Results of the 2007 WDFW
Fall Walleye Index Netting (FWIN) Surveys

Scooteney Reservoir, Moses Lake,
Potholes Reservoir, Banks Lake and Lake Roosevelt

This report documents the results of the 2007 fall walleye index netting (FWIN) surveys in five eastern Washington waters (Figure 1). For more information on Washington walleye biology and distribution and the FWIN sampling protocol, please see the 2005 report on this website.

Similar to the previous web reports for our FWIN surveys, the results from our 2007 surveys are shown in the form of graphs followed by a brief explanation of each. The **relative abundance** graph compares the average number of walleye captured per net from all lakes for all years combined, on a single graph (we use the geometric mean for these values). After that, there are four individual graphs for each lake: **size distribution** (the percentage of walleye in each size group), **age distribution** (the percentage of walleye in each age group), **species composition pie chart** (the percentage of each different species captured in our survey, for each lake) and **species composition bar graph over time,** which shows the general species composition from 2002 – 2007 for each lake. The size and age distribution graphs compare the 2007 values with the average values from 2003 – 2007 so you can see how 2007 compared with an "average" year on that water for size and age distribution. At the end of the report is a **length-at-age graph**, which shows the average length at each year of age for walleye from all six FWIN waters on one graph. **Please bear in mind that since we sample exclusively with gill nets for the FWIN surveys, the species composition graphs may or may not accurately represent the fish communities from each lake. These graphs will only provide a general picture of the fish community make-up. Like any single capture technique, gill nets have particular biases for and against certain species and sizes of fish. They are however, the best single technique for capturing a representative sample of the walleye populations and fall is the best time to do it.**

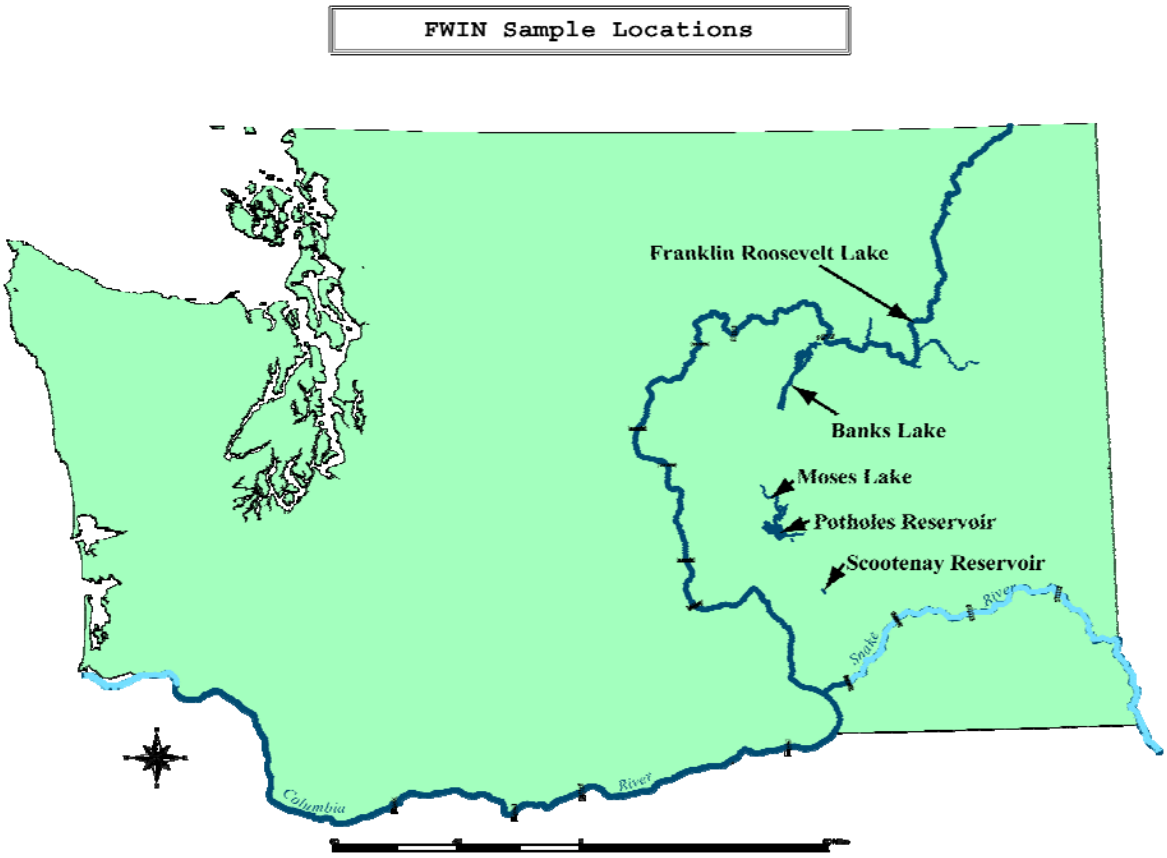
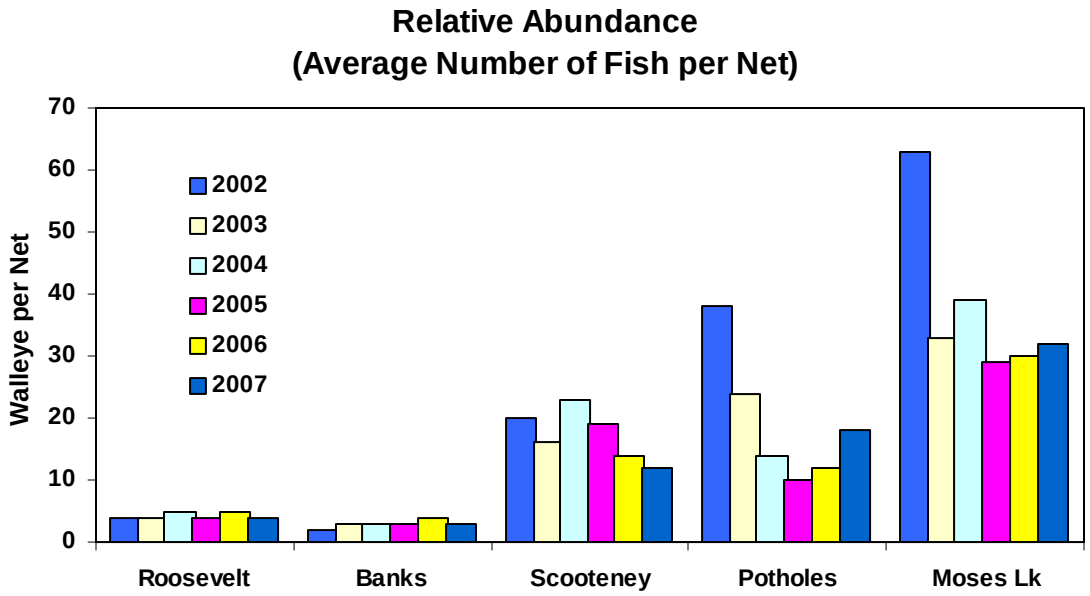
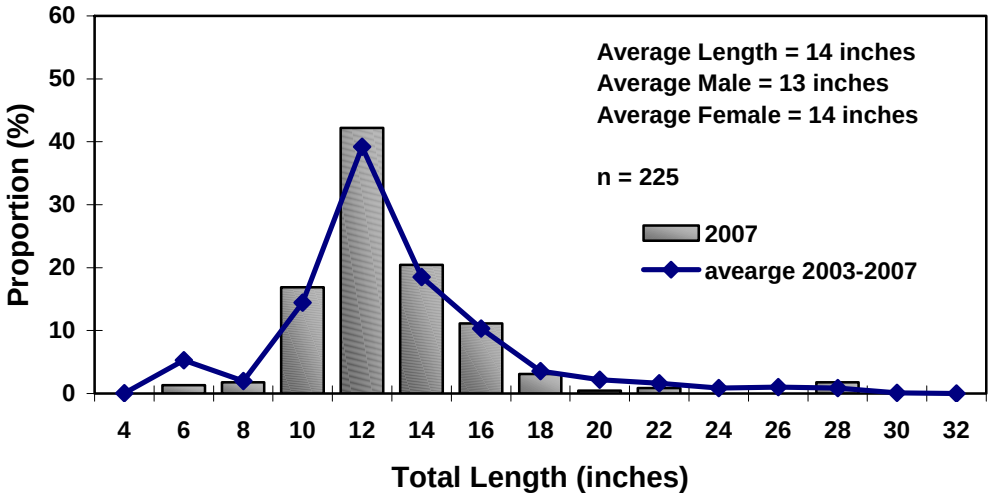


Figure 1. Locations of the five lakes sampled by WDFW for the 2007 Fall Walleye Index Netting surveys.

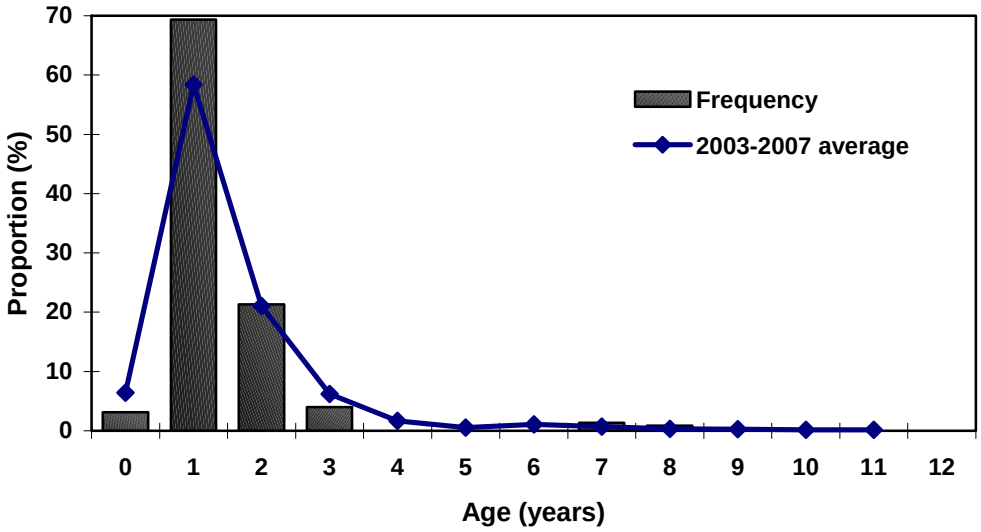


This graph shows the average number of walleye caught per net, regardless of size, for each lake, for each year. We use the geometric mean instead of the arithmetic mean. The geometric mean tends to dampen the effect of outlying high and low values that could bias the true average value. The only apparent irregularity in the catch rates is the change from 2002 to 2003 in Moses Lake and Potholes Reservoir. There were two changes in the sampling protocol that could account for the decrease in the total number of walleye that were captured, rather than a dramatic decrease in the population itself. First we changed the way we set the nets, with a certain percentage being set offshore. Secondly we developed a "biological limit" of 300 walleye, which we did not have in 2002. If we catch 300 walleye from any water, we stop sampling at that time. We feel that sample size will give us a representative sample of the walleye population for all the parameters we are measuring. Besides those two years in those two waters, the average number of walleye caught per net in each lake has been relatively consistent. It is however, not unusual to see significant fluctuations in walleye populations. Like other members of the perch family, walleye form very strong year classes and very weak year classes, so it is normal for their populations to cycle up and down over time. Our sampling effort is still in its initial stages compared to states in the Midwest that have been doing index surveys on their walleye populations for over 40 years. Continued monitoring in Washington will provide more and better data that will clarify the condition and trends of each of our walleye populations.

Size Distribution
Scooteney Reservoir, 2007 -vs- 2003-2007



Age Distribution Comparison
Scooteney Res., 2007 -vs- 2003-2007



In 2007, the size range of walleye was very similar to the average values of the previous four years. The average walleye length remained the same as the previous two years at 14 inches. Size ranged from six to 29 inches and weights up to 9 pounds. Similar survey results may be due to more consistent year-class strength at Scooteney than is seen in some of our other waters. This phenomenon is seen in the age distribution graph. The

2007 data is again similar to the average of the previous four years, where we see a very large one-year-old age-class and very few walleye older than two years of age. A hypothesis for this anomaly follows the next graph.

Age Class Proportions
Scooteney Res. & Moses Lk., 2003-2007

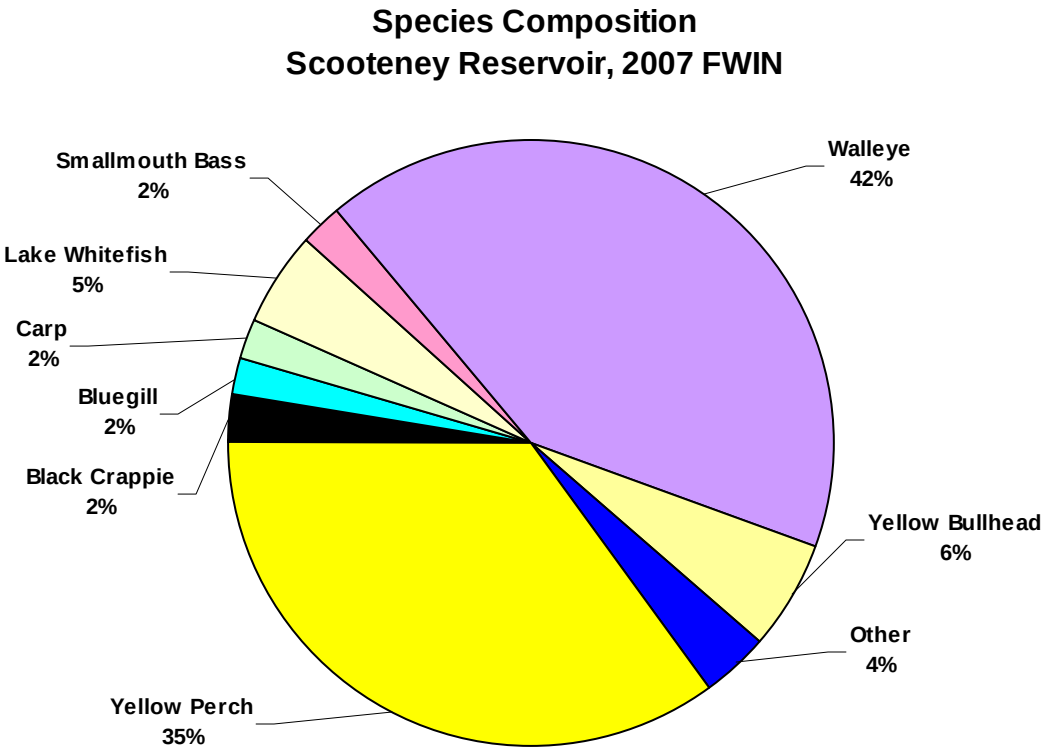
This graph shows the average percent of walleye in each age class from 2003 – 2007 for both Scooteney Reservoir and Moses Lake. Since we began our FWIN surveys, we have noticed a striking paucity of walleye over two years of age in Scooteney Reservoir. The above graph compares Scooteney with Moses Lake (representing an "average" walleye population age-class distribution). Another anomaly in Scooteney is the fact that every year there is a very large one-year-old age-class. Since walleye populations tend to be very cyclic, all other populations have large one-year-old age-classes from time to time but not every year. These two features of the Scooteney Reservoir walleye population can be easily seen on this graph when compared with the Moses Lake age data.

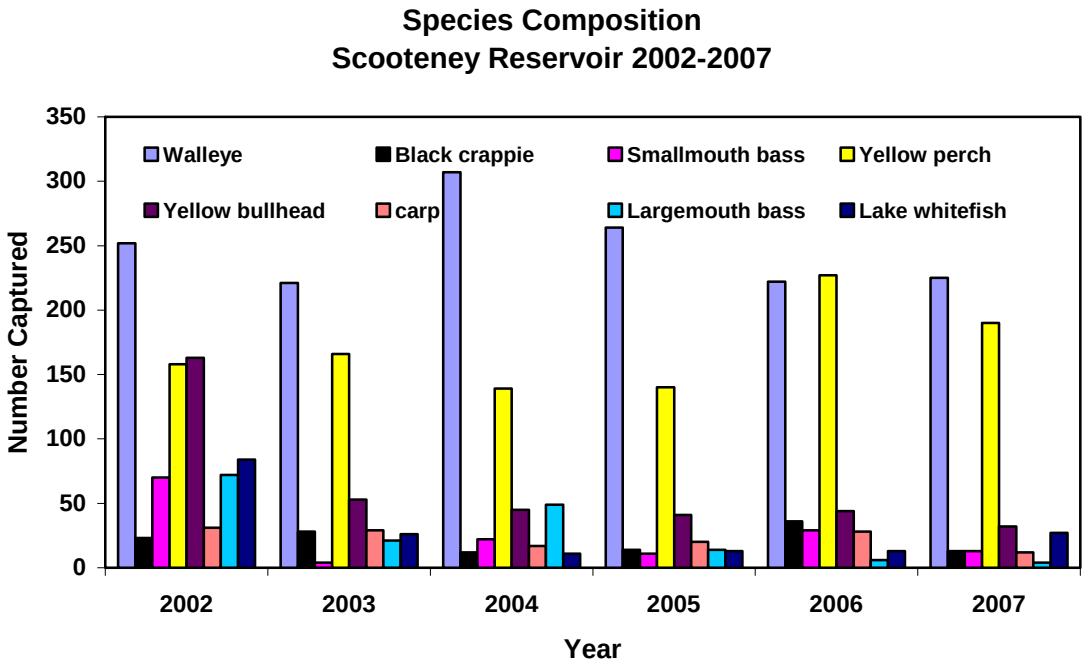
Because we have been sampling Scooteney Reservoir since 2002 and have six years of consistent data, we believe we have a reasonable hypothesis to explain these two irregularities.

Scooteney Reservoir is part of the Columbia Basin Irrigation Project so its water levels and flows are regulated throughout the year. We believe the sexually mature walleye (two-year-old males and three-year-old females) move out of the reservoir (downstream) during times of high flow for irrigation purposes (early spring), which coincides with normal pre-spawning movement. Walleye tend to follow moving water (either upstream or downstream) to stage into spawning areas. In the case of Scooteney Reservoir, there is an impassable barrier 3.6 miles upstream and no favorable spawning habitat in that

stretch, so many walleye will likely move downstream where they will enter the main stem of the Columbia River. There obviously are enough sexually mature walleye that remain in Scooteney Reservoir and successfully spawn to maintain the population but the majority of fish over two years of age leave.

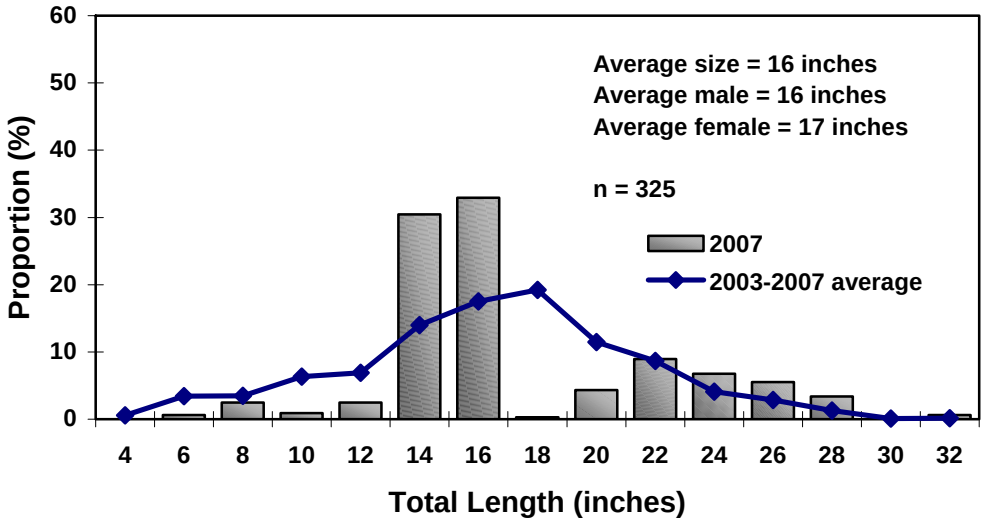
The explanation for Scooteney Reservoir having a strong one-year-old age-class every year would appear to be the fact that there are very few predators of walleye fry and fingerlings in the reservoir so survival from zero to one-year is very good every year.



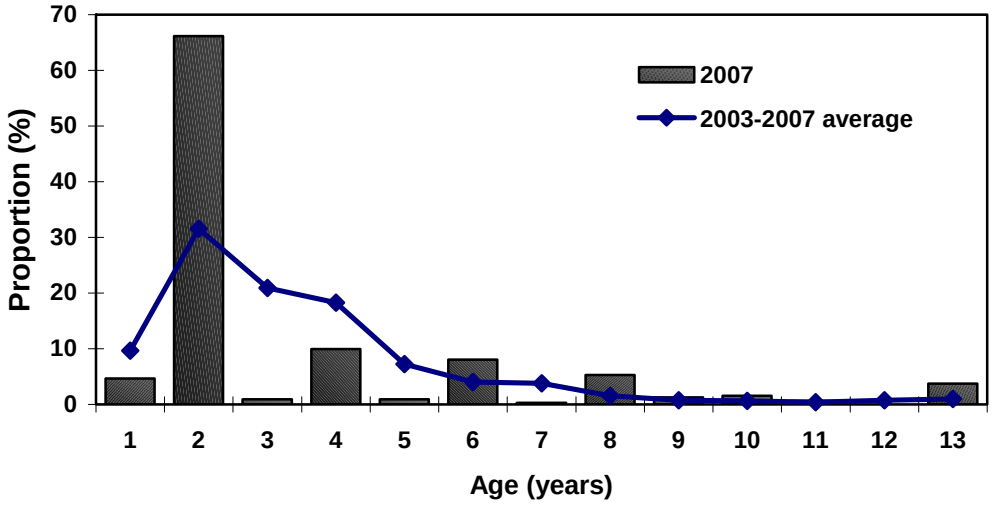


The species composition in Scooteney Reservoir was dominated by walleye and yellow perch, but our survey indicated catchable-size largemouth bass (>8 inches) averaged 9 inches, whereas, catchable-size smallmouth bass (>7 inches) ranged from 7 to 16 inches and averaged 14 inches, weighing up to 1.8 pounds. Other game fish species are also available to anglers at Scooteney Reservoir including black crappie, averaging 6 inches, yellow perch, averaging 8 inches, and yellow bullhead catfish, averaging 10 inches. Also present are channel catfish, lake whitefish, pumpkinseed sunfish, and common carp.

Size Distribution
Moses Lake, 2007 -vs- 2003-2007

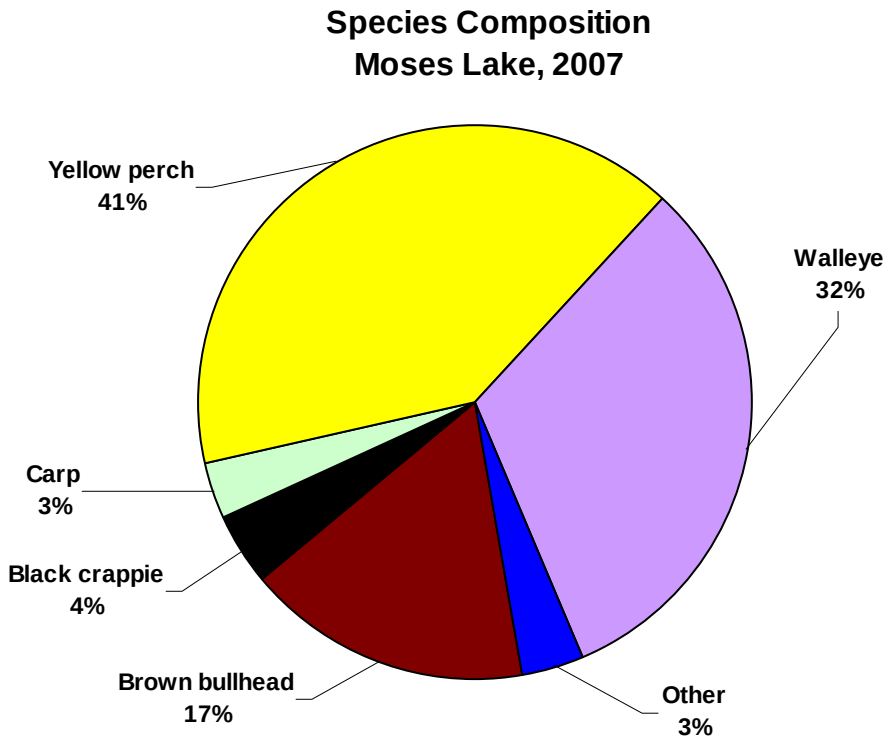


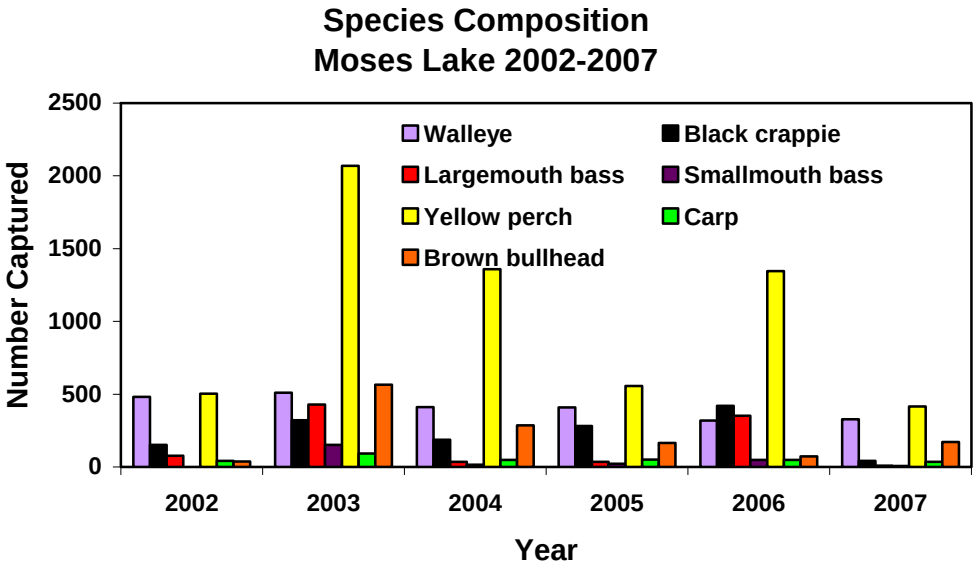
Age Distribution
Moses Lake, 2007 -vs- 2003-2007



The average size of walleye collected in 2007 decreased by two inches from 2006 for both the overall average and the average-sized male and by one inch for the average-sized female. The exceptionally large age-one year-class should account for all of the 14 to16-inch fish seen in the size distribution graph. In 2006, there was a very large two-year-old age-class, which is exceptionally small as a three-year-old age class in 2007. Those fish

were likely removed by angling and/or entrainment. Angling in 2008 should be good for the two-year-old fish, but the impact of the change in age and size distribution from the last five-year average remains to be seen. There were still moderate numbers of walleye in the larger size ranges (20 – 28 inches. The low number of age-0 walleye in our samples does not generate concern since this age-class is not often collected effectively in gill nets.

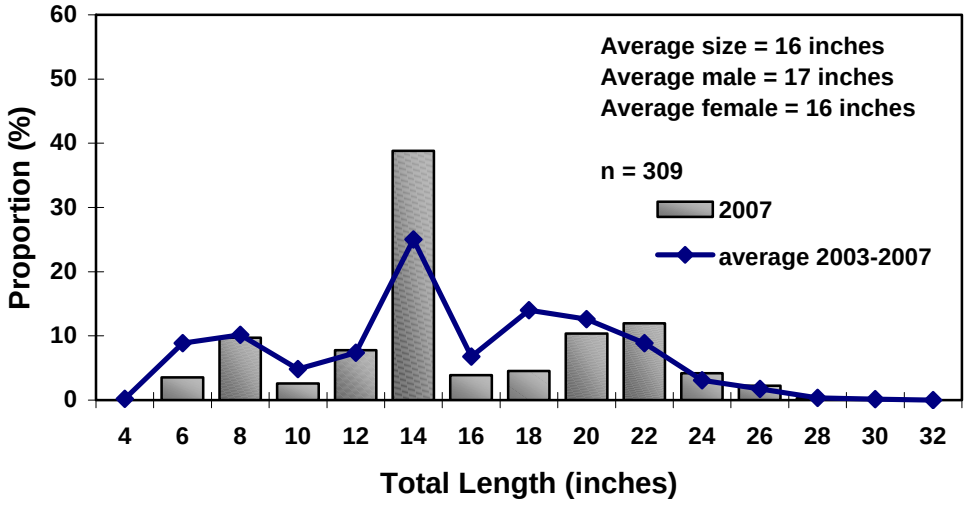




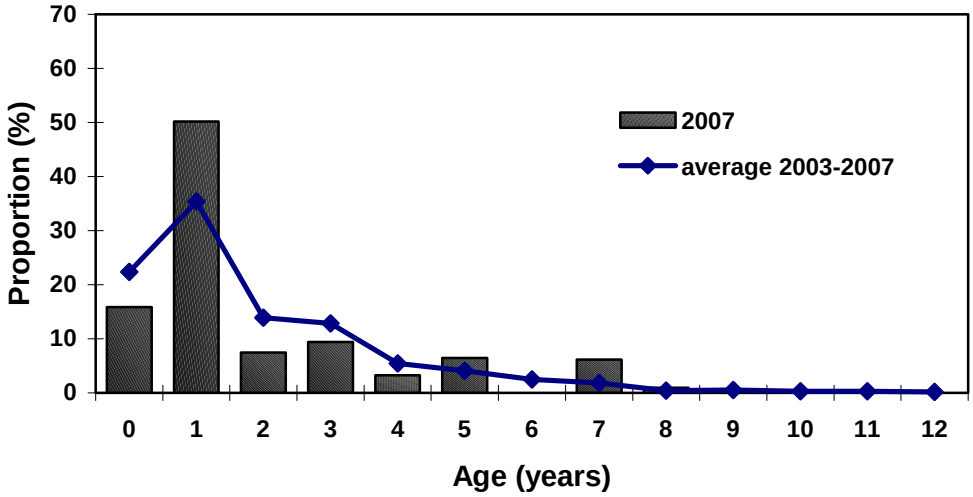
The walleye in Moses Lake ranged from five to 30 inches long, averaging 16 inches in length and 1.5 pounds in weight with a maximum of 30 inches and seven pounds. Yellow perch were once again the most populous fish in Moses Lake even though their numbers were reduced from 2006. As mentioned before, yellow perch populations routinely cycle up and down significantly and this can easily be seen in the above graph from 2002 – 2007. They averaged only six inches in 2007 with a maximum of twelve inches. Black crappie also averaged six inches (ranging from three to nine inches) and brown bullhead averaged nine inches (ranging from 5 – 16 inches).

Other species present in lower numbers include bluegill, pumpkinseed sunfish, largescale sucker, longnose sucker, common carp, lake whitefish, largemouth bass, smallmouth bass, channel catfish and rainbow trout.

Size Distribution
Potholes Reservoir, 2007 -vs- 2003-2007



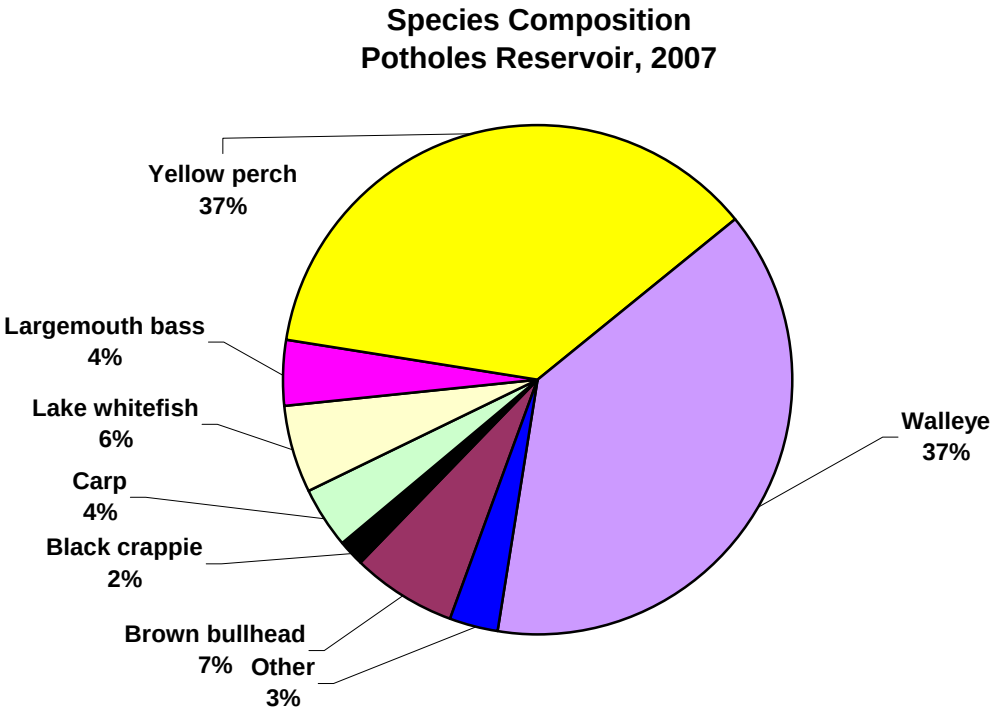
Age Distribution
Potholes Reservoir, 2007 -vs- 2003-2007

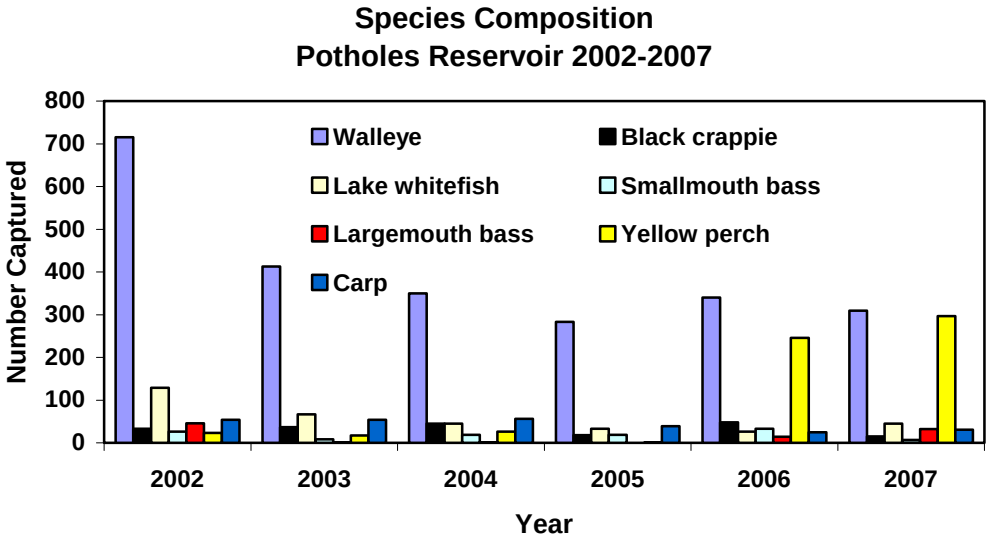


Unlike Moses Lake, the size and age distributions of walleye collected from Potholes Reservoir in 2007 was almost exactly the same as the average of the previous four years. The overall average size and average size of females remained the same, at 16 inches, but the size of the average male increased by one inch to 17 inches. The strong one-year-old age-class is well represented in the 14-inch size-class. There are few fish in the 16 to 18-

inch range, but better numbers in the 20 to 24-inch range. To this point in time, the 12-inch minimum size limit, implemented in May 2006, seems to have had little impact on the number of fish in the 12 to 16-inch size range.

Size distribution of walleye collected from Potholes Reservoir during 2007 shows fish represented moderately in most ranges, and disproportionate between 350 and 400mm. Walleye in the 300 mm length frequency were low, likely a result of the rapid growth of age 1 walleye growing out of the range of overlap with age 0 walleye. Age data identified age 5 walleye as absent from samples, and was expected as this age class has been low or absent at earlier ages. A new walleye harvest regulation was implemented in May 2006 (305mm/12inch minimum size/8 fish limit), and length frequencies of walleye collected during 2007 indicate 81 percent of walleye in samples were of harvestable size. Age 0 walleye are typically excluded from analyses due to high variations in growth, and when excluded, 100 percent of age 1 and older walleye were of harvestable size at the time of our survey.

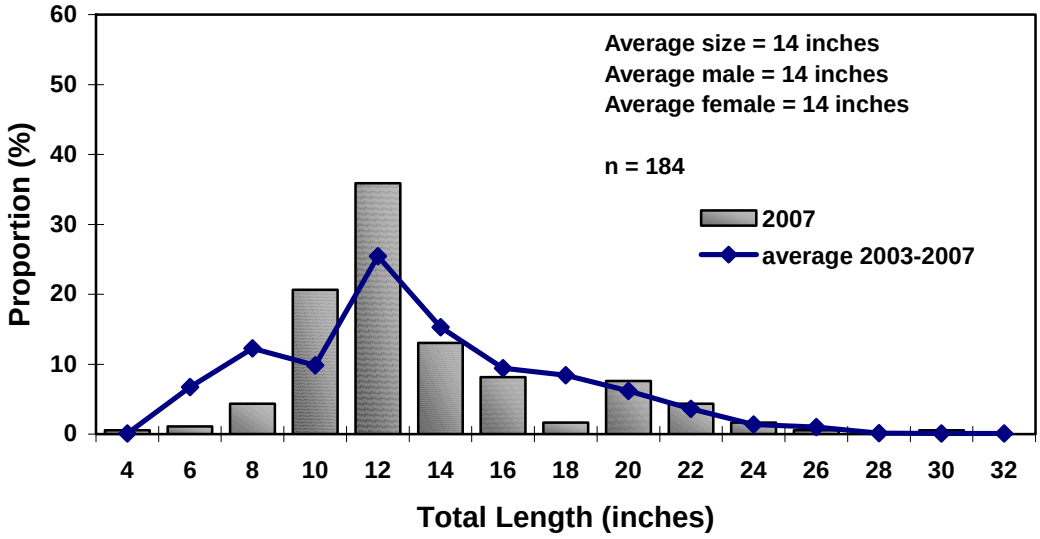




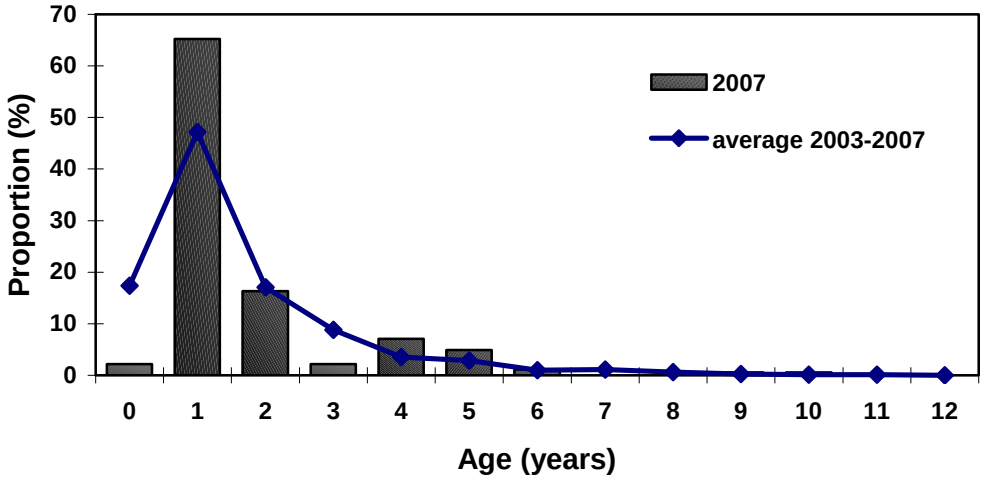
For the second year in a row, the fish community in Potholes Reservoir was dominated by both walleye and yellow perch. Before 2006, walleye alone far outnumbered all other species. It is common for both perch and walleye (both members of the perch family) to have large swings in their population numbers. Walleye averaged 16 inches with the largest being 29 inches and 10.5 pounds. Yellow perch averaged six inches in length,

black crappie averaged seven-plus inches, lake whitefish averaged 20 inches and four pounds, largemouth bass averaged nine inches with a maximum of 21 inches and five pounds and brown bullhead averaged ten inches. Other species present in smaller numbers include smallmouth bass, channel catfish, carp and yellow bullhead.

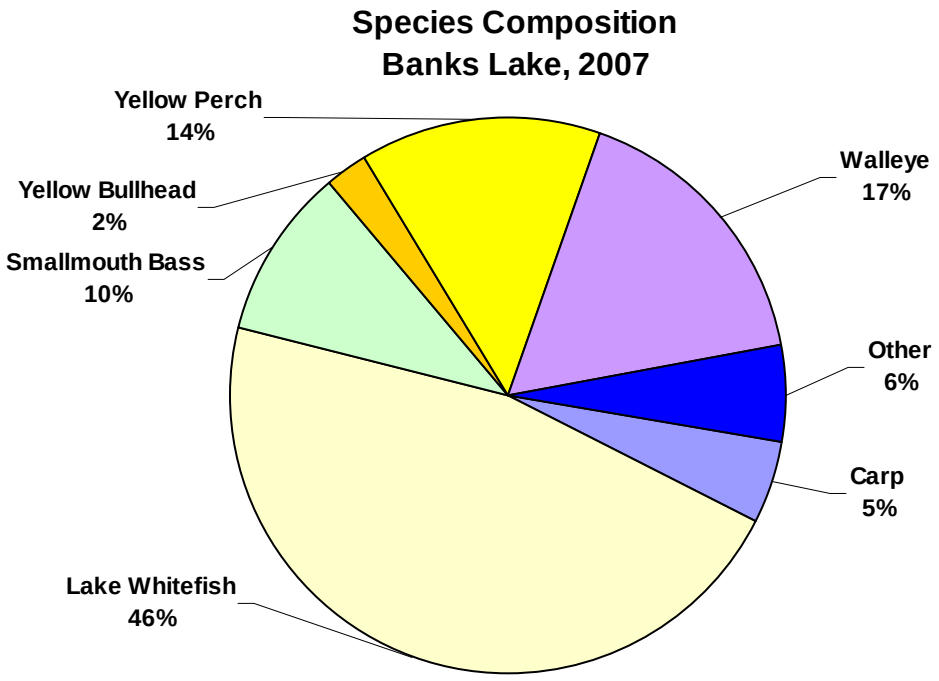
Size Distribution
Banks Lake, 2007 -vs- 2003-2007

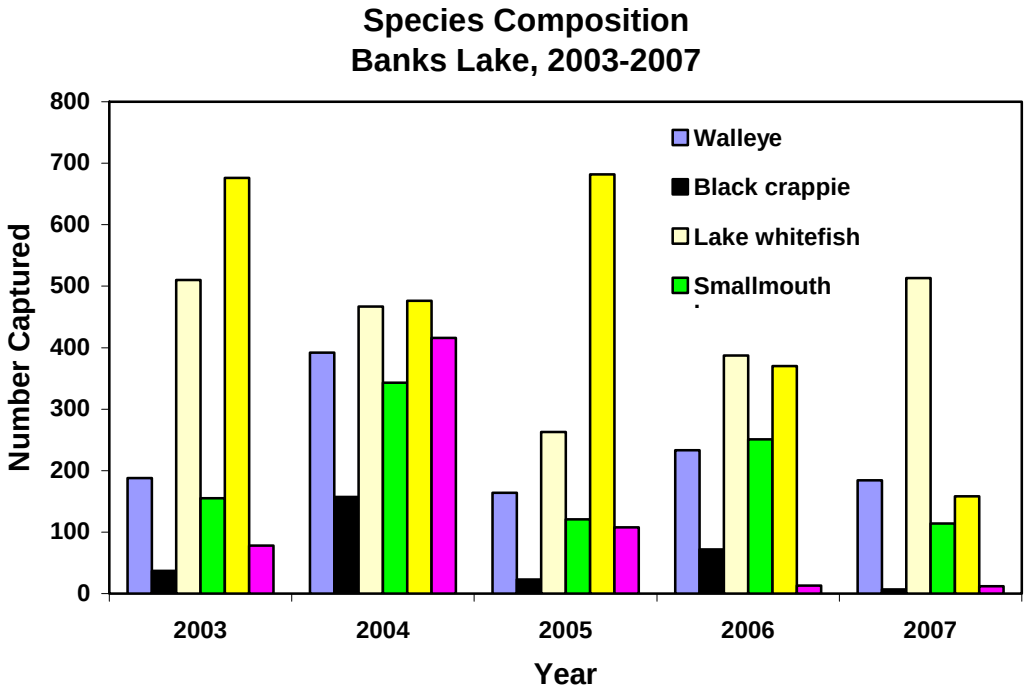


Age Distribution
Banks Lake, 2007 -vs- 2003-2007



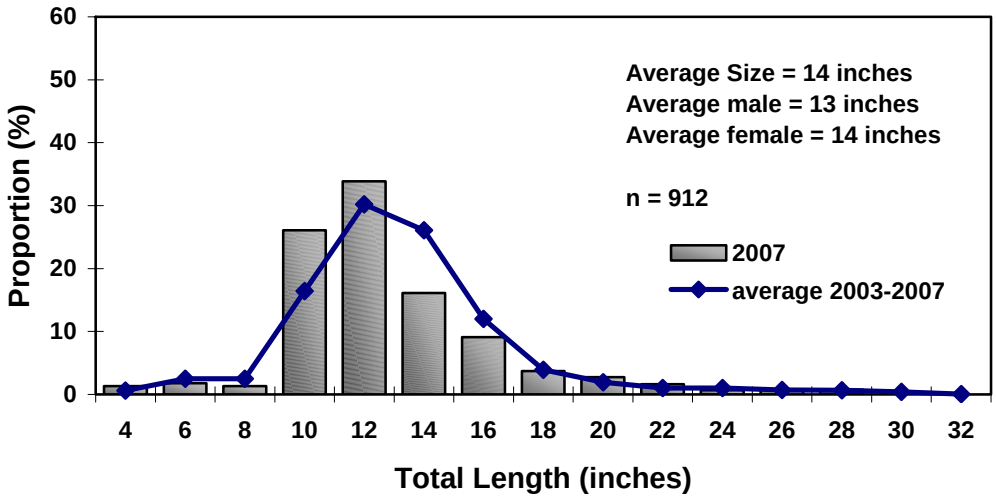
Size distribution of walleye collected from Banks Lake in 2007 was very similar to the average for the last five years. There were a slightly higher percent of ten and twelve-inch fish because of the larger one-year-old age class. Looking at the average values for both size and age in Banks Lake for the last five years, we see a pattern similar to that in Scooteney Reservoir. Although Banks is of course much larger and the current moving through the reservoir is not as strong as that in Scooteney, entrainment could help explain the low number of fish over two years of age. Most walleye collected from Banks Lake in 2007 (75%) were sub-legal in length. This could indicate there should be good fishing for walleye over 16 inches in 2008, but considering the average age makeup of the population, the 2008 size and age distribution remains to be seen.



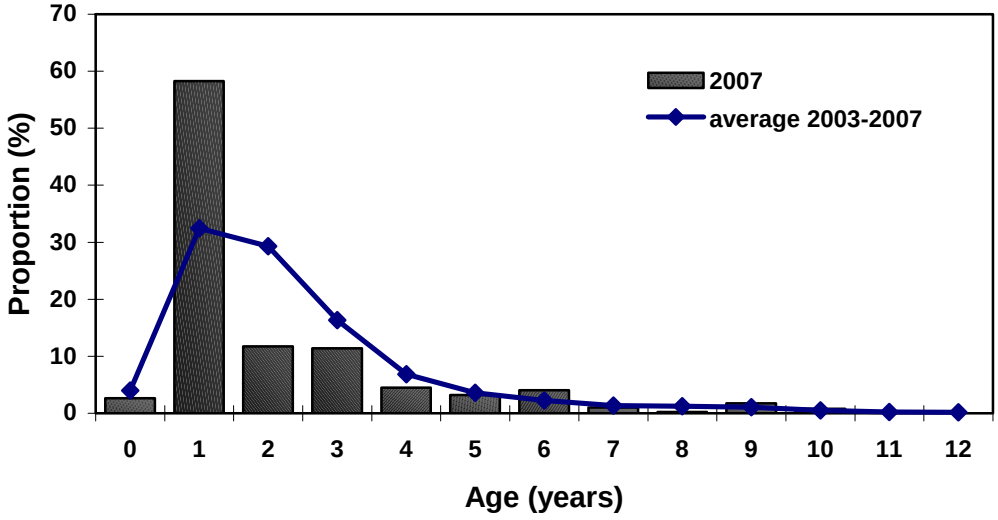


Compared to the 2006 survey, in 2007 the same species dominated the fish community, but in lesser numbers. Yellow perch continued its decline in numbers for the second consecutive year, which is not uncommon, and they averaged eight inches in length. Kokanee averaged 17 inches and 1.7 pounds, lake whitefish averaged 18 inches and 2.3 pounds, smallmouth bass averaged 14 inches and 1.5 pounds with a maximum size of three pounds and the largest walleye we caught was 30 inches and six pounds. Smallmouth bass, the other apex predator besides walleye, kept the same relative abundance compared to walleye numbers as it has had the last few years. Other species present in lower numbers included brown and yellow bullhead, common carp, largemouth bass, burbot and black crappie.

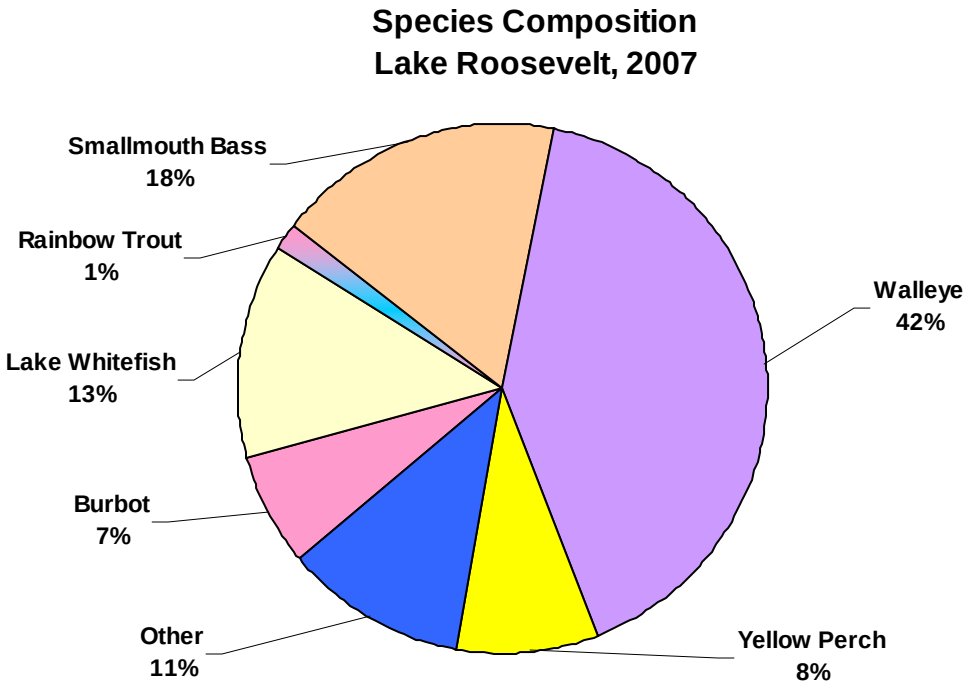
Size Distribution
Lake Roosevelt, 2007 -vs- 2003-2007

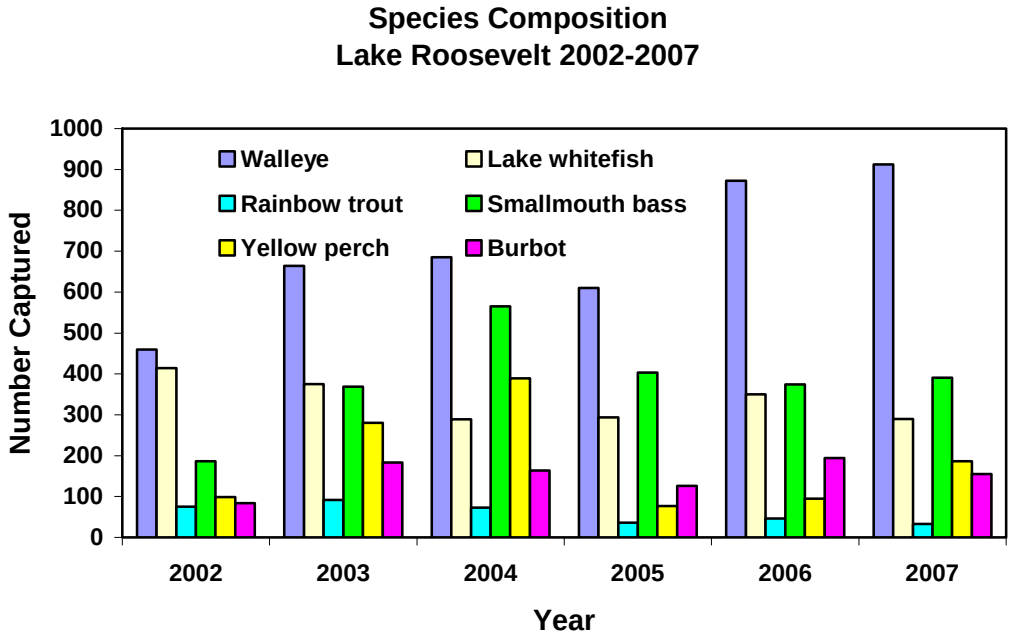


Age Distribution
Lake Roosevelt, 2007 -vs- 2003-2007



In 2007, Lake Roosevelt catchable-size walleye (>10 inches) ranged in length from 10 to 30 inches (11 pounds) and averaged 14 inches, which is similar to previous surveys. Even though there was an extremely large one-year-old age class, the size distribution was close to “average”. The strong one-year-old class indicates adequate recruitment and should bolster the fishery in the years ahead.

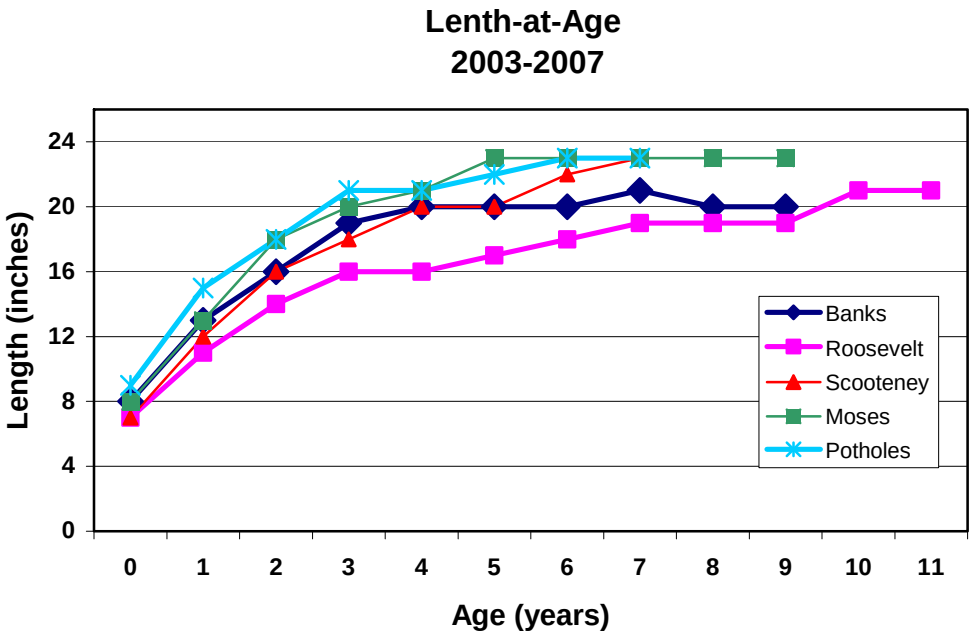




The total numbers of all fish species in the Lake Roosevelt 2002-2007 species composition graph (Y axis) are high compared to the other lakes because Lake Roosevelt

is divided into three sections, each sampled with 50 nets. The data for this graph is from the three sections combined. As stated earlier, we have a "biological limit" of 300 walleye for each lake (or "section" as in the case of Lake Roosevelt). If we reach that number, we stop sampling because we feel a sample size of 300 fish will give us a representative sample of the walleye population for the parameters we measure. That is why this graph shows that we captured close to 900 walleye in Lake Roosevelt in 2006 and 2007.

In addition to walleye, other species of interest to anglers included smallmouth bass, averaging 12 inches and ranging from 7 to 22 inches and weights up to five pounds; rainbow trout averaged 17 inches and yellow perch averaged 8 inches. Burbot averaged 19 inches and ranged from 10 to 29 inches and lake whitefish averaged 19 inches. Other species sampled in lower numbers include largescale sucker, longnose sucker, northern pikeminnow, common carp, peamouth, redside shiner, white sturgeon, kokanee, mountain whitefish, and tench. The bar graph shows the predominant species over the past six years have been walleye, smallmouth bass, burbot and lake whitefish.



This graph shows growth and "length-at-age" information for all five lakes we have done FWIN surveys on. The "zeros" or zero-age walleye are of course not hatched at a length of eight inches but are that length by their first fall, when we do our sampling, after being hatched in the spring of that year.

Not surprisingly, Lake Roosevelt has the slowest growth of the five lakes and the smallest asymptotic length, or average maximum length. Of course there are many

walleye in Lake Roosevelt that are bigger than 19 inches, but that is where the majority stop growing in length. This is because Lake Roosevelt does not have the available nutrients to support the amount of biomass of the other lakes, and consequently, there is not as much available forage for a predator such as walleye.

Banks Lake and Scooteney Reservoir have the "medium" growth rates in our state with their asymptotic curves topping out at 20 inches each. Moses Lake and Potholes reservoirs, which are shallow, "productive" waters, full of nutrients and forage fish, support much faster growth of juvenile and sub-adult walleye and have a full two to three inches larger average maximum lengths.

WDFW will be publishing a comprehensive report covering all the FWIN data collected from 2001 onward. It will provide more in-depth explanations of the above information, along with information on growth, physical condition, sex ratio by size, reproductive maturity by size and age and explanations of the trends we are seeing to date in our FWIN surveys. It will be printed as an agency research report and also placed on the WDFW web site near the location of this report. It will likely not be published until 2011, after we have collected ten years of FWIN data.

For questions, comments or additional information on this or other FWIN reports or surveys, please contact Bruce Bolding in the Olympia WDFW office: telephone at 360-902-8417 or email at boldibdb@dfw.wa.gov