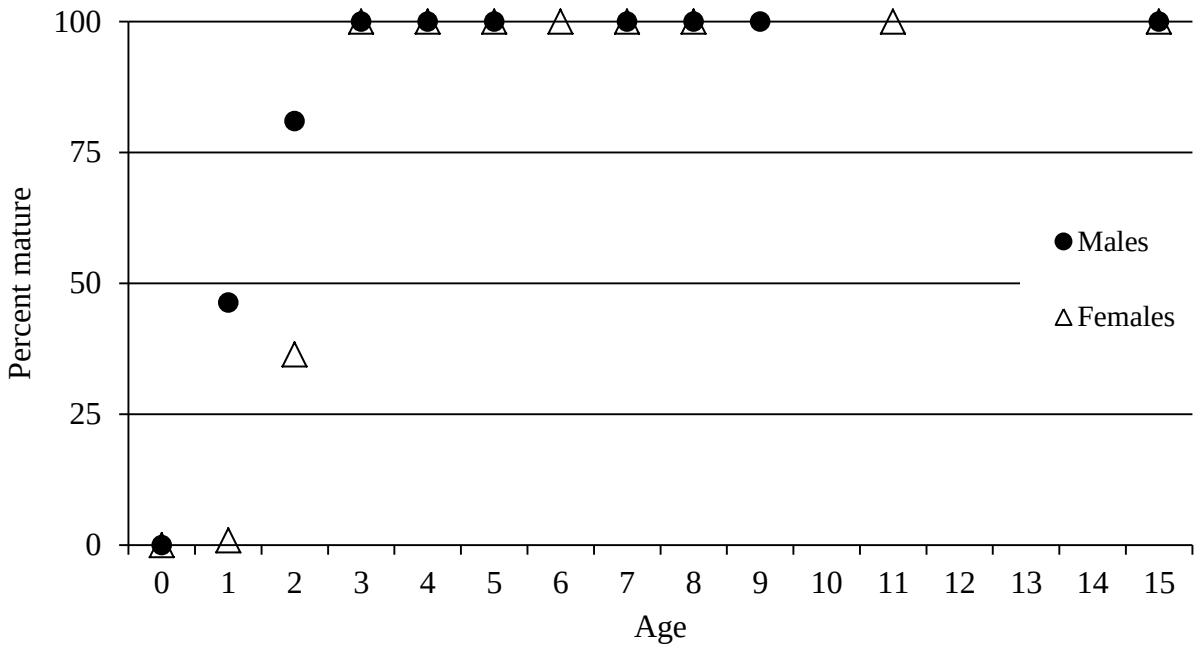

FIGURE 25. Percent of mature male and female Walleye at each age-class collected during FWIN on Potholes Reservoir in 2013. Note: No age-6 or age-11 male Walleye, no age-9 female Walleye and no age-10, 12, 13 or 14 Walleye of either sex were collected from Potholes Reservoir in 2013.

Length-at-age of Walleye in Potholes Reservoir was above the southern lakes average for Walleye to age-7 (FIGURE 26). Beyond age-7 the average length-at-age declined below the southern lakes average; however, we only collected 5 Walleye between age 8 and 15 and these fish may not have been representative of these year classes. Potholes Reservoir Walleye have the fastest growth rate of all our FWIN waters, reaching 15 inches by fall as age-1 and over 19 inches by fall as age-2. Anglers should find excellent opportunities on Potholes Reservoir in 2014. As stated previously, anglers should be prepared for fewer large Walleye, but can expect abundant Walleye in the 12–20 inch range.

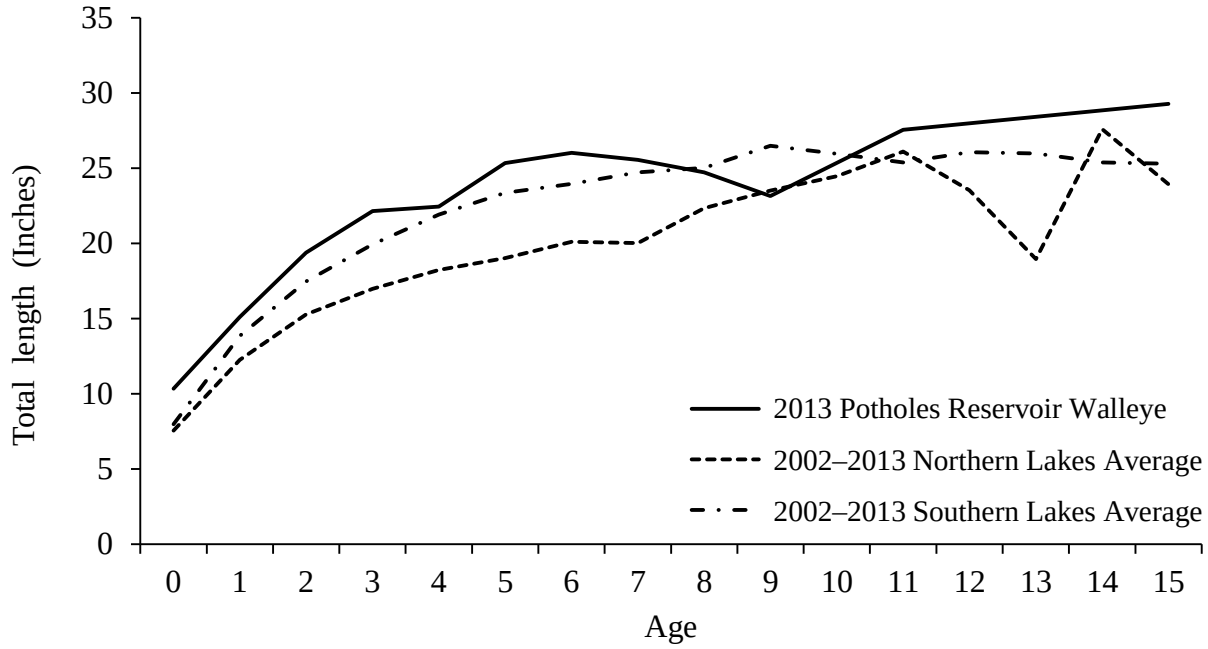

FIGURE 26. Length-at-age (± 80% CI) of Walleye collected during FWIN on Potholes Reservoir in 2013 compared to the Northern and Southern Lakes Average determined from FWIN surveys conducted from 2002–2013.

Fish Community

In addition to Walleye 14 other fish species were collected during the 2013 FWIN survey on Potholes Reservoir. Similar to 2012, Yellow Perch dominated our catch during FWIN on Potholes Reservoir in 2013. Yellow Perch represented 52% of the fish collected in 2013 (65% in 2012) (FIGURE 27). This is a significant change from previous years (18%, 2% and 3% in 2009, 2010 and 2011, respectively). In addition, the average size of Yellow Perch increased in 2013 due to significant changes in the length distribution of the catch as well as the abundance of large Yellow Perch collected. In 2012 the average size of Yellow Perch was 6 inches. In 2013 average length increased to 8 inches. In 2012 we collected 1287 Yellow Perch; however, 64% were less than 5 inches. In 2013 we collected 747 Yellow Perch and all but one were over 5 inches. Not only did we collect fewer small Yellow Perch, we also collected over three times as many Yellow Perch at least 8 inches in 2013. This increase in size should be beneficial to anglers seeking to harvest Yellow Perch on Potholes Reservoir.

With the exception of Yellow Perch and Walleye relatively few other fish were collected during our 2013 FWIN survey of Potholes Reservoir. Brown bullhead, while third in abundance, represented only 10% of the total catch during this survey (FIGURE 27). Since 2009 we have found that as the CPUE of Yellow Perch increased CPUE of Lake Whitefish decreased; however, we have insufficient data to test the significance of this relationship. The reduction of Lake Whitefish in our samples is not necessarily indicative of a reduced population size, but may suggest that Lake Whitefish are exhibiting net avoidance as nets become saturated with Yellow Perch.

While Potholes Reservoir is widely recognized as a world class Walleye fishery it is also one of the most popular bass fisheries (Smallmouth and Largemouth) in Washington. Smallmouth Bass fishing can be very good along the face of O'Sullivan Dam and in Lind Coulee. Excellent Largemouth Bass fishing can be found in the sand dunes at the north end of the reservoir. Black Crappie fishing is popular in the sand dunes of Potholes Reservoir as well as along the docks at MarDon Resort. At the time of this survey we noted an abundance of boat anglers on Potholes Reservoir as well as dock fishermen at MarDon Resort. While speaking to these anglers we learned that perch and crappie fishing had been excellent throughout fall 2013.

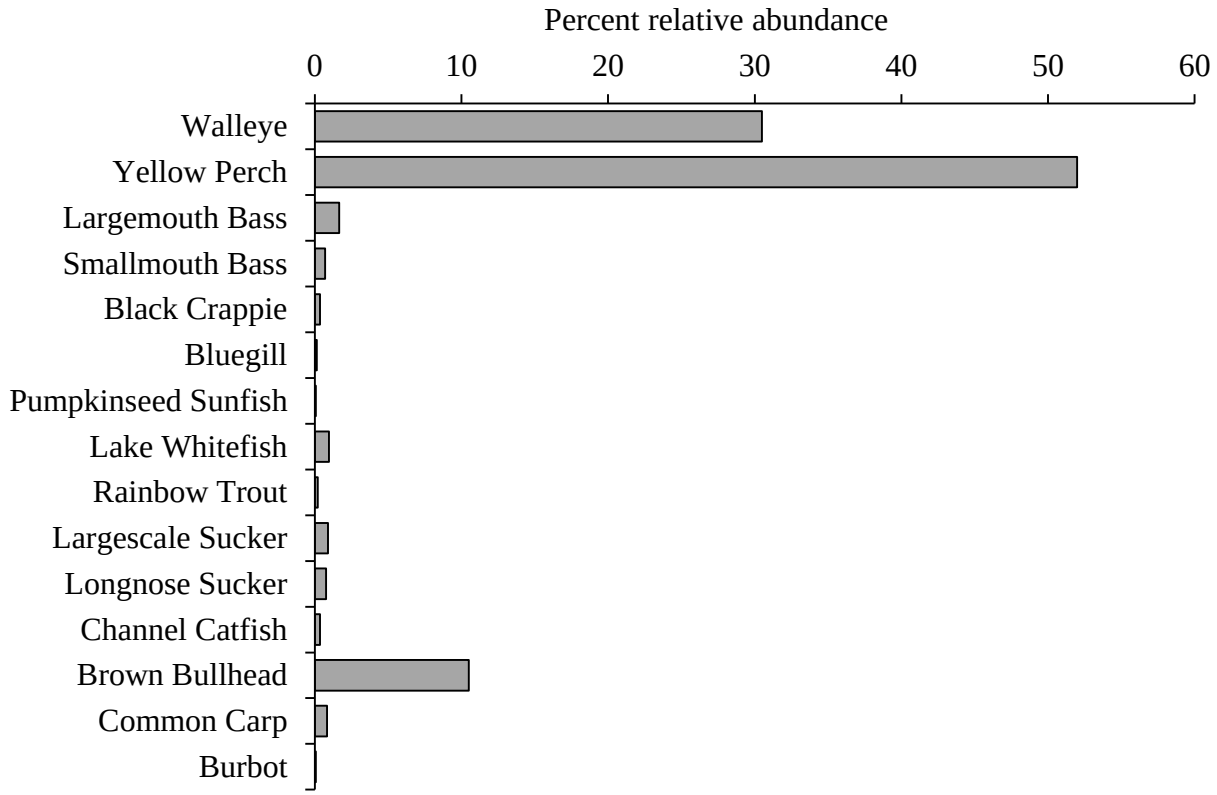

FIGURE 27. Percent relative abundance of the total number of fishes collected during FWIN on Potholes Reservoir in 2013.

Potholes Reservoir Recreational Opportunities

Potholes Reservoir is the home of Potholes State Park and MarDon Resort. Both offer water access for boat launching and shore fishing, as well as camping and RV hook-ups. MarDon Resort also offers cabin rental and a store that sells a wide variety of fishing supplies. Both facilities are in close proximity to the desert lakes and chain lakes directly adjacent to the south side of Potholes Reservoir where anglers can find numerous opportunities for Walleye and bass fishing as well as trout and panfish. Those lakes are relatively small and offer very good shore access for fishing.

Scooteney Reservoir

Walleye Population Sampling

We conducted the 2013 Scooteney Reservoir FWIN survey October 30–31. A total of 12 FWIN nets were set throughout the reservoir and 189 Walleye were collected. The mean Walleye CPUE in 2013 on Scooteney Reservoir was 15.7 fish per net. This is a decline from 2012 and is the second lowest CPUE from all FWIN surveys on Scooteney Reservoir from 2002–13 (FIGURE 28). Since 2010 the mean Walleye CPUE has been below the long-term average; however, it has remained relatively stable since 2002, especially when compared with the yearly fluctuations in Moses Lake and Potholes Reservoir.

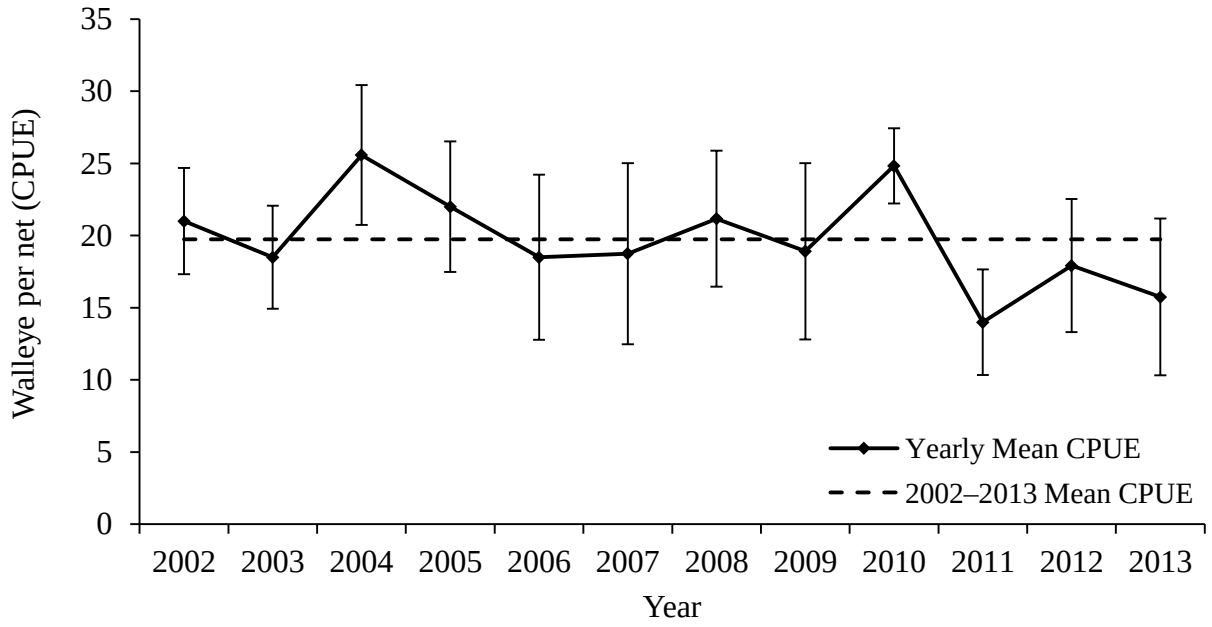

FIGURE 28. Mean (± 80% CI) CPUE for all FWIN surveys on Scooteney Reservoir from 2002–2013 compared to the mean CPUE for all years 2002–2013.

Walleye from Scooteney Reservoir averaged 14 inches in 2013. This is unchanged from 2012 and is equal to the long-term average. The most notable change from 2012 was the decline in relative abundance of 12–16 inch Walleye, (77% to 45%, respectively) which were mostly age-1 fish. In addition, we saw an increase in relative abundance of 8–12 and 16–20 inch Walleye. Approximately 31% of the Walleye collected in 2013 were at least 16 inches. This is nearly double what we found in 2012 (17%) and slightly higher than the long-term average (27%) (FIGURE 29). Scooteney Reservoir typically produces fewer large Walleye than Moses Lake or Potholes Reservoir; however, anglers should find excellent opportunities for 16–20 inch Walleye in 2014.

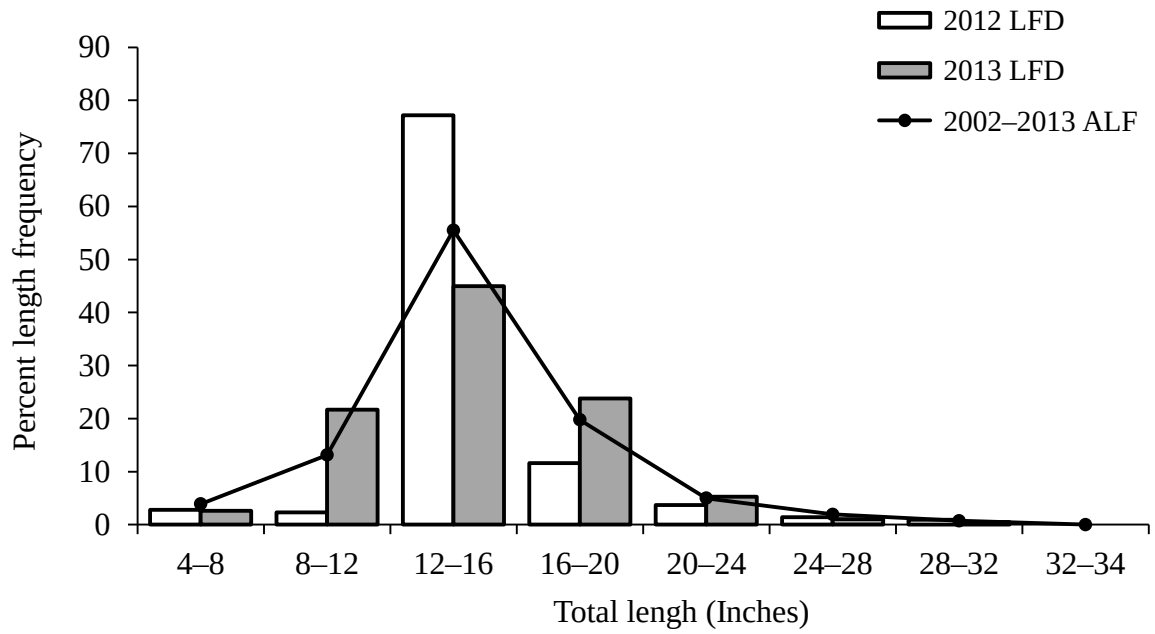

FIGURE 29. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Scooteney Reservoir in 2013 compared to 2012 and the average length frequency (ALF) from all FWIN surveys on Scooteney Reservoir from 2002–2013.

Walleye ranged in age from 0 to 11 years and 7 year classes were collected in 2013 on Scooteney Reservoir. Similar to other FWIN waters the age-1 year class was the most abundant collected in 2013 on Scooteney Reservoir. However, with the exception of the age-0 and age-4 year classes none were above the long-term average (FIGURE 30). We only collected two Walleye older than age-4; these fish were age-9 and age-11. Since 2002 the vast majority of Walleye sampled from this population (97%) have been age-4 and younger. The age-1 year class is primarily comprised of Walleye 13–16 inches and should provide anglers with good fishing opportunities.

FIGURE 30. Percent age distribution of Walleye collected during FWIN on Scooteney Reservoir in 2013 compared to 2012 and the average age distribution from all FWIN surveys on Scooteney Reservoir from 2002–2013.

Of the 189 Walleye collected in Scooteney Reservoir a total of 40 (21%) were mature. Of these, 11 were female and 29 were male. Male Walleye began to mature in fall as age-1 fish and by age-2 79 % were mature. Female Walleye did not begin to mature until age-3. By fall as age-3 100 % of both male and female Walleye were mature. As stated previously, only two Walleye older than age-4 were collected on Scooteney Reservoir in 2013. Both of those fish were mature females (FIGURE 31).

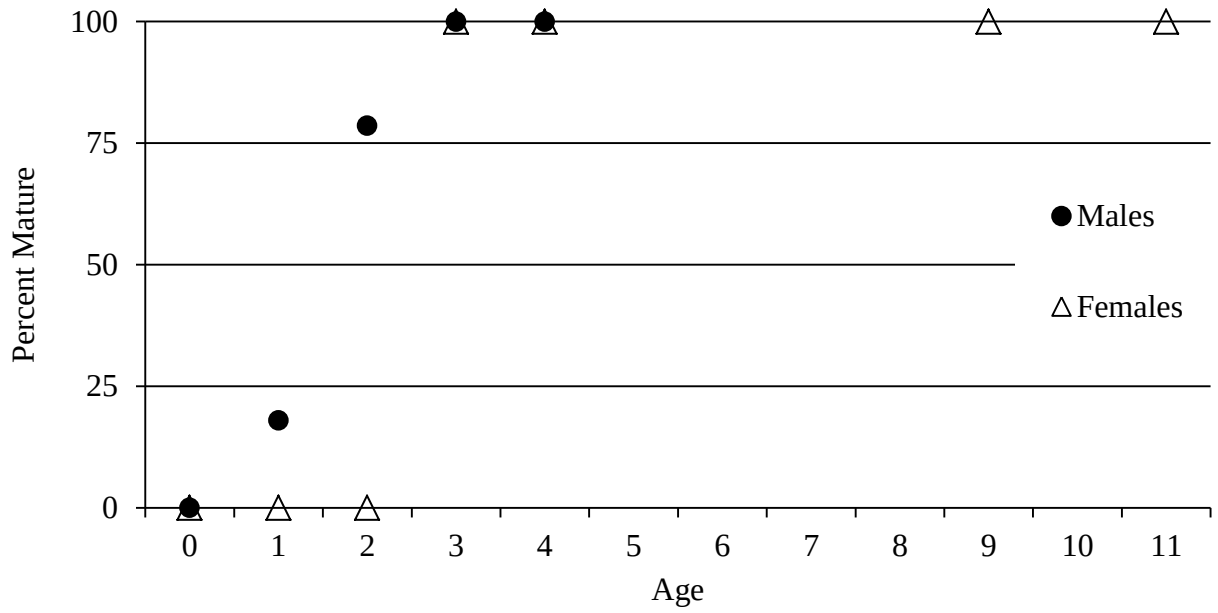

FIGURE 31. Percent of mature male and female Walleye at each age-class collected during FWIN on Scooteney Reservoir in 2013. Note: No male Walleye and only two female Walleye over age-4 were collected from Scooteney Reservoir in 2013.

Length-at-age of Walleye in Scooteney Reservoir was near the southern lakes average for most age-classes, with Walleye reaching 16 inches by fall as age-2 (FIGURE 32). The majority (89%) of Walleye collected were age-2 and under and only two Walleye over age-4 were collected. The lack of older Walleye in our samples, combined with fast growth rates, could be an indication of overharvest of larger fish. Most Walleye in Scooteney Reservoir were young fish in the 12–20 inch range.

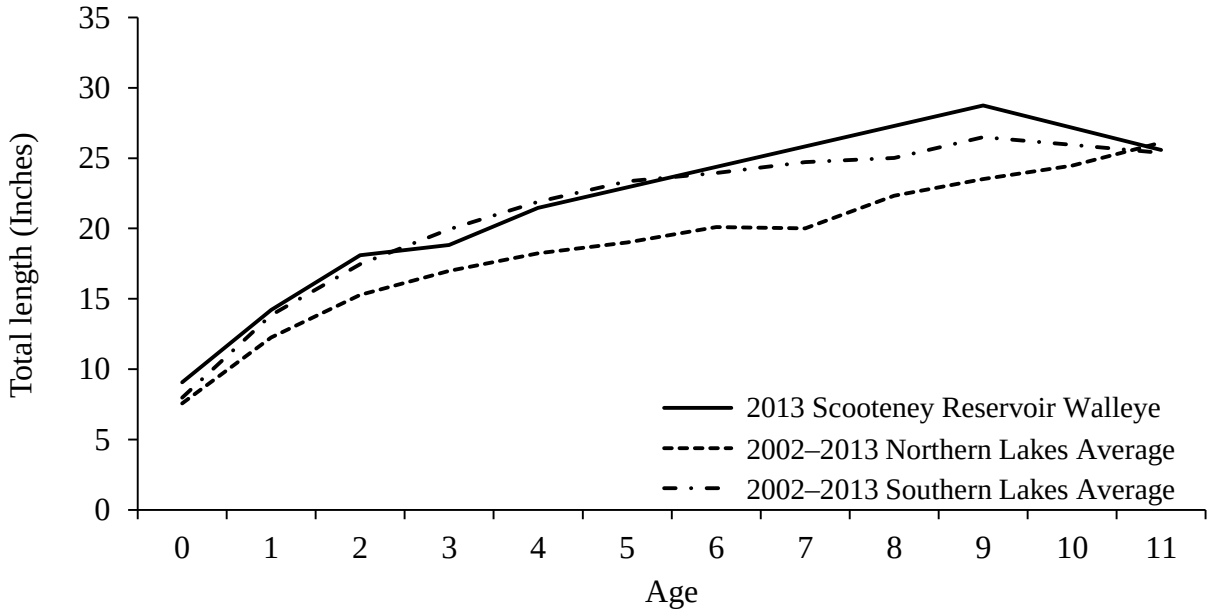

FIGURE 32. Average length-at-age (± 80% CI) of Walleye collected during FWIN on Scooteney Reservoir in 2013 compared to the Northern and Southern Lakes Average determined from FWIN surveys conducted from 2002–2013.

Fish Community

In addition to Walleye, Yellow Perch dominated the catch in 2013 on Scooteney Reservoir. This is similar to our results in 2012; however the relative abundance of Yellow Perch in our samples has declined from 52% in 2012 to 23% in 2013. In 2012 we collected 228 Yellow Perch at least 5 inches. In 2013 this number dropped to 73. The percentage of Yellow Perch at least 8 inches was 40% in 2012 and 18% in 2013. While the relative abundance and average size of Yellow Perch has declined in Scooteney Reservoir, anglers will continue to have good opportunities to catch some large Yellow Perch. Ten other fish species were collected; however; similar to 2012, none represented more than 6% of the total catch (FIGURE 33).

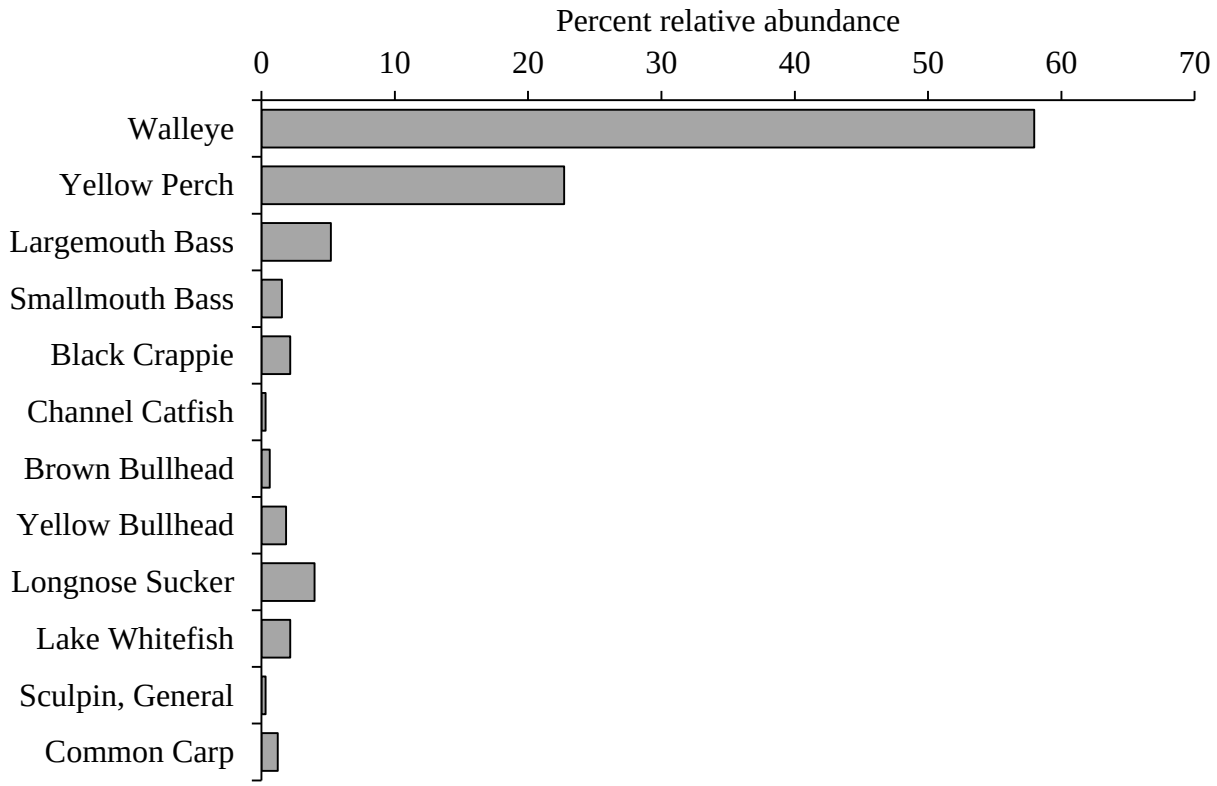

FIGURE 33. Percent relative abundance of the total number of fishes collected during FWIN on Scooteney Reservoir in 2013.

Scooteney Reservoir Recreational Opportunities

Water access is plentiful at Scooteney Reservoir, with abundant shore fishing and several boat ramps, including a double paved ramp with a launching float at the Bureau of Reclamation Park. That park also has a meticulously maintained grassy day-use area with picnic tables, overnight camping and RV hook-ups.

Conclusions

In speaking to many anglers and fishing clubs we have found that there is a strong catch-and-release mentality among many anglers. Our data on Walleye populations over the past 12 years indicate that these populations can tolerate much more harvest. As mentioned many times in this report, we encourage anglers to harvest more Walleye. It will greatly benefit our large Walleye populations in the long term.

In 2006 we raised the daily limit to 8 Walleye per day on Lake Roosevelt, Potholes Reservoir, and Moses Lake. Unfortunately, few anglers took advantage of this as the results from our two-year creel survey on Potholes Reservoir and Moses Lake indicated that very few anglers ever retained a limit of Walleye. Creel surveys on FDR indicated that Walleye harvest was approximately 50,000 Walleye annually, which was 1/3 of the management goal. In 2013 we raised the Walleye daily limit to 16 fish and removed size restrictions. In addition, we opened the Spokane Arm during the Walleye spawning season (April and May). These regulations were liberalized in order to accomplish two primary management goals: Improve Walleye growth and condition and bring about a balance in the predator/prey fish community. We are relying on anglers to help us achieve these management goals.

Based on the results of the 2013 FWIN Walleye abundance was high on all of our FWIN lakes and we continue to encourage anglers to harvest more Walleye. Too many Walleye in a population can have a negative impact on the rest of the fish community, which will in turn negatively impact the Walleye population as forage is reduced. Routine monitoring of these fisheries, through the use of FWIN sampling as well as creel surveys, will ensure that we are not negatively impacting Walleye populations and that we are maintaining balance in these fish communities.

Besides Walleye, Yellow Perch, Smallmouth Bass and Lake Whitefish were abundant in several of our FWIN lakes. Yellow Perch populations are quite cyclical; however, perch fishing on Banks Lake and Moses Lake can be excellent at times. Smallmouth Bass are abundant, and anglers report excellent fishing for them on all our FWIN lakes with the exception of Scooteney Reservoir. Lake Whitefish are very abundant on FDR, Banks Lake, and Potholes Reservoir, yet are underutilized by most angler groups. There is a small, but dedicated, group of wintertime Lake Whitefish anglers on Banks Lake who target whitefish under the ice. We are trying to encourage anglers to diversify their angling experiences by fishing for, and harvesting, more Lake Whitefish, which are excellent eating, particularly when smoked.

This report serves as a status update on popular Walleye fisheries in Washington and also as an informational guide on other fisheries in these lakes. For further details on the FWIN surveys conducted on various waters please contact regional warmwater fisheries biologists.

Acknowledgements

The FWIN surveys are very labor-intensive and require numerous volunteers and staff to complete this work. Planning for these surveys often begins in mid-summer and without a large pool of both volunteers and staff we would not be able to complete these surveys in a timely manner.

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If you are interested in volunteer opportunities, have questions about our FWIN surveys or would like additional copies of this report please contact the following regional warmwater fisheries biologists.

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