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### Protecting Water Supply Quality through Watershed Planning and Management

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## **FY 2006 WRRC Annual Report**

**Title:** “Protecting Water Supply Quality through Watershed Planning and Management”

**Principal Investigator:** John M. Halstead, Department of Resource Economics and Development, University of New Hampshire

### **1. Problem**

Management plans for natural resources can be seen as multi-attribute goods that involve many different interest groups (including specific stakeholders, experts, and public citizens) and numerous decision criteria. In recent years it has become more accepted that the management of scarce or sensitive natural resources requires both expert and public input. The former provides a basis for understanding natural systems and forecasting the likely outcomes of different policy or management options, while the latter is necessary to ensure that public values and concerns are incorporated in management alternatives and that local knowledge is considered. This research is part of a larger natural resource management project in which there are very structured procedures for the involvement of experts. However, the public and stakeholder involvement methods were much less developed. Much of the research on public participation in environmental decision-making states that traditional methods of public hearings and public comment periods are not effective on their own as a means for involving these groups in the decision process.

With increasing population and development comes increased demand for water by all members of society including businesses, landowners, and local citizens. As with most environmental policy issues, balancing competing demands of all river water users can often be contentious and confrontational. The state of New Hampshire has recognized the need to address the challenge of river management and in 2002, a broad coalition of New Hampshire business and conservation interests joined together to enact compromise legislation which

became Chapter 278, Laws of 2002 (from House Bill 1449-A). The legislation calls for a pilot program for instream flow protection on two of the fourteen designated rivers - the Lamprey River in the coastal watershed and the Souhegan River in the Merrimack watershed. In order to manage important water resources. The Instream Flow Study is a highly technical process that involves engineers, hydrologists, and biologists. However, there is limited involvement of public and stakeholder values in the study.

## **2. Objectives**

This research developed a management model for assessing the needs and values of water users and watershed residents. The objective was to create and implement a decision analytic approach to river management that involves stakeholders and citizens with experts. To maintain the health and maximal functionality of a scarce resource, states across America are developing water management plans.. This research set out to create a framework for structuring a water management plan that includes expert, stakeholder, and public opinions while providing information to and offering recommendations for the Lamprey Instream Flow Study and Water Management Plan development. In the pages to come, recommendations for a more balanced, structured, and inclusive water management process will be made based upon research findings.

## **3. Methods**

A series of social science research methods, including interviews and two survey tools, were used to involve the public and stakeholders in the process while eliciting their values about the river. Interviews focused on gaining local knowledge about how stakeholders (those that were designated by the New Hampshire Department of Environmental Services as affected water users, affected dam owners, and others including watershed association members, local and university officials). A stakeholder survey followed the interviews and was meant to verify

interpretations from the interviews as well as prioritize potential conflicts in the management of the Lamprey River. Next, a larger, survey was sent to 1,000 randomly selected public residents of the Lamprey River watershed. The survey utilized a modified Dilman approach and included many qualitative and quantitative questions that helped to prioritize aspects of river management. Because natural resource management requires tradeoffs, conjoint analysis was utilized to force respondents to make tradeoffs among hypothetical water management plan alternatives. Respondents were asked to rank hypothetical water management plans from one to 10 with , one being the most preferred and 10 being the least preferred. From this ranking, the application of conjoint analysis allows the determination of part worths for each of the four attributes of a water management, which were ecological health, recreational use, community business use, and withdrawal amounts.

#### **4. Major Findings and Significance**

Results from the stakeholder interviews and surveys indicated that the stakeholders have a complex relationship with the river. For example, they may use the river as a crucial part of their business production while at the same time enjoy fishing in the Lamprey River. The respondents to the public watershed survey (we obtained a 25% response rate) indicated that they were much more focused on the ecological and public water supply components of the river. This process allowed the identification of potential conflicts in the watershed when it comes for the actual implementation of the water management plan. Additionally, it identified and characterized the values and perspectives of stakeholders and the public. In general, recommendations for a more balanced, structured, and inclusive water management process are being made to the state based on the findings of the interviews and surveys. Because the Lamprey River study is part of a pilot program for the State, we recommend that future Instream

Flow Studies incorporate stakeholder and public values in these studies. We also make recommendations that are applicable to all natural resource managers and these include encouraging managers and decision makers to involve stakeholders and the public in the decision process early and throughout, utilizing a structured decision analysis process that focuses on values, assessing areas of possible conflict and evaluating management alternatives in a manner that is comprehensive to the public, experts, and other decision makers.

## **5. Publications, presentations, awards**

Research findings presented at the following conferences:

-2<sup>nd</sup> Potawatomi Student Industrial Ecology Conference, Angola, Indiana. March 23-25, 2007

-NH Water Conference, Concord, NH, April 9, 2007

-Northeast Agricultural and Resource Economics Association Meeting, Rehoboth Beach, DE  
June 10-13, 2007

-United States Society for Ecological Economics Conference, New York, NY. June 24-26, 2007

**1. Number of students supported:** Ms. Shannon Rogers, MS Degree in Resource

Administration and Management granted May, 2007. Currently pursuing PhD in Natural Resources at University of New Hampshire.