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UNDERSTANDING DEEP ATLANTIC ECOSYSTEMS



Monitoring and evaluation of a Spatially Managed Area in the Case Study No 11, following the MESMA framework: Step 1 - Context Setting

ATLAS General Assembly. April 9-12th. Mallorca. ESPAÑA



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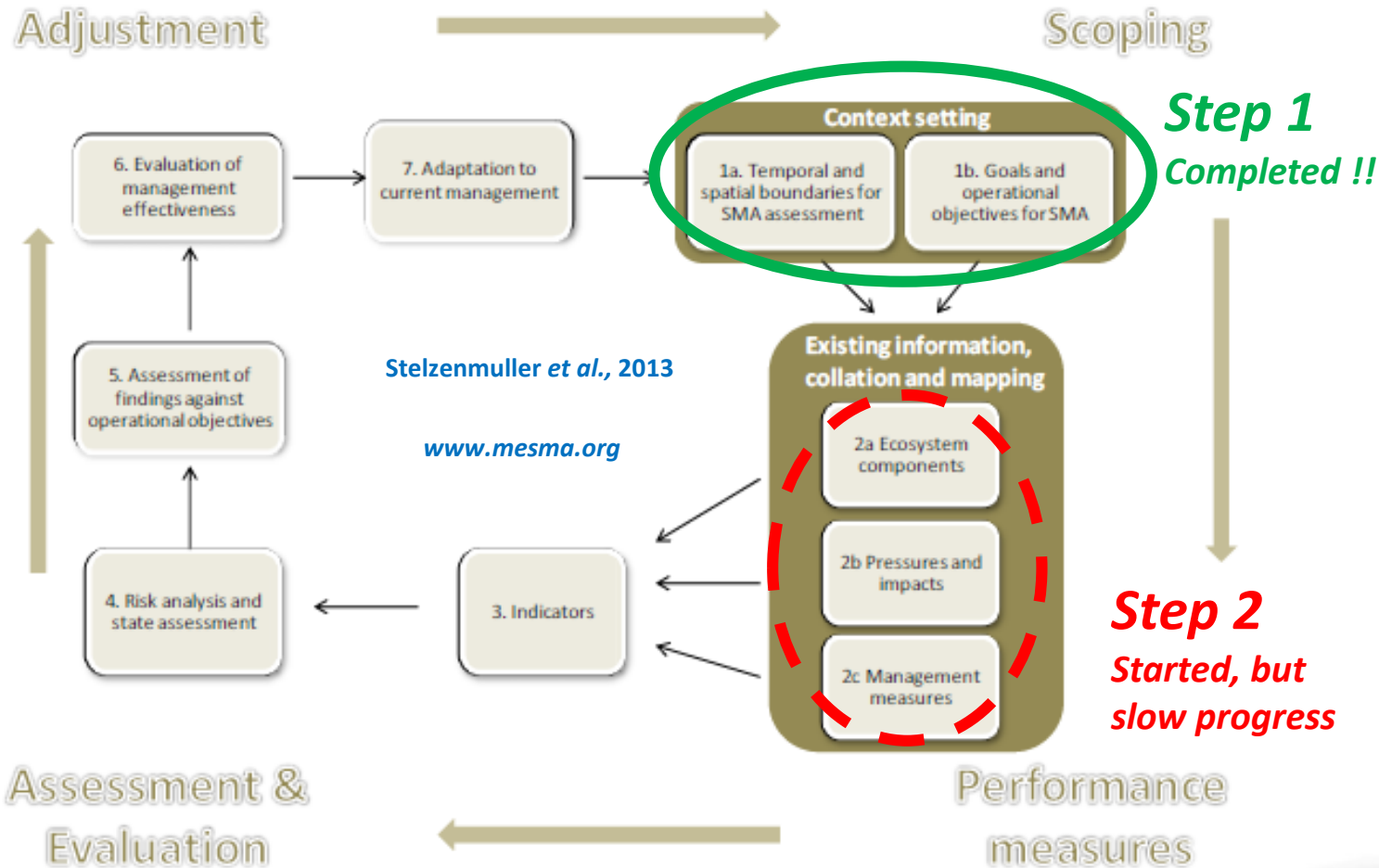


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 678760 (ATLAS). This output reflects only the author's view and the European Union cannot be held responsible for any use that may be made of the information contained therein.



MESMA framework to monitor/evaluate Spatially Management Areas (SMAs)

Using MESMA as a practical guide

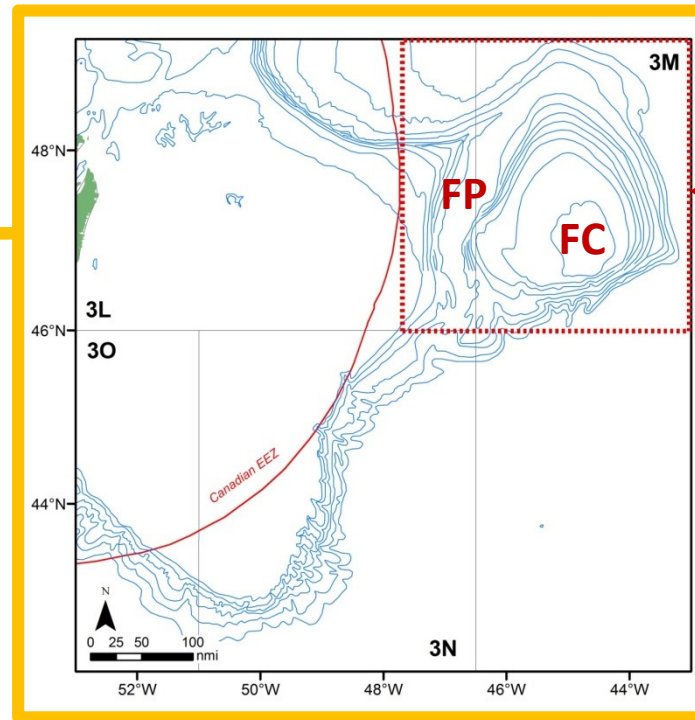




Description of Case Study



Flemish Cap (Div 3M) is an Oceanic Bank (plateau) located within NAFO Regulatory Area and separated from the Grand Banks by the **Flemish Pass (Div 3L)**



Case Study Area
 Flemish Cap + Flemish Pass
 ~ 124,000 km²
 NAFO Regulatory Area
 High-seas (ABNJ)



Convention Area: the area to which this Convention applies, as described in Article IV.
Regulatory Area: part of the Convention Area beyond areas under national jurisdiction.



Potential blue growth activities - ATLAS

	Lofoten-Vesteralen Observatory	North and West of Shetland	Rockall	Mingulay Reef Complex	Porcupine Seabight	Bay of Biscay	Gulf of Cadiz/Alboran Sea - Medwaves	Azores	Deep-Links - Gulf of Cadiz	Davis Strait	Flemish Cap	Canyon Province, US Atlantic Bight
Jurisdiction	EEZ	EEZ	EEZ/ABNJ/Ext C	EEZ	EEZ	EEZ	EEZ	EEZ	EEZ	EEZ	ABNJ/Ext CS	EEZ/ABNJ
Conservation management	X	X	X	X (SAC)		x		x		X	X	X
Reason for Spatial Management Plan?	Existing - fishing and tourism (no oil - at the moment), offshore windmills, Zooplankton - Calanus									Fisheries, oil and gas, tourism, indigenous fisheries	Fisheries, oil and gas, shipping, cables	Fisheries, recreational fisheries (?), cables, tourism, shipping, research
Blue Growth Scenarios												
Blue Economy												
Minerals	x											x
Renewable energy	x											
Aquaculture	x											
Tourism	x											
Eco-tourism										x		x
Biotechnology	x	x								x	x	x
Oil and gas	x	x								x	x	x
Carbon sequestration ?												
Shipping		x								x	x	x
Zooplankton										x		
Cables		x									x	x
New fisheries resources		?								x	x	x
Scientific (research) reference sites/observatories			x							x	x	x
Indigenous peoples												
Maritime security and surveillance												x

BE/BG Scenario

Shipping

Cables

New fisheries resources

Scientific (research) reference sites/observatories



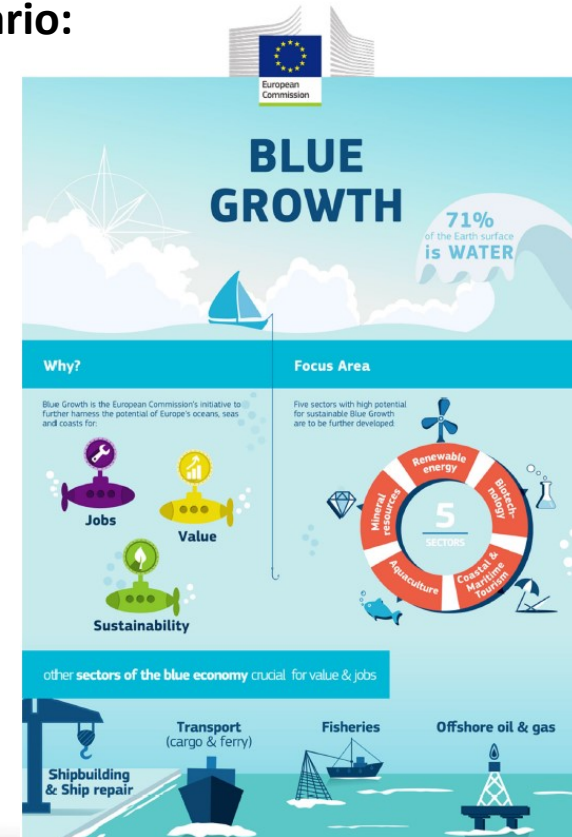


Scenario to apply MESMA

“Accommodate hydrocarbon exploration and exploitation, minimising impacts on existing activities (particularly fishing) and VMEs”

Reasons for selecting this *Blue Economy / Blue Growth* scenario:

- The increase demand for oil exploration and exploitation in the area.
- The potential conflict/interaction with other uses of the marine space:
 - *NAFO conservation measures (VMEs)*
 - *High-seas fisheries*
 - *Marine research (fisheries, ecosystem, etc.)*
 - *Marine traffic*
 - *Cable industry*
 - *Historical ocean disposal sites - UXO?*
 - *Biotechnology (future)?*



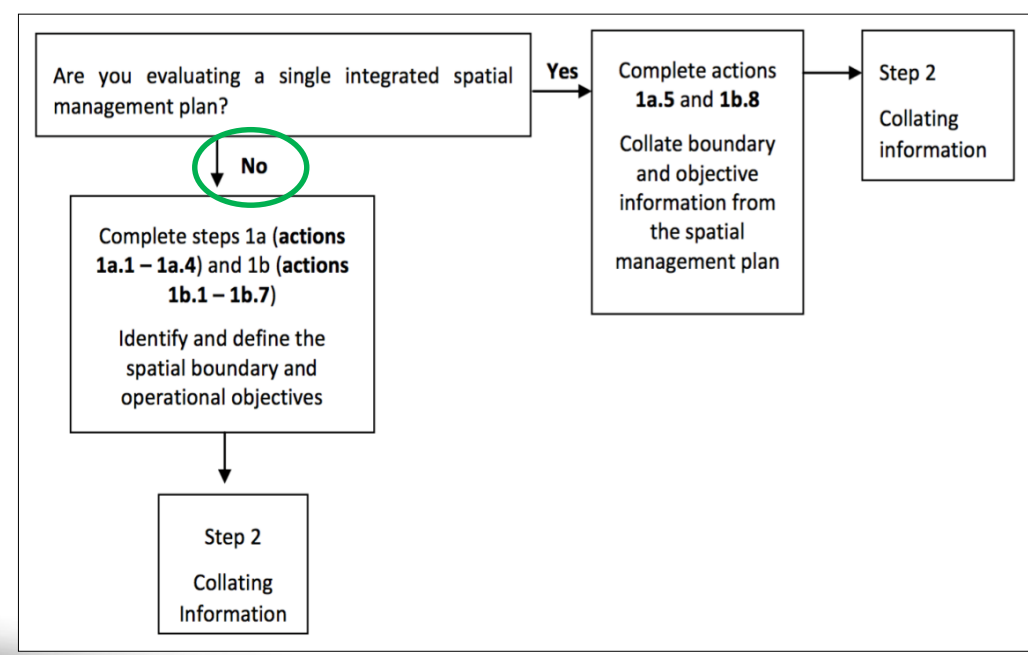


There is no an integrated management plan in the area

- A fisheries management plan active: the NAFO management plan



- Offshore oil and gas resources are managed by the Canada Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB)





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Action 1a.1 Identifying and mapping existing management plans

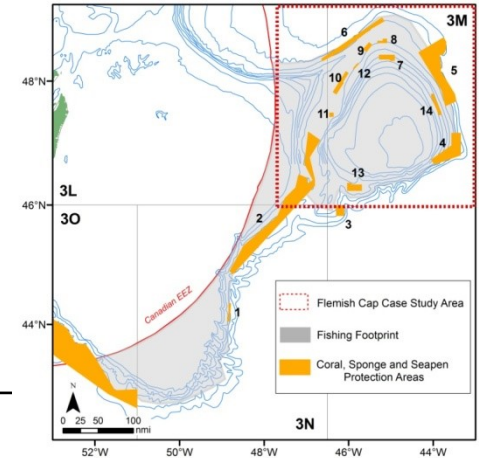


Table 1a.1 Management plan spatial and temporal limits

Operational level (local/national etc)	Plan name	Date of implementation	Review cycle (years)	Describe spatial boundary
Fisheries. Intergovernmental RFMO	NAFO management under the NAFO Convention: NAFO “Conservation and Enforcement Measures (CEM)” NAFO “Road Map to EAF”	1979 (previously ICNAF since 1949) 2010	Annually Multiyear	NAFO Regulatory Area (NRA) High-seas (ABNJ)

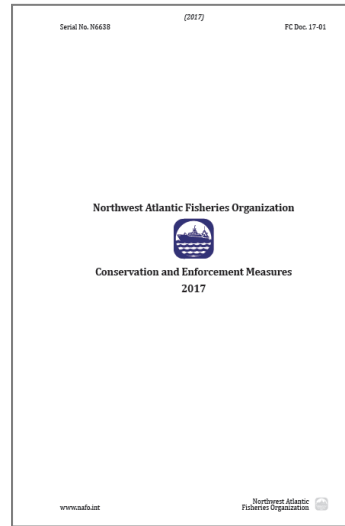


The **Northwest Atlantic Fisheries Organization (NAFO)** is the intergovernmental RFMO that has responsibility for fisheries management and ecosystem conservation in the NRA



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Action 1a.1 Identifying and mapping existing management plans

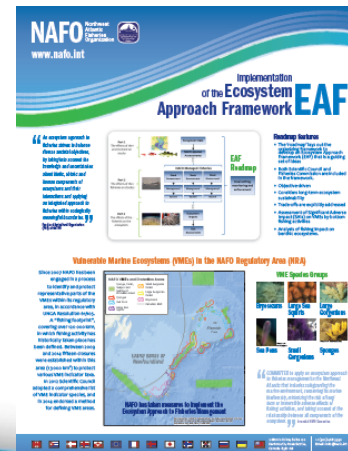


NAFO “Conservation and Enforcement Measures” (NAFO CEM)

- Catch and effort limitations
- Bycatch measures
- Recovery and rebuilding plans
- Conservation and management of sharks
- Vessel and gear requirements
- Protection of VMEs – Closed Areas
- Fisheries monitoring
- Fisheries footprint
- ...

.... to ensure **the long term conservation and sustainable use of the fishery resources** in the Convention Area and, in so doing, **to safeguard the marine ecosystems....**

..... amendments (18 May 2017) were comprehensive, designed to modernize NAFO, particularly **by incorporating an ecosystem approach to fisheries management....**



NAFO “Road Map to EAF”

- Framework to develop an Ecosystem Approach Framework (EAF)
- Guiding set of ideas
- Scientists & Managers



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Action 1a.1 Identifying and mapping existing management plans

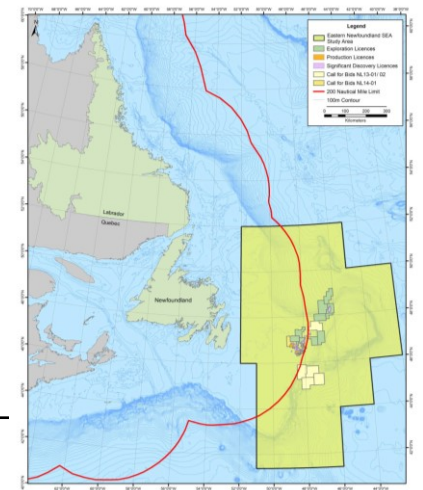


Table 1a.1 Management plan spatial and temporal limits

Operational level (local/national etc)	Plan name	Date of implementation	Review cycle (years)	Describe spatial boundary
Oil and gas. National, local (Governments of Canada, Newfoundland and Labrador)	<p>C-NLOPB Management under the “Accord Acts”:</p> <p><i>Canada-Newfoundland Atlantic Accord Implementation Act,</i></p> <p><i>Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act</i></p>	1986	Multiyear	Newfoundland and Labrador Offshore Area



The **Canada Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB)** is the national board responsible for petroleum resource management in the Newfoundland and Labrador Offshore Area

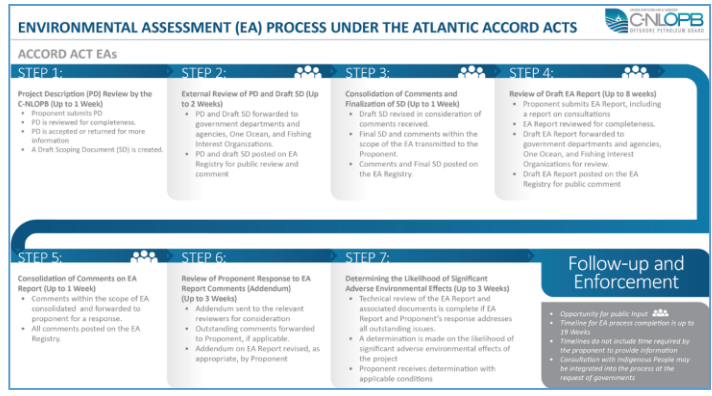


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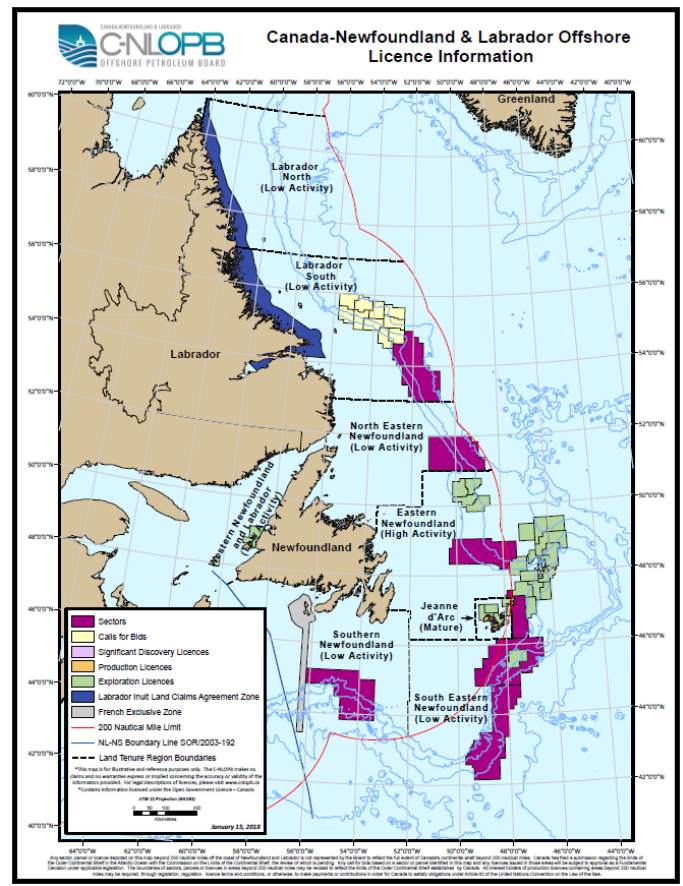
Action 1a.1 Identifying and mapping existing management plans



Environmental Assessments



Canadian Environmental Assessment Act (CEAA, 2012)



Exploration Licence

Based on the results of the call for bids. Right to explore, drill, test, and obtain a production licence.

Significant Discovery Licence

A discovery that suggests the existence of an accumulation of hydrocarbons that has potential for sustained production.

Production Licence

A commercial discovery that justify the investment of capital and effort to bring the discovery to production.

Action 1a.2 Identifying and mapping sectors and activities

¹ NAFO Scientific Council Working Group on Ecosystem Science Assessment (WGESA)

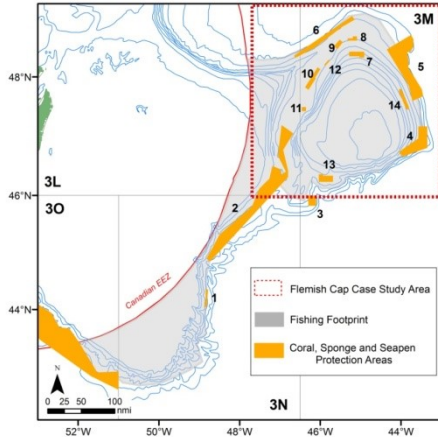
*Relevant for the NAFO Area

Anthropogenic activities and stressors identified by WGESA¹ (NAFO, 2014)

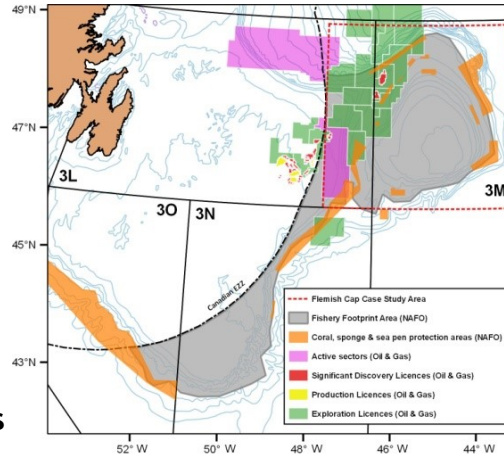
Anthropogenic activity	Stressor
Fishing*	
Transportation*	AIS vector
	Accidental events
Oil and gas exploration and exploitation*	Drilling wastes*
	Produced water*
	Seismic*
	Accidental events*
Other energy sources	Wind
	Tidal
Mining*	Tailings disposal
	Placer mining*
	Nodule dredging*
Waste inputs*	Litter*
	Microplastics*
Cables*	
Pipelines*	
Recreation and tourism	
Marine protected areas (broadly defined)*	
Defense activities*	Sonar, dumping
Aquaculture	
Dumping solid waste*	Habitat modification/destruction
Coastal infrastructure/ shoreline modification	Habitat modification/destruction
Global change*	Climate
	Weather
	Ecosystem shifts
	Acidification
	Eutrophication



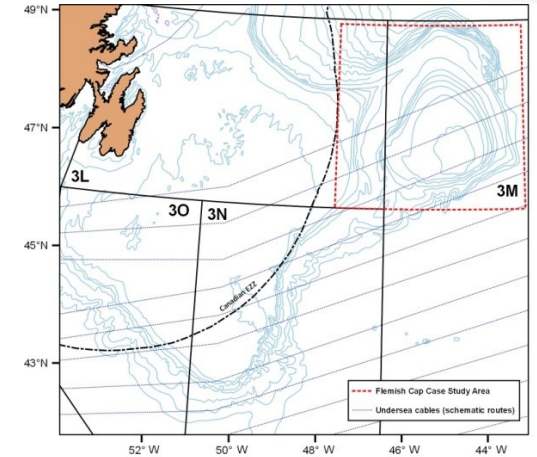
Action 1a.2 Identifying and mapping sectors and activities



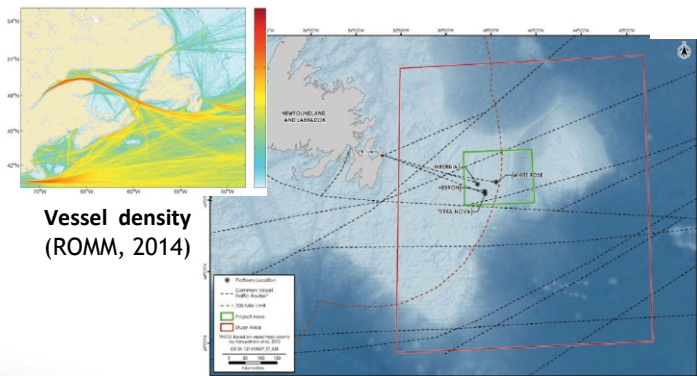
Fishing footprint and VME protection areas (shapefiles from NAFO)



Hydrocarbon exploration/exploitation (shapefiles from C-NLOPB)



Submarine cable location (shapefiles from EMODnet)



High-density Marine Traffic Transit Routes (Stantec, 2016)



Research (Fisheries/Ecosystems)



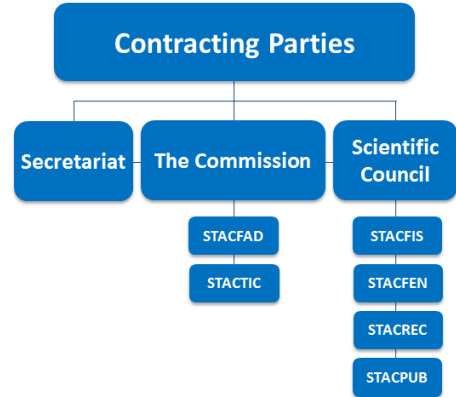
Action 1a.3 Assessing institutional landscapes



NAFO is an **Intergovernmental** fisheries science and management body, founded in 1979 as a successor to ICNAF.

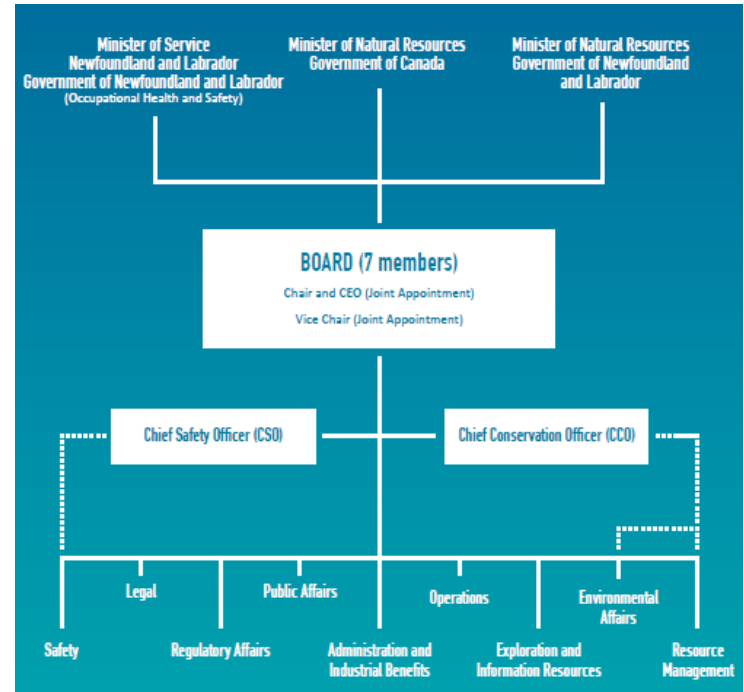
The objective of the NAFO Convention is to ensure the long term conservation and sustainable use of the fishery resources in the Convention Area and, in so doing, to safeguard the marine ecosystems.

Currently NAFO has 12 Contracting Parties (including EU, Canada and EEUU)



www.nafo.int

C-NLOPB began operations in January 1986 and is responsible, on behalf of the **Government** of Canada and the **Government** of Newfoundland and Labrador, for petroleum resource management in the Newfoundland and Labrador (NL) Offshore Area.



www.cnlopb.ca

Action 1a.4 Finalise the spatial boundary

The **proposed boundary** is part of the area previously identified in:

REPORT OF THE NORTH-WEST ATLANTIC REGIONAL WORKSHOP TO FACILITATE THE DESCRIPTION OF ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS (EBSA)

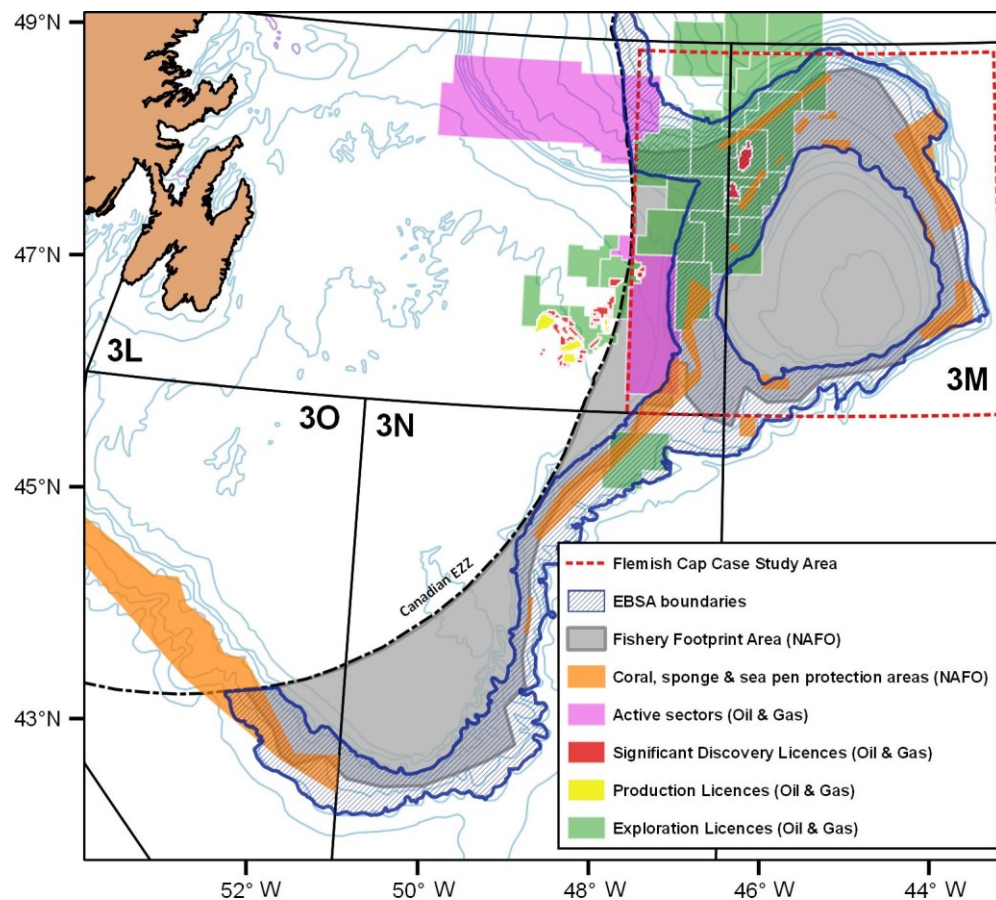
(UNEP, 2014)

- Meets the criteria for EBSAs

UN Convention on Biological Diversity

- Includes:

Most of the area of interest for human uses of the marine space and ecosystem conservation



EBSA Area No.4: Slopes of the Flemish Cap and Grand Banks (UNEP, 2014)



atlas Action 1b.1 Identifying legal policy objectives

Table 1b. 1 Legal policy objectives and guidance

Operational level (local, national..)	Statute - title and reference	Implementing department / agency	Key regulations and byelaws - reference	Related policy objectives and guidance - reference
International	UNCLOS, 1982	Signatory parties; competent international organizations	Framework/legal basis for conservation and management of marine living resources, sea exploitation, allocation of activities and protection of environment (Maes, 2008)	Law of the sea
International	Convention on Biological Diversity (UN, 1992)	Signatory parties; competent international organizations	Conservation of biological diversity; sustainable use; fair and equitable sharing of the benefits arising out of the utilization of genetic resources	Measures for conservation and sustainable use
International	1995 UN agreement on management of straddling fish stocks	Signatory parties; competent international organizations		
International	Relevant UNGA Resolutions on Sustainable Fisheries (e.g. UNGA 2006. Res 61/105)	Signatory parties; competent international organizations		
International	NAFO Convention (2017)	Contracting parties; NAFO	To ensure the long term conservation and sustainable use of the fishery resources and to safeguard the marine ecosystems	
International	Relevant FAO fisheries agreements and guidelines (e.g. FAO 2009 Deepsea Guidelines)	Signatory parties; FAO	High-seas fisheries	
International	Strategic plan for the organization 2016-2021 International Maritime Organization (IMO, 2015)	Signatory parties; IMO	Safety and security of shipping and the prevention of marine pollution by ships	Create a regulatory framework for the shipping industry
International	MARPOL Convention (1983)	Signatory parties;	Prevent pollution from ships	
National	Atlantic accord Acts; Canadian Environmental Assessment Act	Government of Canada; Government of Newfoundland-Labrador	Regulating the hydrocarbon exploration and exploitation; Regulating the Environmental Assessments	Management of the resource; Environmental Assessment
National	Coastal Fisheries Protection Act R.S.C., 1985, c. C-33	Government of Canada	Sedentary species	Foreign fishing vessel / sedentary species
National	Relevant national fisheries regulations	Governments of NAFO contracting parties fishing in the area	High-seas fisheries regulations and policies	



Action 1b.2 Identifying sectoral interests

Main Stakeholders

- Fishing industry & organizations
- Hydrocarbon industry
- Shipping industry
- Submarine cable industry
- Biotechnology industry
- RFMO (NAFO)
- National authorities and boards
- Research institutions
- Environmental NGOs

Atlas Action 1a.2 Identifying and mapping sectors and activities

Anthropogenic activities and stressors identified in WGESA report for 2014 (NAFO, 2014)

Anthropogenic activity	Stressor
Fishing*	
Transportation*	AS vector Accidental events
Oil and gas exploration and exploitation*	Drilling wastes* Produced water* Seismic*
Other energy sources	Accidental events*
	Wind
Mining*	Tidal Tailings disposal Placer mining* Nodule dredging*
Waste inputs*	Litter* Microplastics*
Cables*	
Pipelines*	
Recreation and tourism	
Marine protected areas (broadly defined)*	
Defense activities*	Sonar, dumping
Aquaculture	
Dumping solid waste*	Habitat modification/destruction
Coastal infrastructure/ shoreline modification	Habitat modification/destruction
Global change*	Climate Weather Ecosystem shifts Acidification

*Relevant for the NAFO area.
 NAFO Scientific Council Working Group on Ecosystem Science Assessment (WGESA)

www.eu-atlas.org

Atlas Action 1a.2 Identifying and mapping sectors and activities

Fishing footprint and VME protection areas (shapefiles from NAFO)

Hydrocarbon exploration/exploitation (shapefiles from C-NLOPB)

Submarine cable location (shapefiles from EMODnet)

Vessel density (DOIWI, 2014)

High-density Marine Traffic Transit Routes (Stantec, 2016)


Research (Fisheries/Ecosystems)

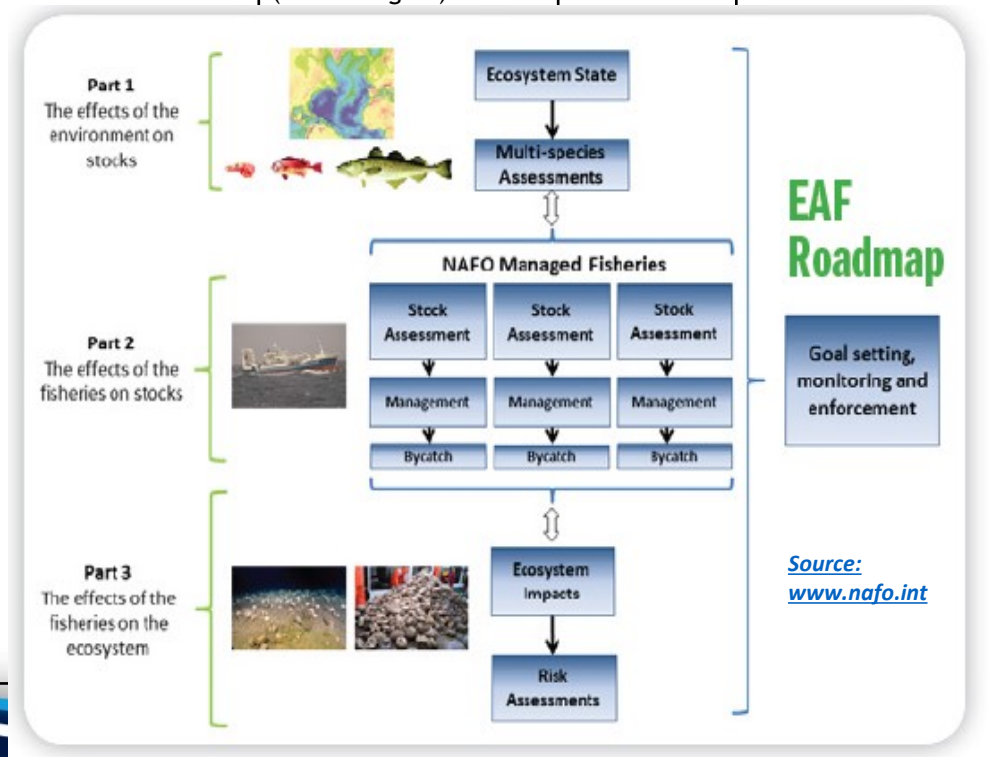
www.eu-atlas.org



Action 1b.3 Identifying and defining objectives of existing management plans

Table 1b.3 Objectives of existing management plans

Plan name	Plan objectives	Are the objectives ecological (E), social (S), economic (Ec), mixed or other (O)?	Area for which the objective is relevant (whole region / part of the region)	Objective deadline	Conflicts between other management plans / objectives
<p>NAFO Management:</p> <p>NAFO “CEM”</p> <p>NAFO “Road Map to EAF”</p> 	<p>to ensure the <u>long term conservation and sustainable use of the fishery resources</u> and to <u>safeguard the marine ecosystems</u> in which these resources are found:</p> <p><i>Prevent significant adverse impacts of bottom fisheries on VMEs;</i></p> <p><i>Conserve biodiversity;</i></p> <p><i>Maintain/restore ecosystem structure & function...</i></p> <p>.....</p> <p>.....</p>	(S) (Ec) (E)	NAFO Regulatory Area (Whole region)		





Action 1b.3 Identifying and defining objectives of existing management plans

Table 1b.3 Objectives of existing management plans

Plan name	Plan objectives	Are the objectives ecological (E), social (S), economic (Ec), mixed or other (O)?	Area for which the objective is relevant (whole region / part of the region)
<p>C-NLOPB Management:</p> <p>The “Accord Acts”:</p> <p><i>Canada-Newfoundland Atlantic Accord Implementation Act</i></p> <p><i>Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act</i></p>	<p>to facilitate the <u>exploration for and development of the petroleum resources</u> in a manner that conforms to the statutory provisions for:</p> <p><i>Worker health and safety, environmental protection, effective management of land tenure, maximum hydrocarbon recovery and value, and Canada/Newfoundland and Labrador benefits.</i></p>	<p>S) (Ec) (E)</p>	<p>Newfoundland and Labrador Offshore Area</p> <p>(Whole region)</p>

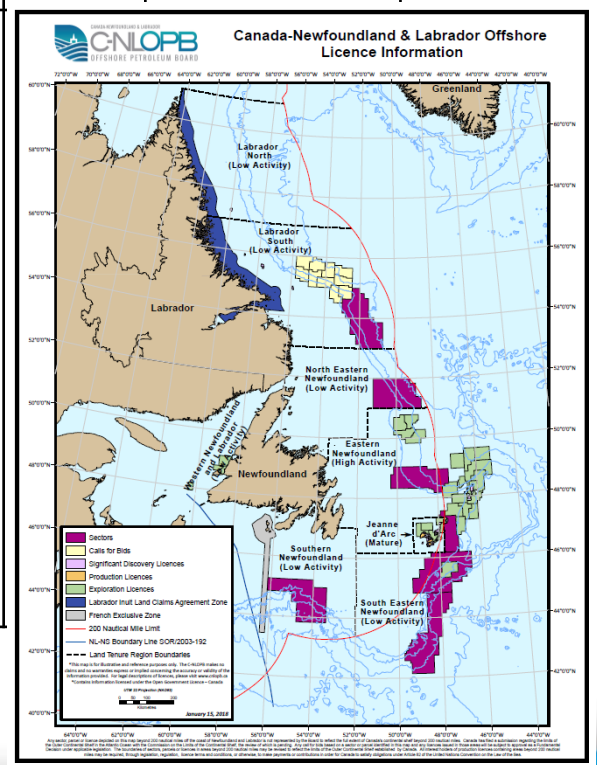


Table 1b. 4 Assessing operational objectives against SMART criteria

(BE/BG Scenario: proposed management initiative)

Operational objective	Specific (yes or no)	Measurable (yes or no)	Achievable (yes or no)	Realistic (yes or no)	Time-bound (yes or no)	Comments on quality of data available (none, poor, intermediate, good)
To accommodate a sustainable development of oil and gas exploration and exploitation	No	No	To be seen	To be seen	Yes	Good
Prevent significant adverse impacts of oil and gas exploration and exploitation on vulnerable marine ecosystems	No	Yes	To be seen	To be seen	Yes	Good
Prevent significant adverse impacts of oil and gas exploration and exploitation on fisheries and scientific research activities	No	Yes	To be seen	To be seen	Yes	Intermediate
Close VME protection areas established by NAFO to oil and gas exploration and exploitation	Yes	Yes	Yes	Yes	Yes	Good
Create spatial management areas within the EBSA area	No	Yes	Yes	To be seen	Yes	Good



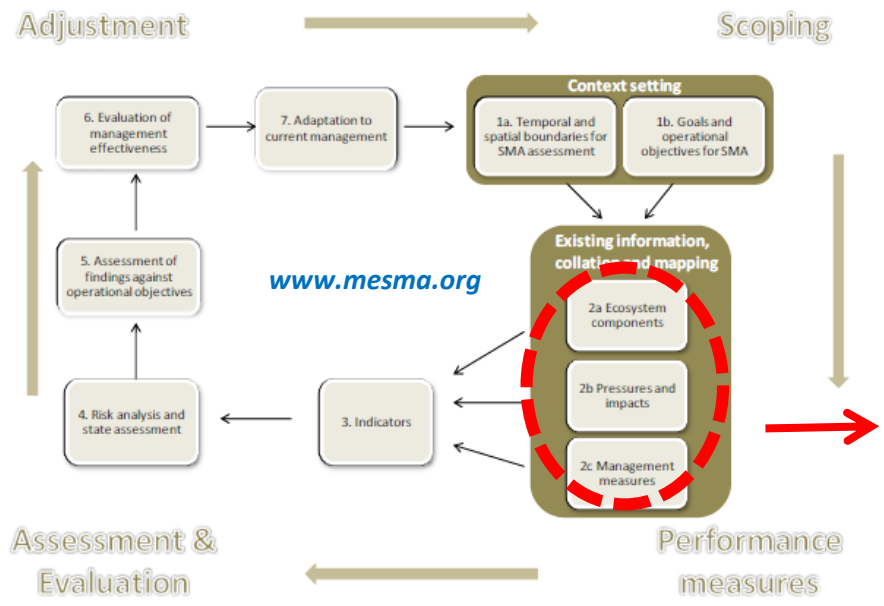
1b.6 Concluding on operational objectives

Table 1b.6.2 Prioritisation of operational objectives (BE/BG scenario: proposed management initiative)

Ecological operational objective	Reasons why important	Focus for assessment? Y/N
Prevent significant adverse impacts of oil and gas exploration and exploitation on vulnerable marine ecosystems	There are many potential adverse effects derived the different actions/phases related with this activity (structures, drilling wastes, produced water, seismic)	Y
Close VME established by NAFO to oil and gas industry	Deep-sea sponge grounds and corals are important components of deep-water ecosystems	Y
Social operational objective	Reasons why important	Focus for assessment? Y/N
--	--	--
Economic operational objective	Reasons why important	Focus for assessment? Y/N
To accommodate a sustainable development of oil and gas exploration and exploitation, minimizing impacts on existing activities (fisheries)	Blue economy activity, but need to achieve the goals of the Europe 2020 strategy for smart, sustainable and inclusive growth.	
Maintain current fisheries at or close to MSY taking into account wider ecosystem impacts	Blue economy activity. Existing use of the marine space.	
Other/Mixed operational objective	Reasons why important	Focus for assessment? Y/N
Prevent significant adverse impacts of oil and gas exploration and exploitation on fisheries and research	Existing use of the marine space. These Activities are very important (economic/social) in the study area	Y
Create spatial management areas within the EBSA boundaries in the Case Study Area	Area described as meeting the EBSA criteria	Y



Start point for Step 2: Inventory of data needed for MESMA



Step 2
..... in progress

Type	Description
Ecosystem	VME indicator species distribution Demersal fish distribution Seabird community Marine mammals
Seafloor	Bathymetry Seafloor geological settings map
Oceanography	CTD
Human activities & footprint	International Bottom fishing footprint International Bottom fishing VMS High density marine traffic routes Undersea cable location Oil exploration/exploitation Seabed litter distribution Historical ocean disposal sites
Conservation/management	NAFO closed areas (VME protection); Other NAFO measures EBSA boundaries



Step 2 – Inventory of data needed

leanne.roberts@gmail.com has shared a link to the following spreadsheet:

[ATLAS List of CS data layers.xlsx](#)

Unknown profile photo Hello ATLAS CS leaders, please find here the link to a Google Doc for you to list data layers and maps for you to complete before 1 December 2017.
Thank you,
Lea-Anne.

<https://docs.google.com/spreadsheets/d/1CZBkb-poxdjOyflBi6PDdYvleKkJKPjRog-UIFd6ujE/edit?usp=sharing>

[Open in Sheets](#)



21 potential sources were identified

Availability?

Shapefiles containing boundaries of areas closed to protect CWC & Sponges
Shapefile containing boundaries of EBSA
Shapefile containing boundaries of the international bottom fishing footprint (existing bottom fishing areas)
Shapefiles containing boundaries of the NAFO Divisions (statistical areas)
FAO VME database
Shapefile containing boundaries of different hidrocarbon exploration and exploitation activities
Map of hidrocarbon exploration and exploitation activities in the Case Study Area
Map of Canada-Newfoundland & Labrador Offshore Licence Information (hidrocarbon exploration and exploitation)
EMODnet Human Activities: Telecom cables
Interactive Submarine Cable Map
Submarine Cable wall Map
VMS data from fishing vessels for inspection, scientific, search, rescue and maritime safety purposes.
Global ship traffic in the study area
Map of the bottom trawl international fishing effort
Map of locations of dumpsites of Unexploded Ordnance (UXO) in NW Atlantic
Gregs cable map (Telecom marine cables)
Offshore Seabird Monitoring Program
Seabird community of the Flemish Cap
General Bathymetric Chart of the Oceans
VMEs distribution maps
Seabed map



Author(s)	Title	Year of publication	Description	Label(s)	Source (URL)	Open Access	Linked data publication(s)	Linked literature publication(s)
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Step 2 – Inventory of data needed

leanne.roberts@gmail.com has shared a link to the following spreadsheet:

[ATLAS List of CS observational data.xlsx](#)

Unknown profile photo Dear ATLAS CS leaders, please find here the link to the Google Doc for any other sorts of data observations, this might include e.g., point data on fish species, VME indicator taxa, marine litter, marine infrastructure, etc..
Thank you,
Lea-Anne.

<https://docs.google.com/spreadsheets/d/13H-K4kSJFc0e5fNjAvi6KJvhEEwqm0aGXVUXipErbSg/edit?usp=sharing>

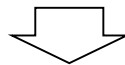
[Open in Sheets](#)



CTD data register of fisheries cruises. Since 1988, summer expeditions have been carried out for the evaluation of the stock at Flemish Cap deposited in SeaDataNet
Fishing data of the evaluation of the demersal stock at Flemish Cap (since 1988), deposited in SeaDataNet
Invertebrate data from grounfish surveys in Flemish Cap (since 2007)
Data from benthic samplers (Box-corer & rock dredge)
Multibeam and TOPAS seismic profiles) data
CTD data
Video footage and photos (ROV)

7 potential sources were identified

Availability?



Author(s)	Title	Year of publication	Description	Label(s)	Source (URL)	Open Access	Linked data publication(s)	Linked literature publication(s)
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Thank You!



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CENTRO
OCEANOGRÁFICO
DE **VIGO**

100 años en Vigo
una vida en el mar



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