

2023 Walleye Survey of Scooteney Reservoir with Comparison to 2016 Survey



Fisheries Biologists Kent Mayer and Randy Osborne hold a 31-inch Walleye from Scooteney Reservoir

**Kent Mayer
and
Danny Garrett**



Washington Department of
FISH & WILDLIFE

**Warmwater Fisheries Program
Fish Management Division**

ABSTRACT

A Fall Walleye Index Netting (FWIN) survey was conducted on Scooteney Reservoir in October of 2023, seven years after the previous survey in 2016. A total of 242 Walleye were caught in 12 nets (20.2 Walleye/net), slightly below the long-term (2002-2016) average of 21.6 Walleye per net. The average length of Walleye was 15.9 inches (403 mm), which was 1.5 inches (38 mm) longer than the long-term (2002-2016) average of 14.4 inches. The largest Walleye caught was 31 inches (790 mm). Walleye in Scooteney exhibited relatively fast growth, with most fish reaching 18 inches by age 2. Female Walleye grew faster than males at all ages. One in six Walleye (17%) were over 22 inches in 2023, while only one in 29 fish (3%) were over 22 inches in 2016. There was also a significant difference in the age-at-maturity between 2023 and 2016; with age-1 males and age-2 females maturing earlier. In 2023, 31% of the males were mature at age-1, compared to only 1% of the age-1 females; 81% of the males were mature by age 2, compared to 23% of the age-2 females. All fish were mature by age 3. The majority (80%) of Walleye were age 3 or younger and maturing earlier, which is a similar trend to what we are seeing in other Walleye populations in Washington. Scooteney Reservoir appears to have all the attributes of a quality Walleye fishery, with high recruitment of age-1 fish every 3-5 years, resulting in stable abundance and a substantial number of older Walleye over 22 inches.

INTRODUCTION

The WDFW Warmwater Program has been conducting Fall Walleye Index Netting (FWIN) surveys since 2002, to monitor the biological data, abundance and trends of selected Walleye (*Sander vitreus*) populations. The main Walleye waters in Washington include Banks Lake, Lake Roosevelt, Moses Lake, Potholes Reservoir and Scooteney Reservoir.

Scooteney Reservoir is a 710 acre reservoir, in Franklin County, about nine miles southeast of Othello, which is part of the Columbia Basin Project. Scooteney Reservoir has a year-round fishery, with both shore and boat fishing, and a Bureau of Reclamation campground. The FWIN surveys were conducted annually on Scooteney Reservoir from 2002 to 2016, and again in 2023.

METHODS

A total of 12 FWIN gill nets were randomly set throughout the reservoir. The nets were 200 feet (61 meters, m) long and 6 feet (1.8 m) deep, with eight 25-foot (7.6 m) panels, with stretched mesh sizes of 25, 38, 51, 64, 76, 102, 127 and 152 mm, respectively, constructed of monofilament.

All fish captured were identified to the species level, measured for total length (TL; mm), weighed to the nearest gram (g), sexed and state of maturity (immature/mature/unknown) were recorded. To create an age structure of the population, otoliths were removed for age analyses at the WDFW Aging Lab in Olympia. Length-at-age data from otolith annuli were used to describe growth rates, using a von Bertalanffy growth function, which is expressed as length-at-age over time.

The proportional size distributions (PSD) were calculated using the number of quality-size (PSD), preferred-size (PSD-P), memorable-size (PSD-M) and trophy-size (PSD-T) fishes, divided by the number of the number of stock-size fish and multiplying by 100. PSD length categories for Walleye are stock (10" TL), quality (15" TL), preferred (20" TL), memorable (25" TL) and trophy (30" TL).

The relative weight (W_r) was used to evaluate the condition of the Walleye. The index is defined as $W_r = W/W_s \times 100$, where W is the weight (g) of an individual fish, and W_s is the standard weight of fish at the same length.

A comparison of biological data between the 2023 and the 2016 (the previous) survey of Scootenevy was conducted for selected metrics, including length, age, sex ratio, growth and age-at-maturity.

We evaluated changes in the size structure of the population by analysing catch rates of different sizes of Walleye between 2023 and 2016. A T-test was used to determine if there was a significant difference in size structure over time. To determine if there were any changes in age-at-maturity between 2023 and 2016, we performed a Z-test to compare percent maturity, by sex and age.

Year class strength (cohort size) was determined for the 2002-2016 time period, based on the proportion of Walleye caught at each age in a given year. Year class strength was determined for the Scootenevy Reservoir Walleye population over time, by tracking the larger proportions of a given age across (i.e., passing through) consecutive years.

RESULTS

A total of 242 Walleye were caught in 12 nets (CPUE = 20.2 Walleye/net) in 2023, which is a little below the long-term average in Scootenevy Reservoir of 21.6 Walleye/net (Figure 1).

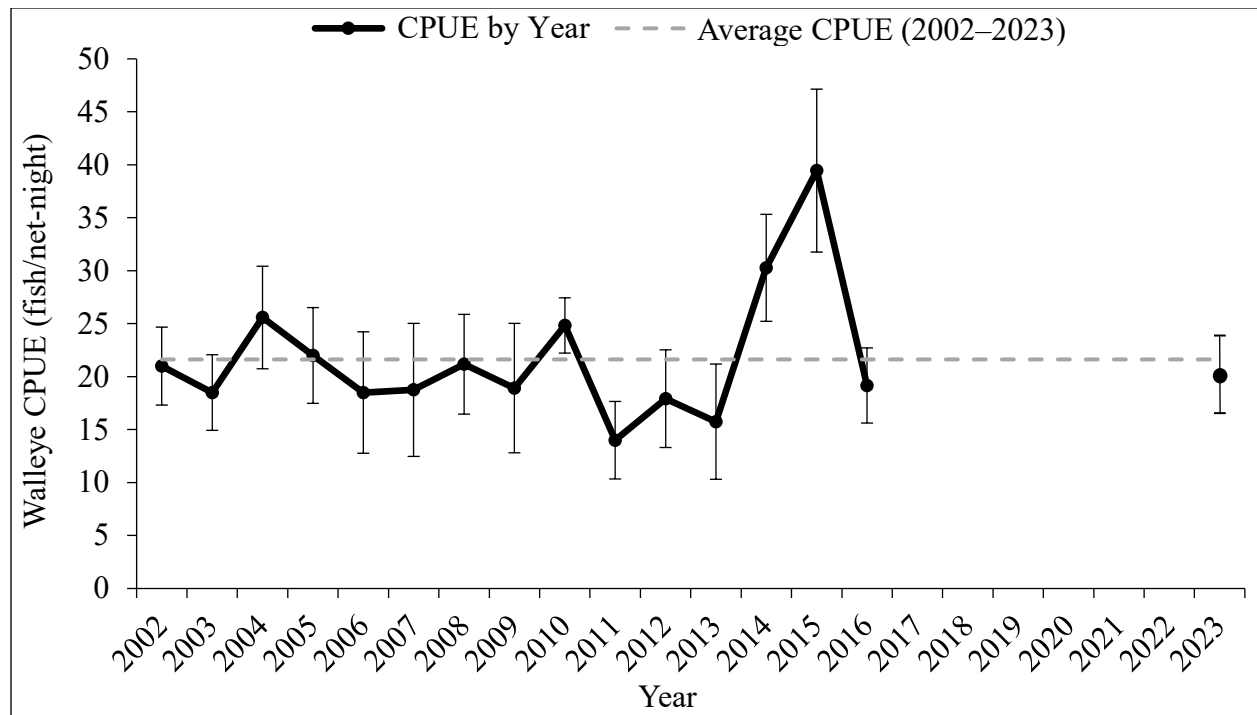


Figure 1. Catch per unit effort (CPUE) of Walleye captured in the 2023 Scootenevy Reservoir FWIN survey compared to the previous 15 FWIN surveys, from 2002 to 2016. The grey dashed line (---) is the average CPUE of all previous FWIN surveys.

The mean length of Walleye captured in 2023 was 15.9 inches (403 mm), with a median of 14.3 inches (363 mm). The majority (60%) of Walleye were greater than 12 inches (305 mm), and 16% were greater than 22 inches (560 mm). The largest Walleye captured was 31 inches (790 mm). A length distribution of all Walleye captured in 2023 is shown in Figure 2. There was a 2.1 inch (54 mm) gap in lengths between 9.3 inches (236 mm) and 11.4 inches (290 mm), which corresponded to the gap between age-0 and age-1 Walleye.

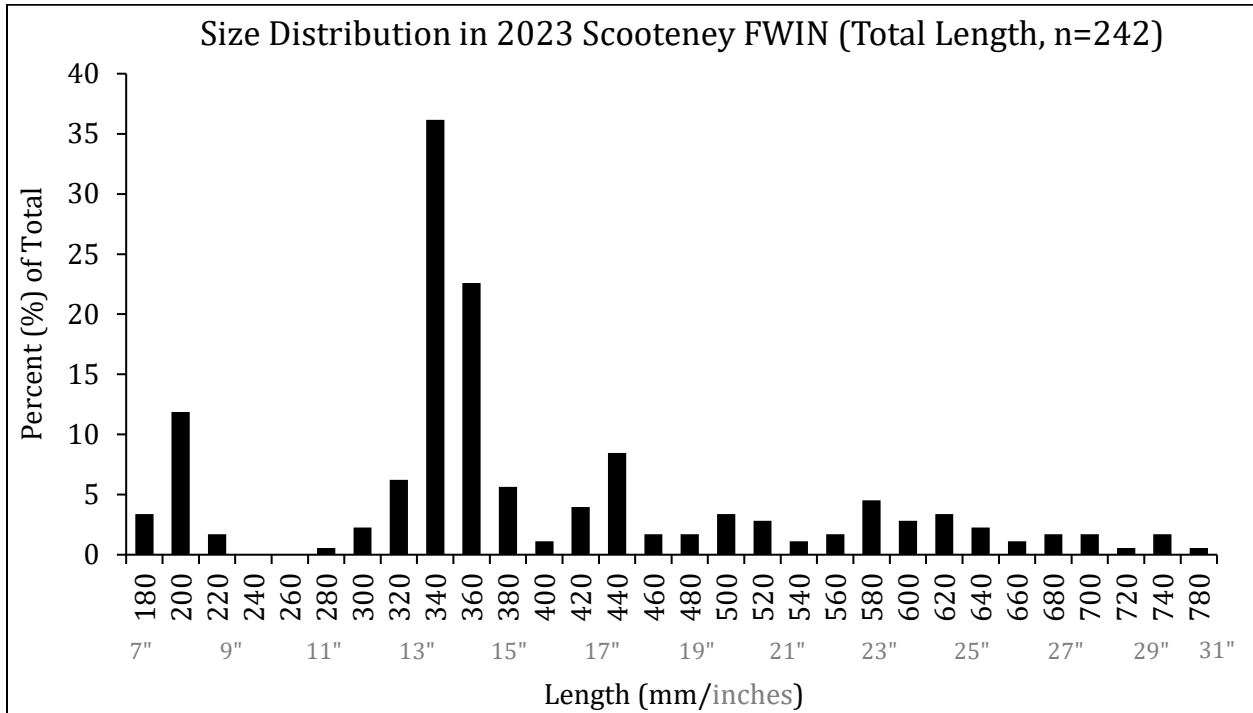


Figure 2. Length distribution (in millimeters and inches) of the 242 Walleye captured in the 2023 Scootenev Reservoir FWIN survey.

The age of Walleye captured in the 2023 survey ranged from age-0 to age-14, with an average age of 2.2-years: 1.9-years old for males and 2.4-years old for females (Figure 3). Approximately 77% of the Walleye were age-2 or younger, 80% were age-3 or younger, and 86% were age-4 and younger.

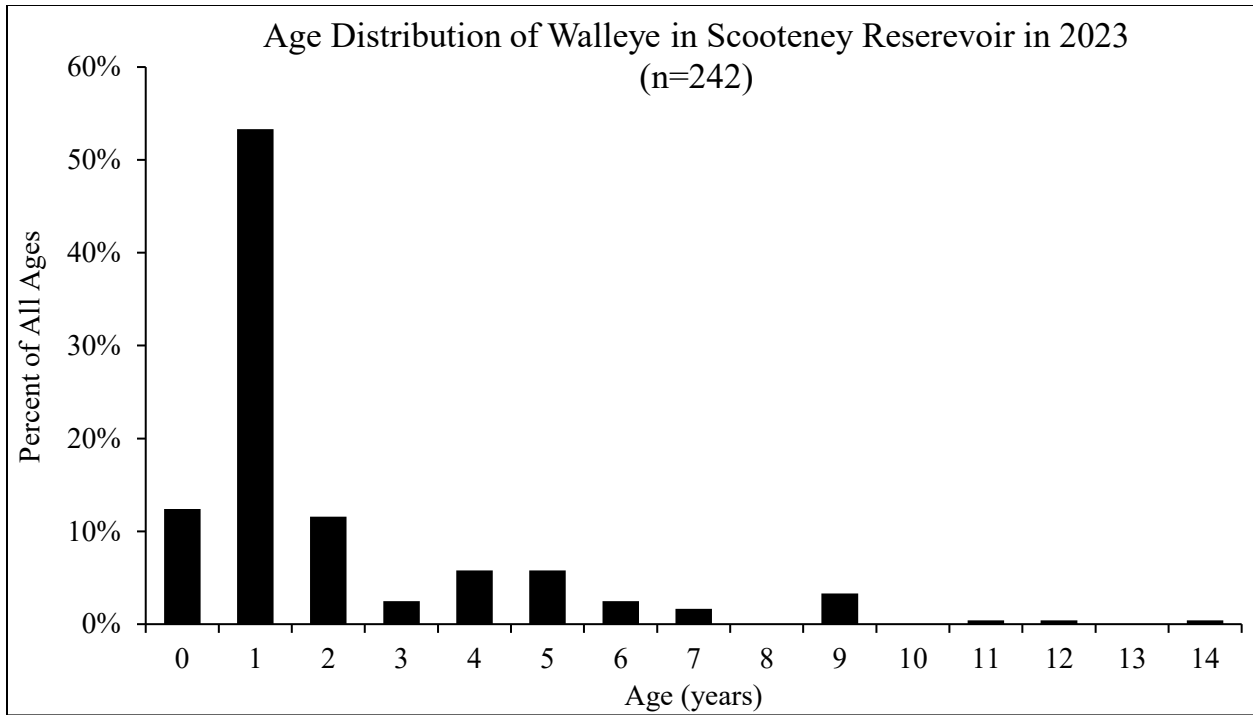


Figure 3. Age distribution of Walleye captured in the 2023 Scooteny Reservoir FWIN survey.

Length-at-age growth curves for male and female Walleye are presented in Figure 4. While both male and female Walleye were about the same size at age-1 (209 and 207 mm, respectively), female Walleye grew faster than male Walleye at all ages: 14% faster from age 1 to 2, 36% faster from age 2 to 3, 55% faster from age 3 to 4, and 43% faster from age 4 to 5.

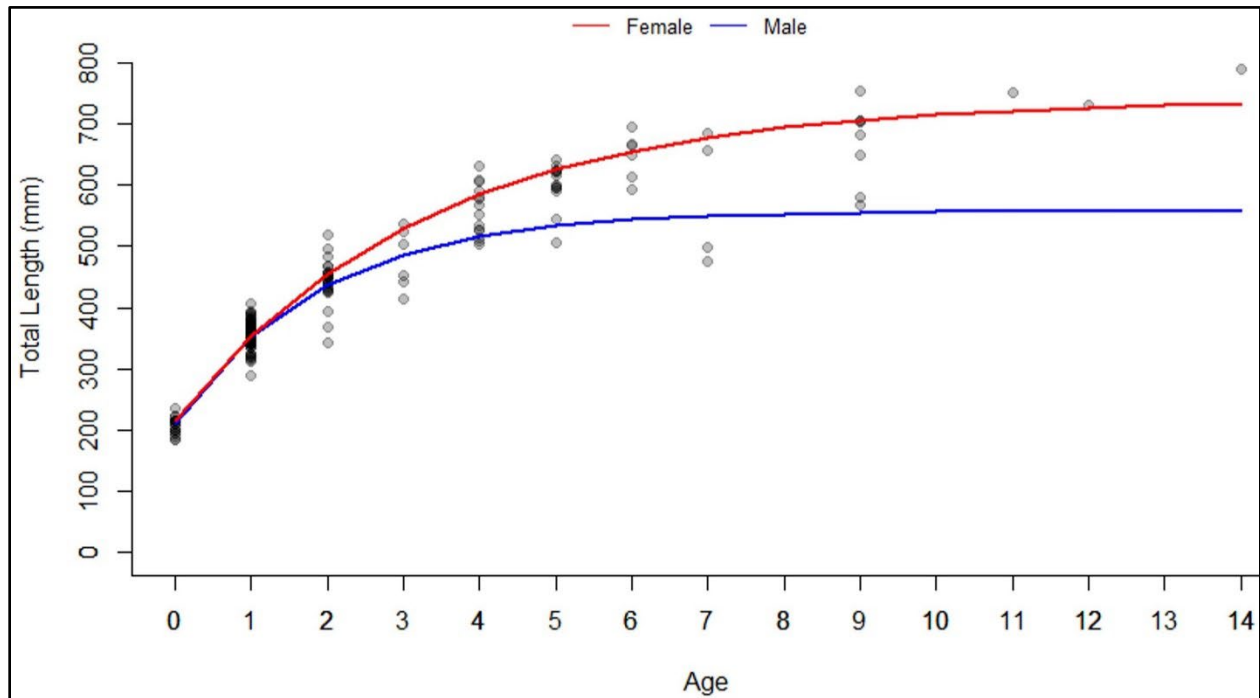


Figure 4. Total length-at-age for male Walleye (n=94) and female Walleye (n=134) captured in the 2023 Scooteny Reservoir FWIN survey.

Walleye (both males and females) in Scooteney Reservoir exhibited relatively fast growth compared to other FWIN waters, with most fish reaching 18 inches by age 2. The proportional size distribution (PSD) of Walleye in the 2023 FWIN survey is presented in Table 1. The Walleye in Scooteney were well-represented in the “Preferable” and “Memorable” size categories.

Table 1. The proportional size distribution of Walleye captured in the 2023 Scooteney Reservoir FWIN survey (Quality = 15", Preferred = 20", Memorable = 25", Trophy = 30"), with 80% confidence intervals ($\pm 80\%CI$).

Stock	PSD-Q	80%CI	PSD-P	80%CI	PSD-M	80%CI	PSD-T	80%CI
212	43	4	23	4	9	2.5	0.5	0.6

The age-at-maturity for male and female Walleye in Scooteney reservoir are presented in Figure 5. Thirty-one percent of the male Walleye were mature at age 1 (30% more than females) and 81% were mature by age 2 (57% more than females). Whereas only 1% of the females were mature at age 1 and 23% by age 2. All Walleye (male and female) were mature at age 3.

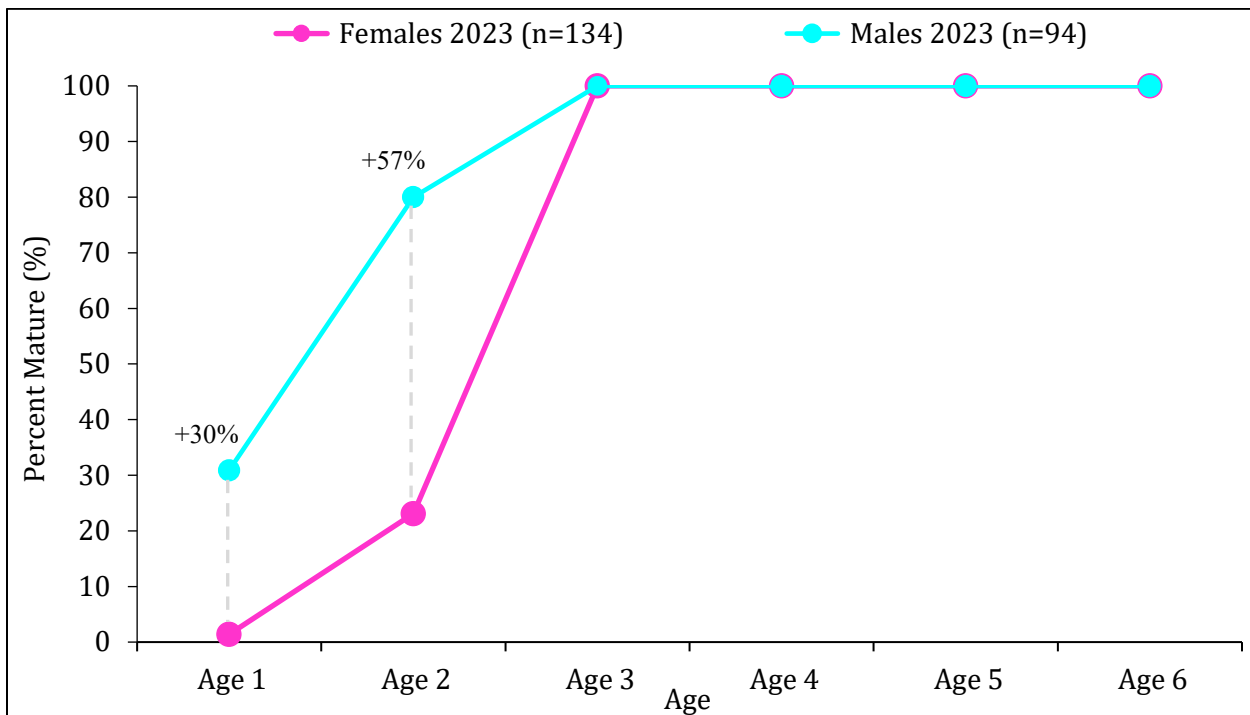


Figure 5. Age-at-maturity of male and female Walleye captured in the 2023 Scooteney Reservoir FWIN survey.

The average relative weight (W_r) of Walleye in Scooteney Reservoir was 90 (Figure 6), which is the average W_r for Walleye in Washington. (Note: A value of 100 is the nation-wide average W_r for Walleye; 90 is the average W_r for Walleye in the State of Washington).

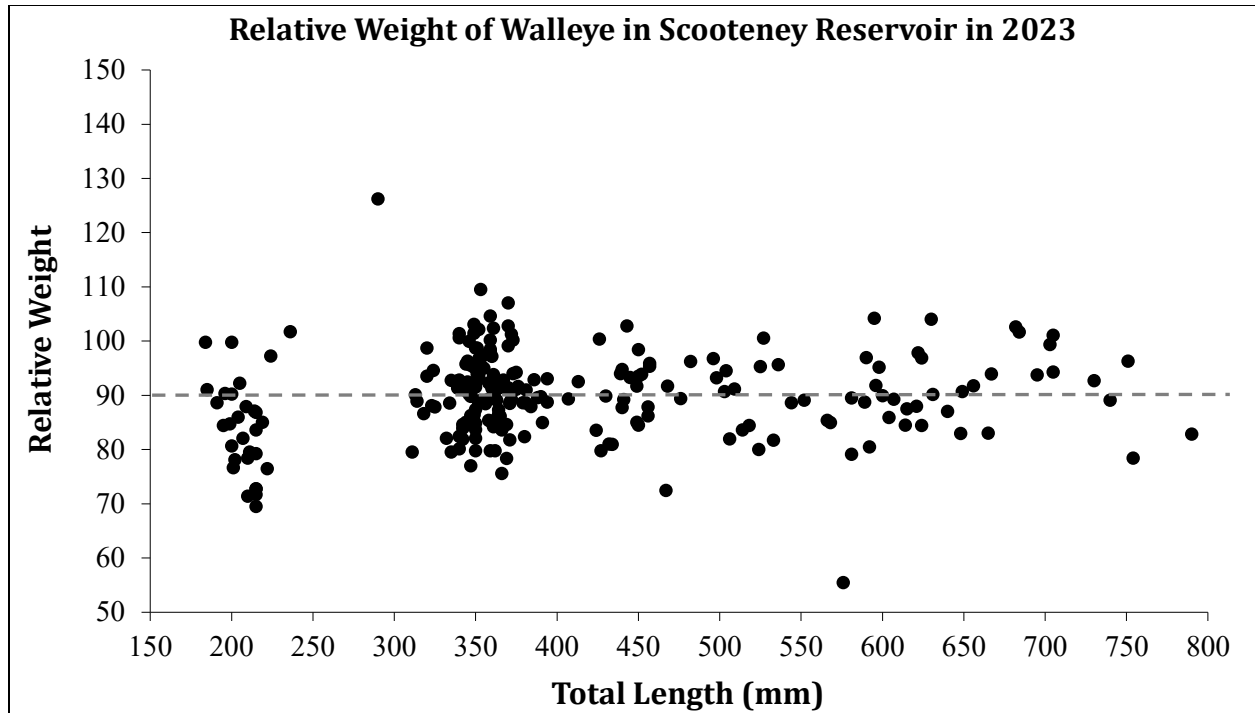


Figure 6. Relative weight (W_r) of Walleye captured ($n=242$) in the 2023 Scootenev Reservoir FWIN survey. The grey dashed line (---) is the average W_r of Walleye in Washington.

A total of 1,269 fishes were captured in the 2023 Scootenev Reservoir FWIN survey, representing 12 different species, as follows: Black Crappie (*Pomoxis nigromaculatus*), Bluegill (*Lepomis macrochirus*), Brown Bullhead (*Ameiurus nebulosus*), Common Carp (*Cyprinus carpio*), Largemouth Bass (*Micropterus salmoides*), Longnose Sucker *Catostomus catostomus*, Mountain Whitefish *Prosopium williamsoni*, Pumpkinseed Sunfish (*Lepomis gibbosus*), Smallmouth Bass (*Micropterus dolomieu*), Walleye, Yellow Bullhead (*Ameiurus natalis*) and Yellow Perch (*Perca flavescens*). Each species by number and as a percentage of all fish captured (relative abundance) is shown in Table 2.

Table 2. Number and relative abundance (% of total catch) for each species of all 1,268 fishes captured in the 2023 Scootenev Reservoir FWIN Survey.

Species	Number	Percent
Yellow Perch	387	30.5%
Walleye	242	19.1%
Black Crappie	131	10.3%
Brown Bullhead	115	9.1%
Largemouth Bass	102	8.0%
Smallmouth Bass	88	6.9%
Yellow Bullhead	78	6.1%
Bluegill	50	3.9%
Pumpkinseed Sunfish	35	2.8%
Common Carp	26	2.0%
Longnose Sucker	9	0.7%
Mountain Whitefish	5	0.4%
Total fishes	1,268	100.0%

Comparison to the 2016 Walleye Survey

A comparison of selected statistics between the 2023 Scooteney Reservoir FWIN and the previous FWIN survey in 2016 is presented in Table 3.

Table 3. Selected metrics of Walleye captured in the 2023 Scooteney Reservoir FWIN survey compared to the previous (2016) survey of Scooteney. The Net Change column shows the difference for each metric between the 2023 and 2016 surveys.

Statistic	2023 Result	2016 Result	Net Change
Number of nets	12	12	0
Number of Walleye	242	230	+12
CPUE (fish/net)	20.2	19.2	+1.0 fish/net
Walleye mean length (population)	403.5	387.2	+16.3 mm
Walleye median length (population)	362.5	388.0	-25.5 mm
Mean age (population)	2.1	1.9	+0.2 yrs.
Median age (population)	1.0	2.0	-1.0 yrs.
Sex Ratio (Male to Female)	41% M:59 % F	49% M:51% F	-8% M:+8% F
Age-at-Maturity: Male age-1	30.9%	3.0%	+27.9%
Age-at-Maturity: Female age-2	23.1%	1.3%	+21.8%

There was no difference in the length distribution of Walleye in Scooteney Reservoir between 2023 and 2016 (Figure 7). Interestingly, there was/is a 2.1 inch (54 mm) gap in length between 9.3 inches (236 mm) and 11.4 inches (290 mm), corresponding to the 100% separation between age-0 and age-1 Walleye. A similar gap of 2.3 inches (59 mm) between 9.1 inches (232 mm) and 11.4 inches (291 mm) was present in 2016, which also corresponded to the 100% separation between age-0 and age-1 Walleye.

The mean length of Walleye in Scooteney Reservoir in 2023 was 15.9 inches (403 mm), up from 15.2 inches (387 mm) in 2016. There was also a 1.5 inch (38 mm) increase over the long-term average (2002-2016; N=3840) of 14.4 inches, due to the larger number of older fish in 2023. About 16% of the Walleye captured in 2023 were over 22 inches, while only 3.4% of the Walleye were over 22 inches in 2016. However, the distribution in lengths of Walleye in 2023 was not significantly different (t-test; $p>0.05$) than in 2016.

There was no difference in the age structure of the Walleye population in Scooteney Reservoir between 2023 and 2016 (Figure 8).

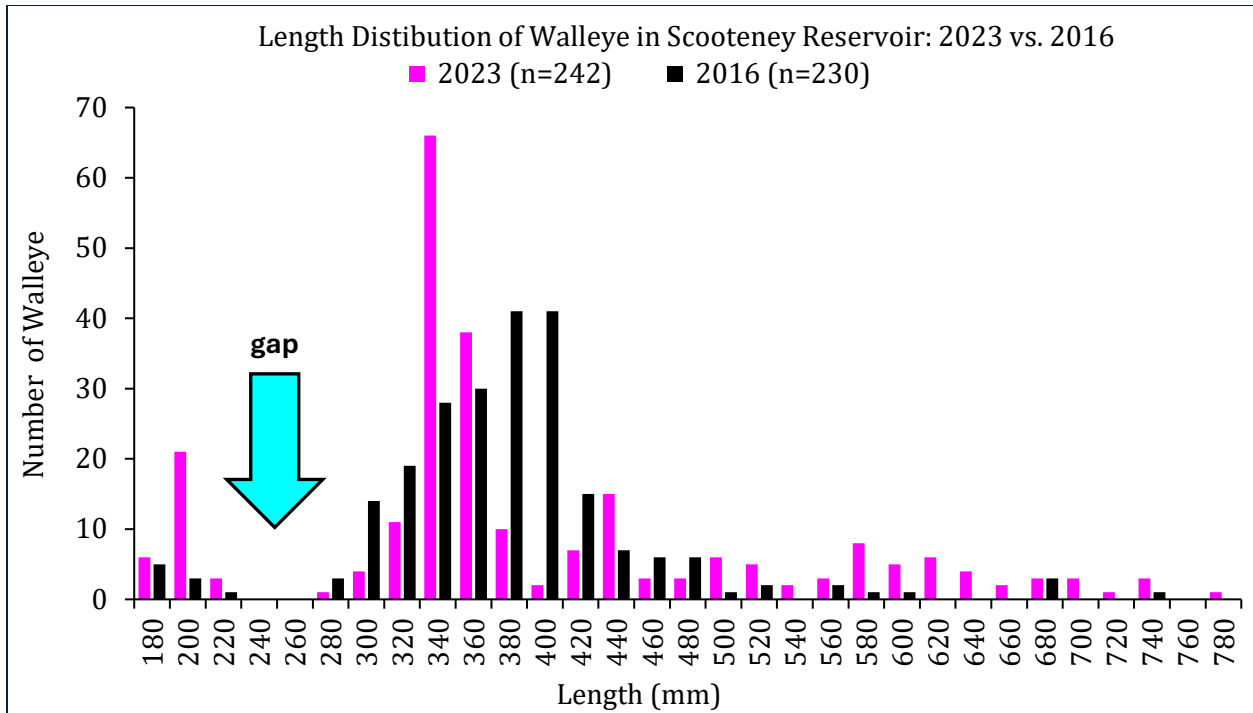


Figure 7. Length distribution of Walleye captured in the 2023 Scooteny Reservoir FWIN survey compared to the 2016 FWIN survey. The blue arrow is the 2.2 inch (56 mm) gap in Walleye lengths, which is the separation between age-0 and age-1 fish in the reservoir in both 2023 and 2016.

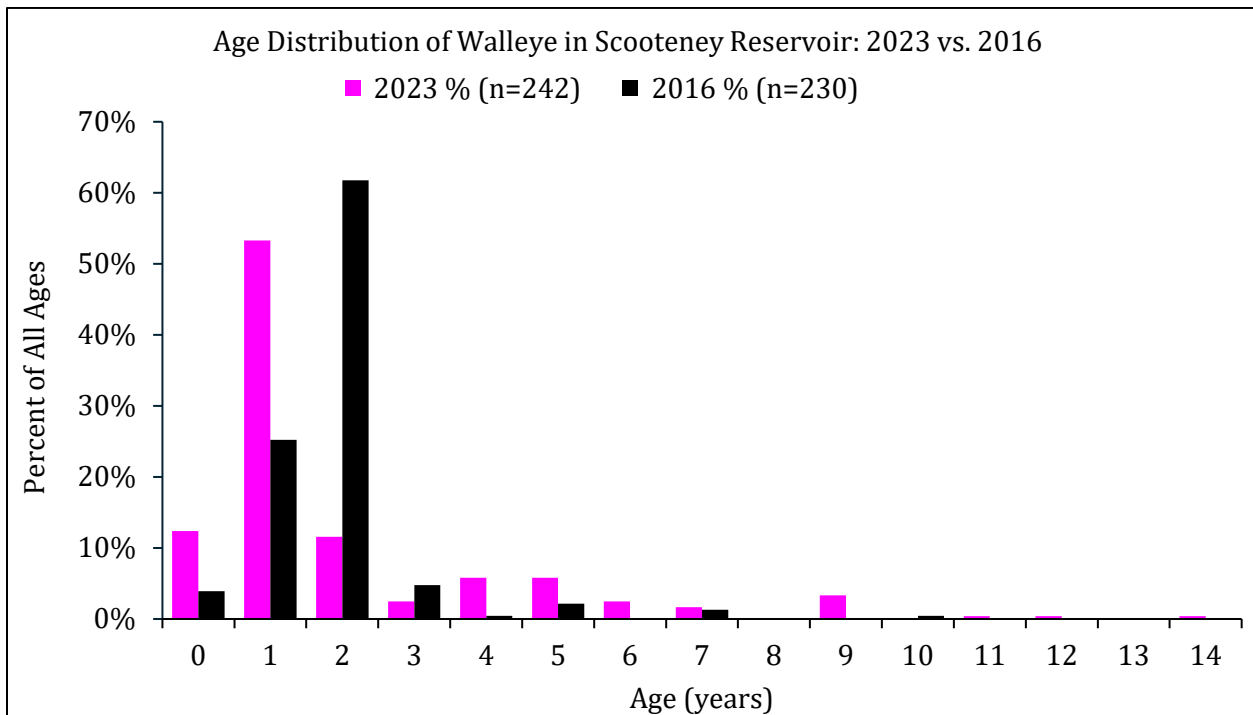


Figure 8. The 2023 age distribution of Walleye captured in the 2023 Scooteny Reservoir FWIN survey compared to the 2016 FWIN survey.

There was a significant difference in the age-at-maturity of age-1 male and age-2 female Walleye captured in Scooteneey Reservoir between 2023 and 2016, indicating a shift in the maturity schedule (Figures 9 and 10), in which Walleye are maturing earlier. The sample size of mature age-3 females was small in both 2023 and 2016 (n=2 and 4, respectively).

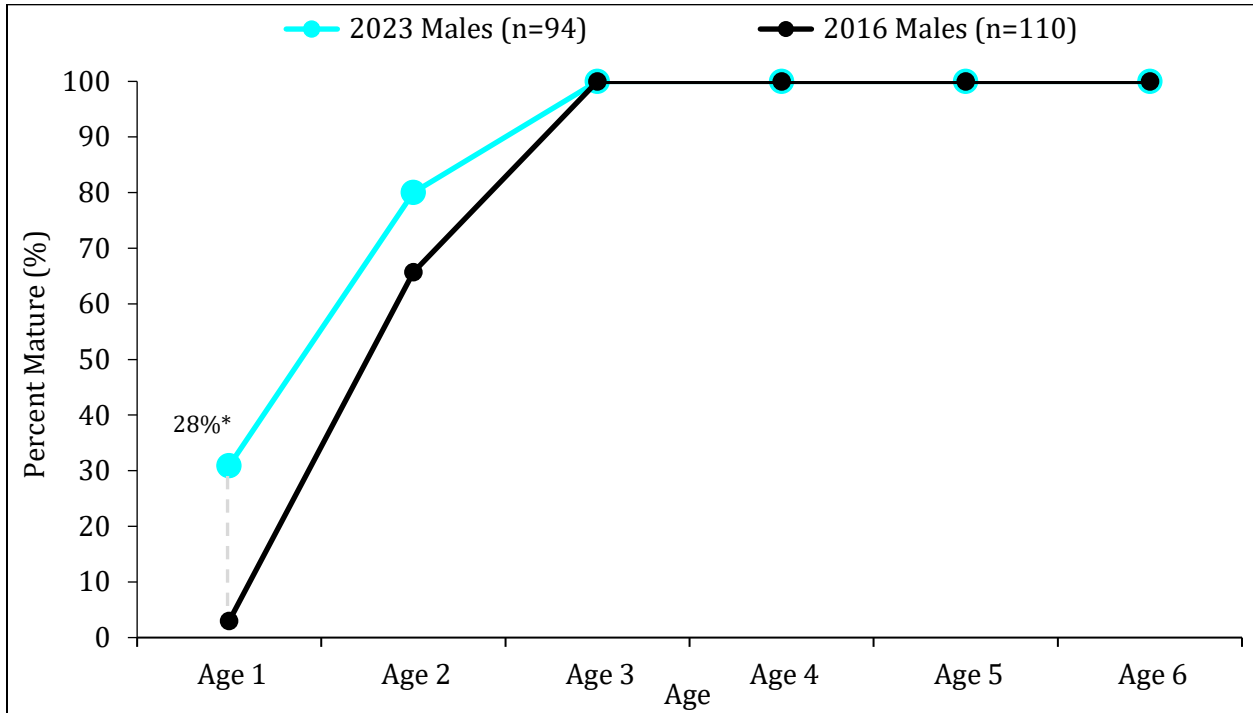


Figure 9. Comparison of age-at-maturity of male Walleye captured in the 2023 Scooteneey Reservoir FWIN survey compared to the 2016 FWIN survey. The asterisk (*) represents a significant difference ($p < 0.05$) between the two surveys (2023 and 2016).

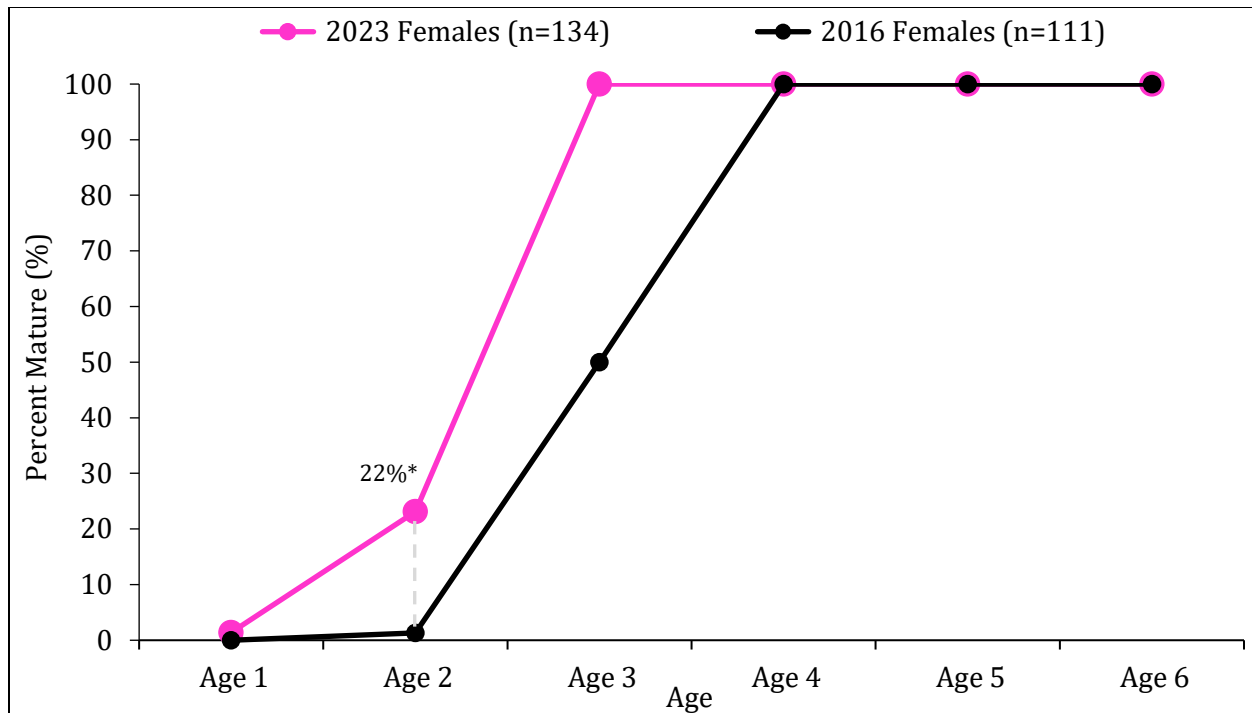


Figure 10. Comparison of age-at-maturity of female Walleye captured in the 2023 Scootenev Reservoir FWIN survey compared to the 2016 FWIN survey. The asterisk (*) represents a significant difference ($p < 0.05$) between the two surveys (2023 and 2016).

Comparison of By-catch between 2023 and 2016

Overall, there were almost three times more fish caught in the 2023 survey (1,268 fish; 12 species) than in the 2016 survey (452 fish; 14 species), in 12 nets. Based on the by-catch data, the two most dominate species (other than Walleye) in both 2023 and 2016 were Yellow Perch and Black Crappie, which comprised 34.7% and 19.4% of the relative abundance in 2016, and 37.7% and 12.8% of the relative abundance in 2023, respectively (Table 4). The species with the largest increase in relative abundance (number caught) between 2016 and 2023 were Brown Bullhead (the least abundant fish in 2016), increasing from 0.9% to 11.2% of the total catch, and Largemouth Bass, which increased from 2.3% to 9.9% of the total catch. There were two species captured in 2016 that were not captured in 2023: Lake Whitefish and Largescale Sucker.

Table 4. Comparison of by-catch captured in the 2023 Scooteney Reservoir FWIN survey compared to the 2016 FWIN survey, excluding Walleye. Both surveys used 12 nets.

2023 Species	Number	Percent	2016 Species	Number	Percent
Yellow Perch	387	37.7%	Yellow Perch	77	34.7%
Black Crappie	131	12.8%	Black Crappie	43	19.4%
Brown Bullhead	115	11.2%	Smallmouth Bass	24	10.8%
Largemouth Bass	102	9.9%	Yellow Bullhead	21	9.5%
Smallmouth Bass	88	8.6%	Longnose Sucker	13	5.9%
Yellow Bullhead	78	7.6%	Lake Whitefish	10	4.5%
Bluegill	50	4.9%	Bluegill	8	3.6%
Pumpkinseed Sunfish	35	3.4%	Pumpkinseed Sunfish	7	3.2%
Common Carp	26	2.5%	Common Carp	6	2.7%
Longnose Sucker	9	0.9%	Largemouth Bass	5	2.3%
Mountain Whitefish	5	0.5%	Largescale Sucker	3	1.4%
Lake Whitefish	0	0.0%	Mountain Whitefish	3	1.4%
Largescale Sucker	0	0.0%	Brown Bullhead	2	0.9%
Total fishes	1,026	100.0%	Total fishes	222	100.0%

History of Walleye year class strength in Scooteney Reservoir

Year class strength of Walleye in Scooteney Reservoir from 2002 to 2016 is presented in Table 5. Based on this data, large year classes are moving through consecutive years about every three years (range 2-4 years). The large number of age-9 Walleye (3.3%) in 2023 were from the large age-1 year class in 2015, which is also seen in Table 4.

Table 5. Year class strength of the Walleye population in Scootenev Reservoir from 2002 to 2016 and in 2023. The figures shaded in gray represent the tracking of large year classes (i.e., the same cohort) moving through (across) consecutive years.

Age	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2023
1	50.4%	80.5%	18.9%	65.5%	60.5%	69.3%	45.1%	63.4%	65.1%	41.9%	78.6%	46.6%	47.6%	73.5%	25.2%	53.3%
2	22.4%	1.4%	63.8%	4.6%	23.6%	21.3%	40.7%	16.3%	17.1%	42.5%	5.6%	18.5%	8.1%	13.8%	61.7%	11.6%
3	3.7%	11.3%	0.0%	15.3%	0.5%	4.0%	4.3%	14.5%	6.0%	3.0%	7.4%	4.2%	5.4%	6.0%	4.8%	2.5%
4	8.9%	1.4%	3.6%	0.8%	3.2%	0.0%	3.2%	2.2%	6.0%	2.4%	1.4%	5.3%	1.2%	2.1%	0.4%	5.8%
5	5.4%	0.5%	0.3%	1.9%	0.0%	0.0%	0.0%	0.4%	2.3%	1.2%	0.9%	0.0%	3.3%	0.2%	2.2%	5.8%
6	2.6%	2.3%	1.0%	1.9%	0.5%	0.0%	0.4%	0.0%	0.7%	1.2%	0.5%	0.0%	0.3%	1.2%	0.0%	2.5%
7	1.9%	0.0%	1.3%	1.1%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	1.3%	1.7%
8	1.1%	0.0%	0.0%	0.4%	0.5%	0.9%	1.6%	0.0%	0.0%	0.0%	0.9%	0.0%	1.2%	0.0%	0.0%	0.0%
9	0.4%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	0.4%	0.0%	0.6%	0.0%	0.5%	0.3%	0.2%	0.0%	3.3%
10	0.4%	0.5%	0.3%	0.0%	0.0%	0.0%	0.4%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.7%	0.4%	0.0%

DISCUSSION

The abundance and age structure of the Walleye population in Scooteney Reservoir appears stable, with an increase in mean length related to a greater number of older fish in the population in 2023. The CPUE of Walleye in the 2023 FWIN survey was a little below average, compared to the historical CPUE IN FWIN surveys of Scooteney Reservoir.

One in six Walleye in Scooteney Reservoir were over 22 inches in 2023, compared to only one in 29 fish over 22 inches seven years earlier in 2016. The proportion of Walleye >22" in Scooteney is the highest among WDFW's five main Walleye waters; compared to 15% in Moses Lake, 13% in Banks Lake, 7% in Potholes Reservoir, and 1.5% in Lake Roosevelt. Larger fish (>22 inches) were mainly represented by age-3 and older females and age-6 and older males. Females accounted for 90% of the Walleye >22" in Scooteney Reservoir.

Similar to other Walleye populations in Washington, the majority of Walleye in Scooteney Reservoir were less than 3-years old. The growth curves demonstrate high growth rates, particularly for female Walleye, relative to other Walleye waters in the State. The fast growth between age-0 and age-1 fish resulted in a gap in the length distribution, between 9.2 inches (234 mm) and 11.4 inches (290 mm), which represents the transition from age-0 to age-1 Walleye.

Also, similar to other Walleye populations in Washington, Walleye in Scooteney Reservoir demonstrate variable year class strength, with stronger year classes every three to five years. We were unable to track year classes in 2023 (except for age-9 Walleye) due to the time lag between the 2016 and 2023 surveys. However, future FWIN surveys of Scooteney Reservoir about every three years should allow tracking of year class strength and periodicity.

The Walleye in Scooteney Reservoir were maturing earlier in 2023 than in 2016, which is a similar trend to what we see occurring in the Lake Roosevelt Walleye population (based on FDR FWIN results from 2002-2023). We are unsure if the significant changes in the percent maturity of age-1 males and age-2 females reflect an overall shift in the maturity schedule of the population. Future monitoring of the maturity schedule may help elucidate these results.

In summary, Scooteney Reservoir appears to have all the attributes of a quality Walleye fishery with high recruitment of age-1 fish every 3-5 years, resulting in stable abundance and a substantial number of older Walleye over 22 inches, reaching the larger preferable and memorable PSD sizes. Abundant forage species, mainly Yellow Perch and Black Crappie, is likely responsible for this high growth rate of Walleye in Scooteney Reservoir. (Anecdotally, Yellow Perch and Black Crappie were observed in the stomachs of some of the Walleye sampled.) The presence of older fish (particularly age-9), with lower rates of survival, suggests that 1) harvest regulations are successfully protecting over-harvest of fish over 22 inches, and/or 2) overall angling effort and exploitation has been low. Future monitoring of this fishery will continue to broaden our understanding of the dynamics in the Scooteney Reservoir Walleye population.



This program receives Federal financial assistance from the U.S. Fish and Wildlife Service Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972. The U.S. Department of the Interior and its bureaus prohibit discrimination on the bases of race, color, national origin, age, disability and sex (in educational programs). If you believe that you have been discriminated against in any program, activity or facility, please contact the Civil Rights Coordinator at 833-885-1012, email: CivilRightsTeam@dfw.wa.gov or by mail at P.O. Box 43139, Olympia, WA 98504, or write to:

Department of the Interior
Chief, Public Civil Rights Division
1849 C Street NW
Washington D.C. 20240