

Regional Association for Research on the Gulf of Maine

Mechanisms for Improving the Integration of Science and Management in Decisions Affecting the Environmental Quality of the Gulf of Maine

Workshop at Migis Lodge, Sebago Lake, Maine
June 2-3, 1997

Introduction

The need to incorporate state-of-the-art science and management strategies in response to contemporary and emerging issues affecting the environmental quality of coastal ecosystems has been well documented in a series of case studies and workshops. The Regional Association for Research on the Gulf of Maine (RARGOM) is convening a series of workshops which are intended to foster improved stewardship of environmental resources through an informed partnership of scientists, managers, the public, and non-governmental organizations as environmental policy is developed in the Gulf of Maine region. The series began with the "Gulf of Maine Ecosystem Dynamics Scientific Symposium and Workshop" held in St. Andrews, New Brunswick, Canada in September, 1997. At that workshop, managers in the Gulf of Maine region were invited to present regional environmental issues of concern requiring additional scientific knowledge for their solution.

This second workshop, held at Sebago Lake, Maine in June 1997, brought together a range of scientific and management expertise from the United States and Canada to assess improved mechanisms for effective interactions between the scientific and resource management communities in the Gulf of Maine. Participants were asked to help identify appropriate structures, functions, responsibilities and support needed to improve the integration of scientific and management expertise in the region on both sides of the international boundary. The workshop utilized the broad recommendations and concepts contained in the recent National Research Council report entitled "Science, Policy and the Coast: Improving Decisionmaking" (1995). It also made use of the environmental issues identified at the St. Andrews conference last year.

While this second workshop emphasized the perceptions of scientists and managers, the need to involve the broader public sector in the solution of environmental problems was also recognized. RARGOM intends to focus on these additional interfaces between science, management, the public, and non-governmental organizations in future collaborative work.

This report is intended for the research community and natural resources managers. We challenge the reader to take personal responsibility for disseminating this document and promoting these recommendations within their sphere of responsibility. Institutional leaders, recognizing the importance of scientific outreach, should plan for and implement these recommendations by such measures as reallocating existing resources and identifying new resources for programs designed to improve information dissemination and utilization.

Three categories of recommendations resulted from this workshop: A). apply the region's expertise to current and emerging issues; B). improve regional information management and dissemination; C). develop new tools to integrate science and policy. These are outlined in more detail below.

A. Apply the Region's Expertise to Current and Emerging Issues

A broad, long-term vision for the Gulf of Maine ecosystem must be developed that can guide policy development, decision-making and research. This will facilitate flexible responses to current problems and better anticipation of emerging issues because it provides cohesiveness and establishes priorities. The Gulf of Maine Council on the Marine Environment should bring stakeholders together over the next year to create a shared long term vision for the Gulf of Maine, providing a direction for the future, identifying information needs, and specifying a process for user involvement. Building a long-term vision requires a collaborative and mutually-rewarding partnership between scientists, managers, the public and non-governmental organizations. It is recommended that the following steps should be taken to make this happen:

1. Independent and credible scientific advisory groups should be used to help identify emerging issues, to set priorities for research and to provide the best available advice on issues of immediate concern. Advisory groups should consist of both long-term oversight committees and *ad hoc* expert panels, be financially supported, and responsive, but not captive, to management needs.

An example of a visible and successful partnership between managers and scientists in the Gulf of Maine region is illustrated by the Massachusetts Water Resources Authority (MWRA) technical advisory committee. The committee, convened by the Secretary of Environmental Affairs of the Commonwealth of Massachusetts, has provided advice on a wide variety of MWRA activities (representing a four billion dollar investment over fifteen years). The committee goals are to enhance the environmental quality of Boston Harbor, while at the same time, to avoid significant compromise of the environmental quality of Massachusetts Bay. Projects include the design and siting of the outfall diffuser location in Massachusetts Bay and the design and implementation of its ongoing monitoring plan. The MWRA has been able to objectively address a number of critical uncertainties surrounding its projects through an effective third-party review process provided by the technical advisory committee. In general, the MWRA efforts have been well received by the public.

2. The management and academic communities need to recognize the potential value of scientific contributions to societal needs and improve the opportunities to apply this expertise. The scientific reward system (both academic and governmental) needs to be addressed because it often fails to adequately recognize and reward professional time invested in public service. In addition to the generation of new knowledge, the integration, application and transmission of that knowledge must be considered valid activities of scholarship (Boyer, 1990). Administrators in both academic and government research organizations should convene groups of scientists to discuss necessary changes in reward systems so that scientific expertise is more readily available to meet management needs.

3. Financial resources are needed to enable scientists to participate in applied scholarship, technical advisory roles, and the identification of research needs that are important to resource managers. Both the management and science communities benefit from these activities, and they should work together to expand support for these purposes.

4. Integration between scientists and managers often requires new skills and relationships. University training programs are needed in such areas as adaptive management (National Research Council, 1995) and risk assessment. New students as well as mid-career scientists and managers should participate. Relationships built by frequent personal interaction help to establish better communication, trust, and understanding of scientific and technical approaches.

B. Improve Regional Information Management and Dissemination

A regionally-developed information management system is essential for improving communication between scientists and managers within and across political boundaries. Such a system should include scientific databases, synthesized data and selected information products for more general use. Scientists are using distributed databases routinely; these should be expanded to provide access to managers and policy makers for products that they need. Management decisions should be documented and synthesized for use in guiding decisions in the Gulf of Maine region. Specifically, the scientific input for decisions should be identified and made available to all interested parties on electronic networks and other information products.

Development of information management systems will require fiscal and human resources for maintenance, management, and quality control or assessment. Institutional leaders should provide the resources necessary to profile the scientific databases and make them accessible and useful to managers. In order to make information available in a format appropriate to managers and policy-makers, increased support is needed for well trained personnel and soft/hardware capabilities that can synthesize and translate scientific information.

To accomplish this, it is recommended that:

- 1. Managers should document the basis for their decisions and summarize decision-making processes for the benefit of the public, the policy-making community and scientists.** Appropriate documentation is needed to learn how scientific information is ultimately used in the decision-making process.
- 2. Scientists and managers need to recognize that successful communication is a two-way process.** An understanding time frames, so that appropriate lead time and timely feedback can be provided, is integral to such interactions.
- 3. Public agencies and academic organizations should support scientists and managers who serve as synthesizers, translators, and communicators in the integration of science into management decisions and public policy.** The costs of providing scientific translation should be included in the research funding and/or be borne by the management agency needing the translation. Scientific translators and communicators should be supported to develop syntheses of data, deliver annual briefings, and provide documentation of how scientific information has been, is, or will be used to assist with decision-making. Scientific and technical information available for decision-making inevitably contains uncertainty for which scientists should prepare an understandable, non-technical explanation.
- 4. Regional organizations should establish, maintain and enhance the information infrastructure useful for managers.** RARGOM and the Gulf of Maine Council on the Marine Environment should collaboratively assess EDIMS, REDIMS, and other regional information databases in both the United States and Canada, and ensure appropriate support for the continuing development of this infrastructure. Predictive modeling efforts, that assist in the visualization of scientific data, are necessary in order to better understand ecosystems and to improve the decision-making process. RARGOM and the Gulf of Maine Council on the Marine Environment should collaboratively develop the organizational capacity (electronic communication, networking, etc.) to serve as a clearing house of information by scientific advisors, translators, and managers.

C. Develop New Tools to Integrate Science and Policy

Integrating science into the decision-making process will be facilitated by the development of new tools that can be used interactively by both scientists and managers. Interactive tools need to account for the uncertainty existing in experimental data, models, standards and policy formulation and decisions. Risks must be acknowledged in the decision-making process.

It is recommended that regional scientists and managers:

- 1. Develop better procedures for risk assessment and estimates of uncertainty.** Managers should pose questions for the scientists in terms of probability of occurrence and probability for variation; the process should often include contingency plans and other strategies as well as resources for evaluating the impacts of decisions made, responding to uncertainty and managing risks.
- 2. Use adaptive management techniques, including research and monitoring programs, to evaluate the impacts of policy decisions, to test predictions of environmental impacts and to provide timely communication of results to project management.**
- 3. Systematically review environmental regulations to improve effectiveness and reduce procedural complexity.**
- 4. Develop contingency plans to deal with major uncertainties such as coastal oil spills.**
- 5. Improve anticipatory planning in both science and management activities.** RARGOM should organize periodic region-wide briefings on new scientific developments that are relevant to management and other users.
- 6. Develop and apply an integrated ecosystem perspective in addressing environmental issues (e.g., on the scale of a watershed, estuary, coastal bay, etc.) that bear on the structure, functioning of the marine system and the societal stresses on it.**
- 7. Strive to apply common tools and approaches consistently across political jurisdictions in both Canada and the United States in recognition of the cross-boundary character of the natural system under our collective stewardship.**

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References

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