CANADIAN HEALTHY OCEANS NETWORK

Novel Use of Ocean Research Data

SEC 01 WHY THIS SCIENCE BRIEF?

Marine data encompasses complex data types acquired in scientific studies of genetic, ecological, taxonomic, physical, chemical, and geological questions. The emergence and incorporation of new technologies in research such as autonomous sampling increasingly yields large amounts of marine data. The diversity, complexity, and massive scale of this data demands effective data management to enable uses that empower data-driven decisions. New applications and online platforms allow us to achieve these data management and data use goals.

SEC 02 OUR RECOMMENDATIONS

Collective work across CHONe identified the following priorities:

- Support data management at the institutional level and make data management support available to researchers,
- Support a research culture that embraces data management,
- Support Findable, Accessible, Interoperable and Reusable (FAIR) data,
- Support sharing data publicly,
- Encourage researchers to use innovative ways to share data and research results publicl

SEC 03 THE CHALLENGE, NEED, AND OPPORTUNITY

Research data has always been a powerful aspect of scientific research that often adds value well beyond its initial application. However, the challenge lies in taking full advantage of rapid advances in technology that enable the collection of large volumes of data and improving the availability of data to diverse users. These challenges create a vital need to advance data management and accessible data products in ocean science. Importantly, such advances create a tremendous opportunity to achieve greater efficiency in data use and to advance science-based decision-making in support of the sustainable management of marine resources.

SEC 03

THE CHALLENGE, NEED, AND OPPORTUNITY

Achieving these goals and deriving valuable insights that support making decisive data-driven management decisions requires data management systems and innovative data visualization tools. Sharing data with collaborators, stakeholders, and policymakers demands data management products, such as online data repositories and visualization tools.
CHONe emphasized three primary pathways to advance data management and data products:

- protect the data and derived information products,
- promote future reuse of data,
- share data and research results in innovative and easily accessible ways for diverse users.

The recently launched DFO Data Strategy and DFO Data Centre and recently published Tri-Agency Research Data Management Policy highlights data management as an evolving domain in Canada. CHONe has worked on data management and supporting new data management strategies. CHONe researchers recognized the importance of data management in achieving national and international data standards, supporting research excellence, and increasing accessibility of research results to support informed science decision-making.

SEC 04

OUR APPROACH

Research data has virtually unlimited potential for reuse in innovative ways – by researchers, industry, policymakers, and society. That reuse hinges upon long-term preservation and access. Improving data access delivers significant benefits for research and nations, such as accelerating scientific progress, avoiding the duplication of research, enabling replication and verification of research results, and increasing the visibility and impact of research accomplishments. To promote excellence in data management practices and data stewardship in CHONe, we closely follow recent developments in data management and apply the best data management practices.

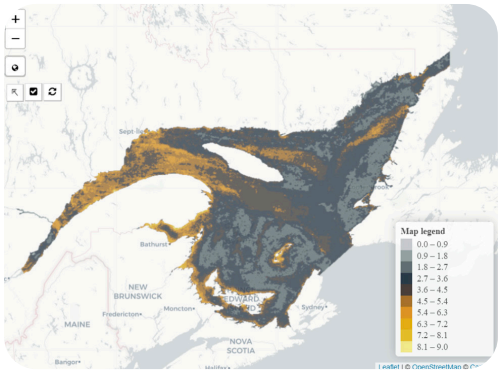
We required all graduate students and post-doctoral fellows to complete a data management plan (DMP). All stages of the research project lifecycle require data management planning from design to completion. A DMP describes data collection, formatting, preservation and sharing, and assists researchers in determining the costs, timelines, and anticipating challenges of managing data. We used the Portage DMP Assistant tool online and then shared our data on Scholar Dataverse publicly. Dataverse offers an open-source web application to share, preserve, cite, explore, and analyze research data. It facilitates making data available to others and allows replication of others' work more efficiently. Finally, to increase the visibility and accessibility of our datasets, we published links to our datasets on our website, and also promoted them on our social media platforms.

Although sharing data in a repository offers an excellent pathway to increase the accessibility of data by researchers, we also recognize new innovative ways to share data and data products with the public. These creative ways allow researchers to share and present data and its story. These new tools also provide a platform to showcase research results. We also recognize that although integration of all scientific data from major projects into a single database would offer opportunities for integrative analyses, the diverse forms and objectives of some data collection activities often do not lend themselves to such integration without major investment in data managers. We, therefore, emphasized accessibility over integration. The following examples illustrate two different approaches CHONe has used to share the data in creative ways.

SEC 05

OPEN KNOWLEDGE PLATFORM: EDRIVER

Intensification of the human footprint in marine ecosystems requires a systematic planning approach for evaluating the use of marine resources. However, we currently lack knowledge of how multiple stressors affect ecosystem structure and functions. The open online knowledge platform, eDriver illustrates the intensity and spatial distribution of different stressors that interested users can explore and download for the St. Lawrence System. For more information, visit on eDriver, read further about it in Front. Mar. Sci., 24 June 2020 | Characterizing Exposure to and Sharing Knowledge of Drivers of Environmental Change in the St. Lawrence System in Canada.

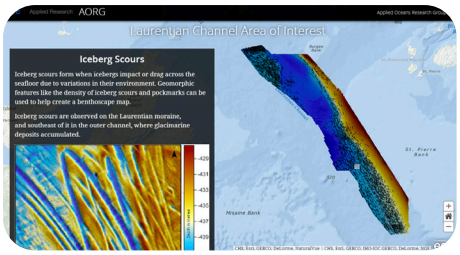


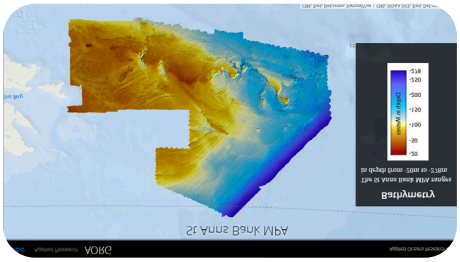
SEC 06

STORY MAPS OF THE LAURENTIAN CHANNEL AND THE ST. ANNS BANK MARINE PROTECTED AREAS (MPAS)

Exploring the role seafloor habitat mapping plays in the monitoring of conservation sites. CHONe's MPA Landscape Ecology group created and produced underwater landscape story maps of the Laurentian Channel and the St. Anns Bank MPAs by combining high-resolution sonar technology and subsea video and photographs of the seafloor. Story maps provide an innovative tool to summarize research outcomes with collaborators, stakeholders, policymakers, and the general public in order to influence opinion and create awareness. These StoryMaps powerfully illustrate the status of these MPAs and show how to determine seafloor patterns and link them to biodiversity within these conservation areas.

For further information, visit The Laurentian Channel Story Map and St Anns Bank MPA Stoy Map.





SEC 07

CONCLUSION

Data management represents a rapidly emerging and essential domain in research. Research excellence requires creating an institutional culture encouraging best practices for data management and supporting FAIR data to have accessible data products in ocean science to inform evidence-based decision-making in support of the sustainable management of marine resources

SEC 08

ANTICIPATED BENEFITS

FAIR and open data support a clean, healthy, productive, sustainable and predicted ocean. These outcomes benefit Canadians and support United Nations Sustainable Development Goals 14 and the United Nations Decade of Ocean Science. The likelihood of successful outcomes, however, significantly increases only by engaging coastal communities, Indigenous groups, industry, and other ocean stakeholders, including the governments that represent them.

SEC 09

GET IN TOUCH

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