A Study of the General Public's Perceptions and Opinions of Lake and Aquatic Plant Management in Minnesota.

Project Report

Submitted to:
Minnesota Department of Natural Resources

By:
Sue Schroeder
Michelle A. Payton
David C. Fulton

USGS
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
1980 Folwell Avenue
St. Paul, Minnesota 55108
Phone: 612-625-5256
Fax: 612-625-5299

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Contact Information

1) Sue Schroeder, Research Fellow
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
200 Hodson Hall, 1980 Folwell Avenue
St. Paul, MN 55108
(612)624-3479 (phone) / (612)625-5299 (fax)
sas@umn.edu

2) Michelle A. Payton, Research Fellow
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
200 Hodson Hall, 1980 Folwell Avenue
St. Paul, MN 55108
(612)624-2228 (phone) / (612)625-5299 (fax)
payt0008@umn.edu

3) David C. Fulton, USGS Assistant Unit Leader
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
142 Hodson Hall, 1980 Folwell Avenue
St. Paul, MN 55108
(612)625-5256 (phone) / (612)625-5299 (fax)
dcfulton@umn.edu

Executive Summary

This study examined public attitudes about Minnesota lakes and their management. Specifically, this research examined peoples' attitudes about the value and importance of Minnesota lakes, perceptions of lake health and aquatic plants, attitudes about lake and aquatic plant management, and public use of lakes for recreation.

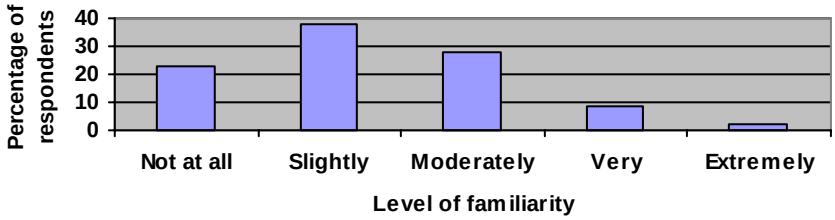
Data were gathered through a mail survey, which was distributed to 2,300 Minnesota residents. We received 1,057 completed surveys for a 48% response rate.

Value of Minnesota Lakes and Aquatic Plants

Respondents reported that Minnesota lakes were important to them. Respondents felt that items related to the general, aesthetic, ecological, and economic value of the lakes were all important. Items included in aesthetic values were rated most important (4.7 on a 5-point scale), followed by general values (4.5), ecological values (4.4), and economic values (4.1).

Respondents were largely unfamiliar with issues related to native aquatic plants and lake ecology. Only 10.5% of respondents indicated that they were very or extremely familiar with these issues (Table S-1). Respondents, however, seem to understand that aquatic plants are beneficial to lakes. Approximately 80% of respondents reported that removing native aquatic plants was slightly, quite, or extremely bad, and slightly, quite, or extremely harmful. Respondents agreed that native aquatic plants had ecological value (4.1 on a 5-point scale), recreational value (4.0), protection/removal value (3.7), and aesthetic value (3.5).

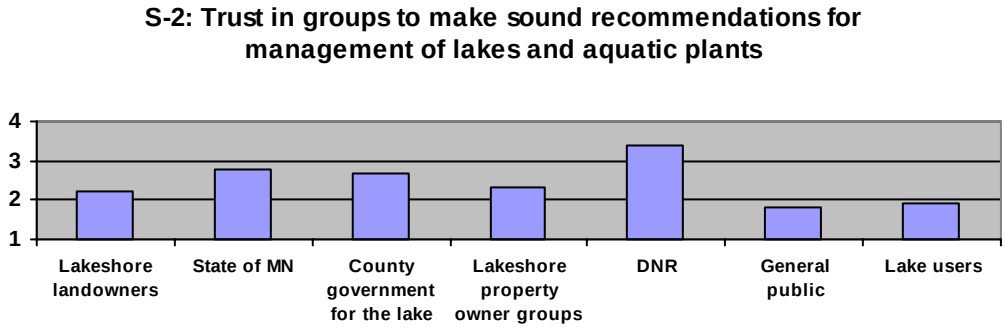
Figure S-1: Familiarity with issues related to native aquatic plants and lake ecology



Management of Lakes and Aquatic Plants

Respondents reported limited knowledge of regulations related to aquatic plant management in Minnesota. Approximately 80% of respondents indicated that they were either "not at all" or "slightly" knowledgeable of these regulations, compared to 18% who reported being "moderately" knowledgeable, 2% who reported being "very" knowledgeable, and less than 1% who reported being "extremely" knowledgeable. When asked if the current regulations were too restrictive, about right, or not restrictive enough, over 60% of respondents indicated that they didn't know.

Respondents were asked how much they trusted different groups to make sound recommendations concerning management of lakes and aquatic plants. On a 4-point scale ranging from 1 (do not trust at all) to 4 (trust greatly), respondents reported the greatest trust in the Minnesota Department of Natural Resources (3.4) and the least trust in the general public (1.8) (Table S-2).



Lake Meanings

Respondents who used a particular lake most often were asked to report their agreement with statements about the meaning the lake has for them. Respondents agreed most with items about their emotional attachment to the lake (3.9 on a 5-point scale), followed by family attachment (3.8), identity (3.7), and place dependence (3.6).

Actions

Respondents were asked what actions they would be likely to take if the environmental quality of the lake they used most often declined. Respondents reported that they would be most likely to (a) vote for people who support lake protection (4.2 on a 5-point scale), followed by (b) support legislation or regulations that limit human use to protect the lake (3.6), (c) contribute personal time to protect the lake (3.5), (d) contribute money to protect the lake (3.4), and (e) join an organization working to protect the lake (3.3).

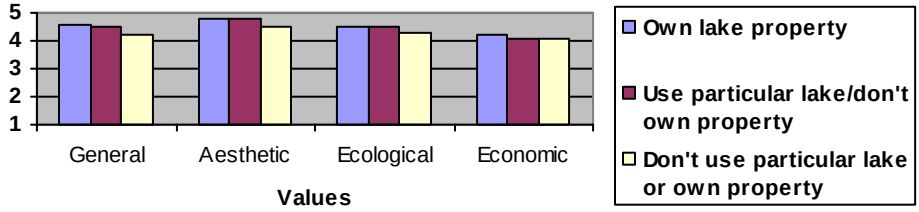
Relationship Between use of a Particular Minnesota Lake/Ownership of Minnesota Lake Property and Valuation of Lakes and Aquatic Plants

We analyzed respondents' attitudes about lakes and aquatic plants based on whether: (a) they owned lakeshore property, (b) they used a particular lake most often, or (c) they neither owned lakeshore property nor used a particular lake most often. Nearly 20% of respondents reported that they owned lake property, compared to 47% who reported that they used a particular lake most often but did not own lake property, and 35% who reported that they neither owned lake property nor frequented a particular lake.

Respondents who used a particular lake or owned Minnesota lake property reported greater familiarity with issues related to native aquatic plants and lake ecology. There were, however, no significant differences between the groups on whether removing native aquatic plants from lakes was bad or good, or harmful or beneficial.

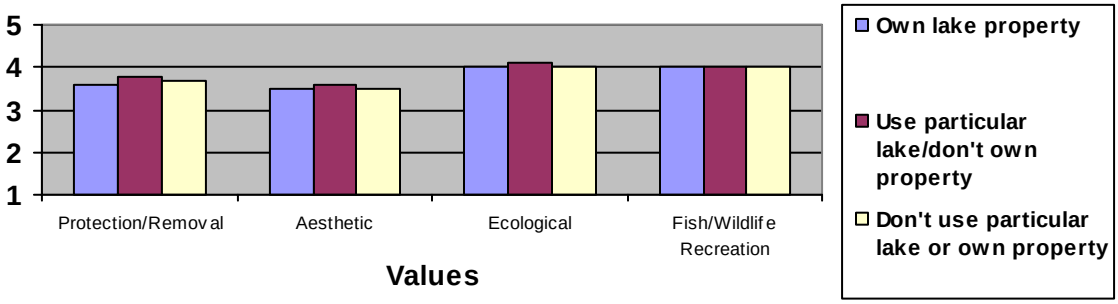
There were significant differences among the three groups with respect to the importance of general, aesthetic, and ecological values of Minnesota lakes. There were no significant differences among groups for the importance of economic values. Respondents who owned lakeshore property reported the highest importance for these values associated with Minnesota lakes, while respondents who didn't own property or frequent a particular lake reported the lowest importance. Respondents who used a particular lake, but did not own property held values similar to lake property owners (Table S-3).

S-3: Comparison of respondents' opinions on the importance of values associated with MN lakes



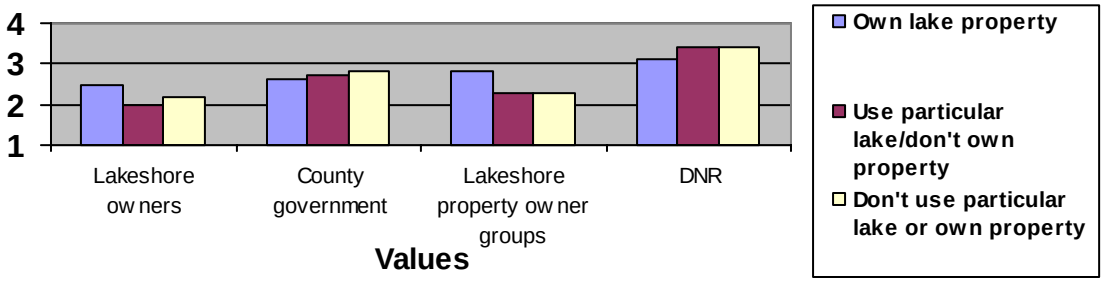
There were also significant differences reported by the three groups with respect to the value of aquatic plants. Specifically, significant differences existed in: (a) protection/removal value, (b) aesthetic value, and (c) ecological value. There was not a significant difference for recreational value. Respondents who frequented a particular lake, but did not own lake property held slightly more positive views of aquatic plants.

S-4: Comparison of respondents' opinions on the value of native aquatic plants



Respondents who did not use a particular lake or own lake property reported the lowest level of knowledge about aquatic plant regulations (1.6 on a 5-point scale), followed by respondents who used a particular lake (1.9), and respondents who owned lake property (2.3). When asked who they could trust to make sound recommendations about management of lakes and aquatic plants, lakeshore property owners reported relatively more trust in individual lakeshore landowners and lakeshore property owner groups, and relatively less trust in the Minnesota DNR, county government, or the general public.

S-5: Comparison of trust in groups to manage lakes and aquatic plants



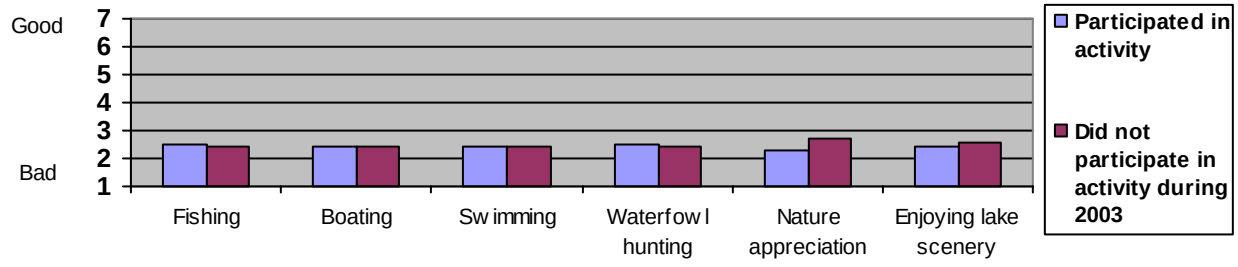
Lakeshore property owners reported a much stronger sense of place related to their lake compared to respondents who did not own property. Likewise, property owners indicated a stronger likelihood of: (a) contributing personal time, (b) contributing money, or (c) joining an organization to protect their lake.

Recreational Lake Activities and Valuation of Lakes and Aquatic Plants

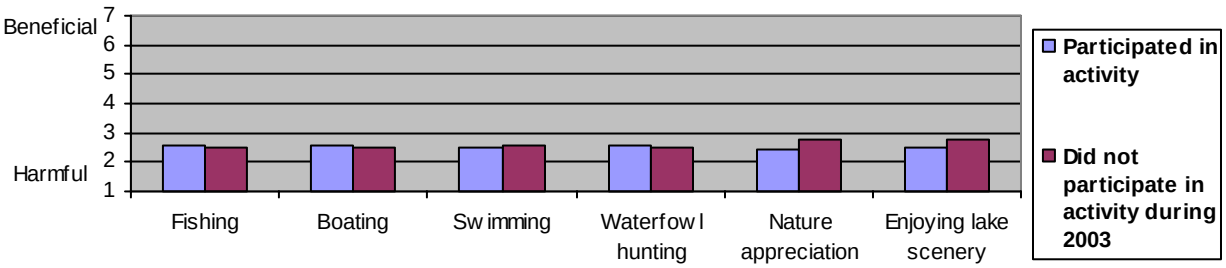
We asked respondents how often they visited Minnesota lakes during 2003, and what types of recreational activities they participated in. Respondents spent an average of 42 days at Minnesota lakes during 2003. Nearly all of the respondents (93%) reported "enjoying lake scenery" at Minnesota lakes during 2003. About two-thirds of respondents participated in boating, swimming, or nature appreciation activities (bird watching, wildlife viewing, or nature study). Almost 60% of respondents went fishing, and about 10% reported hunting waterfowl.

Respondents who participated in recreation activities at Minnesota lakes rated: (a) values associated with the lakes, (b) familiarity with issues related to native aquatic plants and lake ecology, (c) knowledge of native aquatic plants, (d) knowledge of aquatic plant regulations, (e) lake meanings and attachment, and (f) likelihood of taking action to protect a lake, higher than respondents who did not participate in recreation activities. Interestingly, however, participation in most lake-based recreational activities does not appear to influence peoples' perception of whether removing native plants is bad or good, or harmful or beneficial. Respondents who participated in nature appreciation activities reported that removing native plants was significantly more "bad" and "harmful," however there were no significant differences between participant and non-participants in the other five activities (Figure S-6 and Figure S-7).

S-6: Comparison of whether removing aquatic plants is good or bad by recreation participation



S-7: Comparison of whether removing aquatic plants is harmful or beneficial by recreation participation



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Introduction and Study Overview

Several groups, including citizens, lakeshore landowners, and lake associations, have expressed concern over the rate of lakeshore development and the consequent loss of aquatic plants in Minnesota lakes. Lakeshore land continues to be developed and fewer lakeshores remain in their original state. These trends and the concern of the public prompted the Minnesota Department of Natural Resources (DNR) to re-examine its policies on aquatic plant protection and control. Aquatic plant protection is necessary because aquatic plants play a vital role in lake health, and control is needed to enhance access and recreation on lakes.

The DNR was interested in the opinions and perspectives of three major groups closely tied to aquatic plant management: lakeshore landowners, aquatic plant management business owners, and the general Minnesota public. A separate survey and report was designed for each group. This report covers the findings of the general public survey conducted in the spring and summer of 2004 by the University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit.

Specific findings outlined in this report, include:

- Minnesota resident demographics,
- recreational lake activities,
- value and importance of Minnesota lakes,
- lake use and value
- lake health and aquatic plants
- lake and aquatic plant management, and
- value of aquatic plants.

Data presented in this report were drawn from mailback questionnaires sent to individuals living in Minnesota who were randomly selected for the general public study. This report consists of a description of study methodology, selected findings including tables and figures, and copies of the survey instrument, cover letters, and postcard (Appendices A, B, C, D, E).

Study Methods

Mailback Survey Instrument

Researchers from the Minnesota Cooperative Fish and Wildlife Research Unit and Minnesota Department of Natural Resources (DNR) developed the mailback questionnaire for this study. The population of interest in this study included all residents (18 years of age and older) in the state of Minnesota.

A sample of 2,300 Minnesota residents was drawn from phone records by Survey Sampling International. Although phone ownership in Minnesota is 98.9%, 30% of Minnesota households have unlisted phone numbers and were not included in the sampling frame. This non-coverage of households with unlisted phone numbers is a source of potential bias in the sample that we could not address in an efficient way.

The survey (Appendix C) was designed to gather data on: resident demographic characteristics, recreation on Minnesota lakes, importance and value of lakes and aquatic plants, and perceptions of lake and aquatic plant management. Dillman's (2000) Tailored Design Method (TDM) was used in the mail survey to encourage a high response rate. TDM involves designing a survey that is relatively easy to complete along with written contact information that encourages response by highlighting the importance of study participation and the social utility of the study.

Many of the survey questions used 5-point Likert scales. Likert scales include items written and selected so that agreement with the item represents a favorable or unfavorable attitude toward the object (Eagly & Chaiken, 1993). Likert scales produce ordered (ordinal-level) data. The two items measuring how good/bad or beneficial/harmful it is to remove native aquatic plants from lakes were measured using semantic differential scaling. Semantic differential scales are bipolar adjective scales separated into seven categories (Eagly & Chaiken, 1993). Like Likert scaling, semantic differential produces ordered (ordinal-level) data. A number of survey questions, including gender, race, and education, were closed-ended questions with specific response categories. These items produce categorical data that is either dichotomous (when there is a choice of two responses) or polytomous (when there are more than two response categories). Finally, several questions were open-ended where respondents were asked to fill in a number. These items produce ratio-level data, which is similar to interval-level data but includes the possibility of a zero response.

Mailings were sent out in May, June, and July of 2004. The sample of Minnesota residents was first sent a prenotice letter to inform them that they would be receiving a survey in the near future (Appendix A). About a week later, we sent a cover letter (Appendix B), survey (Appendix C), and postage-paid return envelope. One week after the initial survey was mailed, a reminder postcard (Appendix D) was sent, and three weeks after the first survey a new cover letter (Appendix E), replacement survey, and postage-paid envelope were sent. Six weeks after the first survey a second reminder postcard was sent.

Response Rate

We contacted 2,300 Minnesota residents by mail. Of the 2,300 surveys, 109 were undeliverable. We discarded 84 surveys because the residents were deceased or indicated they did not want to complete the survey. We received 1,057 completed surveys for a response rate (excluding undeliverable surveys and deceased persons from eligible respondents) of 48.2%. A shortened version of the survey was mailed to all non-respondents to assess differences in respondents and non-respondents (Appendix F).

People who responded to the one-page survey were similar in age and number of years lived in Minnesota. A smaller proportion of the late respondents were female, and a greater proportion had either not completed high school, or had completed a bachelor's degree or higher education. About the same percentage of regular and late respondents (~65%) reported using a particular Minnesota lake most often, but 34% of late respondents compared to 27% of regular respondents reported owning property on a Minnesota lake. On average late respondents reported a greater level of familiarity with issues related to lake ecology and greater knowledge of regulations concerning aquatic plant management. On average the late respondents rated removal of native aquatic plants more beneficial and "good." Finally, people who responded to the shortened survey rated the importance of lake values related to ecology, aesthetics, and recreation slightly lower than those who responded to the official survey. We did not attempt to correct for any difference between respondents and non-respondents by weighting the data.

Analysis

Data were professionally keypunched and were analyzed using the Statistical Program for the Social Sciences (SPSS/PC+ 11.0). Resident names and addresses were deleted from data sets to ensure anonymity.

Because a higher proportion of our respondents were male and older compared to census data for Minnesota (Appendix G), statewide results in Sections B and C are weighted to reflect census gender and age proportions (Tables A-1 and A-2). "Simply defined, weighting is the attempt to alter data to reflect truer population proportions than were encountered in the data collection process" (Pino, 2004, ¶ 2).

The report presents basic descriptive statistics, including frequency distributions, measures of central tendency (mean, median, and mode), and "valid" percents. "Valid" percentages were computed after eliminating those who did not answer or were not required to answer a particular question.

Several statistics presented in the report are used to show the association between variables.

- Pearson product moment correlations are used to show the linear relationship between two measured (interval-level) variables. Pearson correlations range from -1.0 (perfect negative association) to 1.0 (perfect positive association), with 0 indicating no linear association (Norusis, 2002).

- The chi-square statistic is used to test whether two categorical variables are independent. The chi-square statistic is not a good measure of association (Norusis, 2002), so the Cramer's V statistic is provided to show the strength of the relationship. Values for Cramer's V range from 0.0 (no association) to 1.0 (perfect association) (Norusis, 2002).

- Analysis of variance (ANOVA) is used to test hypotheses about differences in two or more population means (Norusis, 2002). In this report it is used to compare: (a) the means of measured (interval-level) variables based on one multiple-category (polytomous) variable, or (b) the means of multiple interval-level variables. ANOVA produces the F ratio. Large values for the F ratio indicate that the sample means vary more than you would expect (Norusis, 2002). The correlation ratio (eta) is calculated for one-way ANOVA calculations in this report, to indicate the strength of the relationship. Like the Cramer's V statistic, eta (η) ranges from 0.0 (no association) to 1.0 (perfect association) (Norusis, 2002).

Scales of multiple items (i.e. questions) were included in the survey to measure: (a) the importance of Minnesota lakes, (b) knowledge of aquatic plants, (c) attitudes about aquatic plants, and (d) sense of place. It is important to report the reliability of measurement scales. The reliability of items that make up a scale indicates the extent to which the scale yields consistent results over repeated observations (Eagly and Chaiken, 1993). Other ways of thinking about the reliability of a measure are: (a) "the extent to which it is free from random error" (Eagly and Chaiken, 1993, p. 64), or (b) "how well scores on the measuring instrument correlate with themselves" (Eagly and Chaiken, 1993, p. 64). We use Cronbach's alpha to report the reliability of the scales in this report. This reliability coefficient can range from 0.0 to 1.0, with larger values indicating higher reliability. In general, a reliability of 0.70 or higher indicates an acceptable level of reliability.

Selected Study Results

This section of the report presents findings of data analyses considering all respondents. The following topics are covered:

- Respondent demographics,
- Recreational lake activities,
- Value and importance of Minnesota lakes,
- Lake health and aquatic plants,
- Lake and aquatic plant management, and
- Value of aquatic plants.

Each section contains response frequencies and percentages for survey questions related to the section topic. Tables show the actual responses of all individuals who completed a survey. Percentages are calculated after eliminating those who did not answer or were not required to answer a survey question.

Section A: Respondent Demographics

Residents were asked a number of questions about demographic characteristics including gender, age, race, ethnicity, education, income, length of residence in Minnesota, and length of residence in current home. Demographic information helps to identify needs related to educational programming, communication efforts, and other services. This information can also be used to determine if a bias in the data exists (for example one group may be over-represented or under-represented in the sample).

Approximately 60% of respondents were male and 40% were female (Table A-1). The mean age of respondents was approximately 53 years (Table A-2). Nearly half of respondents (44%) were between the ages of 41 and 60. Because a higher proportion of our respondents were male and older compared to census data for Minnesota (Appendix F), statewide results in Sections B and C are weighted to reflect census gender and age proportions (Tables A-1 and A-2).

Nearly all (98%) of the respondents were white (Tables A-4). Almost all respondents (95%) reported that they had at least a high-school degree or equivalent. Twenty percent of all respondents had a college degree or higher degree (Table A-6). Seventy percent of respondents reported a total household income of $40,000 or more (Table A-7).

On average respondents reported they had lived in Minnesota 44 years (Table A-8). The average length of residence in current residence was 15 years (Table A-9).

Table A-1. Respondent gender.

	Actual		Weighted	
Gender	**N**	**Percent**	**N**	**Percent**
Male	631	60.2	513	48.9
Female	418	39.8	537	51.1
Total	**1049**	**100.0**	**1049**	**100.0**

Source: Mail-back questionnaire, question 18.

Table A-2. Respondent age.

	Actual[1]			Weighted[2]		
Age[1]	**N**	**Percent**	**Cumulative percent**	**N**	**Percent**	**Cumulative percent**
20 to 24 years	20	1.9	1.9	98	9.4	9.4
25 to 34 years	121	11.7	13.6	200	19.2	28.7
35 to 44 years	203	19.6	33.2	245	23.6	52.3
45 to 54 years	225	21.7	55.0	198	19.1	71.4
55 to 59 years	117	11.3	66.3	67	6.5	77.9
60 to 64 years	87	8.4	74.7	53	5.1	82.9
65 to 74 years	138	13.3	88.0	88	8.5	91.4
75 to 84 years	94	9.1	97.1	63	6.1	97.5
85 years and over	30	2.9	100.0	26	2.5	100.0
Total	**1035**	**100.0**	**100.0**	**1038**	**100.0**	**100.0**

Source: Mail-back questionnaire, question 14
[1] Mean age: 53.2 years; Median age: 52.0
[2] Mean age: 46.4; Median age: 43.0

Table A-3. Respondent racial identity.

Race	N	Percent
Identify as one racial group	1029	99.3
Identify as more than one racial group	7	0.7
Total	**1036**	**100.0**

Source: Mail-back questionnaire, question 20.

Table A-4. Respondent racial identity.

Race	N	Percent
African American/ black	3	0.3
American Indian or Alaskan Native	7	0.7
Asian	8	0.8
Caucasian/ white	1010	98.2
Pacific Islander	1	0.0
Total (who identify as one racial group)	**1029**	**100.0**

Source: Mail-back questionnaire, question 20.

Table A-5. Respondent ethnic identity.

Ethnicity	N	Percent
Hispanic/ Latino/ Spanish	15	1.5
Not Hispanic/Latino/Spanish	966	98.5
Total	**981**	**100.0**

Source: Mail-back questionnaire, question 21.

Table A-6. Respondent level of education.

Education level	N	Percent	Cumulative percent
Grade school	28	2.7	2.7
Some high school	22	2.1	4.8
High school diploma or GED	173	16.6	21.4
Some vocational or technical school	98	9.4	30.7
Vocational or technical school (associate's) degree	112	10.7	41.5
Some college	180	17.2	58.7
Four-year college (bachelor's) degree	227	21.7	80.5
Some graduate school	53	5.1	85.5
Graduate (master's or doctoral) degree	151	14.5	100.0
Total	**1044**	**100.0**	

Source: Mail-back questionnaire, question 17.

Table A-7. Respondent household income (before taxes) in 2003.

Gross income range	N	Percent	Cumulative percent
Less than $15,000	305	28.9	28.9
$15,000 to $24,999	51	4.8	33.7
$25,000 to $39,999	116	11.0	44.7
$40,000 to $64,999	204	19.3	64.0
$65,000 to $84,999	152	14.4	78.3
$85,000 to $99,999	70	6.6	85.0
$100,000 or more	159	15.0	100.0
Total	**1057**	**100.0**	

Source: Mail-back questionnaire, question 19.

Table A-8. Respondent length of residence in Minnesota.

Years[1]	N	Percent	Cumulative percent
0-10	57	5.4	5.4
11-20	61	5.8	11.2
21-30	148	14.0	25.2
31-40	171	16.2	41.3
41-50	223	21.1	62.4
51-60	172	16.3	78.7
61+	225	21.3	100.0
Total	**1057**	**100.0**	

Source: Mail-back questionnaire, question 15.
[1] Mean length of residence: 44 years.

Table A-9. Respondent length of residence in current home.

Years[1]	N	Percent	Cumulative percent
0-5	320	30.3	30.3
6-10	208	19.7	50.0
11-15	148	14.0	64.0
16-20	108	10.2	74.2
21+	272	25.8	100.0
Total	**1056**	**100.0**	

Source: Mail-back questionnaire, question 16.
[1] Mean length of residence in current home: 15 years.

Section B: Recreational lake activities

The 'Recreational Lake Activities' section of the survey was designed to measure how often residents participate in certain activities. This information helps managers understand what types of activities residents engage in and how much residents use Minnesota lakes. Comparisons of lakeshore landowners can be made based on their preferred types of activities.

Respondents were asked how many days they spent visiting Minnesota lakes and if they engaged in certain recreational activities. The number of days visiting Minnesota lakes during 2003 ranged from 0 to 365 days with a mean of 42 days. Approximately 5% of respondents spent no days at Minnesota lakes, and about 3% spent every day of 2003 at a Minnesota lake. The distribution of lake visit days was skewed to the lower end of the 365-day distribution, with a majority (60%) of respondents spending less than 25 days on Minnesota lakes (Table B-1).

Participation in listed recreational activities (fishing, pleasure boating, swimming/wading, hunting waterfowl, nature viewing, and enjoying lake scenery) ranged from 93% for enjoying lake scenery to 10% for hunting waterfowl (Table B-2). About two-thirds of respondents participated in boating, swimming, or "bird watching, viewing wildlife, or studying nature" during the year. Slightly less than 60% of respondents participated in fishing. Enjoying lake scenery was by far the most popular activity listed. Forty percent of respondents reported that they enjoyed lake scenery 21 or more times during 2003. In contrast, only 1% of respondents hunted waterfowl 21 or more times during the year.

Table B-1. Number of days respondents spent visiting Minnesota lakes in 2003.[1]

Days[2]	N	Percent	Cumulative percent
5 or less	203	19.4	19.4
6-20	266	25.4	44.7
21-40	215	20.6	65.3
41+	363	34.7	100.0
Total	**1047**	**100.0**	

Source: Mail-back questionnaire, question 2.

[1] Data in this table is weighted to reflect gender and age proportions in the population.

[2] Average number of days spent visiting Minnesota lakes: 41.5 days.

Table B-2. Respondents' participation in activities on Minnesota lakes during the past year (2003). [1]

Activity	N	Not at all[1] (0)	1 or 2 times/ yr (1)	3 to 5 times/ yr (2)	6 to 10 times/ yr (3)	11 to 20 times/yr or more (4)	21 or more times (5)
Fishing of all types (boat, shore, dock, ice)	1005	42.8%	13.8%	11.4%	8.7%	8.4%	14.9%
Pleasure boating (motorized or unmotorized) excluding fishing from a boat	1003	33.6%	22.0%	16.2%	10.8%	9.1%	8.3%
Swimming/wading	1002	30.8%	16.6%	18.5%	13.5%	10.3%	10.4%
Hunting waterfowl (ducks, geese)	993	89.7%	3.1%	2.7%	1.6%	1.9%	1.1%
Bird watching, viewing wildlife, studying nature	998	32.3%	14.1%	13.4%	12.1%	9.6%	18.4%
Enjoying lake scenery	1012	7.1%	6.7%	16.7%	15.0%	15.2%	39.4%

Source: Mail-back questionnaire, question 1.

[1] Data in this table is weighted to reflect gender and age proportions in the population.

Section C: Value and Importance of Minnesota Lakes

Previous research has indicated that values can predict future behaviors (Fulton, et al, 1996). The values residents assign to Minnesota lakes can strongly influence recreational behaviors and behaviors related to lake protection and management. The questions in this section assessed if and why respondents thought Minnesota lakes were valuable. Survey questions were adapted from previous studies conducted on perceptions of lake value (Anderson, et al. 1999) and attitudes on fisheries issues (Jacobson, et al., 1999).

Respondents were asked about: (a) the general importance of Minnesota lakes to them, (b)how attached they feel to the lake they used most often (sense of place), and (c) what actions they would be willing to take if that lake was in decline. These questions provide insight into why residents value lakes (i.e. aesthetic, ecological, and/or economic reasons) and how attached they are to the lake they use the most.

Importance of Minnesota Lakes

To assess the importance of Minnesota lakes, respondents were given a list of thirteen statements and asked to indicate their level of agreement with each statement on a five-point scale (1=strongly disagree to 5=strongly agree; Table C-1). Minnesota adults, on average, responded that they mildly or more strongly agreed with all of the listed statements except: Minnesota lakes have no particular importance to me, which they mildly to strongly disagreed with. Because this item reflected negative or absent lake values, it was reverse coded in later analyses. The reliability (after reverse coding) for the full 13-item scale was 0.84.

The four statements with the highest level of respondent agreement were: (a) Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment (4.8), (b) Minnesota lakes are important to me, whether or not I use them (4.7), (c) Minnesota lakes are important to me because of their beauty and atmosphere (4.7), and (d) Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish (4.7). After reverse coding the statement, Minnesota lakes have no particular importance to me, the four items with the lowest level of respondent agreement were: (a) Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals (4.3), (b) Minnesota lakes are important to me because they are sources of clean water (4.2), (c) Minnesota lakes are important to me because of their economic value to surrounding communities (4.1), and (d) Minnesota lakes are important to me because they are a source of childhood memories (4.0)

The thirteen statements examining lake value were divided into four categories: general value, aesthetic value, ecological value, and economic value. Seven items were included under general value (Cronbach's α=0.63), one item under aesthetic value, four under ecological value (Cronbach's α=0.82), and one under economic value. The means for the four scales were: general value at 4.5, aesthetic value at 4.7, ecological value at 4.4, and economic value at 4.1 ($F=210.70$, $p\leq0.001$).

The total number of days that respondents visited lakes in Minnesota in 2003 was correlated to five of the seven general value items, the one aesthetic value item, and one of the four ecological

value items. Respondents who spent more days at the lake agreed more strongly with the personal values: (a) Minnesota lakes are important to me, whether or not I use them ($r=0.07$, $p \leq 0.05$), (b) Minnesota lakes are important to me because they offer many types of recreation ($r=0.12$, $p \leq 0.001$), (c) Minnesota lakes are important to me because they are quiet, natural places for personal renewal ($r=0.10$, $p \leq 0.01$), and (d) Minnesota lakes are important to me because they are a source of childhood memories ($r=0.16$, $p \leq 0.001$). Respondents who spent more days at Minnesota lakes in 2003 disagreed more strongly that: Minnesota lakes have no particular importance to me ($r=-0.11$, $p \leq 0.001$). Respondents who spent more days at the lake agreed more strongly with the aesthetic value: Minnesota lakes are important to me because of their beauty and atmosphere ($r=0.12$, $p \leq 0.01$). Finally, respondents who spent more days at the lake agreed more strongly with the ecological value that Minnesota lakes are important to me because of their fish, wildlife, and other natural features ($r=0.08$, $p \leq 0.05$).

Lake Health and Aquatic Plants

Respondents were provided with the following description of aquatic plants:

> Minnesota is home to about 150 types of aquatic plants, including a few types that are exotic species not native to the state. The questions below address ***native*** aquatic plants like water lilies, wild rice, and cattails, NOT non-native exotic species like Eurasian water milfoil and curly-leaf pondweed.

We asked respondents to report their familiarity with, knowledge of, and attitudes about aquatic plants.

Familiarity and Knowledge of Issues Related to Native Aquatic Plants and Lake Ecology.

We asked respondents to indicate whether they were: (a) not at all, (b) slightly, (c) moderately, (d) very, or (e) extremely familiar with issues related to native aquatic plants and lake ecology. Only 10.5% of respondents indicated that they were very or extremely familiar (Table C-2). Familiarity with native aquatic plants and lake ecology was positively correlated with the number of days spent at Minnesota lakes in 2003 ($r=0.20$, $p \leq 0.001$).

We presented respondents with eight items addressing their knowledge of aquatic plants (Table C-3). Responses were: (a) definitely false, (b) probably false, (c) unsure, (d) probably true, and (e) definitely true. Five items were reverse coded to consistently reflect positive knowledge of aquatic plants on one end of the scale. The reliability coefficient for the knowledge items was 0.67.

Responses, which were generally in the middle of the scale, suggest that the general public is largely unsure of the function of aquatic plants in lakes. The average scores for two items were close to the "probably true" point: (a) removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.) (4.0), and (b) removal of native aquatic plants increases shoreline erosion (3.8). The mean scores for two items were close to the "probably false" point: (a) native aquatic plants decrease the scenic beauty of the lake (2.4), and (b) native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.) (1.9).

Attitudes About Native Aquatic Plants and Their Removal

We presented two 7-point semantic differential scales. Respondents were asked to indicate whether removing native aquatic plants from lakes is extremely, quite, or slightly (a) bad or good, and (b) harmful or beneficial. Approximately 80% of respondents indicated that removing native aquatic plants from lakes was slightly, quite, or extremely bad (Table C-4). Similarly, 78% of respondents indicated that removing native aquatic plants from lakes was slightly, quite, or extremely harmful (Table C-5). The correlation coefficient for these two items was 0.88. Neither of these items was correlated with the number of days spent at Minnesota lakes in 2003.

We also presented respondents with 17 statements to address attitudes about aquatic plants, and asked them to indicate their level of agreement on a five-point scale (1=strongly disagree to 5=strongly agree) (Table C-6). Eight items were reverse coded to report positive attitudes toward aquatic plants with higher numbers on the scale. The reliability coefficient for this scale was 0.90. Respondents most strongly agreed that: (a) native aquatic plants serve important functions that maintain the health of lakes (4.4), and (b) life in lakes depends on native aquatic plants (4.3).

We divided the 17 aquatic plant attitude statements into four categories: (a) protection/removal value (five items, Cronbach's α=0.71), (b) aesthetic value (four items, Cronbach's α=0.78), (c) general ecological value (five items, Cronbach's α=0.75), and (d) fish and wildlife recreation value (three items, Cronbach's α=0.78). The scale means were 4.1 for ecological value, 4.0 for recreation value, 3.7 for protection/removal value, and 3.5 for aesthetic value ($F=134.47$, $p\leq0.001$).

Two of the 17 items, (a) lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake ($r=0.08$, $p\leq0.05$), and (b) native aquatic plants improve the quality of fishing ($r=0.08$, $p\leq0.05$), were correlated to the number of days spent at Minnesota lakes in 2003

Management of Aquatic Plants

We asked respondents how much they trusted seven groups of people to make sound recommendations concerning the management of lakes and aquatic plants. The groups included: (a) individual lakeshore landowners, (b) the State of Minnesota, (c) the county government for the lake, (d) lakeshore property owner groups, (e) the Minnesota Department of Natural Resources (DNR), (f) the general public, and (g) lake users (recreationists, etc.) (Table C-7). Responses were on a 4-point scale ranging from: 1 (do not trust at all) to 4 (trust greatly). The Minnesota Department of Natural Resources was rated the most trustworthy for managing aquatic plants (3.4) and lake users were rated least trustworthy (1.9).

There was a positive correlation between the number of days spent at Minnesota lakes in 2003 and trust in two groups: (a) lakeshore landowners ($r=0.13$, $p\leq0.001$), and (b) lakeshore property owner groups ($r=0.16$, $p\leq0.001$).

Respondents were asked to rate how much they know about regulations concerning aquatic plant management in Minnesota using the responses: (a) not at all knowledgeable, (b) slightly knowledgeable, (c) moderately knowledgeable, (d) very knowledgeable, and (e) extremely knowledgeable (Table C-8). Over three-fourths (79.5%) of the respondents indicated that they were either not at all, or slightly knowledgeable about aquatic plant management regulations in Minnesota. There was a positive correlation between the number of days spent at Minnesota lakes in 2003 and reported knowledge of regulations concerning aquatic plant management ($r=0.25$, $p\leq0.001$).

Respondents were asked to describe current management regulations concerning native aquatic plants in Minnesota using the responses: (a) too restrictive, (b) about right, (c) not restrictive enough, or (d) don't know (Table C-9). Over half of the respondents (63.4%) said "don't know," and approximately one-fifth (18.7%) said the regulations were "about right." Fourteen percent said that the regulations were "not restrictive enough," and about 5% said that they were "too restrictive." Restricting analysis to respondents who gave an opinion about aquatic plant regulations (Table C-10), half said that the regulations were about right, about 40% said the regulations were not restrictive enough, and 12% said they were too restrictive.

Lake Meanings and Attachment (Sense of Place)

Respondents were asked several questions about the lake they used most often. Approximately two-thirds (65%) of respondents reported there was a lake or lakes in Minnesota they used most often (Table C-11). Of those respondents, over one-fourth 27% owned property on the lake they used the most (Table C-11). Over two-thirds (70%) of respondents owning lakeshore property reported the major use of the property was seasonal or recreational property, and almost one-third (29%) reported that the property was their primary residence (Table C-12).

Respondents were asked about their feelings related to the Minnesota lake they used most often. Questions in this section were designed to assess the meaning lakes held for respondents and how attached respondents were to their lake. The questions were adapted from sense of place research conducted by Stedman (2002). Stedman defines sense of place as the meanings and attachment to a setting held by an individual or group. The concept of sense of place is integral to understanding the relationship between residents and Minnesota lakes.

The survey had thirteen statements measuring sense of place such as, "It is my favorite place to be" and "I feel happiest when I am there" (Table C-13). Respondents could respond to the statements on a five-point scale ranging from: 1 (strongly disagree) to 5 (strongly agree). Two items were reversed to code positive feelings about the most-used lake as higher numbers on the scale. Respondents most strongly agreed with the following three statements about the lake they visited most: (a) I feel that I can really be myself there (4.2), (b) it is my favorite place to be (4.1), and (c) it is a special place for my family (4.1).

We divided the thirteen sense of place statements into four categories: (a) emotional attachment, (b) place dependence, (c) identity, and (d) family attachment. Emotional attachment included three items (Cronbach's $\alpha=0.87$); place dependence included three items (Cronbach's $\alpha=0.78$); identity included four items (Cronbach's $\alpha=0.85$), and family attachment included three items

(Cronbach's α=0.82). The scaled means for the four categories were 3.9 for emotional attachment, 3.8 for family attachment, 3.7 for identity, and 3.6 for place dependence ($F=57.73$, $p \leq 0.001$).

All of the thirteen sense of place items were correlated to the number of days spent at Minnesota lakes in 2003. Not surprisingly, respondents who spent more days at Minnesota lakes in 2003 felt a stronger attachment to the lake that they used most often.

Actions

Respondents who had a lake that they used most often were also asked whether they would be willing to take certain actions if the environmental quality of the lake they used most often was declining. This section of the survey indicates how willing residents are to devote their resources to lake protection.

Five actions were listed including: (a) contributing money, (b) contributing personal time, (c) joining an organization, (d) supporting legislation that protected lakes, and (e) voting for individuals who support lake protection (Table C-14). Respondents were asked to indicate how likely it was they would take each action on the five-point scale 1 (extremely unlikely) to 5 (extremely likely). Respondents were most willing to vote for individuals who support lake protection (4.2).

Likelihood of taking three of the five listed actions was correlated to the number of days spent at Minnesota lakes in 2003. Respondents who visited lakes more often reported stronger inclinations to: (a) contribute money to protect the lake(s) ($r=0.18$, $p \leq 0.01$), (b) contribute personal time to protect the lake(s) ($r=0.18$, $p \leq 0.001$), and (c) join an organization working to protect the lake(s) ($r=0.19$, $p \leq 0.001$).

Table C-1. Respondents' opinions on the value and importance of Minnesota lakes.[1]

Statement	N	Strongly disagree (1)	Mildly disagree (2)	Neutral (3)	Mildly agree (4)	Strongly agree (5)	Mean
General Value (Cronbach's α: 0.63)							**4.5**
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1024	1.5%	0.1%	1.8%	8.8%	87.8%	4.8
• Minnesota lakes are important to me, whether or not I use them.	1027	2.6%	0.1%	1.9%	12.3%	83.0%	4.7
• Minnesota lakes are inviting to me.	1019	1.4%	0.7%	7.3%	24.9%	65.6%	4.6
• Minnesota lakes are important to me because they offer many types of recreation.	1019	1.8%	2.1%	10.9%	26.8%	58.4%	4.4
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1012	2.1%	2.8%	13.6%	24.6%	56.8%	4.3
• Minnesota lakes are important to me because they are a source of childhood memories.	1007	7.1%	4.8%	18.2%	21.9%	48.0%	4.0
• Minnesota lakes have no particular importance to me.[2]	1018	76.3%	10.4%	4.5%	2.5%	6.2%	1.5
Aesthetic Value							**4.7**
• Minnesota lakes are important to me because of their beauty and atmosphere.	1025	1.5%	0.2%	3.6%	19.1%	75.4%	4.7
Ecological Value (Cronbach's α: 0.82)							**4.4**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1015	1.4%	0.3%	3.6%	20.0%	74.6%	4.7
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1021	2.0%	0.6%	4.9%	17.9%	74.6%	4.6
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1000	1.7%	2.0%	16.6%	27.2%	52.5%	4.3
• Minnesota lakes are important to me because they are sources of clean water.	972	1.9%	3.7%	16.5%	29.5%	48.4%	4.2
Economic Value							**4.1**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	989	2.4%	4.5%	17.4%	32.5%	43.3%	4.1

Source: Mail-back questionnaire, question 3.

[1] Data in this table are weighted to reflect gender and age proportions in the population.
[2] Item(s) reversed for scale calculations.

Table C-2. Respondent familiarity with issues related to native aquatic plants and lake ecology. [1]

Level of familiarity	N	Percent
Not at all familiar	232	22.6
Slightly familiar	389	38.0
Moderately familiar	295	28.0
Very familiar	90	8.7
Extremely familiar	19	1.8
Total	**1024**	**100.0**

Source: Mail-back questionnaire, question 4.
Mean level of familiarity: 2.29.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-3. Respondents' knowledge of native aquatic plants. [1]

Statement	N	Definitely false (1)	Probably false (2)	Unsure (3)	Probably true (4)	Definitely true (5)	Mean[2]
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	970	2.7%	4.4%	14.2%	42.1%	36.5%	4.05
• Removal of native aquatic plants increases shoreline erosion.	962	5.2%	6.7%	16.7%	42.0%	29.4%	3.84
• Removal of native aquatic plants is harmful to fish populations.	981	9.1%	10.0%	10.7%	40.0%	30.1%	3.72
• Removal of native aquatic plants increases the value of the lake as a recreational area. [3]	965	13.7%	20.4%	25.8%	33.1%	7.0%	2.99
• Native aquatic plants reduce the economic value of the lake in the long-term. [3]	963	16.7%	29.4%	30.6%	18.6%	4.7%	2.65
• Native aquatic plants reduce water clarity and quality. [3]	953	20.6%	31.2%	27.5%	16.2%	4.5%	2.53
• Native aquatic plants decrease the scenic beauty of the lake. [3]	990	36.8%	25.3%	13.7%	14.2%	9.9%	2.35
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.) [3]	971	42.1%	34.4%	15.8%	4.6%	3.2%	1.92

Source: Mail-back questionnaire, question 6.
Cronbach's α (8 items): 0.67.
[1] Data in this table are weighted to reflect gender and age proportions in the population.
[2] $F=525.244$ ($p \leq 0.001$)
[3] Item(s) reversed for scale calculations.

Table C-4. Removing native aquatic plants from lakes is: [1]

	N	Percent
Extremely bad	292	28.3
Quite bad	358	35.9
Slightly bad	162	16.3
Neither	109	10.9
Slightly good	41	4.1
Quite good	28	2.8
Extremely good	18	1.8
Total	**999**	**100.0**

Source: Mail-back questionnaire, question 5.
Mean level: 2.42.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-5. Removing native aquatic plants from lakes is: [1]

	N	Percent
Extremely harmful	238	24.1
Quite harmful	366	37.1
Slightly harmful	161	16.3
Neither	123	12.5
Slightly beneficial	47	4.8
Quite beneficial	33	3.3
Extremely beneficial	19	2.0
Total	**987**	**100.0**

Source: Mail-back questionnaire, question 5.
Mean level: 2.55.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-6. Respondents' attitudes about aquatic plants. [1]

Statement	N	Strongly disagree (1)	Mildly disagree (2)	Neutral (3)	Mildly agree (4)	Strongly agree (5)	Mean[2]
Protection/Removal Value (Cronbach's α=0.71)							**3.72**
• Removal of native aquatic plants should be closely regulated.	927	4.3	10.9	9.9	38.0	36.8	3.92
• Native aquatic plants are so important they should be completely left alone.	876	6.5	26.0	15.0	36.5	15.9	3.29
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake.	953	25.4	34.3	9.2	22.1	9.0	2.55
• Native aquatic plants have no importance to me.[3]	952	34.0	37.3	16.1	10.1	2.5	2.10
• Native aquatic plants are weeds and should be removed. [3]	913	50.1	33.5	8.0	5.9	2.5	1.77
Aesthetic Value (Cronbach's α=0.78)							**3.51**
• Native aquatic plants add to the scenic beauty of lakes.	943	2.8	7.5	12.5	43.5	33.6	3.98
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	928	4.8	19.1	23.2	35.8	17.1	3.41
• Native aquatic plants make the shoreline look messy. [3]	945	17.7	32.9	17.2	27.2	5.0	2.69
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge. [3]	959	29.4	23.0	17.2	21.6	8.8	2.57
General Ecological Value (Cronbach's α=0.75)							**4.05**
• Native aquatic plants serve important functions that maintain the health of lakes.	902	1.8	1.8	5.0	41.1	50.4	4.36
• Life in lakes depends on native aquatic plants.	866	1.3	2.5	4.8	44.0	47.3	4.34
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake. [3]	699	21.8	37.2	24.0	13.9	3.1	2.39
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes. [3]	813	30.2	34.9	16.6	11.2	7.2	2.30
• To improve the overall health of lakes, native aquatic plants should be removed.[3]	829	45.8	35.5	10.7	5.7	2.3	1.83
Fish and Wildlife Recreation Value (Cronbach's α=0.78)							**3.98**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	806	0.7	1.0	13.0	44.5	40.9	4.24
• Native aquatic plants improve the quality of fishing.	849	0.8	3.3	9.8	48.6	37.5	4.19
• Native aquatic plants support the economic value of lakes for tourism and recreation.	768	3.6	15.2	25.9	39.1	16.3	3.49

Source: Mail-back questionnaire, question 7.
Cronbach's α (17 items): 0.8976
[1] Data in this table are weighted to reflect gender and age proportions in the population.
[2] $F=479.639$ ($p \leq 0.001$)
[3] Item(s) reversed for scale calculations.

Table C-7. Respondents' trust in groups to make sound recommendations for aquatic plant management. [1]

Statement	N	Do not trust at all (1)	Trust slightly (2)	Trust moderately (3)	Trust greatly (4)	Mean[2]
• The Minnesota Department of Natural Resources (DNR)	991	3.9	7.9	32.0	56.2	3.41
• The State of Minnesota	965	6.2	24.2	51.4	18.3	2.82
• The county government for the lake	951	6.9	30.4	46.6	16.1	2.72
• Lakeshore property owner groups	955	21.6	33.6	35.2	9.7	2.33
• Individual lakeshore landowners	960	25.1	39.1	31.7	4.1	2.15
• The general public	944	39.3	41.5	17.1	2.1	1.82
• Lake users (recreationists, etc.)	964	33.4	42.9	20.6	3.1	1.93

Source: Mail-back questionnaire, question 8.
[1] Data in this table are weighted to reflect gender and age proportions in the population.
[2] $F=450.044$ ($p \leq 0.001$)

Table C-8. How knowledgeable respondents feel they are about aquatic plant regulations. [1]

Level of knowledge	N	Percent
Not at all knowledgeable	452	44.0
Slightly knowledgeable	365	35.5
Moderately knowledgeable	184	17.9
Very knowledgeable	20	2.0
Extremely knowledgeable	6	0.6
Total	**1028**	**100.0**

Source: Mail-back questionnaire, question 9.
Mean level of knowledge: 1.80.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-9. Respondents' opinion about current aquatic plant management regulations in Minnesota. [1]

Opinion about restrictiveness of regulations	N	Percent
Too restrictive	44	4.3
About right	191	18.7
Not restrictive enough	140	13.6
Don't know	648	63.4
Total	**1022**	**100.0**

Source: Mail-back questionnaire, question 10.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-10. Of respondents with an opinion, respondents' opinion about current aquatic plant management regulations in Minnesota. [1]

Opinion about restrictiveness of regulations	N	Percent
Too restrictive	44	11.6
About right	191	51.1
Not restrictive enough	140	37.2
Total	**375**	**100.0**

Source: Mail-back questionnaire, question 10.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-11. Respondents indicated if there was a lake or lakes in Minnesota they used most often and if they owned property on the most used lake. [1]

Survey Question	N	Percent Yes	N	Percent No
Is there a lake or lakes in Minnesota that you use most often?	658	65.3	349	34.7
Do you own property on the lake you use most often?	176	27.1	474	72.9

Source: Mail-back questionnaire, question 11 & 11a.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-12. Respondents indicated whether their lakeshore property was primary residence, seasonal or recreational property, rental property, or business property. [1]

Property Category	N	Percent
Primary residence	50	29.0
Seasonal or recreational property	121	70.0
Rental property	0	0.0
Business property	0	0.0
Other	2	1.0
Total	**173**	**100.0**

Source: Mail-back questionnaire, question 11b.
[1] Data in this table are weighted to reflect gender and age proportions in the population.

Table C-13. Of respondents who use a particular lake most often, feelings about the lake they use most often. [1]

Statement	N	Strongly disagree (1)	Mildly disagree (2)	Neutral (3)	Mildly agree (4)	Strongly agree (5)	Mean[2]
Emotional attachment (Cronbach's α=0.87)							**3.93**
• It is my favorite place to be.	648	1.3	3.9	12.5	44.6	37.6	4.13
• I really miss it when I am away from it too long.	643	2.7	8.1	20.8	36.1	32.3	3.87
• I feel happiest when I am there.	643	2.4	6.5	26.6	36.4	28.2	3.81
Place dependence (Cronbach's α=0.78)							**3.59**
• It is the best place to do the things I enjoy.	646	2.0	8.0	22.8	37.7	29.5	3.85
• For the things I enjoy doing most, no other place can compare it.	629	5.2	14.5	31.4	28.0	21.0	3.45
• As far as I am concerned there are better places to be.[3]	631	22.7	28.0	28.9	14.2	6.3	2.54
Identity (Cronbach's α=0.85)							**3.72**
• I feel that I can really be myself there.	647	0.8	2.8	15.4	39.4	41.7	4.18
• It reflects the type of person that I am.	638	3.4	6.9	26.6	33.6	29.5	3.79
• Everything about it is a reflection of me.	626	7.0	16.2	38.9	24.5	13.5	3.21
• It says very little about who I am. [3]	618	28.5	29.0	25.9	12.3	4.3	2.35
Family attachment (Cronbach's α=0.82)							**3.80**
• It is a special place for my family.	635	1.6	4.9	17.8	34.9	40.8	4.08
• Many important family memories are tied to it.	639	6.0	10.0	16.3	29.2	38.5	3.84
• It ties the generations of my family together.	635	13.5	9.6	22.8	24.1	29.9	3.47

Source: Mail-back questionnaire, question 12.

[1] Data in this table are weighted to reflect gender and age proportions in the population.
[2] $F=249.331$ ($p \leq 0.001$)
[3] Item(s) reversed for scale calculations.

Table C-14. Of respondents who use a particular lake most often, likeliness of taking action related to the lake they use most often. [1]

Action	N	Extremely unlikely (1)	Moderately unlikely (2)	Neither (3)	Moderately likely (4)	Extremely likely (5)	Mean[2]
• Vote for people who support lake protection.	629	3.7	5.9	6.0	40.2	44.2	4.15
• Support legislation or regulations that limit human use to protect the lake(s).	611	12.2	12.2	10.0	36.7	28.9	3.58
• Contribute personal time to protect the lake(s).	611	8.1	15.6	11.2	47.3	17.8	3.51
• Contribute money to protect the lake.	602	12.5	15.0	9.5	49.7	13.3	3.36
• Join an organization working to protect the lake(s).	608	9.8	21.4	16.7	36.4	15.7	3.27

Source: Mail-back questionnaire, question 13.
[1] Data in this table are weighted to reflect gender and age proportions in the population.
[2] $F=81.297$ ($p \leq 0.001$)

Section D: Relationship Between Use of a Particular Minnesota Lake / Ownership of Minnesota Lake Property and Valuation of Lakes and Aquatic Plants

We separated respondents into three categories based on whether: (a) they owned lakeshore property, (b) they used a particular lake or lakes most often, or (c) they neither owned lakeshore property nor used a particular lake most often. These three groups of respondents differed in several basic ways. First, the lakeshore property owners visited Minnesota lakes an average of 110 days during 2003, compared to 41 days for respondents who used a particular lake most often, and 13 days for other respondents ($F=100.259$, $p\leq0.001$, $\eta=0.437$). Second, the lakeshore property owners had an average income of $94,205, compared to $70,561 for respondents who used a particular lake, and $66,554 for other respondents ($F=9.370$, $p\leq0.001$, $\eta=0.155$). Finally, lakeshore property owners had lived 87% of their lives in Minnesota, compared to 84% for respondents who used a particular lake, and 80% for other respondents ($F=4.202$, $p\leq0.05$, $\eta=0.092$).

Importance of Minnesota Lakes

Respondents who used a particular lake or owned Minnesota lake property differed from other respondents in many of their opinions on the value and importance of Minnesota lakes (Table D-1). There were significant differences among these groups for three of the four scaled categories, including general value, aesthetic value, and ecological value. There was not a significant difference between groups for economic value. Significant differences were found for all eight general value items, the one aesthetic value item, and two of the four ecological value items. In each case, respondents who owned lake property reported the strongest positive values associated with Minnesota lakes, and respondents who neither owned lake property nor used a particular lake most often reported the lowest values. In general, the respondents who used a particular lake or lakes most often, but did not own lake property held similar values to lake property owners.

Lake Health and Aquatic Plants

Respondents who used a particular lake or owned Minnesota lake property reported greater familiarity with issues related to native aquatic plants and lake ecology ($F=35.403$, $p\leq0.001$, $\eta=0.260$) (Table D-2). There were, however, no significant differences between the groups on whether removing native aquatic plants from lakes was bad or good (Table D-3), or harmful or beneficial (Table D-4) with most respondents reporting removal to be bad and harmful.

There were significant differences for three of the eight items related to knowledge about aquatic plants (Table D-5). Respondents who owned lake property were more likely to rate the item "native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)" false than respondents who used a particular lake most often but did not own lake property, or respondents who did not use a particular lake most often ($F=6.863$, $p\leq0.001$, $\eta=0.120$). Respondents who did not own lake property or frequent a particular lake were slightly less likely to rate the item "native aquatic plants reduce the economic value of the lake in the long term"

false than respondents who used a particular lake most often, or respondents who owned lake property ($F=3.651$, $p\leq0.05$, $\eta=0.089$). Finally, respondents who used a particular lake most often, and respondents who owned lake property were more likely to rate the item "removal of native aquatic plants increases shoreline erosion" as true than respondents who did not use a particular lake or own lake property ($F=3.293$, $p\leq0.05$, $\eta=0.084$).

There were significant differences for three of the four scales and six of the 17 items addressing attitudes about aquatic plants (Table D-6). For the three value scales where differences existed (protection/removal value, aesthetic value, and ecological value), respondents who did not own lake property but frequented a particular lake or lakes held the most positive views of aquatic plants.

There were also differences for specific aquatic plant attitude items. Fewer respondents who did not own lake property or frequent a particular lake disagreed with the item "native aquatic plants have no importance to me" ($F=7.368$, $p\leq0.001$, $\eta=0.126$). Respondents who owned lake property disagreed less with the statement "lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake" ($F=4.797$, $p\leq0.01$, $\eta=0.102$). Respondents who owned lake property agreed less with the item "removal of native aquatic plants should be closely regulated" ($F=4.313$, $p\leq0.05$, $\eta=0.097$). Respondents who did not own lake property or frequent a particular lake disagreed somewhat less with the item "lake shorelines are more beautiful when lawns are turf grass and mowed to the edge" ($F=4.258$, $p\leq0.05$, $\eta=0.0.095$). Respondents who used a particular lake most often, but did not own lake property disagreed most that "native aquatic plants make the shoreline look messy" followed by respondents who did not use a particular lake most often, and lakeshore property owners ($F=3.015$, $p\leq0.05$, $\eta=0.0.081$). Finally, respondents who did not own lake property or use a particular lake most often agreed somewhat less that "native aquatic plants serve important functions that maintain the health of lakes ($F=3.289$, $p\leq0.05$, $\eta=0.0.086$).

Management of Aquatic Plants

Respondents were asked how much they could trust seven groups to make sound recommendations concerning the management of lakes and aquatic plants. We compared the responses of lakeshore property owners, respondents who used a particular lake or lakes most often but do not own property, and respondents who don't frequent a particular lake (Table D-7). Lakeshore property owners report relatively more trust in individual lakeshore landowners ($F=19.584$, $p\leq0.001$, $\eta=0.201$) and lakeshore property owner groups ($F=26.581$, $p\leq0.001$, $\eta=0.233$), and less trust in the Minnesota DNR ($F=9.038$, $p\leq0.001$, $\eta=0.136$), the county government for the lake ($F=5.358$, $p\leq0.01$, $\eta=0.107$), and the general public ($F=3.807$, $p\leq0.05$, $\eta=0.091$).

Respondents were asked to report their knowledge about regulations concerning aquatic plant management in Minnesota, and we compared respondents based on their use of a particular lake and ownership of lake property (Table D-8). As might be expected, respondents who did not use a particular lake or own lake property reported the lowest level of knowledge of aquatic plant regulations, followed by respondents who used a particular lake or lakes, and respondents who owned lake property ($F=58.417$, $p\leq0.001$, $\eta=0.324$).

Finally, we asked respondents to indicate whether current management regulations for native aquatic plants were: (a) too restrictive, (b) about right, (c) not restrictive enough, or (d) "don't know." We compared the responses of lakeshore property owners, respondents who used a particular lake or lakes most often but do not own property, and respondents who don't frequent a particular lake for this question (Table D-9). The results suggest that many people don't know much about the regulations for aquatic plants. Over one-third of the respondents from each of the three categories indicated that they didn't know how they would describe the regulations. Nearly two-thirds of the respondents who didn't use a particular lake or own lake property selected "don't know." The majority of respondents from each of the groups who gave an opinion indicated that they thought the restrictions were about right. About 20% of respondents who owned lake property or frequented a particular lake indicated that the regulations were "not restrictive enough."

Lake Meanings and Attachment (Sense of Place)

Respondents who indicated that there was a lake or lakes that they used most often were asked to respond to a series of questions addressing how they felt about that lake or lakes. We compared lakeshore property owners and non-owners on this series of questions (Table D-10). There were strong, significant differences between property owners and non-owners for each of the four sense of place scales with property owners reporting stronger attachment levels. We also found significant differences ($p \leq 0.001$) between these groups for each of the thirteen sense of place items. Results suggest that lakeshore property owners feel a much stronger sense of place related to their lake.

Actions

Respondents who indicated that there was a lake or lakes that they used most often were asked to respond to a series of questions about the actions they would be willing to take if the environmental quality of that lake declines. Again, we compared lakeshore property owners and non-owners on this series of questions (Table D-11). We found significant differences ($p \leq 0.001$) between these groups for three of the five listed actions. Lakeshore property owners indicated a stronger likelihood of: (a) contributing personal time ($F=58.254$, $p \leq 0.001$, $\eta=0.294$), (b) contributing money ($F=44.285$, $p \leq 0.001$, $\eta=0.261$), or (c) joining an organization ($F=56.634$, $p \leq 0.001$, $\eta=0.291$), to protect the lake. There were no significant differences between lakeshore property owners and others in their likelihood of: (a) voting for people who support lake protection, and (b) supporting legislation or regulations that limit human use to protect the lakes.

Table D-1. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they had a lake they used most often, or owned land on a lake.

Statement	N	Respondents who…[1] do not use a particular lake most often	use a particular lake most often, but do not own lake property	own lake property	F	η
General Value	**991**	**4.24**	**4.54**	**4.64**	**31.736*** **	**0.246**
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	987	4.72	4.85	4.86	4.525*	0.095
• Minnesota lakes are important to me, whether or not I use them.	990	4.56	4.78	4.79	8.220***	0.128
• Minnesota lakes are inviting to me.	984	4.35	4.65	4.72	3.421*	0.083
• Minnesota lakes are important to me because they offer many types of recreation.	987	4.11	4.47	4.57	21.514***	0.205
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	981	4.12	4.36	4.41	7.997***	0.127
• Minnesota lakes are important to me because they are a source of childhood memories.	968	3.66	4.03	4.35	22.089***	0.209
• Minnesota lakes have no particular importance to me. [2]	982	1.89	1.33	1.25	33.835***	0.254
Aesthetic Value	**987**	**4.48**	**4.75**	**4.79**	**17.369*** **	**0.185**
• Minnesota lakes are important to me because of their beauty and atmosphere.	987	4.48	4.75	4.79	17.369***	0.185
Ecological Value	**990**	**4.33**	**4.49**	**4.46**	**4.725** **	**0.097**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	986	4.55	4.71	4.72	5.600**	0.106
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	986	4.46	4.70	4.77	12.480***	0.157
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	967	4.18	4.29	4.15	1.892	0.063
• Minnesota lakes are important to me because they are sources of clean water.	956	4.14	4.22	4.22	0.736	0.039
Economic Value	**969**	**4.08**	**4.11**	**4.20**	**0.897**	**0.043**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	969	4.08	4.11	4.20	0.897	0.043

[1] Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table D-2. Respondent mean familiarity with issues related to native aquatic plants and lake ecology by whether they had a lake they used most often..

Respondents who…[1]					
do not use a particular lake most often	**use a particular lake most often, but do not own lake property**	**own lake property**	**N**	**F**	**η**
2.08	2.47	2.74	938	35.403***	0.260

[1] Mean is based on the scale: 1=not at all familiar 5=extremely familiar
*** p≤0.001, ** p≤0.01, * p≤0.05

Table D-3. Respondent mean opinion on whether removing native aquatic plants from lakes is bad or good by whether they had a lake they used most often..

Respondents who…[1]					
Do not use a particular lake most often	**use a particular lake most often, but do not own lake property**	**own lake property**	**N**	**F**	**η**
2.43	2.31	2.58	954	2.298	0.101

[1] Mean is based on the scale: 1=extremely bad 7=extremely good
*** p≤0.001, ** p≤0.01, * p≤0.05

Table D-4. Respondent mean opinion on whether removing native aquatic plants from lakes is harmful or beneficial by whether they had a lake they used most often.

Respondents who…[1]					
do not use a particular lake most often	**use a particular lake most often, but do not own lake property**	**own lake property**	**N**	**F**	**η**
2.50	2.49	2.66	940	0.991	0.371

[1] Mean is based on the scale: 1=extremely harmful 7=extremely beneficial
*** p≤0.001, ** p≤0.01, * p≤0.05

Table D-5. Respondents' mean level of knowledge of native aquatic plants by whether they had a lake they used most often.

Statement	N	Respondents who…[1] do not use a particular lake most often	use a particular lake most often, but do not own lake property	own lake property	F	η
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)	939	2.03	1.85	1.70	6.863***	0.120
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	941	4.01	4.06	4.07	0.256	0.023
• Removal of native aquatic plants increases shoreline erosion.	934	3.69	3.89	3.89	3.293*	0.084
• Removal of native aquatic plants is harmful to fish populations.	947	3.61	3.66	3.76	0.830	0.042
• Removal of native aquatic plants increases the value of the lake as a recreational area.	926	3.02	2.87	2.98	1.565	0.058
• Native aquatic plants reduce the economic value of the lake in the long-term.	924	2.71	2.49	2.51	3.651*	0.089
• Native aquatic plants reduce water clarity and quality.	919	2.54	2.48	2.37	1.302	0.053
• Native aquatic plants decrease the scenic beauty of the lake.	954	2.45	2.25	2.31	1.924	0.063

[1] Mean is based on the scale: 1=definitely false 5=definitely true
*** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$

Table D-6. Respondents' mean value scores for native aquatic plants by whether they use a particular lake.

Statement	N	Respondents who…[1] do not use a particular lake most often	use a particular lake most often, but do not own lake property	own lake property	F	η
Protection/Removal Value	**962**	**3.73**	**3.84**	**3.62**	**5.252****	**0.104**
• Removal of native aquatic plants should be closely regulated.	910	3.98	4.06	3.77	4.313*	0.097
• Native aquatic plants are so important they should be completely left alone.	870	3.37	3.35	3.18	1.589	0.060
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake. [2]	923	2.47	2.42	2.76	4.797**	0.102
• Native aquatic plants have no importance to me. [2]	912	2.23	1.97	1.91	7.368***	0.126
• Native aquatic plants are weeds and should be removed. [2]	888	1.80	1.69	1.89	2.868	0.080
Aesthetic Value	**960**	**3.47**	**3.64**	**3.46**	**4.040***	**0.091**
• Native aquatic plants add to the scenic beauty of lakes.	920	3.95	4.06	3.86	2.835	0.078
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	912	3.45	3.50	3.39	0.686	0.039
• Native aquatic plants make the shoreline look messy. [2]	910	2.65	2.54	2.79	3.015*	0.081
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge. [2]	931	2.71	2.42	2.49	4.258*	0.095
General Ecological Value	**918**	**3.98**	**4.11**	**4.03**	**3.132***	**0.082**
• Native aquatic plants serve important functions that maintain the health of lakes.	880	4.26	4.42	4.38	3.289*	0.086
• Life in lakes depends on native aquatic plants.	854	4.29	4.37	4.27	1.404	0.057
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake. [2]	706	2.42	2.35	2.35	0.275	0.028
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes. [2]	805	2.31	2.15	2.19	1.381	0.059
• To improve the overall health of lakes, native aquatic plants should be removed. [2]	826	1.90	1.77	1.83	1.242	0.055
Fish and Wildlife Recreation Value	**898**	**3.96**	**4.03**	**3.97**	**0.663**	**0.038**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	816	4.23	4.26	4.30	0.468	0.034
• Native aquatic plants improve the quality of fishing.	856	4.11	4.25	4.23	2.409	0.075
• Native aquatic plants support the economic value of lakes for tourism and recreation.	786	3.60	3.55	3.45	1.079	0.052

[1] Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table D-7. Respondents' trust in groups to make sound recommendations for aquatic plant management by whether they use a particular lake.

		Respondents who…[1]				
Statement	**N**	**do not use a particular lake most often**	**use a particular lake most often, but do not own lake property**	**own lake property**	**F**	**η**
• The Minnesota Department of Natural Resources (DNR)	964	3.36	3.40	3.11	9.038***	0.136
• The State of Minnesota	936	2.89	2.85	2.72	2.655	0.075
• The county government for the lake	932	2.79	2.66	2.55	5.358**	0.107
• Lakeshore property owner groups	930	2.31	2.25	2.81	26.581***	0.233
• Individual lakeshore landowners	938	2.16	2.03	2.49	19.584***	0.201
• The general public	923	1.88	1.90	1.72	3.807*	0.091
• Lake users (recreationists, etc.)	940	1.92	1.97	1.91	0.537	0.034

[1] Mean is based on the scale: 1=do not trust at all 4=trust greatly
*** p≤0.001, ** p≤0.01, * p≤0.05

Table D-8. Respondent mean knowledge of aquatic plant regulations by whether they had a lake they used most often..

Respondents who…[1]					
do not use a particular lake most often	**use a particular lake most often, but do not own lake property**	**own lake property**	**N**	**F**	**η**
1.55	1.94	2.32	1,001	58.417***	0.324

[1] Mean is based on the scale: 1=not at all knowledgeable 5=extremely knowledgeable
*** p≤0.001

Table D-9. Respondents' opinion about current aquatic plant management regulations in Minnesota, by whether they used a particular lake.

		Percent		
		Respondents who…		
Opinion about restrictiveness of regulations	**N**	**do not use a particular lake most often**	**use a particular lake most often, but do not own lake property**	**own lake property**
Too restrictive	995	3.1%	4.8%	7.6%
About right		17.1%	21.3%	36.5%
Not restrictive enough		9.8%	16.3%	19.3%
Don't know		70.0%	57.6%	36.5%

Chi-square=61.481 (p≤0.001); Cramer's V=0.176 (p≤0.001)

Table D-10. Of respondents who use a particular Minnesota lake or lakes most often, feelings about the lake they use most often, by whether they own lake property.

Statement	N	Own lake property? [1] No	Yes	F	η
Emotional attachment	**660**	**3.74**	**4.39**	**87.591*** **	**0.343**
• It is my favorite place to be.	656	3.94	4.56	78.800***	0.328
• I really miss it when I am away from it too long.	648	3.66	4.36	68.288***	0.309
• I feel happiest when I am there.	651	3.60	4.24	60.291***	0.292
Place dependence	**657**	**3.42**	**3.90**	**41.284*** **	**0.243**
• It is the best place to do the things I enjoy.	653	3.68	4.21	41.459***	0.245
• For the things I enjoy doing most, no other place can compare it.	644	3.25	3.84	38.928***	0.239
• As far as I am concerned there are better places to be. [2]	640	2.71	2.34	13.486***	0.144
Identity	**655**	**3.49**	**4.07**	**68.302*** **	**0.308**
• I feel that I can really be myself there.	652	3.96	4.46	48.757***	0.264
• It reflects the type of person that I am.	638	3.56	4.15	45.956***	0.260
• Everything about it is a reflection of me.	636	3.05	3.58	32.136***	0.220
• It says very little about who I am. [2]	628	2.61	1.94	46.099***	0.262
Family attachment	**653**	**3.59**	**4.29**	**71.544*** **	**0.315**
• It is a special place for my family.	648	3.80	4.52	80.245***	0.332
• Many important family memories are tied to it.	6.50	3.65	4.31	44.390***	0.253
• It ties the generations of my family together.	643	3.31	4.04	43.597***	0.252

[1] Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table D-11. Of respondents who use a particular Minnesota lake or lakes most often, likeliness of taking action related to the lake they use most often, by whether they own lake property.

Action	N	Own lake property?[1] No	Yes	F	η
• Vote for people who support lake protection.	636	4.08	4.14	0.349	0.023
• Support legislation or regulations that limit human use to protect the lake(s).	622	3.57	3.46	0.801	0.036
• Contribute personal time to protect the lake(s).	616	3.24	4.01	58.254***	0.294
• Contribute money to protect the lake.	607	3.14	3.86	44.285***	0.261
• Join an organization working to protect the lake(s).	612	3.02	3.83	56.634***	0.291

[1] Mean is based on the scale: 1=extremely unlikely 5=extremely likely
*** p≤0.001, ** p≤0.01, * p≤0.05

Section E: Relationship Between Recreation Participation and Valuation of Lakes and Aquatic Plants

We asked respondents to indicate how often they: (a) fished, (b) boated, (c) swam/waded, (d) hunted waterfowl, (e) watched birds, viewed wildlife, or studied nature, and (f) enjoyed lake scenery at Minnesota lakes in 2003. In this section, we compare respondents' valuation of lakes and aquatic plants based on their participation in these activities. To facilitate comparison, we collapsed respondents into those who had participated in an activity during 2003 and those who had not. Before describing differences in values related to lakes and aquatic plants, we provide a brief description of the recreation participants.

Anglers visited Minnesota lakes an average of 55 days during 2003, compared to 30 days for nonanglers ($F=21.038$, $p\leq0.001$, $\eta=0.152$). Over 70% of anglers were male compared to 44% of nonanglers ($\chi^2=73.526$, $p\leq0.001$, Cramer's $V=0.265$). The average age of anglers was 52 years compared to 55 years for nonanglers ($F=7.045$, $p\leq0.01$, $\eta=0.082$). On average, anglers had lived 86% of their lives in Minnesota, compared to 80% for nonanglers ($F=11.461$, $p\leq0.001$, $\eta=0.105$). Anglers reported an average income of $76,107, compared to $67,827 for nonanglers ($F=3.005$, not significant).

Respondents who participated in pleasure boating (motorized or unmotorized), excluding fishing from a boat, visited Minnesota lakes an average of 57 days during 2003, compared to 24 days for nonboaters ($F=37.769$, $p\leq0.001$, $\eta=0.202$). The average age of boaters was 51 years compared to 57 years for nonboaters ($F=29.630$, $p\leq0.001$, $\eta=0.167$). On average, boaters had lived 85% of their lives in Minnesota, compared to 80% for nonboaters ($F=7.871$, $p\leq0.01$, $\eta=0.087$). Boaters reported an average income of $77,063, compared to $64,576 for nonboaters ($F=6.428$, $p\leq0.05$, $\eta=0.090$). On average, boaters reported higher levels of education, compared to nonboaters ($\chi^2=57.432$, $p\leq0.001$, Cramer's $V=0.235$). There was no significant difference in gender between boaters and nonboaters.

Respondents who participated in swimming or wading visited Minnesota lakes an average of 57 days during 2003, compared to 25 days for nonswimmers ($F=35.815$, $p\leq0.001$, $\eta=0.197$). The average age of swimmers was 49 years compared to 60 years for nonswimmers ($F=122.803$, $p\leq0.01$, $\eta=0.326$). On average, swimmers reported higher levels of education, compared to nonswimmers ($\chi^2=77.649$, $p\leq0.001$, Cramer's $V=0.273$). Income and the proportion of life lived in Minnesota, did not differ significantly between swimmers and nonswimmers. There was also no substantive difference in gender between swimmers and nonswimmers.

Respondents who participated in waterfowl hunting visited Minnesota lakes an average of 51 days during 2003, compared to 44 days for those who didn't hunt waterfowl ($F=0.925$, not significant). On average, waterfowl hunters had lived 89% of their lives in Minnesota, compared to 82% for those who didn't hunt waterfowl ($F=10.836$, $p\leq0.001$, $\eta=0.102$). The hunters reported an average income of $85,838, compared to $70,657 for nonhunters ($F=5.334$, $p\leq0.05$, $\eta=0.082$). Over 70% of waterfowl hunters were male compared to 58% of those who didn't hunt waterfowl ($\chi^2=8.060$, $p\leq0.01$, Cramer's $V=0.088$).

Respondents who participated in bird watching, wildlife viewing, or studying nature visited Minnesota lakes an average of 56 days during 2003, compared to 20 days for those who didn't watch birds, wildlife, or nature ($F=41.922$, $p\leq0.001$, $\eta=0.213$). On average, respondents who bird watched, viewed wildlife, or studied nature reported higher levels of education, compared to those who didn't ($\chi^2=22.384$, $p\leq0.01$, Cramer's $V=0.146$). There were no significant differences for age, gender, income, or proportion of life in Minnesota.

Respondents who reported "enjoying lake scenery," visited Minnesota lakes an average of 48 days during 2003, compared to 8 days for those who didn't ($F=18.352$, $p\leq0.001$, $\eta=0.142$). The average age of respondents who enjoyed lake scenery was 52 years compared to 61 years for others ($F=23.190$, $p\leq0.001$, $\eta=0.148$). On average, respondents who "enjoyed lake scenery" at Minnesota lakes during 2003 reported higher levels of education ($\chi^2=41.858$, $p\leq0.001$, Cramer's $V=0.200$). There was no significant difference in gender, income, or proportion of life in Minnesota.

Importance of Minnesota Lakes

Anglers rated the general value ($F=29.299$, $p\leq0.001$, $\eta=0.167$), aesthetic value ($F=6.099$, $p\leq0.05$, $\eta=0.077$), ecological value ($F=11.142$, $p\leq0.001$, $\eta=0.104$), and economic value ($F=8.077$, $p\leq0.01$, $\eta=0.089$) of Minnesota lakes significantly higher than nonanglers did (Figure E-1). More specifically, anglers rated general value items related to recreation and childhood memories, and ecological value items related to fish and wildlife significantly higher than nonanglers did (Table E-1).

Boaters rated general value ($F=33.400$, $p\leq0.001$, $\eta=0.177$) and aesthetic value ($F=15.800$, $p\leq0.001$, $\eta=0.123$) of Minnesota lakes significantly higher than nonboaters did (Figure E-2). Boaters rated general value items related to recreation and childhood memories significantly higher than nonboaters did (Table E-2).

Respondents who swam or waded in Minnesota lakes during 2003 rated the general value ($F=36.642$, $p\leq0.001$, $\eta=0.176$), aesthetic value ($F=10.902$, $p\leq0.001$, $\eta=0.103$), and ecological value ($F=3.841$, $p\leq0.05$, $\eta=0.061$) of Minnesota lakes significantly higher than nonswimmers did (Figure E-3). More specifically, swimmers rated general value items related to recreation and childhood memories, and ecological value items related to fish and wildlife significantly higher than nonswimmers did (Table E-3).

There were no significant difference between waterfowl hunters and respondents who didn't hunt waterfowl in their valuation of the importance of Minnesota Lakes (Figure E-4) (Table E-4).

Respondents who reported "bird watching, viewing wildlife, or studying nature" rated the general value ($F=30.077$, $p\leq0.001$, $\eta=0.169$), aesthetic value ($F=20.239$, $p\leq0.001$, $\eta=0.139$), and ecological value ($F=29.335$, $p\leq0.001$, $\eta=0.167$) of Minnesota lakes significantly higher than others did (Figure E-5). More specifically, the bird watching respondents rated all of the ecological value items, and all of general value items except "Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment" significantly higher than other respondents did (Table E-5).

Respondents who reported "enjoying lake scenery" during 2003 rated the general value ($F=21.172$, $p\leq0.001$, $\eta=0.142$), aesthetic value ($F=27.835$, $p\leq0.001$, $\eta=0.163$), and ecological value ($F=7.950$, $p\leq0.01$, $\eta=0.089$) of Minnesota lakes significantly higher than others did (Figure E-6). The respondents who enjoyed lake scenery rated all of the ecological value items except "Minnesota lakes are important to me because they are sources of clean water," and all of general value items except "Minnesota lakes are inviting to me" significantly higher than other respondents did (Table E-6).

Lake Health and Aquatic Plants

Familiarity With Issues Related to Native Aquatic Plants and Lake Ecology.

Respondents that participated in lake-related recreational activity reported greater familiarity with issues related to native aquatic plants and lake ecology, compared to nonparticipants. This difference in familiarity was found for: (a) anglers ($F=40.319$, $p\leq0.001$, $\eta=0.194$), (Table E-7), (b) boaters ($F=23.211$, $p\leq0.001$, $\eta=0.149$), (Table E-8), (c) swimmers and waders ($F=27.793$, $p\leq0.001$, $\eta=0.161$), (Table E-9), (d) waterfowl hunters ($F=6.528$, $p\leq0.05$, $\eta=0.079$), (Table E-10), (e) bird watchers ($F=67.020$, $p\leq0.001$, $\eta=0.248$), (Table E-11), and (f) people who enjoyed lake scenery ($F=22.424$, $p\leq0.001$, $\eta=0.146$), (Table E-12).

Knowledge of Native Aquatic Plants and Lake Ecology

In general, respondents who participate in lake-based recreation report slightly more knowledge about aquatic plants.

Anglers rated the statement "native aquatic plants are harmful to wildlife populations" more false than nonanglers did ($F=6.640$, $p\leq0.001$, $\eta=0.082$), (Figure E-7) (Table E-13). There were no other significant differences between anglers and nonanglers in knowledge about native aquatic plants.

Boaters rated the statement "removal of native aquatic plants is harmful to fish populations" more true than nonboaters did ($F=4.092$, $p\leq0.05$, $\eta=0.064$), (Figure E-8) (Table E-14). There were no other significant differences between boaters and nonboaters in knowledge about native aquatic plants.

Like boaters, swimmers rated the statement "removal of native aquatic plants is harmful to fish populations" slightly more true than nonswimmers did ($F=4.669$, $p\leq0.05$, $\eta=0.069$), (Figure E-9) (Table E-15). Like anglers, swimmers rated the statement "native aquatic plants are harmful to wildlife populations" slightly more false than nonswimmers did ($F=6.267$, $p\leq0.05$, $\eta=0.080$), (Table E-15). Swimmers also rated the statement "native aquatic plants decrease the scenic beauty of the lake" significantly more false than nonswimmers did ($F=7.383$, $p\leq0.01$, $\eta=0.086$), (Table E-15). There were no other significant differences between swimmers and nonswimmers in knowledge about native aquatic plants.

Waterfowl hunters rated the statement "native aquatic plants decrease the scenic beauty of the lake" significantly more false than nonhunters did ($F=4.854$, $p\leq0.05$, $\eta=0.070$), (Figure E-10) (Table E-16). Waterfowl hunters also rated the statement "native aquatic plants reduce water clarity and quality" significantly more false than nonhunters did ($F=6.175$, $p\leq0.05$, $\eta=0.080$), (Table E-16). There were no other significant differences between waterfowl hunters and other respondents in knowledge about native aquatic plants.

Respondents who watched birds, viewed wildlife, or studied nature at Minnesota lakes in 2003 reported differences (compared to respondents who didn't do these activities) in four of the items used to gauge knowledge of aquatic plants (Figure E-11) (Table E-17). Like anglers and swimmers, bird watchers rated the statement "native aquatic plants are harmful to wildlife populations" slightly more false than others did ($F=9.175$, $p\leq0.01$, $\eta=0.097$). Like swimmers and waterfowl hunters, birders rated the statement "native aquatic plants decrease the scenic beauty of the lake" significantly more false than nonbirders did ($F=13.362$, $p\leq0.001$, $\eta=0.115$). Again like waterfowl hunters, birders rated the statement "native aquatic plants reduce water clarity and quality" significantly more false than others did ($F=10.638$, $p\leq0.001$, $\eta=0.105$). Finally, birders rated the item "native aquatic plants reduce the economic value of the lake in the long-term" more false than others did ($F=11.573$, $p\leq0.001$, $\eta=0.109$). There was no significant difference between waterfowl hunters and other respondents in the other four statements addressing knowledge about native aquatic plants.

Respondents who "enjoyed lake scenery" at Minnesota lakes during 2003 differed from other respondents for one item: "native aquatic plants reduce the economic value of the lake in the long-term." Respondents who enjoyed lake scenery rated this item more false than others did ($F=7.113$, $p\leq0.01$, $\eta=0.086$) (Figure E-12) (Table E-18).

Attitudes About Native Aquatic Plants and Their Removal

Respondents that participated in bird watching, wildlife viewing, and/or studying nature at Minnesota lakes in 2003 reported that removing native plants was significantly more "bad" ($F=12.617$, $p\leq0.001$, $\eta=0.112$), (Table E-23), and more harmful ($F=14.651$, $p\leq0.001$, $\eta=0.122$), (Table E-29), compared to respondents who didn't participate in these activities. There were no other significant differences reported on these items for other recreation participants (Tables E-19, E-20, E-21, E-22, E-24, E-25, E-26, E-27, E-28, E-30).

Anglers rated the scaled items related to fish and wildlife recreation value ($F=5.935$, $p\leq0.05$, $\eta=0.080$) of native aquatic plants significantly higher than nonanglers did (Figure E-13) (Table E-31). Specifically, anglers rated two fish and wildlife recreation value items related to hunting and fishing significantly higher than nonanglers did. They did not rate the protection/removal value, aesthetic value, or general ecological value scales significantly different than nonanglers did.

Boaters did not rate any of the four value scales (protection/removal, aesthetic, general ecological, or fish and wildlife recreation) (Figure E-14) or any of the individual items significantly different than nonboaters did (Table E-32).

Respondents who swam or waded in Minnesota lakes during 2003 did not rate any of the four value scales (protection/removal, aesthetic, general ecological, or fish and wildlife recreation) significantly different than nonswimmers did (Figure E-15) (Table E-33). Swimmers did disagree more with one protection/removal value item: "native aquatic plants have no importance to me" ($F=9.485$, $p\leq0.01$, $\eta=0.100$), and one aesthetic value item: "lake shorelines are more beautiful when lawns are turf grass and mowed to the edge" ($F=3.907$, $p\leq0.05$, $\eta=0.063$). Swimmers agreed more with the fish and wildlife value item: "native aquatic plants support the economic value of lakes for tourism and recreation" ($F=3.859$, $p\leq0.05$, $\eta=0.069$).

Waterfowl hunters did not rate any of the four value scales significantly different than nonhunters did (Figure E-16) (Table E-34). Waterfowl hunters rated one fish and wildlife recreation value item: "native aquatic plants improve the quality of hunting for waterfowl and other wildlife" higher than nonhunters did ($F=8.486$, $p\leq0.01$, $\eta=0.100$).

Respondents who reported "bird watching, viewing wildlife, or studying nature" rated the protection/removal value ($F=21.012$, $p\leq0.001$, $\eta=0.143$), aesthetic value ($F=29.287$, $p\leq0.001$, $\eta=0.169$), general ecological value ($F=5.444$, $p\leq0.05$, $\eta=0.075$), and fish and wildlife recreation value ($F=7.916$, $p\leq0.01$, $\eta=0.092$) of Minnesota lakes significantly higher than others did (Figure E-17). More specifically, the birders rated all of the aesthetic value items, all of fish and wildlife recreation value items, and three of the five items in both the protection/removal value and the general ecological value scales significantly higher than other respondents did (Table E-35).

Respondents who reported "enjoying lake scenery" during 2003 did not rate any of the four value scales significantly different than others did (Figure E-18) (Table E-36). The respondents who enjoyed lake scenery did disagree more with one protection/removal value item: "native aquatic plants have no importance to me" ($F=7.483$, $p\leq0.01$, $\eta=0.089$), and one aesthetic value item: "lake shorelines are more beautiful when lawns are turf grass and mowed to the edge" ($F=4.029$, $p\leq0.05$, $\eta=0.064$). These respondents also agreed more with one general ecological value item: "native aquatic plants serve important functions that maintain the health of lakes" ($F=5.390$, $p\leq0.05$, $\eta=0.077$).

Management of Aquatic Plants

Respondents who participated in different lake-based recreational activities differed in their trust of groups to make sound recommendations concerning the management of lakes and aquatic plants. Compared to nonanglers, anglers reported relatively less trust in the DNR ($F=3.970$, $p\leq0.05$, $\eta=0.063$) and county governments ($F=4.886$, $p\leq0.05$, $\eta=0.071$), and relatively more trust in lakeshore property owner groups ($F=5.011$, $p\leq0.05$, $\eta=0.072$) and lake users ($F=4.042$, $p\leq0.05$, $\eta=0.065$) (Table E-37). Boaters reported relatively less trust in the general public ($F=8.162$, $p\leq0.01$, $\eta=0.092$) and county governments ($F=5.611$, $p\leq0.05$, $\eta=0.077$), and relatively more trust in lakeshore property owner groups ($F=7.071$, $p\leq0.01$, $\eta=0.086$), compared to nonboaters (Table E-38). Swimmers reported relatively more trust in the DNR ($F=5.533$, $p\leq0.05$, $\eta=0.075$), and less trust in county governments ($F=4.694$, $p\leq0.05$, $\eta=0.070$), and the general public ($F=4.192$, $p\leq0.05$, $\eta=0.066$) (Table E-39). Waterfowl hunters reported less trust in county governments than nonhunters did ($F=7.968$, $p\leq0.01$, $\eta=0.091$) (Table E-40). Respondents who reported "enjoying lake scenery" at Minnesota lakes during 2003 reported more trust in the DNR

(F=7.877, p≤0.01, η=0.089) and lakeshore property owner groups (F=4.165, p≤0.05, η=0.066) (Table E-41).

Respondents that participated in lake-related recreational activity reported greater knowledge of regulations concerning aquatic plant management. This difference in knowledge was found for: (a) anglers (F=70.615, p≤0.001, η=0.254), (Table E-43), (b) boaters (F=28.615, p≤0.001, η=0.165), (Table E-44), (c) swimmers and waders (F=33.269, p≤0.001, η=0.177), (Table E-45), (d) waterfowl hunters (F=14.113, p≤0.001, η=0.116), (Table E-46), (e) bird watchers (F=34.468, p≤0.001, η=0.180), (Table E-47), and (f) people who enjoyed lake scenery (F=17.263, p≤0.001, η=0.129), (Table E-48).

Respondents were asked to describe current management regulations concerning native aquatic plants as: (a) too restrictive, (b) about right, or (c) not restrictive enough. Respondents were also given the option to select "don't know." A large proportion of respondents indicated that they didn't know about the restrictiveness of aquatic plant regulations. For each recreational activity, a larger proportion of respondents who did not participate in an activity indicated that they didn't know about aquatic plant regulations (Tables E-49 through E-54). Respondents who didn't know about aquatic plant regulations were filtered from the data to conduct additional analysis of opinions about current regulations. A greater proportion of birders indicated that they thought current regulations were not restrictive enough (χ^2= 13.362, p≤0.001, Cramer's V=0.176) (Table E-53). There were no significant differences for anglers (Table E-49), boaters (Table E-50), swimmers (Table E-51), waterfowl hunters (Table E-52), or respondents who spent time enjoying lake scenery (Table E-54).

Lake Meanings and Attachment (Sense of Place)

Our analysis shows a strong relationship between recreation participation and sense of place. The four sense of place scales were significantly related to participation in all of the six lake-based recreation activities surveyed (Figures E-19, E-20, E-21, E-22, E-23, E-24) (Tables E-55, E-56, E-57, E-58, E-59, E-60). In all cases, recreation participants rated sense of place higher than nonparticipants did.

Boaters (Figure E-20) (Table E-56), swimmers (Figure E-21) (Table E-57), waterfowl hunters (Figure E-22) (Table E-58), and bird watchers (Table E-59) rated all of the four scales and each of the individual items related to sense of place significantly higher than nonparticipants did.

Anglers rated the four scales related to sense of place significantly higher than nonanglers did (Figure E-19) (Table E-55). For emotional attachment (F=13.767, p≤0.001, η=0.145), anglers rated all three items significantly higher. For place dependence (F=15.507, p≤0.001, η=0.154), anglers rated two of three items significantly higher. For identity (F=13.712, p≤0.001, η=0.145), anglers rated four of four items significantly higher, and for family attachment (F=17.177, p≤0.001, η=0.163), anglers rated three of three items significantly higher.

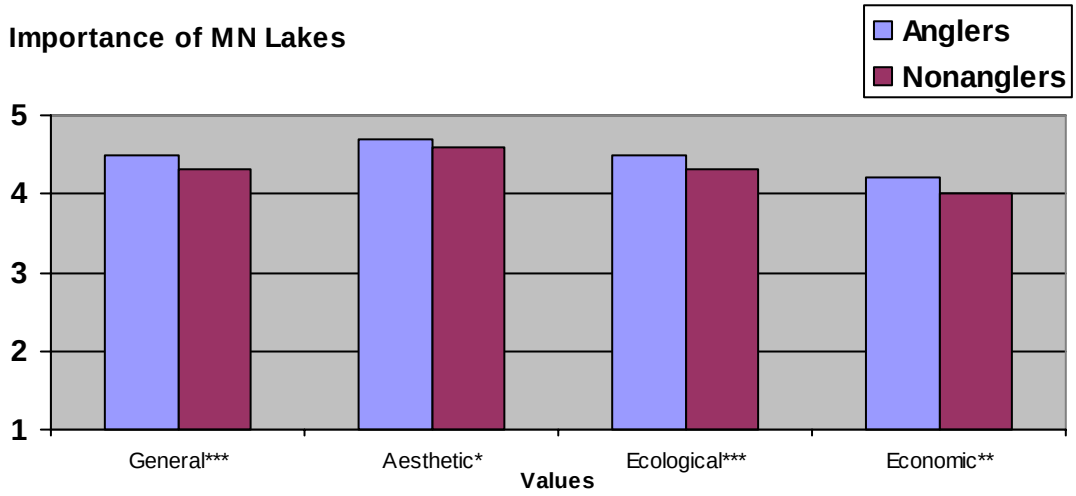
People who enjoyed lake scenery at Minnesota lakes during 2003 rated each the four scales related to sense of place significantly higher than other respondents did (Figure E-24) (Table E-60). For emotional attachment (F=10.124, p≤0.01, η=0.125), scenery viewers rated all three

items significantly higher. For place dependence ($F=6.390$, $p\leq0.05$, $\eta=0.100$), scenery viewers rated one of the three items significantly higher. For identity ($F=11.201$, $p\leq0.001$, $\eta=0.132$), scenery viewers rated four of four items significantly higher, and for family attachment ($F=4.429$, $p\leq0.05$, $\eta=0.083$), scenery viewers rated two of three items significantly higher.

Actions

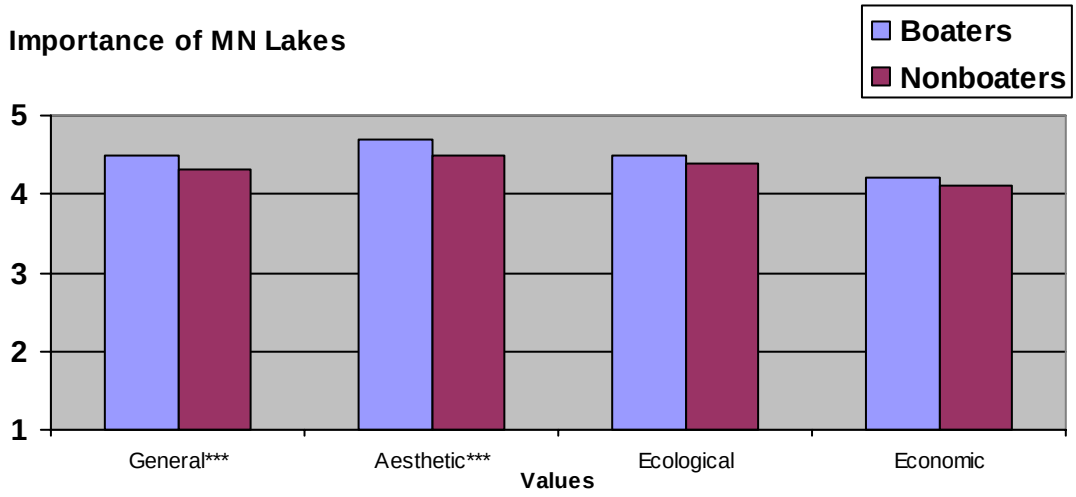
Our analysis shows a relationship between recreation participation and likelihood of taking action to protect the environmental quality of a lake. Anglers (Table E-61), boaters (Table E-62), swimmers (Table E-63), and waterfowl hunters (Table E-64) all reported that they would be more likely to protect the lake they used most often by contributing time or money, or joining an organization. For these four user groups, there was no significant difference in likelihood of voting for people who support lake protection, or supporting legislation or regulations that limit human use to protect lakes. People who participated in bird watching, wildlife viewing, or nature study during 2003 reported that they would be more likely to take all of the five actions (Table E-65). Respondents who enjoyed lake scenery during 2003 reported that they would be more likely to take all of the actions, except for contributing personal time to protect the lake(s) (Table E-66).

Figure E-1. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they fished in 2003.



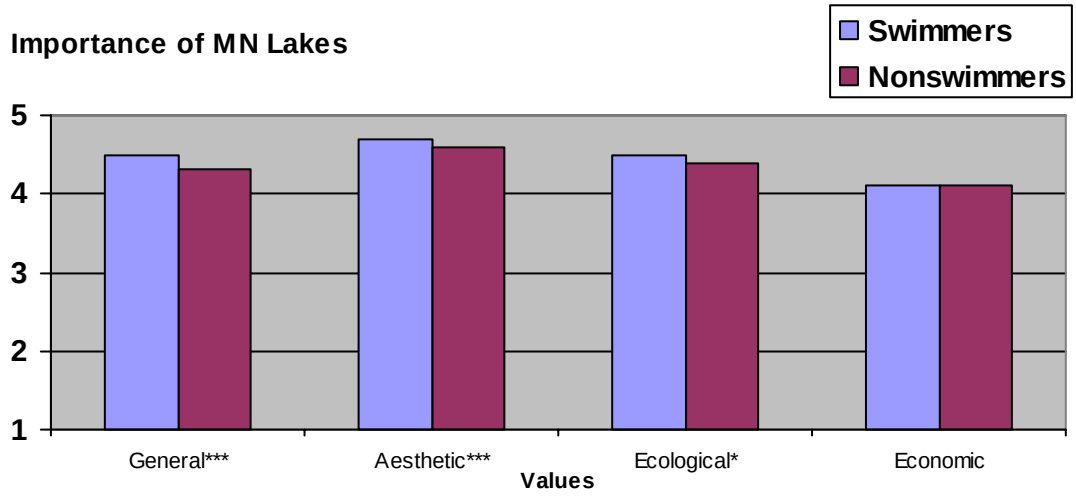
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-2. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they boated in 2003.



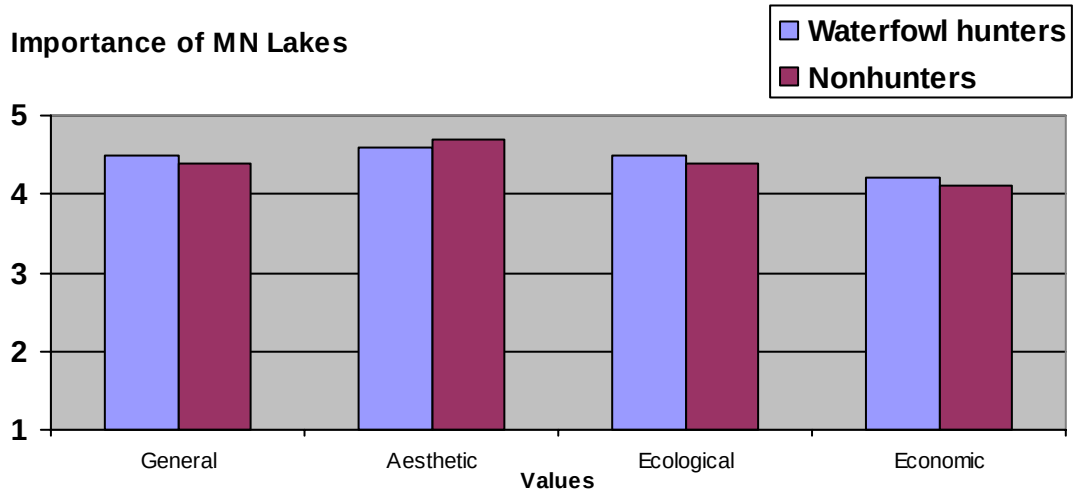
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-3. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they swam or waded in a Minnesota lake in 2003.



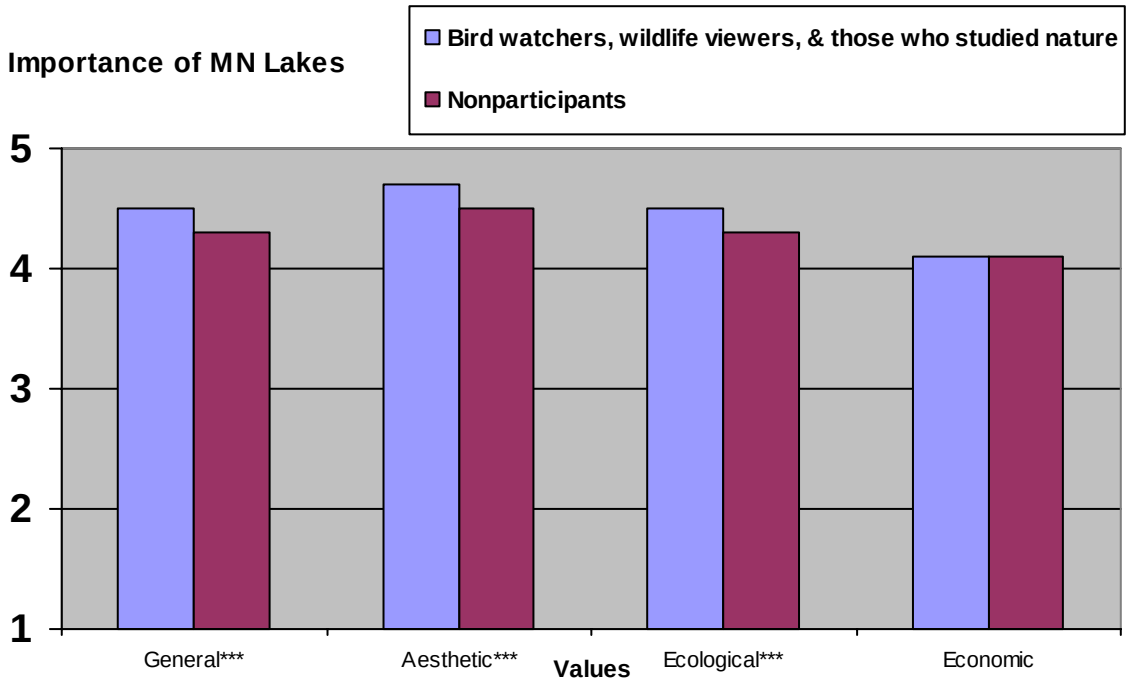
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-4. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they hunted waterfowl at Minnesota lakes in 2003.



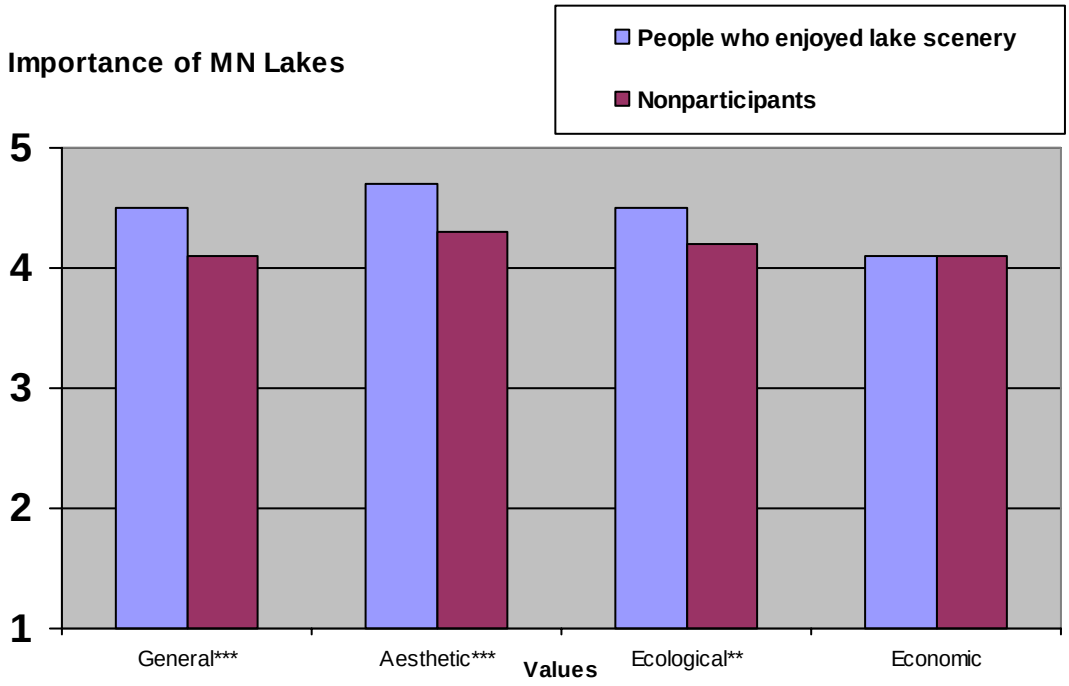
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-5. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they bird watched, viewed wildlife, or studied nature at Minnesota lakes in 2003.



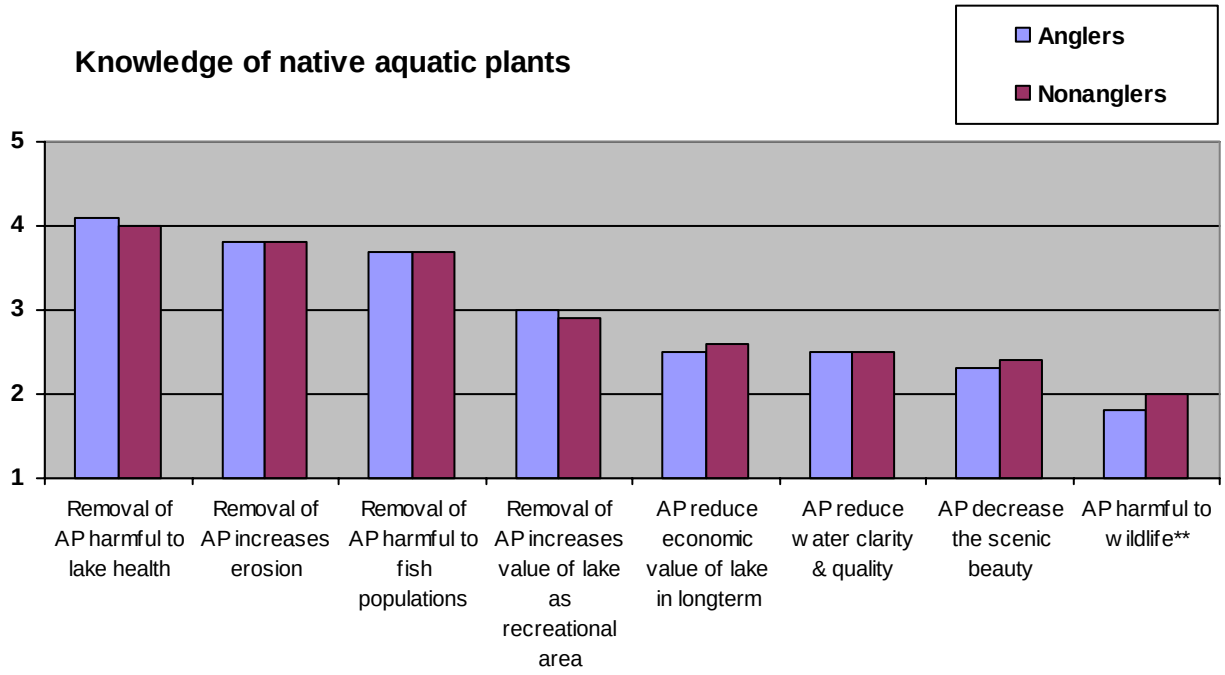
***p≤0.001, ** p≤0.01, * p≤0.05

Figure E-6. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they enjoyed lake scenery at Minnesota lakes in 2003.



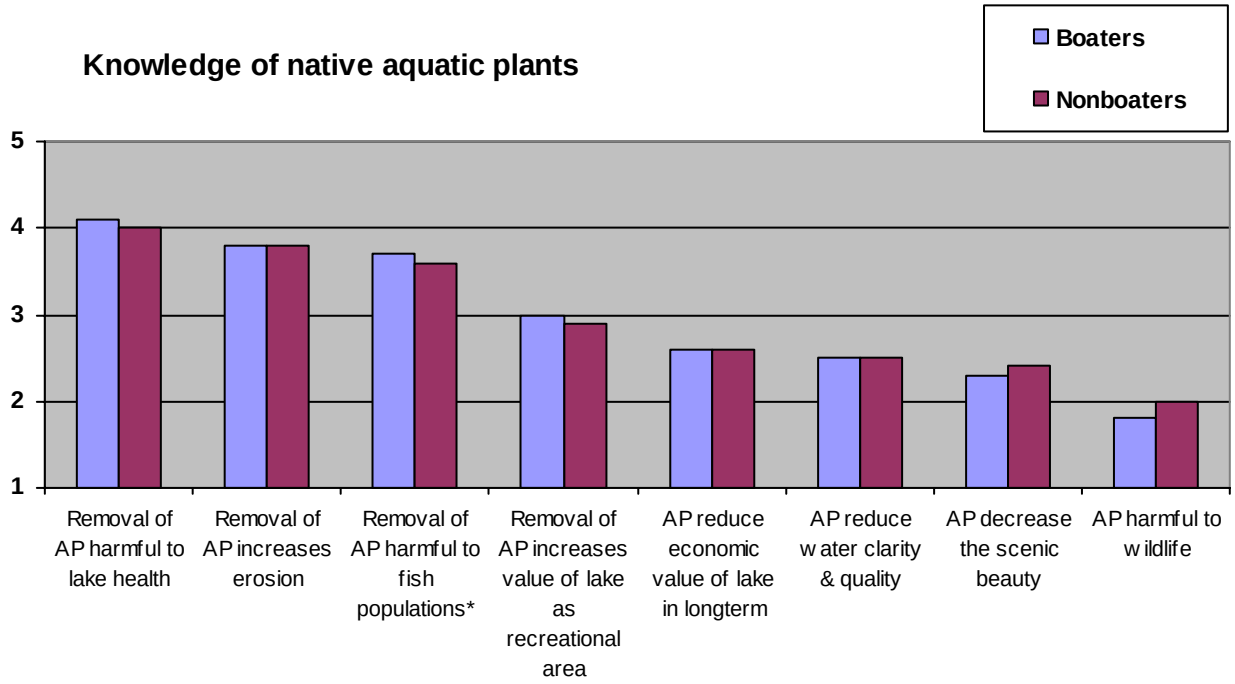
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-7. Respondents' mean level of knowledge of native aquatic plants by recreation activity.



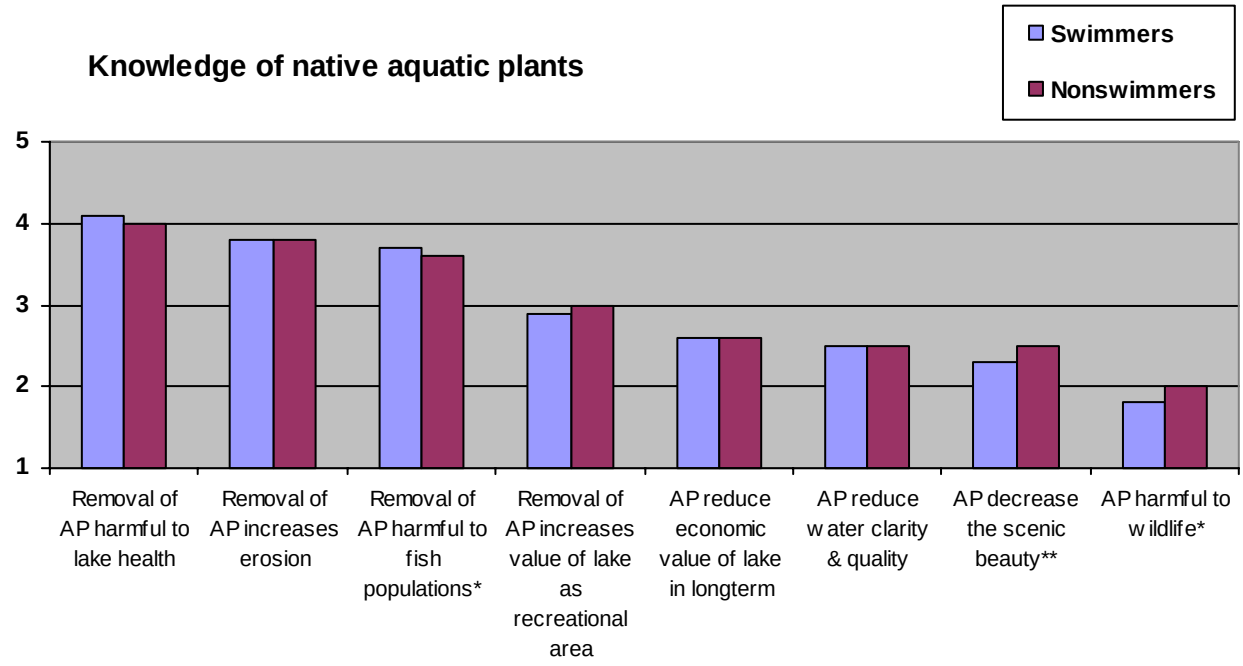
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-8. Respondents' mean level of knowledge of native aquatic plants by recreation activity.



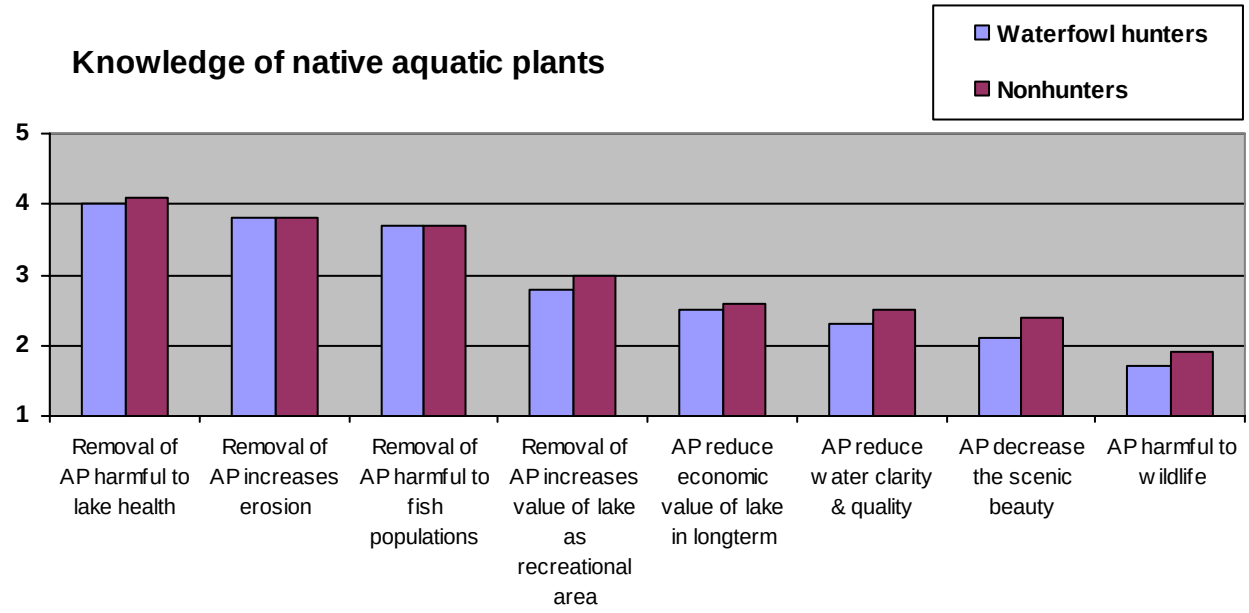
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-9. Respondents' mean level of knowledge of native aquatic plants by recreation activity.



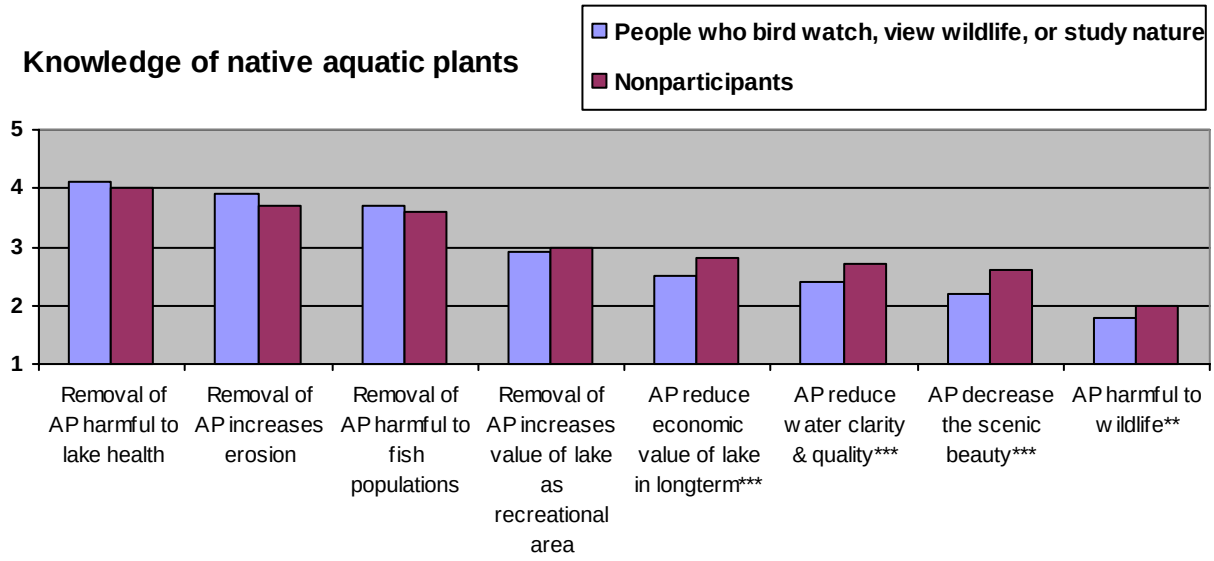
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-10. Respondents' mean level of knowledge of native aquatic plants by recreation activity.



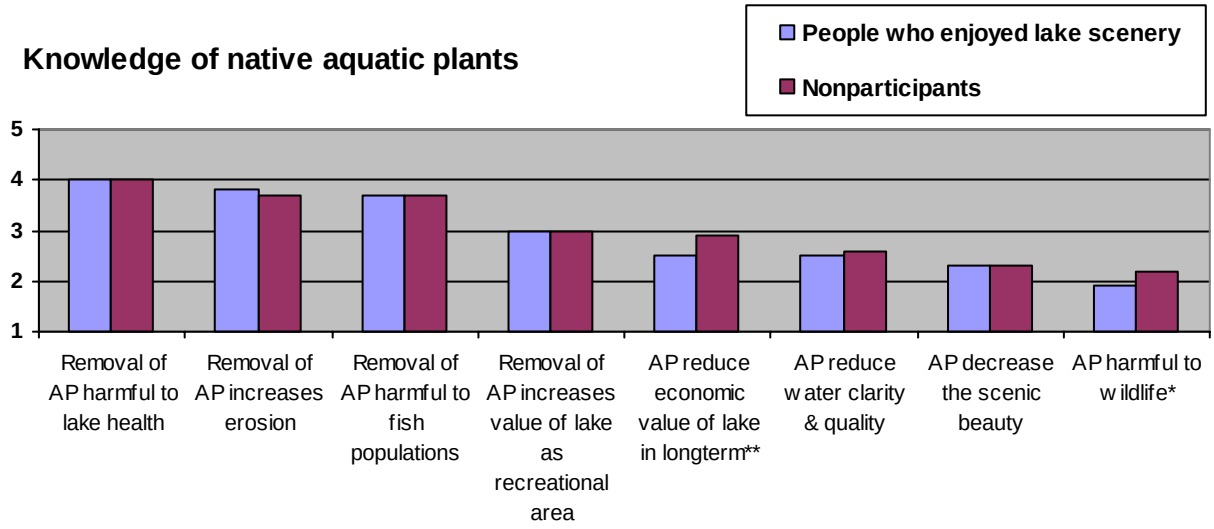
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-11. Respondents' mean level of knowledge of native aquatic plants by recreation activity.



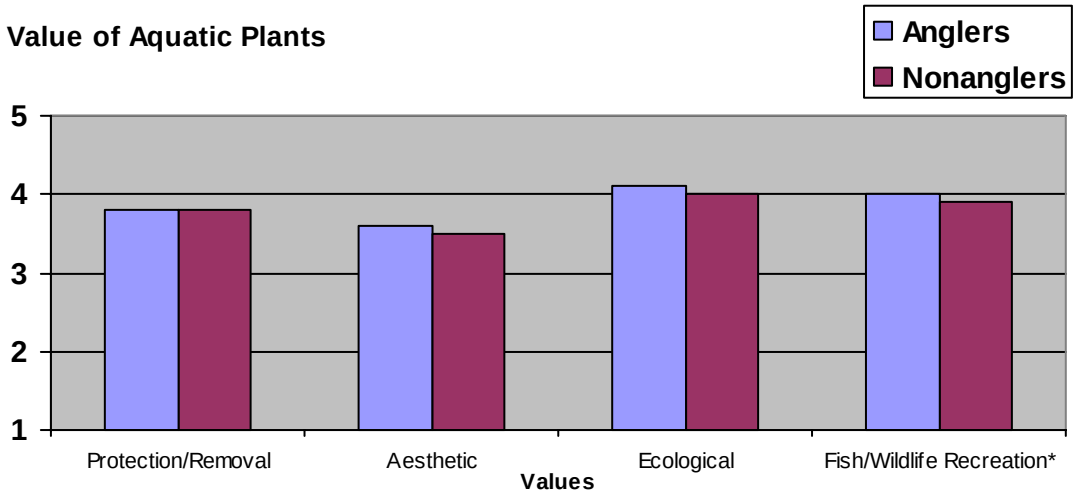
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-12. Respondents' mean level of knowledge of native aquatic plants by recreation activity.



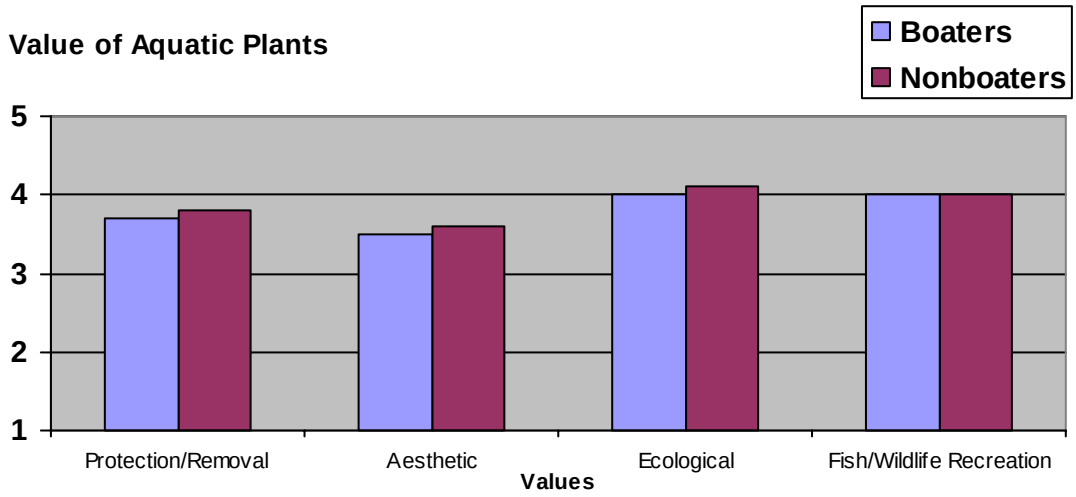
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-13. Respondents' mean attitudes about native aquatic plants by recreational activity.



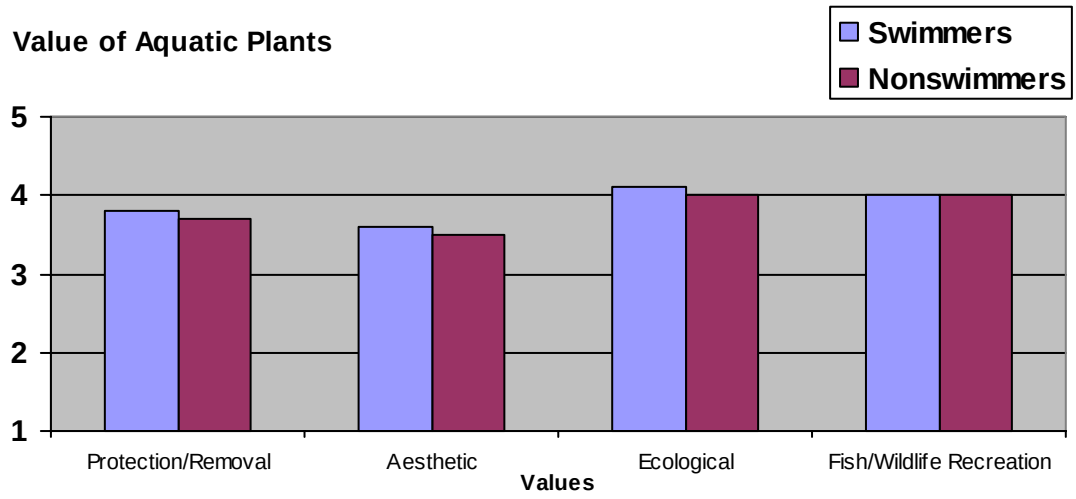
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-14. Respondents' mean attitudes about native aquatic plants by recreational activity.



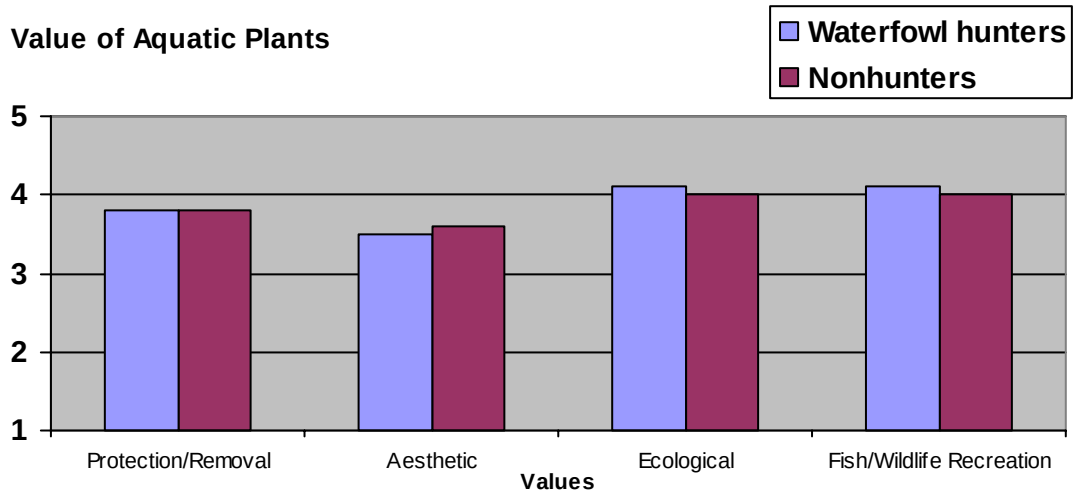
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-15. Respondents' mean attitudes about native aquatic plants by recreational activity.



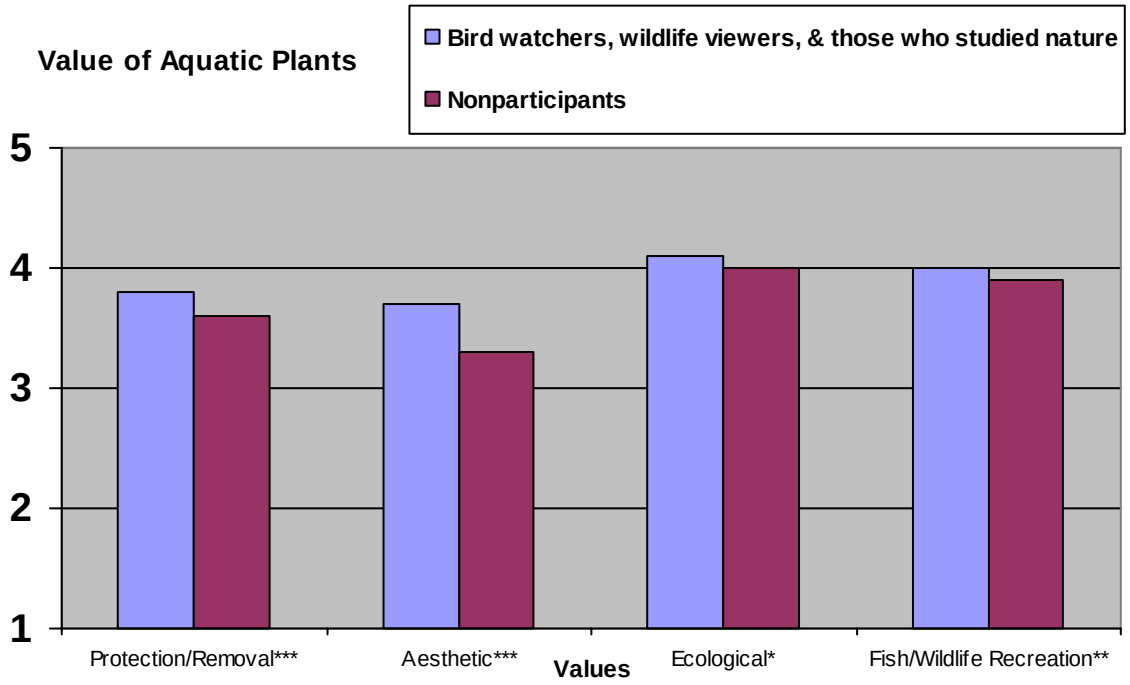
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-16. Respondents' mean attitudes about native aquatic plants by recreational activity.



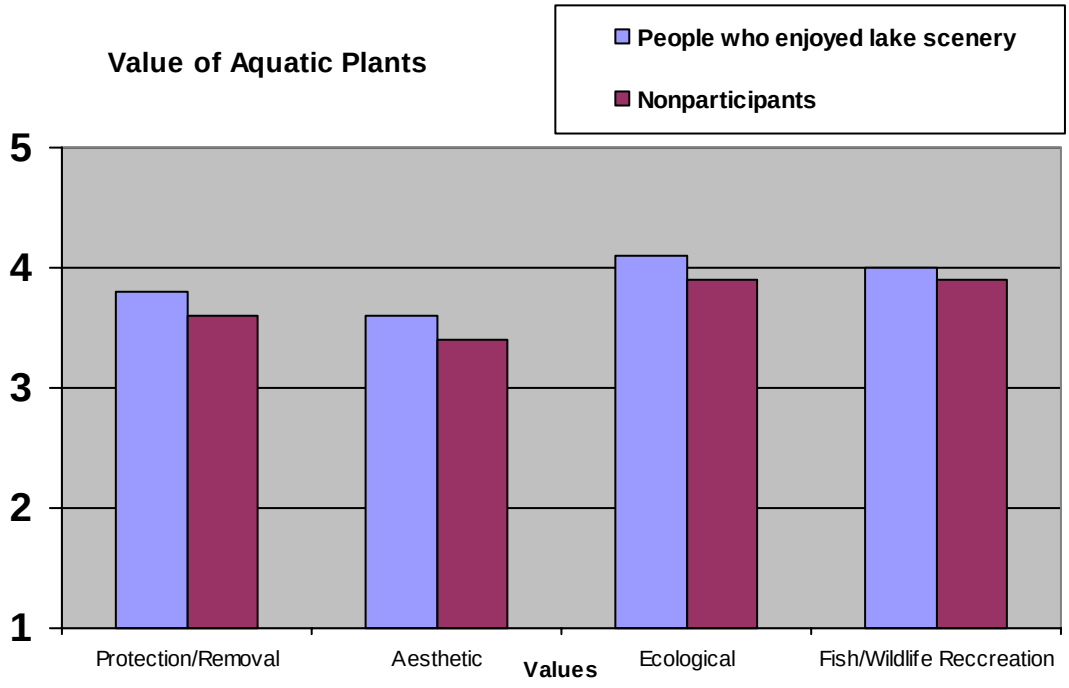
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-17. Respondents' mean attitudes about native aquatic plants by recreational activity.



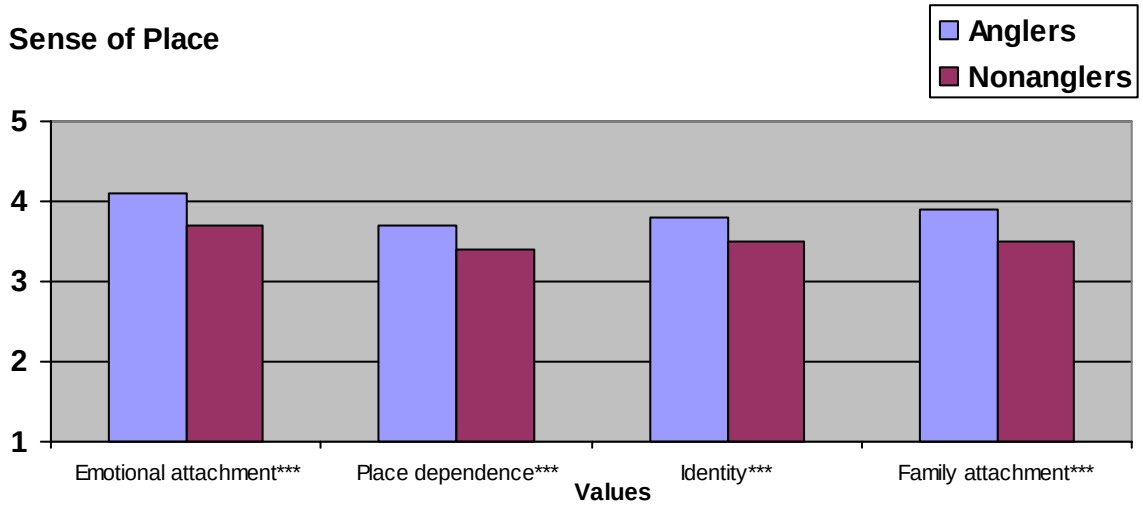
***p≤0.001, ** p≤0.01, * p≤0.05

Figure E-18. Respondents' mean attitudes about native aquatic plants by recreational activity.



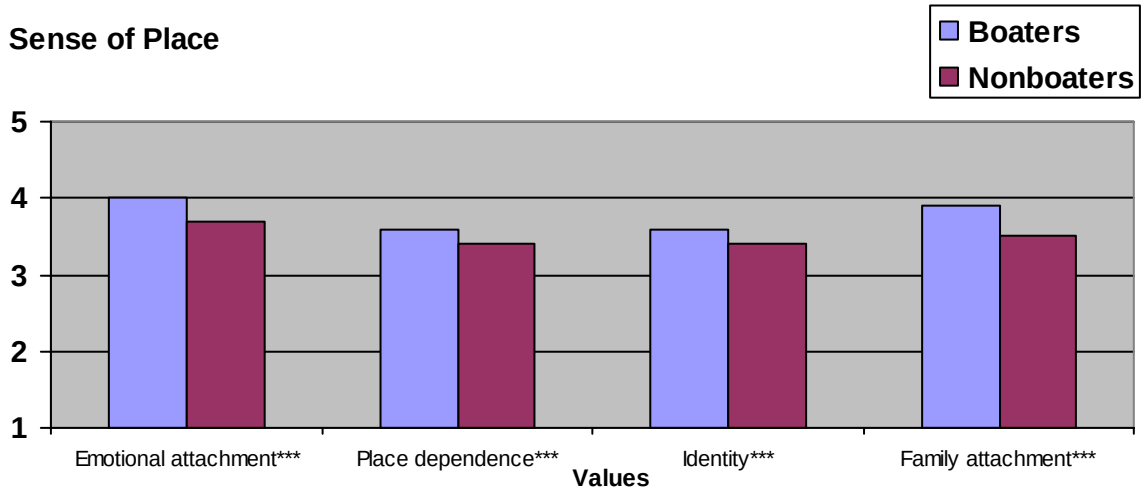
*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-19. Of respondents who use a particular Minnesota lake or lakes most often, feelings about the lake they use most often, by recreation activity.



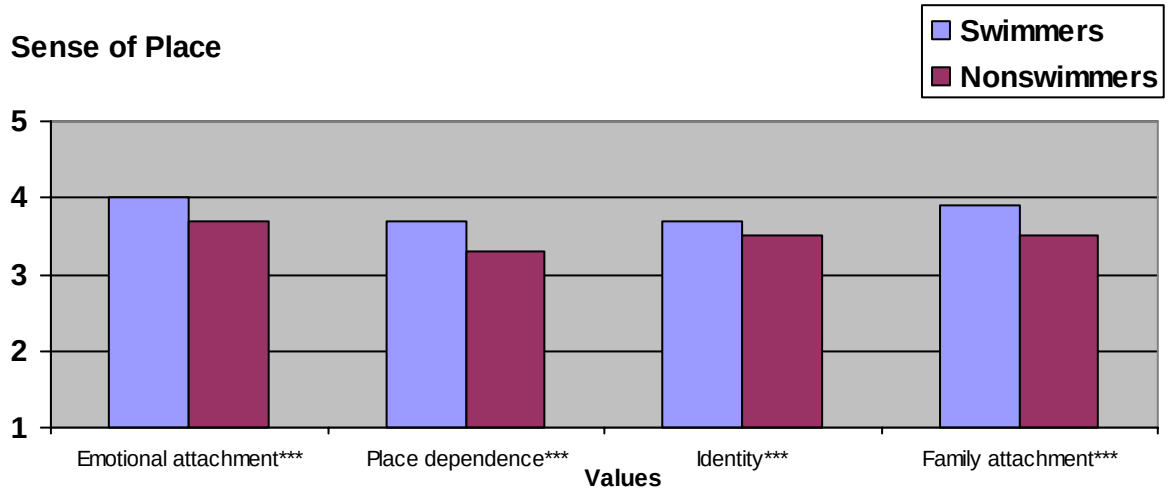
***p≤0.001, ** p≤0.01, * p≤0.05

Figure E-20. Of respondents who use a particular Minnesota lake or lakes most often, feelings about the lake they use most often, by recreation activity.



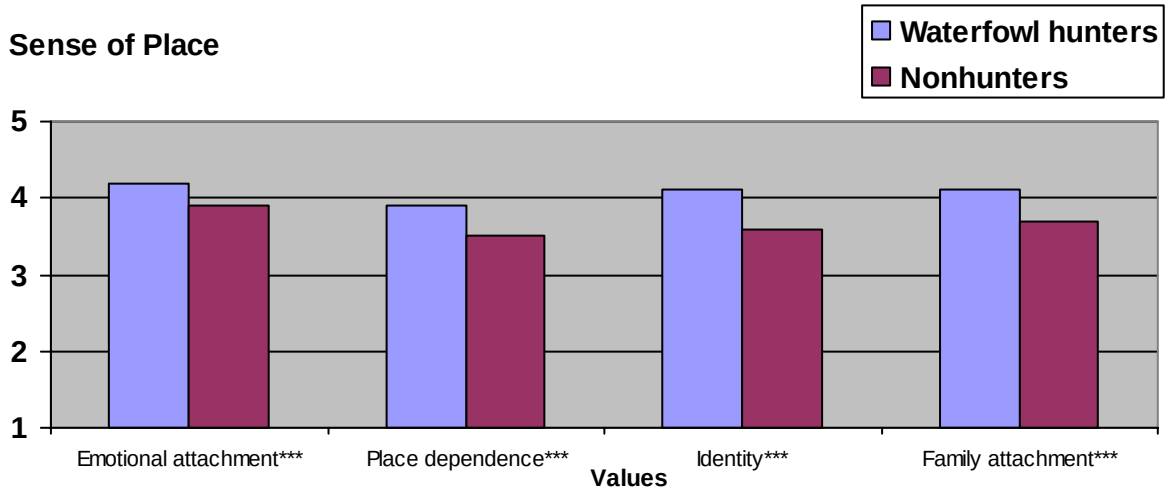
***p≤0.001, ** p≤0.01, * p≤0.05

Figure E-21. Of respondents who use a particular Minnesota lake or lakes most often, feelings about the lake they use most often, by recreation activity.



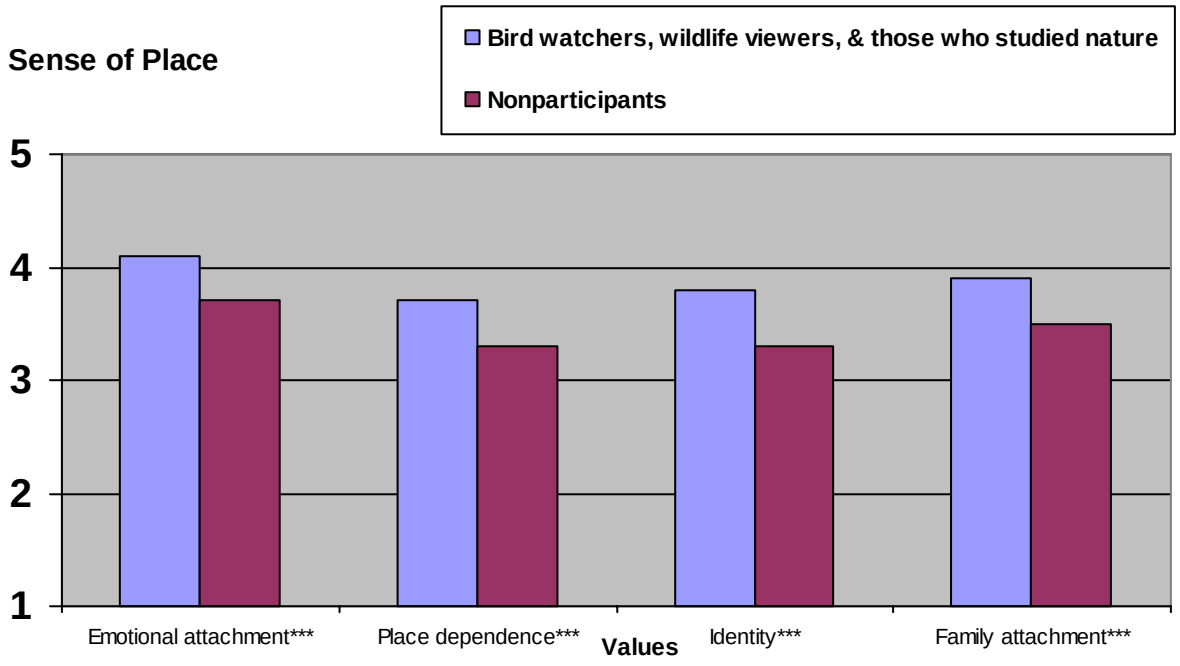
***p≤0.001, ** p≤0.01, * p≤0.05

Figure E-22. Of respondents who use a particular Minnesota lake or lakes most often, feelings about the lake they use most often, by recreation activity.



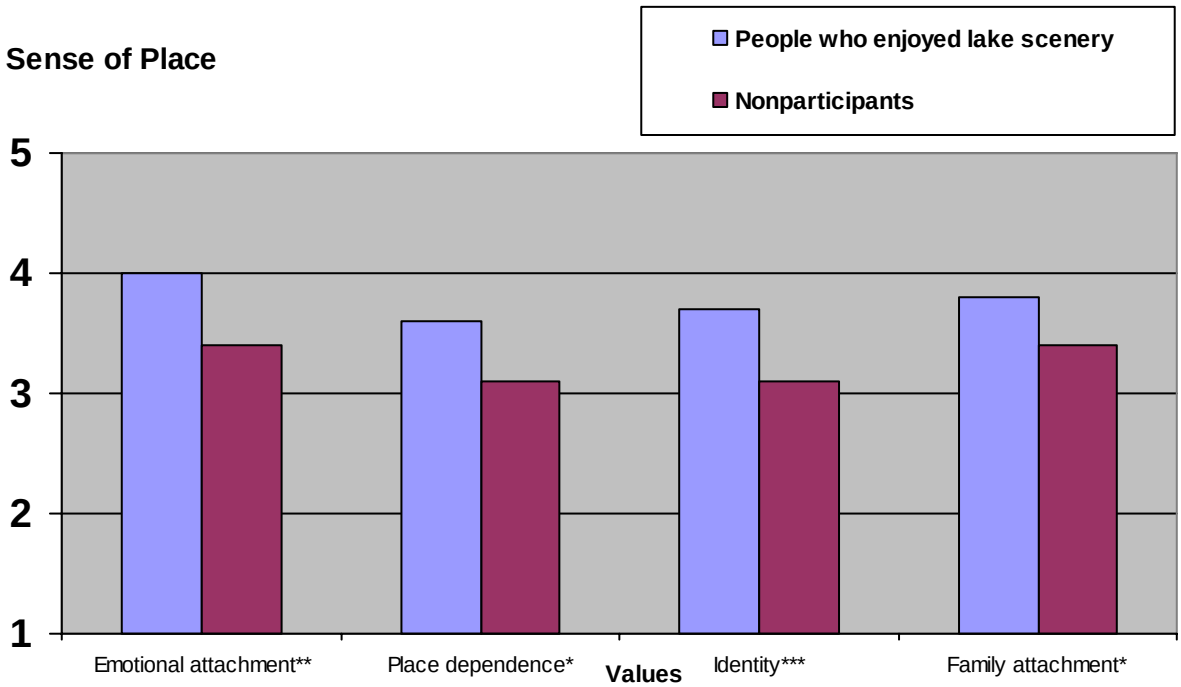
***p≤0.001, ** p≤0.01, * p≤0.05

Figure E-23. Of respondents who use a particular Minnesota lake or lakes most often, feelings about the lake they use most often, by recreation activity.



*** p≤0.001, ** p≤0.01, * p≤0.05

Figure E-24. Of respondents who use a particular Minnesota lake or lakes most often, feelings about the lake they use most often, by recreation activity.



*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-1. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they fished in 2003.

		Respondents who…[1]			
Statement	**N**	**Fished during 2003**	**Did not fish during 2003**	**F**	**η**
General Value	**1029**	**4.54**	**4.31**	**29.299*** **	**0.167**
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1024	4.84	4.74	5.659*	0.074
• Minnesota lakes are important to me, whether or not I use them.	1028	4.78	4.60	12.776***	0.111
• Minnesota lakes are inviting to me.	1021	4.64	4.44	2.751	0.052
• Minnesota lakes are important to me because they offer many types of recreation.	1025	4.55	4.08	65.194***	0.245
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1017	4.31	4.26	0.677	0.026
• Minnesota lakes are important to me because they are a source of childhood memories.	1005	4.14	3.71	30.434***	0.172
• Minnesota lakes have no particular importance to me. [2]	1018	1.46	1.64	6.017*	0.077
Aesthetic Value	**1024**	**4.71**	**4.59**	**6.099***	**0.077**
• Minnesota lakes are important to me because of their beauty and atmosphere.	1024	4.71	4.59	6.099*	0.077
Ecological Value	**1028**	**4.49**	**4.34**	**11.142*** **	**0.104**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1021	4.73	4.55	14.204***	0.117
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1022	4.78	4.40	57.677***	0.231
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1002	4.20	4.28	1.609	0.040
• Minnesota lakes are important to me because they are sources of clean water.	990	4.23	4.16	1.227	0.035
Economic Value	**1007**	**4.19**	**4.01**	**8.077****	**0.089**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	1007	4.19	4.01	8.077**	0.089

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2]Item reversed for scale.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-2. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they boated in 2003.

		Respondents who…[1]			
Statement	**N**	**Boated during 2003**	**Did not boat during 2003**	**F**	**η**
General Value	**1029**	**4.54**	**4.29**	**33.400*** **	**0.177**
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1024	4.83	4.75	3.687	0.060
• Minnesota lakes are important to me, whether or not I use them.	1028	4.77	4.59	12.500***	0.110
• Minnesota lakes are inviting to me.	1021	4.73	4.54	3.764	0.061
• Minnesota lakes are important to me because they offer many types of recreation.	1025	4.51	4.09	49.447***	0.215
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1017	4.33	4.20	4.328*	0.065
• Minnesota lakes are important to me because they are a source of childhood memories.	1005	4.10	3.73	22.638***	0.149
• Minnesota lakes have no particular importance to me. [2]	1018	1.42	1.74	18.439***	0.134
Aesthetic Value	**1024**	**4.73**	**4.54**	**15.800*** **	**0.123**
• Minnesota lakes are important to me because of their beauty and atmosphere.	1024	4.73	4.54	15.800***	0.123
Ecological Value	**1028**	**4.46**	**4.38**	**3.046**	**0.054**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1021	4.69	4.60	3.722	0.060
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1022	4.71	4.49	17.774***	0.131
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1002	4.21	4.25	0.392	0.020
• Minnesota lakes are important to me because they are sources of clean water.	990	4.23	4.17	0.768	0.028
Economic Value	**1007**	**4.15**	**4.07**	**1.374**	**0.037**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	1007	4.15	4.07	1.374	0.037

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2]Item reversed for scale.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-3. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they swam or waded in a Minnesota lake in 2003.

		Respondents who…[1]			
Statement	**N**	**Swam/waded during 2003**	**Did not swim or wade during 2003**	**F**	**η**
General Value	**1029**	**4.54**	**4.30**	**32.642*** **	**0.176**
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1024	4.82	4.77	1.215	0.034
• Minnesota lakes are important to me, whether or not I use them.	1028	4.76	4.62	7.612**	0.086
• Minnesota lakes are inviting to me.	1021	4.64	4.42	3.257	0.056
• Minnesota lakes are important to me because they offer many types of recreation.	1025	4.51	4.11	45.885***	0.207
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1017	4.34	4.20	4.422*	0.066
• Minnesota lakes are important to me because they are a source of childhood memories.	1005	4.12	3.70	27.961***	0.165
• Minnesota lakes have no particular importance to me. [2]	1018	1.40	1.76	23.592***	0.151
Aesthetic Value	**1024**	**4.72**	**4.56**	**10.902*** **	**0.103**
• Minnesota lakes are important to me because of their beauty and atmosphere.	1024	4.72	4.56	10.902***	0.103
Ecological Value	**1028**	**4.47**	**4.39**	**3.841***	**0.061**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1021	4.68	4.62	2.001	0.044
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1022	4.69	4.52	11.332***	0.105
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1002	4.23	4.22	0.050	0.007
• Minnesota lakes are important to me because they are sources of clean water.	990	4.24	4.14	2.238	0.048
Economic Value	**1007**	**4.14**	**4.09**	**0.517**	**0.023**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	1007	4.14	4.09	0.517	0.023

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2]Item reversed for scale.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-4. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they hunted waterfowl at Minnesota lakes in 2003.

Statement	N	Respondents who…[1] Hunted waterfowl during 2003	Respondents who…[1] Did not hunt waterfowl during 2003	F	η
General Value	**1029**	**4.49**	**4.44**	**0.654**	
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1024	4.76	4.81	0.768	0.027
• Minnesota lakes are important to me, whether or not I use them.	1028	4.72	4.71	0.017	0.004
• Minnesota lakes are inviting to me.	1021	4.59	4.67	0.032	0.006
• Minnesota lakes are important to me because they offer many types of recreation.	1025	4.48	4.34	2.641	0.051
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1017	4.33	4.28	0.374	0.019
• Minnesota lakes are important to me because they are a source of childhood memories.	1005	4.11	3.95	2.266	0.047
• Minnesota lakes have no particular importance to me. [2]	1018	1.49	1.54	0.252	0.016
Aesthetic Value	**1024**	**4.59**	**4.67**	**1.793**	**0.042**
• Minnesota lakes are important to me because of their beauty and atmosphere.	1024	4.59	4.67	1.793	0.042
Ecological Value	**1028**	**4.46**	**4.43**	**0.221**	**0.015**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1021	4.67	4.66	0.018	0.004
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1022	4.71	4.62	1.734	0.041
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1002	4.16	4.24	0.864	0.029
• Minnesota lakes are important to me because they are sources of clean water.	990	4.26	4.20	0.468	0.022
Economic Value	**1007**	**4.16**	**4.11**	**0.361**	**0.019**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	1007	4.16	4.11	0.361	0.019

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2]Item reversed for scale.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-5. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they bird watched, viewed wildlife, or studied nature at Minnesota lakes in 2003.

Statement	N	Respondents who…[1] Bird watched (etc.) during 2003	Respondents who…[1] Did not bird watch (etc.) during 2003	F	η
General Value	**1029**	**4.53**	**4.28**	**30.077*** **	**0.169**
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1024	4.82	4.75	2.321	0.048
• Minnesota lakes are important to me, whether or not I use them.	1028	4.76	4.59	9.434**	0.095
• Minnesota lakes are inviting to me.	1021	4.69	4.25	11.913***	0.107
• Minnesota lakes are important to me because they offer many types of recreation.	1025	4.42	4.24	7.822**	0.087
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1017	4.37	4.08	18.699***	0.134
• Minnesota lakes are important to me because they are a source of childhood memories.	1005	4.05	3.78	10.891***	0.104
• Minnesota lakes have no particular importance to me. [2]	1018	1.44	1.75	17.115***	0.129
Aesthetic Value	**1024**	**4.73**	**4.50**	**20.239*** **	**0.139**
• Minnesota lakes are important to me because of their beauty and atmosphere.	1024	4.73	4.50	20.239***	0.139
Ecological Value	**1028**	**4.51**	**4.25**	**29.335*** **	**0.167**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1021	4.72	4.51	18.475***	0.133
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1022	4.71	4.45	21.577***	0.144
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1002	4.33	3.99	28.416***	0.166
• Minnesota lakes are important to me because they are sources of clean water.	990	4.27	4.05	10.698***	0.103
Economic Value	**1007**	**4.13**	**4.10**	**0.129**	**0.011**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	1007	4.13	4.10	0.129	0.011

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2]Item reversed for scale.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-6. Comparison of respondents' mean scores on the value and importance of Minnesota lakes by whether they enjoyed lake scenery at Minnesota lakes in 2003.

Statement	N	Respondents who…[1] Enjoyed lake scenery during 2003	Did not enjoy lake scenery during 2003	F	η
General Value	**1029**	**4.48**	**4.13**	**21.172*** **	**0.142**
• Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1024	4.82	4.64	5.295*	0.072
• Minnesota lakes are important to me, whether or not I use them.	1028	4.73	4.44	10.010**	0.098
• Minnesota lakes are inviting to me.	1021	4.56	4.55	0.000	0.000
• Minnesota lakes are important to me because they offer many types of recreation.	1025	4.40	3.99	14.881***	0.120
• Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1017	4.32	3.86	16.297***	0.126
• Minnesota lakes are important to me because they are a source of childhood memories.	1005	4.00	3.64	6.592**	0.081
• Minnesota lakes have no particular importance to me. [2]	1018	1.47	2.28	39.666***	0.194
Aesthetic Value	**1024**	**4.70**	**4.25**	**27.835*** **	**0.163**
• Minnesota lakes are important to me because of their beauty and atmosphere.	1024	4.70	4.25	27.835***	0.163
Ecological Value	**1028**	**4.45**	**4.22**	**7.950****	**0.088**
• Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1021	4.68	4.45	7.687**	0.087
• Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1022	4.65	4.35	10.822***	0.102
• Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1002	4.26	3.88	11.918***	0.109
• Minnesota lakes are important to me because they are sources of clean water.	990	4.21	4.12	0.575	0.024
Economic Value	**1007**	**4.12**	**4.06**	**0.301**	**0.017**
• Minnesota lakes are important to me because of their economic value to surrounding communities.	1007	4.12	4.06	0.301	0.017

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2]Item reversed for scale.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-7. Mean familiarity with issues related to native aquatic plants/lake ecology by recreational activity.

Respondents who…[1]				
…fished on MN lakes during 2003	**…did not fish on MN lakes during 2003**	**N**	**F**	**η**
2.54	**2.16**	**1029**	**40.319*** **	**0.194**

[1] Mean is based on the scale: 1=not at all familiar 5=extremely familiar; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-8. Mean familiarity with issues related to native aquatic plants/lake ecology by recreational activity.

Respondents who…[1]				
…boated on MN lakes during 2003	**…did not boat on MN lakes during 2003**	**N**	**F**	**η**
2.49	**2.19**	**1029**	**23.211*** **	**0.149**

[1] Mean is based on the scale: 1=not at all familiar 5=extremely familiar; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-9. Mean familiarity with issues related to native aquatic plants/lake ecology by recreational activity.

Respondents who…[1]				
…swam or waded in MN lakes during 2003	**… did not swim or wade in MN lakes during 2003**	**N**	**F**	**η**
2.50	**2.18**	**1029**	**27.493*** **	**0.161**

[1] Mean is based on the scale: 1=not at all familiar 5=extremely familiar; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-10. Mean familiarity with issues related to native aquatic plants/lake ecology by recreational activity.

Respondents who…[1]				
…hunted waterfowl on MN lakes during 2003	**…did not hunt waterfowl on MN lakes during 2003**	**N**	**F**	**η**
2.57	**2.35**	**1029**	**6.528***	**0.079**

[1] Mean is based on the scale: 1=not at all familiar 5=extremely familiar; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-11. Mean familiarity with issues related to native aquatic plants/lake ecology by recreational activity.

Respondents who…[1]				
…watched birds/wildlife or studied nature at MN lakes during 2003	**… did not watch birds/wildlife or study nature at MN lakes during 2003**	**N**	**F**	**η**
2.54	**2.03**	**1029**	**67.020*** **	**0.248**

[1] Mean is based on the scale: 1=not at all familiar 5=extremely familiar; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-12. Mean familiarity with issues related to native aquatic plants/lake ecology by recreational activity.

Respondents who…[1]				
…enjoyed lake scenery at MN lakes during 2003	**…did not enjoy lake scenery at MN lakes during 2003**	**N**	**F**	**η**
2.43	**1.92**	**1029**	**22.424*** **	**0.146**

[1] Mean is based on the scale: 1=not at all familiar 5=extremely familiar; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-13. Respondents' mean level of knowledge of native aquatic plants by recreation activity.

		Respondents who…[1]			
Statement	**N**	**…fished on MN lakes during 2003**	**…did not fish on MN lakes during 2003**	**F**	**η**
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	979	4.06	4.00	0.781	0.028
• Removal of native aquatic plants increases shoreline erosion.	971	3.80	3.81	0.023	0.005
• Removal of native aquatic plants is harmful to fish populations.	986	3.67	3.68	0.006	0.003
• Removal of native aquatic plants increases the value of the lake as a recreational area.[2]	964	2.96	2.93	0.148	0.012
• Native aquatic plants reduce the economic value of the lake in the long-term.[2]	963	2.54	2.62	1.044	0.033
• Native aquatic plants reduce water clarity and quality.[2]	956	2.47	2.50	0.205	0.015
• Native aquatic plants decrease the scenic beauty of the lake.[2]	993	2.27	2.43	3.186	0.057
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)[2]	977	1.82	1.99	6.640**	0.082

[1] Mean is based on the scale: 1=definitely false 5=definitely true
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-14. Respondents' mean level of knowledge of native aquatic plants by recreation activity.

Statement	N	Respondents who… …boated on MN lakes during 2003	…did not boat on MN lakes during 2003	F	η
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	979	4.05	4.01	0.308	0.018
• Removal of native aquatic plants increases shoreline erosion.	971	3.83	3.77	0.565	0.024
• Removal of native aquatic plants is harmful to fish populations.	986	3.73	3.56	4.092*	0.064
• Removal of native aquatic plants increases the value of the lake as a recreational area.	964	2.96	2.93	0.105	0.010
• Native aquatic plants reduce the economic value of the lake in the long-term.	963	2.55	2.61	0.603	0.025
• Native aquatic plants reduce water clarity and quality.	956	2.49	2.46	0.141	0.012
• Native aquatic plants decrease the scenic beauty of the lake.	993	2.28	2.43	2.745	0.053
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)	977	1.84	1.96	3.189	0.057

[1] Mean is based on the scale: 1=definitely false 5=definitely true
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-15. Respondents' mean level of knowledge of native aquatic plants by recreation activity.

Statement	N	Respondents who… …swam or waded in MN lakes during 2003	… did not swim or wade in MN lakes during 2003	F	η
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	979	4.07	3.97	2.022	0.045
• Removal of native aquatic plants increases shoreline erosion.	971	3.82	3.78	0.255	0.016
• Removal of native aquatic plants is harmful to fish populations.	986	3.74	3.55	4.669*	0.069
• Removal of native aquatic plants increases the value of the lake as a recreational area.	964	2.94	2.97	0.129	0.012
• Native aquatic plants reduce the economic value of the lake in the long-term.	963	2.56	2.60	0.398	0.020
• Native aquatic plants reduce water clarity and quality.	956	2.46	2.52	0.568	0.024
• Native aquatic plants decrease the scenic beauty of the lake.	993	2.25	2.49	7.383**	0.086
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)	977	1.83	2.00	6.267*	0.080

[1] Mean is based on the scale: 1=definitely false 5=definitely true
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-16. Respondents' mean level of knowledge of native aquatic plants by recreation activity.

Statement	N	Respondents who… …hunted waterfowl on MN lakes during 2003	…did not hunt waterfowl on MN lakes during 2003	F	η
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	979	3.95	4.05	1.202	0.035
• Removal of native aquatic plants increases shoreline erosion.	971	3.82	3.80	0.048	0.007
• Removal of native aquatic plants is harmful to fish populations.	986	3.71	3.66	0.186	0.014
• Removal of native aquatic plants increases the value of the lake as a recreational area.	964	2.84	2.97	1.434	0.039
• Native aquatic plants reduce the economic value of the lake in the long-term.	963	2.50	2.58	0.642	0.026
• Native aquatic plants reduce water clarity and quality.	956	2.26	2.52	6.175[4]	0.080
• Native aquatic plants decrease the scenic beauty of the lake.	993	2.11	2.37	4.854[4]	0.070
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)	977	1.74	1.91	3.384	0.059

[1] Mean is based on the scale: 1=definitely false 5=definitely true
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-17. Respondents' mean level of knowledge of native aquatic plants by recreation activity.

Statement	N	Respondents who… …watched birds (etc.) at MN lakes during 2003	… did not watch birds/wildlife (etc.) at MN lakes during 2003	F	η
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	979	4.07	3.97	2.043	0.046
• Removal of native aquatic plants increases shoreline erosion.	971	3.85	3.70	3.339	0.059
• Removal of native aquatic plants is harmful to fish populations.	986	3.71	3.58	2.292	0.048
• Removal of native aquatic plants increases the value of the lake as a recreational area.	964	2.92	3.03	1.902	0.044
• Native aquatic plants reduce the economic value of the lake in the long-term.	963	2.49	2.76	11.573***	0.109
• Native aquatic plants reduce water clarity and quality.	956	2.40	2.67	10.638***	0.105
• Native aquatic plants decrease the scenic beauty of the lake.	993	2.23	2.57	13.362***	0.115
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)	977	1.82	2.03	9.175**	0.097

[1] Mean is based on the scale: 1=definitely false 5=definitely true
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-18. Respondents' mean level of knowledge of native aquatic plants by recreation activity.

Statement	N	Respondents who… …enjoyed lake scenery at MN lakes during 2003	…did not enjoy lake scenery at MN lakes during 2003	F	η
• Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	979	4.04	4.01	0.040	0.006
• Removal of native aquatic plants increases shoreline erosion.	971	3.82	3.68	0.970	0.032
• Removal of native aquatic plants is harmful to fish populations.	986	3.67	3.68	0.001	0.001
• Removal of native aquatic plants increases the value of the lake as a recreational area.	964	2.95	2.99	0.066	0.008
• Native aquatic plants reduce the economic value of the lake in the long-term.	963	2.54	2.92	7.113**	0.086
• Native aquatic plants reduce water clarity and quality.	956	2.48	2.56	0.334	0.019
• Native aquatic plants decrease the scenic beauty of the lake.	993	2.33	2.34	0.005	0.002
• Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)	977	1.86	2.16	6.046*	0.079

[1] Mean is based on the scale: 1=definitely false 5=definitely true
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-19. Mean opinion on whether removing native aquatic plants from lakes is bad/good by recreational activity.

Respondents who…[1] …fished on MN lakes during 2003	…did not fish on MN lakes during 2003	N	F	η
2.45	**2.37**	**992**	**0.683**	**0.026**

[1] Mean is based on the scale: 1=extremely bad 7=extremely good
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-20. Mean opinion on whether removing native aquatic plants from lakes is bad/good by recreational activity.

Respondents who…[1] …boated on MN lakes during 2003	…did not boat on MN lakes during 2003	N	F	η
2.43	**2.40**	**992**	**0.089**	**0.009**

[1] Mean is based on the scale: 1=extremely bad 7=extremely good
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-21. Mean opinion on whether removing native aquatic plants from lakes is bad/good by recreational activity.

Respondents who…[1]				
…swam or waded in MN lakes during 2003	**… did not swim or wade in MN lakes during 2003**	**N**	**F**	**η**
2.42	**2.41**	**992**	**0.019**	**0.004**

[1] Mean is based on the scale: 1=extremely bad 7=extremely good
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-22. Mean opinion on whether removing native aquatic plants from lakes is bad/good by recreational activity.

Respondents who…[1]				
…hunted waterfowl on MN lakes during 2003	**…did not hunt waterfowl on MN lakes during 2003**	**N**	**F**	**η**
2.51	**2.40**	**992**	**0.714**	**0.027**

[1] Mean is based on the scale: 1=extremely bad 7=extremely good
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-23. Mean opinion on whether removing native aquatic plants from lakes is bad/good by recreational activity.

Respondents who…[1]				
…watched birds/wildlife or studied nature at MN lakes during 2003	**… did not watch birds/wildlife or study nature at MN lakes during 2003**	**N**	**F**	**η**
2.31	**2.67**	**992**	**12.617*** **	**0.112**

[1] Mean is based on the scale: 1=extremely bad 7=extremely good
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-24. Mean opinion on whether removing native aquatic plants from lakes is bad/good by recreational activity.

Respondents who…[1]				
…enjoyed lake scenery at MN lakes during 2003	**…did not enjoy lake scenery at MN lakes during 2003**	**N**	**F**	**η**
2.40	**2.60**	**992**	**1.299**	**0.036**

[1] Mean is based on the scale: 1=extremely bad 7=extremely good
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-25. Mean opinion on whether removing native aquatic plants from lakes is harmful/beneficial by activity.

Respondents who…[1]				
…fished on MN lakes during 2003	**…did not fish on MN lakes during 2003**	**N**	**F**	**η**
2.56	**2.49**	**978**	**0.622**	**0.025**

[1] Mean is based on the scale: 1=extremely harmful 7=extremely beneficial
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-26. Mean opinion on whether removing native aquatic plants from lakes is harmful/beneficial by activity.

Respondents who…[1]				
…boated on MN lakes during 2003	**…did not boat on MN lakes during 2003**	**N**	**F**	**η**
2.55	**2.51**	**978**	**0.182**	**0.014**

[1] Mean is based on the scale: 1=extremely harmful 7=extremely beneficial
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-27. Mean opinion on whether removing native aquatic plants from lakes is harmful/beneficial by activity.

Respondents who…[1]				
…swam or waded in MN lakes during 2003	**… did not swim or wade in MN lakes during 2003**	**N**	**F**	**η**
2.53	**2.55**	**978**	**0.035**	**0.006**

[1] Mean is based on the scale: 1=extremely harmful 7=extremely beneficial
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-28. Mean opinion on whether removing native aquatic plants from lakes is harmful/beneficial by activity.

Respondents who…[1]				
…hunted waterfowl on MN lakes during 2003	**…did not hunt waterfowl on MN lakes during 2003**	**N**	**F**	**η**
2.58	**2.53**	**978**	**0.138**	**0.012**

[1] Mean is based on the scale: 1=extremely harmful 7=extremely beneficial
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-29. Mean opinion on whether removing native aquatic plants from lakes is harmful/beneficial by activity.

Respondents who…[1]				
…watched birds/wildlife or studied nature at MN lakes during 2003	**… did not watch birds/wildlife or study nature at MN lakes during 2003**	**N**	**F**	**η**
2.42	**2.81**	**978**	**14.651*** **	**0.122**

[1] Mean is based on the scale: 1=extremely harmful 7=extremely beneficial
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-30. Mean opinion on whether removing native aquatic plants from lakes is harmful/beneficial by activity.

Respondents who…[1]				
…enjoyed lake scenery at MN lakes during 2003	**…did not enjoy lake scenery at MN lakes during 2003**	**N**	**F**	**η**
2.51	**2.81**	**978**	**2.701**	**0.053**

[1] Mean is based on the scale: 1=extremely harmful 7=extremely beneficial
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-31. Respondents' mean value and importance scores about native aquatic plants by recreational activity.

Statement	N	Respondents who…[1] …fished on MN lakes during 2003	…did not fish on MN lakes during 2003	F	η
Protection/Removal Value	**1002**	**3.77**	**3.75**	**0.146**	**0.012**
• Removal of native aquatic plants should be closely regulated.	942	3.98	3.96	0.047	0.007
• Native aquatic plants are so important they should be completely left alone.	903	3.30	3.37	0.614	0.026
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake.[2]	960	2.55	2.45	1.483	0.039
• Native aquatic plants have no importance to me.[2]	948	2.00	2.11	2.444	0.051
• Native aquatic plants are weeds and should be removed.[2]	924	1.79	1.73	0.746	0.028
Aesthetic Value	**999**	**3.55**	**3.54**	**0.013**	**0.004**
• Native aquatic plants add to the scenic beauty of lakes.	954	3.96	4.02	1.064	0.033
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	948	3.46	3.49	0.148	0.012
• Native aquatic plants make the shoreline look messy.[2]	946	2.63	2.62	0.015	0.004
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge.[2]	969	2.50	2.58	0.864	0.030
General Ecological Value	**956**	**4.05**	**4.04**	**0.058**	**0.008**
• Native aquatic plants serve important functions that maintain the health of lakes.	914	4.35	4.35	0.007	0.003
• Life in lakes depends on native aquatic plants.	890	4.32	4.32	0.000	0.000
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake.[2]	732	2.36	2.42	0.520	0.027
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes.[2]	838	2.23	2.21	0.040	0.007
• To improve the overall health of lakes, native aquatic plants should be removed.[2]	859	1.84	1.84	0.002	0.002
Fish and Wildlife Recreation Value	**932**	**4.04**	**3.91**	**5.935***	**0.080**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	845	4.31	4.19	4.814*	0.075
• Native aquatic plants improve the quality of fishing.	889	4.24	4.12	4.627*	0.072
• Native aquatic plants support the economic value of lakes for tourism and recreation.	813	3.57	3.48	1.333	0.041

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-32. Respondents' mean value and importance scores about native aquatic plants by recreational activity.

Statement	N	Respondents who…[1] …boated on MN lakes during 2003	…did not boat on MN lakes during 2003	F	η
Protection/Removal Value	**1002**	**3.74**	**3.80**	**1.556**	**0.039**
• Removal of native aquatic plants should be closely regulated.	942	3.94	4.03	1.267	0.037
• Native aquatic plants are so important they should be completely left alone.	903	3.28	3.43	2.937	0.057
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake. [2]	960	2.57	2.41	2.955	0.055
• Native aquatic plants have no importance to me. [2]	948	2.00	2.13	3.456	0.060
• Native aquatic plants are weeds and should be removed. [2]	924	1.80	1.70	1.802	0.044
Aesthetic Value	**999**	**3.53**	**3.60**	**1.261**	**0.036**
• Native aquatic plants add to the scenic beauty of lakes.	954	3.94	4.06	3.119	0.057
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	948	3.43	3.55	2.275	0.049
• Native aquatic plants make the shoreline look messy. [2]	946	2.68	2.52	3.752	0.063
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge. [2]	969	2.48	2.63	2.384	0.050
General Ecological Value	**956**	**4.04**	**4.06**	**0.101**	**0.010**
• Native aquatic plants serve important functions that maintain the health of lakes.	914	4.35	4.35	0.000	0.000
• Life in lakes depends on native aquatic plants.	890	4.29	4.38	2.154	0.049
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake. [2]	732	2.38	2.40	0.090	0.011
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes. [2]	938	2.21	2.24	0.069	0.009
• To improve the overall health of lakes, native aquatic plants should be removed. [2]	859	1.82	1.88	0.556	0.025
Fish and Wildlife Recreation Value	**932**	**4.00**	**4.00**	**0.003**	**0.002**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	845	4.26	4.27	0.000	0.001
• Native aquatic plants improve the quality of fishing.	889	4.21	4.18	0.150	0.013
• Native aquatic plants support the economic value of lakes for tourism and recreation.	813	3.55	3.51	0.196	0.016

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-33. Respondents' mean value and importance scores about native aquatic plants by recreational activity.

Statement	N	Respondents who…[1] …swam or waded in MN lakes during 2003	… did not swim or wade in MN lakes during 2003	F	η
Protection/Removal Value	**1002**	**3.78**	**3.71**	**1.561**	**0.039**
• Removal of native aquatic plants should be closely regulated.	942	3.95	4.03	1.124	0.035
• Native aquatic plants are so important they should be completely left alone.	903	3.32	3.35	0.173	0.014
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake. [2]	960	2.51	2.52	0.012	0.004
• Native aquatic plants have no importance to me. [2]	948	1.97	2.18	9.485**	0.100
• Native aquatic plants are weeds and should be removed. [2]	924	1.76	1.77	0.042	0.007
Aesthetic Value	**999**	**3.57**	**3.50**	**1.232**	**0.035**
• Native aquatic plants add to the scenic beauty of lakes.	954	3.99	3.96	0.187	0.014
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	948	3.47	3.46	0.031	0.006
• Native aquatic plants make the shoreline look messy. [2]	946	2.61	2.65	0.154	0.013
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge. [2]	969	2.47	2.65	3.907*	0.063
General Ecological Value	**956**	**4.07**	**3.99**	**2.695**	**0.053**
• Native aquatic plants serve important functions that maintain the health of lakes.	914	4.38	4.30	1.531	0.041
• Life in lakes depends on native aquatic plants.	890	4.33	4.30	0.277	0.018
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake. [2]	732	2.38	2.40	0.068	0.010
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes. [2]	838	2.19	2.28	0.838	0.032
• To improve the overall health of lakes, native aquatic plants should be removed. [2]	859	1.80	1.92	2.441	0.053
Fish and Wildlife Recreation Value	**932**	**4.02**	**3.95**	**1.857**	**0.045**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	845	4.28	4.23	0.671	0.028
• Native aquatic plants improve the quality of fishing.	889	4.22	4.15	1.290	0.038
• Native aquatic plants support the economic value of lakes for tourism and recreation.	813	3.59	3.43	3.859*	0.069

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-34. Respondents' mean value and importance scores about native aquatic plants by recreational activity.

Statement	N	Respondents who…[1] …hunted waterfowl on MN lakes during 2003	Respondents who…[1] …did not hunt waterfowl on MN lakes during 2003	F	η
Protection/Removal Value	**1002**	**3.82**	**3.75**	**1.128**	**0.034**
• Removal of native aquatic plants should be closely regulated.	942	4.01	3.97	0.150	0.013
• Native aquatic plants are so important they should be completely left alone.	903	3.41	3.31	0.667	0.027
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake. [2]	960	2.46	2.52	0.340	0.019
• Native aquatic plants have no importance to me. [2]	948	1.94	2.06	1.514	0.040
• Native aquatic plants are weeds and should be removed. [2]	924	1.73	1.77	0.153	0.013
Aesthetic Value	**999**	**3.53**	**3.55**	**0.052**	**0.007**
• Native aquatic plants add to the scenic beauty of lakes.	954	3.92	3.99	0.601	0.025
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	948	3.37	3.49	1.240	0.036
• Native aquatic plants make the shoreline look messy. [2]	946	2.49	2.65	2.322	0.050
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge. [2]	969	2.45	2.55	0.647	0.026
General Ecological Value	**956**	**4.07**	**4.04**	**0.168**	**0.013**
• Native aquatic plants serve important functions that maintain the health of lakes.	914	4.36	4.35	0.039	0.007
• Life in lakes depends on native aquatic plants.	890	4.33	4.32	0.017	0.004
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake. [2]	732	2.34	2.39	0.254	0.019
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes. [2]	838	2.17	2.23	0.283	0.018
• To improve the overall health of lakes, native aquatic plants should be removed. [2]	859	1.77	1.85	0.802	0.031
Fish and Wildlife Recreation Value	**932**	**4.10**	**3.98**	**3.017**	**0.057**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	845	4.45	4.23	8.486**	0.100
• Native aquatic plants improve the quality of fishing.	889	4.26	4.19	1.015	0.034
• Native aquatic plants support the economic value of lakes for tourism and recreation.	813	3.55	3.53	0.014	0.004

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-35. Respondents' mean value and importance scores about native aquatic plants by recreational activity.

Statement	N	Respondents who…[1] …watched birds (etc.) at MN lakes during 2003	Respondents who… … did not watch birds/wildlife (etc.) at MN lakes during 2003	F	η
Protection/Removal Value	**1002**	**3.84**	**3.57**	**21.012*** **	**0.143**
• Removal of native aquatic plants should be closely regulated.	942	4.02	3.86	3.735	0.063
• Native aquatic plants are so important they should be completely left alone.	903	3.34	3.31	0.061	0.008
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake.[2]	960	2.43	2.72	9.937**	0.101
• Native aquatic plants have no importance to me.[2]	948	1.92	2.33	30.857***	0.178
• Native aquatic plants are weeds and should be removed.[2]	924	1.68	1.97	15.956***	0.130
Aesthetic Value	**999**	**3.65**	**3.30**	**29.287*** **	**0.169**
• Native aquatic plants add to the scenic beauty of lakes.	954	4.06	3.78	16.472***	0.130
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	948	3.55	3.27	11.616***	0.110
• Native aquatic plants make the shoreline look messy.[2]	946	2.54	2.83	11.530***	0.110
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge.[2]	969	2.37	2.93	35.725***	0.189
General Ecological Value	**956**	**4.08**	**3.96**	**5.444***	**0.075**
• Native aquatic plants serve important functions that maintain the health of lakes.	914	4.39	4.25	5.411*	0.077
• Life in lakes depends on native aquatic plants.	890	4.36	4.21	5.859*	0.081
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake.[2]	732	2.38	2.41	0.142	0.014
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes.[2]	838	2.16	2.39	6.531*	0.088
• To improve the overall health of lakes, native aquatic plants should be removed.[2]	859	1.80	1.94	2.793	0.057
Fish and Wildlife Recreation Value	**932**	**4.04**	**3.88**	**7.916****	**0.092**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	845	4.31	4.15	5.929*	0.084
• Native aquatic plants improve the quality of fishing.	889	4.23	4.10	4.211*	0.069
• Native aquatic plants support the economic value of lakes for tourism and recreation.	813	3.59	3.39	5.608*	0.083

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-36. Respondents' mean value and importance scores about native aquatic plants by recreational activity.

Statement	N	Respondents who…[1] …enjoyed lake scenery at MN lakes during 2003	…did not enjoy lake scenery at MN lakes during 2003	F	η
Protection/Removal Value	**1002**	**3.77**	**3.62**	**2.290**	**0.048**
• Removal of native aquatic plants should be closely regulated.	942	3.98	3.88	0.489	0.023
• Native aquatic plants are so important they should be completely left alone.	903	3.32	3.41	0.267	0.017
• Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake. [2]	960	2.51	2.51	0.002	0.001
• Native aquatic plants have no importance to me. [2]	948	2.02	2.37	7.483**	0.089
• Native aquatic plants are weeds and should be removed. [2]	924	1.75	1.94	2.222	0.049
Aesthetic Value	**999**	**3.56**	**3.43**	**1.316**	**0.036**
• Native aquatic plants add to the scenic beauty of lakes.	954	3.99	3.84	1.548	0.040
• Lake shorelines are more attractive when they have an abundance of native aquatic plants.	948	3.48	3.37	0.595	0.025
• Native aquatic plants make the shoreline look messy. [2]	946	2.62	2.67	0.092	0.010
• Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge. [2]	969	2.51	2.84	4.029*	0.064
General Ecological Value	**956**	**4.05**	**3.93**	**1.849**	**0.044**
• Native aquatic plants serve important functions that maintain the health of lakes.	914	4.37	4.10	5.390*	0.077
• Life in lakes depends on native aquatic plants.	890	4.33	4.26	0.340	0.020
• Abundant floating and emergent native aquatic plants are signs of an unhealthy lake. [2]	732	2.39	2.38	0.002	0.002
• Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes. [2]	838	2.22	2.29	0.176	0.014
• To improve the overall health of lakes, native aquatic plants should be removed. [2]	859	1.83	2.00	1.491	0.042
Fish and Wildlife Recreation Value	**932**	**4.01**	**3.87**	**1.736**	**0.043**
• Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	845	4.27	4.16	1.162	0.037
• Native aquatic plants improve the quality of fishing.	889	4.21	4.08	1.240	0.037
• Native aquatic plants support the economic value of lakes for tourism and recreation.	813	3.54	3.47	0.214	0.016

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree
[2] Item(s) reversed for scale calculations.
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-37. Respondents' trust in groups to make sound recommendations for aquatic plant management by recreational activity.

Statement	N	Respondents who…[1] …fished on MN lakes during 2003	Respondents who…[1] …did not fish on MN lakes during 2003	F	η
• The Minnesota Department of Natural Resources (DNR)	990	3.29	3.39	3.970*	0.063
• The State of Minnesota	961	2.82	2.87	0.846	0.030
• The county government for the lake	954	2.63	2.75	4.886*	0.071
• Lakeshore property owner groups	955	2.44	2.30	5.011*	0.072
• Individual lakeshore landowners	961	2.19	2.14	0.722	0.027
• The general public	948	1.85	1.88	0.421	0.021
• Lake users (recreationists, etc.)	963	1.98	1.87	4.042*	0.065

[1]Mean is based on the scale: 1=do not trust at all 4=trust greatly
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-38. Respondents' trust in groups to make sound recommendations for aquatic plant management by recreational activity.

Statement	N	Respondents who…[1] …boated on MN lakes during 2003	Respondents who…[1] …did not boat on MN lakes during 2003	F	η
• The Minnesota Department of Natural Resources (DNR)	990	3.33	3.33	0.013	0.004
• The State of Minnesota	961	2.81	2.88	1.664	0.042
• The county government for the lake	954	2.64	2.77	5.611*	0.077
• Lakeshore property owner groups	955	2.44	2.27	7.071**	0.086
• Individual lakeshore landowners	961	2.18	2.15	0.187	0.014
• The general public	948	1.81	1.96	8.162**	0.092
• Lake users (recreationists, etc.)	963	1.93	1.95	0.084	0.009

[1]Mean is based on the scale: 1=do not trust at all 4=trust greatly
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-39. Respondents' trust in groups to make sound recommendations for aquatic plant management by recreational activity.

Statement	N	Respondents who…[1] …swam or waded in MN lakes during 2003	Respondents who…[1] … did not swim or wade in MN lakes during 2003	F	η
• The Minnesota Department of Natural Resources (DNR)	990	3.37	3.24	5.533*	0.075
• The State of Minnesota	961	2.81	2.88	1.391	0.038
• The county government for the lake	954	2.64	2.76	4.694*	0.070
• Lakeshore property owner groups	955	2.40	2.35	0.586	0.025
• Individual lakeshore landowners	961	2.17	2.17	0.006	0.002
• The general public	948	1.82	1.93	4.192*	0.066
• Lake users (recreationists, etc.)	963	1.96	1.90	0.917	0.031

[1]Mean is based on the scale: 1=do not trust at all 4=trust greatly
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-40. Respondents' trust in groups to make sound recommendations for aquatic plant management by recreational activity.

Statement	N	Respondents who…[1] …hunted waterfowl on MN lakes during 2003	Respondents who…[1] …did not hunt waterfowl on MN lakes during 2003	F	η
• The Minnesota Department of Natural Resources (DNR)	990	3.28	3.34	0.524	0.023
• The State of Minnesota	961	2.72	2.86	3.292	0.058
• The county government for the lake	954	2.50	2.71	7.968**	0.091
• Lakeshore property owner groups	955	2.32	2.40	0.902	0.031
• Individual lakeshore landowners	961	2.12	2.18	0.568	0.024
• The general public	948	1.79	1.87	1.387	0.038
• Lake users (recreationists, etc.)	963	1.99	1.93	0.596	0.025

[1]Mean is based on the scale: 1=do not trust at all 4=trust greatly
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-41. Respondents' trust in groups to make sound recommendations for aquatic plant management by recreational activity.

Statement	N	Respondents who…[1] …watched birds (etc.) at MN lakes during 2003	Respondents who… … did not watch birds/wildlife (etc.) at MN lakes during 2003	F	η
• The Minnesota Department of Natural Resources (DNR)	990	3.34	3.30	0.561	0.024
• The State of Minnesota	961	2.83	2.85	0.151	0.013
• The county government for the lake	954	2.65	2.76	3.567	0.061
• Lakeshore property owner groups	955	2.39	2.39	0.012	0.004
• Individual lakeshore landowners	961	2.15	2.22	1.467	0.039
• The general public	948	1.84	1.90	1.232	0.036
• Lake users (recreationists, etc.)	963	1.95	1.92	0.242	0.016

[1]Mean is based on the scale: 1=do not trust at all 4=trust greatly
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-42. Respondents' trust in groups to make sound recommendations for aquatic plant management by recreational activity.

Statement	N	Respondents who…[1] …enjoyed lake scenery at MN lakes during 2003	Respondents who… …did not enjoy lake scenery at MN lakes during 2003	F	η
• The Minnesota Department of Natural Resources (DNR)	990	3.35	3.07	7.877**	0.089
• The State of Minnesota	961	2.83	2.85	0.034	0.006
• The county government for the lake	954	2.68	2.72	0.220	0.015
• Lakeshore property owner groups	955	2.40	2.16	4.165*	0.066
• Individual lakeshore landowners	961	2.18	2.10	0.532	0.024
• The general public	948	1.86	1.91	0.275	0.017
• Lake users (recreationists, etc.)	963	1.94	1.85	0.780	0.028

[1]Mean is based on the scale: 1=do not trust at all 4=trust greatly
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-43. Respondent mean knowledge of aquatic plant regulations by recreational activity.

Respondents who…[1]				
…fished on MN lakes during 2003	**…did not fish on MN lakes during 2003**	**N**	**F**	**η**
2.05	**1.61**	**1030**	**70.615*** **	**0.254**

[1] Mean is based on the scale: 1=not at all knowledgeable 5=extremely knowledgeable;
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-44. Respondent mean knowledge of aquatic plant regulations by recreational activity.

Respondents who…[1]				
…boated on MN lakes during 2003	**…did not boat on MN lakes during 2003**	**N**	**F**	**η**
1.98	**1.68**	**1030**	**28.615*** **	**0.165**

[1] Mean is based on the scale: 1=not at all knowledgeable 5=extremely knowledgeable;
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-45. Respondent mean knowledge of aquatic plant regulations by recreational activity.

Respondents who…[1]				
…swam or waded in MN lakes during 2003	**… did not swim or wade in MN lakes during 2003**	**N**	**F**	**η**
1.99	**1.67**	**1030**	**33.269*** **	**0.177**

[1] Mean is based on the scale: 1=not at all knowledgeable 5=extremely knowledgeable;
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-46. Respondent mean knowledge of aquatic plant regulations by recreational activity.

Respondents who…[1]				
…hunted waterfowl on MN lakes during 2003	**…did not hunt waterfowl on MN lakes during 2003**	**N**	**F**	**η**
2.12	**1.83**	**1030**	**14.113*** **	**0.116**

[1] Mean is based on the scale: 1=not at all knowledgeable 5=extremely knowledgeable;
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-47. Respondent mean knowledge of aquatic plant regulations by recreational activity.

Respondents who…[1]				
…watched birds (etc.) at MN lakes during 2003	**… did not watch birds/wildlife (etc.) at MN lakes during 2003**	**N**	**F**	**η**
1.98	**1.64**	**1030**	**34.468*** **	**0.180**

[1] Mean is based on the scale: 1=not at all knowledgeable 5=extremely knowledgeable;
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-48. Respondent mean knowledge of aquatic plant regulations by recreational activity.

Respondents who…[1]				
…enjoyed lake scenery at MN lakes during 2003	**…did not enjoy lake scenery at MN lakes during 2003**	**N**	**F**	**η**
1.91	**1.51**	**1030**	**17.263*** **	**0.129**

[1] Mean is based on the scale: 1=not at all knowledgeable 5=extremely knowledgeable;
*** p≤0.001, ** p≤0.01, * p≤0.05

Table E-49. Respondents' opinion about current aquatic plant management regulations in Minnesota, by recreation activity.

Opinion about restrictiveness of regulations	N	Respondents who…		N	Respondents who…[1]	
		…fished on MN lakes during 2003	…did not fish on MN lakes during 2003		…fished on MN lakes during 2003	…did not fish on MN lakes during 2003
Too restrictive	1025	6.1	2.2	430	11.9	8.0
About right		28.1	15.0		54.7	54.5
Not restrictive enough		17.1	10.3		33.3	37.5
Don't know		48.6	72.4			
Chi-square		χ^2=58.240***, Cramer's V=0.238			χ^2=1.580, Cramer's V=0.061	

[1] Percentages exclude respondents who did not have an opinion about aquatic plant regulations.

Table E-50. Respondents' opinion about current aquatic plant management regulations in Minnesota, by recreation activity.

Opinion about restrictiveness of regulations	N	Percent of respondents who…		N	% of respondents with an opinion about regulations who…[1]	
		…boated on MN lakes during 2003	…did not boat on MN lakes during 2003		… boated on MN lakes during 2003	…did not boat on MN lakes during 2003
Too restrictive	1025	4.7	4.4	430	10.0	13.4
About right		26.3	16.8		55.9	51.3
Not restrictive enough		16.0	11.6		34.1	35.3
Don't know		53.0	67.2			
Chi-square		χ^2 =20.571***, Cramer's V=0.142			χ^2=1.335, Cramer's V=0.056	

[1] Percentages exclude respondents who did not have an opinion about aquatic plant regulations.
***p≤0.001

Table E-51. Respondents' opinion about current aquatic plant management regulations in Minnesota, by recreation activity.

Opinion about restrictiveness of regulations	N	Percent of respondents who… …swam or waded in MN lakes during 2003	Percent of respondents who… … did not swim or wade in MN lakes during 2003	N	% of respondents with an opinion about regulations who…[1] … swam at MN lakes during 2003	% of respondents with an opinion about regulations who…[1] …did not swim at MN lakes during 2003
Too restrictive	1025	4.6	4.6	430	9.9	13.4
About right		26.0	17.4		56.4	50.4
Not restrictive enough		15.5	12.5		33.7	36.2
Don't know		54.0	65.4			
Chi-square		χ^2= 14.265 ** Cramer's V=0.118**			χ^2= 1.762 Cramer's V=0.064	

[1] Percentages exclude respondents who did not have an opinion about aquatic plant regulations.
**p≤0.01

Table E-52. Respondents' opinion about current aquatic plant management regulations in Minnesota, by recreation activity.

Opinion about restrictiveness of regulations	N	Percent of respondents who… …hunted waterfowl on MN lakes during 2003	Percent of respondents who… …did not hunt waterfowl on MN lakes during 2003	N	% of respondents with an opinion about regulations who…[1] … hunted waterfowl on MN lakes during 2003	% of respondents with an opinion about regulations who…[1] …did not hunt waterfowl on MN lakes during 2003
Too restrictive	1025	6.6	4.2	430	11.9	10.7
About right		34.2	21.0		61.9	52.9
Not restrictive enough		14.5	14.4		26.2	36.4
Don't know		44.7	60.4			
Chi-square		χ^2= 16.906 *** Cramer's V=0.128***			χ^2= 3.149 Cramer's V=0.086	

[1] Percentages exclude respondents who did not have an opinion about aquatic plant regulations.
***p≤0.001

Table E-53. Respondents' opinion about current aquatic plant management regulations in Minnesota, by recreation activity.

Opinion about restrictiveness of regulations	N	Percent of respondents who… …watched birds (etc.) at MN lakes during 2003	Percent of respondents who… … did not watch birds/wildlife (etc.) at MN lakes during 2003	N	% of respondents with an opinion about regulations who…[1] … watched birds (etc.) at MN lakes during 2003	% of respondents with an opinion about regulations who…[1] …did not watch birds (etc.) at MN lakes during 2003
Too restrictive	1025	4.1	5.7	430	8.7	18.4
About right		24.8	18.7		53.0	60.2
Not restrictive enough		17.9	6.6		38.3	21.4
Don't know		53.2	69.0			
		χ^2= 33.472 *** Cramer's V=0.181***			χ^2= 13.362*** Cramer's V=0.176	

[1] Percentages exclude respondents who did not have an opinion about aquatic plant regulations.
***p≤0.001

Table E-54. Respondents' opinion about current aquatic plant management regulations in Minnesota, by recreation activity.

Opinion about restrictiveness of regulations	N	Percent of respondents who… …enjoyed lake scenery at MN lakes during 2003	Percent of respondents who… …did not enjoy lake scenery at MN lakes during 2003	N	% of respondents with an opinion about regulations who…[1] … enjoyed lake scenery at MN lakes during 2003	% of respondents with an opinion about regulations who…[1] …did not enjoy lake scenery at MN lakes during 2003
Too restrictive	1025	4.6	4.7	430	10.6	17.4
About right		23.5	16.3		54.3	60.9
Not restrictive enough		15.2	5.8		35.1	21.7
Don't know		56.7	73.3			
		χ^2= 10.387 * Cramer's V=0.101*			χ^2= 2.235 Cramer's V=0.072	

[1] Percentages exclude respondents who did not have an opinion about aquatic plant regulations.
*p≤0.05

Table E-55. Mean attachment scores of respondents who use a particular Minnesota lake or lakes most often by participation in fishing.

Statement	N	Respondents who…[1] …fished on MN lakes during 2003	Respondents who…[1] …did not fish on MN lakes during 2003	F	H
Emotional attachment	**641**	**4.12**	**3.74**	**13.767*** **	**0.145**
• It is my favorite place to be.	639	4.22	3.92	15.215***	0.153
• I really miss it when I am away from it too long.	632	3.96	3.72	6.803**	0.103
• I feel happiest when I am there.	633	3.88	3.59	11.245***	0.132
Place dependence	**638**	**3.66**	**3.35**	**15.507*** **	**0.154**
• It is the best place to do the things I enjoy.	636	3.96	3.56	21.419***	0.181
• For the things I enjoy doing most, no other place can compare it.	627	3.54	3.17	13.600***	0.146
• As far as I am concerned there are better places to be. [2]	625	2.53	2.71	2.960	0.069
Identity	**638**	**3.76**	**3.48**	**13.712*** **	**0.145**
• I feel that I can really be myself there.	636	4.18	4.00	5.625*	094
• It reflects the type of person that I am.	623	3.84	3.52	12.020***	0.138
• Everything about it is a reflection of me.	619	3.31	2.96	12.827***	0.143
• It says very little about who I am. [2]	612	2.33	2.59	6.394*	0.102
Family attachment	**634**	**3.91**	**3.54**	**17.177*** **	**0.163**
• It is a special place for my family.	631	4.11	3.84	9.681**	0.123
• Many important family memories are tied to it.	631	3.95	3.62	9.726**	0.123
• It ties the generations of my family together.	626	3.68	3.15	20.950***	0.188

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree; *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$
[2] Item(s) reversed for scale calculations.

Table E-56. Mean attachment scores of respondents who use a particular Minnesota lake or lakes most often by participation in boating.

Statement	N	Respondents who…[1] …boated on MN lakes during 2003	Respondents who…[1] …did not boat on MN lakes during 2003	F	H
Emotional attachment	**641**	**4.00**	**3.72**	**12.690*** **	**0.140**
• It is my favorite place to be.	639	4.22	3.87	18.134***	0.166
• I really miss it when I am away from it too long.	632	3.95	3.68	8.035**	0.112
• I feel happiest when I am there.	633	3.85	3.62	6.177*	0.098
Place dependence	**638**	**3.64**	**3.35**	**11.652*** **	**0.134**
• It is the best place to do the things I enjoy.	636	3.91	3.66	7.086**	0.105
• For the things I enjoy doing most, no other place can compare it.	627	3.51	3.21	7.443**	0.108
• As far as I am concerned there are better places to be. [2]	625	2.50	2.87	11.749***	0.136
Identity	**638**	**3.64**	**3.35**	**13.954*** **	**0.147**
• I feel that I can really be myself there.	636	4.20	3.91	12.350***	0.138
• It reflects the type of person that I am.	623	3.81	3.54	7.490**	0.109
• Everything about it is a reflection of me.	619	3.26	3.04	4.387*	0.084
• It says very little about who I am. [2]	612	2.29	2.77	19.538***	0.176
Family attachment	**634**	**3.91**	**3.46**	**23.747*** **	**0.190**
• It is a special place for my family.	631	4.15	3.67	29.104***	0.210
• Many important family memories are tied to it.	631	3.93	3.62	7.661**	0.110
• It ties the generations of my family together.	626	3.67	3.09	22.244***	0.186

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree; *** p≤0.001, ** p≤0.01, * p≤0.05
[2] Item(s) reversed for scale calculations.

Table E-57. Mean attachment scores of respondents who use a particular Minnesota lake or lakes most often by participation in wading.

Statement	N	Respondents who…[1] …swam or waded in MN lakes during 2003	Respondents who…[1] … did not swim or wade in MN lakes during 2003	F	η
Emotional attachment	**641**	**4.01**	**3.71**	**14.961*** **	**0.151**
• It is my favorite place to be.	639	4.20	3.93	11.576***	0.134
• I really miss it when I am away from it too long.	632	3.96	3.66	10.326***	0.127
• I feel happiest when I am there.	633	3.89	3.52	16.078***	0.158
Place dependence	**638**	**3.65**	**3.33**	**15.198*** **	**0.153**
• It is the best place to do the things I enjoy.	636	3.93	3.60	13.011***	0.142
• For the things I enjoy doing most, no other place can compare it.	627	3.53	3.15	13.000***	0.143
• As far as I am concerned there are better places to be. [2]	625	2.51	2.81	7.223**	0.107
Identity	**638**	**3.74**	**3.47**	**12.233*** **	**0.137**
• I feel that I can really be myself there.	636	4.19	3.94	9.693**	0.123
• It reflects the type of person that I am.	623	3.82	3.53	8.370**	0.115
• Everything about it is a reflection of me.	619	3.27	3.03	5.040*	0.090
• It says very little about who I am. [2]	612	2.31	2.70	12.755***	0.143
Family attachment	**634**	**3.91**	**3.48**	**20.516*** **	**0.177**
• It is a special place for my family.	631	4.15	3.66	30.010***	0.213
• Many important family memories are tied to it.	631	3.94	3.57	11.206***	0.132
• It ties the generations of my family together.	626	3.63	3.21	11.298***	0.133

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree; *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$
[2] Item(s) reversed for scale calculations.

Table E-58. Mean attachment scores of respondents who use a particular Minnesota lake or lakes most often by participation in waterfowl hunting.

Statement	N	Respondents who…[1] …hunted waterfowl on MN lakes during 2003	Respondents who…[1] …did not hunt waterfowl on MN lakes during 2003	F	η
Emotional attachment	**641**	**4.24**	**3.88**	**15.560*** **	**0.154**
• It is my favorite place to be.	639	4.33	4.10	6.100*	0.097
• I really miss it when I am away from it too long.	632	4.25	3.82	14.955***	0.1521
• I feel happiest when I am there.	633	4.17	3.73	17.868***	0.166
Place dependence	**638**	**3.93**	**3.50**	**19.950*** **	**0.174**
• It is the best place to do the things I enjoy.	636	4.24	3.77	20.119***	0.175
• For the things I enjoy doing most, no other place can compare it.	627	3.90	3.35	21.179***	0.181
• As far as I am concerned there are better places to be. [2]	625	2.34	2.63	5.215*	0.091
Identity	**638**	**4.07**	**3.60**	**25.850*** **	**0.198**
• I feel that I can really be myself there.	636	4.37	4.08	9.244**	0.120
• It reflects the type of person that I am.	623	4.19	3.66	23.646***	0.192
• Everything about it is a reflection of me.	619	3.67	3.12	21.113***	0.182
• It says very little about who I am. [2]	612	1.99	2.48	14.751***	0.154
Family attachment	**634**	**4.13**	**3.74**	**12.027*** **	**0.137**
• It is a special place for my family.	631	4.23	4.00	4.698*	0.086
• Many important family memories are tied to it.	631	4.23	3.78	11.833***	0.136
• It ties the generations of my family together.	626	3.93	3.45	11.029***	0.132

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree; *** p≤0.001, ** p≤0.01, * p≤0.05
[2] Item(s) reversed for scale calculations.

Table E-59. Mean attachment scores of respondents who use a particular Minnesota lake or lakes most often by participation in bird/wildlife watching.

Statement	N	Respondents who…[1] …watched birds (etc.) at MN lakes during 2003	Respondents who… … did not watch birds/wildlife (etc.) at MN lakes during 2003	F	η
Emotional attachment	**641**	**4.12**	**3.67**	**18.120*** **	**0.166**
• It is my favorite place to be.	639	4.20	3.92	11.114***	0.131
• I really miss it when I am away from it too long.	632	3.98	3.59	16.216***	0.158
• I feel happiest when I am there.	633	3.89	3.49	18.032***	0.167
Place dependence	**638**	**3.65**	**3.31**	**15.208*** **	**0.153**
• It is the best place to do the things I enjoy.	636	3.90	3.65	7.250**	0.106
• For the things I enjoy doing most, no other place can compare it.	627	3.51	3.17	9.888**	0.125
• As far as I am concerned there are better places to be.[2]	625	2.49	2.92	15.555***	0.156
Identity	**638**	**3.78**	**3.33**	**31.398*** **	**0.217**
• I feel that I can really be myself there.	636	4.22	3.84	21.188***	0.180
• It reflects the type of person that I am.	623	3.84	3.43	17.364***	0.165
• Everything about it is a reflection of me.	619	3.30	2.88	15.719***	0.158
• It says very little about who I am.[2]	612	2.27	2.86	28.767***	0.212
Family attachment	**634**	**3.88**	**3.54**	**12.298*** **	**0.138**
• It is a special place for my family.	631	4.10	3.81	9.853**	0.124
• Many important family memories are tied to it.	631	3.94	3.55	12.018***	0.137
• It ties the generations of my family together.	626	3.60	3.29	5.759*	0.0961

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree; *** p≤0.001, ** p≤0.01, * p≤0.05
[2] Item(s) reversed for scale calculations.

Table E-60. Mean attachment scores of respondents who use a particular Minnesota lake or lakes most often by participation in enjoying the scenery.

Statement	N	Respondents who…[1] …enjoyed lake scenery at MN lakes during 2003	Respondents who…[1] …did not enjoy lake scenery at MN lakes during 2003	F	η
Emotional attachment	**641**	**3.96**	**3.39**	**10.124****	**0.125**
• It is my favorite place to be.	639	4.15	3.71	6.014*	0.097
• I really miss it when I am away from it too long.	632	3.92	3.13	14.130***	0.148
• I feel happiest when I am there.	633	3.82	3.30	5.917*	0.096
Place dependence	**638**	**3.59**	**3.11**	**6.390***	**0.100**
• It is the best place to do the things I enjoy.	636	3.87	3.33	6.768**	0.103
• For the things I enjoy doing most, no other place can compare it.	627	3.45	3.00	3.670	0.076
• As far as I am concerned there are better places to be.[2]	625	2.57	3.00	3.168	0.071
Identity	**638**	**3.70**	**3.10**	**11.201*****	**0.132**
• I feel that I can really be myself there.	636	4315	3.58	9.890**	0.124
• It reflects the type of person that I am.	623	3.77	3.22	6.382*	0.101
• Everything about it is a reflection of me.	619	3.23	2.67	6.021*	0.098
• It says very little about who I am.[2]	612	2.37	3.08	8.655**	0.118
Family attachment	**634**	**3.82**	**3.38**	**4.429***	**0.083**
• It is a special place for my family.	631	4.06	3.29	14.705***	0.151
• Many important family memories are tied to it.	631	3.87	3.42	3.324*	0.073
• It ties the generations of my family together.	626	3.53	3.42	0.171	0.017

[1]Mean is based on the scale: 1=strongly disagree 5=strongly agree; *** p≤0.001, ** p≤0.01, * p≤0.05
[2] Item(s) reversed for scale calculations.

Table E-61. Mean likeliness of taking an action of respondents who use a particular Minnesota lake or lakes most often by participation in fishing.

Action	N	Respondents who…[1] …fished on MN lakes during 2003	Respondents who…[1] …did not fish on MN lakes during 2003	F	η
• Vote for people who support lake protection.	615	4.08	4.19	1.210	0.044
• Support legislation or regulations that limit human use to protect the lake(s).	606	3.53	3.60	0.340	0.024
• Contribute personal time to protect the lake(s).	600	3.63	3.16	19.465***	0.178
• Contribute money to protect the lake.	590	3.47	3.13	9.062**	0.123
• Join an organization working to protect the lake(s).	598	3.39	3.04	9.717**	0.127

[1]Mean is based on the scale: 1=extremely unlikely 5=extremely likely; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-62. Mean likeliness of taking an action of respondents who use a particular Minnesota lake or lakes most often by participation in boating.

Action	N	Respondents who…[1] …boated on MN lakes during 2003	Respondents who…[1] …did not boat on MN lakes during 2003	F	η
• Vote for people who support lake protection.	615	4.08	4.22	1.803	0.054
• Support legislation or regulations that limit human use to protect the lake(s).	606	3.54	3.60	0.286	0.022
• Contribute personal time to protect the lake(s).	600	3.63	3.05	26.021***	0.204
• Contribute money to protect the lake.	590	3.50	2.95	21.240***	0.187
• Join an organization working to protect the lake(s).	598	3.38	3.00	9.582**	0.126

[1]Mean is based on the scale: 1=extremely unlikely 5=extremely likely; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-63. Mean likeliness of taking an action of respondents who use a particular Minnesota lake or lakes most often by participation in swimming.

Action	N	Respondents who…[1] …swam or waded in MN lakes during 2003	Respondents who… … did not swim or wade in MN lakes during 2003	F	η
• Vote for people who support lake protection.	615	4.12	4.09	0.059	0.010
• Support legislation or regulations that limit human use to protect the lake(s).	606	3.54	3.58	0.068	0.011
• Contribute personal time to protect the lake(s).	600	3.60	3.14	17.138***	0.167
• Contribute money to protect the lake.	590	3.45	3.12	7.535**	0.112
• Join an organization working to protect the lake(s).	598	3.35	3.11	3.806	0.080

[1]Mean is based on the scale: 1=extremely unlikely 5=extremely likely; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-64. Mean likeliness of taking an action of respondents who use a particular Minnesota lake or lakes most often by participation in waterfowl hunting.

Action	N	Respondents who…[1] …hunted waterfowl on MN lakes during 2003	Respondents who… …did not hunt waterfowl on MN lakes during 2003	F	η
• Vote for people who support lake protection.	615	4.10	4.11	0.016	0.005
• Support legislation or regulations that limit human use to protect the lake(s).	606	3.46	3.57	0.498	0.029
• Contribute personal time to protect the lake(s).	600	3.79	3.44	7.197**	0.109
• Contribute money to protect the lake.	590	3.80	3.29	13.933***	0.152
• Join an organization working to protect the lake(s).	598	3.73	3.21	13.863***	0.151

[1]Mean is based on the scale: 1=extremely unlikely 5=extremely likely; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-65. Mean likeliness of taking an action of respondents who use a particular Minnesota lake or lakes most often by participation in bird/wildlife watching.

Action	N	Respondents who…[1] …watched birds (etc.) at MN lakes during 2003	Respondents who… … did not watch birds/wildlife (etc.) at MN lakes during 2003	F	η
• Vote for people who support lake protection.	615	4.20	3.79	16.324***	0.161
• Support legislation or regulations that limit human use to protect the lake(s).	606	3.64	3.24	9.572**	0.125
• Contribute personal time to protect the lake(s).	600	3.57	3.23	8.434**	0.118
• Contribute money to protect the lake.	590	3.45	3.10	8.071**	0.116
• Join an organization working to protect the lake(s).	598	3.38	2.95	12.165***	0.141

[1]Mean is based on the scale: 1=extremely unlikely 5=extremely likely; *** p≤0.001, ** p≤0.01, * p≤0.05

Table E-66. Mean likeliness of taking an action of respondents who use a particular Minnesota lake or lakes most often by participation in enjoying the scenery.

Action	N	Respondents who…[1] …enjoyed lake scenery at MN lakes during 2003	Respondents who… …enjoyed lake scenery at MN lakes during 2003	F	η
• Vote for people who support lake protection.	615	4.14	3.48	8.764**	0.119
• Support legislation or regulations that limit human use to protect the lake(s).	606	3.58	2.77	7.867**	0.113
• Contribute personal time to protect the lake(s).	600	3.51	3.00	3.598	0.077
• Contribute money to protect the lake.	590	3.39	2.70	6.023*	0.101
• Join an organization working to protect the lake(s).	598	3.31	2.71	4.554*	0.087

[1]Mean is based on the scale: 1=extremely unlikely 5=extremely likely; *** p≤0.001, ** p≤0.01, * p≤0.05

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Appendix A: Prenotice Letter

May, 2004

«ID»

«LNAME» HOUSEHOLD
«ADDRESS»
«CITY», «ST» «ZIP»-«ZIPFOUR»

Dear «LNAME» household,

In a few days, your household will receive a questionnaire in the mail. The questionnaire is for an important research project being completed by the University of Minnesota and the Minnesota Department of Natural Resources.

The project concerns peoples' feelings about and use of Minnesota lakes and waterways.

I am writing to you in advance because we have found that many people like to know ahead of time that they will be contacted. The study is important because it will help the Minnesota Department of Natural Resources better understand how citizens feel about the lakes in the state.

In order for the results of this survey to accurately represent all adults in the state, **it is important that the questionnaire sent to your household be completed by the adult (18 years or older) who now lives there and has had the most recent birthday**.

Thank you for your time and consideration. It's only with the generous help of people like you that our research can be successful.

Sincerely,

David C. Fulton
Assistant Professor

Appendix B: First Cover Letter

June, 2004

«ID»

«LNAME» HOUSEHOLD
«ADDRESS»
«CITY», «ST» «ZIP»-«ZIPFOUR»

Dear «LNAME» household,

I am writing to ask for your help in a study about Minnesota lakes and waterways. This study is part of an effort to learn how Minnesotans feel about their lakes.

You are one of a small sample of Minnesota residents who were randomly selected to participate in this study. The quality of our results depends on responses from you and other survey recipients. In order for the results of this survey to accurately represent all adults in the state, **it is important that the questionnaire be completed by the adult (18 years or older) who now lives in your household and has had the most recent birthday.**

The results of this study will be used to help the Minnesota Department of Natural Resources (DNR) manage lakes and waterways. The DNR relies on public input to manage lands, waterways, plants, and wildlife. The DNR has contracted the University of Minnesota to conduct this survey.

Your answers on this survey are completely confidential and will be released only as summaries in which no individual's answers can be identified. When you return your completed questionnaire, your name will be deleted from the mailing list and never connected to your answers in any way. This survey is voluntary. However, you can help us by taking a few minutes to share your feelings and opinions about Minnesota lakes. If for some reason you prefer not to respond, please let us know by returning the blank questionnaire in the enclosed stamped envelope.

We hope you will take the time to fill out and return the enclosed questionnaire. Your answers will provide insight into public feelings about Minnesota lakes.

We would be happy to answer any questions you might have. Please call or e-mail Sue Schroeder, the project manager for the study at (612) 624-3479 or sas@umn.edu. Thank you in advance for taking the time to help the DNR manage our lakes. Your input is greatly appreciated!

Sincerely,

David C. Fulton, Ph.D.
Assistant Professor

Appendix C: Mailback Survey

Minnesota Lakes Survey

Spring 2004

Please complete this survey and return it in the postage-paid return envelope.

Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
1980 Folwell Avenue
St. Paul, Minnesota 55108

A. Recreating on Minnesota lakes and waterways

Q1. Please indicate how often you personally did each of the following activities in 2003 on lakes in Minnesota. ***(Please circle one response for each.)***

Activities on Lakes in 2003	Not at all	1 or 2 times	3 to 5 times	6 to 10 times	11 to 20 times	21 or more times
Fishing of all types (boat, shore, dock, ice)	0	1	2	3	4	5
Pleasure boating (motorized or unmotorized) excluding fishing from a boat	0	1	2	3	4	5
Swimming/wading	0	1	2	3	4	5
Hunting waterfowl (ducks, geese)	0	1	2	3	4	5
Bird watching, viewing wildlife, studying nature	0	1	2	3	4	5
Enjoying lake scenery	0	1	2	3	4	5

Q2. In total how many days would you say you visited lakes in Minnesota in 2003?

_____days

B. Importance of Minnesota lakes

Q3. Please indicate how much you agree or disagree with the following statements using the scale 1=strongly disagree to 5=strongly agree. ***(Please circle one response for each.)***

	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree	Don't know
Minnesota lakes have no particular importance to me.	1	2	3	4	5	9
Minnesota lakes are important to me, whether or not I use them.	1	2	3	4	5	9
Minnesota lakes are important to me because of their fish, wildlife, and other natural features.	1	2	3	4	5	9
Minnesota lakes are important to me because they offer many types of recreation.	1	2	3	4	5	9
Minnesota lakes are inviting to me.	1	2	3	4	5	9
Minnesota lakes are important to me because of their beauty and atmosphere.	1	2	3	4	5	9
Minnesota lakes must be taken care of, so that we can pass them along to future generations for their enjoyment.	1	2	3	4	5	9
Minnesota lakes are important to me because of their economic value to surrounding communities.	1	2	3	4	5	9
Minnesota lakes are important to me because they are sources of clean water.	1	2	3	4	5	9
Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1	2	3	4	5	9
Minnesota lakes are important to me because they are a source of childhood memories.	1	2	3	4	5	9
Minnesota lakes are important to me because they are quiet, natural places for personal renewal.	1	2	3	4	5	9
Minnesota lakes are important to me because they offer protection for rare, unique, or endangered plants and animals.	1	2	3	4	5	9

C. Lake health and aquatic plants

Aquatic Plants: Minnesota is home to about 150 types of aquatic plants, including a few types that are exotic species not native to the state. The questions below address ***native*** aquatic plants like water lilies, wild rice, and cattails, NOT non-native exotic species like Eurasian water milfoil and curly-leaf pondweed.

Q4. Please rate your level of familiarity with issues related to native aquatic plants and lake ecology.

- ❑ Not at all familiar
- ❑ Slightly familiar
- ❑ Moderately familiar
- ❑ Very familiar
- ❑ Extremely familiar

Q5. For each of the word pairs below, please place an "X" in the space that best expresses how you feel.

Removing native aquatic plants from lakes is:

Bad	_____:	_____:	_____:	_____:	_____:	_____:	_____	**Good**
	extremely	quite	slightly	Neither	slightly	quite	extremely	
Harmful	_____:	_____:	_____:	_____:	_____:	_____:	_____	**Beneficial**
	extremely	quite	slightly	Neither	slightly	quite	extremely	

Q6. Please rate the following items on the scale of 1=definitely false to 5=definitely true. ***(Please circle one response for each.)***

	Definitely false	Probably false	Unsure	Probably true	Definitely true	Don't know
Removal of native aquatic plants is harmful to lake health (water quality, biotic balance, etc.)	1	2	3	4	5	9
Native aquatic plants are harmful to wildlife populations (waterfowl, wading birds, amphibians, etc.)	1	2	3	4	5	9
Removal of native aquatic plants is harmful to fish populations	1	2	3	4	5	9
Native aquatic plants decrease the scenic beauty of the lake	1	2	3	4	5	9
Removal of native aquatic plants increases the value of the lake as a recreational area	1	2	3	4	5	9
Native aquatic plants reduce the economic value of the lake in the long-term	1	2	3	4	5	9
Removal of native aquatic plants increases shoreline erosion	1	2	3	4	5	9
Native aquatic plants reduce water clarity and quality	1	2	3	4	5	9

Q7. For the following statements regarding native aquatic plants, please indicate the degree to which you agree or disagree with each statement by circling the appropriate number. ***(Please circle one response for each.)***

	Strongly disagree	Mildly disagree	Neither	Mildly agree	Strongly agree	Don't know
Native aquatic plants have no importance to me.	1	2	3	4	5	9
Native aquatic plants are weeds and should be removed.	1	2	3	4	5	9
Native aquatic plants are so important they should be completely left alone.	1	2	3	4	5	9
Lakeshore property owners should be allowed to control native aquatic plants as much as they wish to improve their use of the lake.	1	2	3	4	5	9
Removal of native aquatic plants should be closely regulated.	1	2	3	4	5	9
Native aquatic plants add to the scenic beauty of lakes.	1	2	3	4	5	9
Native aquatic plants make the shoreline look messy.	1	2	3	4	5	9
Lake shorelines are more beautiful when lawns are turf grass and mowed to the edge.	1	2	3	4	5	9
Lake shorelines are more attractive when they have an abundance of native aquatic plants.	1	2	3	4	5	9
Removal of native aquatic plants is essential to maintaining the water quality and water clarity of lakes.	1	2	3	4	5	9
To improve the overall health of lakes, native aquatic plants should be removed.	1	2	3	4	5	9
Native aquatic plants serve important functions that maintain the health of lakes.	1	2	3	4	5	9
Abundant floating and emergent native aquatic plants are signs of an unhealthy lake.	1	2	3	4	5	9
Life in lakes depends on native aquatic plants.	1	2	3	4	5	9
Native aquatic plants support the economic value of lakes for tourism and recreation.	1	2	3	4	5	9
Native aquatic plants improve the quality of fishing.	1	2	3	4	5	9
Native aquatic plants improve the quality of hunting for waterfowl and other wildlife.	1	2	3	4	5	9

Q8. How much do you trust each of the following groups to make sound recommendations concerning the management of lakes and aquatic plants? *(Please circle one response for each.)*

	Do not trust at all	Trust slightly	Trust moderately	Trust greatly	Don't know
Individual lakeshore landowners	1	2	3	4	9
The State of Minnesota	1	2	3	4	9
The county government for the lake	1	2	3	4	9
Lakeshore property owner groups	1	2	3	4	9
The Minnesota Department of Natural Resources (DNR)	1	2	3	4	9
The general public	1	2	3	4	9
Lake users (recreationists, etc.)	1	2	3	4	9

Q9. How knowledgeable are you about regulations concerning aquatic plant management in Minnesota? (Please check one.)

- ❑ Not at all knowledgeable
- ❑ Slightly knowledgeable
- ❑ Moderately knowledgeable
- ❑ Very knowledgeable
- ❑ Extremely knowledgeable

Q10. How would you describe current management regulations concerning native aquatic plants in Minnesota?

- ❑ Too restrictive
- ❑ About right
- ❑ Not restrictive enough
- ❑ Don't know

D. Lake property and use

Q11. Is there a lake or lakes in Minnesota that you use most often?

- ❑ **No.** (*If no, please skip to Part E, Q14.*)
- ❑ **Yes. (*If yes, please answer Q11a.*)**

Q11a. If yes, do you own property on the lake?

- ❑ No. **(*If no, please skip to Q12.*)**
- ❑ Yes. *(If yes, please answer Q11b.)*

Q11b. How would you describe your use of the property?

- ❑ Primary residence
- ❑ Seasonal or recreational property
- ❑ Business property
- ❑ Rental property
- ❑ Other (Please describe: _____.)

Q12. How do you feel about the Minnesota lake you use most often. *(Circle one response for each.)*

	Strongly disagree	Mildly disagree	Neither	Mildly agree	Strongly agree	Don't know
It is my favorite place to be.	1	2	3	4	5	9
I feel that I can really be myself there.	1	2	3	4	5	9
I really miss it when I am away from it too long.	1	2	3	4	5	9
I feel happiest when I am there.	1	2	3	4	5	9
It is the best place to do the things I enjoy.	1	2	3	4	5	9
It reflects the type of person that I am.	1	2	3	4	5	9
For the things I enjoy doing most, no other place can compare it.	1	2	3	4	5	9
Everything about it is a reflection of me.	1	2	3	4	5	9
As far as I am concerned there are better places to be.	1	2	3	4	5	9
It is a special place for my family.	1	2	3	4	5	9
It says very little about who I am.	1	2	3	4	5	9
Many important family memories are tied to it.	1	2	3	4	5	9
It ties the generations of my family together	1	2	3	4	5	9

Q13. If the environmental quality of the lake(s) you use most often declines, how likely would you be to take the following actions? *(Please circle one response for each.)*

	Extremely unlikely	Moderately unlikely	Neither	Moderately likely	Extremely likely	Don't know
Contribute money to protect the lake(s).	1	2	3	4	5	9
Contribute personal time to protect the lake(s).	1	2	3	4	5	9
Join an organization working to protect the lake(s).	1	2	3	4	5	9
Support legislation or regulations that limit human use to protect the lake(s).	1	2	3	4	5	9
Vote for people who support lake protection.	1	2	3	4	5	9

E. Demographics

Q14. In what year were you born?

_____ **year**

Q15. How many years have you lived in Minnesota?

_____ **years**

Q16. How many years have you lived in your current residence?

_____ **years**

Q17. What is the highest level of education you have completed? ***(Check one.)***

□ **Grade school**
□ **Some high school**
□ **High school diploma or GED**
□ **Some vocational or technical school**
□ **Vocational or technical school (associate's) degree**
□ **Some college**
□ **Four-year college (bachelor's) degree**
□ **Some graduate school**
□ **Graduate (master's or doctoral) degree**

Q18. What is your gender?

- ❑ Male
- ❑ Female

Q19. What was your approximate total household income before taxes last year?

$ _____

Q20. Which of the following best describes your race? ***(Check all that apply.)***

- ❑ Caucasian/White
- ❑ African American/Black
- ❑ Asian
- ❑ Pacific Islander
- ❑ American Indian or Alaskan Native

Q21. Do you consider yourself Hispanic/Latino/Spanish? (*Check one*.)

- ❑ No
- ❑ Yes

Appendix D: Postcard Reminder

Dear Minnesotan,

You have received several mailings about a lake survey.

If you have already completed and returned the questionnaire, please accept our thanks! If you have not completed your survey, we hope you will complete it and mail it back.

Your participation is completely voluntary. If you do not wish to complete the survey, please return your blank survey in its business-reply envelope. Then we can remove your name from our mailing list.

If you have any questions about the survey please contact the project manager for the study, Sue Schroeder, at (612) 624-3479 or sas@umn.edu.

Sincerely,

David Fulton
Assistant Professor
Department of Fisheries, Wildlife and Conservation Biology

Appendix E: Cover Letter for Second Survey Mailing

June, 2004

«ID»

«FNAME» «LNAME»
«ADDRESS»
«CITY», «ST» «ZIP»-«ZIPFOUR»

Dear «FNAME» «LNAME»,

About three weeks ago we sent your household a survey about Minnesota lakes. As of today, we have not received your completed questionnaire. We realize that you may not have had time to complete it. However, we would appreciate hearing from you. If you have recently returned your survey, please disregard this letter and accept our thanks for your input.

Your response to this survey will help direct future policies related to lakes in Minnesota. We are writing to you again because the study's usefulness depends on our receiving a questionnaire from each household.

Your name was drawn through a scientific sampling process in which every household with a listed Minnesota phone number had an equal chance of being selected. Your participation in the survey is voluntary. However, in order that the results of this survey accurately represent all adults in the state, it is important that the questionnaire be completed by the adult (18 years or older) who now lives in your household and has had the most recent birthday.

In the event that your questionnaire has been misplaced, a replacement is enclosed. We would be happy to answer any questions you have about the study. Please call or e-mail call the project manager for the study, Sue Schroeder, at (612) 624-3479 or sas@fw.umn.edu.

Sincerely,

David C. Fulton, Ph.D.
Assistant Professor

Appendix F: Cover Letter and Follow-up Survey to Non-respondents

October, 2004

Dear _____,

In June and July, we sent your household several mailings about a Minnesota lakes survey we are conducting for the Minnesota Department of Natural Resources.

We are sending you this final contact because we are concerned that people who did not respond to the survey may differ from those who responded. So, we have enclosed a one-page follow up survey that includes a few questions from our original survey, and a few demographic questions. Your response to this short questionnaire will assure that our survey results are as accurate as possible.

In order that the results of this survey accurately represent all adults in the state, we ask that the questionnaire be completed by the adult (18 years or older) who now lives in your household and has had the most recent birthday.

We appreciate your willingness to consider our request as we conclude this effort to better understand how Minnesota residents feel about the state's lakes. We would be happy to answer any questions you have about the study. Please call or e-mail the project manager for the study, Sue Schroeder, at (612) 624-3479 or sas@umn.edu.

Thank you very much.

Sincerely,

David C. Fulton, Ph.D.
Assistant Professor

A. Recreating on Minnesota lakes

Q1. Please indicate how often you personally did each of the following activities in 2003 on lakes in Minnesota. ***(Please circle one response for each.)***

	Not at all	1 or 2 times	3 to 5 times	6 to 10 times	11 to 20 times	21 or more times
Fishing of all types (boat, shore, dock, ice)	0	1	2	3	4	5
Pleasure boating, do not include fishing from a boat	0	1	2	3	4	5
Swimming/wading	0	1	2	3	4	5
Hunting waterfowl (ducks, geese)	0	1	2	3	4	5
Bird watching, viewing wildlife, studying nature	0	1	2	3	4	5
Enjoying lake scenery	0	1	2	3	4	5

B. Importance of Minnesota lakes

Q2. Please indicate how much you agree or disagree with the following statements. ***(Please circle one response for each.)***

	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree	Don't know
Minnesota lakes are important to me because they offer many types of recreation.	1	2	3	4	5	9
Minnesota lakes are important to me because of their beauty and atmosphere.	1	2	3	4	5	9
Minnesota lakes are important to me because of their economic value to surrounding communities.	1	2	3	4	5	9
Minnesota lakes are important to me because they provide habitat and protection for wildlife and fish.	1	2	3	4	5	9

C. Lake health and aquatic plants.

Aquatic Plants: Minnesota is home to about 150 types of aquatic plants, including a few types that are exotic species not native to the state. The questions below address ***native*** aquatic plants like water lilies, wild rice, and cattails, NOT non-native exotic species like Eurasian water milfoil and curly-leaf pondweed.

Q3. Please rate your level of familiarity with issues related to native aquatic plants and lake ecology.

- ❑ Not at all familiar
- ❑ Slightly familiar
- ❑ Moderately familiar
- ❑ Very familiar
- ❑ Extremely familiar

Q4. For each of the word pairs below, please place an "X" in the space that best expresses how you feel.

Removing native aquatic plants from lakes is:

Bad	_____:	_____:	_____:	_____:	_____:	_____:	_____	**Good**
	extremely	quite	slightly	neither	slightly	quite	extremely	
Harmful	_____:	_____:	_____:	_____:	_____:	_____:	_____	**Beneficial**
	extremely	quite	slightly	neither	slightly	quite	extremely	

Q5. How knowledgeable are you about regulations concerning aquatic plant management in Minnesota? *(Please check one.)*

- ❑ Not at all knowledgeable
- ❑ Slightly knowledgeable
- ❑ Moderately knowledgeable
- ❑ Very knowledgeable
- ❑ Extremely knowledgeable

Q6. How would you describe current management regulations concerning native aquatic plants in Minnesota? *(Please check one.)*

- ❑ Too restrictive
- ❑ About right
- ❑ Not restrictive enough
- ❑ Don't know

Q7. Is there a lake or lakes in Minnesota that you use most often?

- ❑ No. (*If no, please skip to Part D, Q8.*)
- ❑ Yes. (*If yes, please answer Q7a.*)

Q7a. If yes, do you own property on the lake?

- ❑ No.
- ❑ Yes.

D. Demographic information

Q8. In what year were you born?

_____ **year**

Q9. How many years have you lived in Minnesota?

_____ **years**

Q10. What is the highest level of education you have completed? *(Check one.)*

- □ Grade school
- □ Some high school
- □ High school diploma or GED
- □ Some vocational or technical school
- □ Vocational or technical school (associate's) degree
- □ Some college
- □ Four-year college (bachelor's) degree
- □ Some graduate school
- □ Graduate (master's or doctoral) degree

Q11. What is your gender?

- ❑ Male
- ❑ Female

Appendix G: 2000 Census Data Used for Weighting Sample

	N	%
Male (18 years and over)	1,775,400	48.87%
Female(18 years and over)	1,857,185	51.13%
Total	3,632,585	100%

AGE CATS EXCLUDING 19 AND UNDER	N	%
20 to 24 years	322,483	9.2544%
25 to 34 years	673,138	19.3173%
35 to 44 years	824,182	23.6519%
45 to 54 years	665,696	19.1038%
55 to 59 years	226,857	6.5102%
60 to 64 years	178,012	5.1085%
65 to 74 years	295,825	8.4894%
75 to 84 years	212,840	6.1080%
85 years and over	85,601	2.4565%
	3,484,634	100.0000%
Median age (years)	35.4	