Spring 1999 ISSUE # 1 (revised)

FUNDY ISSUES

WORKING TOGETHER WITHIN AN ECOSYSTEM

The Bay of Fundy Ecosystem Partnership

A Bay of Promise

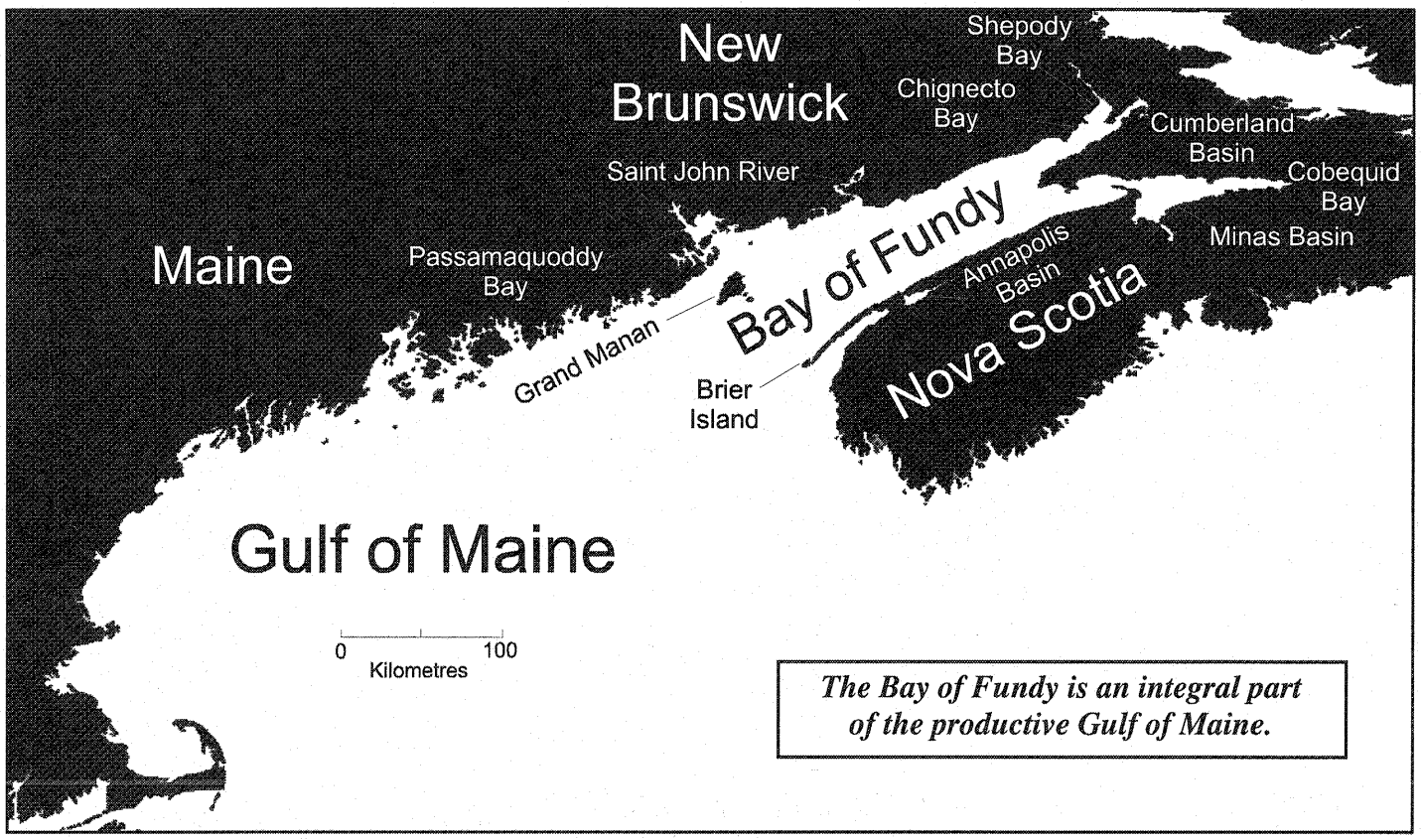
The Bay of Fundy, linking New Brunswick and Nova Scotia, is a 270 kilometre northeastern extension of the productive Gulf of Maine ecosystem. The Bay's 1,300 kilometre coastline ranges from rugged, rocky headlands flanking its mouth to broad mudflats and lush salt marshes at its inner reaches. It has long been of great economic, ecological and scientific significance, largely because of its renowned tides that can exceed 16 metres in height. Twice daily, water equal to the flow of 2,000 St. Lawrence Rivers surges into the Bay. Its funnel shape and gradual shallowing causes a piling up of the inrushing water. Because the Bay of Fundy and the Gulf of Maine form a single large basin, the moving seawater also sloshes back and forth like a wave in a giant tub. This aptly named "bathtub effect", being nearly in unison with the Bay's tidal cycle, gives the water the extra push needed for the world record heights.

For decades engineers and developers have dreamed of harnessing these great tidal flows to generate cheap, clean and renewable electrical energy. Scientists too have been drawn by these unusual tides, fascinated by the complex relationships between the Bay's surging waters and its diverse ecosystems. They have found that the ceaseless tidal turbulence stirs the waters of the Bay, raising dissolved nutrients from its darkest depth to its sunlit surface. This "upwelling" of life-giving nutrients is particularly marked around Brier Island and Grand Manan, two rocky sentinels guarding the mouth. This endless abundance of natural fertiliser stimulates the production of marine plants and the animals that feed on them. These in turn support large populations of fish, seabirds, whales and seals that congregate in these waters and are the mainstays of diverse fisheries and expanding ecotourism in the region. In particular, these productive waters are a critical feeding and nursery area for the endangered North Atlantic Right Whale. Generations ago these leviathans were hunted to near extinction, and even though hunting has long since ceased their numbers continue to decline. Almost half of the 300 animals left spend their summers around the mouth of the Bay.

The restless tidal circulation also stirs up the fine sediments eroded from the soft rocks surrounding the upper Bay and over time has shaped them into the productive salt marshes and seemingly endless mudflats that fringe Minas Basin, Chignecto Bay

FMESP
Fundy Marine Ecosystem Science Project

BOFEP
BAY OF FUNDY Ecosystem Partnership



The Bay of Fundy is an integral part of the productive Gulf of Maine.

and other estuaries. The few remnants of these once extensive salt marshes that were not diked for agricultural use are home to large numbers of waterfowl and other wildlife. The nearby mudflats are important as critical feeding and resting areas for millions of shorebirds on their annual migration from the subarctic to the tropics. Large tracts of the upper Bay are now protected areas for shorebirds and waterfowl, thanks to a number of national and international programs designed to conserve critical habitats throughout the birds' ranges.

Large, sheltered, coastal embayments near the mouth of Fundy, such as Passamaquoddy Bay, are attractive sites for farming of fish and other marine organisms in large floating cages. The growth of salmon aquaculture in New Brunswick in the past two decades has been explosive. The annual value of the production is fast catching up to that of the traditional fisheries in the Bay. The industry is also expanding in Nova Scotia, and as suitable inshore sites fill up, farms may soon spread into offshore areas.

The Bay of Fundy is clearly a dynamic, highly productive and ecologically diverse coastal ecosystem. It is rich in living resources, and promises continuing economic opportunities for those who dwell on its shores, if they use and manage it wisely.

A Bay at Risk

However, in recent years there have been disturbing signs that all may not be well with the Bay, and that its marine life and their habitats are at risk. The following are a few indicators of such worrisome changes. There have been dramatic declines in a number of fish stocks throughout the region, jeopardising the economy and way of life of coastal communities. Other wildlife species have also fallen in numbers or have inexplicably changed their distributions. Periodic fatal collisions between ships and Right Whales may hamper the recovery of the whale population. Ship traffic and ecotourism may be interfering with feeding, nursing and mating activities of whales, and disturbing important seabird colonies.

In the upper Bay, continuing loss of remnant salt marshes and erosion of mudflats threatens the species dependent on these habitats. There are reports of great fluctuations in abundance of some bottom dwelling and intertidal animals. In too many parts of the Bay, sewage contamination and sedimentation have closed or destroyed once productive clam flats. The accumulations of organic wastes from large aquaculture operations have degraded nearby benthic habitats. Ominously, scientists are finding many different contaminants in the seawater, bottom sediments and tissues of marine animals.

In many areas marine seafloor habitats are being degraded by intensive, highly mechanised and destructive harvesting such as bottom trawling and scallop dragging. Causeways, dams or bridges now obstruct most large rivers flowing into the Bay, and there are indications that these have altered sediment transport, water flow and related natural processes in some areas. On one of these causeways, across the Annapolis River, the turbines of a tidal power plant kill and maim many passing fish.

Marine scientists familiar with the Bay are alarmed by the number of such ominous reports. They are puzzled that many of the changes they see or measure can't readily be explained by what we presently know about the oceanography and ecology of the Bay. Almost twenty years ago scientists reviewed our knowledge about the Bay for an environmental assessment of a proposed large tidal power project in Cumberland Basin. They were confident then that there was a reasonable understanding of many of the significant oceanographic and ecological processes in the Bay. However, in light of their uncertainty about the causes of recent changes, it is clear that this complex ecosystem needs another close look.

BoFEP is a widely dispersed "Virtual Institute", open to all interested citizens and groups who share its vision.

"FMESP fosters information exchange and research co-operation among scientists working in the Bay"

Working Together Within an Ecosystem

Thus, a small group of concerned scientists met at the Acadia Centre for Estuarine Research (ACER) in Wolfville, Nova Scotia in early 1995. They wanted to find ways of encouraging both scientists and environmental managers to examine information gathered over the past two decades and to suggest how science could address some of the more pressing environmental questions. The Fundy Marine Ecosystem Science Project (FMESP) arose out of this meeting. Its goal is to encourage scientists and managers from around the Bay to expand and co-ordinate their research activities, to improve our understanding of the Bay and to work to protect its remaining resources and habitats. An initial report reviewed our knowledge of the Bay and outlined the more pressing environmental threats.

An important next step was to bring together 70 scientists and managers from both sides of the Bay at a Workshop in Wolfville in early 1996. Participants talked about their research work in relation to the environmental issues, reviewed the initial report and discussed the following questions. Does the scientific information support the hypothesis that major environmental changes are occurring in the Bay? Are we missing any crucial information? How can we best obtain such information? Are the environmental changes due to natural processes or to human activities? How can we stop or reverse undesirable trends? Or more succinctly, "What are the problems? What are the causes? How can we fix them?". Their responses, as well as their recommendations for co-ordinating research and improving management of natural resources, are recorded in the Proceedings of the Workshop *[See further reading on page 6].*

Those at the workshop clearly recognised that ensuring a healthy ecosystem in the Bay has to involve

SHARING THE VISION

VISION: The Bay of Fundy Ecosystem Partnership is dedicated to:

1) promoting the ecological integrity, vitality, biodiversity and productivity of the Bay of Fundy ecosystem, in support of the social well-being and economic sustainability of its coastal communities;

2) facilitating and enhancing communication and co-operation among all citizens interested in understanding, sustainably using and conserving the resources, habitats and ecological processes of the Bay of Fundy.

THIS VISION is predicated on the following general principles:

1) Conservation, protection and management of Bay of Fundy resources and their habitats should be ecosystem-based and reflect an holistic understanding of ecosystem structure, processes and interactions.

2) Resource development and other coastal zone activities should be based on ecologically sound integrated coastal planning and management.

3) Coastal planning and management should be transparent and open to participation by resource users, coastal communities, First Nations, industries, scientists, governments, managers and all other individuals and groups with interests in the Bay of Fundy ecosystem.

4) Effective communication and active co-operation among all citizens with an interest in the Bay of Fundy, and linkages with groups and programs that share similar objectives are vital to this enterprise.

TO ADVANCE THIS VISION BoFEP will initially undertake to:

1) form a geographically dispersed, adaptable, responsive and inclusive network ("Virtual Institute") linking all partners who share the vision and principles;

2) serve as a readily accessible network for scientific, community and other knowledge pertaining to the Bay of Fundy by:

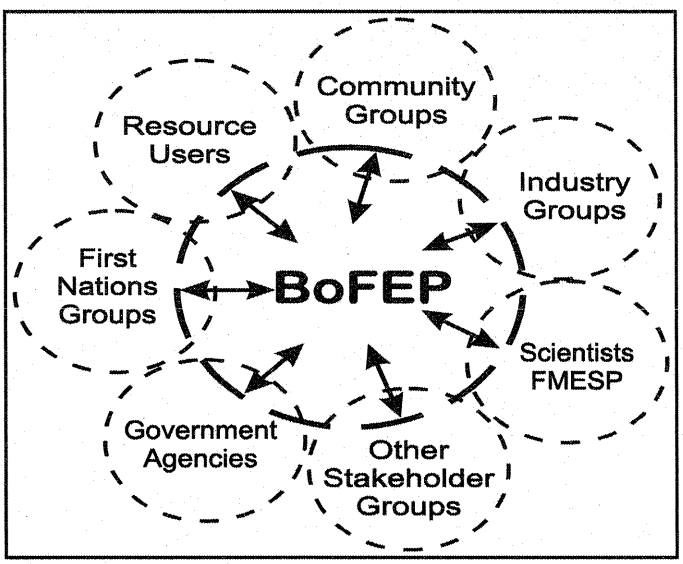
a) facilitating the timely sharing of information about the Bay of Fundy among partners.
b) fostering effective communications among interested groups and individuals.
c) encouraging and facilitating co-operative activities and linkages among partners and with other interested groups or individuals;

3) promote and facilitate the regular assessment of the state of the Bay of Fundy Ecosystem (or of specific issues) which will identify issues, priorities, accomplishments and new directions.

4) promote and facilitate long-range planning and integrated management in the coastal zone.

more than just scientists. Federal and Provincial government departments that share responsibility for managing the Bay and its resources have to be involved. Resource users and residents of communities all around the Bay must take part, because the way they use the Bay and its resources directly affects its well-being. As well, many residents have first-hand experience about the changing environment and wildlife populations of the Bay that could be a valuable complement to the available scientific information. As well, some community groups and volunteers are now part of the scientific effort, collecting information and samples for many monitoring and research programs.

A number of steps for further involving the wider Fundy community arose from the First Science Workshop. Most notable was the formation of a new broader-based organisation, initially named the Bay of



BoFEP is an informal framework for fostering communication and co-operation among many partners who share a common vision.

Fundy Ecosystem Program (BoFEP). Its inaugural meeting was held on November 15th 1997 in St. Andrews NB as part of the Second Bay of Fundy Science Workshop (*jointly sponsored with the Environmental Monitoring and Assessment Network - EMAN*). Representatives from many groups around the Bay proposed a general initial framework for BoFEP. They also altered the name slightly to the ***"Bay of Fundy Ecosystem Partnership"***, feeling that this better reflected the open nature of the organisation. They also drafted the vision, principles and objectives for BoFEP [see "Sharing the Vision" on page 4] and elected a chairman and an interim Steering Committee.

BoFEP is a widely dispersed "Virtual Institute", open to all interested citizens and groups who share its vision. Community organisations, resource harvesters, scientists, resource and habitat managers, coastal zone planners, First Nations groups, businesses, government agencies, shipping interests and academic institutions; in short, anyone who has an interest in protecting or sustainably using the Bay of Fundy, is welcome to join. The organisation is relatively informal and will evolve gradually in ways that best fulfil the needs and interests of its partners. Projects and activities dealing with particular environmental issues are carried out by informal Working Groups proposed and formed as needed by interested members.

Active Web Sites (BoFEP, Fundy Forum), periodic workshops in different parts of the Fundy region and regular publications are used to share information among the partners and inform them about each other's interests and activities. One ongoing project is this series of "Fundy Issues" fact sheets. These summarise, in a non-technical fashion, our scientific understanding of some of the pressing environmental issues confronting the Bay. They are intended to assist those who dwell on Fundy's shores in making informed decisions about developments and activities in and around **their** Bay.

The original Fundy Marine Ecosystem Science Project (FMESP) still thrives as an integral partner of BoFEP. FMESP fosters information exchange and research co-operation among scientists working in the Bay and is committed to sharing scientific information about the Bay with its BoFEP partners and others. It convenes Working Groups largely comprised of scientists and environmental managers. The first, on "*Corophium as a keystone species*", has been active since 1987. Others will deal with contaminants and tidal barriers. It encourages new research projects to address environmental questions identified by BoFEP. It organises the Bay of Fundy Science Workshops, the third of which will be held at Mount Allison University in Sackville N.B. on April 22-24, 1999, with a fourth planned at the Coastal Zone 2000 Conference in Saint John, N.B. in September, 2000.

FMESP and BoFEP together provide an opportunity for all who share an interest in the well-being of the Bay of Fundy to work together to resolve the many problems confronting this unique marine ecosystem. Only by sharing our knowledge and unifying our efforts can we ensure that we, and generations to come, will continue to benefit from Fundy's great bounty and appreciate its awesome beauty and diversity.

HOW TO CONTACT BoFEP/FMESP

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Further Reading

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From Cape Cod to the Bay of Fundy. An environmental atlas of the Gulf of Maine. P.W. Conkling (editor). Massachusetts Institute of Technology Press. Cambridge, Mass. 258 pages. (1995)

Habitat lost: taking the pulse of estuaries in the Canadian Gulf of Maine. J. Harvey, D. Coon and J. Abouchar. Conservation Council of New Brunswick, Fredericton, N.B. 81 pages. (1998)

The Fundy Issues Series is an initiative of the Bay of Fundy Ecosystem Partnership. These publications describe our present scientific understanding of some of the environmental issues confronting the Bay. We hope that they will enhance your understanding of the biological richness and complexity of this unique marine area and the problems confronting it. Such awareness may encourage you to help in protecting it for the use and enjoyment of all, so that future generations may also share and appreciate its bounty and rare beauty.

Fundy Issues are available on the boFEP website at
http://www.auracom.com/~bofep