

**Fish Population Assessments of Ceded Territory Lakes in
Wisconsin, Michigan and Minnesota During 1999**

by

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THE NATIONAL BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE

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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, Minnesota, and the upper peninsula of Michigan. Assessment crews from the U.S. Fish and Wildlife Service and the St. Croix Chippewa assisted with spring population estimate surveys; crews from the St. Croix and Bad River tribes assisted with fall surveys. In the spring, adult walleye (*Stizostedion vitreum vitreum*) population estimates were conducted on nineteen lakes. A total of 42,112 walleye were sampled from 29,270 acres of water during the spawning adult estimate period. Density of adult walleye averaged 4.46 (SD = 1.35, range: 1.90 to 6.70, N=12) fish per acre in lakes with naturally reproducing populations. In ten of these twelve lakes, adult walleye population densities were at least 3.0 fish per acre, indicating that walleye populations were healthy. Density of adult walleye averaged 4.28 (SD = 2.13, range: 1.15 to 8.07) fish per acre for all lakes combined. In two of the nineteen lakes surveyed, juvenile walleye population estimates were also conducted. A total of 2,802 juvenile walleye were sampled from 908 acres of water. Density of juvenile walleye were 19.7 and 27.4 fish per acre in these lakes.

Summer fish community surveys using gill nets and fyke nets were conducted on four Minnesota lakes and one Wisconsin lake. A total of 7,894 fish were collected, identified to species, and catch per effort values determined.

During the fall, electrofishing surveys were conducted on 96 lakes in Wisconsin, 7 lakes in Michigan, and 8 lakes in Minnesota to determine year class strength of age 0 (young of the year) and age 1 (yearling) walleye. Additional surveys were conducted on Squaw Lake (Vilas Co., WI) and Bass-Patterson Lake (Washburn Co., WI) to obtain fall age 0 and age 1 population estimates. In Wisconsin, a total of 31,892 age 0 and 7,192 age 1 walleye were sampled. In addition, 587 gamefish including muskellunge (*Esox masquinongy*), northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*) and smallmouth bass (*M. dolomieu*) were sampled. In Michigan, a total of 1,096 age 0 and 144 age 1 walleye plus 24 gamefish were sampled during the fall. In Minnesota, a total of 1,816 age 0 and 340 age 1 walleye plus 52 gamefish were sampled.

Contents

	Page
Acknowledgments.....	3
Introduction.....	4
Methods	
Spring Adult Walleye Population Estimates.....	4
Spring Juvenile Walleye Population Estimates.....	5
Summer Surveys.....	6
Fall Recruitment Surveys.....	6
Fall Age 0 and Age 1 Walleye Population Estimates.....	7
Results and Discussion	
Spring Adult Walleye Population Estimates.....	7
Spring Juvenile Walleye Population Estimates.....	8
Summer Surveys.....	9
Fall Recruitment Surveys.....	9
Fall Age 0 and Age 1 Walleye Population Estimates.....	10
References.....	11
Appendices	
A. Spring Population Data.....	12
B. Summer Survey Data.....	42
C. Fall Recruitment Data.....	48

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Introduction

Fishery assessment surveys of ceded territory lakes were conducted during spring, summer, and fall of 1999 by the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) to continue developing an understanding of spatial and temporal variability of walleye populations in ceded territory waters of northern Wisconsin, Michigan and Minnesota. These studies add to an extensive body of information describing walleye populations and associated biological parameters. They provide information needed to update recruitment codes, set harvest quotas, and monitor the impacts of a combined tribal and sport angler 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. Under the current agreement, USFWS provides technical support and equipment during spring surveys. The St. Croix Chippewa Assessment Unit was initially equipped and funded in 1990 to conduct surveys; assistance in subsequent years was continued through a subcontract with GLIFWC. Assistance by Bad River during the fall was provided through a Memorandum of Understanding between the Band and GLIFWC.

Methods

Spring Adult Walleye Population Estimates

Nineteen lakes in the ceded territory (Figure A1) of Wisconsin, Michigan, and Minnesota were selected to collect current information on adult walleye populations. Fifteen lakes were surveyed in Wisconsin, two lakes were surveyed in Michigan, and two lakes were surveyed in Minnesota (Table A1). Of the fifteen Wisconsin lakes, eleven had experienced tribal spear harvest during the previous year. All four lakes surveyed in Michigan and Minnesota were speared in 1998.

Nine lakes in Wisconsin are GLIFWC long-term study lakes. Large (greater than 500 acres in area) long-term lakes surveyed in 1999 included Butternut Lake (Forest Co.), Squirrel Lake (Oneida Co.), Kentuck Lake (Vilas Co.), and Squaw Lake (Vilas Co.). Small (less than 500 acres in area) long-term study lakes surveyed in 1999 included Siskiwit Lake (Bayfield Co.), Annabelle Lake (Vilas Co.), Sherman Lake (Vilas Co.), and Bass-Patterson Lake (Washburn Co.). Long-term study lakes are surveyed annually to collect trend and variability information on adult walleye populations. Continuing efforts are being made to use adult estimates and fall recruitment data from long-term study lakes to develop population models for predicting population size and assessing the accuracy of model predictions.

The survey of Lake Chippewa (Sawyer Co.) was conducted jointly by GLIFWC and the Wisconsin Department of Natural Resources, with the cooperation of the Lac Courte Oreilles tribe. All data from this survey are reflected in this report, regardless of which agency did the actual collection.

Mark and recapture data were used to calculate the adult walleye population estimate for each lake following 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 Wisconsin Department of Natural Resources (WDNR) and GLIFWC 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, a spearing "adjustment" was made. This adjustment reduced the marking sample by the number of marked fish speared. Also, the total number of fish speared before the first recapture run (except for immature fish) was added to the estimate.

Marking periods began soon after ice-out and electrofishing was the primary gear used to capture fish in all lakes. Eight electrofishing boats and crews were used, including four from GLIFWC, three from USFWS, and one from St. Croix. All boats had an arrangement of six umbrella dropper anodes and used pulsed DC at 60 pps. Fyke nets were used by two GLIFWC crews to supplement catch during the marking period on some lakes. Electrofishing occurred after sunset. Fyke nets were set in daylight, fished through the night, and lifted the following morning.

During the marking period, each crew concentrated on finding and sampling walleye spawning areas. With this concentrated effort crews were able to mark the target number of walleye in 1-5 nights, depending upon lake size and the number of crews used. Fyke nets were usually set for 4-5 nights on each lake where they were used. Net catches were low compared to those made by electrofishing, however.

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, and age determined later. Additional samples were collected from Lake Chippewa. Generally, spines were taken from fish >10 inches and scales from smaller fish. Fish were given a single or multiple fin clip or tail notch and released away from the capture area, typically near the middle of the lake. On long-term study lakes, fish were also tagged with yellow colored numbered floy tags prior to release.

In most cases, recapture surveys with electrofishing equipment were conducted 1-3 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 determined.

Spring Juvenile Walleye Population Estimates

Juvenile walleye population estimates were made on one small (Sherman Lake, Vilas Co.) and one large (Squaw Lake, Vilas Co.) long term study lakes in Wisconsin. For the purposes of these estimates, "juvenile" refers to any walleye less than fifteen inches in total length.

Marking periods began from three to four weeks after the adult spawning period. Electrofishing gear was used to capture fish in all lakes. All electrofishing boats had an arrangement of six umbrella dropper anodes and used pulsed DC at 60 pps. Electrofishing took place after sunset.

Each electrofishing survey was treated as a recapture run, so that the entire shoreline of each lake was covered, except for cases when a survey had to be curtailed due to inclement weather or equipment malfunction. Four marking/recapture surveys were conducted on each lake. For each fish captured, total length, sex (if known), and mark (if present) were determined. Fish captured during the juvenile surveys were given different fin clips than those that were used during the adult population estimate surveys, and were released away from the capture area, typically near the middle of the lake. Scale or spine samples for aging were collected from a maximum of ten fish per half-inch group for fish under 13" in length; for larger fish, aging samples from the adult population estimate were used. Spines were collected from fish ten inches or larger in length, and scales were collected from smaller fish.

Juvenile population estimates were calculated using the Schnabel formula, where all surveys except the first were treated as a recapture survey. Data were stratified according to length, with one strata for fish less than 12" in length, and another for fish between 12" and 15". Recaptures of fin clips given during the adult survey were recorded in the field, but only clips given during the juvenile surveys were tallied in calculating the population estimates. Juvenile population estimates were apportioned by age for ages 1, 2, and 3.

Summer Surveys

Fish community assessment surveys were conducted on Goose Lake (Chisago Co., MN) on July 11 and 12, on Green Lake (Chisago Co., MN) on July 18 and 19, on East Rush Lake (Chisago Co., MN) on August 22 and 23, on West Rush Lake (Chisago Co., MN) on August 15 and 16, and on Kentuck Lake (Vilas Co., WI) on June 29 through July 2. During the survey period, 7 gill nets were set on Goose Lake, 15 gill nets were set on Green Lake, and 10 gill nets were set on East and West Rush Lakes. No gill nets were set on Kentuck Lake. Nine trap nets were set on Goose, Green, and West Rush Lakes, 7 trap nets were set on East Rush Lake, and 32 trap nets were set on Kentuck Lake. The nets were of standard size and set according to Minnesota DNR protocol in the Minnesota lakes. The trap nets used 0.75" mesh, and the gill nets were 250' long and 6' deep and consisted of five 50' sections of mesh sizes 0.75", 1", 1.25", 1.5", and 2".

Fall Recruitment Surveys

Fall electrofishing surveys were conducted in 111 ceded territory waters including 96 lakes in Wisconsin, 7 lakes in Michigan, and 8 lakes in Minnesota. Fall surveys were conducted to evaluate recruitment of age 0 (young of the year) and age 1 (yearling) walleye, and to develop data to assess whether recruitment codes were appropriate or needed to be changed. Multiple runs were made on Siskiwit Lake (Bayfield Co.) and Butternut Lake (Forest Co.) to conduct age 0 and age 1 mark and recapture population estimates. Two surveys were conducted on Kentuck Lake (Vilas Co.), one before and one after extended growth walleye fingerlings were stocked. Up to six electrofishing boats (all DC) sampled lakes four nights per week during the eleven week period from August 30 through October 21, 1999. The number of boats assigned to each lake was based upon shoreline length. For planning purposes, it was assumed that one boat was needed for every 5-7 miles of shoreline. Index stations were sampled on 33 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 walleye juveniles. Panfish and other species were collected as a third priority. Results of 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 index station was sampled. Exceptions preventing the completion of a survey on a given lake included equipment problems, severe weather, and high waves. All fish collected were identified to species and their length measured (total length in inches). For walleye only, a scale sample was collected from five fish per half-inch group for fish ranging between 4.5-12.0 inches to determine the length range of age 0 and age 1 walleye.

Surveys on Red Cedar Lake (Barron Co.), Trude Lake (Iron Co.) and Big Lake (MI border, Vilas Co.) were conducted jointly by GLIFWC and the Wisconsin Department of Natural Resources. Data from the Red Cedar Lake and Big Lake surveys were summarized by GLIFWC; all data from these surveys are reflected in this report, regardless of which agency did the actual collection. Data from the Trude Lake survey were summarized by WDNR and are not reflected in this report.

Fall Age 0 and Age 1 Population Estimates

Mark-recapture age 0 and age 1 walleye population estimates were conducted during the fall on two Wisconsin lakes, Squaw Lake (Vilas Co.), and Bass-Patterson Lake (Washburn Co.). Electrofishing was used as the capture method, and similar techniques were used as for the fall recruitment surveys. For each survey, the boats made a complete circuit of the lake, and gave a temporary fin clip to all walleye under 15". Squaw Lake was surveyed three times and Bass-Patterson Lake was surveyed four times. Crews were informed that if time permitted, they should return to areas of higher concentrations of walleye to mark additional fish, keeping a separate record of these captures.

Scale samples were collected from ten fish per half-inch group between 5.5" and 11.9", and five per half-inch group between 12.0" and 14.9". Population estimates were calculated using the Petersen method.

Results and Discussion

Spring Adult Population Estimates

Walleye adult population estimates for nineteen adult stocks in Wisconsin, Michigan, and Minnesota (Table A1) ranged from 671 to 82,070 fish. Estimated population densities ranged from 1.15 to 8.07 walleye per acre (mean = 4.28, SD = 2.13) (Figure A2). Duck Lake (Gogebic Co., MI) had the lowest estimated density while Goose Lake (Chisago Co., MN) had the highest.

The Report on Biological Issues (1988) listed several indicators of healthy 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 fish that each contribute at least 15 percent to the population.

Seven of nineteen lakes surveyed had recruitment codes of NR (Table B1) indicating that natural reproduction was the only source of recruitment. Five lakes had recruitment codes of C-NR, indicating that some stocking occurred even though the population was sustained by natural reproduction. Mean density of walleye in these twelve lakes was 4.46 (SD = 1.35) per acre. Ten of these twelve lakes surveyed had walleye densities of greater than 3.0 per acre.

Six lakes had recruitment codes of C-ST, indicating that the population was sustained by stocking with some natural reproduction occurring. One lake had a recruitment code of ST, indicating that stocking was the only source of recruitment. Mean density of walleye in these seven lakes was 3.97 fish per acre (SD = 3.18).

Two recapture surveys were conducted on two lakes in order to assess sampling variation and the effect of the timing of the survey on the population estimates (Table A2). Fish newly marked during the first recapture survey were treated as part of the marked sample during the second recapture survey. On Siskiwit Lake, estimated adult density changed from 5.18 to 4.77 fish per acre from the first recapture survey to the second, an 8% decrease. On Bass-Patterson Lake, estimated adult density changed from 3.38 to 4.12 fish per acre, a 22% increase.

Male-to-female sex ratios (Table A1) were skewed in favor of males in all but one of the lakes surveyed. The reliability of these values is questionable in some lakes, however. Electrofishing may bias sampling in favor of males (Shively and Kmiecik, 1991). From personal observation during surveying, it appeared that females preferred deeper water than males, and in some instances, many females were out of effective netting range except during or after spawning.

A total of 3,724 female, 34,490 male, and 3,898 unknown sex walleye were measured (Figure A3, Table A3) and a subsample was aged (Figure A4). Female lengths ranged from 11.0 to 30.5 inches, male lengths ranged from 7.0 to 27.5 inches, and unknown lengths ranged from 5.0 to 30.5 inches. Age-length tables were developed for subsets of female, male, and unknown sex walleye in each of nineteen lakes sampled in Wisconsin, Michigan, and Minnesota (Tables A4 - A23). These age-length tables by themselves are not necessarily representative of the size and age structure of the population, since spines for aging are 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 given should be sufficient to detect the presence or absence of year classes. Regarding the second population health criterion, ten of the twelve NR and C-NR lakes had populations with at least five year classes of females in the aging sample.

Spring Juvenile Walleye Population Estimates

Juvenile walleye Schnabel population estimates for all fish under 15" were 3,375 for Sherman Lake and 15,472 for Squaw Lake (Table A23). Population densities were 27.4 walleye per acre for Sherman Lake and 19.7 walleye per acre for Squaw Lake (mean=23.6). A total of 2,851 walleye were sampled during the juvenile population estimate surveys. Lengths of walleye ranged from 5.0 inches to 18.4 inches. Age-length tables were developed using spines and scales collected from a subset of fish from both the adult and juvenile surveys (Tables A25-A26), and

the data were used to apportion the Schnabel juvenile estimates by age. Mean densities for age 1, age 2, and age 3 walleye were 20.0 per acre, 1.1 per acre, and 1.8 per acre, respectively for Sherman Lake, and 7.3 per acre, 5.2 per acre, and 3.7 per acre, respectively for Squaw Lake.

Summer Surveys

The fish community survey on Goose Lake caught 12 species and 568 fish. The most abundant species captured was bullhead (28.0% of the fish), followed by bluegill (22.5%), black crappie (12.3%), walleye (12.0%), and yellow perch (11.1%) (Table B1).

The fish community survey on Green Lake caught 11 species and 1,766 fish. The most abundant species captured was bluegill (56.0% of the fish), followed by black crappie (24.2%), and walleye (8.5%) (Table B2).

The fish community survey on East Rush Lake caught 13 species and 833 fish. The most abundant species captured was black crappie (32.7% of the fish), followed by yellow perch (30.9%), bluegill (11.5%), and walleye (9.0%) (Table B3).

The fish community survey on West Rush Lake caught 13 species and 777 fish. The most abundant species captured was yellow perch (38.4% of the fish), followed by black crappie (36.0%), bluegill (7.2%), golden shiner (4.5%), and walleye (4.0%) (Table B4).

The fish community survey on Kentuck Lake caught 9 species and 3,950 fish. The most abundant species captured was bluegill (85.5% of the fish), followed by pumpkinseed (9.7%) (Table B5).

Fall Recruitment Surveys

Fall recruitment surveys were conducted on 111 lakes in the ceded territories of Wisconsin, Michigan and Minnesota (Figure C1, Table C2). Survey effort included 390.1 hours of electrofishing along 1,039.4 miles of shoreline resulting in the collection of 51,495 walleye.

Of 96 lakes surveyed in Wisconsin, 333.4 hours of electrofishing along 890.8 miles of shoreline resulted in a collection of 47,480 walleye. In Michigan, 7 surveys were conducted in 19.4 hours along 57.0 miles of shoreline resulting in the collection of 1,543 walleye. In Minnesota, 8 surveys were conducted in 37.3 hours along 91.6 miles of shoreline resulting in the collection of 2,472 walleye (Tables C2 and C3).

A total of 31,892 age 0 (young of the year, or YOY) walleye were caught in 102 surveys in Wisconsin. Age 0 walleye were caught in 95 of 102 fall surveys. Catch per effort (CPE) for age 0 walleye ranged from 0.0 to 182.3 (mean = 34.0; SD = 42.7) YOYs per mile. A total of 7,192 age 1 (yearling) walleye were caught in 91 surveys. Age 1 CPE ranged from 0.0 to 83.7 (mean = 9.1; SD = 12.6) yearlings per mile (Table C2).

In Michigan, 1,096 age 0 walleye were caught. Age 0 CPE ranged from 0.0 to 79.4 (mean = 27.2; SD = 31.6) YOYs per mile. A total of 144 age 1 walleye were caught. Age 1 CPE ranged from 0.0 to 11.3 (mean = 3.2; SD = 4.3) yearlings per mile (Table C2).

In Minnesota, 1,816 age 0 walleye were caught. Age 0 CPE ranged from 0.0 to 42.9 (mean = 8.5; SD = 15.6) YOYs per mile. A total of 340 age 1 walleye were caught. Age 1 CPE ranged from 0.0 to 12.8 (mean = 3.8; SD = 4.9) yearlings per mile (Table C2).

Summary statistics for NR and C-NR lakes, C- lakes, C-ST and ST lakes, and O-ST lakes in Wisconsin, Michigan and Minnesota are given in Table C3. Data are plotted for each recruitment code in Figures C2 and C3. 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. Table C4 summarizes the number of gamefish captured in these same three lake groupings in the three states. These include muskellunge, northern pike, largemouth bass, and smallmouth bass. Various panfish and rough fish species were also collected but their numbers are not reported here.

Fall Age 0 and Age 1 Population Estimates

A total of 2,112 age 0 and age 1 walleye were sampled during the age 0 and age 1 population estimates. The mean age 0 and age 1 densities obtained from the fall population estimates were 10.5 per acre and 12.7 per acre, respectively for Squaw Lake, and 17.6 per acre and 2.2 per acre, respectively for Bass-Patterson Lake (Table C5). Mean age 0 and age 1 catch per effort (CPE) on these lakes were 36.1 per mile and 14.5 per mile, respectively.

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Appendix A: Spring Population Surveys

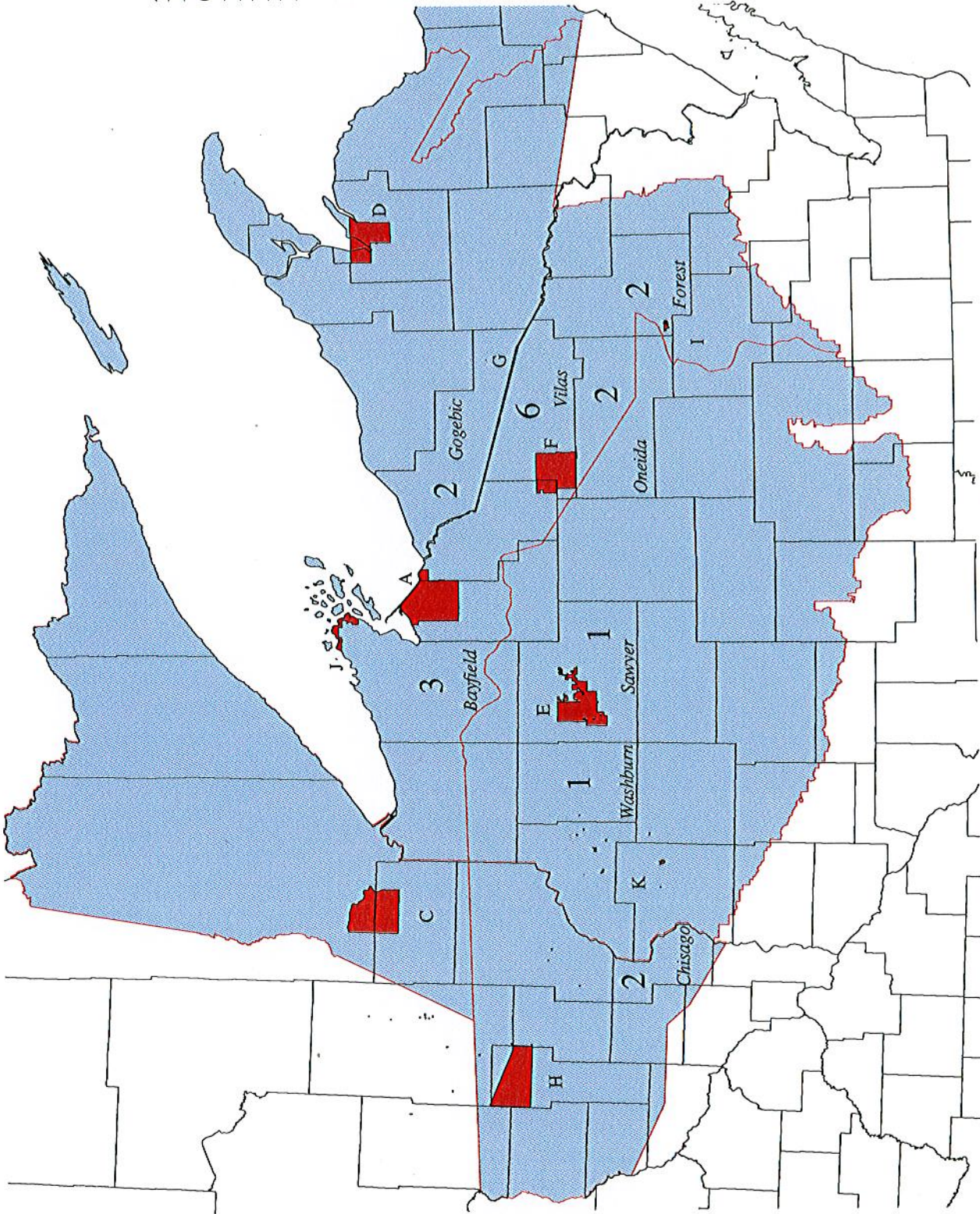
Figure	Page
A1. Ceded territory in Wisconsin, Michigan, and Minnesota with the number of lakes per county where spring population estimates were conducted by GLIFWC during 1999	14
A2. Estimated Adult Walleye Densities by Recruitment Code, Spring 1999	15
A3. Length Frequency of Adult Walleye Marked, Spring 1999	16
A4. Age Frequency of Adult Walleye Aged, Spring 1999	17
 Table	 Page
A1. Spring 1999 Adult Population Estimates Conducted by GLIFWC	18
A2. Supplemental Spring 1999 Adult Population Estimates Conducted by GLIFWC	18
A3. Lengths of Walleye Collected During Spring 1999 Adult Population Estimates	19
A4. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Duck Lake, Gogebic Co., MI	20
A5. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Pomeroy Lake, Gogebic Co., MI	21
A6. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Goose Lake, Chisago Co., MN	22
A7. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Green Lake, Chisago Co., MN	23
A8. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Lake Owen, Bayfield Co., WI	24
A9. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Siskiwit Lake, Bayfield Co., WI	25
A10. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Upper Eau Claire Lake, Bayfield Co., WI	26
A11. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Butternut Lake, Forest Co., WI	27
A12. Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Lake Metonga, Forest Co., WI	28

A13.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Buckskin Lake, Oneida Co., WI	29
A14.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Squirrel Lake, Oneida Co., WI	30
A15.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Lake Chippewa, Sawyer Co., WI	31
A16.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Annabelle Lake, Vilas Co., WI	32
A17.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Kentuck Lake, Vilas Co., WI	33
A18.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Little Arbor Vitae Lake, Vilas Co., WI	34
A19.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Little John Lake, Vilas Co., WI	35
A20.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Sherman Lake, Vilas Co., WI	36
A21.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Squaw Lake, Vilas Co., WI	37
A22.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates: Bass-Patterson Lake, Washburn Co., WI	38
A23.	Spring 1999 Juvenile Population Estimates Conducted by GLIFWC	39
A24.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult and Juvenile Population Estimates Combined: Sherman Lake, Vilas Co., WI	40
A25.	Number of Walleye Aged by Sex and Length From Spring 1999 Adult and Juvenile Population Estimates Combined: Squaw Lake, Vilas Co., WI	41

- A - Bad River
- B - Bay Mills (not depicted)
- C - Fond du Lac
- D - Keweenaw Bay
- E - Lac Courte Oreilles
- F - Lac du Flambeau
- G - Lac Vieux Desert
- H - Mille Lacs
- I - Mole Lake
- J - Red Cliff
- K - St. Croix



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



Figures A1. Ceded territory in Wisconsin, Michigan, and Minnesota with the number of lakes per county where spring electrofishing surveys were conducted by GLIFWC during 1999.

Figure A2. Estimated Adult Walleye Densities by Recruitment Code, Spring 1999

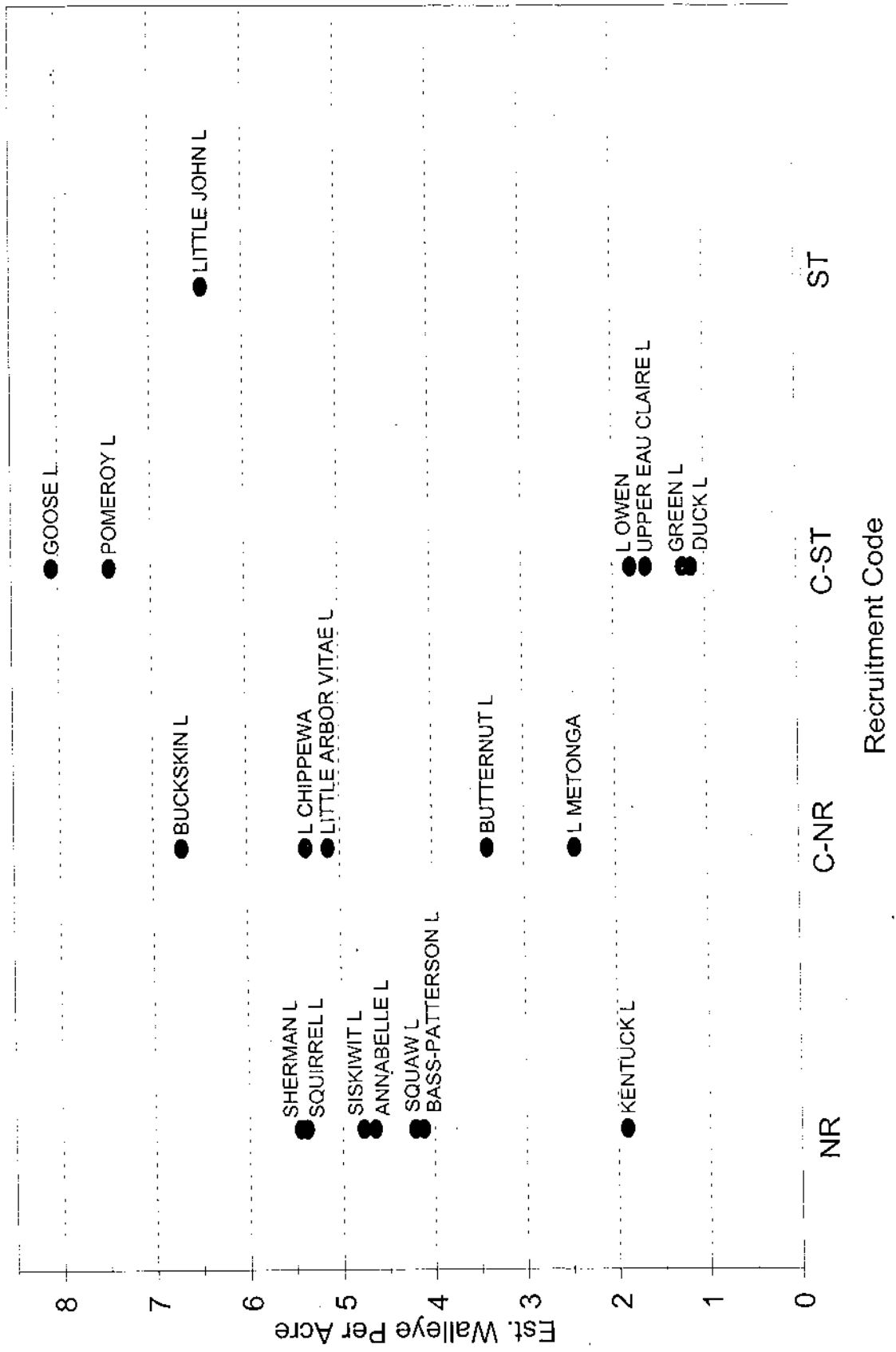


Figure A3. Length Frequency of Adult Walleye Marked, Spring 1999

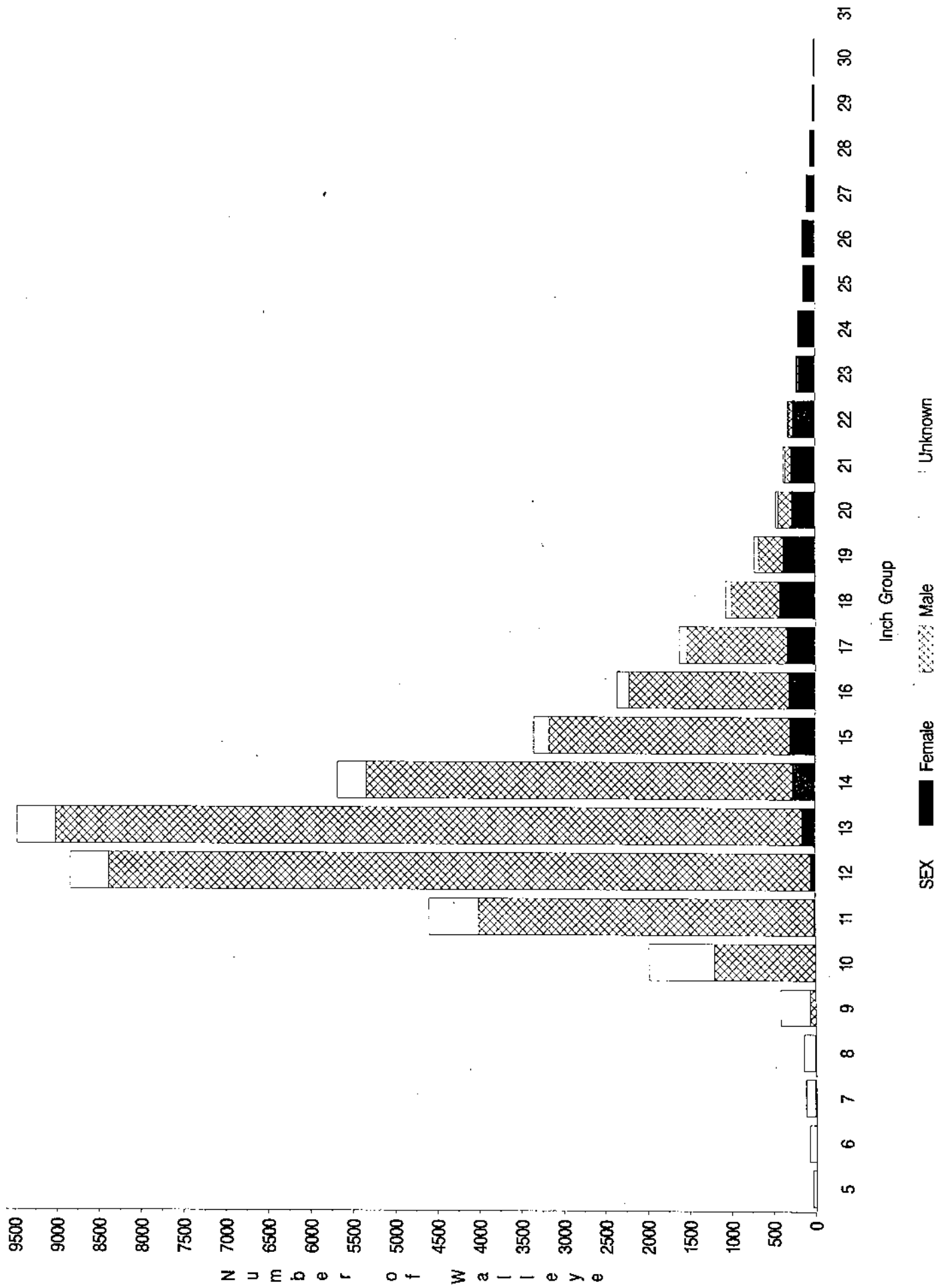


Figure A4. Age Frequency of Adult Walleye Aged, Spring 1999

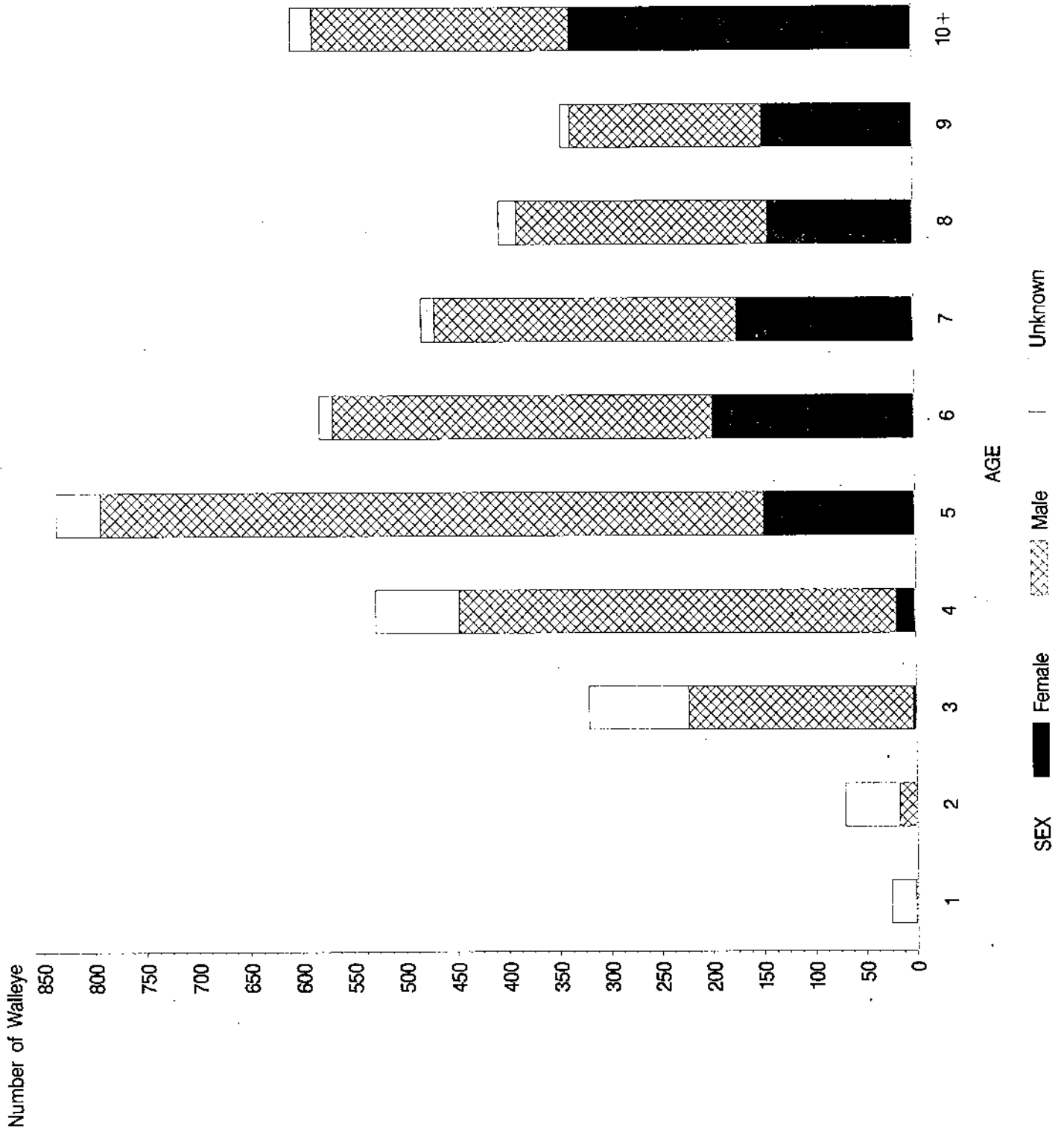


Table A1. Spring 1999 Adult Population Estimates Conducted by GLIFWC

State	County	Lake	Acres	1999 Walleye Code	Population Estimate	Coefficient of Variation (%)	Density	Marking gear*	Recapture gear*	Fin clip applied**	Male: female sex ratio***	Angling length regulation
MI	GOGEBIC	DUCKL	616	C-ST	709	9.4	1.15	E	E	TC	12.1:1	15" minimum
MI	GOGEBIC	POMEROY L	314	C-ST	2,339	25.0	7.45	E	E	TC	17.4:1	15" minimum
MN	CHISAGO	GOOSE L	442	C-ST	3,567	31.7	8.07	E	E	TCN	38.4:1	17" minimum
MN	CHISAGO	GREEN L	1,715	C-ST	2,123	21.1	1.24	E	E	TCN	4.8:1	17" minimum
WI	BAYFIELD	LOWEN	1,323	C-ST	2,399	5.7	1.81	E	E	TCN	7.8:1	15" minimum
WI	BAYFIELD	SISKIWI L	330	NR	1,574	7.3	4.77	E	E	TCN/YF	17.3:1	15" minimum
WI	BAYFIELD	UPPER EAU CLAIRE L	1,030	C-ST	1,688	6.3	1.64	E	E	TCN	2.0:1	15" minimum
WI	FOREST	BUTTERNUT L	1,292	C-NR	4,394	4.7	3.40	E/F	E	BCN/YF	15.6:1	14"-18" slot †
WI	FOREST	L METONGA	1,991	C-NR	4,851	20.0	2.44	E	E	TCN	11.7:1	15" minimum
WI	ONEIDA	BUCKSKIN L	634	C-NR	4,248	10.1	6.70	E	E	TCN	16.4:1	1 over 14" †
WI	ONEIDA	SQUIRREL L	1,317	NR	7,079	6.3	5.38	E	E	TCN/YF	17.9:1	1 over 14" †
WI	SAWYER	L CHIPPEWA	15,300	C-NR	82,097	2.4	5.37	E/F	E	LP/RP	9.9:1	No minimum
WI	VILAS	ANNABELLE L	213	NR	990	14.9	4.65	E	E	TC/YF	6.4:1	15" minimum
WI	VILAS	KENTUCK L	957	NR	1,819	42.5	1.90	F	E	TCN/YF	0.04:1	15" minimum
WI	VILAS	LITTLE ARBOR VITAE L	534	C-NR	2,738	4.6	5.13	E	E	TCN	10.4:1	1 over 14" †
WI	VILAS	LITTLE JOHN L	166	ST	1,070	6.5	6.44	E	E	TCN	5.0:1	15" minimum
WI	VILAS	SHERMAN L	123	NR	671	11.6	5.45	E	E	TCN/YF	115.3:1	1 over 14" †
WI	VILAS	SQUAW L	785	NR	3,303	6.3	4.21	E	E	TCN/YF	7.3:1	1 over 14" †
WI	WASHBURN	BASS-PATTERSON L	188	NR	775	5.5	4.12	E	E	TC/YF	11.1:1	1 over 14" †

Table A2. Supplemental Spring 1999 Adult Population Estimates Conducted by GLIFWC

(These are based on additional recapture runs taking place before the final recapture runs used to calculate the population estimates in Table A1.)

State	County	Lake	Acres	1999 Walleye Code	Population Estimate	Coefficient of Variation (%)	Density	Marking gear*	Recapture gear*	Fin clip applied**	Male: female sex ratio***	Angling length regulation
WI	BAYFIELD	SISKIWI L	330	NR	1,711	10.1	5.18	E	E	TCN/YF	18.1:1	15" minimum
WI	WASHBURN	BASS-PATTERSON L	188	NR	635	6.7	3.38	E	E	TC/YF	24.6:1	1 over 14" †

*Gear used: E = electrofishing, F = fyke nets

** BCN = bottom caudal notch, LP = left pectoral, RP = right pectoral, TC = top caudal clip, TCN = top caudal notch, YF = numbered yellow floy tag

***Sex ratio is calculated for walleye sampled during marking and recapture runs but excludes recaptured fish.

† No minimum length limit, but only 1 walleye over 14" allowed

‡ No minimum length limit, but walleye from 14" to 18" may not be kept, and only one fish over 18" is allowed

Table A3. Lengths of Walleye Collected During Spring 1999 Adult Walleye Population Estimates

STATE	COUNTY	LAKE	NUMBER SAMPLED			FEMALE		MALE		UNKNOWN	
			FEMALE	MALE	UNKNOWN	MINIMUM LENGTH	MAXIMUM LENGTH	MINIMUM LENGTH	MAXIMUM LENGTH	MINIMUM LENGTH	MAXIMUM LENGTH
MI	GOGEBIC	DUCK L	33	399	33	17.0	27.5	11.0	22.0	10.0	13.0
MI	GOGEBIC	POMEROY L	49	854	228	13.5	26.0	9.5	19.5	9.5	24.5
MN	CHISAGO	GOOSE L	10	384	133	14.5	28.0	10.5	25.5	10.5	30.5
MN	CHISAGO	GREEN L	98	467	82	18.0	28.5	10.0	25.0	8.0	21.0
WI	BAYFIELD	L OWEN	138	1,072	129	13.5	27.0	11.0	22.5	10.5	23.5
WI	BAYFIELD	SISKIWIIT L	37	668	22	12.5	21.5	11.0	18.0	5.5	17.5
WI	BAYFIELD	UPPER EAU CLAIRE L	331	665	48	15.0	30.0	11.5	25.5	6.5	17.5
WI	FOREST	BUTTERNUT L	126	1,967	6	13.5	27.5	10.0	20.5	10.0	21.0
WI	FOREST	L METONGA	63	736	6	12.5	26.5	10.5	19.5	13.0	17.0
WI	ONEIDA	BUCKSKIN L	79	1,299	114	12.5	26.5	8.5	24.5	8.5	23.5
WI	ONEIDA	SQUIRREL L	148	2,650	39	12.0	24.5	9.0	21.5	9.0	16.5
WI	SAWYER	L CHIPPEWA	1,917	18,945	2,224	11.5	30.5	7.0	27.5	5.0	23.5
WI	VILAS	ANNABELLE L	46	295	184	12.0	24.5	9.5	17.5	9.0	27.0
WI	VILAS	KENTUCK L	197	7	0	19.0	30.5	15.5	26.0		
WI	VILAS	LITTLE ARBOR VITAE L	136	1,420	200	12.5	27.5	8.5	22.0	7.0	22.5
WI	VILAS	LITTLE JOHN L	116	575	46	15.5	26.5	12.0	26.0	6.5	20.0
WI	VILAS	SHERMAN L	3	346	153	16.0	25.5	9.5	19.0	7.5	23.5
WI	VILAS	SQUAW L	179	1,299	233	11.0	27.5	8.0	17.5	6.0	16.0
WI	WASHBURN	BASS-PATTERSON L	18	442	18	14.0	23.0	11.0	18.0	10.0	16.5
OVERALL			3,724	34,490	3,898	11.0	30.5	7.0	27.5	5.0	30.5

Number of walleye Aged by Sex and Length From Spring 1999 Adult Population Estimates

STATE=MI COUNTY=6086BIC LAKE=DUCK L

Table A4

INCH GROUP	AGE																																								
	1			2			3			4			5			6			7			8			9			10+													
	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											
5																																									
6																																									
7																																									
8																																									
9																																									
10						1																																			
11									7	10	1	1																													
12											12	5	3																												
13													4																												
14																																									
15													4																												
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29																																									
30																																									
TOTAL							1	1		7	10	13	6		11	6	12	1	24		7	11	2	3	17	38															

Table A7

INCH GROUP	AGE																					
	1		2		3		4		5		6		7		8		9		10+			
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	U	
5																						
6																						
7																						
8																						
9																						
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25																						
26																						
27																						
28																						
29																						
30																						
TOTAL	16																					

STATE=WI COUNTY=FOREST LAKE=BUTTERNUT L

Table A11

INCH GROUP	AGE																													
	1			2			3			4			5			6			7			8			9			10+		
	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			
5																														
6																														
7																														
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25																														
26																														
27																														
28																														
29																														
30																														
TOTAL																														

Table A13

INCH GROUP	AGE																					
	1		2		3		4		5		6		7		8		9		10+			
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M		
5																						
6																						
7																						
8	1		2																			
9		5	7	1	1																	
10			15	10	1																	
11			6	6	16	1																
12					1	7	2	13	2													
13						1		14		1												
14								5	12													
15								1	7	11	1											
16								1	6	3	10	1										
17								3	7	3	4	7										
18									9	2	2	5	9									
19									1	4	7	1	8									
20											1	1	2									
21												7	7									
22													5	2								
23													1	1								
24																				1		
25																						
26																						
27																						
28																						
29																						
30																						
TOTAL	1		5	9	22	17	1	25	0	5	32	2	17	27	7	17	6	18	22	15	3	20

Table A15

INCH GROUP	AGE												TOTAL								
	1		2		3		4		5		6			7		8		9		10+	
	F	M	F	M	F	M	F	M	F	M	F	M		F	M	F	M	F	M	F	M
5																					
6																					
7	1																				
8	1																				
9	1	2	3																		
10		1		9	3	2			1												
11			12	1	17	3	2														
12			1		17	2	33														
13					1	2	41	3	6												
14					2	1	15	2	7	36	1	1									
15					1	6	2	2	14	2	16	2	16								
16							9	2	5	3	1	1	16	1	12						
17							6		13	4	1	3	4	3	7	2	8				1
18							1		21			18	1	4	3	1	9	1	9		
19									5	1	24			7		3	10				
20									2		8			7		3	3				
21											3			5		8					
22														7		7					
23																4					
24																					
25																2					
26																					
27																					
28																					
29																					
30																					
TOTAL	3	2	5	22	4	36	9	25	94	7	55	64	3	59	38	1	33	22	30	31	74

Table A16

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

Table A21

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

Table A22

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

Table A23. Spring 1999 Juvenile Population Estimates Conducted by GLIFWC

County	Lake	Area	Schnabel PE	St. Dev. of Schnabel PE	Schnabel Density	Age 1 Density	Age 2 Density	Age 3 Density
VILAS	SHERMAN L	123	3,375	479	27.44	19.98	1.05	1.84
VILAS	SQUAW L	785	15,472	1,463	19.71	7.25	5.24	3.71

MEAN

23.57 13.61 3.14 2.78

Table A24

INCH GROUP	AGE																					
	1		2		3		4		5		6		7		8		9		10+			
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	U	
3																						
4																						
5																						
6		1																				
7																						
8																						
9																						
10																						
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25																						
26																						
27																						
28																						
TOTAL	85	1	28	15	29	35	25	1	29	21	7	6	2	3	3	7	1	1	1	1	2	

Table A25

INCH GROUP	AGE																				
	1		2		3		4		5		6		7		8		9		10+		
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	
3																					
4																					
5			21																		
6			21																		
7			15																		
8			2																		
9			2																		
10																					
11																					
12																					
13																					
14																					
15																					
16																					
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					
25																					
26																					
27																					
28																					
TOTAL			61																		

Appendix B: Summer Surveys

Table		Page
B1.	Fish community survey, Goose Lake, Chisago Co., MN	43
B2.	Fish community survey, Green Lake, Chisago Co., MN	44
B3.	Fish community survey, East Rush Lake, Chisago Co., MN	45
B4.	Fish community survey, West Rush Lake, Chisago Co., MN	46
B5.	Fish community survey, Kentuck Lake, Vilas Co., WI	47

Table B1: Fish Community Survey, Goose Lake, Chisago County, Minnesota Dates: July 11 and 12, 1999 Net Sets: 7 gill nets and 9 trap nets Area: 442 acres

Inch Group	Black Crappie		Bluegill		Bowfin		Bullhead		Carp		Largemouth Bass		Northern Pike		Pumpkinseed		Walleye		Warmouth		White Sucker		Yellow Perch		
	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	
1.5-1.9																									
2.0-2.4																									
2.5-2.9																									
3.0-3.4																									
3.5-3.9																									
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6.5-6.9																									
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29.0-29.4																									
29.5-29.9																									
30.0-30.4																									
30.5-30.9																									
31.0-31.4																									
31.5-31.9																									
32.0-32.4																									
32.5-32.9																									
33.0-33.4																									
33.5-33.9																									
Unmeasured																									
Total	47	23	32	96	1		48	22	1															63	
Catch/Net	6.71	2.96	4.57	10.67	0.14		18.71	3.11	0.14	0.11	0.11		0.22	3.29	0.43	2.78	9.29		0.44	2.71	0.11	0.11	1	9.00	

Survey notes: The crew reported that trap net #6 was tampered with, but there were still 34 fish caught, which was the second-highest catch for the trap nets. The data is included in the summary.

Table B2: Fish Community Survey, Green Lake, Chisago County, Minnesota Dates: July 18 and 19, 1999 Net Sets: 15 gill nets and 9 trap nets Area: 1,715 acres

Inch Group	Black Crappie		Bluegill		Bullhead		Carp		Largemouth Bass		Northern Pike		Pumpkinseed		Rock Bass		Walleye		White Sucker		Yellow Perch		
	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	
1.5-1.9																							
2.0-2.4																							
2.5-2.9																							
3.0-3.4																							
3.5-3.9																							
4.0-4.4																							
4.5-4.9																							
5.0-5.4																							
5.5-5.9																							
6.0-6.4																							
7.0-7.4																							
7.5-7.9																							
8.0-8.4																							
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14.5-14.9																							
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18.5-18.9																							
19.0-19.4																							
19.5-19.9																							
20.0-20.4																							
20.5-20.9																							
21.0-21.4																							
21.5-21.9																							
22.0-22.4																							
22.5-22.9																							
23.0-23.4																							
23.5-23.9																							
24.0-24.4																							
24.5-24.9																							
25.0-25.4																							
25.5-25.9																							
26.0-26.4																							
26.5-26.9																							
27.0-27.4																							
27.5-27.9																							
28.0-28.4																							
28.5-28.9																							
29.0-29.4																							
29.5-29.9																							
30.0-30.4																							
30.5-30.9																							
31.0-31.4																							
31.5-31.9																							
32.0-32.4																							
Unmeasured																							
Total	266	161	226	763	47	14	1	1	8	2	33	4	11	60	1	147	3	13	2	2	13	1	
Catch/Net	17.73	17.89	15.07	84.78	3.13	1.56	0.07	0.11	0.53	0.22	2.20	0.44	0.73	6.67	0.11	9.80	0.33	0.87	0.22	0.13	0.87	0.11	

Survey notes: Trap net #10 could not be set due to weed growth. This was not counted as one of the nine that were set.

Table B3: Fish Community Survey, East Rush Lake, Chicago County, Minnesota Dates: August 22 and 23, 1999 Net Sets: 10 gill nets and 7 trap nets Area: 1,359 acres

Inch Group	Black Crayfish		Bluegill		Bullhead		Carp		Freshwater Drum		Golden Shiner		Largemouth Bass		Muskeelunge		Northern Pike		Pumpkinseed		Smallmouth Bass		Walleye		Yellow Perch			
	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net		
1.5-1.9	50	50																										
2.0-2.4		1																										
2.5-2.9		6																										
3.0-3.4		12																										
3.5-3.9		6																										
4.0-4.4		2																										
4.5-4.9		1																										
5.0-5.4		2																										
5.5-5.9		14																										
6.0-6.4		46																										
6.5-6.9		15																										
7.0-7.4		14																										
7.5-7.9		42																										
8.0-8.4		30																										
8.5-8.9		5																										
9.0-9.4		3																										
9.5-9.9		2																										
10.0-10.4		1																										
10.5-10.9		1																										
11.0-11.4		1																										
11.5-11.9		1																										
12.0-12.4																												
12.5-12.9																												
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30.0-30.4																												
30.5-30.9																												
31.0-31.4																												
31.5-31.9																												
32.0-32.4																												
34.0-34.4																												
38.0-38.4																												
Total	173	99	6	90	1	90	3	15	47	1	20	1	2.00	4	0.57	0.10	23	11	5	23	11	5	2	73	2	244	13	
Catch/Net	17.30	14.14	0.60	12.86	0.10	12.86	0.30	2.14	4.70	0.14	2.00	0.14	2.00	0.57	0.10	2.30	1.57	0.71	2.30	1.57	0.71	0.29	7.30	0.29	24.40	1.86		

Table B4: Fish Community Survey, West Rush Lake, Chisago County, Minnesota Dates: August 15 and 16, 1999 Net Sets: 10 gill nets and 9 trap nets Area: 1,464 acres

Inch Group	Black Crappie		Bluegill		Bowfin		Bullhead		Carp		Freshwater Drum		Golden Shiner		Largemouth Bass		Northern Pike		Pumpkinseed		Redhorse		Walleye		Yellow Perch		
	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	Gill Net	Trap Net	
1.5-1.9																											
2.0-2.4		1																									1
2.5-2.9		4		1																							
3.0-3.4																											
3.5-3.9		2		1																							
4.0-4.4		7		2																							
4.5-4.9		6		4																							
5.0-5.4		37		1																							
5.5-5.9		12		2																							
6.0-6.4		5		2																							
6.5-6.9		27		3																							
7.0-7.4		19		1																							
7.5-7.9		8		2																							
8.0-8.4		1																									
8.5-8.9		1																									
9.0-9.4		1																									
9.5-9.9		1																									
10.0-10.4		1																									
10.5-10.9																											
11.0-11.4																											
11.5-11.9																											
12.0-12.4																											
12.5-12.9																											
13.0-13.4																											
13.5-13.9																											
14.0-14.4																											
14.5-14.9																											
15.0-15.4																											
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16.0-16.4																											
16.5-16.9																											
17.0-17.4																											
17.5-17.9																											
18.0-18.4																											
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19.5-19.9																											
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29.5-29.9																											
30.0-30.4																											
31.0-31.4																											
31.5-31.9																											
32.0-32.4																											
Unmeasured																											
Total	35	30	17	39	1	1	6	1	1	1	23	4	35	4	2	2	2	2	2	5	3	7	1	30	1	18	
Catch/Net	25.00	3.33	1.70	4.33	0.10	0.11	0.60	0.11	0.10	0.10	2.30	0.44	3.50	0.44	0.20	0.20	0.20	0.20	0.56	0.30	0.78	0.10	3.00	0.11	28.00	2.00	

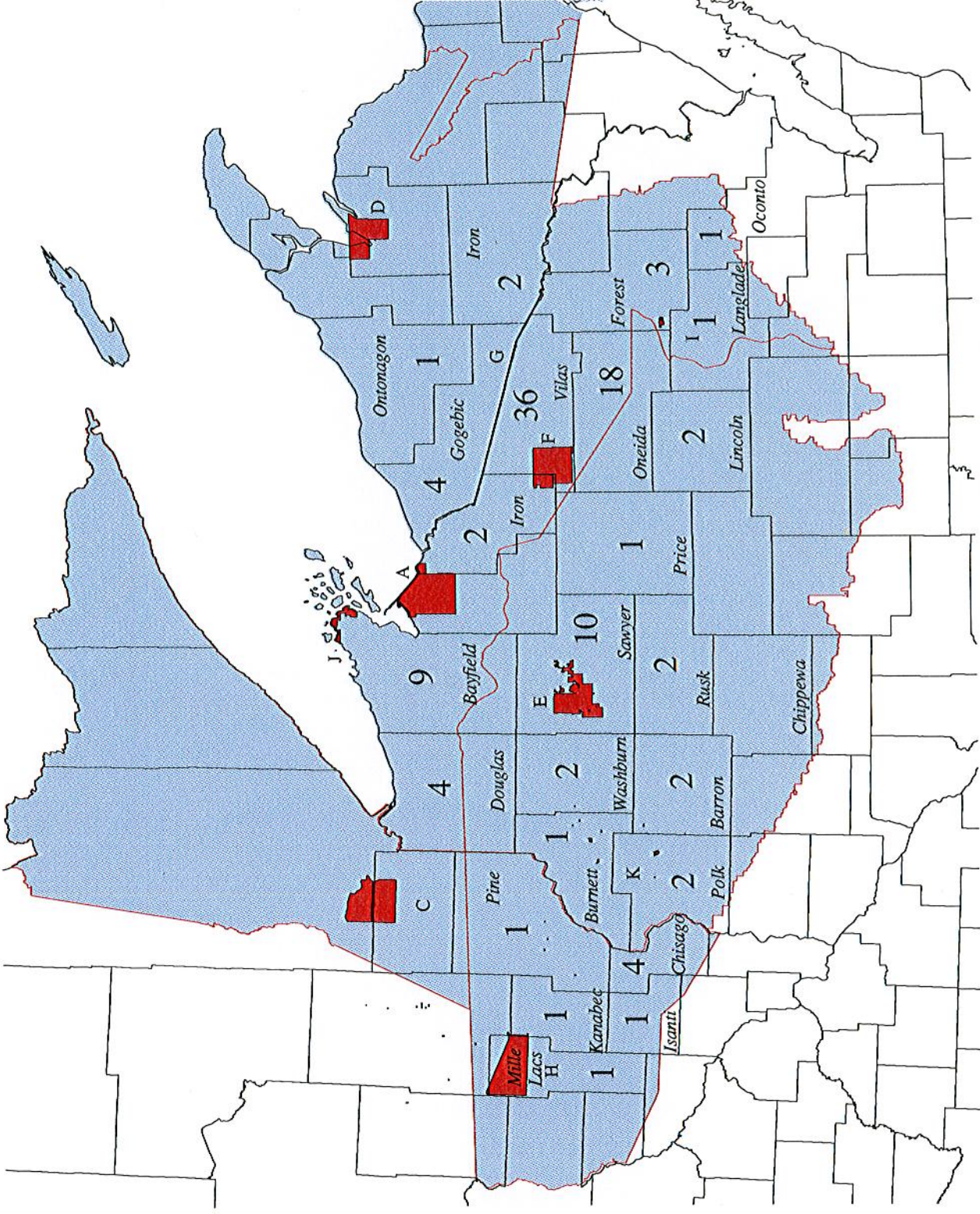
Survey Notes: Two additional gill nets were set, but were tampered with and had no catch. These were not counted as part of the ten that were set.

Inch Group	Black Crappie Trap Net	Bluesill Trap Net	Golden Shiner Trap Net	Largemouth Bass Trap Net	Pumpkinseed Trap Net	Rock Bass Trap Net	Smallmouth Bass Trap Net	White Sucker Trap Net	Yellow Perch Trap Net
1.5-1.9									
2.0-2.4									
2.5-2.9									
3.0-3.4									
3.5-3.9									
4.0-4.4									
4.5-4.9									
5.0-5.4									
5.5-5.9									
6.0-6.4									
6.5-6.9									
7.0-7.4									
7.5-7.9									
8.0-8.4									
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21.0-21.4									
21.5-21.9									
22.0-22.4									
23.0-23.4									
23.5-23.9									
24.0-24.4									
24.5-24.9									
25.0-25.4									
25.5-25.9									
26.0-26.4									
26.5-26.9									
27.0-27.4									
27.5-27.9									
28.0-28.4									
28.5-28.9									
29.0-29.4									
29.5-29.9									
30.0-30.4									
30.5-30.9									
31.0-31.4									
31.5-31.9									
32.0-32.4									
Unmeasured									
Total	1.84	105.59	0.91	2	385	12.03	0.88	1.53	0.22
Catch/Net									

Appendix C: Fall Recruitment Surveys

Figure		Page
C1.	Ceded territory in Wisconsin, Michigan, and Minnesota with number of lakes per county where fall electrofishing surveys were conducted in 1999 by GLIFWC	49
C2.	Age 0 CPE by Code for GLIFWC 1999 Recruitment Surveys	50
C3.	Age 1 CPE by Code for GLIFWC 1999 Recruitment Surveys	50
Table		Page
C1.	Description of Walleye Recruitment Source Codes	51
C2.	Fall 1999 Recruitment Surveys Conducted by GLIFWC	52
C3.	Summary of Age 0 and Age 1 Catch per Effort Rates During Fall 1999 Recruitment Surveys Conducted by GLIFWC	54
C4.	Summary of Other Gamefish Species Collected During Fall 1999 Recruitment Surveys Conducted by GLIFWC	55
C5.	Fall 1999 Age 0 and Age 1 Population Estimates Conducted by GLIFWC	56

- A - Bad River
- B - Bay Mills (not depicted)
- C - Fond du Lac
- D - Keweenaw Bay
- E - Lac Courte Oreilles
- F - Lac du Flambeau
- G - Lac Vieux Desert
- H - Mille Lacs
- I - Mole Lake
- J - Red Cliff
- K - St. Croix



Figures C1. Ceded territory in Wisconsin, Michigan, and Minnesota with the number of lakes per county where fall electrofishing surveys were conducted by GLIFWC during 1999.



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

Figure C2. Age 0 CPE By Code for GLIFWC 1999 Recruitment Surveys

(X is the mean for each code, + is the median. A random jitter has been added for each point)

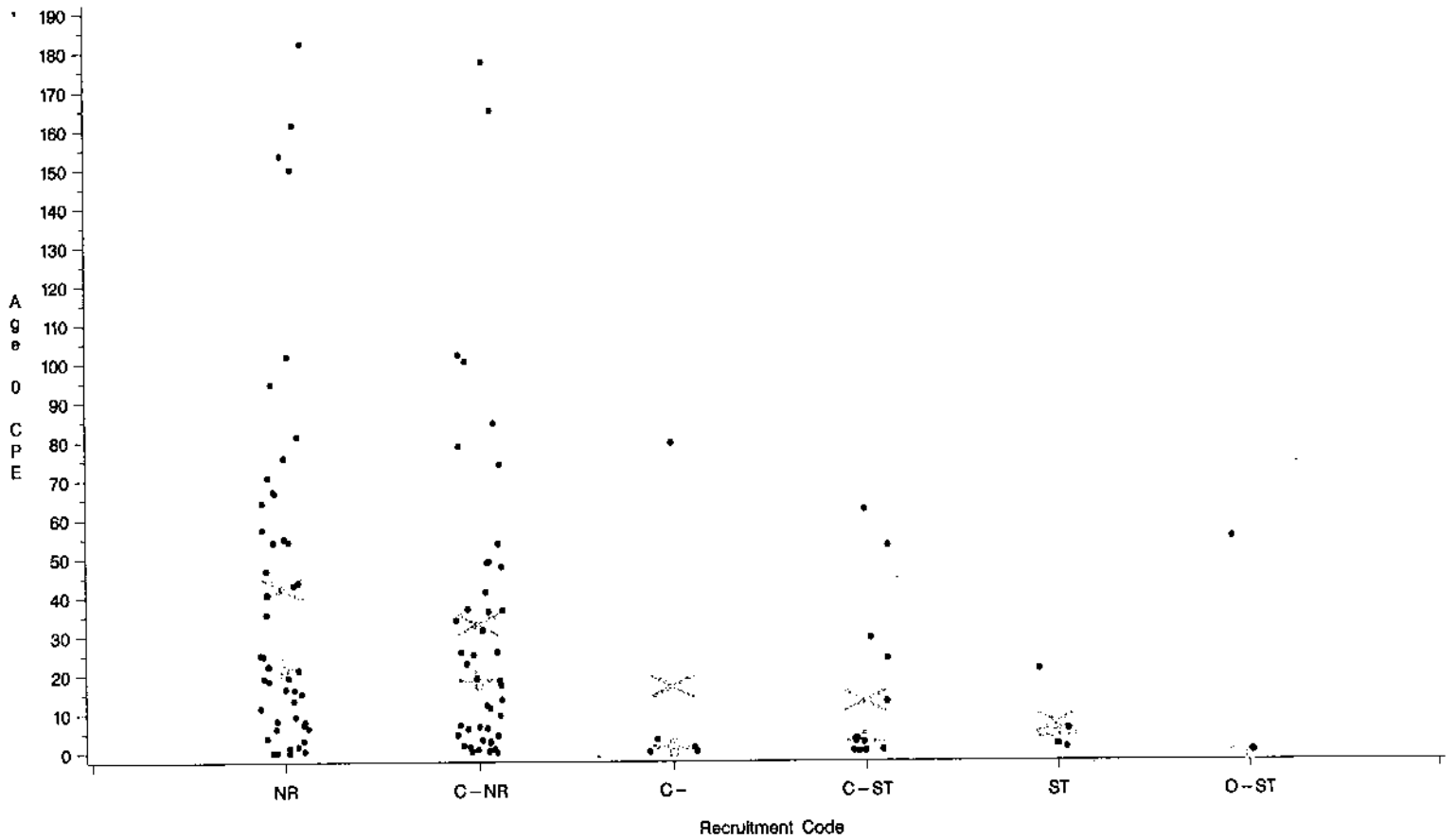


Figure C3. Age 1 CPE By Code for GLIFWC 1999 Recruitment Surveys

(X is the mean for each code, + is the median. A random jitter has been added for each point)

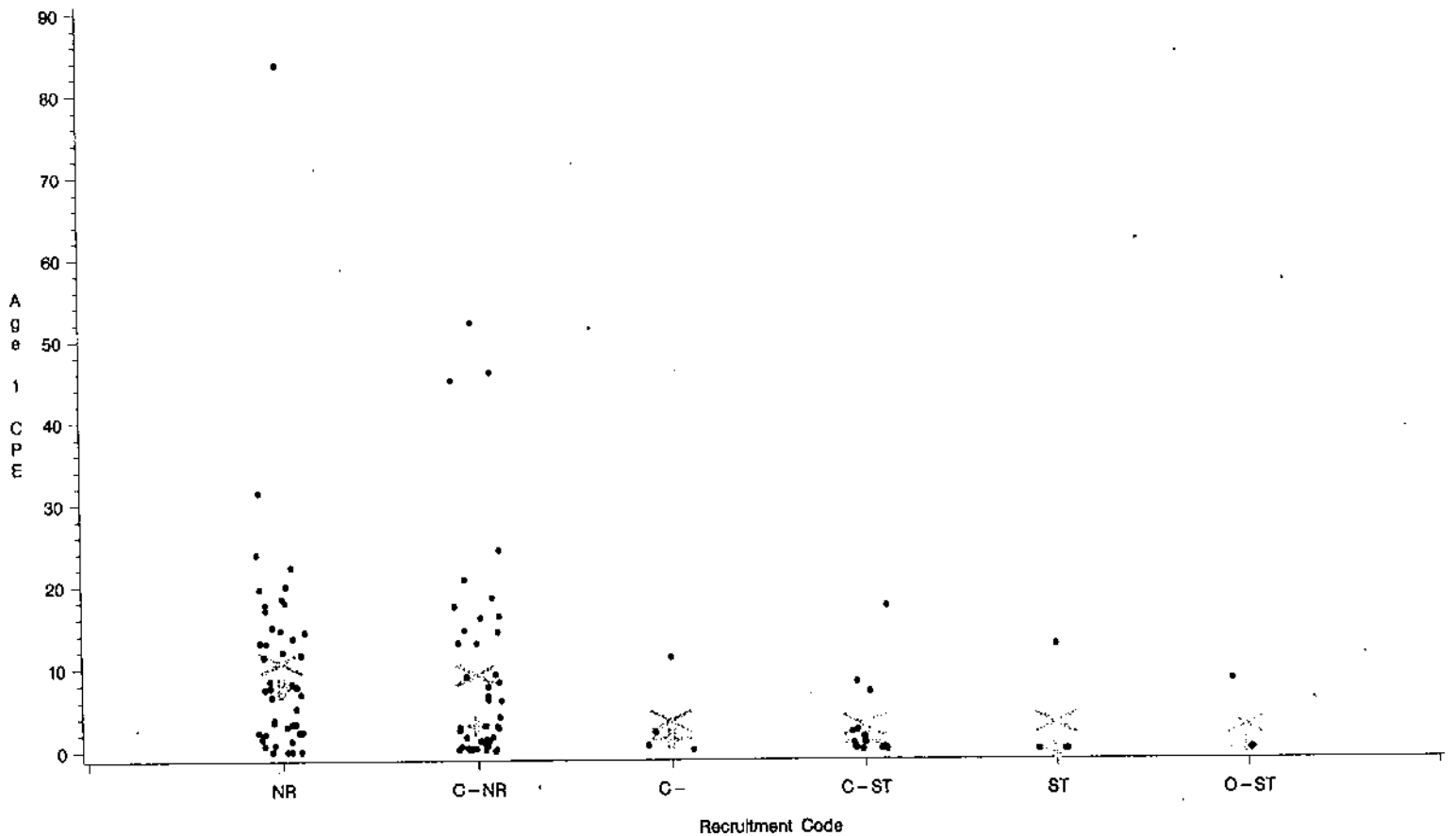


Table C1. Description of Walleye Recruitment Source Codes.

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 densities are 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, 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 C3. Summary of Age 0 and Age 1 Catch per Effort Rates During Fall 1999 Recruitment Surveys Conducted by GLIFWC

NR and C-NR || C- || C-ST and ST || O-ST

INCLUDING LAKES WHERE NO YEAR CLASS WAS DETECTED

AGE 0	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	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE
WISCONSIN	38.1	44.4	87	0.0	182.3	2.2	1.4	2	1.2	3.2	9.7	17.0	10	0.0	52.9	18.3	31.6	3	0.0	54.8
MICHIGAN	5.4	5.7	2	1.4	9.4	79.4		1	79.4	79.4	25.1	27.4	4	3.3	62.2			0		
MINNESOTA	42.9		1	42.9	42.9	0.1	0.1	2	0.0	0.1	5.0	9.0	5	0.0	21.0			0		
POOLED	37.4	43.9	90	0.0	182.3	16.8	35.0	5	0.0	79.4	11.7	18.5	19	0.0	62.2	18.3	31.6	3	0.0	54.8

AGE 1

AGE 1	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	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE
WISCONSIN	10.2	13.2	85	0.0	83.7	1.1	1.5	2	0.0	2.1	2.6	5.6	9	0.0	17.5	2.9	4.9	3	0.0	8.5
MICHIGAN	1.6	1.7	2	0.4	2.7	11.3		1	11.3	11.3	2.0	3.4	4	0.0	7.0			0		
MINNESOTA	3.3		1	3.3	3.3	0.6		1	0.6	0.6	4.5	5.7	5	0.0	12.8			0		
POOLED	10.0	13.1	88	0.0	83.7	3.5	5.2	4	0.0	11.3	3.0	5.1	18	0.0	17.5	2.9	4.9	3	0.0	8.5

EXCLUDING LAKES WHERE NO YEAR CLASS WAS DETECTED

AGE 0	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	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE
WISCONSIN	39.9	44.6	83	0.2	182.3	2.2	1.4	2	1.2	3.2	10.8	17.7	9	0.2	52.9	54.8		1	54.8	54.8
MICHIGAN	5.4	5.7	2	1.4	9.4	79.4		1	79.4	79.4	25.1	27.4	4	3.3	62.2			0		
MINNESOTA	42.9		1	42.9	42.9	0.1		1	0.1	0.1	8.4	10.9	3	1.7	21.0			0		
POOLED	39.1	44.2	86	0.2	182.3	21.0	39.0	4	0.1	79.4	13.9	19.4	16	0.2	62.2	54.8		1	54.8	54.8

AGE 1

AGE 1	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	MEAN CPE	ST. DEV.	N	MIN. CPE	MAX. CPE
WISCONSIN	10.9	13.3	80	0.1	83.7	1.1	1.5	2	0.0	2.1	3.4	6.3	7	0.1	17.5	4.3	5.9	2	0.1	8.5
MICHIGAN	1.6	1.7	2	0.4	2.7	11.3		1	11.3	11.3	2.7	3.8	3	0.2	7.0			0		
MINNESOTA	3.3		1	3.3	3.3	0.6		1	0.6	0.6	7.5	5.7	3	1.5	12.8			0		
POOLED	10.6	13.2	83	0.1	83.7	3.5	5.2	4	0.0	11.3	4.2	5.6	13	0.1	17.5	4.3	5.9	2	0.1	8.5

Table C4. Summary of Other Gamefish Species Collected During Fall 1999 Recruitment Surveys Conducted by GLIFWC

	Wisconsin		Michigan		Minnesota	
	Number of Fish Collected	Number of Lakes	Number of Fish Collected	Number of Lakes	Number of Fish Collected	Number of Lakes
Muskellunge	26	7	0	0	0	0
Northern Pike	124	17	2	1	20	2
Largemouth Bass	274	30	10	2	32	4
Smallmouth Bass	163	28	12	3	0	0

Table C5. Fall 1999 Age 0 and Age 1 Population Estimates Conducted by GLIFWC

County	Lake	1999 Walleye Code	Area	Age 0 Population Estimate	Coefficient of Variation (%)	Age 0 Density Per Acre	Mean Age 0 CPE (#/mile)	Age 1 Population Estimate	Coefficient of Variation (%)	Age 1 Density Per Acre	Mean Age 1 CPE (#/mile)
VILAS	SQUAW L	NR	785	8,262	37.0	10.5	18.0	9,954	49.3	12.7	14.3
WASHBURN	BASS-PATTERSON I	NR	188	3,302	20.3	17.6	54.2	407	22.4	2.2	14.7
MEAN				5,782		14.0	36.1	5,181		7.4	14.5

