Hotspot Ecosystem Research and Man’s Impact on European Seas

41 partners
Euro 8M
Duration 2009-2012
Continued from HERMES project

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Human impact on the deep seafloor > 200 m in 2005

Marine Scientific Research

Oil and gas installations

Oil and gas pipelines

Exploration and development wells to end 2005

Tracks of bottom trawlers (1.5 - 5.0 knots)

Radioactive waste dumpsites

Munitions and chemical weapons dumpsites

Submarine telecommunications cables

200 m depth contour

Benn, Weaver, Billett, van den Hove PLoS1, 2010
Area of seabed impacted by human activities in 2005. Data from OSPAR area of NE Atlantic and deeper than 200 metres water depth.

Benn, Weaver, Billett, van den Hove PLoS1, 2010

† Spatial extent extrapolated from available data
‡ Spatial extent of activities during 2005 only
‡‡ Spatial extent of activities during 2005 (if applicable) and past activities
An example of deep-sea fishing impacts in the ICES Sub Area VII Divisions b, c, j and k

scientific trawls carried out between 1977-1989 (95 trawls)

scientific trawls carried out between 1997-2002 (59 trawls) after fishing began in the area

Commercial Target Species

Orange Roughy – *Hoplostethus atlanticus*
1438 tonnes/annum

Roundnose grenadier
*Corypophenoides rupestris*
973 tonnes/annum

Black Scabbard
*Aphanopus carbo*
423 tonnes/annum

Total Abundance of All Species

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<th>Total Abundance of All Species</th>
<th>25,000 fish per square kilometre before fishing</th>
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<td>7,225 fish per square kilometre after fishing</td>
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Maximum depth of Commercial fishing 1,500m

Fishing effects evident to >3000m

Dashed lines = 95% confidence limits

Bailey et al. (2009)
Each vertical line represents the water depth range of a single fish species.

Fishery at 500 – 1500 m

By-catch includes all 78 species intersecting the fishery.

10.1111/j.1439-0485.2009.00330.x
Fishing Area in yellow
52,000 km²

Reduction in Fish Abundance

Area of Impact – fish removed from all yellow
to red areas
142,000 km²
2.74 × fishing area

Priede I.G. et al. (2011) ICES Journal of Marine Science;
Interpretation of the bathymetry indicates that there are nearly 1500 coral reefs in this area.

Density of cold water coral mounds in the Træna Deep, Norway

Pål B. Mortensen IMR, Bergen
The Move-on rule

Bycatch threshold values

Threshold levels of Vulnerable Marine Ecosystem bycatch before fishing must cease:

NEAFC – 800kg live sponge, 60kg live coral
NAFO – 800kg live sponge, 60kg live coral
New Zealand/SPRFMO – 1-30kg of coral depending on species or 50kg sponges
The Move-on rule – where to move to?

VME encounter assumed to be middle of trawl

Initial trawl track c15 nm

Move-on tracks must step away 2 nm from encounter

Weaver et al 2011 Report on fisheries impacts
Recent results from the RRS *James Cook* cruise 060, 9 May – 12 June 2011; © NOC, NERC, UK, 2011

Cost of cruise – about €1.2M

Veerle Huvenne NOC, Southampton
The inner purple box represents a fisheries closed area. It has been suggested to extend this to the outer purple box. Data was collected in the areas of proposed extension.

Recent results from the RRS James Cook cruise 060, 9 May – 12 June 2011; © NOC, NERC, UK, 2011

Veerle Huvenne NOC, Southampton
Intact habitat inside the fisheries closed area and in the southern proposed SAC with living coral, lots of fish and many other organisms

Veerle Huvenne NOC, Southampton
Coral communities destroyed by bottom trawling in northern proposed SAC area, no fish, no living coral and few other organisms

Veerle Huvenne NOC, Southampton
Key points

1. At present deep-sea bottom trawling has a greater impact on ecosystems than all other activities combined

2. Deep-sea fisheries have a disproportionate impact on non-target species and affect areas outside of the fished area

3. Existing measures to avoid impacts of bottom impact fishing are inadequate and potentially destructive

4. The deep-sea is poorly known but new scientific data consistently shows it is very complex and often slow to recover from human impact

5. Scientific research is very expensive and until recently has not focussed on fisheries issues, but can provide critical information