



## **Basin Head Marine Protected Area: 2012-2013 Management Plan Implementation Progress Report**

Fisheries and Oceans Canada, Gulf Region  
343 Université Avenue, P.O. Box 5030  
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2015

**Gulf Region Basin Head Management Series 2015/01**





## **Gulf Region Basin Head Management Series**

The Gulf Region Basin Head Management series of publications are reports on management initiatives and monitoring undertaken in the Basin Head Marine Protected Area in the Gulf Region. This series consist of monitoring progress report, operational management plan, consultant reports, scientific studies, workshops and other public documents related to the Basin Head Marine Protected Area. The Basin Head Management series was established in 2013. Reports in this series have been written by or prepared under the guidance of staff of the Department of Fisheries and Oceans - Gulf Region. The content of this series is meant as a source of information for public and internal dissemination.

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La série de publications sur la gestion de Basin Head de la Région du Golfe regroupe des rapports au sujet d'initiatives de gestion et de monitoring entreprit dans la zone de protection marine de Basin Head dans la région du Golfe. Cette série se compose principalement de rapport de progrès sur le monitoring effectué à Basin Head, plan de gestion opérationnel, d'études scientifique, de rapports de consultants, d'ateliers et d'autres documents publics relié à la zone de protection marine de Basin Head. La série sur la gestion de Basin Head a été créée en 2013. Ces rapports ont été rédigés par le personnel du Ministère de Pêches et Océans ou ont été préparés sous la direction de ceux-ci – dans la Région du Golfe. Le contenu de cette série se veut une source d'information pour une diffusion publique et interne.




Gulf Region Basin Head Management Series

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2012-2013 MANAGEMENT PLAN IMPLEMENTATION PROGRESS REPORT

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## **ABSTRACT**

This Progress Report for the Basin Head Marine Protected Area outlines the activities and monitoring associated with the four regulatory conservation objectives that occurred during the 2012-13 fiscal year. This report also highlights the different management actions taken in 2012-13 and the future steps and priorities for the integrated management of the Basin Head Marine Protected Area.

## **RÉSUMÉ**

Ce rapport de progrès pour la zone de protection marine de Basin Head décrit les activités et la surveillance associée avec les quatre objectifs de conservation réglementaires qui ont eu lieu au cours de l'année financière 2012-13. Ce rapport met également en lumière les différentes mesures de gestion prises en 2012-13 ainsi que les prochaines étapes et les priorités pour la gestion intégrée de la zone de protection marine de Basin Head.





## 1.0 INTRODUCTION

The Basin Head Marine Protected Area (MPA) was designated on September 26, 2005. This MPA has been established via regulations under the statutory authority of Canada's *Oceans Act* (Basin Head Marine Protected Area Regulations).

The MPA encompasses Basin Head, a tidal inlet and harbour, as well as an adjacent offshore buffer zone, in eastern Prince Edward Island within the Gulf of St. Lawrence bioregion (Figure 1). The MPA was designated by regulations to conserve and protect a unique form of an otherwise common marine alga, Irish moss (*Chondrus crispus*). This form of *Chondrus* is thought to exist only within the confines of Basin Head. It is believed that certain habitat conditions within the inlet, not yet understood, give rise to this form of *Chondrus*. Thus the MPA was designated under the *Oceans Act* Section 35, paragraph (1) c (conservation and protection of unique habitats), as well as paragraph (1) e.

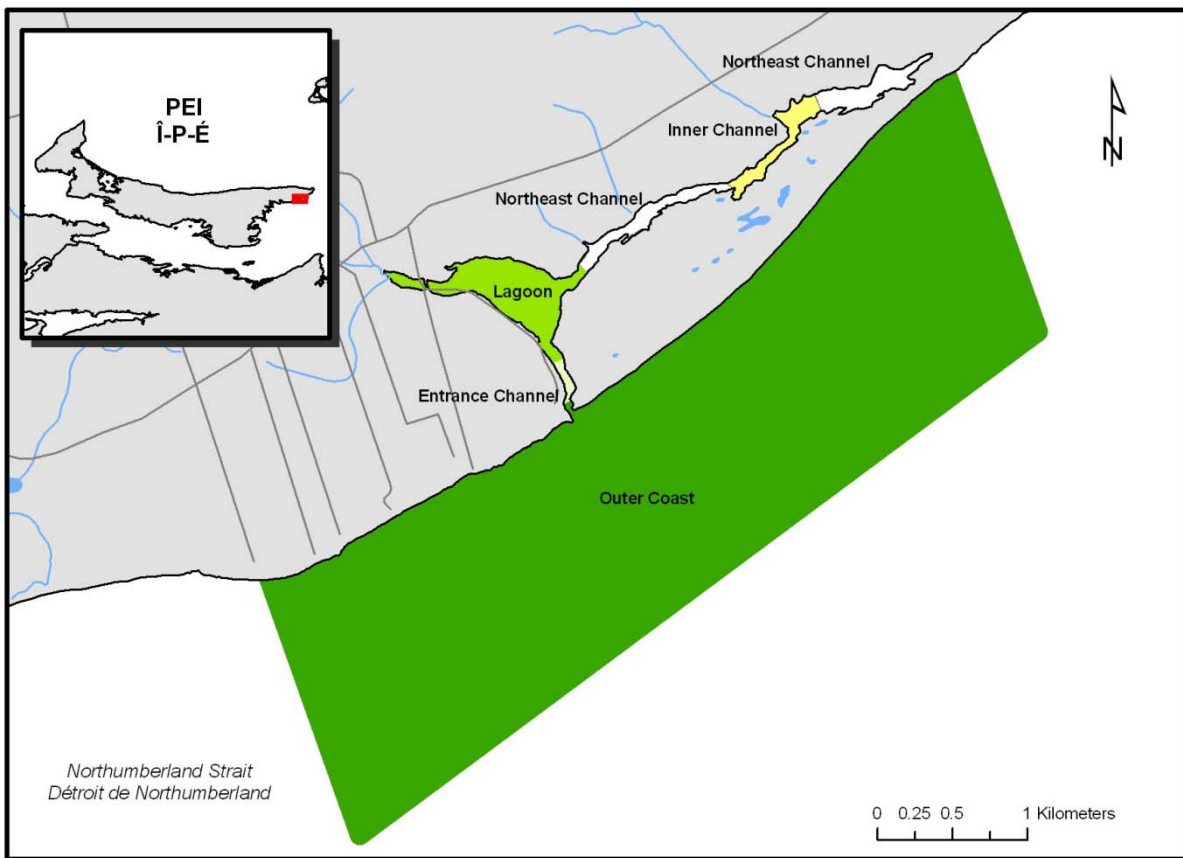



Figure 1: Basin Head Marine Protected Area

The Basin Head MPA Operational Management Plan (OMP) was written in 2009, to serve as a guide for informed decisions in the management of this unique ecosystem. The management plan forms the basis for development of comprehensive conservation and management strategies. It provides information on regulatory measures, monitoring, enforcement and compliance, managing certain human activities via an activity approval process and other non-



regulatory management measures. It also provides the detail required to ensure that management decisions, prohibitions, and activity applications processes are clearly understood.

Personnel from Ecosystems Management, Fisheries and Oceans Canada (DFO), Gulf Region are responsible for efforts at achieving the objectives described in the OMP. Management of the MPA is also guided by the advice of the local community and stakeholders, other federal and provincial government departments, and Aboriginal groups, acting through the Basin Head MPA Advisory Board.


The Basin Head MPA OMP is intended to serve as a “living” document which may be amended as required to ensure management objectives and monitoring requirements are met. The OMP is scheduled to be reviewed every five years with provisions for amendments on a continuing basis. The periodic reviews will examine the conservation objectives of the MPA to determine if they remain appropriate, evaluate the success of management actions in achieving the conservation objectives, and identify emerging priorities for subsequent reviews of the OMP.

A scientific finding on the further decline of the Basin Head *Chondrus* reported in September 2012 has led to a decision to delay the scheduled review of the Operational Management Plan (2009), while discussions are held on possible further actions to maintain at least a minimal amount of the Basin Head *Chondrus* form within the MPA, or on changes to the existing OMP conservation objectives to reflect the evolving ecological conditions.

The purpose of this Progress Report is to record activities in the Basin Head MPA during 2012-2013 fiscal year. This report and past reports will serve as guides for the Operational Management Plan review, which will be completed in 2015.

## **2.0 MANAGEMENT HIGHLIGHTS FOR 2012-2013**

- Regular monitoring for water quality, microbiology, and aquatic species populations was performed during summer and autumn of 2012.
- A scientific survey carried out in September 2012 revealed a further significant decline in the *Chondrus* biomass in the MPA. It was found that a continuous bed of *Chondrus* no longer exists, and that the *Chondrus* now survives only as isolated clumps with a total combined cover of less than 2 m<sup>2</sup>.
- A draft scientific paper whose principal author is Dr. David Cairns, DFO Gulf Region’s scientist overseeing scientific activities in the Basin Head MPA, examined recent and historical data to test three hypotheses which may explain the *Chondrus* decline: nutrient enrichment; climate change; and activities of the invasive green crab (*Carcinus maenas*).
- On the basis of these analyses, the authors of the draft paper suggested that the invasive green crab and its activities (predation of mussels; digging and disruption of substrate; direct herbivory of *Chondrus*) are a plausible trigger for the Irish moss collapse. They also suggested that nutrient enrichment and eutrophication may have stressed Basin Head *Chondrus*, leaving it susceptible to other disturbances.

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- The Memorandum of Understanding between DFO Gulf Region and the National Research Council, for the maintenance of 10 kg of Basin Head *Chondrus* at the NRC's Sandy Cove facility, was renewed for 2012-2013.
  - The Basin Head Marine Protected Area Advisory Board held a meeting on October 17, 2012 at the Eastern Kings Community Center. It was intended as a general information sharing meeting, but the principal subject of discussion was the results of the September 2012 *Chondrus* survey, and the limited prospects for recovery of the natural *Chondrus* biomass within the MPA.
  - A follow-up meeting of the Advisory Board was held in Charlottetown on December 12, 2012, to present the results of Dr. Cairns' (et al.) research document cited above. Glyn Sharp, DFO Scientist Emeritus, participated by telephone link, and suggested it would be possible to maintain some *Chondrus* within the MPA using artificial growing and maintenance techniques (essentially aquaculture).
  - Policy advice was sought from DFO's National Headquarters on artificial maintenance of organisms in MPAs.

### 3.0 CONSERVATION OBJECTIVES AND ACTIONS TAKEN

Conservation objectives describe the desired ecological outcome of establishing an MPA and are based on the best available scientific and traditional ecological knowledge. These objectives guide the MPA establishment and management process by providing the basis for determining management measures. They also allow the setting of limits within which the nature and magnitude of human impacts on ecosystems and/or key ecological features of the MPA are assessed. Economic opportunities compatible with these conservation objectives may be permitted within the MPA or within specific zones.

There are 4 conservation objectives for Basin Head 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.

Management actions taken during the 2012-13 fiscal year to fulfill short and long-term management goals for both regulatory and non-regulatory conservation objectives are shown in Table 1 and 2, respectively.

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

	Management Goals	Action Taken in 2012-2013
<p><b>Regulatory Conservation Objective:</b></p> <p>Maintain the quality of the marine environment supporting the <i>Chondrus crispus</i></p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>To maintain twice-monthly water quality monitoring (May through November) at 6 water stations within the MPA. Information will be collected on nitrate, nitrites, phosphates, suspended solids, temperature, oxygen and salinity (<u>Note: the monitoring in this goal has been expanded to the end of November</u>).</li> <li>To monitor water temperature in the inner channel station and the main basin.</li> <li>To monitor 3 stations in the basin to test for <i>E.coli</i> contamination</li> </ul> <p><b>Long Term:</b> By using the data collected, determine if there is a significant decline in the quality of the marine environment supporting the <i>Chondrus crispus</i>.</p>	<p>11 sites were sampled weekly to biweekly from June to Sept 2012, near high tide. Sampling was extended to the end of November 2012.</p> <p>Temperature loggers were deployed and water temps were taken weekly/biweekly.</p> <p>Canadian Shellfish Sanitation Program (CSSP) sampling conducted in 2012.</p> <p>Research paper developed on cause of steep <i>Chondrus</i> decline since 2007 (Cairns et al. unpubl.).</p> <p>Prince Edward Island Wildlife Federation (PEIWF) – Souris and Area Branch monitored Young’s Hill Rd. as a point source of sediments; reported condition of boat slip to Province, as well as condition of Bothwell Beach Rd.; no stream cleaning done in 2012.</p>
<p><b>Regulatory Conservation Objective:</b></p> <p>Maintain the physical structures of the ecosystem supporting the <i>Chondrus crispus</i></p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>Establish the limits of the barrier dune structure at the ocean entrance and northern limit.</li> </ul> <p><b>Long Term:</b></p> <ul style="list-style-type: none"> <li>Using underwater video imaging, monitor the usage and erosion of the watershed area. (<u>Note: this goal changed from using aerial photography</u>)</li> <li>Monitor municipal land use and permit approval data.</li> </ul>	<p>An estuary model, which was developed by DFO in 2011, can be used to study scenarios of physical changes to the dune system and entrance channel. No further action taken in 2012-2013</p> <p>Aerial photography deemed no longer feasible due to extent of <i>Chondrus</i> decline. Equipment was developed and installed on boat for underwater imaging and transects measurement. This was unsuccessful due to <i>Chondrus</i> presence as clumps only. <i>Chondrus</i> bed no longer exists.</p> <p>On-going; no issues arising in 2012-2013.</p>

	Management Goals	Action Taken in 2012-2013
	<ul style="list-style-type: none"> <li>Develop water circulation model to evaluate any water circulation changes.</li> </ul>	Hydrological model integral to the Estuary Model noted above, which is consistent with field results. No further action taken in 2012-2013.
<p><b>Regulatory Conservation Objective:</b></p> <p>Maintain the health (biomass and coverage) of Basin Head <i>Chondrus crispus</i></p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>To initiate a photo mosaic of the entire basin every three years to quantify the <i>Chondrus crispus</i> and green algae coverage.</li> <li>Establish 3 permanent monitoring transects within the <i>Chondrus crispus</i> bed.</li> </ul> <p><b>Long Term:</b></p> <ul style="list-style-type: none"> <li>Maintain the biomass and coverage of <i>Chondrus crispus</i> to baseline data collected over the last 20 years.</li> </ul>	<p>5 shore stations overlooking the Lagoon and NE Arm were selected; photographs were taken from April to November, to establish record of green alga (<i>Ulva</i>) growth.</p> <p>Aerial photography deemed no longer feasible for <i>Chondrus</i> monitoring due to extent of <i>Chondrus</i> decline. A direct imagery system using underwater video mounted on a flat-bottomed boat was developed for use in 2012.</p> <p>This has not been successful; immediate cause of the <i>Chondrus</i> decline may be the invasive green crab, as per draft scientific paper (Cairns et al. unpubl.). This paper to be reviewed in Special Science Response document expected for April 2013.</p> <p>MOU with NRC renewed for maintenance of Basin Head <i>Chondrus</i> culture (10 kg) at NRC research facility at Sandy Cove, Nova Scotia.</p>
<p><b>Regulatory Conservation Objective:</b></p> <p>Maintain the overall ecological integrity of the Basin Head lagoon and inner channel.</p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>To continue Community Aquatic Monitoring Program to monitor trends in community abundance and diversity of fish and benthic invertebrates within Basin Head.</li> <li>To create detailed contour maps of percent of cover by major plant species.</li> </ul> <p><b>Long Term:</b></p> <ul style="list-style-type: none"> <li>Maintain the diversity of indigenous flora and fauna within the Basin Head Marine Protected Area.</li> </ul>	<p>CAMP Program conducted in 2012 from June to September.</p> <p>Ongoing monitoring via CAMP</p> <p>Not initiated but baseline exists for <i>Ulva</i> and <i>Chondrus</i>.</p>

Table 2 outlines the activities associated with non-regulatory objectives of the MPA, and identifies management actions and those taken in 2012-2013 for achieving those objectives.

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

	<b>Management Goal</b>	<b>Action Taken in 2012-2013</b>
<p><b>Non-Regulatory Objective:</b></p> <p>To ensure the participation of interested and affected stakeholders in the operation of the MPA.</p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>Continuation of Advisory Board meetings to ensure stakeholder support and involvement.</li> </ul> <p><b>Long Term:</b></p> <ul style="list-style-type: none"> <li>Investigate the possibility of establishing an Irish moss centre of expertise within the area.</li> <li>Increase Aboriginal involvement in the MPA.</li> </ul>	<p>Advisory board meetings held in October and December 2012. Follow-up meeting scheduled in March 2013 was delayed to await DFO (NHQ) MPA policy advice and Special Science Response. To be followed up.</p> <p>Deferred to next fiscal year.</p> <p>Deferred to next fiscal year.</p>
<p><b>Non-Regulatory Objective:</b></p> <p>To increase the public awareness of the <i>Chondrus crispus</i>, the ecosystem of the Basin Head MPA and its conservation measures.</p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>To develop a Basin Head MPA website.</li> <li>To enhance the existing on site laboratory to maximize education potential.</li> </ul> <p><b>Long Term:</b></p> <ul style="list-style-type: none"> <li>To increase public awareness through publication of brochures and involvement in community events.</li> <li>Support the establishment of an Irish moss centre of expertise within the area.</li> </ul>	<p>No action taken in 2012-13; existing info link to DFO site; PEI Wildlife Federation site partnering in highlighting the MPA.</p> <p>No further action required in 2012.</p> <p>On-going. Brochures available at Museum. Preliminary planning initiated for interactive computer kiosks to be installed in Basin Head Museum.</p> <p>PEIWF – Souris and Area Branch communicates regularly to local stakeholders through the “Souris &amp; Area Watershed News” on any activity that involved Basin Head.</p> <p>Deferred to next fiscal year.</p>
<p><b>Non-Regulatory Objective:</b></p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>To continue to collaborate with</li> </ul>	<p>A contract with PEIWF – Souris and</p>

	<b>Management Goal</b>	<b>Action Taken in 2012-2013</b>
To promote scientific research to increase the level of understanding of the Basin Head MPA.	<p>Island Nature Trust and the University of Prince Edward Island to meet the monitoring requirements identified in the Operational Management Plan.</p> <ul style="list-style-type: none"> <li>• Development of Activity Plans and Approvals as outlined in Section 5.0 of the Basin Head MPA Regulations.</li> </ul> <p><b>Long Term:</b></p> <ul style="list-style-type: none"> <li>• To continue to identify potential partners for collaborative research projects.</li> </ul>	<p>Area Branch, was in place to provide assistance with the summer and fall monitoring program.</p> <p>Approval Process in Place; activity plans for 2012 season submitted and approved.</p> <p>On-going; PEIWF – Souris and Area Branch contracted to provide monitoring assistance plus engagement in the greater watershed initiative.</p>
<p><b>Non-Regulatory Objective:</b></p> <p>To maintain and enhance the quality of the Basin Head ecosystem.</p>	<p><b>Short Term:</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Development of Activity Plans and Approvals as outlined in Section 5.0 of the Basin Head MPA Regulations.</li> </ul> <p><b>Long Term:</b></p> <ul style="list-style-type: none"> <li>• To implement best management practices to reduce the impact of nutrient enrichment on marine environmental quality within the Basin Head ecosystem.</li> <li>• To reduce the spread of aquatic invasive species in the Basin Head ecosystem.</li> </ul>	<p>A contract with PEIWF – Souris and Area Branch, was in place to provide assistance with the summer and fall monitoring program.</p> <p>Approval Process in Place; activity plans for 2014 season were submitted and approved.</p> <p>No action taken in 2012-2013. It is reported that farmers are more diligent in the use of fertilizer, partly because of the cost; also new farm practices are being tried or considered for soil conservation.</p> <p>Monitored through the Aquatic Invasive Species program (AIS) and CAMP; no additional invasive species reported in the Lagoon in 2012.</p> <p>Continued implementation of the Basin Head Watershed Management Plan.</p>

#### 4.0 ACTIVITY PERMIT APPLICATIONS

MPA regulations recognize that certain activities within an MPA may be consistent with conservation objectives. For some of these activities, Basin Head MPA regulations stipulate

requirements for activity plan submissions and specify approval conditions. Ministerial approval of activity plans is one of the primary means of governing the activities proponents undertake in MPAs.

Proposed activity plans are reviewed to assess environmental impacts of the individual activity along with cumulative effect of all activities in the MPA, and to ensure that the activity is for the purpose of the conservation and/or management of the MPA, or for allowable scientific or educational purposes. Thus the requirement of the submission of an activity plan for certain activities is an important regulatory mechanism used to limit human impacts in MPAs before they occur. Activity approvals for the 2012-13 field season are shown in Table 3.

Table 3: Activity Approvals in Basin Head MPA

Study Name	Researcher	Affiliation	Purpose	Date
Deployment of Water quality monitoring package (sonde)	G. Bugden	DFO - BIO	Seasonal record of water quality parameters.	March 14 2012
Trapping Green crabs; acoustic tracking	A. Locke	DFO - Gulf	Trap green crabs for gut content analysis; acoustic tracking of crabs tagged in 2011.	May 14 2012
Irish Moss clump dynamics	G. Sharp	DFO - BIO	Determine dynamics of clump formation and degradation	May 14, 2012
Chondrus bed survey	H. Vandermeulen	DFO- MAR	Visual survey using underwater video equipment mounted on boat	Feb. 2 2012
Community Aquatic Monitoring Program	M.-H. Thériault	DFO - Gulf	Monitor marine environment of estuary	Feb 10 2012
Temperature loggers	D. Cairns	DFO - Gulf	Provide a long-term and continuous temperature record for Basin Head	March 27 2012
Water quality monitoring	D. Cairns	DFO-Gulf	weekly water sampling for nutrient analysis	March 27 2012


## 5.0 ENFORCEMENT AND COMPLIANCE

No enforcement issues were identified in the fiscal year 2012- 2013.

## 6.0 PUBLIC AWARENESS AND EDUCATION

Public education and outreach are critical factors in ensuring the long term success of an MPA. Compliance with MPA regulations is higher when community members, MPA users and the general public are aware of objectives and management strategies of an MPA. Education and





outreach tools are most effective when they target appropriate user groups, stakeholders and the public, present a straightforward message, and use the most appropriate product to communicate the message.

Currently brochures and display panels explaining the purpose of the MPA are available to the public at the nearby Basin Head Fisheries Museum.

Planning as well as preparation of texts have begun for an interactive display kiosk at the Basin Head Museum, using computer monitors with touch-screen technology to give historical and biological information on Basin Head, as well as general information on the Canadian MPA program. The texts and images may also serve to produce updated brochures.

## 7.0 NEXT STEPS AND PRIORITIES

Fisheries and Oceans Canada will focus on several priorities related to the implementation of the management plan in the next fiscal year. Priorities include:

- Continue annual monitoring of water quality and biota, at established levels of effort likely to be sustainable for the mid- and long-term.
- Follow-up on policy advice from DFO National Headquarters concerning artificial maintenance of organisms in Marine Protected Areas; as well as results of the Special Science Response on the immediate cause of the *Chondrus* decline, in deciding whether to maintain artificial culture of *Chondrus* in Basin Head.
- The revision of the Basin Head Operational Management Plan, with changes to, or removal of, redundant non-regulatory objectives, has been rescheduled for the autumn of 2013 (FY 2013-2014).
- Consider changes in focus for conservation, in light of *Chondrus* decline.

## 8.0 REFERENCES

Basin Head MPA Regulations, Canada Gazette Part 1, June 18, 2005.

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