NAFO Northwest Atlantic Fisheries Organization

Committed to **Conservation** and **Management** of **Fisheries** and **Ecosystems** in the **Northwest Atlantic**

Impacts of bottom fishing and long-term sustainable management in the Northwest Atlantic Fisheries Organization (NAFO)

Presentation to the General Assembly Workshop on measures to address the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks.

Tom Blasdale

NAFO Scientific Council Coordinator

2 August 2022

Outline

- About NAFO
- Assessing bottom fishing impacts in NAFO
- Measures to protect VMEs
- The NAFO Ecosystem Approach Roadmap

- NAFO is an international regional fisheries management organization (RFMO)
- International cooperation in fishery science and fishery management
- Manages the fishery in the international waters of the Northwest Atlantic
- Four coastal States – Canada, USA, France (St. Pierre et Miquelon) and Denmark (Greenland)

13 Contracting Parties (CPs)


Canada


Cuba



Denmark (in respect of Faroe Islands & Greenland)


European Union (EU)


France (in respect of Saint Pierre et Miquelon)


Iceland


Japan


Korea, Republic of


Norway


Russian Federation


Ukraine


United Kingdom of Great Britain and Northern Ireland


United States of America

- Established in 1979 by international treaty
- Succeeded the 1949 International Commission for the Northwest Atlantic Fisheries (ICNAF)
- NAFO Convention was substantially amended in 2007 and the amendments to the NAFO Convention came into force 18 May 2017.

Objective

“ … 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 in which these resources are found. ”

NAFO Convention and Regulatory Area

NAFO is the RFMO responsible for managing the fish stocks (except salmon, whales, tuna and sedentary species) in the NW Atlantic outside the EEZs of Coastal States (FAO Statistical Area 21).

Biological Resources under NAFO Regulation

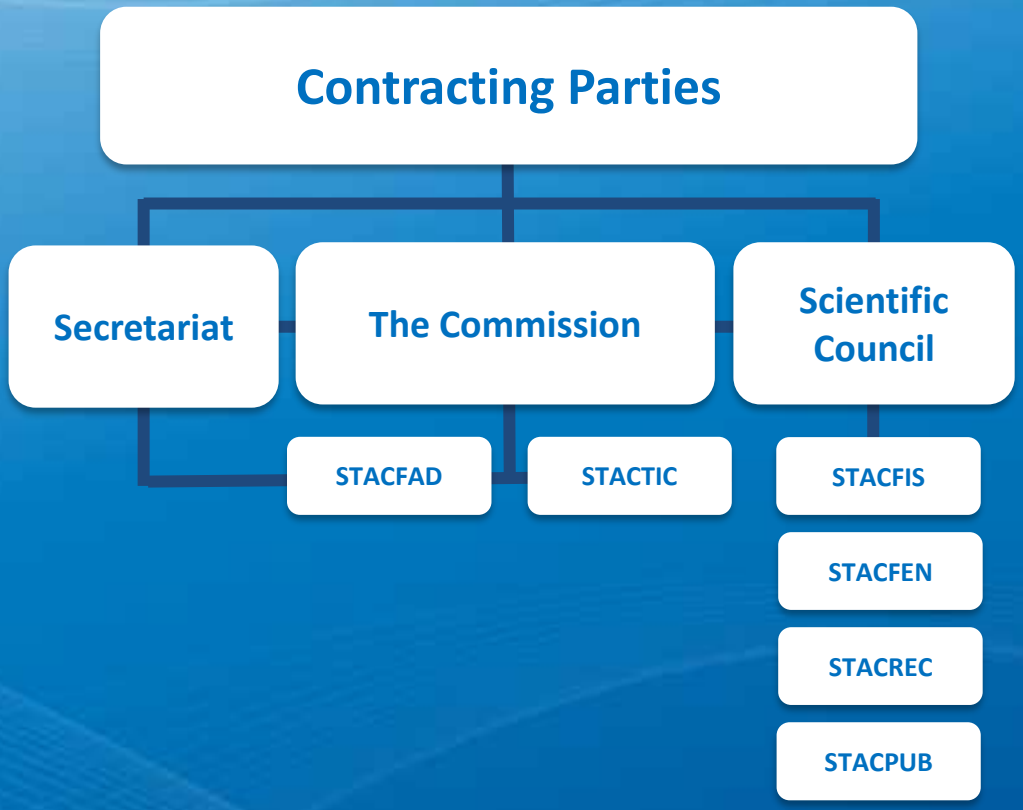
NAFO manages most fishery resources of the Northwest Atlantic except sedentary species (e.g. shellfish) and species managed by other fishery bodies, i.e. salmon, tunas/marlins and marine mammals.

The NW Atlantic Fishery in 2019

- 47 vessels
- About 74 000 tonnes of catches* of NAFO regulated species, predominantly by bottom trawl
- Approximate value is CDN$452 million (or about 309 million euro)

*Preliminary estimate based on Daily CATs

NAFO Structure



Assessment of Bottom Fisheries Activities – in 2016, 2021 and every 5 years (Article 23 of NCEM)

Tasks – Par. 47 of DSF Guidelines (Annex I.E, NCEM)
Description of fisheries, bycatch, effort
Habitats and communities, ecosystems
Mapping of VMEs – known or likely to occur in fishing area
Evaluation of likely impacts --- Significant Adverse Impact
VME elements in fishing area
Data and methods to assess SAI
Risk assessment of impacts due to fishing
Mitigation and management measures, monitoring

Identifying VME Species and Elements

Species

- **Large-sized sponges**
- **Stony Corals**
- **Gorgonian corals**
- **Sea pens**
- **Tube-dwelling anemones**
- **Erect bryozoans**
- **Sea lilies**
- **Sea squirts**

Elements

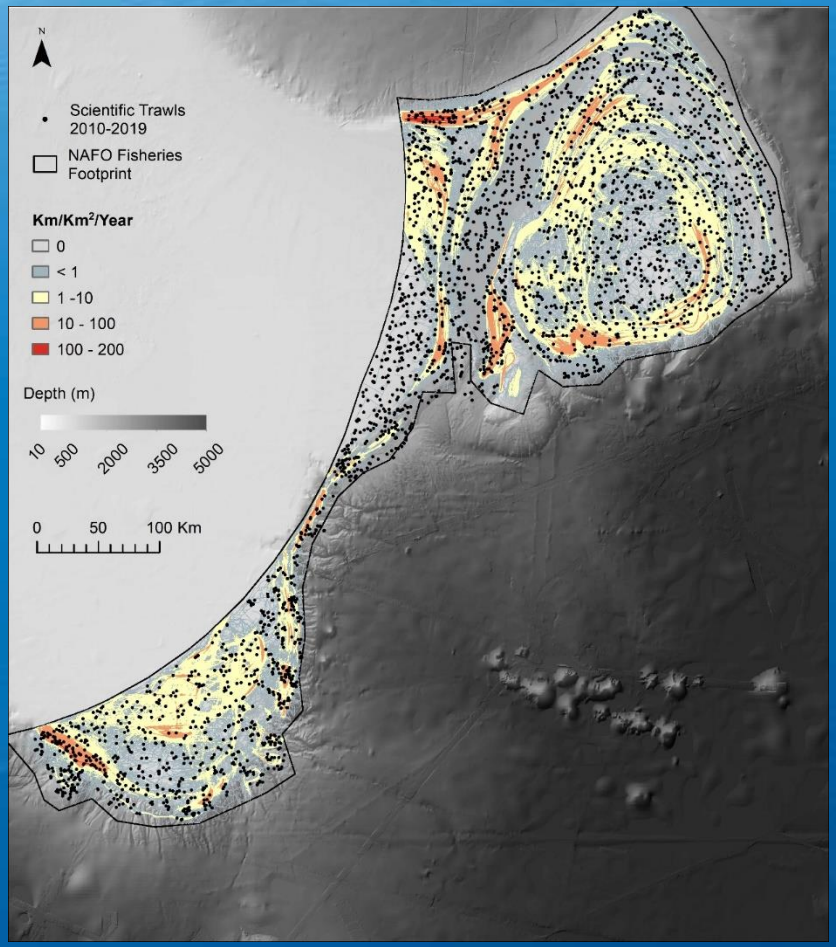
- **Seamounts**
- **Canyons**
- **Knolls**
- **Shoal**
- **Steep flanks**

Identifying VME Areas

Objective

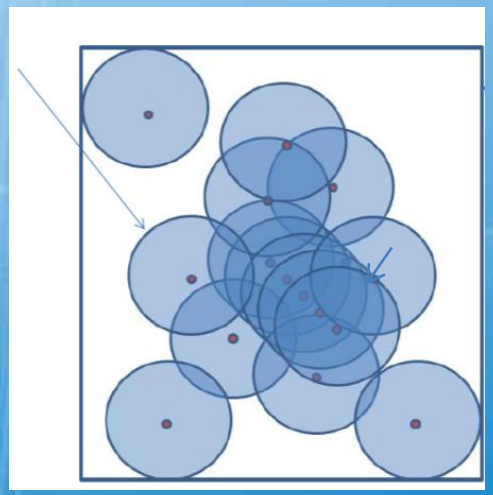
- To identify “significant areas” of high biomass from the broader distribution of the indicator taxa using research vessel trawl survey catch data

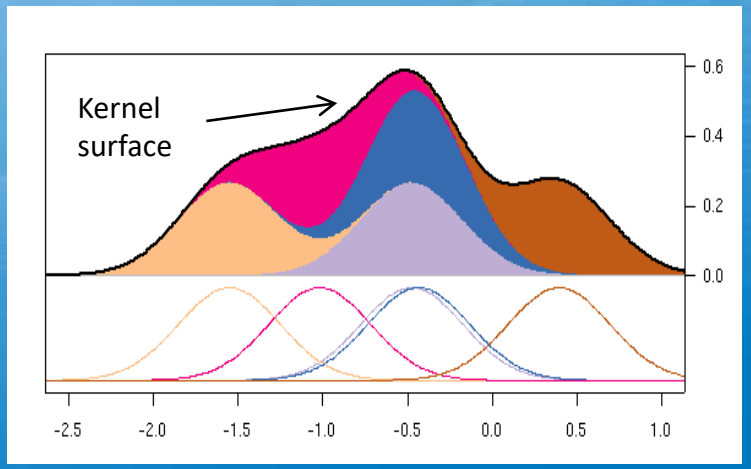
Programme	Period	NAFO Division
Spanish 3NO Surveys (IEO)	2011-2019	3NO
EU Flemish Cap Surveys (IEO, IIM, IPIMAR)	2011-2019	3M
Spanish 3L Surveys (IEO)	2011-2019	3L
DFO NL Multi-species Spring and Fall Surveys (DFO)	2011-2019	3LNO

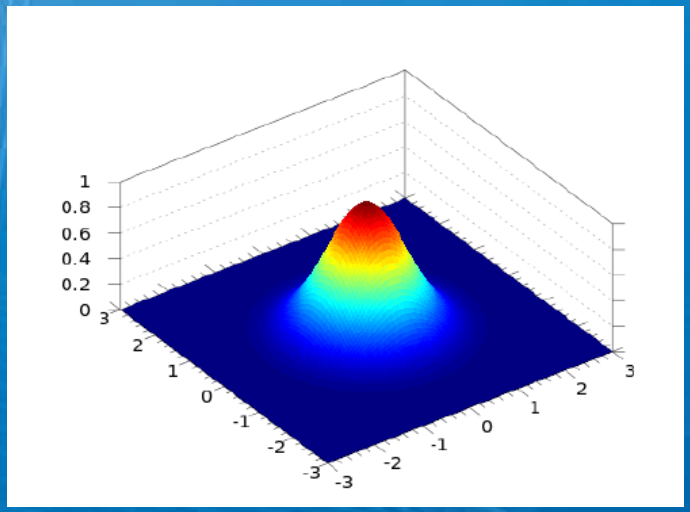


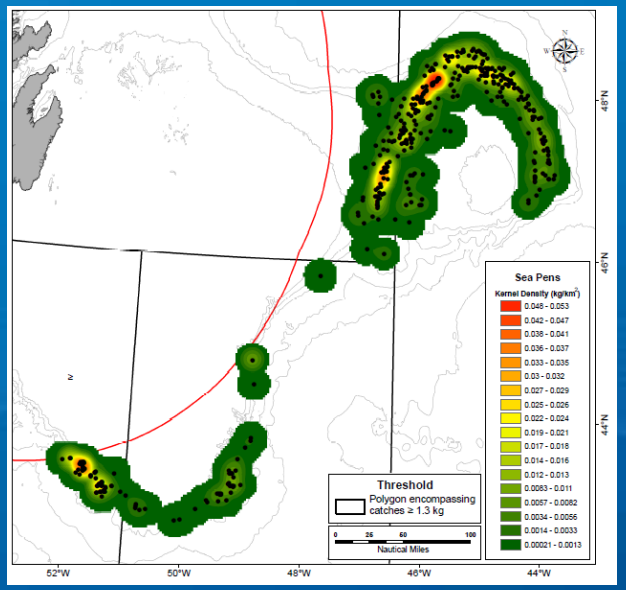
Analysis – Creation of Kernel Density Surface

Search Radius



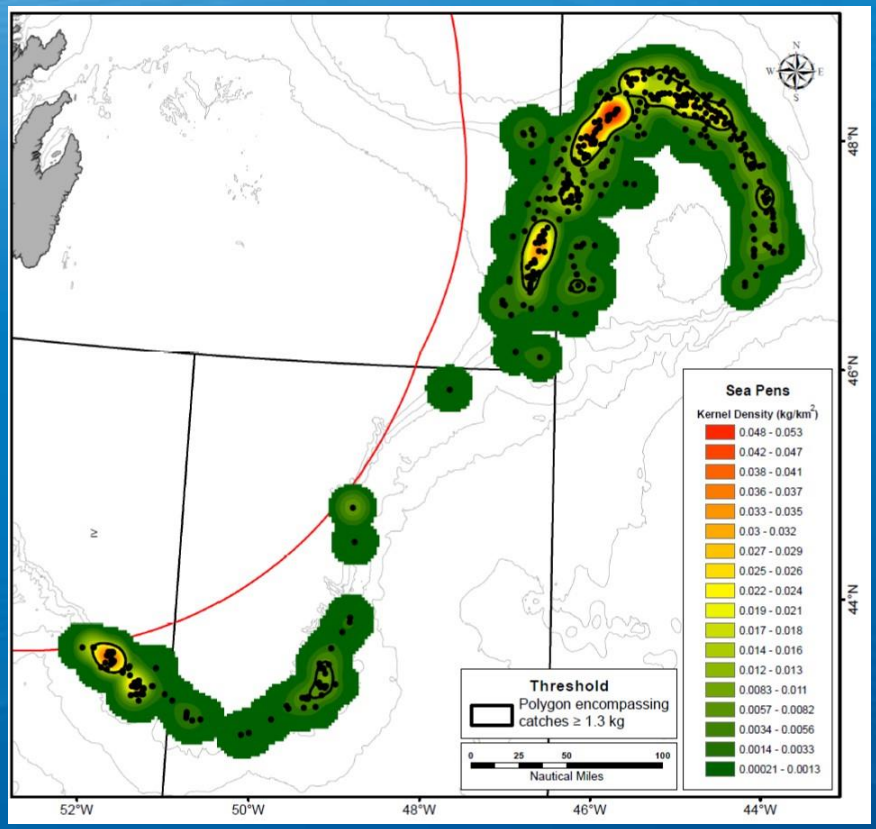




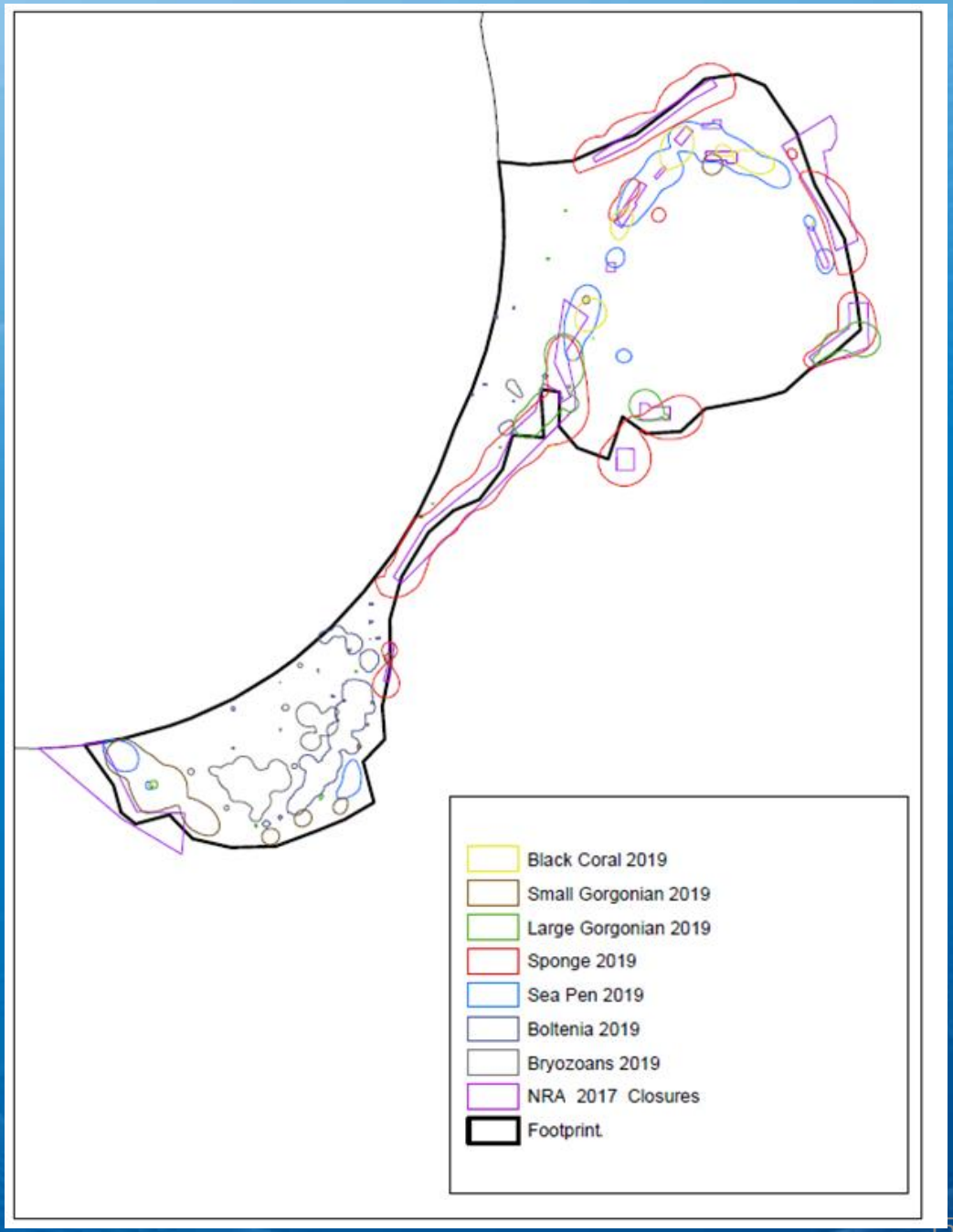


Analysis – Generation of density polygons

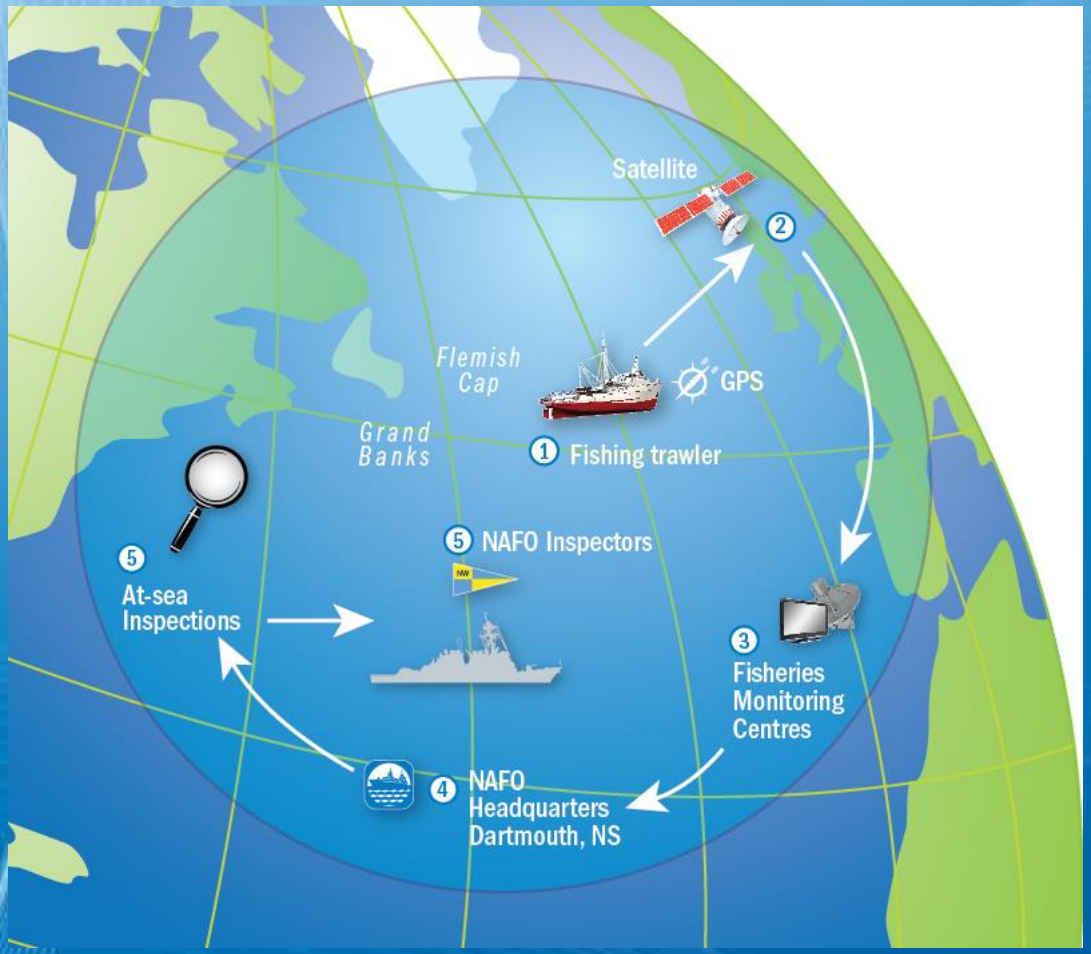
- Define the areas of high concentrations for each VME taxa separately
- Delineate areas of high concentration above threshold determined iteratively (black lines)
- Not all observations with high concentrations are included in VME areas



Mapping of VME polygons

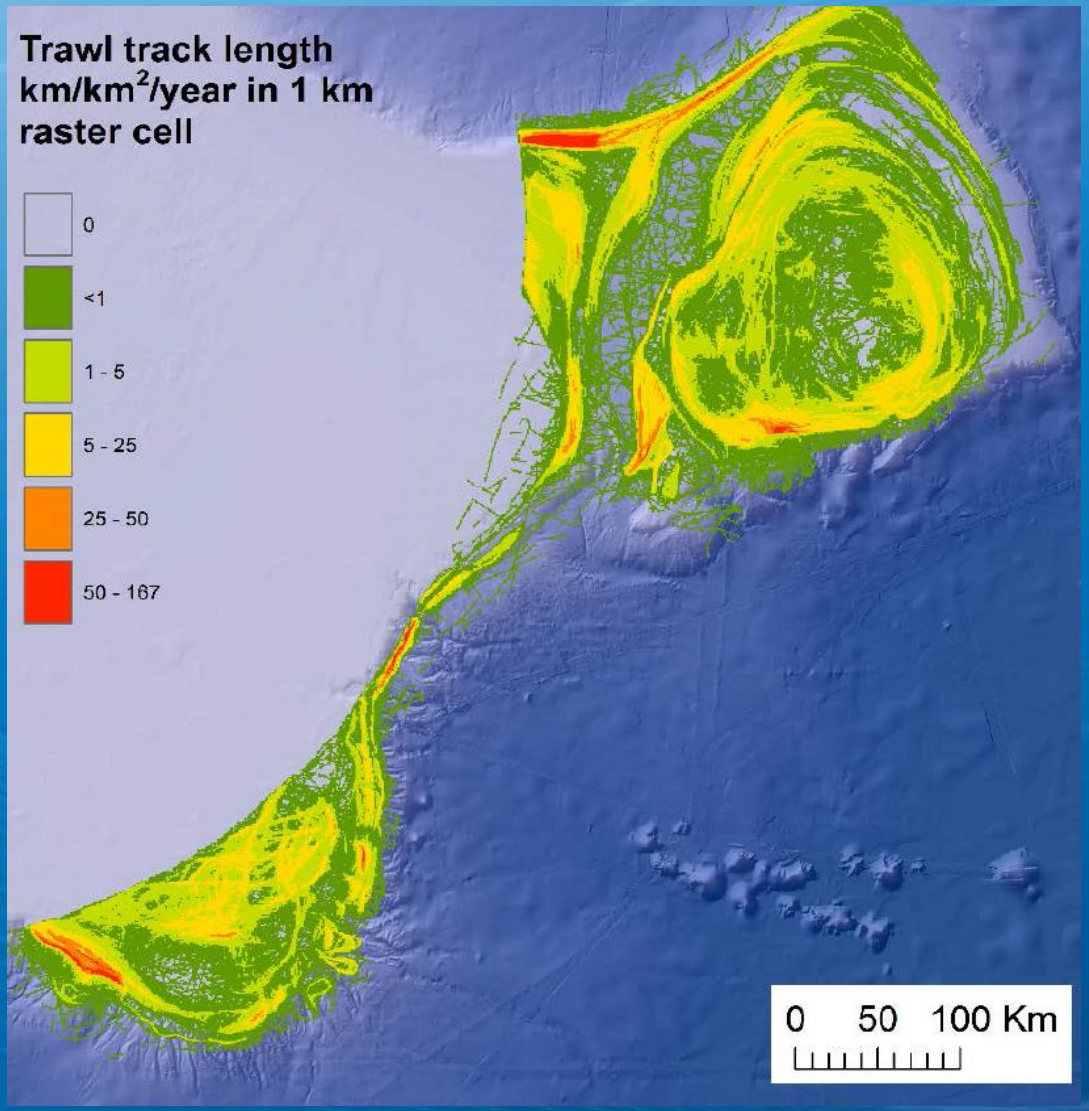


Mapping Fishing Effort: NAFO Vessel Monitoring System (VMS)

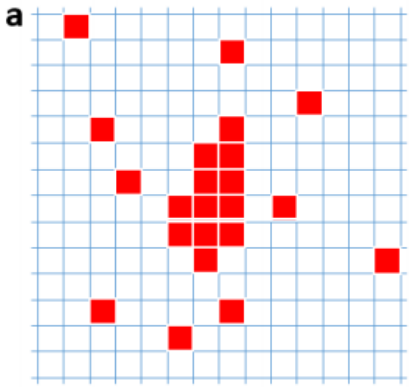


- Vessels send <u>hourly</u> position reports through the VMS to Fisheries Monitoring Centres (FMCs)
- FMCs send the information to the NAFO Secretariat and Inspectors

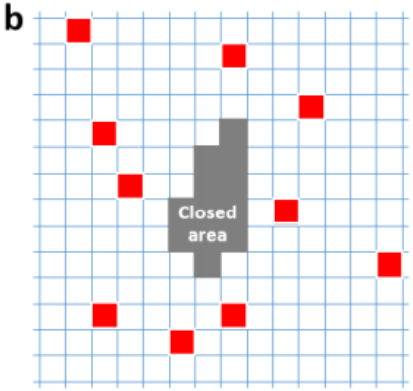
Fishing effort distribution in the NRA 2010 to 2019



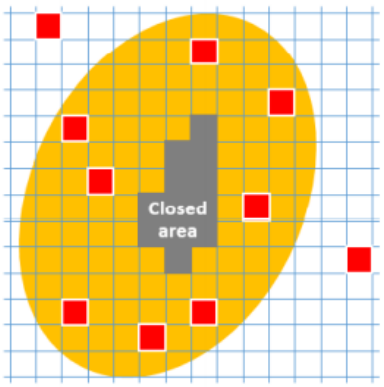
Assessing SAI



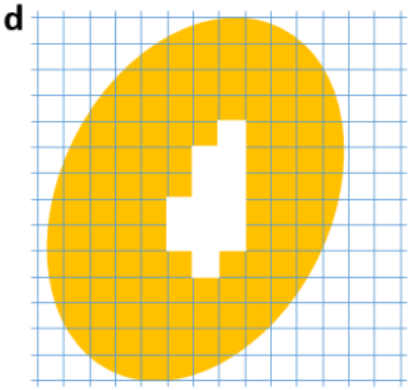
Gridded observations of VME biomass within fishing footprint



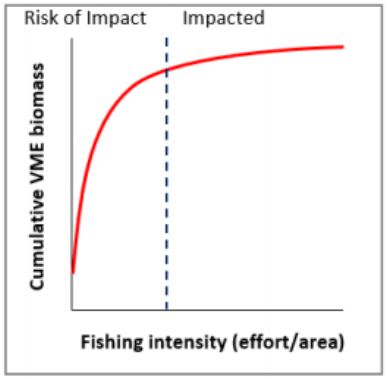
Assignation of fishery closures around significant aggregations of VME biomass



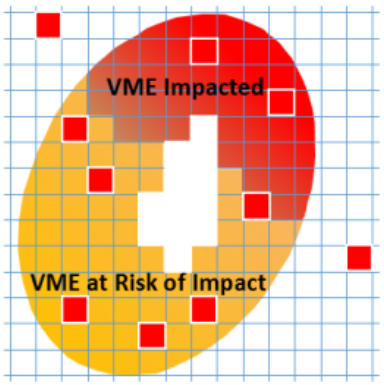
Modelled prediction of VME extent



Area at Risk of Impact = VME extent – Closed Area



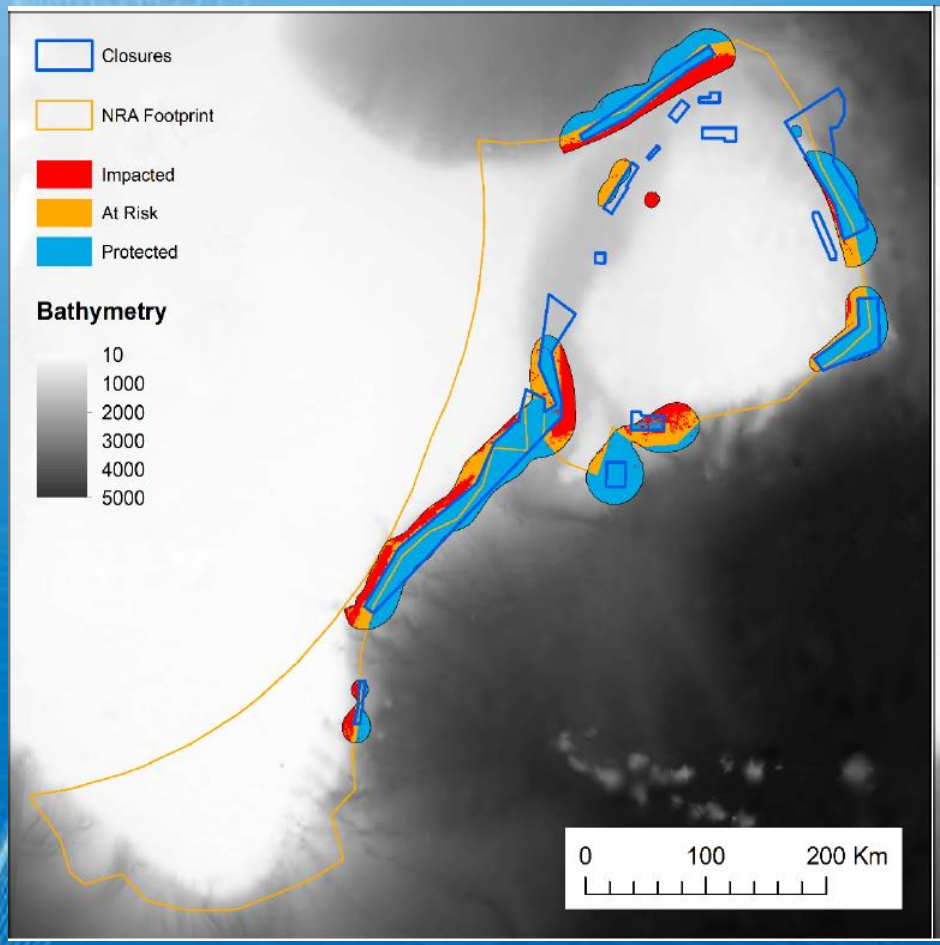
Evaluation of VME biomass observations inside area at Risk of Impact



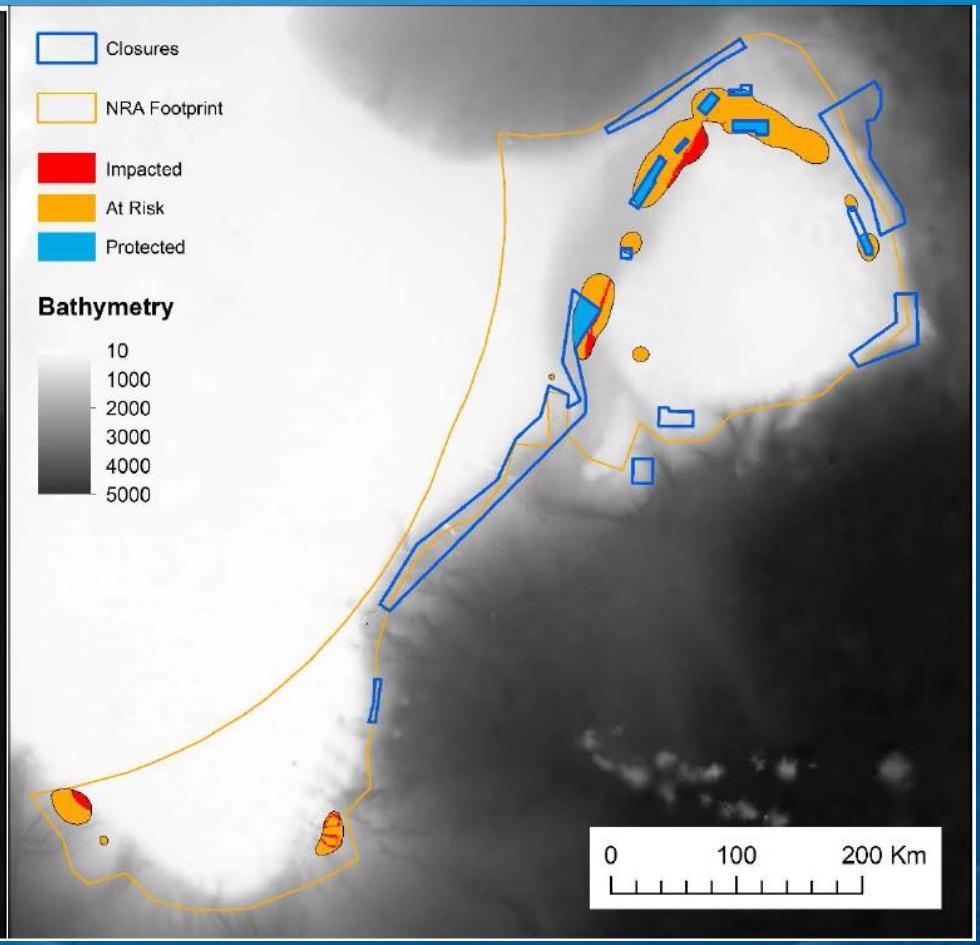
- Areas of low fishing intensity and high VME biomass = Risk of Impact
- Areas of high fishing intensity and low VME biomass = Impacted

Assessment of area and biomass impacted

Large sponges



Sea pens



Overall SAI score category criteria and metrics.

SAI metric	SAI Score Categories		
	Good (Low SAI risk)	**Limited (Intermediate SAI risk)**	**Poor (High SAI risk)**
VME Protected	> 60%	30% - 60%	< 3%
VME At Risk	-	-	-
VME Impacted	-	-	-
VME Fragmentation/Proximity	>740	340 - 740	< 340
Fishing Stability (10yrs)	> 20%	10% - 20%	< 10%
VME Sensitivity	< 0.5	0.5 - 1	>1
Proportion of overlapping VMEs in closures	>40%	20% - 40%	<20%
Number of overlapping functions (>50%) in VMEs	<2	2 - 3	>3

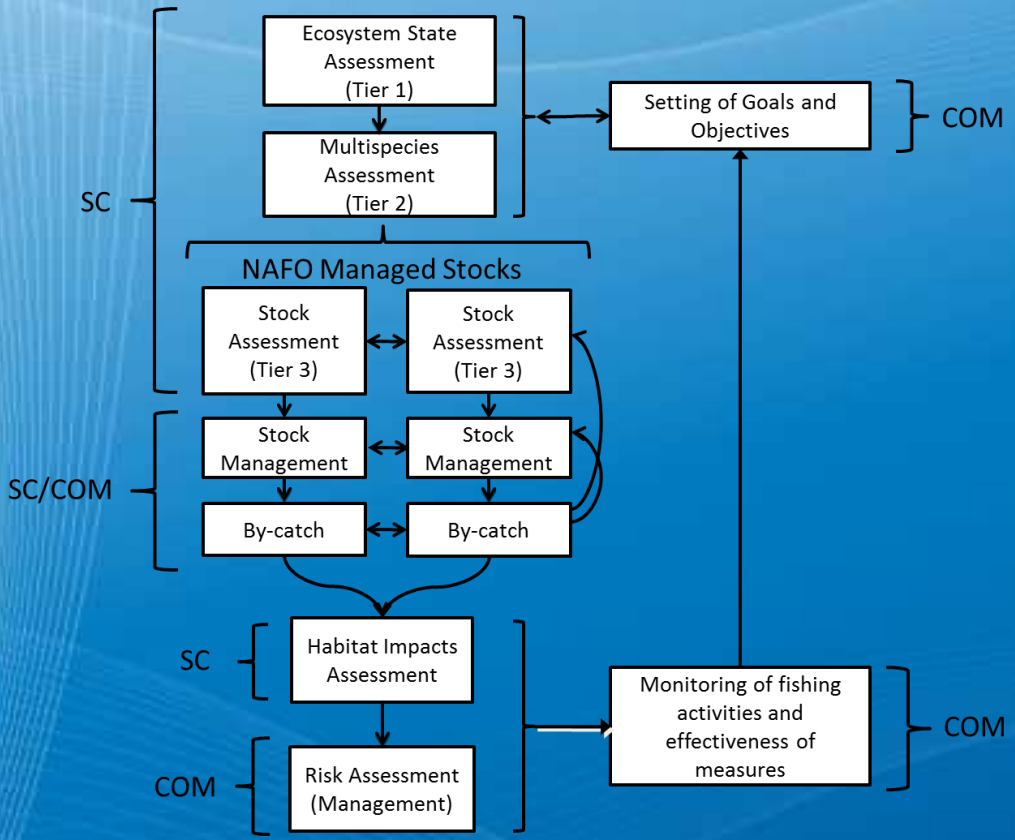
Overall SAI assessment scores for each VME and SAI

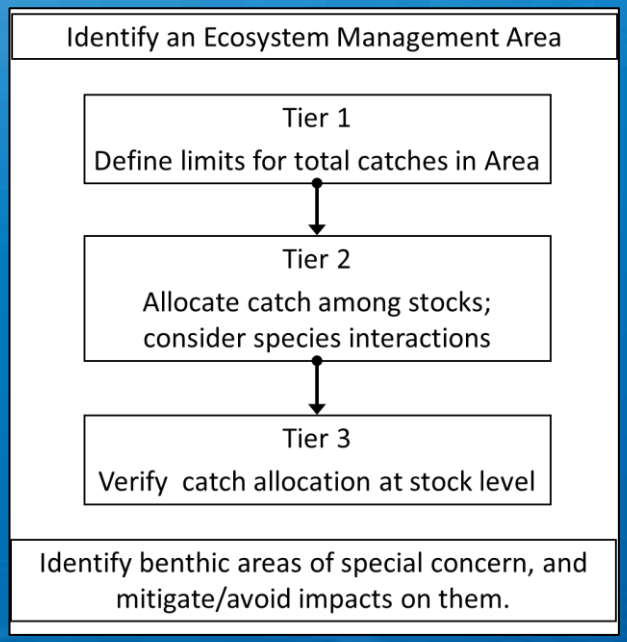
	Sponge		Sea pen		Large gorgonian		Small gorgonian		Black Coral		Bryozoan		Sea Squirt	
SAI metric	**Area**	**Biomass**	**Area**	**Biomass**	**Area**	**Biomass**	**Area**	**Biomass**	**Area**	**Biomass**	**Area**	**Biomass**	**Area**	**Biomass**
VME Protected	64%	93%	16%	34%	60 %	89%	2%	2%	17%	23%	<1%	<1%	<1%	1%
VME At Risk	19%	6%	74%	64%	23 %	10%	72%	86%	63%	67%	96%	99%	79%	85%
VME Impacted	18%	1%	9%	2%	16 %	1%	26%	12%	20%	10%	4%	1%	21%	14%
SAI Risk (biomass)	**Low**		Intermediate		**Low**		**High**		**High**		**High**		**High**	
VME Fragmentation/Proximity	1,112		394		255		125		109		717		802	
Fishing Stability (10yrs)	14%		11%		10%		28%		9%		0%		7%	
VME Sensitivity	3.3		0.2		1.7		0.5		1.4		0.1		0.5	
Proportion of overlapping VMEs (km^2) in closures	62%		19%		65%		9%		21%		4%		0%	
Number of overlapping functions	2		4		2		1		3		4		4	
Overall SAI Risk	Low (1/4)		Intermediate (3/1)		Low (2/3)		High (4/2)		High (5/0)		High (5/1)		High (5/1)	
Ranking for Management Action	**6**		**4**		**5**		**3**		1		**2**		**2**	

NAFO Measures to Protect VMEs

- Existing bottom fishing areas – "Footprint"
- Closed areas and the scientific justification for closure
- Thresholds for encounters with VMEs within Footprint ("move on" rule)
- Bottom fishing in new fishing areas (Exploratory Fisheries) with scientific justification as a precondition
- Periodic (5 year) reassessment of bottom fishing activities

The NAFO Roadmap to EAF





Marine Policy (2019)

Global and Regional Cooperation

NAFO participates in:

- UN and FAO WG's and consultative processes
- COFI (FAO) as an observer
- CWP, ASFA, FIRMS, VME Database (FAO)
- Regional Fishery Body Secretariats Network (FAO)
- Global Dialogue between RFMOs and Regional Seas Organizations (CBD)
- Joint Scientific Symposia
- Joint Working Groups with ICES
- JAGDM (Joint Advisory Committee on Data Management)
- International Fisheries Commission Pensions Society
- BBNJ process as an observer (UN)
- Other RFMO meetings as an observer

For further information, please visit:

www.nafo.int