**Aim**

Actual maritime spatial planning was not part of the expected outcome from the Danish straits. The area was meant to serve more as a workshop area for investigating how ecological data / information can be better used in MSP:

- Developing new mapping and modelling tools and testing their applicability for maritime spatial planning in general.
- Investigate the effect of ship noise on harbour porpoises

**Main Conflicts**

The area around Hatter Barn in the Danish Great Belt area was chosen as a pilot area for the BaltSeaPlan project for several reasons. It is known as a notorious risk area for grounding and collision of ships passing the Danish straits to and from the Baltic.

The pilot area hosts a high number of different habitats, large areas designated as NATURA-2000 areas and it is a key area for marine mammals like harbour porpoises and harbour seals.

A risk analysis for shipping in Danish waters in 2001 concluded that the Hatter Barn area at that time had the second highest risk of accidents in Danish waters (Anon. 2002). The reason was a combination of the necessary crossover of ships in the separation zones between the deep and shallow water route, the sharp turns in the deep water route combined with the lack of possible traffic separation due to the narrow passage and relatively strong and shifting current pattern in the area. One suggestion to minimize the risk was a deepening of the shallow water route from 15 to 19 m.

**Potential Future Dilemma:**

Shipping accidents in the area could cause severe effects on valuable ecosystems and protected areas and accidents affecting the ship traffic passing this bottleneck could have severe economic influence in the Baltic as well as other regiol bathymetry data are available. On the other hand dredging the seabed could result in loss of valuable habitats.

**Stocktaking**

**Nature Protection and Shipping**

Pilot area in the Danish Strait. It hosts a large number of NATURA-2000 areas (green hatching) and is a key area for harbour porpoises. Major shipping routes are indicated by purple dots. Based on data from Sensius (2009), the number of ship passages around Hatter Barn is estimated to be approximately 25,000 per year with a size exceeding 300 gross tons.

**ECOLOGICAL VALUES**

The biological communities inhabiting the pilot area are shaped by the substrate, the presence of light and the salinity.

- **Shallow stone reefs**
  - Very productive sea-weed forests inhabit the reef areas in shallow waters where light is sufficient.
- **Deep stone reefs**
  - Different fauna species dominate the boulders in deep waters below 18m depth.
- **Biogenic reef on gravely seaboeds**
  - Dense populations of the horse mussel below 15-16m depth act as a substrate for a rich biological community.
- **Occurrence of harbour porpoises**
  - One of the most important areas in European waters

**Findings**

**Mapping and Modelling for MSP**

Map of Hatter Barn Great Belt area showing the depth zones and the main shipping routes.

- **Habitat Modelling and Effect of Ship Traffic**
  - A statistically significant model describing the macroalgal vegetation cover as function of depth, cover of sea urchin and location was established based on data from the area. We found that the seaweed forest was significantly affected by depth, sea-urchin grazing and the presence inside or outside the shipping route. The vegetation model was used to produce a habitat map. The map describes the vegetation cover on the identified reef parts taking depth and presence (inside/outside the sailing route) into account assuming a moderate grazing pressure from sea urchins.

**Conclusions**

The new method identifying hard bottom using a reproducible and cost effective method, given that high resolution bathymetry data are available. Deepening the present shallow water route will result in a loss of 15% reef areas within the investigation area. The relative effect would be most severe on the deeper reef parts were app. 1/3 would be lost. Ship traffic significantly affect the benthic seaweed forest within the shipping routes. The reduction in this case was approximately 30%.

Although high levels of noise were recorded within the shipping lanes, no evidence of lower abundance of porpoises within shipping lanes could be documented with the present measuring setup.

**References**


Sensius, J. 2009: AO (Fisken og havet) - New method of mapping seabed morphology for marine life protection and porpoise echolocation.

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