

Article #: 82

Title: Randomly Drawn Opportunity Sets in a Random Utility Model of Lake Recreation

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Abstract:

This paper uses the Random Utility Model to estimate lake recreation demand in Wisconsin. This model is useful when there are a large number of available sites to a recreator, making substitution between sites an important part of the decision. However, to deal with exceedingly large numbers of sites that even this model cannot handle (as Wisconsin has thousands of lakes), randomly drawn opportunity sets of sites are taken from the full set, as is the case in this paper. The application to lake recreation in Wisconsin considers four different user groups: boaters, anglers, swimmers, and viewers. Water quality is measured in level of dissolved oxygen and clarity of water, which are commonly used and considered good indicators of water quality. The data used were previously studied by Caulkins and [Caulkins, Bishop, and Bouwes](#) derived from a random phone survey on Wisconsin residents in 1978.

The study finds that people are more likely to visit cheaper, larger, and cleaner lakes with commercial facilities nearby, having relatively easy access, and are located in the north. A welfare analysis is conducted for two scenarios:

- Improving water quality at all lakes to a *low standard* where none have levels of dissolved oxygen that reach zero and the lake is void of life.
- Improving water quality at all lakes to a *high standard* where dissolved oxygen and clarity is maintained at desirable level.

At the low standard, the average value per choice occasion (value per visit) is \$0.83 for swimming, \$0.50 for fishing, \$0.19 for boating, and \$0.15 for viewing. These values remain largely the same at various sample sizes of different lakes. At the high standard, the average value per choice occasion (value per visit) is \$5.82 for swimming, \$5.53 for viewing, \$4.22 for boating, and \$0.94 for fishing. The wide variability between different sample sizes in the high standard of improvement can be attributed to the fact that this improvement level would affect 90% of all lakes where the low standard would only affect 25% of all lakes so it is more sensitive to changes in number of lakes in the sample.