

Fladen - A Potential MPA

Location

Fladen is an offshore bank situated in the Kattegat, 17 km west of the Swedish coast. Kattegat connects the North Sea and the Baltic Sea and is the geographic overlap area of the Helsinki and OSPAR Conventions. The bank and adjacent sea area are mostly situated in Swedish territorial waters, but the southern parts also extend into Sweden's Exclusive Economic Zone (EEZ). The southwestern part of the bank is connected to Groves Flak, a shallow offshore bank in the EEZ and territorial waters of Denmark. The position of Fladen is 57°10' N and 11°46' E.

Potential Reasons for Selection

Fladen is representative of the rich offshore banks in eastern Kattegat, displaying lush vegetation with high diversity and dense growth of macroalgae. The water is clear and the area still has a rather intact ecological structure, making it a potential breeding and nursery area for a great variety of invertebrates associated with hard bottoms, soft bottom and kelp beds, as well as for fish. Fladen is also a very important feeding and wintering area for seabirds and an important feeding area for grey- and common seals.

Site Description

The area proposed for designation as a marine protected area is a shallow bank of ~100 km², rising from depths of 50 - 100 m in the surrounding area to 5 m in the shallowest part, with the major part of the bank being 10-20 meters deep.

The bottom topography is varied with ridges and ravines. Stones and boulders provide substrate for macroalgal stands. There are also areas with soft bottoms of sand, shell gravel and maerl.

The Kattegat is characterised by highly variable hydrographic conditions and strong stratification. The bottom water consists of

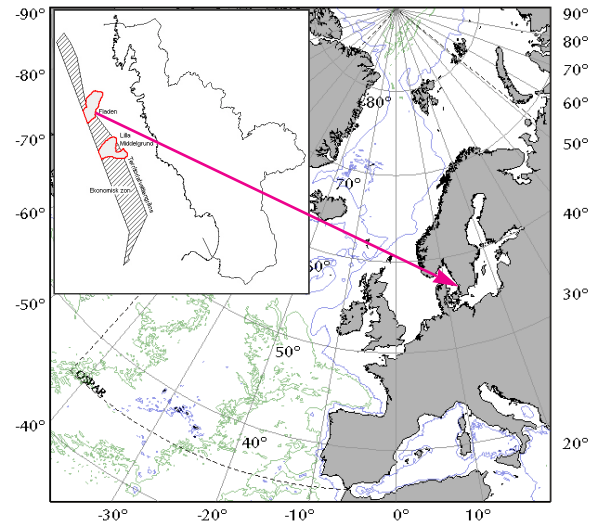


Fig. 1: Location of Fladen in the offshore Kattegat. Inserted is the area outlined by the County Administration in Halland and the Swedish EPA to delimit the proposed offshore SAC.

North Sea water with high salinity (~33 ‰), entering the Kattegat along the Swedish west coast. This bottom water is covered by a layer of Baltic outflow water with lower salinity (~22 ‰ close to Fladen). The border between these layers of water varies between 10-20 m depth depending on the current, which most commonly is strongest along the Swedish coast. The intensity and direction of the current varies greatly and is influenced by the wind conditions in both the North and Baltic Sea.

The area is affected by anthropogenic substances from the coastal areas in a limited manner. Despite general eutrophication of the surface water, the water is clear and has good light transparency.

Biological Features

Fladen is representative of the highly diverse fauna and flora associated with offshore banks in Kattegat. Relatively little information is available about the biological conditions in the area. A few field-studies have been carried out, but only the macroalgae have been investigated in more detail. Most recently, a study on macroalgae and invertebrate fauna was carried out, commissioned by a Swedish energy company as part of an environment impact assessment for a planned offshore wind park.

A total of 142 species (except vertebrate fauna) has been recorded in the area, 42 species of macroalgae and 100 species of invertebrate fauna. Compared with the predominant characteristics of Kattegat, Fladen displays rich vegetation with high diversity and dense growth of macroalgae. The clear water enables macroalgae to

**The Fladen Bank -
a Showcase Example
for the OSPAR System
of Marine Protected
Areas**

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Fig. 2: Kelp beds provide an ideal habitat for a diverse flora and fauna. (Courtesy of Jan Karlsson©Jan Karlsson)

grow at 30 m which is as much as 11 m deeper than in the coastal areas. The vegetation is characterised by distinct zoning. Extensive areas at depths between 12 – 20 m are dominated by the brown canopy-forming algae Kelp, *Laminaria hyperborea*. 61% of the studied area in this depth interval consists of kelp, which is instrumental for habitat diversity. Kelp beds provide a 3-dimensional structure of different habitat types, supporting a diverse flora and fauna for all or part of their life cycle. Kelp beds for example provide an ideal habitat for filamentous algae, bottom-fauna, epi-fauna, fish etc. Closer to the Swedish west-coast, from Gothenburg and further to the south, kelp only occurs sporadically.

The vegetation in more shallow areas (<10 m) is dominated by a high diversity of red algae. The area also supports species which otherwise are rare in the Kattegat, like the red algae *Apoglossum ruscifolium*, *Erythrodermis traili* and *Bonnemaisonia asparagoides*.

Deeper areas (18-25 m) are dominated by a zone with dead man's fingers. Coralline algae (maerl) i.e. *Phymatolithon calcareum* are also found on the soft sandy bottoms in the northern part of the bank. The extensive kelp beds and maerl are the two most unique and important habitats in the area.

The benthic fauna is dominated by filtering organisms like dead men's fingers, mussels, starfishes, brittlestars, sea-squirts and worms. The high prevalence of filtering organisms is an indication of high water exchange and low sedimentation. Particularly noteworthy is the high density of big horse mussels (>10 cm) that are found at depths of more than 12 m.

Little research has been carried out on the fish fauna in the Fladen area, yet the area is known as a significant nursery area for juvenile herring (*Clupea harengus*), especially the

northern parts. Spawning herring requires substrata for attaching the eggs, high current velocity to ensure sufficient oxygen supply to the large masses of eggs and after some time abundant plankton in the water column to feed the planctonic larvae. In former times, herring used to be extremely abundant in the Kattegat. Nowadays, herring has become rare, threatened by overfishing and habitat destruction. Fladen is also considered an important area for other fish species, both as a spawning- and nursery area, but also as a refuge when oxygen deficiency occurs in deeper parts of the Kattegat. A significant amount of recreational fishing for mackerel, cod and catfish takes place in the area. Also commercial fishing of herring, Norway lobster and plaice are carried out in the area.

Fladen has been identified as an internationally important feeding and wintering area for seabirds. In winter this, and adjacent banks provide an ample supply of Bluemussels (*Mytilus edulis*) and small fish, providing feed for diving seabirds. Fladen is a significant wintering area for species such as the razorbill (*Alca torda*), common guillemot (*Uria algae*), kittiwakes (*Rissa tridactyla*), common eider (*Somateria mollissima*) and fulmars (*Fulmaris glacialis*).

Moreover, the area is an important feeding ground for the common seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*).



Fig. 3: Fladen is an important feeding ground for the common seal (*Phoca vitulina*). (Courtesy of Ola Jennersten ©Ola Jennersten)

Human Impacts

The Kattegat is the shipping route connecting the Baltic Sea with the Atlantic. There are shipping lanes east and west of the Fladen bank, the largest ships most often passing west of the bank. Thus, there is a high risk of oil spills, which particularly endanger the wintering seabirds.

Recently, the area was pointed out as a suitable site for offshore wind farms by the Swedish Energy Administration. Göteborg Energi, a Swedish energy company, has plans to

apply for a licence to build 60 windfarms (5MW each). According to the plans the first windmill will be in place in the autumn of 2004. There is extensive debate about if and how the construction and running of wind farms damage the ecosystem. To put the debate in perspective it has to be mentioned that only limited scientific studies have been made which makes it difficult to draw conclusions. Moreover, more extensive knowledge about the marine environment is needed as well. WWF holds the view that large numbers of wind farms are likely to threaten seabird populations and destroy the integrity of the habitat. Wind farms may spoil the characteristics of the site which make it an important nursery area for herring and bottom-dwelling fish. The Swedish Environment Protection Agency has pointed out the area as one of four important offshore areas that should be protected from wind farm exploitation.

There is little documentation as to whether sediment extraction and fisheries (bottom trawling and drift net fishing) have damaged the marine ecosystem so far. However, both activities bear the potential to destroy the site if carried out unsustainably. The macroalgal community currently seems to be intact. In order to ensure a sustainable use of the area, the commercial activities should be carefully surveyed and not expanded.



Fig. 4: The vegetation in more shallow areas is dominated by a high diversity of red algae. The picture shows the red algae *Phyllophora sp.* (Courtesy of Lars-Ove Loo ©Lars-Ove Loo)

Existing/Proposed Protection

Fladen is currently not subject to any legal environmental protection measures. However, the whole Northern Kattegat (9,170 km²) is listed as an Important Bird Area (IBA) by BirdLife International. In 1998, Fladen was proposed as a Baltic Sea Protected Area (BSPA) to HELCOM.

The County Administration in Halland and the Swedish Environment Protection Agency have also proposed an area of ~100 km² as a Special Area of Conservation (SAC) to the Swedish Ministry for the Environment.

Although local and national agencies support protection for the Fladen bank and the attempts to ensure protection date back several years the Swedish Ministry for the Environment has not indicated when or if the site will be protected. WWF would like to stress that the high biological value of the area and the fact that Fladen is recognised as unique by local, national and international authorities urgently warrants appropriate legal protection. Caution is required when current and future activities, such as wind park development exhibit strong interest in the area for exploitation purposes. Such interests may gain on downplaying the magnitude of uniqueness of existing biological values.

Action to be Taken

In addition to the efforts to protect the area under HELCOM and EU legislation, WWF would like to propose two additional legal protection mechanisms:

- 1) Sweden should propose the area as a potential OSPAR MPA to be included in a network of marine protected areas, ensuring the conservation of valuable marine habitats in the North-East Atlantic; and
- 2) Sweden should apply to the International Maritime Organisation (IMO) for the status of a Particularly Sensitive Sea Area (PSSA) for the entire Kattegat.

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