DeRuyter Reservoir Fisheries Survey 2018

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Abstract

A fisheries survey of DeRuyter Reservoir in Madison County was conducted in 2018, consisting of two sampling efforts, a nighttime electrofishing sample in June and a gill net and fyke net sample in July. The survey was conducted to evaluate age, growth, condition, and relative abundance of the reservoir's sportfish community, and to determine if fingerling walleye stocked by the Tioughnioga Lake Preservation Foundation, Inc. (TLPF) were recruiting to the fishery. Overall, 1,233 fish were caught, representing 15 species. Pumpkinseed were the most numerous species with 288 caught (23% of catch) followed by bluegill (n=265, 21% of catch). Gamefish caught were largemouth bass (n=175, 14% of catch), walleye (n=38, 3% of catch), smallmouth bass (n=30, 2% of catch) and chain pickerel (n=25, 2% of catch). Overall, with a few exceptions, by New York standards the sportfish community had average growth rates, were in good condition and found in moderate to high abundance. Of the 38 walleye caught 32% were from the TLPF fingerling stocking, the remaining 68% were from the New York State Department of Environmental Conservation (DEC) fry stocking. While the TLPF fingerling stockings are represented in the fishery it doesn't appear that they are recruiting to the fishery any better than the fry stocked by the DEC. While a sample size of 38 walleye is relatively small, the results, nonetheless, suggest that stocking DeRuyter Reservoir with the larger fingerlings is not worth the additional expense. Recommended management actions based on these surveys would be to continue with the special regulation for walleye only if the TLPF decides to continue with their experimental walleye fingerling stocking program. However, if they decide to end that program, DEC should resume fry stocking and go back to the statewide walleye regulation (5/day with a minimum size of 15"). Continue with statewide regulations for all other species.

Introduction

DeRuyter Reservoir (ONT-66-11-P26-37-6-2-37-P139A) is a 557 acre mesotrophic waterbody (Citizens Statewide Lake Monitoring Program [CSLAP] DeRuyter Reservoir 2016) located in the Towns of DeRuyter and Cazenovia, Madison County, and in the Town of Fabius, Onondaga County. It has a maximum depth of 52 ft and mean depth of 22 ft (CSLAP 2016). The current sportfishery is comprised of largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*, walleye (*Sander vitreus*), chain pickerel *(Esox niger*), and a variety of panfish species such as bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), black crappie (*Pomoxis nigromaculatus*), and yellow perch (*Perca flavescens*).

DeRuyter Reservoir was stocked by the New York State Department of Environmental Conservation (DEC) with walleye fry from 1935-1990 and from 2001 to 2012 (Appendix 1). The Tioughnioga Lake Preservation Foundation, Inc. (TLPF) took over walleye stocking in 2013 to try a "top-down" predator control experiment for Eurasian watermilfoil (*Myriophyllum spicatum*). For this program they decided to stock fall fingerling walleye, instead of fry, and from 2013 to 2017 they have stocked between 8,000 and 50,000 annually (Appendix 1).

Access to the reservoir is provided by The DeRuyter Lake General Store, a private marina located on the south end with a fee launch. Some shore access exists on the north end at the dam. Statewide fishing regulations have been used on the reservoir with one recent exception, starting in April 2017 the walleye regulation changed from the statewide minimum length of 15-inches and daily limit of 5, to an 18-inch minimum and a daily limit of 3.

The survey was conducted to provide current information on the status of the sportfish community for appropriate management of the fishery as the last “all-fish” survey conducted by the DEC took place in October,1996. Fall walleye assessments were done by the DEC in 2012, 2013 and 2015, but walleye were the target species and the only fish collected. SUNY Cobleskill has done six electrofishing surveys on the reservoir, all of which included all-fish runs. None of these surveys have been reported at this time. Objectives of this survey were to evaluate age, growth, condition, and relative abundance of the reservoir's sportfish community and to evaluate the success of the TLPF walleye fingerling stocking compared to the DEC’s fry stocking. This stocking comparison data is important as it will aid in future walleye stocking decisions for DeRuyter Reservoir by the DEC, such as should we continue with fry stocking or switch to fall fingerlings. Similarly, the data will hopefully also aid future stocking decisions by the TLPF.

Methods

Water Chemistry

Surface water temperature, air temperature, p.H., dissolved oxygen (DO) and conductivity were recorded on June 6 and 7, 2018, prior to electrofishing. Those same measurements, along with DO and water temperature taken at five-foot intervals to 30 and 35 ft were taken during the July 17 and 18 netting survey. A Professional Plus model YSI meter was used for all water chemistry.

Electrofishing

DeRuyter Reservoir was boat electrofished on the nights of June 6 and 7th following the protocol outlined in the new DEC Bass and Sunfish Sampling Manual (Brooking et al. 2018), with one exception, the start time (see below). Twelve sites (Figure 1) covering 86% of the shoreline was fished for a total of four hours of “on-time.” The boat used was borrowed from Region 6 Fisheries staff and was a Polarcraft with a Smith-Root box model VI-A with two 4-dropper umbrella arrays extending 6 ft in front of the boat as anodes. Direct current half-wave (60 pulses per second) with 6 amps and 250 volts was used. Shocking started 15 minutes after sunset (protocol was for ½ hour) and was done as this was a borrowed boat and not familiar to the biologist. Sampling was conducted along the shoreline in 1 to 5 ft of water with a speed of approximately 1-1.5 mph. The crew consisted of a driver and two netters. Six half-hour game-fish only runs were conducted with walleye, largemouth bass smallmouth bass and chain pickerel as the targets. Six 10 minute all-fish runs were conducted; attempts (within reason) were made to collect every fish that was shocked.

Collected fish were identified to species and lengths (mm) and weights (gm) were recorded. Scale samples were collected for age determination from five individual fish

per 10 mm size increments of walleye, largemouth bass, smallmouth bass, bluegill pumpkinseed, rock bass (*Ambloplites rupestris*), black crappie, and yellow perch that were >100 mm. No scales were collected from chain pickerel. Age structure of the unaged sample of fish was estimated based on the frequency of known age fish in each 10 mm size increment.

Fyke Netting

Fyke nets were used to keep some similarity between gears used on recent Madison County fisheries surveys by the DEC. One fyke net was fished overnight on July 17 for 18.5 hours and then relocated and fished overnight on July 18 for 21.4 hours (Figure 1). The net used was a modified fyke net with a sinking trap and a single lead. Specifications for the net are: netting - 1/2 in bar knot-less nylon, with black asphalt-type coating; lead -100 ft long and 3 ft high; frames - the opening consists of two 3×6 ft rectangular frames each with a center brace; frames are spaced 24 in apart with inwards mesh trap that tapers from the first frame to the second ending in a 4 in diameter opening; these are followed behind by four 30 in diameter hoop frames spaced 24 in apart, with mesh funnel between first and third hoops; cod end - with purse string closure. On the first night the net was set perpendicular to shore off a small island in 1 to 6 ft of water, and on the second night the net was fished perpendicular to shore in 1 to 3 ft of water.

Collected fish were identified to species, and lengths (mm) and weights (gm) were taken for all fish except for 45 pumpkinseed and 25 bluegill for Site 5, which were placed on a Bulk Fish (BF) form with just the min and max length. Scale samples were collected for age determination from five individual fish per 10 mm size increments of bluegill, pumpkinseed, rock bass and largemouth bass >100 mm. Age structure of the unaged sample of fish was estimated based on the frequency of known age fish in each 10 mm size increment.

Gill netting

Three DEC standard inland gill nets were set over night on July 17 and 18, for a total of six net nights (Figure 1). The standard gill net is 6 ft deep with 25 ft panels of 1.5, 2.0, 2.5, 3.0, 3.5 and 4.0 in stretch mesh monofilament netting. Four of the nets were set on the bottom perpendicular to shore, starting at a nearshore depth of 10, 12 or 15 ft. Depths at the outer end of the nets were 14, 19, 32 and 36 ft. Of the two other nets, one was set off shore near the large island from 10 to 20 ft of water, and the other was set off shore on the south end of the lake in 15 to 16 ft. Orientation of gill net mesh size was random, with three nets having small mesh inshore and three having big mesh inshore. Gill nets were fished for an average of 19.4 hours (range was 18.0 to 20.8 hours).

Collected fish were identified to species and lengths (mm) and weights (gm) were recorded. Scale samples were collected for age determination from five individual fish per 10 mm size increments of bluegill, black crappie, smallmouth bass, largemouth bass, yellow perch, and walleye >100 mm. Otoliths were also collected from walleye to aid in age determination. Age structure of the unaged sample of fish was estimated based on the frequency of known age fish in each 10 mm size increment.

Ten yellow perch and largemouth bass were collected for contaminant monitoring and were individually tagged, bagged and placed on ice. These fish were placed in a freezer when brought back to the office and were taken to the DEC Hale Creek Field Station, Gloversville NY, for lab analysis in February 2019.

Fish Indices

Indices used to assess the quality of the fish population in DeRuyter Reservoir included electrofishing, gill net and fyke net catch rates, growth rates, proportional stock density (PSD), relative stock density (RSD), and relative weight (Wr). PSD is expressed as the percentage of the stock that is of "quality" size; and RSD is expressed as the percentage of the stock that is of "preferred" size (Anderson 1980). It should be noted that captures from all gears were combined to calculate PSD and RSD and that these indices may have been influenced by the different size selectivity of these gears. Lengths used for stock, quality, preferred, memorable, and trophy sizes for all species are from Gablehouse (1984) and can be found in Appendix 2. Wr is an index of condition that compares the actual weight with a standard weight for fish of the same length (Anderson 1980). Abundance estimates for largemouth and smallmouth bass were derived from regression equations based on spring nighttime electrofishing catch rates from Green (1989). Abundance estimates for walleye and yellow perch were derived from electrofishing and gill net catch rates, and mean length at age-4 from Forney et al. (1994). For walleye only, three different agers aged the scale and otolith samples. The most frequent age was used (2 out of 3), if all three were different the middle age was used.

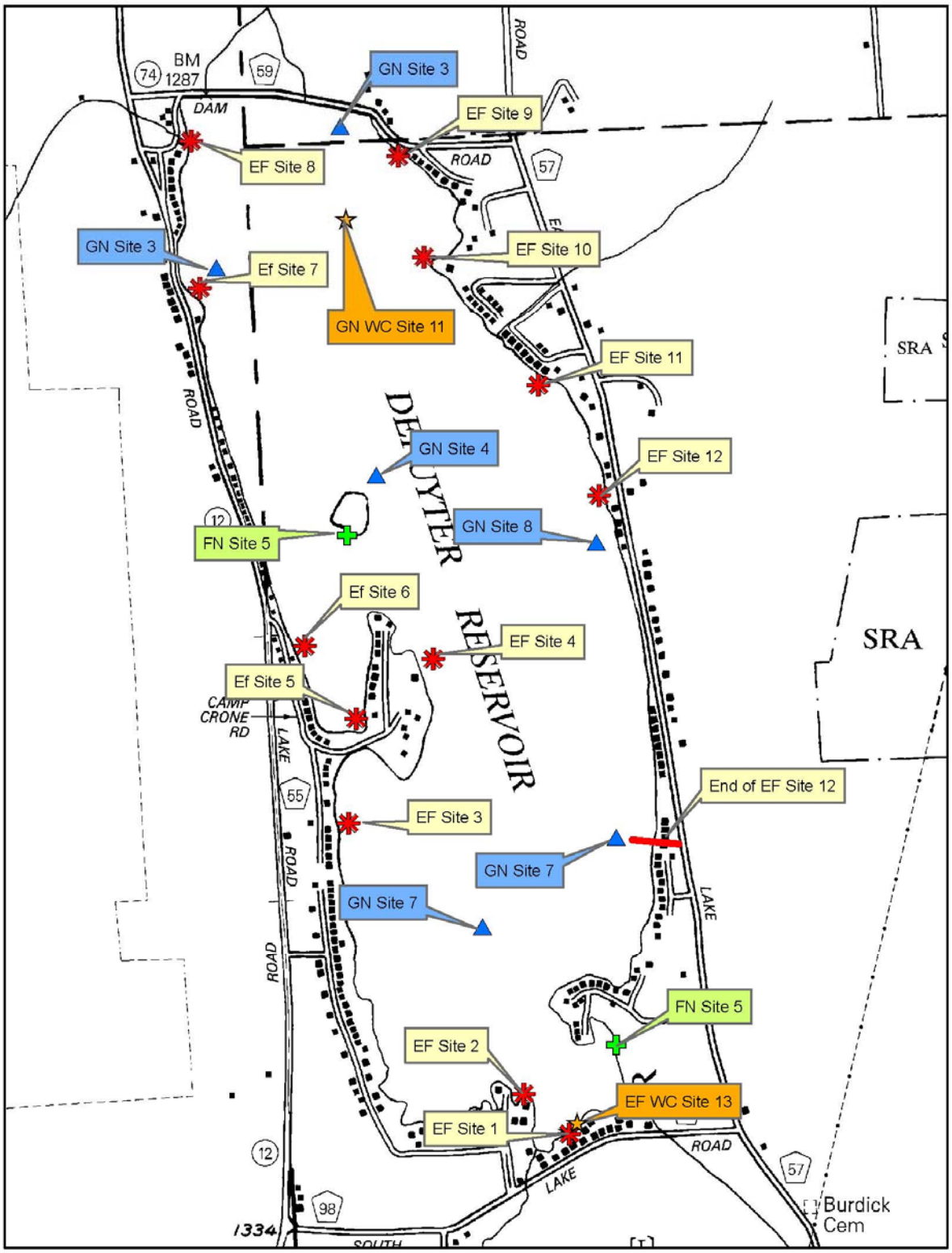

Figure 1. Site locations for gill net (GN), fyke net (FN), water chemistry (WC), and the starting point for electrofishing (EF) runs on DeRuyter Reservoir during June and July, 2018 sampling efforts.

Results

Water Chemistry

During the June 6 and 7th electrofishing survey the surface water temperature was 63 and 67° F, respectively. During the gill and fyke net survey on July 16 and 17th the surface water temperature was 79° F and at 30 ft it was 70° F (Table 1).

Table 1. Water chemistry data from June and July 2018 for DeRuyter Reservoir, Madison County.

Date	Depth (Feet)	Water Temp. (Fahrenheit)	DO (ppm)	pH	Conductivity (umho/cm3)
6/6/2018	0	63.3	3.2	8.2	193
6/7/2018	0	67.4	2.7	8.2	208
7/16/2018	0	79.0	2.9	7.8	203
	5	78.7	2.8		
	10	78.4	3.2		
	15	77.9	3.7		
	20	76.9	4.3		
	25	73.7	4.9		
	30	70.3	4.7		
	35	69.1	4.2		
7/17/2018	0	78.6	7.1	8.4	201
	5	78.3	7.3		
	10	78.1	7.5		
	15	77.8	7.8		
	20	75.8	8.7		
	25	72.6	7.9		
	30	70.2	6.7		

Species Collected

Overall, 1,233 fish were caught, representing 15 species (Table 2). Pumpkinseed were the most numerous with 288 caught (23% of catch). The next most numerous species was bluegill (n=265, 21% of catch), followed by largemouth bass (n= 175, 14% of catch). Other gamefish caught were walleye (n=38, 3% of catch), smallmouth bass (n=30, 2% of catch), and chain pickerel (n=25, 2% of catch).

Gamefish

Largemouth Bass

A total of 175 largemouth bass were caught with the three gears. Electrofishing accounted for the majority of them with 131. The electrofishing catch per unit effort (CPUE) ranged from 0 to 53 fish per hour (fish/h), with an average of 32.6/h (4 standard error, SE) for all size largemouth bass (Table 3). The average CPUE for ≥12 in bass was 26.9/h (SE=4). Using Greens (1989) formula and the electrofishing CPUE of 22/h (SE=3) for largemouth bass ≥10 in yields a first order density estimate of 8.8 largemouth bass ≥10 in per acre. Forty largemouth bass were caught in gill nets for an average

CPUE of 6.7/net night (SE=2). Fyke nets accounted for just four with a CPUE of 2/net night (SE=0). Largemouth bass lengths ranged from 3.2 to 18.9 in, with12 in bass being most frequent (Figure 2). The resulting PSD for largemouth bass was 59 and the RSD_{15} (bass ≥15 in) was 8 (Table 4). The largemouth bass average Wr was 102 (SE=1; Table 5). Largemouth bass were slow growing, by New York State (NYS) standards, with the average age to reach legal size (≥12 in) occurring at age-5; NYS mean is age-4 (Brooking et al. 2018; Figure 3). Age-6 largemouth bass were the most frequent age class collected (Figure 4).

Table 2. Species caught by electrofishing (EF), gill net (GN), and fyke net (FN) during June and July 2018 on DeRuyter Reservoir, Madison County.

Species	Scientific Name	EF	GN	FN	Total	Frequency
Chain Pickerel	*Esox niger*	15	10	0	25	2%
Golden Shiner	*Notemigonus crysoleucas*	6	160	0	166	13%
Spottail Shiner	*Notropis hudsonius*	3	0	0	3	0%
White Sucker	*Catastomus commersonii*	2	2	0	4	0%
Yellow Bullhead	*Ameirus natalis*	1	0	1	2	0%
Brown Bullhead	*Ameirus nebulosus*	14	0	1	15	1%
Banded Killifish	*Fundulus diaphanus*	3	0	0	3	0%
Rock Bass	*Ambloplites rupestris*	78	3	5	86	7%
Pumpkinseed	*Lepomis gibbosus*	136	31	121	288	23%
Bluegill	*Lepomis macrochirus*	133	15	117	265	21%
Smallmouth Bass	*Micropterus dolomieu*	25	5	0	30	2%
Largemouth Bass	*Micropterus salmoides*	131	40	4	175	14%
Black Crappie	*Pomoxis nigromaculatus*	3	72	6	81	7%
Yellow perch	*Perca flavescens*	26	25	1	52	4%
Walleye	*Sander vitreus*	9	29	0	38	3%
Total		585	392	256	1,233	

Table 3. Spring night-time boat electrofishing catch from DeRuyter Reservoir, Madison County, on June 6-7, 2018. CPUE values are mean catch rates by run, with standard error in parenthesis.

Species	Total Catch	On-Time (h)	Mean CPUE (fish/h; Standard Error) All	≥Stock	≥Quality	≥Preferred
Chain Pickerel	15	4	3.7 (1)	3.7 (1)	3.5 (1)	1.2 (0.3)
Golden Shiner	6	1	5.9 (3)	-	-	-
Spottail Shiner	3	1	2.9 (2)	-	-	-
White Sucker	2	1	2.0 (2)	-	-	-
Yellow Bullhead	1	1	1.0 (1)	-	-	-
Brown Bullhead	14	1	13.8 (12)	13.8 (12)	11.8 (10)	11.8 (10)
Banded Killifish	3	1	2.9 (1)	-	-	-
Rock Bass	78	1	76.8 (17)	70.9 (15)	44.3 (13)	2.0 (2)
Pumpkinseed	136	1	133.9 (23)	121.1 (24)	64.0 (20)	9.8 (5)
Bluegill	133	1	130.9 (35)	91.5 (28)	45.3 (18)	15.7 (8)
Smallmouth Bass	25	4	6.2 (2)	6.2 (2)	5.0 (2)	3.2 (1)
Largemouth Bass	131	4	32.6 (4)	26.9 (4)	15.9 (2)	1.5 (1)
Black Crappie	3	1	3.0 (1)	-	-	-
Yellow Perch	26	1	24.6 (10)	11.8 (6)	4.9 (2)	2.0 (1)
Walleye	9	4	2.0 (1)	2.0 (1)	1.5 (1)	0.2 (0.2)
Total	585					

Table 4. Number of fish caught of stock, quality, preferred (Pref), memorable (Mem), and trophy lengths and resulting PSD and RSDp in June and July 2018 on DeRuyter Reservoir, Madison County.

Species	Total	Stock	Quality	Pref	Mem	Trophy	PSD	RSDp
Chain Pickerel	25	25	20	6	0	0	80	24
White Sucker	4	4	4	4	4	0	100	100
Brown Bullhead	15	15	13	12	1	0	87	80
Rock Bass	86	79	49	2	0	0	62	3
Pumpkinseed	288	185	97	16	0	0	52	9
Bluegill	265	127	59	21	0	0	46	17
Smallmouth Bass	30	30	25	16	2	0	83	53
Largemouth Bass	175	144	85	11	0	0	59	8
Black Crappie	81	79	69	21	0	0	87	27
Yellow Perch	52	37	25	11	1	0	68	30
Walleye	38	38	35	4	1	0	92	11

Table 5. Mean relative weight (Wr) by size categories for fish sampled on DeRuyter Reservoir, Madison County, in June and July 2018. N is number of fish in the size category and standard error is in parenthesis. Pref-preferred and Mem-memorable.

					Wr					
	All		Stock-Quality		Quality-Pref		Pref-Mem		Mem-Trophy	
Species	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
Chain Pickerel	25	84 (2)	5	100 (1)	14	82 (3)	6	78 (2)	0	-
White Sucker	4	100 (4)	0	-	0	-	0	-	4	100 (4)
Brown Bullhead	15	97 (3)	0	82 (0)	0	126 (0)	11	98 (2)	1	95
Rock Bass	79	103 (1)	30	104 (3)	47	103 (1)	2	95 (3)	0	-
Pumpkinseed	136	105 (1)	39	101 (8)	81	107 (2)	16	105 (3)	0	-
Bluegill	74	104 (1)	15	107 (12)	38	104 (2)	21	101 (2)	0	-
Smallmouth Bass	30	91 (2)	5	112 (4)	9	88 (2)	14	87 (3)	2	81 (2)
Largemouth Bass	171	102 (1)	59	106 (1)	74	100 (1)	11	99 (2)	0	-
Black Crappie	81	95 (1)	10	97 (3)	48	96 (1)	21	89 (1)	0	-
Yellow Perch	45	90 (1)	12	93 (3)	14	89 (1)	10	86 (3)	1	67
Walleye	37	87 (1)	3	87 (4)	30	87 (3)	3	90 (2)	1	92

Walleye

A total of 38 walleye were caught. Nine were caught by boat electrofishing with an average CPUE of 2/h (SE=1; Table 3). The 29 caught by gill net had a CPUE range from 2 to 7/net night with an average of 5/net night (SE=1). There were no walleye caught with the fyke net. Lengths ranged from 10.3 to 25.4 in, with 16-inch walleye being most frequent (Figure 5). The resulting PSD was 92 and the RSD_{20} was 11 (Table 4). One memorable length (≥25 in) walleye was collected but no trophy lengths (≥30 in; Table 4). The average walleye Wr was 87 (SE=1; Table 5). Walleye were slow growing by NYS standards, and on average were not reaching legal size (≥18 in) until age-7 (Figure 6). Walleye ages ranged from 2 to 11, and age-6 were the most frequent age class collected (Figure 7).

Scales were taken from all walleye and to better determine age, otoliths were also collected from the 29 walleye that were caught with gill nets. These otolith ages were compared to the ages derived from reading scales for those same fish and results can be seen in Table 6.

Smallmouth Bass

A total of 30 smallmouth bass were caught with the majority, 25, by electrofishing. The electrofishing CPUE ranged from 0 to 18/h for all size smallmouths with an average of 6.2/h (SE=2; Table 3). The average CPUE for ≥11 in bass was also 6.2/h (SE=2).The CPUE for bass ≥10 in was 5/h (SE=3) which according to Green (1989), yields a first order density estimate of 1.2 smallmouth bass ≥10 in per acre. The average gill net CPUE was 0.8/net night (SE=0). No smallmouth bass was caught with fyke net. Lengths ranged from 8.3 to 18.9 in, with 16-inch smallmouth bass being most frequent (Figure 8). The resulting PSD was 83 and the RSD_{14} was 53 (Table 4). Two

memorable length (≥17 in) smallmouth bass were caught but no trophy lengths (≥20 in; Table 4). The smallmouth bass average Wr was 91 (SE=2; Table 5). Smallmouth had average growth rates by NYS standards (Figure 9). Smallmouth bass ages ranged from 2 to 9, with age-7 being the most frequent age class collected (Figure 10).

Chain Pickerel

A total of 25 chain pickerel were caught, 15 with electrofishing and 10 with gill net. No chain pickerel was caught with fyke net. The electrofishing CPUE for all size chain pickerel ranged from 0 to 10/h with an average of 3.7/h (SE=1; Table 3). The average gill net CPUE was 1.7/net night (SE=1). Lengths ranged from 12.9 to 22.9 in, with 17 and 19-inch chain pickerel being most frequent (Figure 11). The resulting PSD was 80 and the RSD_{20} was 24 (Table 4). The chain pickerel average Wr was 84 (SE=2; Table 5). No age frequency was done as scale analysis for chain pickerel is generally unreliable.

Table 6. Difference between scale and otolith aging of walleye caught in July 2018 in DeRuyter Reservoir.

	Structure		
Length (in)	Scale	Otolith	Difference
14.7	4	3	1
15.0	4	3	1
15.5	5	6	1
15.6	4	6	2
16.1	6	7	1
16.1	5	3	2
16.2	6	7	1
16.2	6	11	5
16.3	6	7	1
16.6	7	7	0
16.7	7	11	4
16.7	6	4	2
16.7	7	8	1
16.8	5	5	0
16.8	8	11	3
16.8	6	11	5
16.9	6	6	0
16.9	5	3	2
17.0	7	11	4
17.1	6	6	0
17.2	7	4	3
17.4	6	6	0
17.5	6	5	1
17.5	6	5	1
18.3	7	11	4
18.5	7	6	1
19.8	8	6	2
20.8	8	11	3
22.5	8	7	1

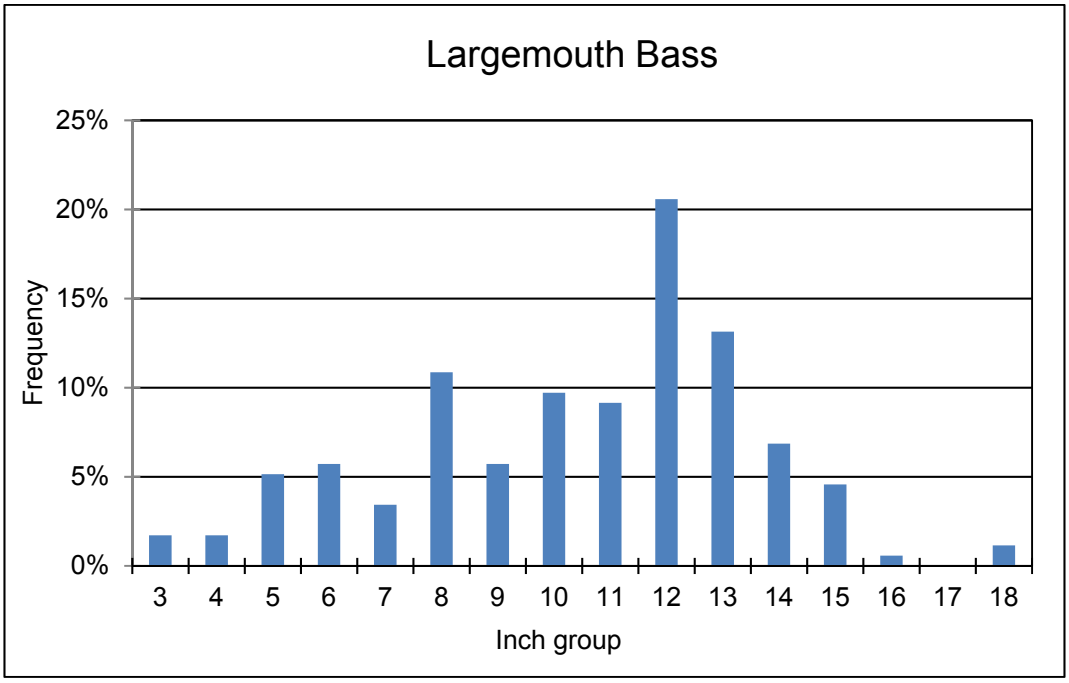

Figure 2. Length frequency distribution of largemouth bass caught in DeRuyter reservoir in June and July 2018.

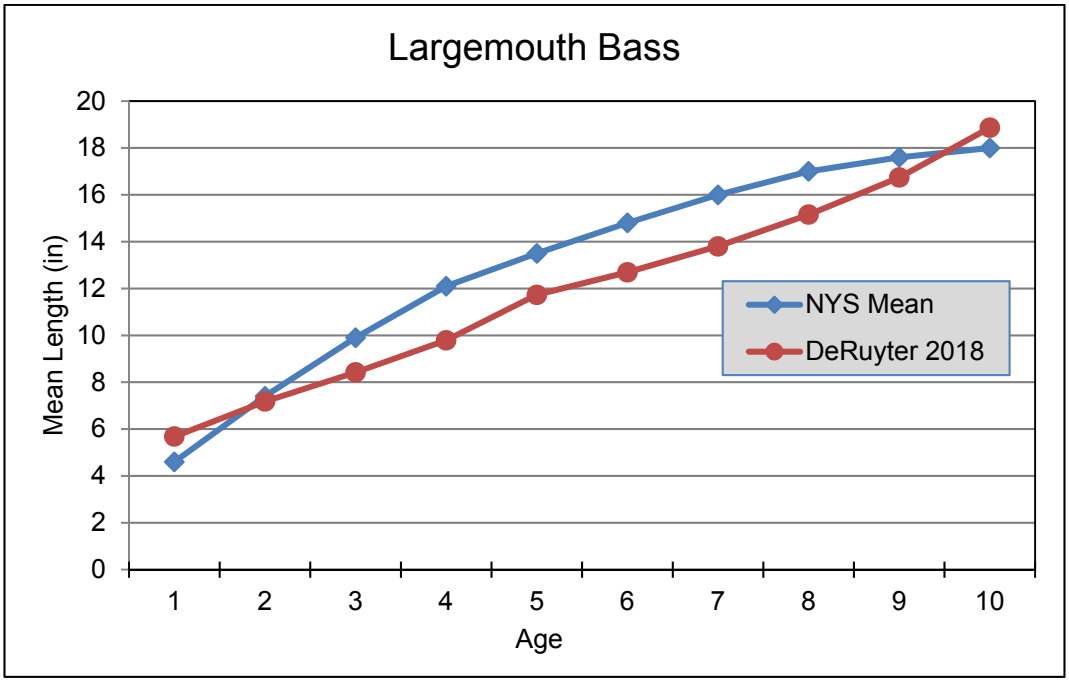

Figure 3. Observed mean length at age of largemouth bass caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Brooking et al. 2018).

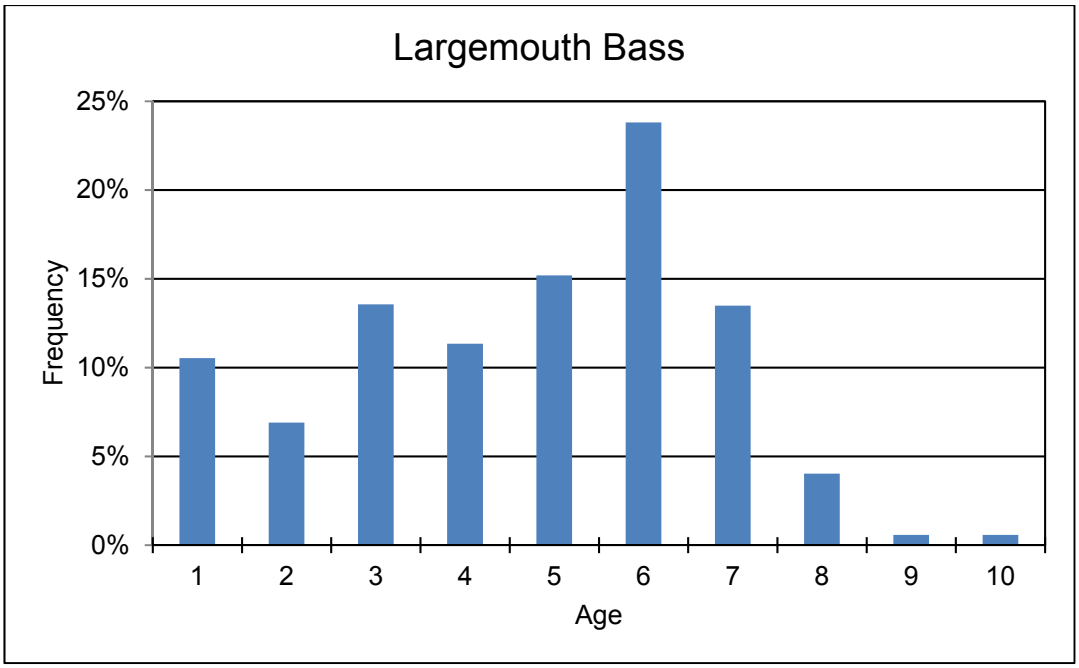

Figure 4. Age frequency distribution of largemouth bass caught in DeRuyter Reservoir in June and July 2018.

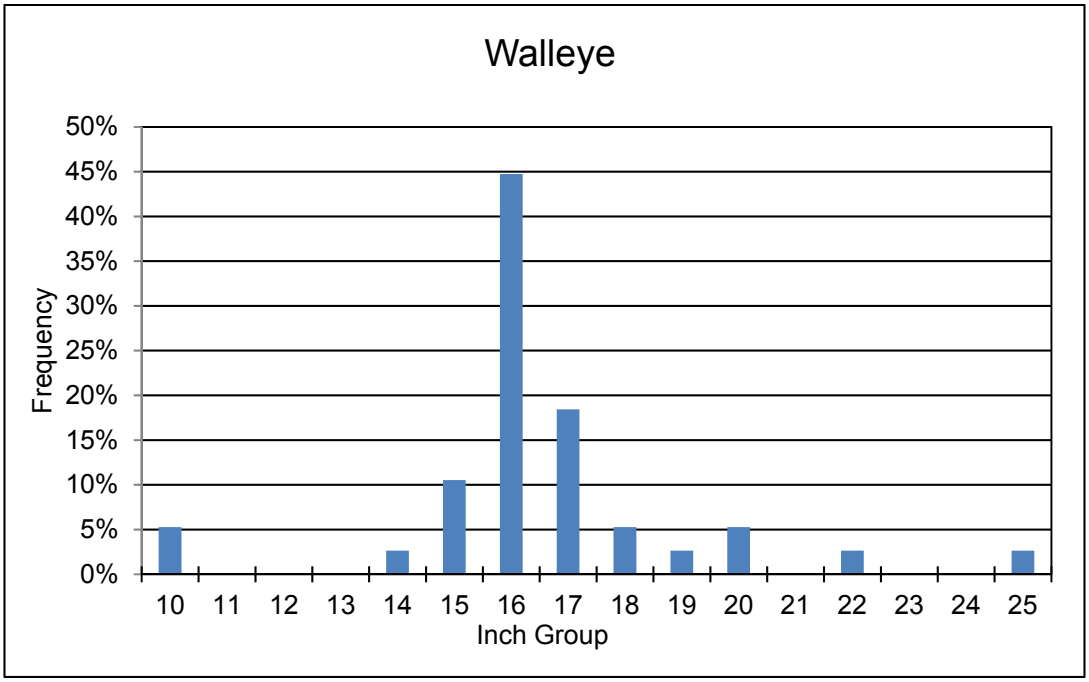

Figure 5. Length frequency distribution of walleye caught in DeRuyter Reservoir in June and July 2018.

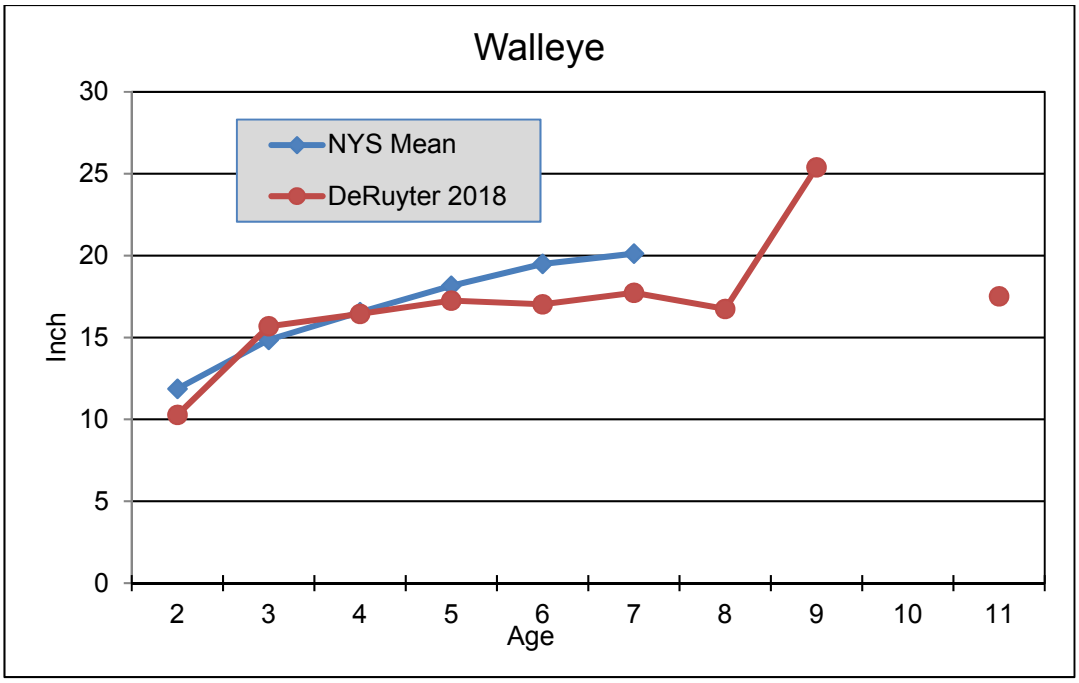

Figure 6. Observed mean length at age of walleye caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Forney et al. 1994).

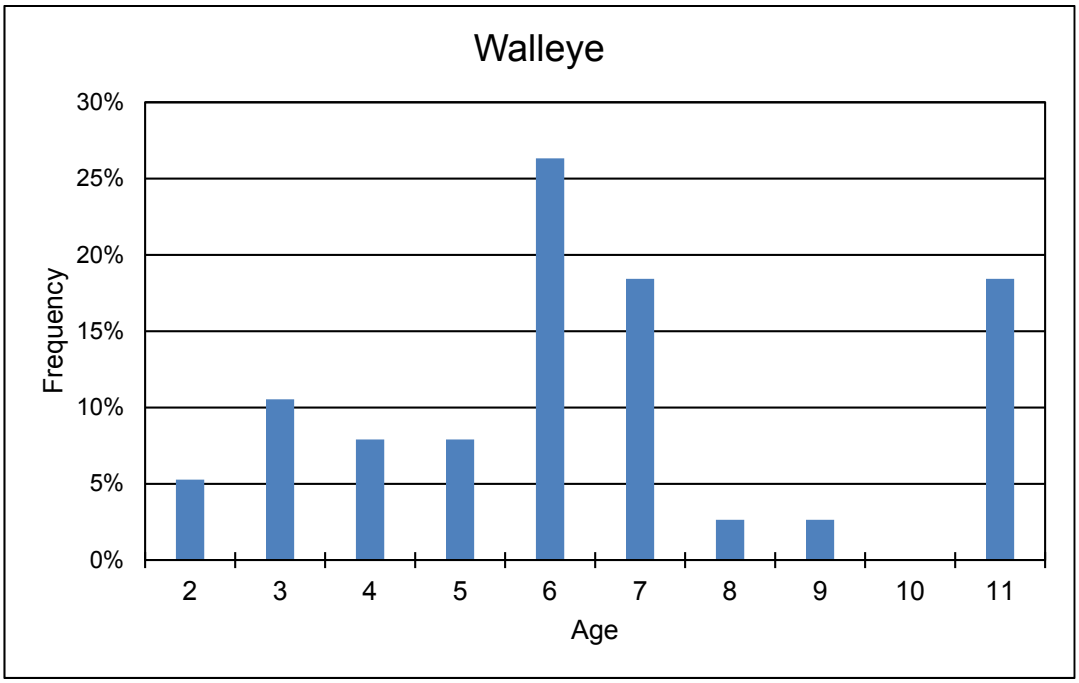

Figure 7. Age frequency distribution of using otolith and scale aged walleye caught in DeRuyter Reservoir in June and July 2018.

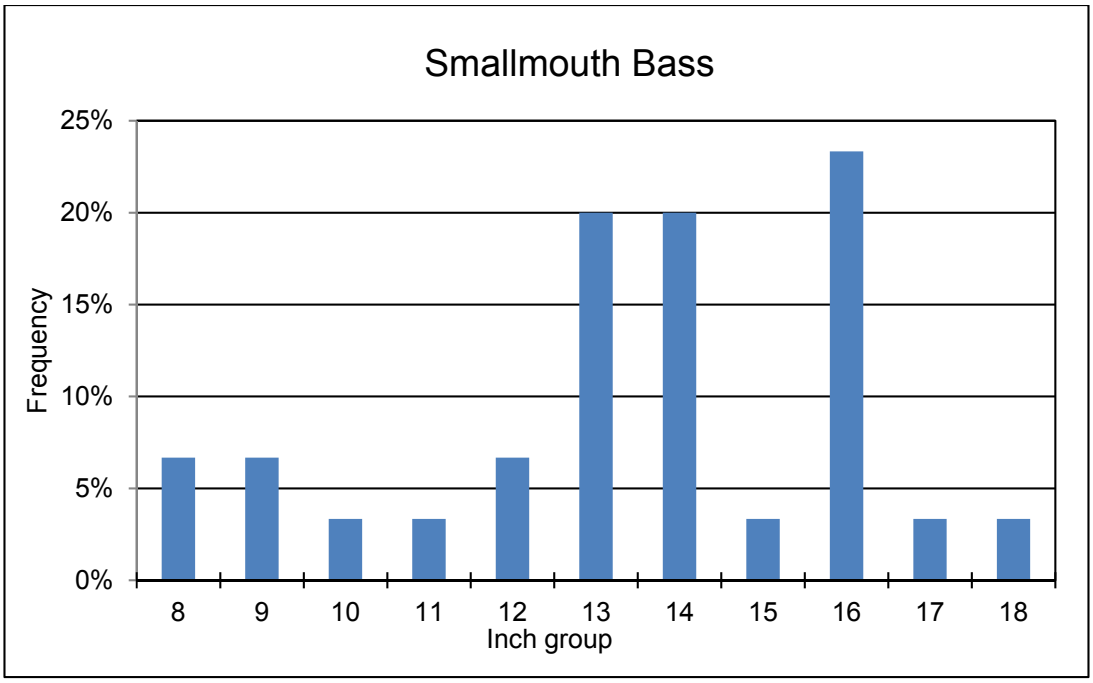

Figure 8. Length frequency distribution of smallmouth bass caught in DeRuyter Reservoir in June and July 2018.

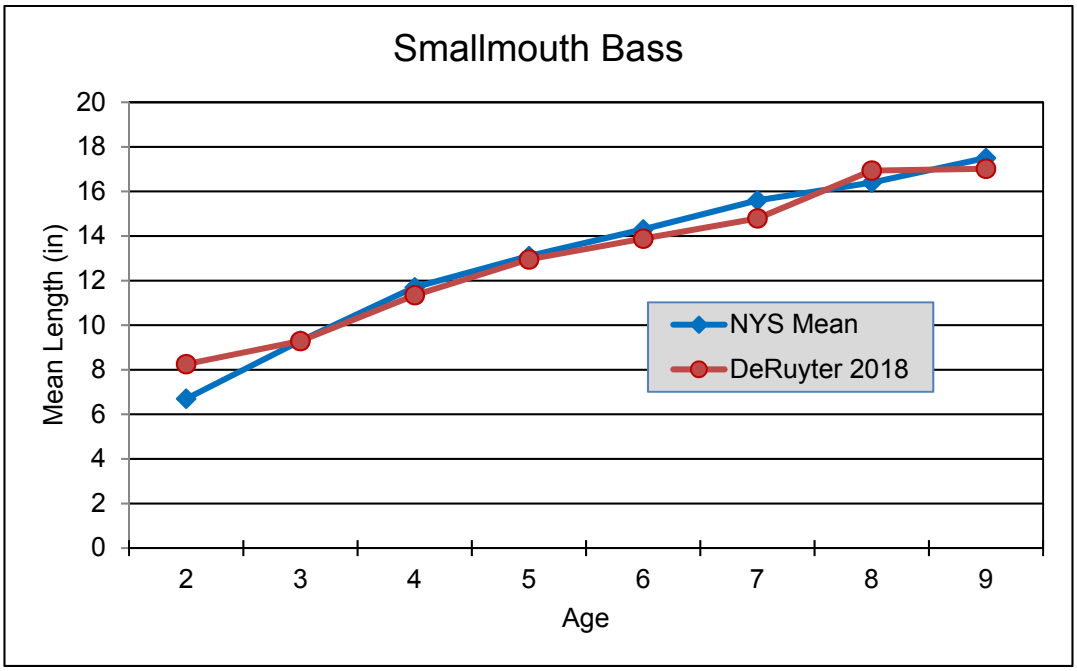

Figure 9. Observed mean length at age of smallmouth bass caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Brooking et al. 2018).

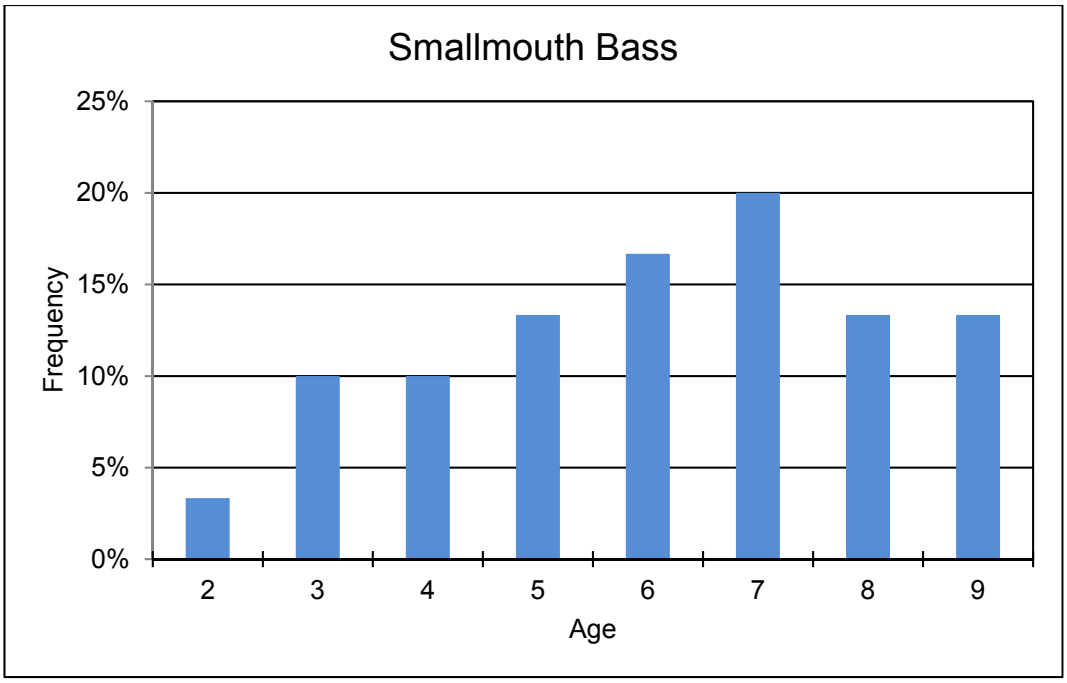

Figure 10. Age frequency distribution of smallmouth bass caught in DeRuyter Reservoir in June and July 2018.

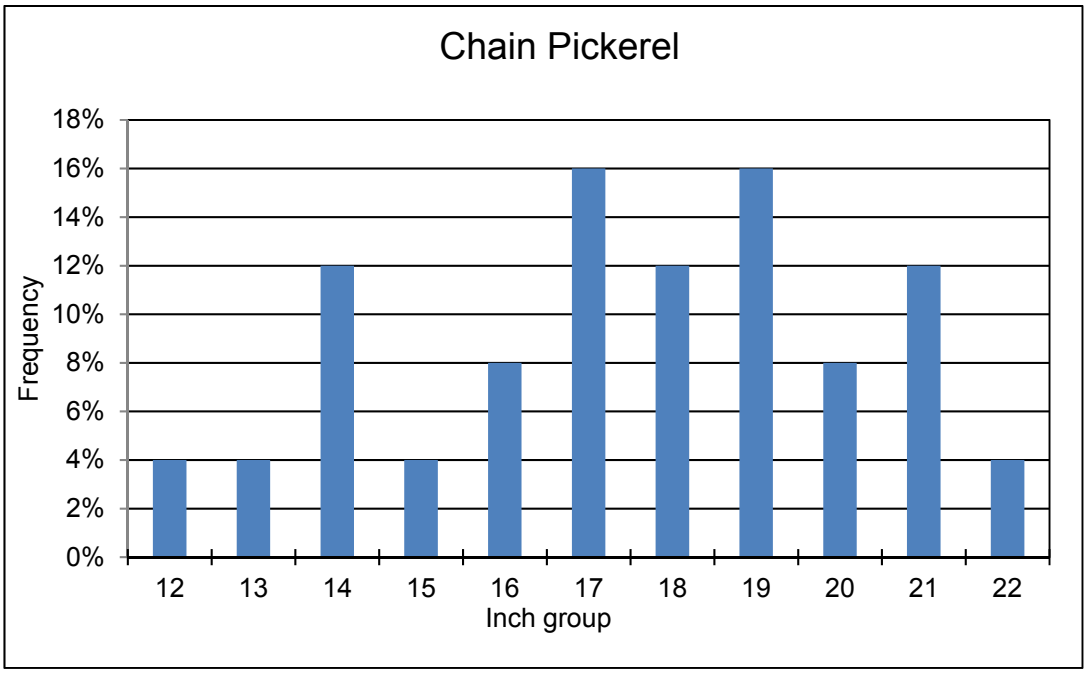

Figure 11. Length frequency distribution of chain pickerel caught in DeRuyter Reservoir in June and July 2018.

Panfish

Pumpkinseed

A total of 288 pumpkinseed were caught, 136 by electrofishing, 31 by gill net and 121 with fyke net. The electrofishing CPUE for all sized pumpkinseed ranged from 64 to 194/h with an average of 134/h (SE=23; Table 3). The gill net average CPUE was 5.2/net night (SE=1) and the average fyke net CPUE was 61 (SE=34). Pumpkinseed lengths ranged from 1.7 to 9.3 in with fish in the 3 in size range being most frequent (Figure 12). Pumpkinseed PSD was 59 and RSD_8 was 9 (Table 4). Pumpkinseed had an average Wr of 105 (SE=2; Table 5). Pumpkinseed mean length at age was below the NYS mean for ages 3 to 7, but above for ages 8 to 10 (Figure 13). Age-2 pumpkinseed were most frequent age class collected (Figure 14).

Bluegill

A total of 265 bluegill were caught, 133 by electrofishing, 15 with gill net and 117 by fyke net. The electrofishing CPUE for all size bluegill ranged from 58 to 217 fish/h with an average of 131/h (SE=35; Table 3). The average gill net CPUE was 2.5/net night (SE=1) and the fyke net average was 59/net night (SE=14). Bluegill lengths ranged from 1.8 to 8.6 in with fish in the 3 in size range being most frequent (Figure 15). Bluegill PSD was 46 and RSD_8 was 17 (Table 4). Bluegill had an average Wr of 104 (SE=1; Table 5). Bluegill mean length at age was below the NYS mean for ages 3 to 6, and 9, but above for age-7 and 8 (Figure 16). Age-2 bluegill were the most frequent age class collected (Figure 17).

Rock Bass

A total 86 rock bass were caught, and electrofishing accounted for 78 of them with a CPUE range of 6 to 120/h with an average of 78/h (SE=1; Table 3). Only three were collected by gill netting for a CPUE of 0.5/net night (SE=0), and five by fyke net for a CPUE of 2.5/net night (SE=3). Rock bass lengths ranged from 2.8 to 9.2 in with fish in the 7.0 and 7.5 in range most common (Figure 18). PSD was 62 and RSD_9 was 3 (Table 4). Rock bass had an average Wr of 103 (SE=1; Table 5). Rock bass had slow growth rates by NYS standards (Figure 19). Age-8 rock bass were the most frequent age class collected (Figure 20).

Black Crappie

A total of 81 black crappie were caught and only three by electrofishing for a CPUE 3/h (SE=1; Table 3). Gill netting accounted for 72 of the black crappie with a CPUE range of 3 to 19/net night and an average of 12/net night (SE=3). The fyke net average CPUE was 3/net night (SE=2). Black crappie lengths ranged from 4.4 to 11.1 in with fish in the 8.5 in range most common (Figure 21). Black crappie PSD was 87 and RSD_{10} was 27 (Table 4). Black crappie had an average Wr of 95 (SE = 1; Table 5). Except for age 2 and 3 fish, black crappie had average growth rates by NYS standards (Figure 22). Age-4 black crappie were most frequent age class collected (Figure 23).

Yellow Perch

A total of 52 yellow perch were caught with 26 by electrofishing, 25 with gill net and just one by fyke net. The electrofishing CPUE ranged from 0 to 59 fish/h with an average of 25/h (SE=10; Table 3). The average gill net CPUE was 4.2/net night (SE=2). One yellow perch was collected by fyke net for a CPUE of 0.5/net night (SE=1). Yellow perch lengths ranged from 2.8 to 12.1 in with fish in the 4.5 in size range being most frequent (Figure 24). Yellow perch PSD was 68 and RSD_{10} was 30 (Table 4). One yellow perch was of memorable size (≥12 in) and no trophy (≥15 in) size were caught (Table 4). Yellow perch had an average Wr of 90 (SE=2; Table 5). Yellow perch had slow growth rates and the mean length at age was below the NYS mean for most ages (Figure 25). Age-7 yellow perch were most frequent age class collected (Figure 26).

Other Fishes

Fifteen brown bullhead (*Ameiurus nebulosus*) were caught with an average length of 11.8 in (SE=1). Two yellow bullhead (*Ameiurus natalis*) that were 9.3 and 11.0 in were also collected. Non-sport fish consisted of 166 golden shiners (*Notemigonus crysoleucas*), three spottail shiner (*Notropis hudsonius*), four white sucker (*Catastomus commersonii*) and three banded killifish (*Fundulus diaphanus*). Golden shiner lengths ranged from 5.3 to 10.7 in with an average length of 8.2 in (SE=0). Only 24 of the golden shiners were weighed with an average Wr of 109 (SE=6). The four white suckers had an average length of 17.8 in (SE=1)

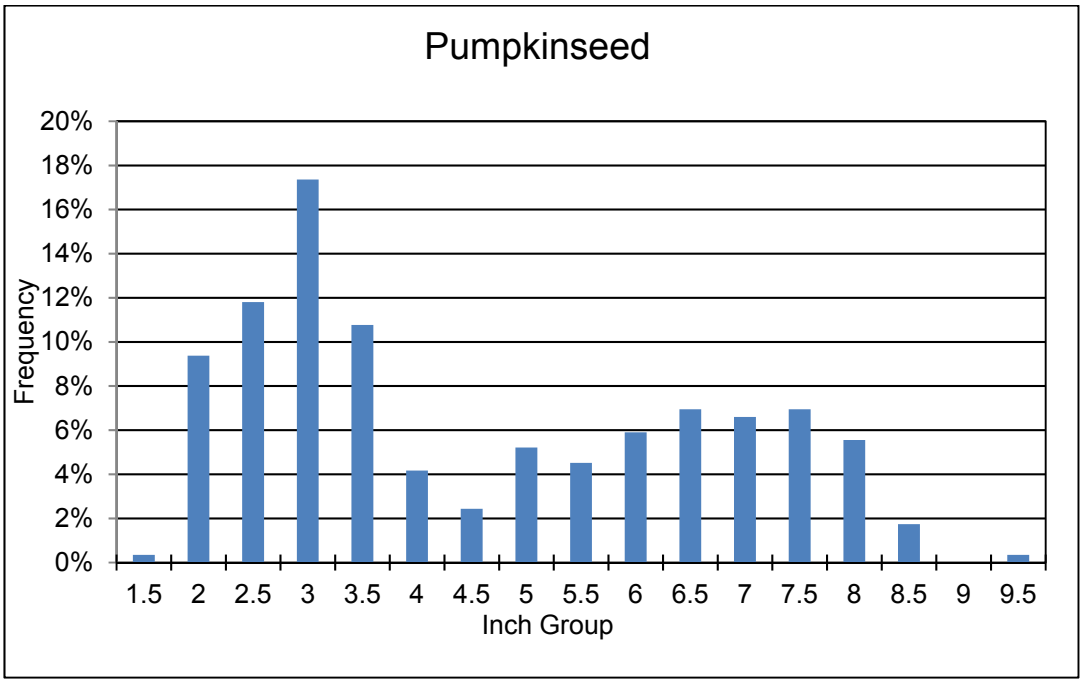

Figure 12. Length frequency distribution of pumpkinseed caught in DeRuyter Reservoir in June and July 2018.

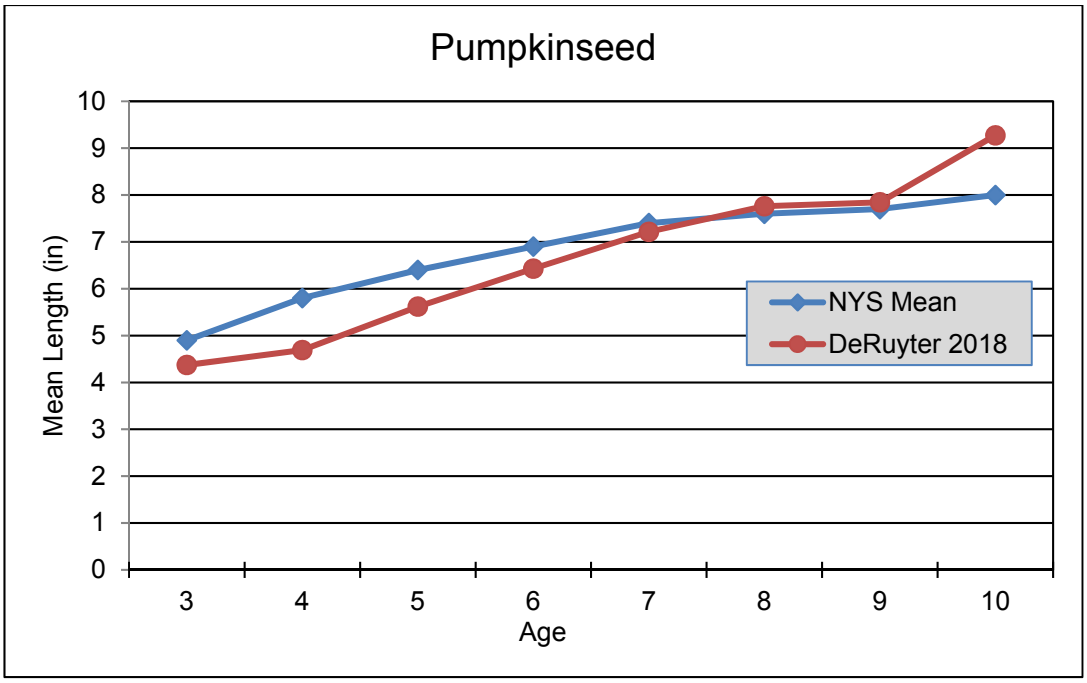

Figure 13. Observed mean length at age of pumpkinseed caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Brooking et al. 2018).

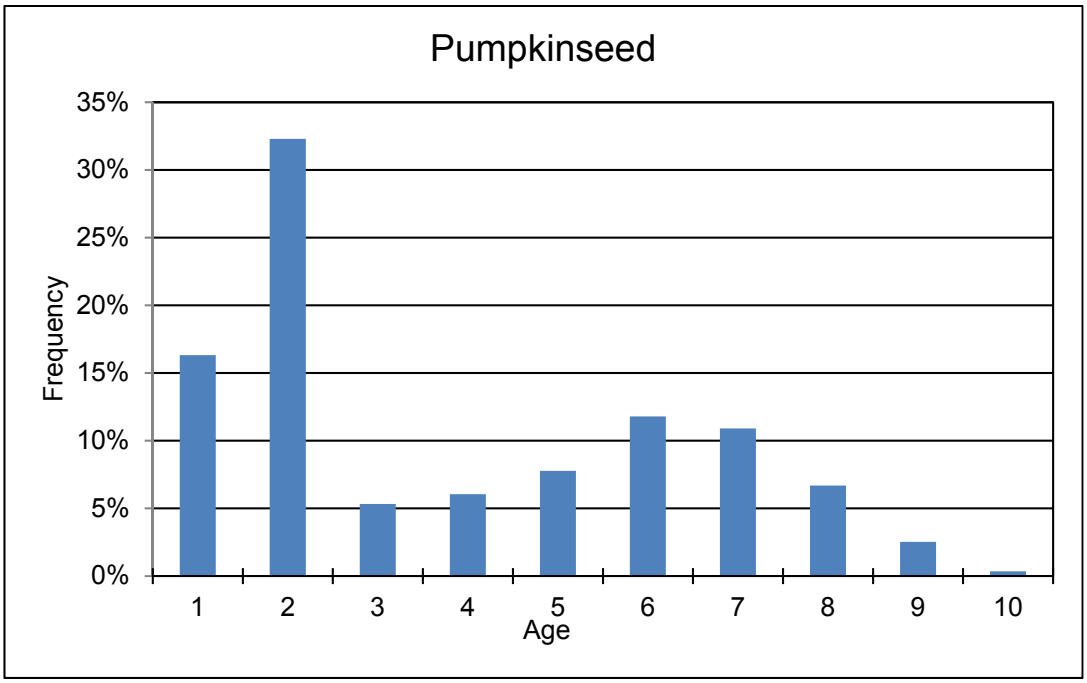

Figure 14. Age frequency distribution of pumpkinseed caught in DeRuyter Reservoir in June and July 2018.

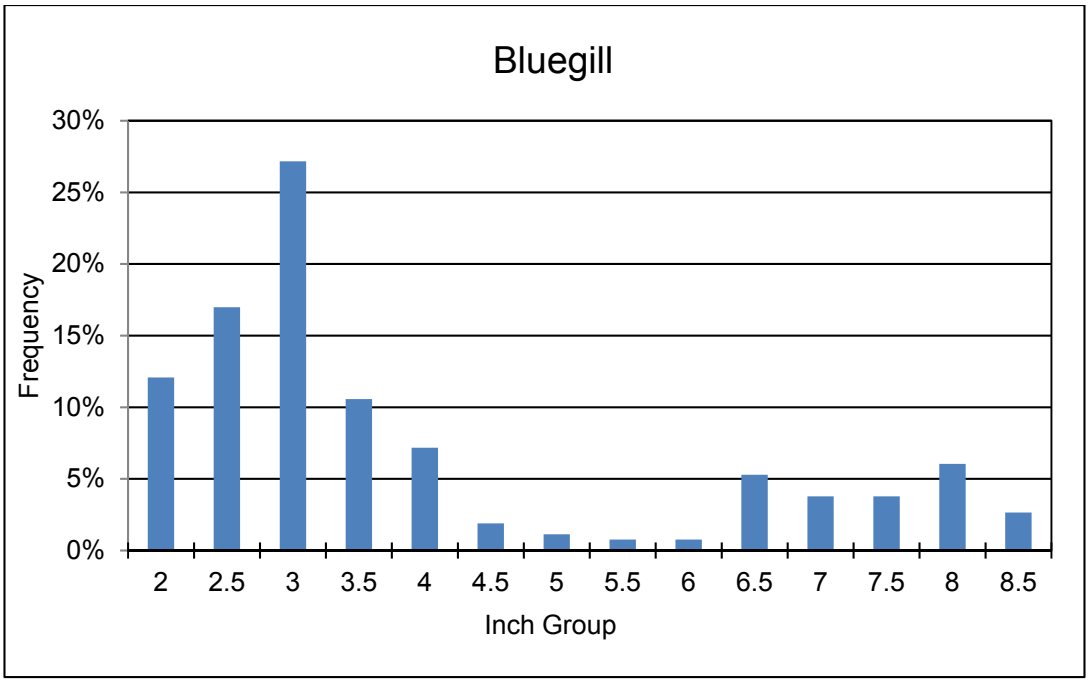

Figure 15. Length frequency distribution of bluegill caught in DeRuyter Reservoir in June and July 2018.

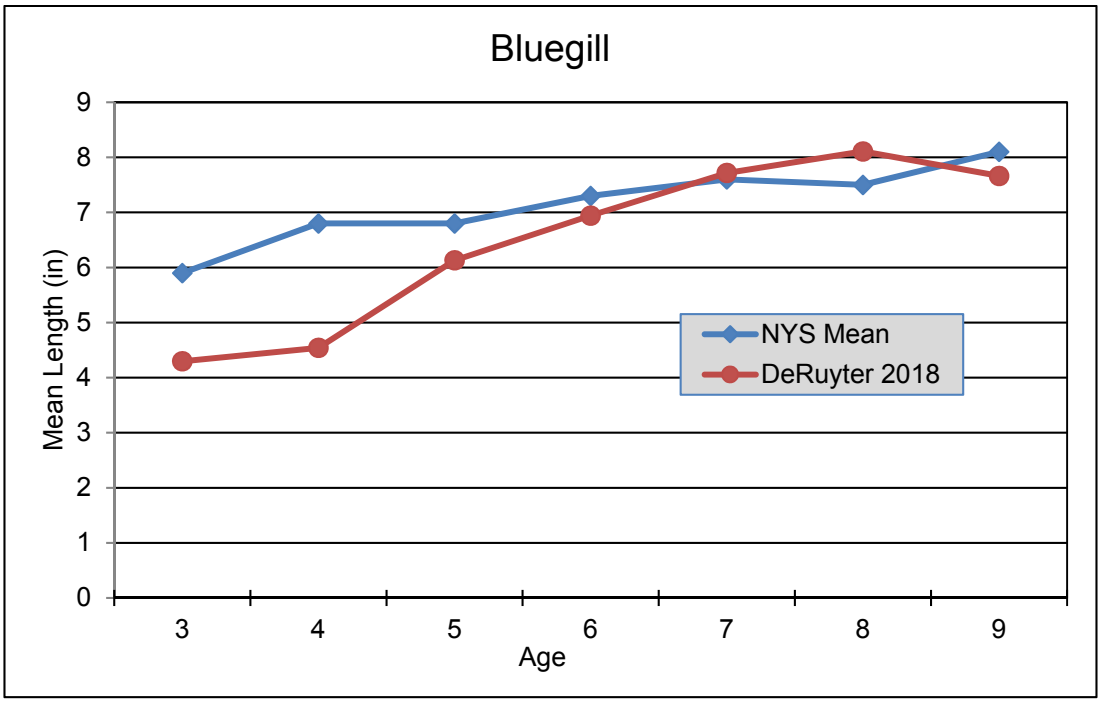

Figure 16. Observed mean length at age of bluegill caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Brooking et al. 2018).

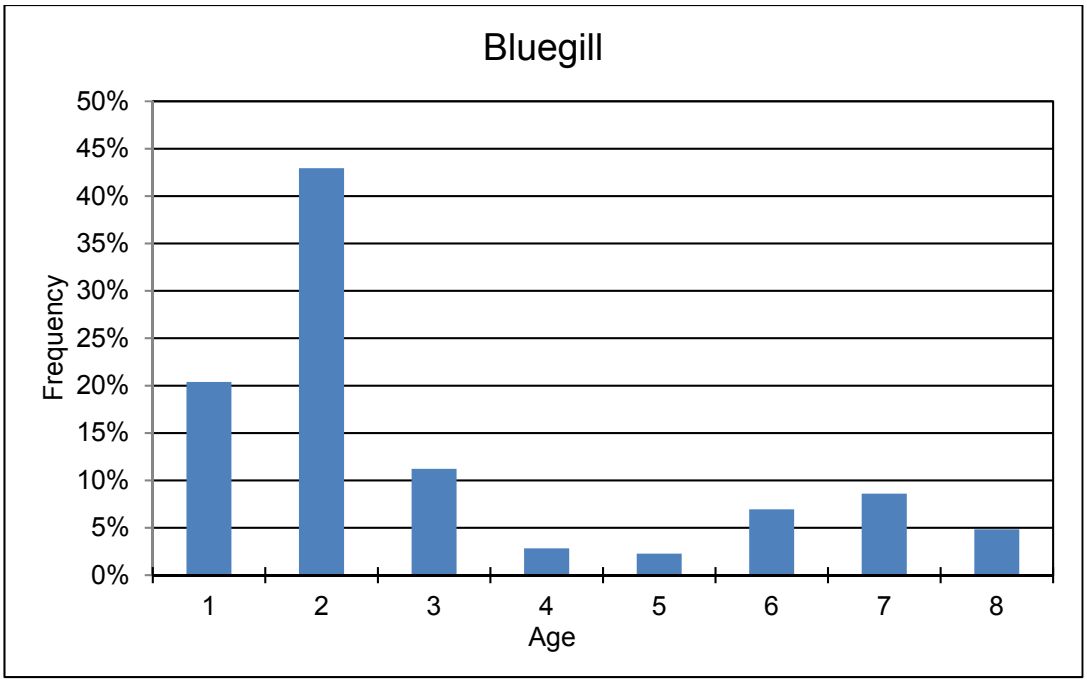

Figure 17. Age frequency distribution of bluegill caught in DeRuyter Reservoir in June and July 2018.

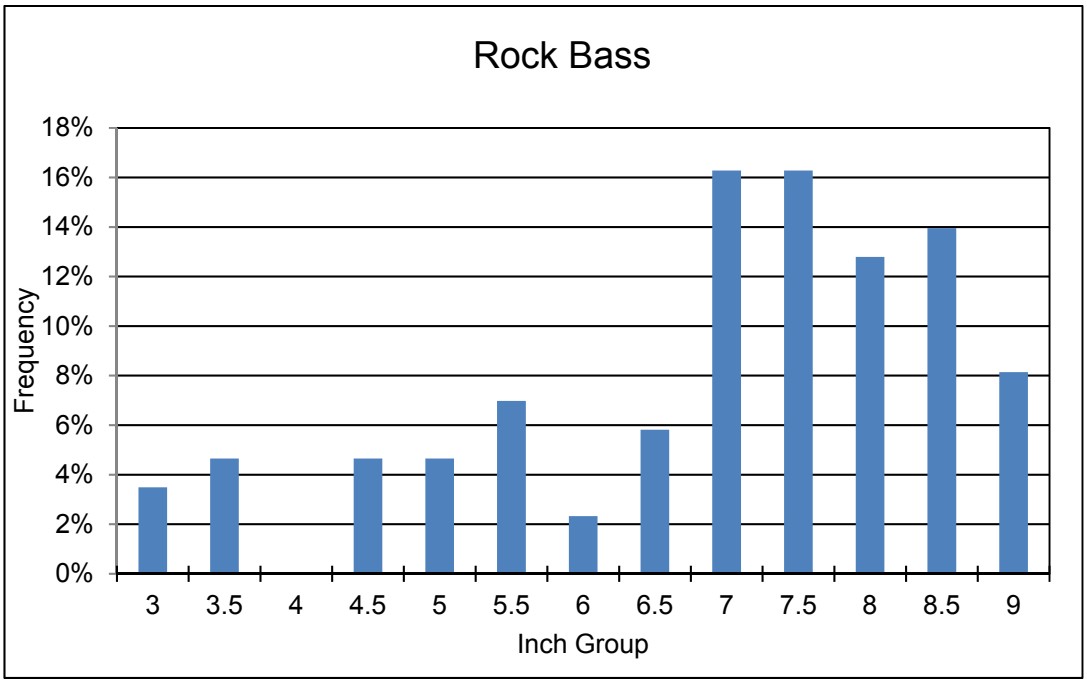

Figure 18. Length frequency distribution of rock bass caught in DeRuyter Reservoir in June and July 2018.

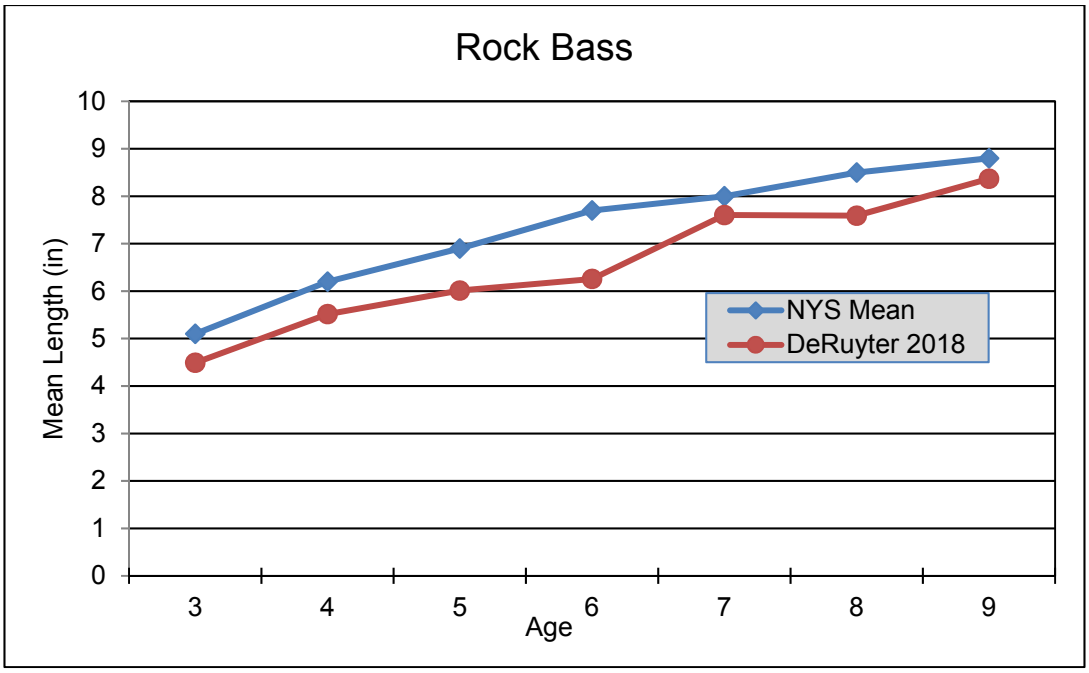

Figure 19. Observed mean length at age of rock bass caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Brooking et al. 2018).

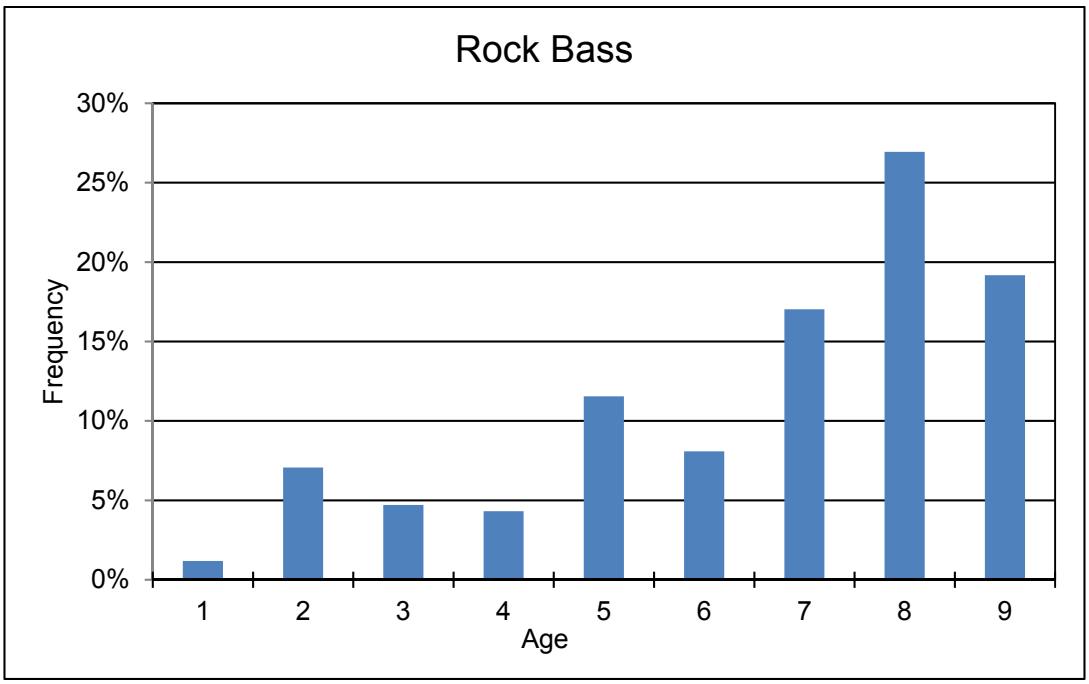

Figure 20. Age frequency distribution of rock bass caught in DeRuyter Reservoir in June and July 2018.

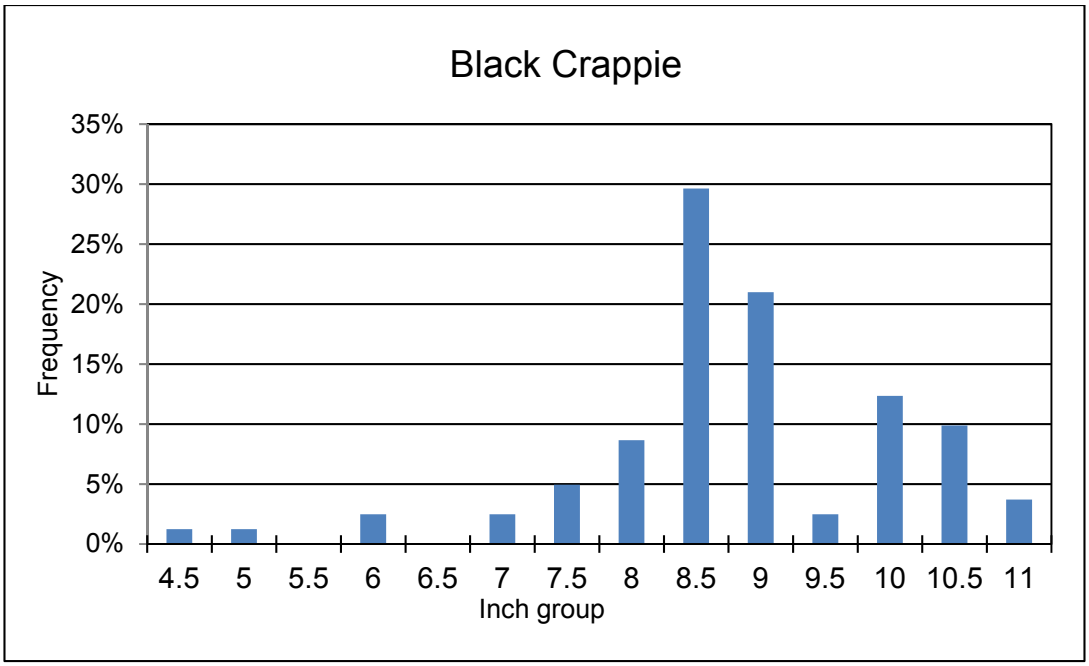

Figure 21. Length frequency distribution of black crappie caught in DeRuyter Reservoir in June and July 2018.

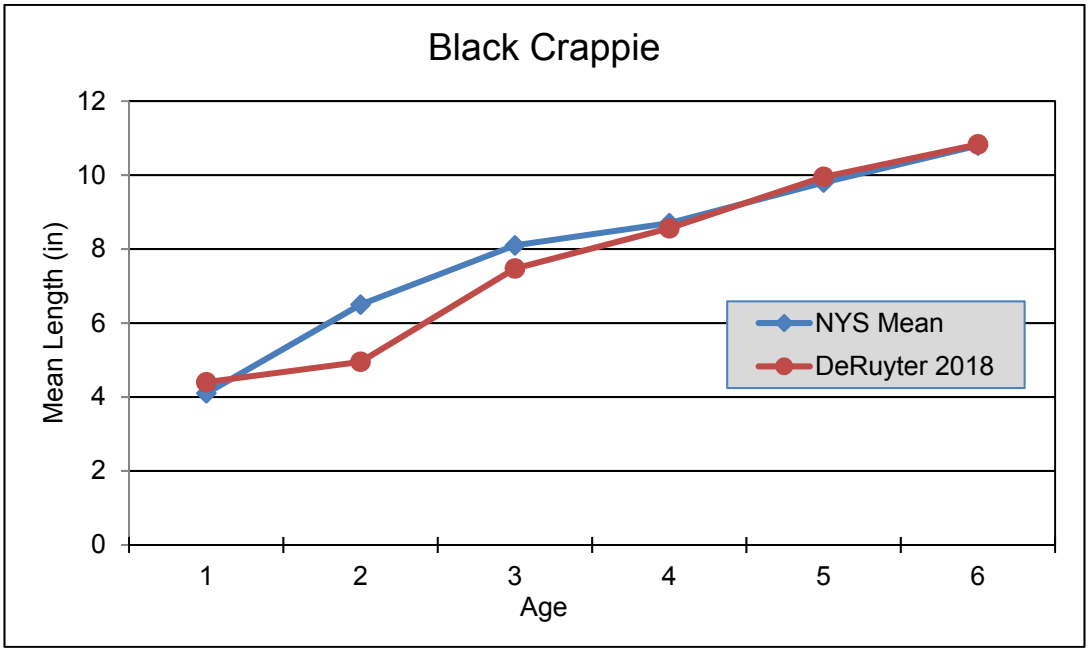

Figure 22. Observed mean length at age of black crappie caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Brooking et al. 2018).

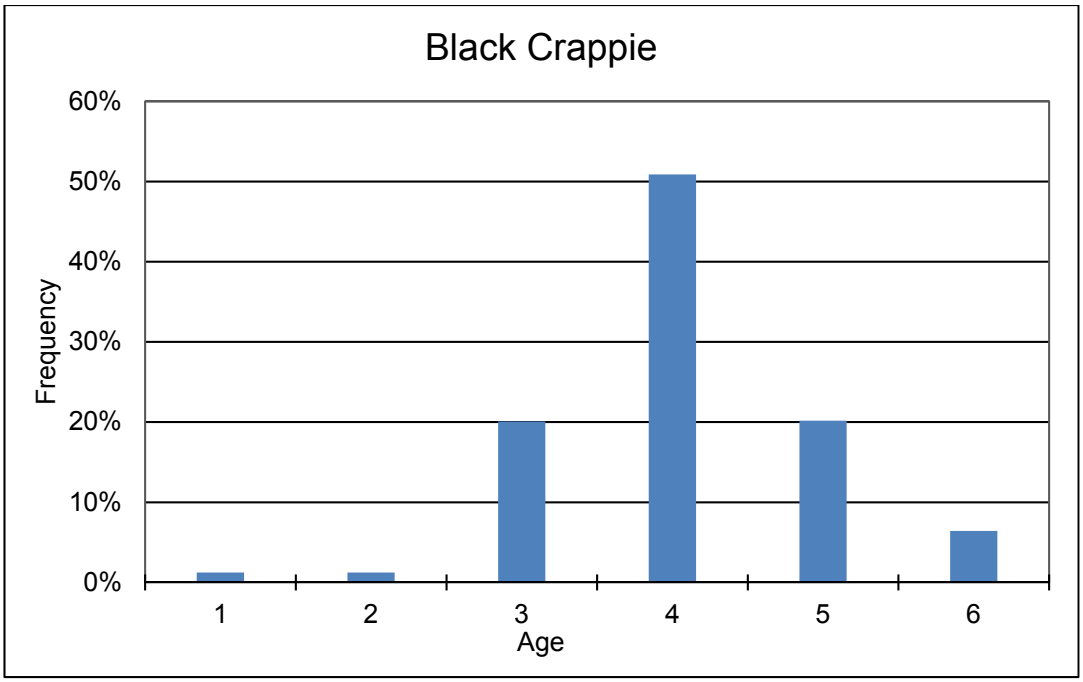

Figure 23. Age frequency distribution of black crappie caught in DeRuyter Reservoir in June and July 2018.

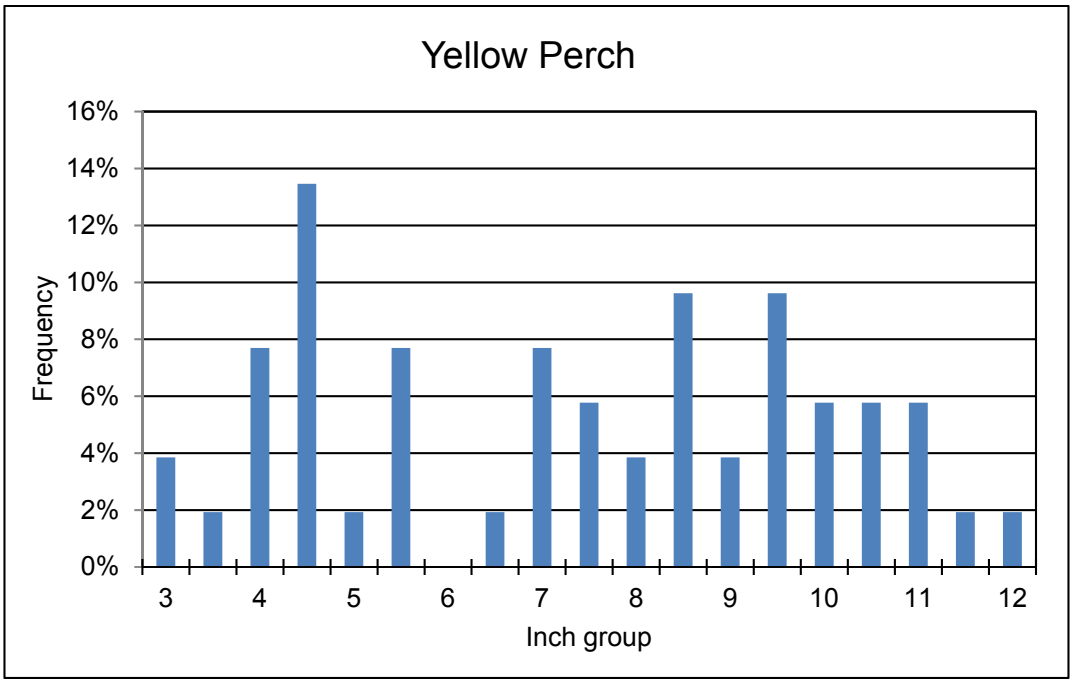

Figure 24. Length frequency distribution of yellow perch caught in DeRuyter Reservoir in June and July 2018.

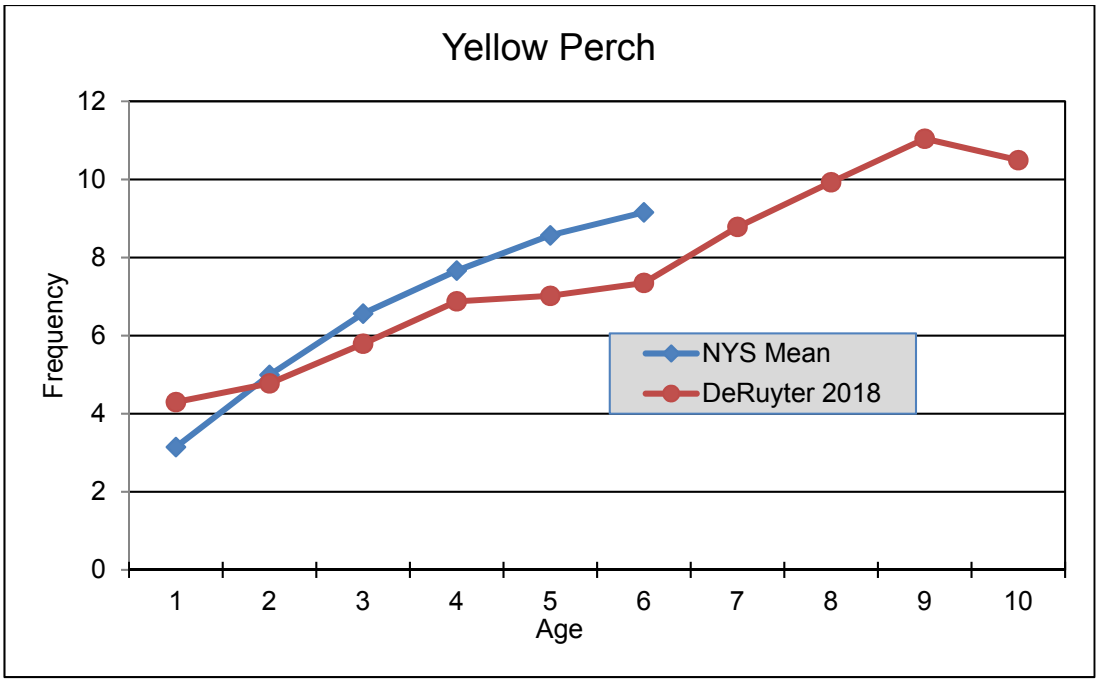

Figure 25. Observed mean length at age of yellow perch caught in DeRuyter Reservoir in June and July 2018 and the NYS mean (Forney et al. 1994).

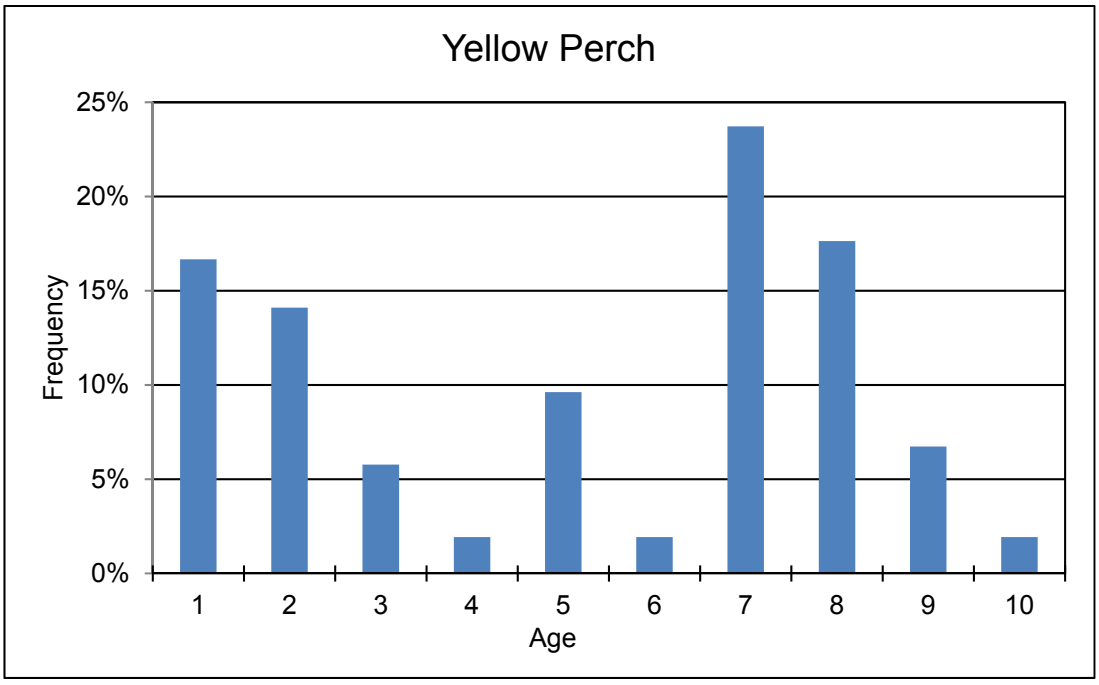

Figure 26. Age frequency distribution of yellow perch caught in DeRuyter Reservoir in June and July 2018.

Discussion

Water Chemistry

During the June 6 and 7th electrofishing survey, the surface water temperature was well within the 59 to 73° F range suggested in the Bass and Sunfish Manual (Brooking et al. 2018). During the July survey the water temperature was "fairly" uniform from top to bottom and no thermocline was evident. The DO meter was not calibrated on July 16th so readings were likely not accurate. The meter was calibrated before taking readings on July 17th and there was sufficient DO at all depths to support fish.

Species Collected

The 15 species observed in DeRuyter Reservoir is comparable to the number of species collected thus far, for Madison County waters surveyed by the DEC in recent years (Table 7). Seventeen species were collected in Cazenovia Lake (Everard 2013), 16 in Eaton Brook Reservoir (Everard 2016), 15 in Lake Moraine (Everard 2015), 18 in Upper and Lower Leland Ponds (Everard 2017), 11 in Lebanon Reservoir (Everard 2020) and 9 in Stoney Pond (Everard 2020a). It's also comparable to the number of species caught by SUNY Cobleskill during their recent electrofishing surveys on DeRuyter Reservoir (Table 8).

Table 7. Fish species collected by the DEC in recent sampling efforts on Madison County waters and year sampled. Cazenovia Lake (CL), Eaton Brook Reservoir (EB), Lake Moraine (LM), Upper and Lower Leland Ponds (LP), Lebanon Reservoir (LR), Stoney Pond (SP) and DeRuyter Reservoir (DR). [1] Boat electrofishing and gill net. [2] Boat electrofishing, gill net, and fyke net. [3] Boat electrofishing

Species	CL 2012[1]	EB 2013[1]	LM 2014[2]	LP 2015[2]	LR 2016[2]	SP 2017[3]	DR 2018[2]
Alewive				X			
Brown Trout				X			
Rainbow Trout		X			X		
Chain Pickerel	X	X	X	X		X	X
Common Carp				X			
Golden Shiner	X	X	X	X	X	X	X
Emerald Shiner		X					
Spottail Shiner	X	X		X			X
Spotfin Shiner	X						
White Sucker	X	X	X	X	X		X
Creek Chubsucker			X	X			
Yellow Bullhead	X		X	X			X
Brown Bullhead	X	X	X	X	X	X	X
Banded Killifish	X						X
Rock Bass	X	X	X	X	X	X	X
Redbreast Sunfish			X	X			
Pumpkinseed	X	X	X	X	X	X	X
Bluegill	X	X	X	X	X	X	X
Smallmouth Bass	X	X	X	X			X
Largemouth Bass	X	X	X	X	X	X	X
Black Crappie	X	X	X	X	X	X	X
Tessellated Darter	X	X					
Yellow Perch	X	X	X	X	X	X	X
Walleye	X	X	X		X		X
Species	17	16	15	18	11	9	15

Table 8. Fish species caught, and electrofishing catch per unit effort (CPUE) for Fisheries surveys on DeRuyter Reservoir by the DEC and SUNY Cobleskill (SUNY).

	CPUE (catch/h)									
	DEC	SUNY				DEC			SUNY	DEC
Species	Oct-96	Jun-04	Jun-07	Jun-08	Jun-10	Oct-12	Oct-13	Oct-15	Oct-17	Jun-18
C. Mud Minnow	0.0	0.0	0.0	0.0	0.9				0.0	0.0
Chain Pickerel	63.3	0.0	39.7	18.0	13.2				19.2	3.7
Common Carp	0.0	23.3	0.0	0.0	0.0				0.0	0.0
Golden Shiner	9.3	24.5	40.6	9.0	7.9				12.3	5.9
Emerald Shiner	0.0	17.5	0.0	1.1	0.0				0.0	0.0
Spottail Shiner	1.3	15.1	0.9	6.8	32.6				0.0	2.9
Bluntnose Minnow	7.3	1.2	14.8	21.4	10.6				23.5	0.0
White Sucker	12.0	0.0	0.9	3.4	2.6				7.8	2.0
Yellow Bullhead	0.0	0.0	0.0	0.0	0.0				2.2	1.0
Brown Bullhead	1.3	4.7	7.4	1.1	11.4				15.6	13.8
Margined Madtom	2.7	0.0	0.0	0.0	0.0				1.1	0.0
Banded killifish	1.3	8.2	9.2	2.3	2.6				24.6	2.9
Rock Bass	12.0	125.8	179.0	283.5	229.0				138.6	76.8
Pumpkinseed	40.0	152.6	98.7	47.3	298.5				41.3	133.9
Bluegill	0.0	100.2	131.0	101.3	156.8				264.8	130.9
Smallmouth Bass	6.7	19.8	10.2	4.5	7.9				3.5	6.2
Largemouth Bass	3.8	26.8	52.6	31.5	587.4				19.7	32.6
Black Crappie	5.3	0.0	0.0	0.0	0.9				39.1	2.0
Tessellated Darter	0.0	8.2	5.5	10.1	6.2				10.1	0.0
Yellow Perch	84.0	349.4	121.8	398.3	374.3				65.9	24.6
Walleye	10.0	8.2	3.7	4.5	2.6	3.9	10.1	5.7	5.2	2.0

Gamefish

Largemouth Bass

The average electrofishing CPUE of 33/h (SE=4) for all size largemouth bass was just below the spring statewide average of 36/h (SE=2; Brooking et al. 2018). While the average electrofishing CPUE of 27/h (SE=4) for ≥12 in bass was well above the spring statewide average of 14/h (SE=1; Brooking et al. 2018). Using Greens (1989) formula and the average CPUE for bass ≥10 in suggest DeRuyter Reservoir has a moderate largemouth bass population density. Anderson (1980) suggests a balanced bass population has a PSD range of 40 to 70, and RSD_{15} of 10 to 40. So, the DeRuyter Reservoir largemouth bass PSD of 59 and RSD_{15} of 15 falls within this balanced population range. The largemouth bass mean Wr of 102 (SE=1), was above the spring statewide Wr average of 98 (SD = 7; Perry et al. 2014) for all size largemouth bass. As was the average spring electrofishing Wr of 106 (SE=3) for stock-quality size, statewide average is 99 (SE=1; Brooking et al. 2018). The Wr index uses a range of 95 to 105 as the benchmark for fish in good condition (Pope and Kruse 2007).

Though largemouth bass had slow growth rates, by NYS standards, its likely "stunting" is not an issue. Many definitions of stunting exist, but Heath and Roff (1987) define stunting as a population with "drastically" reduced growth rates. Given that mean length at age was just a year behind the NYS mean, mean Wr was above the NYS mean, and the population had a balanced PSD and RSD_{15}, there is no concern at this time for the slow growth rate. However, one of the complaints we hear from anglers about the largemouth bass fishing on DeRuyter Reservoir is the lack of "large" (>18 in bass). This was also evident in our sampling with just two largemouth bass caught in that size range. It's possible that the slow growth rate is contributing to this, but it's unlikely that it's the main cause. The DEC will continue to monitor this in future surveys. Currently, DeRuyter Reservoir should, and does, provide excellent largemouth bass fishing as far as catch rates for bass up to 15 in.

Smallmouth Bass

The average electrofishing CPUE of 6.2/h (SE=2) for all size smallmouth bass was well below the spring statewide average of 27/h (SE=2) as was the average CPUE for bass ≥11 in of 6.2/h (SE=2) and the statewide average of 10/h (SE=1; Brooking et al. 2018). However, when using the CPUE of 5/h (SE=3) for bass ≥10 in and Greens (1989) formula it suggest DeRuyter Reservoir has a moderate smallmouth bass population density. This was surprising as DeRuyter Reservoir is not really thought of as a smallmouth fishery. The smallmouth bass population would also be considered "out of balance" as it had a very large PSD and RSD_{14}, indicating the population has a lot of large individuals but few small ones. This is likely due to sampling bias, such as surveying when adults may have been spawning, this may have also contributed to the higher CPUE of ≥10 in bass. Smallmouth bass were in very good condition with an average Wr well above of the 90 (SD=8; Perry et al. 2014) spring statewide average. As was the spring electrofishing average Wr of 112 (SE=7) for stock-quality sized, statewide average is 91 (SE=1; Brooking et al. 2018). Unlike the largemouth bass, smallmouth bass had average growth rates by NYS standards and were reaching legal size at age-4.

Though not normally considered a smallmouth fishery, DeRuyter Reservoir should provide some opportunities, especially in the spring, for anglers targeting them along with the chance of catching fish ≥15 in.

Walleye

The electrofishing and gill netting CPUE's for DeRuyter Reservoir are contradictory of each other when it comes to estimating walleye abundance, with electrofishing falling well below the suggested low abundance estimated CPUE of 8/h, and the gill net CPUE equaling the 5/net night that would suggest high abundance (Forney et al. 1984). We can also compare growth rates of walleye when trying to determine abundance, specifically, the mean length at age-4. Only three age-4 were caught with a mean length of 16.9 in (431 mm) which falls between a mean length at age-4 of 18 in (457 mm) that would suggest low abundance, and a mean length of 15 in (380 mm) that would suggest high abundance (Forney et al. 1994). So, between the three estimates we have a low, moderate, and high. It should be noted that fall electrofishing catch rates for walleye are generally higher than those for spring (Forney

et al. 1994) so the observed electrofishing catch rate likely underestimates the walleye density. It is therefore likely that the DeRuyter walleye abundance would fall in the moderate range.

Though the walleye mean Wr of 87 (SE=1) fell below the 95 to 105 benchmark for fish in good condition (Pope and Kruse 2007) this hasn't been unusual for walleye in Madison County waters surveyed in recent years. For the four other waters walleye were caught in the average Wr ranged from 85 to 91 (Everard 2013, 2015, 2016, 2020). Similarly, the 44 walleye caught in the 1996 DeRuyter Reservoir survey had a mean Wr of 83 (SE=1), so this low Wr is likely of little concern at this time.

Scales were taken from all walleye and to better determine age, otoliths were also collected from the 29 walleye that were caught with gill nets. As expected, there was a difference in age estimates between scale and otolith aging methods, with the most disparity occurring in the older aged fish. Scales are generally reliable for determining walleye ages up to age-7 (Forney et al. 1994). To further improve aging confidence, three individuals independently aged each scale and otolith. Otoliths provided a better agreement among the three readers than with scales with 59% exact agreement and 97% ±1 year with otoliths. With scales the exact agreement was 38% and 82% ±1 year (Table 9).

One of the objectives of the survey was to determine if recent year classes of fingerling walleye stocked by the TLPF were recruiting to the fisheries. It should be noted that walleye stocked into DeRuyter Reservoir have not been marked for identification so there is no way to determine if a walleye was stocked or naturally produced (wild). Because of this, for comparison purposes, we are assuming that collected walleye are stocked fish. Under this assumption, four of the five-year classes from the TLPF stockings, ages 2 to 5, were represented and they made up 32% of the walleye catch. The remaining 68% ranged in age from 6 to 11 and presumably originated from the DEC fry stocking program. While the TLPF fingerling stockings are represented in the fishery it doesn't appear that they are recruiting to the fishery any better than the fry stocked by the DEC. While a sample size of 38 walleye is relatively small, the results, nonetheless, suggest that stocking DeRuyter Reservoir with the larger fingerlings is not worth the additional expense.

DeRuyter Reservoir does appear to have an abundance of potential walleye fry and fingerling predators. Research conducted by Cornell University indicated that low survival of stocked walleye was observed in lakes with electrofishing catch rates of >5 fish/h of largemouth bass and esocids >15 in (Jackson et al. 2003). The DeRuyter Reservoir average electrofishing catch rate for largemouth bass and chain pickerel >15 in was 4.8 fish/h, which is right on the borderline, indicating that we would expect survival of stocked walleye to be low. As will be discussed below, the electrofishing catch of chain pickerel in this survey was lower than expected so that predator catch rate of 4.8/h is likely underestimated. However, that being said, it does appear that on most years the walleye stocking (whether fingerling or fry) is seeing some success

Table 9. Percentage agreement of walleye age estimates between three readers for walleye collected in DeRuyter Reservoir in June and July 2018.

Structure	Exact	(±1 year)
Scales	38%	82%
Otolith	59%	97%

Chain Pickerel

Overall, the number of chain pickerel caught during this survey was surprisingly low. Pickerel are frequently caught while angling on the lake, almost to the point of being a "nuisance" when targeting other species (personal angling experience) and during the 1996 electrofishing survey 285 were caught for a CPUE of 63/h (SE=13; Table 7). SUNY Cobleskill has averaged 18/h (SE=6) during recent electrofishing surveys between 2004 and 2017 (Table 8). Though well below the CPUE of the 1996 survey it's still well above the 4/h of this survey. It should be mentioned here that this survey was not designed to monitor pickerel. However, one explanation for this low catch of chain pickerel in the 2018 electrofishing survey is they may not have been in the near shore area during the spring sampling. Some evidence for this is the gill net CPUE of 1.7/net night was above the 1.6/net night for chain pickerel caught on Lake Moraine in 2014 (Everard 2015). Lake Moraine is considered an excellent chain pickerel fishery, and the electrofishing CPUE for that survey was 31/h. The chain pickerel average Wr was well below the 95 to105 suggesting a fish in good condition. As with the walleye, this hasn't been an unusual occurrence for chain pickerel in the Madison County waters with average Wr ranging from 82 to 87 (Everard 2013, 2015, 2016, 2017, 2020a) for the five waters surveyed since 2012 where pickerel were caught, so is likely of little concern. Though our sampling doesn't show it, DeRuyter Reservoir should provide excellent chain pickerel fishing with good catch rates for legal length fish.

Panfish

Pumpkinseed

The average electrofishing CPUE of 126/h (SE=24) for ≥stock size pumpkinseed was well above the statewide average of 70 (SE=9; Brooking et al. 2018). As was the CPUE of 10/h (SE=6) for ≥preferred size, state average is 3/h (SE=0; Brooking et al 2018). Anderson (1985) suggests a balanced bluegill population should have a PSD range of 20 to 60, and a RSD_8 of 5 to 20. If we assume pumpkinseed stock density ranges are similar to bluegill, the DeRuyter Reservoir PSD of 59 and RSD_8 of 9 would indicate a balanced population. The pumpkinseed average Wr of 102 for stock-quality size fish is above the statewide mean of 98 (SE=2; Brooking et al. 2018). Though no memorable or trophy sized pumpkinseeds were caught, when looking at CPUE's for preferred size, along with the RSD_8 and Wr, DeRuyter Reservoir should provide excellent pumpkinseed angling for both numbers and size.

Bluegill

The average electrofishing CPUE of 93/h (SE=23) for ≥stock size bluegill was just above the statewide mean of 91 (SE=9; Brooking et al. 2018). While the average

CPUE for ≥preferred size bluegills of 16/h (SE=9) was well over the statewide average of 6/h (SE=2; Brooking et al. 2018). Both the DeRuyter Reservoir bluegill PSD and RSD_8 fall within the suggested ranges that would indicate a balanced population with a good percentage of bluegill ≥8 in. Bluegill were also in very good condition with the mean Wr for stock-quality size bluegills of 108 (SE=3) which is above the statewide average of 102 (SE=0; Brooking et al. 2018). So, as with pumpkinseed, DeRuyter Reservoir should provide good angling for bluegills both in numbers and size.

Rock Bass

The average electrofishing CPUE of 72/h (SE=16) for ≥stock size rock bass was well above the statewide mean of 32/h (SE=2; Brooking et al. 2018). While the average CPUE for ≥preferred size rock bass was equal to the statewide average of 2/h (SE=2; Brooking et al. 2018). Rock bass were also in very good condition with the mean Wr for stock-quality size bluegills of 105 (SE=3), which is above the statewide average of 97 (SE=2; Brooking et al. 2018). Though not as popular as some of the other panfish species, rock bass are abundant and decent sized on DeRuyter Reservoir and should also provide good angling.

Black Crappie

It was interesting to see the difference in catch rates of black crappie between the three gears used, with gill netting accounting for the majority of them. Black crappie can often be difficult to collect by electrofishing, as this survey shows, and are likely often underrepresented when that is the only gear used. The electrofishing catch rate of 3/h falls well below the statewide average of 11/h (SE=1; Brooking et al. 2018). Many of the black crappie collected were at, or just below, the legal length of ≥9-inches. The average Wr of 95 (SE=3) suggest black crappie are in good condition. As with the other members of the sunfish family, DeRuyter Reservoir should provide good black crappie angling for both size and numbers especially in the next year or two.

Yellow Perch

The average electrofishing catch rate for yellow perch would suggest moderate abundance as it fell between the 15/h that would suggest low abundance and 50/h that would suggest high abundance (Forney et al. 1994). While the gill net catch rate fell just below 5/net night suggesting low abundance (Forney et al. 1994). Yellow perch mean length at age-4 can also be used to estimate abundance with a mean length of 8.5 in (215 mm) suggesting low abundance, while a mean length of 7 in (180 mm) suggests high abundance (Forney et al. 1994). The DeRuyter Reservoir yellow perch mean length at age-4 of 6.9 in (175 mm) suggests high abundance which contradicts the electrofishing and gill net CPUEs, it's likely the yellow perch population would fall in the moderate range. The yellow perch PSD of 68 falls above the accepted range of 30 to 60 (Anderson and Weithman 1978) for a balanced population. Currently the population seems to be made up of young fish (age-1 and 2) and old (age-7 and 8) with fewer fish in the mid-age ranges. Indicating that recruitment is likely highly variable for yellow perch on DeRuyter Reservoir. Though not abundant, there are some "keeper" size yellow perch in the reservoir that should provide a nice "bonus" catch to anglers targeting the other more abundant panfish.

Recommendations

Management recommendations based on the results of this survey are:

- Continue with the special regulation for walleye only if the TLPF decides to continue with their experimental walleye stocking program. However, if they decide to end that program, go back to the statewide walleye regulation (5/day with a minimum size of 15").
- Continue with statewide angling regulations for all other species.
- Continue to allow the TLPF to stock walleye fingerlings for their experimental program. Though based on the results of this survey they may want to try stocking a different size class such as pond fingerling (1.5") or stop stocking altogether.
- DEC should resume walleye fry stocking if/when the TLPF decides to stop their experimental walleye stocking program.

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*Appendix 1. Number of walleye stocked into DeRuyter Reservoir by the Department of Environmental Conservation (DEC) and Tioughnioga Lake Preservation Foundation, Inc. (TLPF). * Average number of walleye stocked per year during the 1935-1990 time period.*

Year	Stocked By	Number	Stage
1935-1990	DEC	954,341*	Fry
2001	DEC	2,880,000	Fry
2002	DEC	2,880,000	Fry
2005	DEC	2,880,000	Fry
2006	DEC	2,880,000	Fry
2007	DEC	2,880,000	Fry
2008	DEC	2,880,000	Fry
2009	DEC	2,880,000	Fry
2010	DEC	2,880,000	Fry
2011	DEC	1,730,000	Fry
2012	DEC	1,730,000	Fry
2013	TLPF	50,000	Fingerling
2014	TLPF	10,000	Fingerling
2015	TLPF	25,000	Fingerling
2016	TLPF	8,000	Fingerling
2017	TLPF	15,000	Fingerling

Appendix 2. Lengths used for stock, quality, preferred, memorable, and trophy sizes for species collected from DeRuyter Reservoir, Madison County, NY in June and July 2018.

	Stock		Quality		Preferred		Memorable		Trophy	
Species	mm	in	mm	in	mm	in	mm	in	mm	in
Chain Pickerel	250	10	380	15	510	20	630	25	760	30
White Sucker	150	6	250	10	330	13	410	16	510	20
Brown Bullhead	130	5	200	8	280	11	360	14	430	17
Rock Bass	100	4	180	7	230	9	280	11	330	13
Pumpkinseed	80	3	150	6	200	8	250	10	300	12
Bluegill	80	3	150	6	200	8	250	10	300	12
Largemouth Bass	200	8	300	12	380	15	510	20	630	25
Smallmouth Bass	180	7	280	11	350	14	430	17	510	20
Black Crappie	130	5	200	8	250	10	300	12	380	15
Yellow Perch	130	5	200	8	250	10	300	12	380	15
Walleye	250	10	380	15	510	20	630	25	760	30