

**THINKING LIKE AN ESTUARY:  
USING IDA AS A TOOL FOR PROBLEM-SOLVING IN NARRAGANSETT BAY**

by

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## ABSTRACT

The Narragansett Bay Project was established under the Water Quality Renewal Act of 1984 to assess "the principal factors having an adverse effect on the environmental quality of the Narragansett Bay...as perceived by both scientists and users, in conjunction with developing and implementing a management program to improve the Bay's water quality." (Section 46b1) Due to the complexity of an estuary such as Narragansett Bay, numerous variables need to be considered in setting policy. These variables include physiological aspects of the estuary, chemical and biological processes, the concerns of regulatory agencies, and the interactions between uses of the resource. A better understanding of the relationship between the variables is needed for effective management of the Bay.

Initial Decision Analysis (IDA) is a computer program which gives interest groups and policy-makers a format for defining the significant aspects of a resource, understanding the interactions within the system, and building consensus on how to resolve management problems. The program can be characterized as a notepad that helps decision-makers organize information on many parts of the resource and examine the effects which policies will have on the system as a whole. It operates as a mediation tool, assisting interest groups and policy-makers in establishing a common framework for discussion. We have used IDA to build a model of the Narragansett Bay based upon the natural processes and human uses of the estuary which are of greatest concern to interest groups, scientists, regulators, and the general public.

The IDA program is broken into three main sections: "define problem," "construct model," and "perform experiments." The "define problem" section involves identifying the variables, or parts of the system, that are central to the problem. We chose our variables after observing a goal-setting process sponsored by the Narragansett Bay Project which was intended to identify the goals of interest groups with a stake in the Project's research and, through mediation, to assist the groups in working together to prioritize these goals. We also conducted a series of interviews to gain information relevant to each variable and its interactions with others.

Once the resource has been defined through a list of its most significant variables, the "construct model" section examines how the variables affect one another. The "perform experiments" section utilizes the model built in the previous section to simulate the consequences of alternative policies and evaluate these consequences in relation to the concerns of affected interest groups.

We found that the largest advantage of this model lay in its ability to help us organize information connecting the ecological and social processes occurring in the Bay. However, we question the validity of the "perform experiments" section of the model, both because it involves "black box" processes which are not adequately explained and because our results included many unrealistic effects. We suggest that in the future the model be applied to smaller systems where relationships are more uniform across time and space.