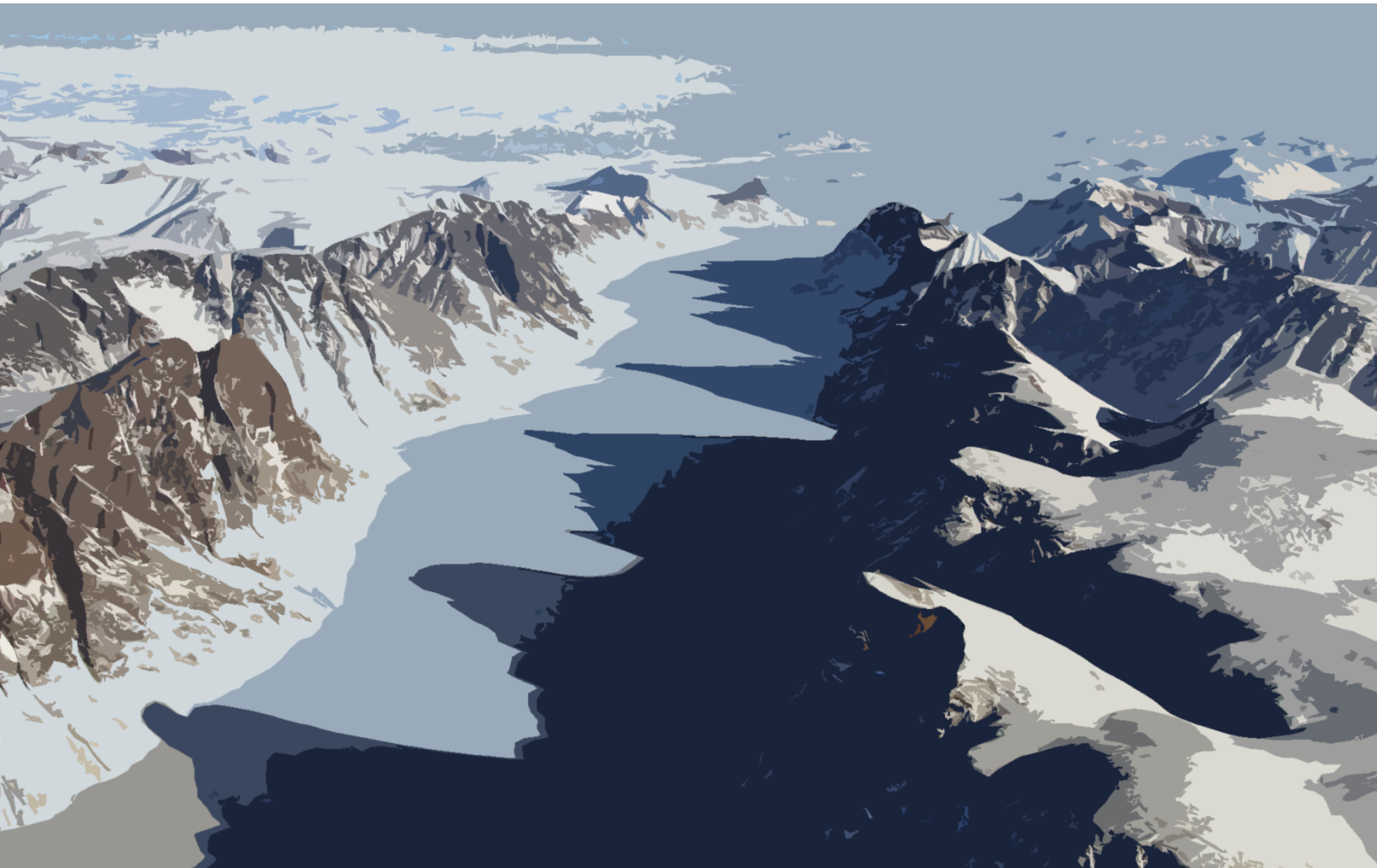




# ARHC National Report of Canada

September 2023



## Executive Summary

This report provides a comprehensive overview of the Canadian Hydrographic Service (CHS) and highlights its significant activities and noteworthy developments since the previous report presented to the 12th ARHC in September 2022.

### 1. Hydrographic Office / Service

**1.1** The primary mission of the CHS is to ensure safety to navigation by providing accurate and up-to-date nautical charts and navigational information. Covering an expansive area of approximately 5.5 million square kilometers, the Canadian Arctic poses significant challenges for surveying and maritime operations. With its rugged coastline, vast ice-covered waters, and harsh weather conditions, the Arctic demands specialized expertise and resources. Despite the vastness of the Arctic, it is home to a relatively small community. In order to effectively allocate our efforts in the region, we actively solicit input from our stakeholders to determine the key areas of focus for our work. This collaborative approach enables the CHS in its efforts to conduct extensive surveys, collect hydrographic data, and employ advanced technologies to navigate these challenging environments, contributing to safe navigation, marine transportation, and sustainable development in the Arctic.

**1.2** The CHS teams operating across Canada are resolutely dedicated to their mission. This mission involves fulfilling Fisheries and Oceans Canada's mandates, which encompass ensuring the safety and efficiency of navigation, as well as advancing prosperous marine sector economies while upholding sovereignty within Canadian waters. Achieving these objectives is a collaborative endeavor, involving partnerships with vital entities such as the Canadian Coast Guard, various government bodies, academia, the private sector, and regional stakeholders. This collaborative approach is central to our Arctic engagement, supported by programs like the Government of Canada's Oceans Protection Plan and federal initiatives. This strategic approach empowers the CHS to play a pivotal role in enhancing Canada's relationships with Indigenous communities. Our commitment involves recognizing and honoring rights, fostering mutual respect, promoting cooperative endeavors, and establishing partnerships as we work to comprehensively map the depths of Canada's navigable waters.

### 2. Surveys

**2.1** Given the limited survey season window, the CHS adopts a multi-faceted approach to data collection in the Canadian Arctic. The CHS does not have dedicated vessels for data collection in the Canadian Arctic and relies primarily on CCG vessels to survey. Based on priorities set in consultation with stakeholders, the CHS accesses primary ship-time for dedicated surveys in addition to collecting data opportunistically while CCG vessels are on standby for ice escort or transiting. The CHS also procures data acquisition services through private industry. Finally, the CHS partners with vessels of opportunity and receives data from various trusted sources.

Common survey objectives include:

- Enhancing navigational charts and products by collecting multi-beam bathymetry in accordance with the CHS mandate.
- Identifying, classifying, and reporting navigational hazards to ensure safe passage.



**2.6** The CHS is also planning work in the corridors around Southampton Island (Shugliaq) in the Kivalliq Region in Nunavut Canada for late July to early October 2023.

**2.7** In collaboration with indigenous-owned businesses, Sedna ROV Services Inc. of Iqaluit and Miawpukek Horizon Maritime Services, the CHS has successfully secured a dedicated survey vessel contract for the first time, so that CHS staff will have dedicated survey time on board the M/V Polar Prince.

### 3. New Charts and Updates

**3.1** The Canadian Hydrographic Service is currently preparing for S100 standards. Since September 2023, the CHS has released 31 new ENC's and 17 new edition ENC's. Of the 31 ENC's, 25 were released on the S-100 grid along the north shore of the Northwest Territories between Mackenzie Bay and the Amundsen Gulf. In 2023-24, the CHS plans to create between 40 and 50 ENC's on the S100 grid in the Arctic.



*New ENC's released since September 2022*



*New Edition ENC's released since September 2022.*

**3.2** Since September 2022, the CHS has released 8 new edition Paper Charts.



*New Edition Paper Charts released since September 2022.*

## 4. New Publications & Updates

**4.1** The CHS ensures timely updates of ENC's, charts, reprints, and patches to provide mariners with vital navigational information. New significant data is promptly advertised through the Canadian Coast Guard's websites via '[Navigational Warning \(NAVWARN\)](#)' and '[Notices to Mariners \(NOTMAR\)](#)' for immediate awareness.

**4.2** As part of our ongoing modernization initiative, the CHS Sailing Directions and the CHS Tide Tables are available online.

<https://www.charts.gc.ca/publications/sailingdirections-instructionsnautiques-eng.html>

<https://www.charts.gc.ca/publications/tables-eng.html>

## 5. MSI: Existing infrastructure for MSI dissemination

**5.1** Information on marine communications and traffic services (MCTS) in Canada is available at:

<http://www.ccg-gcc.gc.ca/Marine-Communications/Home>

**5.2** Canadian Coast Guard (CCG) continues to operate the Navigational Warnings (NAVWARNs) web site and subscription service which replaced the domestic Notice to Shipping (NOTSHIP) services. For further information visit: <http://nis.ccg-gcc.gc.ca/>

## 6. C-55:

**6.1** Canada is in the process of updating its C-55 information

## 7. Capacity Building

**7.1** In 2022, the CHS embarked on the Community Hydrography project, a transformative initiative designed to enhance the collection and utilization of bathymetric data by coastal and indigenous communities. Aligned with the objectives of Ocean Protection Plan phase 2, a comprehensive open call for Contribution Agreements was diligently executed, resulting in the allocation of financial support to three deserving communities. These communities were granted funding dedicated to data acquisition and application, enabling them to effectively pursue their individual objectives. The designated communities include:

- Community-based bathymetric and hydrographic data collection in the Qikiqtani region of Nunavut (Kinngait).
- Bathymetry and hydrographic data collection in support of Ecosystem Knowledge of Areas of Importance to Miawpukek First Nations.
- Community-driven bathymetric mapping in Tuktoyaktuk.

To learn more about community hydrography at the Canadian Hydrographic Service, please click the following [link](#).

## 8. Oceanographic Activities

**8.1** CHS maintains a network of 5 permanent tide gauges in the Canadian Arctic (Refer map below).

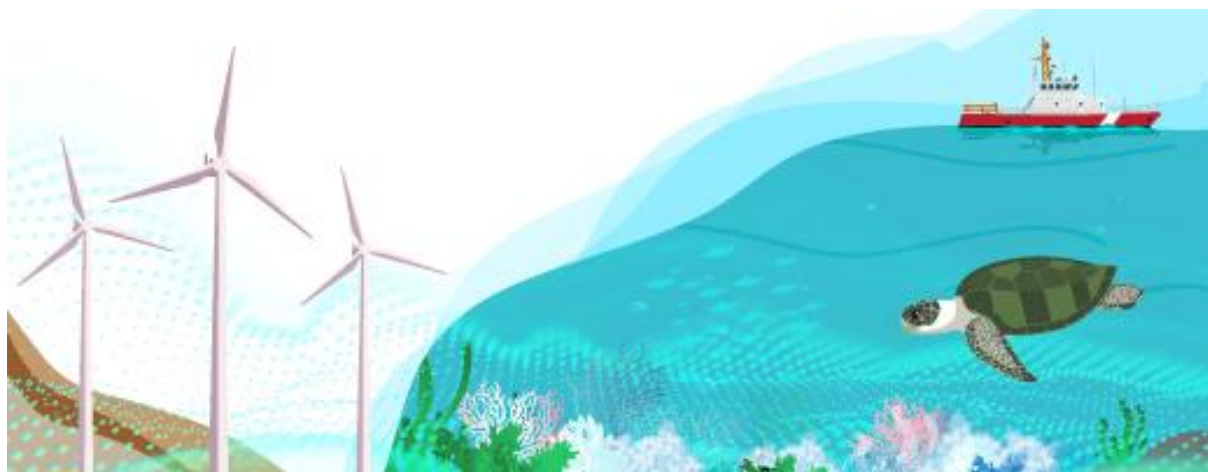
- CHS employs both permanent and temporary tide gauges to enhance tidal predictions. Notably, certain areas in the Eastern Arctic, like Ungava Bay, boast some of the world's largest tidal ranges, exceeding an impressive 15 meters.
- The CHS is working on generating a new Continuous Vertical Datum (CVD) surface in Canadian Waters. This updated surface will incorporate the latest vertical reference data, meticulously collected and analyzed. The result will be an enhanced reference for bathymetric surveys and updated Chart Datum for navigational products, ensuring greater accuracy and reliability.

## 9. Spatial Data Infrastructure

**9.1** DFO MSDI stands as a national solution for Marine data publication and web application development. Since its inception, the MSDI has contributed over 580 datasets to the Canadian Open Data Initiative from across several maritime domains. There are currently 15 applications which have been released on the platform, with another 9 applications in development. Our ESRI infrastructure is moving to the cloud, bringing increased scalability and efficiency.

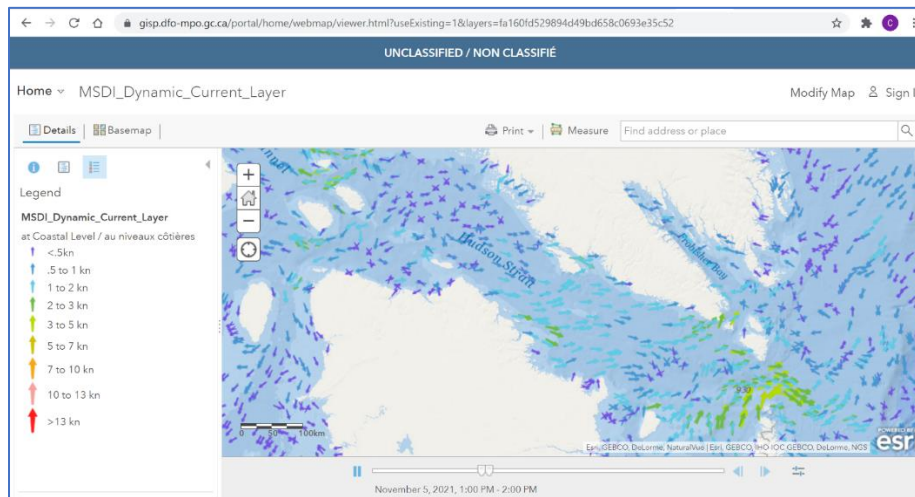
**9.2** All data published through the MSDI adheres to the Government of Canada's Harmonized North American Profile (HNAP) – ISO 19115.

**9.3** DFO MSDI serves all regions of Canada including the Arctic and is also a stakeholder in OGC (Open Geospatial Consortium) FMSDI Pilot Project.



## 10. Innovation

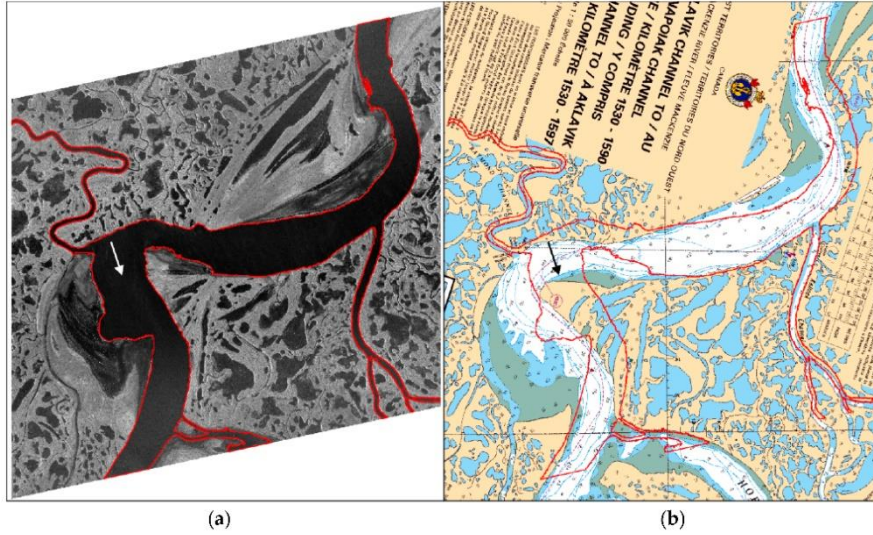
**10.1** The CHS harnesses the power of the Government of Canada's Marine Spatial Infrastructure (MSDI) and integrates it with advanced Oceanographic and Meteorological prediction systems to deliver dynamic surface currents information for all three of Canada's coasts, including the Arctic Ocean. The service follows the S111 standard, providing graphical representation of surface currents (refer to the image below). Although the current resolution in Arctic waters is relatively low, future plans are in place to enhance data resolution wherever possible. Access this valuable data service through: <https://gisp.dfo-mpo.gc.ca/portal/home/item.html?id=be4ff7af23384fdbac2e6c8c165b6622>.



**10.2** The CHS has embraced remote sensing techniques as an alternative method of collecting hydrographic data, which plays a crucial role in enhancing the accuracy of CHS navigation charts. By utilizing optical and synthetic aperture radar (SAR) data, CHS has developed innovative hybrid remote sensing strategies. This approach enhances shoreline extraction, streamlines change detection, and refines optical satellite-derived bathymetry (SDB) methods. CHS ensures the precision of satellite images through meticulous geometric correction using advanced physical techniques, resulting in nautical products of outstanding positional accuracy.

A notable benefit of remote sensing data is its capacity to effectively cover extensive areas at a fraction of the cost associated with conventional methods. This attribute is especially valuable in dynamic regions that require frequent updates. As a pivotal element of Phase 2 of the Ocean Protection Plan, the CHS will continue to use remote sensing to support the creation of nautical products in the Arctic. Additionally, a remote sensing initiative has been introduced to address the intricate challenge of charting highly dynamic areas, using the Mackenzie River as the first site for implementation due to its constantly changing coastlines.





RADARSAT-2 Spotlight image (a) and over chart 6428 (b). Note the arrow on both maps: on map (a), the arrow indicates the important erosion on the river. RADARSAT-2 Data and Products © MacDonald, Dettwiler and Associates Ltd. (2014/2016) – All Rights Reserved. RADARSAT is an official mark of the Canadian Space Agency.

Over the past year, work has been carried out on several sections of the river. The Canadian Coast Guard (CCG) is also contributing to the project by providing survey data to support the changes detected. The data is collected by the crew of the CCGS DUMIT and Eckaloo, who maintain the navigation buoys on the river. Work has begun on the most dynamic section of the river (figure 2), the shoreline has been extracted and the data collected by the CCG is beginning to be analyzed.

## 11. Other Activities

**11.1** In December 2022, Canada filed an Addendum to the Partial Submission of Canada to the Commission on the Limits of the Continental Shelf regarding its Continental Shelf in the Arctic Ocean under UNCLOS.

## Annex

New ENC releases since September 2022. CHS has released 31 new ENCs.

ENC #	ENC Title
CA473521	Wakeham Bay and Fisher Bay et les Approches/and Approaches
CA4B724A	CA4B724A
CA573522	Diana Bay (Partie Sud/Southern Portion)
CA473541	Padloping Island and Approaches / et les Approches
CA573546	Cape Hooper Upper Anchorage / Mouillage Amont
CA373545	Cape Hooper and Approaches / et les Approches
CA4AW1TA	CA4AW1TA
CA4B72QA	CA4B72QA
CA4B73BA	CA4B73BA
CA4B73MA	CA4B73MA
CA4B73XA	CA4B73XA
CA4B74JA	CA4B74JA
CA4BH2QA	CA4BH2QA
CA4BH3BA	CA4BH3BA
CA4BH3MA	CA4BH3MA
CA4BH3XA	CA4BH3XA
CA4BH4JA	CA4BH4JA
CA4B71HA	CA4B71HA
CA4B717A	CA4B717A
CA4B731A	CA4B731A
CA4B748A	CA4B748A
CA573547	Cape Hooper Lower Anchorage / Mouillage Aval
CA4B72EA	CA4B72EA
CA4BH4UA	CA4BH4UA
CA4BH5FA	CA4BH5FA
CA4BH5RA	CA4BH5RA
CA4BH31A	CA4BH31A
CA4BH48A	CA4BH48A
CA4BH55A	CA4BH55A
CA4BH62A	CA4BH62A
CA4B71TA	CA4B71TA

New edition ENC releases since September 2022. CHS has released 17 new edition ENCs.

Chart #	Chart Title
CA273257	Prince Regent Inlet
CA273274	Gulf of Boothia and Committee Bay
CA273329	M'Clintock Channel, Larsen Sound and/et Franklin Strait
CA373504	Pelly Bay
CA376049	Nunasuk Island to Calf Cow and Bull Islands
CA376050	Seniartlit Islands to Nain
CA376351	Dog Islands to/à Cape Makkovik
CA376361	Cape Makkovik to/à Winsor Harbour Island
CA376362	Kaipokok Bay
CA376368	Cape Harrigan to/aux Kitlit Islands
CA376483	Davis Inlet to/aux Seniartlit Islands
CA376738	Lake Melville
CA473413	Hopes Advance Bay
CA473505	Korvigdjuak Island Channels
CA473506	St. Peter Bay
CA476369	Windy Tickle
CA4B71TA	CA4B71TA

New edition Paper Chart releases since September 2022. CHS has released 8 new edition paper charts.

Chart #	Chart Title
5464	Diana Bay (Partie Sud/Southern Portion)
7575	Peel Sound and/et Prince Regent Inlet
7578	Pelly Bay
7578	Pelly Bay (Korvigdjuak Island Channels)
7578	Pelly Bay (St. Peter Bay)
5390	Wakeham and Fishers Bay and Approaches
5349	Hopes Advance Bay
6427	Point Separation to/au Aklavik Channel Kilometre 1480 / Kilomètre 1540