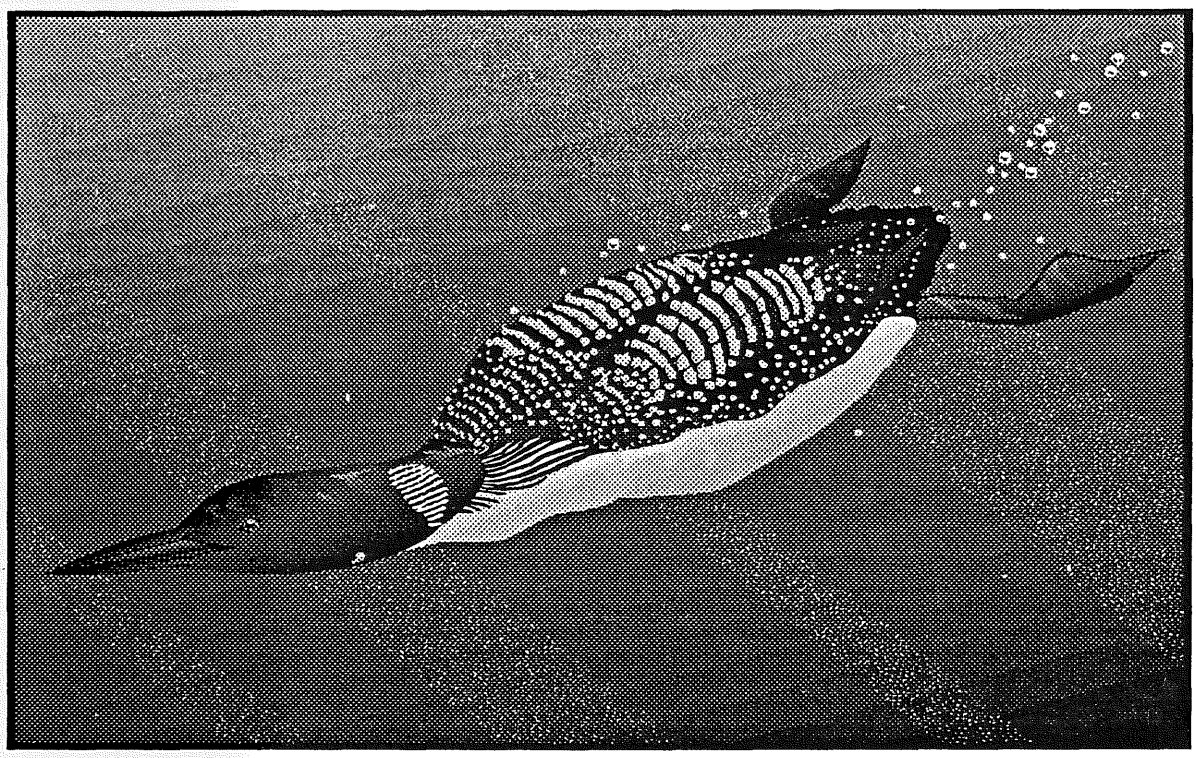
An Estimate of Minnesota's Summer Population of Adult Common Loons



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ABSTRACT

LoonWatch and Minnesota DNR's Nongame Wildlife Program conducted Minnesota's first statewide population estimate of common loons using volunteers in 1989. Over 600 volunteers and biologists searched for loons on 723 lakes $\geq$ 10 acres from the ground, water, and air. The calculated estimate was 11,626 adult common loons with a 95 percent confidence interval of 1,271 (10.9%). Surveyors reported at least one adult loon on 49.5 percent of the sample lakes. Lakes with loons tended to occur more often in west-central, north-central, and northeastern parts of the state. Occupancy rates were greatest on lakes in the 150-499 acre size class with nearly two-thirds of the lakes harboring loons.

Minnesota currently has the largest summer population of common loons in the lower 48 United States. The 1989 survey did not identify trends in the population, but established a baseline from which trends can be estimated. Additionally, it verified range shrinkage since pre-settlement times and revealed a large number of lakes that have become dry or marshy since the mid-1900's.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGMENTS

The 1989 Minnesota Loon Survey was truly a grassroots effort and many individuals and institutions deserve recognition. Dennis Olson of Duluth initiated this project while he was the coordinator of Minnesota Loon Watch (now combined with Wisconsin Project Loon Watch and called simply LoonWatch). Colleen Gardner, the 1989 Sigurd Olson Fellow at the Sigurd Olson Environmental Institute, conducted much of the pre-survey work and began the data compilation. Lee Pfannmuller, Minnesota DNR Nongame Wildlife Research Supervisor, made important contributions to all aspects of project planning, administration, and guidance. Pamela Perry, Minnesota DNR Nongame Wildlife Specialist from Brainerd provided valuable assistance with volunteer recruitment, survey design, and aerial surveys. Other MDNR Nongame Wildlife Biologists, Joan Galli, Katie Haws, John Schladweiler, and Fred Strand, and technicians, Jeff Hines and Bruce Lenning; MDNR pilots, Tom Peterson, Dan Ross, Dick Stoltman, and Dave Carpenter; Voyageurs National Park biologist, Lee Grim; and private pilot Dave Oschenbauer of Ashland, Wisconsin, assisted with aerial survey.

John Mathisen coordinated parts of the survey in and around the Chippewa National Forest as did Ed Lindquist in the Superior National Forest, Pete Gogan in Voyageurs National Park, and Floyd Jorgenson in the Red Lake Indian Reservation. Special thanks go to agency personnel from the Minnesota DNR, U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service who conducted some of the ground surveys.

Interested editors and reporters from the printed and electronic media assisted the effort by publishing press releases before and after the survey, doing follow-up stories on interesting angles of the survey, and by going into the field with some of the volunteers on the survey day. Their efforts made the Minnesota Loon Survey something the entire citizenry of Minnesota could enjoy.

Richard Pace, formerly with the MDNR, and Michael Riggs, MDNR, provided valuable biostatistical assistance in designing the survey and compiling and analyzing the data. Rick Gelbmann of the Minnesota DNR Division of Waters assisted with gaining access to existing computerized databases. April Lehman and Terry Dunn of the Sigurd Olson Environmental Institute assisted with production of the final report. Tom Klein produced the cover graphic and other computer-generated figures that grace this report, and coordinated it's final production.

The Minnesota Loon Survey would not have become a reality without the dedication and efforts of the hundreds of volunteers who braved mosquitoes, mud, remote territory, and the possibility of not seeing any loons on Saturday, July 15. All those who participated can take pride in being part of the largest, one-day wildlife survey ever conducted in Minnesota.

Funding for the 1989 Minnesota Loon Survey came from the U.S. Fish and Wildlife Service Office of Migratory Bird Management, the North American Loon Fund, the Minnesota Department of Natural Resources' Nongame Wildlife program supported by donations to the Nongame Wildlife tax check-off program, and the Sigurd Olson Environmental Institute's LoonWatch project.

PREFACE

During the last decade the common loon has gained national recognition as a symbol of wild, unspoiled northern lakes. It is the subject of books, magazine articles, movies, videos, and sound recordings, and appears on a myriad of commercial products.

The loon's popularity and tenuous status in some parts of its North American breeding range has resulted in an international protection organization as well as state and provincial groups. These organizations enlist the support of thousands of volunteers who conduct educational programs, population surveys, and lake stewardship activities. Additionally, wildlife conservation programs conducted by state and federal governments have taken active roles in loon preservation.

The common loon is Minnesota's state bird. It has become important as a symbol of a state which retains much of its natural heritage. In other states which have greatly altered their pre-settlement landscapes, the common loon does not fare as well. It is a state threatened species in New Hampshire and Michigan and is endangered in Vermont. Its numbers are low in Washington, Idaho, Wyoming, North Dakota, New York, and Massachusetts. It is to Minnesota's credit that the loon still thrives there. Its relative abundance, however, should not be taken lightly. Minnesota citizens and agencies would do well to take actions to ensure the continued survival of the common loon and its aquatic habitats and view those actions as an ounce of medicine that will prevent future generations from invoking a pound of cure.

INTRODUCTION

The common loon (Gavia immer) population in Minnesota has been well studied (Olson and Marshall 1952, McIntyre 1975, Titus and VanDruff 1981, Eberhardt 1984), and surveys of parts of the summer population have been conducted (McIntyre 1978, 1988a, Hirsch and Henderson 1980, Mooty and Goodermote 1985, Reiser 1988, Valley 1987, Mathisen 1988, Mooty and Perry 1988). (See Hands et al. (1989) for a summary of the status of loons in Minnesota.) However, the apparently large summer population has never been estimated using statistically valid techniques. Hirsch and Henderson (1980), using a non-random sample, estimated the summer adult population at 10,700 . This estimate suggested that Minnesota may harbor one-half to two-thirds of the summer common loon population in the lower 48 United States.

Even though the state's common loon population has never been accurately estimated, some data suggest that the population has decreased over the past century and that populations in some parts of the state may be declining currently. Historically, common loons nested throughout Minnesota (Roberts 1932); their breeding range at the turn of the century extended into northeastern Iowa (Palmer 1962). In 1980, Hirsch and Henderson (1980) found common loons in 40 counties north of the Minnesota River. In a 15-year interval survey conducted in 1971 and 1986, McIntyre (1988a), also using a non-random sample, reported a smaller proportion of lakes with territorial residents in 1986. In a lake by lake comparison, she found nearly eight times as many lakes with less versus more loon use.

In 1988, the Sigurd Olson Environmental Institute (SOEI) and the Minnesota Department of Natural Resources' Nongame Wildlife Program (MDNR) began planning a statewide survey of Minnesota's summer adult common loon population to be conducted in 1989. This report details the methodology and results of the survey.

METHODOLOGY

Establishing the Sample

Common loons are known to have recent occupation histories in 41 northern and central counties of the state (Hirsch and Henderson 1980, Fig. 1). Consistent anecdotal reports from some additional south-central counties (MDNR unpubl. data) suggested establishment of a sample area that included most counties north of the Minnesota River (Fig. 2).

Based on recent surveys of common loons in Wisconsin (Olson 1986) and Michigan (Dahmer and Robinson 1985, Heitman and Robinson 1985, Robinson et al. 1986), and a study of loon use of small lakes in north-central Minnesota (Perry 1987), we decided to limit the survey to lakes $\geq$ 10 acres. Lakes < 25 acres are sometimes thought to be unsuitable for use by common loons, but Perry's (1987) study reported substantial use of lakes in this size class.

Olson (1986) suggested that volunteers could be used to survey lakes for loons, but that their ability to do so was impaired on lakes $\geq$ 500 acres. Accordingly, we divided the sample into two parts - one to be conducted by volunteers on lakes < 500 acres and one to be conducted by professional wildlife biologists on lakes $\geq$ 500 acres. We further subdivided the subsample of lakes < 500 acres into three classes based on the mean number of loons seen on lakes of various size classes in Wisconsin (Olson 1986): 10-49 acres, 50-149 acres, and 150-499 acres. In Wisconsin, there was approximately 1 loon per lake in the 10-49 acre class, 2 loons in the 50-149 acre class, and >2 loons in the 150-499 acre class (Olson 1986). For the three smaller size classes, we decided that a sample of 650 lakes (approximately 5 percent of the total number of lakes in these size classes) would be adequate for sampling logistics and statistical analysis, but added 1 percent more to bring the total to 780 to both accommodate a surplus of volunteers and to account for volunteer attrition that was expected to occur (Table 1). Olson (1986) reported approximately 20 percent of the volunteers in Wisconsin failed to complete the survey.

Again following the methodology used by Olson (1986), we selected lakes using a random cross-stratified format with two strata, lake size class and county, to ensure equitable distribution across the range of lake sizes and across the sample area. First, we obtained a computer file of the most current listing of lakes ≥ 10 acres in Minnesota (MDNR 1968) and deleted all lakes for the 38 counties not included in the survey. Then, for each remaining county, we determined the number of lakes in each size class within each county (N_{ij}), where "i" denotes size classes and "j" denotes counties. We calculated the number of lakes to be sampled from all three smaller size classes in each county (n_j) using the formula for proportional allocation (Cochran 1977):

$$n_j = (N_j/N)\ (780)$$

where N_j equals the total number of lakes ≥10 acres and <500 acres in county "j", N equals the total number of lakes ≥10 acres and <500 acres in all counties in the study area, and 780 is the sample size.

Using this sampling routine, we found that no lakes would be sampled in Benton, Mille Lacs, and seven northwestern counties (Kittson, Koochiching, Lake of the Woods, Marshall, Pennington, Red Lake, Roseau). We pooled the seven northwestern counties in order to obtain at least a small sampling from that region.

To distribute the N_j lakes among the size classes in a manner that would reduce the variance for our estimate, we inspected data from other surveys of common loons in the U.S. and Ontario and summarized information on lake area and numbers of loons (Table 2). Using these survey data, we derived a pooled estimate of the variance for each size class ($\hat{v}_i$) using the formula (Cochran 1977):

$$\hat{v}_i = \{\sum_{j=1}^{J} s_{ij}^2(n_{ij}-1)\} / (n_{i.} - J)$$

where: I = # of size classes
J = # of studies
n_{ij} = sample size for the ith size class in the jth study
s_{ij}^2 = estimated sample variance for the ith size class in the jth study
$n_{i.} = \sum_{j=1}^{J} n_{ij}$

yielding the following for $\hat{v}_i$:

size class	$\hat{v}_i$
10-49 acres	- 0.96
50-149 acres	- 1.48
150-499 acres	- 3.83
≥ 500 acres	- 66.77.

We then determined the number of lakes to be sampled in each size class in each county (n_{ij}) using the formula (Cochran 1977):

$$n_{ij} = n_j\ \{(N_{ij} * \hat{v}_i)\ /\ (\sum_{i=1}^{3} N_{ij} * \hat{v}_i)\}$$

We selected the sample lakes by assigning a random number to each lake in the <500 acre size classes in the 49 counties to be included in the survey, grouping the lakes within each county by size class, sorting the groupings by random number, and selecting the first n_{ij} lakes (Fig. 3).

Few data were available for surveys of lakes ≥ 500 acres, but great variance in the number of loons on lakes in this size class was thought to exist, so we decided to sample approximately 20 percent of the lakes. From the 623 lakes ≥ 500 acres in the study area we randomly selected 126 lakes (Fig. 3). Because there is a low-level flight ban over the Boundary Waters Canoe Area

(BWCA), we replaced all randomly selected lakes within the BWCA with the nearest lake ≥ 500 acres outside of the BWCA and in the same county.

Finally, we located all randomly selected lakes < 500 acres on county highway maps, or on topographic maps if they did not appear on county maps. Many lakes that were absent on both maps were apparently dry or marshy. We replaced these lakes with the closest lake in the same county and size class (Table 1).

Volunteer Recruitment

LoonWatch (LW) began recruiting volunteers early in 1989. LW compiled lists of potential volunteers including LW members, citizens participating in the Minnesota Pollution Control Agency's lake monitoring activities, and persons who had contributed data to the MDNR's annual loon monitoring program. Additionally, MDNR and LW each submitted press releases to radio and television stations, newspapers, and other print media throughout Minnesota and in western Wisconsin, eastern North and South Dakota, and northern Iowa.

Matching Volunteers to Lakes

After an adequate number of volunteers had been recruited, LW staff assigned volunteers to the sample lakes. Volunteers were assigned to the lakes closest to their homes unless they requested a lake in another part of the state. Volunteers from the MDNR, Voyageurs National Park, Chippewa National Forest, and Superior National Forest were assigned to many lakes within these and other remote areas.

Information for Volunteers

Approximately one month before the survey date, packets containing survey materials were sent to volunteers. The packets contained maps of the lakes and surrounding areas, recording forms for the data, instructions for conducting the survey, and a complementary decal (Appendix I).

The Aerial Component

We assigned survey lakes > 500 acres to MDNR regional nongame wildlife biologists, other MDNR staff, and the LW coordinator. Each group surveyed 28-35 lakes.

All survey groups received specific instructions for flying over the lakes. We instructed surveyors to fly the airplanes at 75-90 miles per hour 100-300 feet above the lake and to circumnavigate the lake approximately 300 feet from the shoreline. Surveyors flew an additional pass(es) to cover the remaining areas of the lake, particularly lakes with open water basins and/or islands. Because visibility decreases on choppy water, flights were aborted if the wind was ≥ 5 mph at the time of departure, or if conditions worsened during the flight. For consistency among flights and to make best use of optimal viewing conditions, surveyors were instructed to conduct all surveys between 0500 and 0900 CST, with some latitude allowed. Surveyors counted adult loons and recorded their locations on maps. All surveys were done July 17-24.

Data Compilation and Analysis

Volunteers returned completed data forms to LW and the forms were inspected for errors. If data on the numbers of adult loons seemed unusual (e.g. a large number of loons on a very small lake), the volunteer was contacted by telephone and queried about the accuracy of the data. Volunteers who did not return forms were not contacted.

All data were entered into a data management software program and inspected for errors in transfer. Data on weather conditions, time spent conducting the survey, and methods of observation were summarized. Data on the number of adult loons were subjected to the following mathematical treatments.

Within each size class we totaled the number of adult loons observed and calculated a sample mean and variance. We then estimated the number of adult loons in each lake size class using the formula:

$$\hat{y}_i = \bar{y}_i N_i$$

where $\hat{y}_i$ = the estimate for a size class
$\bar{y}_i$ = the sample mean for a size class
N_i = the actual number of lakes in each size class.

The total estimate ($\hat{y}$) was a sum of the estimates for the four size classes.

We calculated the variance of the estimate ($s^2(\hat{y})$) using the formula for stratified random sampling (Cochran 1977):

$$s^2(\hat{y}) = \sum_{i=1}^{4} N_i(N_i-n_i)\,(s_i^2/n_i),$$

and calculated a 95 percent confidence interval bounded by:

$$tNs(\hat{y})$$

where $t = 1.96$,
N = total number of lakes = 12,524, and
$s(\hat{y})$ = standard deviation of the estimate.

We asked all observers to record the number of groups of loons and the size of the largest group. From each data form with at least one loon reported we tried to determine the size of loon groups. If data on group size were absent or not determinable, the lake was left out of the group size analysis.

RESULTS

Rate of Reporting

We received data for 723 lakes (Appendix II); volunteers submitted data for 597 (74.8%) of the 798 assigned lakes < 500 acres (see Appendix III for a complete list of volunteers returning completed data forms), and all 126 of the lakes ≥ 500 acres were surveyed (Table 1). Lakes for which no forms were submitted tended to be small and in remote areas such as the Superior National Forest in northeastern Minnesota.

Occupancy Rates by Geography and Lake Size

Surveyors reported at least one adult loon on 358 (49.5%) of the 723 lakes (Fig. 4). There seemed to be slight geographic differences between lakes with loons present versus lakes with loons absent (compare Figs. 4 and 5). Lakes with loons present tended to occur more often in west-central, north-central, and northeastern parts of the study area. Occupancy rates varied by size class, ranging from nearly one-third of the lakes 10-49 acres to nearly two-thirds of the lakes over 149 acres (Fig. 6). Loons were absent from a majority of lakes in the southern part of the study area (Fig. 7). Occupancy rates varied greatly by size class within counties also (Figs. 8-11), but generally reflect the trend of greater occupancy in the northern parts of the study area except for the extreme Northwest. Observers did not spot loons on any of the survey lakes in nine counties: Dakota, Hennepin, Lake of the Woods, Marshall, Mille Lacs, Ramsey, Scott, Stevens, and Swift.

The number of loons seen on individual lakes ranged from zero to 27 (Fig. 12). The most common numbers of loons seen were zero, one, or two across all size classes. Large numbers of loons were seen most often on lakes ≥ 150 acres, while the probability of observing zero loons was most common in the smaller size classes. There was great variation in numbers of loons seen in all lake size classes. The mean number of loons per lake varied from one-half on the 10-49 acre lakes to nearly three on lakes ≥ 500 acres (Fig. 13).

Group Size

We were able to determine the size of 395 groups of common loons (Table 3). Group size ranged from one to eight. Most loons were seen singly (39%) or in pairs (41%). The numbers of groups of one and two loons were nearly equal in the 10-49 acre and 150-499 acre size classes. However, there were nearly twice as many groups of two in the 50-149 acre class. No groups of two were reported in the >500 acre class because we asked for group size only for groups >2 loons in that class.

The Population Estimate

Observers counted 1135 adult loons on the survey lakes, yielding an estimate of 11,626 adult common loons with a 95 percent confidence interval of +/- 1,271 (10.9%). The estimated population was distributed fairly evenly across the lake size classes although lakes in the 10-49 acre class accounted for twice as many loons as lakes ≥ 500 acres (Fig. 14).

Conditions during the Survey

Almost all of the ground survey volunteers completed the survey on July 15, the assigned survey date. Only 14 (2%) used the bad weather date or one of the other substitute dates (Appendix II).

DISCUSSION

The Population Estimate

Our estimate of about 12,000 adult common loons compares favorably with the estimate of 10,700 by Hirsch and Henderson (1980). It is the largest concentration of common loons in the lower 48 United States (Fig. 15) and accounts for approximately three quarters of the common loons in the Midwest and over half of the common loons in the lower 48 U.S. (McIntyre 1988b:152).

The occupancy rates (Figs. 6-11) suggest that loons are most common in the north-central and northeastern parts of Minnesota, corresponding to the forested and lightly settled parts of the state. Low occupancy rates were primarily in southern and northwestern counties. While loons were not observed on any lakes in nine counties, it is likely that some loons summer in these areas. A larger sample of lakes, particularly those most likely to harbor loons, would be necessary to conclude that no loons summer in those counties.

Loons were more likely to be found on lakes ≥ 150 acres (Fig. 6), however, the majority of Minnesota's loon population apparently resides on lakes < 150 acres (Fig. 14) because the vast majority of lakes are in this size class. Therefore, the importance of small lakes to the loon population should not be overlooked. The recent discovery of multi-lake territories in Michigan's western Upper Peninsula and northeastern Wisconsin (Miller and Dring 1988), a phenomenon that occurs primarily on lakes < 50 acres in close proximity to one another, suggests that occupancy rates on small lakes be interpreted cautiously. Loon pairs may defend two to four small lakes, but their presence on only one lake at any time will lower occupancy rate estimates. The proportion of lakes actually being used by resident loons, however, may be substantially higher.

Mean numbers of loons per lake (Fig. 13) are similar to those reported by Olson (1986) in northern Wisconsin. Few conclusions should be drawn from correlations between lake size and mean numbers of loons observed because the means for the two smallest size classes were greatly affected by the large numbers of lakes with zero loons (Fig. 12). Loons were absent on over half of the sample lakes in these size classes. Additionally, the aerial survey technique used on lakes $\geq$ 500 acres almost always counts less than 75 percent of the actual number of loons present (Dibello et al. 1984). The proper interpretation of these statistics is that they represent the average number of loons one is likely to see on a lake of a given size class selected at random from all of the lakes in that size class in the survey area.

Dry and Replacement Lakes

The intent of this project was to estimate Minnesota's summer adult population of common loons based on a random sample of lakes that were potential loon habitat. Early on we discovered that the most comprehensive data on Minnesota lakes (MDNR 1968) were derived from aerial photography taken between 1938 and 1955. Many water bodies listed as open water lakes in this reference have since been drained or ditched, leaving them marshy or dry. Additionally, water bodies already in one of these conditions were contained in the database. Therefore, the original sample contained some lakes that had low or zero probability of harboring loons (Figs. 16 and 17).

We did not assign lakes known to be marshes or dry lake beds to volunteers on the assumption that no loons would be present on them. Some lakes surveyed by volunteers were reported as dry or marshy and were included in the estimate.

The replacement lakes were used in the population estimate because they were essentially a random sample (see Methodology). The dry lakes were omitted because they were not considered potential loon habitat.

Use of Volunteers

Use of volunteers was considered essential to the success of this undertaking. Olson (1986) used volunteers to count loons in Wisconsin and volunteers are used regularly to count loons in New Hampshire, Vermont, and Maine. Despite their value, volunteers posed some problems to survey coordinators.

First, considerable time and money were necessary to recruit, correspond with, and assign lakes to volunteers. Recruitment was reasonably simple, due no doubt to the popularity of loons and to the fact that many people independently monitor loon activity on lakes.

Second, volunteers seemed to have a preconceived notion that they would be able to count the loons on a lake they had chosen in advance. Despite numerous efforts to explain the importance of "randomness" in the survey design, many volunteers were disgruntled when they learned that they would not be able to count the loons on "their" lake. This confusion may have been an after-effect of the surveys conducted in 1971 and 1986 (McIntyre 1988a) and 1980 (Hirsch and Henderson 1980), and the ongoing data collection conducted by the Minnesota DNR in which volunteers are allowed to observe loons on the lake(s) of their choosing. A similar problem occurred in the 1985 Wisconsin survey (Dennis Olson, pers. comm.).

RECOMMENDATIONS

The results of this survey indicate that Minnesota has a large summer common loon population. However, because it is the first estimate of its kind for loons, it does not indicate any trend in population size, distribution, reproductive success, or habitat suitability. It would be prudent to either repeat this survey periodically, or implement a monitoring program designed to detect significant changes in Minnesota's common loon population.

If it is decided that repeating the survey is most desirable, we recommend that it be conducted every five years for three reasons. First, large amounts of time, effort, and funds were needed to conduct the survey and it would be logistically and economically infeasible to conduct it annually. The estimated cost of time and expenses associated with planning, implementing, and reporting this survey was $40,000. Second, the common loon population is large and widely distributed, and is harbored on lakes surrounded by a variety of public and private lands; it is in no immediate danger of sudden population decline resulting from changes on the breeding grounds. Third, because adult loon populations probably change slowly due to low reproductive rates, recruitment, and adult mortality rates, it is unlikely that short-interval surveys would be able to detect small changes in the population.

At the same time, we believe that some effort should be made to assess the reproductive success of the breeding population and the habitat quality of important breeding lakes. Minnesota's adult loon population could remain nearly stationary for a number of years with little or no reproduction. Periodic surveys of reproductive success would augment data on the adult population. McIntyre's (1988a) study suggested that lakeshore development and lake recreation may have been correlated with decreases in some loon population parameters. Further investigation of this phenomenon seems warranted. Additionally, the large number of lakes that have become dry or marshy since the photography for Bulletin 25 was taken is disconcerting. A survey to update the status of Minnesota's lakes should be a high priority for the near future.

CONCLUSION

The methodology used in the 1989 Minnesota Loon Survey allowed for a scientifically valid estimate of the state's summer loon population, established a list of lakes and volunteers that can be used in future surveys, and generated substantial positive public relations for wildlife protection in Minnesota. The estimate of about 12,000 adult common loons is probably a minimum because the survey methodology undercounted loons on lakes > 500 acres and because the lake list used to establish the sample contained many lakes that were dry or marshy.

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Table 1.
Distribution of Lakes Included Survey
(see text for explanation)

	Size Class (acres)				
	10-49	**50-149**	**150-499**	**>499**	**Total**
Status of Lakes in Initial 5% Sample					
Existing in 1989	204	159	196	126	685
Marshy/Dry in 1989	43	26	21		90
Total	247	185	217	126	775
Status of Lakes in Additional 1% Sample					
Existing in 1989	47	39	48		134
Marshy/Dry in 1989	9	5	1		15
Total	56	44	49	0	149
Total Marshy/Dry Lakes	52	31	22	0	105
Lakes Visited					
Selected in Initial 5% Sample					
Existing Lakes	142	128	161	126	557
Replacements for Marshy/Dry Lakes	31	24	17		72
Selected in Additional 1% Sample					
Existing Lakes	25	26	34		85
Replacements for Marshy/Dry Lakes	7	2	0		9
Total	205	180	212	126	723
Lakes Not Visited					
Selected in Initial 5% Sample					
Existing Lakes	62	31	35		128
Replacements for Marshy/Dry Lakes	12	2	4		18
Selected in Additional 1% Sample					
Existing Lakes	22	13	14		49
Replacements for Marshy/Dry Lakes	2	3	1		6
Total	98	49	54	0	201

Table 2.

Data From Surveys of Common Loons in the United States and Canada

n – # of lakes surveyed
x – mean # of loons/lake
sd – standard deviation # loons/lake

Size Class		Location Year (Source)								
		Wisconsin 1985 (Olson 1986)	N. Maine 1984 (Dibello et al. 1984)	S. Maine 1984 (Dibello et al. 1984)	Minnesota 1986 (McIntyre unpub.)	Minnesota 1987 (Perry unpub.)	Minnesota 1987 (MPCA unpub.)	Minnesota 1985 (Mooty unpub.)	New Hampshire 1988 (Loon Pres. C, unpub.)	Ontario 1987 (Long Pt. B.O. unpub.)
10-49 acres	n	63	4	13	9	15	17	58	62	102
	x	0.7	0.25	1.0	0.44	1.67	0.23	0.47	0.19	1.61
	sd	1.07	0.5	0.91	0.88	0.72	0.56	0.73	0.57	1.34
50-149 acres	n	69	7	51	22	29	48	31	75	86
	x	1.01	1.00	1.06	1.14	1.93	1.29	1.35	0.81	2.67
	sd	1.05	0.82	1.24	0.99	0.37	1.62	1.11	0.98	1.51
150-499 acres	n	43	12	79	59	51	100	14	67	124
	x	0.98	1.67	2.04	1.63	2.72	2.15	1.93	1.13	4.11
	sd	1.32	1.43	1.74	1.16	1.80	2.25	1.73	1.07	2.69
>499 acres	n	14	27	81	138	58	124	9	32	198
	x	1.64	10.96	7.53	4.86	4.76	3.77	2.11	6.84	5.93
	sd	1.78	11.62	6.98	11.46	5.61	6.32	1.62	13.22	6.08

Table 3.

Number of Sample Lakes with Groups of Loons of Various Sizes

Group Size	Size Class 10-49	50-149	150-499	>499	Total
1	26	28	68	32	154
2	32	54	74	0*	160
3	5	2	16	12	35
4	1	3	8	7	19
5	3	1	3	5	12
6	0	3	5	3	8
7	0	0	2	0	5
8	0	0	2	0	2
	67	91	178	59	395

* observers on lakes surveyed by airplane were asked to report group size only for groups > 2 loons.

Figure 1.
Minnesota Townships with Loon Records as of 1980

■ = Twp with Loon Record ☒ = Twp without Lakes

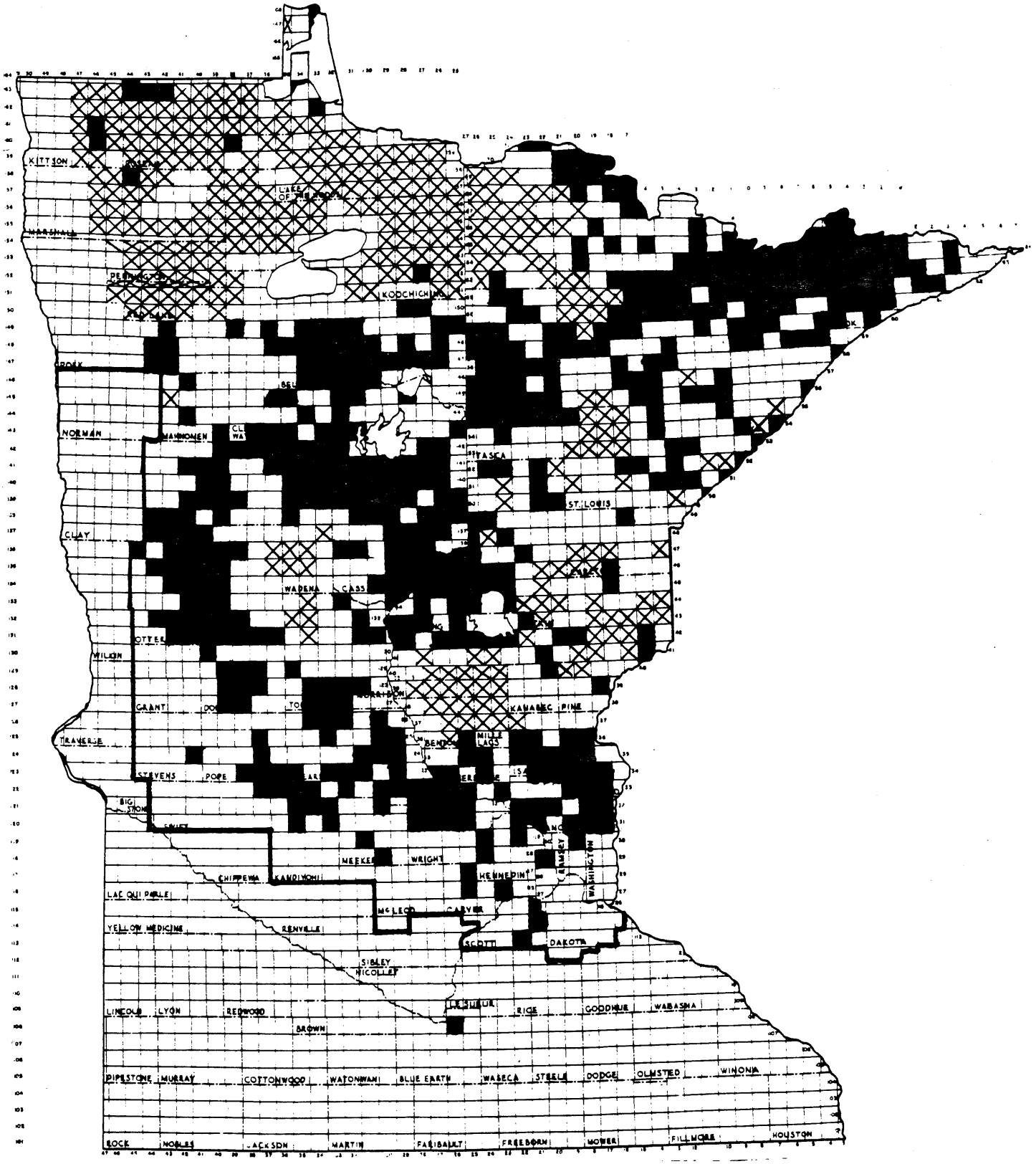


Figure 2.
Area Included in Survey

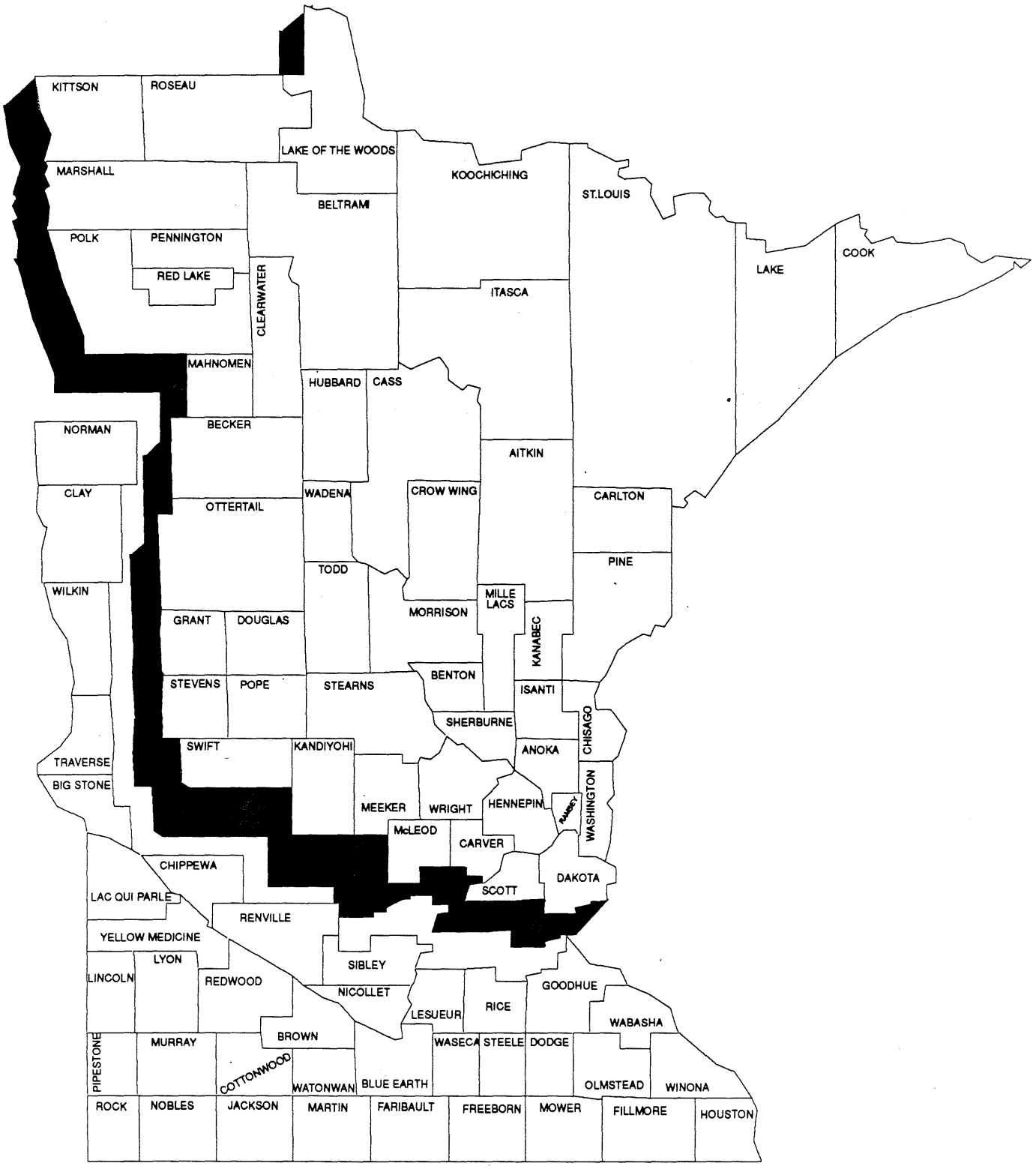


Figure 3.
Geographical Distribution of Lakes Surveyed
• = 10-499 Acres ● = 500+ Acres

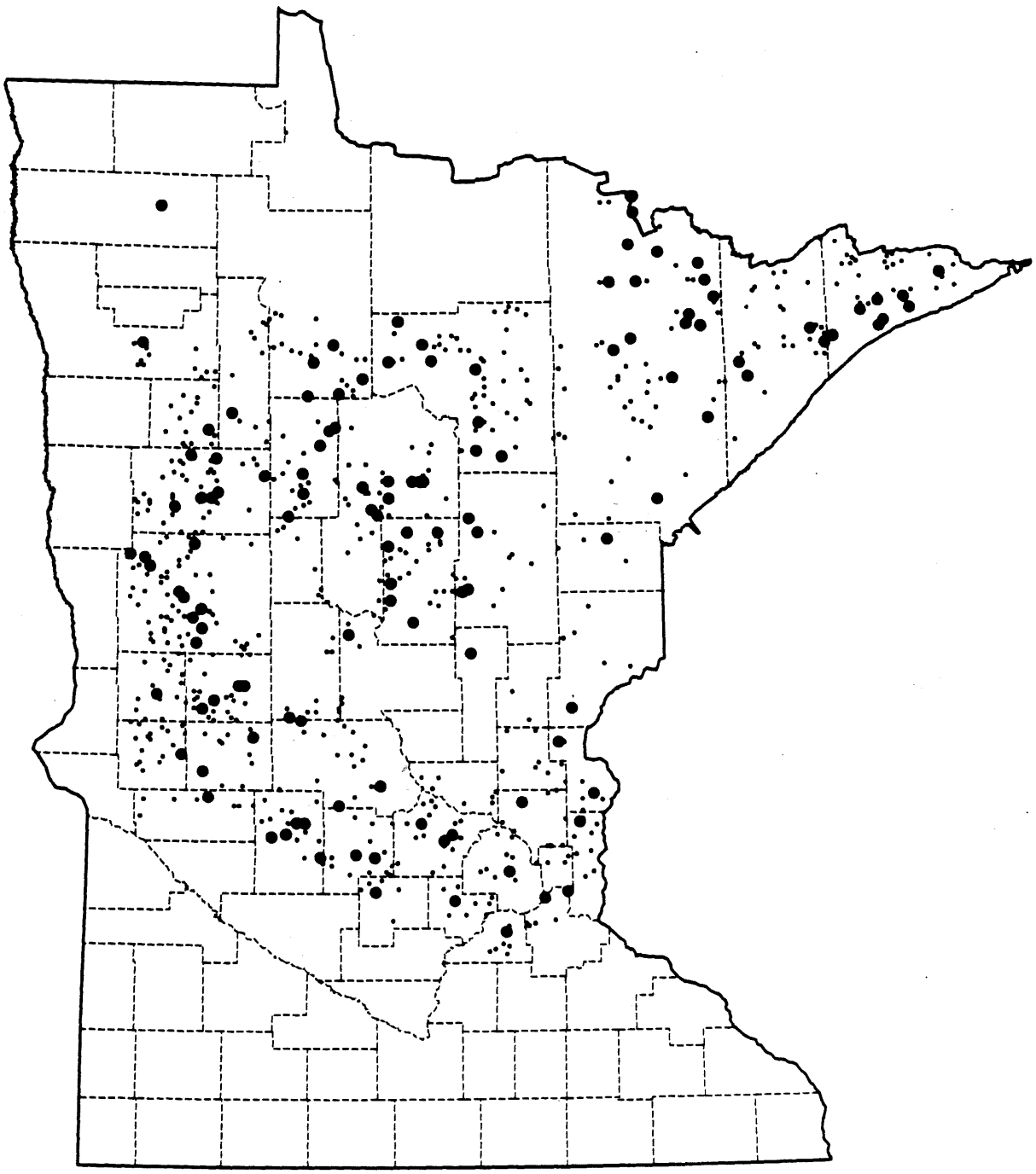


Figure 4.
Lakes on Which at Least One Adult Common Loon Was Seen During Survey
• = 10-499 Acres ● = 500+ Acres

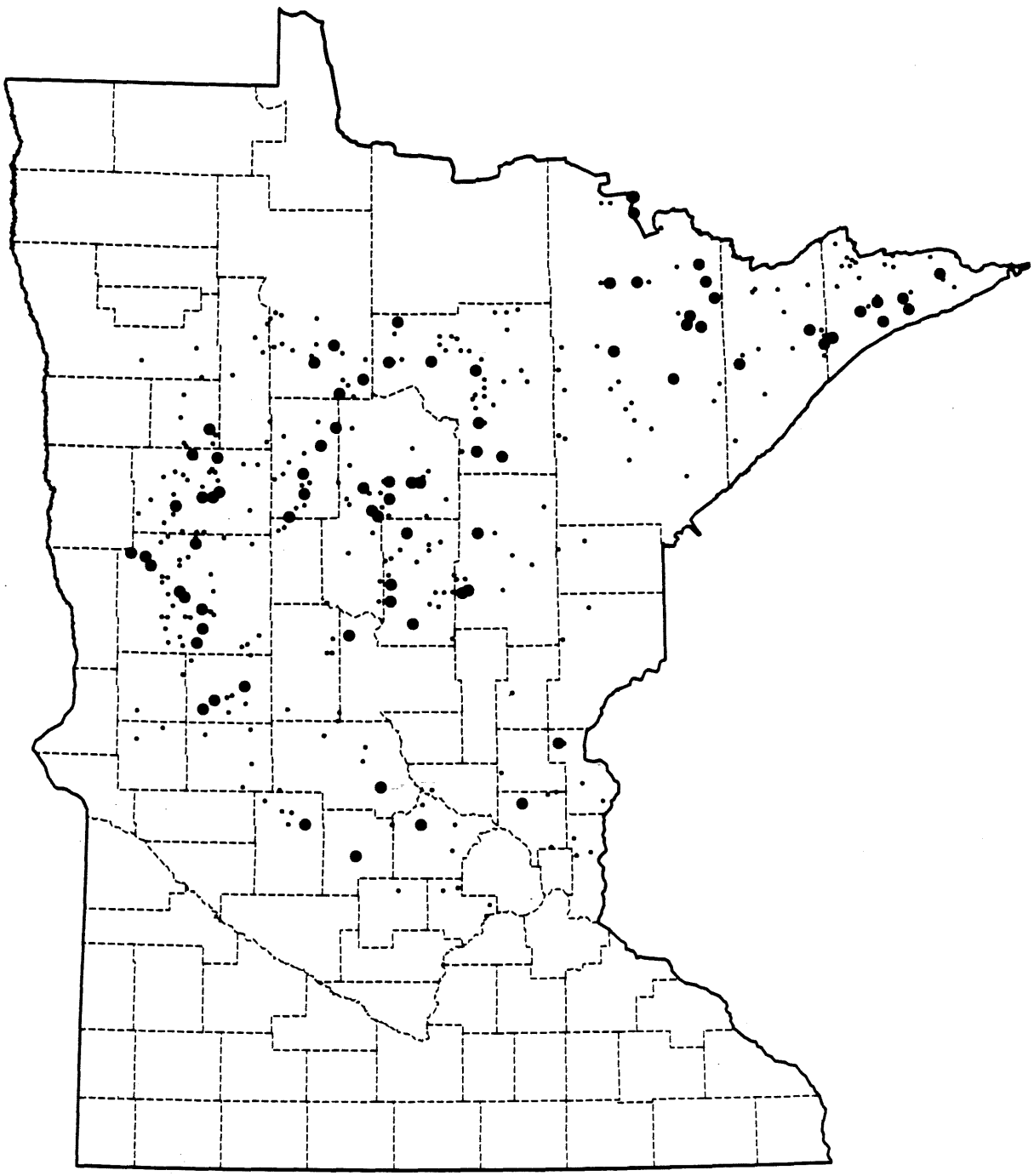


Figure 5.
Lakes on Which No Adult Common Loons Was Seen During Survey
• = 10-499 Acres ● = 500+ Acres

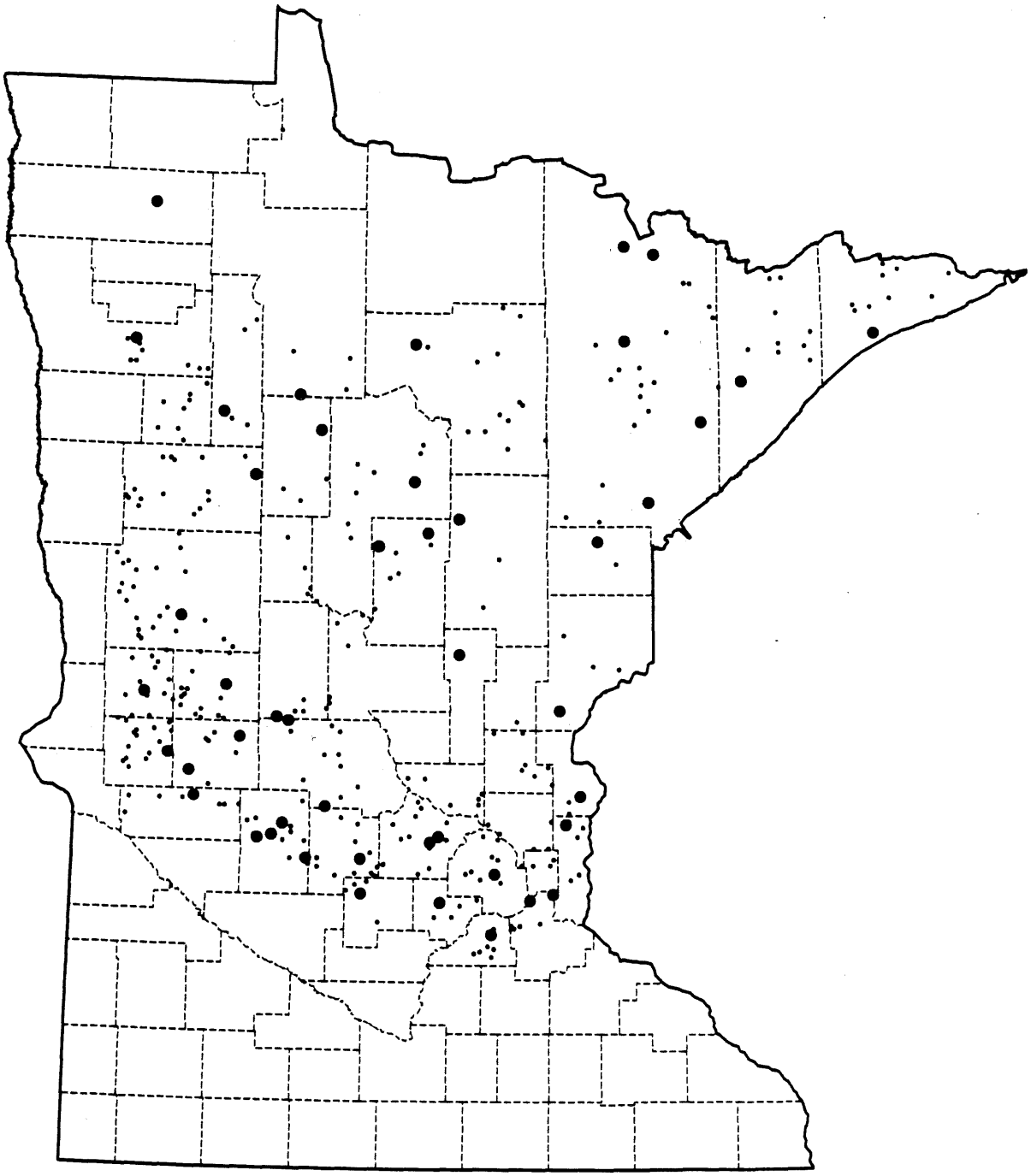


Figure 6.
Occupancy Rate of Lakes Surveyed, by Size Class

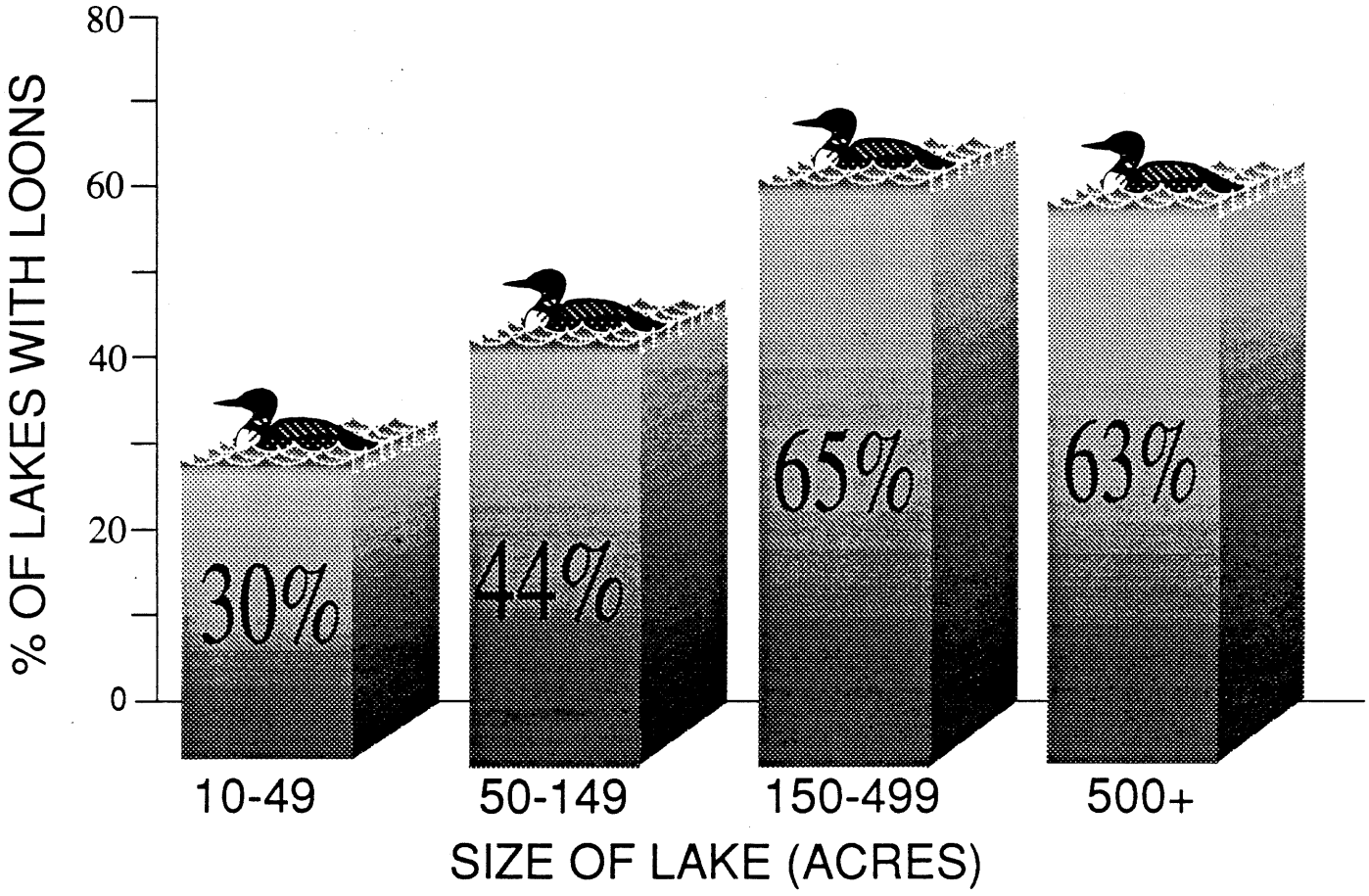


Figure 7.
Occupancy Rate for All Lakes Surveyed, by County

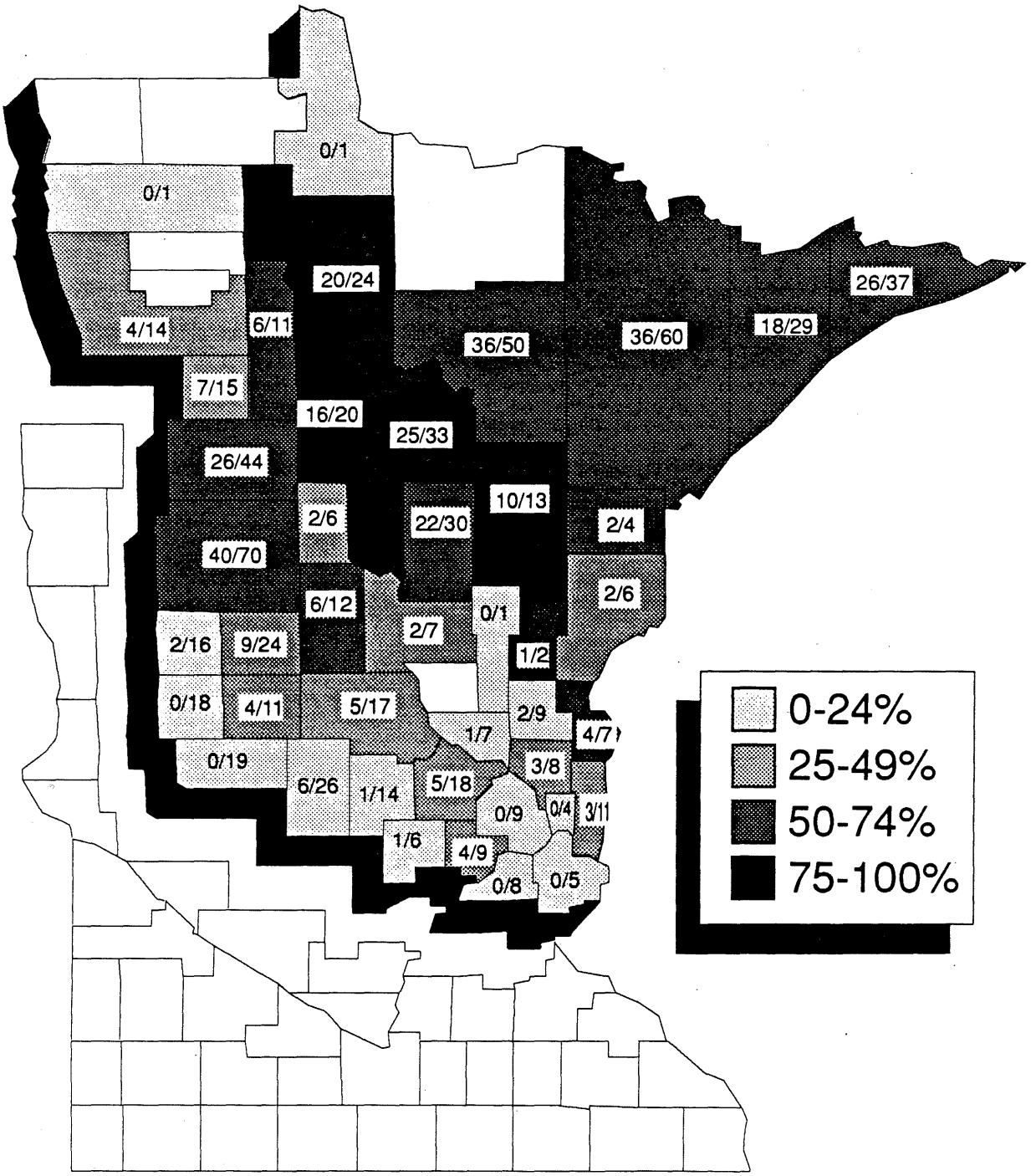


Figure 8.
Occupancy Rate for All 10-49 Acre Lakes Surveyed, by County

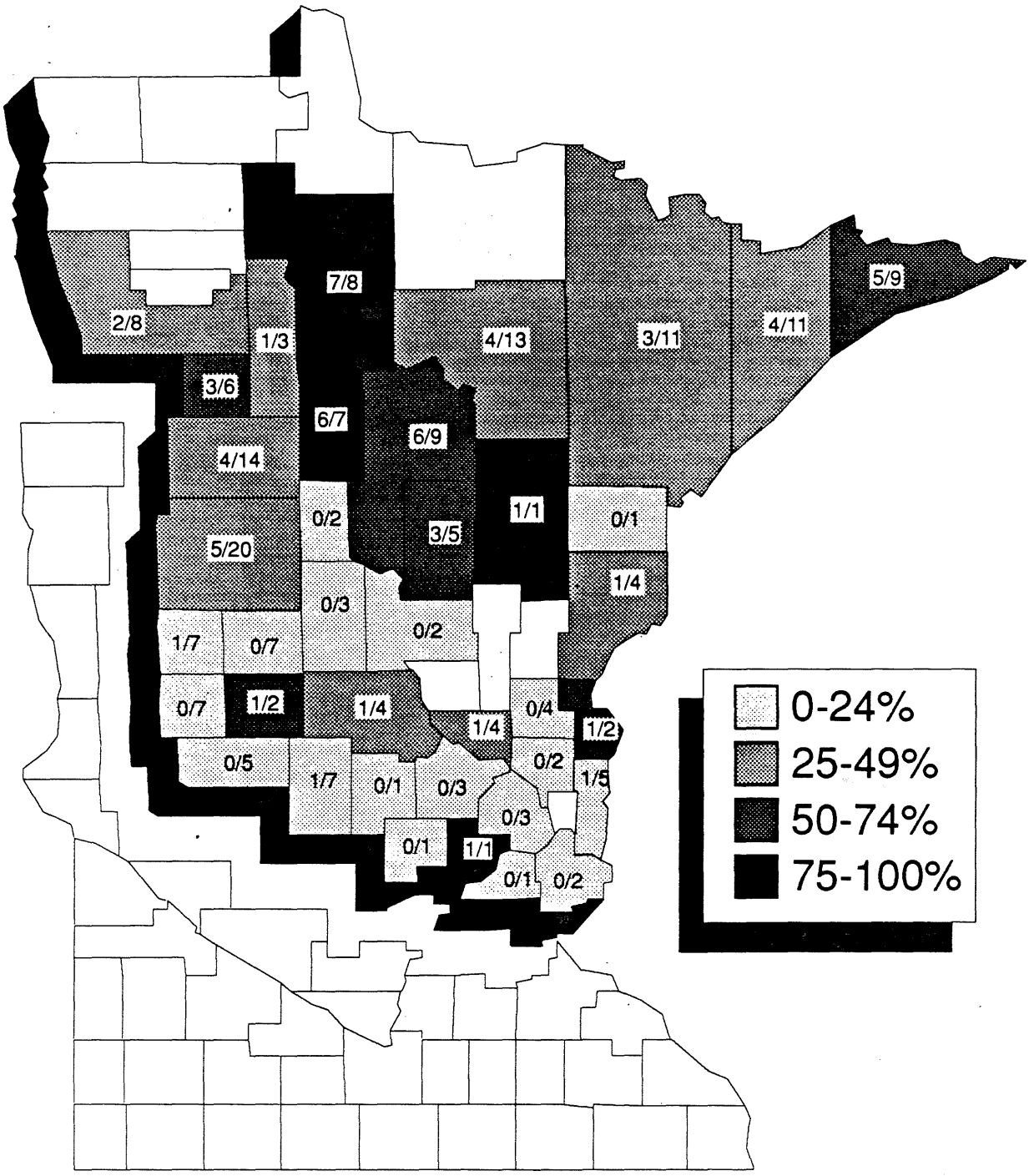


Figure 9.
Occupancy Rate for All 50-149 Acre Lakes Surveyed, by County

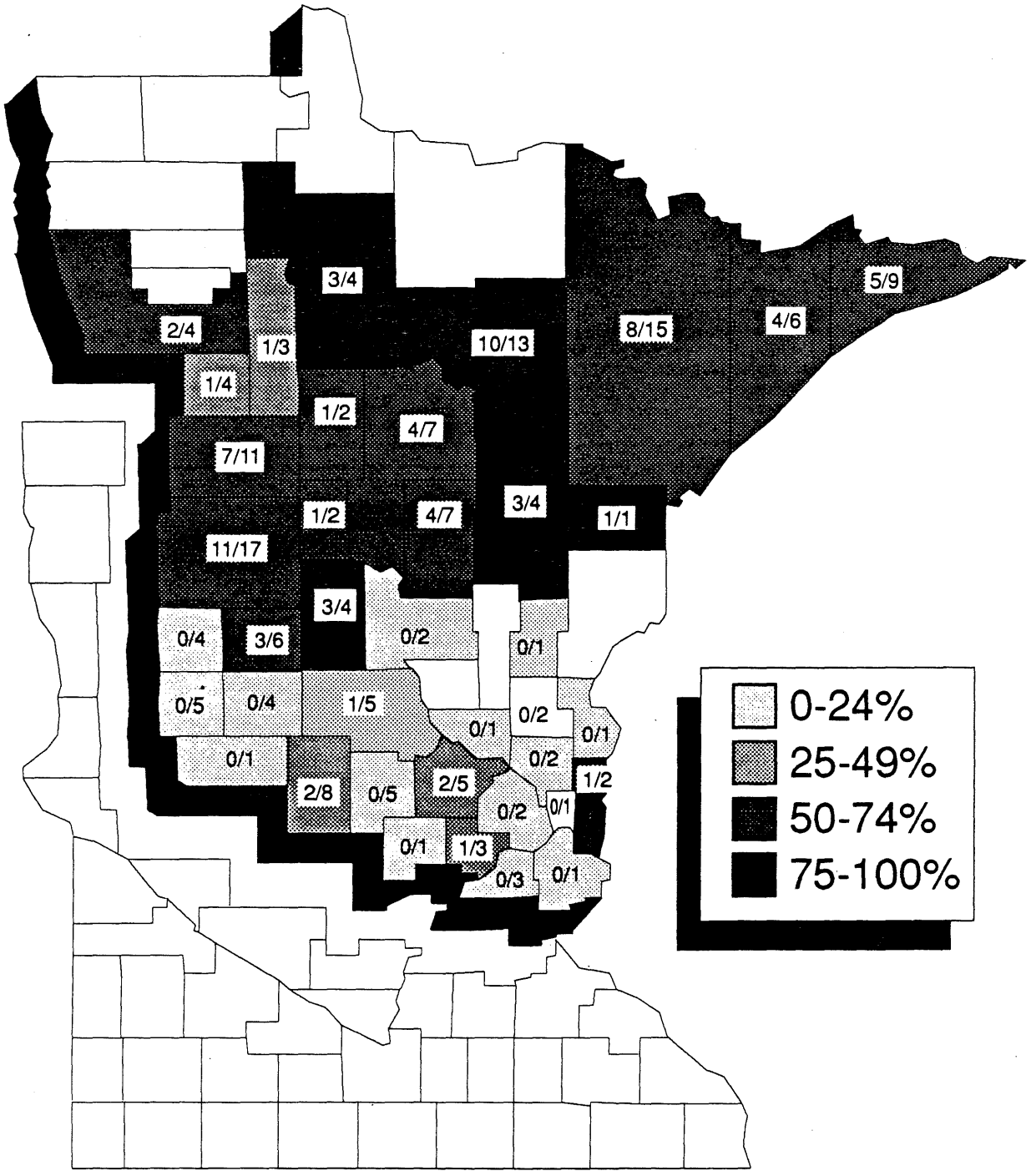


Figure 10.
Occupancy Rate for All 150-499 Acre Lakes Surveyed, by County

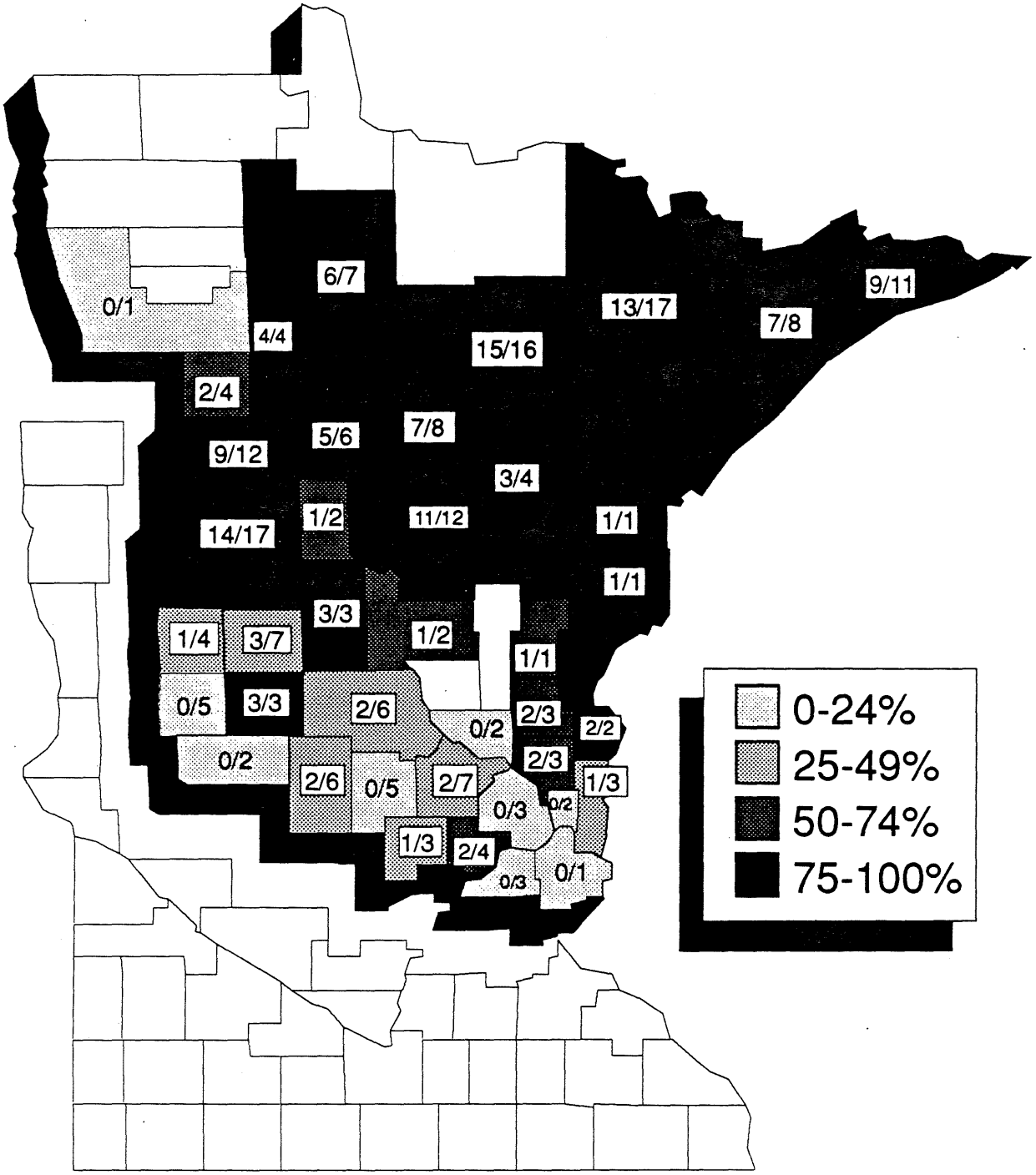


Figure 11.
Occupancy Rate for All >500 Acres Lakes Surveyed, by County

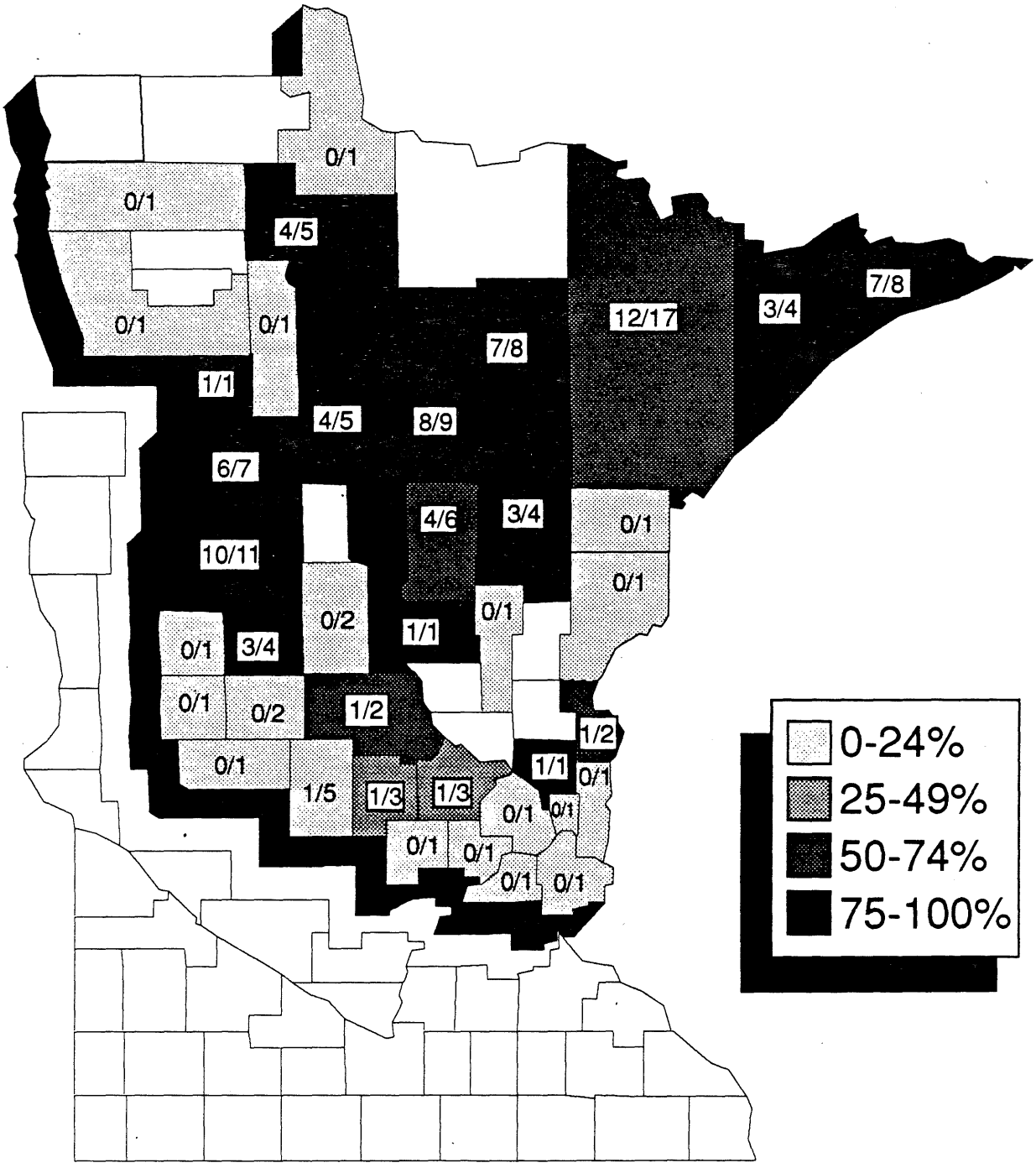


Figure 12.
Number of Common Loons Seen on Lakes Surveyed

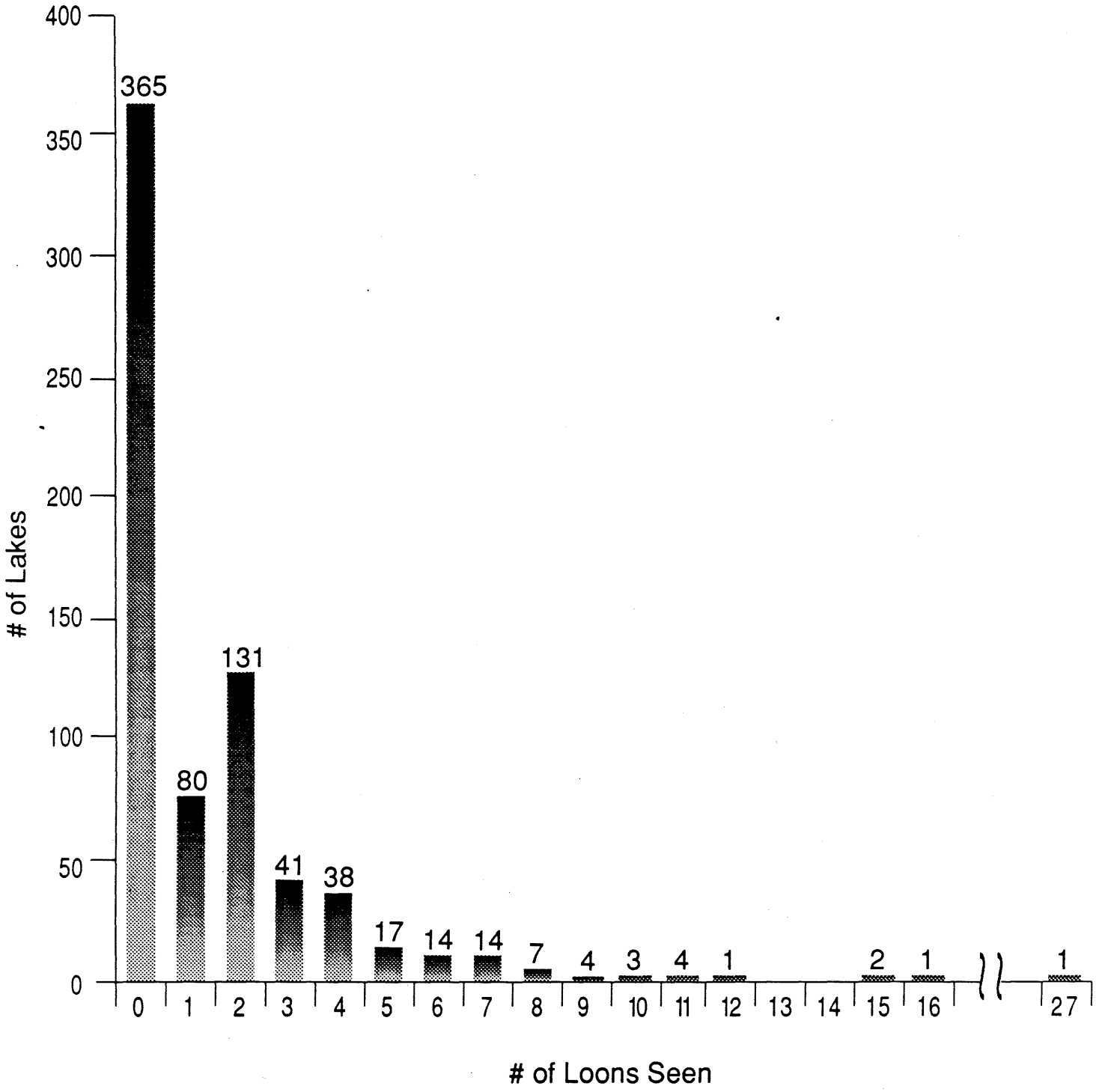


Figure 13.
Average Number of Common Loons Seen on Lakes Surveyed, by Size Class

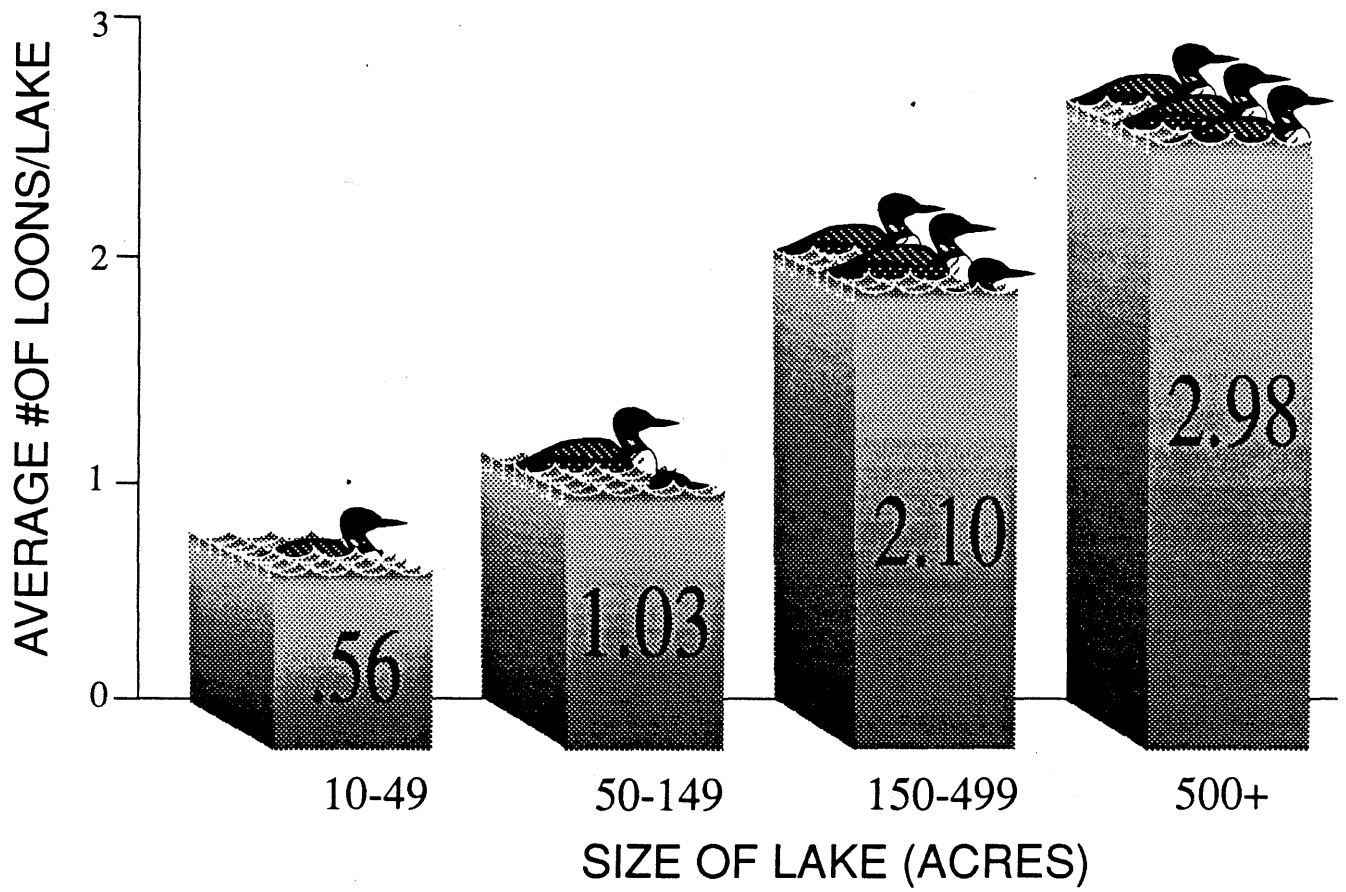


Figure 14.
Percent of Estimated Common Loon Population in Each Size Class

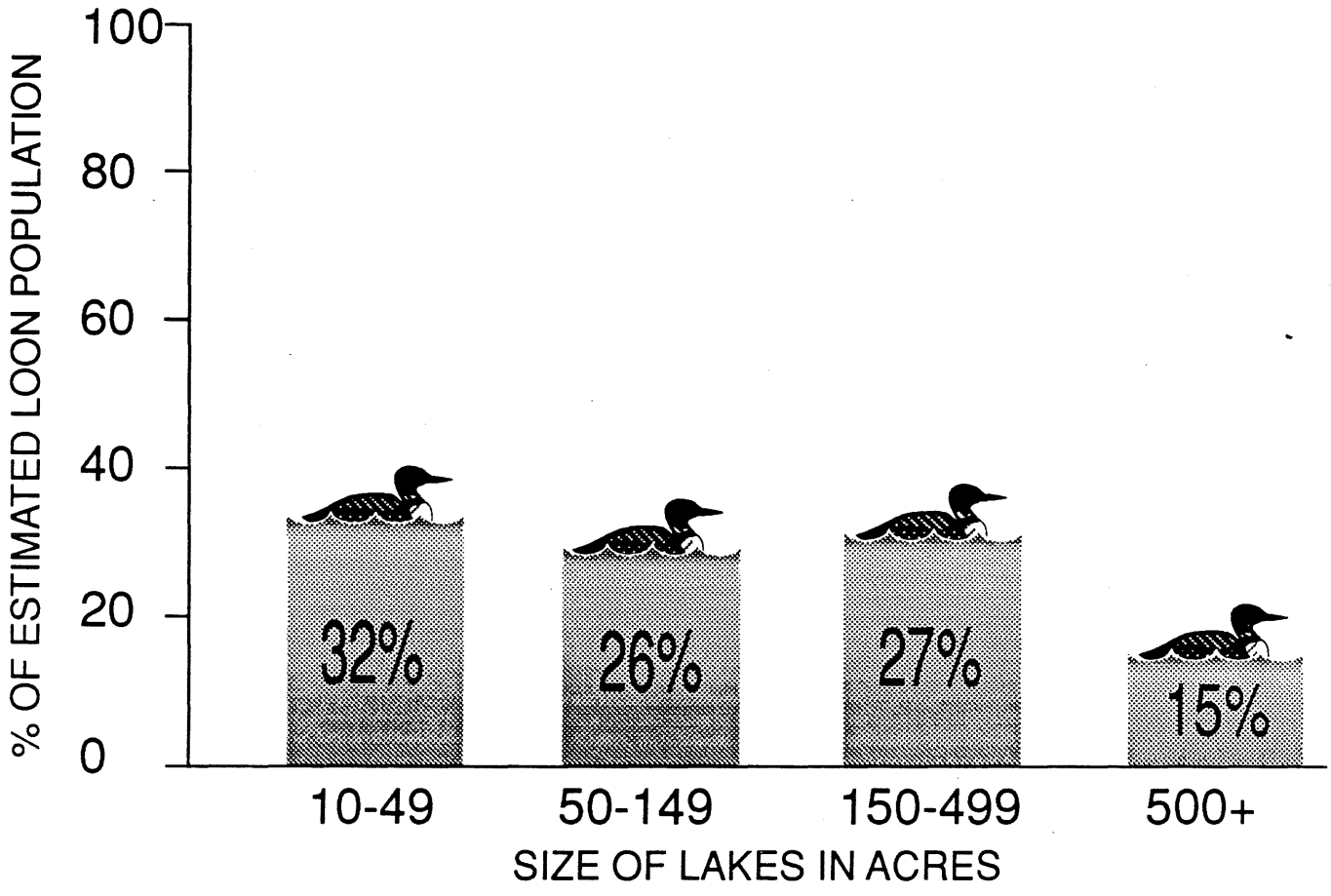


Figure 15.
Estimated Common Loon Population Sizes for the Lower 48 United States

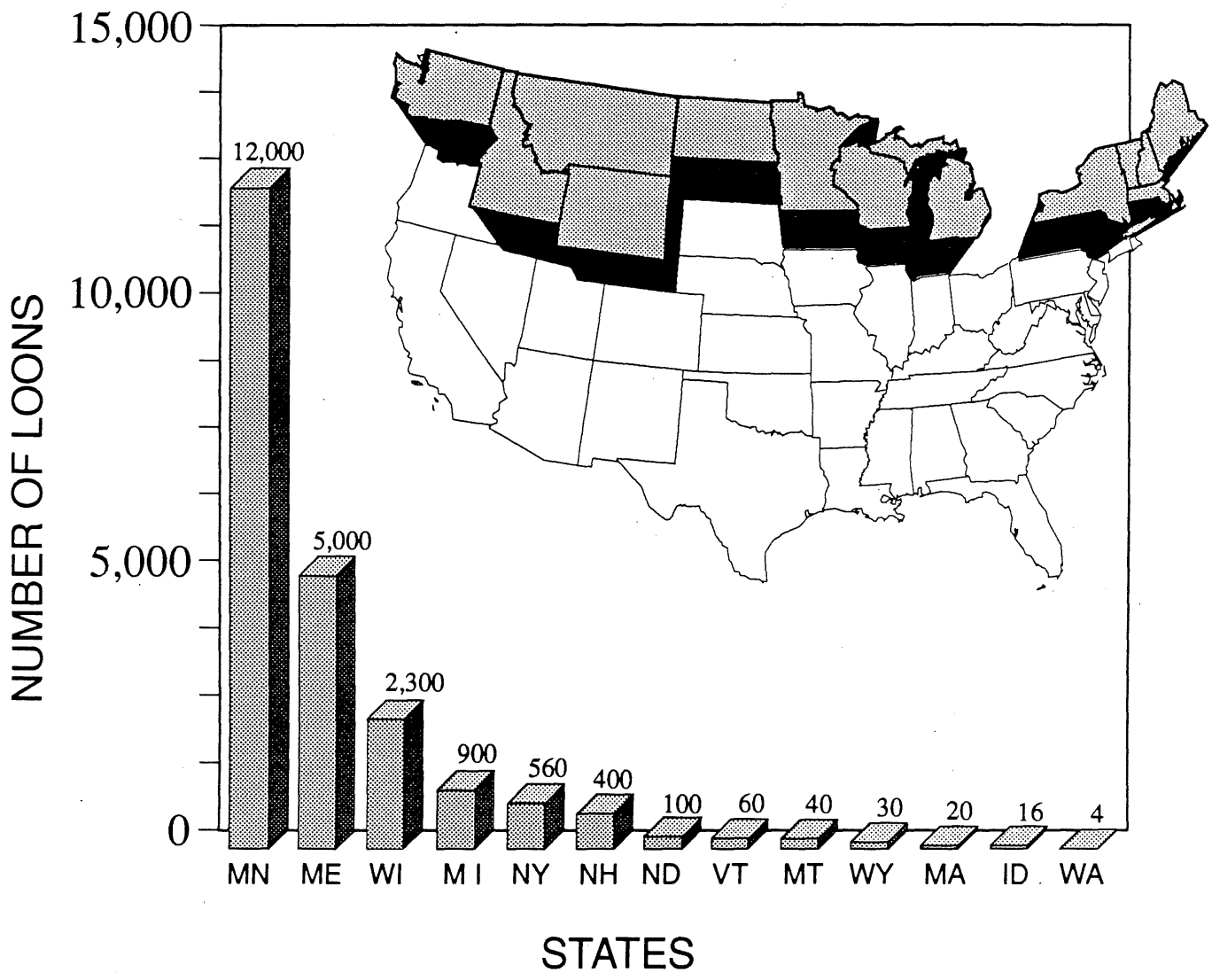


Figure 16.

Percent of Lakes Originally Selected for Survey that Were Dry or Marshy, by Size Class

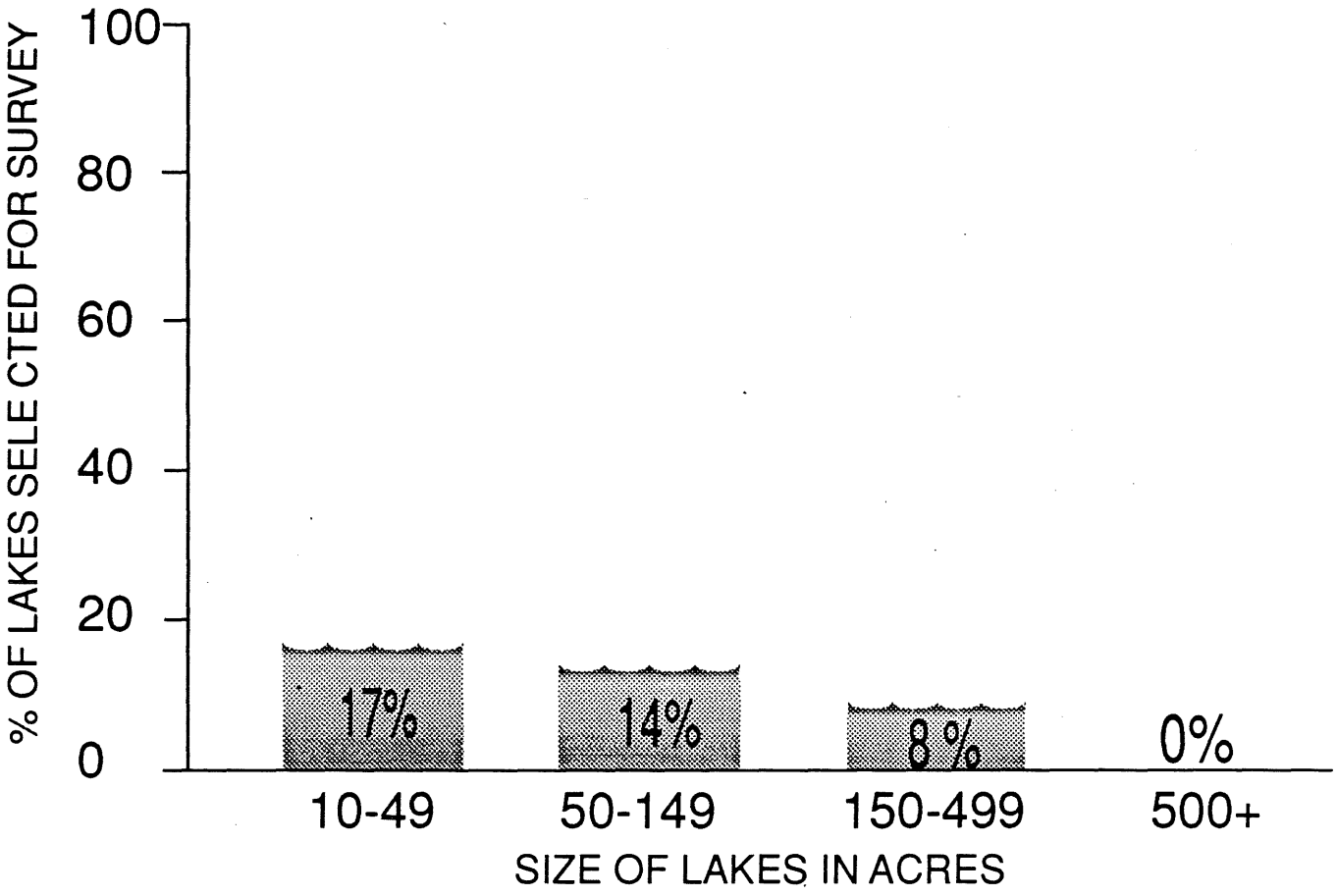
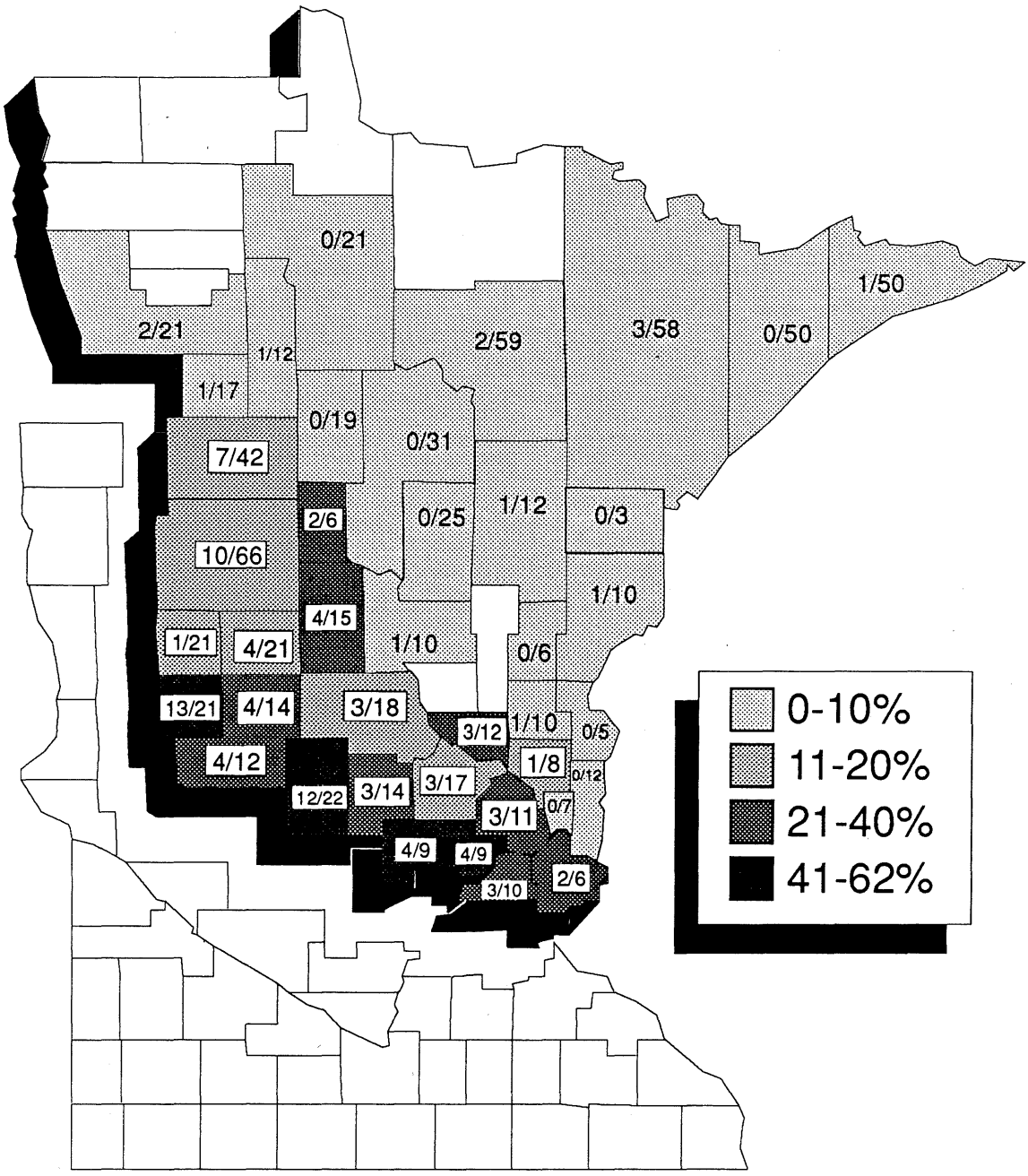


Figure 17.
Distribution of Lakes Originally Selected for Survey that were Dry or Marshy, by County



APPENDIX I. Contents of packet sent to volunteers participating in the 1989 Minnesota Statewide Common Loon Survey.

IF YOU CAN NOT SURVEY THE LAKE, NOTIFY LOONWATCH IMMEDIATELY

1989 MINNESOTA LOON SURVEY REPORTING FORM

LAKE _____ COUNTY _____

LEGAL DESCRIPTION _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE # _____

PLEASE READ THE INSTRUCTIONS FORM BEFORE THE SURVEY!

Date of observation _____

Time of observation: beginning _____ end _____

Number of adult common loons seen on the lake during observation _____

Number of common loon chicks seen on the lake during observation _____

IMPORTANT! If you don't see any loons, indicate 0 - don't leave spaces blank.

Circle all appropriate responses for the following:

Wind/water conditions, in general: calm ripples whitecaps

Cloud cover: rain overcast partly cloudy clear

Visibility: zero poor good excellent

Method of observation: shore boat canoe

Equipment used: binoculars spotting scope

Comments:

IMPORTANT! PLEASE RETURN FORM AND MAP TO *LOONWATCH, SOEI, NORTHLAND COLLEGE, ASHLAND, WI 54806*
THE FIRST MAILING DAY AFTER THE SURVEY.

QUESTIONS? CALL COLLEEN GARDNER OR PAUL STRONG AT 715-682-1489.


MINNESOTA DNR NONGAME WILDLIFE
VOLUNTEER

IF YOU CAN NOT SURVEY THE LAKE FOR ANY REASON, NOTIFY LOONWATCH IMMEDIATELY!

INSTRUCTIONS FOR CONDUCTING THE MINNESOTA LOON SURVEY

Saturday, July 15, 1989 5:00 - 10:00 a.m.
Alternate Bad Weather Date - Saturday, July 22, 1989

Questions? Call Colleen Gardner or Paul Strong at 715-682-1489 during work hours.

Having problems getting onto land, etc.? Contact a Nongame Wildlife Biologist at one of the following DNR offices: Brainerd 218-828-2228; Bemidji 218-755-2976; Grand Rapids 218-327-4421; St. Paul 612-297-2277.

Thanks for participating in the Minnesota Loon Survey! Counting loons on one lake sounds easy and it should be, but there are several things you may have questions about. Please read this form carefully before undertaking the count on July 15.

Am I sure which lake I'm supposed to do?

You should have received a lake assignment and a map of the area. If not, call LoonWatch immediately. Please check to see if you can determine where the lake is and how to get to it. If you know of a different name for the lake, check with LoonWatch or the local DNR office to make sure you have the correct lake.

Should I check out the lake beforehand?

Absolutely! Many of the lakes in the survey do not have public access points or roads directly to them. Take a drive to the lake (unless it's too far away or you live on the lake or you already know about it) to find out where the boat launch is or to secure permission from a shoreline property owner to cross his/her land. Additionally, you should start to formulate a plan for surveying the lake. Do a trial run if you have the time. Don't be concerned if you don't see any loons on this trip. Many of the lakes will not have loons on them, but it is crucial that these lakes be covered. Otherwise, we'll be overly optimistic about the size of the loon population. At the same time, don't let your count on July 15 be biased by numbers of loons seen on visits prior to that date. The number of loons on the lake can change.

What is the best way to survey the lake?

There will be several ways to adequately survey each lake. Most importantly, be sure that you get a look at all parts of the lake during the survey period. Small, round lakes will be easy - you should be able to see the entire lake from one land or water vantage point. Larger lakes that have irregular shorelines and islands will be more difficult. You may need to select several vantage points if you survey from land (Figure 1). If you survey from a boat or canoe, you will need to station yourself in several different areas and/or pick a route that allows you to see all of the lake (Figure 2). Be careful not to double count birds as you move around the lake. Binoculars and/or a spotting scope will be extremely helpful on most lakes. If you have an opportunity to make a trial run, do it. You'll feel more confident come July 15.

FIGURE 1. *Example of vantage points needed to survey an irregularly shaped lake from land.*

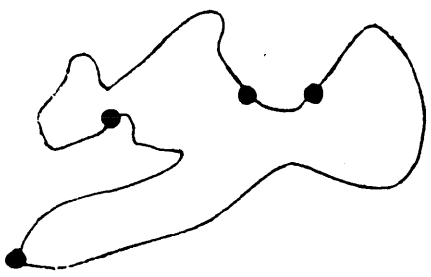
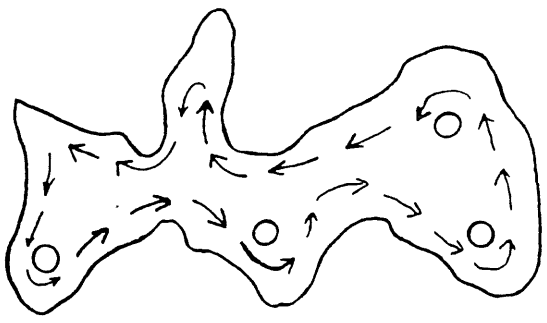


FIGURE 2. *Example of boat route needed to survey an irregularly shaped lake.*

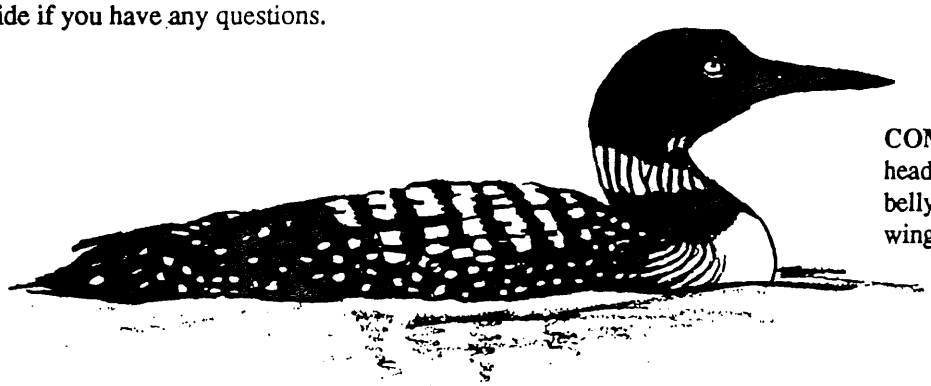


How long should I spend surveying the lake?

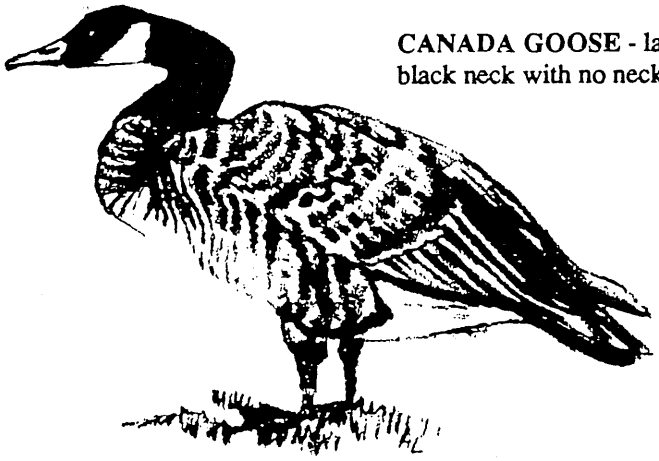
The survey is scheduled for 5:00 - 10:00 a.m. Your survey should be completed within that time. The actual time needed will depend on how long it takes to look over the entire lake. Spend at least 30 minutes at the lake. If you observe from several vantage points, spend at least 5 minutes at each. Seeing loons can be tricky so don't hurry. Stop the survey any time after 30 minutes when you feel that you have seen all that there is to see. Early morning hours will be best in most cases because the water will be calmer during that time.

Are there any birds that I could possibly confuse with an adult common loon?

Yes. Although adult common loons are quite distinctive, distance, poor observation conditions, and lack of familiarity with other species could cause you to misidentify other birds. Some birds you might have specific problems with include the Canada goose, red-breasted merganser, common merganser, double-crested cormorant, red-necked grebe, western grebe, and immature common loon. Please study the drawings on this form and read the following text to ensure that you can distinguish these birds from a common loon. Consult a field guide if you have any questions.



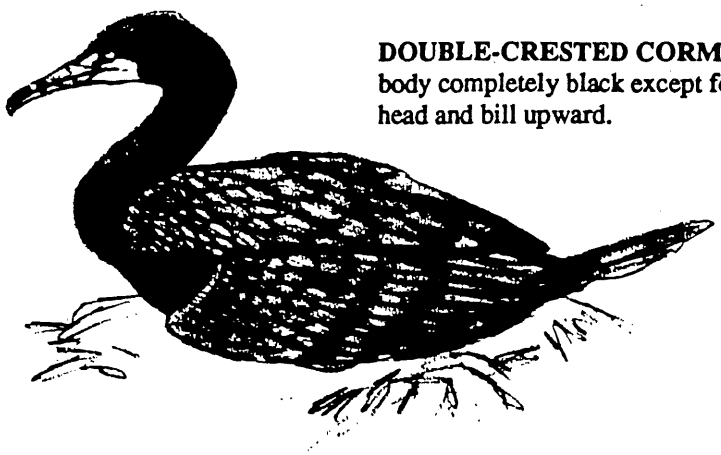
COMMON LOON - sits low in the water, jet black head and bill, black neck with white stripes, white belly, black back with white dots on the back and wings, body length 2-3 feet.



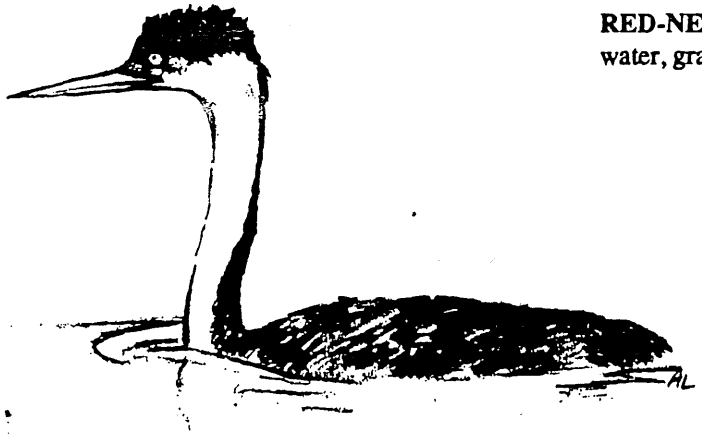
CANADA GOOSE - larger than a loon, sits higher in the water, black neck with no necklace stripes, solid white cheek patch.

RED-BREASTED MERGANSER - half as large as common loon, similar silhouette, sexes different, females are dull gray with rusty head, males have green head, white neck, and rusty breast, both sexes have crests on the back of the head and bright orange bills.

COMMON MERGANSER - similar to red-breasted merganser, but lacks rusty breast.

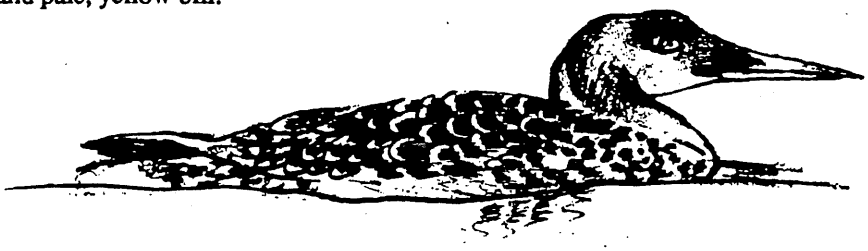


DOUBLE-CRESTED CORMORANT - similar in size and shape to loon, sits low in water, body completely black except for orange throat pouch, when swimming points its head and bill upward.



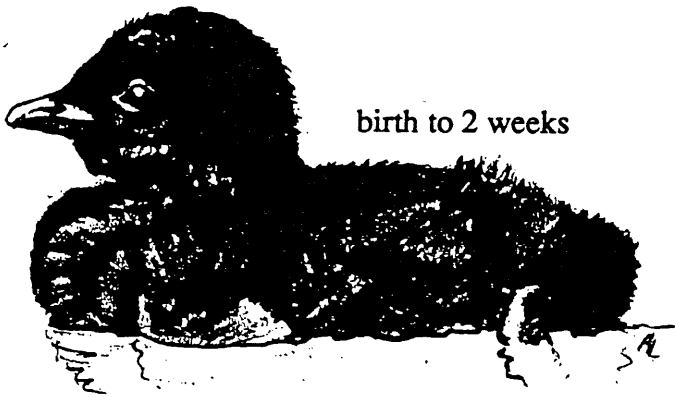
RED-NECKED GREBE - smaller than loon, similar silhouette, sits low in water, gray body, red neck, and white throat and cheek.

WESTERN GREBE - nearly as large as loon, similar silhouette, sits low in water, solid black body, long, white neck, and pale, yellow bill.



IMMATURE COMMON LOON - rarely seen in Minnesota during the summer, same shape and size as adult loons, plumage is gray or brown, white belly, but not black head with white stripes.

Loon chicks



birth to 2 weeks

2 to 6 weeks

What should I do if I observe a loon nest?

You should try to stay as far away as possible from nests to reduce disturbance. If you see a loon on land, incubating eggs on the nest, include it in your count. However, do not actively search for loon nests.

What should I do if loons leave or fly in to the lake I'm watching?

Do not include loons that you see fly in to the lake during your count. However, include all loons that fly off if they were on the lake when you started your observation. If you are not sure, be conservative and count only those loons you are sure were on the lake.

What if I don't see any loons on the lake?

Your number to report will be zero. Please indicate that no loons were seen. Do not simply leave the space blank. The compilers won't know if you didn't see any loons or if you forgot to write in a number.

What if I hear a loon, but don't see one?

Count only the loons you see, but use calls to help you spot hard to see loons. If you don't see a loon on the lake, but hear one calling, stay at the lake for a while. The loon may appear.

What do I do if the weather is so bad that I can't get out on the lake or see the loons?

If the weather is bad at the beginning of the observation period, stick around. It may get better. (Bring doughnuts, coffee, and the morning paper to fight off the temptation to leave.) If the fog, wind, and or rain don't let up, you have two choices - come back again the next Saturday morning or if that is not possible, count the best you can and indicate that weather prevented a good survey. Be sure to indicate bad weather conditions on your reporting form. Do not conduct a postponement count on any day but Saturday, July 22.

What is the correct way to fill out the form and map?

The form should be filled out completely and returned to LoonWatch. On the map you received, please indicate where you observed from (boat route and/or vantage points) and where loons were seen. Please put the form in the mail as soon as possible unless you postponed the count because of weather. Please return the form even if you were unable to conduct the count. Return the form and map to **LoonWatch, Sigurd Olson Environmental Institute, Northland College, Ashland, WI 54806-3999 by July 24.**

REMEMBER

1. Have fun.
2. Be careful - wear life vests if you go in a boat or canoe.
3. Try to avoid disturbing the loons as you count them.
4. Bring binoculars, spotting scope, pencil, reporting form, map, instructions form, bird book.

APPENDIX II. List of lakes surveyed, with associated data.

FIELD	EXPLANATION OF DATA/CODES
County Name:	County in which lake occurs.
Lake Number:	From Bulletin 25. First digit (in 5 digit #) or first two digits (in 6 digit #) refers to county; last four digits is a unique lake number within that county.
Lake Area:	From Bulletin 25; in acres.
Township/s:	From Bulletin 25.
Range/s:	From Bulletin 25.
Section/s:	From Bulletin 25.
Lake Name:	From Bulletin 25, unless updated from county (MNDOT) or USGS maps.
Survey Length:	Number of minutes surveyor spent at lake; not recorded for lakes surveyed aerially.
Survey Date:	Not entered (but available) for lakes surveyed aerially.
# Adults:	Number of adult loons seen.
# Juv's:	Number of juvenile loons seen. Not required from volunteer surveyors, and not recorded for lakes surveyed aerially.
# Groups:	Number of groups in which loons were seen. Not required from volunteer surveyors and not recorded for all lakes surveyed aerially.
Largest Group:	Size of largest group in which loons were seen. Not required from volunteer surveyors and not recorded for all lakes surveyed aerially.
Surface Cond.:	Surface Condition: C=calm; R=ripples; W=whitecaps.
Cloud Cover:	R=rain; O=overcast; PC=partly cloudy; C=clear.
Visib.:	Visibility: Z=zero; P=poor; G=good; E=excellent.
Observ. Method:	Observation Method: S=shore; B=boat; C=canoe.
Equip. Used:	Equipment Used: B=binoculars; S=spotting scope.

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
AITKIN																	
	10019	168	50,51	22	5,6;32	WOLF	90	7/15	2	0	1	2	R	C	E	S	B
	10028	81	47	23	8,9	STARVATION	135	7/15	2	0	1	2	C	C	E	B	B
	10072	333	48	24	16,21,22,27,28	ROCK	105	7/15	1	0	1	1	C	C	E	C	B
	10074	63	48	24	28,29,32	TURNER	105	7/15	0	0	0	0	C	C	E	S	B
	10085	153	45	25	20,29	TWENTY	45	7/15	0	0	0	0	C	C	E	C	B
	10092	276	46	25	26	SWAMP		7/15	2	0	1	2	C	C	E	B	B
	10107	97	49	25	8,9,16,17	RED	20	7/15	2	0	1	2	C	C	G	S	B
	10136	819	49	26	9-11,14-16	WAUKENABO			1	0			*******	surveyed aerially			*******
	10148	780	50	26,27	18,19;13,24	WHITE ELK			0	0			*******	surveyed aerially			*******
	10159	2025	45,46	27	4-6;28,29,31-33	FARM ISLAND			5	0			*******	surveyed aerially			*******
	10160	107	46	27	3	THREE	30	7/15	2	0	1	2	C	C	E	C	B
	10164	20	46	27	6	CHRISTMAS	30	7/15	1	0	0	0	C	C	E	S	B
	10178	523	46	27	23-26	SPIRIT			2	0			*******	surveyed aerially			*******
ANOKA																	
	20013	220	31	22	30,31	BALDWIN	45	7/15	3	0	1	3	C	PC	G	C	B
	20014	178	31	22	35	AMELIA	240	7/15	0	0	0	0	C	PC	E	S	B
	20045	50	31	23	25,36	GOLDEN	180	7/15	0	0	0	0	C	C	E	C	B
	20065	324	34	23	25,26,35,36	FISH	60	7/15	3	0	2	2	C	C	E	S	B
	20080	23	30	24	NC26	SULLIVAN	15	7/15	0	0	0	0	C	C	E	S	B
	20091	542	33	24	8-10,15-17	GEORGE			1	0			*******	surveyed aerially			*******
	20107	22	31	25	C1	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	20110	136	32	25	17-20	ITASCA	30	7/15	0	0	0	0	C	PC	G	S	B
BECKER																	
	30017	643	141	36	11,13,14,23	TWO INLETS			0				*******	surveyed aerially			*******
	30030	401	141,142	36	5;29,32	BOOT	135	7/15	4	0	1	4	C	C	E	B	B
	30040	52	142	36	19	** UNNAMED **	90	7/15	0	0	0	0	C	C	E	S	B
	30061	48	139	37	SW23	BRANCH	30	7/15	1	2	1	1	C	C	E	S	B
	30097	72	142	37	27,28,33	SOCKEYE		7/15	2	0	1	2	C	C	P	C	-
	30107	1810	139	38	4,8-10,15-17,20,21	TOAD			2				*******	surveyed aerially			*******
	30114	18	139	38	NE29	** UNNAMED **	135	7/15	4	0	3	2	C	O	E	B	B
	30115	50	139	38	SC29	** UNNAMED **	25	7/15	0	0	0	0	C	C	E	S	BS
	30123	36	140	38	16	JONES	30	7/15	0	0	0	0	C	C	E	S	B
	30153	1209	140	38,39	7,18,19,30;13,24	ISLAND			11		2	5	*******	surveyed aerially			*******
	30154	33	140	38,39	30;25	TWENTYFIVE	180	7/15	0	0	0	0	C	C	E	S	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
BECKER (cont.)																	
	30157	122	141	38,39	30;25,36	TEA CRACKER	60	7/15	2	0	1	2	C	C	E	C	B
	30168	28	138	39	6	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	30181	14	139	39	C12	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	30187	144	139	39	21,22,27,28	MUD		7/15	0	0	0	0	C	C	E	S	B
	30195	3943	139,140	39	2-5,9-11;26-28,32-34	HEIGHT OF LAND			7		1	3	*******	surveyed aerially			*******
	30206	493	141	39	3,4,9,10	UPPER EGG	45	7/15	2	1	1	2	R	PC	G	B	B
	30209	217	141	39	9,16	CARMAN	30	7/15	2	1	1	2	C	PC	G	S	B
	30213	249	141	39	14	WABOOSE	40		2	0	1	2	C	C	G	B	B
	30214	185	141	39	15,16	SPINDLER	30	7/15	0	0	0	0	C	PC	E	S	BS
	30238	21	142	39	27	** UNNAMED **	15	7/15	0	0	0	0	R	PC	E	S	B
	30241	2227	140	39,40	18,19,30,31;12-14,23-25,36	TAMARACK			2				*******	surveyed aerially			*******
	30292	148	140	40	11,12	BALSAM	25	7/15	1	0	1	1	C	C	E	S	B
	30318	124	141	40	28,29,32,33	EAGEN	210	7/15	2	0	1	2	C	PC	G	S	BS
	30319	87	141	40	29,30,31	BLACKBERRY	60	7/15	2	0	1	2	C	C	G	C	B
	30328	2074	142	40	4,5,8-10,15-17,20,21	WHITE EARTH			9		1	3	*******	surveyed aerially			*******
	30337	87	142	40	21,22	LITTLE BASS	25	7/15	1	0	1	1	C	C	E	S	BS
	30374	313	138	41	22,26,27,34,35	REEVES	45	7/15	4	4	2	2	C	C	G	B	B
	30383	434	138,139	41	5;29-32	LONG	240	7/15	2	1	1	2	R	C	E	B	B
	30387	1212	139	41	3,4,9,10,15,16	FLOYD			4				*******	surveyed aerially			*******
	30421	22	140	41	SE29	SEABOLD	45	7/15	2	0	1	2	C	C	E	S	B
	30428	121	141	41	10,15	O-ME-MEE	120	7/15	1	0	1	1	C	C	E	B	B
	30430	192	141	41	13,14,23,24	ST CLAIR	300	7/15	6	0	1	6	C	C	E	C	B
	30464	41	142	41	SE20	** UNNAMED **	40	7/15	0	0	0	0	C	C	E	S	B
	30468	31	142	41	SC26	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	B	B
	30471	263	142	41	35,36	MISSION	60	7/15	0	0	0	0	C	C	E	C	B
	30486	218	138	42	11-14	PEARL	90	7/15	2	2	1	2	C	C	E	S	B
	30579	305	139	42,43	7;1,12	BOYER	80	7/15	0	0	0	0	C	C	E	S	B
	30580	20	139	42,43	19;13,24	** UNNAMED **	15		0	0	0	0	C	C	E	S	B
	30612	43	139	43	C1	LITTLE BOYER	40	7/15	1	0	1	1	C	C	E	C	B
	30616	17	139	43	SE6	** UNNAMED **	35	7/15	0	0	0	0	C	C	E	S	B
	30620	11	139	43	NW8	** UNNAMED **	55	7/15	0	0	0	0	C	C	E	S	B
	30632	50	139	43	22,23	PRUNE	75	7/15	0	0	0	0	C	PC	G	S	B
	30638	229	139	43	29,30,32	BESEAU	90	7/15	4	3	2	2	C	C	E	B	B
	30650	58	140	43	NW27	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B

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BELTRAMI																	
	40007	1850	146,147	30	4-8;31-33	KITCHI			2				*******	surveyed aerially			*******
	40021	27	148	30	27,34	BAUMGARTNER	60	7/15	1	0	1	1	C	C	E	S	B
	40023	89	148	30	30	HOLLAND	80	7/15	0	0	0	0	C	C	E	S	B
	40038	1448	146	31	7,8,17-20,30,31	ANDRUSIA			3				*******	surveyed aerially			*******
	40040	35	146	31	9,10	BLUE SKY	35	7/15	2	0	1	2	C	C	E	S	B
	40042	352	146	31	12-14,23,24	BUCK		7/15	0	0	1	4	C	C	E	C	B
	40048	184	146	31	35,36	WINDIGO	120	7/15	4	0	1	4	C	C	E	C	B
	40052	48	147	31	30-32	JESSIE	55	7/15	2		1	2	C	C	E	C	B
	40056	33	148	31	8,17	CARTER		7/15	1	0	0	0	C	C	G	S	B
	40120	2148	148,149	32	1-4,11;26,27,34,35	GULL			3		1	3	*******	surveyed aerially			*******
	40125	223	149	32	23-26	LOON	30	7/15	2	1	1	2	C	C	E	S	B
	40142	578	146	33	20,29;30-32	MARQUETTE			0				*******	surveyed aerially			*******
	40155	464	148	33	8,16,17,20,21	LITTLE TURTLE	35	7/15	6	0	3	3	C	C	E	B	B
	40159	1584	148	33	15,16,21,22,27,28,33	TURTLE			5		1	3	*******	surveyed aerially			*******
	40162	154	148	33	22,23,26,27	FOX	90	7/15	4	4	2	2	C	O	E	B	B
	40178	126	149	33	26,27,34,35	STRAND	60	7/15	2	0	1	2	C	C	G	S	B
	40183	21	150	33	11,14	WENDING	120	7/15	5	2	2	3	C	PC	E	C	B
	40230	287	148	34	5,8	DEER	60	7/15	4	0	2	2	C	C	G	B	B
	40232	28	148	34	11,14	** UNNAMED **		7/15	0	0	0	0	C	C	E	S	B
	40293	15	148	35	5	** UNNAMED **	150	7/15	3	0	1	3	C	C	E	S	B
	40309	154	149	35	26,27,35	WHITEFISH	180	7/15	2	2	1	2	C	C	E	B	B
	40312	90	150	35	2,3,10,11	SANDY	30	7/15	2	0	1	2	C	C	E	C	B
	40313	30	150	35	4	PINE ISLAND	90	7/15	4	4	2	2	C	C	E	B	B
	40321	58	150	35	17,18	MOLLISON	60	7/15	2	0	1	2	C	PC	G	S	B
CARLTON																	
	90014	27	47	17,18	N7;12	FLODEEN	90	7/15	0	0	0	0	C	C	E	C	B
	90036	796	48,49	18,19	6,29,30,31;1;36	PERCH			0	0			*******	surveyed aerially			*******
	90060	456	48,49	20	3,4,9,10;33,34	ISLAND	60	7/15	1	0	1	1	C	C	G	B	B
	90070	62	48	21	17,18	** UNNAMED **	60	7/15	2	0	1	2	C	C	E	S	S

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CARVER																	
	100005	10	115	23	9	** UNNAMED **	30	7/15	2	0	1	2	C	C	E	C	B
	100007	137	116	23	2,3,10,11	LUCY	105	7/15	0	0	0	0	C	C	E	B	B
	100014	236	116	23	21,22	HAZELTINE	90	7/15	1	0	1	2	C	C	E	C	B
	100029	145	115	24	7,8	MILLER	110	7/15	0	0	0	0	R	PC	E	S	B
	100048	277	116	24	14,22,23	WASSERMANN	120	7/15	0	0	0	0	C	PC	G	S	B
	100059	3196	116	24,25	6,7,18;1,2,10-15	WACONIA			0	0			*******	surveyed aerially			*******
	100067	187	115	25	5-8	BARLOUS	75	7/15	0	0	0	0	C	PC	G	S	B
	100095	423	117	25	15,21,22,23	SWEDE	285	7/15	3	0	1	3	C	C	E	B	B
	100104	95	117	25,26	30;24,25	LIPPERT	120	7/15	1	0	1	1	R	C	G	B	B
CASS																	
	110014	39	140	25	28,29	LOON		7/15	2	0	1	1	R	C	E	S	S
	110074	20	141	26	8	ODODIKOSSI	120	7/15	1	0	1	1	C	C	E	S	B
	110084	37	142	26	5-8	DEWEY	90	7/15	0	0	0	0	C	C	E	S	B
	110098	18	143	26	WC27	LOWER MENTON	90	7/15	0	0	0	0	R	C	E	S	B
	110104	1424	140,141	26,27	5,6;29-32;25,36	LAURA			0	0			*******	surveyed aerially			*******
	110120	935	140,141	27	5-8,17,18;29,32	INGUADONA			5	1	1	3	*******	surveyed aerially			*******
	110124	100	141	27	13,24	WAX	45	7/15	2	0	1	2	C	C	E	S	B
	110129	592	141	27	26,27,34,35	LOWER TRELIPE			7	2	1	6	*******	surveyed aerially			*******
	110133	339	142	27	15,16,21,22,26,27	SWIFT	90	7/15	5	1	3	2	C	C	E	B	B
	110201	5360	140,141	28,29	various	WOMAN			15	2	3	5	*******	surveyed aerially			*******
	110215	28	134	29	SE32	BASS	20	7/15	4	0	1	4	C	C	G	C	-
	110222	230	135	29	17,20,29	MARGARET	105	7/15	3	0	2	2	C	PC	G	B	B
	110232	592	138,139	29	6;29,30,31,32	HATTIE			8	0	1	5	*******	surveyed aerially			*******
	110234	380	139	29	3,9,10,15,16	PONTO	60	7/15	5	0	1	5	C	C	E	B	B
	110244	57	139	29	NW15	ONE	30	7/15	2	1	1	2	C	C	E	S	B
	110267	36	140	29	SC16	** UNNAMED **	90	7/15	2	0	1	2	C	C	E	C	-
	110274	761	140	29	25,26,34-36	BLACK WATER			2	1			*******	surveyed aerially			*******
	110282	484	140,141	29	3,4,10;33,34	MANN	60	7/15	9	0	5	3	C	C	E	B	B
	110289	121	141	29	11,14	CEDAR	60	7/15	0	0	0	0	C	C	E	S	B
	110307	498	138	29,30	29,30,31;26,36	NORWAY	120	7/15	3	1	2	2	C	C	E	S	O
	110308	956	139	29,30	7,18;13,14,23,24	BIG PORTAGE			2	0			*******	surveyed aerially			*******
	110337	305	137	30	5,8	RICE	180	7/15	0	0	0	0	R	C	E	C	B
	110345	105	138	30	17,18	COW	210	7/15	0	0	0	0	C	C	E	S	B
	110371	523	140	30	4,5,8,9	STONY			7	1	1	6	*******	surveyed aerially			*******
	110382	100	140	30	21,22	BOSS	120	7/15	0	0	0	0	C	PC	G	C	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
CASS (cont.)																	
	110384	135	140	30	22,23	LONG	105	7/15	2	0	1	2	C	C	P	S	-
	110405	20	142	30	34	NOMAD	30	7/15	0	0	0	0	C	C	E	S	B
	110422	41	136	31	4	** UNNAMED **	40	7/15	2	0	1	2	C	C	E	S	B
	110452	12	139	31	10	** UNNAMED **	270	7/15	1	0	1	1	R	PC	G	S	B
	110463	146	140	31	32,33	VARIETY	45	7/15	2	1	1	2	R	PC	E	B	B
	110480	218	141,142	31	4;27,28,33,34	LONG	50	7/15	3	0	1	3	C	C	E	C	B
	110493	191	144	31	25,26	WELSH	150	7/15	2	0	1	2	C	C	G	B	B
	110504	1761	144	31,32	19,20,29,30;24,25	STEAMBOAT			2				*******	surveyed aerially			*******
CHISAGO																	
	130001	206	33	19	6,7	BLOOMS	50	7/15	1	0	1	1	C	C	E	S	B
	130032	760	34	20	15,16,21,22,27,28,34	NORTH CENTER			0	0			*******	surveyed aerially			*******
	130042	65	33	20,21	31;36	BIRCH	60	7/15	0	0	0	0	R	C	E	B	B
	130046	19	33	21	WC12	EMILY	120	7/15	0	0	0	0	R	C	E	S	B
	130060	263	34	21	28	MUD	210	7/15	5	0	1	5	C	C	G	S	B
	130083	710	36,37	22	3,4,9,10,15;34	GOOSE			2	0			*******	surveyed aerially			*******
	130088	30	37	22	29,30	STAUFFER	105	7/15	1	0	1	1	C	C	E	S	B
CLEARWATER																	
	150001	240	144	35,36	7,18;12,13	BIG LASALLE	180	7/15	1	0	1	1	C	C	E	C	B
	150003	77	150	35,36	30;25	PICKEREL	30	7/15	2	0	1	2	C	C	E	C	B
	150010	306	143	36	15,22,23	ELK		7/15	2	0	1	2	C	C	E	S	B
	150020	90	144	36	29,30	SUCKER	60	7/15	0	0	0	0	C	C	G	C	B
	150027	455	148	36	9,10,15	EAST FOUR LEGGED		7/15	8	0	2	7	C	C	E	S	B
	150033	11	149	36	SE7	***UNNAMED**		7/15	0	0	0	0	C	C	E	C	B
	150037	182	149	36	18-20	NELS OLSON	90	7/15	6	0	1	6	C	C	E	B	B
	150048	24	150	36	22,23	BORG	40	7/15	0	0	0	0	C	C	E	C	B
	150075	131	144	37	8,17	ROCKSTAD	60	7/15	0	0	0	0	C	C	E	B	B
	150130	2375	144,145	38	2,3;14,15,22,23,26,27,34,35	LOWER RICE			0				*******	surveyed aerially			*******
	150138	46	147	38	23-26	SABE	40	7/15	8	0	2	5	C	C	G	S	B

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COOK																	
	160019	411	63	3E	16,21,22,26-28	TOM	150	7/15	5	0	3	3	R	C	G	B	B
	160031	16	64	3E	21	LOFT	300	7/15	0	0	0	0	R	C	E	B	B
	160035	101	64,65	3E	3;33,34	JOHN	120	7/15	1	2	1	1	C	C	G	C	B
	160055	31	63	2E	10,11	SECTION TEN	90	7/15	1	0	1	1	C	C	E	S	B
	160077	2078	64	2E	21-28,34	GREENWOOD			3	0			*******	surveyed aerially			*******
	160087	61	65	2E	30,31	GOGEBIC	120	7/15	3	2	2	2	R	C	E	S	B
	160089	443	63	2,1E	29-33;25	NORTHERN LIGHT		7/15	0	0	0	0	C	C	E	B	B
	160143	1873	62	1E,1W	30,31;25-29,34,35	DEVIL TRACK			5	0			*******	surveyed aerially			*******
	160145	173	63	1E,1W	30,31;25,36	EAST TWIN	300	7/15	1	0	1	1	C	C	G	B	B
	160156	858	62	1W	3-5,8,9	TWO ISLAND			4	0	1	3	*******	surveyed aerially			*******
	160202	18	64	1W	9	SQUINT	0	7/15	0	0	0	0	0	0	0	0	0
	160238	95	63	1,2W	31;36	HAND	30	7/15	0	0	0	0	C	PC	E	S	B
	160240	297	64	1,2W	18,19;13	CARIBOU	240	7/15	2	0	1	2	R	C	E	C	B
	160245	108	65	1,2W	30;25	DUNN	160	7/15	4	0	2	2	C	C	E	S	B
	160252	850	61	2W	9,10,15-19	PIKE			3	0			*******	surveyed aerially			*******
	160299	316	64	2W	5,7-9	RUSH	120	7/15	2	0	1	2	C	C	E	C	B
	160318	76	64	2W	21,22	PILLSBERRY	180	7/15	0	0	0	0	R	C	E	C	B
	160343	10	65	2W	34	SURBER	30	7/15	0	0	0	0	C	C	E	S	B
	160345	70	62	2,3W	6;1	TOMASH	270	7/15	3	0	1	3	R	C	G	C	B
	160346	534	62	2,3W	6,7;12,13	CASCADE			2	0			*******	surveyed aerially			*******
	160360	714	60,61	3W	1,2,11,12;35,36	CARIBOU			0	0			*******	surveyed aerially			*******
	160381	23	62	3W	14	JOCK MOCK	90	7/15	0	0	0	0	C	C	E	C	B
	160382	306	62	3W	16,20,21	LICHEN	120	7/15	2	0	1	2	R	C	E	C	B
	160454	836	62	3,4W	19,20,29-31;24,25,36	CRESCENT			7	2			*******	surveyed aerially			*******
	160476	188	62	4W	2,10	KELLY	60	7/15	0	0	0	0	C	C	G	C	B
	160489	64	62	4W	23,24	MOORE	60	7/15	0	0	0	0	C	C	G	B	B
	160526	46	64	4W	2,11	CROSS BAY	420	7/15	2	0	1	2	C	C	G	C	B
	160537	10	64	4W	9	HUBBUB	30	7/15	2	1	1	2	C	C	E	C	B
	160569	167	64	4W	25,26,35,36	GORDON	300	7/15	6	0	1	6	C	C	E	B	0
	160597	40	65	4W	29	MINE	300	7/15	1	0	1	1	R	C	E	S	B
	160606	168	65	4W	33,34	ROUND BEAR	45	7/15	2	0	1	2	C	0	G	B	B
	160639	593	60	5W	4,8-10,16,17	FOURMILE			3	0	1	3	*******	surveyed aerially			*******
	160686	294	63	5W	10,11,14,15	WINE	240	7/15	8	0	2	5	R	C	E	C	B
	160726	80	64	5W	12	OWL	30	7/15	4	3	2	2	R	C	E	C	B
	160793	464	65,66	5W	4,5;28,29,32-34	RED ROCK	30	7/15	8	2	5	3	C	C	E	C	0

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
CROW WING																	
	180007	33	43	28	13,14,23,24	** UNNAMED **	120	7/15	2	0	1	2	C	C	E	S	B
	180041	462	45	28	16,17,19-21,29,30	CROOKED	120	7/15	6	2	3	3	C	C	E	B	B
	180076	196	46	28	28,33	LONG	75	7/15	2	1	1	2	C	C	E	C	B
	180080	102	46	28	35,36	GOOSE	75	7/15	5	0	1	5	C	C	E	S	B
	180087	68	47	28	36	** UNNAMED **	180	7/15	2	0	1	2	C	C	G	S	B
	180105	193	45	29	15,22	POINTON	165	7/15	4	0	1	4	C	C	E	B	B
	180123	256	46	29	25,26,36	CROCKER	60	7/15	3	2	2	2	C	C	E	B	B
	180136	1380	44	29,30	18;13,14,22-24,26,27	LONG			2	0			*******	surveyed aerially			*******
	180183	256	137	25,26	7,18;13	ISLAND	120	7/15	4	1	2	2	C	C	E	B	B
	180195	264	137	26	17-20	DOLNEY	135	7/15	2	0	1	2	C	C	P	S	B
	180199	43	137	26	23,24	LITTLE BASS	50	7/15	0	0	0	0	C	C	E	S	B
	180203	675	137,138	26	2,3;26,27,34,35	EMILY			0	0			*******	surveyed aerially			*******
	180221	32	138,139	26	6;31	WOOD	180	7/15	1	0	1	1	C	C	E	B	B
	180225	322	136,137	26,27	6;31,32;1	ADNEY	75	7/15	3	0	1	3	C	C	E	B	B
	180247	181	136	27	9,16	FLANDERS	240	7/15	1	1	1	1	C	PC	G	C	B
	180254	94	136	27	S21	LITTLE BASS	150	7/15	7	0	1	7	C	C	G	S	B
	180304	181	135	27,28	6,7;1,12	PERCH	120	7/15	0	0	0	0	C	PC	E	C	B
	180315	1486	137,138	27,28	various	BIG TROUT			11	0	1	6	*******	surveyed aerially			*******
	180332	50	135	28	16,21	GUIDA	30	7/15	0	0	0	0	R	C	E	S	B
	180345	23	136	28	2	** UNNAMED **	15	7/15	0	0	0	0	C	O	G	S	B
	180363	21	137	28	27,34	STRAWBERRY	45	7/15	1	0	1	1	C	C	E	S	B
	180373	1706	134,135	28,29	6;31;1,2;35,36	ROUND			1	2			*******	surveyed aerially			*******
	180378	720	137	28,29	18,19,30;13,24,25	LOWER HAY			0	0			*******	surveyed aerially			*******
	180381	57	133	29	11-14	RUSH	30	7/15	0	0	0	0	C	C	G	S	B
	180382	139	133	29	14,15	** UNNAMED **	35	7/15	0.	0	0	0	C	C	G	S	B
	180386	569	133,134	29	1,2;35,36	RED SAND			5	0			*******	surveyed aerially			*******
	180399	213	135	29	11,14	NISSWA	25	7/15	3	0	1	3	C	C	P	B	B
	180404	412	136	29	9,10,15,16,22	SIBLEY	45	7/15	5	2	3	4	C	C	E	B	B
	180405	85	136	29	NE13	RICE	120	7/15	1	0	1	1	C	C	G	S	B
	180415	190	138,139	29	1,2;35,36	JAIL	50	7/15	4	0	2	3	R	C	E	S	B

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DAKOTA																	
	190011	41	115	19	20,21	KEGAN	120	7/15	0	0	0	0	C	PC	E	S	B
	190021	113	115	20	20,29	ALIMAGNET	150	7/15	0	0	0	0	C	PC	E	C	B
	190027	290	114,115	20,21	31,32;36;6	CRYSTAL	65	7/15	0	0	0	0	R	PC	G	B	B
	190033	23	115	21	25,26	EARLEY	120	7/15	0	0	0	0	R	C	E	S	B
	190078	519	27,28	23	4,5;32,33	GUN CLUB			0	0			*******	surveyed	aerially		*******
DOUGLAS																	
	210049	210	127	37	4,5;32,33	BURGEN	90	7/15	2	0	1	2	C	C	E	B	B
	210056	1892	128,129	37	4-6,8,9;32-34	LE HOMME DIEU			2	2			*******	surveyed	aerially		*******
	210057	3017	128,129	37	19-21,29-32	CARLOS			0	0			*******	surveyed	aerially		*******
	210067	76	130	37	2	** UNNAMED **	120	7/15	4	4	2	2	R	C	E	S	B
	210071	10	130	37	NW5	** UNNAMED **	45	7/15	0	0	0	0	C	C	E	S	B
	210081	220	128	37,38	18,19;23-26	WINONA	140	7/15	0	0	0	0	C	C	E	C	B
	210086	103	127	38	15,16	MUD	90	7/15	2	2	1	2	C	C	E	S	B
	210089	246	127	38	25-27	LONG	120	7/15	0	0	0	0	C	C	E	S	0
	210090	269	127	38	25,26,35,36	TURTLE	150	7/15	0	0	0	0	C	PC	E	S	B
	210105	98	128	38	14,15	LOTTIE	150	7/15	2	2	1	2	C	C	E	C	B
	210108	447	128	38	16,17,19,20	MINA	120	7/15	10	2	4	4	C	C	E	B	B
	210144	1293	128	38,39	19,30;13,22-27	LOBSTER			6	0	1	5	*******	surveyed	aerially		*******
	210157	104	127	39	11,14,15	ECHO	60	7/15	0	0	0	0	C	C	E	C	0
	210173	11	127	39	SC29	** UNNAMED **	80	7/15	0	0	0	0	C	C	E	S	B
	210177	40	127	39	34	WEST OLAF	70	7/15	0	0	0	0	C	C	E	C	B
	210209	28	129	39	C7	** UNNAMED **	90	7/15	0	0	0	0	C	C	E	S	B
	210234	24	130	39	3	** UNNAMED **	80	7/15	0	0	0	0	C	C	E	S	B
	210257	1018	127	39,40	4-9;1,12	OSCAR			5	0	1	3	*******	surveyed	aerially		*******
	210271	35	127	40	9	** UNNAMED **	300	7/15	0	0	0	0	C	PC	G	S	B
	210293	104	128	40	1,2,11	AMOS	60	7/15	0	0	0	0	C	PC	E	S	B
	210299	48	128	40	9	** UNNAMED **	100	7/15	0	0	0	0	C	C	E	S	B
	210305	193	128	40	14,15,22	VENUS	75	7/15	0	0	0	0	C	PC	E	B	B
	210313	72	128	40	21,28	** UNNAMED **	105	7/15	0	0	0	0	C	C	E	B	B
	210353	208	130	40	8,9,17	ANKA	60	7/15	3	0	2	2	C	C	E	B	B

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GRANT																	
	260030	90	128	41	20,21	TURTLE	130	7/15	0	0	0	0	R	C	E	S	B
	260040	171	128	41	26,27,34,35	ELK	150	7/15	0	0	0	0	C	PC	E	S	B
	260052	19	129	41	NC11	** UNNAMED **	120	7/15	2	2	1	2	C	C	E	C	B
	260062	17	129	41	SW26	** UNNAMED **	90	7/15	0	0	0	0	C	C	E	S	B
	260071	56	130	41	C3	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	260087	31	130	41	29,30	** UNNAMED **	30	7/15	0	0	0	0	C	PC	E	S	S
	260114	93	127	42	33,34,35	SHAUER	120	7/15	0	0	0	0	C	C	E	S	B
	260117	1291	128	42	8-10,15-17,21,22	CORMORANT			0	0			*******	surveyed aerially			*******
	260137	37	129	42	EC1	** UNNAMED **	35	7/15	0	0	0	0	C	C	E	S	B
	260149	403	129	42	29,30,31,32	ROUND	40	7/15	0	0	0	0	R	PC	G	S	B
	260166	75	130	42	11,14	HORSESHOE	100	7/15	0	0	0	0	C	C	G	S	B
	260194	262	127	43	7,8,17,18	BIG	120	7/15	4	5	2	2	R	C	E	S	B
	260218	162	127	43	33,34	** UNNAMED **	270	7/15	0	0	0	0	C	C	E	S	B
	260235	106	128	43	19,29,30	MUSTINKA RIVER	180	7/15	0	0	0	0	C	C	E	S	B
	260237	48	128	43	20,21,28,29	PRESCOTT	60	7/15	0	0	0	0	C	C	E	S	B
	260246	25	128	43	27,28	** UNNAMED **	15	7/15	0	0	0	0	C	C	E	S	B
	260280	42	130	43	14,23	** UNNAMED **	30	7/15	0	0	0	0	C	C	G	S	B
HENNEPIN																	
	270052	38	117	21	SW7	HANNAN	45	7/15	0	0	0	0	C	PC	E	S	O
	270066	91	120	21,22	30;25	LEMANS	40	7/15	0	0	0	0	C	PC	E	S	S
	270104	924	118	22	14,23-26	MEDICINE			0	0			*******	surveyed aerially			*******
	270111	470	118,119	22	1,2;25,35,36	EAGLE	90	7/15	0	0	0	0	C	C	E	S	B
	270119	88	119	22	26,27	CEDAR ISLAND	60	7/15	0	0	0	0	C	C	E	C	O
	270125	408	120	22	17-19	DIAMOND	60	7/15	0	0	0	0	C	C	E	C	B
	270138	10	117	23	SW1	PEAVY	75	7/15	0	0	0	0	C	C	E	S	B
	270154	497	118	23	19,20,29,30	KATRINA	140	7/15	0	0	0	0	R	PC	E	C	B
	270156	11	118	23	SE21	THIES	300	7/15	0	0	0	0	C	PC	E	C	B
HUBBARD																	
	290022	71	140,141	32	1,2;35,36	STEEL	30	7/15	7	0	1	7	C	C	E	B	B
	290043	180	141	32	23-26	SHINGOBEE	30	7/15	0	0	0	0	C	PC	E	B	B
	290061	984	143,144	32	4,5,8,9,16;32,33	GARFIELD			0				*******	surveyed aerially			*******
	290075	2607	142,143	32,33	various	KABEKONA			16		3	4	*******	surveyed aerially			*******
	290079	38	139	33	NW5	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	290097	222	140,141	33	4-6;31-33	CLAUSENS	75	7/15	1	1	1	1	C	PC	E	B	B
	290132	21	143	33	34,35	BASS	180	7/15	2	0	1	2	C	O	P	S	B

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HUBBARD (cont.)																	
	290136	38	144	33	14	HORSEHEAD	60	7/15	3	0	1	3	C	C	E	S	B
	290143	327	139	33,34	6,7;1,12	STONY	120	7/15	3	1	2	2	C	C	E	B	B
	290146	1252	140	33,34	7-10,16-20;13,24	BELLE TAINE			12		2	3	*******	surveyed		aerially	*******
	290148	505	141	33,34	7;1,12,13	UPPER BOTTLE			3		1	3	*******	surveyed		aerially	*******
	290157	693	138,139	34	6;30,31	NORTH TWIN			4		1	4	*******	surveyed		aerially	*******
	290160	41	139	34	15,16	** UNNAMED **	90	7/15	7	1	2	5	C	C	E	S	B
	290162	301	140	34	1,2	BULL	110	7/15	10	0	3	8	C	C	G	C	B
	290164	114	140	34	8,17	SWEITZER	35	7/15	0	0	0	0	C	C	E	S	B
	290193	10	142	34	SW1	** UNNAMED **	35	7/15	1	0	1	1	C	PC	G	S	B
	290212	198	142	34	29,30	SKUNK	195	7/15	3	1	2	2	C	C	E	B	B
	290261	24	141	35	13,14	** UNNAMED **	90	7/15	2	1	1	2	C	C	E	S	B
	290265	40	141	35	29	BEDEN	30	7/15	2	0	1	2	C	C	G	C	O
	290286	150	143	35	2,10,11	ALICE	270	7/15	3	0	2	2	C	C	E	B	B
ISANTI																	
	300006	39	34	22	12	HURLEY	30	7/15	0	0	0	0	C	PC	G	S	B
	300009	273	34	22	21,22,28	TYPO	125	7/15	2	0	1	2	C	PC	E	B	B
	300014	33	35	22	2,10	SPRING	210	7/15	0	0	0	0	C	C	E	S	B
	300034	13	35	23	4	** UNNAMED **	30	7/15	0	0	0	0	C	PC	G	S	B
	300039	59	35	23	17	** UNNAMED **	130	7/15	0	0	0	0	C	PC	P	S	B
	300041	30	35	23	25	** UNNAMED **	90	7/15	0	0	0	0	C	C	G	S	B
	300057	208	37	23	4,5,8	UPPER RICE	90	7/15	0	0	0	0	C	C	E	S	B
	300113	164	35	25	17,19,20	TENNYSON	240	7/15	1	0	1	1	C	C	G	C	B
	300140	142	37	25	3,10	KRONE	30	7/15	0	0	0	0	C	C	E	S	S
ITASCA																	
	310002	11	55	22;21	36;30	** UNNAMED **	45	7/15	0	0	0	0	R	C	E	S	B
	310122	34	57	23	20,21,28	THIRD SUCKER	60	7/15	0	0	0	0	C	C	E	C	B
	310124	211	57	23	28,33,34	SUCKER	55	7/15	0	0	0	0	C	PC	G	C	B
	310137	163	58	23	21	KENNEDY	60	7/15	2	1	1	2	R	C	E	C	B
	310154	271	59	23	30,31	HARTLEY	60	7/15	1	1	1	1	R	C	E	C	B
	310179	24	62	23	C18	** UNNAMED **	30	7/15	2	0	1	2	R	C	E	C	B
	310185	10	62	23	EC27	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	310201	115	54	24	11,13,14	RICE	75	7/15	0	0	0	0	C	C	E	S	B
	310224	14	56	24	17	MOONSHINE	45	7/15	0	0	0	0	C	C	E	C	B
	310227	146	56	24	23,25,26	HOLMAN	90	7/15	0	0	0	0	R	C	E	S	B
	310252	63	58	24	18,19	** UNNAMED **	60	7/14	2	1	1	2	R	C	E	S	B

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ITASCA (cont.)																	
	310306	53	60	24	30,31	LITTLE ANTLER	50	7/15	0	0	0	0	C	C	E	C	B
	310317	190	61	24	16,21	LARSON	10	7/15	10	0	4	3	C	C	E	S	B
	310328	37	62	24	10	ELBOW	50	7/15	0	0	0	0	C	C	E	C	B
	310337	18	62	24	21,22	** UNNAMED **	50	7/15	2	0	1	2	C	C	E	S	B
	310356	576	53,54	25	1,2,11,12;36	COWHORN			1	0			*******	surveyed aerially			*******
	310372	41	55	25	16	ICE	60	7/15	0	0	0	0	C	C	E	S	B
	310406	73	57	25	32,33	ISLAND	45	7/15	4	1	2	2	C	C	E	S	B
	310530	237	62	25	13,14,23	BUSTIES	50	7/15	3	0	1	3	C	C	E	S	B
	310541	20	59	25,26	18;13	LITTLE BASS	65	7/15	0	0	0	0	C	C	E	S	B
	310554	1350	54	26	16-21	SISEEBAKWET			4	1			*******	surveyed aerially			*******
	310567	39	55	26	16	LOST	90	7/15	0	0	0	0	C	C	E	S	B
	310575	158	55,56	26	2;35,36	LITTLE BASS	60	7/15	3	0	1	3	C	C	E	B	B
	310576	2844	55,56	26	various	BASS			11	1	1	4	*******	surveyed aerially			*******
	310578	28	56	26	3,4	CLARKE	40	7/15	1	0	0	0	C	PC	E	B	S
	310586	437	57	26	1,2,11-13	JOHNSON	150	7/15	6	1	4	3	C	C	E	B	B
	310590	53	57	26	4,5,9	BEAVER	90	7/15	3	0	2	2	C	C	G	C	B
	310597	186	57	26	9,10,15,16	AMEN	20	7/15	7	4	3	3	C	C	E	B	B
	310609	174	57	26	17-20	FAWN	90	7/15	3	0	1	3	C	C	E	C	B
	310613	274	57,58	26	1;25,26,35,36	LITTLE LONG	90	7/15	5	2	3	2	C	C	E	B	B
	310629	64	58	26	12,13	FLY	270	7/15	2	1	1	2	C	PC	E	C	B
	310653	907	58,59	26	4,5;28,29,32,33	NORTH STAR			4	1			*******	surveyed aerially			*******
	310656	234	59	26	2,11	BIG DICK	100	7/15	2	1	1	2	C	C	E	B	B
	310658	85	59	26	3,10,11	LITTLE DICK	240	7/15	2	2	1	2	C	PC	G	S	B
	310696	269	60	26	19,30	HORSESHOE	60	7/15	8	1	2	6	C	C	E	C	B
	310736	57	54	27	14,15,22	SKELLY	240	7/15	2	1	1	2	C	C	E	B	B
	310771	245	60	27	22,23,26,27	HATCH	30	7/15	7	0	3	3	C	C	E	B	B
	310782	172	60;149	27;25	3,4;24	GUNDERSON	60	7/15	4	0	2	2	C	C	G	C	B
	310789	121	148	25	8	SPRING	60	7/15	2	2	1	2	C	C	G	S	B
	310800	73	149	25	10,15	DAVID	210	7/15	2	0	1	2	C	R	G	B	O
	310814	378	148,149	25,26	6;31;1;36	FOUR TOWNS	240	7/15	11	2	3	8	C	PC	E	B	B
	310826	3785	147,148	26	various	SAND			8	3	1	4	*******	surveyed aerially			*******
	310827	12	148	26	3	** UNNAMED **	90	7/15	0	0	0	0	C	PC	G	S	B
	310838	39	149	26	12,13	DOGFISH	185	7/15	2	1	1	2	C	C	E	S	B
	310876	911	148,149	27	1,2;35,36	RICE			0	0			*******	surveyed aerially			*******
	310906	58	148	28	23,26	VIRGIN	120	7/15	2	0	1	2	C	C	E	S	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
ITASCA (cont.)																	
	310907	70	148	28	32	SIOUX	60	7/15	1	0	1	1	C	C	E	S	B
	310910	222	149	28	5,6,8	SHALLOW POND	90	7/15	3	1	2	2	C	PC	G	B	B
	310913	2920	150	28	various	ISLAND			2	0			*******	surveyed aerially			*******
	310921	666	148	28,29	30,31;24,25,36	DIXON			2	0			*******	surveyed aerially			*******
KANABEC																	
	330030	132	38	24	13	PENNINGTON	90	7/15	0	0	0	0	C	C	E	C	B
	330040	363	39,40	24,25	various	ANN	180	7/15	1	0	1	1	C	C	E	B	B
KANDIYOHI																	
	340007	53	118	33	SW1,12	** UNNAMED **	60	7/15	0	0	0	0	C	PC	E	S	B
	340022	1153	118,119	33	2,3,4;34,35	ELIZABETH			0	0			*******	surveyed aerially			*******
	340051	324	120	33	26,27,34,35	WHEELER	105	7/15	0	0	0	0	C	O	E	S	B
	340054	44	120	33	27,28,33,34	HUBBARD	45	7/15	0	0	0	0	C	C	E	B	B
	340068	29	122	33	22	REAMER	70	7/15	0	0	0	0	C	C	E	S	B
	340069	30	122	33	27	** UNNAMED **	75	7/15	0	0	0	0	C	PC	E	S	B
	340078	55	120	33,34	18,19;13	BASS	40	7/15	0	0	0	0	C	PC	E	S	B
	340079	5821	120,121	33,34	various	GREEN			7	0	2	3	*******	surveyed aerially			*******
	340105	469	119	34	25,35,36	KASOTA	270	7/15	0	0	0	0	R	PC	E	S	B
	340106	269	119	34	26,27,34,35	SWAN	140	7/15	0	0	0	0	C	PC	E	S	B
	340111	40	120	34	C1	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	340139	41	120	34	33	BURR OAK	120	7/15	0	0	0	0	C	PC	G	S	B
	340148	140	121	34	7	BEAR	90	7/15	2	0	1	2	C	C	E	C	B
	340154	1019	121	34	20-22,27-29,32,33	NEST			0	0			*******	surveyed aerially			*******
	340192	1715	120	35	11-15,22,23	LONG			0	0			*******	surveyed aerially			*******
	340207	63	121	35	3	HENCHIEN	60	7/15	4	2	2	2	C	PC	E	S	B
	340208	440	121	35	3,4,9,10	MIDDLE	150	7/15	3	0	1	3	R	C	E	C	B
	340221	47	121	35	36	** UNNAMED **	120	7/15	1	0	0	0	C	C	E	S	S
	340245	560	120	35,36	19,30;24,25	WEST SOLOMON			0	0			*******	surveyed aerially			*******
	340249	109	121	35,36	18,19;13,24	MARY	120	7/15	0	0	0	0	C	PC	E	S	B
	340292	63	120	36	22,23	CHURCH	105	7/15	0	0	0	0	C	C	E	C	B
	340316	230	121	36	21-23,27,28	HENJUM	300	7/15	0	0	0	0	C	C	E	S	B
	340321	123	121	36	24,25	SWENSON	85	7/15	0	0	0	0	C	C	G	S	B
	340322	57	121	36	25	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	340324	37	121	36	27,28,33	** UNNAMED **	120		0	0	0	0	C	PC	E	S	B
	340352	205	122	36	21,22	GLESNE	60	7/15	1	0	1	1	C	PC	E	C	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
LAKE																	
	380023	55	59	6	8,17	SHOEPACK	120	7/15	0	0	0	0	C	C	E	C	B
	380026	48	59	6	11,14	HARE	75	7/15	3	0	1	3	C	C	E	S	B
	380040	29	60	6	SW2,11	BESHO	210	7/15	1	0	1	1	R	O	P	C	B
	380047	666	60	6	15,16,21-23,26	WILSON			5	0	1	3	*******	surveyed aerially			*******
	380066	307	61	6	21,28,29	T	210	7/15	0	0	0	0	C	C	E	C	B
	380068	469	61	6	26-28,34	WINDY	300	7/15	1	0	1	1	C	C	E	S	B
	380210	122	66	6	23-26	ASHDICK	105	7/15	2	0	1	2	R	C	E	C	B
	380219	1294	60,61	6,7	5;19,20,29-32,25,36	SILVER ISLAND			1	0			*******	surveyed aerially			*******
	380267	29	60	7	24	SCANLON	60	7/15	0	0	0	0	C	C	E	S	B
	380324	98	63	7	1,2,11,12	BOW		7/15	2	2	1	2	C	O	G	O	B
	380336	157	63	7	11	AMBER	150	7/15	2	0	1	2	C	C	G	C	O
	380393	476	59,60	7,8	6,7;31;1	DUMBBELL	120	7/15	4	0	1	4	R	C	E	B	B
	380426	10	60	8	16	** UNNAMED **	40	7/15	0	0	0	0	C	C	E	S	B
	380436	10	60	8	33	ELLEN	20	7/12	0	0	0	0	C	C	E	S	B
	380460	37	62	8	20	MARATHON	75	7/13	0	0	0	0	R	C	E	S	B
	380463	88	62	8	27,28	PELT	35	7/13	2	0	1	2	R	PC	G	S	B
	380472	52	63	8	7,18	BECOOSIN	60	7/15	1	0	1	1	R	PC	G	S	B
	380506	13	64	8	EC22	SWING	150	7/15	0	0	0	0	C	C	E	C	B
	380541	22	57	9	20	KARI	30	7/15	1	0	1	1	R	PC	E	S	B
	380622	26	64	9	13	WOODEN LEG	180	7/15	0	0	0	0	C	C	E	S	O
	380640	383	63	9,10	7,18;11-14	OJIBWAY	220	7/15	4	2	3	2	R	O	G	C	B
	380656	1469	58,59	10	4,5,7-9,17-20;32	GREENWOOD			0	0			*******	surveyed aerially			*******
	380679	56	60	10	22,27	CAMPERS	40	7/15	0	0	0	0	R	C	E	S	B
	380682	46	60	10	25,26	LUSTER	60	7/15	0	0	0	0	C	C	E	S	B
	380686	323	60	10	35,36	NORTH McDOUGAL	100	7/15	1	0	1	1	C	C	E	B	B
	380718	316	63	10	15,16,20-22	GREENSTONE	80	7/15	2	0	1	2	R	O	E	C	B
	380735	506	59	10,11	18;13,23-25	SAND			7	0	1	3	*******	surveyed aerially			*******
	380744	264	54	11	4,5,8,9	STEWART	70	7/15	4	0	2	3	C	C	E	C	B
	380761	14	59	11	11,12	FOOLS	180	7/15	2	0	1	2	R	PC	G	S	B
LAKE OF THE WOODS																	
	390004	24	161	34	19	NORQUIST	30	7/15	0	0	0	0	C	PC	G	S	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
MCLOED																	
	430041	482	117	28	28-32	SWAN	150	7/15	2	0	1	2	C	PC	G	S	B
	430060	71	115	29	13,24	CLEAR	45	7/15	0	0	0	0	C	PC	E	S	B
	430071	238	117	29	5,8	TODD	60	7/15	0	0	0	0	C	PC	E	C	B
	430085	729	116,117	29,30	various	OTTER			0	0			*******	surveyed aerially			*******
	430104	160	117	30	10,11,15	STAHL	45	7/15	0	0	0	0	C	PC	E	S	B
	430114	36	117	30	29,30	** UNNAMED **	60	7/15	0	0	0	0	C	O	G	S	B
MAHNOMEN																	
	440008	19	143	39	11,12	** UNNAMED **	90	7/15	4	0	2	2	C	C	E	S	B
	440011	160	143	39	22,27	LITTLE ELBOW	120	7/15	3	0	1	3	C	C	E	B	B
	440023	946	144	39	28-30,32,33	NORTH TWIN			1				*******	surveyed aerially			*******
	440036	162	146	39	12,13	GREER	35	7/15	0	0	0	0	C	C	E	C	B
	440054	30	143	40	5,6	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	440076	103	143	40	21,22,28	CAPON	75	7/15	0	0	0	0	C	C	G	C	B
	440085	43	143	40	31	** UNNAMED **	30	7/15	2	0	1	2	C	C	E	S	B
	440117	74	145	40	NE2	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	440121	213	145	40	10,11,14	SNETSINGER	35	7/15	0	0	0	0	C	C	E	S	B
	440124	31	145	40	14	** UNNAMED **	75	7/15	2	1	1	2	C	C	G	S	B
	440140	43	145	40	28,33	CIRCLE	30		0	0	0	0	C	C	E	C	B
	440179	498	145,146	40,41	6,7;31;1;36	VANOSE	40	7/15	4	0	3	2	C	C	E	C	B
	440199	60	143	41	25	BARK	120	7/15	2	0	1	2	C	C	E	S	B
	440208	145	144	41	10,11	SANDY	80	7/15	1	0	0	0	C	C	E	B	B
	440227	82	145	41	17,20	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	440253	28	143	42	NW1	** UNNAMED **	180	7/15	0	0	0	0	C	PC	G	S	B
MARSHALL																	
	450002	23700	156,157	41,42	various	MUD			0				*******	surveyed aerially			*******
MEEKER																	
	470001	140	118	28,29	18;12,13	MAPLE	105	7/15	0	0	0	0	C	C	E	C	B
	470004	377	117,118	29	2;35	BYRON	195	7/15	0	0	0	0	C	PC	E	C	B
	470016	296	118	29	22,23,26,27	WOLF	285	7/15	0	0	0	0	C	C	E	S	B
	470029	56	119	29	20,21	HART	100	7/15	0	0	0	0	C	PC	G	S	B
	470046	2524	118,119	29,30	various	WASHINGTON			0	0			*******	surveyed aerially			*******
	470064	196	118	30	22,23,26	ERIE	35	7/15	0	0	0	0	C	C	E	S	B
	470068	626	118,119	30	2,3;34,35	STELLA			0	0			*******	surveyed aerially			*******
	470082	151	119,120	30	3;34	DUNNS	90	7/15	0	0	0	0	C	C	E	S	B
	470089	39	120,121	30	2,3;35	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
MEEKER (cont.)																	
	470127	118	118	31	32,33	GOOSE	40	7/15	0	0	0	0	C	C	E	S	B
	470134	1060	119	31	14,15,22-26	RIPLEY			2	0			*******	surveyed aerially			*******
	470151	166	121	31	22,23	HORSESHOE	60	7/15	0	0	0	0	C	PC	G	S	B
	470168	61	118	32	16	** UNNAMED **	30	7/15	0	0	0	0	R	C	E	S	B
	470173	74	118,119	32	4,5;32,33	POPPLE	30	7/15	0	0	0	0	C	C	E	S	B
MILLE LACS																	
	480012	771	42	27	14,15,22-24	SHAKOPEE			0	0			*******	surveyed aerially			*******
MORRISON																	
	490036	260	133	29,30	19,30;24,25	SYLVAN	90	7/15	0	0	0	0	C	C	G	B	0
	490050	22	131	30	18,19	MEADOW	90	7/15	0	0	0	0	C	C	E	S	B
	490089	109	128	31	19	GANZ	140	7/15	0	0	0	0	C	C	G	S	B
	490091	50	128	31	31	COON	45	7/15	0	1	0	0	C	C	E	S	B
	490125	16	132	31	SW4,10	** UNNAMED **	45	7/15	0	0	0	0	C	C	E	S	B
	490137	1320	132	31	28-33	FISH TRAP			6	0			*******	surveyed aerially			*******
	490140	250	127	31,32	17,18;13	CEDAR	130	7/15	6	0	1	6	C	C	G	C	B
OTTER TAIL																	
	560013	169	131,132	36	4,5;32	NORTH MAPLE	270	7/15	1	0	1	1	C	C	G	C	B
	560023	87	131	37	10,15	CORA	150	7/15	1	0	1	1	C	C	E	S	B
	560029	53	131	37	20	CLARNO	40	7/15	1	0	1	1	C	C	E	S	B
	560031	249	131	37	21,22,27,28	ADLEY	180	7/15	0	0	0	0	R	C	E	C	B
	560063	86	137	37	23,24	** UNNAMED **	60	7/15	7	0	1	7	C	C	E	C	B
	560080	16	131	38	12	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	560100	127	132	38	16,21	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	C	B
	560116	870	134	38	22-26	EAST LEAF			3				*******	surveyed aerially			*******
	560131	137	137	3	5;8	INDIAN	45	7/15	1	0	1	1	C	C	E	C	B
	560160	756	131	39	17-20	SPITZER			3				*******	surveyed aerially			*******
	560161	31	131	39	19,30	** UNNAMED **	120	7/15	0	0	0	0	C	PC	G	S	B
	560174	17	132	39	11	** UNNAMED **	210	7/15	0	0	0	0	C	C	E	S	B
	560195	222	133	39	16,17,20,21	BEAUTY SHORE	35	7/15	2	2	1	2	C	C	E	S	B
	560196	500	133	39	21-23,27	MASON			3				*******	surveyed aerially			*******
	560202	51	134	39	15	PELICAN BAY	30	7/15	2	0	1	2	C	C	E	S	B
	560212	179	135	3	9,10,15,16	BOEDIGHEIMER	45	7/15	3	0	1	3	C	C	E	B	B
	560229	358	137,138	39	6;31	MURPHY	30	7/15	6	0	2	5	C	C	E	B	B
	560238	2522	132	39,40	6,7;1,10-15,23,24	CLITHERALL			4				*******	surveyed aerially			*******
	560240	1352	133	39,40	6,7,18;1,11-13	BLANCHE			1				*******	surveyed aerially			*******

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
OTTER TAIL (cont.)																	
	560253	853	131	40	10,11,14,15	EAGLE			2				*******	surveyed aerially			*******
	560283	64	131,132	40	6;31	** UNNAMED **	240	7/15	0	0	0	0	C	C	E	B	B
	560302	894	133	40	17,18,20,21,28,33	SILVER			0				*******	surveyed aerially			*******
	560306	193	133	40	29,32	ELBOW	120	7/15	1	0	1	1	C	C	G	B	B
	560321	69	135	40	10,14,15	TEE	150	7/15	0	0	0	0	C	PC	P	S	B
	560329	59	136	40	4,5	MINK	60	7/15	0	0	0	0	C	C	E	C	B
	560334	41	136	40	7,18	JERRY BACON	300	7/15	2	0	1	2	C	C	G	S	B
	560355	290	137	40	3,10	WIMER	210	7/15	2	2	1	2	C	C	E	S	B
	560357	296	137	40	5,8	FIVE	80	7/22	0	1	1	1	C	C	E	C	B
	560358	244	137	40	7,8	SCALP	210	7/15	4	2	2	2	C	PC	E	S	B
	560360	1177	137	40	various	ROSE			6		1	3	*******	surveyed aerially			*******
	560368	206	137,138	40	3,4;33,34	GRAHAM	60	7/15	2	0	1	2	C	C	E	B	B
	560380	107	133	40,41	30,31;25	** UNNAMED **	300	7/15	1	0	1	1	C	C	E	C	B
	560382	709	134	40,41	18,19,30;13,24	TWIN			2				*******	surveyed aerially			*******
	560390	409	131	41	1-3	LONG	240	7/15	2	0	1	1	C	C	E	B	B
	560408	387	131	41	21,22,23	SEWELL	135	7/15	6	2	3	2	C	C	E	S	B
	560425	28	132	41	6	** UNNAMED **	300	7/15	0	0	0	0	C	C	E	S	O
	560449	482	133	41	5-8	PLEASANT	35	7/15	2	0	1	1	C	O	G	S	B
	560458	179	133	41	15,21,22	CROOKED	45	7/15	0	0	0	0	C	C	E	S	B
	560475	833	134	41	10-15	PICKEREL			1				*******	surveyed aerially			*******
	560512	47	136	41	SE21,22	SUNFISH	60	7/15	2	0	1	2	C	C	E	S	B
	560517	310	136	41	27,32-34	EAST SILENT	75	7/15	4	0	3	2	C	C	E	B	B
	560558	248	131	41,42	7,18;12-14	FORMOE	30	7/15	2	0	1	2	C	C	E	C	B
	560572	72	134	41,42	18,19;24	** UNNAMED **	40	7/15	1	0	1	1	R	C	E	S	B
	560578	162	137	41,42	6,7;1;12	HOLBROOK	45	7/15	2	0	1	2	C	C	G	S	B
	560606	22	131	42	17,18	** UNNAMED **	120	7/15	0	0	0	0	C	C	E	S	B
	560608	25	131	42	18	** UNNAMED **	75	7/15	0	0	0	0	C	C	E	S	B
	560642	55	132	42	22,23	** UNNAMED **	120	7/15	2	0	1	2	C	C	E	C	B
	560646	26	132	42	23,26	** UNNAMED **	120	7/15	0	0	0	0	C	C	E	C	B
	560682	56	133	42	33,34	SPRING	60	7/15	2	0	1	2	C	C	E	S	B
	560683	25	133	42	36	** UNNAMED **	85	7/15	1	0	1	1	C	C	E	S	B
	560713	41	134,135	42	3;34	** UNNAMED **	90	7/15	2	1	1	2	C	C	E	S	B
	560725	15	135	42	12	JAMES	60	7/15	0	0	0	0	C	C	G	S	B
	560727	55	135	42	13,14,24	FLADMARK	195	7/15	6	0	3	4	C	C	E	S	B
	560731	30	135	42	22	KEPPLE	90	7/15	2	1	1	2	C	C	E	S	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
OTTER TAIL (cont.)																	
	560774	114	137	42	22	ELBOW	60	7/15	1	1	1	1	C	PC	G	B	B
	560795	69	131	43	12	** UNNAMED **	135	7/15	0	0	0	0	C	C	E	S	B
	560812	23	131,132	43	1;36	** UNNAMED **	30	7/15	0	0	0	0	R	C	E	S	B
	560826	24	132	43	NC11	** UNNAMED **	60	7/15	0	0	0	0	R	C	G	S	S
	560857	21	133	43	8	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	560878	92	134	43	14,15	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	560899	24	135	43	SE14	** UNNAMED **	20		0	0	0	0	C	C	G	S	B
	560915	1025	136	43	10,11,14,15	PRAIRIE			4				*******	surveyed aerially			*******
	560989	24	134	44	11,12,14	** UNNAMED **	180	7/15	0	0	0	0	C	C	E	S	B
	560996	38	134	44	23,26	** UNNAMED **	45	7/15	0	0	0	0	C	C	E	S	B
	561035	21	136	44	14;15	KOPPERUD	210	7/15	0	0	0	0	C	PC	E	S	B
PINE																	
	580021	24	41	17	SE18	EAST KRAMER	10	7/15	0	0	0	0	C	C	E	S	B
	580054	28	41	19	10	WALLACE	120	7/15	0	0	0	0	C	C	E	S	B
	580112	12	44,45	20	SW2;35	ZALESKY	45	7/15	1	0	1	1	C	O	P	S	B
	580116	25	43	20,21	SW18;13	** UNNAMED **	30	7/15	0	0	0	0	C	C	G	S	B
	580119	1013	39	21	various	CROSS			0	0			*******	surveyed aerially			*******
	580130	216	43	21	20,21,28,29	UPPER PINE	60	7/15	2	0	1	2	C	C	E	C	B
POLK																	
	600008	12	147	39	C20	** UNNAMED **	120	7/15	0	0	0	0	C	C	E	S	B
	600009	41	147	39	23	** UNNAMED **	180	7/15	0	0	0	0	C	C	G	S	B
	600084	13	147	40	WC15	** UNNAMED **	1	7/15	0	0	0	0	C	C	E	S	O
	600095	22	147	40	36	** UNNAMED **	90	7/15	2	0	2	2	C	C	E	S	B
	600104	29	148	40	9,10	BREED	50	7/15	5	0	1	5	C	C	E	S	O
	600222	67	147	43	3	** UNNAMED **	100	7/15	2	2			C	C	G	S	B
	600223	50	147	43	3,10	** UNNAMED **	90	7/15	0	0	0	0	C	C	E	S	B
	600228	161	147	43	6-8	HALVERSON	90	7/15	0	0	0	0	C	C	E	S	B
	600250	23	148	43	5,6	** UNNAMED **	180	7/15	0	0	0	0	R	C	E	C	B
	600257	57	148	43	SW11	** UNNAMED **	45		0	0	0	0	C	C	G	C	B
	600277	11	148	43	EC24	** UNNAMED **	20	7/15	0	0	0	0	C	C	E	S	B
	600288	67	148	43	33	** UNNAMED **	75	7/15	2	0	1	2	C	C	E	S	B
	600294	20	149	43	31,32	** UNNAMED **	90	7/15	0	0	0	0	R	C	E	C	B
	600305	1445	148,149	43,44	various	MAPLE			0				*******	surveyed aerially			*******

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
POPE																	
	610043	300	123	37	21,28,29	GOOSE	195	7/15	2	0	1	2	C	C	E	C	B
	610048	385	124	37	11,12,14	ROUND	60	7/15	2	0	1	2	R	C	E	S	B
	610061	62	125	37	26,35	** UNNAMED **	40	7/15	0	0	0	0	C	C	E	S	B
	610064	948	125,126	37	2;23-26,35,36	AMELIA			0	0			*******	surveyed aerially			*******
	610066	296	126	37	11-14	LEVEN	15	7/15	3	0	1	3	C	C	E	B	B
	610086	94	123	38	19,20,29,30	RASMUSON	150	7/15	0	0	0	0	C	C	E	B	B
	610110	40	125	38	6,7	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	610123	128	126	38	21,28	JOHN	60		0	0	0	0	C	C	E	C	B
	610128	98	125	38,39	6;1	STRANDNESS	285	7/15	0	0	0	0	C	C	E	B	B
	610179	32	126	39	30	** UNNAMED **	115	7/15	1	0	1	1	C	PC	G	S	B
	610180	2246	124	39,40		EMILY			0	0			*******	surveyed aerially			*******
RAMSEY																	
	620004	511	28	22	10,11,14,15,23	PIGS EYE			0	0			*******	surveyed aerially			*******
	620034	152	30	22	S22,23	GOOSE	65	7/15	0	0	0	0	C	PC	G	S	B
	620040	75	30	22	33,34	WILLOW	120	7/15	0	0	0	0	C	C	E	S	B
	620078	211	30	23	33,34	JOHANNA	75	7/15	0	0	0	0	C	C	E	C	B
ST. LOUIS																	
	690041	436	56,57	12	5,6;31,32	BASSETT	180	7/15	2	0	1	2	R	C	G	C	B
	690044	442	57,58	12	4,5;32,33	LONG	120	7/15	1	0	1	1	R	PC	E	C	B
	690048	336	58	12	25,26	ROUND	30	7/15	0	0	0	0	R	PC	G	B	O
	690060	256	62	12	4,9	MUD	120	7/15	0	0	0	0	C	PC	E	C	B
	690061	369	62	12	28,32-34	ONE PINE	75	7/15	0	0	0	0	R	C	E	C	B
	690069	2639	63	12	19-23,26-32	SHAGAWA			7	0	1	4	*******	surveyed aerially			*******
	690115	2667	61	12,13	various	BEAR ISLAND			9	0	1	3	*******	surveyed aerially			*******
	690118	10236	63	12,13	various	BURNTSIDE			27	2	2	5	*******	surveyed aerially			*******
	690143	529	55,56	13	1,2;35,36	WOLF			0	0			*******	surveyed aerially			*******
	690175	61	63,64	13	5,6;31,32	OLE	360	7/15	0	0	0	0	C	C	E	S	B
	690190	2049	64,65	13	various	BIG			4	1	1	3	*******	surveyed aerially			*******
	690231	88	52	14	9,10	JACOBS	105	7/15	2	0	1	2	R	C	G	C	B
	690254	693	61	14	1,2,10,11,12,14	BEARHEAD			4	1			*******	surveyed aerially			*******
	690285	1926	62	14	various	EAGLES NEST			7	3			*******	surveyed aerially			*******
	690288	106	62	14	29,30	FIVE MILE	135	7/15	4	0	1	4	C	O	G	C	B
	690315	62	63,64	14	1;36	KORB	60	7/15	0	0	0	0	C	C	E	C	B
	690317	133	64	14	5	JONATHAN	30	7/15	2	1	1	2	R	PC	E	S	B
	690376	599	58	14,15	18;13,24	WHITEWATER			2	0			*******	surveyed aerially			*******

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
ST. LOUIS (cont.)																	
	690377	28	61	14,15	30;25	FALLS	35	7/15	0	0	0	0	C	C	E	S	B
	690431	29	58	15	20	CEDAR	15	7/15	0	0	0	0	C	PC	E	S	B
	690456	638	65	15	4-8	JEANETTE			0	0			*******	surveyed aerially			*******
	690484	175	67	15	16,21,22	LITTLE LOON	35	7/15	2	2	1	2	C	C	E	S	B
	690489	569	51	15,16	18,19;13,14,24	CARIBOU			0	0			*******	surveyed aerially			*******
	690535	32	55	16	6	SEASTED	90	7/15	0	0	0	0	C	C	E	S	B
	690537	60	55	16	15	LITTLE PALEFACE	90	7/15	2	0	1	1	C	C	E	S	B
	690548	85	56	16	11,12	LITTLE MUD HEN	120	7/15	0	0	0	0	C	C	E	C	B
	690556	110	57	16	9,10	LOST	140	7/15	0	0	0	0	C	C	G	S	B
	690568	157	58	16	14,22,23,26,27	CEDAR ISLAND	240	7/15	0	0	0	0	C	C	G	C	O
	690572	50	58	16	21	FORGE	30	7/15	0	0	0	0	C	C	E	S	B
	690574	55	58	16	NW27	SALT	180	7/15	1	0	1	1	C	C	E	S	B
	690578	41	59	16	27,28	RICE	60	7/15	0	0	0	0	C	C	E	S	B
	690583	202	63,64	16	2,3;34	MERRITT	45	7/15	2	0	2	1	C	C	E	S	B
	690613	1125	64	16,17	various	VERMILION RIVER			1	0			*******	surveyed aerially			*******
	690615	1222	66	16,17	various	ECHO			0	0			*******	surveyed aerially			*******
	690617	8890	68,69	16,17	various	SAND POINT			15	0			*******	surveyed aerially			*******
	690627	444	53	17	7,8	NICHOLS	90	7/15	2	1	1	2	C	C	E	C	B
	690639	18	56	17	7	LITTLE TONY	120	7/15	2	1	1	2	C	C	P	C	O
	690646	356	56	17	27,28,33,34	MURPHY	210	7/15	1	0	1	1	C	C	E	B	B
	690657	169	57	17	28,33,34	HALF MOON	180		3	0	1	3	C	C	P	S	B
	690668	18	58,59	17	5,6;32	** UNNAMED **	120	7/15	0	0	0	0	C	C	G	S	B
	690669	2072	60	17	various	BIG RICE			0	0			*******	surveyed aerially			*******
	690684	748	68	17	26,27,34,35	MUKOODA			1	1			*******	surveyed aerially			*******
	690698	142	50	18	29,30	LOST	90	7/15	0	0	0	0	C	C	E	C	B
	690705	25	52	18	20	MUSKRAT	40	7/15	0	0	0	0	C	C	G	S	B
	690714	25	57	18	4,5	SILVER	60	7/15	2	1	1	2	R	C	E	C	B
	690723	20	58	18	14	MUD	315	7/22	0	0	0	0	C	C	E	S	B
	690725	119	58	18	23	MASHKENODE	75	7/15	1	0	1	1	C	C	G	B	B
	690726	181	58	18	24-26	MANGANIKA	50	7/15	2	0	1	2	C	C	E	S	B
	690736	792	60	18	various	SAND			3	0			*******	surveyed aerially			*******
	690744	1528	64	18	various	ELBOW			2	0			*******	surveyed aerially			*******
	690756	59	68	18	3,10	TOOTH	40	7/15	2	0	1	1	C	O	G	S	B
	690759	50	68	18	7	** UNNAMED **	30	7/15	2	2	1	2	C	C	G	S	B
	690794	78	60	19	12,13	THIRTEEN	30	7/15	0	0	0	0	C	C	P	S	B

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ST. LOUIS (cont.)																	
	690796	253	60	19	15,16,21,22	LEANDER	75	7/15	1	0	1	1	R	PC	E	B	B
	690802	252	63,64	19	1,2;35,36	HOODOO	5	7/15	1	0	1	1	R	C	E	O	O
	690847	37	50	20	17,18	MOBERG	120	7/15	0	0	0	0	R	C	E	S	B
	690889	299	55	21	20,21,29	ISLAND	180	7/15	1	0	1	1	C	C	E	C	B
	690893	171	55	21	33,34	FINBERG	180	7/16	2	0	1	2	C	C	E	C	B
	690904	256	57,58	21	3,4;33,34	MAHONING	45	7/15	9	0	2	7	C	C	E	S	B
	690920	26	59	21	29	STUART	45	7/15	1	0	1	1	R	PC	E	S	B
	690933	375	60	21	16,17,20,21	SIDE	55	7/15	1	0	1	1	R	PC	E	S	B
SCOTT																	
	700029	122	113	22	2	ST CATHERINE	90	7/15	0	0	0	0	C	PC	E	S	B
	700043	59	113	22	22	CEDAR	40	7/15	0	0	0	0	C	PC	E	S	B
	700052	195	113,114	22	4,5;32,33	CYNTHIA	45	7/15	0	0	0	0	C	PC	E	S	B
	700054	690	114	22	3-5,8-10	SPRING			0	0			*******	surveyed aerially			*******
	700055	17	114	22	4	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	700072	326	114,115	22	2-4;34,35	UPPER PRIOR	120	7/15	0	1	0	0	C	PC	E	B	B
	700090	105	113	22,23	7;12	HICKEYS	60	7/15	0	0	0	0	C	C	E	S	B
	700098	269	113	23	10,11,15	PLEASANT	150	7/15	0	0	0	0	C	PC	G	S	B
SHERBURNE																	
	710004	86	33	26	2	** UNNAMED **	105	7/15	0	0	0	0	C	PC	G	S	B
	710008	39	33	26	13,14	EAGLE	30		0	0	0	0	C	C	G	S	B
	710027	43	34	26	24	** UNNAMED **	120	7/15	0	0	0	0	C	C	E	C	B
	710062	15	33	27	18	MITCHELL	45	7/15	0	0	0	0	R	C	E	S	B
	710128	28	34	29	17,20	** UNNAMED **	30	7/15	2	0	1	2	C	C	G	S	B
	710147	161	35	29	27,34	RUSH	70	7/15	0	0	0	0	C	C	E	C	B
	710159	180	34,35	30	4,5;33,34	LONG	50	7/15	0	0	0	0	C	C	E	B	B
STEARNS																	
	730055	666	123	29	21,28,29	GRAND			1	0			*******	surveyed aerially			*******
	730084	26	123	30	23-26	** UNNAMED **	30	7/15	0	0	0	0	C	PC	E	S	B
	730100	104	124	30	8	KALLA	120	7/15	3	0	1	2	C	PC	G	B	B
	730121	16	125	30	16	** UNNAMED **	70	7/15	1	0	1	1	C	C	E	S	B
	730147	312	122	31	11,14	NORTH BROWNS	40	7/15	0	0	0	0	C	PC	E	S	B
	730168	282	124	31	14,22,23	BIG RICE	60	7/15	0	0	0	0	C	E	S	B	B
	730175	71	124,125	31	3;34	SAND	210	7/15	0	0	0	0	C	C	E	C	B
	730180	76	125	31	35	FIFTH	30	7/15	0	0	0	0	C	C	E	S	B
	730183	119	126	31	5-8	ST ANNA	90	7/15	0	0	0	0	C	C	E	B	B

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STEARNS (cont.)																	
	730184	16	126	31	14,23	** UNNAMED **	60		0	0	0	0	C	C	G	S	B
	730197	29	122	31,32	30,31;25	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	730199	215	125	31,32	30,31;25,36	SAND	195	7/15	0	0	0	0	C	C	E	B	B
	730200	3471	121,122	32	various	KORONIS			0	0			*******	surveyed aerially			*******
	730226	152	126	32	10,20,29,30	CEDAR	90	7/15	6	1	2	4	C	C	E	C	B
	730237	191	123	33	10,15	HENRY	240	7/15	0	0	0	0	C	C	E	S	B
	730256	57	126	33,34	19;24	** UNNAMED **	45	7/15	0	0	0	0	C	C	E	S	B
	730281	223	123	35	32,33	FISH	60	7/15	3	0	2	2	C	C	E	S	B
STEVENS																	
	750024	588	124,125	41	2,3,10;26,35	LONG			0	0			*******	surveyed aerially			*******
	750029	50	125	41	8,17	FOSS	65	7/15	0	0	0	0	C	C	E	S	B
	750064	53	126	41	10,11	ERICKSON	180	7/15	0	0	0	0	C	C	E	C	B
	750072	37	126	41	16	** UNNAMED **	25	7/15	0	0	0	0	C	C	E	S	BS
	750080	18	126	41	25	** UNNAMED **	60	7/15	0	0	0	0	C	C	G	S	B
	750097	196	124	42	3	CRYSTAL	45	7/15	0	0	0	0	C	C	E	S	B
	750102	20	124	42	16	** UNNAMED **	35		0	0	0	0	C	C	E	S	B
	750146	25	126	42	13,24	** UNNAMED **	15	7/15	0	0	0	0	C	C	E	S	B
	750147	60	126	42	15	** UNNAMED **	165	7/15	3	3	2	2	C	C	E	S	B
	750192	195	124	43	8,9,16,17	CLEAR	40	7/15	0	0	0	0	C	C	E	S	B
	750199	263	124	43	19,20	HORSESHOE	20	7/15	0	0	0	0	C	PC	E	B	B
	750207	41	124	43	NE33	** UNNAMED **	60	7/15	0	0	0	0	R	C	E	S	B
	750212	28	125	43	SW1	** UNNAMED **	15	7/15	0	0	0	0	C	C	G	S	B
	750230	187	125	43	21,22,27,28	** UNNAMED **	45		0	0	0	0	C	C	E	S	B
	750237	27	125,126	43	2;35	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	750267	52	126	43	25	** UNNAMED **	120		0	0	0	0	C	C	E	S	B
	750277	267	125	43,44	6,7;1,12	FISH	30	7/15	0	0	0	0	C	C	P	S	S
	750304	99	126	44	1,2	** UNNAMED **	35	7/15	0	0	0	0	C	PC	E	S	B
SWIFT																	
	760032	200	121,122	37	1;36	WEST SUNBURG	60	7/15	0	0	0	0	C	C	G	S	B
	760034	135	121,122	37	5,6;31	FRANK	105	7/15	0	0	0	0	C	C	E	S	0
	760069	14	122	38	SE34,35	** UNNAMED **	25	7/15	0	0	0	0	C	C	E	S	B
	760086	706	122	39	4,8-10,16	HASSEL			0	0			*******	surveyed aerially			*******
	760094	157	122	39	17-20	JOHNSON	180	7/15	0	0	0	0	C	C	E	S	B
	760107	43	122	40	15,21,22	MALACHY	135	7/15	0	0	0	0	C	C	E	S	B

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SWIFT (cont.)																	
	760112	25	122	41	17,20	** UNNAMED **	15	7/15	0	0	0	0	C	C	E	S	B
	760139	20	121	43	EC20	** UNNAMED **	30	7/15	0	0	0	0	C	PC	G	S	B
	760158	41	122	43	20,21	** UNNAMED **	30	7/15	0	0	0	0	C	PC	P	S	B
TODD																	
	770001	11	127	31,32	6,7;11,12	ROCK	60	7/15	0	0	0	0	C	C	P	S	B
	770019	121	127	32	25,26;35,36	MARY	120	7/15	4	0	1	4	C	C	P	C	B
	770066	233	131	32	29,31,32	THUNDER	120	7/15	4	0	1	4	C	C	E	S	B
	770067	293	131	32	33,34	PINE ISLAND	90	7/15	2	0	1	2	C	C	E	B	B
	770068	121	131,132	32	2,3;34,35	CRANBERRY	270	7/15	2	1	1	2	C	C	Z	S	0
	770093	43	127	33	7,18	DEER	30	7/15	0	0	0	0	C	C	E	S	B
	770094	10	127	33	10,15	** UNNAMED **	300	7/15	0	0	0	0	C	C	P	S	B
	770115	149	128	33	22,27	FELIX	60	7/15	0	0	0	0	C	C	E	S	B
	770150	2111	126,127	34	various	SAUK			0	0			*******	surveyed aerially			*******
	770154	557	127	34	8,17,20,29,30	FAIRY			0	0			*******	surveyed aerially			*******
	770182	171	127	35	1,2,11,12	GUERNSEY	40	7/15	1	0	1	1	C	C	E	B	B
WADENA																	
	800003	107	134	33	12	SIMON	30	7/15	0	0	0	0	C	C	E	S	B
	800005	43	134	33	22,23	** UNNAMED **	60	7/15	0	0	0	0	C	C	G	S	B
	800010	39	135	33	3	** UNNAMED **	30	7/15	0	0	0	0	C	C	E	S	B
	800022	384	137	34	3,4,9,10	YAEGER	30	7/15	0	0	0	0	C	C	E	S	B
	800037	356	138	35	13,14,23	STOCKING	270	7/15	1	0	1	1	C	C	E	B	B
	800039	115	138	35	21,22,28	SPIRIT	60	7/15	1	0	1	1	C	C	E	B	B
WASHINGTON																	
	820011	18	29	20	17	** UNNAMED **	60	7/15	0	0	0	0	C	C	G	S	B
	820016	50	30	20	7	SILVER	60	7/15	2	0	1	2	C	PC	E	B	B
	820029	12	31	20	9	** UNNAMED **	60	7/15	0	0	0	0	C	C	E	S	B
	820030	88	31	20	9,10	LONG	165	7/15	0	0	0	0	C	C	E	C	B
	820067	46	32	20	26	SAND	150	7/15	0	0	0	0	R	PC	G	S	B
	820079	12	32	20,21	7;12,13	ELWELL	45	7/15	0	0	0	0	C	C	E	S	B
	820106	317	29	21	13,14,23,24,26	ELMO	300	7/15	0	0	0	0	C	C	E	C	B
	820129	32	30	21	17	ECHO	120	7/15	1	0	1	1	C	C	E	C	B
	820140	381	31	21	9,16	ONEKA	150	7/15	1	0	2	2	C	C	E	C	B
	820159	2206	32	21	various	FOREST			0	0			*******	surveyed aerially			*******
	820168	187	32	21,22	18;13	MUD	210	7/15	0	0	0	0	C	PC	G	S	B

COUNTY NAME	LAKE NUMBER	LAKE AREA	TOWNSHIP/S	RANGE/S	SECTION/S	LAKE NAME	SURVEY LENGTH	SURVEY DATE	# ADULTS	# JUV'S	# GROUPS	LARGEST GROUP	SURFACE COND.	CLOUD COVER	VISIB.	OBSERV. METHOD	EQUIP. USED
WRIGHT																	
	860029	207	120	24,25	30;24,25	SCHMIDTS	90	7/15	0	0	0	0	C	PC	E	S	B
	860041	204	119	25	9,16	DEAN	105	7/15	1	0	1	1	C	C	E	S	B
	860053	770	120	25	8,9,16,17,20,21	PULASKI			0	0			*******	surveyed	aerially		*******
	860064	388	120,121	25	3,4;33,34	GILCHRIST	130	7/15	1	0	1	1	C	PC	E	C	B
	860075	42	121	25	24,25	** UNNAMED **	120	7/15	0	0	0	0	C	C	E	C	B
	860086	455	118	25,26	6,7,18;12,13	FOUNTAIN	90	7/15	0	0	0	0	C	C	G	C	B
	860089	123	119	25,26	6,7;1,12	TAMARACK	50	7/15	0	0	0	0	C	PC	E	S	B
	860090	1510	119,120	25,26	30,31;1,25,35,36	BUFFALO			0	0			*******	surveyed	aerially		*******
	860101	187	118	26	20,28,29	DOG	190	7/15	0	0	0	0	C	C	E	B	B
	860152	221	121	26	17,18	MILLSTONE	135	7/15	0	0	0	0	C	C	E	S	B
	860162	17	121,122	26	4;33	SLOUGH	180	7/15	0	0	0	0	C	PC	G	S	B
	860166	13	122	26	19,20	** UNNAMED **	30	7/15	0	0	0	0	C	PC	G	S	B
	860213	277	120	27	11,14,15,23	HENSHAW	30	7/15	0	0	0	0	C	C	E	S	B
	860218	146	120	27	20,21,29	MAXIM	75	7/15	0	0	0	0	R	PC	E	S	B
	860227	837	121	27	15,21,22,27,34	CEDAR			1	1			*******	surveyed	aerially		*******
	860238	76	122	27	22,23,26	NIXON	70	7/15	5	1	2	3	C	PC	E	S	B
	860256	67	118	28	7,8	CHELGREN	90	7/15	0	0	0	0	C	PC	E	S	B
	860278	114	120,121	28	2,3;34,35	GOOSE	15	7/15	0	0	0	0	C	C	G	S	B
	860298	91	121	28,29	30,31;25,36	UNION	70	7/15	2	0	1	2	C	C	E	S	B

APPENDIX III. List of volunteers.

Patty Jo Aanerud
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Daniel Akel
Bruce and Carol Albright
Nancy Aleff
Joe and Ione Altobelli
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Bryce Anderson
Carrie Anderson
Claire and Daryl Anderson
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Florence Anderson
Harold Anderson
Harold R. Anderson
Julie Strand Anderson
Kate Anderson
Robin Anderson
Roy Anderson
Stew Anderson
Yvette Anderson
Dan Andree
Chester Angulski
Angie and Jim Archer
Myrtle Arness
Bon and Joyce Arvidson
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Ralph P. Bachmeier
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Tom Backman
Donald C. Badger
Don and Arlene Bailey
Gregory and Victoria Baker
Richard J. Baker
Lucy Bangston
Cheryl and David Barness
Jack Barner
Scott Barry
Herby Barstad
Nyola Barwise
Pette Bauer
John Bauerfeind
Cynthia Baumbach
Bob Bayer
Tim Bayerl
Kevin V. Beal
William Beck
Wally Behm
Lamonte H. Belisle
Walter L. Benhardus
Ron Bennett
Vickie Bennett
Richard Benson
Dan Bera
Carolyn and Chris Berneking
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Sandy Bessingpas
Mark and Mary Bishop
Edward Blais
Tina Blomer
Dale and Debbie Blume
Jim Bocinsky
Linda Boe
Jack Bonner
Barry Bonoff
Diane and Vern Booth
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Katy Brady
Gary Brekke
Gene Brekke
Bryan Bressem
Jack and Karen Bridges
Chris and Jeff Briggs
Gary and Nancy Briske
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Jack Bugbee
Janine Bulter
Diane Bunker
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Paul M. Bursik
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Michael Callahan
Joe Cancellare
Jean Captain
Raymond Carlson
Alice and Ray Carson
Lyman Childers
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Scott B. Christopherson
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Jo Colleran
George D. Cook
Tim Cooper
Laine Covington
Douglas Crampton
Maureen Critt
Dan and Margaret Croswell
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Ella M. and Timber Dahlberg
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Ruben J. Danzl
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Jack Davis
Ray Davis
Cathryn Deal
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Fiamma di Gioia
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