

**Decision Paper for Consideration by SCUFN 37**  
**Update on Undersea Feature Names Project Team (UFNPT)**  
**And on the Detection of Undersea Features (DUF), an Ocean Decade project**

<b>Submitted by:</b>	Canadian Hydrographic Service of Fisheries and Oceans Canada, Undersea Feature Names Project Team
<b>Executive Summary:</b>	This document reports on the progress made by the Undersea Feature Names Project Team (UFNPT) and the project of Detection of Undersea Features from November 2023 to June 2024
<b>Related Documents:</b>	SCUFN36-08.1A, SCUFN33-08.1A, HSSC11-07.1C, Terms of Reference of UFNPT
<b>Related Projects:</b>	Standardization of the undersea features, Ocean Decade Detection of Undersea Features, SCUFN Naming 2030 Sub-Group

## Introduction / Background

1. At SCUFN36-08.1A, the Undersea Feature Names Project Team (UFNPT) proposed that the objectives of the UFNPT were re-assessed to:
  - a. Develop S-100 Product Specifications for UF and register SCUFN terms in the IHO GI registry in collaboration (or merger) with the Horizontal Resolution Project Team.
  - b. Design a repository for methods of detection of undersea features (accessible through a public repository).
  - c. Explore managing a database/catalogue of undersea features detected from the Data Centre of Digital Bathymetry (DCDB) and that qualify for official naming but have yet to be named.
  
2. Membership of the UFNPT as of June 2024:

Member	Country	E-Mail
Britt Lonneville (Chair of S-130PT)	Belgium	britt.lonneville@vliz.be
Alper Celebi	Australia	alper.celebi@defence.gov.au
Mike Coffin (Chair of the Horizontal Resolution Project Team)	Australia	mike.coffin@utas.edu.au
Anna Hendi (Chair UFNPT)	Canada	anna.hendi@dfo-mpo.gc.ca

3. Update of the 2023/2024 work plan presented at SCUFN36-08.1A follows:

Task	H-High	Start Date	End Date	P-Pending	Contact Person (s) *Indicates leader
	M-Medium			O-Ongoing	
				C-Completed	
1. Update objectives, as per the direction given by SCUFN	H	23-Nov	23-Dec	N/A	A. Hendi
2. Update Terms of Reference of the UFNPT, as per direction from SCUFN	H	23-Nov	23-Dec	(in draft form, see Annex 1)	A. Hendi
3. Work with the Horizontal Resolution Project Team	M	23-Aug	TBD	O	Mike Coffin
4. Collaborate with Ocean Decade project of Detection of Undersea Features, as per the Project Plan	M	24-Jan	24-Dec	O	A. Hendi
5. Update the UFNPT website to show all of the documents shared to date	M	24-Jun	24-Oct	P	A. Hendi
6. Create an update for SCUFN 37 and plan for 2025	M	24-Jun	24-Sep	C	A. Hendi
7. Select a new Chair for the UFNPT	H	TBD	SCUFN 37	P	SCUFN 37

### Analysis/Discussion

4. This project team has not met since the preparation for SCUFN 36. The timing of SCUFN 37 during the Summer, has coincided with the hiring of the Summer student that is usually hired to help with the progress of the UFNPT. Therefore, the progress since SCUFN 36 is not significant.
  
5. Discussion about the table above, for the Work Plan during period 2023/2024
  1. The new objectives proposed for the Project Team, at SCUFN 36, were accepted during SCUFN 36 and that is why the status is "N/A" in the table above.
  2. The new Terms of Reference of the UFNPT, are ready in draft form and shown in Annex 1.
  3. Our work with the Horizontal Resolution Project Team has not been continued since the short time after SCUFN 36.
  4. The progress of the Ocean Decade project of detection of undersea features is shown in paragraph 8.
  5. We have until the end of October to update the documents on the website for the UFNPT, and they are pending at this time.
  6. The plan for the period 2024/2025 follows in paragraph 6.
  7. The selection of the new Chair is up to SCUFN, as per the Terms of Reference of the UFNPT that state: "3,d) The Chair of the SCUFN PT is designated by the parent body."
  
6. Work Plan for the UFNPT for the period 2024/2025

Task		Start Date	End Date	P-Pending	Contact Person (s) *Indicates leader
	H-High			O-Ongoing	
	M-Medium			C-Completed	
1. Finalize Terms of Reference of the UFNPT, as per direction from SCUFN	H	June 2024	December 2024		A. Hendi
2. Re-start the development of S-100 Product Specification for Ufs	H	November 2024	November 2026		TBD
3. Work with the Horizontal Resolution Project Team	M	June 2024	June 2025	O	Mike Coffin
4. Work with Naming 2030 Sub-Group to identify a test case of data flow of unofficially named Ufs, from source contributor to the repository of of data, by using an ID	M	June 2024	November 2025		TBD
5. Collaborate with Ocean Decade project of Detection of Undersea Features, as per the Project Plan	M	June 2024	June 2025	O	A. Hendi
6. Update the UFNPT website to show all of the documents shared to date	M	June 2024	October 2024		TBD
7. Create an update for SCUFN 38 and plan for 2026	M	June 2024	September 2025		TBD

7. The key outputs from the Project Implementation Plan of project of Detection of Undersea Features are:
- Methodology for detecting undersea features** and a repository of these methods that could be used and re-used by other Hydrographic Offices and by the larger science community to uncover UFs from digital data. (Ongoing)
  - Criteria for the application of Deep Learning and to further contribute to the **development of an S-100 specification for undersea features**. (S-100 planned for 2025)
  - A database of **unofficially named undersea features**. (Seems to be the objective of the SCUFN Naming 2030 Sub-Group)
8. Of the long list of tasks in the Project Implementation Plan of the Ocean Decade project of Detection of Undersea Features (Annex 2), these are the tasks that were due in 2024, and their status.

Milestone	Task	Due date	Status
<b>Confirm work and schedule</b>	Plan work and define deadlines	2023 / 2024	Completed
<b>Sign Project Plan</b>	Circulate to co-designers for signature	Start of 2024	Completed at SCUFN, Pending at TSCOM, Pending others
<b>Unofficially named undersea features.</b>	initiate work on design data model, ID ...	2024	Seems to have been addressed by the creation of the SCUFN Naming 2030 Sub-Group

9. The exploration of methods of detection in ongoing. Given that the amount of records and bathymetry available in the Data Center of Digital Bathymetry have not increased in the short period since SCUFN 36, we are exploring AI analysis from altimetry data. We are hoping to be able to share the findings by the next SCUFN 38.

10. To advance the objectives of the UFNPT, this is the proposed work plan for the period 2024-2025

Task		Start Date	End Date	P-Pending	Contact Person (s) *Indicates leader
	H-High			O-Ongoing	
	M-Medium			C-Completed	
<b>1. Finalize Terms of Reference of the UFNPT, as per direction from SCUFN</b>	H	June 2024	December 2024		A. Hendi
<b>2. Re-start the development of S-100 Product Specification for Ufs</b>	H	November 2024	November 2026		TBD
<b>3. Work with the Horizontal Resolution Project Team</b>	M	June 2024	June 2025	O	Mike Coffin
<b>4. Work with Naming 2030 Sub-Group to identify a test case of data flow of unofficially named Ufs, from source contributor to the repository of of data, by using an ID</b>	M	June 2024	November 2025		TBD
<b>5. Collaborate with Ocean Decade project of Detection of Undersea Features, as per the Project Plan</b>	M	June 2024	June 2025	O	A. Hendi
<b>6. Update the UFNPT website to show all of the documents shared to date</b>	M	June 2024	October 2024		A. Hendi
<b>7. Create an update for SCUFN 38 and plan for 2026</b>	M	June 2024	September 2025		TBD

## Recommendations

Given that the Terms of Reference of the Naming 2030 Sub-Group and the new Terms of Reference of the UFNPT have not been approved, it is recommended that SCUFN reviews the UFNPT Work Plan for the period 2024/2025, for overlaps with the tasks to be assigned to other working groups, project teams and sub-groups.

### **Justification and Impacts**

There will be no impact on existing named features.

### **Action Required of SCUFN37**

- That the new Terms of Reference of the UFNPT are reviewed, and approved if applicable.
- That a new Chair for the UFNPT is nominated.
- That the work plan for the period 2024-2025 is approved.
- Any other actions that SCUFN will find helpful

## Annex 1

### **Undersea Feature Names Project Team (UFNPT) Terms of Reference and Rules of Procedure**

#### References:

1. 36<sup>th</sup> meeting of SCUFN, Wollongong, Australia, November 2023.
2. 29<sup>th</sup> meeting of SCUFN, Boulder, Colorado, USA, September 2016, endorsed by HSSC-8.
3. IHO CL 30/2017 dated 3 April – Composition of the GEBCO SCUFN UFNPT

#### **Objective**

- d. Develop S-100 Product Specifications for UF and register SCUFN terms in the IHO GI registry
- e. Design an accessible repository for methods of detection of undersea features.
- f. Explore managing a database/catalogue of undersea features detected from the DCDB and that qualify for official naming but have yet to be named.

#### **Authority**

The Project Team for Undersea Feature Names (SCUFN PT) reports to the IHO-IOC GEBCO SubCommittee on Undersea Feature Names, SCUFN. The Terms of Reference and Rules of Procedure of SCUFN apply.

#### **Composition and Chair**

- a) The Undersea Feature Names Project Team (SCUFN PT) shall comprise representatives of IHO Member States (MS), IHO-IOC GEBCO Subject Matter Experts, Expert Contributors (EC) and observers from accredited NGOs. The IHO Secretariat may also be represented. A membership list shall be maintained and posted on the IHO website.
- b) EC membership is open to entities and organizations that can provide relevant and constructive contribution to the work of the SCUFN PT. ECs shall seek approval of their membership from the Chair of the SCUFN PT.
- c) EC membership may be withdrawn, in the event that a majority of SCUFN PT members agree that an EC's continued participation is either irrelevant or not constructive to the work of the SCUFN PT.
- d) The Chair of the SCUFN PT is designated by the parent body.
- e) If a Secretary is required, he/she should normally be drawn from a member of the SCUFN PT.

#### **Procedures**

- a) The SCUFN PT should work primarily by written correspondence and teleconferences.
- b) Decisions should be made by consensus. Dissenting opinions, if any, should be reflected in the SCUFN PT report.
- c) The SCUFN PT should liaise with other IHO bodies, international organizations, end users and industry to ensure the relevance and currency of its work.
- d) The SCUFN PT should report in accordance with its Work Plan.

Annex 2



2021 United Nations Decade  
2030 of Ocean Science  
for Sustainable Development

# Detection of Undersea Features







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## Ocean Decade Canada-GEBCO Project Implementation Plan

### Detection of Undersea Features

#### Project Description

**Name of Project:** Detection of Undersea Features (DUF)

UFs: Undersea Features

**Start and End Date:** First endorsement January 2022 – December 2023

Second endorsement January 2024 - December 2026 with a possibility of extension.

**Geographic area:** North Atlantic Ocean, Arctic Ocean, North Pacific Ocean

**Brief Summary of Project:** There are more than 40 types of undersea features, each with its characteristics. Their detection has the potential to provide insight into underwater ecosystems and inform area-based management. As the Seabed 2030 projects keep updating General Bathymetric Chart of Oceans (GEBCO)'s global bathymetry grid, the detection of submarine features using GIS, geomatics and deep learning will become increasingly viable.

All of the undersea features in the GEBCO database are publicly available to build a digital inventory of training bathymetric data that can be used to detect more undersea features with deep learning analysis. Other methods of analysis of multilayered data, such as remote sensing and geological data, could also compliment the results.

The findings, will be shared with the Undersea Feature Names Project Team (UFNPT), to inform the Product Specification development process, for the development of a digital standard for undersea features (under the “S100” umbrella). The International Hydrographic Organization (IHO) is already overseeing the structure, design and development of the standardization of marine data standards to make the data findable, accessible, interoperable and reusable.

As the Ocean Decade research progresses and the detection from GEBCO bathymetry provides some confidence in the existence of some features, we envision the creation of a growing database of unnamed undersea features.

Co-designers from IHO and Intergovernmental Oceanographic Commission (IOC) member states, academia and other Ocean Decade projects are welcome to collaborate. Students in earth-related studies will continue to assist in the development of detection methods.

For an extended description of co-design, please refer to [Co-designing the science we need for the ocean we want: guidance and recommendations for collaborative approaches to designing & implementing decade actions - UNESCO Digital Library](#).

The key outputs will be:

- a) **Methodology for detecting undersea features** and a repository of these methods that could be used and re-used by other Hydrographic Offices and by the larger science community to uncover UFs from digital data.

- b) Criteria for the application of Deep Learning and to further contribute to the **development of an S-100 specification for undersea features.**
- c) A database of **unnamed undersea features.**

## **Project Scope**

This project contributes to the following Ocean Decade intentions:

### **Ocean Decade Outcomes**

Outcome 6: An accessible ocean with open and equitable access to data, information, technology and innovation.

Outcome 7: Engaging the public by supplying educational sources to understand the values of ocean sciences in connection to human wellbeing and sustainable development.

### **Ocean Decade Challenges**

Challenge 8: Through multi-stakeholder collaboration, develop a comprehensive digital representation of the ocean, including a dynamic ocean map, which provides free and open access for exploring, discovering, and visualizing past, current, and future ocean conditions in a manner relevant to diverse stakeholders.

Challenge 9: Ensure comprehensive capacity development and equitable access to data, information, knowledge and technology across all aspects of ocean science and for all stakeholders.

### **Ocean Decade Objectives**

Objective 1: Identify critical ocean knowledge; strengthen existing or new partnerships across nations and/or between diverse ocean actors, including users of ocean science.

Objective 2: Build capacity and generate knowledge; is co-designed and/or co-delivered by knowledge generators and users, thus facilitating the uptake of ocean knowledge for policy, decision-making, management and innovation.

Objective 3: Increase ocean knowledge. Ensure that all data are provided in an open access and discoverable manner. Collaborate and engage with local and Indigenous knowledge holders.

## **Key Activities and Deliverables**

- a) Develop a **methodology for the detection** of 40 types of undersea features which are defined in GEBCO bathymetric document B-6, “*Standardization of Undersea Feature Names*”.
  - Continue the development of digital automated methods of detection of UFs.
  - Start an inventory of methods for the automation of detection of UFs.
  - Describe the metadata for each method that is stored.

- Communicate opportunities for improvement of the definitions of generic terms in the Sub-Committee on Undersea Feature Names (SCUFN) *Cookbook for generic terms of undersea* feature names.
  - Share progress and findings with SCUFN, UFNPT, co-designers and stakeholders.
- b) **S-100 specification for undersea features.**
- Obtain a number under which to develop the standard.
  - Expand on the Product Specification draft built in 2018.
  - Engage with the S-130 Project Team, to contribute their experience.
  - Follow the process established by the Hydrographic Services and Standards Committee (HSSC) until the specification is approved.
  - Share progress and findings with SCUFN, UFNPT, co-designers and stakeholders.
- c) **Database of unnamed undersea features.**
- o Design the numeric convention for the IDs of the unnamed UFs.
  - o Design the link between the IDs and the metadata stored in the IHO Data Centre for Digital Bathymetry (DCDB).
    - Find a dataflow and IDs allowing SCUFN to accept this data as authoritative and the feature names as official.
  - o Create records of newly detected undersea features.
  - o Find a home for this database.
  - o Share this information.

## **Outcomes and Performance Indicators**

- Developed **methodology for the detection** of 40 types of undersea features.
  - o A repository of detection methods, presentations and papers about the DUFs that are publicly available. The parameters tested for detection will inform the specification for undersea features.
- **S-100 specification for undersea features.**
  - o A product specification for Undersea Features, within the open access, sharing and discoverability manner of the S-100 standard for marine information, has been started by the Undersea Feature Names Project Team from SCUFN.
- **Database of unnamed undersea features.**
  - o Records of undersea features detected through georeferenced data analysis of - exist in a publicly accessible location.

The speed at which we were able to work on this project from January 2022 to December 2022 has proven that to fulfill all key activities and deliverables the UFNPT will need an extension beyond December 2023.

## **Budget**

To the discretion of each co-designer

## **Full Time Equivalent (FTE) staff**

To the discretion of each co-designer

## Risks and Responses

Table 1. Risks and Responses

RISK	LEVEL	MITIGATION
A specification number is not granted	Moderate	Apply a second time.
Lack of resources	Moderate	Plan to assess availability and constraints and secure them in advance.

## Training

To the discretion of each co-designer

## Communication and Engagement

The members will communicate by email and teleconferences, when necessary.

There is a potential to engage other hydrographic offices by presenting papers and presentation updates to the SCUFN and Technical Sub-Committee on Ocean Mapping (TSCOM).

Materials to reshare on our social media channels can be found on the Ocean Decade [Trello Board](#).

## Timelines for Implementation: Milestones, Activities and Action

	Milestones	Description	Due Date
<b>Detection of Undersea Features</b>	Confirm work and schedule	Plan work and define deadlines	2023 / 2024
	Sign Project Plan	Circulate to co-designers for signature	Start of 2024
	Develop <b>methodologies for the detection</b> of the 40 types of undersea features	<p>Reach out for advice about development and location of a repository:</p> <ul style="list-style-type: none"> <li>- To OceanDecade</li> <li>- to an active working group with participants from Australia, UK, Ireland and Norway.</li> </ul> <p>Include:</p> <ul style="list-style-type: none"> <li>- applicable disclaimers about the methodologies and results (licensing, liability, misinterpretation, misuse)</li> <li>- strengths, limitations, biases, suitability of each method</li> </ul> <p>Explore existing communities:</p> <ul style="list-style-type: none"> <li>- <a href="https://github.com/sacridini/Awesome-Geospatial">https://github.com/sacridini/Awesome-Geospatial</a></li> <li>- <a href="https://github.com/stac-extensions/label">https://github.com/stac-extensions/label</a></li> <li>- <a href="https://tiledb.com/products/tiledb-cloud">https://tiledb.com/products/tiledb-cloud</a></li> </ul>	2024
	Make an inventory of methods public		

	Milestones	Description	Due Date
		Research and build on existing ocean GIS analysis tools: <ul style="list-style-type: none"> <li>- <a href="#">Home   AusSeabed</a></li> <li>- <a href="#">Frontiers   Rule-based semi-automated tools for mapping seabed morphology from bathymetry data (frontiersin.org)</a></li> <li>- <a href="#">Geomorphology classification framework and glossary - Version 1.0. (oceanbestpractices.org)</a></li> <li>- <a href="#">Research Vocabularies Australia (ardc.edu.au)</a></li> <li>- <a href="#">Ocean Mapping Community Wiki</a></li> <li>- <a href="#">Zenodo.org</a></li> </ul>	
	Select metadata to be stored	Should match SCUFN proposal form	2024
	Develop 4 or 5 methods of detection	4 or 5 methods per year are added to the repository	Ongoing
	Update Cook Book	Add new parameters for detection, if necessary	Ongoing
	Share progress and findings with SCUFN, UFNPT, co-designers and stakeholders	Provide a project update at SCUFN and TSCOM meetings	Ongoing
<b>S-100 specification for undersea features</b>	Obtain an S-100 number	Send HSSC a paper for Action  Flagg as Standard for Non-Navigational information. Geological information and other categories might apply.	2025
	Expand on the Draft Product Specification draft built in 2018	Engage the S-130 Project Team to contribute their experience	2025
	Send HSSC a final product Specification	Follow the process established by HSSC	2026
	Share progress and findings with SCUFN, UFNPT, co-designers and stakeholders	Provide a project update at SCUFN and TSCOM meetings	Ongoing
<b>Database of unnamed undersea features.</b>	Design the data model and numeric convention for IDs - linked to GEBCO DCDB	Consider: <ul style="list-style-type: none"> <li>- Reach out to DCDB administrators for awareness of this project.</li> <li>- That some DCDB data might be downgraded, to not show raw data.</li> <li>- The use of existing national codes</li> <li>- How many existing features there are</li> <li>- How many features are estimated to be detected in the future</li> <li>- Validation method to be used for new, changed or deleted features</li> <li>- Explore quality control before and after storage in the DCDB database</li> <li>- Timing of updates to the database</li> <li>- What data would need to be stored with the features</li> </ul>	2024

	Milestones	Description	Due Date	
	Find a dataflow from this new database that will allow SCUFN to accept this data as authoritative and the feature names as official	Complete a test case	2025	
	The database is public	Involve SCUFN and Ocean Decade	2026	
	Share this information	Provide a project update at SCUFN and TSCOM meetings	Ongoing	
Request extension	project	Create a new project plan and have it signed by all co-designer	Submit a proposal and new project plan to Ocean Decade	2026


**Reporting**

Ocean Decade progress reports are requested by email from Ocean Decade, on their schedule.

**Change Control**

Changes to the scope, deliverables, timeline and budget will be requested from the Project Lead at the Canadian Hydrographic Service, and made available in the Change Request Log, upon approval.

**Signatures**

Role	Organization	Signature	Date
Lead	Canadian Hydrographic Service		
Co-designer	Sub-Committee of Undersea Feature Names (SCUFN)		May 8, 2024
Co-designer	Technical Sub-Committee on Ocean Mapping (TSCOM)		
