Fisheries and Oceans Canada
Pêches et Océans Canada

Operational Management Plan
Basin Head
Marine Protected Area

Canada

Acknowledgements:
This Operational Management Plan was prepared by the Oceans, Habitat and Species at Risk Division of the Department of Fisheries and Oceans (DFO), Gulf Region with the assistance of the Basin Head Marine Protected Area Advisory Board.

Cover Photo Credit: Bob Semple

Published by:
Oceans and Habitat Branch
Fisheries and Oceans Canada
Gulf Region

Cat. No. Fs119-1/2009E
ISBN: 978-1-100-12191-8


Printed on recycled paper.

FOREWORD

The Basin Head Marine Protected Area (MPA) was designated on October 11, 2005. The purpose of the MPA is to conserve and protect a unique species of Irish moss (*Chondrus crispus*) that exists only within the boundaries of Basin Head. This designation represents the successful culmination of several years work by the Basin Head Lagoon Ecosystem Conservation Committee (BHLECC).

Although it was a much anticipated event, the designation of the Basin Head MPA was just the beginning. The Basin Head MPA Advisory Board, with representation from the Department of Fisheries and Oceans Canada (DFO), the Prince Edward Island (PEI) Department of Environment, Energy and Forestry, Eastern Kings Community Council, and fishing, agriculture and tourism industries, was formed to provide on-going advice and recommendations to DFO on the management and monitoring of the Basin Head MPA.

PHOTO: BOB SEMPLE

Management Plan (OMP) serves as a guide to facilitate informed decisions in the management of the Basin Head ecosystem. The Basin Head OMP, in association with the Regulations, guides the development of comprehensive conservation and management strategies. Additionally, it addresses matters such as monitoring, enforcement and compliance, and provides the detail required to ensure that the rationale for management decisions, prohibitions, controls and approvals are clearly justified and understood. The Basin Head OMP was developed with input from local stakeholders using scientific data and background information.

The Basin Head OMP is intended to serve as a "living" document and can be amended as required to ensure management objectives and monitoring requirements are met. The Basin Head MPA Advisory Board fully endorses the aims and objectives of the Basin Head MPA will be well-served by this document.

The 2007 monitoring program indicates a significant decline in the Basin Head Irish moss biomass and coverage. Immediate management actions identified to ensure the continued existence of the Irish moss include additional aerial surveys and photography, the collection of Irish moss for propagation in a quarantine laboratory environment, and surveys to determine the survival of the Irish moss over the winter months. A long-term recovery strategy is currently being developed and as additional information becomes available, management actions will be modified and adapted.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1
INTRODUCTION

Basin Head is located on the eastern tip of Prince Edward Island, approximately 100 kilometres east of Charlottetown, between the town of Souris and the community of East Point (Figure 1). Basin Head harbour is a small estuarine lagoon surrounded by agricultural land to the north and by an extensive sand dune system to the south. The Basin Head ecosystem is inhabited by a rich diversity of organisms including marine plants, invertebrates, fish, mammals and birds. Most notable to the area is a unique type of Irish moss (*Chondrus crispus*), a marine plant, which has a life cycle and natural habitat documented nowhere else in the world.

This Marine Protected Area (MPA) has been established under the statutory authority of Canada's *Oceans Act*. The main objective of the MPA is the protection of the unique strain of Irish moss and its habitat.

This management plan establishes the monitoring protocols and governance arrangements for regulatory compliance of the Basin Head MPA. It describes how the goals and objectives of the MPA are to be reached and how the success of the MPA will be measured, reported and, if necessary, management actions changed/adapted. By clearly establishing roles and responsibilities and by using necessary feedback and reporting loops that incorporate an adaptive management approach, it will be possible to ascertain whether management actions have achieved the primary conservation objective (preservation of the Basin Head *Chondrus crispus*). Furthermore, to achieve the main conservation objective and secondary objectives of the MPA, this plan sets out the monitoring program that will be used to give the trend of overall health of the ecosystem over time. All monitoring activities will incorporate collaboration and community-based approaches.

This is a living plan, with review scheduled every three years; it may be amended at any time upon advice of the Advisory Board using the results of the scientific research and monitoring programs.

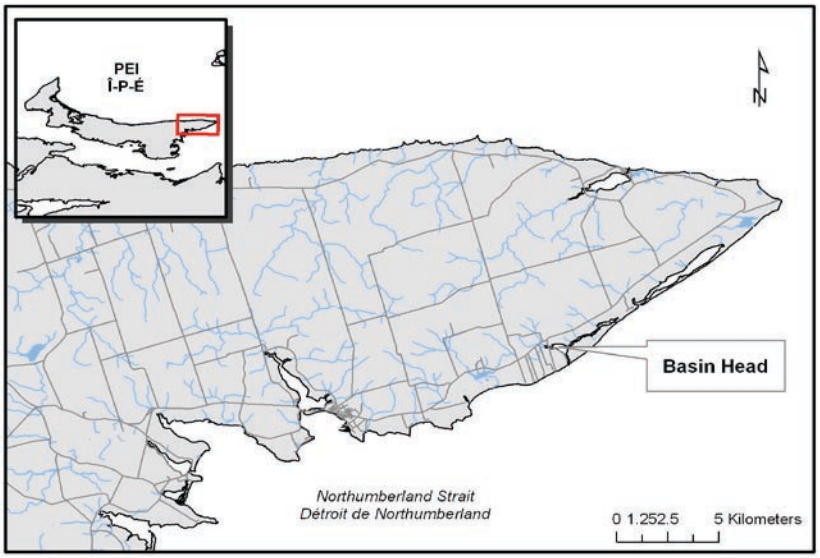


Figure 1: Location of Basin Head PEI

1.1 Operational Management Plan

This plan is an operational tool to guide DFO, the Basin Head MPA Advisory Board and other stakeholders in managing the various human activities within the MPA and includes:

- management zones,
- interpretation of the zoning scheme within the Basin Head MPA,
- the regulations that apply within the MPA,
- a description of the conservation objectives,
- a description of the permitted activities within the boundaries,
- a description of the regulatory and non-regulatory conservation objectives and compliance with the regulations, and
- a description of the governance structure.

1.2 Format of the Operational Management Plan

The plan is comprised of distinct sections, including background information, the management framework, governance, enforcement and education.

PHOTO: SARAH NEBEL

2.1 Basin Head MPA

The Basin Head MPA covers an area of 2,277 hectares, which includes the outer coastal area (Zone 3, as described on page 14). The lagoon itself is approximately 5 kilometres in length and covers 60 hectares. The deeper section of the basin is about 0.5 kilometres in diameter and is attached to a shallower channel about 3 kilometres long and 200 metres wide. The unique strain of Irish moss is found only within this channel. Sandy substrate dominates in the centre of the channel and eelgrass fringes the shallows. The mouth of the lagoon and the first 100 metres of the entrance channel are highly energetic, with current speeds reaching 2 knots or more (Figure 2).

Estuaries and associated salt marsh communities play an important role in the functioning and integrity of the coastal waters of Prince Edward Island. Estuaries are partially enclosed coastal bodies of water where ocean water and fresh water mix. Salt marshes are characterized by salt-tolerant grasses, with an extensive shallow rhizome (root) system that trap and stabilize the soft sediment. Estuaries rank as one of the most productive ecosystems on earth, and marshes are referred to as the life-support system, generating vital functions. Estuarine lagoons, such as Basin Head, are more sensitive than open mouthed estuaries, due to the vulnerability of single narrow openings that create the saline environment, and are more subject to sedimentation due to the lower flushing rates.

The Basin Head watershed is relatively small (1,750 hectares), with several streams entering the north face of the lagoon. The south side of the lagoon is bordered by a fragile sand dune system (320 hectares) measuring between 0.5 and 1 kilometre in width. The large dune complex is fronted, on the ocean side, by an extensive beach (Singing Sands). The waters adjacent to the beach are shallow and sandy. Land use north of the lagoon is primarily agricultural (750 hectares) and forested (600 hectares) with very little residential/ commercial development (10 hectares).

The area surrounding Basin Head lagoon is best characterized as rural agrarian. There is a strong

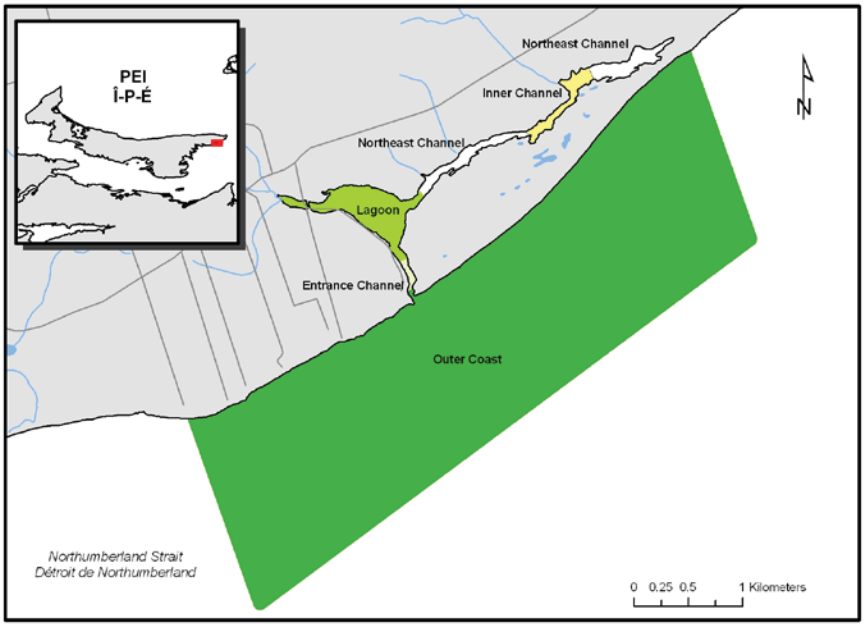


Figure 2: Basin Head MPA

PHOTO: BOB SEMPLE

association with renewable natural resource harvesting (fisheries) and agriculture. The area hosts a provincial fisheries museum and a provincial camping park is located nearby. The Singing Sands beach is very popular for resident Islanders and visitors alike. An audit of human use of the area is available in the document titled *Community Use of the Basin Head Lagoon, Prince Edward Island* (2001) prepared for the Basin Head Lagoon Ecosystem Conservation Committee by the Island Nature Trust.

2.2 Leading-up to Designation as an MPA

The Basin Head Harbour has long been recognized as unique by area residents. It was not until the 1960s that researchers discovered the unique strain of Irish moss at Basin Head. Since then, several options were explored to protect and conserve Basin Head. Among them was discussion of creating a National Park in the late 1960s. Some coastal lands were protected under the provincial *Recreational Development Act* in the late 1970s. The Basin Head museum, which interprets the natural area and related fisheries activities, was opened in 1973. In 1974, Basin Head was recognized as an area worth protecting in a report entitled *"Ecological Reserves in the Maritimes"* (Canadian Committee for the International Biological Programme). It was also included on a list of sites for the Provincial Significant Environmental Areas Program in 1991. Between 1995 and 1997, 96 hectares of the sand dunes surrounding Basin Head were protected under the provincial statutory authority of the *Natural Areas Protection Act.* In 1999, the Basin Head Lagoon Ecosystem Conservation Committee was formed and it proposed to DFO to consider Basin Head as a potential MPA under Canada's new *Oceans Act (1997)*. In November 2007, the Province of PEI entered into an agreement with the Nature Conservancy of Canada (NCC) to secure and protect 57.5 hectares of beach adjacent Basin Head under the province's *Natural Areas Protection Act*.

In order to understand the Basin Head ecosystem, marine plant research scientists had been gathering data on the biological and physical characteristics of the lagoon as early as 1979 (McCurdy, 1979; McCurdy, 1980; Sharp *et al*, 2003). Irish moss normally has a life cycle with 3 phases; male, female

and a spore-producing (tetrasporophyte) phase. All phases are similar in size and shape. The primary mode of reproduction is by the sexual production of spores that form small plants, which attach to the substrate. The second and less usual process is vegetative or non-sexual, where fragments of the plant break off (fragmentation) and re-attach to a hard substrate. The strain of Irish moss in Basin Head is found only in the non-sexual reproductive stage, reproducing by fragmentation. It is significantly larger than the normal plant, and is not attached to the bottom by a holdfast but is weighed down by mussels that attach to the moss. The "free floating" Irish moss is found only in the narrow channel (Zone 1, described on page 12) behind the dune complex. This species is currently limited to 2.6 percent of the total basin area. This area is well flushed, with currents reaching 1 to 1.5 knots in minimum water depths of 40 centimetres. The Irish moss is held in place by the byssal threads of the blue mussels so the moss is resilient to the effects of tidal action and currents.

Investigators also discovered a new plant form of knotted wrack (*Ascophyllum nodosum*). When fragments of knotted wrack become entangled in marsh grass (*Spartina alterniflora*) the wrack loses its regular form and floats, but continues to grow entwined in the lower parts of the grass; this form of wrack had not been seen before in this region (McCurdy, 1979). Sea lettuce (*Ulva latuca*) is the dominant plant in the upper reaches of the northeast channel. Eelgrass (*Zostera marina*) dominates the lagoon and the outer reaches of the northeast channel. These marine plants provide a diverse and complex structure that supports high levels of productivity and maintains high biodiversity in this small harbour.

PHOTO: BOB SEMPLE

The *Oceans Act* authorizes the Governor in Council to designate, by regulation, MPA for one or more of the following reasons under Sub-Section 35 (1):

a) the conservation and protection of commercial and non-commercial fishery resources, including marine mammals and their habitats,
b) the conservation and protection of endangered or threatened marine species and their habitats,
c) the conservation and protection of unique habitats,
d) the conservation and protection of marine areas of high biodiversity or biological productivity, and
e) the conservation and protection of any other marine resource or habitat as is necessary to fulfil the mandate of the Minister.

The Basin Head MPA meets the criteria set out in paragraphs 35 (1)(*c*) and (*e*) above. The criteria in paragraph 35 (1)(*c*) are met because of the existence of a unique strain of floating Irish moss (*Chondrus crispus*). The strain of Irish moss has a life cycle and natural habitat limited to this ecosystem. The criteria in paragraph 35 (1)(*e*) are met

because the designation of Basin Head as an MPA contributes to the development of a national network of MPA by 2012, a commitment by the Government of Canada.

2.3 Consultations

Prior to and since the announcement in 1999 that Basin Head was being considered as an Area of Interest (AOI) under the Marine Protected Areas program, there has been strong local support for designation of Basin Head as a MPA. The consultative process had developed new, trust-based relationships and the formal designation of the MPA and associated regulations in 2005 maintained the level of momentum and stakeholder confidence. There have been six public meetings (one in 1998, two in 1999, one in 2000, one in 2001 and one in June 2002) held in the Basin Head area. During these public meetings, presentations were given on ongoing research, proposed management objectives and proposed regulations.

The Basin Head Lagoon Ecosystem Conservation Committee (BHLECC) established in 1999 consists of representatives from:

- Basin Head Fisheries Museum,
- municipal government (Eastern Kings Community Council),
- agriculture industry,
- tourism industry,
- fishing industry,
- land owners,
- DFO (ex officio), and
- PEI Department of Environment, Energy and Forestry (ex officio).

The role of this committee to date has been to:

- ensure community involvement in the establishment and ongoing management of the Basin Head MPA,
- represent key constituent groups or stakeholders,
- provide advice to DFO and the provincial government on the consultation process,
- collate and analyze feedback from consultations and management proposals, and
- make consensus-based, recommendations to DFO for the establishment of an MPA at Basin Head.

The BHLECC has provided an excellent forum for issue identification, discussion and resolution and has guided the development of a cooperative regulatory framework. The regulations that appear in this document reflect the outcome of a consensus-based process led by the BHLECC, and direction suggested by the public, stakeholders and other partners. The resulting commitment for co-operation and community stewardship has led directly to the development of the Basin Head MPA Operational Management Plan.

The PEI Department of Environment, Energy and Forestry has been involved in the planning and consultation process since Basin Head was announced as an area of interest for designation as an MPA. Meetings held with provincial government representatives on December 8, 2004 and February 15, 2005 confirmed provincial support for the Basin Head MPA. The Province has demonstrated a willingness to use existing legislation to protect part of the watershed surrounding the Basin Head MPA.

Letters of invitations (to meetings and open houses) were sent to aboriginal groups and informal discussions regarding the designation process have taken place since 1999. Presentations were given to the Abegweit and Lennox Island First Nations, and the Mi'kmaq Confederacy of PEI. Native Council on June 5, 2002. A meeting was also held on February 8, 2005 with members of Abegweit and Lennox First Nations and the Mi'kmaq Confederacy of PEI. At that meeting the bands reconfirmed their support of the concept of a MPA at Basin Head as long as a good balance could be achieved between conservation and the economy.

PHOTO: BOB SEMPLE

3.1 Management Zones

The Basin Head MPA includes 3 management zones (Figure 3):

The Inner Channel (Zone 1) – This zone extends from the main Basin eastward for approximately 3 kilometres to the eastern limit of the ecosystem. Zone 1 has the highest level of protection given that it provides the unique habitat for Irish moss within this ecosystem.

The Lagoon (Zone 2) – This zone extends from the inner channel west to the limit of the Basin and south to the mouth of the Basin. This is the main Basin area or lagoon and acts as a buffer zone for the more sensitive Zone 1 area.

The Outer Coast (Zone 3) – This zone extends from the mouth of the lagoon to 1 nautical mile south and covers 3 nautical miles east to west, adjacent to the eastern end of the lagoon. This zone is a buffer to protect the integrity of the dune structure.

3.2 The Regulatory Intent

The health of Basin Head is inextricably linked to surrounding marine waters and the stability of the dune system. These zones reflect the differences among physical environments or habitats and the management approaches required for each. Specific activities will be prohibited within each zone of the MPA to ensure the health of the Irish moss and its supporting habitats. The Basin Head MPA Regulations (Appendix I) contain a general prohibition

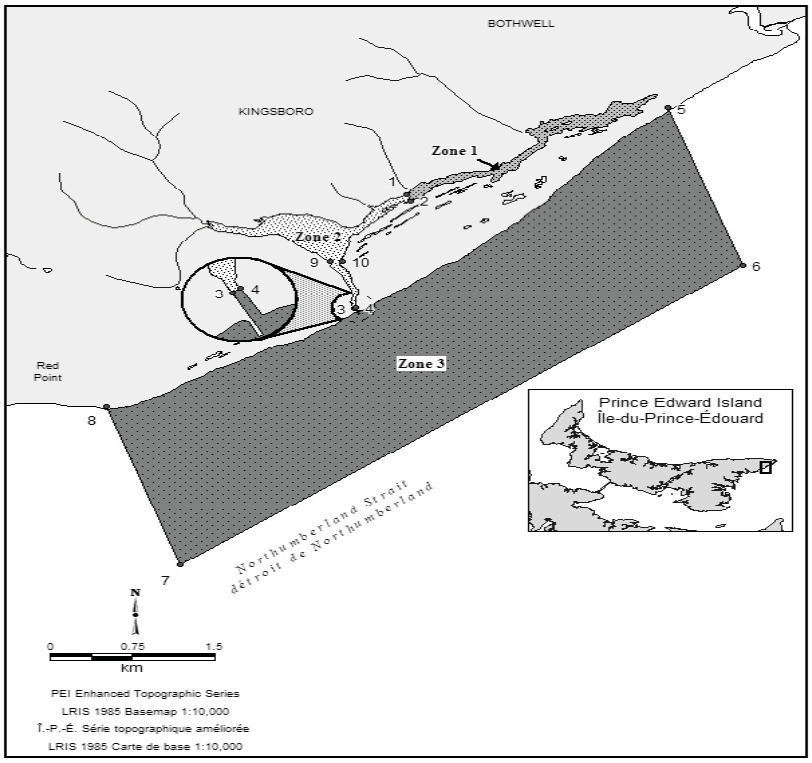


Figure 3: Basin Head MPA Management Zones

against the disturbance, damage, destruction or removal of any living marine organism or any part of its habitat, within the MPA. Also, the Regulations prohibit activities, including depositing, discharging or dumping of substances within the MPA that result in any of those impacts. Any accident that is likely to result in the disturbance, damage, destruction or removal of living marine organisms referred to in the general prohibitions of the Regulations, must be reported within two hours after its occurrence or sighting to the Canadian Coast Guard.

The Regulations recognize that certain activities, such as scientific research and specific types of fishing may be allowed within the MPA as long as they do not compromise the conservation objectives and specific conditions. Under the Regulations (Appendix I), activities are managed through (1) the submission and approval of plans for science and education activities according to specific conditions, and (2) specific exceptions to the general prohibitions according to specified conditions.

Scientific research and educational activities will be approved under specific conditions. Monitoring is required to support the management of the MPA. A plan for these activities must be submitted, specific information listed in the Regulations must be supplied, and the activity must not damage or destroy the habitat of living marine organisms within the MPA. The Minister may approve plans for scientific activities in Zone 1 only for the purposes of managing the MPA or monitoring the effectiveness of the conservation measures. The Minister may approve plans for educational activities in Zone 1 for the purposes of increasing awareness of the MPA, or providing information respecting the conservation measures implemented in the MPA. In Zone 2 and Zone 3, scientific and educational activities can occur provided they do not damage or destroy the habitat of living marine organisms. The cumulative environmental effects of these activities, in combination with all other past and current activities, will be considered before Ministerial approval, to ensure they are not likely to result in damage or destruction of the MPA or the Irish moss it protects. (An *Application for approval to conduct research/education activities in the Basin Head MPA* is found in Appendix II).

Specific exceptions to the general prohibitions are provided throughout the MPA. For activities relating to the purpose of public safety, law enforcement, national defence, national security or emergency response are permitted to ensure the safety of Canadians, and for Aboriginal peoples fishing in accordance with the *Aboriginal Communal Fishing Licences Regulations* are permitted throughout the MPA.

Zone 1 (The Inner Channel) – Activities permitted in this area are limited to those which do not disturb, damage or destroy or remove living marine organisms or their habitat or deposit, discharge or dump harmful substances etc.. Because of the vulnerability of the Irish moss in this zone, activities such as swimming, diving, the use of motorized vessels and fishing are not permitted.

Zone 2 (The Lagoon) – This zone will tolerate some disturbances such as swimming and diving. Non-vessel based fishing will be permitted in this zone if these activities are carried out in accordance with the *Atlantic Fishery Regulations, 1985,* the *Maritime Provinces Fishery Regulations* and/or the *Wildlife*

Conservation Act. The use of a motorized vessel will only be permitted in this zone in order to launch or land a vessel at a boat launch. The maintenance, repair, or removal of a bridge or boat launch will also be permitted in this zone if the applicable authorizations for these activities have been obtained under the *Navigable Waters Protection Act* and/or the *Fisheries Act*. Requirements under this legislation are considered sufficient to ensure that these activities will be conducted in a manner consistent with the conservation objectives of the MPA.

Zone 3 (The Outer Coast) – Prohibitions in this zone restrict physical activities that may alter the coastline in such a way as to endanger the fragile sand dune system, and therefore the lagoon. Fishing will be permitted in this zone if these activities are carried out in accordance with the *Atlantic Fishery Regulations, 1985* and/or the *Maritime Provinces Fishery Regulations.* Swimming, diving and the use of motorized vessels are permitted in this area. The maintenance, repair, or removal of a bridge or wharf will be permitted in this zone if the applicable authorizations for these activities have been obtained under the *Navigable Waters Protection Act* and/or the *Fisheries Act*. Requirements under this legislation are considered sufficient to ensure that these activities will be conducted in a manner consistent with the conservation objectives of the MPA.

3.3 Monitoring

3.3.1 Current and Potential Threats to the Basin Head Ecosystem

The most notable feature of the Basin Head MPA is the unique strain of *Chondrus crispus* (Irish moss) that grows in beds in the Inner Channel (Zone 1). The main objective of the MPA is the protection of this unique strain of Irish moss and its associated habitat, which exists solely within this coastal ecosystem. In general, conditions that favour the *Chondrus* beds will also favour system-wide ecological integrity.

The Basin Head estuary is subject to a number of threats from both humans and natural influences. One of the biggest threats currently to the system and in particular to the *Chondrus crispus* is eutrophication (an increase in chemical nutrients). Nutrient input into the streams from surrounding land use practices (i.e. agriculture, domestic and industrial sources) elevate nitrogen and phosphorus concentrations well above healthy levels for the system. In general 0.63 to 3.0 milligram/litre total nitrogen can cause eutrophication and all of the PEI estuaries are reported to have mean levels higher than these values. Basin Head nutrient input from streams are above the mean levels of other estuaries and lagoons in PEI. It will be important to improve water quality in Basin Head, at a minimum, and to other estuaries in PEI.

Collaboration will be sought between the MPA Advisory Board and with the Province to develop an integrated watershed monitoring plan to improve these conditions.

Eutrophication can lead to excessive algal growth, in particular, sea lettuce (*Ulva*) blooms which reduce other vegetative cover by shading. Excessive *Ulva* growth can also lead to anoxic (lack of oxygen) conditions which can be lethal to plant and animal life. *Ulva* grows profusely in both the Basin Head lagoon and inner channel. The heaviest growth occurs at summer's end in the eastern channel where water circulation is poor. The anoxic zone in the eastern channel has extended to the edge of the Irish moss beds in recent years. Expansion of the anoxic zone threatens the Irish moss because a lack of oxygen could kill the Irish moss and also the mussels that hold the moss in place (production of byssal threads require mussels to be alive). Tidal flushing limits the build-up of *Ulva* blooms by diluting nutrients, oxygenating the water, and exporting the *Ulva* out of the estuary. It will be important to monitor if anoxic conditions expand further towards the *Chondrus* bed.

A potential threat to the estuary and the Irish moss comes from the stability of the entrance channel and the dune structure as they relate to the flushing of the estuary. Any changes in the integrity of these structures will affect the flushing rates and hence the ability of the estuary to rid itself of excessive algal blooms and nutrients. It will be important to develop a circulation model that will enable the prediction of changes in the channel dimensions or with any breach in the coastal dune system.

Erosion from land is also a potential threat to the lagoon and channel. Streams that drain the fields and forest land are important sources of sediment along with soil erosion from the elevated fields adjacent to the Basin.

The presence of invasive species such as the green crab (*Carcinus maenus*) has the potential to threaten the ecological integrity of the Basin Head ecosystem. Green crabs are voracious predators preying on a variety of marine invertebrates. They have the potential to displace native species through competition. The life history and population abundance of green crabs is being monitored through DFO's *Community Aquatic Monitoring Project* (Thériault *et al.*, 2006). Specific monitoring tasks are identified in Appendix III.

PHOTO: BOB SEMPLE

3.3.2 Conservation Objectives

Having identified the current and potential threats to the Basin Head ecosystem, conservation objectives (DFO 2002b) were developed to ensure its health and viability and its unique Irish moss. More specific and measurable marine environmental quality (MEQ) objectives were also set. Appendix III presents the conservation and MEQ objectives, the indicators that will be used to monitor the achievement of the objectives, the triggers that will determine management action, and the agencies responsible for the management action.

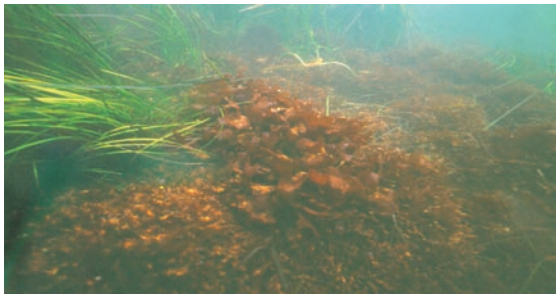


PHOTO: BOB SEMPLE

The primary objective of MPA management is to maintain the unique Irish moss species and habitat. The first indication of a problem in the estuary will come from the measurements of environmental quality including water quality measurements and monitoring for anoxic conditions toward the *Chondrus* bed.

Hence, this is listed as the first conservation objective and crucial to the monitoring program. Overall, there are 4 conservation objectives for this MPA:

Conservation objective 1: Maintain the quality of the marine environment supporting the *Chondrus crispus.*

Conservation objective 2: Maintain the physical structures of the ecosystem supporting the *Chondrus crispus.*

Conservation objective 3: Maintain the health (biomass and coverage) of the Basin Head *Chondrus crispus*.

Conservation objective 4: Maintain the overall ecological integrity of the Basin Head lagoon and inner channel. This includes avoidance of excessive *Ulva* growth, maintenance of adequate oxygen levels, and maintenance of diversity of indigenous flora and fauna.

Table 1 and 2, respectively outline the activities associated with the regulatory conservation objectives and other non regulatory objectives of the MPA. They identify the related legislation, management actions, and responsible leads and associated short and long term activities.

Table 1: Basin Head MPA Regulatory Conservation Objectives and Management Actions.

	Management Action	Lead Responsible	Related Legislation
Regulatory Conservation Objective: Maintain the quality of the marine environment supporting the *Chondrus crispus*	**Short Term:** • To maintain twice-monthly water quality monitoring (May through October) at 6 water stations within the MPA. Information will be collected on nitrate, nitrites, phosphates, suspended solids, temperature, oxygen and salinity.	DFO	Basin Head Marine Protected Area Regulations
	• To monitor water temperature in the inner channel station and the main basin.	DFO	Basin Head Marine Protected Area Regulations
	• To monitor 3 stations in the basin to test for *E.coli* contamination	Environment Canada (in co-operation with PEI Department of Environment, Energy and Forestry)	Canadian Shellfish Sanitation Program
	Long Term: • By using the data collected, determine if there is a significant decline in the quality of the marine environment supporting the *Chondrus crispus*	DFO	Basin Head Marine Protected Area Regulations
Regulatory Conservation Objective: Maintain the physical structures of the ecosystem supporting the *Chondrus crispus*	**Short Term:** • Establish the limits of the barrier dune structure at the ocean entrance and northern limit.	DFO	Basin Head Marine Protected Area Regulations
	Long Term: • Using aerial photography, monitor the usage and erosion of the watershed area.	DFO (with support from PEI Department of Environment, Energy and Forestry)	Basin Head Marine Protected Area Regulations
	• Monitor municipal land use and permit approval data.	DFO (with support from the Eastern Kings Community Council)	Eastern Kings Community Bylaws
	• Develop water circulation model to evaluate any water circulation changes.	DFO	Basin Head Marine Protected Area Regulations

	Management Action	Lead Responsible	Related Legislation
Regulatory Conservation Objective: Maintain the health (biomass and coverage) of Basin Head Chondrus crispus	**Short Term:** • To initiate a photo mosaic of the entire basin every three years to quantify the Chondrus crispus and green algae coverage.	DFO	Basin Head Marine Protected Area Regulations
	• Establish 3 permanent monitoring transects within the Chondrus crispus bed.	DFO	Basin Head Marine Protected Area
	Long Term: • Maintain the biomass and coverage of Chondrus crispus to baseline data collected over the last 20 years.	DFO	Regulations Basin Head Marine Protected Area Regulations
Regulatory Conservation Objective: Maintain the overall ecological integrity of the Basin Head lagoon and inner channel	**Short Term:** • To continue Community Aquatic Monitoring Program to monitor trends in community abundance and diversity of fish and benthic invertebrates within Basin Head.	DFO	Basin Head Marine Protected Area Regulations
	• To create detailed contour maps of percent of cover by major plant species.	DFO	Basin Head Marine Protected Area Regulations
	Long Term: • Maintain the diversity of indigenous flora and fauna within the Basin Head Marine Protected Area.	DFO	Basin Head Marine Protected Area Regulations

Table 2: Basin Head MPA Non-Regulatory Conservation Objectives and Management Actions.

	Management Action	Lead Responsible	Related Legislation
Non-Regulatory Objective: To ensure the participation of interested and affected stakeholders in the operation of the MPA	**Short Term:** • Continuation of Advisory Board meetings to ensure stakeholder support and involvement.	Basin Head Advisory Board (with support from DFO)	Not applicable
	Long Term: • Investigate the possibility of establishing an Irish moss centre of expertise within the area.	DFO (with support from the University of PEI)	Not applicable
	• Increase Aboriginal involvement in the MPA.	DFO (with support from the Mi'kmaq Confederacy of PEI)	Not applicable
Non-Regulatory Objective: To increase the public awareness of the *Chondrus crispus*, the ecosystem of the Basin Head MPA and its conservation measures	**Short Term:** • To develop a Basin Head MPA website.	DFO (with support from Basin Head Advisory Board)	Not applicable
	• To enhance the existing on site laboratory to maximize education potential.	DFO (with support from the Basin Head Fisheries Museum)	Not applicable
	Long Term: • To increase public awareness through publication of brochures and involvement in community events.	DFO (with support from Basin Head Advisory Board)	Not applicable
	• Support the establishment of an Irish moss centre of expertise within the area.	DFO (with support from Basin Head Advisory Board)	Not applicable
Non-Regulatory Objective: To promote scientific research to increase the level of understanding of the Basin Head MPA	**Short Term:** • To continue to collaborate with Island Nature Trust and the University of Prince Edward Island to meet the monitoring requirements identified in the Operational Management Plan.	DFO	Not applicable
	• Development of Activity Plans and Approvals as outlined in Section 5.0 of the Basin Head MPA Regulations.	DFO	Basin Head Marine Protected Area Regulations
	Long Term: • To continue to identify potential partners for collaborative research projects.	DFO	Not applicable

	Management Action	Lead Responsible	Related Legislation
Non-Regulatory Objective: To maintain and enhance the quality of the Basin Head ecosystem	**Short Term:** • To continue to collaborate with Island Nature Trust and University of Prince Edward Island to meet the monitoring requirements identified in the Operational Management Plan.	DFO	Not applicable
	• Development of Activity Plans and Approvals as outlined in Section 5.0 of the Basin Head MPA Regulations.	DFO	Basin Head Marine Protected Area Regulations
	Long Term: • To implement best management practices to reduce the impact of nutrient enrichment on marine environmental quality within the Basin Head ecosystem.	DFO (with support from PEI Departments of Agriculture and Environment, Energy and Forestry)	Not applicable
	• To reduce the spread of aquatic invasive species in the Basin Head ecosystem.	DFO	Not applicable

4 GOVERNANCE

4.1 Roles and Responsibilities

The Department of Fisheries and Oceans (DFO) Canada is the sole responsible authority for administering the regulations governing human activities in the Basin Head MPA. The *Oceans Act* allows DFO to collaborate with a variety of stakeholders to manage projects under the MPA program.

Section 32 of the *Oceans Act* states that the Minister *may, on his or her own or jointly with another person or body or with another minister, board or agency of the Government of Canada, and taking into consideration the views of other ministers, boards and agencies of the Government of Canada, provincial and territorial governments and affected aboriginal organizations, coastal communities and other persons and bodies, including those bodies established under land claims agreements:*

- *establish advisory or management bodies and appoint or designate, as appropriate, members of those bodies, and*
- *recognize established advisory or management bodies.*

The Basin Head MPA Advisory Board has been established to help DFO effectively manage the area. This Advisory Board is comprised of members that are representative of the community, industry, aboriginal peoples, academia, conservation/ non-governmental organizations, municipal, provincial and federal governments with knowledge and experience relating to the ecology, management, conservation and use of the area.

The main objective of the Advisory Board is to provide ongoing advice and recommendations to DFO on the management and monitoring of the Basin Head MPA. While the Basin Head MPA Advisory Board does not have legal or delegated powers from DFO and does not replace the regulatory mandate or decision-making authority of existing bodies, it will play a major role in the implementation of the OMP.

The Province of Prince Edward Island is responsible for the management of activities on the lands adjacent to the Marine Protected Area. The Province is interested in engaging in watershed-based management across PEI. DFO and the Basin Head MPA Advisory Board will support the watershed management concept by endorsing and promoting the goals and objectives of integrated watershed management and apply them to Basin Head.

The Province of PEI is responsible for water quality testing with respect to the Canadian Shellfish Sanitation Program under a Memorandum of Understanding between the Province of PEI and Environment Canada. DFO and the Basin Head MPA Advisory Board may assist the Province with this responsibility.

4.2 Basin Head MPA Advisory Board Terms of Reference

The Terms of Reference establishes the roles and responsibilities for the Advisory Board and includes a commitment to ensure there is annual reporting for environmental and financial responsibilities. The Basin Head MPA Advisory Board will work collaboratively with, and report to, the federal-provincial Regional Committee on Oceans Management (RCOM) to ensure that the following tasks are undertaken as described in the Basin Head MPA OMP:

- primary research activities (conducted under approved research plans),
- monitoring programs (as established by the OMP),
- a communication strategy (as established by the OMP),
- collaboration with the municipality, the provincial government and federal departments to ensure regulatory compliance and jurisdictional issues are dealt with in the proper forum,
- draft financial and environmental reports, and
- review of the Advisory Board Terms of Reference every three years to ensure that membership and roles and responsibilities are still relevant.

As for the day to day requirements of managing the MPA, the following tasks are considered to be essential and will require coordination by DFO in consultation with the Basin Head MPA Advisory Board. These include but are not restricted to:

- arranging meetings and other logistics as required for Board business,
- acting as the contact for media and other communication requirements,
- supervising and scheduling field staff as directed by the Board and supporting research scientists, and
- completing financial and environmental annual reports (with assistance from field staff and researchers).

The Advisory Board will be co-chaired by DFO and another member to be determined by the Board. Advisory Board membership is outlined in Table 3 and is comprised of government departments and agencies with a direct role in ocean management as well as primary users of the MPA, as well as directly affected industrial sectors, conservation and academic interests.

The respective government agencies are expected to appoint their representatives through an internal decision-making process for a term to be determined by the Advisory Board. Non-government agencies will be invited by DFO to participate for a term to be determined by the Advisory Board. A member at large will be appointed by the Advisory Board.

Table 3: Basin Head MPA Advisory Board Membership

Stakeholder	Designate	Justification
Fisheries and Oceans (3 members)	PEI Area Director	Most Senior DFO representative on PEI
	Chief – Oceans & Habitat - PEI	Responsible for the Oceans Program on PEI
	Science Manager	Research and Monitoring capabilities
Province of PEI (2 members)	Department of Environment, Energy and Forestry	Responsible for Provincial Natural Areas Program and Environmental Protection Act
	Department of Tourism	Responsible for Basin Head Provincial Park
PEI Museum and Heritage Foundation	Basin Head Fisheries Museum	Responsible for on-site Basin Head Fisheries Museum
Eastern Kings Community Council	Appointment by Community Councillor	Responsible for Community Bylaws
Community (2 members)		Represent community views
Conservation Group	Island Nature Trust	Devoted to the protection and management of natural areas on PEI
Academia	University of PEI	Research and monitoring capabilities
Aboriginal Community	Mi'kmaw Confederacy of PEI	Ensure Aboriginal interests in Basin Head MPA
Fishing Industry	Appointment by PEI Fisherman's Association	Fishing is an important industry in the Basin Head area
Agriculture Industry	Appointment by Agricultural Community	Agriculture is an important industry in the Basin Head area
Member at Large	Appointed by Advisory Board	

All participants on the Advisory Board are expected to attend board meetings, contribute to discussion, review distributed materials and provide comments and advice in a timely manner. A quorum will be established by the Advisory Board.

The consensus-based recommendations from the Advisory Board will be forwarded to DFO for final decision. The Advisory Board will provide, via DFO, an annual report to the Regional Committee on Oceans Management (RCOM). DFO will develop a mechanism to identify annual budget requirements and to establish annual reporting protocols and requirements for environmental and financial responsibilities related to the Basin Head MPA. DFO will arrange any third party funding agreements, define schedules for any transfer of funds and develop reporting responsibilities on a year to year basis. DFO will also provide secretariat support. The extent of DFO funding will depend on annual budgets allocated to DFO Gulf Region.

5
ENFORCEMENT AND COMPLIANCE

Statutory authority for the Basin Head MPA and its regulations are in accordance with Sub-Section 35(3) of the *Oceans Act,* which states:

35. (3) The Governor in Council, on the recommendation of the Minister, may make regulations (*a*) designating marine protected areas; and (*b*) prescribing measures that may include but not be limited to (i) the zoning of marine protected areas, (ii) the prohibition of classes of activities within marine protected areas, and (iii) any other matter consistent with the purpose of the designation

Section 37 of the *Oceans Act* states that:

37. Every person who contravenes a regulation made under paragraph 35(3)(*b*) or an order made under subsection 36(1) in the exercise of a power under that paragraph (*a*) is guilty of an offence punishable on summary conviction and liable to a fine not exceeding $100,000; or (*b*) is guilty of an indictable offence and liable to a fine not exceeding $500,000

Enforcement responsibilities for the Basin Head MPA and regulations are derived from Sub-Section 39(1) of the *Oceans Act*, which states:

39. (1) The Minister may designate any person or class of persons to act as enforcement officers for the purposes of this Act and the regulations

The Basin Head MPA Advisory Board has identified a need for enforcement with respect to illegal fishing and the use of motorized vessels in areas of the MPA where these activities are not permitted. The Department of Fisheries and Oceans Canada, through the Conservation and Protection Branch of the Fisheries and Aquaculture Management Division, has the primary responsibility of enforcing these regulations. DFO Fishery Officers in Souris will serve as the primary deliverers of the compliance program and may be complemented by other law enforcement personnel (or enforcement officers so designated by the Minister according to Section 39 of the *Oceans Act*). A high level of local support for the MPA suggests that a community watch initiative will be formed to complement DFO surveillance activities.

6
PUBLIC AWARENESS AND EDUCATION

The Basin Head Area is one of the most visited areas in Eastern PEI. Basin Head beach currently attracts upwards of 75,000 visitors a year, while the Basin Head Fisheries Museum receives approximately 20,000 paying visitors per year, plus children and school trips. This provides an excellent opportunity to shine the spotlight on the MPA program as people can get up close to, and see, a Marine Protected Area. The following communications strategy outlines the steps for public communication of the Basin Head MPA.

This communications strategy aims to take advantage of the unique opportunity to partner with local residents, environmental organizations (Island Nature Trust), the aboriginal community and the Basin Head Fisheries Museum (owned and operated by the Province of Prince Edward Island).

The overall goal of this communications strategy is to ensure that all parties influenced by the MPA become aware of the OMP and the MPA regulations. It will also support public education on marine/coastal ecology and conservation in PEI.

The objectives of the strategy are to inform key stakeholders in the local communities surrounding Basin Head about the MPA, its regulations and the *Oceans Act*; to promote the collaboration process that has taken place since 1999 between DFO, the Province of PEI and the BHLECC; and to create awareness on the ecological, economic and cultural importance of Basin Head.

The audiences for the communications activities include:

- stakeholders (including, but not limited to, local landowners, fishing, agriculture, tourism and industrial sectors, environmental groups and community groups),
- aboriginal representatives,
- federal (including DFO), provincial and municipal levels of governments,
- academia,
- MPA community of practice, and
- media (local, provincial, national, and international).

6.1 Communication Tools

The following is a list of the different communication tools that may be used to inform stakeholders about the Basin Head MPA.

Basin Head Marine Protected Area Logo / Signage

Work has begun on the development of a logo for the Basin Head MPA. It is anticipated that this logo will be representative of the Basin Head MPA and will be used on all related communication material. This logo will appear on road signage to be developed in conjunction with the Province of PEI.

Display panels/Information Kiosks

Display panels developed in partnership with the Province of PEI have been installed to showcase the historical, cultural and ecological values of Basin Head, the *Oceans Act* and Marine Protected Areas. These displays will raise awareness of the Regulations to protect the MPA. An information station has also been developed at the Basin Head Fisheries Museum that allows for visitors to understand the types of research and monitoring that are ongoing throughout the MPA.

PHOTO: D. KEEN

Promotional Material

Promotional material (information sheets/ brochures/bookmarks) will be developed to inform visitors about the Basin Head MPA and its Regulations. This material will be available at the provincial tourism information centers and at the Basin Head Fisheries Museum.

Website

The development of a website would be very beneficial both from an environmental perspective as well as a tourism perspective. The potential opportunity for DFO or the Province to provide Internet space will be examined, as will the feasibility of the Advisory Board to access additional funds for website maintenance.

MPA Interpreter

Peak tourist times (June – August), may justify having an MPA interpreter, as the area is the object of many individual, family and school trips. Having an interpreter on site would significantly enhance education and public awareness opportunities. This interpretive role could perhaps be filled by the summer research staff or by Fisheries Museum staff. This item will be discussed during meetings with provincial representatives that will be held to determine how to cooperatively promote the Basin Head MPA.

Aboriginal Involvement

The eastern end of PEI is rich in early aboriginal culture. Paleo-Indian artefacts dating as far back as 9,000 years have been found at Basin Head and more recently Mi'kmaq people used the area seasonally for hunting and fishing. Efforts will be made to highlight significant examples of aboriginal cultural heritage within the Basin Head MPA.

7
MONITORING AND MANAGEMENT PLAN FOLLOW-UP

As discussed, success of the management actions to meet the MPA conservation objectives will be achieved through scientific and compliance monitoring. The Basin Head MPA OMP will be reviewed every three years with provisions for amendment on a continuing basis.

PHOTO: SARAH NEBEL

8
REFERENCES

DFO (Department of Fisheries and Oceans). 2002. Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada. Oceans Directorate. Ottawa, Ontario. 36p.

Island Nature Trust. 2001. Community use of the Basin Head Lagoon, Prince Edward Island. Report prepared by the Island Nature Trust for the Basin Head Lagoon Ecosystem Conservation Committee. 26p.

McCurdy, P. 1980. Investigation of a unique population of *Chondrus crispus* in Basin Head harbour, Prince Edward Island. Final report contract CS155-0-6302, 08-005 to National Research Council of Canada. 34p.

McCurdy, P. 1979. A preliminary study of the ecology of Basin Head harbour and South Lake PEI Final report, Canada Summer Job. Corps Project 16-01-009S. 57p.

Sharp, G., R. Semple, K. Connolly, R. Blok, D. Audet, D. Cairns and S. Courtenay. 2003. Ecological assessment of the Basin Head Lagoon: a proposed Marine Protected Area. Can. Manusc. Rep. Fish. Aquat. Sci. 2641:vi + 70p.

Thériault, M.H., S.C. Courtenay, C. Godin, and W.B. Ritchie. 2006. Evaluation of the Community Aquatic Monitoring Program (CAMP) to assess the health of four coastal areas within the Southern Gulf of St. Lawrence with special reference to the impacts of effluent from seafood processing plants. Can. Tech. Rep. Fish. Aquat. Sci. 2649: vii + 60p.

Appendix I:
The Basin Head Marine Protected Area Regulations

INTERPRETATION

1. (1) The following definitions apply in these Regulations.

"Area" means the Basin Head Marine Protected Area designated under section 2.

"vessel" has the same meaning as in section 2 of the *Canada Shipping Act*.

"waters" means, in addition to the waters, the seabed and subsoil below the waters to a depth of two metres.

(2) In these Regulations, all geographical coordinates (latitude and longitude) are expressed in the North America Datum 1983 (NAD 83) geodetic reference system.

(3) In the schedule, the lines connecting the points are rhumb lines.

DESIGNATION

2. The areas of the sea at Basin Head comprised of the management zones (figure 3) described below – and depicted in the schedule – are together designated as the Basin Head Marine Protected Area:

(*a*) Zone 1, consisting of waters lying generally northeast of a rhumb line connecting points at 46°23'20"N, 62°06'10"W and 46°23'18"N, 62°06'08"W, that are within an area of the sea bounded by the low-water line of the harbour and by the rhumb line to its points of intersection with the low-water line;

(*b*) Zone 2, consisting of waters that are within an area of the sea bounded by the low-water line of the harbour and by the following rhumb lines to their respective points of intersection with the low-water line, namely,

(i) a line connecting points at 46°23'20"N, 62°06'10"W and 46°23'18"N, 62°06'08"W, and

(ii) a line connecting points at 46°22'39"N, 62°06'29"W and 46°22'40"N, 62°06'29"W; and

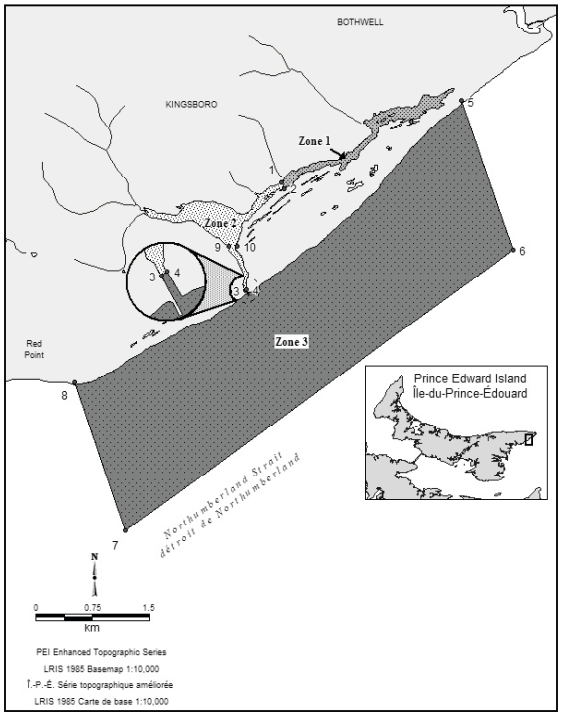
(*c*) Zone 3, consisting of waters that are within an area of the sea bounded by the low-water line of the Northumberland Straight and by the following rhumb lines, namely,

(i) to its points of intersection with the low-water line, a line connecting points at 46°22'39"N, 62°06'29"W and 46°22'40"N, 62°06'29"W,

(ii) to its point of intersection with the low-water line, a line connecting points at 46°23'51"N, 62°04'30"W and 46°22'55"N, 62°04'02"W,

(iii) a line connecting points at 46°22'55"N, 62°04'02"W and 46°21'07"N, 62°07'36"W, and

(iv) to its point of intersection with the low-water line, a line connecting points at 46°21'07"N, 62°07'36"W and 46°22'04"N, 62°08'04"W.



PROHIBITED ACTIVITIES

3. (1) In the Area, no person shall

(*a*) disturb, damage or destroy, or remove from the Area, any living marine organism or any part of its habitat; or

(*b*) carry out any activity — including depositing, discharging or dumping any substance, or causing any substance to be deposited, discharged or dumped — that is likely to result in the disturbance, damage, destruction or removal of a living marine organism or any part of its habitat.

(2) Despite subsection (1), a person may carry out any activity excepted under section 4 or any scientific or educational activity for which a plan is approved under section 6.

EXCEPTIONS

4. The following activities may be carried out in the Area:

(*a*) the following fishing activities, namely,

(i) fishing that is carried out in accordance with the *Aboriginal Communal Fishing Licences Regulations*,

(ii) in Zone 2 or 3, any recreational fishing activity that is carried out in accordance with the *Maritime Provinces Fishery Regulations* or the *Wildlife Conservation Act* of Prince Edward Island, R.S.PEI. 1988, c. W-4.1, as amended from time to time, and

(iii) in Zone 2 or 3, any commercial fishing activity that is carried out in accordance with the *Atlantic Fishery Regulations, 1985* or the *Maritime Provinces Fishery Regulations*;

(*b*) in Zone 2, the operation of a motorized vessel south of a rhumb line connecting points at 46°22'56"N, 62°06'39"W and 46°22'56"N and 62°06'34"W solely for the purpose of transiting that area in order to launch the vessel from, or land it at, a boat launch;

(*c*) any of the following activities — in relation to which approval or authorization is not required under the *Navigable Waters Protection Act* or the *Fisheries Act*, as the case may be, or that is carried out in accordance with an approval or authorization required under either of those Acts — namely,

(i) in Zone 2, the maintenance, repair or removal of a bridge, wharf or boat launch, and

(ii) in Zone 3, the maintenance, repair or removal of a bridge or wharf; and

(*d*) any activity that is carried out for the purpose of public safety, national defence, national security or law enforcement or in response to an emergency.

ACTIVITY PLAN

5. Every person who proposes to carry out a scientific or an educational activity in the Area shall submit to the Minister for approval, not less than 60 days before the day on which the activity is proposed to begin, a plan that contains the following information and documents:

(*a*) the name, address and telephone number and, if applicable, the facsimile number and electronic mail address of a person who can be contacted in respect of the plan;

(*b*) a detailed description of the proposed activity that sets out

(i) its purpose,

(ii) the period or periods during which it is to be carried out,

(iii) a map on which its location is identified,

(iv) the types of data that are to be collected, if any, and the sampling protocols or other techniques to be used to collect the data,

(v) the types of equipment, if any, that are to be used during the proposed activity, including those for gathering data and, if any of the equipment is to be anchored or moored in the Area, the methods by which the anchoring or mooring is to be conducted,

(vi) the type and identity of every vessel that is to be used to carry out the proposed activity, and

(vii) every substance, if any, that is to be deposited, discharged or dumped within the Area during the proposed activity;

(*c*) an assessment of the environmental effects that are likely to occur within the Area as a result of the proposed activity; and

(*d*) a list of every licence, permit, authorization or consent obtained or applied for in respect of the proposed activity.

6. (1) The Minister shall, within 30 days after the day on which a plan that is submitted in accordance with section 5 is received, approve the plan if the proposed activity is not likely to damage or destroy the habitat of a living marine organism in the Area and

(*a*) in the case of a scientific activity that is proposed to be carried out in Zone 1, the activity is for the purpose of managing the Area or monitoring the effectiveness of conservation measures implemented in the Area; and

(*b*) in the case of an educational activity that is proposed to be carried out in Zone 1, the activity is for the purpose of increasing public awareness of the Area or providing information in respect of the conservation measures implemented in the Area.

(2) Despite subsection (1), the Minister shall not approve a plan if the cumulative environmental effects of the proposed activity, in combination with any other past and current activities carried out within the Area, are likely to damage or destroy the habitat of living marine organisms in the Area.

REPORTING OF ACCIDENTS

7. Every person involved in an accident that is likely to result in any disturbance, damage, destruction or removal prohibited under subsection 3(1) shall, within two hours after its occurrence, report the accident to the Canadian Coast Guard.

COMING INTO FORCE

8. These Regulations come into force on the day on which they are registered.

Appendix II:
Application for Approval to Conduct Research/Educational Activities in the Basin Head MPA.

(Insert Title Here)

Application submitted (date):

Contact Information		
Applicant:	*Telephone:*	*E-mail:*
Chief Research Scientist/Educator:	*Telephone:*	*E-mail:*

Detailed Description Of Proposed Activity
Purpose of Proposed Activity:
Period(s) during which the proposed activity is to be carried out:
Location of the proposed activity (attach map if necessary)
Type of data to be collected, and the sampling protocols or other techniques to be used to collect data:
Type(s) of equipment that are to be used during the proposed activity (including those for gathering data). If any of the equipment is to be anchored or moored in the Area, the methods by which the anchoring or mooring is to be conducted must be indicated.
Type of every vessel that is to be used to carry out the project:
A description of every substance, if any, that is to be deposited, discharged or dumped within the Area during the proposed activity:

Include an assessment of the environmental effects that are likely to occur within the Area as a result of the proposed activity

List of every licence, permit, authorization or consent obtained or applied for in respect of the proposed activity. A Scientific Collection Licence from Fisheries and Oceans is required for any collection of aquatic species.
Monitoring and Evaluation

References

Appendix III

Conservation and Marine Environmental Quality Objectives, Identified Triggers and Management Protocols for Monitoring in the Basin Head MPA.

Conservation Objective	Marine Environmental Quality Objective	Indicators and Monitoring Protocols	Triggers	Responsibility
Maintain the quality of the marine environment supporting the *Chondrus crispus*.	Maintain water quality at minimum to baseline data collected for the last 6 years	6 water quality monitoring stations: 4 on the inner channel (for the purpose of monitoring expansion of anoxic conditions), one in main basin, one at the ocean entrance channel: Sample these stations twice monthly from May 1 to Oct. 30. Analyze surface water samples at each station for, nitrate, nitrites, phosphates (soluble), suspended solids. Monitor temperature in the inner channel station and the main basin with recording thermographs. Measure, temperature, O_2 and salinity at each sampling station. Once every three years sample 3 stations in the basin for *E.coli* contamination (done through CSSP).	Management action needed when water quality indicators show persistent increases in either N or P (i.e. over three summers) and persistent anoxic conditions and expansion toward the *Chondrus* bed.	DFO DFO DFO DFO DFO Provided to Province of PEI through MoU with Environment Canada.

Conservation Objective	Marine Environmental Quality Objective	Indicators and Monitoring Protocols	Triggers	Responsibility
Maintain the physical structures of the ecosystem supporting the *Chondrus crispus*.	Maintain the integrity of the basin, the dune structure, the ocean opening, flushing and limit the erosion of land into the basin.	Monitor erosion in the watershed area and land usage: Aerial photography either directed by or obtained from the Province of PEI. Establish the limits of the barrier dune structure at the northern limit and in the area of the ocean entrance (combine with 3 year survey of algal cover). Based on the above evaluate any water circulation changes that may result using a model. Monitor municipal land use and permit approval data.	Changes in flushing rates from baseline data.	DFO DFO/ Province of PEI DFO DFO DFO with Eastern Kings Community Council

Conservation Objective	Marine Environmental Quality Objective	Indicators and Monitoring Protocols	Triggers	Responsibility
Maintain health (biomass and coverage) of Basin Head *Chondrus crispus*	Maintain the biomass and coverage of *Chondrus crispus* to baseline data collected for the last 20 yrs	To quantify coverage of the *Chondrus* bed and other algae: Once every 3 years develop a photo mosaic of the entire basin or at a minimum the inner channel in mid to late July. Establish 3 permanent monitoring transects using geographical positioning (GPS) in the *Chondrus* bed of the inner channel; 50 metres apart at the southern edge, northern edge and in the centre of the bed. Once every three years map the distribution and abundance of *Chondrus* and associated plant species on these transects.	Take management action if there are declining trends in *Chondrus* biomass and bed size from baseline data. (Current variation in Chrondus biomass is 40% and *Chondrus* bed size is 10-15%/ year). DFO	DFO DFO DFO DFO

Conservation Objective	Marine Environmental Quality Objective	Indicators and Monitoring Protocols	Triggers	Responsibility
Maintain the overall ecological integrity of the Basin Head lagoon and inner channel.	Maintain diversity of indigenous flora and fauna Avoidance of excessive *Ulva* growth, maintenance of adequate oxygen levels.	Community Aquatic Monitoring Program (CAMP) sampling at 6 sites from May to September (includes species richness, abundance and life history).	Increasing coverage of *Ulva*, and/or decreasing coverage of *Zostera* and *Chondrus*.	DFO
		Other data to be collected as part of the CAMP program include: 3 random quadrats to quantify vegetation at each site; measure salinity, temperature and dissolved oxygen, and sediment sampling once in September.	Early season invasion of major *Ulva* growth. Declining trends in community abundance and diversity of fishes and benthic invertebrates over time.	DFO
		Create detailed contour maps of percent of cover by major plant species (*Ulva, Chondrus, Zostera*) using glass bottom boat or other suitable survey methods. Repeat survey at least once every three years.		DFO