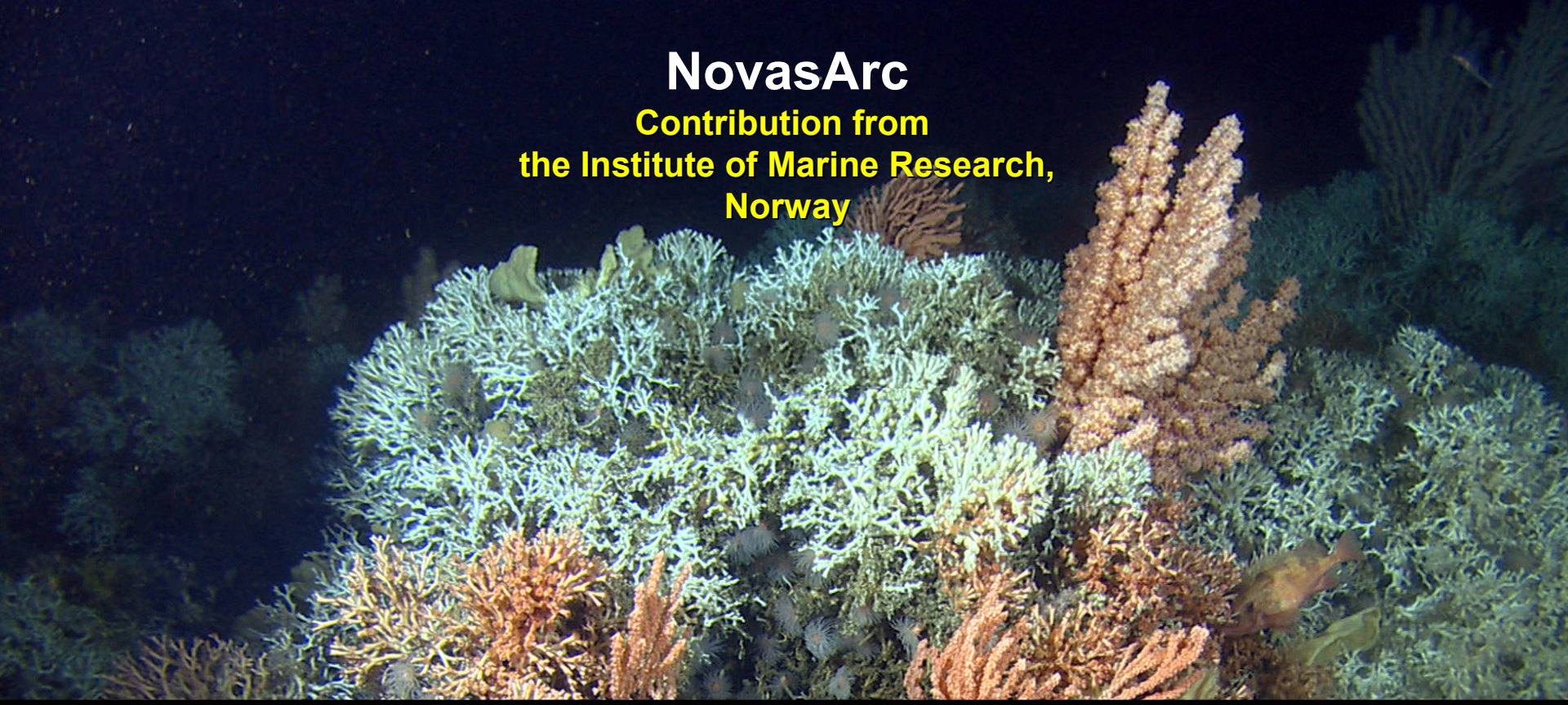
NovasArc

Contribution from the Institute of Marine Research, Norway



- Classification of habitats and collection of new data

Pål Buhl-Mortensen and Lene Buhl-Mortensen

INSTITUTE OF MARINE RESEARCH
HAVFORSKNINGSINSTITUTTET

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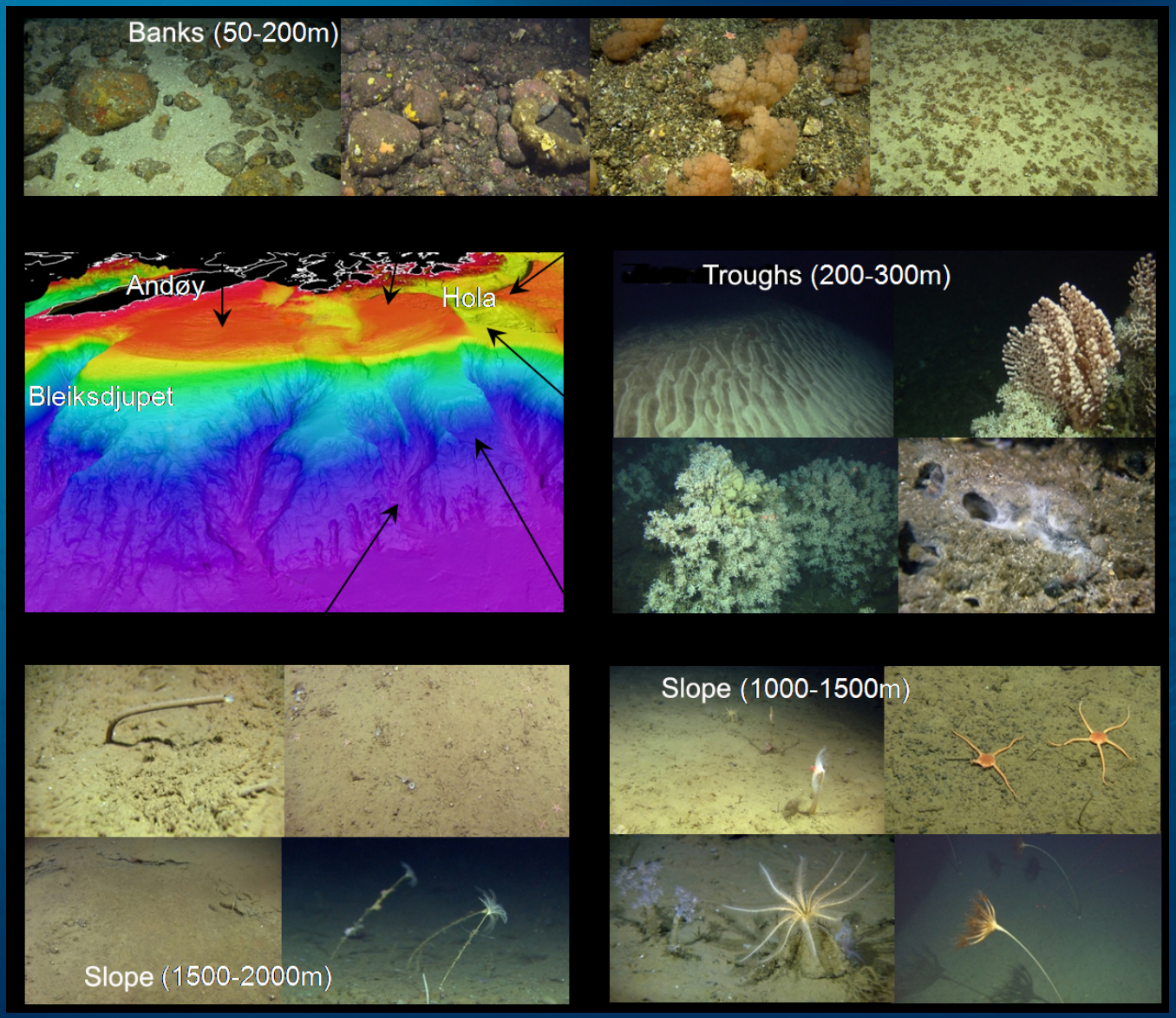
Landscapes, Habitats & Biotopes



Landscape =
Units of terrain features, often comprising several biotopes and habitats.

Habitat =
Species' environment

Biotope =
Communities' environment (Whittaker et al 1973)

Special habitats
(Vulnerable Marine Ecosystems, Prominent, Charismatic, Long-lived, Conservation needs - top-down classification)

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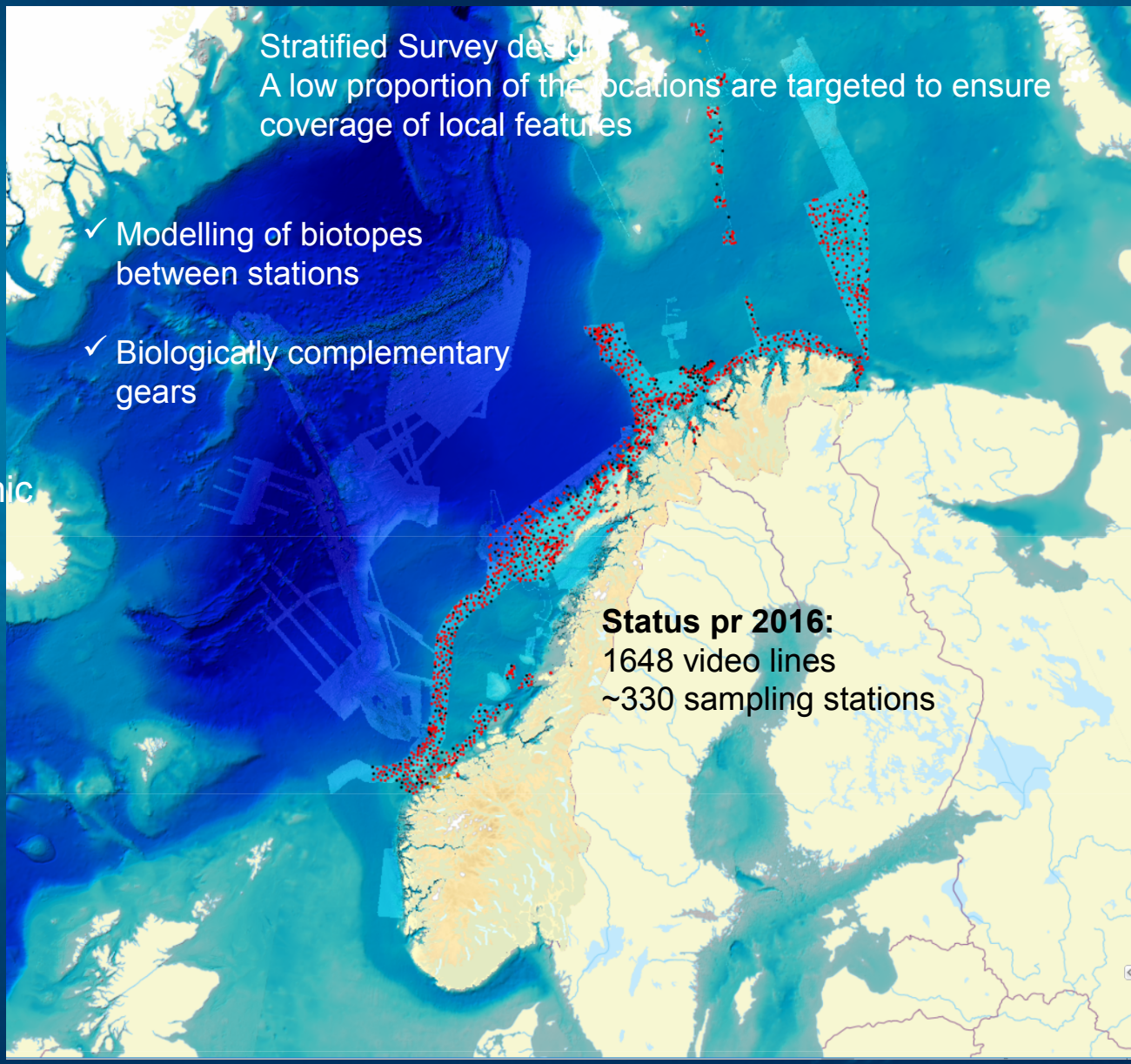
(Marine Areal Database for Norwegian sea areas)

main products:

- Detailed bathymetric maps
- Maps and description of sediment types, habitats, and geological features
- Maps and description of benthic fauna, biodiversity, communities, and production
- Environmental status for sediments
- Areal database for Norwegian coastal- and offshore areas

www.MAREANO.no

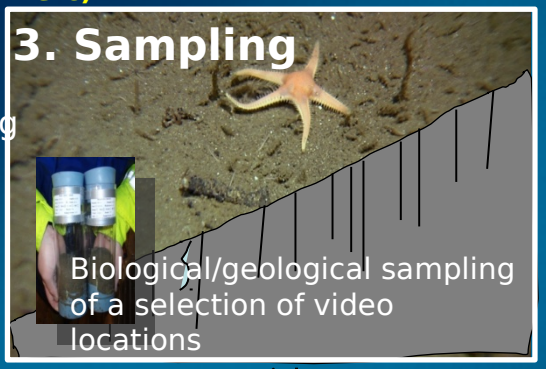
10 video stations each 1000 km²
2 ”sampling-stations” each 1000 km²



Spatial information for decision support

Biological values (Biodiversity, vulnerability, productivity, etc)

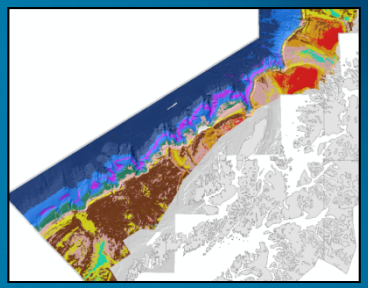
3. Sampling



Biological/geological sampling of a selection of video locations

Mapping activities

Biotope distribution

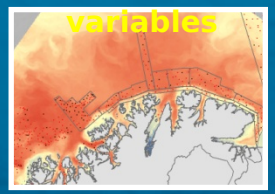


VIII. Selection of sampling locations

VII. Predictive modeling of biotopes

Sediments, Marine landscapes & Oceanography

Environmental variables



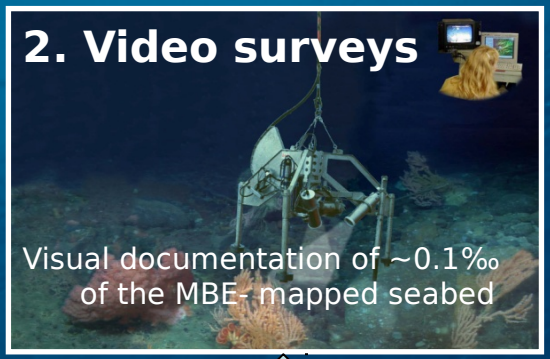
III. Oceanographic modeling

VI. Faunal classification

V. Video analyses

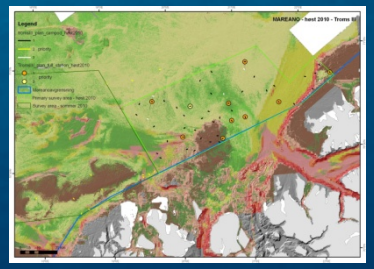
IV. Selection of video survey locations

2. Video surveys



Visual documentation of ~0.1‰ of the MBE- mapped seabed

Environmental proxies



1. Multibeam mapping

II. Unsupervised classification

I. Terrain analyses

MAREANO use video and images for

- Definition and Classification of habitats and biotopes
- Mapping of sediments, habitats and biotopes
- Mapping of threatened and/or declining habitats
- Inventory of megafauna
- Mapping signs of human impact

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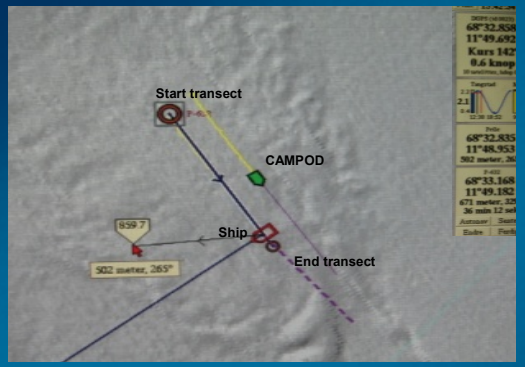
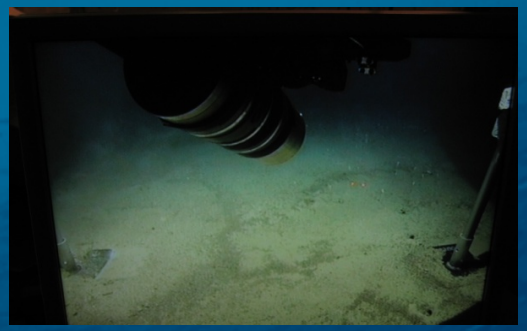
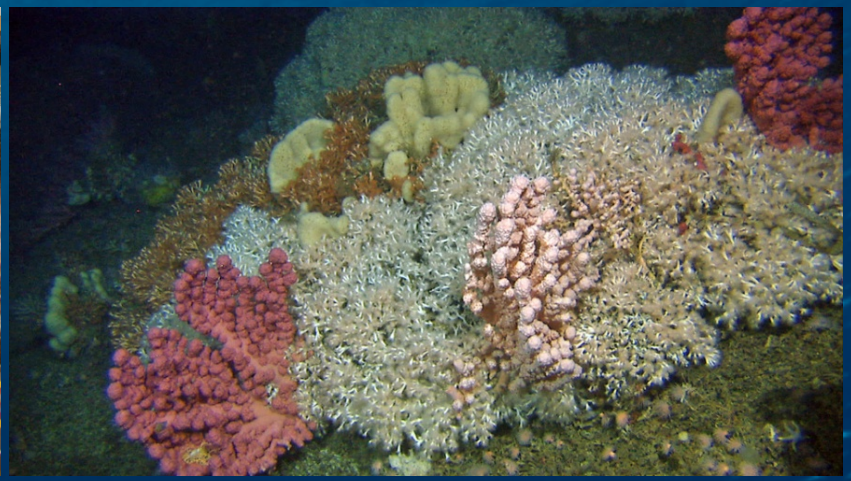
Videorigs
Campod & Chimaera

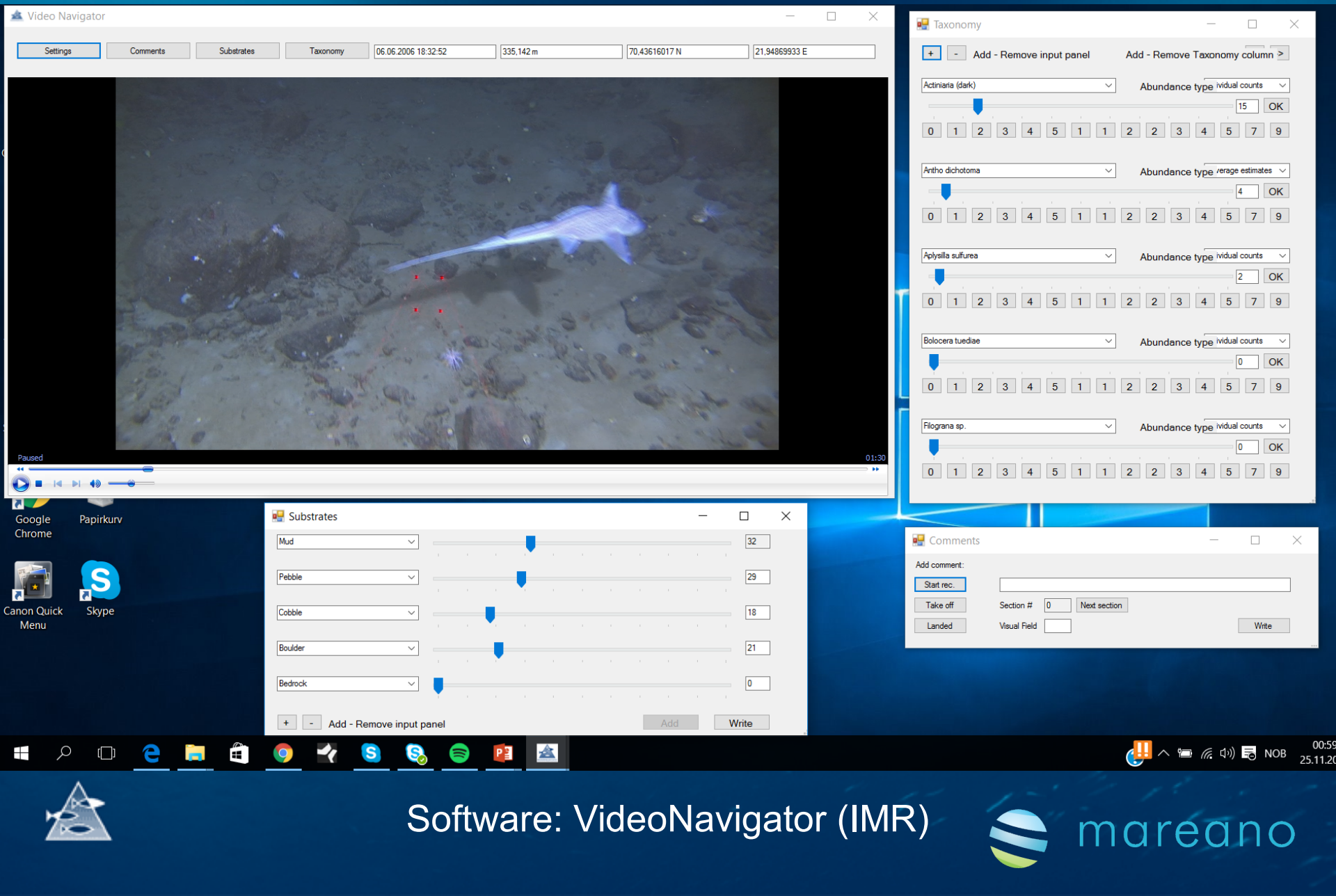
- Towed /drifted and parked
- 3 video cameras (SD, and HD)
- Hard-disc recording/SSD
- Lights (2x400W HMI, LED)
- Depth sensor, Altimeter
- CTD, Current meter, Turbidity
- Laser scales
- Transponder







Video annotation after cruise



Software: VideoNavigator (IMR)

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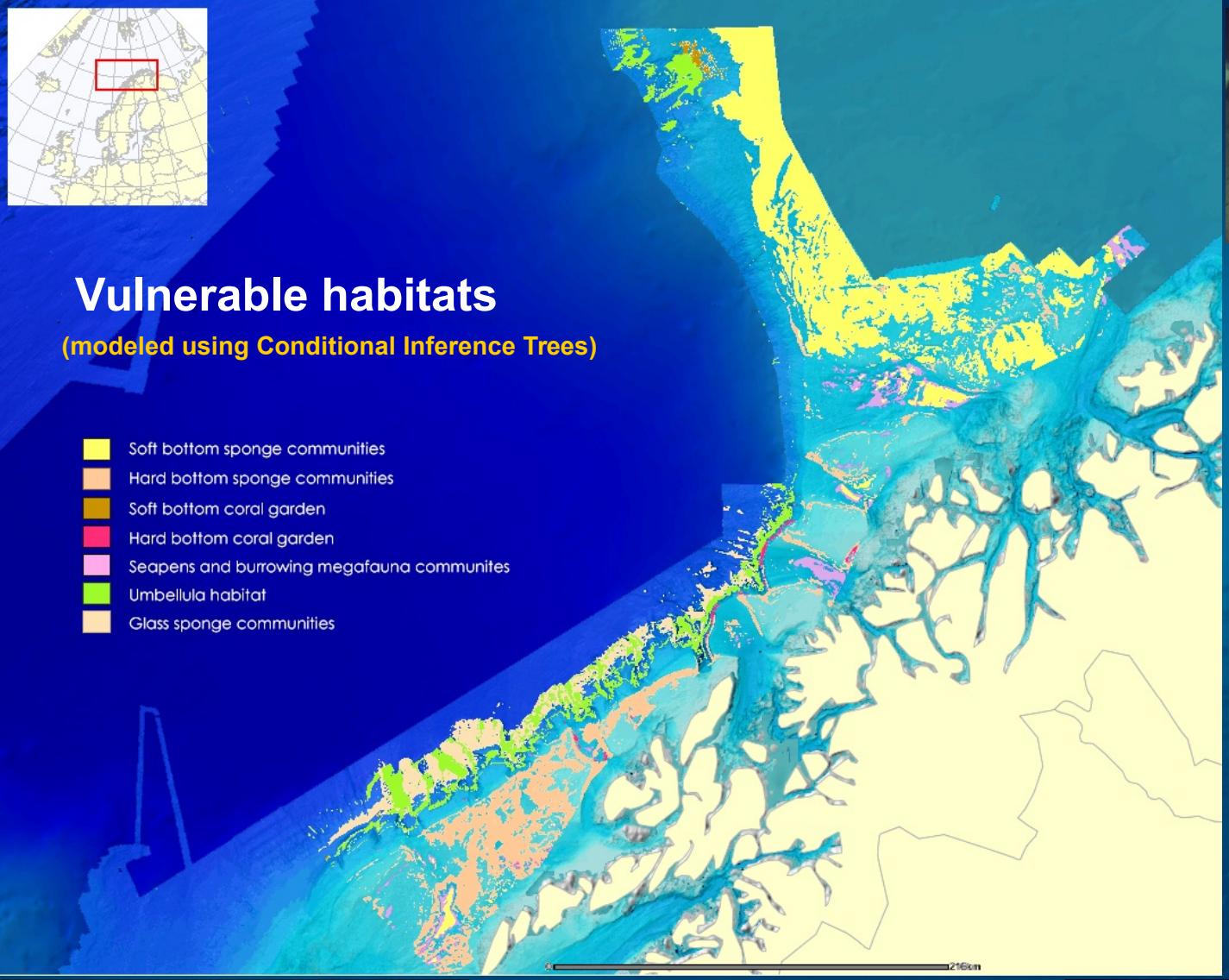

Vulnerable habitats
(modeled using Conditional Inference Trees)
Soft bottom sponge communities
Hard bottom sponge communities
Soft bottom coral garden
Hard bottom coral garden
Seapens and burrowing megafauna communites
Umbellula habitat
Glass sponge communities


Softbottom sponge communities

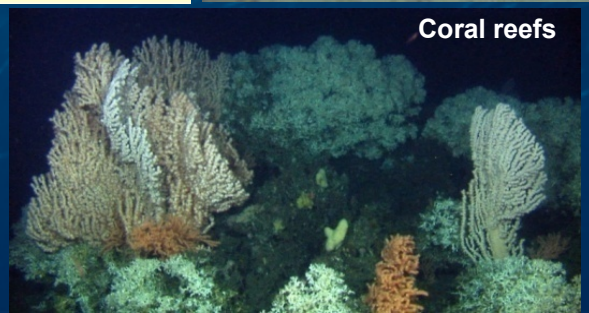

Glass sponge communities


Umbellula
> 700 m


Sea pen


Softbottom coral garden


Hardbottom coral gardens


Coral reefs

OSPAR List of Threatened and/or Declining Habitats

HABITATS	OSPAR Regions where the habitat occurs	OSPAR Regions where such habitats are under threat and/or in decline
Carbonate mounds	I, V	V
Coral gardens	I, II, III, IV, V	All where they occur
Cymodocea meadows	IV	All where they occur
Deep-sea sponge aggregations	I, III, IV, V	All where they occur
Intertidal Mytilus edulis beds on mixed and sandy sediments	II, III	All where they occur
Intertidal mudflats	I, II, III, IV	All where they occur
Littoral chalk communities	II	All where they occur
Lophelia pertusa reefs	All	All where they occur
Maerl beds	All	III
Modiolus modiolus beds	All	All where they occur
Oceanic ridges with hydrothermal vents/fields	I, V	V
Ostrea edulis beds	II, III, IV	All where they occur
Sabellaria spinulosa reefs	All	II, III
Seamounts	I, IV, V	All where they occur
Sea-pen and burrowing megafauna communities	I, II, III, IV	II, III
Zostera beds	I, II, III, IV	All where they occur

These habitats may consist of different habitat-forming species.

The habitat-forming species normally also varies in relation with the bottom substrate type.

For habitats lacking a precise definition (which should include values for characteristic densities of organisms for the habitat-forming species) comparisons between regions is difficult and may result in different management.

Suggested list of deep-water megafaunal habitats

- Cold-water coral reefs
  - *Lophelia pertusa* reef
  - *Solenosmilia variabilis* reef
- Coral gardens
  - Hard bottom coral gardens
    - Hard bottom gorgonian and black coral gardens
    - Colonial scleractinians on vertical walls
    - Non-reefal scleractinian aggregations
  - Soft bottom coral gardens
    - Soft bottom gorgonian and black coral gardens
    - Cup-coral fields
- Deep-sea Sponge aggregations
  - Soft bottom sponge aggregations
  - Hard bottom sponge gardens
  - Cold-water sponge communities
- Seapen and burrowing megafauna communities
  - Shelf and fjord communities
  - *Umbellula* spp communities

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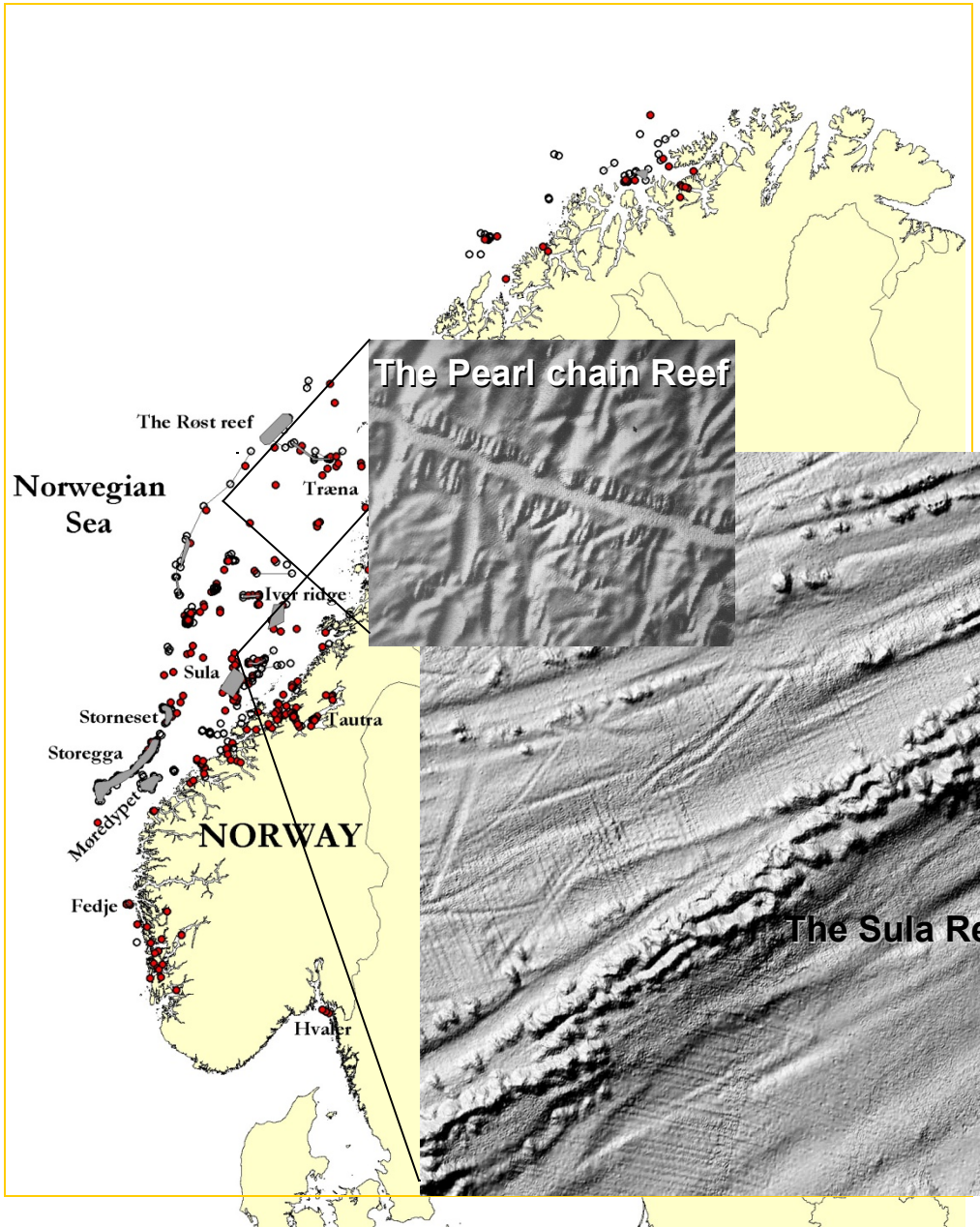
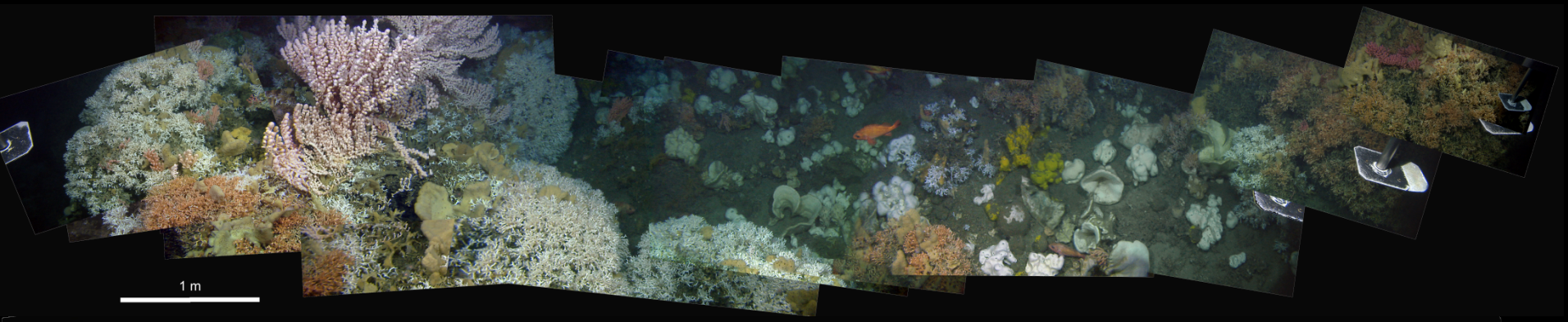
Distribution of *Lophelia pertusa* in Norway

- Reports by fishers
- Verified occurrences
- Reef-area

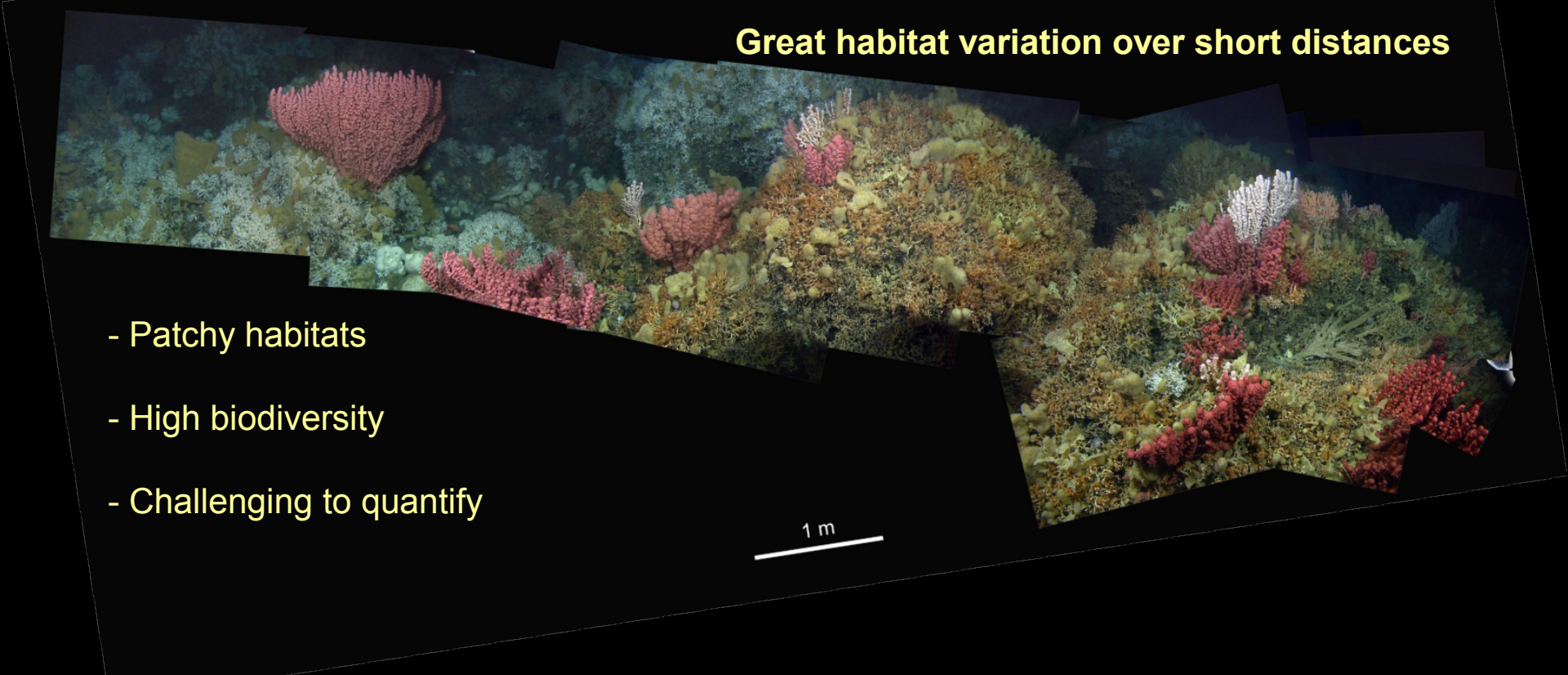


- Probably > 6000 reefs off Norway
- Reef complexes up to ca 45 km long off Røst

Lophelia pertusa reefs



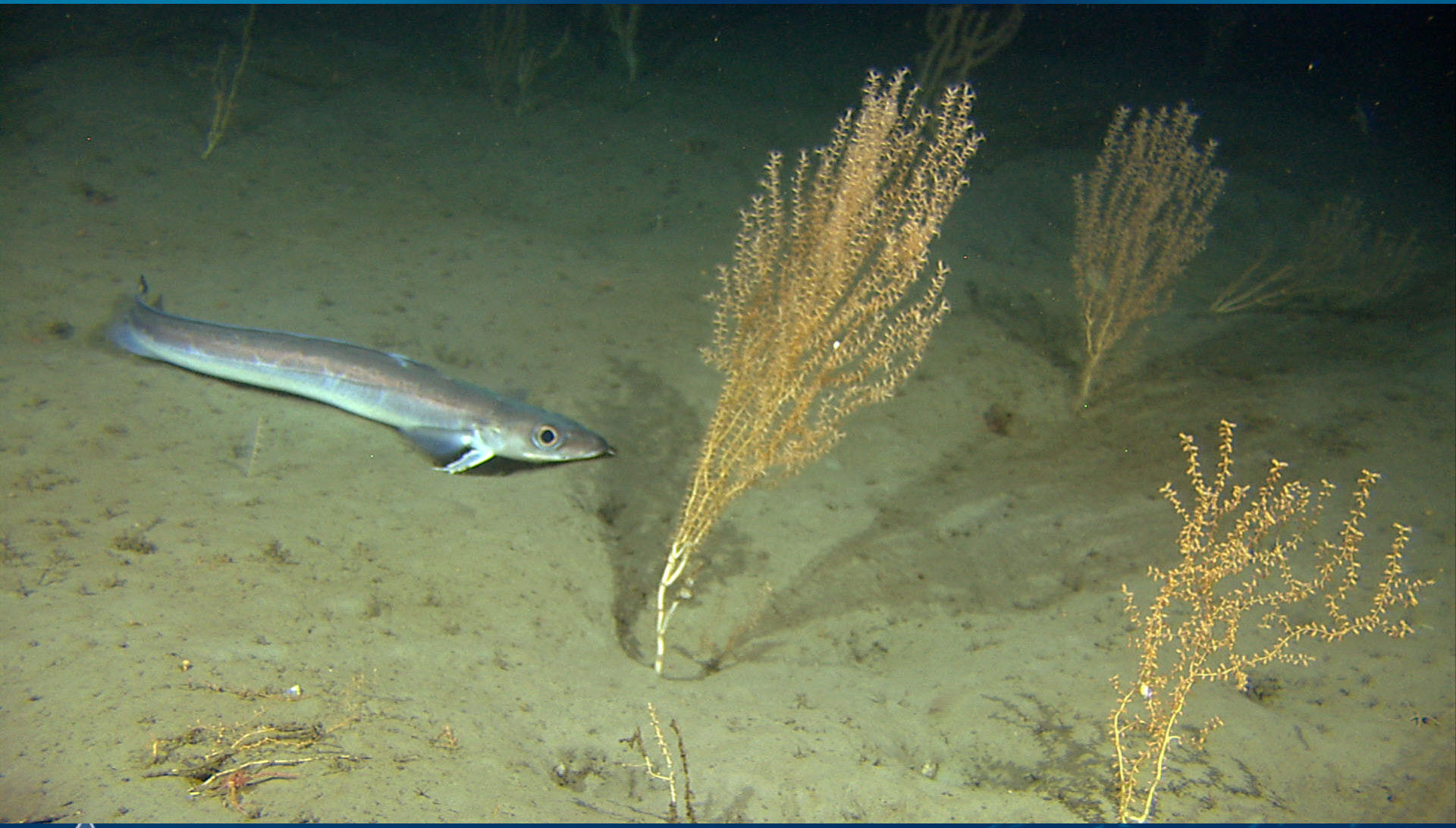
Great habitat variation over short distances



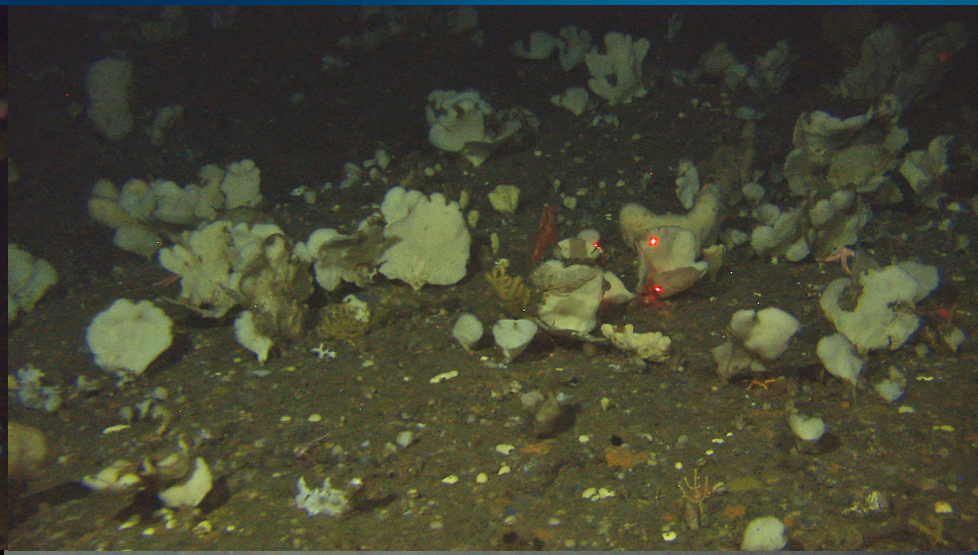
- Patchy habitats
- High biodiversity
- Challenging to quantify

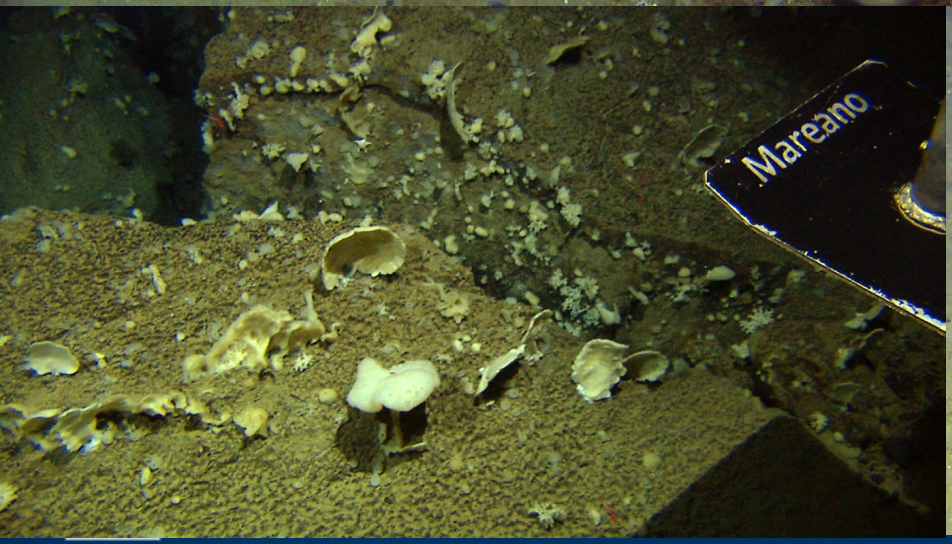
Isidella lofotensis

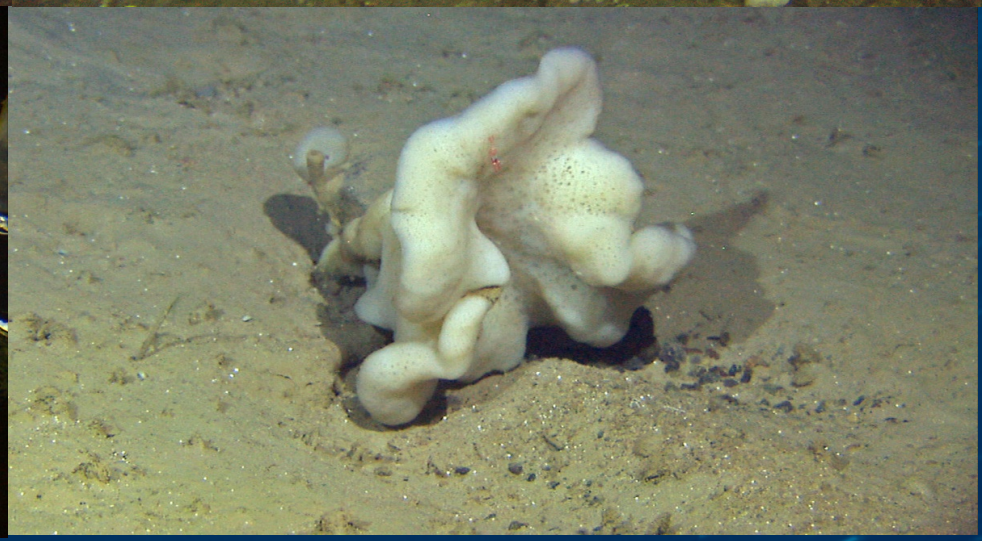
Soft bottom coral garden in deep open Norwegian fjords



Sponges
Only one habitat type?

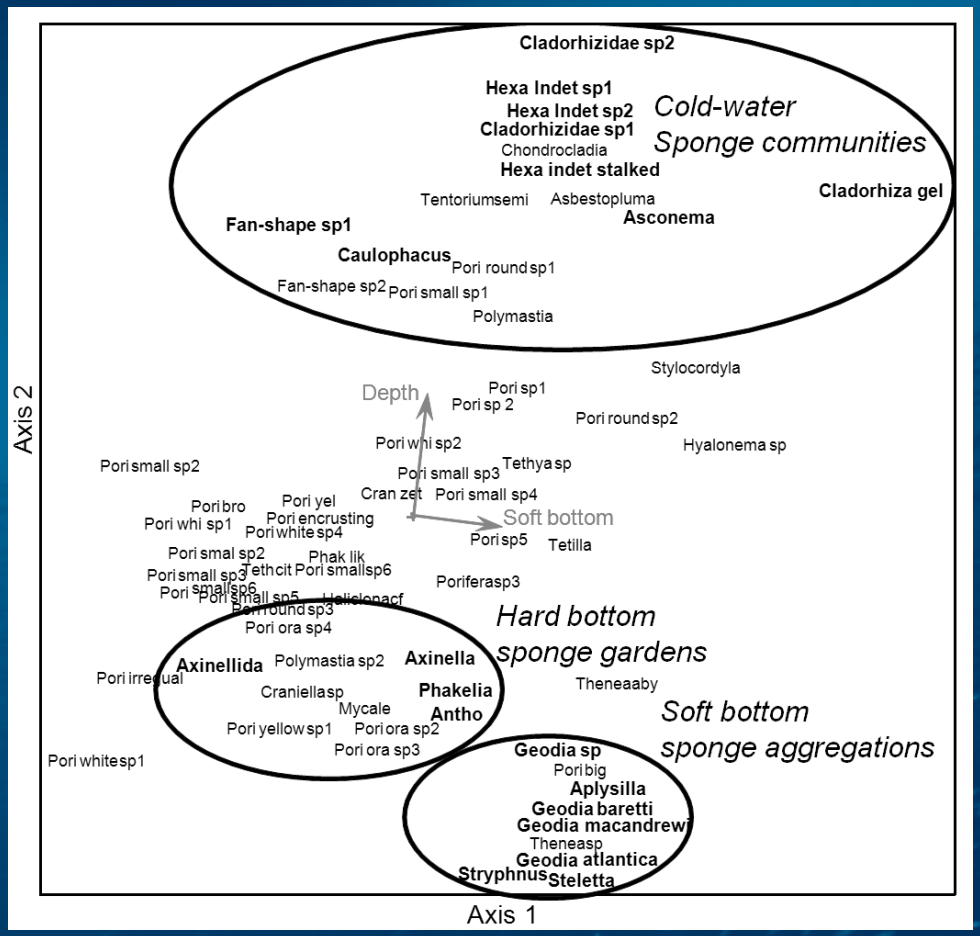






Groups of sponges identified with DCA

- **Soft bottom sponge aggregation**
  Geodidae-dominated communities ("Ostur", Mareano's "Sponge spicule bottom")
- **Hard bottom sponge gardens**
  Axinella, Phakellia, Antho, ++
- **Cold water sponge communities**
  Caulophacus arcticus, Asconema setubalense, and *Pheronema carpenteri*



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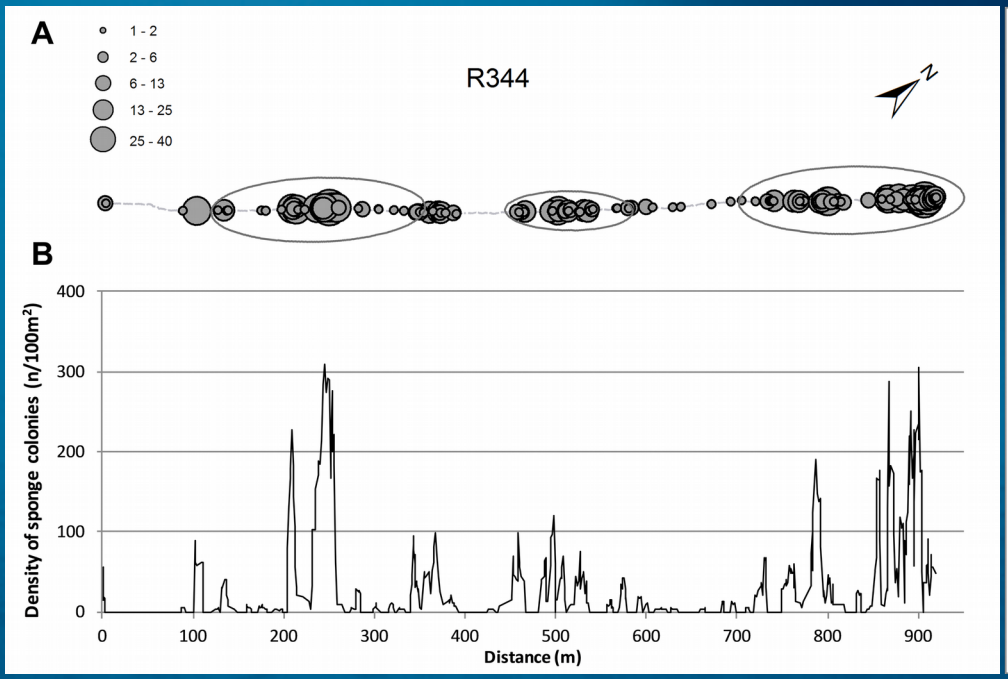
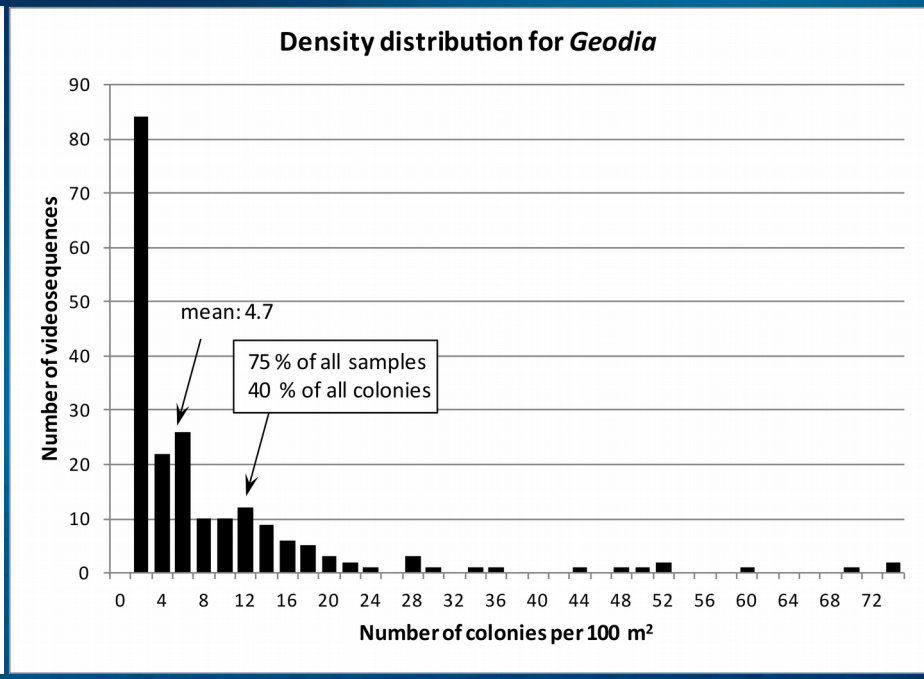
Finding relevant threshold values

Patchiness



Density distributions

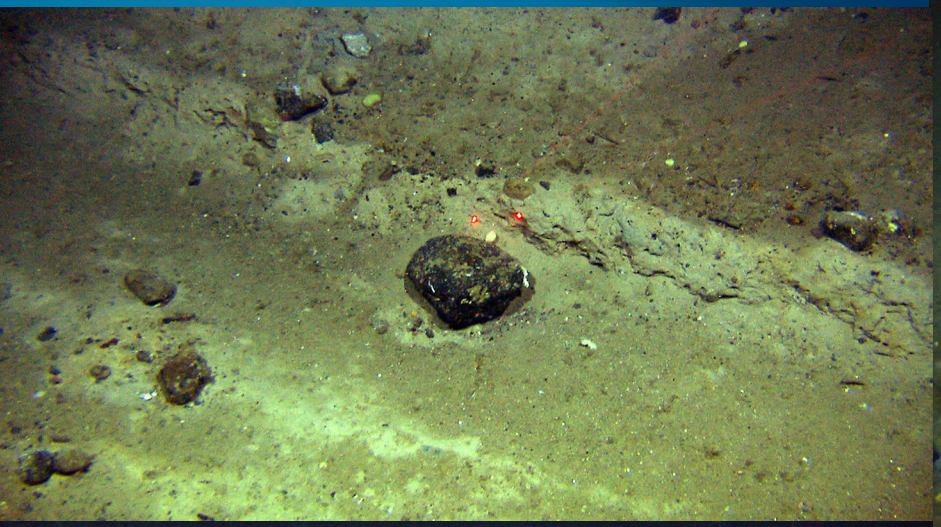


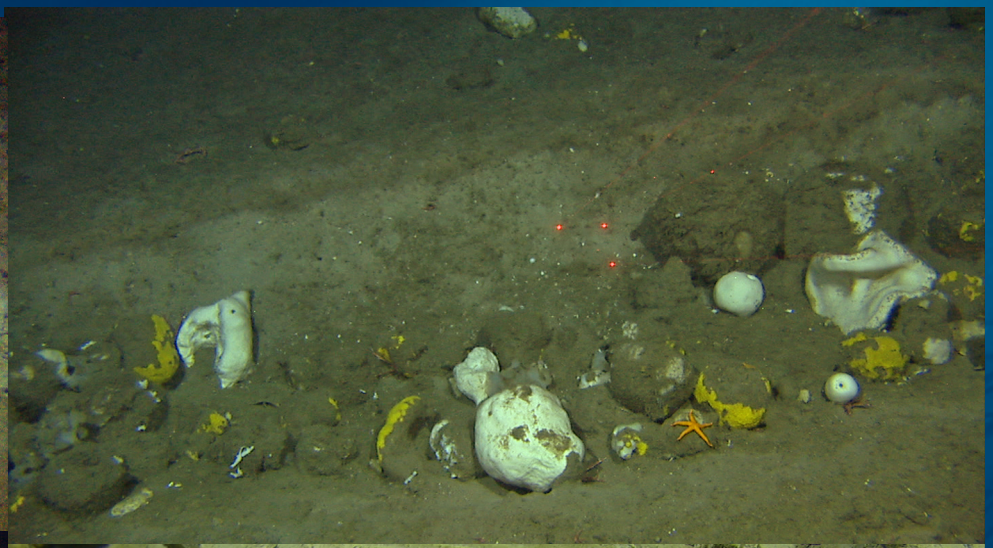
Numbers are scale dependent

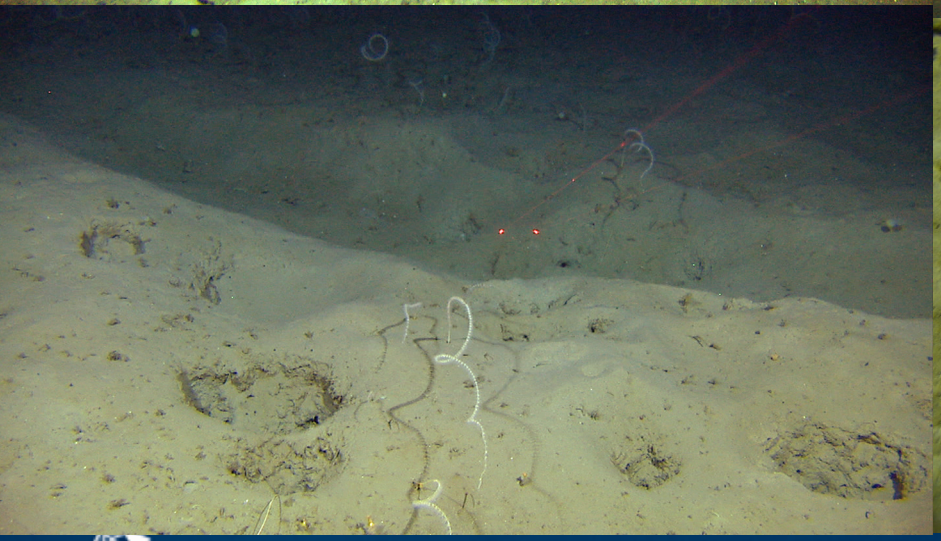
Standardisations needed

Density distribution for the demospongians *Geodia* spp. observed within the MAREANO mapping area. The total number of samples with occurrence of *Geodia* spp. was 414. 64 samples with colony densities below 14 per 100 m² covered 40 percent of all colonies observed.

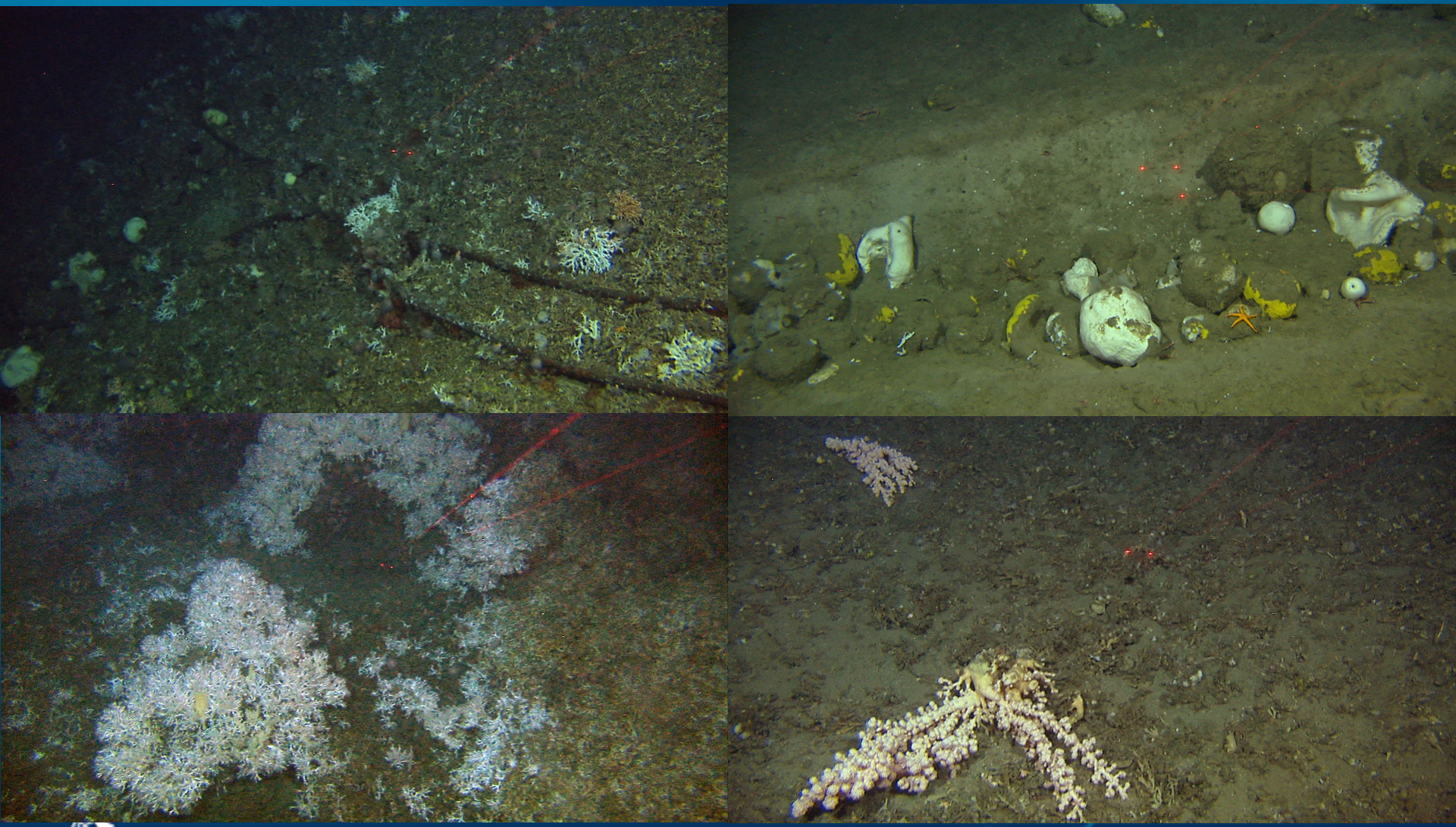
Trawling impact on soft bottom

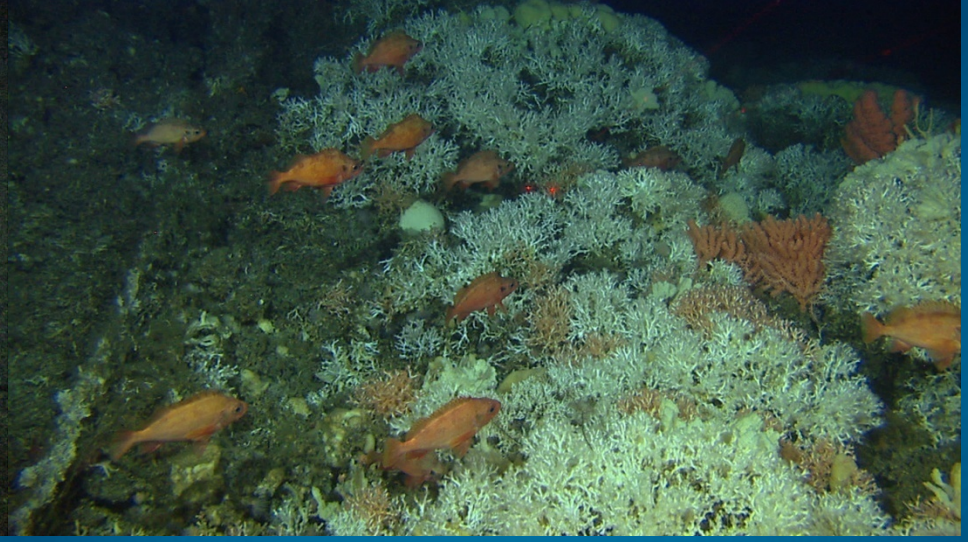






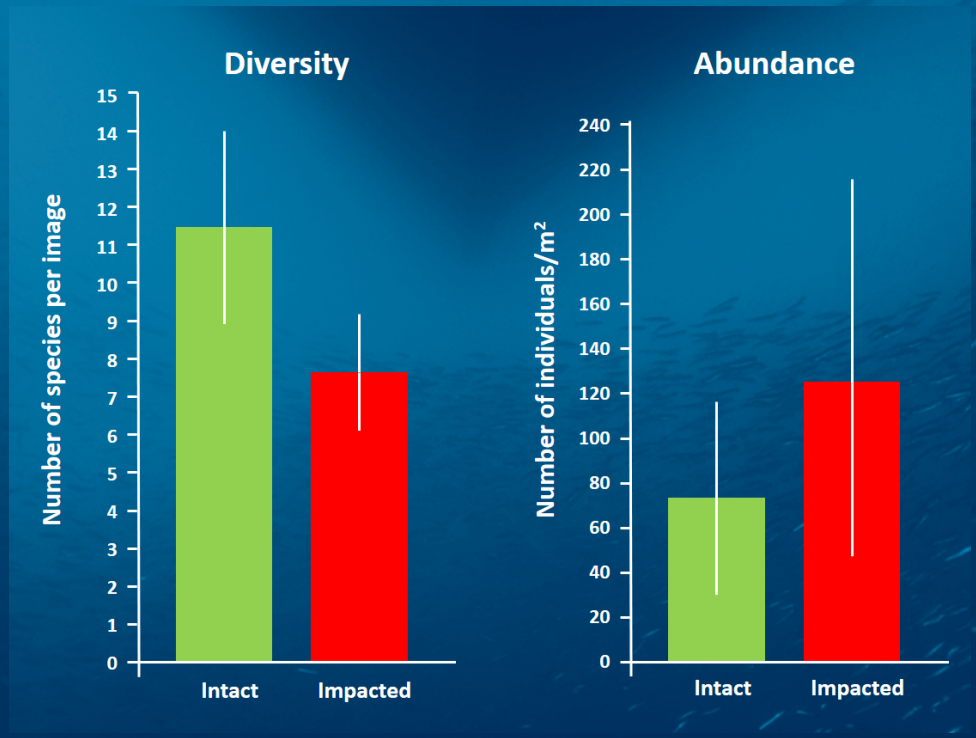
Trawling impact on corals and sponges



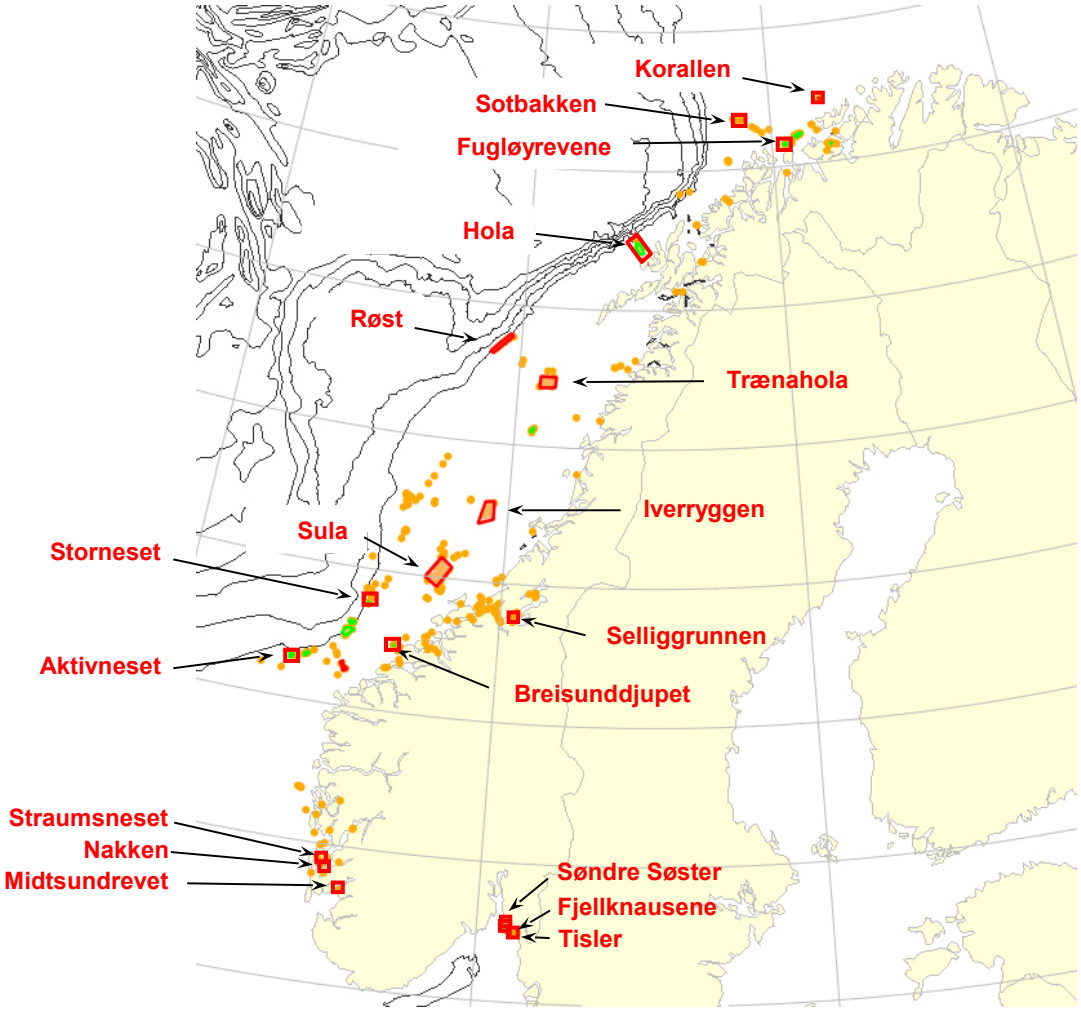


Extensive damages locally
Many sightings of lost fishing gear

Protected autumn 2009



Marine Protection Areas for *Lophelia*-reefs in Norway



Orange points = individual reefs, Red polygons = Coral reef MPAs, Green areas = Coral reef areas.


Thanks for listening!