

**A Study of Landowner Perceptions and Opinions of
Aquatic Plant Management in Minnesota Lakes**

Project Report

**Submitted to:
Minnesota Department of Natural Resources**

**By:
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) 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

- 2) 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

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 (MnDNR) 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 MnDNR teamed with the University of Minnesota Cooperative Fish and Wildlife Research Unit to better understand landowner opinions, perspectives, and actions.

The population of interest in this study are lakeshore landowners on lakes designated as fisheries lakes (n = 3029) within Minnesota. It is estimated that over 180,000 individuals own lakeshore property on lakes designated as fisheries lakes in the state of Minnesota. Each landowner decides how to manage the aquatic plants along his/her shoreline. No data were collected from the estimated 20,000 to 45,000 property owners on the 8,000+ lakes not designated as fisheries lakes.

This report covers the findings of a landowner survey of private property owners on Minnesota's fisheries lakes 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:

- property characteristics,
- aquatic plant removal,
- lake activities,
- opinions on the value of aquatic plants and value and importance of lakeshore property,
- perceptions of lake conditions,
- subjective norms, behavior evaluations, and removal behaviors,
- awareness of consequences of plant removal,
- opinions regarding responsibility for managing aquatic plants, and
- landowner characteristics.

Methods

Data presented in this report were drawn from mailback questionnaires sent in June–August 2004 to individuals who, based on county property records, owned lakeshore property in Minnesota on one of 2,964 fisheries lakes in the state. These data represent approximately 180,000 lakeshore property owners on fisheries lakes, but do not represent an estimated 20,000 to 45,000 lakeshore property owners on lakes that are not suitable for fisheries management. Prior to selecting study participants, all fisheries lakes in Minnesota were categorized into four ecological types. The ecotypes were based primarily on lake productivity and are described as follows:

Ecotype 1—low productivity lakes, large and small, located in the northeast arrowhead region of the state.

Ecotype 2—large, moderately productive lakes with abundant walleye and sunfish populations generally located in the north central part of the state.

Ecotype 3—small productive lakes generally located from Bemidji southeast to the Twin Cities, MN.

Ecotype 4—larger productive lakes generally located from Willmar, MN north and east to Mille Lacs, MN.

Within these four ecotypes, lakes were stratified based on size (small and large) and development type (recreational/natural and general development). We randomly selected lakes within each stratum and obtained ownership information for all properties on the 242 lakes that were selected. A random sample of property owners was selected from each lake, and questionnaires were mailed to each of the 5,550 households selected. A total of 3115 people replied providing (after correcting for deceased and otherwise unreachable respondents) a 60% response rate. Data were weighted to accurately reflect statewide and ecotype distribution of property owners within lake strata. The data provide estimates within $\pm 2\%$ at the 95% confidence level statewide, and $\pm 4\%$ at the 95% confidence level within each lake ecotype. Highlights of the results within each study topic are provided below.

Property characteristics

- Median length of property ownership was 15 years.
- Almost all property was used as a primary residence (50%) or as a seasonal/recreational residence (49%).
- Seventy-five percent of respondents owned less than 200 feet of shoreline, with a median of 130 feet.
- While natural vegetation was the most common shoreline type, more than 25% of property owners indicated that sandy beach, rip rap, and mowed turf grass represented at least 40% of their shoreline.
- On average, properties in the Metro Twin Cities area had larger percentages of their shoreline in rip rap, seawall, and mowed turf grass.

Aquatic Plant Removal Actions

- Seventy-six percent of respondents indicated there were aquatic plants in the lake next to their property.

- About 30% of all property owners kept an area free of aquatic plants, or 41% of the property owners that reported having aquatic plants in the lake in front of their property.
- A larger percentage of property owners in the 10-county Twin Cities metropolitan area removed aquatic plants (51% who have aquatic plants in their lake, or 41% of all metro lakeshore property owners).
- Among respondents who removed aquatic plants, 8 in 10 removed submerged plants while 4 in 10 removed floating-leaf and emergent plants. Metro respondents were more likely to remove emergent plants (52%) than were other respondents (42%).
- The most common reasons for removing aquatic plants were swimming (82%), boating (58%) and “to make the shoreline look better” (35%).
- About 10% of those that removed aquatic plants indicated they removed plants from >50% of their shoreline property (~3% of all shoreline property owners).
- On average, respondents who removed aquatic plants removed an area of 1762±180 sq.ft. with a median of 800 sq. ft.
- Approximately 18% of those who removed plants (or 6% of all shoreline property owners) reported they removed more than 2500 square feet of aquatic plants. Among Metro respondents, 27% (or 11% of all metro shoreline property owners) reported removing aquatic plants from an area > 2500 sq. ft.
- The most common aquatic plant removal activity reported was manual removal of submerged plants (76%) while 32% indicated they had removed emergent plants.
- Metro area respondents (32%) were much more likely to use herbicide than Greater Minnesota respondents and were much more likely to hire someone to remove aquatic plants (30% vs. 10%).

Lake Activities

- Respondents were asked how many times during the past year they participated in certain activities on the lake where they own property. Most lakeshore owners reported participating in fishing from a motorized boat (74%), fishing from a dock or pier (73%), pleasure boating (motorized) (78%), canoeing/kayaking (53%), birding watching/viewing wildlife (88%), swimming/wading (82%), and enjoying lake scenery (98%) at least once during the year.
- Participation in activities varied across the lake ecotype with fishing from a boat (motorized and non-motorized), canoeing, and swimming/wading less likely in ecotype 4 lakes.

- Metro residents were less likely to ice fish, fish from a motorized boat, pleasure boat, and swim than their Greater Minnesota counterparts.

Importance of Aquatic Plants and Attachment to Lake Properties

- Overall, a slight majority of lakeshore property owners statewide viewed aquatic plants as valuable and favored some protection of aquatic plants.
- Most property owners also believed native aquatic plants were aesthetically appealing, had value for fish and wildlife and were beneficial to lake ecosystems.
- Respondents were evenly divided on whether or not they thought aquatic plants contributed to the economic value of lakeshore property.
- Respondents on Ecotype 4 lakes generally had a lower appreciation of the aesthetic value of aquatic plants.
- Metro area respondents reported lower protection and aesthetic values for aquatic plants.
- Most respondents reported strong emotional, family and place attachment to their lake properties, with no major differences across ecotypes. Metro respondents, however, indicated lower levels of attachment to their properties compared to Greater Minnesota Respondents.

Perceptions of Lake Conditions

- Nine out of 10 respondents reported the scenic quality of lake and shoreland areas as good or excellent, while 3 out of 4 reported the condition of the land 0-1000ft. away from the shoreline, overall condition of lake and shoreline areas as good or excellent. Two out of 3 indicated that water quality and clarity were good or excellent, while only one-half reported fishing to be good or excellent.
- Except for fishing, the perceptions of lake conditions decreased from ecotype 1 to ecotype 4 lakes.
- About 30% of respondents believed there was too much motorized watercraft and shoreland housing on the lake they live on, while 45% believed the number of keeper size fish was too little. Fewer than 20% believed waterfowl numbers were too small.
- One in 5 respondents believed there was too much emergent aquatic vegetation and one-third thought there was too much floating algae, while almost half (44%) believed there was too much submerged vegetation.
- Less than 20% reported that there were “too little” aquatic or shoreline plants.

- Respondents from ecotype 3 and 4 lakes, were more likely to believe there was “too much” submerged vegetation in the lakes, and Metro respondents were more likely than Greater Minnesota respondents to believe there was “too much” emergent or submerged vegetation in the lakes.
- Metro respondents and respondents on ecotype 4 lakes, were much more likely to perceive a problem with invasive, exotic species such as loosestrife or Eurasian milfoil, and respondents on large recreational/natural ecotype 4 lakes reported the most concern with these problems.
- Statewide, 60% of respondents believed shoreland housing and motorized watercraft had increased since they owned their lake shore property. In general, 20-25% reported that the condition and water quality of the lakes had decreased during this time period, and one-third reported declines in fishing.
- One-third of respondents indicated an increase in submerged plants since owning their property, almost 30% indicated an increase in floating algae, and 16% reported an increase in invasive exotics such as Eurasian milfoil.
- About 15% reported an increase in emergent plants, while another 15% reported a decrease in emergent plants.
- About 1 in 4 respondents reported that natural shoreline vegetation had declined.
- Respondents on ecotype 4 lakes were more likely to report an increase in submerged plants and invasive exotics, and Metro respondents were much more likely than Greater Minnesota respondents to report increases in submerged plants, emergent plants, invasive exotics, and floating algae.

Factors Influencing Aquatic Plant Removal Behavior

- The Theory of Reasoned Action was used to guide collection of information reported in this section (see Section F).
- Overall, about one-third of respondents viewed aquatic plant removal as positive, one-third viewed it as negative, and one-third were neutral.
- Respondents’ beliefs about whether or not the people important to them would want them to remove aquatic plants were similarly divided.
- Attitudes and subjective norms were both significant predictors of aquatic plant removal, but together explained only 27% of the variance in aquatic plant removal which is lower than is usually obtained in applications of the Theory of Reasoned Action.
- The lack of prediction is likely due to the large percentage of respondents who were “neutral” toward aquatic plant removal.

- The evaluative beliefs that were statistically significant in influencing aquatic plant removal included that aquatic plant removal would:
 - decrease the natural appearance of the lake,
 - decrease the lake’s water quality,
 - improve swimming conditions,
 - remove native plants,
 - cause erosion in the lake,
 - remove fish and wildlife habitat from the lake, and
 - harm the lake’s ecosystem.

It should be noted that while statistically significant, none of these beliefs predicted more than ~10% of differences in aquatic plant removal.

- Groups that were identified as influencing aquatic plant removal included:
 - Family members
 - Minnesota DNR
- More than two-thirds of respondents were aware that removing aquatic plants could be harmful to a lake and the fish and wildlife in the lake, and these beliefs had a small but statistically significant influence on discouraging plant removal.
- One-half of respondents believed that removing aquatic plants enhances recreation in the lake, about 1 in 4 believed native aquatic plants decrease the aesthetic beauty of a lake and both of these beliefs slightly encouraged plant removal.
- Findings from the Theory of Reasoned Action provide direction for communication and education efforts to change aquatic plant removal behavior.

Socio-demographic and Household Characteristics of Landowners

- Landowners were asked a number of questions about specific socio-demographic characteristics including gender, age, race, ethnicity, education, number of individuals in household, and income. Socio-demographic characteristic information helps managers identify landowner needs related to educational programming, communication efforts, and other services.
- Approximately 72% of respondents were male and 28% were female. The median age of respondents was approximately 58 years.
- Landowners were not a diverse group in ethnicity or race. About 98% of respondents were white. Almost all respondents (97.5%) reported that they had at least a high school degree or equivalent, and almost 50 percent of all respondents had a college degree. The reported median household income of respondents was \$75,000.

- On average respondents reported their households consisted of 2 adults, with about 15% of respondents reporting any children (0-12 years), or teenagers (13-17 years) in the household. Approximately 60% of respondents reported having grandchildren.