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Center: The Atlantic Slope Consortium - Developing Ecological Indicators for Aquatic Ecosystems of the Atlantic Slope Region
Center Director: Robert Brooks
Title: Socioeconomic and Institutional Research
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Project Amount: see main project abstract
Research Category: Environmental Indicators

Objective

This is the fourth of four subprojects under the Atlantic Slope Consortium (ASC) center. The goal of this subproject is to provide scientific results that support the choice and communication of suites of environmental indicators that will be meaningful to and relevant for environmental managers and other intended audiences. Specific objectives are to examine: (a) human perceptual and attitudinal dimensions of the types of indicators that different audiences find useful, (2) risk communication methods for presenting indicator information, (3) institutional and jurisdictional obstacles to indicator use, (4) their value for environmental management, and (5) their relationships to socioeconomic indicators at multiple scales.

Progress Summary

The Human Dimensions group's data collection and data analysis activities fell into four areas during the reporting period.

1. ***Government Official Interviews***: We have conducted interviews with 35 state and 12 federal agency officials who make use of environmental indicators for water quality management. The interviews were designed to gather information about what indicators are being used by water quality managers in the ASC, what these indicators are used for, and attributes of indicators that make them particularly useful. Interviewees were selected to provide broad representation of state and federal agencies involved in water quality management in the ASC. Agencies and individuals within agencies were selected in consultation with the entire ASC team. ASC collaborators were consulted extensively in the development of the interview protocol. We are currently analyzing the data and will soon have a report on the results. We expect the results to provide one set of data for to guide the selection of a suite of indicators that will be useful for water quality management decisions as well as understandable by stakeholders with interests in or who are affected by those decisions.

   This research will lead to a Masters Thesis in Environmental Pollution Control for Amy Balog (expected May, 2003). The work will also be reported at the annual meeting of the Ecolgocial Science Association in Atlanta in August, 2003.

2. ***Value of Information Modeling***: Several models were developed for examining the value of various types of information in aquatic ecosystem management.

    a. ***Susquehanna Nitrogen Management Model.*** A coupled economic-biophysical model was developed for estimating the value of various types of economic and biophysical information required to assess the costs and benefits of controlling nitrogen pollution loads to the Chesapeake Bay from the Pennsylvania portion of the Susquehanna River Basin. The model is being used to conduct simulation experiments for estimating the value of alternative information sets under alternative water quality policy regimes.

    This research will lead to a Ph.D dissertation in Agricultural, Environmental, and Regional Economics (expected May, 2003) for Tatiana Borisova. Papers have been submitted for presentation at the 2003 Annual meetings of the Northeast Agricultural and Resource Economics Association and the American Agricultural Economics Association.

    b. ***Value of Information in Wetlands Assessment.*** The Wetland Monitoring Matrix for wetlands assessment developed by ASC team members Wardrop and Brooks has been represented in a decision theoretic framework that allows estimation of the value of information in wetlands assessment. The model could also be used to help make decisions about wetlands assessment activities.

3. ***Integrated Assessment of Quality of Life and Environment:*** Several models were developed for integrated assessment of the quality of life and the quality of environment. The primary goal is to provide methods for ranking the relative efficiency of communities in the region in producing a high quality of life and environment using minimal value judgments, and for explaining differences in the relative efficiency of communities. A secondary role is to develop theory and results about economy-environment linkages to guide the use of information in integrated assessment and policy analysis. The models use optimal control, stochastic frontier analysis, data envelopment analysis, and Hauss Diagrams.

    This research will lead to Masters Theses in Agricultural, Environmental, and Regional Economics for Julio Molineros (expected May, 2003) and Yun Cai (expected August 2003), and a Ph.D. dissertation for Ram Ranjan (expected May 2003). Papers based on the work were presented at the 2002 Annual Meeting of the Northeast Agricultural and Resource Economics Association and the Heartland Environmental and Resource Economics Workshop. Papers based on the work have been accepted for presentation at the August, 2003 Joint Meeting of the Association of Environmental and Resource Economists with the American Agricultural Economics Association, and Northeast Agricultural and Resource Economics Association.

4. ***Institutional and Jurisdictional Aspects of Indicator Use:*** During the second grant year, the Environmental Law Institute: (1) collected and analyzed state laws from the Atlantic

Slope States to determine where such laws authorized the use of ecological indicators in decisionmaking, (2) advised the Human Dimensions working group on questionnaire design and identified government officials in the region to be interviewed, (3) conducted independent interviews on indicator programs, (4) conducted the research for a baseline analysis of the status of ecological indicators as a management tool in state programs across the nation, (5) participated in consortium meetings and research.

Publications and Presentations

Marshall, E., and J. Shortle. Indicators for assessing the ecological impacts of urban sprawl. Northeast Center for Rural Development Land Use Research Workshop. Land Use Research Workshop. Orlando FL, February 2002.

Molineros, J, and J. Shortle. Assessing the efficiency of deforestation using stochastic frontier analysis. Presented at the Annual Meeting of the Northeast Agricultural and Resource Economics Association, Harrisburg, PA, June 2002.

Future Activities

1. ***Watershed Level Data Collection From Stakeholders***. Our major activity in the coming year will be to conduct focus groups and random sample surveys of diverse stakeholders about diverse indicators in selected ASC watersheds. These information collection activities will enable us to test the value of specific indicators and suites of indicators for different types of stakeholders for addressing specific water quality problems. We will collaborate closely with all ASC institutions in selecting watersheds, focus group participants, and developing the sample survey instrument.

2. ***Value of Information Modeling.*** The Susquehanna River Basin Value of Information Modeling (item 2.a above) will be completed in the coming year. We will conduct applications of the wetlands value of information model (item 2.b above).

3. ***Integrated Assessment of Quality of Life and Environment.*** Our efforts in integrated assessment of quality of life and quality of environment have been focused on theory and methods. We are now using county level data for proof of concept studies. We will continue this proof of concept testing during the coming year. Our ultimate goal is to make use of data generated through ASC environmental and human dimensions sampling activities to assess the relative efficiency of communities in the region in producing a high quality of life and environment using minimal value judgments, and for explaining differences in the relative efficiency of communities.

4. ***Institutional and Jurisdictional Aspects of Indicator Use:*** Upcoming activities include (1) writing and submitting for publication a research paper on the status of ecological indicators as a management tool in state programs, and (2) targeted research linking state and local laws authorizing indicator use to the selected case study watersheds.

Supplemental Keywords: ecological indicator, human dimension, environmental management, risk assessment, value of information, quality of life, environmental law

Relevant Websites: www.asc.psu.edu