

Willingness to Pay for Clear Lake Cleanup

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The water quality in Iowa's lakes has been a hot topic lately. Concerns about the water quality in many of the state's lakes have brought increased attention to the value of the lakes as a recreational resource. One lake that has experienced recent water quality problems, as well as the accompanying publicity, is Clear Lake, located in Cerro Gordo County.

In 2000, the Iowa Department of Natural Resources and the Clear Lake Enhancement and Restoration (CLEAR) Project, composed of Clear Lake citizens and municipal officials, initiated a comprehensive study of water quality at Clear Lake. The purpose of the study was to determine the source and extent of the damage and present different restoration alternatives to improve the conditions at the lake. Iowa State University departments involved in the project included animal ecology, agronomy, economics, geology, and landscape architecture.

THE SURVEY

The authors were asked to do a valuation, or an investigation of the value that visitors and residents place on preservation and/or improvements in water quality. The monetary value of water quality improvements at Clear Lake can be measured using the economic concept of "maximum willingness to pay." The maximum amount people are willing to pay for a good measures the value of that good, in that it represents the value of other



goods and services that they are willing to forgo in order to acquire or preserve the good. Thus, estimates of the willingness to pay to improve water quality can be a powerful public policy tool and educational resource.

Data for the valuation portion of the study was gathered through the use of a survey conducted throughout the winter and spring of 2000/01. The survey was sent to approximately 1,000 people who had used the lake in the summer of 2000, as well as 900 residents of the town of Clear Lake.

Since valuing changes in water quality was the focus of the survey, it was necessary to describe the current water quality for the respondent. Current water quality was summarized in a table containing information about water clarity (objects distinguishable 6 inches to 1 foot under water), algae blooms (10 to 12 per year), water color (bright green to brown), water odor (mild odor, occasionally strong), bacteria presence (possible short-term swim advisories), and fish populations (low diversity, but good walleye population due to cool water and lack of competition).

Respondents were presented with various plans, each describing a different overall condition of the lake as defined by the previously described attributes, and were asked about their willingness to pay for each plan. Plan A described a decrease in water quality, while Plan B described an increase in water quality.

In addition to the valuation questions, the survey also contained questions pertaining to lake usage, the respondents' support for various projects for improving water quality, their opinions concerning various land use changes, and the water quality attributes most important to them.

SURVEY RESULTS

On average, visitors reported high usage of Clear Lake between November 1999 and October 2000. The average total number of trips taken was 6.6. Of those trips, an average of 2.67 were multiple-day visits (that is, the respondents spent at least one night in or around Clear Lake). Respondents said they expected to make an average of 6.63 trips to Clear Lake over the next year. Figure 1 shows the average percentage of time devoted to various activities reported by respondents.

In order to get an idea of the relative importance of various water quality characteristics, respondents were also asked to rank the importance of lake characteristics listed in Figure 2 (allocating 100 importance points among the characteristics). The average point allocation is shown for both visitors and residents. Safety from bacterial contamination is the most important characteristic for both visitors and local residents. As expected, those characteristics associated with water recreation are slightly more important to visitors, while water clarity and lack of water odor are slightly more important to local residents.

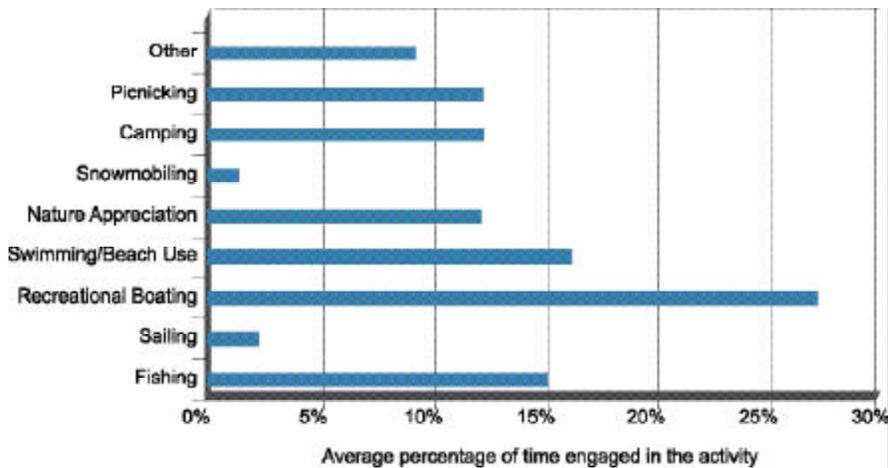


FIGURE 1. CLEAR LAKE ACTIVITIES

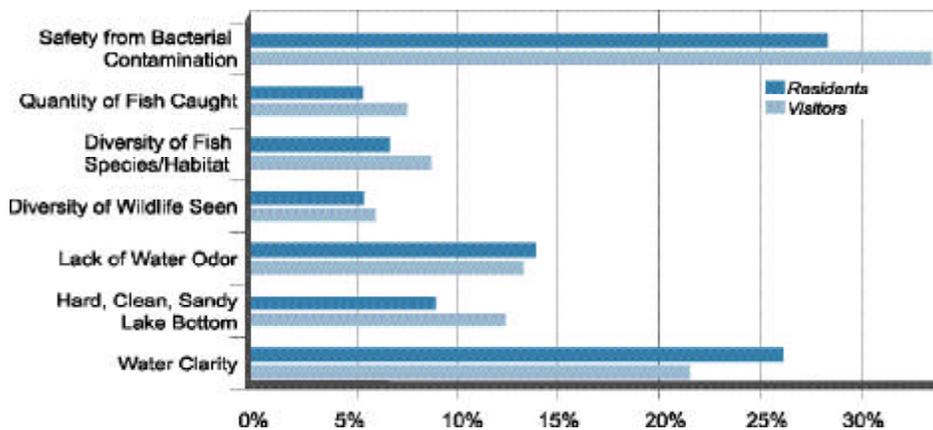


FIGURE 2. IMPORTANCE POINTS

Respondents were also asked about their opinions regarding various water quality projects and land use changes. In general, both visitors and local residents supported, or were indifferent to, projects and changes to improve water quality. The issue that generated the most opposition was the institution of non-motor boat days. Approximately 27 percent of visitors surveyed supported non-motor boat days, with 45 percent of visitors opposing them (the remaining 28 percent were indifferent). Among local residents, 45 percent supported non-motor boat days, with 32 percent opposing them.

While not surprising, this result highlights the conflicting uses of the

lake. Almost half of the visitors, who use the lake primarily as a recreational resource, opposed this restriction to the use of the lake. On the other hand, almost half of local residents, who live in close proximity to the lake and its attributes, supported the restriction.

As described earlier, the main goal of the survey was to estimate the value that both visitors and local residents place on the preservation and/or restoration of Clear Lake. The first valuation scenario was entitled Plan A. The description of the plan stated that if nothing is done to improve the water quality of the lake, it is likely to deteriorate over the next decade. Specifically, respondents were told to suppose that the condi-

tions at Clear Lake deteriorated to a water clarity of objects distinguishable one inch to five inches under water, constant algae blooms, fluorescent green water, constant strong water odor, frequent swim advisories and/or beach closings, and low fish diversity, with mostly rough fish.

Respondents were asked whether they were willing to pay \$B (B was varied across respondents) to avoid this deterioration in water quality. Based on the data gathered from this question, the average willingness to pay was estimated to be about \$104 per visitor and \$568 per local resident. The significantly higher value for local residents is not surprising, given their continuous exposure to the lake and its attributes.

While Plan A focused on the respondents' willingness to pay to avoid a deterioration in water quality, Plan B focused on willingness to pay to actively improve water quality. Two versions of Plan B were created. The first described a program that would result in a small improvement in water quality over the next five to ten years, while the second described a program that would result in a large improvement in water quality over the next 10 to 20 years.

The low quality improvement scenario included objects distinguishable two to four feet under water, six to eight algae blooms per year, green to brown water, occasional mild odor, occasional swim advisories, and low fish diversity with a good walleye population. Based on the data gathered from the low quality version of Plan B, visitors would, on average, be willing to pay approximately \$85 in support of the low quality improvement described, while local residents would, on average, be willing to pay approximately \$550 in support of the low quality improvement. The fact that these values are actually lower than the values estimated for willingness to pay to avoid the deteriorated water quality scenario described in Plan A,

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though not statistically different, indicates that both visitors and local residents are willing to pay little, if anything, for modest improvements.

The high quality improvement scenario included objects distinguishable 10 to 12 feet under water, 0 to 1 algae bloom per year, blue water, no odor, no swim advisories, and highly diverse fish populations. Based on the data gathered from the high quality version of Plan B, it is estimated that visitors would, on average, be willing to pay approximately \$425 in support of the high quality improvement. This is substantially more than visitors were willing to pay to avoid deterioration (\$104) and for the low quality improvement (\$85).

Respondents also indicated that different levels of water quality would impact the number of trips taken to the lake. Visitors said that they took an average of 6.60 trips between November 1999 and October 2000. The response to the decreased water quality described in

Plan A is dramatic. With the decrease in water quality, visitors would take an average of about two trips. Visitors also responded to the higher water quality scenarios by predicting that they would increase the number of trips they would take. With the low quality improvement, respondents would take an average of 7.03 trips, while with the high quality improvement respondents would take an average of 10.32 trips.

CHOICES BASED ON VALUES

Clear Lake is very important as a recreational resource, with visitors reporting high, persistent usage of the lake. Both visitors and residents indicated a high willingness to pay to avoid further deterioration of the lake. When asked about their willingness to pay for improvement, respondents indicated that they were willing to pay only moderate amounts for a low quality improvement to the lake, but they were willing to pay substantially more for a significant quality improvement to the conditions at the lake. This strong preference for the high qual-

ity improvement over the low quality improvement is also borne out by the number of trips visitors expect to take under each scenario.

The diagnostic portion of the Clear Lake project was concluded in spring of 2001. Results of this segment of the study were presented at a public meeting held in the town of Clear Lake. Results will be published in the *Clear Lake Diagnostic Report*. Suggestions for possible projects to improve water quality are currently being developed.

This project serves as an example of how survey methods can be used to generate willingness to pay estimates. These value estimates can be an important tool for decisionmakers in Iowa's communities as they confront their own environmental issues and questions. For more information on the Clear Lake project, contact the authors. The full report, "Valuing Preservation and Improvements of Water Quality in Clear Lake," (CARD Staff Report 01-SR 94) is available at www.card.iastate.edu, or by calling 515-294-7519. ♦

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