

# Seabed mapping and biological groundtruthing of habitats on the Swedish west coast

(Work package 6 in Forum Skagerrak II)

## The aim of the project is to

- carry out a survey of a selected offshore area and to develop maps of benthic habitats.
- develop a dialog with stakeholders i.e. commercial and recreational fishermen, and governmental authorities to use the achieved knowledge.

The ultimate aim of the project is to deliver results that can be used to set up a management plan for best fishing practises.

## Introduction

One difficulty in managing the offshore marine environment is lack of inventories of habitats and species of large areas. Using advanced techniques such as multibeam swath bathymetry and side scan sonar, it is now possible to efficiently and in detail survey the seabed topography and structure. With biological groundtruthing and geological and biological interpretation of datasets, habitat maps can be developed.

Fish habitats are often controlled by the nature of the seabed, and fishery interests seek information that makes fishing more economical and safe. Environmental managers seek information on the spatial extent of sensitive habitats to minimise environmental impacts of human activities, such as bottom trawling.

As a test case, an area situated in the Swedish economic zone has been chosen due to indications of high biological values (valuable fishing ground for both commercial and recreational fisheries and reports that deep-water coral habitats are present in the area). The fishery in the area is under EU regulation and thus provides an interesting case since interregional interests operate and there are few examples of marine protected areas outside territorial waters.

## Approach

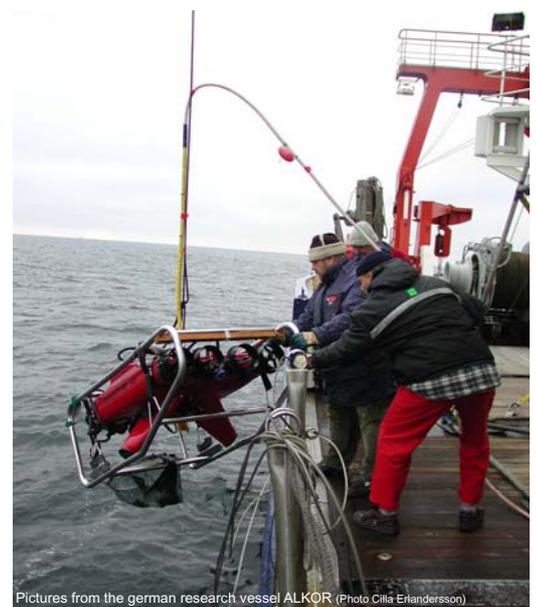
- The project has surveyed the area using multibeam echo sounders to assess bathymetry and geology. The surveys were carried out with the research vessels Alkor and Triad in collaboration with Kiel University and Marin Mätteknik AB.
- Flat areas, slopes, trenches and sills have been identified from the bathymetry data.
- In selected areas sidescan sonar and sub-bottom profiler data have been collected for increased resolution of benthic structures and assessment of historical trawl marks.
- Stratified biological groundtruthing will be used to describe different benthic habitats and dominating organisms in the area using remotely operating vehicles (ROV) with cameras, dredging and grab sampling.
- Habitat maps will be developed using GIS.
- Commercial fishery intensity in the area will be assessed using databases of set positions and satellite positioning (VMS) of boats operating in the area.
- Meetings will be arranged with stakeholders to present the habitat maps and discuss potential conflicts between the use of the area and possible conservation aspects.
- A report will be synthesised including recommendations on how the achieved results can be included in a management plan for the area.



R/V ALKOR (Photo Cilla Erianderson)



R/V Triad (Photo: Marin mätteknik AB)



Pictures from the german research vessel ALKOR (Photo Cilla Erianderson)



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### Results so far

The area is situated on the slope towards the Norwegian trench with depths between 150 – 420 m. The seascape is topographically complicated and diverse in habitats. Several deep canyons extend from the trench towards the coast in a north to easterly direction. These canyons are narrow, steep sided and interrupted with several sills (Fig 1).

The bottom substrate is mainly soft mud, but the slopes and sills of the canyons consist of rocky bottoms and coarse sand and gravel. Interesting features are also the giant pockmarks. The use of a sub-bottom profiler revealed that these pockmarks are created by local gas fields that have surfaced leaving a deep hole in the sediment bottom (Fig. 2).

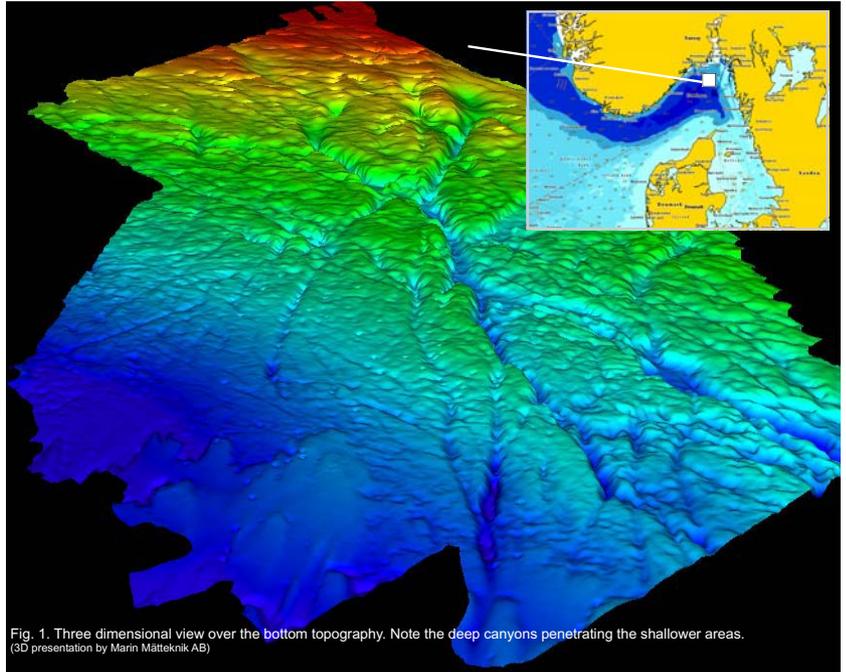


Fig. 1. Three dimensional view over the bottom topography. Note the deep canyons penetrating the shallower areas. (3D presentation by Marin Mätteknik AB)

The landings from the commercial fishery are diverse and confirms the diversity of habitats. The most important fishery is for prawns *Pandalus borealis* followed by witch, cod, pollock and haddock (Fig. 3).

There are also landings of threatened and declining species, such as skates. The effort in the demersal fisheries have increased since 1996 in the area. The most common gear used is prawn trawls without excluding device for fish, and this fishery also land other demersal species, particularly witch. From 2001 and onwards the use of double coupled trawls have increased the trawling effort in the area (Fig. 4).

The area is also important for the recreational fishery. These fishermen are relatively few, highly technical and seek up the deeper troughs in search for large predatory fishes like tusk, ling, skates and rays.

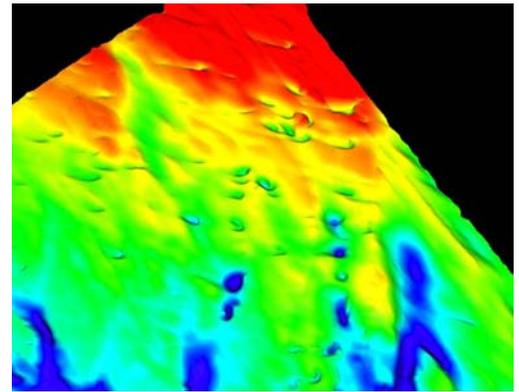


Fig. 2. Close up three dimensional view with pockmarks (3D presentation by Marin Mätteknik AB)



Deep water basket star *Gorgonocephalus caput-medusae*. (Photo Rutger Rosenberg)



The reef-building scleratinian coral *Lophelia pertusa* and the redfish *Sebastes viviparus*. (Photo Tomas Lundälv)



Deep-water Gorgonians (*Paragorgia arborea* and *Primnoa resediformis*). (Photo Tomas Lundälv)

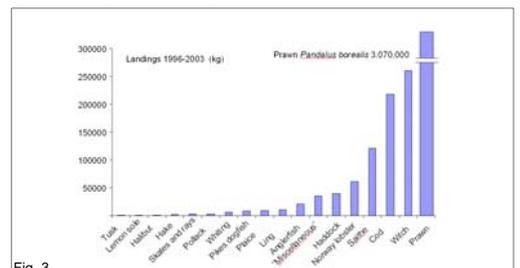


Fig. 3

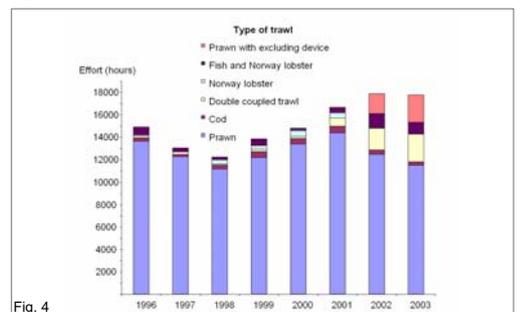


Fig. 4

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