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Title: Procedures in Estimating Benefits of Water Quality Change
Authors: Nicolaas W. Bouwes, Sr. and Robert Schneider
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Abstract:

This study starts with a hypothetical focus on Pike Lake, Wisconsin and its rapidly deteriorating water quality due to storm sewers depositing large nutrient loads directly into the lake. This decline can be prevented by a storm sewer diversion system that can be constructed with a fixed cost of $175,000, so the resource manager must determine if the benefits derived by preserving a high level of water quality justifies the project cost.
Specifically, this paper seeks to present a method to estimate water quality change by:

1. Presenting a theoretical basis of measuring value of an environmental resource.
2. Establishing a relationship between objective measures of water quality and subjective measures used by lake users.
3. Presenting a model that incorporates the subjective measures of recreators.

The theoretical basis behind measuring environmental quality is that the benefits of a quality change in a public good (such as water quality) can be derived from information on the demand of the private good (such as number of visits). Estimating the effect of changing water quality on the value of a recreational resource depends on a systematic relationship between the objective measures of water quality used by scientists and lake researchers (such as turbidity, dissolved oxygen, and BOD in parts per million) and the subjective rating of water quality as perceived by lake users. This paper utilizes Uttormark's Lake Condition Index (LCI), which was developed to classify all Wisconsin lakes larger than 100 acres.

Using survey data collected from Pike Lake, the number of visitors is used to determine the resource value of Pike Lake for that year. Then, using various estimated values based on the LCI quality ratings, different resource values can be determined and the difference between these values represents the estimated benefits of water quality improvement (or cost of water quality decline).