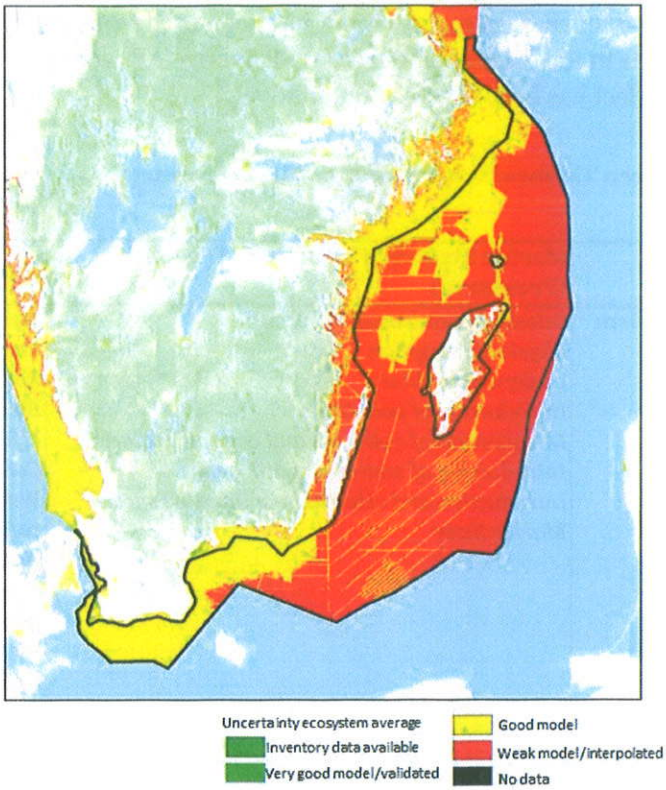

Figure 11 Aggregated uncertainty for the Baltic Sea based on data on ecosystem components. In the red areas, knowledge of nature values is low and the model is thereby weaker compared with, e.g. coastal areas.

Further information on the planning support Symphony can be read in the SwAM report 2018:1.

4.4 Environmental assessment method

Environmental assessment of the plan proposal in 2030 is made against the zero alternative in 2030. This way, the MSP's environmental effect and benefit is estimated and put in relation to the environmental conditions without implementation of the MSP. The environmental assessment is done according to three steps.

Step 1. Identification of the connection between sectors and pressures

The environmental assessment is based on the sectors defined in the MSPs within the themes. The sectors' impact is linked to the type of potential impact (pressures) as defined in the Marine Strategy Framework Directive. The purpose of this is to achieve a suitable structure in the environmental assessment.

The environmental assessment is largely based on an analysis of data from Symphony, which provides a quantitative assessment of the cumulative environmental effect. The type of impact as defined in Symphony is linked to the impact according to the Marine Strategy Framework Directive, see Table 2. Today, some of the Marine Strategy Framework Directive's pressures are not

Table 3 Assessment of effects for pressures not handled in Symphony.

OBJECT'S VALUE/SENSITIVITY	PRESSURE/IMPACT **Large pressure**	**Moderate pressure**	**Small pressure**
HIGH VALUE	Large effects	Moderate-large effects	Moderate effects
MODERATE VALUE	Moderate-large effects	Moderate effects	Small-moderate effects
LOW VALUE	Moderate effects	Small-moderate effects	Small effects

Step 3 Assessment of environmental consequences

In this step, the scope is assessed of the environmental effects that arise as a result of the marine sector's impact.

The following scale has been applied in the impact assessment:

- Positive consequences
- Small negative consequences
- Moderate negative consequences
- Large negative consequences

The cumulative effects in the Baltic Sea in the plan alternative mainly come from the background pressure (approx. 87%). The background pressure consists of oxygen-free seabeds (approx. 36%), but also nitrogen (approx. 14%), pollutants in sediment (synthetics approx. 16%, heavy metals approx. 10%), phosphorous (approx. 8%), and heavy metals and chemical pollutants from World War II (approx. 3% and less than 1%, respectively). Of the sectors, it is mainly Transportation and communication, and to a lesser extent Commercial fisheries and Defence, that contributes to the cumulative environmental effect, see Figure 37. Attractive living environments, Energy, Storage and extraction of materials, and Aquaculture and blue biotechnology contribute marginally to the total cumulative effect at <1% each.

Figure 36 Change in the cumulative environmental effect in per cent in the Baltic Sea marine spatial planning area compared with the zero alternative. Positive values, in red and grey, result in a larger cumulative environmental effect compared with the zero alternative. Negative values, in blue and green, result in a smaller cumulative environmental effect compared with the zero alternative.

Transportation and communications, which account for around 10%, consist of *underwater noise* and *introduction of pollutants* (oil spills) from shipping. Defence contributes around 1% and consists mainly of *introduction of pollutants*, through the spread of heavy metals, and the spread of *underwater*

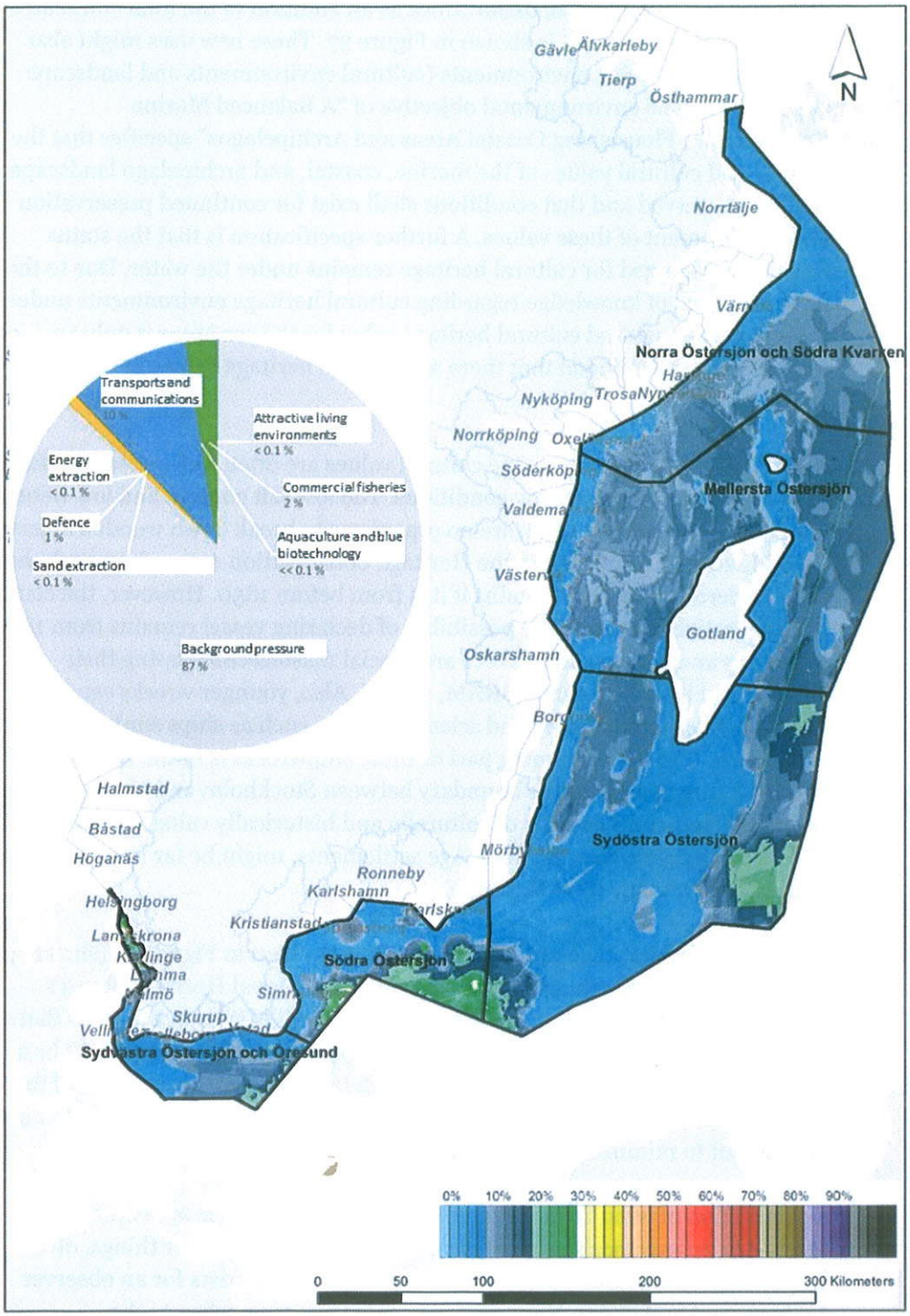

Figure 37 The total cumulative environmental effect in the Baltic Sea marine spatial planning area. The colour scale in the map applies to all of the Baltic Sea, including coastal areas, and shows the percentage of the maximal cumulative effect in the Baltic Sea. The pie chart shows the relative percentage distribution of the sectors' contributions to the cumulative effect. The colours in the pie chart indicate sectors.

Besides the environmental effects analysed above, the MSP's planning of the sectors Energy and Storage and extraction of materials also entails *physical*

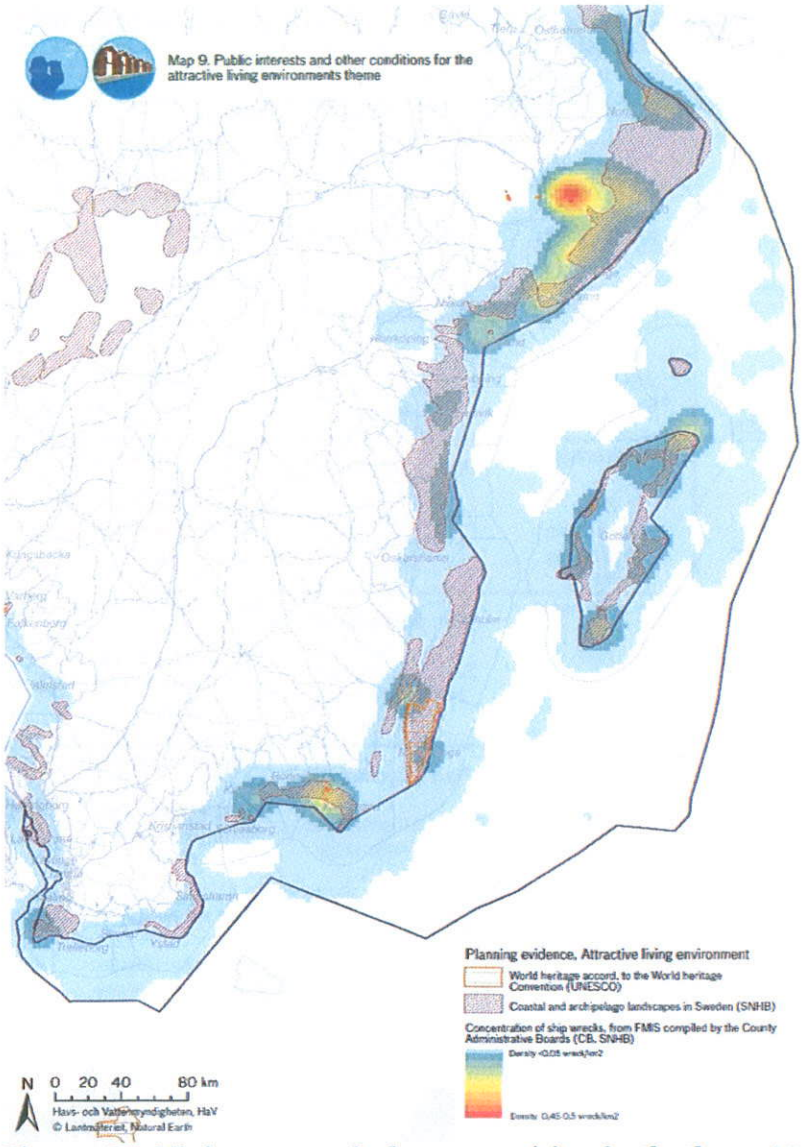

Figure 38 Public interests and other prerequisites for the theme Attractive living environments in the marine spatial planning area (SwAM, 2018b).

For every marine area in the Baltic Sea marine spatial planning area, the environmental effects for the pressures of air emissions, invasive species, and marine litter were assessed. The MSP in 2030 entails only a small increase in the pressures air quality and greenhouse gases in the South-western Baltic Sea and Öresund. It is changes in the theme Transportation and communication (shipping) in the South-western Baltic Sea and Öresund that contribute these pressures. This entails further small environmental effects that are added with the MSP 2030 guidance compared with the effects that the zero alternative 2030 entail (text in light grey in Table 13).

contributions to the cumulative effect. The colours in the pie chart indicate sectors.

The cumulative effects are seen mainly on deep soft seabeds, but also on herring, plankton, sprat, spawning fish, aphotic and deep transport bottoms, and aphotic soft and hard seabeds.

8.3.4 South-eastern Baltic Sea

Within the marine area of the South-eastern Baltic Sea, the wind power establishment at the Södra Midsjöbanken entails a negative change in the environmental effect compared with the zero alternative (approx. 10% higher than the zero alternative), see Figure 43. Södra Midsjöbanken is currently a relatively unaffected area with high values for sea birds. Establishment of wind power entails some pressures, but at the same time it can create positive effects similar to reef environments and marine nature reserves where fish can seek protection. These effects are not included in Symphony.

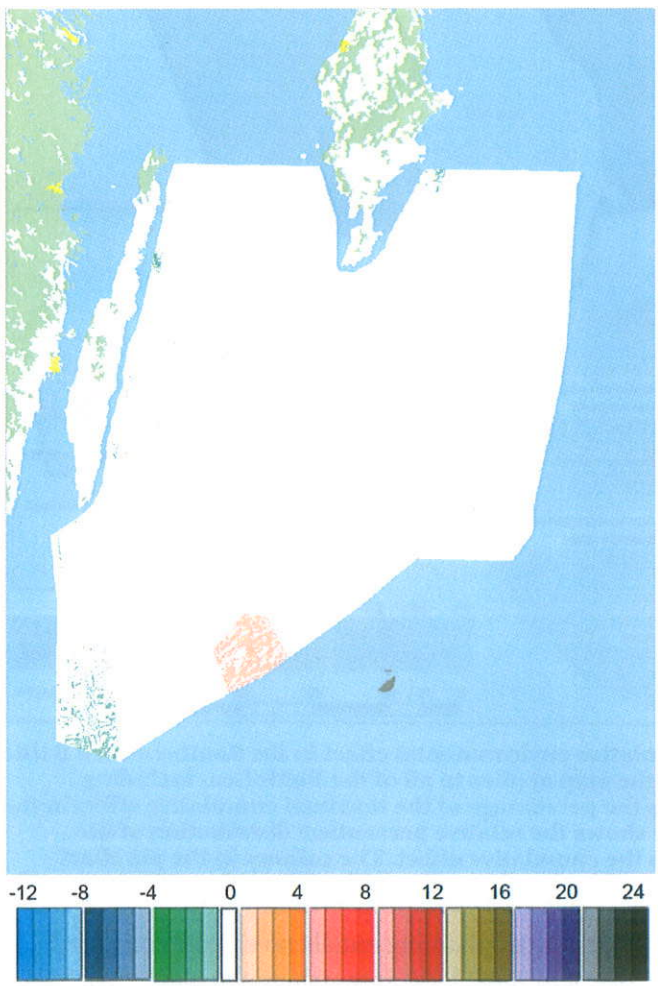

Figure 43 Change in the cumulative environmental effect in per cent in the South-eastern Baltic Sea compared with the zero alternative. Positive values, in red and grey, result in a larger cumulative environmental effect compared with the zero alternative. Negative values, in blue and green, result in a smaller cumulative environmental effect compared with the zero alternative.

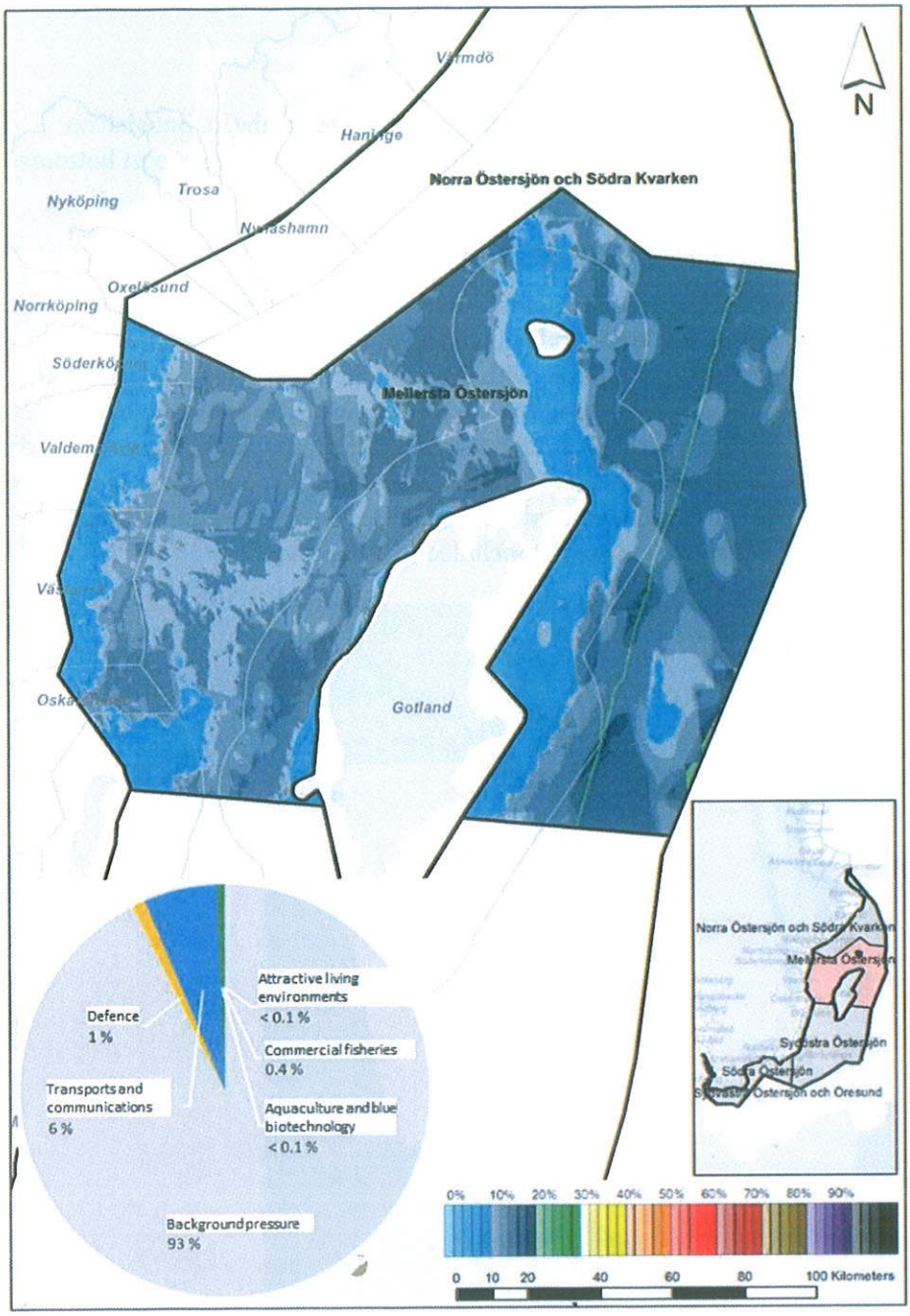

Figure 44 The total cumulative environmental effect in the South-eastern Baltic Sea. The colour scale in the map applies to all of the Baltic Sea, including coastal areas, and shows the percentage of the maximal cumulative effect in the Baltic Sea. The pie chart shows the relative percentage distribution of the sectors' contributions to the cumulative effect. The colours in the pie chart indicate sectors.

In the other areas, the marine spatial planning entails no change compared with the zero alternative except in some local areas where the marine spatial planning entails a positive change resulting from areas in which *particular consideration to high nature values (n)* is to be taken. The major environmental improvement is mainly in fishing being limited within these areas, which has a positive effect on the cumulative environmental effect. In

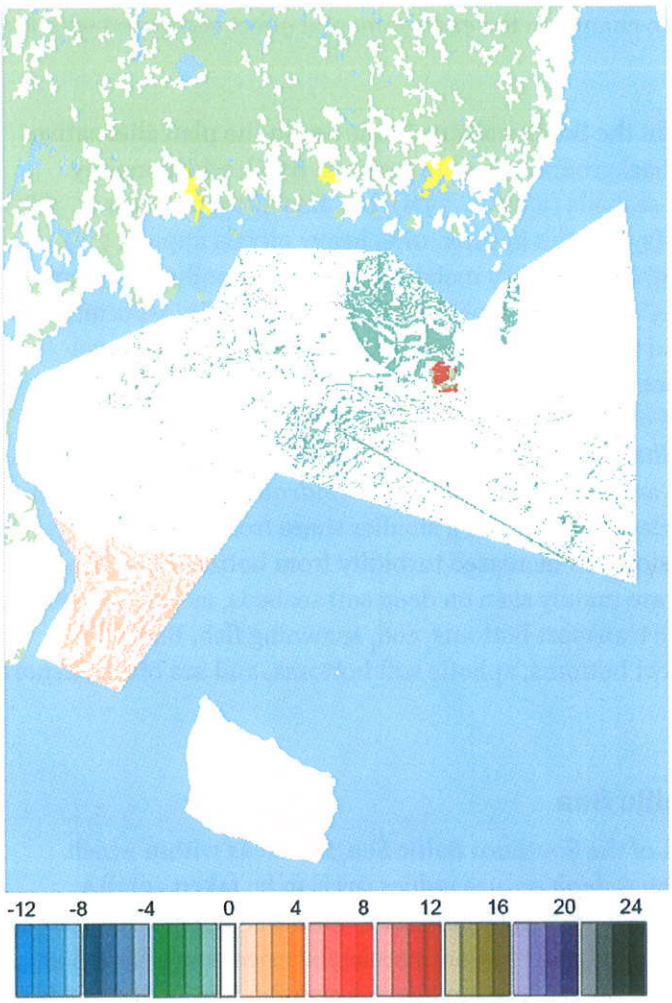

Figure 45 Change in the cumulative environmental effect in the South Baltic Sea compared with the zero alternative. Positive values, in red and grey, result in a larger cumulative environmental effect compared with the zero alternative. Negative values, in blue and green, result in a smaller cumulative environmental effect compared with the zero alternative.

The cumulative effects in the Southern Baltic Sea in the plan alternative come from the sectors Transportation and communication, Commercial fisheries, Defence, and Storage and extraction of material. Transportation and communications account for around 11%, which mainly consist of *underwater noise* and *introduction of pollutants* (oil spills) from shipping. Commercial fisheries contributes around 9% and consists mainly of *selective withdrawals of species* from bottom trawling and pelagic trawling and a smaller share from *physical disturbance* from abrasion and increased turbidity from bottom trawling. Defence contributes around 2% and consists mainly of *introduction of pollutants* (the spread of heavy metals) and *underwater noise* from explosions. Storage and extraction of materials, around 1%, includes *physical loss* and *disturbance* from sand extraction and mining. The background pressure contributes around 76%, which consists of oxygen-free bottoms (approx. 20%), nitrogen (approx. 18%), pollutants in sediment (synthetics approx. 13%, heavy metals approx. 5%), chemical compounds from dumping during World War II (approx. 12%), and phosphorous (approx. 8%).

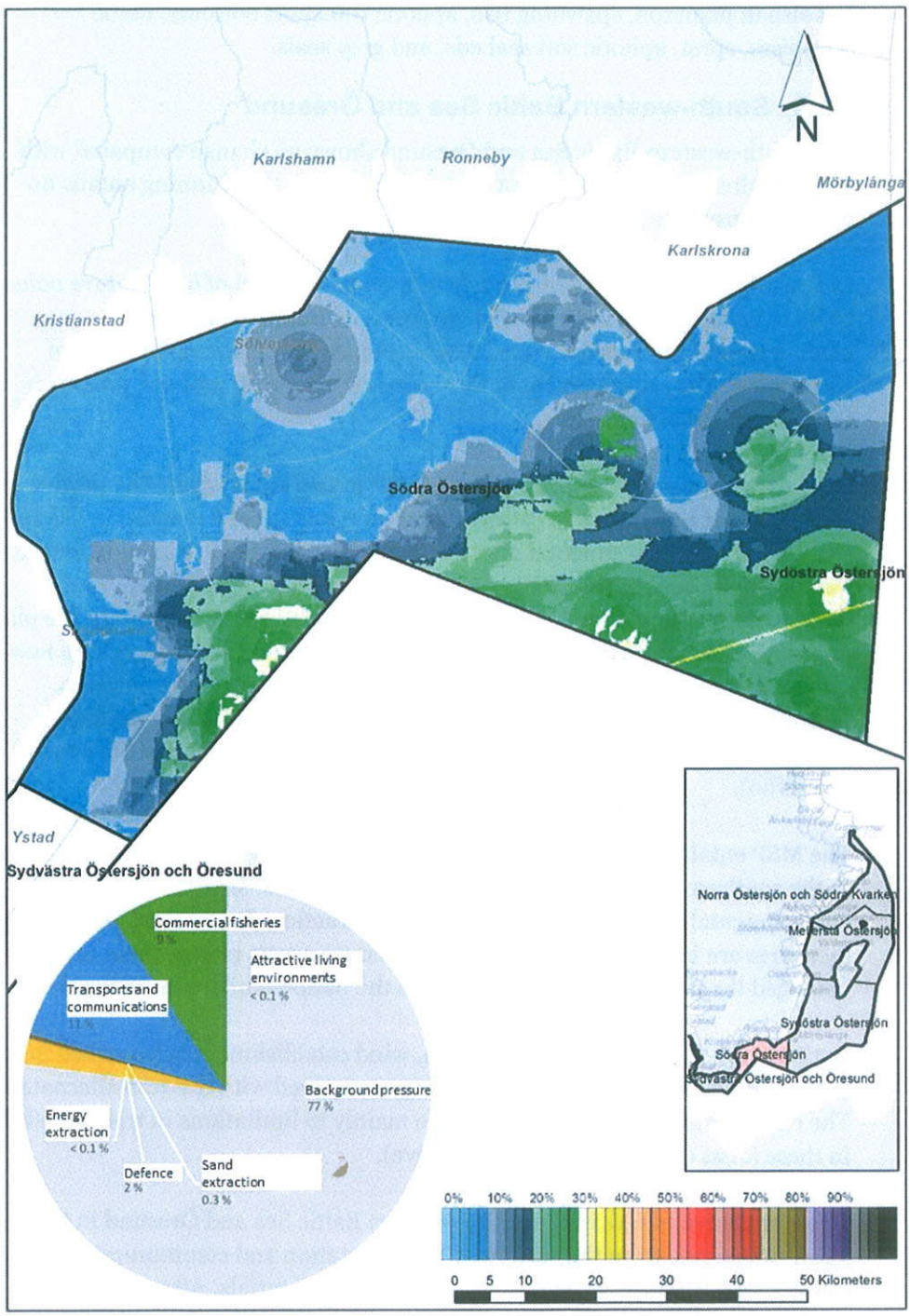

Figure 46 The total cumulative environmental effect in the Southern Baltic Sea. The colour scale in the map applies to all of the Baltic Sea, including coastal areas, and shows the percentage of the maximal cumulative effect in the Baltic Sea. The pie chart shows the relative percentage distribution of the sectors' contributions to the cumulative effect. The colours in the pie chart indicate sectors.