Fish Population Assessments of Ceded Territory Lakes in Wisconsin, Michigan and Minnesota During 2020

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Administrative Report 21-04
May 2021

Great Lakes Indian Fish and Wildlife Commission
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Abstract

The Inland Fisheries Section of the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) conducted fishery assessment surveys of Ceded Territory lakes in northern Wisconsin and the upper peninsula of Michigan. Assessment crews from the Sokaogon (Mole Lake), and St. Croix Bands assisted with spring and fall surveys.

In the spring, adult walleye (*Sander vitreus*) population estimates were conducted on 4 Wisconsin lakes. A total of 2,026 walleye were sampled from 2,416 acres of water during these surveys. Two of the four lakes surveyed had naturally reproducing walleye populations, and density of adult walleye of 1.13 Pike Lake Chain (Bayfield Co.) and 2.71 Jungle Lake (Forest Co.) fish per acre. Adult walleye population densities were at least 3.0 fish per acre in only Kawaguesaga Lake (Oneida Co.).

During the fall, electrofishing surveys were conducted on 40 lakes in Wisconsin and 3 lakes in Michigan to determine year class strength of age 0 (young of the year) and age 1 (yearling) walleye. In Wisconsin, a total of 5,374 age 0 and 1,481 age 1 walleye were sampled. In addition, 2,793 gamefish including muskellunge (*Esox masquinongy)*, northern pike (*Esox lucius*), largemouth bass and smallmouth bass (*M. dolomieui*) were sampled. In Michigan, a total of 1,251 age 0 and 425 age 1 walleye were sampled during the fall.

Contents

Acknowledgments

The authors thank fisheries technicians Butch Mieloszyk and Ed White for their assistance in selecting lakes, conducting field work, providing boat maintenance, supervising crews during spring and fall survey seasons, and aging walleye structures (spines, scales, and otoliths). Due to the COVID-19 pandemic no fisheries aides were hired to assist with either the spring or fall surveys. Kia Hmielewski, Database Manager, is thanked for entering fall survey data. Thanks also to Sokaogon (Mole Lake), and St. Croix personnel for their efforts, and to Dr. Jonathan Gilbert, Biological Services Director, for editing the manuscript.

Introduction

Fishery assessment surveys were conducted during spring and fall of 2020, by the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) to improve understanding of spatial and temporal variability of walleye populations in Ceded Territory waters of northern Wisconsin, Michigan. These studies add to an extensive body of information describing ceded territory walleye populations and associated biological parameters. They provide data needed to update recruitment codes, set harvest quotas, and monitor the impacts of a combined tribal and sport fishery on the walleye resource.

Since 1989, a Memorandum of Understanding has been in effect between the U.S. Fish and Wildlife Service (USFWS) and GLIFWC. The St. Croix Chippewa Assessment Unit was initially equipped and funded in 1990 to conduct surveys; assistance in subsequent years has continued through a subcontract with GLIFWC. The Sokaogon (Mole Lake) Band assisted with the spring and fall surveys through a subcontract with GLIFWC.

Methods

Spring Adult Walleye Population Estimates

Current information on adult walleye populations was collected from 4 lakes in the ceded territory of Wisconsin (Figure A1). The Pike Chain of lakes was the only lake surveyed that experienced tribal harvest during the previous year.

There are Nine lakes in Wisconsin are GLIFWC long-term study lakes that are typically sampled annually or biannually for trends and variabilities in adult walleye populations. The continuing goal is to use adult estimates and fall recruitment data from long-term study lakes to develop and assess models for predicting population size. However, due to the COVID 19 pandemic and inability to hire fisheries aides during the spring and fall, no spring surveys were conducted on any of these long-term study lakes.

Mark and recapture data were used to calculate the adult walleye population estimate for each lake according to the Peterson formula (Chapman's modification) described in Ricker (1975). A target number of adult walleye to be marked and recaptured was derived from curves that were developed by Robson and Regier (1964). These curves required an initial estimate of population size. This estimate was obtained either from a previous population estimate survey, or when none existed, from a regression formula estimate for a lake of similar size and recruitment code.

Per agreement between GLIFWC and WDNR biologists, all unknown sex fish less than 15 inches in total length were assumed to be immature fish and excluded from the calculation of

adult population estimates. In lakes where spearing occurred prior to the recapture survey, an adjustment was made by reducing the marking sample by the number of marked fish speared. Also, the total number of fish speared before the first recapture run (except for walleye of unknown sex less than 15 inches) was added to the estimate.

Fish were captured for marking with electrofishing gear soon after ice out in all lakes except Jungle Lake (Forest Co.) where walleye were captured only by fyke netting. Two electrofishing boats and crews were used during the season, including one from GLIFWC and one from Sokaogon (Mole Lake). All boats in all spring electrofishing surveys conducted during 2020 had an arrangement of six umbrella dropper anodes and used pulsed DC at 60 pps. Electrofishing occurred after sunset.

During the marking period, effort was focused on finding and sampling walleye spawning areas. With this concentrated effort, crews were able to mark the target number of walleye in one to seven nights, depending upon lake size and the number of crews used.

Walleye were measured (total length in inches) and sexed (male, female, or unknown). Crews were instructed to collect a scale or spine sample from ten male fish per half-inch group between 11.0 inches and 16.9 inches, and from five fish per half-inch group for males of other sizes and females. Generally, spines were taken from fish 10 inches and larger, and scales were taken from smaller fish. Spines and scales were analyzed at a later date for age determination. On long-term study lakes, fish were tagged with yellow colored individually numbered Floy tags prior to release. Fish on all other lakes were given a single caudal fin notch. After being tagged or notched, fish were released away from the capture area, typically near the middle of the lake.

Recapture surveys with electrofishing equipment were conducted one to two nights after the marking period ended. Surveys covered the entire shoreline of each lake. For each fish captured, length, sex and mark, if any, were recorded.

Fall Recruitment Surveys

Fall electrofishing surveys were conducted in 43 ceded territory waters including 40 lakes in Wisconsin and three lakes in Michigan. Fall surveys were conducted to evaluate recruitment of age 0 (young of the year) and age 1 (yearling) walleye, and to assess whether recruitment codes were appropriate.

Electrofishing boats generally sampled lakes four nights per week from September 9 through October 19. Five assessment crews were used during the season, including three from GLIFWC and crews from the Sokaogon (Mole Lake), and St. Croix tribes. The number of boats assigned to each lake was based upon the shoreline length to be surveyed, and whether the entire shoreline or index station segments would be surveyed. For planning purposes, it was assumed that one boat was needed for every 5-7 miles of shoreline. Index stations were sampled on 18 of the larger waters.

The primary objective of these surveys was to assess year class strength of stocked or naturally reproduced age 0 and age 1 walleye. Larger walleye and other game fish (e.g., bass, northern pike and muskellunge) were of secondary priority and collected if this effort did not detract from the collection of juvenile walleye. Panfish and other species were collected as a third priority. Results of these surveys were used to determine whether lake recruitment code changes were needed. Other uses included trend analysis of important mixed fishery lakes

maintained by natural reproduction, and the development of a regional perspective of annual walleye year class strength.

Electrofishing began at dusk and continued until the entire shoreline or set of index stations was sampled. Cases of severe weather were the only exceptions that prevented survey completion. All fish collected were identified to species and measured (total length in inches). For walleye only, a scale sample was collected from five fish per half-inch group between 5.5 and 12.0 inches to determine the length range and numbers of age 0 and age 1 walleye.

Protocols were adopted by GLIFWC in the fall of 2004 to reduce the likelihood of spreading aquatic invasive species. All equipment coming in contact with water was checked visually for aquatic invasive species each night before entering the water and again after leaving the water. Boats and trailers were bleached, pressure-washed, or steam-cleaned daily. In addition, crew leaders documented any aquatic invasive species observed.

Surveys on the following five Wisconsin lakes were conducted jointly by GLIFWC and WDNR, and the results summarized and reported by GLIFWC: Red Cedar Lake (Barron Co.), Turtle-Flambeau Flowage (Iron Co.), Balsam Lake (Polk Co.), Lake Chetac (Sawyer Co.), and Trout Lake (Vilas Co.). All data from these five surveys are reflected in this report, regardless of which agency did the actual collection of fish.

Results and Discussion

Spring Adult Walleye Population Estimates

A total of 2,026 walleye were sampled from 2,416 acres of water in Wisconsin during the spawning adult walleye population estimate period. Adult walleye population estimates for the four stocks ranged from 480 to 2,120 fish (Table A1). Estimated population densities ranged from 1.13 per acre for Pike Lake Chain, Bayfield Co., to 3.16 walleye per acre for Kawaguesaga Lake, Oneida Co. (mean = 2.04, SD = 1.06) (Figure A2).

The Report on Biological Issues (1988) listed several indicators of healthy naturally reproducing walleye stocks agreed to by state and tribal biologists. Two indicators included: a) population density of three adult walleye per acre; and, b) the presence of five year classes of females in a sample, or three year classes in a sample of 100 females that each contribute at least 15 percent of the sample.

Two of the four lakes surveyed had recruitment codes of NR (Table A1), indicating that natural reproduction was the only source of recruitment. Two lakes had a recruitment code of C-ST, indicating that some natural reproduction occurred even though the population was sustained by stocking. One of the four lakes had walleye densities of greater than 3.0 per acre.

Male-to-female sex ratios (Table A1) were skewed in favor of males in three of the lakes, except for Kawaguesaga Lake (Oneida Co.). The reliability of these values is questionable in some lakes, however. Electrofishing may bias sampling in favor of males (Shively and Kmiecik 1991) because males spend more time in shallow water than females during the spawning period (Colby et al. 1979), and many females are out of effective capture range except during or after spawning.

A total of 731 female, 1,268 male, and 27 unknown sex walleye were measured (Figure A3, Table A2) and a subsample aged (Figure A4). Female lengths ranged from 13.5 to 28.0 inches, male lengths ranged from 10.0 to 20.5 inches, and lengths for walleye of unknown sex ranged from 15.0 to 20.0 inches. Age-length tables were developed for subsets of female, male, and unknown sex walleye in each of the lakes sampled, except for Jungle Lake (Forest Co.) where no aging structures were collected (Tables A3 – A5). These age- length tables by themselves are not necessarily representative of the size and age structure of the population, since spines for aging were collected according to a stratified sampling scheme. However, age-length tables reflective of the population can be developed when coupled with length-frequency data from the population estimates. Also, the age-length tables should be sufficient to detect the presence or absence of year classes. Regarding the second population health criterion, all of the Wisconsin lakes had populations with at least five year classes of females in the aging sample.

Fall Recruitment Surveys

Fall recruitment surveys were conducted on 43 lakes in the ceded territories of Wisconsin and Michigan (Figure B1, Table B2). Survey effort included 164.76 hours of electrofishing along 366.1 miles of shoreline resulting in the collection of 11,553 walleye.

From surveys conducted on 40 lakes in Wisconsin, 154.0 hours of electrofishing along 346.7 miles of shoreline resulted in a collection of 9,540 walleye. In Michigan, three lakes were surveyed in 10.8 hours along 19.4 miles of shoreline, resulting in the collection of 2,013 walleye (Table B2).

A total of 5,374 age 0 walleye were caught in Wisconsin. Age 0 walleye were caught in 33 of the 40 lakes surveyed. Over all 40 surveys, catch per effort (CPE) for age 0 walleye ranged from 0.0 to 66.5 (mean = 13.5, median =3.0, SD = 20.6) per mile. A total of 1,481 age 1 (yearling) walleye were caught in 29 of the 40 lakes surveyed. Over all surveys, age 1 CPE ranged from 0.0 to 21.7 (mean = 3.5, median = 1.0, SD = 5.5) yearlings per mile.

In order to gauge the relative strength of the 2020 and 2019 walleye year classes monitored in the 2020 fall surveys as age 0 and age 1 fish, plots of mean and median CPE values were generated for each year from 1986 through 2019 for all Wisconsin lakes with recruitment codes of NR or C-NR with at least 75% of the shoreline surveyed, including lakes surveyed by WDNR and including CPEs of 0.0 (Figures B2 and B3). For 1986 through 2019, the averages of the yearly mean and median age 0 CPEs are 27.9 and 14.3 per mile, respectively, and the averages of the yearly mean and median age 1 CPEs are 9.8 and 4.9 per mile, respectively. For 2020, the mean and median age 0 CPEs were 19.1 and 6.1, respectively, and the mean and median age 1 CPEs were 4.0 and 1.0, respectively.

In Michigan, 1,251 age 0 walleye were caught. Age 0 walleye were caught in all of the three lakes surveyed. Age 0 CPE ranged from 1.0 to 85.8 (mean = 51.2, median = 66.8, SD = 36.3) per mile. A total of 425 age 1 walleye were caught in all three lakes. Age 1 CPE ranged from 2.2 to 32.7 (mean = 14.6, median = 9.0, SD = 13.1) yearlings per mile.

Table B2 includes summaries of gamefish including muskellunge, northern pike, largemouth bass, and smallmouth bass. Various panfish and rough fish species were also collected but their numbers are not reported here. Summary statistics for NR and C-NR lakes, C-ST lakes, and O-ST lakes in Wisconsin and Michigan are given in Table B3.
Statistics include the average CPE, the standard deviation, the number of lakes, and the range of CPE values for all lakes and for lakes where a year class was detected. Data were plotted for each recruitment code in Figures B4 and B5.

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Appendix A: Spring Survey Data

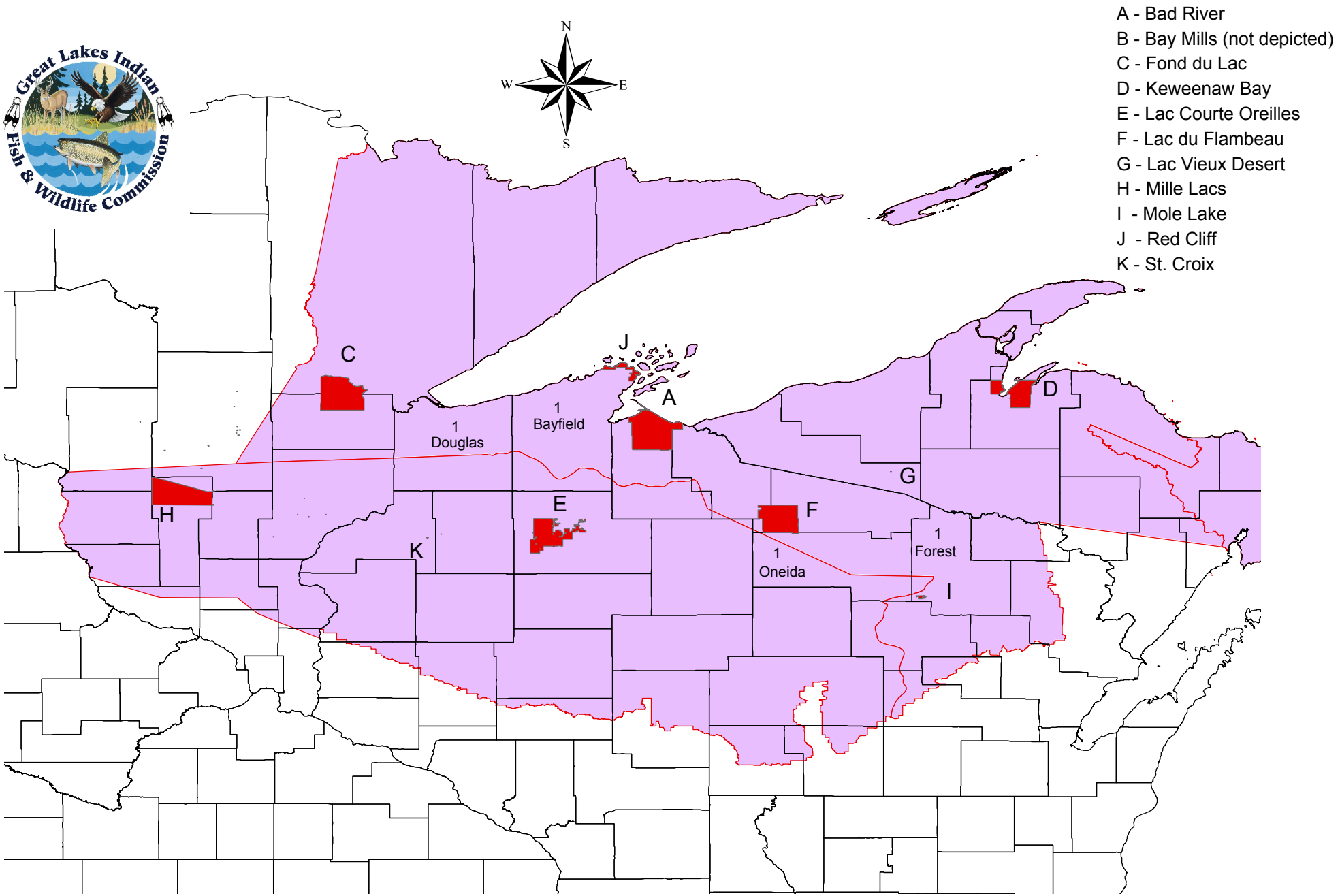

Figure A1. Ceded Territory in Wisconsin, Michigan, and Minnesota with the number of lakes per county where spring adult walleye surveys were conducted by GLIFWC during 2020.

*The ceded territory boundaries and the tribal reservation boundaries are representations and may not be the actual legally binding boundaries.

Figure A2: Estimated Adult Walleye Densities by Recruitment Code, Spring 2020

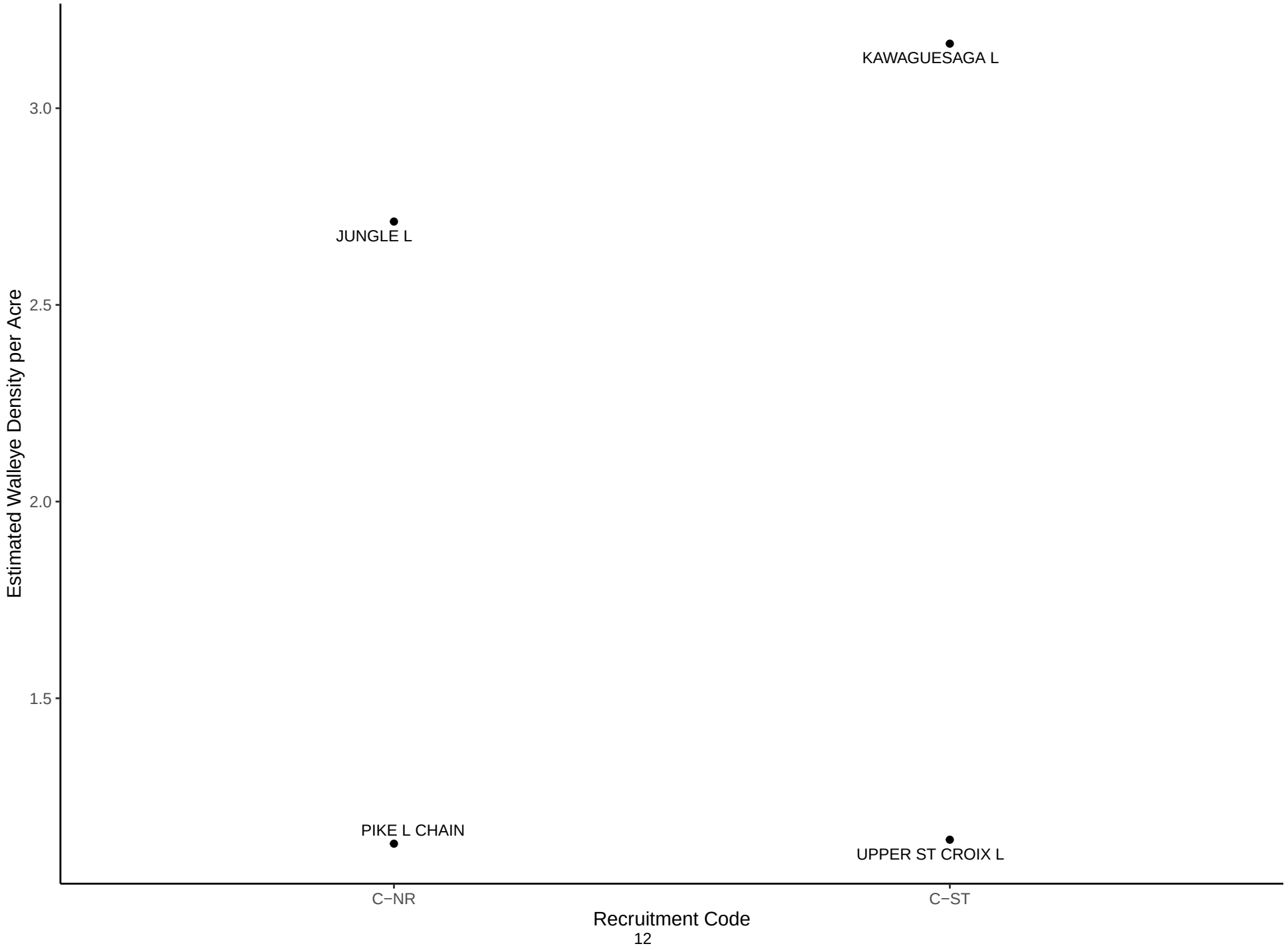

Figure A3: Length Frequency of Adult Walleye Marked, Spring 2020

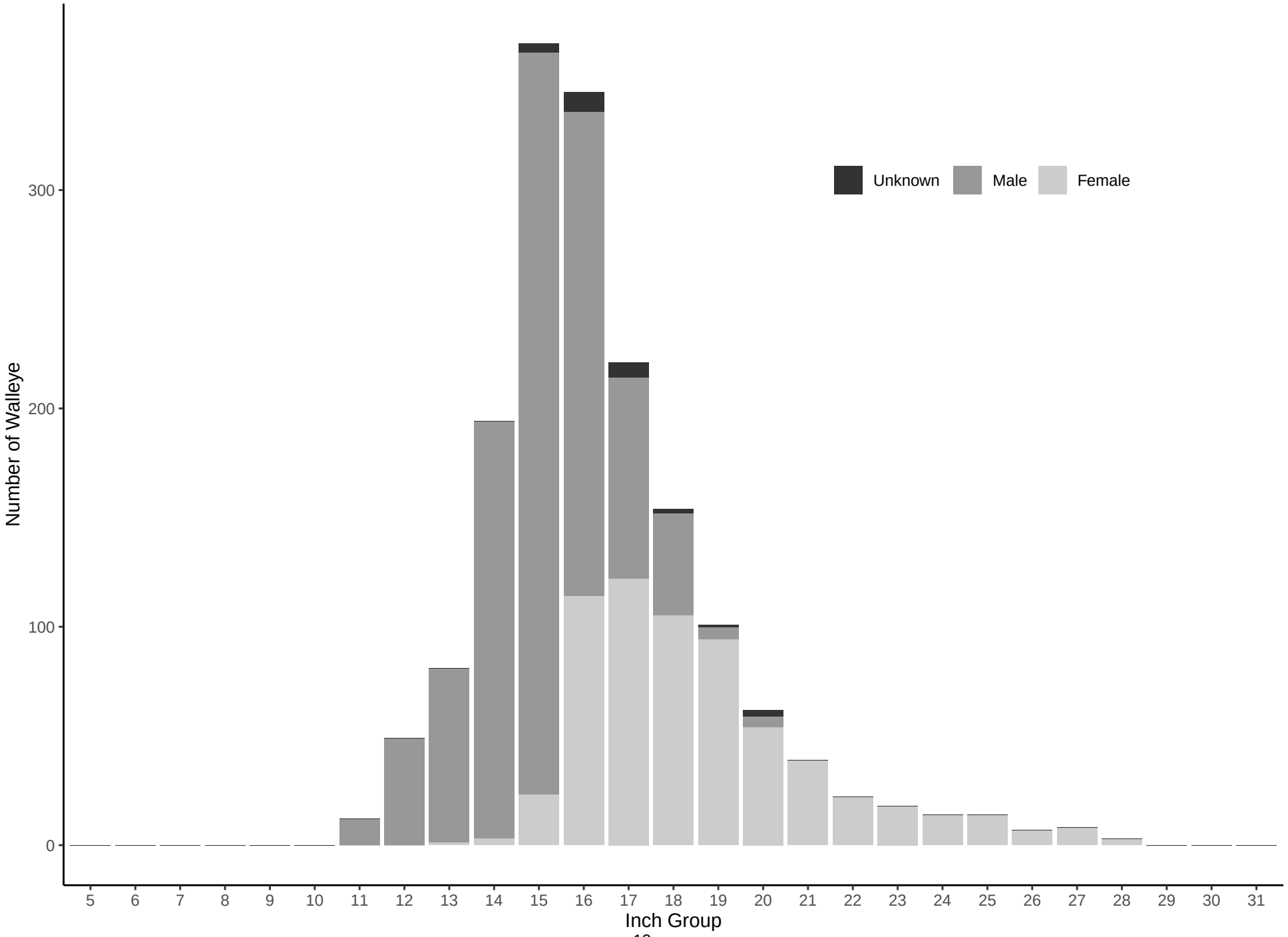

Figure A4: Age Frequency of Adult Walleye Age, Spring 2020

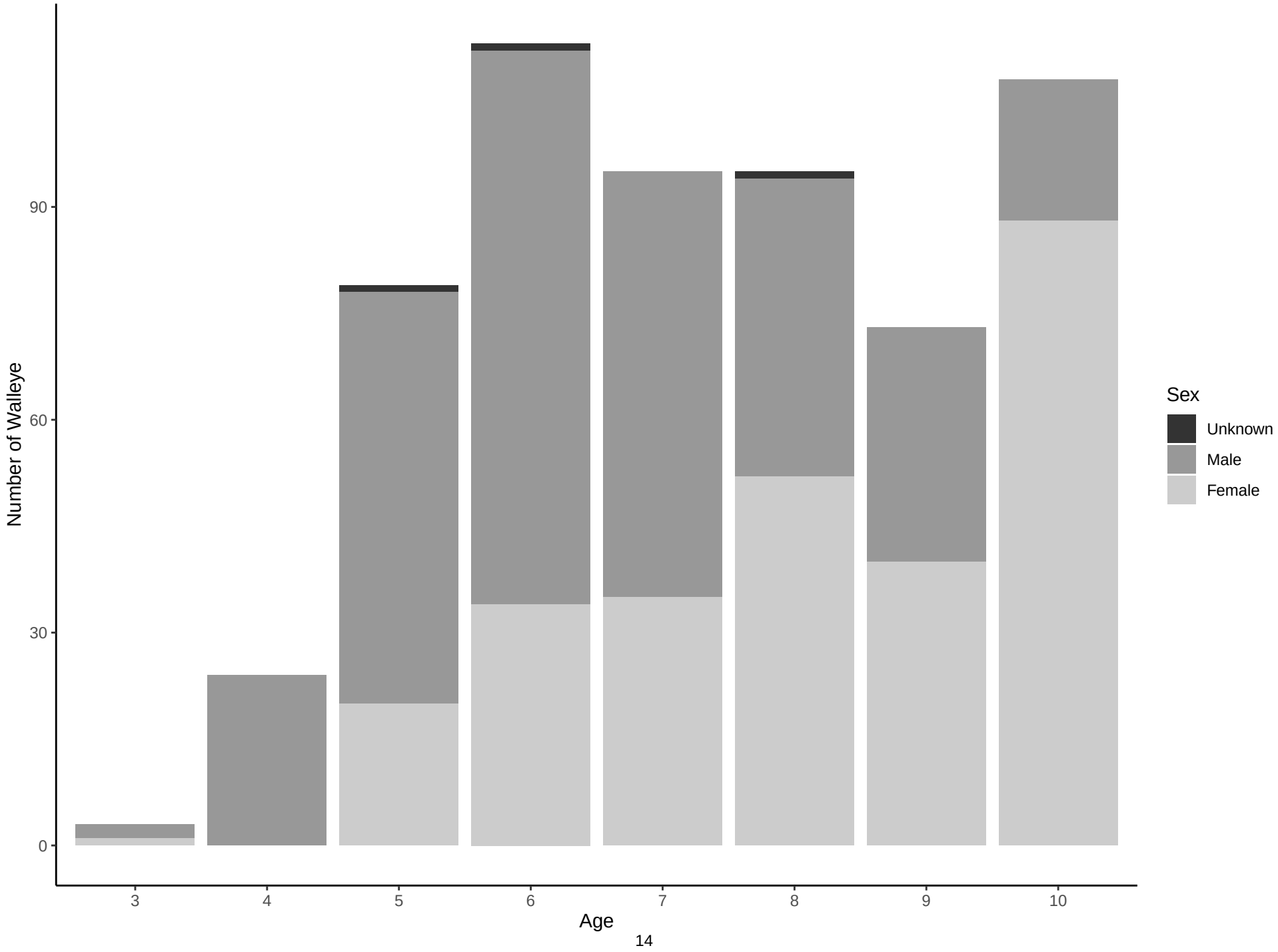

Table A1. Spring 2020 Adult Population Estimates Conducted by GLIFWC

State	County	Lake	Surface Area (Acres)	2020 Walleye Code	Population Estimate	Density	Coefficient of Variation (%)	Marking Gear*	Recapture Gear*	Fin clip applied**	Male: female sex ratio***
WI	BAYFIELD	PIKE L CHAIN	714	C-NR	807	1.13	7.91	E	E	LP	2.6
WI	DOUGLAS	UPPER ST CROIX L	855	C-ST	975	1.14	10.30	E	E	TC	4.7
WI	FOREST	JUNGLE L	177	C-NR	480	2.71	8.63	F	E	TCN	2.5
WI	ONEIDA	KAWAGUESAGA L	670	C-ST	2,120	3.16	10.03	E	E	TCN	0.8

*Gear used: E = electrofishing, F = fyke netting
** TCN = top caudal notch, LP = left pectoral TC = top caudal
***Sex ratio is calculated for walleye sampled during marking and recapture runs but excludes recaptured fish

Table A2. Lengths of Walleye Collected During Spring 2020 Adult Walleye Population Estimates

			NUMBER SAMPLED				FEMALE		MALE		UNKNOWN	
STATE	COUNTY	LAKE	FEMALE	MALE	UNKNOWN	TOTAL	MINIMUM LENGTH	MAXIMUM LENGTH	MINIMUM LENGTH	MAXIMUM LENGTH	MINIMUM LENGTH	MAXIMUM LENGTH
WI	BAYFIELD	PIKE L CHAIN	104	272	8	384	15.5	27.0	11.5	20.5	16.0	20.0
WI	DOUGLAS	UPPER ST CROIX L	93	438	1	532	14.0	28.0	11.0	19.5	15.0	15.0
WI	FOREST	JUNGLE L	90	224	1	315	16.0	28.0	13.0	19.0		
WI	ONEIDA	KAWAGUESAGA L	444	334	17	795	13.5	28.0	12.0	20.5	15.0	20.0
OVERALL			731	1,268	27	2,026	13.5	28.0	11.0	20.5	15.0	20.0

Table A3

Number of Walleye Aged by Sex and Length From Spring 2020. Adult Population Estimate
Pike Lake Chain, Bayfield County, Wisconsin

INCH	AGE 1			AGE 2			AGE 3			AGE 4			AGE 5			AGE 6			AGE 7			AGE 8			AGE 9			AGE 10+			TOTAL			
GROUP	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	ALL
3																																		
4																																		
5																																		
6																																		
7																																		
8																																		
9																																		
10																																		
11								1																								1		1
12											4																					4		4
13														5																		5		5
14														7			12															19		19
15													3	1		2	15			5											5	21		26
16													2		1	5	3	1		12			7								7	22	2	31
17													2			3			3	6		2	3			1					10	10		20
18																			6	1		4	5			3			1		10	10		20
19																			5	1		4			1	2			2		10	5		15
20																						2	1	1	4			3	1		9	2	1	12
21																						1			2			5			8			8
22																									3			2			5			5
23																												3			3			3
24																									1			5			6			6
25																												4			4			4
26																												2			2			2
27																												3			3			3
28																																		
29																																		
30																																		
TOTALS								1			4		7	13	1	10	30	1	14	25		13	16	1	11	6		27	4		82	99	3	184

Number of female year classes: 6 Number of male year classes: 8

Table A4

Number of Walleye Aged by Sex and Length From Spring 2020. Adult Population Estimate
Upper St. Croix Lake, Douglas County, Wisconsin

INCH	AGE 1			AGE 2			AGE 3			AGE 4			AGE 5			AGE 6			AGE 7			AGE 8			AGE 9			AGE 10+			TOTAL			
GROUP	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	ALL
3																																		
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12											2			13			2															17		17
13														14			5															19		19
14													1	1			17			1											1	19		20
15														1		2	3		1	16			1								3	21		24
16							1						3			3	1		1	4			14								8	19		27
17													3			2			1			1	3		1	7					8	10		18
18																2			7			1				2		1	4		11	6		17
19																			3			4			2	1		1			10	1		11
20																1						7			1						9			9
21																						2			2			4			8			8
22																						2			1			3			6			6
23																												3			3			3
24																												1			1			1
25																																		
26																												2			2			2
27																																		
28																												1			1			1
29																																		
30																																		
TOTALS							1	1			12		7	29		10	28		13	21		17	18		7	10		16	4		71	123		194

Number of female year classes: 7 Number of male year classes: 8

Table A5

Number of Walleye Aged by Sex and Length From Spring 2020 Adult Population Estimate
Kawaguesaga Lake, Oneida County, Wisconsin

INCH	AGE 1			AGE 2			AGE 3			AGE 4			AGE 5			AGE 6			AGE 7			AGE 8			AGE 9			AGE 10+			TOTAL			
GROUP	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	F	M	U	ALL
3																																		
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14											1			12		3	5			2												20		20
15													5			5	14			6												20		20
16																6			5	6			8			6						20		20
17																			1			9				9			1			10		10
18																			1			5			4	2			7			9		9
19																			1			3			6				1			1		1
20																						4			2			3	3			3		3
21																						1			6			3						
22																									3			4						
23																									1			9						
24																												7						
25																												9						
26																												3						
27																												5						
28																												2						
29																																		
30																																		
TOTALS											8		6	16		14	20		8	14		22	8		22	17		45	12			95		95

Number of female year classes: 6 Number of male year classes: 7

Appendix B: Fall Recruitment Survey Data

Figure **Page**

Table **Page**

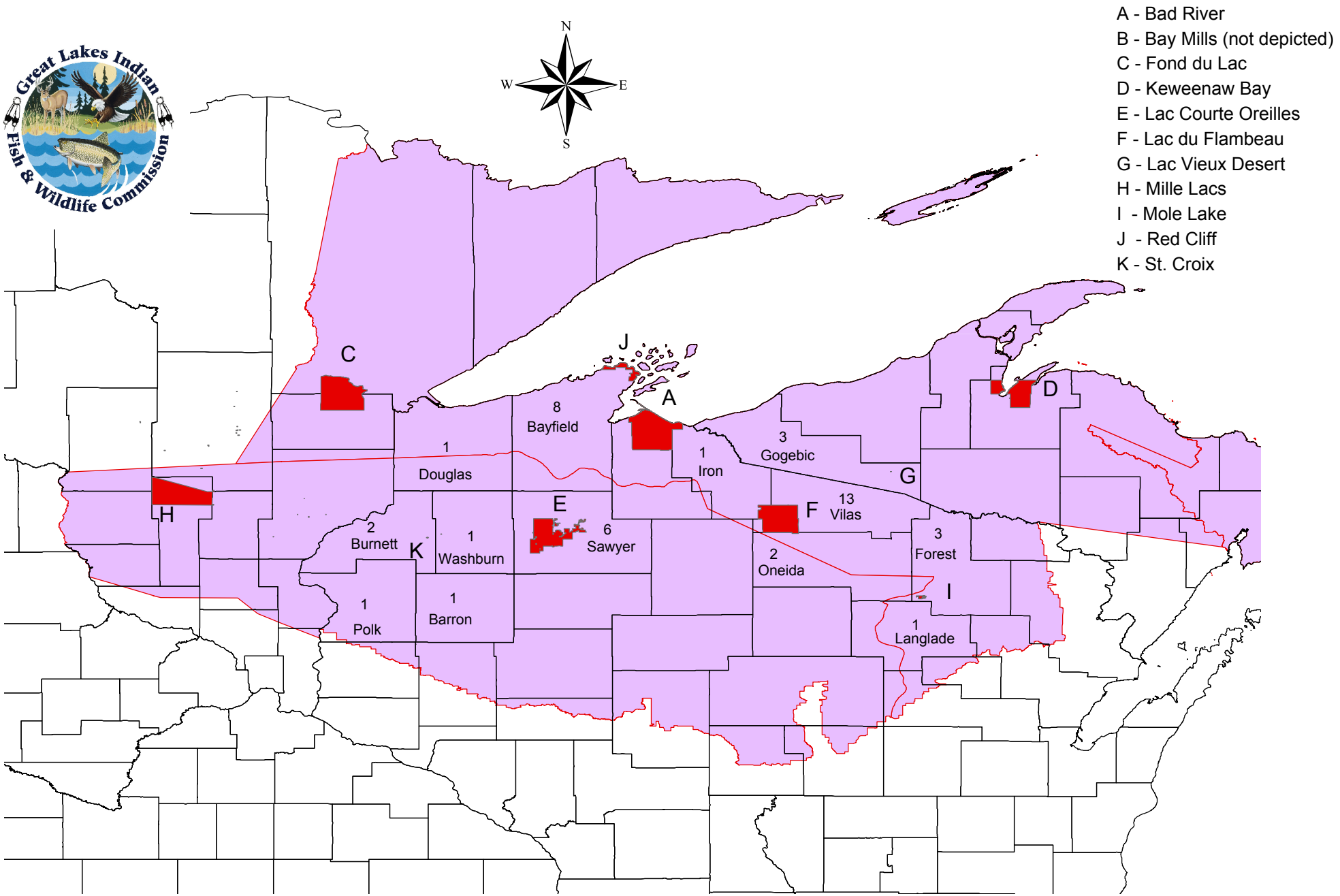


Figure B1. Ceded Territory in Wisconsin, Michigan, and Minnesota with the number of lakes per county where fall juvenile walleye surveys were conducted by GLIFWC during 2020

*The ceded territory boundaries and the tribal reservation boundaries are representations and may not be the actual legally binding boundaries.

Figure B2 Means of Age 0 and Age 1 Walleye CPEs in Wisconsin

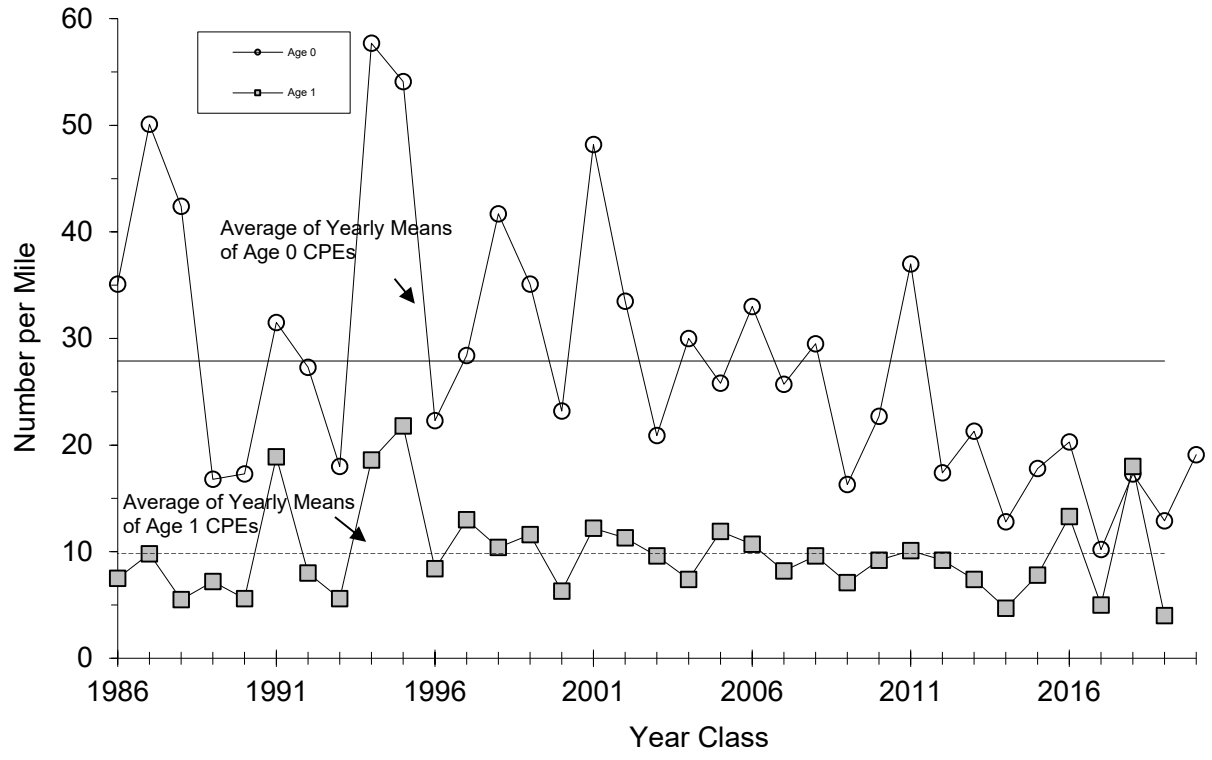
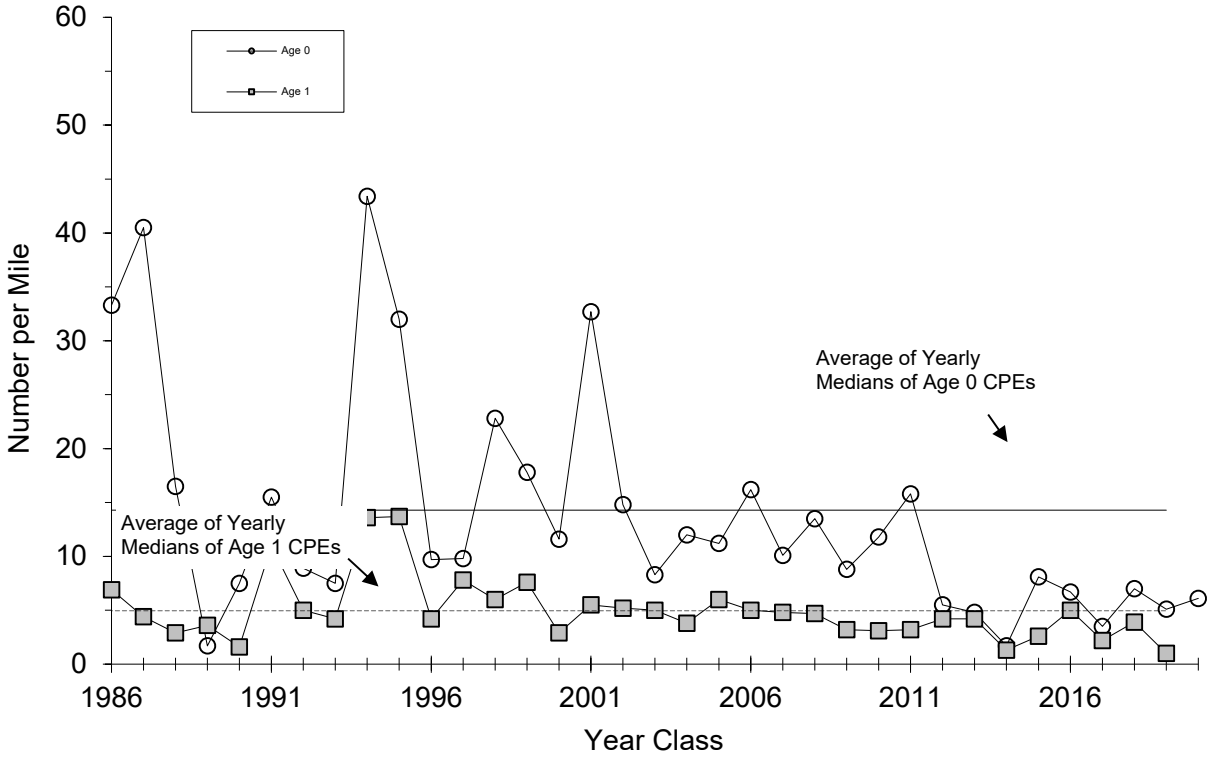


Figure B3 Medians of Age 0 and Age 1 Walleye CPEs in Wisconsin



Data represents NR and C-NR lakes in Wisconsin with at least 75% of the shoreline surveyed, and includes Wisconsin DNR data and all cases with CPEs of 0.

Figure B4: Age 0 CPE by Code for GLIFWC 2020 Recruitment Surveys

(X is the mean and + is the median for each code)

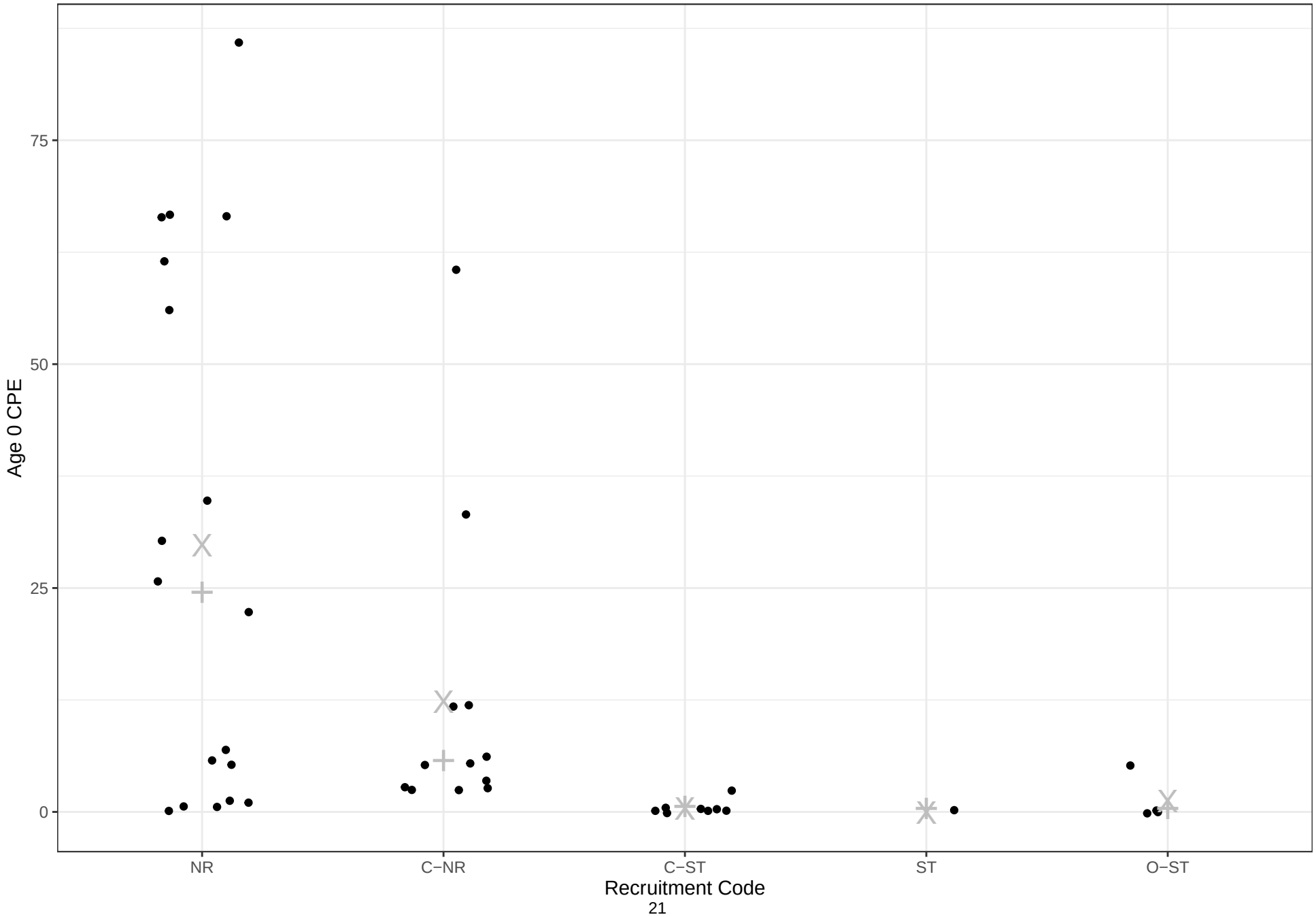


Figure B5: Age 1 CPE by Code for GLIFWC 2020 Recruitment Surveys

(X is the mean and + is the median for each code)

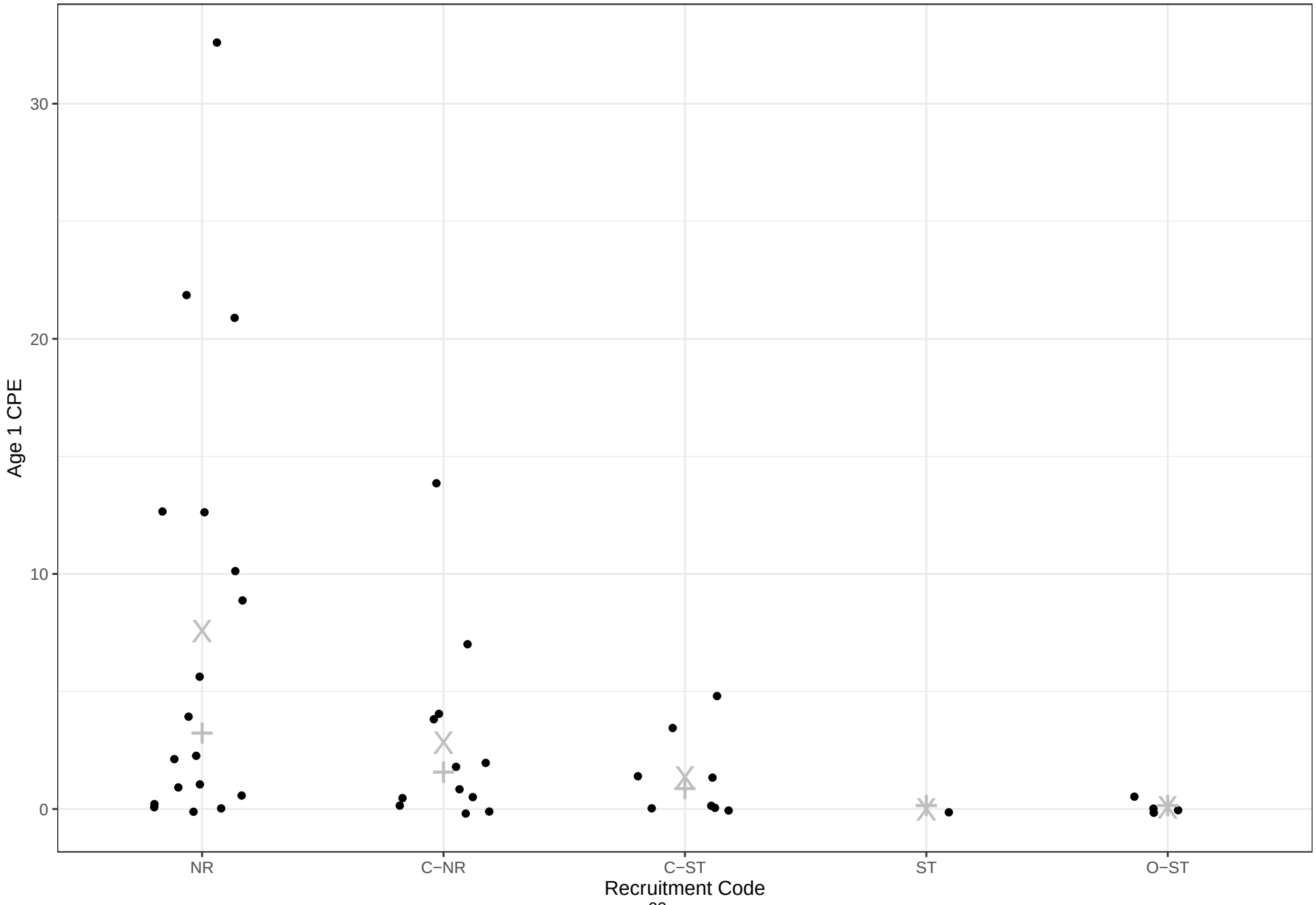


Table B1. Description of Walleye Recruitment Source Codes.

Code		Recruitment Code Description
NR	=	Natural reproduction provides the only source of recruitment to the adult population and is consistent enough to result in an adult population with multiple year-classes present.
NR-2	=	Natural reproduction provides the only source of recruitment to the population, but adult density is low, presumably resulting from weak or inconsistent year-classes.
C-NR	=	Natural reproduction is sufficient to sustain the adult population, but stocking occurs for non-biological reasons and may or may not augment the adult population (e.g., NR lakes stocked back with fry after spawn collection, NR lakes stocked by lake associations).
C-	=	Natural reproduction and stocking provide more or less equal recruitment to the population, or the relative contributions of natural reproduction and stocking are not understood well enough to make an accurate judgement as to the dominant source.
C-ST	=	Stocking provides the dominant source of recruitment to the adult population but natural reproduction occurs and may augment the adult population to a lesser extent (e.g., NR-2 lakes that are stocked to produce greater abundance).
ST	=	Stocking provides the only source of recruitment to the adult population. If stocking is regular then the adult population may consist of multiple year-classes; if irregular, then the population may consist of one or two year-classes with perhaps only large fish.
REM	=	Absence of recruitment to the adult population due to discontinued stocking or habitat changes has resulted in a remnant population of adults; the stock will disappear at some point in the future.
O-ST	=	Stocking provides the only source of recruitment to the population in an attempt to establish an adult population, but survey data is either not available or indicates that adult density is less than 0.5 per acre.
O	=	Walleye are not present.

Table B2. Fall 2020 Walleye Recruitment Surveys Conducted by GLIFWC

WISCONSIN		Surface	2020																	Other Species			
County	Lake	Area (Acres)	Walleye Code	Date Surveyed	Age 0 CPE	Age 0 Walleye	Age 0 Min Length	Age 0 Max Length	Age 0 Mean Length	Age 1 CPE	Age 1 Walleye	Age 1 Min Length	Age 1 Max Length	Age 1 Mean Length	Total Walleye	Miles Surveyed	Shore Miles	Hours Surveyed	Temp-erature	MUE	NOP	LMB	SMB
BARRON	RED CEDAR L	1,841	C-NR	10/5	12.0	147	3.8	8.6	5.9	1.9	23	9.6	11.9	10.7	174	12.2	15.9	5.60	58	0	0	0	0
BAYFIELD	BUSKEY BAY	100	C-NR	9/21	2.5	6	5.7	7.0	6.6	0.4	1	9.4	9.4	9.4	13	2.4	2.4	1.16	62	0	2	54	9
BAYFIELD	HART L	259	C-NR	9/21	2.6	9	5.9	7.3	6.7	0.0	0				12	3.5	3.5	1.77	63	1	1	20	27
BAYFIELD	L MILLICENT	183	C-NR	9/21	6.3	24	5.9	8.1	6.8	0.0	0				27	3.8	3.8	1.55	62	0	5	32	35
BAYFIELD	L OWEN	1,323	C-NR	9/14	5.1	123	4.3	7.3	6.0	0.3	8	8.4	9.7	9.0	141	24.0	24.0	11.16	63	0	57	38	262
BAYFIELD	NAMEKAGON L	3,227	C-NR	10/1	11.8	302	3.9	7.5	6.0	7.0	181	7.6	10.3	9.0	871	25.7	43.6	8.73	57	0	0	0	0
BAYFIELD	SISKIWIT L	330	NR	9/10	66.5	266	4.5	7.2	5.8	10.0	40	8.1	10.4	9.5	416	4.0	4.0	2.85	62	0	0	0	0
BAYFIELD	TWIN BEAR L	172	C-NR	9/21	2.6	10	6.4	7.7	7.1	0.0	0				13	3.9	3.9	2.01	63	0	5	42	27
BAYFIELD	UPPER EAU CLAIRE L	996	C-NR	9/30	2.5	28	5.8	7.5	6.8	1.0	11	8.5	10.2	9.5	48	11.1	11.1	4.37	58	0	0	16	27
BURNETT	DEVILS L	1,001	O-ST	10/6	5.0	26	5.6	8.1	6.6	0.4	2	8.4	8.6	8.5	29	5.2	5.2	2.02	57	0	0	0	0
DOUGLAS	UPPER ST CROIX L	855	C-ST	9/22	0.2	2	6.1	6.6	6.4	1.3	13	9.4	10.8	10.3	50	10.0	10.0	4.10	69	0	0	0	0
FOREST	CRANE L	337	C-ST	9/10	0.3	1	6.3	6.3	6.3	1.3	5	6.4	10.8	10.1	19	3.9	3.9	1.77	63.1	0	5	73	0
FOREST	LILY L	213	NR	9/15	25.9	132	4.6	7.7	5.5	5.7	29	7.8	11.0	10.4	183	5.1	5.1	1.46	61.2	0	0	0	0
IRON	TURTLE-FLAMBEAU FL	13,545	NR	9/28	61.4	1,571	3.7	7.9	5.4	12.5	320	8.0	9.5	8.7	2,161	25.6	211.0	8.90	59	0	43	9	26
LANGLADE	ENTERPRISE L	505	NR	9/9	34.7	208	4.2	6.2	5.2	12.7	76	7.2	8.7	8.1	419	6.0	6.0	2.03	60.2	0	0	0	0
FOREST	LITTLE SAND L	229	O-ST	9/11	0.0	0				0.0	0				26	2.8	2.8	1.33	62.7	3	4	26	0
BURNETT	BIG SAND L	1,400	O-ST	10/8	0.0	0				0.0	0				3	7.6	7.6	2.31	55	0	0	0	0
ONEIDA	BEARSKIN L	400	NR	10/14	55.9	313	4.8	7.2	6.0	20.9	117	7.7	9.4	8.7	656	5.6	5.6	2.57	53	7	0	0	0
ONEIDA	SQUIRREL L	1,317	NR	9/30	66.3	921	4.4	7.1	5.9	21.7	302	7.2	9.8	8.5	1,374	13.9	13.9	6.46	57	0	0	0	0
POLK	BALSAM L	2,054	C-ST	9/28	0.1	1	7.7	7.7	7.7	0.2	3	11.1	11.8	11.6	34	18.2	22.7	6.50	61	0	12	408	0
SAWYER	CONNORS L	429	NR	9/24	22.4	112	5.7	8.1	6.8	4.0	20	8.5	10.2	9.9	305	5.0	5.0	2.68	65	8	12	11	15
SAWYER	DURPHEE L	193	ST	9/15	0.0	0				0.0	0				2	2.7	2.7	0.95	65	0	1	27	3
SAWYER	L CHETAC	1,920	C-ST	9/20	0.3	5	7.1	7.7	7.4	0.1	2	9.3	10.2	9.8	330	17.5	17.5	7.17	63	0	68	490	37
SAWYER	OSPREY L	208	O-ST	9/26	0.0	0				0.0	0				0	2.7	6.0	1.24	66	0	13	32	4
SAWYER	SISSABAGAMA L	719	C-ST	9/19	0.4	3	6.2	7.4	6.8	0.1	1	9.7	9.7	9.7	75	8.2	8.2	5.03	63	0	50	137	3
SAWYER	WINDIGO L	522	NR	10/7	0.6	5	6.8	8.0	7.2	1.1	10	9.4	10.3	10.0	55	9.0	9.0	4.27	54	0	0	27	10
VILAS	AMBER L	785	NR	10/12	1.3	12	6.4	7.4	6.9	1.0	9	9.3	10.3	9.9	148	9.0	9.0	4.17	52	3	0	0	1
VILAS	ANNABELLE L	213	NR	9/23	0.0	0				2.0	2	10.1	10.2	10.2	16	1.0	4.2	0.74	63	0	0	0	0
VILAS	BIG L (BOULDER JCT)	835	NR	10/13	30.3	291	5.4	8.0	7.0	0.6	6	8.2	9.3	8.6	350	9.6	9.6	3.90	53	5	0	0	0
VILAS	BIG SAND L	1,418	C-ST	9/14	0.0	0				3.3	28	9.3	11.8	10.4	46	8.5	8.5	2.99	61.2	0	28	83	8
VILAS	CLEAR L	555	C-NR	9/16	5.6	29	4.9	7.1	5.9	4.0	21	8.5	9.8	9.2	85	5.2	7.1	2.83	60	0	0	0	1
VILAS	HARRIS L	507	NR	10/15	0.5	3	7.4	8.0	7.7	0.0	0				10	6.0	6.0	2.53	44	0	0	0	0
VILAS	ISLAND L	1,023	C-NR	9/16	33.3	300	3.4	7.3	5.7	13.9	125	7.4	9.6	8.6	625	9.0	16.8	5.06	62	0	0	0	0
VILAS	L LAURA	599	NR	10/6	5.2	25	6.0	8.1	7.0	0.0	0				29	4.8	4.8	2.53	53	1	0	0	0
VILAS	LAC VIEUX DESERT	4,300	C-ST	9/9	0.0	0				0.0	0				67	16.3	16.3	9.12	57	1	256	89	62
VILAS	PAPOOSE L	428	C-NR	10/19	60.5	399	3.6	7.8	6.1	3.8	25	7.9	9.9	8.6	434	6.6	6.6	3.51	53	8	0	0	0
VILAS	REST L	608	C-NR	9/15	3.5	28	5.0	7.4	6.6	1.9	15	8.7	9.6	9.3	76	8.1	8.1	3.90	62	0	0	0	0
VILAS	SHERMAN L	123	NR	10/15	6.8	15	7.9	8.8	8.2	0.0	0				32	2.2	2.2	1.34	48	8	0	0	0
VILAS	TROUT L	3,816	C-ST	10/7	2.2	40	6.2	7.8	7.0	4.7	85	9.1	11.3	10.3	166	17.9	17.9	10.20	56	2	5	0	8
WASHBURN	BASS-PATTERSON L	188	NR	9/29	5.9	17	6.1	7.9	7.0	0.3	1	8.2	8.2	8.2	20	2.9	2.9	1.15	61	0	0	0	0
COUNT: 40 SURVEYS ON 40 LAKES				TOTALS:		5,374					1,481				9,540	346.7		153.96		47	567	1,614	565
				AVERAGES:	13.5	134			6.5	3.5	37			9.5	239								
				NUMBER OF SURVEYS WITH FISH CAUGHT:	33					29				39					11	17	18	18

MICHIGAN		Surface Area	2020 Walleye	Date	Age 0	Age 0 Wall-	Age 0 Min	Age 0 Max	Age 0 Mean	Age 1	Age 1 Wall-	Age 1 Min	Age 1 Max	Age 1 Mean	Total Wall-	Miles	Shore	Hours	Temp-	Other Species			
County	Lake	(Acres)	Code	Surveyed	CPE	eye	Length	Length	Length	CPE	eye	Length	Length	Length	eye	Surveyed	Miles	Surveyed	erature	MUE	NOP	LMB	SMB
GOGEBIC	L GOGEBIC	13,380	NR	10/5	85.8	1,000	4.1	7.0	5.4	32.7	381	7.1	10.2	8.5	1,449	11.7	35.0	5.95	53	0	0	0	0
GOGEBIC	POMEROY L	314	NR	10/8	66.8	247	4.0	7.6	6.0	2.2	8	8.3	9.6	9.3	357	3.7	3.7	2.38	52	0	0	0	0
GOGEBIC	TAMARACK L	335	NR	10/12	1.0	4	4.7	5.8	5.1	9.0	36	8.0	9.6	9.2	207	4.0	4.0	2.47	48	0	0	0	0
COUNT: 3 SURVEYS ON 3 LAKES				TOTALS:		1,251					425				2,013	19.4		10.80		0	0	0	0
				AVERAGES:	51.2	417			5.5	14.6	142			9.0	671								
				NUMBER OF SURVEYS WITH FISH CAUGHT:	3					3					3					0	0	0	0
OVERALL: 43 SURVEYS ON 43 LAKES				TOTALS (OVERALL):		6,625					1,906				11,553	366.1		164.76		47	567	1,614	565
				AVERAGES (OVERALL):	16.1	154			6.5	4.2	44			9.4	269								
				NUMBER OF SURVEYS WITH FISH CAUGHT (OVERALL):	36					32					42					11	17	18	18

CPE=catch per unit effort (number of fish divided by shore miles surveyed), MUE=muskellunge, NOP=northern pike, LMB=largemouth bass, SMB=smallmouth bass.

Table B3 Summary of Age 0 and Age 1 Catch per Effort Rates During Fall 2020 Recruitment Surveys Conducted by GLIFWC

Including Lakes Where No Year Class Was Detected

		NR and C-NR					C-ST					NR-2 and O-ST				
AGE	STATE	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE
0	WISCONSIN	14.3	21.4	65	0.0	86.6	2.5	6.5	16	0.0	23.4	0.0	0.0	3	0.0	0.0
	MICHIGAN	28.3	35.9	6	0.0	76.3	0.0		1	0.0	0.0					
	MINNESOTA															
	POOLED	15.5	23.0	71	0.0	86.6	2.4	6.3	17	0.0	23.4	0.0	0.0	3	0.0	0.0
1	WISCONSIN	15.7	22.7	65	0.0	86.5	2.9	4.3	16	0.0	12.0	1.6	2.5	3	0.0	4.5
	MICHIGAN	27.8	47.2	6	0.0	110.0	0.0		1	0.0	0.0					
	MINNESOTA															
	POOLED	16.7	25.3	71	0.0	110.0	2.7	4.2	17	0.0	12.0	1.6	2.5	3	0.0	4.5

Excluding Lakes Where No Year Class Was Detected

		NR and C-NR					C-ST					NR-2 and O-ST				
AGE	STATE	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE
0	WISCONSIN	16.9	22.3	55	0.2	86.6	5.0	8.7	8	0.1	23.4	0.0	0.0	0	0.0	0.0
	MICHIGAN	34.0	37.0	5	5.4	76.3										
	MINNESOTA															
	POOLED	18.3	23.9	60	0.2	86.6	5.0	8.7	8	0.1	23.4	0.0	0.0	0	0.0	0.0
1	WISCONSIN	18.9	22.7	54	0.1	86.5	5.1	4.6	9	0.4	12.0	2.4	3.0	2	0.3	4.5
	MICHIGAN	33.4	47.2	5	0.6	110.0										
	MINNESOTA															
	POOLED	20.1	25.3	59	0.1	110.0	5.1	4.6	9	0.4	12.0	2.4	3.0	2	0.3	4.5