Results from the 2014 Fall Walleye Index Netting Surveys in Washington State

Washington Department of FISH and WILDLIFE

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Cover photos: Boat crew retrieve a FWIN net on Moses Lake. Left inset: Mike Meseberg of MarDon Resort holds a Potholes Reservoir Walleye. Lower right: WDFW biologist displays a Walleye collected on Lake Roosevelt.

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Abstract

Understanding the dynamics and monitoring trends of fish populations managed for recreational fishing is an important component of effective fisheries management. We conducted Fall Walleye Index Netting (FWIN) surveys on five important Walleye *Sander vitreus* lakes in central and eastern Washington (Lake Roosevelt, Banks Lake, Moses Lake, Potholes Reservoir and Scooteney Reservoir in fall 2014 to monitor population abundance and biological parameters of Walleye. Walleye abundance increased from 2013 on all waters except Banks Lake. Moses Lake and Potholes Reservoir had the most significant increases in Walleye abundance from 2013. These increases were due to the higher than average relative abundance of age-0 Walleye collected in 2014. Moses Lake, Potholes Reservoir and Scooteney Reservoir had the highest percentage of Walleye at least 16 inches and had the fastest growing fish, with Walleye reaching 18 inches by fall at age–2. In addition to Walleye, Lake Whitefish were very abundant in Lake Roosevelt and Banks Lake, representing 28% and 33% of the total fish collected during FWIN on those waters, respectively. Yellow Perch were very abundant on Moses Lake, Potholes Reservoir, and Scooteney Reservoir with a high percentage over 8 inches. Walleye anglers should find excellent fishing opportunities on all our FWIN waters; however; anglers in search of larger Walleye should focus on Moses Lake and Potholes Reservoir.

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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.

The Washington Department of Fish and Wildlife (WDFW) 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.

Potholes Reservoir Walleye

Each fall since 2002, we have collected biological information on Walleye from five populations in central and eastern Washington. This information has helped us develop and shape Walleye angling regulations specific to those populations. Our principle goals are to maximize recreational opportunity and maintain healthy fish communities where Walleye are a primary predator.

This report summarizes our findings from the 2014 FWIN surveys in Washington and provides anglers with updates on popular fisheries on FWIN lakes in Washington.

Methods

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

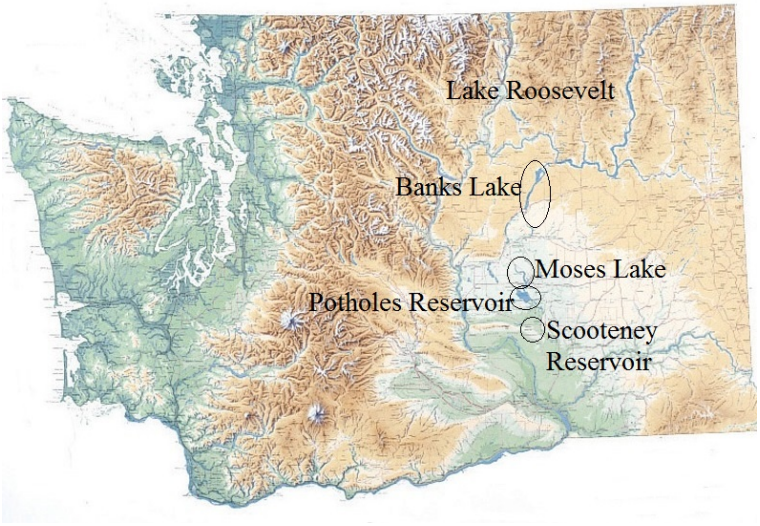

FIGURE 1. Map of FWIN lakes in Washington

The number of nets set per lake is based on two factors: Lake surface area and the number of Walleye collected. The recommended number of nets set per lake is based on lake acreage, with larger lakes receiving more sampling effort than smaller lakes (TABLE 1). This is to ensure that sampling effort is apportioned equally for each lake.

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 continue FWIN sampling until 300 Walleye are collected or the recommended number of net sets is achieved, whichever occurs 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 is necessary in order to make a detailed assessment of the Walleye population on FDR due to its size and habitat diversity.

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

Net set locations are randomly chosen in order to not bias Walleye catch rates and each site is sampled once. Each FWIN net consists 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. 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 overnight. 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). Sex and sexual maturity were determined by features described in Duffy et al. (2000). Otoliths were removed from all Walleye for age determination.

Mean catch-per-unit-effort (CPUE ± 80% CI) is determined by enumerating the total number of Walleye collected and dividing by the total number of net sets. The 80% confidence intervals are 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 (2002–2014) mean CPUE for each lake. It is important to understand that increases in Walleye abundance are primarily due to increases in Walleye production (age–0 Walleye); however; this increase is not detected until Walleye grow to a size that allows us to catch them effectively in gill nets. This is referred to as *recruiting to the gear*. Walleye typically recruit to FWIN nets at 8–12 inches (around age–1); however; in populations with faster growth (e.g. Moses Lake and Potholes Reservoir) this often occurs at age–0. Increases in Walleye abundance in a population may also be due to immigration of Walleye into a lake from a connected system. Our FWIN waters are connected via the Columbia Basin Irrigation Project; however; the degree to which immigration of Walleye affects population abundance is poorly understood. Our data suggest that increases in abundance are primarily due to increases of young fish.

Length frequency distribution is determined by enumerating the number of Walleye collected at each 4-inch 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 (Responsive Management 2013).

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 where necessary. 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 age-class.

Length-at-age is 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 2002–2014. 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 sampled using other sampling methods. In addition, lengths of Smallmouth Bass collected in gill nets tend to be higher than those collected via boat electrofisher.

Results and Discussion

In 2014, the mean CPUE for all FWIN lakes combined was 27 Walleye per net. This is an increase from 2013 (17) and 2012 (18) and is the highest average CPUE since 2002 when the average was 27 Walleye per net. The only lake which did not have an increase in Walleye CPUE was Banks Lake which remained at 7 Walleye per net. The most dramatic increases in Walleye CPUE occurred on Moses Lake and Scooteney Reservoir (FIGURE 2).

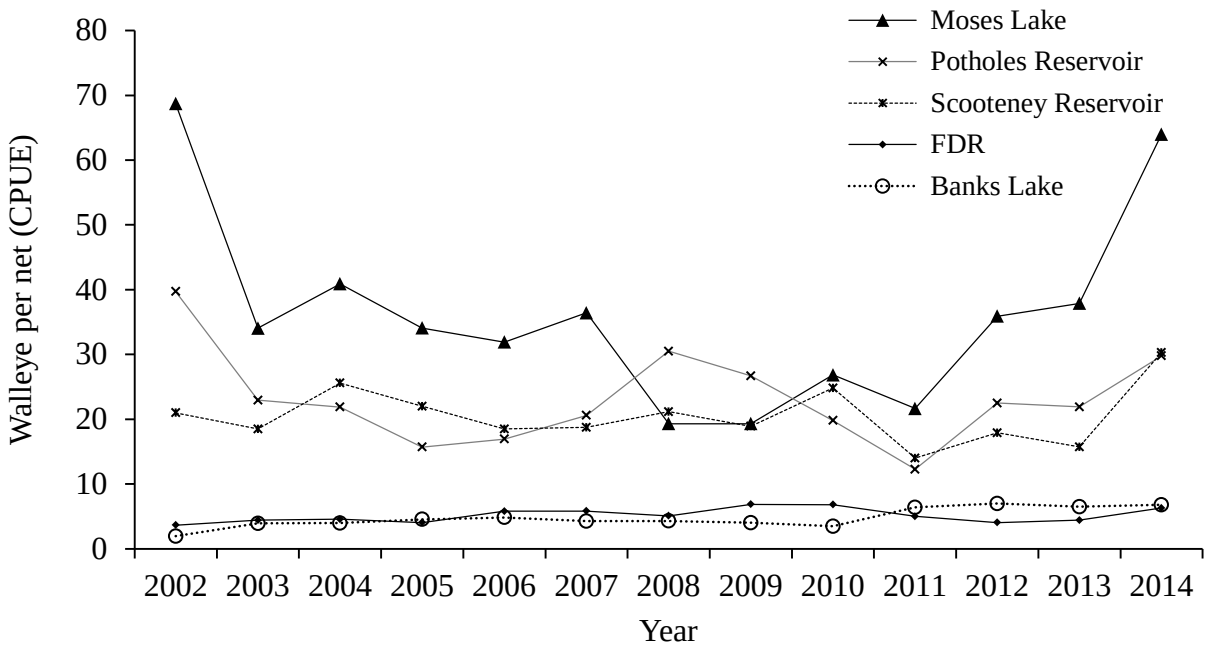

FIGURE 2. Distribution of Walleye CPUEs from FWIN surveys on Washington FWIN lakes 2002–2014.

Approximately 31% of the Walleye collected from all lakes were at least 16 inches. Moses Lake, Potholes Reservoir and Scooteney Reservoir had the three highest percentages of Walleye at least 16 inches, respectively. Banks Lake and FDR had the two lowest percentages, respectively (FIGURE 3).

In 2014 the age–0 year-class was the most abundant collected on Moses Lake and Potholes Reservoir, representing 40% and 43% of the Walleye collected, respectively. The age–1 Walleye year-class was the most abundant collected on FDR and Scooteney Reservoir, representing 60% and 47% of the Walleye collected, respectively and the age–2 year-class was the most abundant collected on Banks Lake (83%).

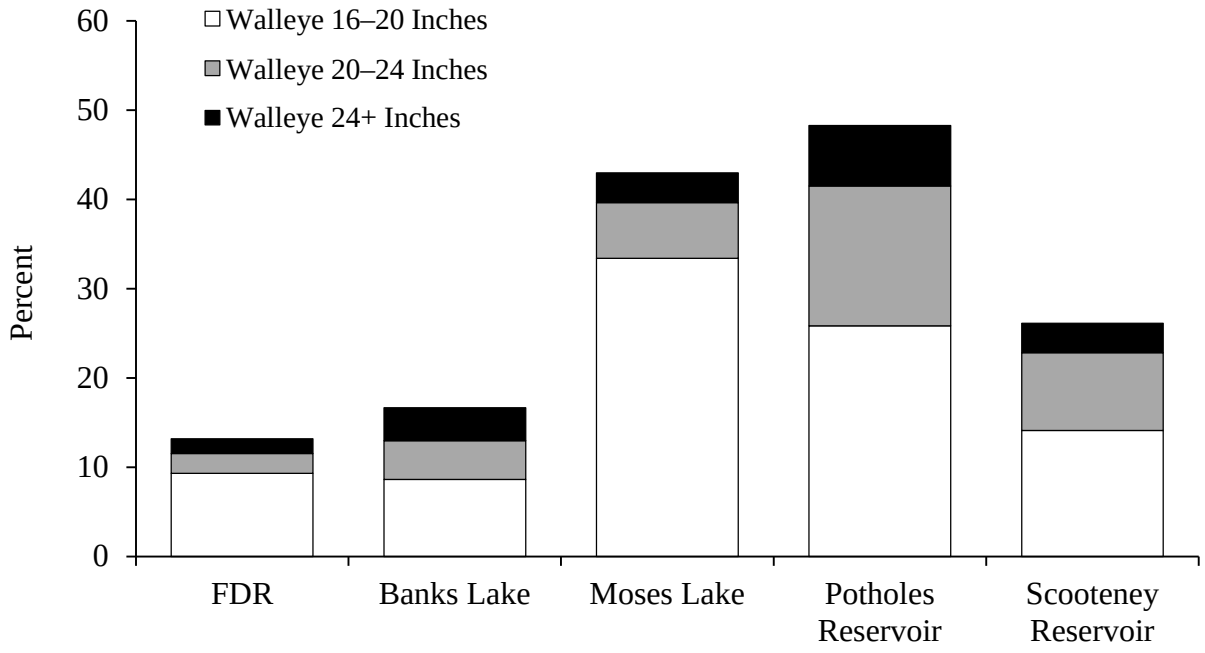

FIGURE 3. Percent of Walleye collected in three size classes during FWIN surveys in 2014. This figure excludes Walleye less than 16 inches.

On average, 50% of male and female Walleye collected in Moses Lake, Potholes Reservoir and Scooteney Reservoir 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–5.

Length-at-age of Walleye in Moses Lake, Potholes Reservoir, and Scooteney Reservoir was above the regional average with Walleye reaching 18 inches by fall as age–2. Length-at-age of Walleye in FDR and Banks Lake was below average with most Walleye reaching 16 inches by age–3.

Lake Roosevelt (FDR)

Walleye Population Sampling

We conducted the 2014 FDR FWIN survey November 3–7. A total of 150 FWIN nets were set throughout the lake and 1,034 Walleye were collected. The mean Walleye CPUE was 6.9 fish per net (FIGURE 4), which is an increase from 2013 (4.4 Walleye per net) and is above the long–term average (5.1 Walleye per net). This increase was due to higher catch rates of age–1 Walleye (FIGURE 6).

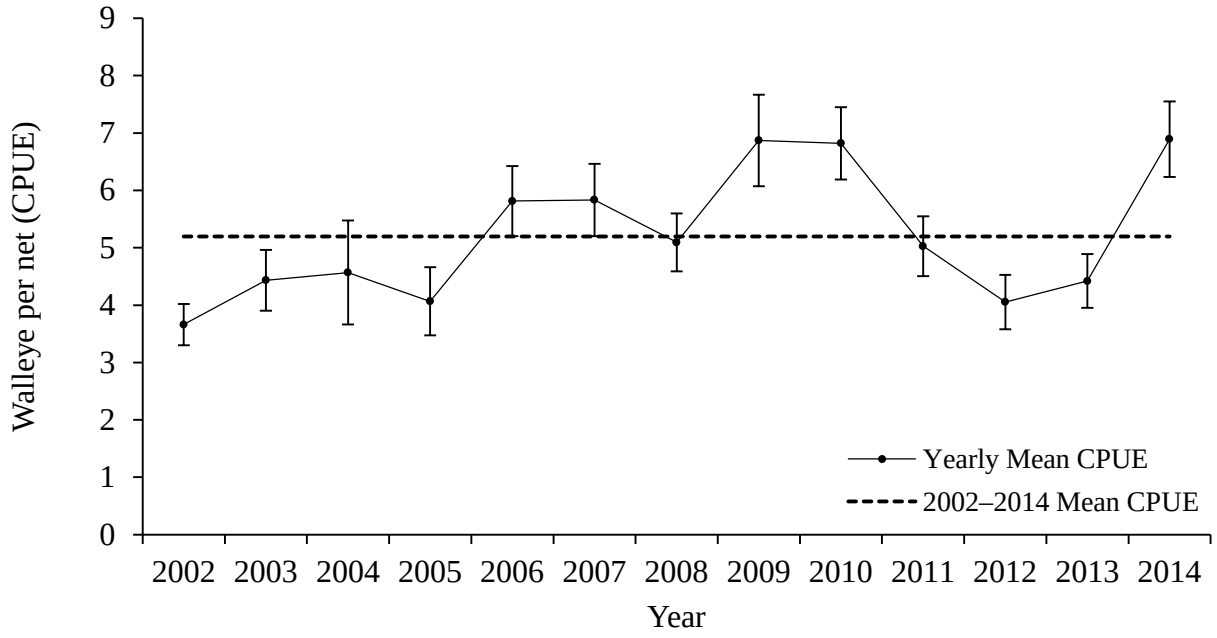

FIGURE 4. Mean (± 80% CI) CPUE for all FWIN surveys on FDR from 2002–2014 compared to the mean CPUE for all years 2002–2014.

Walleye collected during FWIN on FDR averaged 13 inches in 2014. This is a decrease from 2013 and the long-term (2002–2014) average (14 inches). Only 13% of the Walleye collected in 2014 were at least 16 inches, which was approximately 50% less than in 2013 (FIGURE 5). The relative abundance of 8–12 inch Walleye increased nearly 3-fold in 2014, and while Walleye in the 12–16 inch range decreased in relative abundance they represented 38% of the Walleye collected. Overall Walleye abundance was above the long-term average in 2014; however; there will likely be fewer Walleye above 16 inches available for harvest in 2015.

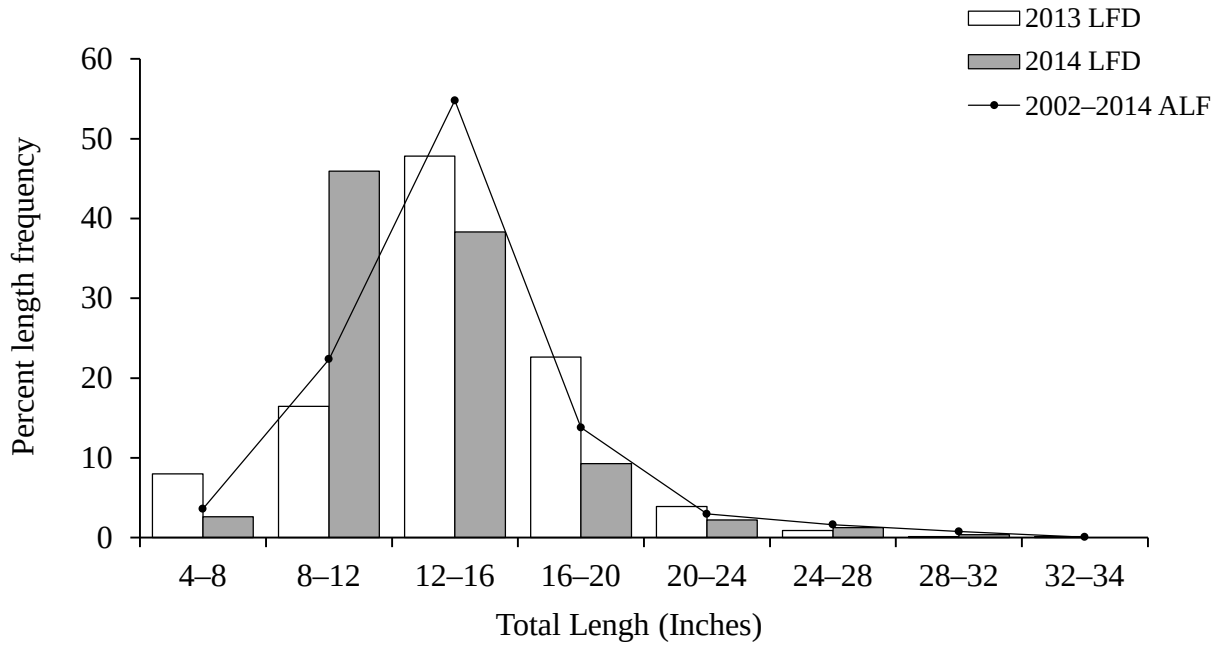

FIGURE 5. Percent length frequency distribution (LFD) of Walleye collected during FWIN on FDR in 2014 compared to 2013 and the average length frequency (ALF) from all FWIN surveys on FDR from 2002–2014.

A total of 12 age-classes were collected during the 2014 FWIN survey, ranging from 0 to 17 years. Walleye aged 11, 12, 14, 15 and 16 were not collected. The age–1 and 2 year-classes were the most abundant collected in 2014 and the age–1 and 5 year-classes were above average in relative abundance (FIGURE 6). The age–5 year-class was a strong year-class representing 7% of the Walleye collected. This is the highest percentage of age–5 Walleye ever collected on FDR. Walleye beyond age–5 were low in abundance and represented only 5% of our total Walleye catch in 2014.

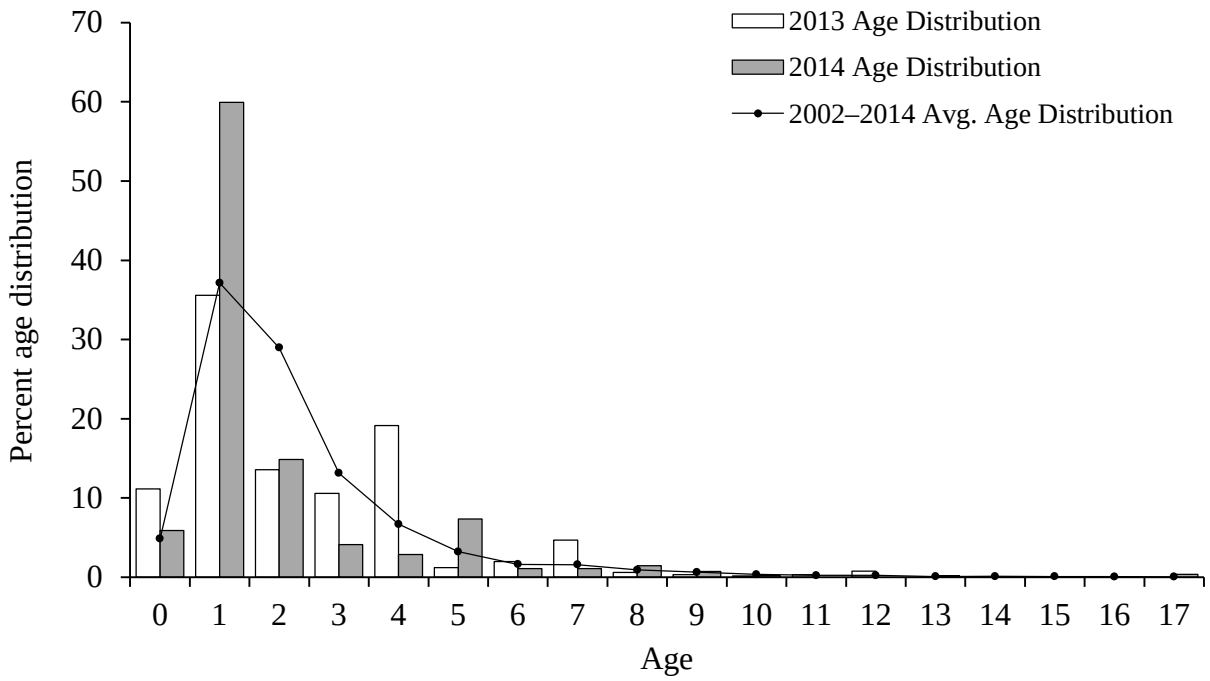

FIGURE 6. Percent age distribution of Walleye collected during FWIN on FDR in 2014 compared to 2013 and the average age distribution from all FWIN surveys on FDR from 2002–2014.

Of the 1,034 Walleye collected in FDR a total of 206 (20%) were mature. Of these, 170 were male and only 36 were female. Male Walleye in FDR began to mature by fall as age–2 fish. By fall as age–3 70% of male Walleye were mature and by age–5 100% were mature. Female Walleye were slower to mature reaching 62% maturity by fall as age–5 and 100% by age–6. When compared to other Washington FWIN waters female Walleye in FDR were the slowest to mature. Walleye populations with slow growth and maturity are more sensitive to weak year-classes since proportionally fewer fish in the population are mature and it takes several years for fish to become mature.

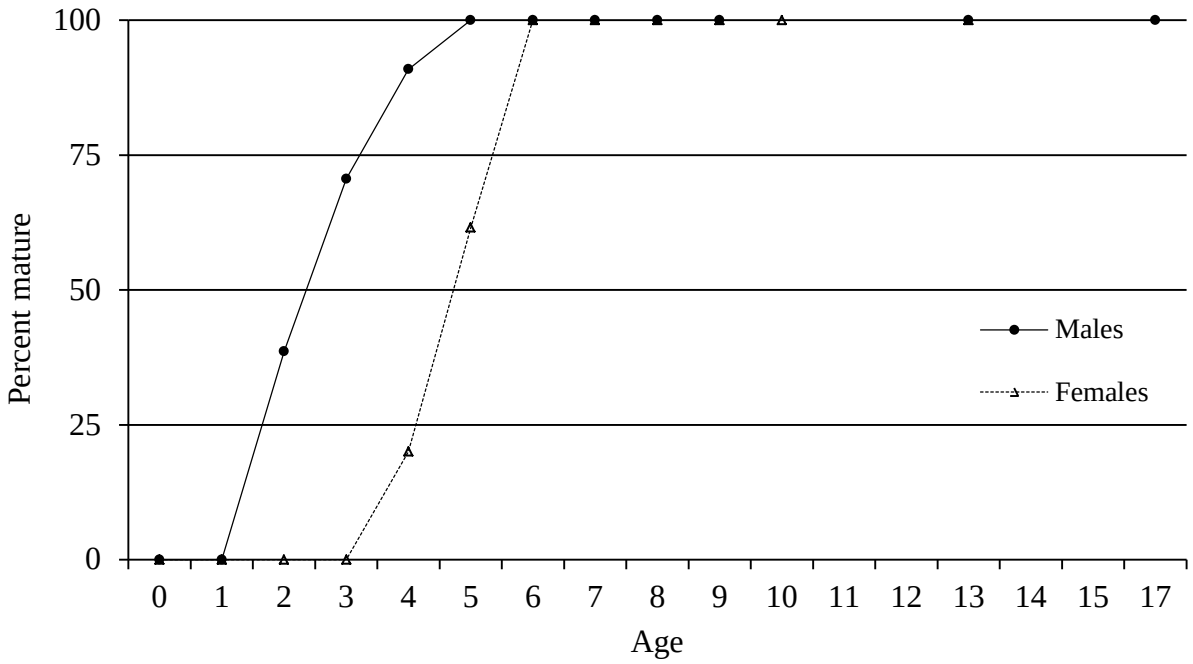

FIGURE 7. Percent of mature male and female Walleye at each age-class collected during FWIN on FDR in 2014.

Length-at-age of Walleye collected from FDR in 2014 was near the *northern lakes average* for age–0, 1 and 2 Walleye, while age–3, 4 and 5 Walleye were below average. We only collected 30 Walleye over age–5 in 2014 and beyond age–5 there was a great deal of variation in length-at-age and no consistent trend was detected (FIGURE 8). 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.

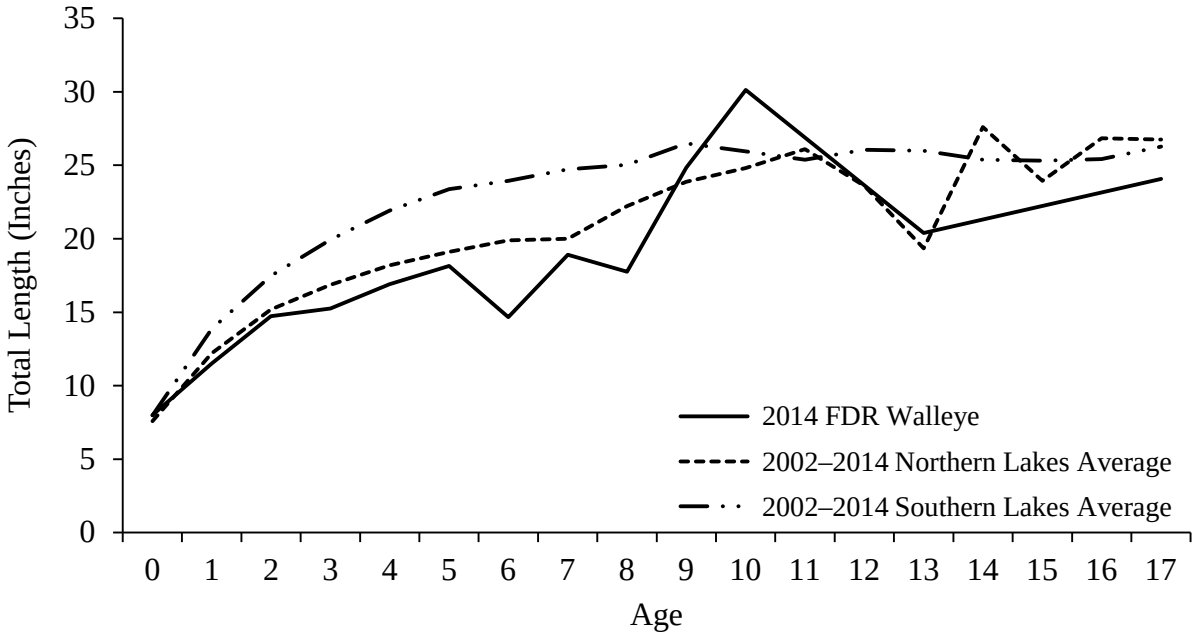

FIGURE 8. Average length-at-age of Walleye collected during FWIN on FDR in 2014 compared to the Northern and Southern Lakes Average from FWIN surveys conducted from 2002–2014.

Fish Community

In addition to Walleye, which was the most abundant species collected, 15 other fish species were collected during the 2014 FWIN survey on FDR, and anglers can expect to find diverse fishing opportunities (FIGURE 9). Lake Whitefish was second in abundance and represented 28% of the total catch followed by Smallmouth Bass (10%) and Longnose Sucker (9%). The remaining species ranged from less than 1% to 7% 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.

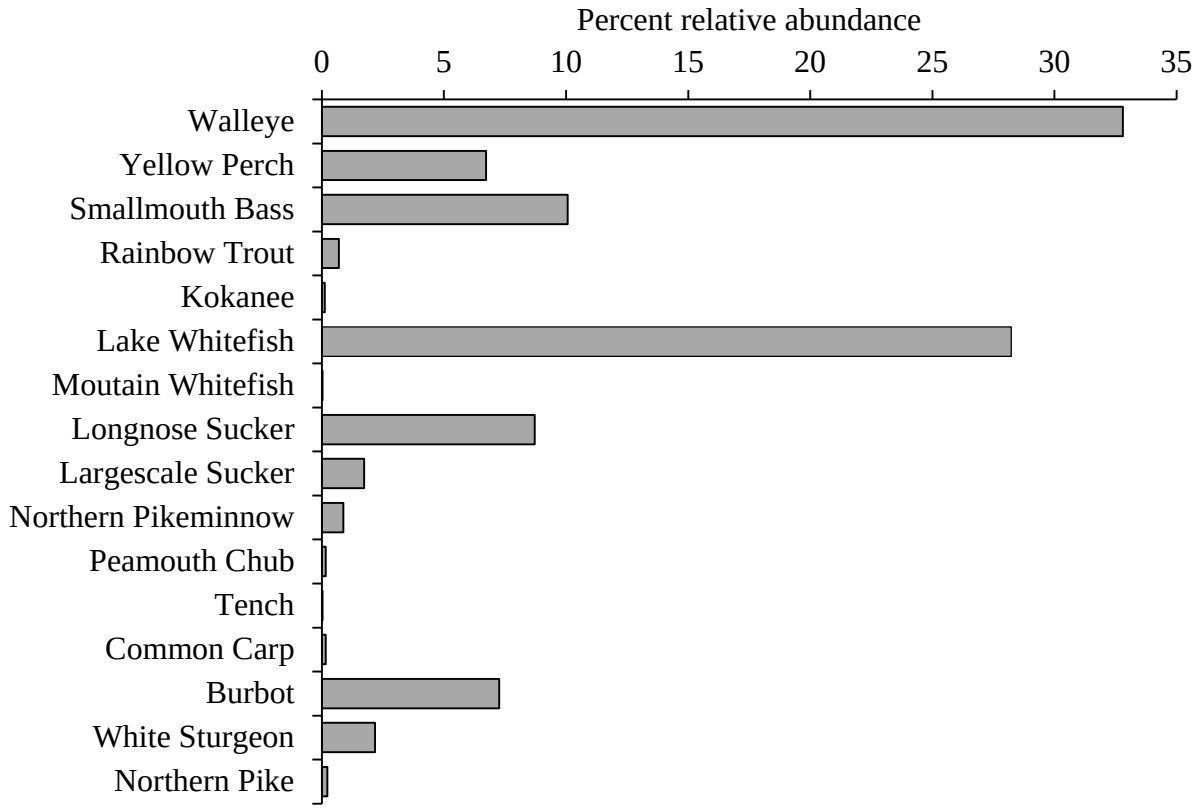

FIGURE 9. Percent relative abundance of the total number of fishes collected during FWIN on FDR in 2014.

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 2014 Banks Lake FWIN survey October 13–16. A total of 48 FWIN nets were set throughout the lake and 327 Walleye were collected. The mean Walleye CPUE in 2014 on Banks Lake was 6.8 fish per net (FIGURE 10). This is a slight increase from 2013, and is the second highest CPUE of all FWIN surveys on Banks Lake. The increase in Walleye CPUE began in 2011 and corresponded to the 30-foot drawdown of Banks Lake, which concentrated fish. Since 2012, higher than average CPUE of Walleye has been due to a large year-class of Walleye that has represented 60–83% of our total catch.

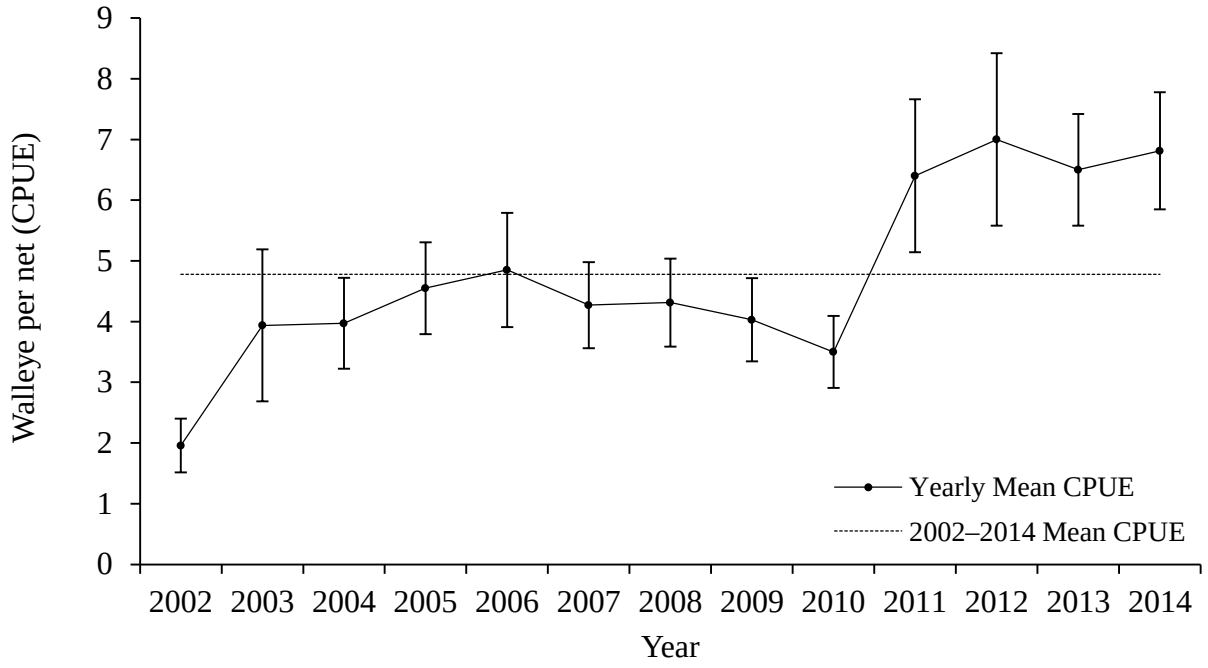

FIGURE 10. Mean (± 80% CI) CPUE for FWIN surveys on Banks Lake from 2002–2014 compared to the mean CPUE for all years 2002–2014.

Walleye collected during FWIN on Banks Lake averaged nearly 15 inches in 2014. This was an increase from 2013 (14 inches) and was consistent with the long-term average. Approximately 76% of Walleye collected were in the 12–16 inch range (FIGURE 11), and were primarily age–2 fish (FIGURE 12). Only 17% of the Walleye collected were at least 16 inches. This is a decline from 2013 and is the lowest percentage of larger Walleye collected during FWIN surveys on Banks Lake since 2002. These results indicate that anglers will likely encounter fewer large Walleye in 2015 and 2016 in Banks Lake.

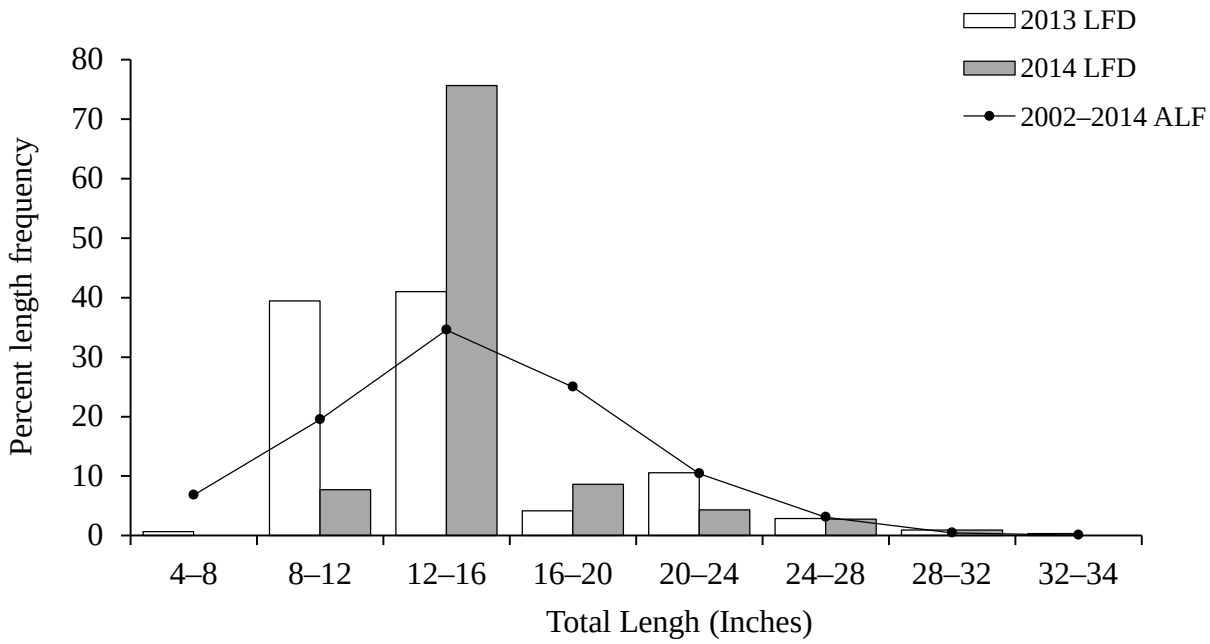

FIGURE 11. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Banks Lake in 2014 compared to 2013 and the average length frequency (ALF) from all FWIN surveys on Banks Lake from 2002–2014.

A total of 10 age-classes were collected during the 2014 FWIN survey, ranging from 1 to 12 years. Walleye aged 10 and 11 were not collected. The age–2 year-class represented 83% of the Walleye collected in 2014. This is consistent with 2013 when age–1 Walleye represented 80% of the Walleye collected. Relatively few older age Walleye were collected and no age–0 Walleye were collected in 2014. Ten age–8 Walleye were collected and this year-class has been strong since 2006 when these fish were age–0. Low numbers of age–0 Walleye in our samples does not necessarily give us cause for concern. From 2007 to 2011 only 12 age–0 Walleye were collected in FWIN surveys on Banks Lake. This was followed by a year in which we collected 200 age–0 Walleye; these fish are now age–2. It is likely that we underestimate the relative abundance of age–0 Walleye in many of our lakes since these fish are not as effectively collected in gill nets due to their small size.

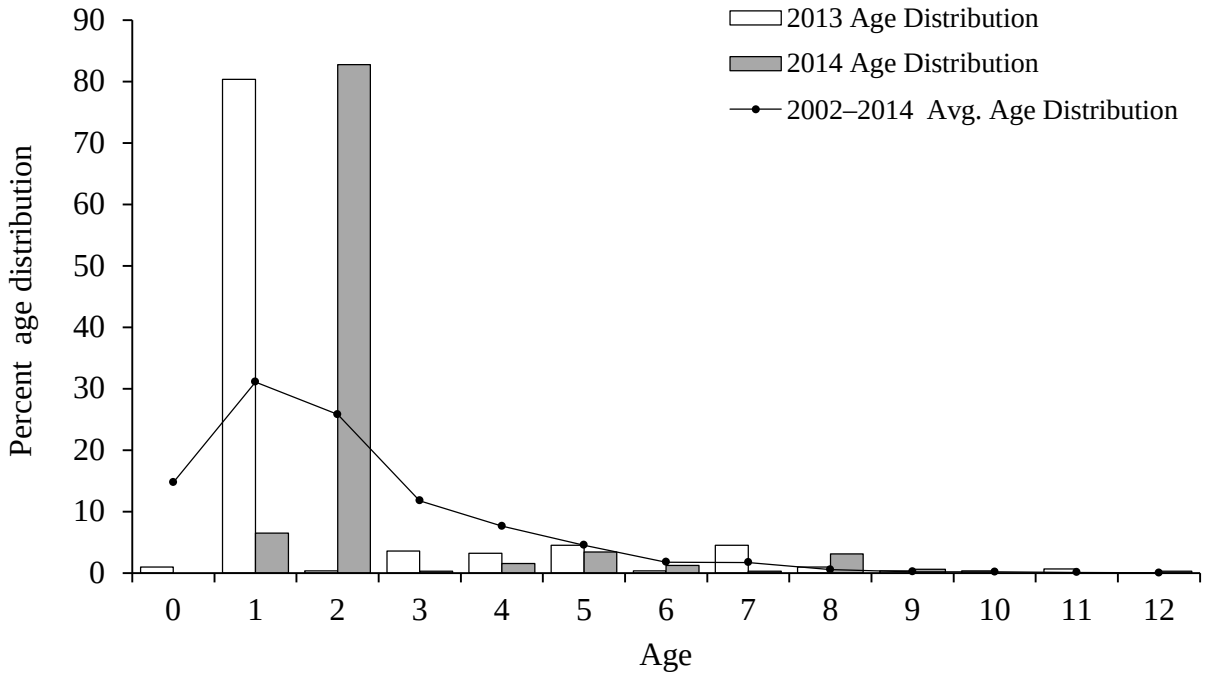

FIGURE 12. Percent age distribution of Walleye collected during FWIN on Banks Lake in 2014 compared to 2013 and the average age distribution from all FWIN surveys on Banks Lake from 2002–2014.

Of the 327 Walleye collected in Banks Lake a total of 38 (11%) were mature. Of these, 13 were female and 25 were male. A small percentage of male Walleye were mature by fall as age–2 fish and 100% were mature by fall as age–4 fish (FIGURE 13). Approximately 25% of female Walleye were mature by fall as age–4 fish and 80% were mature by age–5. We only collected 2 age–6, female Walleye and both were immature. This is a very uncommon occurrence and would require much more information to determine the cause of this anomaly. Collecting low numbers of adult fish prevents us from accurately determine the age at which the majority of Walleye mature.

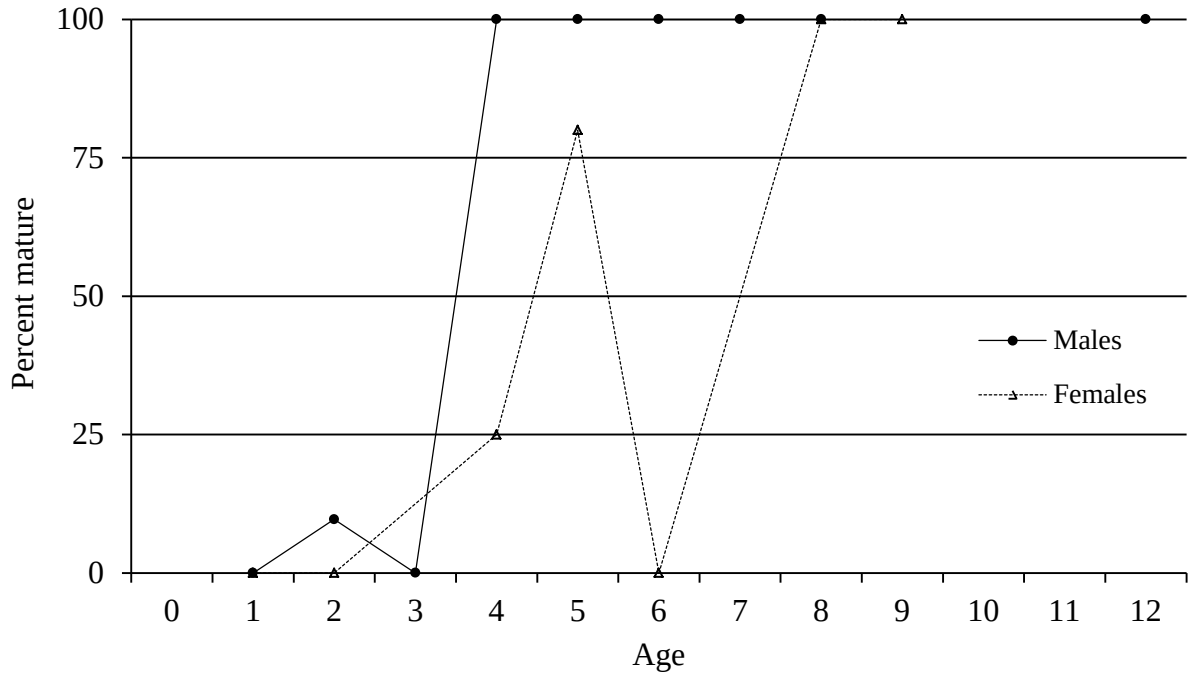

FIGURE 13. Percent of mature male and female Walleye at each age-class collected during FWIN on Banks Lake in 2014.

Length-at-age of Walleye collected from Banks Lake in 2014 was higher than the *northern lakes average* for most year-classes with Walleye reaching nearly19 inches by fall as age–4 fish (FIGURE 14). No age–0 Walleye and only 35 Walleye over age–2 were collected in 2014. Small samples of fish at these age-classes created inconsistent 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 2014 compared to the Northern and Southern Lakes Average determined from FWIN surveys conducted from 2002–2014.

Fish Community

In addition to Walleye, which was third in abundance, 13 other fish species were collected during our 2014 FWIN survey on Banks Lake. Lake Whitefish was the most abundant species collected and represented 34% of the total catch in 2014. The relative abundance of Lake Whitefish has increased since 2013 and represents an important resource for anglers.

Yellow Perch was second in abundance, representing 24% of the total catch. Our overall catch of Yellow Perch reduced by half since 2013; however; average size increased from 7 inches, in 2013, to 10 inches in 2014. Other species ranged in abundance from 1% to 4% of the total catch.

Despite their abundance, large size (average weight 2 ½ pounds in 2014), and palatability, few anglers exploit Lake Whitefish on 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. In winter 2014 WDFW biologists created an instructional

video on fishing for Lake Whitefish on Banks Lake. That video can be found on WDFW's YouTube channel https://www.youtube.com/watch?v=ubC64vGneAo .

Similar to FDR, Banks Lake is an important Smallmouth, and Largemouth Bass fishery hosting several bass tournaments each year. 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.

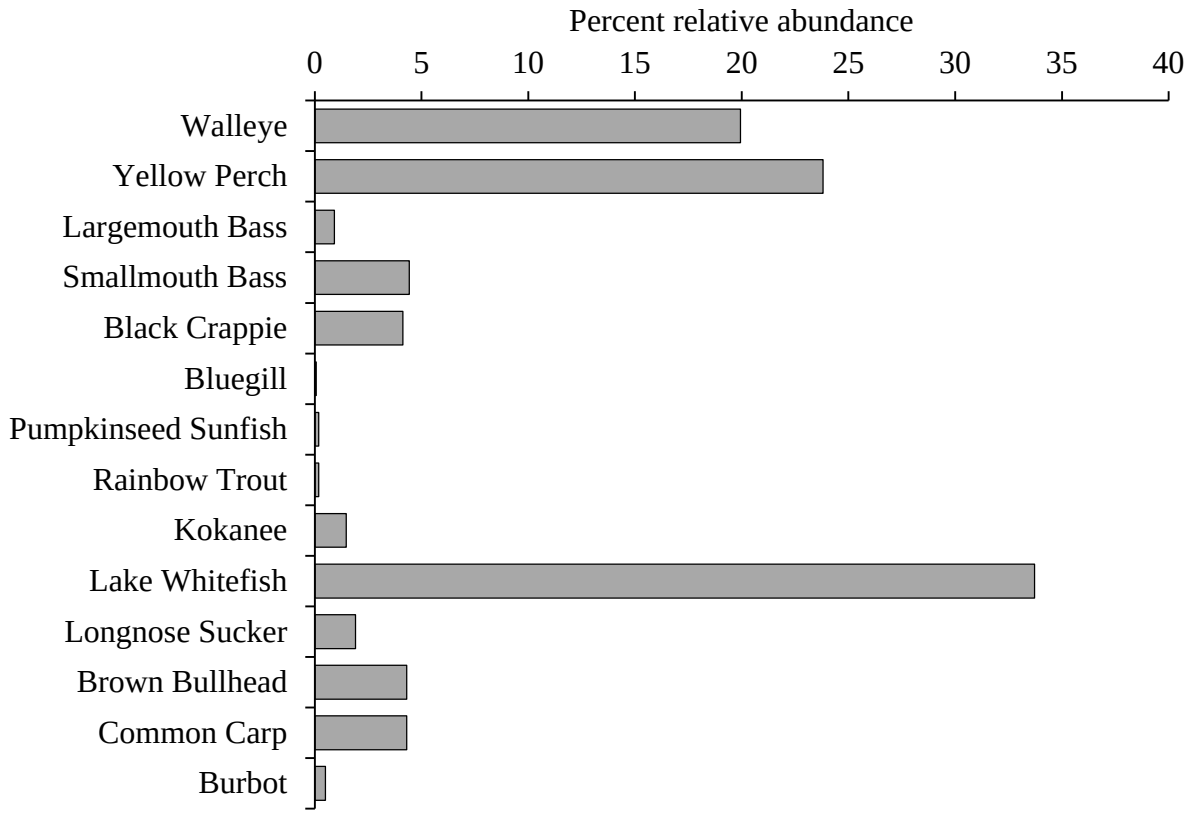

FIGURE 15. Percent relative abundance of the total number of fishes collected during FWIN on Banks Lake in 2013.

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 2014 Moses Lake FWIN survey October 14–15. A total of eight FWIN nets were set throughout the lake and 512 Walleye were collected. The average Walleye CPUE in 2014 on Moses Lake was 64 fish per net (FIGURE 16). This is a significant increase from 2013 (38 Walleye per net average) and is primarily due to an increase in our catch of age-0 Walleye. Since 2011 Walleye CPUE has been above the long-term average on Moses Lake. With the exception of 2008 and 2009, the average Walleye CPUE was higher on Moses Lake than on any other FWIN water (FIGURE 2).

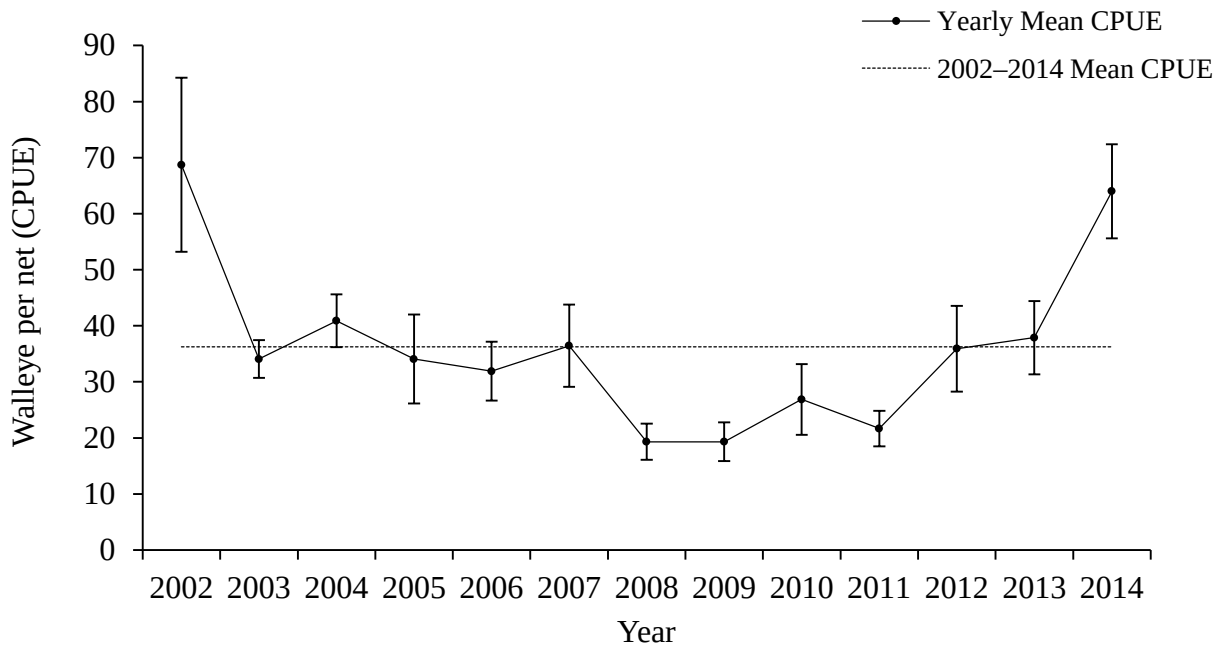

FIGURE 16. Mean (± 80% CI) CPUE for FWIN surveys on Moses Lake from 2002–2014 compared to the mean CPUE for all years 2002–2014.

Walleye collected during FWIN on Moses Lake averaged 14 inches in 2014. This is smaller than the 2013 average (15 inches) as well as the long-term average (16 inches). Approximately 43% of the Walleye collected in 2014 were at least 16 inches (FIGURE 17). This was the highest percentage of Walleye at least 16 inches collected in Moses Lake since 2011; however; it was less than the long-term average (51%). In 2013 the percentage of Walleye in the 12–16 inch range was well above the long-term average. Many of these fish likely recruited in to the 16–20 inch range which, in 2014, represented approximately 33% of the Walleye collected. Anglers should find a higher percentage of Walleye greater than 16 inches on Moses Lake in 2015 compared to 2014.

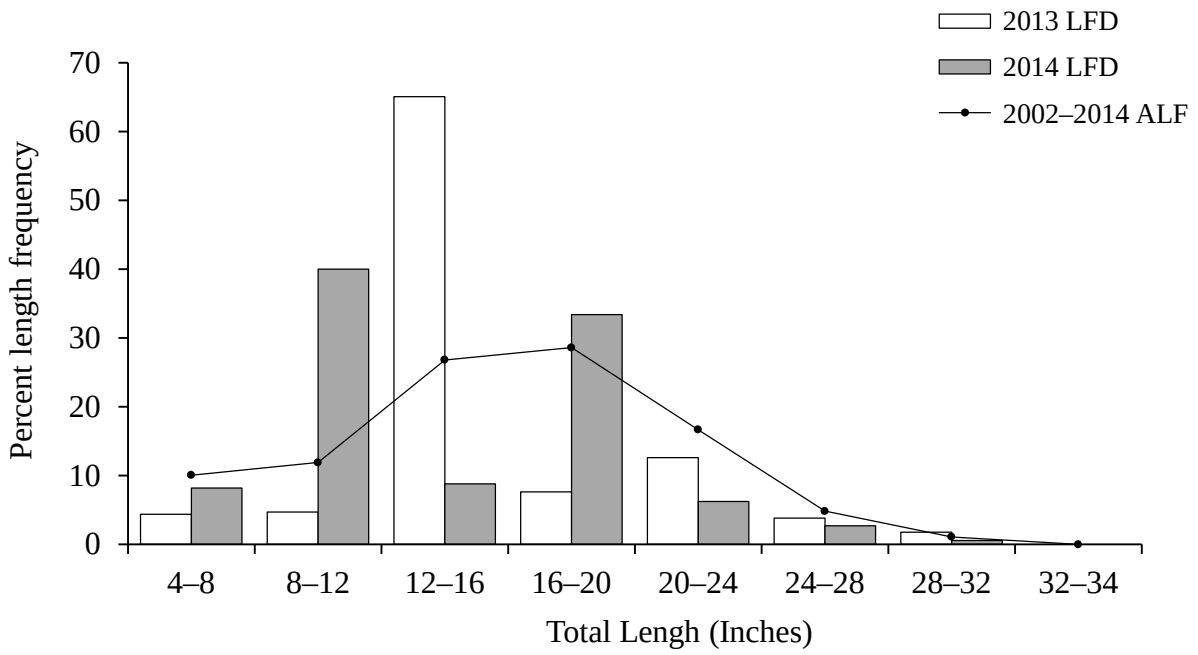

FIGURE 17. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Moses Lake in 2014 compared to 2013 and the average length frequency (ALF) from all FWIN surveys on Moses Lake from 2002–2014.

A total of 11 age-classes were collected during the 2014 FWIN survey, ranging from 0 to 14 years. Walleye aged 9, 10, 11, and 13 were not collected. The age–0 and 2 year-classes were the most abundant collected and were above the long-term average for Moses Lake (FIGURE 18). The age–5 year-class was also above the long-term average and has been consistently strong since these fish were age–0 (in 2009). The age–1, 3 and 4 year-year-classes were collected in very low abundance; however; the age–0 year-class represented nearly 40% of our total catch and should provide good opportunities for anglers in the coming years. Walleye in the age–2 year-class averaged 18 inches and will likely drive this fishery until age–0 fish grow to a size anglers prefer to catch and harvest.

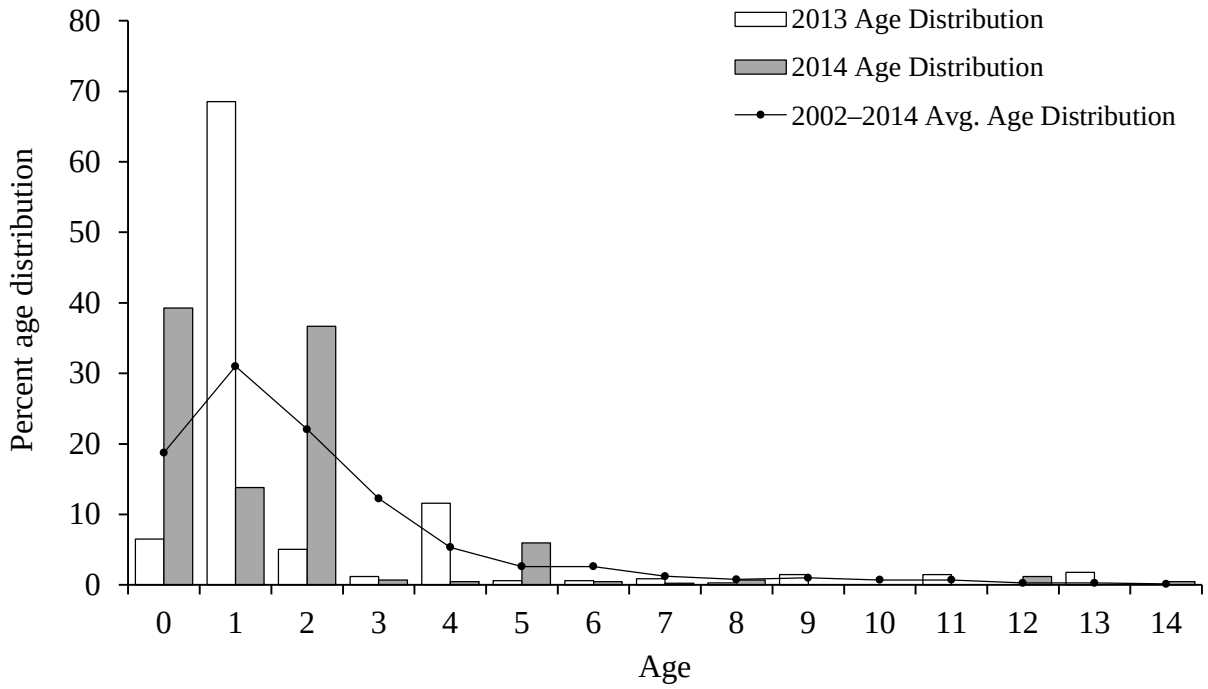

FIGURE 18. Percent age distribution of Walleye collected during FWIN on Moses Lake in 2014 compared to 2013 and the average age distribution from all FWIN surveys on Moses Lake from 2002–2014.

Of the 512 Walleye collected in Moses Lake a total of 216 (42%) were mature. Of these, 72 were female and 144 were male. Male Walleye began to mature by fall as age–1 fish and reached 100% maturity by fall as age–3. A smaller percentage of female Walleye were mature by fall as age–1 fish; however; by fall as age–3 100% of female were mature as well (FIGURE 19). The age–0 year-class was the most abundant collected in 2014 on Moses Lake. Many of these fish will become mature by fall 2015 and will likely reproduce in spring 2016. The early maturation of Walleye in Moses Lake is unsurpassed by any other population monitored in Washington.

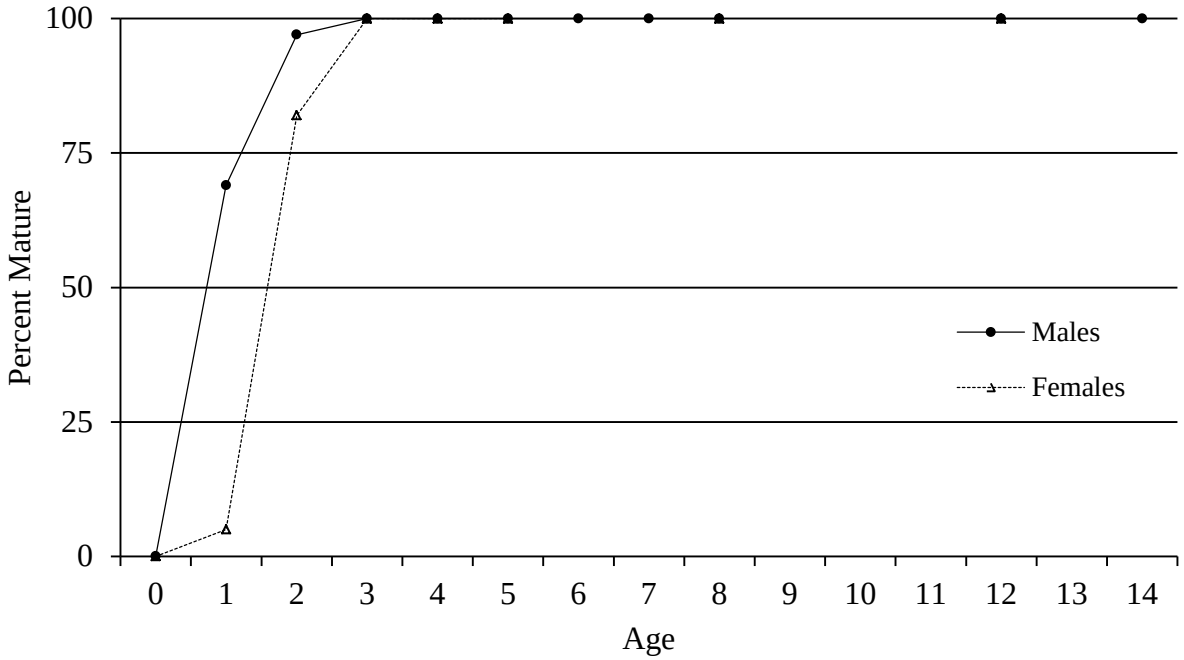

FIGURE 19. Percent of mature male and female Walleye at each age-class collected during FWIN on Moses Lake in 2014. Breaks in data point continuity indicate missing Walleye at that age-class.

Length-at-age of Walleye collected in Moses Lake was just above the *southern lakes average* for Walleye out to age–5 (FIGURE 20). Only 13 Walleye were collected beyond age–5. Collecting very few fish in an age-class prevents us from making precise estimates of average length-at-age and length-at-age estimates for Walleye older than age–5 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.

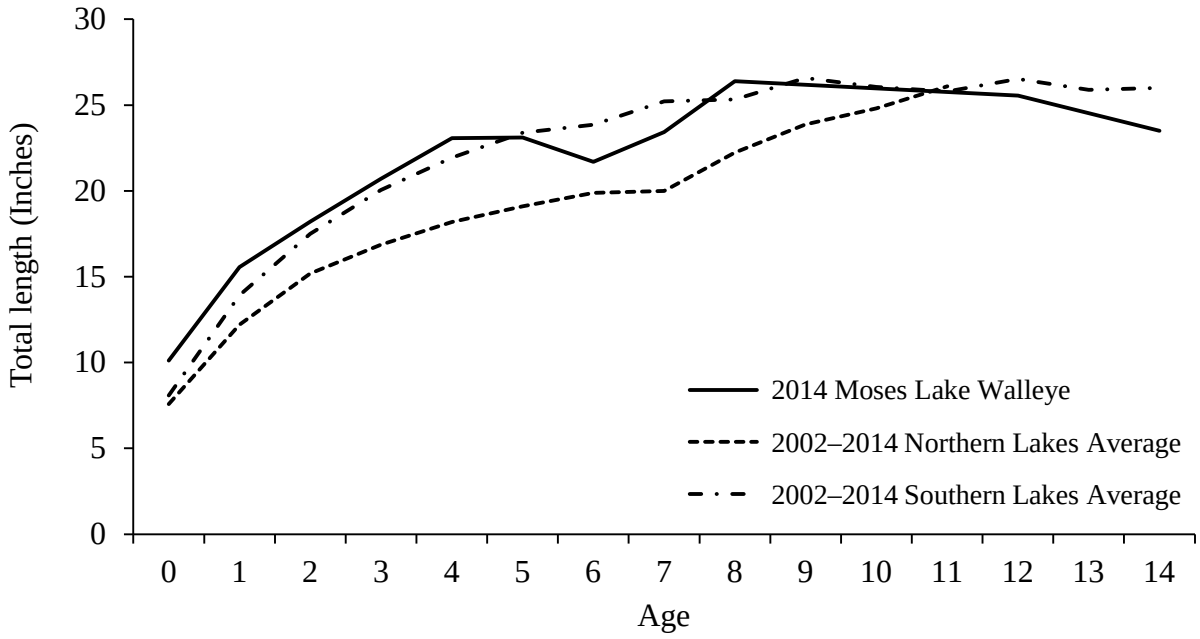

FIGURE 20. Average length-at-age of Walleye collected during FWIN on Moses Lake in 2014 compared to the Southern and Northern Lakes Average determined from FWIN surveys conducted from 2002–2014.

Fish Community

In addition to Walleye, 9 other fish species were collected during the 2014 FWIN survey on Moses Lake. With the exception of Yellow Perch; however; none represented more than 2% of the total number of fish collected. Relative abundance of Yellow Perch increased slightly from 2013. Approximately 50% of the Yellow Perch collected were at least 10 inches and nearly 5% were at least 12 inches. This increase in average size of Yellow Perch should be a boon for anglers in 2015.

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. Perch fishing can be quite good on Moses Lake, especially 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.

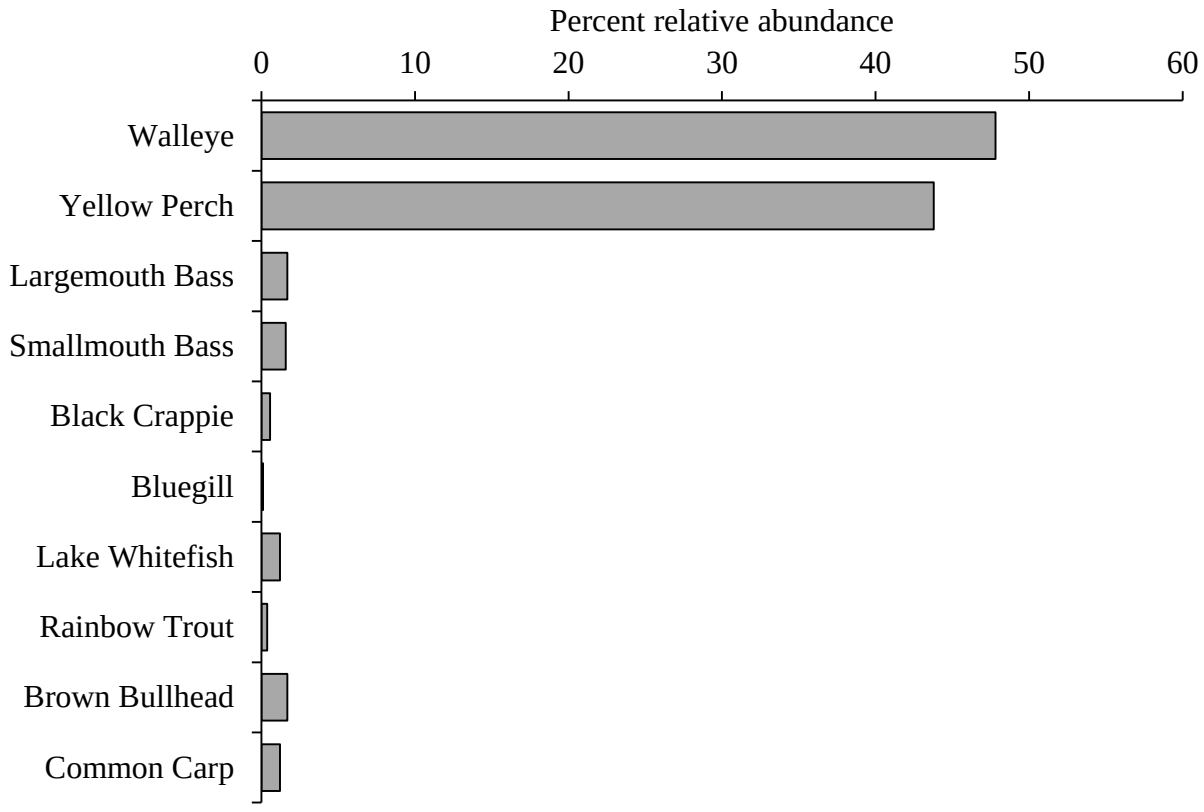

FIGURE 21. Percent relative abundance of the total number of fishes collected during FWIN on Moses Lake in 2014.

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 and 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 2014 Potholes Reservoir FWIN survey October 20–21. A total of 10 FWIN nets were set throughout the reservoir and 298 Walleye were collected. The average Walleye CPUE in 2014 on Potholes Reservoir was 29.8 fish per net. This is the highest CPUE since 2008 and the third highest since FWIN began in 2002. This increase was primarily due to an increase in the number of age–0 Walleye collected. Age–0 Walleye represented 43% of the Walleye collected in 2014.

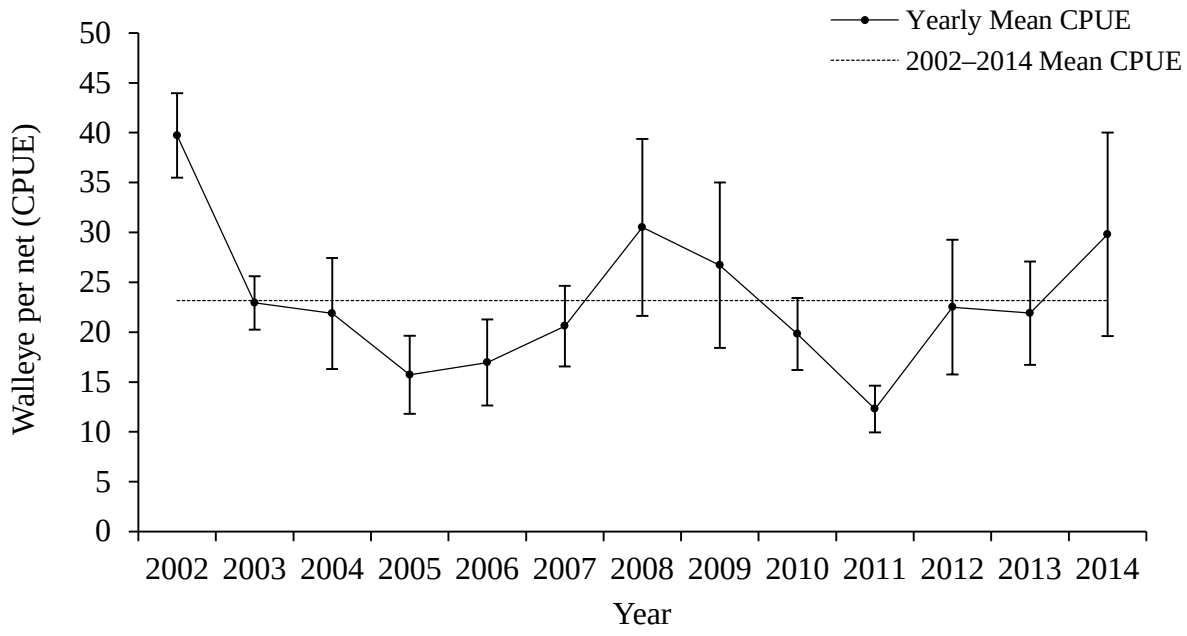

FIGURE 22. Mean (± 80% CI) CPUE for FWIN surveys on Potholes Reservoir from 2002–2014 compared to the mean CPUE for all years 2002–2014.

Walleye collected during FWIN on Potholes Reservoir averaged 15 inches in 2014. This is similar to 2013 but below the long-term average (16 inches). Walleye in the 8–12 inch range represented 42% of the Walleye collected (FIGURE 23). Walleye in the 12–16 inch range declined in relative abundance from 2013. These Walleye may have undergone significant harvest in 2014. Walleye above 16 inches represented 48% of those collected and approximately 23% were over 20 inches. Anglers should have plenty of opportunities for catching and harvesting Walleye in 2015 on Potholes Reservoir.

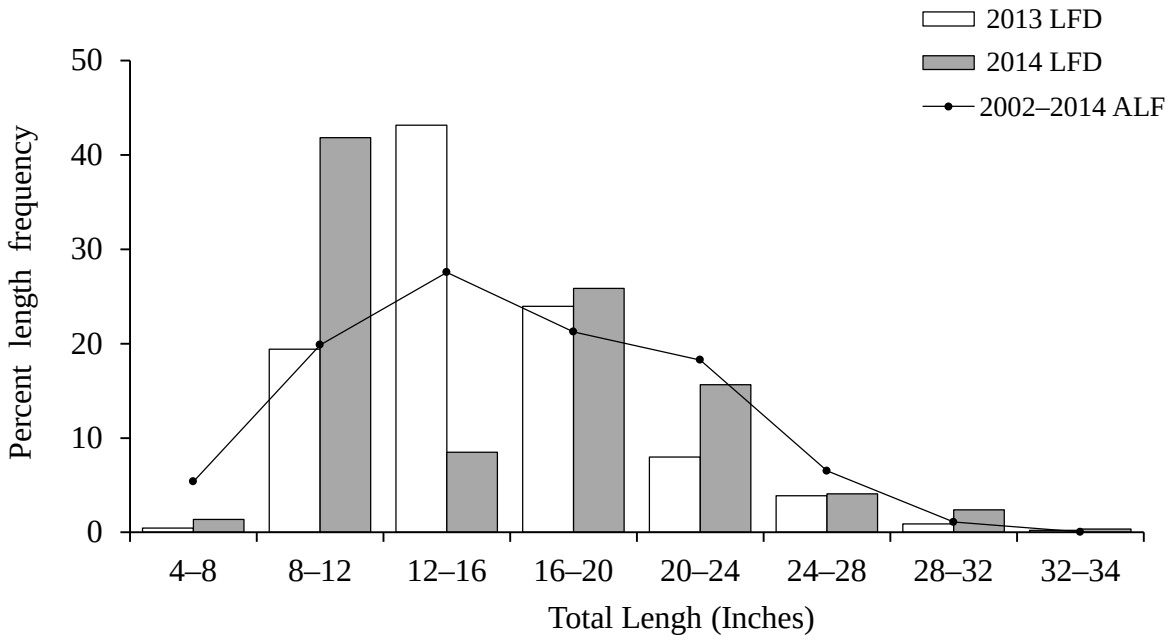

FIGURE 23. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Potholes Reservoir in 2014 compared to 2013 and the average length frequency (ALF) from all FWIN surveys on Potholes Reservoir from 2002–2014.

A total of 11 age-classes were collected during the 2014 FWIN survey, ranging from 0 to 15 years. Walleye aged 6, 9, 10, 11, and 13 were not collected. The age–0 year-class was the most abundant collected, accounting for 43% of the total Walleye collected (FIGURE 24). This was the highest percentage of age–0 Walleye ever collected during FWIN on Potholes Reservoir. Age–2 Walleye were above the long-term average and represented 23% of the total Walleye collected. This year-class declined in relative abundance from 2013 (as age–1) to 2014. This year-class likely provided the majority of the Walleye harvested in 2013–14 on Potholes Reservoir as these fish averaged 15 inches in fall 2013 and 19 inches in fall 2014.

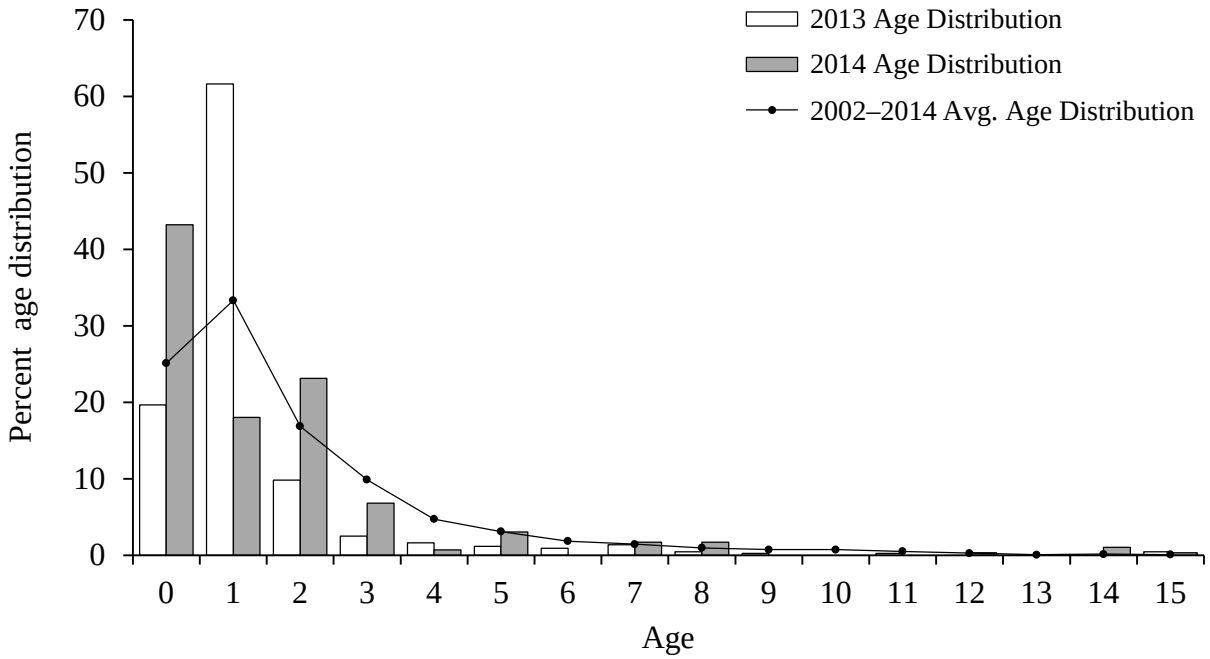

FIGURE 24. Percent age distribution of Walleye collected during FWIN on Potholes Reservoir in 2014 compared to 2013 and the average age distribution from all FWIN surveys on Potholes Reservoir from 2002–2014.

Of the 298 Walleye collected in Potholes Reservoir a total of 133 (45%) were mature. Of these, 37 were female and 96 were male. By fall as age–1 fish approximately 69% of male Walleye and 18% of female Walleye were mature. By fall as age–2, 100% of male Walleye collected were mature. Female Walleye were slower to mature reaching 100% maturity by fall as age–3.

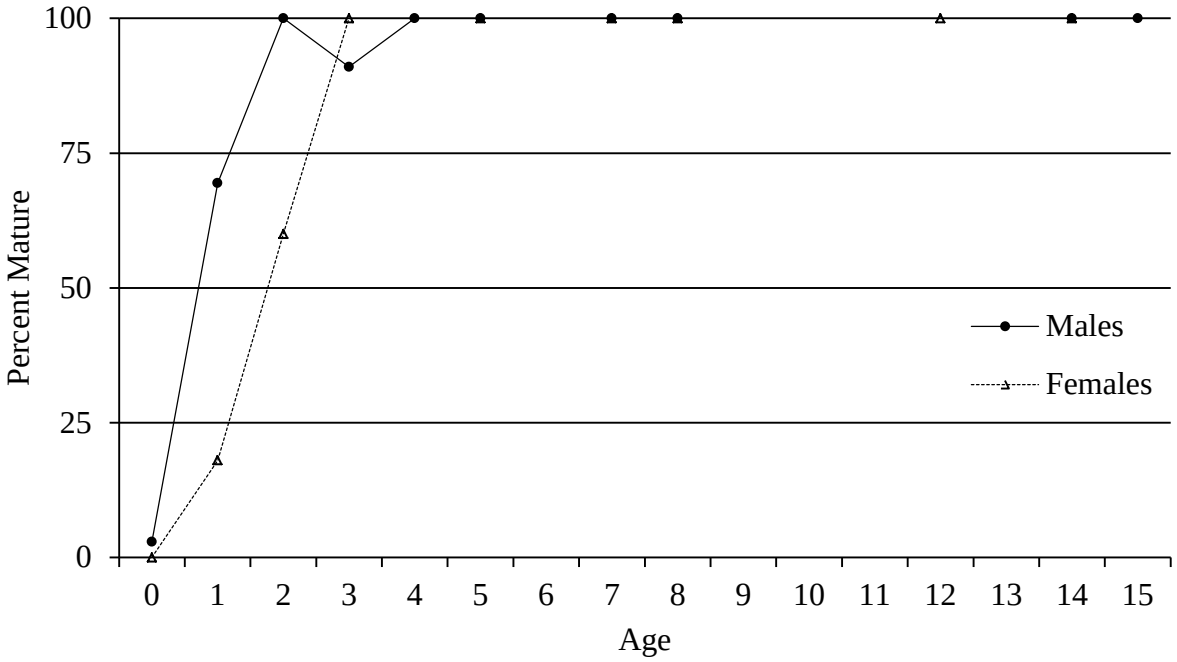

FIGURE 25. Percent of mature male and female Walleye at each age-class collected during FWIN on Potholes Reservoir in 2014. Breaks in data point continuity indicate missing Walleye at that age-class.

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 2015.

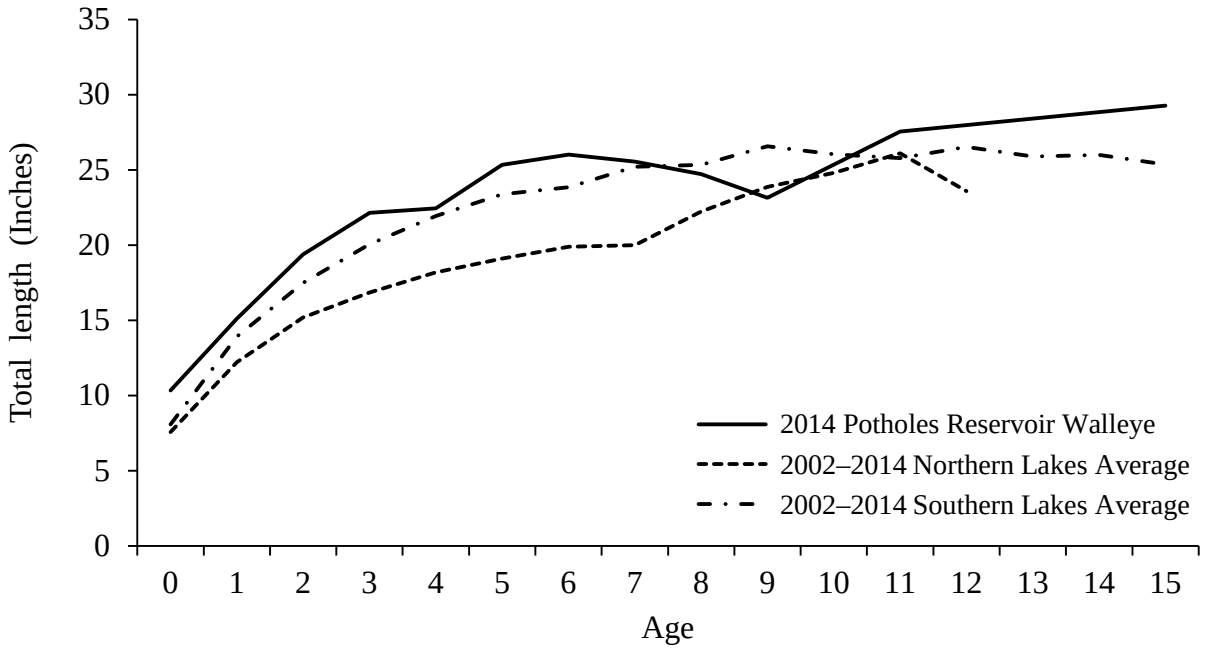

FIGURE 26. Length-at-age (± 80% CI) of Walleye collected during FWIN on Potholes Reservoir in 2014 compared to the Northern and Southern Lakes Average determined from FWIN surveys conducted from 2002–2014.

Fish Community

In addition to Walleye 13 other fish species were collected during the 2014 FWIN survey on Potholes Reservoir. Yellow Perch represented 32% of the fish collected in 2014 (FIGURE 27). This is a decline from the previous two years (65%, and 52% in 2012 and 2013, respectively) and represents an overall decline in Yellow Perch abundance in our samples, not simply a decline in relative abundance. The average size of Yellow Perch increased in 2014 to just over 10 inches. In 2012 the average size of Yellow Perch was 6 inches while in 2013 average length increased to 8 inches.

With the exception of Yellow Perch and Walleye relatively few other fish were collected during our 2014 FWIN survey of Potholes Reservoir and none represented more than 4% of the total catch. Brown bullhead, while third in abundance, represented only 4% of the total catch during this survey (FIGURE 27).

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. In summer and fall 2014 Yellow Perch fishing was reported as being excellent with anglers reporting limits of large Yellow Perch.

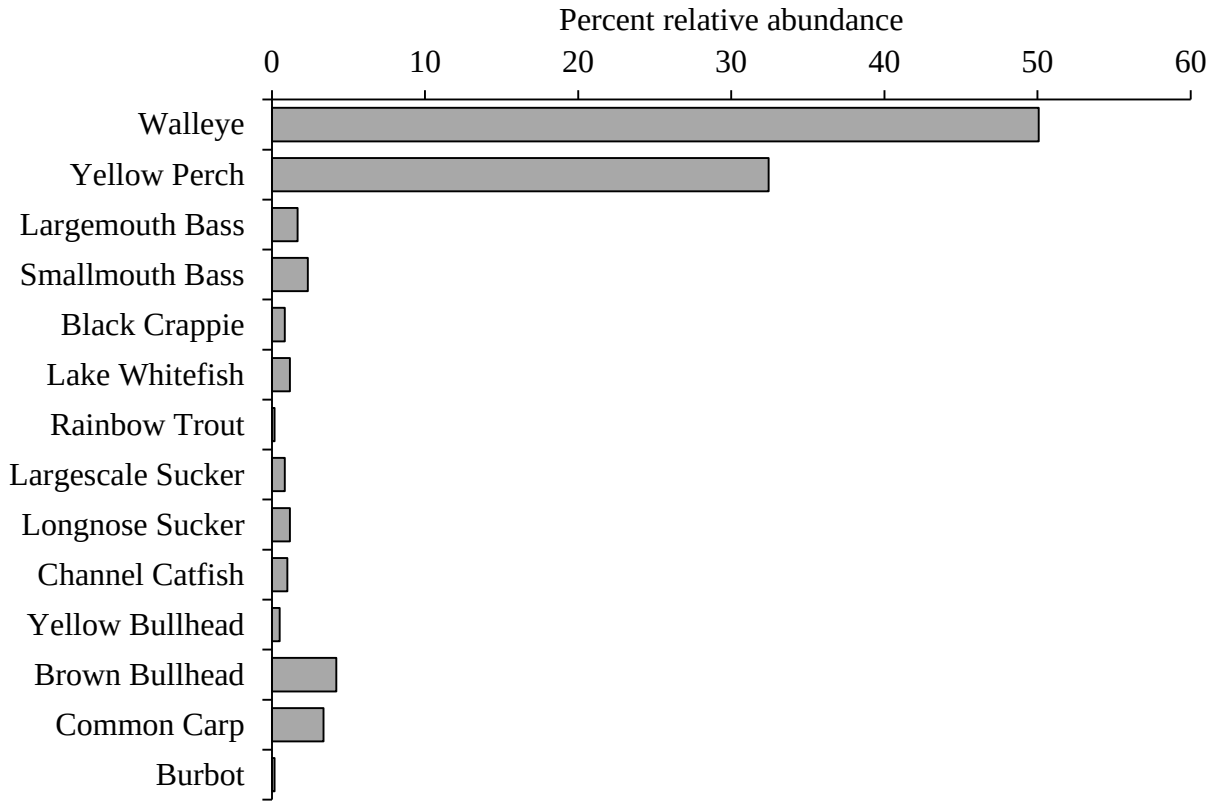

FIGURE 27. Percent relative abundance of the total number of fishes collected during FWIN on Potholes Reservoir in 2014.

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 2014 Scooteney Reservoir FWIN survey October 30–31. A total of 11 FWIN nets were set throughout the reservoir and 333 Walleye were collected. The mean Walleye CPUE in 2014 on Scooteney Reservoir was 30.3 fish per net. This is nearly double what we found in 2013 and is the highest CPUE of Walleye on Scooteney Reservoir since FWIN began (FIGURE 28). This increase in CPUE was due to a two-fold increase in the number of age–0 and 1 Walleye collected.

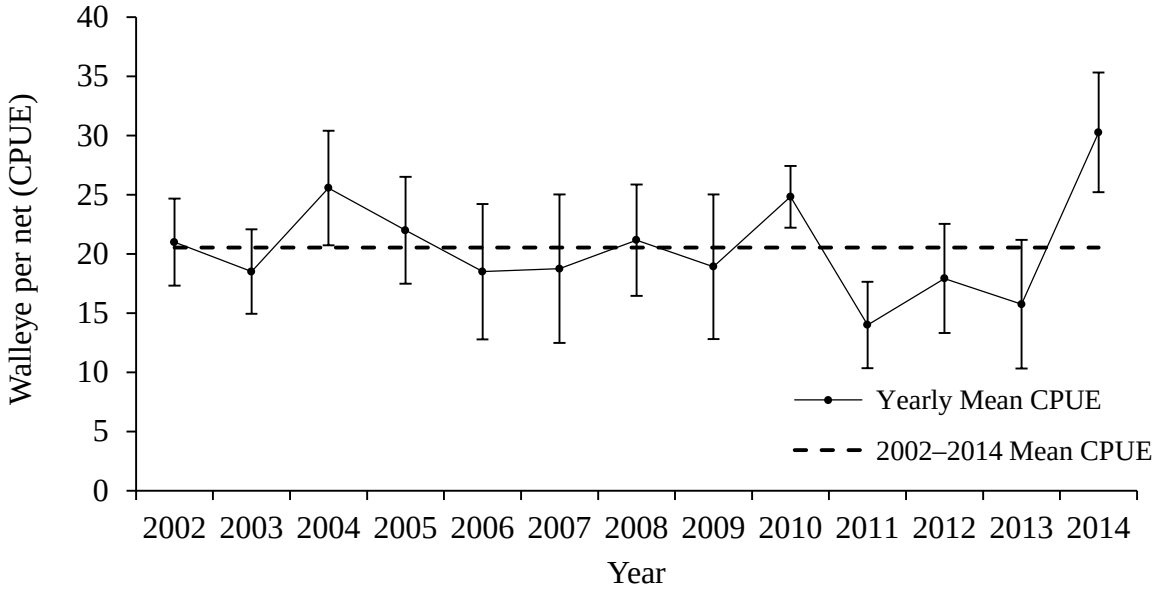

FIGURE 28. Mean (± 80% CI) CPUE for FWIN surveys on Scooteney Reservoir from 2002–2014 compared to the mean CPUE for all years 2002–2014.

Walleye from Scooteney Reservoir averaged 14 inches in 2014. This is unchanged from 2013 and is equal to the long-term average. The majority of Walleye collected were in the 12–16 inch range; however; we saw increases in relative abundance of Walleye in most size ranges FIGURE 29). Scooteney Reservoir typically produces fewer large Walleye than Moses Lake or Potholes Reservoir; however; approximately 26% of the Walleye collected in 2014 were at least 16 inches and anglers should find plenty of opportunities for harvesting Walleye in 2015.

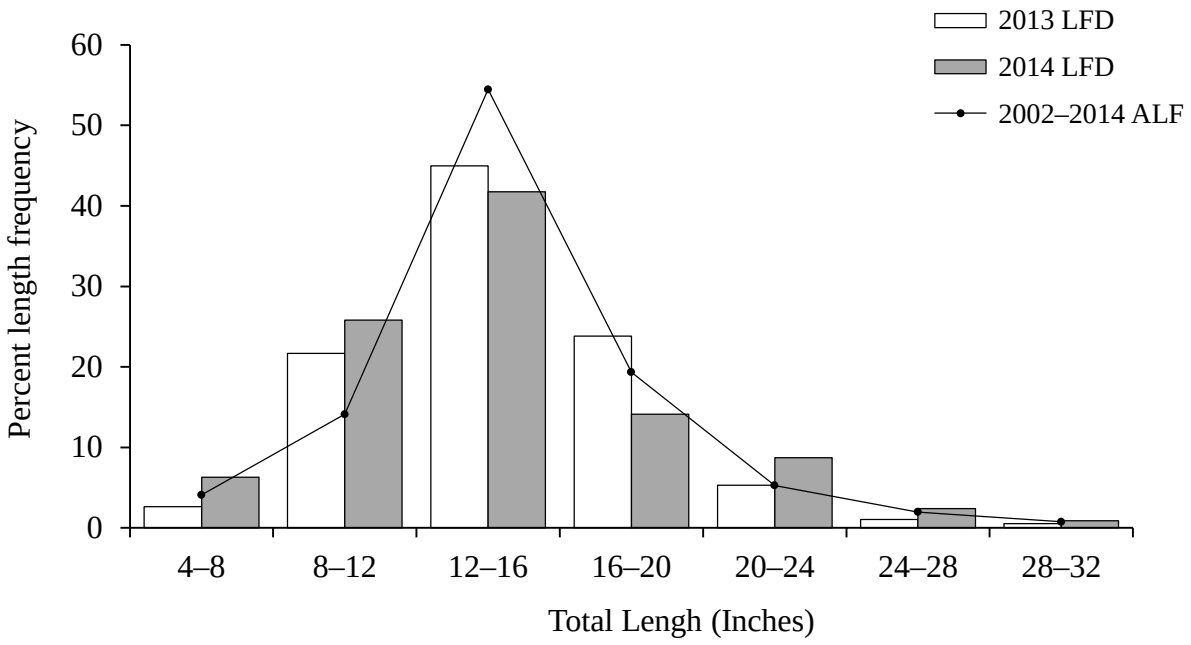

FIGURE 29. Percent length frequency distribution (LFD) of Walleye collected during FWIN on Scooteney Reservoir in 2014 compared to 2013 and the average length frequency (ALF) from all FWIN surveys on Scooteney Reservoir from 2002–2014.

A total of 11 age-classes were collected during the 2014 FWIN survey, ranging from 0 to 12 years. Walleye aged 10 and 11 were not collected. The age–0 year-class was the most abundant collected and was well above the long-term average (FIGURE 30). Prior to 2013 age–0 Walleye never represented more than 13% of our total catch during FWIN on Scooteney Reservoir. In 2013 and 2014 age–0 Walleye represented 24% and 32% of the total number of Walleye collected in Scooteney Reservoir, respectively. These higher than average relative abundances were associated with longer average length of age–0 Walleye in 2013 and 2014 as well. Prior to 2013 age–0 Walleye averaged 7.4 inches; in 2013 and 2014 age–0 Walleye averaged 9 inches. These increases in relative abundance of age–0 Walleye may be due to the fact that a higher percentage of age–0 Walleye grew to a size that increased their probability of being caught in gill nets rather than an actual increase in the number of age–0 Walleye in the population. The age–1 year-class is primarily comprised of Walleye 13–16 inches and should provide anglers with good fishing opportunities.

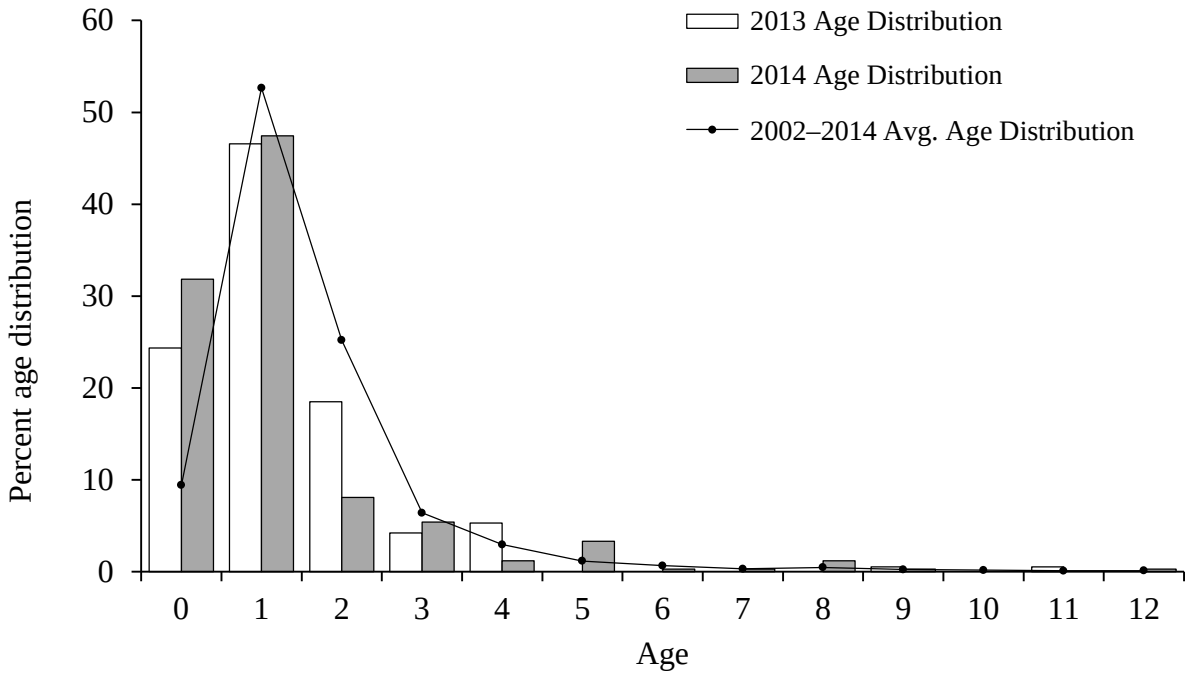

FIGURE 30. Percent age distribution of Walleye collected during FWIN on Scooteney Reservoir in 2014 compared to 2013 and the average age distribution from all FWIN surveys on Scooteney Reservoir from 2002–2014.

Of the 333 Walleye collected in Scooteney Reservoir a total of 74 (22%) were mature. Of these, 26 were female and 48 were male. Male Walleye began to mature in fall as age–1 fish and by age–2 100 % were mature. A small percentage of female Walleye began to mature at age–2 and by fall at age–3 60% were mature. Female Walleye reached 100% maturity by fall as age–4 fish. (FIGURE 31).

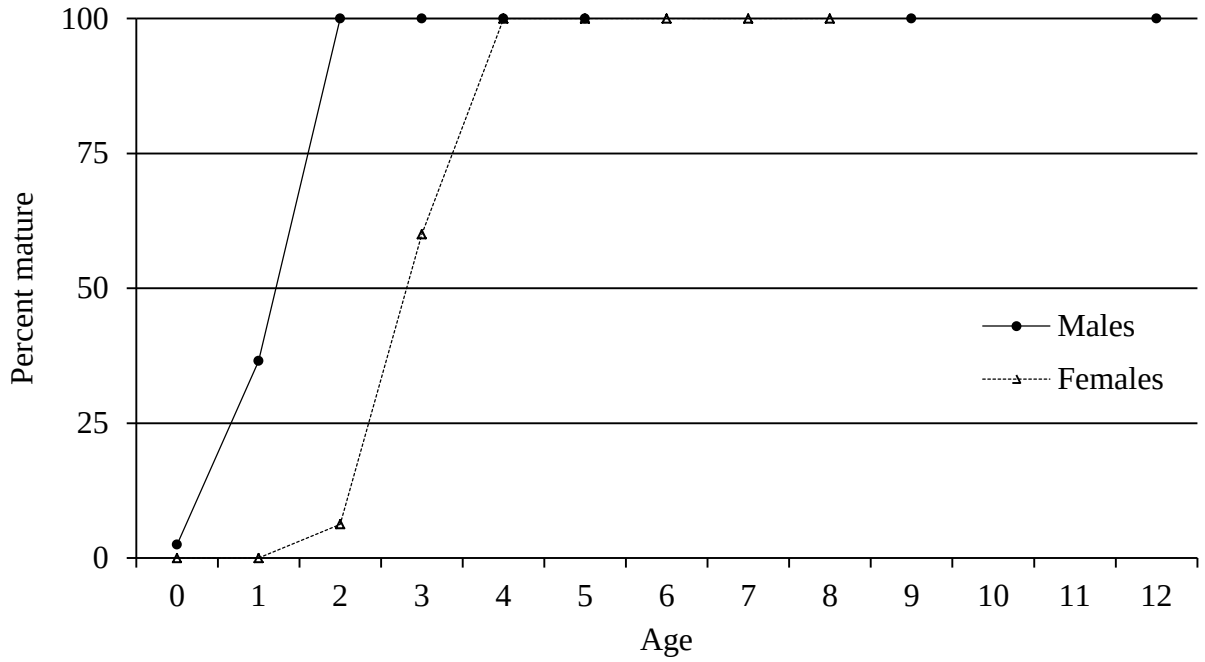

FIGURE 31. Percent of mature male and female Walleye at each age-class collected during FWIN on Scooteney Reservoir in 2014.

Length-at-age of Walleye in Scooteney Reservoir was near the *southern lakes average* for most age-classes, with Walleye reaching 18 inches by fall as age–2 (FIGURE 32). Only 23 Walleye older than age–3 were collected and length-at-age estimates for these age-classes are likely not accurate.

FIGURE 32. Average length-at-age (± 80% CI) of Walleye collected during FWIN on Scooteney Reservoir in 2014 compared to the Northern and Southern Lakes Average determined from FWIN surveys conducted from 2002–2014.

Fish Community

In addition to Walleye 13 other fish species were collected during the 2014 FWIN survey on Scooteney Reservoir. Yellow Perch was the most abundant fish species collected in 2014 representing 57% of the fish collected in Scooteney Reservoir. The size distribution of Yellow Perch increased as well. In 2013 only 15% of the Yellow Perch collected were at least 8 inches. In 2014 this number increased to 55% at least 8 inches. Anglers should have good opportunities to catch some large Yellow Perch in 2015. Of the remaining 12 species collected none represented more than 6% of the total catch (FIGURE 33).

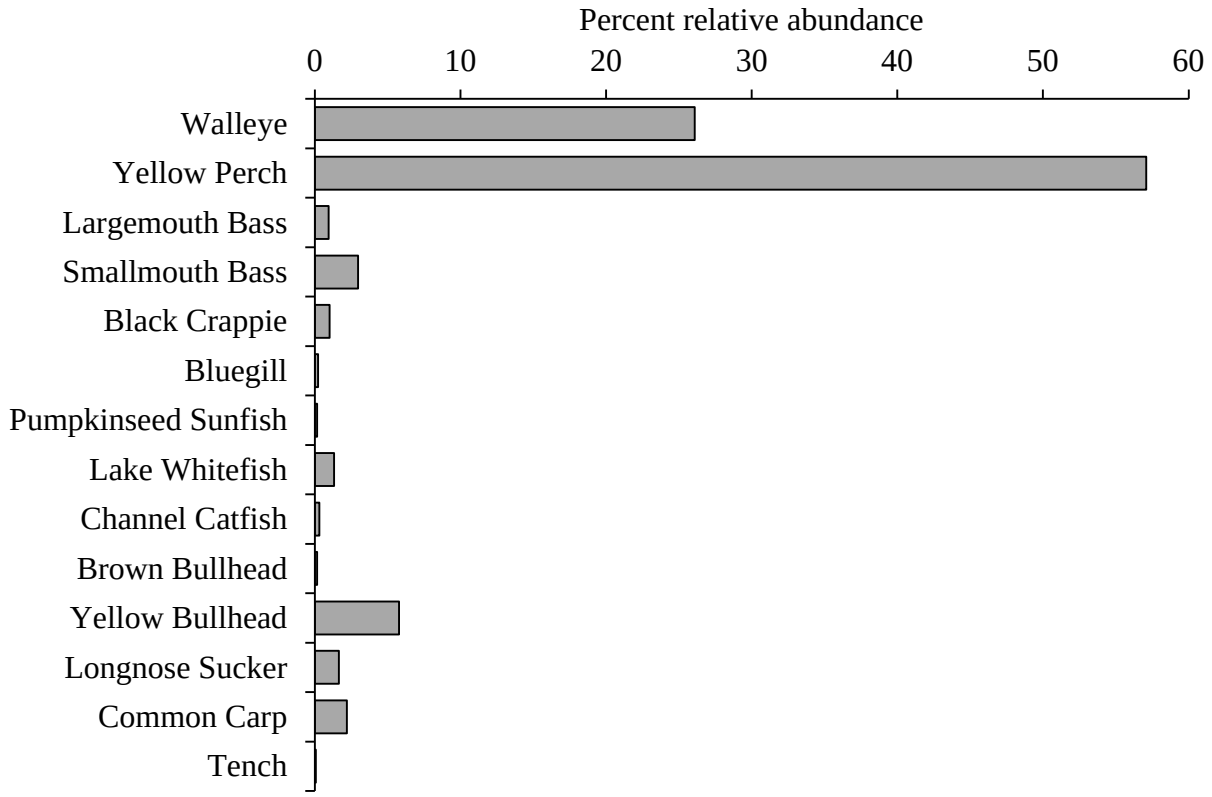

FIGURE 33. Percent relative abundance of the total number of fishes collected during FWIN on Scooteney Reservoir in 2013.

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

Based on the results of the 2014 FWIN, Walleye abundance was high in all of our FWIN lakes and we want 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 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.

In speaking to many anglers and fishing clubs we have found that there is a strong catch-and-release mentality among Walleye anglers. Our data on Walleye populations over the past 12 years indicate that these populations can sustain more harvest and indeed need more harvest.

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 to angling during the Walleye spawning season (April and May), when it had been previously closed. 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. We encourage anglers to help shape our Walleye populations to a more healthy condition by harvesting more fish.

Besides Walleye, Yellow Perch, Smallmouth Bass and Lake Whitefish were abundant in several of our FWIN lakes. 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 when they are spawning and also under the ice. We are trying to encourage anglers to diversify their angling experiences by fishing for, and harvesting, more Lake Whitefish, which are in the salmon family. They are excellent eating, especially 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.

References

Duffy, M. J., J. L. McNulty, and T. E. Mosindy. 2000. Identification of sex, maturity, and gonad condition of Walleye (*Stizostedion vitreum vitreum*). Ont. Min. Natur. Resour, Northwest Sci. & Technol. Thunder Bay, Ont. NWST FG–05. 33pp.

McLellan, H. J., C. Lee, and B. Scofield. 1999. Lake Roosevelt Fisheries Evaluation Program; Limnological and Fisheries Monitoring. 1999 Annual Report. Project No. 199404300, 226 electronic pages. BPA report DOE/BP-32148-8.

Morgan, G. E. 2000. Manual of instructions: Fall Walleye Index Netting (FWIN). Ontario Ministry of Natural Resources, Fish and Wildlife Division. Peterborough, Ontario, Canada. 34pp.

Polacek, M. P. 2013. Banks Lake fishery evaluation project. Annual Report (*in Draft*). Bonneville Power Administration, Project Number 200102800, Portland, Oregon.

Responsive Management. 2013. Washington 2013 Angler Survey Report. Harrisonburg, Virginia.