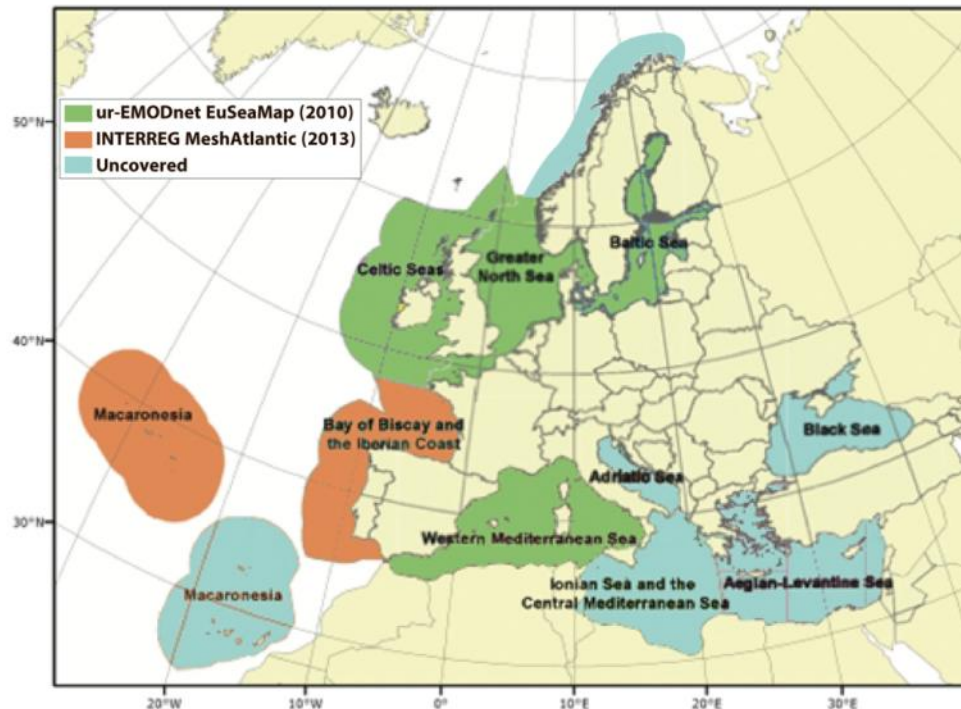# EUSeaMap

- Objective: to provide a 250m pixel size full coverage map of seabed habitats for European waters and Norwegian Sea
  - To update areas that were covered in past projects
  - To prepare new maps for uncovered areas

Principles behind mapping seabed habitats across huge extents

- To make habitats maps limited to the description of environmental conditions
  - Kelp forest on <u>Infralittoral rock exposed to wave action</u>
  - Mediomastus fragilis, Lumbrineris spp. and venerid bivalves in <u>circalittoral coarse sand or gravel</u>

- … which don't tell the full story, but still tell an important part of it
  - don't say that a plant, an animal or a community of plants/animals lives there
  - but say that all the environmental conditions for it to prosper are there
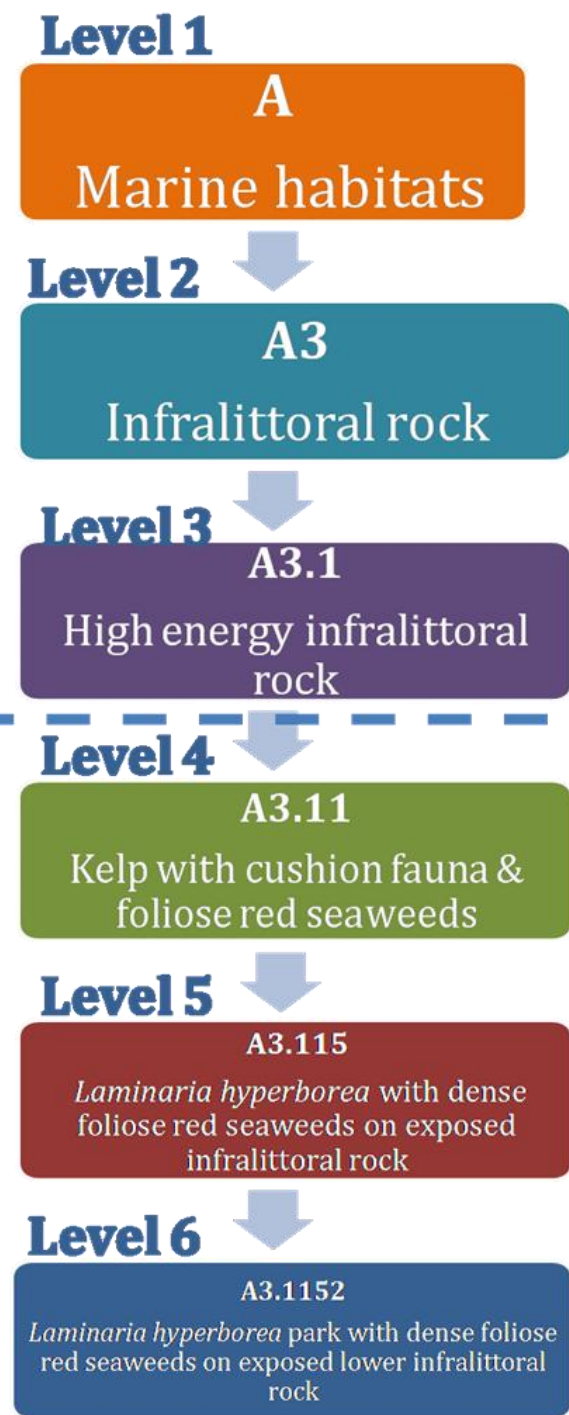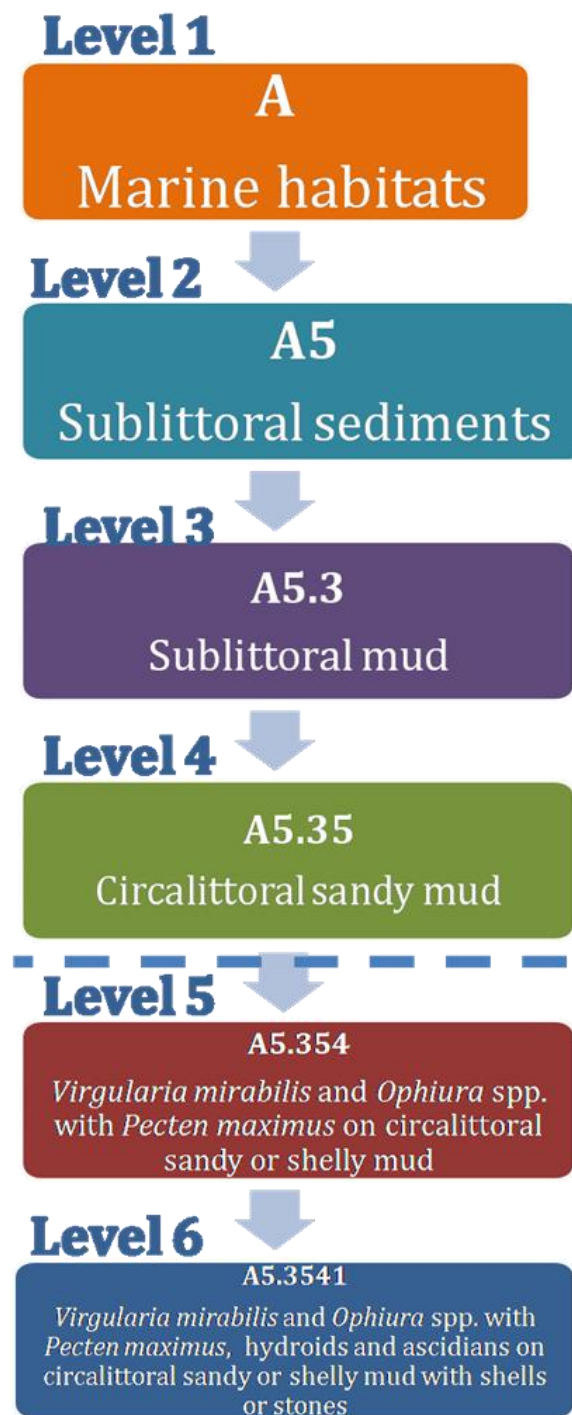
EUSeaMap

- Last output 2012 during EUSeaMap **project** (ur-EMODnet).

- Now fully incorporated as an output **product** under EMODnet Seabed Habitats.

A common language across Europe: the EUNIS classification

Seabed habitat classification – European Nature Information System (EUNIS)

**Physical habitats (level 3 and 4)**

MSFD predominant habitats ≈ EUNIS level 3

Level 1
A Marine habitats

Level 2
A5 Sublittoral sediments

Level 3
A5.3 Sublittoral mud

Level 4
A5.35 Circalittoral sandy mud

Level 5
A5.354 *Virgularia mirabilis* and *Ophiura* spp. with *Pecten maximus* on circalittoral sandy or shelly mud

Level 6
A5.3541 *Virgularia mirabilis* and *Ophiura* spp. with *Pecten maximus*, hydroids and ascidians on circalittoral sandy or shelly mud with shells or stones

Level 1
A Marine habitats

Level 2
A3 Infralittoral rock

Level 3
A3.1 High energy infralittoral rock

Level 4
A3.11 Kelp with cushion fauna & foliose red seaweeds

Level 5
A3.115 *Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock

Level 6
A3.1152 *Laminaria hyperborea* park with dense foliose red seaweeds on exposed lower infralittoral rock
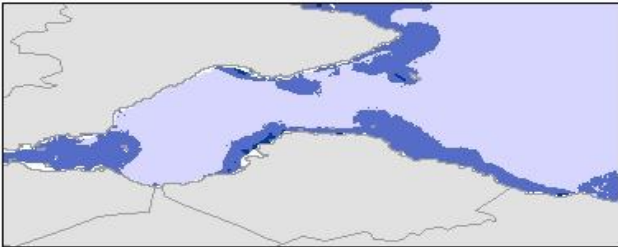
Method

- Requires to prepare full-coverage maps of seabed physical properties
  - substrate
  - depth
  - light conditions
  - wave-induced energy
  - current-induced energy
  - salinity
  - temperature
  - densities
  - …

- An then overlay them with the use of GIS pathways
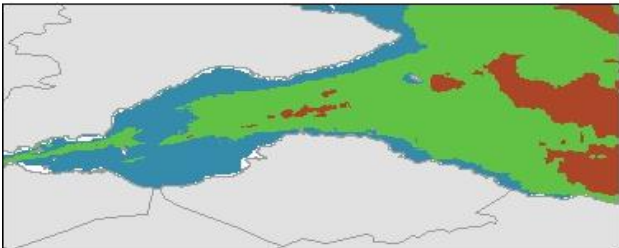
The final EUSeaMap stage
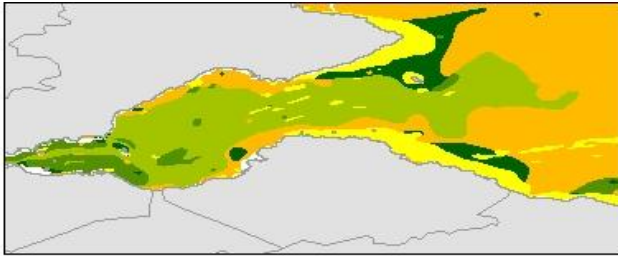
Seabed
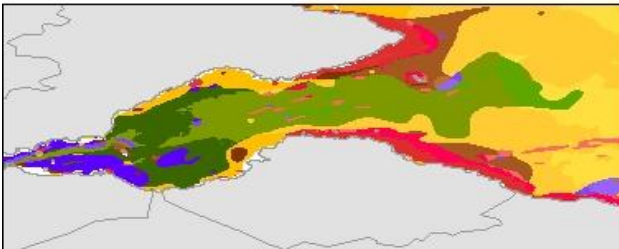Substrate

+

Energy
level
at the
seabed
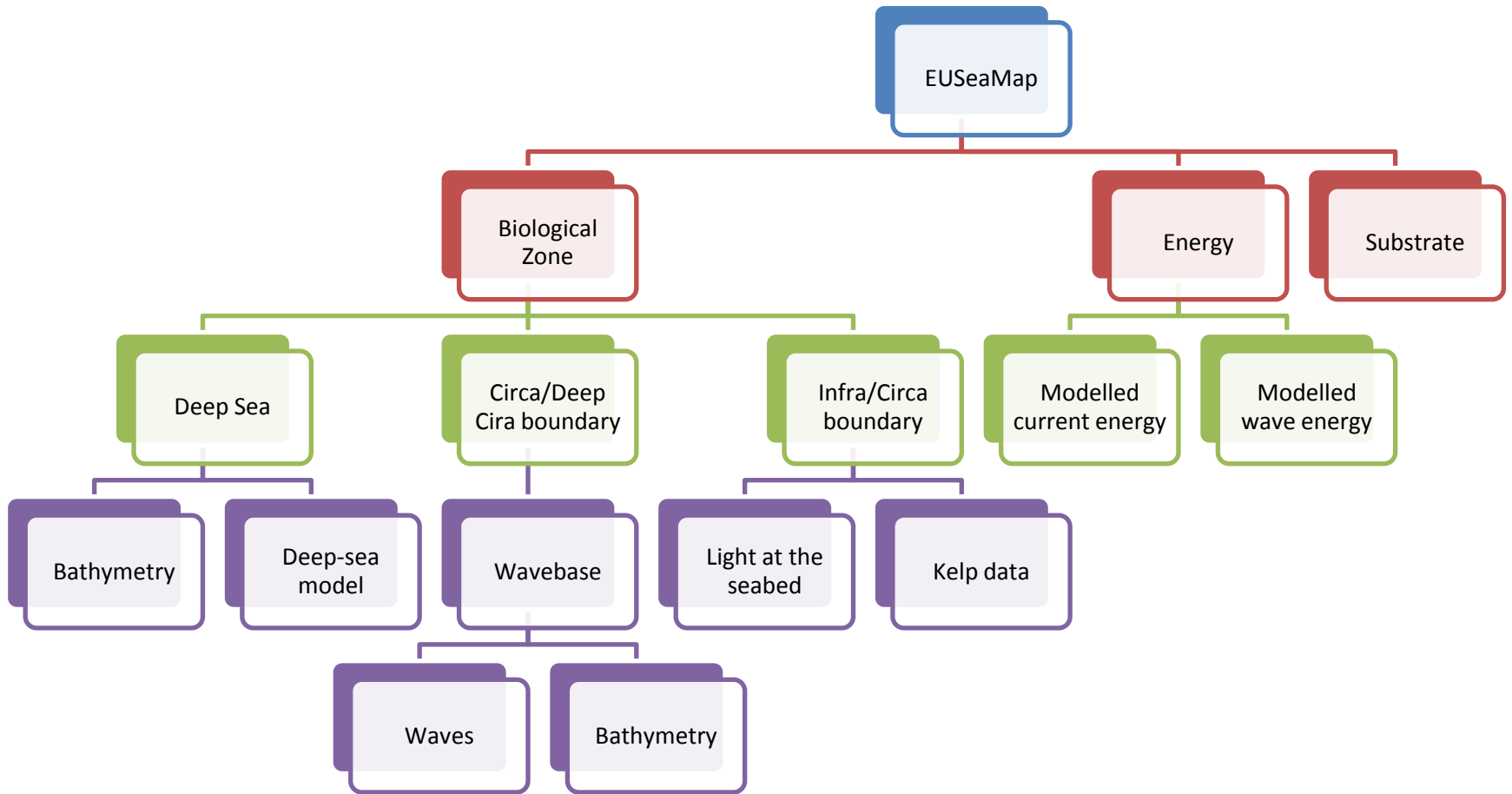
+

Biological
Zones

=

EUNIS
broad-scale
Habitats

However, before the simple last stage…

The EUSeaMap 2015 release

1. **Substrate**

   Update substrate layer from EMODnet geology V July 2015 (DRAFT VERSION) with FOLK classification (sand/muddy sands 9:1 boundary not 4:1)

1. About 34% increase in M to sM (compared to the amount of M to sM in EUSeaMap 2012);
2. 13% decrease in S to mS (compared to the amount of S to mS in EUSeaMap 2012);
3. Rock layer in UK waters not updated
4. Sediment updates around Ireland and more substrate data offshore West Ireland

The EUSeaMap 2015 release

2 . Biozones:

LAYERS

•Updated bathymetry layer (EMODNet bathymetry Feb 2015)

•90th percentile wave length in wavebase (circa/deep circa boundary) ;

•Use of "Amount of light at the seabed" instead of "% light at the seabed";

THRESHOLDS

•New light thresholds (GLM+ Roc analysis in kelp data from UK and Norway);

•New deep sea biozone classes and thresholds (new data from NOC for Arctic, method based on Parry et al., 2015)

•Smaller infralittoral, more accurate light at seabed estimates;

•Smaller shallow circalittoral area and increase in deep circalittoral areas. Wavebase layer resolution has improved

•Deep sea zones same as in the British and Irish biotope classification v 2015

The EUSeaMap 2015 release

3 . ENERGY:

LAYERS

•Use of 90th percentile energy replacing Max statistics (smaller value waves & currents energy)

THRESHOLDS

No updates for current energy (looked into it, no feasible)

Updated for wave energy (Using selected biotopes form MR data)

Smaller values of combined energy and new thresholds for waves
The extent of moderate energy rock habitats (combined waves and currents) are generally reduced compared to EUSeaMap 1, and the extent of low energy rock has increased in some areas.

The EUSeaMap 2016 Final release

Extend coverage to include all EU MSFD;

Confidence Maps

Confidence layers on substrate, bathymetry, fuzzy thresholds for biozones, Energy confidence

Final report

Habitat Map updates:

1. **Substrate**
- Update substrate layer from EMODnet geology V MARCH (?) 2016 (DRAFT VERSION) with FOLK classification (sand/muddy sands 9:1 boundary not 4:1);
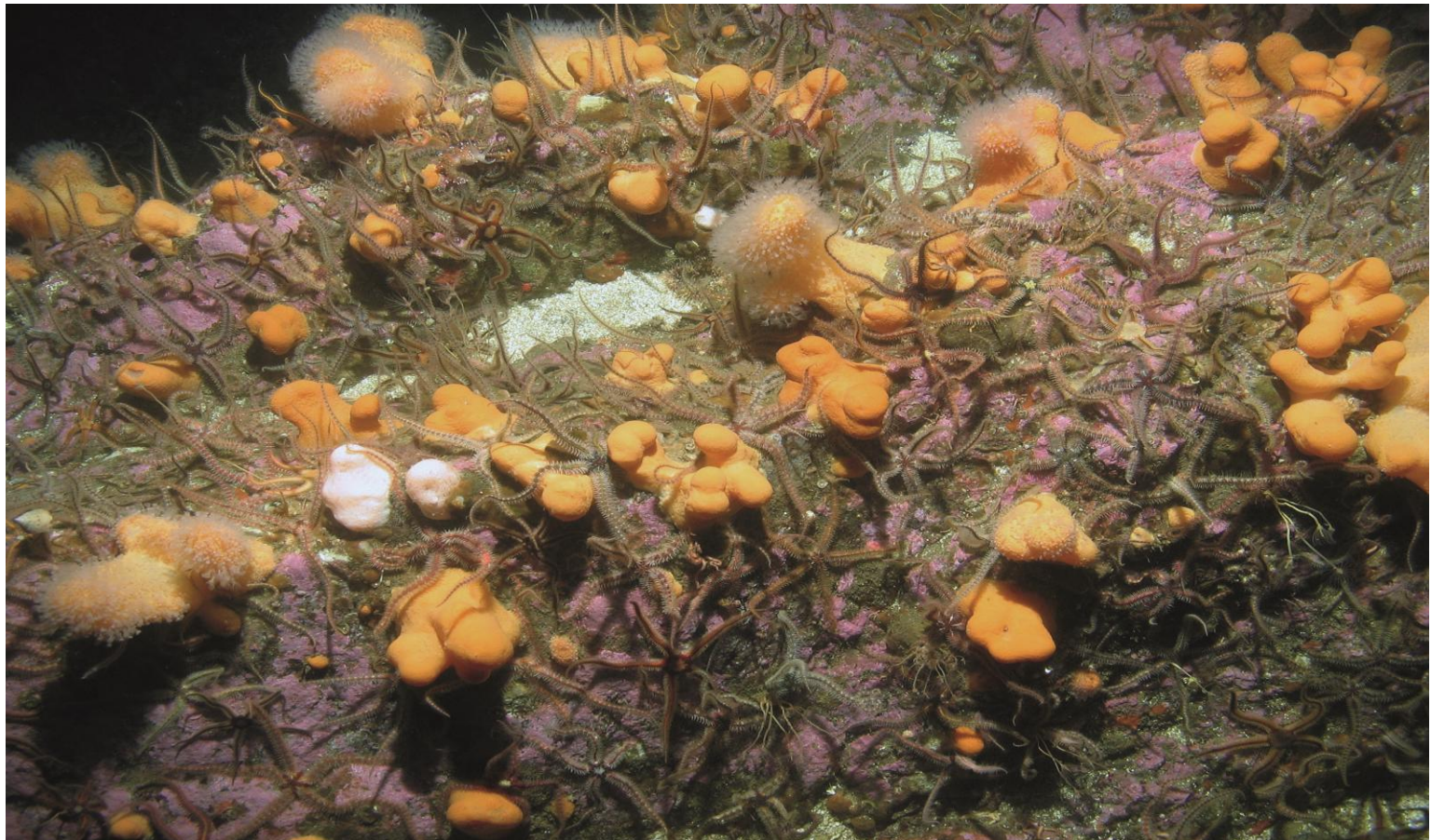- Updated rock layer

2 . Biozones:
- Updated bathymetry layer (EMODNet bathymetry Sept 2015)
- New KDPAR layers; improve in light layer and threshold estimates ;
- New NOC Deep Sea Biogeographic zone model; Improve in deep sea thresholds

3 . Energy:
No change from draft 2015 version

BH3 – Extent of physical damage to predominant and special habitats

BH3 – Extent of Physical damage
## UK: JNCC Cristina Vina-Herbon; DE: BfN, Nina Schröder

- Aim: Extent the seafloor is being damaged or disturbed by physical pressures caused by human activities.

- The outputs are underpinned by two types of data: the distribution & intensity of pressures and the distribution and extent of habitats & their sensitivity to those pressures.

State of indicator development

| Status of indicator	**Common**
Common in regions	**II, III and IV**
Status of assessment	**Draft: New data available May to July 2016**
What needs updating after BDC?	**Re-run analysis and aggregation of disturbance across years**
Benefits of updating after BDC	**Include 2014 and 2015 fisheries data**
CEMAP Guidelines submitted?	**No (require further expert consultation)**
Categorisation of progress	**B**

Method overview

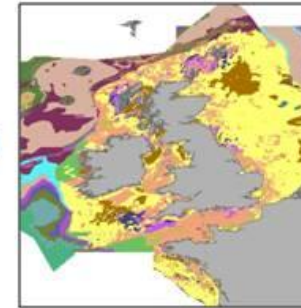Pressure distribution
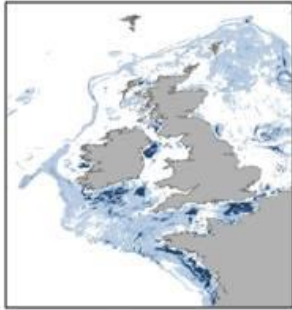
Sensitivity distribution
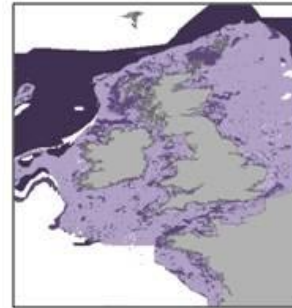
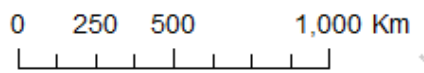Habitat distribution
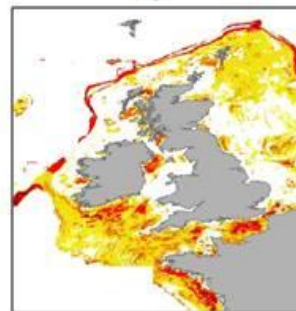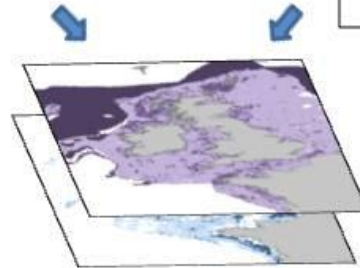
Disturbance distribution

Total area disturbance values & Physical Damage Index

Habitat map sources

Legend:
- OSPAR North-east Atlantic regions
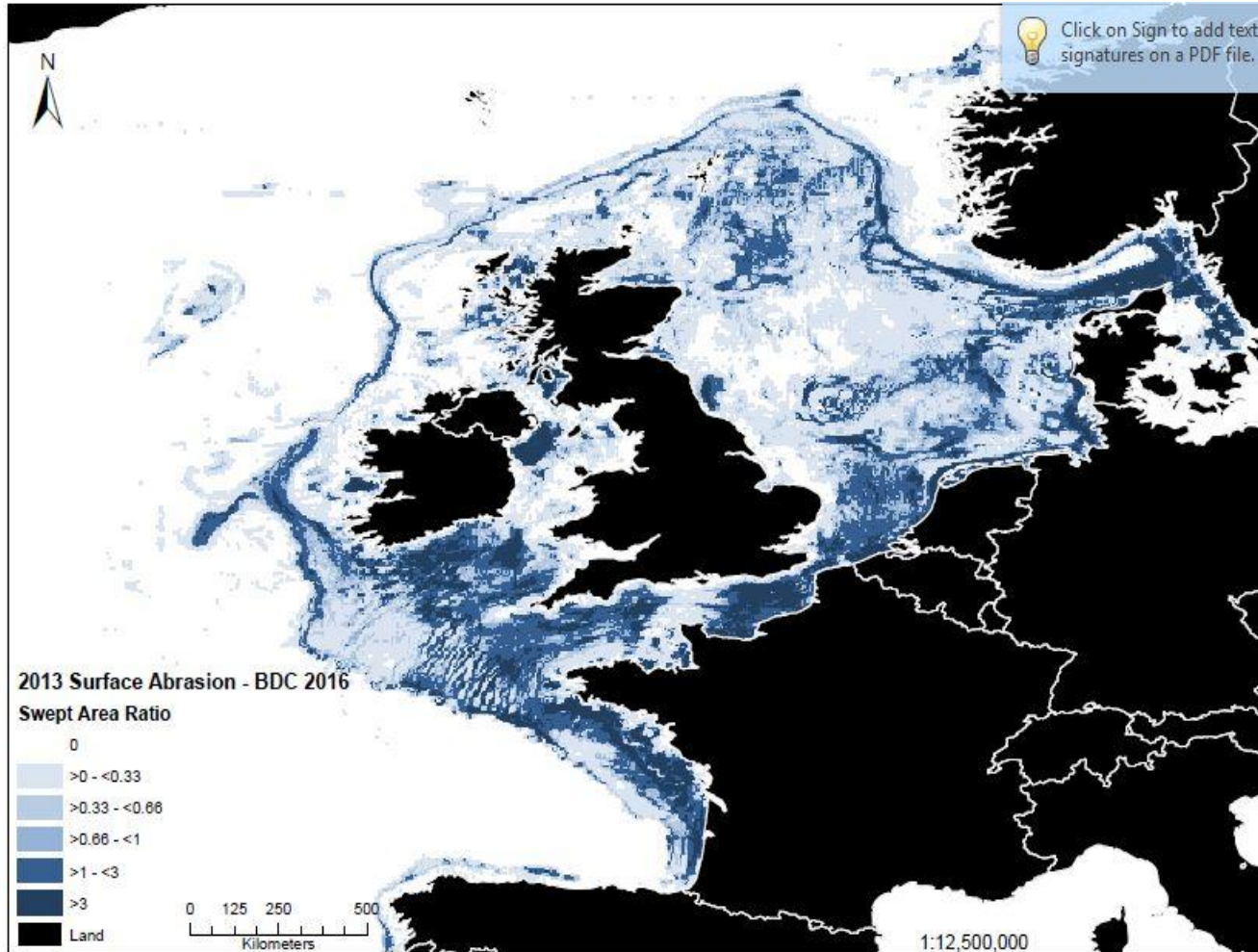- Detailed maps from surveys
- Broad-scale map

Current extent of habitat maps in North-East Atlantic available through EMODnet Seabed Habitats

(June 2015)

0   250   500   1,000 Km

Projected in Europe Albers Equal Area Conic

VMS layer

2013 Surface Abrasion - BDC 2016
Swept Area Ratio
- 0
- >0 - <0.33
- >0.33 - <0.66
- >0.66 - <1
- >1 - <3
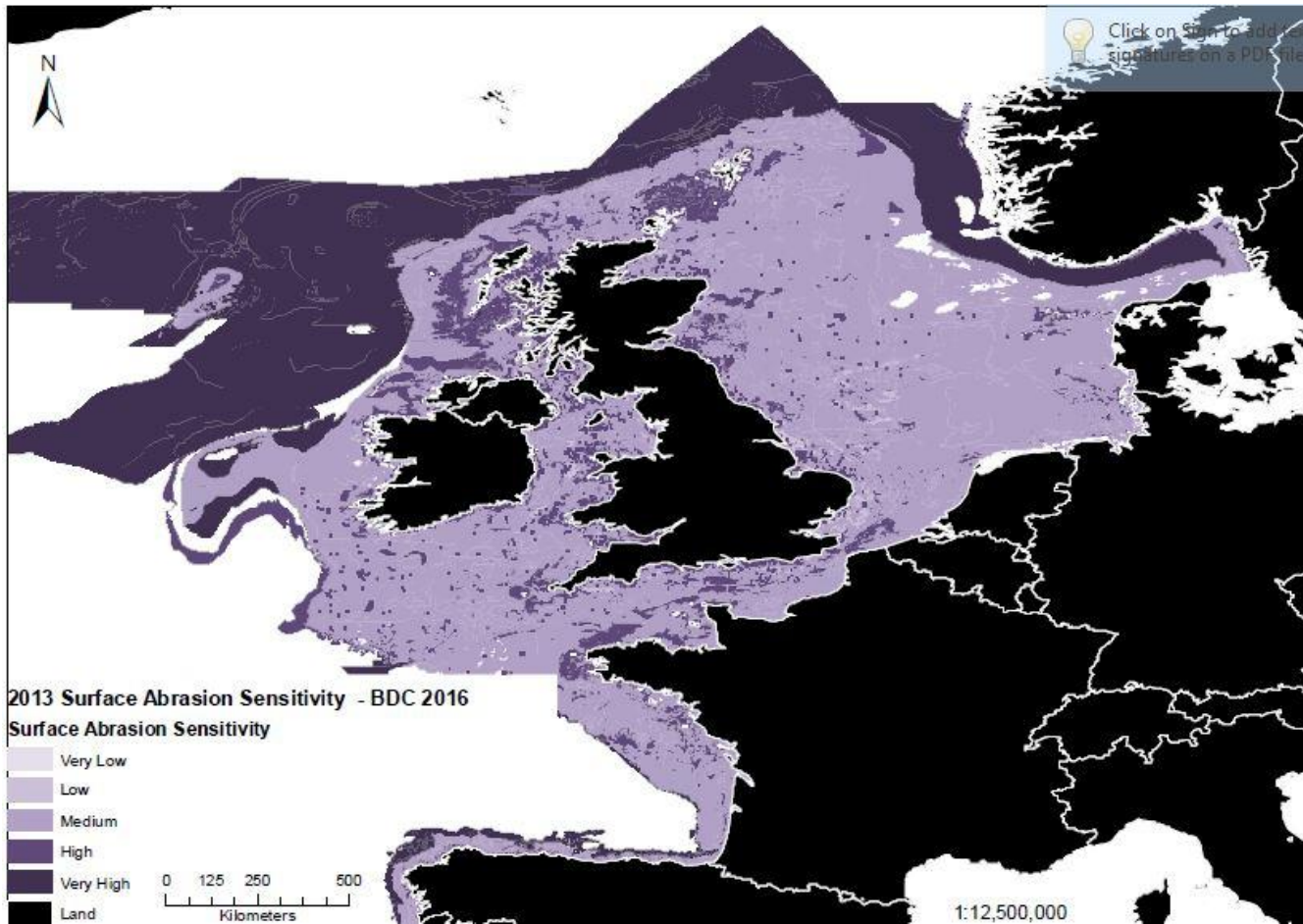- >3
- Land

0   125   250   500
Kilometers

1:12,500,000

DRAFT: Surface abrasion pressure in 2013 from VMS data showing swept area ratio (SAR) for each 0.05x0.05 grid cell

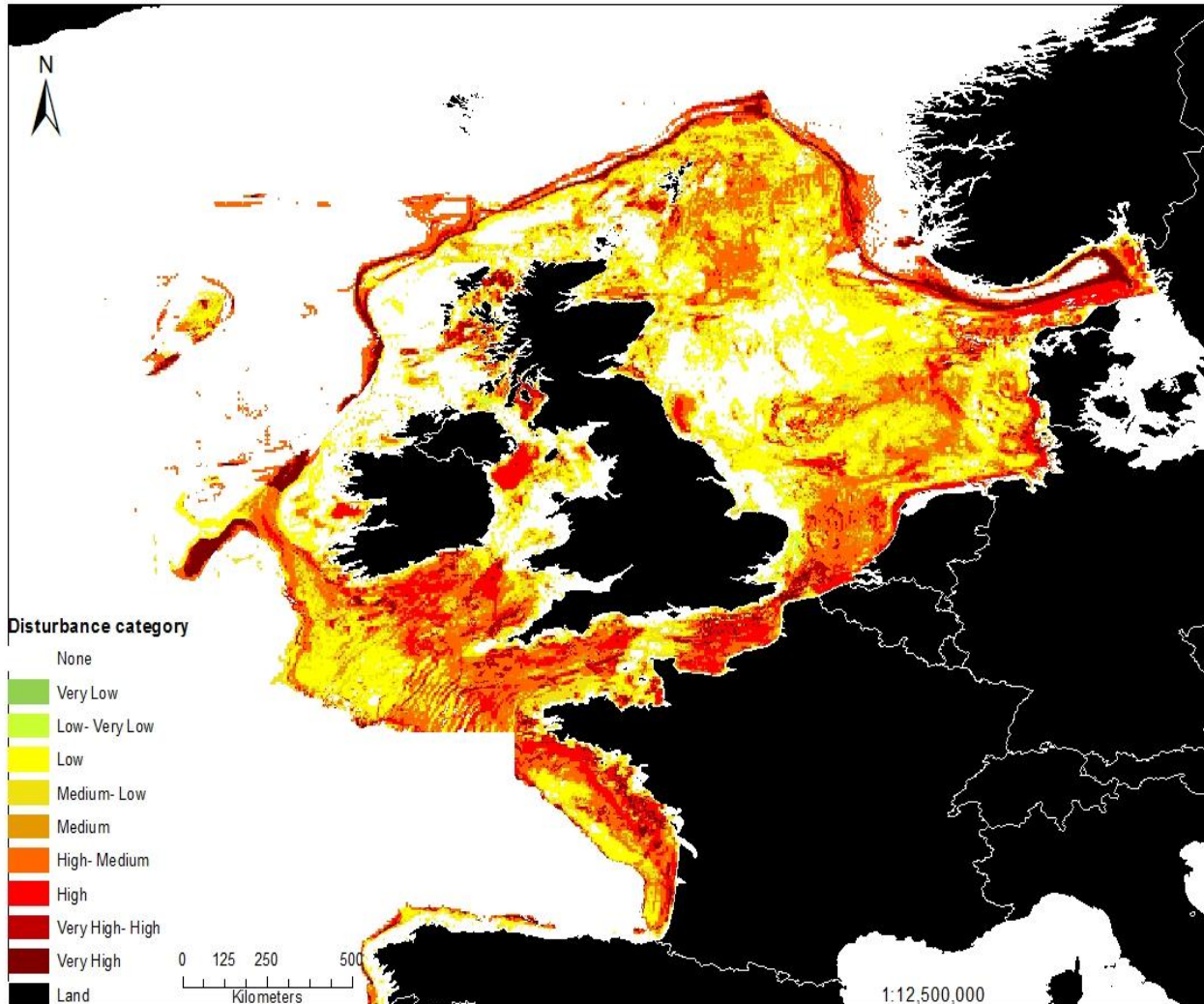(Please note maps will be updated using new data in August 2016)

Sensitivity layer

2013 Surface Abrasion Sensitivity - BDC 2016
Surface Abrasion Sensitivity

- Very Low
- Low
- Medium
- High
- Very High
- Land

0 125 250   500
Kilometers

1:12,500,000

DRAFT: Extent and distribution of sensitivity categories to surface abrasion aggregated at EUNIS Level
3 habitat types

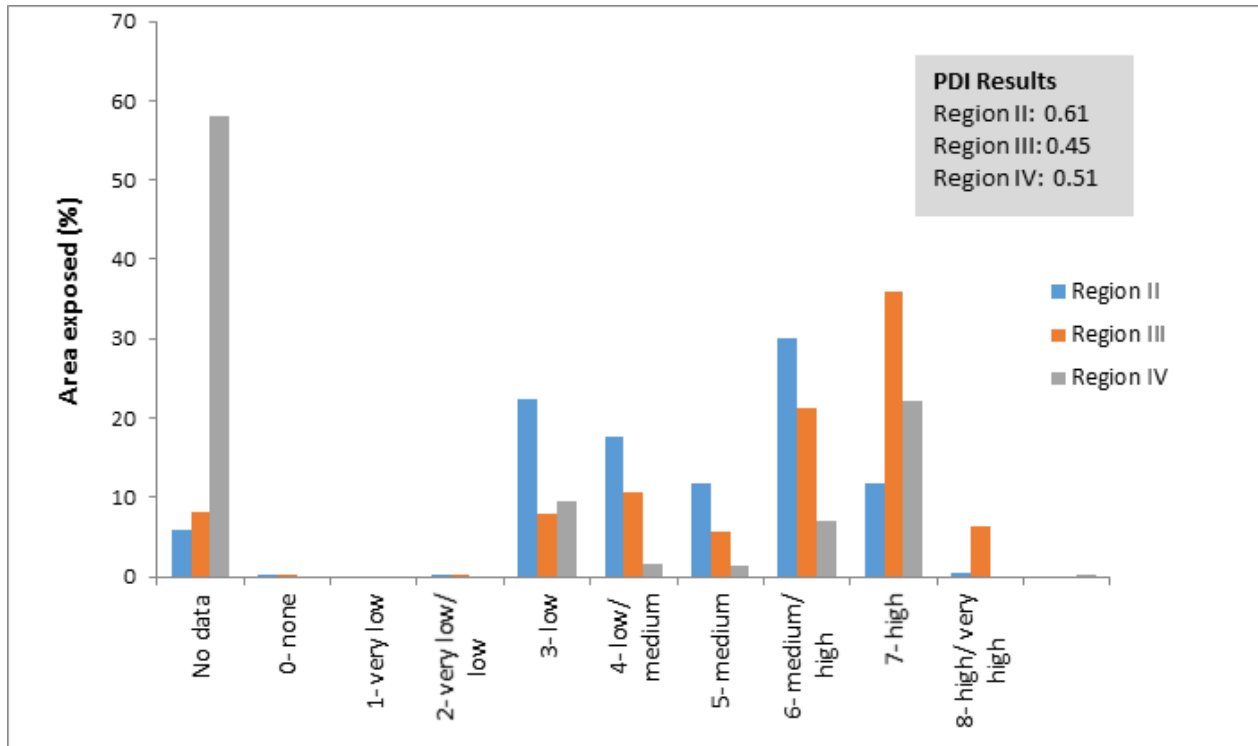(Please note maps will be updated using new data in August 2016)

Disturbance layer

DRAFT: Distribution of categories of disturbance caused by Surface Abrasion across OSPAR regions based on 2013 VMS fishing data

(Please note maps will be updated using new data in August 2016)

Disturbance category
- None
- Very Low
- Low- Very Low
- Low
- Medium- Low
- Medium
- High- Medium
- High
- Very High- High
- Very High
- Land

0 125 250 500
Kilometers

1:12,500,000

Disturbance distribution and PDI values

PDI Results
Region II: 0.61
Region III: 0.45
Region IV: 0.51

$$PDI = 1 - \left(\frac{\sum_{i=1}^{10} d_i a_i}{100 \times A}\right)$$

DRAFT: Disturbance distributions and PDI values for the habitat A5.3 sublittoral mud. Region IV represents a partial assessment due to lack of habitat and pressure data

Conclusion

- Indicator shows results of a modelled assessment of pressures exerted by bottom fishing gears on seabed habitats

- Preliminary results show evidence on:
  - distribution and extent of habitat sensitivity
  - overlapping fishing pressures
  - resulting disturbance
  - → allows distinction of those habitats/geographical areas which are under pressure from fishing activities

- Indicator only shows part of the picture at regional scale
  - Inshore fisheries and other non-fishing activities not included at present
  - outputs will be validated with results from other indicators