

COINAtlantic User Needs – Applications Workshop Report

*Workshop held on 28 March 2008
at the Maritime Museum of the Atlantic
in Halifax, Nova Scotia*

Workshop organized by the ACZISC Secretariat



*Atlantic Coastal Zone
Information Steering Committee*

7 April 2008

COINAtlantic User Needs - Applications Workshop Report

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COINAtlantic

COINAtlantic – the **Coastal and Ocean Information Network for Atlantic Canada** (see <http://COINAtlantic.ca>) is an initiative of the ACZISC. COINAtlantic will develop, implement and sustain a network of data providers and users that will support secure access to data, information and applications, for decision-making by coastal and ocean managers and users of coastal and ocean space and resources. Phase 1 of COINAtlantic is being built with financial support from GeoConnections and in collaboration with many partners.

ACZISC

The Atlantic Coastal Zone Information Steering Committee (ACZISC) was established in January 1992 to foster cooperation in Atlantic Canada with regards to integrated coastal and ocean management (ICOM), coastal mapping and geomatics (see <http://aczisc.dal.ca>).

GeoConnections

GeoConnections, a national program initiative led by Natural Resources Canada, helps decision-makers use online location-based (or "geospatial") information, such as maps and satellite images, to tackle some of Canada's most pressing challenges (see <http://www.geoconnections.ca>).

User-Centred Design Principles

User-centered design (UCD) is a design philosophy and a process in which the needs, wants, and limitations of the end user of an interface or document are given extensive attention at each stage of the design process. User-centered design can be characterized as a multi-stage problem solving process that not only requires designers to analyze and foresee how users are likely to use an interface, but to test the validity of their assumptions with regards to user behaviour in real world tests with actual users. Such testing is necessary as it is often very difficult for the designers of an interface to understand intuitively what a first-time user of their design experiences, and what each user's learning curve may look like.

The chief difference from other interface design philosophies is that user-centered design tries to optimize the user interface around how people can, want, or need to work, rather than forcing the users to change how they work to accommodate the system or function - see http://en.wikipedia.org/wiki/User-centered_design.

Developers should decide who the users will be and to involve them at the earliest possible opportunity. A number of ways of becoming familiar with users, their tasks and requirements are suggested:

- Talk with users
- Observe users working
- Learn about work organization
- Get users to think aloud while working
- Include expert users on the design team
- Make use of surveys and questionnaires
- Visit customer locations
- Videotape users working
- Try it yourself
- Participative design
- Perform task analysis
- Develop testable goals

http://www.ts.mah.se/RUP/RationalUnifiedProcess/process/workflow/requirem/co_ucd.htm

A list of recent users needs studies of relevance to COINAtlantic and integrated coastal and ocean management (ICOM) was compiled by the ACZISC Secretariat in 2005 and is included in Appendix 1.

A **COINAtlantic User Needs – Applications Workshop**, organized by the ACZISC Secretariat, was held at the Maritime Museum of the Atlantic in Halifax, Nova Scotia on Friday, 28 March 2008 – see Appendix 2. This document summarizes the Workshop proceedings and the first steps of the COINAtlantic/GeoConnections development and implementation plan. Data providers, application developers and users were brought together to review the Implementation Plan. Additional interaction is planned at subsequent meetings to ensure the continued application of user-centred design in the development and implementation of COINAtlantic – see <http://COINAtlantic.ca>.

Morning Session

The workshop commenced with an introduction to COINAtlantic. Michael Butler, Director, ACZISC Secretariat, welcomed participants; this was followed by a roundtable introduction of the participants – see Section 4. He continued with a brief overview of the ACZISC and the 20-year history of ICOIN/COIN and the purpose of COINAtlantic.

Paul Boudreau, Project Manager, COINAtlantic, introduced the COINAtlantic conceptual model, the collaborators and contributors, and the challenges facing coastal and ocean managers in accessing and using the numerous available geospatial databases.

In the subsequent discussion, the participants raised the following points:

1. There is a need to determine what decisions need to be made by the end user; only then can the appropriate datasets be identified with the aid of metadata. Depending on its use and the users, data will be needed at different levels of resolution.
2. There is a need to inform users of the limitations of the datasets. This will help prevent incorrect merging of data by disparate users. It would also be useful to have a warning mechanism that is triggered when the user tries to merge data inappropriately, *e.g.*, mismatched data time series. These issues can be dealt with throughout the ongoing evaluation process of the project.
3. There is a need for metadata to allow users to determine what data is available to them.

Paul Boudreau then reviewed the management structure of COINAtlantic, outlining the role of the ACZISC Secretariat, the Management Committee and the Advisory Committee. The members of ACZISC will play a role in reviewing, designing and verifying the COINAtlantic implementation plan and outcomes.

Deliverables for the COINAtlantic project include:

- User Needs Workshops in St. John's, NL, May 2008, and Fredericton, NB, September 2008
- Online data/web applications by 1 September 2008 (provide plenty of evaluation time)
- Next Steps Workshop, February 2009.

Three presentations were made to give examples of potential applications of geomatic data to address integrated coastal and ocean management issues (see Appendix 3 for details):

- Marine Spatial Conservation Planning: User Needs, Tracey Horsman, DFO, and Jennifer Smith, WWF
- Bras d'Or Lakes ILM Project, Bruce Hatcher, Cape Breton University
- Bay of Fundy Decision Support Tool, Anna Dorey, DFO.

Afternoon Session

Tony Turner, GeoConnections, commenced the afternoon session with observations based on the discussions in the morning session:

- Data sharing agreements of COINAtlantic need to extend beyond the length of the COINAtlantic/GeoConnections project, *i.e.* beyond 15 months.
- An application can be as simple as pointing to applications and tools developed for other initiatives.
- The user interface will be critical to the success of any application developed for COINAtlantic.
- COINAtlantic outcomes do not necessarily have to be geospatial (maps) in nature. For example, graphs or tables based on geospatial data can sometimes be more useful to the decision maker.
- COINAtlantic needs to facilitate buy-in to ensure sustainability, for example, by the development of an application to address a "hot button" issue that captures the imagination a broad range of stakeholders/funders.

The afternoon session of the Workshop focused on a review of the COINAtlantic Framework and potential applications. Paul Boudreau introduced the COINAtlantic Framework (Appendix 4), which identifies three general classes of descriptors (issues, applications and users) for each sector of human activity. The user issues were identified from several sources, including earlier user needs reviews (see

Appendix 1). The Framework also includes the specific set of datasets that have been identified for the COINAtlantic/GeoConnections project (Appendix 5).

Participants identified the access to data in support of decision making as a key challenge and priority, rather than the development of applications to address specific issues. Nonetheless, participants agreed that it would be advantageous for COINAtlantic to develop an application that would tweak the imagination of decision makers and could serve as a model of what is possible with the data available through COINAtlantic. Users would have access to the most relevant up-to-date data using COINAtlantic as the entry point. Users could also use the data for applications that they develop to meet their specific management needs.

It was suggested that the issue selected for such an application should have broad appeal, *i.e.* to communities and across all levels of government. Demonstrating applications that are possible through coordinated and integrated data management will build long-term support for COINAtlantic – see <http://COINAtlantic.ca>.

The Workshop concluded with an invitation to participants to review the Framework table and submit suggestions for other relevant data or tools to the COINAtlantic Project Office – COINAtlantic@dal.ca.

Further information on the COINAtlantic initiative and follow-up materials from the Workshop will be posted to the COINAtlantic website at <http://COINAtlantic.ca>. To stay in touch with COINAtlantic developments, the Workshop participants were invited to subscribe to the COINAtlantic Listserv by sending an e-mail to 'LISTSERV@LISTSERV.DAL.CA' with the following text in the body of the email: Subscribe TalkCOINAtlantic.

Acknowledgements

The ACZISC Secretariat would like to acknowledge the GeoConnections Program for its contribution to Phase 1 of COINAtlantic's development and implementation. In addition the Secretariat would like to acknowledge the Centre for Marine Biodiversity for providing financial support for the Workshop and Susan Rolston of Seawinds Consulting Services for her assistance in the preparation of this report.

Participants of the COINAtlantic User Needs – Applications Workshop recommended the following activities/steps in the development and implementation of the COINAtlantic/GeoConnections project:

- Develop a user-friendly application that will allow COINAtlantic users to find and access all of the identified datasets (Appendix 5) and to input the information into the applications that they will develop.
- Facilitate access by making use of registries of datasets (metadata), tools, networks, information sources (e.g., GIS, published maps, reports, etc.).
- Provide sustainable access to the datasets.
- Develop a suitable case study, template or application, e.g., a state of the coast report (either regionally or by province) or climate change impacts.

Tony Abou-Assaleh, GenieKnows.com
Laura Beazley, GeoNOVA
Paul Boudreau, COINAtlantic, ACZISC Secretariat
James Boxall, Dalhousie University
Bob Branton, Ocean Technology Network
Michael Butler, ACZISC Secretariat
John Charles, Halifax Regional Municipality
Bernie Connors, NB Department of Environment
Faye Cowie, NB Aquatic Data Warehouse
Donna Davis, Halifax Regional Municipality
Anna Dorey, Fisheries and Oceans Canada
Michelle Greenlaw, Fisheries and Oceans Canada
Jacques Grondin, Natural Resources Canada
Tim Hall, Fisheries and Oceans Canada
Anita Hamilton, Fisheries and Oceans Canada
Bruce Hatcher, Cape Breton University
Tracey Horsman, Fisheries and Oceans Canada
Ali Kahn, NL Department of Environment and Conservation
Franz Kesick, Maritime Aboriginal Aquatic Resources Secretariate
Peter Lawton, Centre for Marine Biodiversity/ Fisheries and Oceans Canada
Claudette LeBlanc, ACZISC Secretariat
David Mitchell, NS Fisheries and Aquaculture
Sue Nichols, University of New Brunswick
Kathryn Parlee, Environment Canada
Walter Regan, Sackville River Association
Wendy Rodenhizer, Bluenose Coastal Action Foundation
Susan Rolston, Seawinds Consulting Services
Jennifer Smith, WWF
Ashley Sprague, Canadian Parks and Wilderness Society - Nova Scotia
Elaine Toms, Dalhousie University
Karen Traversy, Coastal Coalition of Nova Scotia
Tony Turner, GeoConnections, Natural Resources Canada
Herman Varma, Canadian Hydrographic Service, Fisheries and Oceans Canada
Tammy Wilson, Dalhousie University

SELECTED REFERENCES RE USER NEEDS STUDIES OF RELEVANCE TO ICOM

Prepared in 2005

2005 ACAP Data Sharing Survey – prepared by Southeast Environmental Association (to obtain a copy, email Sarah-Jane Bell - sea@pei.aibn.com)

2005 CGDI Vision – Better Knowledge for Better Decisions

http://www.geoconnections.org/publications/tvip/Vision_E/CGDI_Vision_final_E.html

2005 COINAtlantic – From Concept to Implementation (includes summaries of the COINAtlantic User Needs sessions held in September 2004, Fredericton, NB and in January 2005, Halifax, NS) <http://aczisc.dal.ca/COINAtlantic.doc>

2004 SmartBay / Placentia Bay - <http://www.smartbay.ca/download/downloadFrame.html>

2004 Gulf of Maine Mapping Initiative (GOMMI) User Needs Study

<http://www.gulfofmaine.org/gommi/docs/gommiusersurvey.pdf>

2004 A Geospatial Framework for the Coastal Zone: US National Needs for Coastal Mapping and Charting http://books.nap.edu/catalog.php?record_id=10947
Executive Summary - http://books.nap.edu/execsumm_pdf/10947.pdf

2003 COINPacific Benefit Analysis – to obtain a copy, email Bill Anderson - bill.k.anderson@gov.bc.ca and **How Sharing Information Can Preserve Our Oceans** <http://www.geoconnections.org/CGDI.cfm/fuseaction/articles.see/id/812/gcs.cfm>

2002 GeoNOVA User Evaluation Report

http://gov.ns.ca/GeoNova/about/five_year_strategy/user_evaluation_report.asp

2001 Marine Geospatial Data Infrastructure (MGDI) – Marine User Requirements for Spatial Data

http://www.geoconnections.org/programsCommittees/proCom_marine/keyDocs/Marine_User_Requirements_E.pdf

1996 Parameters Required for Coastal Maps/Databases - ACZISC Workshop on Coastal Mapping - <http://aczisc.dal.ca/MapWkspRpt1996.pdf>

1994. ECNASAP: Towards International Collaboration in Strategic Environmental Assessment. In Coastal Zone Canada 94 conference proceedings – to obtain a copy, email Michael Butler – michael.butler@dal.ca

1989 “Ocean Information Centre: Results of a Survey on User Needs” by E. Wedler in Proceedings of a Forum on the Inland waters, Coastal and Ocean Information Network – to obtain a copy, email Michael Butler – michael.butler@dal.ca

COINAtlantic

Agenda for the User Needs – Applications Workshop

March 28th, 2008, 9:00 to 17:00

Maritime Museum of the Atlantic, 1675 Lower Water Street, Halifax, NS

Objective:

- To get input from potential clients on their needs and uses of COINAtlantic data sources.
- To draft a priorities list of potential applications based on available data and tools that will be considered for implementation under the COINAtlantic/GeoConnections project

Agenda:

- 09:00 Welcome, Introductions and Review of Agenda
- 09:15 COINAtlantic Background and Concept
- 09:30 COINAtlantic/GeoConnections Project Overview
 - > Management structure
 - > Timelines
 - > Data sources and deliverables
- 09:45 Questions and Answers
- 10:00 Health Break
- 10:15 Introductions to COINAtlantic Framework and Definitions
- 10:30 Examples of Potential Applications to Address Issues under the following ICOM Areas:
 - > Watershed management
 - > Coastal management
 - > Marine Protected Areas
 - > Etc.
- 11:30 Review of COINAtlantic Framework to Start Prioritization and Data Identification
- 12:00 Lunch
- 12:45 Round Table Discussion on Potential Applications and their Potential for Implementation:
 - > Preliminary selection of 2-3 applications for detail development
 - > Identification of client groups/key users
 - > Data availability within, and outside of, COINAtlantic/GeoConnections project
- 15:00 Health Break
- 16:30 Conclusions, Wrap up and Next Steps

SUMMARY OF PRESENTATIONS AT THE COINATLANTIC USER NEEDS – APPLICATIONS WORKSHOP

Marine Spatial Conservation Planning: User Needs, Tracey Horsman, DFO, and Jennifer Smith, WWF

This application focuses on marine spatial conservation planning with a view to identifying gaps and areas of priority for marine protected areas (MPAs) on the eastern Scotian Shelf. As the management focus has shifted to integrated and ecosystem-based concepts, there has been an increasing emphasis on the spatial component in management of marine uses, e.g., use-ecosystem considerations, use-use conflict avoidance, ocean zoning, and interest in development of marine protected areas. Recent federal government initiatives have emphasized expanding the network of MPAs in the region. Following a review of the data requirements (ecological, biological, socio-economic, physical, chemical, and legal) and extensive consultation, DFO and the WWF have developed a collaborative spatial conservation planning process through the Eastern Scotian Shelf Integrated Management (ESSIM) Initiative.

Discussion following the presentation focused on the application needs of resource managers, stakeholders and the general public. There was agreement on the need to better engage stakeholders and the general public, although it was difficult to define the “general public”.

The following points were made regarding information requirements:

- It is necessary to identify the data authority and the custodian of the data.
- The constraints associated with the data collection methodology must be relayed to the data user.
- Some users will want raw data; others will want value added or interpreted data.
- Validation of data is important; there is a need to develop a mechanism to identify and correct errors in datasets.
- Enhancing the public’s access to data will increase their participation in the decision-making process and empower communities.
- Not all relevant information for the decision maker is available in datasets, e.g., the political realities.

A proposed activity for COINAtlantic is the interpretation and presentation of information. COINAtlantic can showcase authoritative datasets and facilitate their access through the web.

Bras d'Or Lakes ILM Project, Bruce Hatcher, Cape Breton University

This presentation reviewed the parameters of the Integrated Landscape Management (ILM) project which is focusing on the Bras d'Or Lakes ecosystem. The main deliverable of the project is a web-based system that allows people to envision alternate future scenarios for the Bras d'Or ecosystem resulting from various environmental management options.

Some of the key findings to date relevant to COINAtlantic are as follows:

- Most users will have a narrow geographic focus when accessing the data.
- The decision-making process now involves a collaborative assembly of 20 legally empowered agencies, as well as the general public, *i.e.* the people who live in the ecosystem.
- There is a clear focus by the users on the need for management decision support tools that foster the reconciliation of ecological and economic interests.
- There is never a single user of data; multiple levels of government with overlapping jurisdiction over human activities in the ecosystem need access to the same datasets.
- COINAtlantic could be used as a tool to improve reporting at all levels.
- Datasets need to include patterns and types of nearshore activities that are often overlooked in the data gathering process.
- There is a need for modelling as well as measured data, as many attributes of large ecosystems cannot be directly observed.
- Fun is important! Hire gamers to design the graphic user interface and to make the data retrieval process an engaging experience.

In the following discussion, it was agreed that COINAtlantic should serve as a mechanism for sharing data and networking. It was also suggested that user plug-ins are a way to access specific applications. A plug-in is a computer program that interacts with a host application (a web browser or an email client, for example) to provide a certain, usually very specific, function "on demand" – see <http://en.wikipedia.org/wiki/Plugin>.

Bay of Fundy Decision Support Tool, Anna Dorey, DFO

This presentation outlined the decision-support tools that DFO Habitat Branch is developing to support the evaluation of infrastructure development applications that affect critical habitat of species at risk in the Bay of Fundy region. The tools are designed to facilitate access to relevant data, identify data gaps, and enhance understanding of biological and ecological data intersects with anthropogenic uses of potential habitat for these species.

In the following discussion several issues were raised, including:

- How to make the user aware of the limitations of a dataset?
- How to ensure that users know how to interpret the absence data?
- Access to authoritative real time datasets is critical.

- There is a need to define “authoritative” with regard to datasets.
- The custodians of datasets, primarily municipal, provincial and federal governments, have the responsibility to collect and manage the data.
- When developing applications, it is often difficult to get decision makers to prioritize their information needs.
- A historical record with regard to datasets is important to support the decision-making process as many applications will examine change in ecosystems (e.g., erosion) or cumulative effects.
- Existing metadata registries, e.g., GeoNOVA (<http://geonova.ca>), might serve as a plug-in for COINAtlantic.
- COINAtlantic must be user friendly.

**COINAtlantic Framework for
Addressing User Needs in
Integrated Coastal and Ocean
Management:
Issues, Applications and Users**

***Background Paper for
COINAtlantic User Needs Workshop***

28 March 2008

Halifax, Nova Scotia

Introduction:

The Atlantic Coastal Zone Information Steering Committee (ACZISC) was established in January 1992 to foster cooperation in Atlantic Canada with regards to Integrated Coastal and Ocean Management (ICOM), coastal mapping and geomatics. The Coastal and Ocean Information Network for Atlantic Canada (COINAtlantic) is an initiative of the ACZISC to develop, implement and sustain a network of data providers and users that will support secure access to data, information and applications, for decision-making by coastal and ocean managers and users of coastal and ocean space and resources.

This document summarizes the results of several previous ICOM-related user needs studies, workshops and reports (see References and Bibliography), which are presented in the form of a framework that describes the linkages between a number of components of ICOM.

The framework will be used to facilitate discussions on ICOM in relation to COINAtlantic. The framework will provide a way to communicate and distinguish the various components of ICOM in a result-based manner to managers, and other non-geomatic users. It will provide a structure to organize input from users and to assist in both prioritizing tasks and identifying synergies that will be essential to the success of the COINAtlantic concept.

Ultimately this document will serve to guide the development, implementation and sustainability of COINAtlantic.

Framework Overview:

Based on the many results from previous studies (see References and Bibliography), the framework identifies various sectors of human activity that can be distinguished by their objectives, their potential impacts and by the participants, including those that are involved in the management of the sectors and other groups that have shown a general interest.

It is important to note that the sectors identified are scale dependent. For the broad goals of COINAtlantic, this document is intended to be comprehensive for all four Atlantic Canadian provinces so that appropriate selections can be made from the total suite of sectors, activities etc. For other purposes, all of these general sectors can and should be subdivided and additional detail added to address the specific requirements of the various user client groups for geographic areas within the region. But this is not the purpose of this document.

Within each sector of human activity, examples are given to build a general overview of the sector within the context of ICOM and, in particular, the underlying information management requirements. No attempt is made to cross reference specific activities

with specific impacts and potential applications as this will be done at a higher resolution for particular geographic areas and/or issues.

Framework Details:

In this Framework, we identify three general classes of descriptors for each sector of human activities, along with a number of sub-components:

- Issues
 - Activity
 - Environmental Impact
 - Socio-Economic Impact
- Applications
 - Data
 - Analytical tool
- Users
 - Participants
 - Managers
 - Others

Thus, there are a number of characteristic activities related to a particular sector. For each activity there will be socio-economic impacts, potentially positive and negative. Each activity may also result in environmental impacts. These too may be positive such as in habitat protection, or negative in the more usual sense of environmental degradation.

Once issues can be adequately identified within the COINAtlantic network, the next step is to identify and ensure access to the appropriate applications to address the issue. An application is the result of bringing together the data with the analytical tool to address the management question, *i.e.* the issue.

The term 'applications', as used in COINAtlantic, is the combination of the data available and the specific analytical tool that would form the functional link between the data inputs and the information outputs.

We provide the following description of the terms used in the framework below.

Activity

Within this column we identify a variety of activities for each sector. These activities and/or structures have been identified as most likely to result in environmental impacts.

Activities per se are not necessarily issues as they may not have any impacts that require a management decision or action.

Socio-Economic Impacts

For context, with regard to the identification of issues, we include some indication of the socio-economic impacts of the sector/activity. Within ICOM, the socio-economic impacts, such as the displacement of existing activities, may be more relevant to the development of COINAtlantic applications than the environmental impacts.

Environmental Impacts

Many human activities have no significant environmental impacts and will be a low priority within ICOM. For those activities that do have impacts of concern, it is important to clearly identify the impact, what management actions are possible and thus what outputs might be generated from an application that would support management decisions and actions.

Available Data/Tools circa 2008

Although the COINAtlantic initiative is being developed for long term sustainability, it is critical that priority datasets and tools are identified for development and implementation within the 15-month GeoConnections/ COINAtlantic project. Under this project, a number of collaborators have committed to provide access to a limited number of specific datasets as Web Mapping Services (WMS) and/or Web Feature Services (WFS). They are shown in the following table.

Agency	Data Name	Example data/layers
Department of Fisheries and Oceans	Maritimes Region Human Activities/Ocean Use Atlas	Fishing locations, pipelines
Ocean Biogeographic Information System (OBISCanada) Regional Node	Biodiversity Data Sets	Marine Mammal sightings, Marine Invertebrates
Department of Fisheries and Oceans	Research Trawl Survey Results	Groundfish species catch locations
NRCan Earth Sciences Services	Geosciences for Ocean Management, Coastal Data	Shoreline characteristics, marine surficial geology
Province of Nova Scotia	Coastal Series	Roads, topography, infrastructure
Department of Fisheries and Oceans	Salmon Presence Assessment Atlas (SPAAtlas)	Blockages to fish passage, critical habitat
Department of Fisheries and Oceans	Oceanographic modelling	Sea surface temperature, currents, tides
Department of Fisheries and Oceans	Bathymetric Grid	Water depth
University of New Brunswick	Marine Cadastre/Boundary	Areas of responsibility, boundary lines

These data will form the core of the development and implementation of applications for COINAtlantic in 2008.

Potential Applications

This column in the framework contains applications that can be implemented using available data to address identified issues, within the 15-month COINAtlantic/GeoConnections project.

Potential Applications/Data/Tools

It is recognized that COINAtlantic circa 2008 will need to be focused on a small number of high priority applications. It is understood that there exist a large number of other relevant data and appropriate tools that could be accessed through COINAtlantic when resources allow. The Potential Applications/Data/Tools column will function as a “parking lot” for other applications and activities that could be considered for COINAtlantic as opportunities present themselves.

Users

This column captures the users who are envisaged as needing the applications, *i.e.* people who are directly involved in the sector and who are carrying out activities. Managers include personnel from the federal, provincial and municipal agencies responsible for influencing the activities. This column is also intended to include groups that have an interest in the prosecution of the activity, the resultant impacts and benefits, and those who may be able to contribute to, or benefit from, the COINAtlantic application.

COINAtlantic Framework

Sector	Activity	Potential Environmental Impact	Potential Socio-Economic Impact	Available Data Tools - Circa 2008	Additional Data/Tools	Potential Applications	Users
Habitat Management	<ul style="list-style-type: none"> ➤ Protection ➤ Conservation ➤ Restoration 	<ul style="list-style-type: none"> ➤ Increase productivity ➤ Displacement of other species 	<ul style="list-style-type: none"> ➤ Displacement or restriction of human activities ➤ Support recreational and commercial fishing and harvesting activities 	<ul style="list-style-type: none"> ➤ Hydrology from 1:10,000 Nova Scotia data ➤ Bathymetric grid ➤ Surficial geology ➤ SPAtlas 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify areas with habitat to support Species at Risk ➤ Identify areas for improving commercial and recreational fishing activities 	<ul style="list-style-type: none"> ➤ Fisheries and Oceans Canada ➤ Provincial ➤ NGOs ➤ Fishers ➤ Municipalities
Renewable Resources	<ul style="list-style-type: none"> ➤ Extraction ➤ Maintenance 	<ul style="list-style-type: none"> ➤ Negative impacts on existing non-targeted resources 	<ul style="list-style-type: none"> ➤ Supports jobs 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify areas for sustainable activities 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector
Biodiversity	<ul style="list-style-type: none"> ➤ Protection 	<ul style="list-style-type: none"> ➤ Increase in ecosystem productivity and resilience 	<ul style="list-style-type: none"> ➤ Displacement or restriction of human activities 	<ul style="list-style-type: none"> ➤ OBISCanada 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify areas of high priority 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ NGOs
Aquaculture	<ul style="list-style-type: none"> ➤ Production of food 	<ul style="list-style-type: none"> ➤ Negative impacts on ecosystem ➤ Parasite impacts ➤ Habitat impacts 	<ul style="list-style-type: none"> ➤ Supports jobs ➤ Displaces other activities 	<ul style="list-style-type: none"> ➤ Marine cadastre ➤ Bathymetric grid 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify areas with minimal impacts and maximum benefits 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector ➤ NGOs/Communities
Freshwater Resource Management	<ul style="list-style-type: none"> ➤ Use of lands ➤ Extraction of water ➤ Discharge of materials ➤ Dams 	<ul style="list-style-type: none"> ➤ Negative impacts on environment ➤ Displacement of natural ecosystems 	<ul style="list-style-type: none"> ➤ Supports jobs ➤ Displacement of activities 	<ul style="list-style-type: none"> ➤ NS provincial data ➤ NL provincial data ➤ SPAtlas 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify best use of environmental resources such as hydrology, soils, vegetation cover ➤ Identify most appropriate support for human activities 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector
Non-Renewable Resources	<ul style="list-style-type: none"> ➤ Extraction <ul style="list-style-type: none"> ○ Oil and gas ○ Coal ○ Natural gas ➤ Maintenance of infrastructure 	<ul style="list-style-type: none"> ➤ Negative impacts on existing non-targeted resources 	<ul style="list-style-type: none"> ➤ Supports jobs 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify areas for sustainable activities 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector

Sector	Activity	Potential Environmental Impact	Potential Socio-Economic Impact	Available Data Tools - Circa 2008	Additional Data/Tools	Potential Applications	Users
Marine Transportation	<ul style="list-style-type: none"> ➤ Dredging ➤ Ocean dumping ➤ Movement of goods ➤ Use of anti-fouling agents 	<ul style="list-style-type: none"> ➤ Chronic spills ➤ Accidental spills ➤ Chronic discharge <ul style="list-style-type: none"> ○ Sewage ➤ Negative impacts on large mammals ➤ Introduction of invasive species 	<ul style="list-style-type: none"> ➤ Supports jobs ➤ Increases access by tourists ➤ Decrease value of recreation sites 	<ul style="list-style-type: none"> ➤ Human Use Atlas 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Improve ship routing ➤ Identify areas “sensitive” to invasive species ➤ Identify best location for infrastructure 	<ul style="list-style-type: none"> ➤ Transport Canada ➤ Fisheries and Oceans Canada ➤ Provincial ➤ Private sector
Commercial and Recreational Fishing	<ul style="list-style-type: none"> ➤ Removal of target and non-target species ➤ Development of non-traditional fisheries ➤ See also marine transportation above 	<ul style="list-style-type: none"> ➤ Mortality of target and non-target species ➤ Habitat destruction 	<ul style="list-style-type: none"> ➤ Supports jobs 	<ul style="list-style-type: none"> ➤ Marine cadastre ➤ DFO trawl data 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify most appropriate locations for freshwater and marine harvesting ➤ Identify opportunities for improvements such as opening clam beds 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector ➤ NGOs/ communities
Sovereignty and Defence	<ul style="list-style-type: none"> ➤ Training ➤ Operations 	<ul style="list-style-type: none"> ➤ Negative impacts on environment 	<ul style="list-style-type: none"> ➤ Loss of life or livelihood 	<ul style="list-style-type: none"> ➤ Marine cadastre 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Minimize impacts of activities 	<ul style="list-style-type: none"> ➤ Federal
Marine and Coastal Engineering Works and Services	<ul style="list-style-type: none"> ➤ Build ➤ Maintain ➤ Maximize benefits 	<ul style="list-style-type: none"> ➤ Negative impacts on environment 	<ul style="list-style-type: none"> ➤ Supports jobs 	<ul style="list-style-type: none"> ➤ Oceanographic model 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify best/ appropriate locations 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector
Research	<ul style="list-style-type: none"> ➤ Surveys 	<ul style="list-style-type: none"> ➤ Negative impacts on environment 	<ul style="list-style-type: none"> ➤ Increase knowledge ➤ Support job creation 	<ul style="list-style-type: none"> ➤ DFO trawl data 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify knowledge gaps. ➤ Provide knowledge for ICOM 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Universities ➤ NGOs

Sector	Activity	Potential Environmental Impact	Potential Socio-Economic Impact	Available Data Tools - Circa 2008	Additional Data/Tools	Potential Applications	Users
Recreation and Tourism	<ul style="list-style-type: none"> ➤ Protection of culture and heritage ➤ Sustainable use of natural areas 	<ul style="list-style-type: none"> ➤ Negative impacts on environment 	<ul style="list-style-type: none"> ➤ Supports jobs ➤ Increases awareness of nature 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify appropriate Infrastructure development and maintenance ➤ Identify of economic opportunities 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Municipal
Agriculture	<ul style="list-style-type: none"> ➤ Production of food 	<ul style="list-style-type: none"> ➤ Runoff <ul style="list-style-type: none"> ○ Silt ○ Pesticides ➤ Soil Erosion ➤ Loss of Wetlands 	<ul style="list-style-type: none"> ➤ Supports jobs ➤ Displaces other activities 	<ul style="list-style-type: none"> ➤ Provincial databases 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify areas with minimal impacts and maximum benefits 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector ➤ NGOs/ communities
Industrial	<ul style="list-style-type: none"> ➤ Production of products <ul style="list-style-type: none"> ○ Pulp and paper ○ Smelting ○ Thermal electrical generation ○ Chlor-alkali plants ○ Fish processing plants ○ Food processing plants 	<ul style="list-style-type: none"> ➤ Discharges <ul style="list-style-type: none"> ○ Solids ○ Chemicals ○ Air ➤ 	<ul style="list-style-type: none"> ➤ Supports jobs ➤ Displaces other activities 	<ul style="list-style-type: none"> ➤ Provincial databases 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Identify areas with minimal impacts and maximum benefits 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Private sector ➤ NGOs/ communities

Sector	Activity	Potential Environmental Impact	Potential Socio-Economic Impact	Available Data Tools - Circa 2008	Additional Data/Tools	Potential Applications	Users
Urbanization and Development	<ul style="list-style-type: none"> ➤ Support for human activities 	<ul style="list-style-type: none"> ➤ Negative impacts on environment ➤ Displacement of ecology ➤ Increased nutrient levels ➤ Reduced oxygen levels ➤ Increased sediment discharge 	<ul style="list-style-type: none"> ➤ Supports jobs and people ➤ Displaces other human activities 	<ul style="list-style-type: none"> ➤ Provincial database 	<ul style="list-style-type: none"> ➤ Municipal databases 	<ul style="list-style-type: none"> ➤ Identify areas with minimal impacts and maximum benefits 	<ul style="list-style-type: none"> ➤ Municipalities ➤ Provincial ➤ Private sector ➤ NGOs/communities ➤ Federal
Disaster Management / Emergency Response	<ul style="list-style-type: none"> ➤ Appropriate response ➤ Training 	<ul style="list-style-type: none"> ➤ Slow recovery of environment 	<ul style="list-style-type: none"> ➤ Loss of life or livelihood 	<ul style="list-style-type: none"> ➤ NS provincial data 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Distinguishing areas by priority ➤ Locating response equipment 	<ul style="list-style-type: none"> ➤ Federal ➤ Provincial ➤ Municipal
		<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤

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COINATLANTIC AVAILABLE DATA / TOOLS circa 2008

These data will form the core of the development and implementation of applications for COINAtlantic within the 15-month COINAtlantic/GeoConnections project. Collaborators have committed to provide access to a limited number of specific datasets as Web Mapping Services (WMS) and/or Web Feature Services (WFS).

Agency	Data Name	Example data/layers
Fisheries and Oceans Canada	Maritimes Region Human Activities/Ocean Use Atlas	Fishing locations, pipelines
Ocean Biogeographic Information System (OBISCanada) Regional Node	Biodiversity Data Sets	Marine mammal sightings, marine Invertebrates
Fisheries and Oceans Canada	Research Trawl Survey Results	Groundfish species, catch locations
Natural Resources Canada, Earth Sciences Services	Geosciences for Ocean Management, Coastal Data	Shoreline characteristics, marine surficial geology
Province of Nova Scotia	Coastal Series	Roads, topography, infrastructure
Fisheries and Oceans Canada	Salmon Presence Assessment Atlas (SPAtlas)	Blockages to fish passage, critical habitat
Fisheries and Oceans Canada	Oceanographic Modelling	Sea surface temperature, currents, tides
Fisheries and Oceans Canada	Bathymetric Grid	Water depth
University of New Brunswick	Marine Cadastre/Boundary	Areas of responsibility, boundary lines