MARCH 2020

Data Sharing for an Atlantic Canada Marine Atlas

Workshop Summary Report

COINAtlantic
COASTAL AND OCEAN INFORMATION NETWORK

Prepared by Christina Macdonald, Executive Director, COINAtlantic
and Lydia Ross, Project Officer, COINAtlantic
Supported by DFO Maritimes, Oceans Management Program

RECOMMENDATIONS FOR KEY ACTIONS

An online marine atlas is a critical tool for supporting MSP in the Atlantic Canada region; its 'purpose' and the data that populates the atlas must be driven by user needs and sound policy and institutional frameworks. The process of developing a marine atlas will require significant relationship-building and sustained collaborations to establish and maintain data sharing agreements and processes, particularly given the mandate to deliver a public product that includes non-federal data sources. While not without its challenges, the transparency and trust fostered through this process will help reduce conflicts in the marine space, and support the success of the MSP Program and its goals to balance social, environmental and economic objectives in a changing climate.

The 'Data Sharing for the Development of an Atlantic Canada Marine Atlas' Workshop on March 12 and 13 brought people together from across Atlantic Canada and across sectors to share their needs and data priorities for an atlas, and discuss barriers and opportunities for contributing data to the atlas. The following recommendations for key actions emerged from discussions: Develop a Strategic Plan for the Atlas that identifies long and short-term objectives, sets priorities, focuses energy and resources, and helps ensure organizations and governments are working towards common goals.

Atlas Strategic Plan Objectives:

- DFO to expedite and resource an inter-regional coordination/governance mechanism led by National Headquarters (NHQ) with strong regional representation to plan and coordinate the atlas platform development
- DFO to integrate interdepartmental, intergovernmental, and intersectoral needs in the atlas platform design
- Ensure interoperability of Spatial Data Infrastructure applications across governments
- Prioritize and select bioregional data layers for publication to Open Data/ Open Maps
- In addition to marine data associated with habitat, biodiversity and human-use, consider data that supports understanding of interactions between the land and sea and in international waters (Gulf of Maine), as well as socio-economic information that connects offshore areas to coastal communities
- DFO and CHS to lead the development of online materials and tutorials to support technical aspects of data contributions from partners that are external to the federal government
- Conduct a study to review legislation, policy, and regulation that encourage or impede data-sharing

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COINATLANTIC

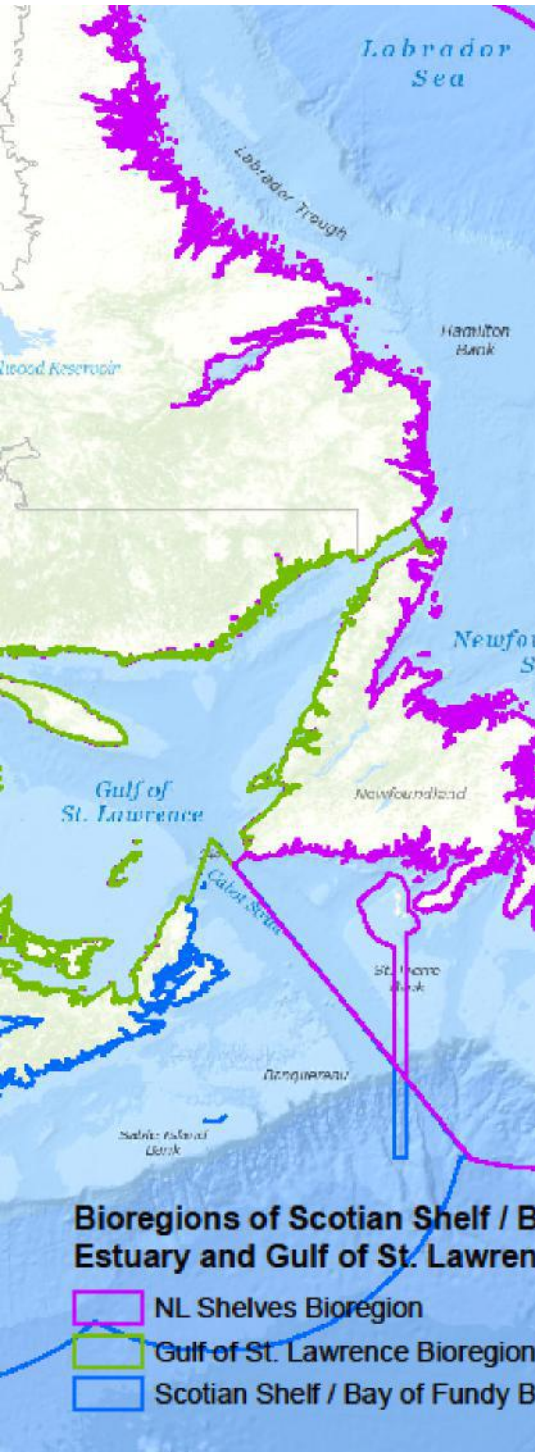
WHO WE ARE

The Coastal and Ocean Information Network Atlantic (COINAtlantic) is a longstanding NGO based in Halifax , Nova Scotia. The organization has several priorities, including encouraging action on the implementation of Integrated Coastal and Ocean Management (ICOM) as a tool to realize environmental, economic and social sustainability, and supporting collaborative sharing of data and information across Atlantic Canada. COINAtlantic achieves this through hosting workshops, our Coastal Update Newsletter, our Geospatial Tools and collaborating with partners on specific projects.

MISSION

COINAtlantic aims to promote, facilitate and influence information management as well as policies and programs that enhance Integrated Coastal and Ocean Management (ICOM) in Atlantic Canada.

coinatlantic.ca



MARINE SPATIAL PLANNING (MSP) PROGRAM

MARINE SPATIAL PLANS

DFO is leading a MSP process that brings together relevant authorities, stakeholders and rightsholders to better coordinate how we use and manage marine spaces to achieve ecological, economic and social objectives. Planning processes are underway in five areas across Canada: Pacific North Coast, Salish Sea, Bay of Fundy/Scotian Shelf, Newfoundland-Labrador Shelves and Gulf of St. Lawrence. These processes will produce marine spatial plans for each area by March 2024.

BIOREGIONAL ATLAS

In support of the MSP program, an atlas for Atlantic Canada's three bioregions (Scotian Shelf, Gulf of St. Lawrence, Newfoundland and Labrador) will be developed by March 2022. This Atlantic Canada-wide compilation of data and information will be a web-based, public platform with interactive maps of ocean ecosystems, human uses and management areas.

WORKSHOP

Marine planners and data experts from across sectors and around Atlantic Canada were invited to a workshop on March 12-13, 2020 in Halifax. The workshop titled "Data Sharing for an Atlantic Canada Marine Atlas" was organized and facilitated by COINAtlantic in close collaboration with the Oceans Management Program, DFO Maritimes Region.

Waegwoltic Club, Halifax, Nova Scotia

DATA SHARING FOR AN ATLANTIC CANADA ATLAS WORKSHOP

The goal of this workshop was to learn from attendees how geospatial information supports their planning, identify priority data for inclusion in the atlas, assess data availability of priority data, and discuss data sharing requirements and capacity for contributing data to the atlas.

"The Atlas is a key element of success." - Wendy Williams, Director of Oceans and Aquaculture Management

Wendy Williams opened Day 2 with remarks from Fisheries and Oceans Canada on the critical role an online public atlas plays in the MSP Program. The atlas is key for making information publicly accessible, reducing conflicts in coastal communities, and driving communication and collaboration across groups and sectors.

ATLAS GOALS

VERBATIM FROM ATTENDEES' STICKY NOTE EXERCISE

DATA NEEDS

- Data that is useful and available for decisions
- Find relevant information from all sources
- Accessible source of ocean information
- Consolidated, public, open data repository
- Accessibility, authoritative, visualize, organize, and analyze
- Long term commitment of all data providers and users to support (fund) the portal (MSP)
- Identify data gaps
- Data gaps monitoring
- Data discover and accessibility for all available data layers from variety of sources
- Data sharing and collaboration
- Incorporate Traditional Ecological Knowledge (TEK) and Local Ecological Knowledge (LEK)
- Make visuals (maps) to present to others
- Layers needed in the atlas
- One place to hold data to support an engaging, collaborative environment
- Holistic planning "one" central portal
- Accessible qualitative data sharing

CONFLICT REDUCTION

- Reduce impacts/conflicts for better planning
- Evaluate use conflicts, minimize these
- Balance protection/ conservation and sustainable resource use
- Potential human use conflicts decision support tool
- Coordination of jurisdictional decisions
- Reduce intersection conflicts
- Reduce intergovernmental conflicts
- All data to identify conflicts, plan for climate change
- Assist in user conflicts. Preserving areas of socio-economic importance while preserving / conserving the ocean environment

ATLAS NEEDS

- User-friendly, easy-to-use
- Reproducibility to support dynamic marine spatial planning
- Streamlined decision making
- Help plan for climate change
- Value-added data for the public
- Broad range of applicability, while flexible and scalable enough to address specific project priorities
- Interoperability/connect data in the atlas with other goals/existing platforms, i.e. CIOOS, GOOS
- Can move forward MPA network planning
- Decision-making tool access to evidence and analytical functions to run 'what if' scenarios.
- Better ocean management and conservation
- Support decision-making
- Long-term planning
- Awareness and visualization of data

TOOL FOR COLLABORATION

- Collaboration, bridging gap between science and business, buy-in from multiple stakeholders
- Collaborative data sharing processes
- Education of Canadians about the diversity, richness, use and importance of the coast and ocean
- Improve coordinated decision-making, support better planning
- Help maintain healthy ecosystems
- Transparency with stakeholders
- Coastal users can better understand the issues and decisions concerning oceans
- Public knows about it and can use it
- Better informed planning decisions
- Advance marine conservation via network sharing
- Requires long-term data commitments, partnerships, collaborative data sharing processes, and funding support

WORKSHOP GOALS

VERBATIM FROM ATTENDEES' STICKY NOTE EXERCISE

NETWORKING

- Build partnership opportunities and coordination among data providers and users
- Expand personal network, meet new people
- Meet data holders
- Meet/ network different sectors, industry, regulators, NGOs
- Leads on future collaborations in data collections and tool development for Environmental Response
- Exchange of ideas, build new connections
- Identify networking/ partnership opportunities
- Network with others, connect, learn, discover, share
- Engagement and buy-in for information network
- Enjoy the accomplishments of talented/ committed people

LEARNING OPPORTUNITIES

- Learn about models from other jurisdictions
- Identify areas in need of work in Atlantic Canada
- Find common vision, commons goals for the atlas
- Share expertise/ opinions concerns/ questions
- Discover best practices from other organizations
- Increase participation in MSP
- Co-manage MSP with federal, provinces, and First Nations, identify the best way to do it
- Identify key decisions that can be answered through an atlas
- Opportunities for engagement of Indigenous people
- Listen and learn from institutional memory
- Learn more about work being completed regionally
- Looking to replicate a similar workshop
- Clear direction for what platform to use and key data layers to include

BETTER UNDERSTANDING

- Understand COINAtlantic partners and their mandates/ contributions to an atlas
- Learn about MSP process, data availability, data access, and current barriers
- Understand the role of data in MSP
- Explain utility of an atlas to the skeptical
- Talk to users about data they would like to see
- Understand/ inform the development of spatial planning
- Gathering information from stakeholders
- Clarifying challenges ahead
- Who will have access to data?
- How will people access data?
- Better understanding of available marine data, where it's held, future plans for data
- Gain insights on how Indigenous perspectives can be incorporated in MSP process
- What is important to potential atlas users? Important from data provider perspective
- Learn about the goals of the project
- Understand partners and stakeholder needs
- Atlantic Canada on the 'same page'

DATA AVAILABILITY

- Inspire people to commit to making data publicly accessible
- Portals available to aid conservation planning
- What marine data exists? Where is it held? What is planned for the future?
- Increase communication about existing data, adding to more collaborative efforts to produce data layers
- Broad considerations of data sources
- Guide the data that is collected/ provided/ gathered
- Establish contacts for data sharing
- How I can collaborate with/ contribute to the atlas

Daniel Bryce, Senior Planner, NS Municipal Affairs and Housing.
Moving Data From Accessible to Useful

PRESENTATION SUMMARIES

Topics were addressed during the workshop, including the MSP Program, the relationship between MSP and marine atlases, marine spatial data infrastructure, demonstrations of atlases and portals from Newfoundland and Labrador and the Northeast and Mid-Atlantic US, the value of open data, an overview of the DFO bioregional data layers, considerations for transforming data from accessible to useful, and finally, how this atlas can be interoperable with provincial spatial data infrastructures. Presentation summaries are provided in this section.
Power Point presentations are available:
https://bit.ly/2UfkHLL

"MSP can operationalize the high-level strategic plans that currently exist." - Geoff Coughlan, Fisheries and Marine Institute of Memorial University of Newfoundland

Workshop Introduction by Christina Macdonald, Executive Director, COINAtlantic

Christina Macdonald, COINAtlantic

Welcome and Orientation

- COINAtlantic is an NGO based in Halifax that promotes, facilitates and influences information management to enhance Integrated Coastal and Ocean Management (ICOM) in Atlantic Canada
- COINAtlantic support ICOM through meetings and workshops across Atlantic Canada, newsletters, project-based work with partners, and free and user friendly open-source geospatial tools
- ICOM is a collaborative approach to managing human activities in the coastal zone and ocean to maintain the health of the coastal and ocean ecosystems
- Rich history of ICOM and data sharing in Atlantic Canada; need to reflect critically and creatively on why change has been slow in certain areas, where progress has been made and what needs to change to make more progress
- Important to identify and leverage established data sharing relationships and processes, and advance different organizational priorities

Scott Coffen-Smout, DFO Maritimes, Oceans Management Program

DFO's Marine Spatial Planning Program and the Role of an Atlantic Canada Bioregional Atlas

- Three Atlantic Bioregions, regional inventories
- Outline MSP process including bringing people together, creating an MSP, improve collective understanding, develop a vision
- Key elements of MSP including governance, bioregional atlas/data portal, decision-support tools, and bioregional marine spatial plans
- MSP can provide a vision, characterization of marine and human activities, mechanisms for information sharing, management actions to guide marine activities, support blue economy while achieving conservation networks

Geoff Coughlan, Master of Marine Studies Program, Fisheries and Marine Institute of Memorial University

How Marine Atlases Support Marine Spatial Planning Requirement

- Important links between MSP and data portals are highlighted
- Spatial analysis and stakeholder engagement lie at the heart of MSP
- MaPP uses SeaSketch and 250 layers as a decision support to tool. Consider this model for the Atlantic Canada marine atlas
- Priority Issue Scans and objectives, part of the NL & LB Coastal and Oceans Management Strategy & Policy Framework, could serve atlas
- Focus on demonstration areas
- Turn priorities into spatially-based questions
- House the atlas outside of government to reduce vulnerability around changing priorities

Chris Hemmingway, Hydrography and Marine Spatial Data Infrastructure for Fisheries and Oceans Canada

How Will Marine Spatial Data Infrastructure Support a Publicly Accessible Atlas?

- Explanation and updates around Marine Spatial Data Infrastructure (MSDI)
- Standards for integrating spatial and legal maritime data- S121
- CHS tasked with supporting MSP through development of the Atlantic Canada atlas
- ISO 19115 metadata standard requirements
- Metadata important for the discovery of data
- Ocean Protection Plan deliverable of an Emergency Response tool of thematic data layers and nautical charts
- Now working with 10 m grid resolution
- Critical importance of authoritative data sources

Mardi Gullage & Nicole Hynes, DFO Newfoundland and Labrador, Ecosystems Management Branch

Oceans Atlas of Human Use

- Atlas is an internal application for ocean information used by DFO NFLD and Labrador
- 353 data layers, expanding in May (layer themes include: ocean management, human activities, ecological information, and infrastructure)
- Core atlas functionalities listed
- Use as a template, customize for user needs
- Overlay different types of information to assess what is taking place in a given location
- Assist in decision-making, including spatial planning, conflict resolution, gap identification, intra-departmental collaboration, education
- Data must be verified, kept up to date and contain full metadata to support evidence-based decision-making
- An application will evolve as feedback is received from users, so too will the data
- Data sharing agreement/ disclaimer/ request

Amy Mui, Department of Earth and Environmental Sciences, Dalhousie University

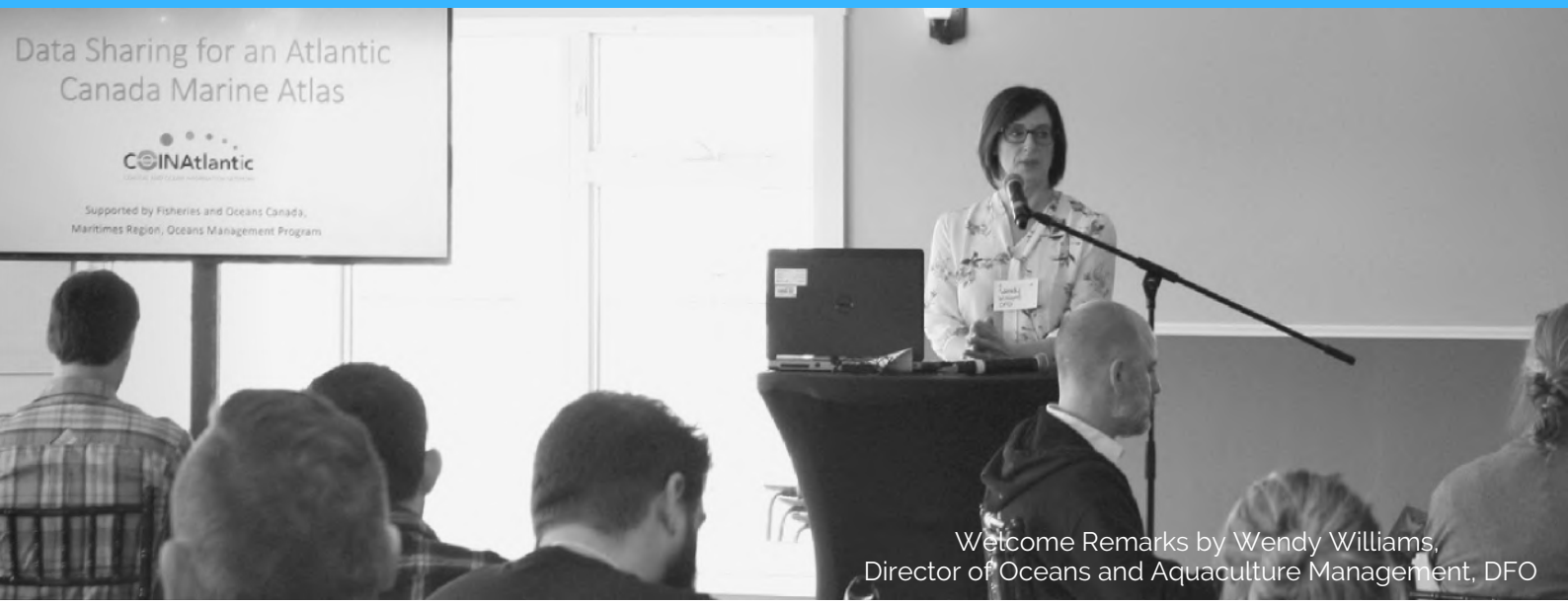
The Value of Open Data

- Use open access data for Multi-Criteria Decision Analysis and habitat suitability models
- Has educational and research value/ benefits
- Open science, accountability, transparency
- Promote active learning, real-world scenarios, i.e. what decisions can be made based on datasets?
- Well-managed data can result in re-use, integration, and new science
- Data Liberation Initiative and Statistics Canada to summarize patterns and trends
- UNEP Environmental Data Explorer, National Aeronautics and Space Administration (NASA), Movebank, eBird, DataONE, BioClim, Landsat

Nick Napoli, Northeast Regional Ocean Council (NROC), Emily Shumchenia, Mid-Atlantic Regional Council on the Ocean (MARCO), & Karl Vilacoba, Monmouth University and MARCO (WebEx)

The Northeast and Mid-Atlantic Ocean Data Portals and Their Use in Marine Planning and Decision Making

- Regional Ocean Council is voluntary
- Useful for cross-state engagement
- Map products of footprint and distribution
- Informed and vetted by experts (data providers) through documentation
- Numerous examples of data portals for reducing socio-economic conflicts, including Transatlantic cables, anchorage sites, fisheries, and offshore wind
- Data portal useful for assessing underlying ecological data of area, core use areas and general home ranges of species, continental in scale (different than observational data)
- Embed and link data portal in documents to create interactive project reports
- Consider thematic working groups to prioritize and verify data layers and develop methods for publishing that data
- Incorporate information to create stories
- Consider site and data maintenance, have a work plan and governance plan
- Develop proof of concept



Welcome Remarks by Wendy Williams,
Director of Oceans and Aquaculture Management, DFO

Gordana Lazin & Scott Coffen-Smout, DFO Maritimes

DFO Bioregional Data Layers

- Core science layers inventory of 234 records:
- Physical (temperature, salinity, currents); Chemical (nutrients, O2); biological (fish, invertebrates, mammals, cetaceans, species at risk); survey footprints; synthesis (annual trawl surveys, stock and risk assessments, ecological and biological significant areas); physical structures; seabed layer; remote survey layer; sea surface temperatures (SST); chlorophyll-a; coral and benthic habitat; aquatic invasive species; marine plants; cumulative impact maps.
- Human use layers (commercial fishing effort; inshore lobster; long-line and trap gear fisheries)
- Hexagon grid, NAFO divisions, ballast water exchange; marine pollution, and marine energy

Daniel Bryce, Nova Scotia Municipal Affairs and Housing

Moving Data From Accessible to Useful

- Make data accessible and useful to users
- Useful = metadata, standards, accessible, managed and maintained
- Consider data source (opaque or transparent) + metadata available to users (on label) + tools in application; Standardization (format i.e. ISO 19115); Contextualization (focus and magnify, thematic data dictionaries); Management (create, maintain, update, roles (Stewards = owner; Custodian = holder, manipulator, distributor); Publishing (provide map/feature service layer, choose distribution mechanism); Accessible (who gets what, when? file formats); Maintenance (requires core operational funding) Data agreements for absence of min. standards

Colin MacDonald, Service Nova Scotia and Internal Services

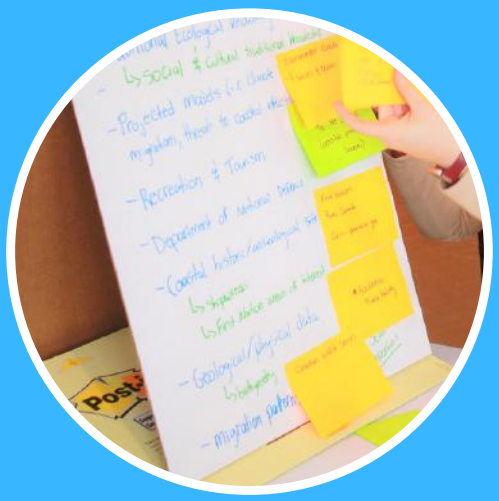
Linking Provincial and Federal Spatial Data Infrastructures in Support of a Marine Atlas for Atlantic Canada

- SDIs are the digital platform of the 21st century
- Provincial SDIs in support of a marine atlas in Atlantic Canada
- Trusted, authoritative source for data of paramount importance for atlas
- Governance for geographic information stipulates who collects, provides, maintains, deploys services
- Data Steward (accountable agency of datasets)
- Data Custodian (performs agreed upon tasks or responsibilities per agreement with Steward)
- MOUs to share restricted geographic data between organizations
- Common mapping toolkits for publishing map layers with "common look and feel"
- Security= database, services, API; Application/Map; Vulnerability threats and risk scans on services

BREAKOUT SESSIONS

BREAKOUT #1

ORGANIZATIONAL AND DEPARTMENTAL PRIORITIES



BREAKOUT INTRO

The question of what data and information is relevant and required for an atlas is strongly dependent on the type of planning the atlas is intended to support, as well as who its intended users are. There are a multitude of federal, provincial and municipal government departments, Indigenous organizations, non-governmental organizations, research institutions, and private-sector companies that collect coastal and marine data in Atlantic Canada and who could potentially benefit from an online marine atlas for Atlantic Canada. **The feedback from workshop participants has been grouped below under key themes.**

FOCUS QUESTION

What are your organizational/departmental priorities? What kinds of geospatial data are used to support this work?

RESOURCE MANAGEMENT

- Fisheries focus
- Aquaculture
- Oil and gas, hydrocarbons
- Offshore wind
- Tourism
- Fish bycatch
- Coastal vulnerability and flood mapping
- Coastal infrastructure (10-year)

CONFLICT REDUCTION

- Navigation and shipping
- Mitigating intergovernmental conflicts in planning
- Conflict avoidance, displacement of use
- Predictive modeling, higher resolution data, distribution with climate change
- Reducing risks, anthropogenic impacts (vessel traffic, oiling, bycatch)

REGULATORY BOUNDARIES/ AUTHORITY

- Coastal vulnerability
- Public safety
- Geohazards
- Ocean policy, boundaries of bilateral agreements
- Traditional water use
- Know regulatory authorities, rights holders

CONSERVATION PLANNING

- Species at risk distribution
- Invasive species
- Cumulative impacts
- Footprint
- Habitat mapping
- Using data to inform the marine context
- Collecting data and bringing in data from all sources
- Promote data sharing across jurisdictions

GEOSPATIAL DATA USED

- Research survey stock assessments, DFO, NAFO
- CanCoast/ CanVec Series
- 10 m grid
- ECCC buoy data
- CWS-EC Eastern Canada Seabirds at Sea (ECSAS)
- Telemetry data (OTN)
- Whale Map
- Social, Economic and Cultural Overview and Assessments (SECOA)
- C-NLOPB/ CNSOPB
- Derived data from human-use atlas
- Statistics Canada
- Province of NFLD for aquaculture, land-use
- Academic sources
- eOceans, citizen science
- Open data portals
- Product/synthesis layers

BREAKOUT #2

ATLAS FUNCTIONALITIES

BREAKOUT INTRO

Atlas functionalities are the tools that transform static maps into interactive data portals. Functionalities should be prioritized to avoid over complicating the atlas, weakening user experience. Determining functionalities of an atlas requires knowledge around the ultimate decisions that the atlas will serve. **With organizational/ departmental priorities in mind, attendees at six tables sorted 28 functionality cards into "critical", "nice to have" and "unhelpful". Ten unanimously critical functions are listed, and the submitted functionalities are listed and ranked.**

FOCUS QUESTION

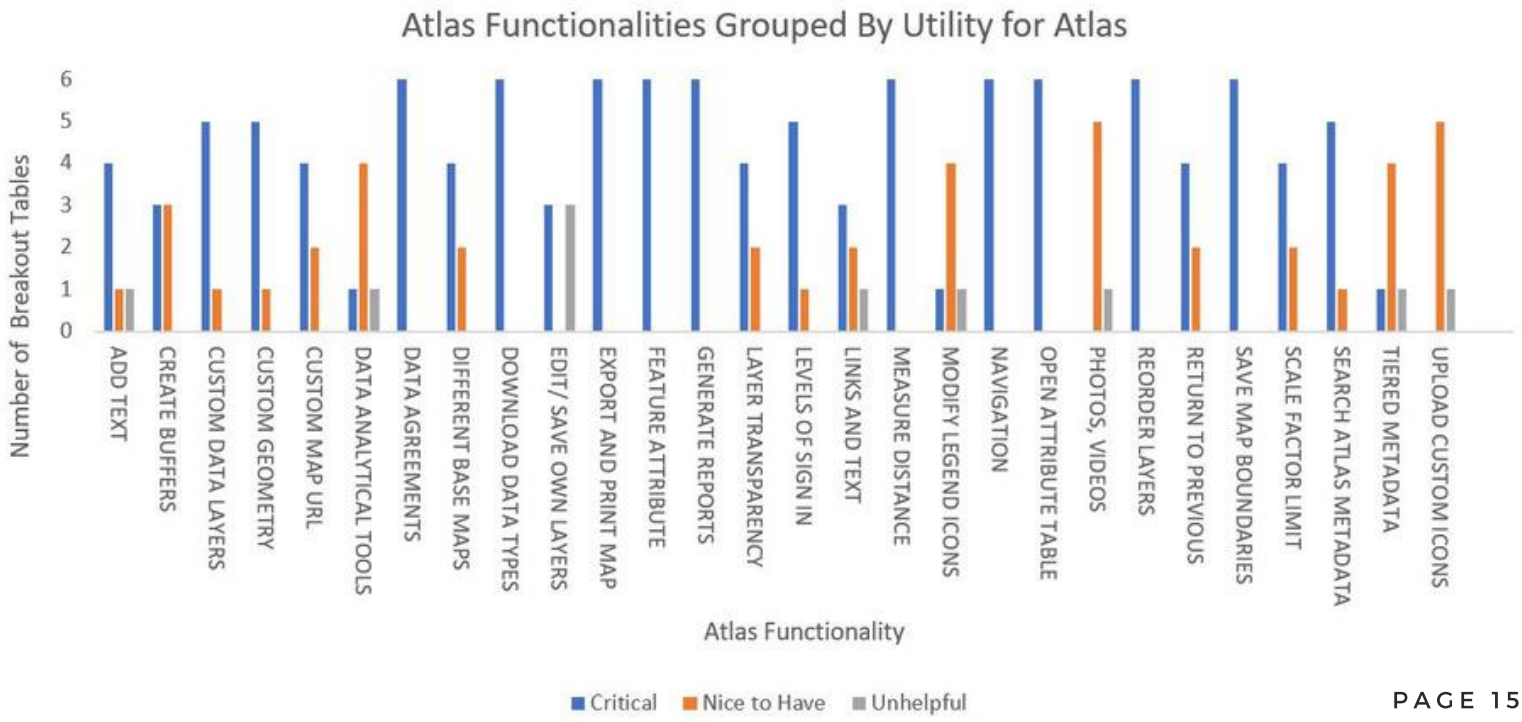
How would you rank common atlas functionalities for their ability to optimize the use of geospatial data in decisions related to your organizational/ departmental priorities?

CRITICAL FUNCTIONALITIES

- Data Licensing Agreements
- Download Data Types (Link to Download OK)
- Export and Print Map
- Identify Feature Attribute
- Generate Reports from Areas
- Measure Distance (M, km, mi)
- Navigation (Pan/Zoom)
- Open Attribute Table
- Reorder Layers/ Move to Front
- Save Map Boundaries/ Extent

SUBMITTED FUNCTIONALITIES

- Participatory mapping using Sea Sketch to identify areas of value from users (Critical if that's an objective)
- Search outside of the Atlas (incorporate Google API) Critical
- Contact information (Critical)
- Help/ User Guide (Critical)
- Data screening for submission quality (critical)
- Save session and share (Critical)
- Save session locally (Critical)
- Get coordinates (Critical)
- Inset map (Critical)
- Scale bar (Critical)
- Simplicity and fast (Critical)
- North arrow (Critical)
- How to/ FAQ (Critical)
- User support (Critical)
- Future predictions (Nice to have)
- Visualize uncertainty (Nice to have)
- Time slider (Nice to have)
- Analysis of conflict summary (Nice to have)
- Add regulatory framework/ rules (Nice to have)



BREAKOUT #3 AND #4

PRIORITY DATA NEEDS AND DATA SOURCES

BREAKOUT INTRO

Marine atlases and data portals typically group available data by themes or categories. Similar themes are found across atlases, starting with base data which commonly include infrastructure, topography/bathymetry, and satellite imagery. Additional, commonly used themes include: Jurisdictional Boundaries, Federal Georegulations, Navigation and Infrastructure, Human Use (energy, mineral extraction, recreation, nature conservation, fishing, underwater heritage, and military), Marine Habitat and Biodiversity, and Geology and Seafloor, and cultural themes such as recreation, culture and heritage, tourism and industry.

FOCUS QUESTION

The focus of Breakout Sessions #3 and #4 was on priority data needs and potential sources of data and information. The feedback gathered from workshop participants has been grouped below under themes.

Theme	Data	Sources
Jurisdictional Boundaries and Federal Georegulations	federal, provincial and international boundaries; private water lots; Indigenous territories; oil and gas zones; bioregions; marine cadastre; legal regulations	Elections Canada, CHS, port authorities, DFO, WWF, NRCan (cadastre), Surveyor General, petroleum boards, CNSOPB, NS Energy, Nalcor
Navigation and Infrastructure	Shipping and transport lanes (AIS, VMS data); slow down zones; submarine cables; impacts of vessel traffic on species, habitat, and people; terrestrial infrastructure with marine connections (ports, harbours, wharves, sewage outfalls, fish plants, roads, aquaculture sites); electricity grid (determines where marine infrastructure can be located)	Transport Canada, National Search and Rescue Program, Canada Coast Guard
Coastal/land-sea interface	Coastal and salt marsh restoration; terrestrial species that interact with the marine system; river discharge information; rain fall; fresh water quality; tailings ponds; agricultural lands; sewage effluent; chemical data along shorelines (including nutrient levels); hydroelectric dams (opening and closing); freshwater input velocity; community coastal activities (consider participatory mapping); coastal vulnerability; algal blooms (eutrophication); flood mapping	PEI Watershed Alliance, Saint Mary's University for eelgrass, Coastal Restoration Fund, ECCC, NS Power, Small Craft Harbours, lighthouses, provincial governments (NS Department of Municipal Affairs, Department of Fisheries and Aquaculture, Department of Transport), Real Property Safety and Security, municipalities, community organizations, recreational users, Non-Governmental Organizations (Ducks Unlimited, WWF, Oceans North, Southern Gulf of St. Lawrence Coalition on Sustainability), CanCoast, Environmental Effects Monitoring

Climate Change	Sea level rise (impacts and future projections); vulnerable coastal infrastructure; ocean acidification; areas vulnerable to storm surges; projections for species migrations; sea surface temperature (current and future trends); climate change model on temporal and spatial species distribution	CHS gauges, port authorities, DFO, ECCC, CIOOS, NRCan, CanCoast
Marine Habitat and Biodiversity	Invasive species (could come from ballast transfer); conservation areas; ecologically and biologically significant areas; sensitive habitat (nurseries, spawning, foraging); species avoidance areas; migratory patterns including temporal scale (birds, salmon); areas of high species density/hotspots (colonies, pupping sites, seabird reserves); species distribution, habitat suitability; Right Whale distribution; fish distribution; functional groups (piscivores); species at risk; dominant species within functional groups; eelgrass	DFO Science branch, CPAWS, Centre for Fisheries Ecosystem Research School of Fisheries Marine Institute, CWS, Parks Canada, ECCC, provincial governments, universities, NETForce (seagrass) Right Whale: North Atlantic Right Whale Consortium, Transport Canada National Aerial Surveillance Program, Citizen Science, Coast Guard oil spill database, Naval Vessel Register, research survey vessels, Marine Animal Rescue Society, CWF

Human Use	Ocean Energy and Mineral Potential	Offshore oil and gas; seismic exploration; offshore wind; tidal; wave and currents; Physical Environmental Guidelines	NRCan, DFO, petroleum boards, CNSOPB, NS Energy and Mines
	Military	Military areas	Department of National Defence
	Fisheries	commercial fisheries; recreational, subsistence fisheries; bycatch; fish quotas; long line trawl and trap	DFO Oceans, provincial governments, fishing associations, seafood processors, First Nation organizations
	Aquaculture	Aquaculture regions (existing, potential, 'no-go'); aquaculture leases (active, inactive)	Federal and provincial governments
	Recreation and Tourism	cultural sites; kayaking routes; coastal tourism (high use areas and frequency); recreational boating	Parks Canada, First Nations, provincial government (ex. NS Communities Culture and Heritage), Heritage Canada, businesses
	Cultural	Coastal historic/archaeological sites (shipwrecks, First Nations area of interest); archeology	First Nations, Parks Canada, provincial governments

Traditional Ecological Knowledge	Indigenous knowledge and use; historical human uses of coast and marine areas pre 1492	Local museums, Indigenous organizations, coastal community members, conservation officers, KMKNO, MCG
Geology and Seafloor	Bathymetry data at 10m resolution or higher (near shore and where terrestrial meets nearshore); benthic info (complexity, substrate type); geomorphology	NRCAN, CHS, GSC, NSCC, CMAR, Cermaq, COGS, AGRG, DFO, fisheries associations, academia, private industry, navigation industry, mining companies, provincial governments, aquaculture industries
Non geospatial	Economic data from commercial fisheries; regulations; green economy; blue economy; Indigenous rights; sustainability certifications; satellite governance and Licensing agreements	
Derived layers	Biodiversity; vulnerability; predictive models (climate change effects); species sensitivity index (e.g. bycatch, oiling, light pollution); suitability	
Other	Atmospheric data; sea ice coverage; sea surface temperature with depth; wind; salinity data; hydrodynamics data; tides; currents/current models; tidal amplitude; wave height/direction/dominant wind direction; lightscape map; debris; dissolved oxygen, Magnitude Exceedance Quotient; oil spills; heavy metals; noise footprints; commercial satellite images, Government of Canada RADAR Sat coverage, digital elevation models; human safety on the water	ECCC, Coast Guard, Transport Canada, DFO, CHS, NSCC, provincial governments, universities, fishing associations, aquaculture associations, CFIA, Smart Atlantic, MEOPAR, AZMP, CIOOS, Polar data catalogue.ca, Perennia, Ventusky (Canadian Meteorological Centre), Magicseaweed

ACRONYMS

- AGRG – Applied Geomatics Research Group
- AZMP – Atlantic Zone Monitoring Program
- CFIA - Canadian Food Inspection Agency
- CHS – Canadian Hydrographic Service
- CIOOS – Canadian Integrated Ocean Observing System
- CMAR – Centre for Marine Applied Research
- CNSOPB – Canadian-Nova Scotia Offshore Petroleum Board
- COGS – Centre of Geographic Sciences
- CPAWS – Canadian Parks and Wilderness Society
- CWF – Canadian Wildlife Federation
- CWS – Canadian Wildlife Service
- DFO – Fisheries and Ocean Canada
- ECCC – Environment and Climate Change Canada
- GOOS- Global Ocean Observing System
- GSC – Geological Survey of Canada
- KMKNO- Kwilmu'kw Maw-klusuaqn Negotiation Office
- MaPP – Marine Plan Partnership for the North Pacific Coast
- MCG – Mi'kmaw Conservation Group
- MEOPAR – Marine Environmental Observation, Predication and Response
- MPA- Marine Protected Area
- MSP – Marine Spatial Planning
- NHQ- National Head Quarters
- NRCan – Natural Resources Canada
- NSCC – Nova Scotia Community College
- WWF – World Wildlife Federation

BREAKOUT #5

BARRIERS, OPPORTUNITIES, AND NEXT STEPS

BREAKOUT INTRO

Despite commitments to open data and data sharing initiatives such as marine spatial data infrastructures, issues with data sharing are common and include: limited human resources to identify and acquire relevant data, data quality and accuracy and variations in metadata standards. Data sensitivities can be specific to sectors and require special considerations and data manipulations.Technological advances in GIS have helped resolve some of the unique challenges with mapping marine regions and presenting the corresponding data and information. Adopting best data practices (including standard terminologies) and a common metadata standard are also important requirements for the development of an online marine atlas. The most significant challenges in the process of developing a marine atlas for Atlantic Canada are obtaining buy-in from stakeholder agencies/organizations and the willingness and capacity of these stakeholders to share and contribute data freely.

FOCUS QUESTION

The focus of this Breakout Session #5 was on 'Barriers, Opportunities and Next Steps'. The feedback from workshop participants has been grouped below under key themes.

Barriers

Data and Technology

- Data products may be available but accompanying raw data may not be available
- Data interoperability due to variations in quality, scale and metadata readiness
- Potential difficulty in obtaining certain data like commercial satellite data
- Infrastructure for sharing the atlas and making it accessible

Governance

- Changes in government priorities; atlas development is not a political priority
- Lack of data sharing agreements between departments and organizations and narrow scope of MOUs; limited coordination and collaboration
- Planning focuses more on data collecting and less on dissemination
- Lack of policies to guide best practices and standardization

Capacity

- Limited capacity to support data sharing from contributors external to federal government; once data contributors are identified, how will the data be acquired?
- Budgets and funding (short term funding is not enough to finish the atlas project)
- Personnel (lack of expertise/technical abilities)
- While there exist regional networks for data sharing, there is no national network
- Long term sustainability, monitoring and maintenance of data in an atlas beyond the deliverable deadline of 2022
- Lack of knowledge transfer and awareness of existing data (institutional memory) and who to contact about data availability
- Lack of capacity to undertake necessary changes in data format (i.e. digitizing data that only exists in print form)

Other Impediments

- Lack of trust (quick to break, long to build) and fear that data will be misused
- Concerns about data privacy and security
- Lack of a data sharing culture
- Intellectual property rights associated with Traditional Ecological Knowledge
- Requirements for licences for data that isn't free or open could limit distribution

Opportunities

Capacity

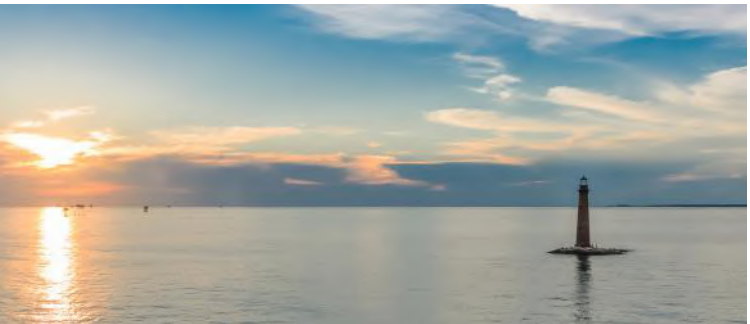
- Trust building and networking opportunities that support collaboration and sharing of best practices and 'lessons learned' from other initiatives (ex. the Ocean Frontier Institute data policy) within federal government and externally
- Long-term funding, including grants and contribution agreements, to help support expansion of allowable expenditures; produce a plan to obtain ongoing funding for the atlas after 2022 and for MSP after 2024
- Workshops to increase exposure to different sectors and spatial data themes
- Focus on sharing good data and communicating data availability to encourage others to do the same; reduces duplication of effort

Governance

- Bilateral agreements and governance frameworks that encourage governments to work together and across sectors to build trust and make decision making more transparent

Data and Technology

- Many atlases/platforms/portals exist already to support technological developments necessary for data sharing; trend is towards open data
  - Ocean Protection Plan Secretariat (Transport Canada, ECCC and DFO)
  - CIOOS
  - Marine Plan Partnership for the North Pacific Coast (MaPP)
  - SeaSketch
  - International Coastal Atlas Network (ICAN)
- New tools and technology that allow coding for reproducibility and automation (increases ease of use for those without expertise)
- SDIs have been established to facilitate interoperability of marine data and connect to provincial infrastructure
- Focus on high priority data and gap identification
- Bring in industry data and information



Next Steps

Engagement

- Conduct awareness raising including developing case studies to show usefulness of the atlas
- Maintain strong ties and regular conversations with stakeholders and users, including indications of progress to support trust building
- Shift attitude from 'protect by default' to 'provide by default': work with regulators / industry associations / funding agencies to produce "open data" guidelines

Momentum Building

- Develop a strategy that includes short and long term attainable goals; maintain a reporting group to increase accountability and develop trust (for example, via communications platforms; COINAtlantic)
- Create collaborative forums for research and thematic workshops that are focused on particular topics
- Hold a conference (similar to ArcticNet) that would include thematic workshops, data showcasing, sharing of inventories; structured with presentations first followed by breakout session and a recap on the last day
- Approach atlas development in a phased manner; start with existing data and in later phases address data gaps

Governance

- Support leadership in understanding the benefits and value of information management, what is involved and how decision makers benefit from final products
- Make the marine atlas and MSP indispensable; tie MSP to the Blue Economy
- Establish a multi-sectoral governance / advisory body to guide Atlas content and function

Capacity

- Increase staff and monetary contributions
- Commit to move beyond planning for data collection and incorporate data dissemination from the start

Data Technology

- Work with existing data, SDIs, applications and platforms (Federal Geospatial Platform, Open NB, GeoNB, etc)
- Link non georeferenced info to the atlas (i.e. laws, bylaws)
- Undertake a 10-year scoping exercise for rescuing historical datasets into contemporary standards

RECOMMENDATIONS FOR KEY ACTIONS

An online marine atlas is a critical tool for supporting MSP in the Atlantic Canada region; its 'purpose' and the data that populates the atlas must be driven by user needs and sound policy and institutional frameworks. The process of developing a marine atlas will require significant relationship-building and sustained collaborations to establish and maintain data sharing agreements and processes, particularly given the mandate to deliver a public product that includes non-federal data sources. While not without its challenges, the transparency and trust fostered through this process will help reduce conflicts in the marine space, and support the success of the MSP Program and its goals to balance social, environmental and economic objectives in a changing climate.

The 'Data Sharing for the Development of an Atlantic Canada Marine Atlas' Workshop on March 12 and 13 brought people together from across Atlantic Canada and across sectors to share their needs and data priorities for an atlas, and discuss barriers and opportunities for contributing data to the atlas. The following recommendations for key actions emerged from discussions: Develop a Strategic Plan for the Atlas that identifies long and short-term objectives, sets priorities, focuses energy and resources, and helps ensure organizations and governments are working towards common goals.

Atlas Strategic Plan Objectives:

- DFO to expedite and resource an inter-regional coordination/governance mechanism led by National Headquarters (NHQ) with strong regional representation to plan and coordinate the atlas platform development
- DFO to integrate interdepartmental, intergovernmental, and intersectoral needs in the atlas platform design
- Ensure interoperability of Spatial Data Infrastructure applications across governments
- Prioritize and select bioregional data layers for publication to Open Data/ Open Maps
- In addition to marine data associated with habitat, biodiversity and human-use, consider data that supports understanding of interactions between the land and sea and in international waters (Gulf of Maine), as well as socio-economic information that connects offshore areas to coastal communities
- DFO and CHS to lead the development of online materials and tutorials to support technical aspects of data contributions from partners that are external to the federal government
- Conduct a study to review legislation, policy, and regulation that encourage or impede data-sharing

THANKS TO EVERYONE

A COLLABORATIVE EFFORT!

This workshop would not have been possible without the support of DFO Maritimes, Ocean Program, the presenters who shared their professional experiences and insights, the attendees who came from across Atlantic Canada, and the workshop facilitators who captured the content of the lively discussions. Thank you!

The development of a marine atlas for Atlantic Canada must be driven by the needs and expertise of regional stakeholders, rightsholders and relevant authorities. This workshop has captured a diverse selection of user needs and identified many sources of data, but additional efforts will be needed to build and sustain the data sharing networks necessary to make this atlas - and the decision-making it supports - a success.

Success! Big smiles from Friday's workshop facilitators. From left to right: Paul Boudreau, Patricia Manuel, Delaney Ewing, Maka Ngulube, Christina Macdonald, Lydia Ross, and Magena Warrior
Not pictured: Caelin Murray

FEEDBACK

"Excellent workshop!"

"Good collaboration occurred"

"Really interesting workshop"

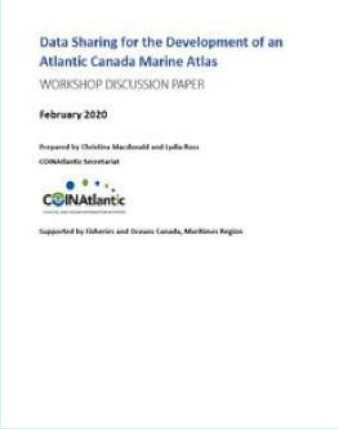
"Would join a follow-up workshop on this topic to see how things have progressed"

WANT TO LEARN MORE?

If you want to learn more about the marine atlas for Atlantic Canada, DFO's Marine Spatial Planning program or how to contribute data, please contact:

Scott Coffen-Smout, DFO Maritimes, Oceans Management Program
Scott.Coffen-Smout@dfo-mpo.gc.ca

Need a context reminder?
The workshop closely followed the discussion paper, a wealth of additional information and resources on marine atlases.


Data Sharing for the Development of an Atlantic Canada Marine Atlas
WORKSHOP DISCUSSION PAPER
February 2020
COINAtlantic

Additional Resources

Presentation Slides & Discussion Paper:

https://drive.google.com/drive/folders/12LoESFZSO72305ibr6QCi5v4TAW44F3p?usp=sharing

Online Resources:

Development of Spatial Data Infrastructures for Marine Data Management, OGC-IHO Marine SDI Concept Development Study
https://iho.int/uploads/user/Inter-Regional%20Coordination/MSDIWG/MSDIWG11/MSDIWG11_2020_09.1_EN_MSDI_CDS_v1.pdf

Federal Geospatial Platform Open Maps
https://maps.canada.ca/en/index.html

Marine Spatial Planning (MSP) In a Nutshell (Video)
https://www.grida.no/resources/11413

Spatial Data Infrastructure "The Marine Dimension" Guidance for Hydrographic Offices.
https://iho.int/iho_pubs/CB/C-17_Ed2.0.0_EN.pdf

The Global Fundamental Geospatial Data Themes, United Nations Committee of Experts on Global Geospatial Information Management
http://ggim.un.org/meetings/GGIM-committee/9th-Session/documents/Fundamental_Data_Publication.pdf

Workshop Attendee List

FEDERAL

- Adrian Hamer, DFO Gulf
- Carys Burgess, Impact Assessment Agency of Canada
- Catalina Gomez, DFO Maritimes
- Chris Hemmingway, DFO-Science-Canadian Hydrographic Service
- Christina Pretty, DFO Newfoundland and Labrador
- Christopher Pierce, Parks Canada
- Colin O'Neil, DFO Maritimes
- David Forsey, DFO Gulf
- Gordana Lazin, DFO Maritimes
- Jeff Campagnola, Transport Canada
- Kasia Rozalska, DFO Maritimes
- Mardi Gullage, DFO Newfoundland and Labrador
- Natalie Zabcic, Fisheries and Oceans Canada
- Neil Ollerhead, DFO Newfoundland and Labrador
- Nicole Hynes, DFO Newfoundland and Labrador
- Olivier Parent, DFO Quebec
- Pascale Groulx, Fisheries and Oceans Canada
- Roan Corbett, Geological Survey of Canada
- Sarah Wong, Canadian Wildlife Services
- Scott Coffen-Smout, DFO Maritimes
- Serge Proulx, DFO Quebec
- Sheila Hynes, Natural Resources Canada
- Sonia Gautreau, DFO Gulf
- Tana Worcester, DFO Maritimes
- Wendy Williams, Fisheries and Oceans Canada

PRIVATE SECTOR

- Kris Vascotto, Atlantic Groundfish Council
- Melinda Cole, Cermaq Canada
- Michael Benson, Cermaq Canada

NON-GOVERNMENTAL ORGANIZATIONS

- Andrew van Wychen, Mi'kmaw Conservation Group
- Andrew Sherin, International Coastal Atlas Network
- Dan Jewell, Maritime Aboriginal Aquatic Resources Secretariate (MAARS)
- Jayden Marion, Mi'kmaw Conservation Group
- Jeff Cullis, Canadian Integrated Ocean Observing System (CIOOS) Atlantic
- Jordy Thomson, Ecology Action Centre (EAC)
- Patrick LeClair, The Gordon Foundation
- Sarah Saunders, World Wildlife Fund (WWF)

PROVINCIAL

- Bill Whitman, NS Department of Fisheries and Aquaculture
- Bobbi Rees, Government of NL and Labrador, Department of Fisheries and Aquaculture
- Colin MacDonald, Service Nova Scotia and
- Internal Services
- Daniel Bryce, NS Municipal Affairs and Housing
- Jesse Hiltz, NS Department of Intergovernmental Affairs
- John Somers, Nova Scotia Environment
- Matthew King, NS Department of Fisheries and Aquaculture

ACADEMIA

- Amy Mui, Dalhousie University
- Brigitte Leblon, University of New Brunswick, Canadian Remote Sensing Society
- Bruce Batstone, Ocean Frontier Institute (OFI)
- Geoff Coughlan, Fisheries and Marine Institute of Memorial University

RSVP'D BUT UNABLE TO ATTEND

- Caitlin Grady, Canadian Parks and Wilderness Society (CPAWS) NS Chapter
- Cliff Drysdale, Southwest Nova Biosphere Reserve
- Elizabeth MacDonald, Canada-Nova Scotia Offshore Petroleum Board (CNSOPB)
- Jean-Sebastien Lauzon-Guay, Acadian Seaplants
- Jennifer LaPlante, DeepSense
- Jessica Norman, Halifax Port Authority
- Nathaniel Feindel, NS Department of Fisheries and Aquaculture
- Shannon Scott-Tibbetts, Fishermen & Scientists Research Society (FSRS)
- Susanna Fuller, Oceans North

FACILITATORS

- Caelin Murray, Dalhousie University
- Christina Macdonald, COINAtlantic
- Delaney Ewing, Dalhousie University
- Lydia Ross, COINAtlantic
- Magena Warrior, Dalhousie University
- Maka Ngulube, Saint Mary's University
- Patricia Manuel, Dalhousie School of Planning
- Paul Boudreau, ACZISC Association