Mapping Vulnerable Marine Ecosystems and anthropogenic activities in Arctic and sub-Arctic waters

Report from kick-off meeting at the Faroe Marine Research Institute in, Torshavn (*Færøyene*) 12-14 januar 2016

Deltakere:
Faroe: Petur Steingrund, Una Matras (unamat@hav.fo), Hjálmar Hátún (hjalmarh@hav.fo),
Iceland: Steinunn Hilma Olofdotter; Julian M Burgos; Stefan Aki Ragnasson,
Norge: Pål Buhl-Mortensen; Lene Buhl-Mortensen.

Tirsdag 12/1 Start 09:00

Planned main activities for meeting:
-Decide on VME species based on reports from OSPAR and WGDEC
-Compile what partners have of information on: Fisheries, VMEs and oceanography

09:10- 10:30 Project background and vision (discussion points)

- VMEs distribution in the area covered by the project (see attached map)
- Distribution of human activities offshore: mainly fishing (bottom trawling and long line) but other activities (petroleum and mining activities) should be mapped.
- Vulnerability/human activities: Compile existing information on vulnerability
- VMEs ecosystem services/function (fish habitat/feeding):Compile existing information on vulnerability
- Trawling scenario models: Modify and use existing model if possible
- Identification of conflict areas: Based on distribution of amount of pressure from activities affecting bottom and vulnerability of bottom community where these occur
- VME distribution model: To provide area based maps both where information is available but also predicting into unmapped areas
- Deliveries: Inform managers and stakeholders, Presentations (national and international meetings), Reports, Publications, Initiate international collaboration
- WGDEC: Use information from ICES working groups and communicate information back

Coffee

10:45 – 12:00 Available data: Human activities (mainly fishery activities)
All three countries have good VMS and logbook data.
The area to cover is shown in attached figure. We will use data from 2013-2015 for bottom trawling and long lines. Different methods for representation of pressure will be tested and one interesting approach is the one presented by Gerritsen et al. 2013.

A buffer zone based on uncertainty will probably be needed to know what VMEs are at risk.

12:20 – 14:00 Lunch

14:15 – 15:15 Oceanography
The main goal is use the habitat requirement of the VME species that is indicated by the bottom conditions and hydrographical setting where they occur, a follow up of the coral study by Buhl-Mortensen et al. 2015, including sponges and with higher geographical resolution. Bottom currents at different depth strata will be used to indicate connectedness by providing the main transport ruts for larvae.

Hjálmar Hátún (oceanographer at Havstovan) presented bottom water temperature in the project area from a paper in press. He will request data from the database that the authors of the paper used. Hjálmar also presented results from an ongoing project on modelling ocean currents in the project area.

For the connectedness analysis requiring information on the main currents at different depth strata he suggested to use the Max Planck model for overall current patterns (resolution 4 km cells?). For coral larva the term "density envelop" has been developed to describe the water masses that would carry the larvaes based on their density. Hjálmar also informed that there are studies that has shown how fish eggs and plankton are held back by a hydrographic barrier at the FSC.

To understand the fine scale distribution/habitat-requirement detailed models of currents on the Icelandic, Norwegian and Faeroe shelf and slope at depth covering the distribution of VMEs will an important tool.
ROMS model at 800 meter cell size will probably provide a high enough resolution and be doable within the project, as suggested by Øystein Skagseth, and this can probably be provided by local oceanographers. We will need a contact person from Iceland for this.

Media
Lene and Petur were interviewed about the project by the local radio. The interview was to be sent on the six o'clock news.

Coffee

16:16 - 17:45 Distribution of VMEs

Available data:
Both Iceland and Norway has new data on VMEs from their shelf and has compiled existing data for the area on most common corals, and thus has a good grip on available sources. In the project this work will be continued including sponges.
Around the Faroese there has been little systematic mapping and main source are from the Biofar project. However, Petur presented some new information on sponge and coral

distribution based on interviews with fishermen. Together we will compile existing information from the area.

To increase knowledge the Faroe ground fish surveys will in 2016 start to report on bycathes of VMEs modifying a guide developed at IMR. This will include photo and if possible notes on weight of bycatches of coral and sponges.

It was also discussed to mount a camera on the trawl to get extra information on the bottom habitat where the trawling was conducted during the ground fish surveys. Lene will contact colleagues at IMR to get information about possibilities to borrow or build equipment for this.

Selection of relevant VMEs:

VME representative species to focus on was selected based on the ecosystem service they provide such as:

-structure and habitat provision for many species and fish and

-facilitation of benthic pelagic energy flux.

Vulnerability is also an important selection criterion.

It was decided to use VME-species based on a review of information from OSPAR, WGDEC and Mareano identified VMEs as presented by Pål. The selected VMEs with representative species are as follows.

Three sponge VMEs were selected with representative species:

Soft bottom sponge aggregation (Ostur): *Geodia* spp, "*Aplysilla*", *Stryphnus*, *Steletta* sp,

Hard bottom sponge gardens: *Axinella* spp, Axinellidae, *Phakellia* spp, *Antho dichotoma*,

Cold water sponge aggregations: Glass sponge dominated (*Caulophacus arcticus*, Hexactinellida spp., Cladorhzidae spp); *Pheronema carpenteri* aggregations

18:00 Dinner

Wednesday 13/1 Start 09:00

09:00 – 10:00 Continue distribution of VMEs

Four coral VMEs were selected with representative species:

Reefs: *Lophelia, Madrepora*

Coral gardens soft bottom (2):

-Gorgonian: *Radicipes, Acanella, Isidella*, ...

-Cup coral fields: *Flabellum* spp.

Coral gardens hard bottom (4):

-*Lophelia* non reefal scleractinian

-Gorgonian: *Primnoa, Paragorgia, Paramuricea, Callogorgia, Keratoises, Swiftia*, ...

-Stylasterid dominated: *Stylaster* sp. ......

-Cauliflowers: *Drifa, Duva, Gersemia*, ...

Seapen communities (2):

Deep sea: *Umbellula* spp.
Shelf: *Pennatula, Kophobelemnon, Virgularia, Funiculina,.....*

Coffee

10:30-12:00 Project deliveries including other initiatives

Based on the project description reports are expected on what is listed below, suggested deadline is provided in brackets:

The status of mapping effort and methods (spring 2016).

Report, human activities VMS, logbooks, fishing data from last three years (2013-15) (autumn 2016, at November meeting).

Identification guide of vulnerable benthic species for by-catch report from ground fish surveys (spring 2016). Pål has delivered the guide developed at IMR.

Distribution of vulnerable species within the project area (spring 2018). In English with Danish summery (Appendix with background data).
Including:
-Overview of fisheries and human pressure and how they conflict with presence of VME species.
-Identify hot spot areas where there are conflicts between commercial and nature/conservation values.
-Identification of gaps in knowledge will be important for directing future investigations.
This will fulfil the coal of the project to augment the knowledge on the distribution of vulnerable benthic habitats/ecosystems within the Arctic, and of the human pressures that affect them.

Identification guide of vulnerable benthic species and habitats found within the project area for video analysis. (spring 2018).

Other deliveries:

Coral database (delivery from a former project between Iceland and Norway that includes info also from present):
-Report on coral distribution in the N. Atlantic including all species (Report on distribution and sources).
-Statistical analysis of community distribution based on the data in the database (paper).

Visual sampling methods: comparing drop-cam photos with video (Iceland and Norway)) (paper).

12:00 - 13:00 Lunch

13:00 – 14:00 Presentation by Lene at the Faroe Marine Research Institute title: "Effects of fishing on benthos and Mareano"
The mapping strategy og Mareano was presented together with results from a new paper published in ICESJMS on the relation between trawlmarks, status of benthic megafauna and bottom trawling intensity.

14:00-14:30 Who delivers what?

VME information to produce database as background for distribution maps: Lene, Steinunn, Pål, and Una. Steinunn distribute excel sheet for data base. Maps: Julian.

Human impact information to produce database is provided by: Stefan, Julian, Petur and Lene. Maps: Julian.

Oceanography:
Database/literature: Hjálmar, Øistein (Vidar Lien provides data from Mareano), Icelandic oceanographer? and Julian. Maps Julian.

Connectedness modells: Main currents at different depth strata (Max Planck model) Hjálmar, Øistein and ?. Detailed local model (ROMS 800 m cells) Hjálmar, Øistein and ?.


14:30 – 15:00 Info to share on Dropbox

-Information on joint cruises: Upcoming cruises with relevance for project, travel to participate will be funded.
-Relevant literature folders: Fishing impact; Oceanography; Coral distribution; Sponge distribution; Ecosystem services; Traits; Conservation/MPA
-Reports in progress

15:00 Plan for next meeting,
November 14-17 Iceland/Norway?
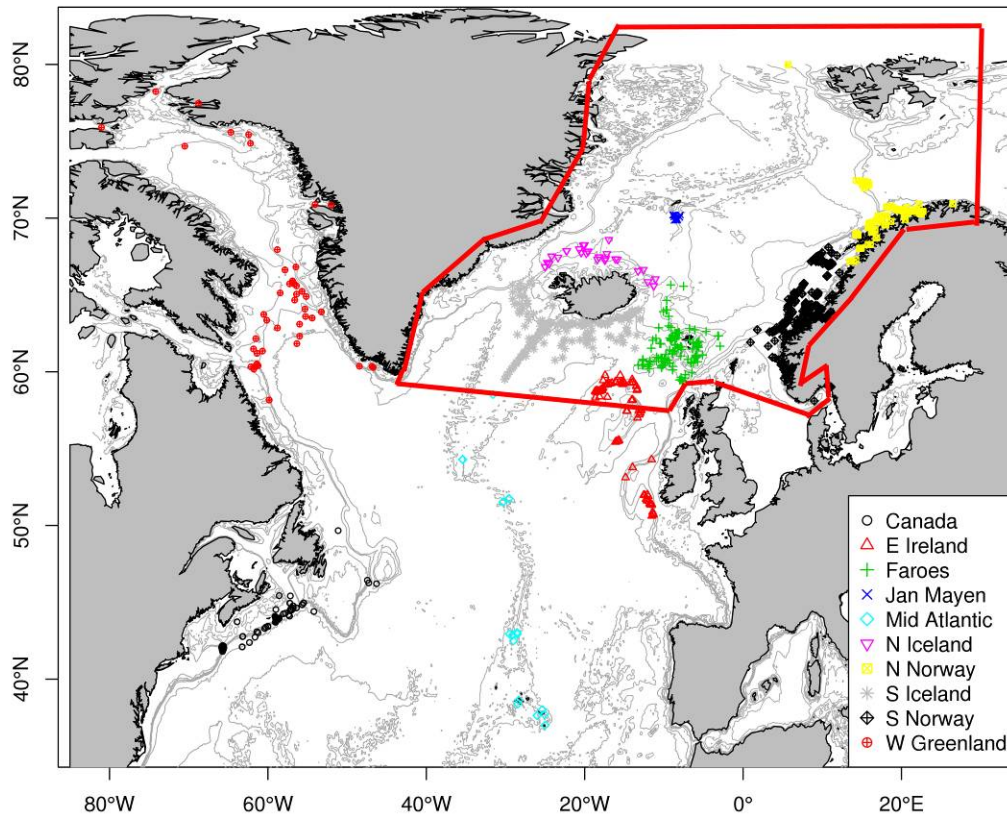
The map shows the study area of the project within red borders. The symbols are coral information compiled by an earlier project between Iceland and Norway.

For this marked area we will compile available data on coral and sponge VMEs, human activities with effects on the seafloor, and oceanographic information on bottom temperature range, large scale current patterns (Max Planck model) and fine scale current pattern on the shelf and upper slope of Iceland, Norway and the Faroes (ROMS model).