VALUING ITASCA COUNTY'S LAKES

Itasca County is home to over 1,000 lakes with water quality that ranks among the highest in Minnesota. Maintenance of the county's high quality lakes requires careful monitoring and management decisions, as well as understanding of the economic value generated by the resource base. With funds awarded by the Blandin Foundation, the Itasca Water Legacy Partnership proposed a study using well-accepted methods developed in the field of environmental economics to focus on the latter of these needs.

University of Wisconsin-Madison economist Dr. Daniel Phaneuf agreed to direct a study that would quantify the contribution of Itasca County's lakes and lake water quality to residents and non-residents well-being. He used a survey of Itasca County residents to measure residents' recreation use of the county's lakes, their knowledge of water quality issues, and the importance they place on preserving the county's high water quality. Dr. Phaneuf received 901 completed surveys with a response rate of 48.4 percent.

Dr. Phaneuf's results demonstrate that lakes in Itasca County provide recreation and aesthetic services to residents and visitors alike. The economic value provided by these services is reflected in the trips residents and visitors make to the county's lakes, the income earning opportunities the lakes provide, and the desire among county residents to provide future generations with access to the same high quality resource. Measurement of this economic value requires an understanding of the 'willingness to pay' by residents and nonresidents for the continued maintenance of a high quality resource.

Willingness to pay (WTP) is a concept economists use to translate abstract concepts such as preference, attitudes, and beliefs into a concrete and comparable figure. It provides a measure of what a person would give up (expressed in terms of money that cannot be spent on other things) in order to have the item under study. Importantly, the concept of WTP is distinct from who actually pays. The survey was used to measure peoples' WTP for (a) recreation access to lakes in the county; and (b) maintenance of water quality in the county.

Lake Usage

The first part of the survey focused on gathering information on respondents' use of lakes in the county. To begin, individuals indicated if they had made any day trip visits to lakes in Itasca County during 2012 and 2013. The survey described a day trip as involving travel of at least 10 minutes to reach the destination, meaning lakefront property owners were not to count uses of their home lake as trips.

Respondents were then asked to report the visits that they made in 2012 and 2013 to a list of 69 of the major water bodies in the county. They were also given the chance to write in the names of non-listed lakes that they had visited. As summarized in table 1, the data show that Itasca County residents are avid lake users, with three quarters of respondents reporting a lake visit. By way of comparison the 2009, the National Survey of Recreation and the Environment, a nationally representative survey, found that 36 percent of respondents went fishing, 42 percent went boating, 21 percent used a personal watercraft, and 13 percent hunted. Thus by national standards residents of Itasca County are unusual in their high rate of water-based, and more generally outdoor, recreation

Table 1: Lake visits by Itasca County residents

year	mean	std. dev.	median	percent > 0
trips in 2012	16.25	35.81	5	76%
trips in 2013	14.14	33.49	4	73%

Among the lakes listed in the survey, Pokegama Lake received the highest frequency of visitation in 2013, with 36 percent of respondents reporting having made a trip to the lake. Other lakes receiving a high percent of respondent visits include Trout Lake (Coleraine) at 14 percent, Cut Foot Sioux Lake at 12 percent, Deer Lake (Deer River) at 11 percent, and Bowstring Lake at 11 percent.

The survey also asked people to report on their activities and group composition when visiting lakes in the county. Table 2 reports participation levels in the various activities. Since people could select more than one activity, the percentages do not add to one hundred. In terms of group composition, nearly half (45 percent) of respondents reported that a typical visit included other adults but no children, eight percent reported visiting alone, and 47 percent typically visited with both children and other adults.

Table 2: Activities by Itasca County residents on lake visits

Activity	percent yes
Swimming or playing in the water	46%
Fishing or hunting	57%
Motorized boating activities such as waterskiing, jet skiing, or tubing	27%
Non-motorized boating activities such as sailing, canoeing, or kayaking	21%
Nature appreciation of wildlife viewing	53%
Relaxing on or near the water	62%
Using walking trails or other near-shore facilities	33%

Attitudes and Beliefs

Following the recreation trip section the survey solicited information on residents' attitudes and beliefs about water quality in the county. These questions revealed that the population is relatively familiar with water quality issues and that there is an appreciation for the fact that water quality in the area is currently high. For example, table 3 shows that a high percentage of respondents are at least somewhat familiar with water quality issues, while table 4 on the next page provides a listing of the water quality dimensions that people thought were most important.

In order to value a change in water quality it is necessary to establish a consistent baseline. As part of this the survey asked people to rate the water quality in the lake they most recently visited according to three qualitative levels. Table 5 on the next page summarizes answers to this question. The figures support the supposition that county residents have a good appreciation for the area's high lake water quality.

Table 3: Water quality in northern Minnesota

How familiar are you with water quality issues in northern Minnesota lakes?	Percent selecting
Very familiar	20%
Somewhat familiar	62%
Not familiar	18%

Table 4: Importance of water quality attributes

Which of the water quality indicators listed above is most important to you?	Percent selecting
Water clarity	23%
Invasive species	30%
Health of fish populations	29%
Weed/algae growth	18%

Table 5: Water quality rating at lake most recently visited

How would you rate the quality of water in the lake you most recently visited ?	Percent selecting
Good	62%
Fair	35%
Poor	3%

Recreation Analysis

A common way to measure the willingness to pay for recreation resources is to examine the travel costs that people bear when driving to a recreation destination. The travel costs include out of pocket expenses such as fuel and vehicle depreciation, as well as the implicit value of travel time. The survey data on residents' visits to the county's lakes was matched to the travel distance and time from each respondent's home to each of the 69 major lakes named in the survey. Analysis of these matched variables suggests that Itasca residents value the county's lakes for recreation purposes at a rate of $49 million annually. An auxiliary intercept survey of visitors to the county conducted in 2012 suggests that visitors enjoy an additional $34 million worth of benefits from their recreation visits. Together the recreation services provided by the county's major lakes are worth nearly $85 million per year, which is equivalent to approximately 12 percent of aggregate county income per year.

Water Quality Changes

To understand residents' willingness to support efforts to preserve water quality in the county the survey used the 'contingent valuation' method. Respondents were reminded that the county currently enjoys high water quality levels, and given a baseline distribution. They were then asked to consider that water quality could deteriorate in the future without additional actions. Figure 1 shows the information that was presented to respondents.

Figure 1: Baseline and changed water quality

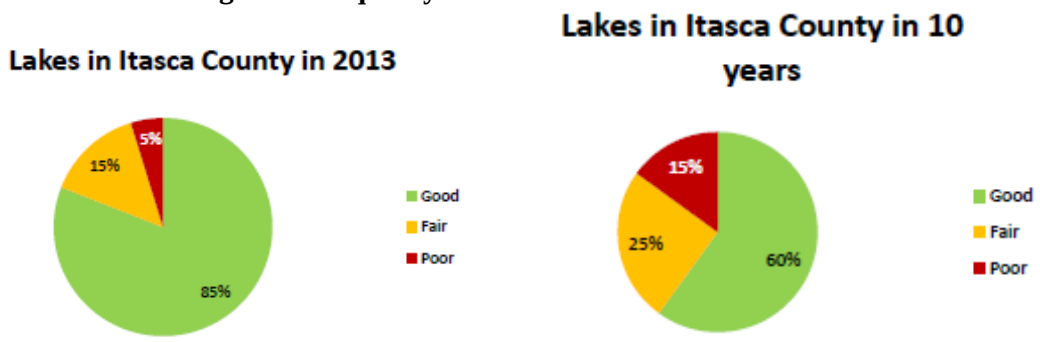

Table 6: Rating the effectiveness of different policies and practice

Which of the following rules/plans would most effectively protect water quality?	Percent selecting
New construction rules	12%
Septic tank maintenance	36%
Lake smart landscapes	21%
Invasive species outreach	31%

Respondents were then asked to consider a public initiative that would maintain today's high water quality using conservation methods of the types listed in table 6. To familiarize people with the possible methods they were asked to report their beliefs about the potential effectiveness of each option.

Contingent Valuation

The contingent valuation method uses a hypothetical referendum format to understand if a sample of people would support a new program in exchange for some addition to their cost of living. In the Itasca County survey respondents were asked if they would vote yes or no on the initiative described above, conditional on knowing that their utility bills would rise by a specified amount in order to pay for the initiative. The method is based on the notion that people will only vote 'yes' for the program if they perceive the benefits it provides to be greater than their personal cost. Thus a yes vote signals that their WTP for the program is larger than the increase in their utility bill. Table 7 provides a summary of how the sample voted in the hypothetical referendum.

Table 7: Percentage of sample voting yes by cost amounts

Annual Increase in Utility Bill	Percent voting 'yes'
$36	68%
$72	68%
$120	57%
$216	52%
$360	39%

Analysis of the voting data shows that county residents are willing to pay at least $10 million per year (nearly 1.5 percent of total county income) to prevent a 20 percent decrease in future water quality, relative to today's high level. This number is notable in that it does not reflect changes in the existence or availability of lakes for recreation; rather, it suggests that high water quality in the county provides substantial economic value by augmenting the appeal of recreation access and through more general channels such as preservation and bequest motives.

Implications

Overall the findings from this study show that Itasca County residents attach significant value to their endowment of high quality lakes, and that the lakes provide economic benefits at a magnitude that ranks them among the major sources of well-being in the county. Care needs to be taken to ensure that this unique resource is managed in a way that allows these large and widely distributed economic benefit flows to continue unabated in the future.