



Marine Spatial Planning — Current Status 2014

National planning in Sweden's territorial waters and exclusive economic zone (EEZ)



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The Swedish Agency for Marine and Water Management

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CONTENTS

Introduction.....	8
Summary.....	14
Marine ecosystems and their condition.....	18
Prerequisites for the ecosystems.....	20
Ecosystems and natural values	24
Ecosystem services.....	33
Population	34
Settlements and communities.....	36
Activities and industries	41
Interests and conditions.....	44
Marine cultural heritage.....	46
Recreation and tourism	56
Commercial fishing.....	66
Aquaculture.....	78
Shipping.....	84
Defence	92
Energy	98
Infrastructure.....	108
Extraction and storage of materials	116
Research and environmental monitoring.....	122
Environmental protection.....	128
Risks and other influential factors	138
Legal prerequisites.....	146
International matters	154
Deficiencies in the data.....	162
Analysis.....	166
Methodology	168
Needs and claims	168
Collaborative and competing interests.....	169
Conclusions.....	180
Potential areas for more detailed analysis.....	185
Marine spatial planning	192
The coming planning process	194
Municipal marine spatial planning.....	195
Cross-border projects within marine spatial planning	199
The ecosystem approach.....	202
Environmental assessment.....	203
National economic impact assessment.....	204
Environmental goals	205
Glossary.....	207
Legislation.....	212
References.....	213

Preface

The Swedish Agency for Marine and Water Management, SwAM, has been commissioned to organise the forthcoming Swedish national marine spatial planning. We have begun this by collating knowledge of the waters around us and by examining how other countries work with marine spatial planning. Swedish national marine spatial planning will encompass Sweden's territorial waters and its exclusive economic zone. In this current status description, SwAM has compiled information regarding the utilisation of marine resources, current conditions, and possible future demands. Our ambition is to convey a cross-sectoral perspective as a starting point for the first phase of the national marine spatial planning.

During our work with the current status description we have acquired data from agencies involved in the marine sector and from county administrative boards. In order to expand and add more detail to our description of the current status, we welcomed cooperation with any interested parties that may contribute their viewpoints and additional information. The current status was discussed at a number of conferences during the spring of 2014, where all concerned parties will have had the opportunity to participate. All viewpoints and other information that stakeholders and other parties concerned submitted to the Swedish Agency for Marine and Water Management have been analysed and have then formed the foundation for revising this description of the current status.

Finally, I would like to thank all who have contributed to this work so far, and at the same time extend a warm welcome, to you and to all other interested parties, to participate as the marine spatial planning process continues.

Gothenburg, November 2015

Björn Sjöberg, Director of
Department for Marine and Water Management

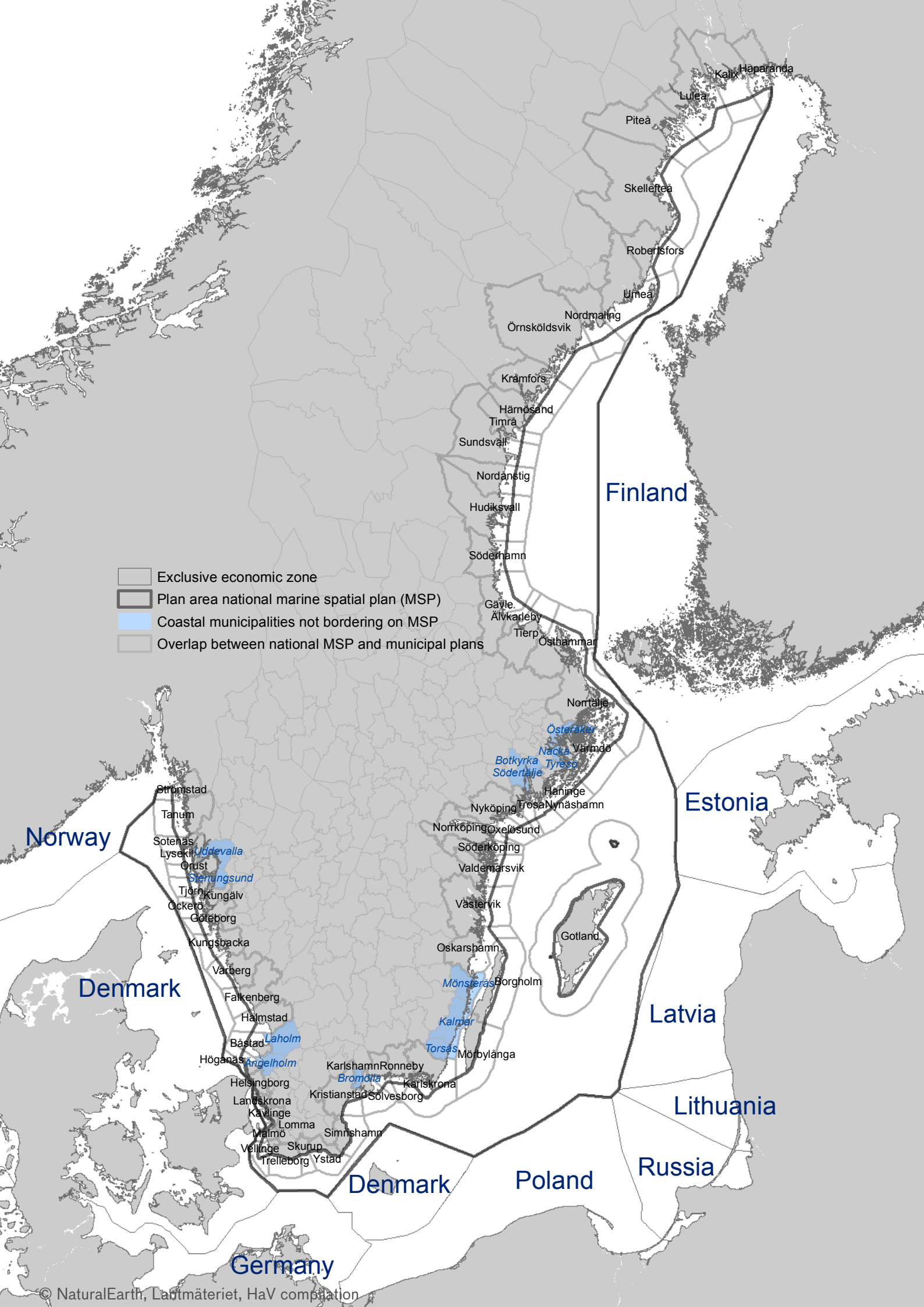
Introduction

Legislation regarding marine spatial planning in Sweden

Legislation for national marine spatial planning in Sweden has been in place since the first of September 2014. This legislation is founded in the Government's view that marine spatial planning is a necessary tool for the conservation of marine areas and to help bring about a cohesive marine management. The demands made of our waters are increasing and developments are expected to contribute to economic growth. This means we have to conserve our waters by balancing various interests to protect the sea as a long-term resource. The purpose of marine spatial planning is to contribute to a long-term, sustainable development that preserves and, if necessary, restores the structures and functions of the ecosystems.

A tenth paragraph was added to the fourth chapter of the Swedish Environmental Code, suggesting that the Government should instigate marine spatial planning as guidance for agencies and municipalities examining claims for use of the marine areas. Marine spatial planning would then form part of the basis for agency and municipality decisions regarding the most appropriate usage of a marine area, taking into account the character and location of the area and the needs that exist.

The legislation on marine spatial planning also includes a provision that allows the Government to issue regulations regarding prohibitions or restrictions to activities and measures within an area covered by a marine spatial plan if such regulations are required to achieve the plan's objective. Marine spatial plans are to be produced for the Gulf of Bothnia, the Baltic Sea as well as for Skagerrak/Kattegat. They will cover Sweden's exclusive economic zone (EEZ) and all areas in Swedish territorial waters within one nautical mile of the baseline that do not constitute private property. A marine spatial planning ordinance to supplement Paragraph 10, Section 4 of the Environmental Code is planned to be decided upon by the Government in the spring of 2015.



Marine spatial planning areas

An earlier investigation was conducted in order to propose a system for marine spatial planning. This was presented in the marine spatial planning investigation's report: Planering på djupet – fysisk planering av havet (SOU 2010:91) (In-depth planning – marine spatial planning). In this report, the division of the marine spatial planning areas follows the proposal made in the previous marine spatial planning investigation. The exact geographical demarcation will be regulated in the coming ordinance on marine spatial planning. In the following descriptions the demarcation relates to:

- Gulf of Bothnia – from the northern part of the Gulf of Bothnia down to the southern part of Öregrund's coastal waters.
- Baltic Sea – from the southern part of Öregrund's coastal waters to the tip of Kullen in the north of the Öresund.
- Skagerrak/Kattegat – from the tip of Kullen in the north of the Öresund to the border with Norway.

The EU Directive on marine spatial planning

Marine spatial planning has been highlighted as an important instrument in the implementation of the EU integrated marine policy that was adopted in 2007. The policy focuses on marine and coastal areas and their potential for sustainable development. This includes Blue Growth, a long-term strategy developed by the European Commission to promote growth throughout all European marine sectors.

In order to create common frameworks, the European Commission adopted a directive on setting up a framework for marine spatial planning in July 2014.

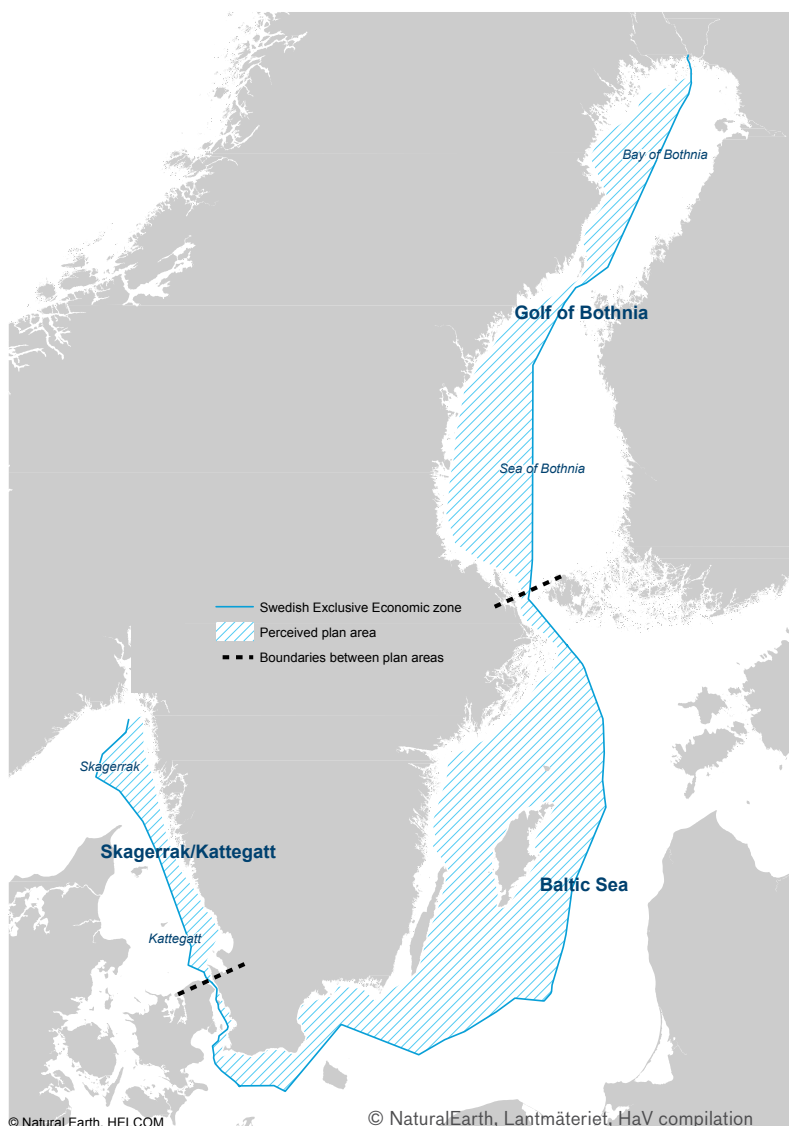
Sweden's maritime strategy

In parallel with the development of Sweden's marine spatial planning, the Government is in the process of producing a maritime strategy. Within this strategy the Government will submit proposals regarding the development of marine and coastal industries. One of the overall goals of the work with the national maritime strategy is to develop the utilisation of Swedish waters as a resource, to create more employment opportunities and to enhance common interests and quality of life.

Work with the maritime strategy focuses on blue growth and the various challenges faced by marine industries. The Government will be devoting itself to the identification of new markets, but will also be ensuring that conditions for commerce and enterprise are improved. The utilisation of the waters must not jeopardise the marine environment for current or future generations.

The aim of the current status description

Since 2011, the Swedish Agency for Marine and Water Management has been commissioned by the Government to work with marine spatial planning issues. This entails assembling expertise and obtaining information that can form the basis for marine spatial planning, in addition to developing marine spatial planning-related collaboration with Sweden's neighbours.



The three marine spatial planning areas: the Gulf of Bothnia, the Baltic Sea and Skagerrak/Kattegatt. The exact geographical demarcation will be regulated in the coming ordinance on marine spatial planning.

This report aims to provide an overall picture of conditions in respect of the utilisation of marine resources, the demands currently been made of these resources and the parties interested in utilising them, in addition to anticipated future developments. The Agency has approached other national agencies and county administrative boards to obtain data for marine spatial planning based on their areas of responsibility and operation. The administrative boards with of the coastal counties have been commissioned by the Government to work with marine spatial planning and the boards in the counties of Västra Götaland, Kalmar and Västernorrland have been given the responsibility to coordinate this work. The data provided by the boards form the foundation for this current status description; conditions that are relevant to marine spatial planning are described in general terms for various

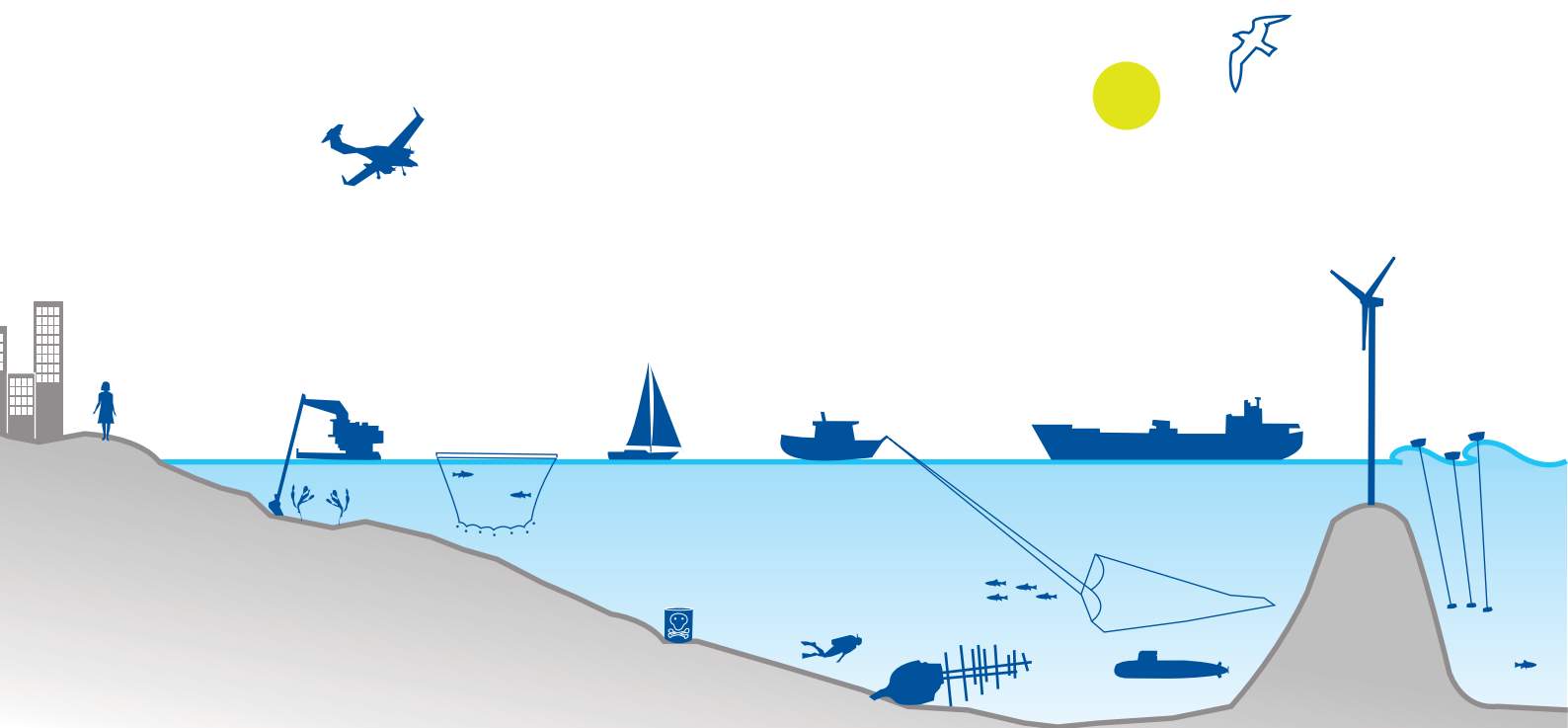
social sectors and marine spatial planning areas. In addition to the agencies' sector reports and the regional reports provided by the county administrative boards, supplementary material has been identified and used.

The marine spatial plans will not encompass coastal areas located within one nautical mile from the baseline, but there is a clear connection between what happens at sea, in the coastal area and on land. No distinction between coast and land is therefore made in the descriptions in this report. All factors considered relevant have been included in the descriptions.

During the work on the current status description, data was acquired from agencies involved in the marine sector and from county administrative boards. In order to expand and add more detail to our description of the current status, the Swedish Agency for Marine and Water Management invited stakeholder to a collaboration in which their viewpoints and additional information was welcomed. The current status was discussed at a number of conferences during the spring of 2014, where all concerned parties will had the opportunity to participate. All viewpoints and other information that stakeholders and other parties concerned submitted to the Swedish Agency for Marine and Water Management have been analysed and have then formed the foundation for revising this description of the current status.

Government agencies that contributed to background papers:

Swedish Energy Markets Inspectorate, Swedish Energy Agency, Swedish Armed Forces, Swedish Board of Agriculture, the County Administrative Boards in Kalmar, Västernorrland and Västra Götaland in collaboration with the administrative boards of other coastal counties, Swedish Civil Contingencies Agency, Swedish Post and Telecom Authority (PTS), Swedish National Heritage Board, Geological Survey of Sweden (SGU), Swedish Maritime Administration, Swedish National Grid, Swedish Agency for Economic and Regional Growth, Transport Analysis, Swedish Transport Administration, Swedish Transport Agency.



Document series for national marine spatial planning

A series of documents will be produced during the marine spatial planning process. The initial document is the Current Status description (CS), which you have in your hands.

The following document in the series is the Guiding Document (GD), the purpose of which is to support and guide the work on developing marine spatial plans as well as to create clarity for the continued planning process. Formulation of planning goals and strategies, as well as organisation and roles within the marine spatial planning process, are included there.

The third document in the series is a proposal for a marine spatial plan (MSP). One plan is produced for each of the three planning areas (GB, BS, SK) – thus, a total of three planning proposals. One strategic environmental assessment (SEA) is produced for each marine spatial plan.

The various reports are marked with a symbol on the cover as shown below.

NATIONAL MARINE SPATIAL PLANNING



The symbol found in the “Marine Spatial Planning – Current Status 2014” report.

NATIONAL MARINE SPATIAL PLANNING



The symbol that will be found on the Guiding Document.

NATIONAL MARINE SPATIAL PLANNING



The symbol that will be found on the marine spatial plans; the example shows the marine spatial plan for the Gulf of Bothnia.

NATIONAL MARINE SPATIAL PLANNING



The symbol that will be found on the environmental impact assessments (MKB) belonging to each marine spatial plan; the example shows the MKB for the Skagerrak/Kattegat.

Summary

Increased use of marine resources

The interest in developing the utilisation of the sea as a resource for more employment opportunities, increased welfare and quality of life is growing. Consequently, greater demands are now being made of our marine areas. Sweden has an extensive coastline and conditions vary greatly between the three marine spatial planning areas: the Gulf of Bothnia, the Baltic Sea and Skagerrak/Kattegat. The international dimension is also important since many countries utilise the same marine areas and the same ecosystems.

Major environmental challenges in the seas

At the same time, we face several environmental challenges and the importance of marine resources being utilised on a scale that is sustainable for the ecosystems in question is increasingly emphasised. The aim, within the EU, is to achieve a sound environmental status within marine ecosystems by 2020; to this end, common goals have been established. In Sweden, this will be achieved through the application of environmental quality standards, in accordance with the Marine Environmental Regulation (SFS 2010:1341). Future climatic changes are currently considered unavoidable; these will be factors that change the conditions in the marine environment.

Ecosystem services show the importance of Biodiversity

The sea has great biodiversity, which contributes to various types of ecosystem services – services which, in turn, contribute to the general welfare of mankind. The term “ecosystem services” represents an attempt to describe ecosystems from a human perspective and to illustrate our dependence on the natural world. They describe the direct and indirect effects that ecosystems have on human well-being. Within the work to produce the current status description, the ecosystem services Biodiversity, Good Water Quality, Provisionings and Recreation have emerged as being particularly relevant in relation to collaboration and competing interests.

Marine spatial planning - spatial balancing for sustainable utilisation

All interested parties making demands of marine resources are connected in some way with marine spatial planning. This report considers cultural environment, recreation and tourism, commercial fishing, aquaculture, shipping, defence, energy, infrastructure, the extraction and storage of material, research as well as environmental monitoring and protection. The descriptions of the various interested parties shows a great number of different needs. Some of them are of a spatial nature. They refer to needs for a specific area on or in the seabed, in a column of water, on or above the surface. Spatial requirements might even concern a given distance from the coast or other requirements for proximity and accessibility, for example to ports. Other needs, such as marine activities, are of a more qualitative nature. These needs refer to the existence of a specific ecosystem service or to a specific property of the marine area in question, such as water of a certain quality.

Many of the potential conflicts of interests in marine areas concern space: different interests and activities that, quite simply, do not fit within the same

area. But there are also many interests that work well together and these can provide positive synergy effects. In the future, even more claims may be made to utilise marine spaces. At present, it is difficult to estimate how great claims coming further on will be.

Developed knowledge

If marine spatial planning is to develop, then more knowledge and planning data is required within all interest areas. This applies to knowledge regarding the marine ecosystems as well as to how the development of various activities might affect conditions for other interests.

Areas to be studied in greater detail

The areas to be studied in greater detail identify which areas are in greatest need of planning. They may need to be prioritised with regard to the production of data, and they may need to be planned in a greater degree of detail than other marine areas.

Conclusions

Based on the descriptions of the current situation and the analysis, the Swedish Agency for Marine and Water Management draws the following conclusions. Geographical conclusions are presented in the chapter entitled Analysis.

Conclusions regarding potential goal conflicts and goal synergies

- Sustainable development is an explicit goal for the majority of sector interests. Cross-sectoral interpretation of what this means for Sweden's marine resources, in terms of securing economic and social sustainability within the scope of ecological sustainability, is a fundamental issue in marine spatial planning.
- Goal conflicts may exist in terms of the respective benefits on land or at sea, for example the extraction of natural gravel on land as opposed to extraction at sea.
- Maintaining the ecosystem services of the sea is a prerequisite for the majority of marine activities and the benefits they provide to society. Safeguarding ecosystem services based on the needs of different interested parties has the potential to increase their benefits to society. At the same time, some marine activities can have a negative effect on environmental goals and ecosystem services. Marine spatial planning therefore has a role to contribute, based on its mandate, to the development of ecosystem services and the prevention of negative effects on the same.

Conclusions regarding collaboration and competing interests

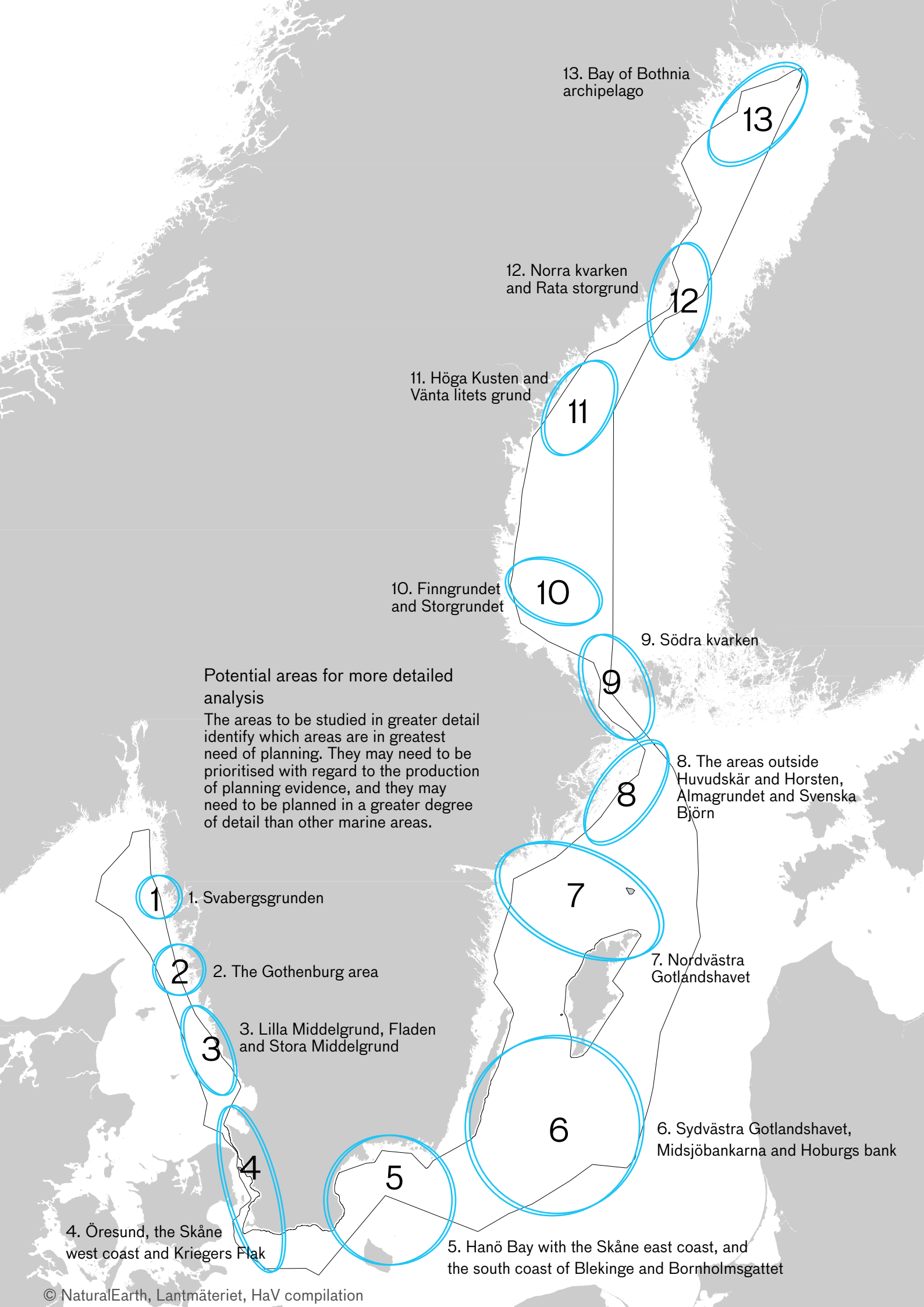
- Within marine spatial planning, the short-term and long-term benefits resulting from various interests and activities should be analysed with reference to the ecosystem services that the sea provides. Blue growth presupposes vigorous ecosystems.
- In certain geographical areas there are specific needs for marine spatial planning in order to help balance the benefit and impact brought about by the various interested parties concerned.

Conclusions regarding the marine spatial planning mandate and opportunities

- Marine spatial planning presents great opportunities to influence the localisation of permanent installations and protected areas.
- Many marine activities are controlled by international agreements, such as shipping regulations and the EU common fisheries policy. Even if marine spatial planning has a limited direct mandate with regard to regulating marine activities, there are major opportunities to suggest suitable amendments to existing management and regulations. The marine spatial plans, which are being produced from a holistic perspective of the sea, will indicate Sweden's position and form a basis for negotiation.
- Many of the environmental problems found in marine areas are caused by activities on land, an issue that cannot be resolved through marine spatial planning. On the other hand, activities and burdens from the land contribute to the environmental situation in the ocean, and are thus factors that must be taken into consideration in marine spatial planning.

Conclusions relevant for ongoing planning

- Sweden has large marine areas and in several of them there are currently no spatial conflicts, however, some require detailed planning. This applies to areas that are used for multiple sectoral interests, and to areas that are particularly vulnerable and/or where there is a high risk factor.
- The need for marine spatial planning stems from a growing pressure on the utilisation of marine resources combined with major environmental problems, and from our neighbours' plans for the adjacent marine areas.
- Despite a deficient knowledge base, planning must be commenced using the knowledge that is available.
- The systematic development of knowledge and mapping of marine natural values is necessary for ecosystem-based marine spatial planning.
- Appropriate skills to work in a sectorally integrated and forward-looking manner with a holistic perspective of national planning need to be developed at several levels.
- Cross-border issues need to be coordinated with our neighbours at an early stage in the planning process.
- Marine spatial planning in the Baltic Sea is more complex internationally speaking since there are several neighbouring countries to consider. More countries planning increased usage in adjacent marine areas entails a need to analyse cumulative effects.
- From an ecosystem perspective, Sweden should strive in its marine spatial planning to reach consensus with our neighbours in respect of marine conditions and the utilisation of marine resources.
- Potential areas to be studied in greater detail have been identified. The areas to be studied in greater detail may need to be prioritised with regard to the production of data, and they may need to be planned in a greater degree of detail than other marine areas.



13. Bay of Bothnia archipelago

13

12. Norra kvarken and Rata storgrund

12

11. Höga Kusten and Vänta litets grund

11

10. Finngrundet and Storgundet

10

9. Södra kvarken

9

8. The areas outside Huvudskär and Horsten, Almagrundet and Svenska Björn

8

7. Nordvästra Gotlandshavet

7

6. Sydvästra Gotlandshavet, Midsjöbankarna and Hoburgs bank

6

5. Hanö Bay with the Skåne east coast, and the south coast of Blekinge and Bornholmsgattet

5

4. Öresund, the Skåne west coast and Kriegers Flak

4

3. Lilla Middelgrund, Fladen and Stora Middelgrund

3

2. The Gothenburg area

2

1. Svabergsgrunden

1

Potential areas for more detailed analysis

The areas to be studied in greater detail identify which areas are in greatest need of planning. They may need to be prioritised with regard to the production of planning evidence, and they may need to be planned in a greater degree of detail than other marine areas.

An aerial photograph of a coastal area, showing a mix of dark blue water and lighter, sandy or silty patches. A white circular overlay is positioned in the upper left quadrant, containing the title and introductory text. In the upper right, a small boat is visible on the water, leaving a white wake. The overall scene suggests a marine environment being assessed for its status.

Marine ecosystems and their status

The first chapter of the current status description is largely based on the report God Havsmiljö 2020 (Good Marine Environment 2020), an initial assessment of environmental status and an analysis of public finances, which was produced as part of the Swedish implementation of the Marine Strategy Framework Directive.



Prerequisites for the ecosystems

As a point of departure for marine spatial planning, a picture is required that illustrates the biogeographic factors affecting the ecosystems, marine biodiversity, the environmental condition of the sea and the ecosystem services that the sea provides. This chapter aims to provide just that.

An ecosystem is a well-defined area that houses a number of plants, animals and microorganisms in a common environment, and their physical surroundings. Ecosystems are not limited in size; they can be as big as a whole ocean or as small as individual tufts of seaweed.

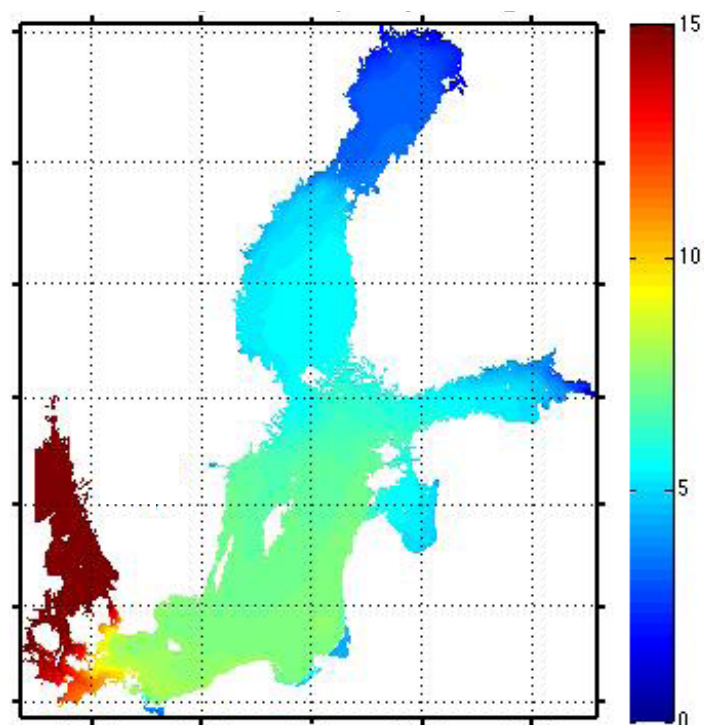
Salt content

The salt content of the sea sets the limits of the ecosystems and affects the geographic range of species. For example, the fertilised eggs of cod need a critical minimum salt content in the water to stay floating near the surface while they develop. The salt content varies massively along the Swedish coastline, from approximately 3.0 - 3.3 per cent in the eastern Skagerrak to 0.2 - 0.4 per cent in the Bay of Bothnia. The number of larger plant and animal species ranges from around 1,500 species in the Skagerrak and around 800 species in the Kattegat to around 70 species in the Baltic Sea, south of Gotland. With the change in salt content, a transition from saltwater species in the Skagerrak to a predominance of freshwater species in the Gulf of Bothnia ensues. Salt content also varies locally, from lower levels along the shoreline, especially near river mouths, to higher levels in the exclusive economic zone. One important factor affecting the conditions of life in the sea is the halocline – that is, the salinity pycnocline – which is especially prevalent in the Baltic Proper.

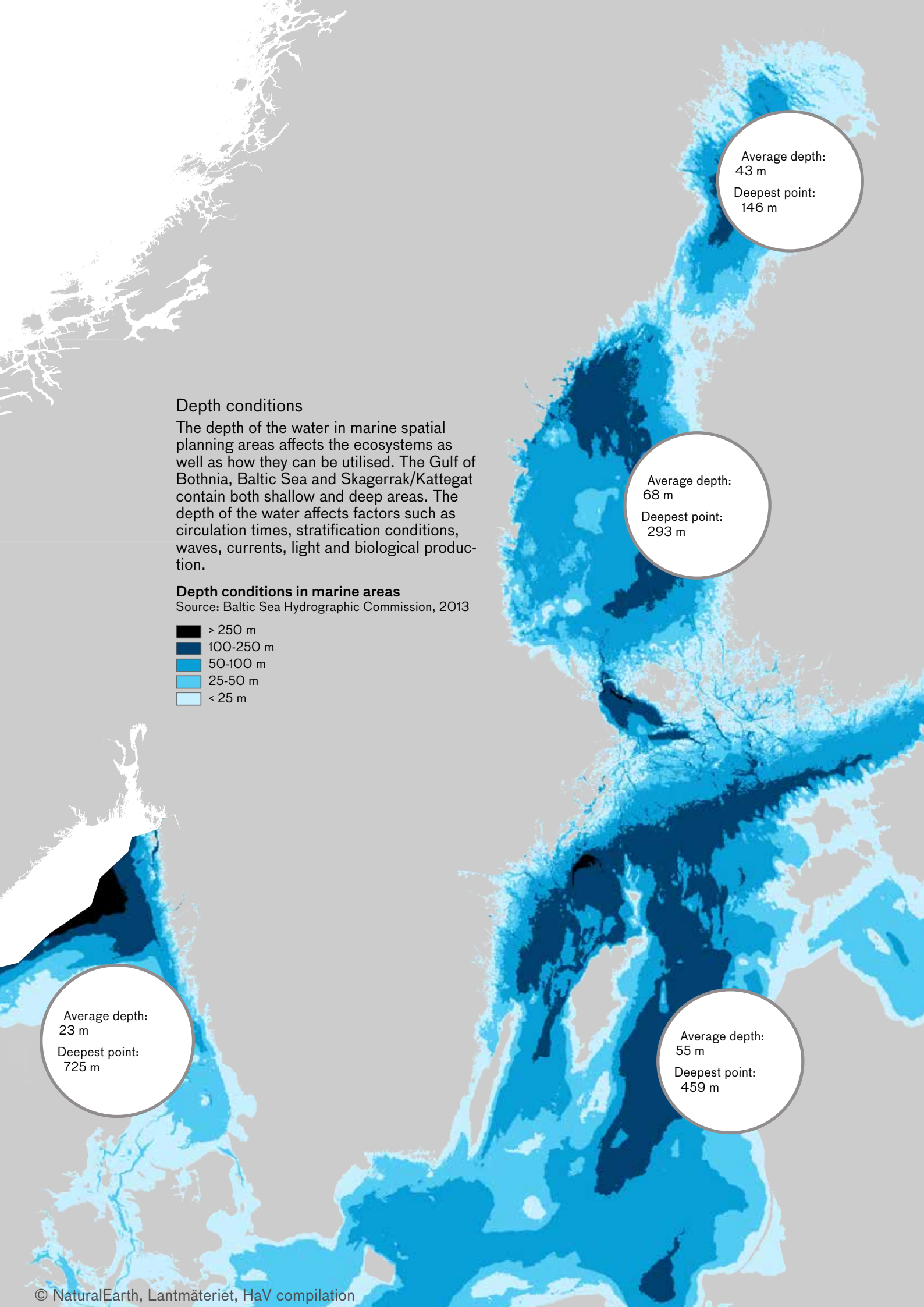
Temperature

Water temperatures vary seasonally and from year to year. In the summer, the surface water temperature is approximately 20 °C in Skagerrak/Kattegat and the Baltic Sea, and around 13 °C in the Gulf of Bothnia. During the winter and spring, the temperature can reach 5 °C in the Baltic Sea and around 0 °C in the Gulf of Bothnia, while Skagerrak/Kattegat may reach temperatures of around 2 °C in the winter. Cold water is heavier than warm water and large differences in temperatures create

The salt content of the sea sets the limits of the ecosystems and affects the geographic range of species. There are major differences between the salty Skagerrak/Kattegat and the Gulf of Bothnia. Salt content; averages for June, July and August, 2006-2011.



Salt content of the sea, parts per thousand. Source: God havsmiljö 2020.



Average depth:
43 m
Deepest point:
146 m

Average depth:
68 m
Deepest point:
293 m

Average depth:
55 m
Deepest point:
459 m

Average depth:
23 m
Deepest point:
725 m

Depth conditions

The depth of the water in marine spatial planning areas affects the ecosystems as well as how they can be utilised. The Gulf of Bothnia, Baltic Sea and Skagerrak/Kattegat contain both shallow and deep areas. The depth of the water affects factors such as circulation times, stratification conditions, waves, currents, light and biological production.

Depth conditions in marine areas

Source: Baltic Sea Hydrographic Commission, 2013

- > 250 m
- 100-250 m
- 50-100 m
- 25-50 m
- < 25 m

layers known as thermoclines. These layers can make it difficult, or completely impossible, for surface water to mix with water from greater depths. During the spring, a thermocline is created in the Baltic Sea at a depth of around 20-30 metres, which is later broken down by autumnal cooling and mixing processes. In Skagerrak/Kattegat, thermoclines often coincide with haloclines at a depth of around 15-20 metres. For the Bay of Bothnia and the Bothnian Sea, a layering of approximately 15 meters depth forms in the summertime.

Water temperatures are also affected by the wind. When the wind is blowing towards land, the warm surface water is pushed inwards and down. When the wind is blowing away from land, the warm surface water is forced out and cold water rises from underneath. This is known as upwelling, and is particularly common in Hanö Bay and around Gotland. When upwelling occurs, water with a high nutritive salt content can be carried to the surface.

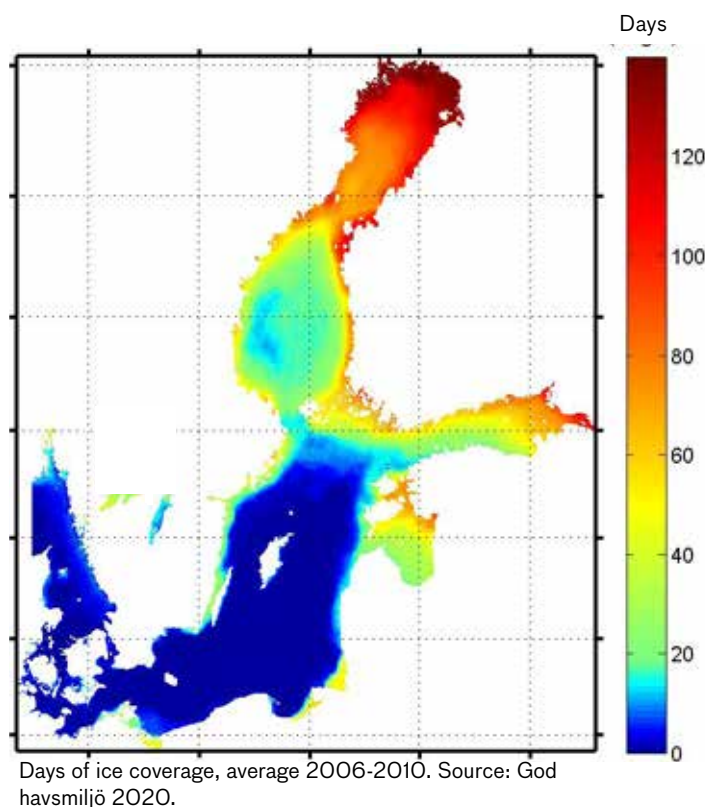
Ice coverage

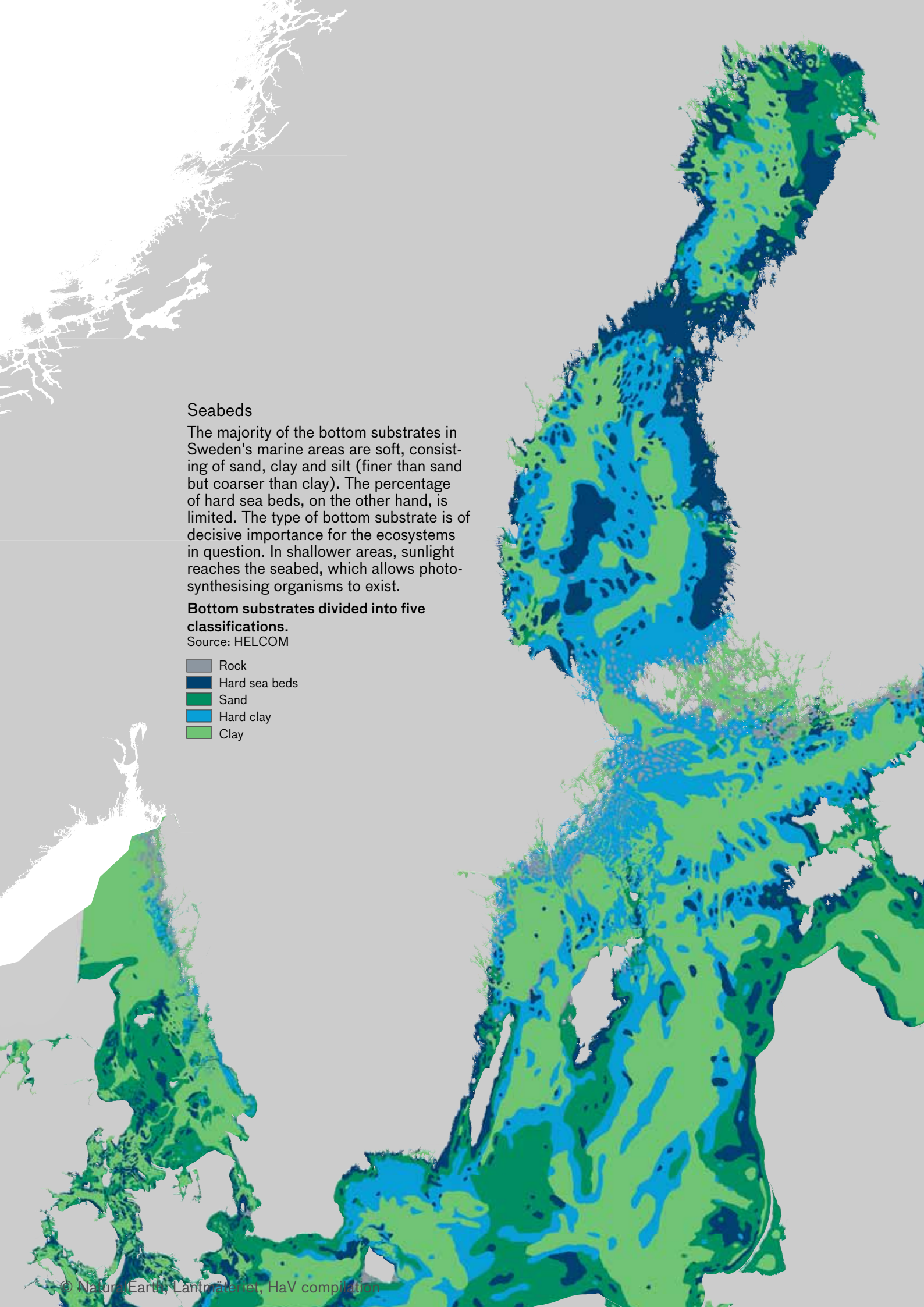
The northern coastal areas of the Gulf of Bothnia will be covered in ice the longest, around 120 to 130 days per year, while in the southern Baltic Sea and Skagerrak/Kattegat have fewer than 20 days with ice coverage. During a normal winter, the maximum distribution of ice covers the whole Gulf of Bothnia and the northern parts of the Baltic Sea. This ice coverage will amongst other things affect the water's circulation.

Currents

Water currents transport oxygen, nutrients, plankton and small larvae. The transportation of larvae is important for disseminating species between different marine areas; transporting oxygen is important for oxygen-poor seabeds. The Skagerrak/Kattegat, and primarily the Skagerrak, has several regular and permanent surface current systems. The Baltic current, which consists of water discharging from the Baltic Sea, flows along Sweden's west coast. In Bohuslän, this northbound surface current is strengthened by the Jutland current that approaches the Swedish coast

During a normal winter, the maximum distribution of ice covers the whole Gulf of Bothnia and the northern parts of the Baltic Sea.





Seabeds

The majority of the bottom substrates in Sweden's marine areas are soft, consisting of sand, clay and silt (finer than sand but coarser than clay). The percentage of hard sea beds, on the other hand, is limited. The type of bottom substrate is of decisive importance for the ecosystems in question. In shallower areas, sunlight reaches the seabed, which allows photosynthesising organisms to exist.

Bottom substrates divided into five classifications.

Source: HELCOM

- Rock
- Hard sea beds
- Sand
- Hard clay
- Clay

via Skagen. The Jutland current has saltier water, which means that it flows underneath the Baltic current. In the Baltic Sea there is a southbound coastal current that flows along Sweden's east coast. The bottom current affects the structure of the seabed as well as the supply of nutrients, particles and the oxygen situation. The tide is of minor importance in Swedish marine areas.

Winds and waves

In Swedish waters, waves are primarily caused by winds. The prevailing wind direction for much of Sweden's marine areas is westerly, which generally means higher waves in eastern areas. Westerly winds in the North Sea can bring about large waves in the Skagerrak and this can lead to water levels a metre or more higher than normal.

Circulation time

The circulation time for water in the Skagerrak/Kattegat is estimated to be a few weeks or months, while the circulation time in the Baltic Sea is estimated at around 30 years, in the Bothnian Sea 3 years and in the Bay of Bothnia 5 years. The inflows from the Kattegat, which decisively change conditions in the Baltic Sea's deep basins, are rare and occur on average every ten years.

Ecosystems and natural values

Marine habitats

Sweden's marine areas are home to many different habitats. The open body of water can be regarded as one. It contains phytoplankton, which forms the base of the marine food chain and thus affects the whole marine ecosystem. Phytoplankton are eaten by zooplankton that in turn become food for fish, which are then eaten by seals, porpoises and sea birds. On hard substrates there are other habitats such as mussel beds and seaweed forests. Soft sediment seabeds are the most common in Swedish marine areas and they contain many burrowing animals such as annelid worms (polychaete) and, in Skagerrak/Kattegat, langoustine. Soft seabeds can also be covered by flowering plants and charophyte green algae, which are important spawning and nursery grounds for fish. These have generally been receding in recent decades. In the deeper, saltier and colder waters of the Skagerrak/Kattegat there are coral reefs to be found.

Assessment of environmental status

Overall assessment

The marine habitats are under a lot of pressure, and they have been marked by several decades of emissions of nutrients and toxins from land and air combined with intensive fishing and other human activities. This has resulted in large-scale changes to the biotope with silted up areas of hard substrates, overgrown shallow bays and changes in respect of species composition in the marine ecosystems.

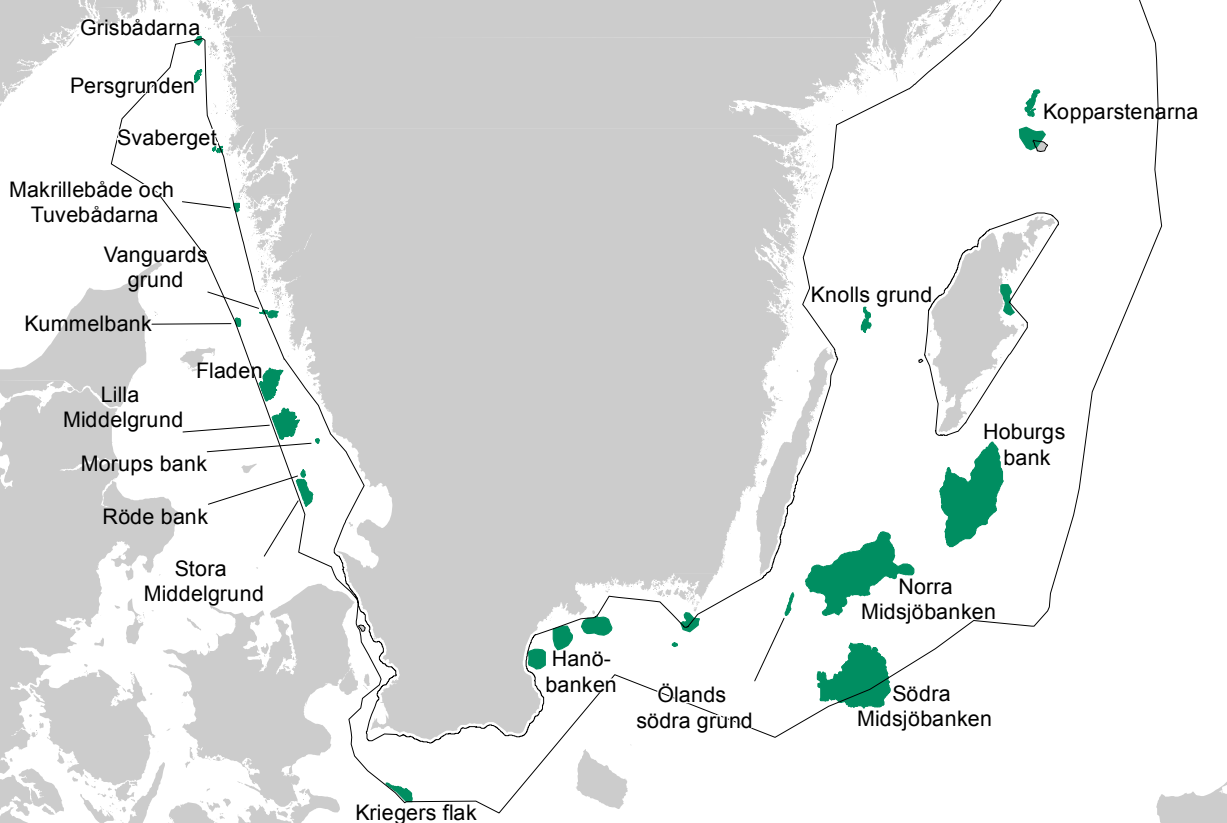
Eutrophication

Eutrophication is the result of excess emissions of fertilising plant nutrients, such as nitric oxides and phosphates. In the sea this can lead to an increase in primary production, with algal blooms and a lack of oxygen as a consequence. This is one of the greatest threats to the marine environment. One example of activities at sea that currently contribute to eutrophication are ocean-based fish farming in open

Offshore banks

Offshore banks are elevations from the bedrock that differ from shallower horizontal coastal areas in that they are surrounded by deeper water. They often hold high biological value, as organisms that were previously common in shallow coastal areas, but have disappeared or decreased there as a consequence of increased disturbances, are often still found on offshore banks. Knowledge of marine environments is often greater for offshore banks than for surrounding areas since several inventories have been conducted, for example to assess their significance for conservation. Offshore banks generally have high natural values, at the same time as their shallow location makes them attractive for various construction projects, e.g., wind farms.

■ Offshore banks
□ Plan area

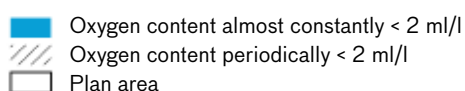


net cages. These are found, for example, in parts of the Gulf of Bothnia where the amount of discharge of nutrients from these are of the same magnitude as discharges from larger industries. Most sources of eutrophication, however, are found on land. Leaks from domestic and industrial sewage facilities are a major source of eutrophication. The largest sewage treatment plants have significantly reduced their discharges of fertilising agents in recent years. A large number of private drains are therefore responsible for a disproportionately large percentage of household discharges. Agriculture also contributes fertilising agents via plant nutrient leakage, from land and groundwater into the water courses. Nitrogen leaks also result from forestry. Other sources of eutrophication are nitrous oxide emissions from motor vehicles and other emissions resulting from combustion and other chemical processes. All of the Kattegat and the offshore waters of the Skagerrak are considered problem areas in terms of eutrophication. The deep-sea waters of the Skagerrak, on the other hand, are not deemed to be a problem area. The Bay of Bothnia is not deemed to have problems with eutrophication, while there are indications of such problems in the Bothnian Sea. The problem of eutrophication is greatest in the Baltic Sea. Eutrophication in Swedish waters affects habitats in both the body of water and in various types of seabeds.

Seabeds with hypoxia

In the Baltic Sea planning area, many of the deeper seabeds are completely or nearly without oxygen. Low oxygen concentrations periodically occur in the southern Kattegat and in the eastern Skagerrak (primarily within the internal fjord system) but the same problem does not exist in the Gulf of Bothnia. Hypoxia leads to reduced biodiversity and altered species composition, and has a negative impact on the ecosystems.

Major sections of the Baltic seabed suffer from hypoxia. Low oxygen contents occur periodically in the Skagerrak/Kattegat, while seabeds in the Gulf of Bothnia are in better condition.



The EU Water Framework Directive
The Water Framework Directive was introduced in 2000 and aims for a longterm and sustainable usage of our water resources. The overall water management goal is to obtain a good water status by 2015, or no later than 2027. A good status means a good ecological and chemical status in all inland and coastal waters. The ecological status is an assessment of the quality of biodiversity. If the body of water is artificial or heavily modified, then the term 'potential' is used instead of 'status'.

Ecological status in coastal and transitional waters as per the 2013 status classification

Source: VISS

- High ecological status
- Good ecological status
- Moderate ecological status
- Poor ecological status
- Bad ecological status
- Plan area

Climate change

In recent years, new threats have arisen in the form of climate change which, amongst other things, implies an increased level of marine acidification. Increasing levels of carbon dioxide in the atmosphere that dissolve into the sea lowers the pH level of the water - the sea is becoming acidified. Falling pH levels have been recorded in the oceans, as well as in Swedish marine areas. The acidification of the seas affects the solubility of calcium carbonate and will have consequences for plant and animal species as well as for marine ecosystems. Warmer sea water makes it easier for new, non-native species to establish themselves in our marine areas and results in increased oxygen consumption, which will impact the oxygen situation in the Baltic Sea. Temperature increases, changes in pH values and salt content are all factors that can affect marine life, both locally and on a larger scale. Together, these changes can place more stress on marine organisms.

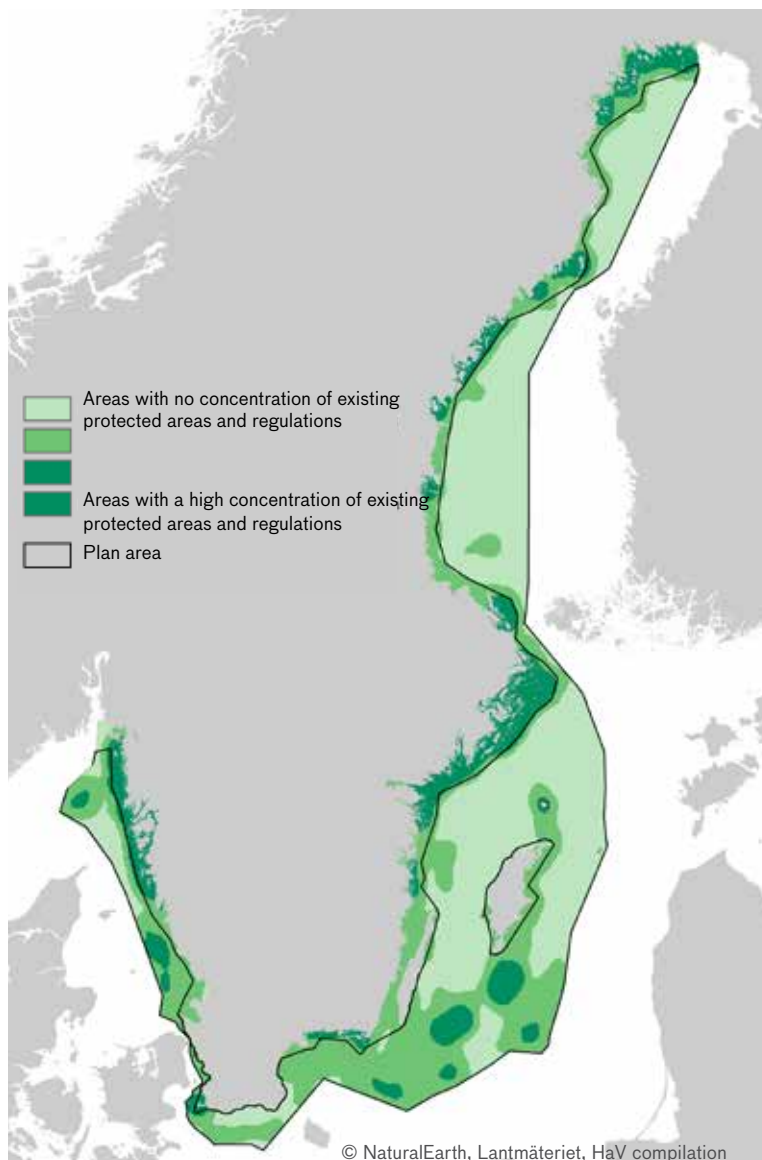
Marine diversity

Stocks of our larger predatory fish have been shrinking due to intensive fishing, which has led to targeted fishing of species at a lower trophic level - species that were previously of little commercial interest. The increasing amount of commercial fishing therefore affects not only individual species of fish, but it also leads to changes throughout the ecosystem. Fishing also affects marine mammals and birds, which get caught in the nets and drown. Benthic fauna is also affected by fishing, in particular by extensive trawling that makes it difficult for large long-lived bottom-dwellers, such as sea pens, to recover. A secondary but no less serious effect is brought about by sludge, which after it has been disturbed settles like a smothering blanket over its surrounding areas. This affects sessile filter feeders, such as sponges. Supply of non-native species - through shipping, for instance - are also examples of marine impact with effects that are difficult to predict.

The serious situation in the sea is reflected in the Swedish Species Information Centre Red List (as per 2010) where the percentage of "red-listed" species in marine environments is deemed to be higher than in any other habitat. The Red List shows that many species that were previously encountered regularly have become very rare or have simply disappeared from coastal habitats. In many cases the species remain, but further out to sea where eutrophication is not as advanced. Other species can currently be found only in small, isolated areas that have escaped trawling due to their inaccessibility.

The situation for marine diversity is serious and the level of knowledge regarding the occurrence and distribution of marine species is generally much worse than it is for other habitats. There is a significant risk that the Red List fails to include many species due to deficient population data. One example is sponges, which are missing completely from the Red List owing to insufficient knowledge. The major changes to the marine environment might therefore affect many more species than the ones on the Red List.

Sweden has a responsibility to preserve the species and habitats covered by the EU Habitats Directive. According to this Directive, and the EU Biodiversity Strategy, these species and habitats are to reach a favourable conservation status no later than 2021. Eighteen of the habitats and seven of the species covered by the Directive are found in Swedish coastal and marine areas.



Concentration areas for biological and ecological values based on protected areas and regulations, as well as other data relating to marine natural values. The map gives an indication of areas of particularly high nature value, but the picture it shows is far from complete.

The map is based on an analysis of existing protected areas and data, including the occurrence of eelgrass meadows, occurrence of red-listed species (west coast), wintering areas for migratory birds, occurrence of porpoises and ringed seals, Ramsar Sites, planned protected areas, nature reserves, national parks, Natura 2000 areas, OSPAR MPAs, HELCOM BSPAs, IBAs (birds), photic zones, animal and plant protection areas, areas where fishing is prohibited as well as spawning, growth and migration areas of fish.

Plant life

Seabeds lined with plants are amongst the most productive and species-rich. There is a great variety of species along all coastlines. The dominant plant groups change as one moves from the Skagerrak to the Bay of Bothnia, but generally speaking the occurrence of macroalgae, or seaweed, is of major significance to the local biodiversity. On the soft seabeds of the Baltic Sea, charophyte green algae in combination with angiosperms may fulfil the same function.

In the Skagerrak/Kattegat there are around 350 species of algae, while there are only a few marine angiosperms. In the southern Baltic Sea there are around 100 species of macroalgae but, as in the Skagerrak/Kattegat, the majority of these are extremely rare. In the southern Baltic Sea, the hard substrate is covered predominately by bladder wrack and toothed wrack. In the

Gulf of Bothnia, the number of marine species decreases the further north you go. Shallow soft sea beds there are dominated by various species of angiospermous vascular plants and charophyte green algae, whereas bladderwrack and the local species, *Fucus radicans*, fulfil a significant biological function on hard sea beds.

In the Baltic Sea and the Skagerrak/Kattegat, the large runoff with nutrients from land has led to major changes along the coast. Nutritive salts raise the amount of phytoplankton and organic particles in the water, which reduces the plants' access to light. Increased access to nutrients generally favours fast-growing algae. Long-term changes in the seaweed community vary along Sweden's coast. A decline has long been under way in the Skagerrak, as in Blekinge and Kalmarsund, while a serious propagation of seaweed in the Stockholm area has recovered and – in certain areas – the depth of propagation is at the same level as the 1940s.

Mammals

The marine mammals that live in Swedish waters are grey seals, harbour seals, ringed seals and porpoises. The grey seal is the largest of the seal species and is found primarily in the Baltic Sea. The harbour seal is most common in the Skagerrak/Kattegat. The ringed seal is the smallest seal species and it lives in the Gulf of Bothnia. The porpoise is the only species of whale that is regularly found in Swedish waters.

In the Baltic Sea, the porpoise is on the Red List as “critically endangered”, the harbour seal as “vulnerable” and the ringed seal as “near threatened”, whereas the grey seal has not been put on the Swedish Red List. In the Skagerrak/Kattegat, the porpoise is listed as “vulnerable” but the situation for the grey seal and harbour seal is favourable. Their areas of distribution are satisfactory, with the exception of harbour seals in the Baltic Sea and ringed seals in general.

The situation for all three seal species has improved since the 1970s when they were severely threatened due to hunting and low fertility. The number of harbour seals in the Skagerrak/Kattegat is now growing at a normal rate, while the number in Kalmarsund is growing more slowly. The number of grey seals in the Baltic Sea is also growing at a healthy rate, while the number of ringed seals in the Gulf of Bothnia is increasing at a slower rate than expected.

Fish

The composition of fish fauna in the Skagerrak/Kattegat is roughly the same as in the rest of the North Sea. Around 80 marine fish species propagate in Swedish waters. Passing from the Skagerrak to Öresund, there is a general decrease in the number of fish species. Cod, herring, sprat and sand lance dominate, along with flatfish on sand and clay beds.

In the Baltic Sea there are around 50 species of fish, which is somewhat lower than in the Skagerrak/Kattegat due to the lower salt content. The most common species in the offshore areas are cod, herring and sprat, while the coastal areas of the Baltic Sea and Gulf of Bothnia are dominated by freshwater species, especially perch and roach. Eels occur along the whole coast but

more commonly in southern parts. The stock of salmon, brown trout, eel, and to a certain extent whitefish, is a mix of wild and farmed fish.

The Skagerrak/Kattegat fish population has been on the decline since the 1800s in respect of large, adult predatory fish, and now consists primarily of small and young individuals. The levels are not satisfactory, even if the amount of large fish is on the increase again. The number of cod is now at such a low level that they are deemed to have a reduced reproductive capacity.

Examples of species that have been seriously affected by the intensity of the fishing are: cod, haddock, sole, plaice and pollack. Recovery is slow, despite the fact that trawling has been replaced and other conservation measures have been implemented. In the Öresund region, where trawling has been banned since the 1930s, the situation is considerably better, but even there the number of large fish has decreased in recent years.

The number of cod in the eastern part of the Baltic Sea decreased drastically at the end of the 1980s due to the intensity of fishing and the impact of seals and cormorants. Their numbers have increased since 2005 but the population is still fairly small. The number of whitefish is decreasing in the Bothnian Sea, while stocks in the Baltic Sea and the Bay of Bothnia remain at a stable level. For the vendace, which is the economically most important species in the Bay of Bothnia, the development of stock in connection with an unchanged intensity of fishing in coming years has been judged as positive. The situation for wild salmon displays a clearly positive trend in the large unregulated Norrland rivers, while that in several smaller watercourses and in the Baltic Sea is troubling. The situation for eels in the Baltic Sea is also critical.

The main human impact on the fish population is of course fishing, but the population is also affected by the supply of nutrients, exploitation and the physical impact on habitats, and environmental toxins. One factor of uncertainty is how climate changes and the increase of hypoxic seabeds in the Baltic will affect the habitats and food supply of fish. Adjustment of rivers, as well as other reservoirs and clearing in both larger and smaller watercourses, impact fish populations and fishing through limiting access to suitable spawning grounds.

Birds

The predominating breeding birds in the Skagerrak/Kattegat are eider and gulls such as the herring gull. The majority breed in the archipelagos of the Bohuslän province, but significant colonies also exist on islands in the Kattegat.

Eider are also predominate the Baltic Sea's archipelagos, but there are also large populations of other diving ducks and gulls. The number of breeding anatidae (ducks, geese and swans) started to decline in Sweden as early as the 1950s. The number of eider has decreased dramatically since the middle of the 1990s. Around the Karlsöarna islands there are colonies of razorbills and guillemots. Razorbills, common guillemots, and black guillemots can also be found further north in the Baltic Sea and the Gulf of Bothnia, for example on

the island of Borden in Norra Kvarken. The sea eagle is a typical species for the Baltic Sea and the Gulf of Bothnia.

Among resting and wintering sea birds, eider, velvet scoters and common scoters are the most common on the west coast, along with a significant number of goldeneyes and mute swans on inland waters. Fulmar and gannets can also be found there in the autumn and winter, especially in stormy weather. Other species are also regularly observed. Black-legged Kittiwakes nest on the island Nidingen. The sea birds that winter in the Baltic Sea and the Gulf of Bothnia are largely diving ducks such as tufted and long-tailed ducks. Auks also winter on the Baltic Sea and the Gulf of Bothnia, as do various species of gull.

Many marine bird species, such as the long-tailed duck, the eider and the velvet scoter, are declining drastically in the Baltic Sea; at the same time, pressure on their habitats is increasing through events such as numerous wind farms being planned, primarily in German, Danish, Polish and Swedish waters in the southern Baltic. A species like the long-tailed duck overwinters at – and is completely dependent on – shallow offshore banks, for example, with a rich presence of blue mussels. There is a risk of the birds being pushed out of these important habitats, which are limited to only a few places in the southern Baltic Sea. Research indicates that certain species – the long-tailed duck among them – often do not return to an area that has been developed.

Bats

Several species of bat occur in Sweden. The extent to which bats move across the sea was previously unknown. However, studies conducted in recent years have shown that bats not only migrate in routes along the coasts but can also venture further out to sea to hunt for insects. This hunting is seasonally restricted to high-late summer and is dependent on good weather. Systematic mapping of bats in coastal and marine areas is yet to be conducted.

Invertebrates

Marine invertebrates represent a large part of the ocean's biodiversity while a limited number of species predominate over larger areas. Blue (common) mussel banks constitute a substrate for other organisms and therefore indicate high biodiversity. Even soft seabeds that are relatively unaffected by trawling can have a high protection value, since they often host threatened tunneling organisms and various species of sea pens (Pennatulacea). The distribution and composition of invertebrate species in the seabeds has undergone a considerable change over the last hundred years. Fishing operations, sewage discharges, agriculture and other activities all affect their conditions. Certain crustaceans such as the northern prawn, brown crab, lobster and langoustine are invertebrates of great significance for humanity. The northern prawn population has decreased drastically over the last few years.

Deficiencies in the structure and function of the ecosystems

Due to the various deficiencies in the structure and function of the ecosystems, the criteria set by the Marine Strategy Framework Directive for good environmental status cannot be fulfilled (see description of the Directive in the chapter on environmental protection). Identified deficiencies include

threatened fish species with small or decreasing populations, shrinking or affected marine habitats and excessively low oxygen levels. In many cases the deficiencies can be linked to various activities. The chapters regarding the various sectors' usage of the sea contain descriptions of their environmental impact. It is important to assess how the combined burden of various activities, i.e., the cumulative impact, affects the environment.

Ecosystem services

The term ecosystem services describes the direct and indirect effects that ecosystems have on human well-being. This represents an attempt to describe ecosystems from a human perspective and to clarify our dependence on the natural world. Ecosystem services are often divided into four categories: supporting, regulating, provisioning and cultural.

Supporting ecosystem services are fundamental functions in the ecosystems on which all other ecosystem services depend, such as photosynthesis and biochemical processes.

Regulating ecosystem services are the benefits humans draw from ecosystem functions that affect environmental factors, such as climate, flooding and waste treatment.

Provisioning ecosystem services are the vital resources that nature provides, for example, oxygen, clean water and raw materials.

Cultural ecosystem services embrace spiritual and experience-based values that contribute to our well-being, such as aesthetic beauty, inspiration and recreation.

Biodiversity is a necessary prerequisite for the ecosystems' capacity to deliver ecosystem services. A variety of ecosystems and habitats, different species and great genetic variation within those species are required for the ecosystems to be vital and have the capacity to adapt and develop despite disturbances (resilience).

Certain ecosystem services are more visible than others, such as the raw materials we use to make goods and food. Others are indirect and more difficult to value. By analysing the ecosystem services that we receive from the sea, the importance of maintaining them becomes clearer. Further on in the current status description, the chapters regarding the various interests describe which ecosystem services the various interests are dependent on, and which services they can have a negative impact on.

An aerial photograph of a coastal town, likely in Sweden, showing a harbor with several boats, a marina, and a residential area with many houses and trees. The town is situated on a peninsula or near a large body of water. The image is partially obscured by a large white circle on the left side, which contains the title and introductory text.

Population

The second chapter of this current status description is largely based on the three regional reports that the county administrative boards in Kalmar, Västernorrland and Västra Götaland have produced, together with the boards of other coastal counties. The material has been supplemented with information from a number of sector reports produced by national agencies.



Settlements and communities

Prehistoric development

People have always lived and worked by the coast. An abundance of relics from the Bronze Age, Iron Age and the Middle Ages can be found near the sea. The first to visit Sweden's west coast were hunters, gatherers and fishermen. In the late Stone Age, agriculture was introduced and people began to settle. The uplift of the land has meant that there are maritime cultural environments far away from the modern-day coasts, especially in the Gulf of Bothnia and northern parts of the Baltic Sea and Skagerrak/Kattegat. In the southern part of the Baltic Sea and Skagerrak/Kattegat, the land has sunk instead, which means that Stone Age settlements can be found on the seabed. On the coasts of the Gulf of Bothnia, seal hunting and fishing were important trades from the very beginning. In the Skagerrak/Kattegat, the seasonal return of the herring gave rise to growing coastal settlements. Some of the fishing hamlets later developed into larger coastal communities.

Establishment of communities

During the Viking Age, the Scandinavians undertook both trade journeys and plundering raids. They traded in slaves and furs, amongst other things. At the start of the eighth century CE, the first cities were also built in Scandinavia. From the twelfth century, the Hanseatic League developed in Northern European cities, trading in silver, iron, copper, salt and fish. Herring was an important trading commodity.

Several of the modern-day cities located along the Skagerrak/Kattegat and Baltic Sea coasts date back to the Middle Ages, as do several cities along the Gulf of Bothnia. The majority of the other coastal towns, including Gothenburg, date back to the 1600s. Bohuslän, Halland, Skåne, Blekinge and Gotland became Swedish in conjunction with the Peace of Brömsebro in 1645 and the Treaty of Roskilde in 1658. Since the seventeenth century, the coast has also been largely characterised by industrial activities, at first steelworks and then sawmills and paper industries. These industries have used the sea as a transport route, as a resource of their processes and as somewhere to dump their waste products.

Sparse population

Although habitation has long been concentrated around the coasts, these areas have only been sparsely populated. Around 1820, only three cities – Stockholm, Gothenburg and Karlskrona – had more than 10,000 inhabitants. In the last 200 years, Sweden has undergone a massive transition from a society based on agriculture and fishing, where the majority of trading was conducted along the coasts or via waterways.

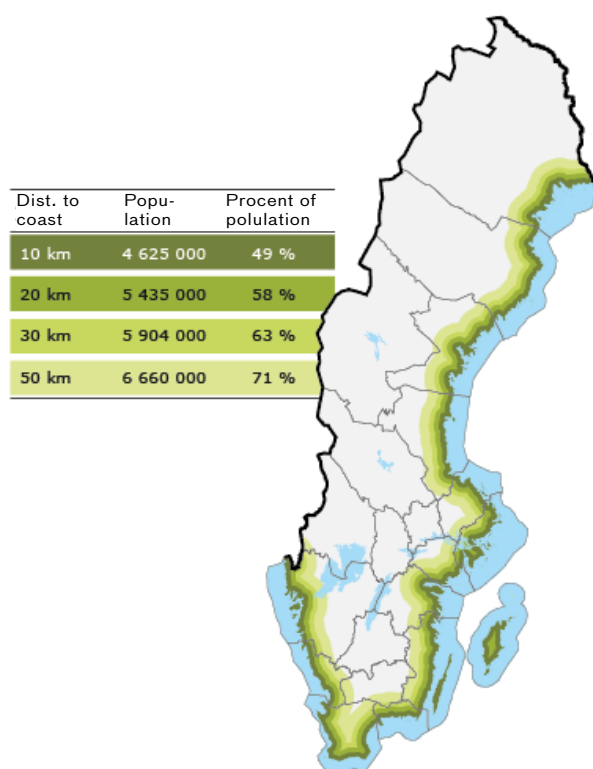
Accelerating urbanisation

Urbanisation has progressed particularly rapidly over the course of the last 50 years, and it is primarily the major cities that have grown. Coastal areas more remote from the metropolitan regions have often lost part of their population, and some permanent settlements are now only used at weekends or during holidays.

In recent years, areas within commuting distance of the three metropolitan regions – Stockholm, Gothenburg and Malmö – have grown considerably. Part of this growth has meant that areas that were previously inhabited only on weekends or during holidays have gotten a new population of permanent residents. This applies, for example, to coastal areas in southern Bohuslän and the northern parts of Halland within commuting distance of Gothenburg. Many attractive coastal areas also draw tourists in the summer, which has allowed for an increased level of permanent residents, supported by the local tourist industry.

Current division of the population

The historic significance of the sea as a transport route or as a source of food is still reflected in the geographic concentration of the population along the coasts. In 2010, half of the population (49 per cent), i.e., 4.6 million inhabitants, lived within 10 kilometres of the coast. If the coastal zone is extended to 50 kilometres, then the proportion of the population increases to 71 per cent, or 6.7 million inhabitants. Sweden's three largest municipalities – Stockholm, Gothenburg and Malmö – all have maritime connections. Out of the 50 largest municipalities, more than four out of five are adjacent to the sea or located near one of the three major lakes – Vänern, Vättern and Mälaren.



49 per cent of Sweden's population lives within 10 kilometres of the coast. Major islands are counted as coastline. Source: Statistics Sweden (SCB)

Gulf of Bothnia

The Gulf of Bothnia's coastal area includes Uppsala, Gävleborg, Västernorrland, Västerbotten, and Norrbotten Counties, as well as 20 municipalities with a total of around 780,000 inhabitants. Over the last ten years, the population in the coastal municipalities on the Gulf of Bothnia has grown more slowly than the national average. Compared with other coastal areas in Sweden, the Gulf of Bothnia is also less densely populated. 11 of the 20 municipalities have fewer than 25,000 inhabitants. Many municipalities extend over a relatively large geographic area with a long coastline.

Umeå is the most densely populated of the coastal municipalities on the Gulf of Bothnia with over 115,000 inhabitants. Gävle and Sundsvall are also relatively large municipalities with almost 100,000 inhabitants. Umeå has seen the greatest increase in population over the last ten years - just over 10 per cent, but Gävle, Luleå and Sundsvall have also witnessed increases of more than 2 per cent during the same period.

The Baltic Sea

Land conditions vary, from Skåne's sandy beaches via the limestone cliffs of Gotland coastline to Stockholm's archipelago with its islands and skerries of gneiss and granite. In the more densely populated coastal areas of Skåne and Stockholm county, there is more pressure on the attractive coastal areas. On Gotland and Öland, the leisure and tourism sectors are important.

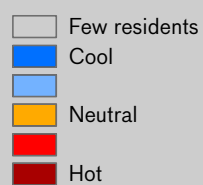
The coastlines can either be open towards the sea, as in Skåne and Gotland, or more closed areas of an archipelagic nature, such as those in Blekinge and the Östergötaland, Södermanland, Stockholm and northern Kalmar counties. Öland and Gotland are also unique in respect of how the sea has shaped living conditions. There are 39 municipalities in seven counties along the Baltic Sea coast. These coastal municipalities house a total population of 2.8 million. This area has a strong population growth on the whole, especially in Stockholm County as well as Malmö, Helsingborg and Norrköping. At the same time, the populations of many other municipalities are either stagnating or falling.

In the Stockholm area, the islands of the archipelago that have a permanent link to the mainland mean that housing demands can be met. Islands without a permanent link therefore become sparsely populated areas close to a major city. Blekinge is a relatively densely populated county, where approximately 75 per cent of the inhabitants live in urban areas. The county's southern coast is also generally viewed as very attractive for new housing developments. The municipality of Gotland conducts coastal zone planning to find areas for coastal residence; this is an important part in Gotland's drive to increase the population on the island.

Claims to coastal areas are currently governed by wind farm construction, sea transportation requirements and a major demand for coastal living. In many locations, "year-round" residence is increasing as former summer homes are starting to be used on a permanent basis. At the same time, the reverse is happening in other locations, for example on the east coast of Skåne. People leave the coastal towns that are further away from the growing metropolitan regions to seek employment opportunities elsewhere. When these areas become depopulated, the buildings left behind often become weekend/holiday homes.

**Hot, cool and neutral areas
for housing and population
development**

Source: The Swedish National
Heritage Board's
Administration Index



The Skagerrak/Kattegat

The area of land adjacent to the Skagerrak/Kattegat consists of three counties: Västra Götaland, Halland and a small part of Skåne. The area consists of a total of 20 coastal municipalities, 12 of which are in Västra Götaland, 5 in Halland and 3 in Skåne. A total of 1.1 million inhabitants live in coastal municipalities along the Skagerrak/Kattegat coast.

The countryside is multifaceted and full of contrasts. In the north there are archipelagos with many islands, large and small, and in the south there are extensive beaches and fertile flatlands. Large cities alternate with sparsely populated areas. Gothenburg is the largest city with over half a million inhabitants – half the population of the coastal municipalities. Halmstad is next with over 90,000 inhabitants. Shipping is important in this coastal zone, and Gothenburg is by far the largest cargo port. There are also ports for passenger transportation to Denmark, Germany and Norway, from Gothenburg, Varberg and Strömstad.

Tourism is increasing and development pressure is considerable in the coastal zone. During the summer, the population of Halland doubles and the population in northern Bohuslän increases fivefold. Recreational boating is extensive here and 27 per cent of all boating-related overnight stays in Sweden occur in Bohuslän.

Developments and trends

The Swedish National Heritage Board's Administration Index reflects the development trends in various parts of Sweden. The index indicates which geographical areas are seeing strong population and housing developments. Expansive areas along the coast, with high population growth and an increase in weekend/holiday housing, can be found along the west coast, as well as in Skåne and Blekinge, Öland and the Stockholm region. The population in northern Bohuslän (apart from Strömstad) is falling, and at the same time there is great development pressure in respect of weekend/holiday homes. To develop coastal and archipelago areas, the development pressure needs to be balanced against the demands made of the areas in respect of recreation and the preservation of coastal cultural environments.

Environmental impact

The size of the population living near the coast gives rise to considerable impact on the marine environment. Industries that are concentrated near the coasts also affect the sea through discharges, etc. Diffuse emissions into the air and onto the land affect the sea by extension in the form of eutrophication and marine acidification.

Another negative environmental impact that could occur both directly and indirectly is the supply of marine waste. It can happen directly through faulty waste management, littering and dumping of garbage into the ocean or along the coast, both from maritime industries and from tourism and recreation. It can happen indirectly through waste being carried out to our oceans from land and cities by wind and watercourses.

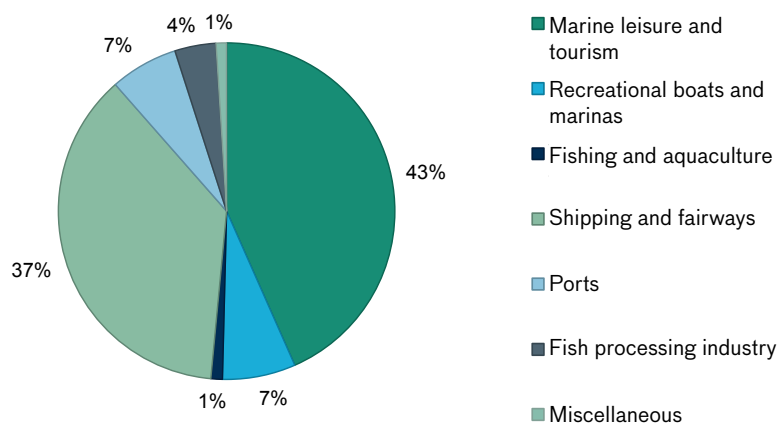
Access to recreational areas, like commercial and public services in many parts of the country, is a prerequisite for attracting residents, and for industry to continue growing in all parts of the country. Precious natural, cultural and environmental values need to be preserved without wasting growth potential.

Activities and industries

Maritime industries can be defined in various ways. A study conducted by Vinnova in 2011 estimated that maritime industries were responsible for 34,000 employees in Sweden within over 2,000 businesses and workplaces. Marine food tourism, commercial accommodation in marine environments and marine tourism were not included in the assessment.

In another statistical approach, conducted within the scope of marine environment management, where the aspects of marine tourism mentioned above were included, the employment figure for 2009 is estimated at roughly double. Turnover for the same year was dominated by tourism and recreation, shipping, work with transport routes, and ports. Fishing and aquaculture accounted for a smaller share.

Vinnova's survey from 2011 indicated that nearly half of all employees were involved in shipping. The industry was dominated by a limited number of major companies with a large number of employees. There are shipping companies and ports at many locations across the country, primarily in Gothenburg, Stockholm, Malmö, Helsingborg and Trelleborg. Within the shipping industry, 37 per cent were employed by foreign-owned companies. Around a quarter of the employees worked in shipyards, with the manufacture of recreational boats or in other technical companies. Fishing and aquaculture accounted for 12 per cent of those employed, but 20 per cent of the workplaces. Many companies within the fishing industry are small, with local ties and only a few employees. Leisure and tourism, narrowly defined, accounted for around 8 per cent of those employed. Marine-based energy production only accounted for a small number of employees.



Division of net turnover in maritime industries in 2009. Marine food tourism, accommodation and tourism are included. Source: God havsmiljö 2020,

Swedish Agency for Marine and Water Management, 2012

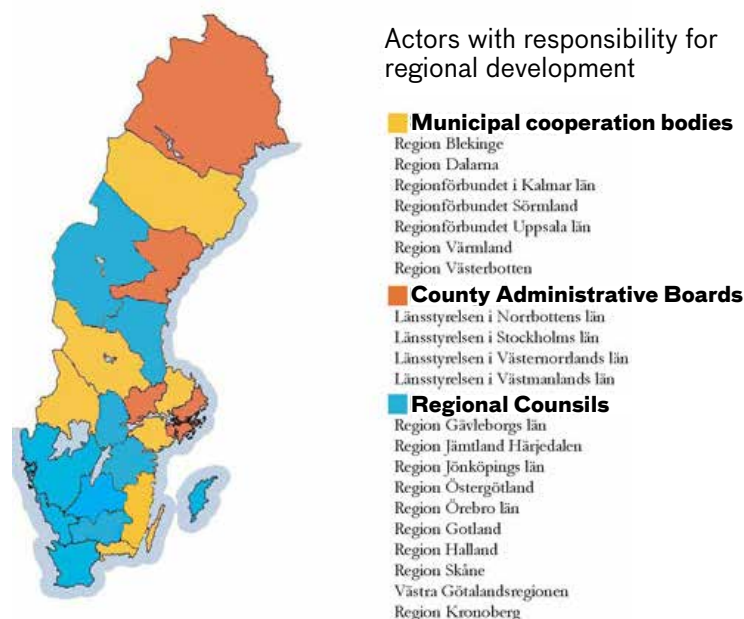
Regional structure

The maritime industries are concentrated near the coast and particularly in the metropolitan regions. This applies primarily to Västra Götaland, followed by the Stockholm region, Skåne and Blekinge. Maritime companies in Västra Götaland county account for 45 per cent of all employees within the maritime industries, followed by Stockholm county with 22 per cent, Skåne county with 11 per cent and Blekinge county with 4 per cent. Gotland county has the largest number employed in maritime industries, followed by Västra Götaland county and Blekinge county. Distributed over the three marine regions, this means that the Skagerrak/Kattegat coast accounts for nearly half of all those employed within maritime industries (47 per cent), the Baltic Sea for a somewhat smaller share (43 per cent) and the Gulf of Bothnia for around 6 per cent.

Growth and regional development

Access to the labour force is one of the most important localisation factors for companies. Specialisation within industry leads to companies seeking creative and skilled workers. Business is therefore developing to a greater extent than before in locations with a high population concentration, and more people are moving to these places in order to work.

Other parts of the industry have other localisation preferences, for example, the growing tourism industry and the raw material-intensive part of the industry. Attractive residential environments, for example near the coast or sea, are important for these industries to recruit and grow.



Source: Tillväxtverket

Developments and trends

The maritime industries showed a stable development with a slight increase in the number of employees for the years 2006-2008. The financial crisis affected shipping in particular, and this has led to a clear trend break as the number of employees has been declining since 2008. One important reason behind the decline is that many Swedish vessels have now registered in other countries. This led to the number of vessels sailing under the Swedish flag being reduced by around 30 per cent during the period from 2008 to 2011. Tourism is a rapidly growing industry.

Blue growth

The EU's integrated maritime policy highlights the sea as a potential resource for strengthening growth in Europe. Blue growth, which is a long-term EU strategy to support sustainable growth in the marine and shipping sectors as a whole, has been developed as the integrating marine policy's contribution to the Europe 2020 Strategy for smart and sustainable growth for everyone. Within the strategy, the seas and oceans are seen as driving forces for the European economy, with a great innovation and growth potential. In Sweden, blue growth is a central concept in the work in progress to develop a Swedish maritime strategy that aims to create more jobs, improve welfare and the quality of life, and where this development is to be brought about based on sustainable usage of marine and coastal resources. The work also encompasses marine spatial planning as a tool for job opportunities and development.

The EU's blue economy represents 5.4 million job opportunities and has a gross added value of just under €500 billion per year. The EU's strategy for blue growth includes monitoring several areas where further growth is possible: aquaculture, coastal tourism, marine biotechnology, marine energy and the extraction of material at sea. The strategy incorporates measures to improve marine knowledge and marine spatial planning, and for increased integration of maritime surveillance. The strategy is to be implemented with the support of sea basin strategies adopted by the EU. One example is the EU Strategy for the Baltic Sea Region, where the member states concerned have agreed on developing marine spatial plans for the Baltic Sea region by no later than 2020.

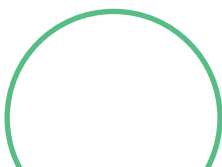
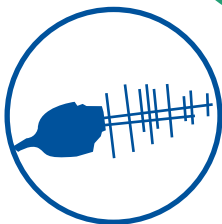
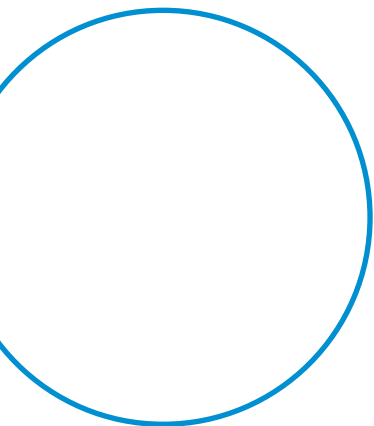
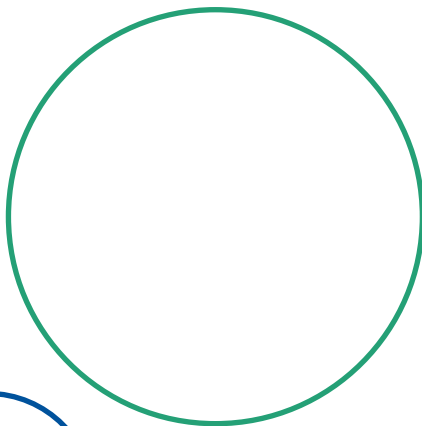
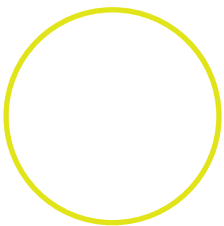
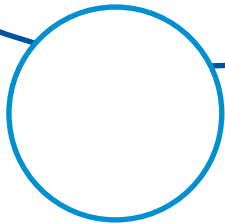
An aerial photograph of a coastal region, likely in the Netherlands, showing a mix of urban development, industrial zones, and agricultural land. In the foreground, there's a large body of water with several wind turbines visible. A large white circle is superimposed on the left side of the image, containing the title and a paragraph of text.

Interests and conditions

The third chapter of this current status description describes the interests that are dependent on marine space. This section is largely based on sector reports produced by national agencies.



Marine cultural heritage



Importance to the community

Cultural heritage values promote our well-being, build our identity and put our existence into context. The cultural heritage is also important to local and regional economic development. Coastal and archipelagic landscapes have largely been characterised by traditional industries such as fishing, shipping, agriculture and tourism which, in turn, arose where they did due to their link with the sea. Precious environments, landscape and buildings are therefore linked to archipelagic agriculture, fishing villages and seaside resorts, ports, fortifications, lighthouses and pilot stations, as well as to coast-linked industry. Cultural values identified at sea can often be explained and given context by relics or environments on land.

Shipping in the Baltic Sea and the Skagerrak/Kattegat has been very intensive over the last century, and this has resulted in a large number of shipwrecks in Swedish waters. The seabed is home to a cultural heritage that tells a story covering everything from medieval cogs, trade and defence fleets of the 1600s and 1700s, industrial shipping and a fishing industry undergoing rapid change to events during the First and Second World Wars. The relics found under water, especially those from sunken vessels, can be related to travelling and the transportation of goods. The relics may appear to be wind-blown solitaires, due to their connection with ill-fated journeys and far-flung oceans, but they are in fact linked more closely to shipping routes and lanes.

Actors

The Swedish National Heritage Board is responsible for issues at the national level concerning cultural heritage environments and cultural heritage. The National Maritime Museums in Sweden, which consist of the Maritime Museum and the Vasa Museum in Stockholm, and the Naval Museum in Karlskrona, is a museum authority with a national mandate to preserve, convey information and increase knowledge in respect of Sweden's maritime heritage, in addition to conducting underwater archaeological projects. The county administrative boards function as the representative of the government when cultural environment issues are addressed regionally and municipally. The Marine Archaeological Council, which consists of representatives from cultural environment institutions at both national, regional and local level, is an advisory body.

The Swedish Coast Guard and the Marine Police also have a share in the responsibility for managing ancient underwater relics and for ensuring compliance with the Heritage Conservation Act (SFS 1988:950) at sea. The Coast Guard's role is one of monitoring and control, while the Marine Police conduct policing tasks in the archipelagos along the coasts.

Maritime cultural heritage

In Swedish waters there is a comprehensive cultural heritage consisting of vessel remains, settlements from the Paleolithic, palings, harbour facilities and so on. In the Baltic Sea, moreover, these are often well-preserved owing

to unique conditions. The low salt content and low water temperature mean that there are no organisms to break down wooden objects. Knowledge of where all these remains are found, however, is relatively low owing to the lack of systematic inventories. Despite this, unfortunately, there are numerous examples of cultural remains being subjected to negative impacts caused by such things as trawling.

Vessel relics are the most common

The majority of known ancient remains on the seabed are shipwrecks. There are also submarine landscapes with sunken settlements from the Stone Age, vessel barricades from the Viking Age and the Middle Ages, and the remains of ports, anchorages and industries. Traces of settlements from the early Stone Age can be found at a depth of 40 metres in the southern Baltic Sea and the Kattegat; settlements that were submerged following changes in the water level. The seabed off the coast of Österlen in Skåne also houses "fossil forests" consisting of well-preserved remains from an approximately 11,000-year-old pine forest.

Knowledge is largely lacking when it comes to marine cultural heritage, on both a detailed and overall level. In the Swedish National Heritage Board Archaeological Sites and Monuments database there is information about all known registered ancient remains and other cultural historical relics in Sweden, including at sea. Out of Sweden's 1.8 million registered ancient remains, approximately 20,000 are maritime objects. The majority of these are vessel remains.

According to the Heritage Conservation Act, vessel remains are ancient remains if they are from before 1850. Previously there was a hundred-year limit – that is, vessel remains became ancient remains once 100 years had passed since the shipwreck, but this no longer applies. The county administrative board, however, has the possibility of declaring vessel remains from 1850 or later as ancient remains if there are particular reasons with regard to its cultural historical value.

There are approximately 3,400 localised vessel remains with cultural historic value registered, and shipwreck information on a further 12,000. More recent wrecks might also have a great cultural historic and/or scientific value, for example ships that sank during the two world wars. The overwhelming majority of these wrecks lie in the Baltic Sea and the Öresund, from Kullen to the border between Stockholm and Uppsala counties. The actual number of vessel and other remains of cultural historic value, such as Stone Age settlements, may be much greater than those currently known.

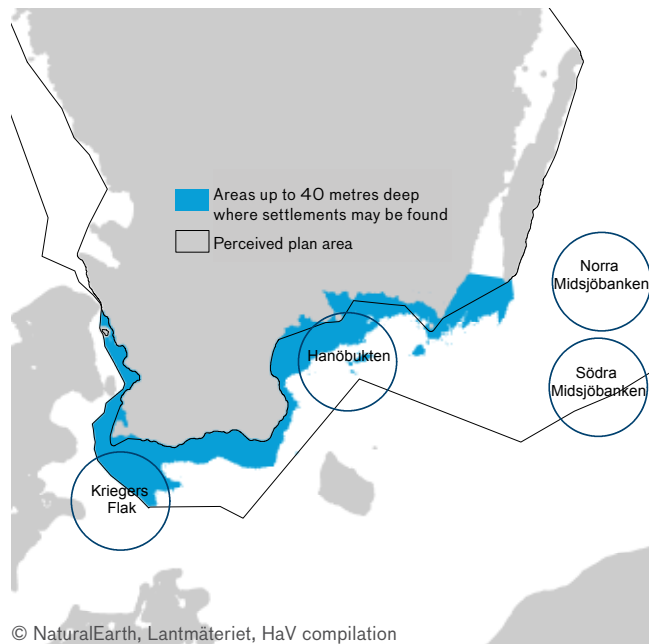
Preservation and use

There are currently no pure marine cultural reserves, but one is being created in the form of the Dalarö shipwreck area dive park outside of Stockholm. The purpose of the reserve is to keep the experience value of several vessel remains in mind through combining use with preservation. There is also a dive park with cultural value in the Axmar nature reserve outside Gävle.

**Known vessel remains and
shipwreck information per 100 sq km**
Source: Swedish National Heritage Board, FMIS



In the southern Öresund there are discoveries indicating settlements from the Paleolithic, when there was a fixed land connection between what is now Sweden and the Continent. Settlements may be found up to 40 metres deep within an area stretching from Öland to the northern Öresund. The area in which the probability of finding traces of the Stone Age is greatest is Hanö Bay, Kriegers Flak and Midsjöbankarna.



Developments and trends

As far as views regarding maritime cultural heritage and cultural values are concerned, the discussion, like the equivalent one referring to environments and values on land, has for a long time been more concerned with the bigger picture than specific objects. Knowledge regarding maritime cultural heritage is variable, however, since no systematic inventories have been conducted; instead, they have been largely governed by developmental projects and the efforts of individuals divers.

Cooperation between agencies and coordinated investigations prior to developmental projects are examples of ways in which we can use the knowledge that does exist. The cultural heritage of the seabed is still fairly untouched, but it is increasingly threatened by technological developments within industry, fishing and diving, and the growing interest in developing the seabed.

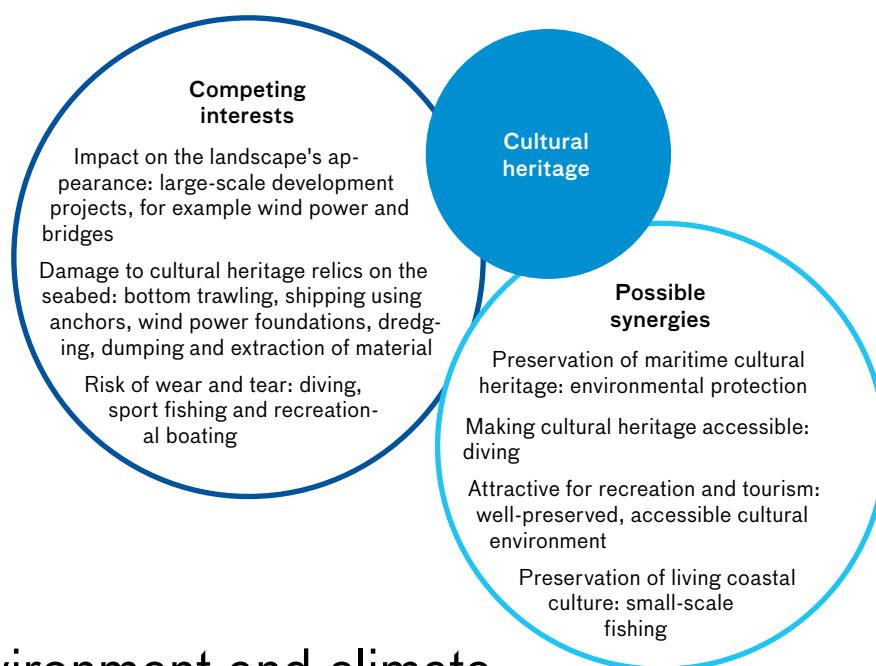
Maritime cultural heritage and other interests

The large-scale wind farms at sea that are currently being discussed, with wind turbines that are 150-250 metres tall, will have a visual impact on wide areas. Coastal areas and archipelagos are characterised by a great abundance of variation, where different stretches have their unique conditions and their own specific history and identity. According to the Swedish National Heritage Board, large-scale development with indifferent localisation and design will dominate a location, thereby drastically affecting or erasing the values indicating important historical processes that previously gave the location its character. Coastlines, in this context, can be extra sensitive, as large-scale developments tend to be exceptionally visible if the coastline is concave and lobate.

Shipping can lead to erosion that can lay bare, grind against and even completely remove exposed parts of remains. Shipping and boat traffic can also

lead to remains in shallow water being damaged by anchors or hulls. Fishing, and in particular bottom trawling, entails a risk of mechanical damage to the maritime cultural heritage. Vessel remains can be heavily damaged and spread out over large areas. Developments that require dredging and dumping, and the extraction of material also constitute a threat to the cultural heritage found on the seabed.

There is great value in making the cultural heritage under water accessible, for example to divers. Diving and other recreation such as sport fishing and boating, however, can entail a risk of destruction of cultural heritage. Diving in particular has developed rapidly in recent years. Whereas previously it did not occur at depths greater than 40 metres, nowadays dives are made in shipwrecks at depths down to around 100 metres.



Environment and climate

Environmental impact

Discharges of environmental toxins and hazardous substances, like the marine environment itself, with its storms, currents and ice, the chemical composition of the water and its microorganism content, can impact on the cultural heritage found on the seabed. At the same time, vessel remains can themselves constitute a potential threat to the environment as a result of the lead, copper and other environmentally hazardous substances they contain. Thousands of vessels that sank during the 1900s have oil and diesel tanks that are gradually rusting to pieces. Explosive mines, and vessel remains with conventional and chemical weapons from both world wars on board, are also an alarming feature in the underwater environment.

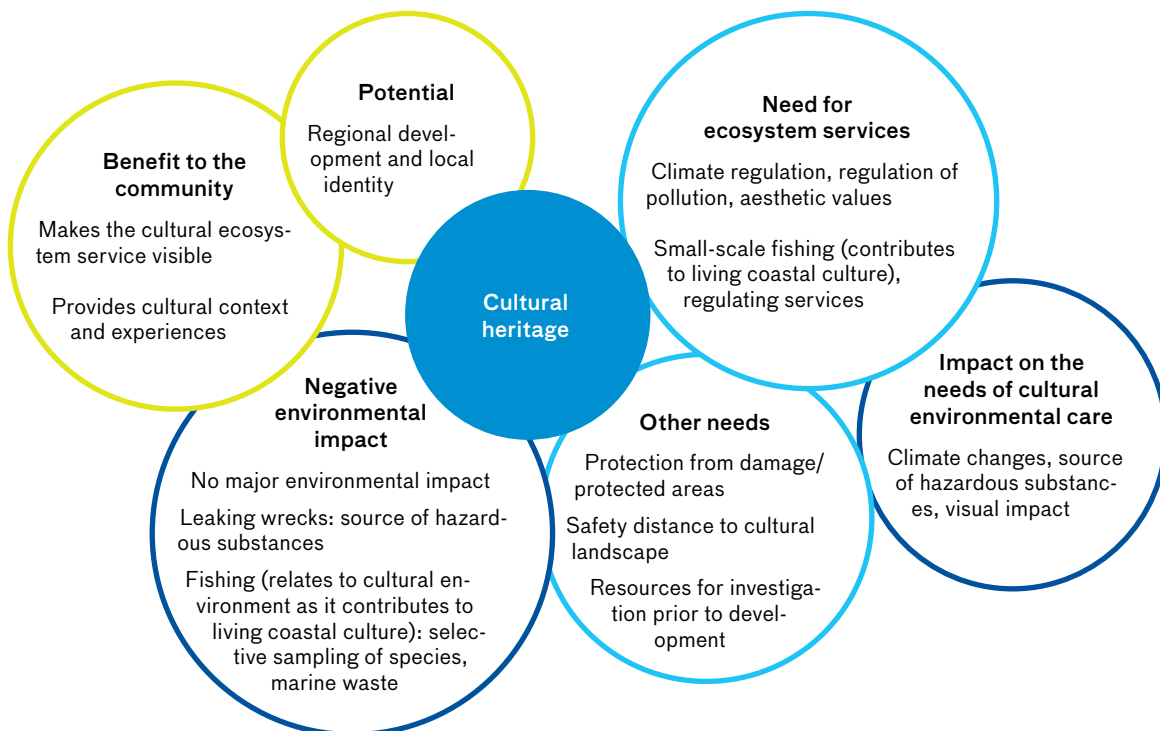
Climate

Climate change can affect the speed of natural processes such as shoreline displacement and seabed movements which, in the long term, can affect archaeological material on the seabed. A changed climate can also affect the living conditions in the Baltic Sea for invasive species – species introduced to

locations outside their original range. Higher water temperatures and altered salt content can make it possible for various wood-eating organisms to settle in these waters, something that would be disastrous for many vessel remains of great cultural historic value.

Claims and goals



For our marine cultural heritage to be preserved, the remains need to be protected from physical damage. In cases where cultural history remains will be affected by development projects, resources are required for investigations prior to commencement. Changing conditions in the sea due to activities and climate change can affect how remains are preserved for the future. Cultural values at sea often find their interpretation or context through links to remains and environments on land. It may therefore be important to design a holistic perspective in connection with assessing how large-scale development at sea impacts cultural environments up on land. This visual impact on cultural environments on land also needs to be noted.



National interests

As the central sector agency within the field of cultural environment, the Swedish National Heritage Board is responsible for representing Sweden's marine interest claims. There are currently no highlighted areas of national interest in respect of cultural environmental care in the area encompassed by the marine spatial plans, but efforts are made to establish an assessment basis and a plan for how such areas could be indicated. On the other hand, there is national interests along the coast that may be indirectly affected.

National interest claims for cultural heritage

-  National interest claims for cultural heritage according to Chapter 3 of the Environmental Code
-  Plan area

Goals

In June 2013, the Swedish Parliament decided on new goals in respect to the cultural environment. According to these goals, national cultural environmental work should promote:

- a sustainable society with a multitude of cultural environments to be preserved, used and developed,
- participation in the cultural heritage work and the opportunity to understand and take responsibility for the cultural heritage,
- an inclusive society where the cultural environment is a common source of knowledge, education and experiences, and
- a holistic view of countryside management that involves the cultural heritage being taken into consideration in social development issues.

The cultural heritage work presupposes knowledge regarding the cultural heritage and should proceed from a scientific perspective.

Environmental quality objectives

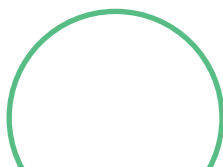
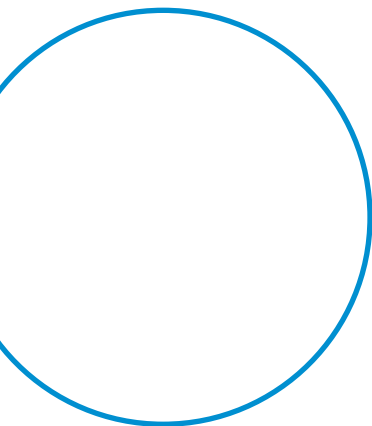
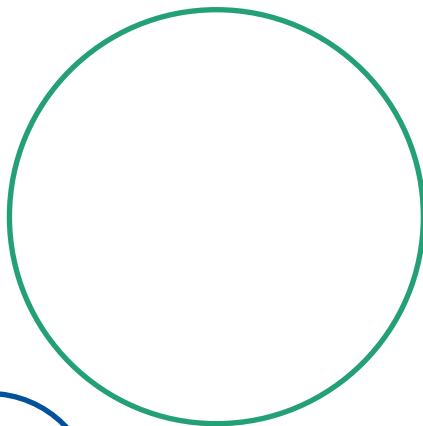
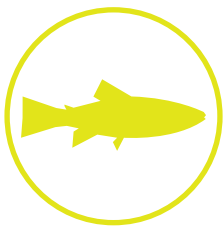
The work to realise the goal of a good living environment that is sustainable in the long term also incorporates the cultural environment. For the cultural heritage, sustainable development means that the community and the individual citizen preserves and uses the environment carefully and conservatively with consideration to its historic diversity, so that no damage is done to the cultural heritage.

The environmental quality objective Balanced Marine Environment with Flourishing Coastal Areas and Archipelagos, along with three of its specifications concern the cultural heritage. Achieving this objective assumes that no non-native species and genotypes threaten our cultural heritage, that our cultural values are preserved and that there are conditions for continued preservation and development of these values. The goal also impacts on archaeological cultural heritage in the form of prehistoric settlements, vessel and other underwater remains, and that the condition of these cultural historic remains shall remain unchanged.

Planning relevance

The protection of cultural heritage at sea can come into conflict with other interests, for example energy production, fishing, and shipping as well as recreation and tourism. Areas with high cultural value need to be identified and described in order to be taken into consideration in a planning situation.

Recreation and tourism



Importance to the community

Recreation and tourism covers many different activities and policy areas. Marine recreation and outdoor life can encompass many varying activities such as recreational fishing, sailing and boating, kayaking, skating, bathing and diving, bird watching and other nature-related activities. Proximity to the sea, high natural and cultural historic values make the coastal landscape an attractive place to live and also invite recreational activities as well as national and international tourism.

Public health

Outdoor life is very important for both individual and public health. Natural and cultural landscapes close to urban areas fulfil an important function with regard to everyday physical activity. Proximity to outdoor and recreational spaces lying close to urban areas has proven to be of major significance in terms of how much people exercise. Interest in outdoor life also creates commitment to environmental issues in general, and to the areas most often visited in particular. Public health can be promoted through good planning and measures that create good preconditions for physical activity. An environment that favours outdoor life can be created by allowing access to attractive areas in the countryside, on the coast or in the archipelago, where there is a good environment full of different experiences that stimulates exercise and an active lifestyle.

Tourism

Marine, coastal and archipelagic landscapes have major values with regards to recreation and tourism. Over 4 million people visited Sweden's archipelagos in 2010. Tourism is growing, along with turnover and job opportunities, and tourism is now a core industry in many Swedish municipalities. The distribution of visitors throughout the country largely reflects the coastal concentration of the population. The Stockholm and Gothenburg regions, for example, enjoy a great number of visitors, and even the Baltic Sea region – according to several reports – is facing major potential development of revenue from tourism.

Actors

Several agencies are working with issues concerning recreation and the Swedish Environmental Protection Agency has been tasked with coordinating this work. The Swedish Agency for Economic and Regional Growth is responsible for investigations concerning the extent of tourism, with a focus on measuring turnover in respect of accommodation, food, restaurants, transportation, shopping and tourism-related activities.

VisitSweden is marketing Sweden as a brand and Swedish destinations and experiences internationally. Svenskt Friluftsliv (Swedish Outdoor Life) is an umbrella organisation for 23 non-profit outdoor organisations in Sweden, incorporating nearly 10,000 local branches that together have approximately 2 million members. The members support and participate in the preservation of plant and animal life and in the restoration of natural environments in various ways. Svenskt Friluftsliv represents the non-profit outdoor organisations in communications with the Government, the Riksdag and public authorities.

Use of the sea

Outdoor activities

Many different types of outdoor activities take place in or by the sea. An increasing number of people are getting involved with diving; in recent years, the number of certified divers has increased significantly. Sweden has a rich biological marine life, especially on its west coast where the salt content is high. There is an abundance of soft coral, anemones, fish and large shellfish, and Sweden has many well-preserved wrecks that are of interest to divers. Regular scuba diving is conducted down to a depth of 50-60 metres. Diving in deeper waters requires special gas mixtures. However, few recreational divers go deeper than 30 metres, since dive time is shorter the deeper you go. Snorkel routes have been organised in certain locations in order to promote interest in the underwater environment.

Accessible shipwrecks are objects of interest to divers and recreational anglers.



Distribution of wrecks at a depth of less than 40 m. Knowledge regarding vessel remains in Swedish waters is lacking and the picture is therefore not comprehensive. Source: Swedish National Heritage Board, FMIS.

Recreational boating

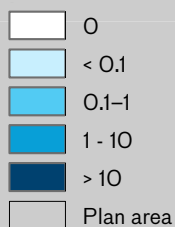
Almost 2.5 million Swedish adults were involved with recreational boating in 2010. In the same year the number of recreational boats was estimated at 881,000 and there is a growing number of foreign boat-owners who visit Swedish waters and Swedish harbours.

There are more than 1,500 harbours for recreational boating in Sweden, 430 of which are classed as guest harbours. The Skagerrak/Kattegat and the Baltic Sea each account for around 45 per cent of guest nights, while the Gulf of Bothnia accounts for barely 6 percent. The major domestic lakes account for a smaller percentage. However, the most common locations for overnight stops for boating tourists are natural harbours.

Day trips and fishing trips are the most common uses of motor boats, while sailing boats are used to a greater extent for longer trips with overnight stops. Cruise tourism is a major activity in Sweden and is expected to grow. Cruises visit several of the countries surrounding the Skagerrak/Kattegat and the Baltic Sea.

Boat berths in recreational harbours per 100 sq km

Source: Environmental data portal of the Swedish Environmental Protection Agency



Birdwatching is a popular outdoor activity that is, of course, dependent on the bird population. Seabird-hunting is another. Several companies organise seabird-hunting trips in the Swedish archipelagos. Seabird-hunting is permitted in public waters and on islets, rocks and skerries. The mallard is currently the species of bird most shot in Sweden. Seabird-hunting is popular in Europe, something that might lead to an increase in hunting-related tourism in Sweden in the long-term. Seal hunting is also growing in popularity.

Recreational fishing

The conditions for recreational fishing in Sweden are very good and, according to estimations, well over a million Swedes fish on a recreational basis every year. Approximately 57 per cent of recreational anglers fish at sea, and 40 per cent of the total number of recreational fishing days in Sweden are spent at sea. Fishing tourism means that people travel to and stay at places outside of their usual surroundings in order to fish, or utilise services provided by companies involved with fishing tourism.

According to Swedish law, all fishing that is conducted without a commercial fishing license or private fishing rights is to be considered recreational fishing. Recreational fishing can be carried out using simple fishing tackle or with very simple equipment, such as a hand net and cages. The term "sport fishing" is normally used for fishing with hand tools (tackle). Recreational salmon fishing is conducted in the sea via trolling, and in coastal areas primarily through fishing with a pound net. Trolling and fishing with hand lines in private waters on the east coast are not covered by the Fishery Act. Trolling for salmon is conducted primarily at sea outside coastal waters and is most intensive from April to June, especially in the Simrishamn area but also elsewhere off the coasts of Skåne and Blekinge.

For fishers using regular tackle, perch, pike, sea trout, salmon, cod, flatfish and mackerel are the most significant. The majority of recreational fishing is conducted using just a simple fishing rod. Recreational fishing is generally considered to have little impact on the fish population, but in certain coastal areas, it can represent a significant proportion of the total catch. Limiting quotas within licensed fishing means that in the future, recreational fishing in certain areas and for certain species will account for a larger proportion of the total catch. One such example involves salmon. Since recreational fishing is often conducted near the angler's town of residence, the intensity of the fishing is often related to the population density and it is therefore spread out along the whole coast. But there are other factors that also apply local pressure on fishing, such as areas that are protected from the wind and weather, access to service and whether the fish population is sufficiently large to attract anglers. The amount of fish caught through recreational fishing in the sea was estimated at approximately 8,000 tonnes in 2007.

Regional aspects

An important area for recreation and tourism in the Gulf of Bothnia is the High Coast, with its powerfully undulating coastline lined with traces of the world's largest land uplift since the last ice age. The Bay of Bothnia archipelago, with excursion boat traffic, ice roads, 57 designated tourist destinations and over 4,000 islands is also an important area. There is great potential for developing the tourism industry, as the relatively undeveloped Norrland

coast is very attractive and has plenty of opportunities for angling.

In the Baltic Sea, the Stockholm area accounts for the majority of visitors, and in particular, the Stockholm archipelago. Waxholmsbolaget and Strömma kanalbolag (two Stockholm-based tourist boating companies) accommodated over 3.1 million passengers during 2008.

The population in Halland doubles during the summer months and the population in northern Bohuslän increases more than fivefold over the same period. This shows that the Skagerrak/Kattegat coast is extremely attractive in terms, both for tourism and recreation.

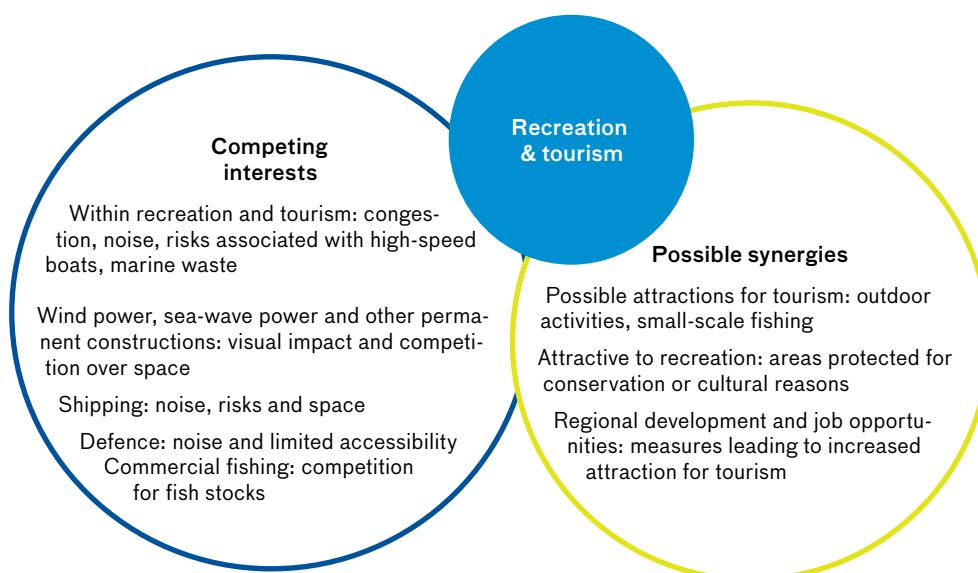
Developments and trends

The urbanisation process in Sweden means that the majority of sparsely populated areas find it hard to retain their population and to employ them. When traditional forms of subsistence disappear in the more peripheral locations, tourism becomes an attractive alternative. Tourism is a growing industry that contributes to development in all parts of the country. Many of its activities happen on land or in close proximity to the coast.

Recreation, tourism and other interests

Recreation and tourism can both conflict with and collaborate with each other. Tourists, often in large groups, look for possible places to stay, eat and experience organised attractions, while recreation often attracts people to places where the natural world has been less exploited. Certain forms of tourism have a requirement for exclusivity, something that can conflict with the broader concept of recreation. Like noise from recreational boating, snowmobiles, and other activities, the development of naturally beautiful locations for tourism activities may conflict with interests related to recreation. Conflicts of interest can arise, for example, between canoeists and jet-ski users.

Wind farms at sea that affect the appearance of the landscape can have a negative impact on recreation and tourism, especially in areas of natural beauty. Military exercises may also hinder recreation in a particular area for all or parts of the year. At the same time, the Armed Forces' claims on the sea prevent the construction of permanent installations that would affect the appearance of the landscape in the area in question.



There is also conflict of interests between recreational and commercial fishers, since they in some cases are competing for the same resource. For recreational fishing to be attractive, there must be a thriving fish population, not just in terms of numbers but also with regard to a natural variety in the age and size of the fish, with large individual fish and a natural geographic distribution of the total population. Another conflict of interest exists between the shipping industry and trolling fishermen; this is most pronounced in the Sea of Åland. Fishing here is conducted for a brief but intensive period, in a limited area close to shipping lanes. One potential conflict is that between wreck diving and the interest in protecting our cultural heritage. Any abolition of shore protection measures could go against the requirements of recreation, i.e., access to the water and shore environments.

Environment and climate

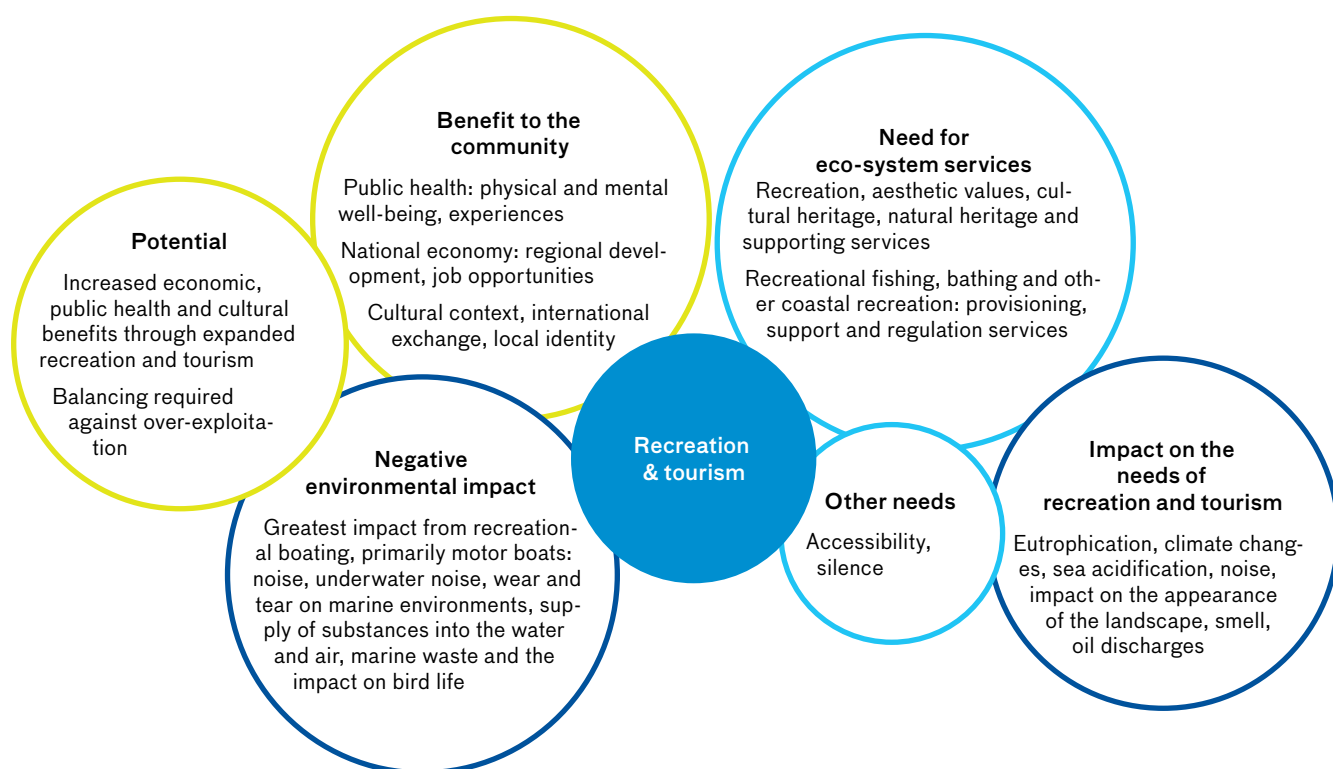
Environmental impact

Recreation and tourism involve a large number of activities that, to a varying degree, require access to a healthy sea and various ecosystem services. But even if tourism and recreation require ecosystem services from nature, the actual activities may negatively impact on the environment in several ways.

Motor-driven traffic at sea, from large cruise ships to small motor boats, increases the number of discharges into the sea. The sea's nutrient level increases due to nitrogen in the fuel and latrine emissions. Recreational boating may also have a negative impact on the seabeds through mechanical wear and tear in valuable shallow water areas, such as eelgrass meadows. Other forms of transportation used for recreation and tourism also use motor-driven transport to a large degree. Passenger vessels discharge approximately 76,000 tonnes of nitric oxide into the Baltic Sea every year. Weekend/holiday homes and commercial accommodations produce sewage that results in nitrogen and phosphorus leaking out into the sea. In this way, even land-based tourism and recreation affects the eutrophication of the sea. Other pollutants in the sea come from various types of boat paint. These pollutants are found in the water and bottom sediment, and accumulate in fish and shellfish. Tourists who holiday by and in the sea also produce litter, which is washed ashore or left on the beach.

The environmental impact of the transport system, in the form of emissions into the air, noise and the consumption of finite resources can also be accounted for under tourism. Noise from jet-skis and other motor-driven recreational boats is a growing problem, as their usage increases. Disruptive recreational activities such as these have a negative effect on other types of tourism and recreation. As tourism increases, there is also a risk of areas with high natural values becoming over-exploited and of plant and animal life being negatively affected by anchoring and the intensive use of natural harbours.

Climate



Increasing levels of tourism mean more emissions of carbon dioxide, since many foreign tourists travel long distances, often by air. Cruise ships and motor boats also cause such emissions. Climate changes can affect the preconditions for tourism and recreation in several ways. A warmer climate could threaten the freeze-up of the Bay of Bothnia archipelago and shorten the double seasons here, both summertime and wintertime. A warmer climate could, over the long term, make holidaying in Sweden more attractive. On the other hand, increased rainfall during the summer could have the opposite effect. Changes in temperature and salt content affect the fish population and the conditions for recreational fishing. Rising sea levels is something that will not affect coastal conditions in the north of Sweden, other than in the very long term, as land in this region is rising more rapidly than elsewhere. In Skåne, where land is already sinking, this tendency may become more exaggerated and the erosion of shorelines may increase.

Claims and goals

Recreation and tourism have varying requirements for the sea, including high natural and cultural values, good accessibility and service, good water quality and abundant plant and animal life (e.g., strong fish population with natural size distribution).

Goals and strategies

Policy goals

The economic policy goal to promote sustainable economic growth and increase employment through more and expanding businesses is important to recreation and tourism.

In 2010, the Government drafted a proposition indicating the goals for recreation in the future (prop. 2009/10:238). The proposition states that nature is to be accessible to everyone; that personal, non-profit involvement is of central importance; that the legal right of access to private land is to be defended; that sustainable use should take the requirement of recreation into consideration; that the municipalities should be strongly responsible for the nature close to urban areas; that recreation should contribute to rural development and regional growth; that protected areas are an asset to recreation; that recreation has a given role in the work of the schools; that physical activity and relaxation strengthens public health; and that decisions regarding recreation should be made based on a good level of knowledge.

Tourism strategy

Svensk Turism, which is part of VisitSweden, has produced a national strategy for the Swedish tourist industry. The vision in the strategy is that tourism is to become Sweden's new core industry, and that tourism is to double by 2020. The vision contains the goal for Sweden to become one of Europe's most attractive travel destinations, with strong brands at national and destination level. Sweden is also to be known as a modern, exciting and sustainable destination in proximity to nature, providing a combination of big city and countryside-based experiences that are hard to beat. At the same time, the Swedish tourist industry is to be developed into a competitive and profitable industry with ecosystem services of increasing added value.

Strategy for recreational fishing and tourism based on fishing

In 2013 the Swedish Board of Agriculture and the Swedish Agency for Marine and Water Management published a joint strategy with their vision and goals for recreational fishing and fishing tourism up to the year 2020. According to the strategy, recreational fishing is to continue at least at its current level, and fishing tourism is to double at the least. National fisheries management and fish conservation are to be conducted based on a long-term, ecosystem-based plan and aim to optimise the economic value of fishing resources within the scope of long-term, sustainable usage.

Planning relevance






There are many potential conflicts of interest between various elements of recreation and tourism, but also between this sector and other interests in the sea and conservation. The sector is of considerable and growing economic importance. Outdoor and tourism activities often take place on the coast and, to a lesser extent, at sea. These, on the other hand, are affected by sea-based activities.

National interests

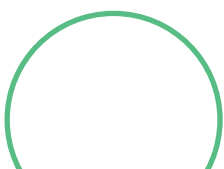
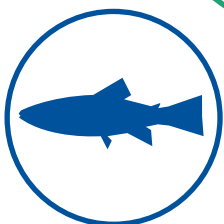
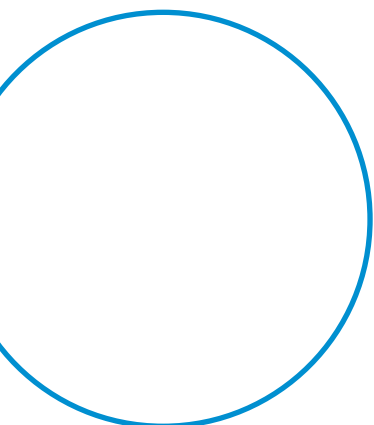
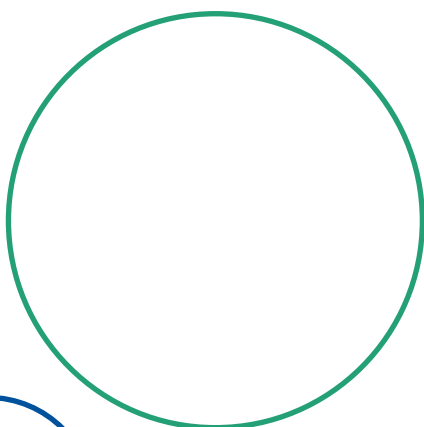
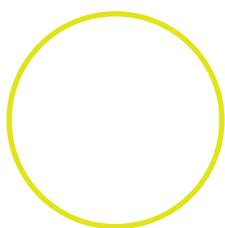
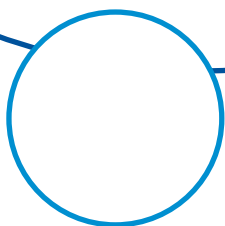
The national interest claims for recreation are defined as areas with major "outdoor values" due to particular natural and cultural qualities - recreational fishing is also included in these claims. Variation of countryside is a natural quality that is important for recreation. The areas with national interest claims have such great outdoor values that they are, or could be, attractive to a great number of visitors. The national interest claims for recreation are currently under review, specifically with regard to nature in proximity to urban areas.

There are also geographically demarcated national interest areas, which have been determined by the Riksdag. These areas have such great natural and cultural qualities that they are, or could be, attractive to a great number of visitors from all or most of the country, or to visitors from overseas.

National interest claims and national interests in recreation, in accordance with Chapter 3 and 4 of the Environmental Code

-  National interest claims Environmental Code Ch.4 §2
-  National interest claims Environmental Code Ch.4 §3
-  National interest claims Environmental Code Ch.4 §4
-  National interests in recreation Environmental Code Ch.3 §6
-  Plan area

Commercial
fishing



Importance to the community

The commercial fishing industry provides consumers and fishfeed manufacturers with fish, at the same time as it provides job opportunities and contributes to the identity and vitality of coastal communities. Commercial fishing and related activities also strengthen the local cultural environment and, in many cases, attract tourism.

The direct contribution of commercial fishing to the Swedish economy, the value added, amounted to approximately SEK 560 million in 2011, at the same time as the industry provided year-round employment for around 1,000 people. These figures do not include port operations, fish processing and other activities related to the Swedish fishing industry.

Actors

Many fishing companies are members of producer organisations that can be found at both regional and national level, some of which concentrate on specific fisheries. At the same time, the majority of Sweden's commercial fishers are members in one of the trade associations. There is a specific organization for those with individual fishing rights.

The Swedish Agency for Marine and Water Management has the overall responsibility for how fishing is conducted and the rules that apply. The Swedish Board of Agriculture is responsible for market issues and the development of the fishing industry. The Swedish Coast Guard conducts control activities at sea, while the Swedish Agency for Marine and Water Management is responsible for the same on shore. Other agencies – the National Food Agency, for example – also work with issues that are directly connected with commercial fishing.

Use of the sea

The Gulf of Bothnia, the Baltic Sea and the Skagerrak/Kattegat have different physical and ecological conditions for the production of fish. The ecosystems of the Gulf of Bothnia and the Baltic Sea have a relatively simple structure with few dominating species, which also makes the ecosystem very sensitive. Many of the species here live near their tolerance limit for salt content and could be exceptionally sensitive to impact. However, the Skagerrak/Kattegat area has high biodiversity and productivity is higher in all links of the food chain. In the Gulf of Bothnia and the Baltic Sea, the composition of species changes from south to north as a consequence of the decreasing salt content, which means that the proportion of marine (saltwater) species decreases while the proportion of freshwater species increases. Several important species of fish, for example herring and sprat, occur in all three areas, while others are unique to their respective waters. Cod can be found in both the Skagerrak/Kattegat and the Baltic Sea.

Fishing activity

Sweden has the longest continuous coastline in the EU and Swedish commercial fishing is conducted in the several different marine areas surrounding the country. Swedish (commercial) fishing is conducted more or less intensively in the Baltic Sea, the Kattegat, Skagerrak and the North sea, but also periodically in the Norwegian Sea. The fishing activity varies geographically and over time. Small-scale fishing is conducted within limited areas and sometimes on a stationary basis, while other forms of fishing are more flexible and are conducted over large areas. Fishing locations vary between seasons, but also depend on how fishing opportunities develop.

In terms of catch areas, the Baltic Sea (including the Gulf of Bothnia and the Öresund) has the largest share with 65 per cent of the total Swedish catch, followed by the North Sea at 20 per cent and the Skagerrak/Kattegat at 16 per cent. Fishing from the vessels of other EU countries occurs in both Swedish territorial waters and the exclusive economic zone.

Pelagic fisheries refer to fishing for species that live in the open seas, as opposed to coastal waters or near the seabed.

Demersal fisheries refer to fishing near the seabed, for example bottom trawling.

Important species

During 2012, Swedish fishing vessels landed approximately 150,000 tonnes of fish at a value of SEK 788 million. The most economically important species are herring and sprat, which are primarily caught through pelagic fishing with trawl or seine; and cod, Norway lobster and Northern prawn that are caught through bottom trawling as well as cod and Norway lobster that are caught with passive fishing gear. The species named above account for roughly 85 per cent of the Swedish fishing industry's total catch. The major pelagic catches – herring and sprat – come from the Baltic Sea, in particular an area south of Gotland between Poland and Sweden, and from Skagerrak. The largest catches of demersal species come from catches south of Hanö Bay in the Baltic Sea and the area outside of Gothenburg, as well as from the central Skagerrak.

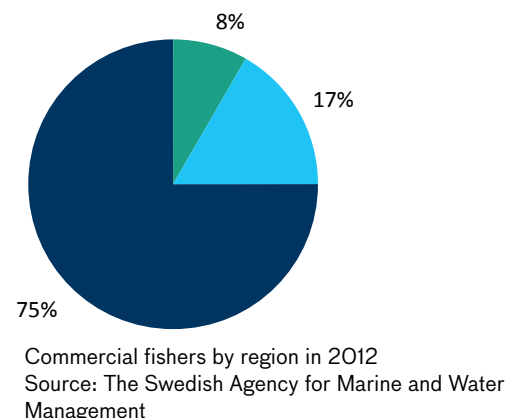
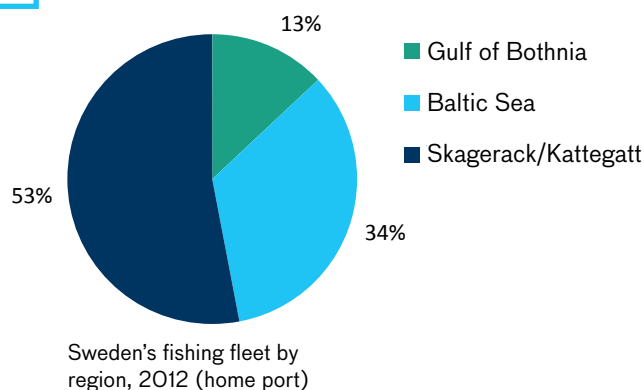
In the Bay of Bothnia, vendace fishing predominates both economically, even if fishing is only conducted during a short period in the autumn. Vendace is fished for its caviar, which fetches a high market price. In the Bothnian Sea, the Baltic herring is the most important catch, both for the Swedish fishermen who provide the surströmming (fermented herring) industry with raw ingredients, and for Finnish fishermen who have access to Swedish waters. In the Baltic Sea, fishing is primarily focused on cod, herring and sprat. In the Kattegat, Skagerrak and the North Sea, fishing is more varied and includes Northern prawn, Norway lobster and a mixture of fish such as cod, haddock and saithe. Mackerel, herring and sprat are also fished in these waters.

Vessel permits

As of 1 October 2014, commercial fishing licenses are no longer required for fishing in the ocean, only vessel permits. Vessel permits and special vessel permits also changed their name to fishing licence.

Fishers and fishing vessels

At the start of 2013, 1,377 persons possessed commercial fishing licenses for fishing at sea. In addition, there are fishermen working on board without their own licenses or under private rights. 54 per cent of the fishermen lived in the counties of Västra Götalands and Halland, 34 per cent in counties along the east coast and 13 per cent near the Gulf of Bothnia. The average age for Swedish commercial fishermen was 54. At the same time, there were 1,376 vessels licensed to fish (of which 1,000 are assessed as active). Almost



Fisheries management

In order to avoid the over-exploitation of fish resources there are comprehensive regulations concerning fisheries management, which limits both the fishing activity that may be conducted and the amount of fish that may be caught. There are restrictions regarding where, when and how fishing is to be conducted. For the most commercially important species there are annual quotas set at the EU level and distributed between the member states. In order to achieve stability and a long-term perspective within the fisheries management there is a system of management plans for certain fish stocks.

In Sweden there is a specific boundary inside which trawling is not permitted, with the exception of "trawling areas". In the Gulf of Bothnia, the Baltic Sea and the Skagerrak, this boundary extends four nautical miles from the baseline. In the Kattegat, the boundary is set at three nautical miles. In the Öresund, trawling is generally not permitted. The trawling boundary very closely follows the boundary for access into Swedish territorial waters that applies according to agreements made with Danish, Norwegian and Finnish fishermen. There are also a number of fish protection areas along the entire Swedish coast and further out into the Baltic Sea and Kattegat where fishing is not permitted year round or for parts of the year.

Fishing regulations

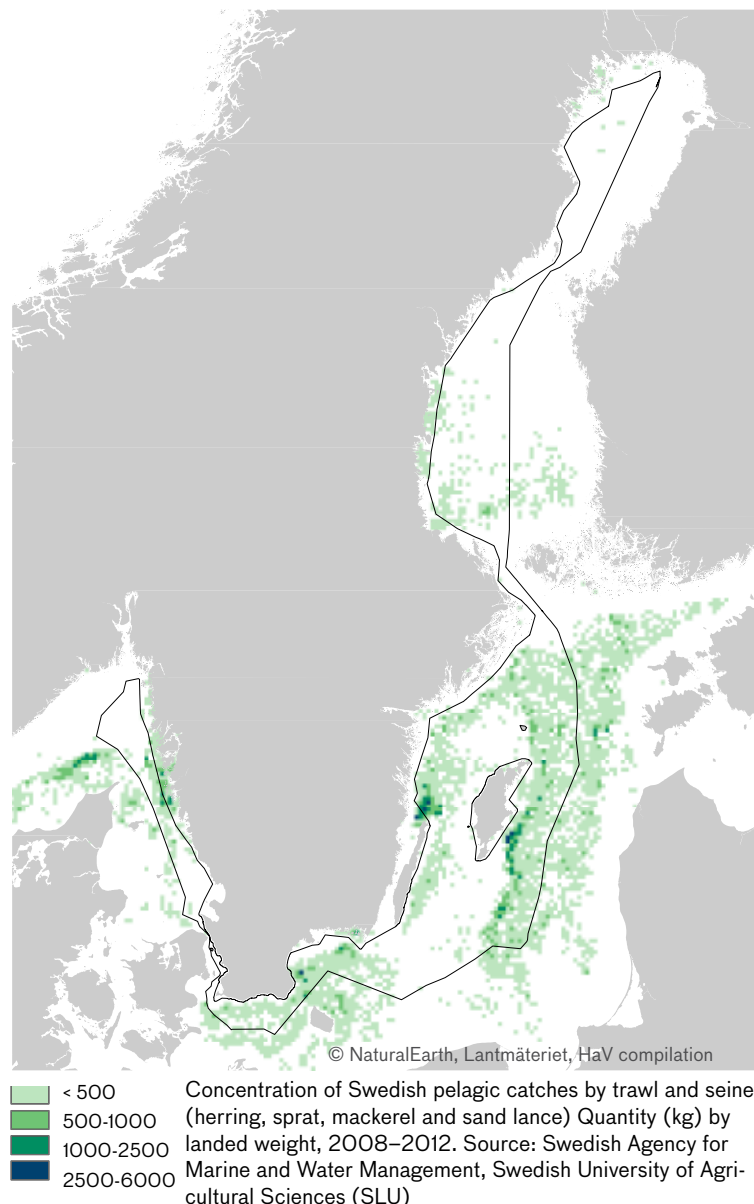
- Trawling boundary
- Trawling is not permitted
- Exception areas
- Protection areas
- Trawling areas
- Plan area

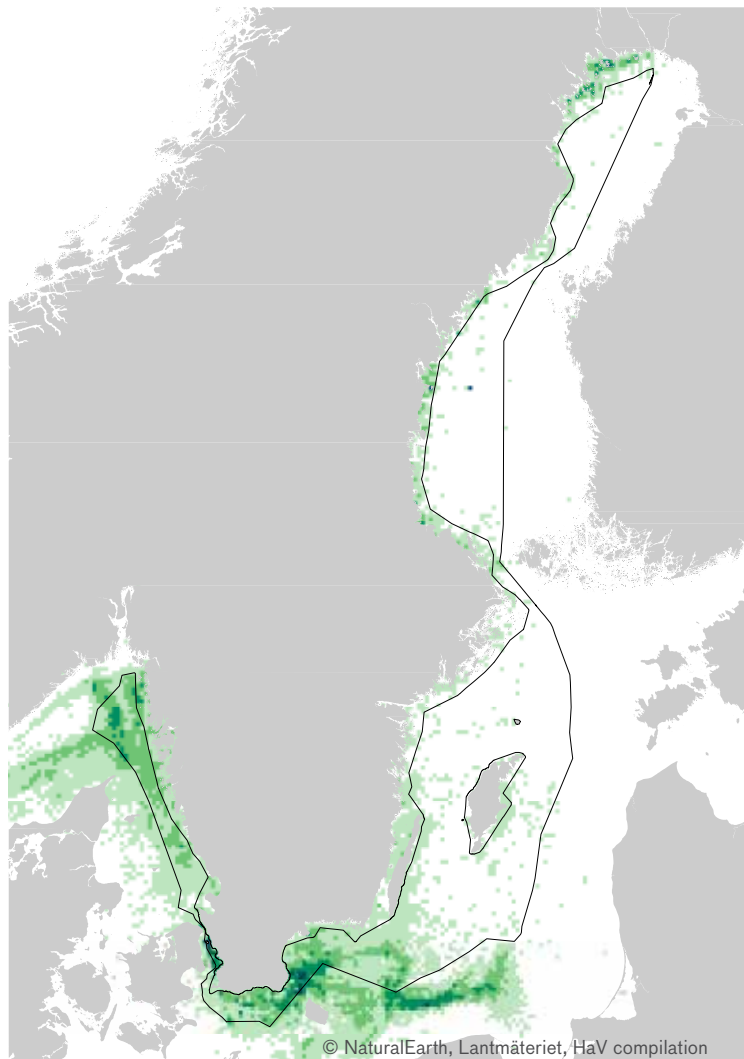
90 per cent of the vessels are less than 12 metres long. However, vessels larger than 12 metres accounted for approximately 85 per cent of the total capacity. Limited introduction of new vessels means that the fishing fleet is becoming older and older. Roughly half of the vessels have their home port on the west coast but many of the vessels are used for fishing both in the Baltic Sea and in the Skagerrak, Kattegat, North Sea and – in certain years – in the Norwegian Sea. Vessels with home ports on the south and east coasts and in the Gulf of Bothnia normally fish locally or regionally.

Ports

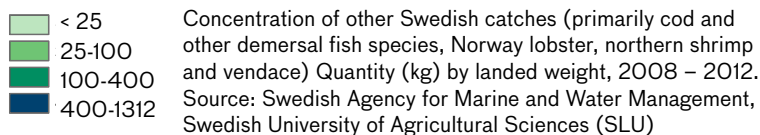
Even if fish are landed at many different locations, a few ports account for approximately 90 per cent of all landings in Sweden in terms of quantity, namely the counties of Gävleborg (Norrundet), Kalmar (Västervik), Gotland (Ronehamn), Blekinge (Nogersund, Karlskrona), Skåne (Simrishamn, Trelleborg, Skillinge) and Västra Götaland (Rönnäng, Ellös, Mollösund, Kungshamn, Gothenburg, Smögen, Strömstad). Traditionally, significant quantities are also landed in Denmark, especially pelagic fish such as herring

The major pelagic catches come from an area south of Gotland between Poland and Sweden, and from an area off Sweden's west coast. In the Bothnian Sea, fishing for Baltic herring is important.





The largest catches of demersal species come from catches south of Hanö Bay in the Baltic Sea and the area outside of Gothenburg, as well as from the central Skagerrak. In the Bay of Bothnia, fishing for vendace is particularly important.



and sprat. In 2012, the landing of Swedish catches in Denmark amounted to approximately 40 per cent of the total Swedish fish landings. Furthermore, a large part of the fish landed in Sweden is then sent to Denmark.

The processing industry

The Swedish fish processing industry uses Swedish raw ingredients to a limited degree. The more large-scale processing industry on the west coast imports raw ingredients from countries outside of the EU, primarily Norway and Iceland. Facilities that receive or process Swedish fish can be found in Simrishamn (herring) and Varberg (cod). Along the Gulf of Bothnia there are industries that produce surströmming (fermented herring) and prepare roe from vendace.

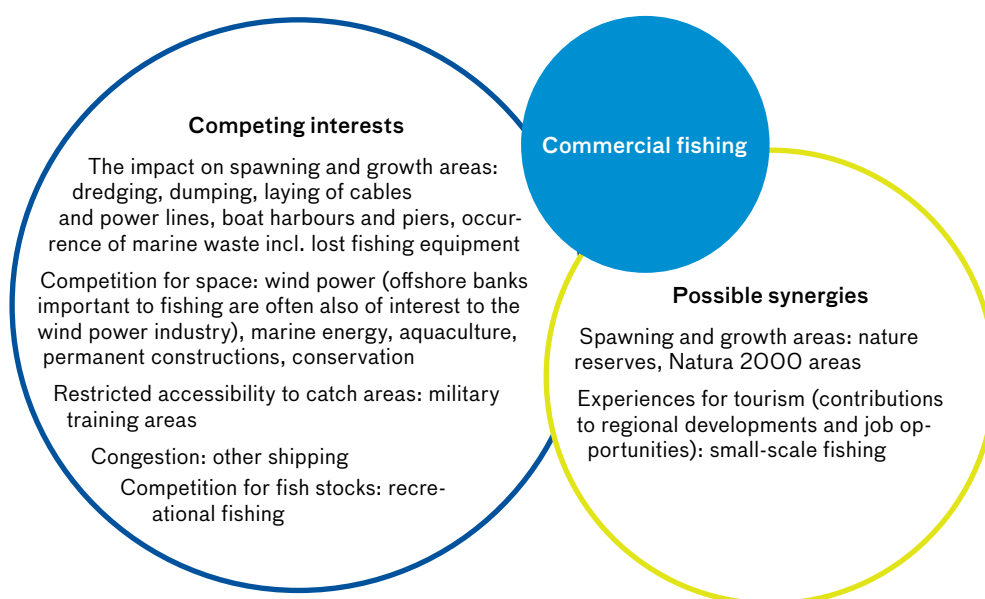
The cod, herring and sprat that is caught is mainly for export, while smaller quantities are sold at local fish markets. However, the Swedish fresh fish market is important for northern shrimp and Norway lobster.

Developments and trends

The restructuring that has long been under way in the Swedish commercial fishing industry is expected to continue. The capacity of the fishing fleet and the number of professional fishers is declining at the same time as the technical capacity of the remaining vessels is increasing. In recent years, vessel capacity has been reduced severely, both in respect of trawling for cod and with regard to the more extensive pelagic fishing for herring, sprat and sand eel. Smaller-scale fishing has also declined and fishing is now often combined with other activities. The changes have had a negative impact on the preservation of the cultural heritage in respect of fishing boathouses, harbours and boats.

The reform of the EU's fisheries policy, which entered into force on 1 January 2014, means that the fisheries policy will contribute explicitly to the achievement of a good environmental status in the EU's marine areas by 2020. The reform means that the maximum, allowable fish catches will be governed by the principle of maximal sustainable yield, i.e., no more fish may be removed from the stock than will allow the population to recover within a year. With a few exceptions, it will also be forbidden to throw fish overboard. The gear primarily used to catch the type of fish in question is to be developed. The traceability of fish products is being improved, both through increased labelling requirements and through industry initiatives. More fish stocks are expected to be covered by multi-year management plans, which will improve the stability of the management.

With better management, it is more likely that a greater number of fish stocks will fall within safe biological limits. Natural fluctuations also affect the development of certain stocks, as does climate change.



Commercial fishing and other interests

Competition with other activities is about access to fishing areas and landing harbours, as well as how other activities affect fish habitats and resources. It also concerns the environmental impact of fishing and how fish resources are affected by the environmental impact from other activities. In certain cases, the interests of the fishing industry are the same as those of other interested parties. There are also different interests to be found within and between commercial and recreational fishers.

There may be reason to restrict fishing for conservation reasons in sensitive areas. Fishing can have major impact on the marine ecosystems, especially in respect of those species that are to be caught, but also in respect of other species and habitats that may need to be protected.

Aquaculture facilities can hinder opportunities for fishing and can impact spawning beds. For fishing with nets, aquaculture facilities can have positive effects as the biomass and diversity of species increase in connection with fish and mussel farming, partly due to the fact that these structures provide hiding places for fish and other animals, and partly because the nutrient leaks from the farming lead to a higher level of local primary production.

Off shore wind power and fishing sometimes compete for space at sea as the good fishing areas, especially the shallow ones, can also be of interest to sea-based wind power companies. For safety reasons it is generally inappropriate to conduct trawling, for example, inside wind farms; sometimes the restrictions have been set much stricter than that.

Sea-wave power can have a similar impact on fishing to wind power, as a result of the location of its foundations, or similar, on the seabed. As far as other shipping and fishing are concerned, there is a risk for conflicts in heavily trafficked areas or if a shipping lane is established that makes fishing difficult. Military exercise and firing ranges can worsen accessibility to fishing.

Dredging, dumping, constructing boat harbours and laying cables or power lines can sometimes affect the areas and habitats important to spawning or growth, or are important migratory routes that are important to certain fish species. At the same time, actual fishing – especially trawling – can be made more difficult. Fishing with trawls can lead to mechanical damage to shipwrecks, and there is a risk that parts of the wreck could be spread out over a large area.

Environment and climate

Environmental impact

Fishing affects the size and structure of the fish populations, both for the targeted species and the ones caught unintentionally, as well as for marine mammals and birds that get stuck in the nets. Equipment lost at sea also constitutes a problem. The reduction in the number of fish higher up the food chain also has consequences for the ecosystem at large. Bottom trawling leaves trails on soft seabeds that can affect bottom-dwelling creatures, which can result in changes to the compositions of species. Fishing also affects the environment in the same way as other maritime traffic through discharges into the air and water.

Ghost nets kill fish, birds, and marine mammals every year in our oceans. Lost and forgotten nets and implements such as cages and fish traps remain in the seas, still catching fish.

Stock size

Annual monitoring and surveys form the basis of scientific assessments regarding the size of the fish population and the quantity of fish that may be caught. Based on these limits, assessments are made of whether a particular fish population is sustainable and whether it falls within safe biological limits.

Ecological disruptions affect the stock

Changes in the surrounding ecosystem may affect the structure of the fish population and the conditions for fishing, but the amount of fishing can also give rise to changes in the ecosystem. Eutrophication from agriculture and sewage treatment works, for example, can affect ecology in the sea. The supply of nutrients leads to the increased production of algae which has a huge impact in certain areas. For many years, environmental pollutants such as dioxin, PCB and mercury have found their way into the sea; these pollutants do not easily break down and can collect and become stored in the fatty tissue of animals and humans. Increased shipping has meant that the dissemination of non-native species has increased. Discharges can also harm fish habitats and habitats can be affected by the wake of boat traffic. Fish resources are also affected by physical disruptions to the ecosystem, which can be caused by dredging, construction, lost fishing equipment and noise. One important influencing factor is shoreline development, which can lead to fish spawning habitats being destroyed in coastal areas.

Climate

Changes in climate can affect not only the geographic distribution of fish but also their reproduction and their access to food, factors that need to be taken into consideration in the management of fish populations. In the Baltic Sea, large-scale climate changes are reflected in an increase in the average sea water temperature, but also through a reduced salt content due runoff and a change in the rate of discharge. Changes in the distribution of fish can have consequence for commercial fishing in so far as a fish population can move away from a traditional catchment area, or a population might become severely reduced.

Climate change is also expected to lead to a change in wind conditions that will make fishing more difficult, especially fishing with nets and trawling with smaller vessels.

Claims and goals

One prerequisite for fishing is access to healthy fish stocks. Healthy fish stocks require that fish have access to the right habitats during the life cycle. Areas for fish reproduction and growth are particularly important. Commercial fishing therefore depends on these habitats being sufficiently protected.

For fishing to be possible, accessible fishing, harbours and landing locations are also important, as is the ability for fishing vessels to move freely between these places. One particular challenge is that fishing is dynamic over time, and fishing must therefore adapt to the development of the fish population with respect to its size, its density and its distribution. There is also an economic dynamic related to market conditions and the profitability of the fishing companies.

National interests

Current national interest claims for commercial fishing refer to areas in the sea, domestic lakes, rivers and harbours and were indicated in 2006 by what was then the Swedish National Board of Fisheries. Since 2011, the Swedish Agency for Marine and Water Management is responsible for national interests.

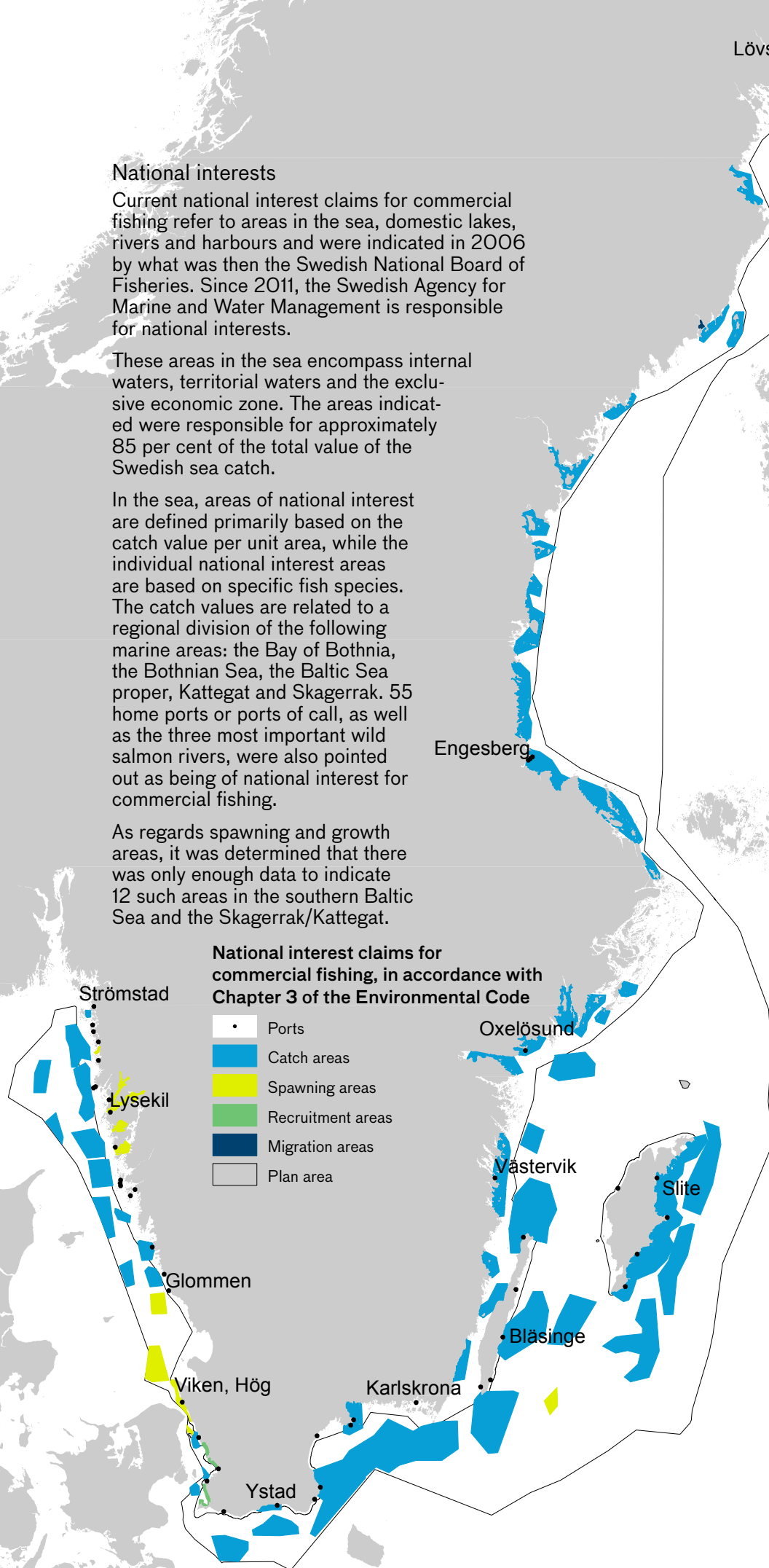
These areas in the sea encompass internal waters, territorial waters and the exclusive economic zone. The areas indicated were responsible for approximately 85 per cent of the total value of the Swedish sea catch.

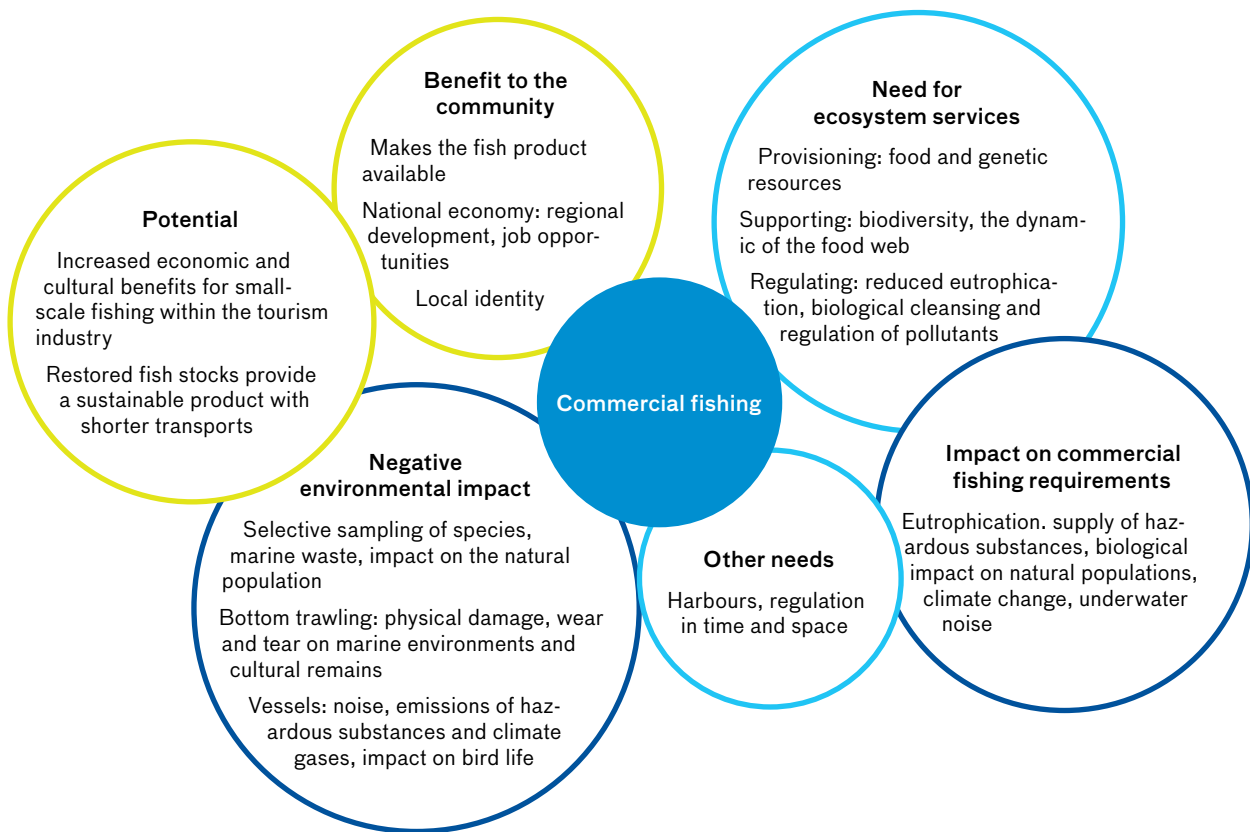
In the sea, areas of national interest are defined primarily based on the catch value per unit area, while the individual national interest areas are based on specific fish species. The catch values are related to a regional division of the following marine areas: the Bay of Bothnia, the Bothnian Sea, the Baltic Sea proper, Kattegat and Skagerrak. 55 home ports or ports of call, as well as the three most important wild salmon rivers, were also pointed out as being of national interest for commercial fishing.

As regards spawning and growth areas, it was determined that there was only enough data to indicate 12 such areas in the southern Baltic Sea and the Skagerrak/Kattegat.

National interest claims for commercial fishing, in accordance with Chapter 3 of the Environmental Code

- Ports
- Catch areas
- Spawning areas
- Recruitment areas
- Migration areas
- Plan area





Objectives within the Common Fisheries Policy

The overall objective of the EU Common Fisheries Policy (CFP) is to ensure that living aquatic resources are utilised in a sustainable manner, from an economic, environmental and social perspective.

For the period 2014–2020 a new fund, the European Maritime and Fisheries Fund (EMFF), will be introduced. The aim of this fund is to promote competitive fishing and aquaculture that is also economically, socially and environmentally sustainable; to support the implementation of the common fisheries policy; to promote territorial development in fishing-dependent areas; and to promote the development and implementation of the integrated marine policy.

The Swedish Board of Agriculture, in collaboration with the Swedish Agency for Marine and Water Management, has developed a technical document in preparation of the forthcoming maritime and fisheries programme 2014–2020. The document contains proposed measures for control and data collection, capacity building, development projects, better water environments, environmentally sustainable fishing and aquaculture, the development of products and processes and the municipal planning of aquaculture. The proposal also includes environmental investments in fishing and aquaculture along with the formation of producer organisations. The regulations have not yet been decided, and programme writing and development of the operative programme are currently under way. There may be changes made before all decisions are finalised.

Environmental quality objectives

Sustainable fishery management is a prerequisite for achieving several of the environmental quality objectives, since both targeted species and by-catch species are affected, as is the whole ecosystem. It is not just the extraction of fish that has an impact, but also the actual fishing, with its impact on the seabed, discharges and boat noise. Small-scale fishing can also be locally significant where it is one of the traditional coastal industries that contribute to a living coast or archipelago.

Issues concerning fish and fishing have a particularly strong link to the environmental quality goals A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, Flourishing Lakes and Streams and A Rich Diversity of Plant and Animal Life. The environmental quality objectives are described with a number of specifications, several of which encompass fish and fishing.

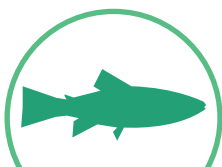
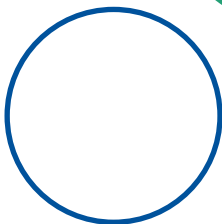
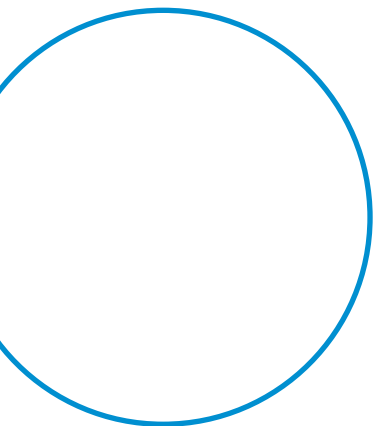
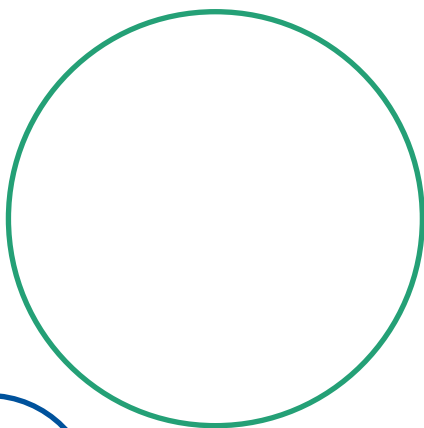
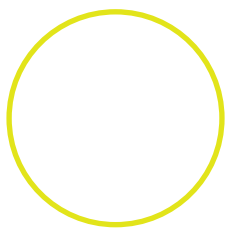
Examples of this include preserved ecosystem services, favourable preservation status, threatened species, an effective green infrastructure, but also specifications regarding good environmental status and good ecological and chemical status. Small-scale fishing is also included in the specifications regarding preserved natural and cultural values.

Other factors may be of significance to fish and fishing too, such as environmental toxins, climate changes and eutrophication. These areas link in to the Reduced Climate Impact, Toxin-Free Environment and Zero Eutrophication environmental quality objectives.

Planning relevance

Fishing is a mobile activity that requires both access to fishing locations and a good fish stock, which in turn is habitat-dependent. Planning issues that concern commercial fishing will be protection for fish habitats and access to fishing locations in relation to other interests, primarily those involving permanent installations. The variability of fishing over time must be taken into consideration in marine spatial planning.

Aquaculture



Importance to the community

The term "aquaculture" encompasses fish, mussel and oyster farming as well as future opportunities that may arise within the realm of marine biotechnology. Aquaculture is currently of minor importance to Sweden, both economically and in terms of regional policy. However, Swedish aquaculture may have good growth opportunities and new job opportunities may be created, not least in archipelagos and sparsely populated areas. New opportunities to develop coastal housing may help to preserve and develop communities, which can also increase their attractiveness for tourism. Mussels consume nutrients such as nitrogen and phosphorus from sea water, something that might help to reduce the problem of eutrophication.

Actors

The Swedish Board of Agriculture has a sectoral responsibility for aquaculture and has a government mandate to promote sustainable Swedish aquaculture. The Swedish Agency for Marine and Water Management is responsible for supervision and guidance regarding aquaculture in accordance with the Environmental Code and handles issues associated with the release of fish in accordance with the Fishery Act. A few operators conduct commercial fish and mussel farming and certain experimental activities are conducted within the aquaculture industry. Vattenbrukarnas riksförbund is the industry's national organisation. There is also a producer organisation for those involved in shellfish farming.

Use of the sea

Fish farming

In coastal waters fish, almost exclusively rainbow trout, are farmed for human consumption. In 2012, 2,838 tonnes of rainbow trout were farmed in nine facilities in the coastal waters of the Gulf of Bothnia, primarily along Höga kusten. In addition to this, 213 tonnes of rainbow trout were farmed in 11 holdings along other parts of the Swedish coast.

Compensatory releases of salmon and sea trout are made by energy companies in connection with their operations in the major Swedish rivers. These releases are based on water judgments made in the Land and Environmental Courts; the majority of these date back several decades. According to applicable water judgments, almost 2 million salmon and approximately 350,000 sea trout are to be released into Sweden's estuaries.

Mussel and oyster farming

The vast majority of the Swedish production of mussels for human consumption occurs in the Skagerrak/Kattegat, in Västra Götaland's coastal waters (over 1,300 tonnes in 2012). In the Baltic Sea, approximately 30 tonnes of common (blue) mussels for nutrient intake are farmed off the northern Kalmar headlands, and small quantities are farmed in experimental facilities off the coast of Malmö/Lomma. There is also oyster farming in the Skagerrak/Kattegat, on a small scale so far but interest seems to be growing.

Developments and trends

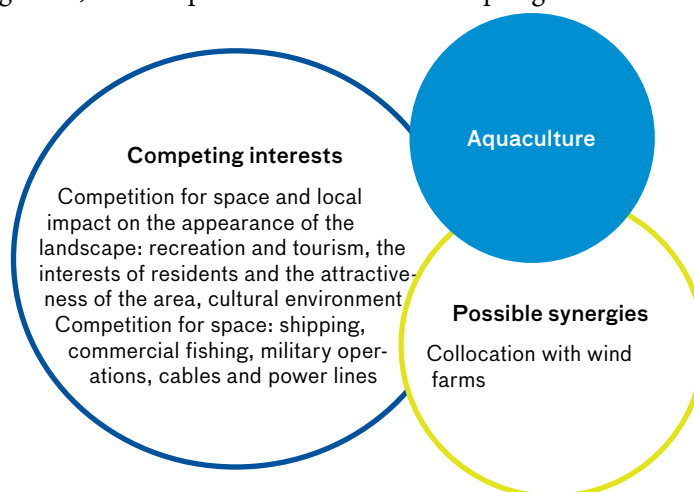
The development of Swedish marine aquaculture has been relatively slow, due to the related legislation being complicated, and many companies have had problems with the initial financing required for such operations. However, the investigation entitled

Det växande vattenbrukslandet (SOU 2009:26) (A growing aquaculture industry) makes the assessment that opportunities for Swedish aquaculture are good, and that new jobs may be created as a result.

On the west coast, discussions are in progress concerning suitable locations for farming rainbow trout in the sea. Sea-based aquaculture would be in need of facilities that tolerate exposure to strong winds and big waves, especially in the North Sea. There are plans to expand mussel farming in Öland and Skåne, and for large-scale test farming in the Baltic Sea within several experimental projects.

The farming of macroalgae is a substantial and growing global market and there is good potential for this type of farming to also grow in Sweden. Many macroalgae-based food and beauty products can already be found on the Swedish market. These are mainly imported, either as finished products or as raw ingredients in the form of the raw seaweed material itself. Many of the species that are currently farmed globally occur naturally in Sweden and the physical conditions for algae farming are good: there is clean sea water with an appropriate salt content and temperature, access to nutrients and sunlight. A pilot study concerning the farming of macroalgae for the production of food, dietary supplements, feedstuffs, biomolecules, ethanol and biogas has recently commenced in Kosterfjorden.

Macroalgae, mussels and other marine organisms—ascidians, for example—are also of interest to biogas producers. In the future, a considerably greater number of marine species may be farmed than is currently the case. Technological developments in respect of the farming of mussels and ascidians are in progress, involving sunken farms that are less sensitive to the impact of waves and ice. This type of farming may, in the long-term, even be possible outside the archipelagos at sea.



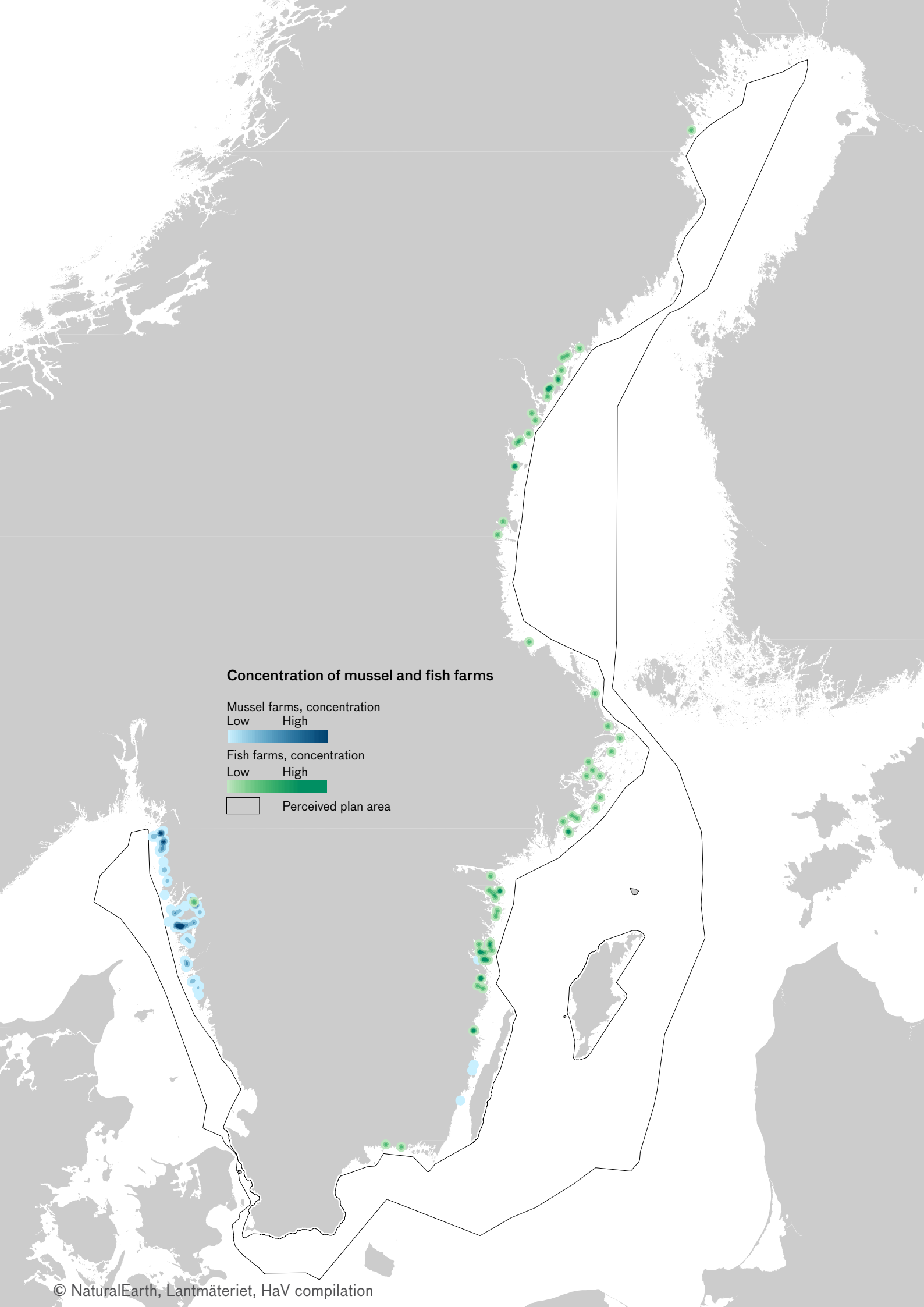
Aquaculture and other interests

Aquaculture facilities can hinder boat traffic and local commercial fishing. Facilities should not be located where there are cables or power lines lying on the seabed, since anchoring and mooring could cause damage. The disruption of the appearance of the landscape may be an argument against the farming of fish and mussels within archipelagos, but it is probably of minor significance at sea. Aquaculture can affect the natural environment in several different ways.

Environment and climate

Environmental impact

Aquaculture affects the environment and the ecosystems in lakes seas through discharges of nutrients. An increased amount of nutrients would be negative, bearing in mind that the sea is already affected by eutrophication. However, the mussels'




Concentration of mussel and fish farms

Mussel farms, concentration
Low High



Fish farms, concentration
Low High



 Perceived plan area

consumption of microalgae means that nutrients are absorbed from the sea, which could reduce eutrophication.

Aquaculture entails a negative impact on the seabed due to accumulations of organic material and a lack of oxygen. This can be reduced by placing the facilities in suitable locations, bearing in mind the type of seabed, the depth and the current conditions.

Many of the feedstuffs used in aquaculture require large catches of fodder fish, and this has a negative impact on marine ecosystems. There are vegetable alternatives and research is under way to examine whether fish feedstuffs can be replaced, for example, by mussels.

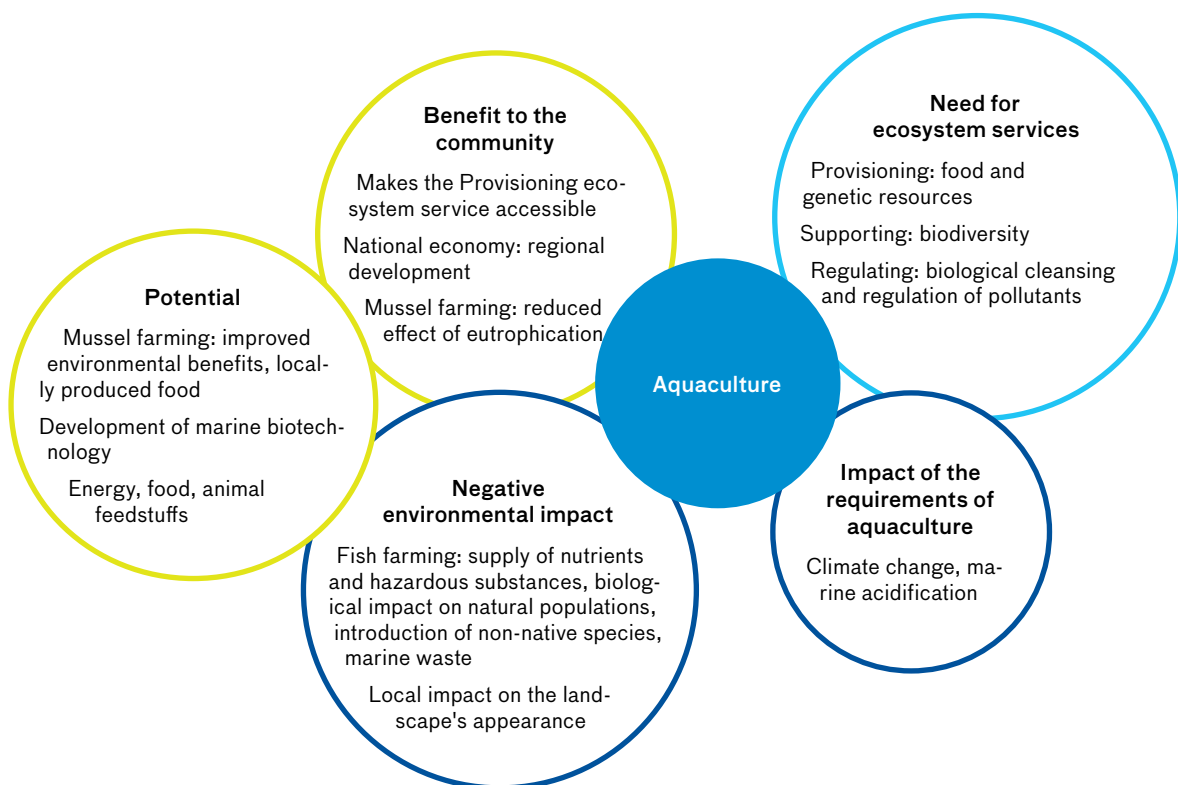
Interaction or hybridisation between wild fish populations and escaped, farmed fish or other farmed fish is a risk, as this can lead to the loss of a genetic variation or genetic changes in strains of wild fish. The introduction of non-native species and strains to our waters entails yet another risk to our biodiversity. The rainbow trout, which is now the predominant fish species in Swedish aquaculture, is not a domestic species and young fish find it difficult to survive in Swedish waters. Fish that escape from farming facilities can still impact domestic fish fauna by competing with brown trout for spawning grounds, and can therefore impact their reproduction.

Farmed fish can also be a source for the spread of diseases and pharmaceutical products. The use of antibiotics within Swedish aquaculture is restrictive and the amount of pharmaceuticals winding up in the water has decreased significantly. Vaccination of farmed fish has increased, however. Toxic pesticides used to prevent algae and mussels from fouling net bags need to be replaced by new, more environmentally-friendly products.

Climate

Fish-farming in Scandinavia primarily involves species of salmonidae that require cold water for their survival. A warmer climate with warmer sea water could have a negative effect on the conditions for farming these species. Other species, such as pike, zander and perch, benefit from warmer water temperatures, but are probably not of interest for farming at sea. The prevalence of disease and parasites may also be assumed to increase with warmer water temperatures.

Discharges into the sea and an increasing carbon dioxide content in the atmosphere contribute to the acidification of sea water, something which could be



problematic for the farming of mussels and oysters, since the layering of calcium would become more difficult. A change in weather conditions, resulting in different wind and wave conditions, could also affect farming. Climate changes affecting the salt content of the water flowing into the Baltic Sea and the Gulf of Bothnia could have major consequences for aquaculture in these areas.

Claims and goals

Sufficient space, good water quality and appropriate hydrological conditions, such as salt content, are factors on which aquaculture depends.

National interests

The Environmental Code contains no provisions regarding national interests for aquaculture, but mentions aquaculture as a public interest.

Marine and fisheries programme 2014 - 2020

The Swedish Board of Agriculture, in collaboration with the Swedish Agency for Marine and Water Management, has produced a technical document in preparation of the forthcoming marine and fisheries programme 2014 - 2020. The document proposes the inclusion of aquaculture in municipal spatial plans, investment support for environmentally sustainable and competitive fishing and aquaculture, support for better animal health and protection, support for aquaculture development, and coordination of fishing and leader areas (leader areas can be found throughout the Swedish countryside and are included in the EU Rural Development Programme with the aim of promoting local development).

National strategy

Trade associations, researchers, interest organisations and agencies have jointly produced a national strategy for the development of Swedish aquaculture, with a vision and goals for its development up to the year 2020. According to the vision, Swedish aquaculture is a growing, profitable and sustainable industry with ethical production. The goals intend, amongst other things, for Swedish aquaculture to produce good, healthy food – food which is sought after by consumers in both Sweden and throughout the world, and which has little environmental impact. The goals also imply that the municipalities need to identify and include suitable locations for aquaculture in their master plans.

Environmental quality objectives

The environmental quality objectives that principally apply to aquaculture are Zero Eutrophication, Flourishing Lakes and Streams, A Balanced Marine Environment and Flourishing Coastal Areas and Archipelagos, and A Rich Diversity of Plant and Animal Life.

Planning relevance

If the industry expands and aquaculture is located further out to sea, conflicts of interest over space could arise. The environmental impact caused by aquaculture cannot be dealt with through marine spatial planning, apart from where the location of facilities is concerned.

Shipping



Importance to the community

Shipping is the mode of transport that accounts for the lion's share as far as Swedish foreign trade is concerned—approximately 90 per cent measured by volume, or approximately 180 million tonnes per year. In addition to this, approximately 30 million passengers are transported per year by ferry to and from Sweden's neighbours. The shipping sector and shipping-related companies employ around 100,000.

Swedish industry is dependent on an effective transport system since this system affects the costs of geographic transactions. For the transport system to function optimally, the various modes of transport need to cooperate with each other. Shipping is the most significant mode in respect of the export of raw materials, which is intensive, and for other industrial sectors that export large volumes. In order to improve the efficiency of the transport system, the interplay between shipping, road and rail transportation needs to be improved. The ports are important locations for the forwarding of goods.

Actors

There is currently no one agency that has a dedicated responsibility for the shipping sector. The Swedish Transport Administration, the Swedish Maritime Administration and the Swedish Transport Agency have responsibility for different parts of the shipping sector.

According to a report produced by the Swedish Agency for Growth Policy Analysis, there were a total of 1,124 Swedish companies operating within sea transport in 2007. Of these, 155 were defined as shipping companies by the Swedish Shipowner's Association. As regards size, these companies were completely dominant within the group, with approximately 93 per cent of all employees and 97 per cent of turnover. The other 969 companies were classified as "other sea transport" and consisted primarily of small operations within towing, taxi boats or shipping on internal waterways.

Use of the sea

Around 60,000 vessels of different types pass in and out of the Baltic Sea annually. At any given time, there are around 2,000 vessels trafficking the Baltic Sea. For shipping traffic to and from the Baltic Sea there are three alternative routes: Öresund, the Kiel Canal and the Great Belt.

Cargo transportation

Of cargo volumes, which in 2010 amounted to roughly 170 million tonnes, around four-fifths was transported by cargo ships; ferries accounted for the other one-fifth. Gothenburg is the only Swedish port of call for transoceanic container lines, while a significant proportion of the cargo is reloaded in any of the larger European ports onto or from smaller vessels. The flow of cargo to and from Sweden primarily concerns the major transoceanic ports in the North Sea and the English Channel, such as Antwerp, Rotterdam and Hamburg.

The shipping of goods overseas has increased in the last decade, while domestic transportation has remained relatively constant. In a normal year, domestic shipping only comprises about seven per cent of total shipping transports, calculated as a percentage of goods. Petroleum products, minerals, and limestone and cement are the main goods transported.

**Contributing cargo
(in 1,000 tonnes)
in the ten largest
ports, 2012.**

Source: Sveriges
Hamnar

Gothenburg 41,100
Brofjorden 18,700
Trelleborg 10,700
Malmö 8,800
Luleå 8,300
Helsingborg 7,900
Karlshamn 5,200
Stockholm 4,300
Oxelösund 4,100
Gävle 4000

**The ten largest
ports 109,500**

**Total for Sweden
173,000**

Passenger traffic

Passenger traffic is also of great importance, and there is a large number of international ferry links. A total of nearly 30 million passengers travel by sea every year. This is a couple of million more than travel by air in Sweden. Sweden has ferry links with Norway, Denmark, Germany, Poland, Lithuania, Latvia, Estonia, Russia and Finland. Cruise traffic in the Baltic Sea accounts for over two million passengers annually.

Ports

The ports in Sweden are important logistic hubs in the intermodal transport chains, both regionally, nationally and internationally. Major flows of goods are handled by ports in southern Sweden, western Sweden and the Stockholm area that are located near the major population centres. The ten largest ports account for about two-thirds of the goods turnover. The ports fulfil different functions within the transport system and this has affected their location and their specialisations in different types of goods. Swedish basic industry relies greatly on port operations; ports have been located close to industry, for example in Luleå.

Waterways and vessels

Sweden's waterway system is divided into four classes; it is primarily classes one and two that are used for commercial shipping. Classes three and four are used for smaller vessels and for recreational boat traffic. For all waterways there are restrictions regarding the size of vessels that may use them. They are marked in different ways and adapted to the type of traffic for which they are intended. Outside of the archipelagos, in addition to the shipping lanes, there are direct, unmarked routes connecting the lanes.

These direct routes change in the winter, since the vessels take the most accessible route with or without the assistance of icebreakers. In order to keep the sea routes open in the winter, commercial shipping is informed of the best routes based on satellite images, helicopter surveillance and information from other vessels. In extreme circumstances, traffic restrictions may have to be imposed due to thick ice and insufficient ice-breaking resources.

The number of vessels is nearing the limit that the shipping lanes can manage without being widened or deepened. Major investments have been made in recent years in the routes to Gothenburg, Malmö, Stockholm, Norrköping and Gävle. The sea routes to Luleå are being equipped for future needs with "Projekt Malmporten". As part of the national infrastructure plan, preparations are under way to implement measures in the Södertälje canal and locks, as well as on the routes from Mälaren to Västerås and Köping.

Refuge harbours

According to an EU directive, member states are to develop plans that provide protected locations for vessels that are in need of assistance. The Swedish Transport Agency is currently conducting a consultation procedure with the Swedish Maritime Administration, the Coast Guard and the Swedish Agency for Marine and Water Management as regards a proposal for such refuge harbours.

Developments and trends

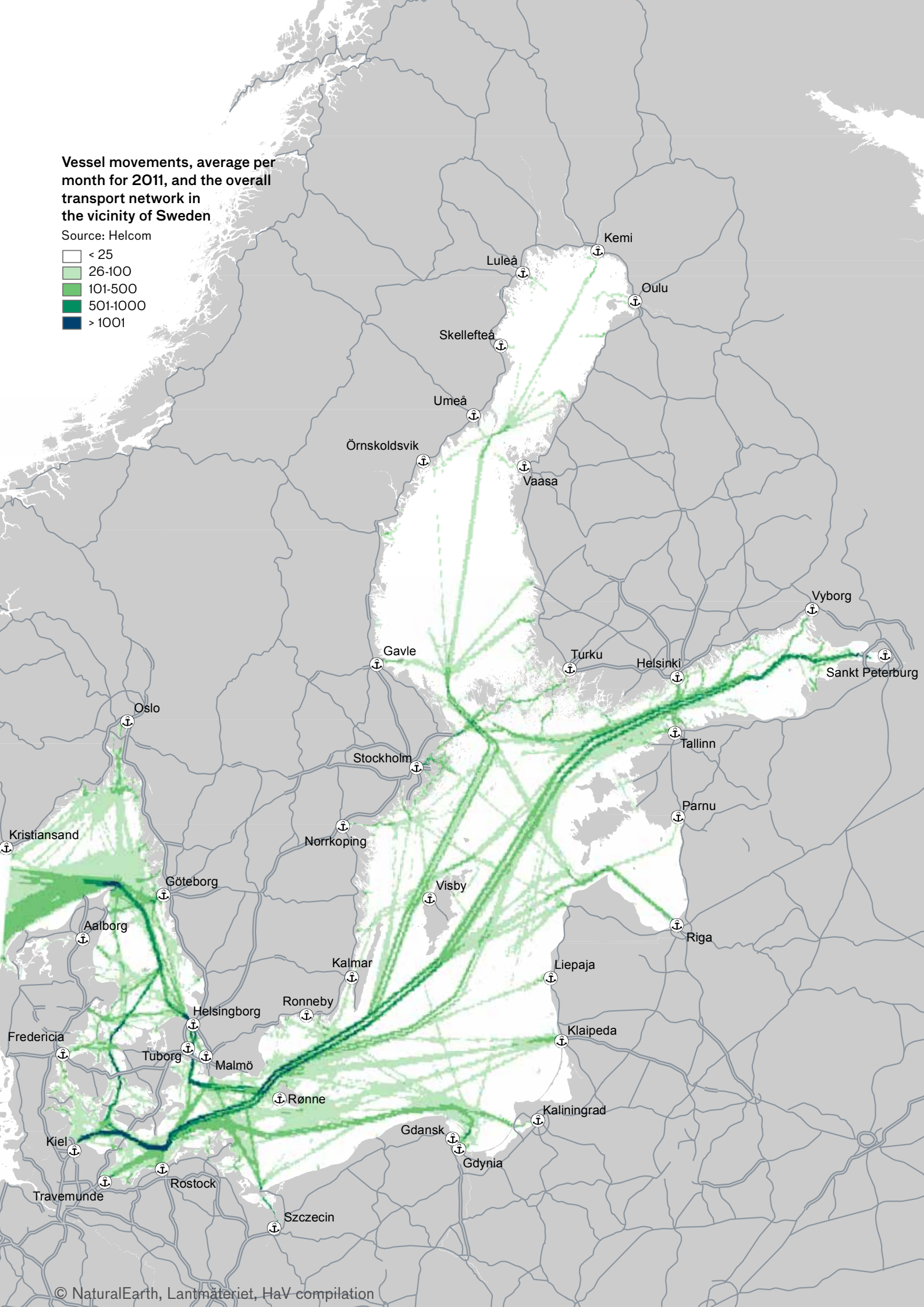
Larger vessels

Vessel size and goods volumes in Swedish ports have increased substantially in recent decades at the same time as the number of vessels has fallen. The shipping of goods overseas is expected to double by 2050 whilst domestic transport volumes are

Vessel movements, average per month for 2011, and the overall transport network in the vicinity of Sweden

Source: Helcom

- < 25
- 26-100
- 101-500
- 501-1000
- > 1001



expected to increase only marginally. Several factors contribute to this: the export of iron ore is increasingly dramatically as a result of increased mining in Kiruna, Gällivare, Pajala and Bergslagen; the import of round timber and wood from eastern Europe is increasing considerably; transportation of refined industrial products is increasing substantially, which is leading to an increased level of combined transport on land and sea.

By 2050, sea transport entering Swedish ports is estimated to increase by a total of 137 per cent, measured in tonne kilometres, and transport within Swedish territorial waters is expected to grow by 77 per cent. Cargo handling in Swedish ports is estimated to increase by 71 per cent, on average. The distribution between the different ports is expected to remain relatively unchanged, and the west coast is likely to retain its dominant position. As far as the future is concerned there are, however, major uncertainties concerning the effects brought about, for example, by the EU's sulphur directive. New demands implying higher transport costs can affect developments.

Increasing demand on waterways

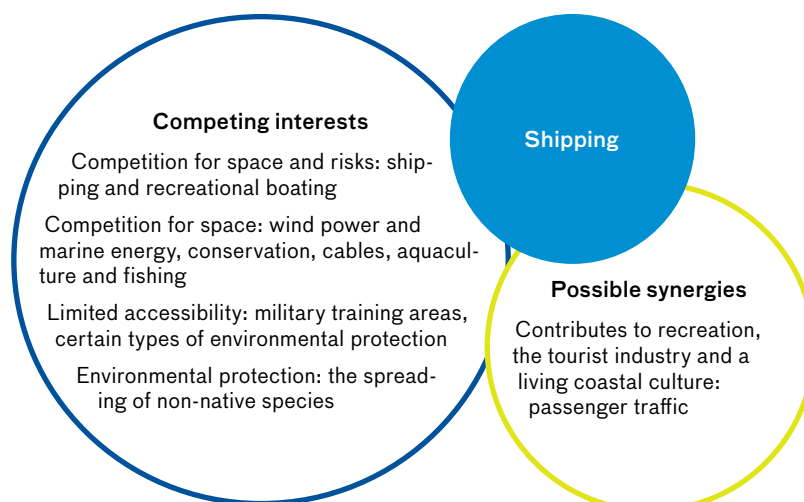
The proportion of goods handled by ferries has increased to nearly 30 per cent since 2001, when it was barely 20 per cent. Cruise traffic in the Baltic Sea continues to grow, with more and bigger vessels. Developments within world shipping mean that vessels calling at Swedish ports are longer, wider and have a deeper hull, and this increases the safety requirements of the lanes in which they sail. The need for investment has increased considerably in recent years, due to safety deficiencies in respect of ports and connected routes, and this need can be expected to increase still further in the future. Measures that could be relevant are primarily those that deepen and widen lanes.

Dredging

Making lanes wider and deeper, and the expansion of ports often involve dredging and dumping dredged materials. Eutrophication of the Baltic Sea has contributed to an increased accumulation of organic sediment in coastal areas and increasing silting of lanes. Land uplift also plays a role in the continual silting up of Sweden's coasts, with the exception of the extreme south of the country. The trend whereby there is an increased need for dredging and dumping of dredged material is likely to continue in the future.

Shipping and other interests

Shipping, as a result of its spatial requirements, may come into conflict with other interests, such as conservation, energy production, fishing and aquaculture. A large part of the shipping is international and a comprehensive picture of shipping in Swedish waters presupposes collaboration with Sweden's neighbours.



Environment and climate

Environmental impact

Shipping has an impact on the environment through discharges into both air and water. While a vessel is in operation it discharges gases into the air, lubricants and oils from propeller casings leak out into the sea, and waste from kitchens, toilets and cleaning accumulates and must be emptied. Non-native species are spread through ballast water and fouling; vessel operation and occasional accidents cause discharges of oil chemicals into the water, which sometimes also reach land. Operational discharges – that is, small, continuous and illegal discharges – constitute the largest portion of oil discharges into the Baltic Sea.

Shipping also has an impact on the seabed and the coast line more directly in conjunction with shipping lanes and ports, for example through erosion and dredging. With dredging operations that involve coarser sediments there is a risk of disruptions in sand transport systems and a risk of erosion of affected areas. With dredging operations involving young, finer sediment that is often polluted by the environmental toxins found in harbours and marinas, turbidity and the spreading of sediment can occur so that the toxins and heavy metals are released and become available to marine organisms. Turbidity itself can also be harmful for marine organisms through preventing access to light or it can have a direct, physical impact by sticking to or damaging the gills of fish. It is particularly important to avoid sensitive period (fish spawning periods, for example) and to avoid and protect sensitive areas. Dumping can be somewhat adjusted so that negative environmental effects are reduced. Dredged material that has been dumped should make as little change as possible to the natural composition of the seabed.

In recent years, awareness has increased in respect of the environmental impact of underwater noise generated by shipping vessels, and research in this field has intensified. It has been noted that primarily marine mammals and fish may be affected by sound – for instance by being forced away from various areas – but there is still a great knowledge gap regarding how continuous low-frequency sound affects marine organisms in the long term.

Effective planning of shipping lanes and routes would help to reduce the burden on the environment by reducing fuel consumption and consequently emissions of carbon dioxide, sulphur, nitrogen and other particles. This would also reduce the risk of collisions and vessels running aground that are often the result of oil or chemicals leaking out into the sea. Through such planning it would also be possible to steer clear of ecologically sensitive areas for all or part(s) of the year.

International rules

The majority of shipping regulations aimed at protecting the environment are international. Opportunities to adopt specific national regulations are limited. The International Maritime Organization, IMO, has highlighted the Baltic Sea as a particularly sensitive marine area within which certain specific measures are to be taken, including traffic management and the stricter application of requirements in respect of discharges and equipment.

The Baltic Sea is a special area in as far as oil, toilet waste and solid waste are concerned, which means that stricter discharge requirements apply for these types of waste. Furthermore, the IMO has also decided to prohibit cruise ships from discharging toilet waste within the special area of the Baltic Sea. This will apply with effect from 2016.

The Baltic Sea and the North Sea have been highlighted as control areas for monitoring vessel discharges of sulphur into the air. Sulphur emissions lead to the

acidification of lakes, streams and seas. In 2008, the IMO decided to reduce the sulphur content in marine fuel within such areas, meaning that fuel may contain no more than 1.0 per cent sulphur by weight from 2010, and 0.1 per cent from 2015. The requirements made of vessels in respect of emissions of nitric oxides will also become progressively more demanding.

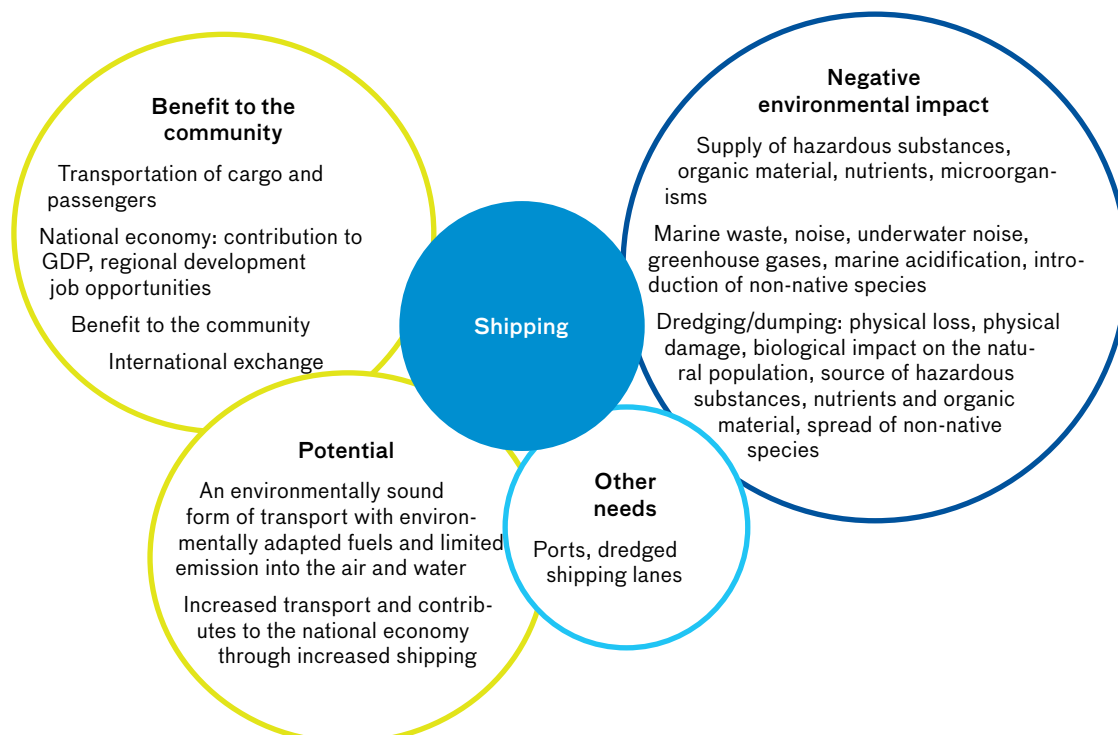
The International Convention for the Control and Management of Ships Ballast Water & Sediments (the Ballast Water Convention) was adopted in February 2004. Sweden ratified the convention in November 2009 and the Riksdag has decided on ballast water legislation. The proposed legislation provides regulations regarding the methods with which ballast water is to be handled. The legislation will not enter into force until the convention has entered into force, which will happen when it has been ratified by a sufficient number of states.

Climate

Shipping affects the climate through emissions of greenhouse gases due to the use of fossil fuels. Between 1990 and 2011, emissions of greenhouse gases from foreign shipping and aviation have increased by 23 per cent. The majority of this increase is due to foreign shipping. Emissions from foreign shipping have increased substantially since 1990 due partly to the amount of goods transportation increasing and partly to the fact that all the more vessels conduct fuel bunkering in Sweden. Within the EU, requirements are being drafted which will lead to large vessels trafficking EU harbours having to monitor, report and verify their carbon dioxide emissions with effect from 2018.

Planning relevance

The requirements of the shipping industry need to be balanced nationally and internationally in relation to other interests in the forthcoming marine spatial planning in respect of safety requirements, accessibility and environmental impact.



Claims and goals

Shipping requires marine space in the form of shipping lanes and direct vessel routes. Space is required on land and adjacent to land for port operations and transport infrastructure. Dredging is required for lanes and harbours.

Read about transport policy goals under Infrastructure on page 114.

National interests





Highlighted national interests for shipping consist of direct shipping routes connected to each other and to an international network, the extent and scope of which is decided by routes established by the IMO and HELCOM as well as by RAIS analyses of actual vessel movements.

Environmental quality objectives

Shipping has links with the Reduced Climate Impact, Clean Air, Natural Acidification Only, Toxin-Free Environment and A Balanced Marine Environment environmental quality goals, as well as Flourishing Coastal Areas and Archipelagos.

National interests

National interest claims for shipping according to Chapter 3 of the Environmental Code

-  Harbour
-  Existing route
-  Planned route
-  Plan area

Defence



Importance to the community

The task of the Swedish Armed Forces is to maintain and develop a military defence with the capacity for armed combat. The Armed Forces must be able to defend Sweden and to promote Swedish security through both national and international missions; they must also be able to detect and repel any infringements on Swedish territory and safeguard Sweden's sovereign rights and national interests outside of Swedish territory. The Armed Forces must be able to carry out such tasks independently, but also in cooperation with other agencies, countries and organisations.

Actors

The Armed Forces are responsible for the military aspect of Sweden's total defence which also incorporates agencies such as the National Defence Radio Establishment (FRA), which monitors signals intelligence in order to identify external military threats to the country, and the Swedish Defence Materiel Administration (FMV).

The Swedish Civil Contingencies Agency (MSB) is responsible for the civil aspect of Sweden's total defence, which includes responsibility for public safety, emergency management and civil defence.

Use of the sea

Exercises

Exercising areas and firing ranges are used to achieve and maintain the Armed Forces' capacity to conduct armed combat above, on or under the sea. Naval units use marine firing ranges in conjunction with air and helicopter units. A number of military airports near the sea are also used.

Exercises and training in armed combat need to be conducted in a safe manner for the units involved but also in respect of the general public and civil shipping and aviation, so that accidental shootings, incidents or accidents do not occur. The Armed Forces conduct exercises on the west, south, east and Norrland coasts with their varying coastal, sea, hydrological and meteorological conditions. Exercises are conducted under different light/darkness conditions, at all times of the day or night, and throughout the year. Several marine firing ranges are connected to firing ranges in the archipelago with firing ranges over water, and these constitute risk areas. They allow marine and airborne units to exercise together with ground units, for example units that operate on both land and sea, and with security units.

The transition of the Swedish Armed Forces from a defence against invasion to an operational defence force has meant that operations are now concentrated in a smaller number of locations. The naval units have a greater need than ever to conduct exercises with live ammunition, both in close proximity to their naval port and also from temporary bases along the Swedish coast.

Signals intelligence

FRA conducts signals intelligence over the sea in order to identify external military threats to the country, threats to Swedish personnel on international missions, international terrorism, cross-border crime and foreign intelligence

operations contrary to Swedish interests. FRA monitors conflicts overseas and the actions and intentions of foreign powers that are significant to Swedish foreign, security and defence policy.

Signals intelligence is extremely sensitive to disruption and requires protection to counteract disturbance from other activities. Railways, motorways, electrical power plants and radio masts are land-based facilities that can disrupt signals intelligence within approximately 10 km of the monitoring sector. Wind power, especially if it is sea-based, can disrupt signals intelligence from a considerably greater distance.

Developments and trends

The world around us

Development trends in the EU's member states mean that ground forces are decreasing in numbers at the same time as the amount of airborne and marine forces is increasing, along with special units. The combat forces have been gradually adapted to handle low-intensity conflicts against new types of enemies that are not composed of national combat forces.

The military dynamic in Europe is changing, Russian's military capacity is increasing and the capacity of western European countries is declining. The increased interest in both the Baltic Sea and the Arctic means that our immediate surroundings are increasing in strategic significance. The Baltic Sea constitutes an increasingly important inland sea for shipping and extraction of natural resources, where the surrounding nations have a mutual interest in both transport and trade being conducted without disruptions.

Russia is the superpower with the strongest interests in Sweden's immediate surroundings. This is due to its geographical location, its significant regional military strength, its dependency on natural resources and transport routes and the prevalence of Russian minorities in the Baltic states. Russian actions in Ukraine in the spring of 2014 have weakened the European security order and created more unpredictable development in Sweden's immediate surroundings. The Swedish Defence Forces are following the altered security situation and are taking the necessary actions in this connection. At the same time, NATO's presence in the vicinity of Sweden is increasing, for example through exercises and the construction of missile defence systems.

Marine training areas

The Swedish Armed Forces considers that all marine training areas must be retained on a long-term basis, regardless of temporary variations in the scope and nature of military operations, since it would be difficult to establish new firing ranges with similar conditions. Their activities include exercises with combat vessels, mine-sweeping vessels, surveillance vessels and submarines, in combination with airborne and helicopter units.

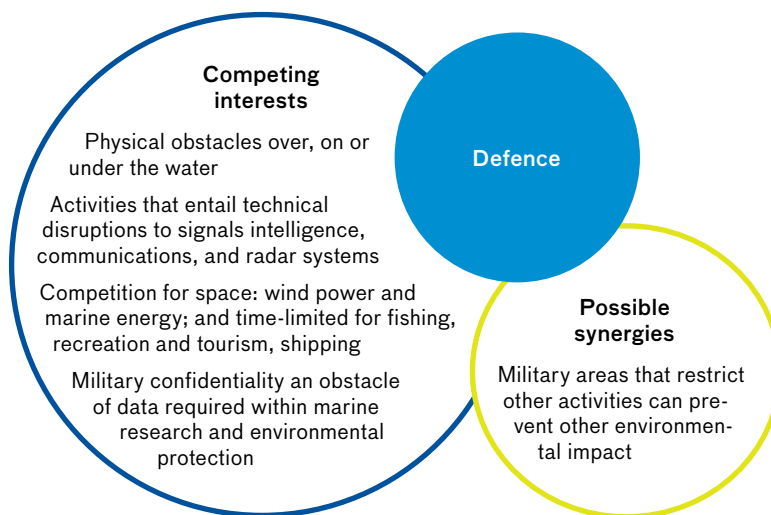
Signals intelligence

The Baltic Sea is and always will be of major significance for the Swedish signals intelligence against sea and airborne targets. Signals intelligence makes it possible to obtain technical information regarding applicable systems and to support the military command system's control of traffic.

Defence and other interests

Facilities and activities can affect the units' opportunity to exercise their weapon systems in conjunction with air operations. These might be physical obstacles above, on or under the water that restrict air and sea operations, for example wind farms at sea. There might also be technical disruptions that affect communications and radar systems, and these disruptions might compromise security in the air and at sea. The Armed Forces are therefore restrictive in their attitude to licensing, permit and planning cases that could have such an effect.

The defence sector impacts on all other sectors, for example commercial fishing and recreation, primarily through the training areas not being accessible while the exercises are in progress. Defence interests influence the needs of those involved with conservation as far as high resolution depth data is concerned, since this information is confidential when it applies to areas within military protected parts of our marine territory. The Armed Forces' operations also affect the natural environment in many different ways.



Environment and climate

Environmental impact

The use of ammunition in shooting exercises also leads to metals winding up in water habitats, and this adds to the pollution in the sea. On a local basis, this can mean a great deal of extra metal.

Shooting, explosions and air and sea exercises create loud noise and disturb animal life both over and below the surface of the water. Noise disturbances are often more serious at certain times of the year, when biological activity is high, than at other times of the year. Such times include fish spawning periods, the periods when seals have their offspring and bird breeding and incubation periods. In order to take into account when the risk of impact is great, the Defence Forces have developed a marine biological calendar. It contains information on which areas are sensitive to impact from underwater noise during various times of the year.

Climate

Extreme weather can change the living conditions in different locations and reinforce pre-existing factors that fuel conflicts. Climate changes also mean changes in the Arctic, something that increases interest in and the strategic significance of Sweden's immediate surroundings and the Baltic Sea.

Claims and goals

The Armed Forces depend on their training areas and firing ranges in order to be able to carry out exercises in different coastal and sea conditions, without disruptions from physical or technical obstacles that restrict their air or sea operations. As far as signals intelligence is concerned, there is a need to counteract disruptions from other activities that affect communications and radar systems, and may also limit security in the air and sea.

Environmental goals for the Swedish Armed Forces

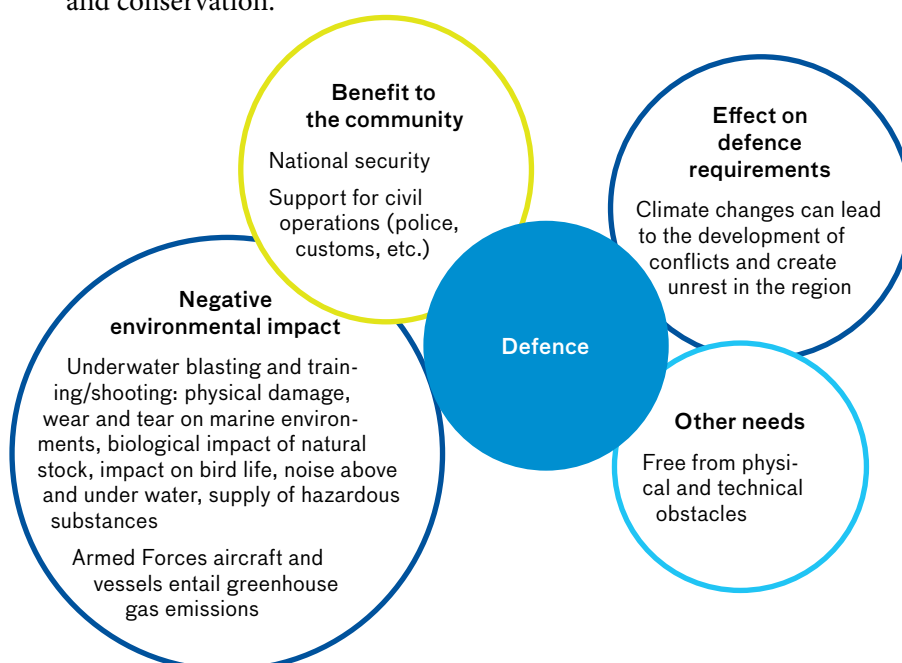
As of 2012, the Armed Forces have set new goals regarding energy efficiency, environmentally-adapted procurement and environmental considerations in connection with exercises and missions. The energy goal is concerned with reducing energy consumption.

Environmental quality objectives

The environmental quality objectives of greatest relevance to defence are Toxin-Free Environment, A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos and Reduced Climate Impact.

Planning relevance









Competing interests may exist in areas that are of interest to Sweden's total defence. This applies above all to permanent installations and high objects. There is a conflict of interest between the Armed Forces' exercise operations and conservation.



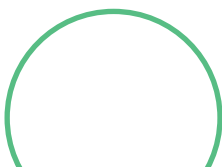
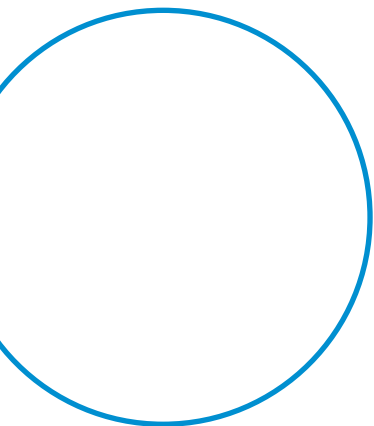
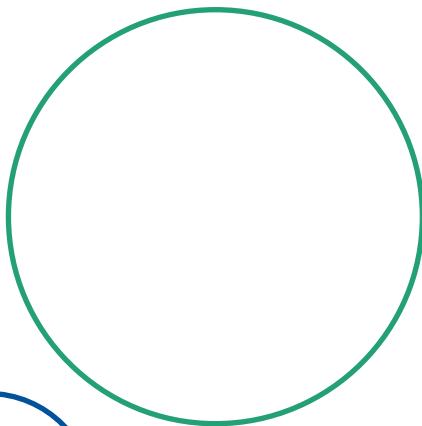
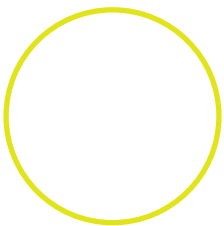
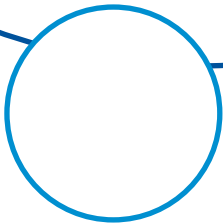
National interests

In 2010, the Swedish Armed Forces presented the areas it deemed to be of interest or national interest in respect of the military part of Sweden's total defence, in accordance with the Environmental Code. The report includes exercise and firing ranges at sea as well as areas on land, including risk areas over water and weather radar stations. The report has now been updated, primarily as a result of ongoing or planned expansions to wind farms and the possible future expansion of sea-wave power with accompanying infrastructure. The report also includes value descriptions for the various areas of national interest.

National interest claims for the military part of Sweden's total defence in marine and coastal areas

-  Exercise and firing ranges at sea
-  Stop high objects
-  Area of influence - air space
-  Areas with a particular need to be obstacle-free
-  National interests with impact on surroundings
-  Coastal weather radars with area of influence
-  Other areas of influence
-  Plan area

Energy



Importance to the community

The energy sector's use of the sea involves both the production and transfer of energy. Nuclear power plants also use sea water for cooling. In Sweden, energy production at sea takes the form of wind power; marine energy takes the form of sea-wave power. Sea-based wind power in Sweden is already in production and may continue to increase. Wave power is currently at stage characterised by research and development, but is on the way towards commercialization through things such as sea-wave power farms being built in Sotenäs Municipality. In Swedish waters, energy is transferred through power lines and gas lines.

Social development entails dependence on electricity, which – according to the Swedish Energy Agency – presupposes a robust and operationally secure transfer network and an increasingly integrated European electricity market. The requirement for good access to energy is of central importance to industry, especially for energy-intensive core industries. Dependency on electricity means that extended power failures are not acceptable.

Several energy policy interests lead to the expansion of renewable electricity, for example wind power and sea-wave power. This may also allow for the development of new services and products. Wind power is currently competing with conservation since, in Sweden, it is primarily offshore banks with high natural values that have been of interest for constructing wind farms. The expansion of renewable energy aims at ecological sustainability, security of supply and increased European competitiveness. Over the long term, the expansion of renewable energy is a requirement for preventing far-reaching effects of climate changes and ocean acidification.

Actors

The Swedish Energy Agency is a supervisory authority and it works toward Sweden having sustainable, secure and efficient access to energy over the long term by exercising supervision over the electricity, natural gas and district heating energy markets, in addition to making proposals concerning the development of the various energy markets. The Agency operates within various social sectors to create the conditions for an efficient and sustainable use of energy and the cost-effective supply of Swedish energy. The Swedish National Grid has the task of transporting electricity from the major power stations to regional electrical grids, via the national electrical grid. The Swedish National Grid is a state-owned company responsible for Sweden's electrical preparedness and coordinating the safety of the country's dams. It is responsible for ensuring balance between consumption and production in Sweden, and contributes to an electricity market with free competition. The Swedish Radiation Safety Authority is a government agency responsible for safety in nuclear power.

For wind power there are industry associations: Swedish Wind Energy and the Swedish Windpower Association. Both private and municipal companies are involved with the planning, projecting, development and operation of planned or existing wind farms. This sector also includes companies that supply equipment to the wind power industry. Research and development within wind power is conducted by universities and colleges, including the Swedish Wind Power Technology Centre at Chalmers University of Technology. Studies of the environmental effect of wind power are conducted by the Swedish Environmental Protection Agency and the Swedish Energy Agency within the Vindval research programme. The Swedish Energy Agency and Vinnova, together with regional financiers, support research and development connected with sea-wave power. Research into sea-wave power is being conducted at institutions such as Uppsala University, Chalmers University of Technology and Blekinge Institute of Technology.

Use of the sea

Electricity production

Wind power

In recent years, land-based wind power facilities have been expanded rapidly in Sweden. At the end of 2013 there were 2,640 wind turbines in Sweden with a combined effect of 4,194 MW. Of these, 91 were located at sea and had a combined effect of 210 MW. Sweden generally has good conditions for sea-based wind power.

Swedish wind power facilities together produced 10 TWh during 2013, of which 0.55 TWh was produced at sea-based facilities. This corresponds to 5.6 per cent of the planning framework set by the Riksdag for wind power of 10 TWh for 2020.

Wind power at sea therefore currently constitutes only a small part of Sweden's total wind power production. Land-based facilities have been expanded considerably faster than those based at sea, which is largely due to technological developments having progressed further on land, and to the fact that the cost for building land-based facilities is generally lower.

From an energy extraction perspective, there are several advantages with sea-based wind power. Winds are often stronger and more consistent at sea, which allows the building of bigger and more efficient wind farms. Sea-based wind power allows a wider geographic distribution of electricity production in Sweden, which is positive as seen from an energy systems perspective. There are many good locations available in southern Sweden, a part of the country where there is little other energy production. This could also help even out the price differences between different electricity areas. Difficulties in achieving economic profitability are restricting expansion projects at sea. The costs are higher than for land-based wind power. More developed technology can lead to better profitability and increased energy production.

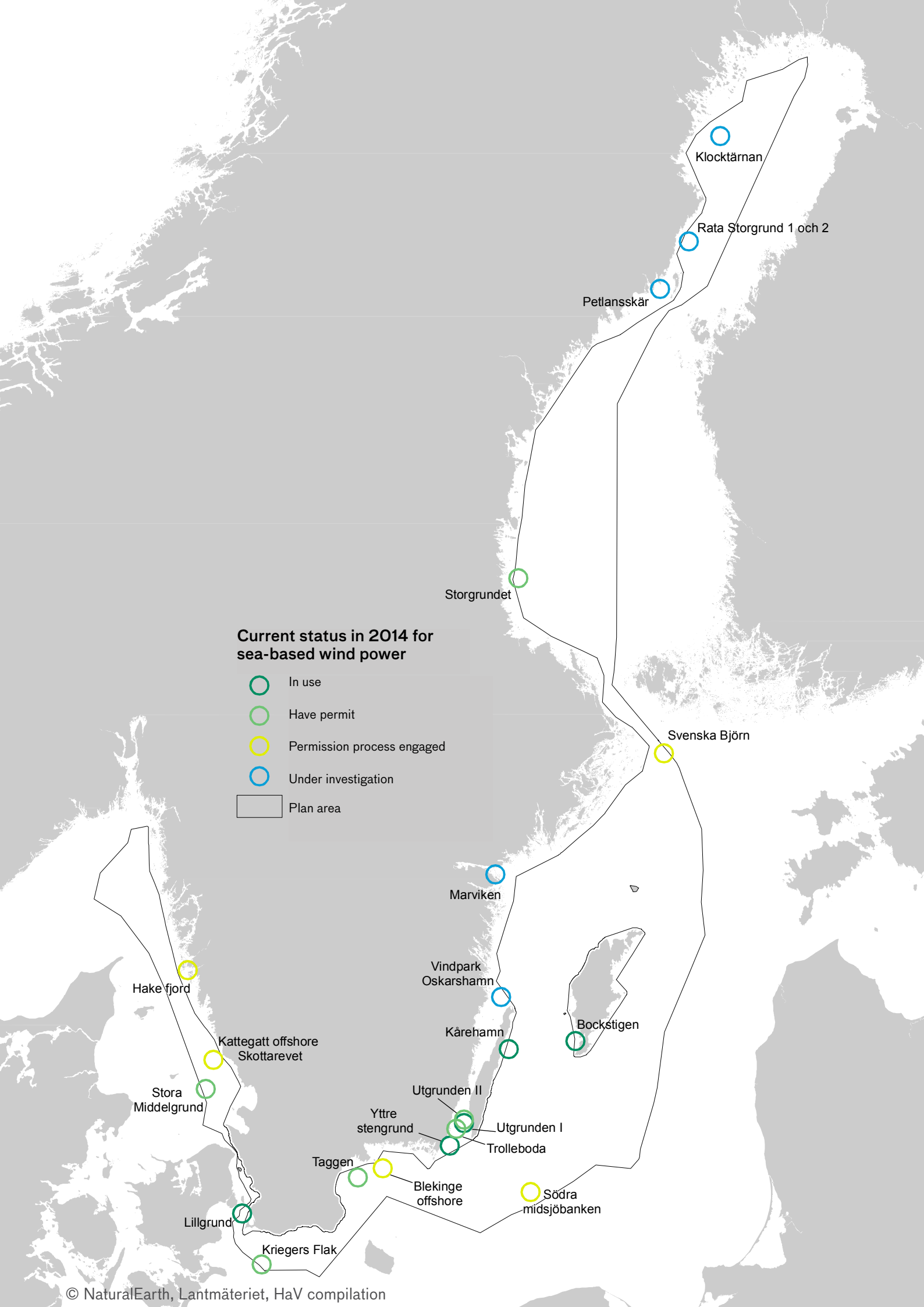
There are currently five wind farms at sea in Sweden - Lillgrund, Bockstigen, Utgrunden 1, Kårehamn and Ytter Stengrund (under phase-out). All of these are located close to Öland and Gotland – except for Lillgrund, which is in the Öresund. All are located within Sweden's territorial waters. There are also several other wind farms planned that have permits, but have not yet been constructed, equivalent to a theoretical annual production of 8.8 TWh and with an installed effective output of 2,400 MW: Kriegers Flak and Stora Middelgrund in the exclusive economic zone, and Storgrundet, Utgrunden II and Taggen in territorial waters. Fears of unprofitability are the primary reason why these farms have not as yet been constructed.

Marine energy

The marine energy system is an umbrella concept that at present primarily consists of energy conversion from sea waves, tides (streaming and dammed-up), differences in temperature and differences in salt content.

Research, development and demonstrations within sea-wave power, as well as research and development within tidal stream energy, are being conducted in Sweden. Stream energy is primarily based on streaming tides and ocean currents. Uppsala University currently runs two different research facilities: Söderfors, where a marine stream energy facility has been installed, and Lysekil, which includes several sea-wave power units.

A sea-wave power farm - planned as one of the largest in the world – is under construction in Sotenäs Municipality. The project is being led by Seabased Industry AB and Fortum, with co-financing from Energimyndigheten, the Swedish Energy Agency.



Within sea-wave power, Sweden lies well ahead in international development; despite this the technologies are still new and under development. The research being conducted at universities, colleges and businesses in Sweden is expected to first be commercialised on markets abroad. A few studies indicate varying potential for sea-wave power in Sweden (circa 10–30 TWh). Tidal resources in Sweden are negligible, whereas there are ocean currents in places such as Öresund.

Nuclear power

The nuclear power plants at Forsmark, Ringhals and Oskarshamn use sea water to cool the reactors. In total, these nuclear power plants use up to 415 m³ of cooling water per second. The water is returned to nearby coastal waters after it has been warmed up.

Transmission of energy

Use of the sea for energy transmission encompasses the installation, operation, maintenance and phase-out of sea cable connections. There are two direct current (DC) connections in the Skagerrak/Kattegat between Sweden and Jutland. Southern Sweden and Zealand are connected through six cable connections.

A DC connection links southern Sweden with Germany between Trelleborg and Lübeck. A new connection with eastern Germany is planned. A DC connection links Karlshamn in Sweden with Slupsk in Poland. A DC connection is also planned for Lithuania. There are currently two connections between Gotland and the mainland; another one is planned for the future. There are two DC connections between Sweden and Finland in the Gulf of Bothnia.

In addition to the overseas electricity cables, there are also regional and local network lines at sea. The Swedish Maritime Administration also has a network of cables in the archipelago that are not concession-bound, which provide both lighthouses and private customers with electricity.

Gas pipelines

Between Malmö and Denmark there is a natural gas pipeline to feed the natural gas system in the west of Sweden.

Nord Stream is a natural gas pipeline between Russia and Germany that runs along the seabed through the Gulf of Finland and the Baltic Sea. Nord Stream consists of two parallel concrete-encased steel pipes with a diameter of approximately 120 cm. These pipes bypass several of the Baltic Sea's biologically important areas. The pipes pass through the territorial waters of Russia, Denmark and Germany and the exclusive economic zones of Sweden and Finland. The total length is 1,220 kilometres. Each pipe is large enough to transport 27.5 billion m³ of natural gas per year, the equivalent of a total of 590 Twh of energy. The first pipe was opened in 2011 and the second in 2012. The company Nord Stream AG has plans to construct one or two more parallel pipes of roughly the same length as the current pipes.

Developments and trends

Wind power

The Swedish Energy Agency considers the future prospects for wind power at sea to be good, as long as research and development is conducted and economic support over and above the electrical certification system is introduced. The research and development concerning wind power that is in progress within the research programmes Vindforsk and Vindval is addressing environmental effects and is concerned with adapting technology to different conditions. So far, the consensus of the conclusions has been that wind power has a limited impact on the environment, but that it depends on which protective measures are taken. The global trend is generally towards

wind turbines with higher capacities and higher towers – often over 100 metres at hub height. The trend is also to build smaller wind farms with larger turbines for better profitability. Technical developments are also in progress with regard to floating wind turbines, but according to the Swedish Energy Agency this technology is still relatively young and it is difficult to predict commercial developments.

Sea-wave power

More cost-effective solutions need to be developed in order for sea-wave power to become competitive. With larger-scale production – and, with that, falling investment costs – the costs of future mains connection, installation, operation and maintenance will be crucial for competitiveness; synergy effects with sea-based wind power may become possible as a result. A new research and innovation programme in marine energy conversion is under development. The programme is being worked out by the Swedish Energy Agency; it is largely based on the surveying done by the Swedish marine energy sector and its need for actions in research and development.

Power lines

One condition for achieving national and European goals for energy and climate policy respectively is that there are opportunities to link together the electrical systems between countries in Europe to a greater extent. According to the Swedish National Grid, the capacity for transmission of electricity needs to be increased, and bottlenecks reduced, in the Scandinavian electricity network and in connections with continental Europe. The 2025 perspective plan describes the planned development of the Swedish national grid. Extensive expansions are required if it is to manage the necessary re-investments, take care of new electricity production and to contribute to a common European electricity market. Submarine cable technology is being developed, and older cables are being replaced by new ones with improved operational security and reduced environmental impact in case of damage.

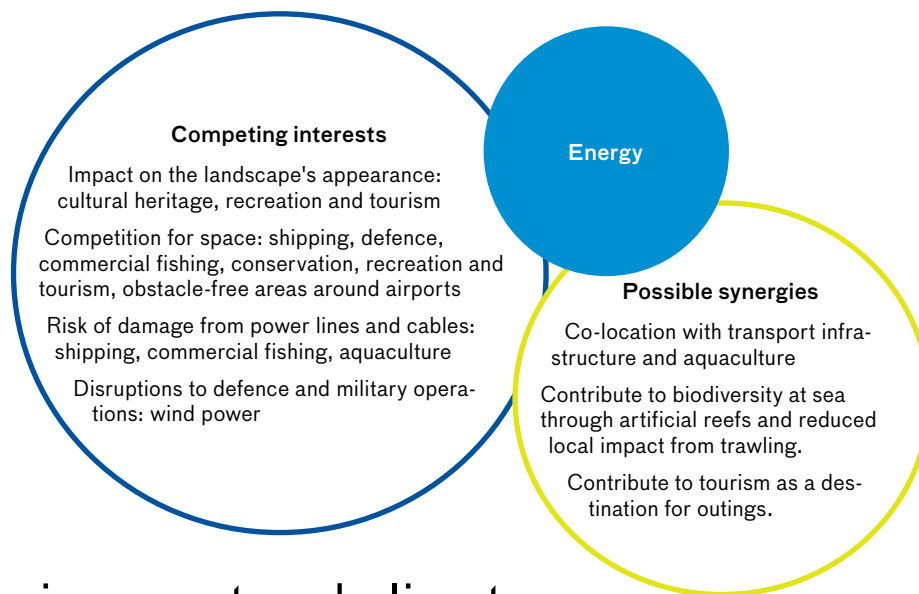
Ice conditions

In the Gulf of Bothnia, there are special conditions as regards thick, extensive sea ice. Permanent constructions can be exposed to extremely severe strain from sea ice, which for example affects wind farms and the like. Especially in the “landvredet”, where sea ice breaks away from land ice, great strains are created where the ice almost always breaks up in the same place and the sea ice starts swirling around.

Energy and other interests

Sea-based wind power could compete – and sometimes coexist – with the interests of recreation, commercial fishing, shipping, Sweden's total defence and conservation. Any future large-scale establishment of sea-wave power in Swedish waters would also compete with the interests of other sectors within the same marine areas. Conflicts of interest arose between energy production and conservation interests in connection with several environmental tests of sea-based wind power on shallow offshore banks. Military operations that need to be obstacle-free above, on and under the water are affected by energy production facilities. The Total Defence Service, like the civil communications systems, can be hampered by technical disruptions from wind farms that affect communications and radar systems.

Submarine cables can impact opportunities for emergency anchoring and therefore come into conflict with shipping, especially in heavily trafficked lanes. Laying submarine cables on the seabed interferes with the marine environment, which could come into conflict with conservation interests. Other possible conflicts could involve mines, national total defence interests and Natura 2000 or other protected areas.



Environment and climate

Environmental impact

Wind power

Ocean-based wind power projects affect the local marine environment in various ways in connection with construction, operation, and phase-out. During the construction phase, primarily pile-driving in connection with a monopile base causes loud noises that can travel far out into the water. Among marine mammals, it has been demonstrated that dolphins can develop impaired hearing and disturbed behaviour from sound in connection with pile-driving. Effects of sounds from pile-driving can be reduced through gradually increasing the power and sound of pile-driving so that larger animals such as fish, seals and porpoises are frightened and manage to leave the area. Other ways of reducing the strength of the sound are to use cofferdams or muffling curtains around the foundation while piles are being driven. Foundations consisting of several smaller piles also give off softer sounds than those consisting of a large monopile. Foundations dug or drilled down into the sea bed involve no pile-driving at all, and the disruption does not occur. Turbidity during the construction phase can also impact marine animal and plant life, but how much sediment is spread depends on sediment type, water currents and which method is used.

The effects are often small and transitory, since the dredging volume is small and because the seabed material usually is coarse-grained. The complete assessment is that the spread is a limited problem during construction of wind farms at sea. During the operational phase, which is the longest, marine life is only affected to a limited extent. Any subtle effects of the sound given off through the foundation have not yet been made clear. As regards all environmental impacts from wind power, the local circumstances play a significant role in which consequences arise. For example, turbidity can cause great damage if the sediment is polluted. Spawning areas for threatened species typically mean that special consideration must be made.

One obvious, positive effect of wind power is that the foundation of the wind farm functions as an artificial reef, attracting invertebrates, fish and marine mammals. The risk that birds or bats will be killed due to wind farms is estimated to be relatively small compared with other human impact, provided that these risks are taken into consideration during localization.

Sea-wave power

Extensive studies of the environmental effects of sea-wave power are lacking. Results from the research facility in Lysekil suggest that sea-wave power has no significant impact on the environment. Any impact from underwater sounds, however, has not yet been investigated. Like sea-based wind power, sea-wave power facilities could result in an increase of certain species, as the foundations serve as an artificial reef and constitute a free zone for marine species. Additional studies need to be made, however, which is also being prioritised in the programme for energy conversion that the Swedish Energy Agency is developing.

Nuclear power

The use of seawater by nuclear power for cooling entails a risk of accidents involving discharges of oil or other harmful substances in the vicinity of the coolant intake points. Nuclear plants' use of water for cooling purposes can have an impact both through the intake and the discharge of large quantities of water. For example, the temperature is affected considerably, which can alter the ecosystem locally. The greatest impact, however, is the large amounts of fish and fry that are caught in the grating of the water intake or are sucked through the cooling system.

Cables and pipelines

Laying submarine cables physically interferes with the seabed habitat. The cable can be laid as deep as a metre beneath the seabed. Construction work causes turbidity in the water, changes the structure of seabed material and has a local impact on aquatic plants. Turbidity can affect fish and benthic fauna and flora. Benthic plants and animals can, however, re-establish themselves above the buried cable. Environmental impact during the operational period is considered to be limited, until an occasion when, if necessary, the cable is to be repaired.

All electric cables generate electromagnetic fields that can affect marine organisms to varying degrees. Power fields vary depending on the type of cable used and the amount of electricity being transmitted. The effect of the power field on marine organisms can be minimised through various protective measures, such as burying the cable in the seabed. This could be important where high-voltage cables cross the migration routes for eels.

Climate

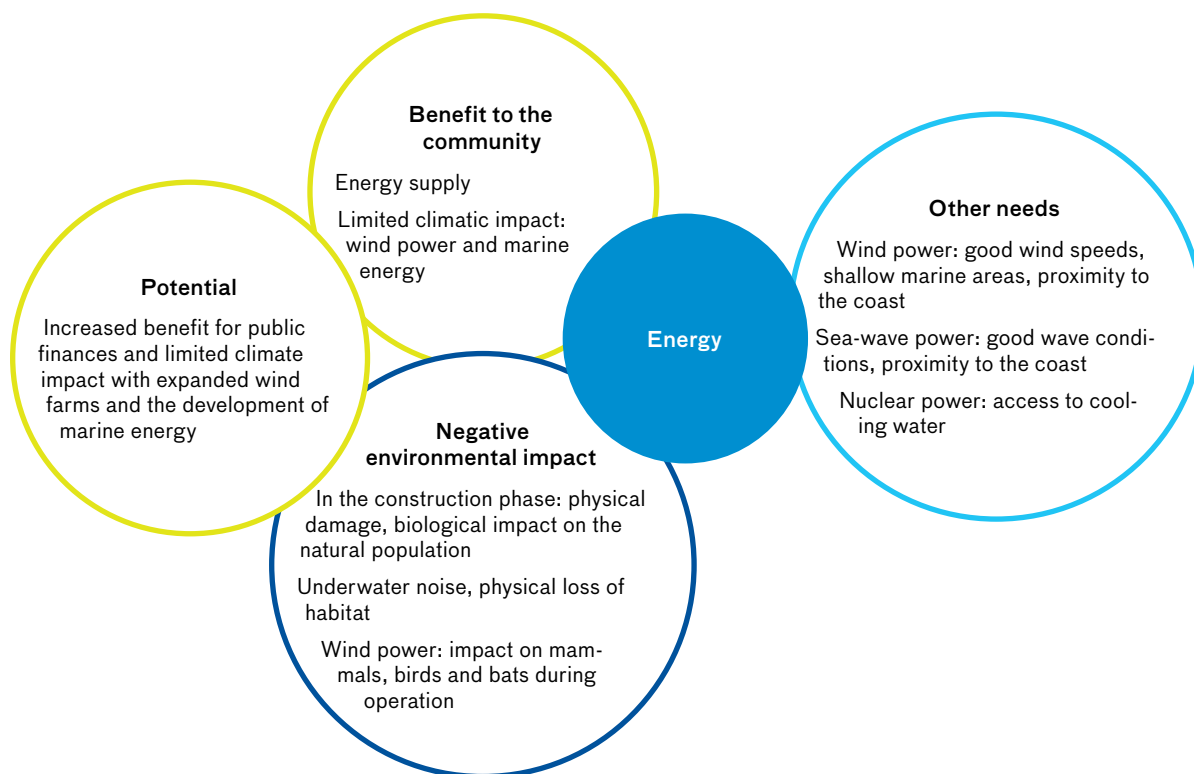
Wind and sea-wave power are renewable energy sources that do not contribute to greenhouse gas emissions or other pollutants during their operation; they also benefit from low life-cycle emissions of carbon dioxide. This is a positive aspect as regards the marine environment, since climate effects – primarily the ongoing marine acidification – comprise a significant threat to marine ecosystems in the near future.

Claims and goals

Wind and sea-wave power require good wind speeds and good wave conditions, respectively. Conditions to be sought after are proximity to the coast and – for wind power – shallow waters as well. Nuclear power plants require access to cooling water.

Goals

Swedish energy policy is built on the same foundation as energy work within the EU. The policy aims at uniting ecological sustainability, competitiveness and security of supply.



The following energy goals have been decided on in Sweden for 2020:

- 50 percent renewable energy
- 10 percent renewable energy in the transportation sector
- 20 percent more efficient energy use between 2008 and 2020
- 40 percent reduction in emission of climate gases (compared with 1990) for the non-trades sector, of which 2/3 in Sweden

Today the prognosis for target fulfillment looks good, with the possible exception of the energy streamlining goal, for which target fulfillment is more difficult to assess. This goal applies to the sector overall and means that energy intensity, measured as energy supplied per BNP unit in fixed prices, shall decrease by 20 percent.

The Riksdag has also decided on a planning framework for wind power of 30 TWh by 2020, of which 10 TWh is to be produced at sea and 20 TWh on land. The planning framework is not a production objective; instead, it means that there should be the scope to make the production of 10 TWh of sea-based wind power possible. There is currently no planning framework or equivalent for sea-wave power in Sweden.

There is, however, a goal within the electricity certificate system of increasing renewable electricity production in Sweden and Norway by 26.4 TWh up through 2020 (compared with 2012). The electricity certificate system is a market-based support system that aims at increasing the production of renewable electricity in a cost-effective manner. Currently, very little points to more ocean-based wind power being built in Sweden as part of this goal.

Within the EU, it was decided in 2014 that the portion of renewable energy is to increase further by 2030. The goal could mean increased claims on marine areas for renewable energy. There is also an ambition to increase European integration of the electricity network.

Environmental quality objectives

The environmental quality objectives that are primarily concerned with the construction and operation of facilities for energy production and transmission on Swedish territorial waters are Reduced Climate Impact, Toxin-Free Environment, A Safe Radiation Environment, A Balanced Marine Environment and Flourishing Coastal Areas and Archipelagos.

Planning relevance



There are conflicts of interest between other interested parties and facilities for the production and transmission of energy at sea. This relates above all to conservation and defence interests, but could also apply to shipping, fishing, recreation and tourism.

National interests

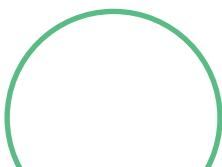
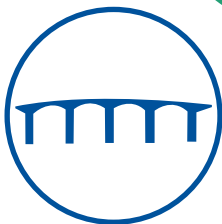
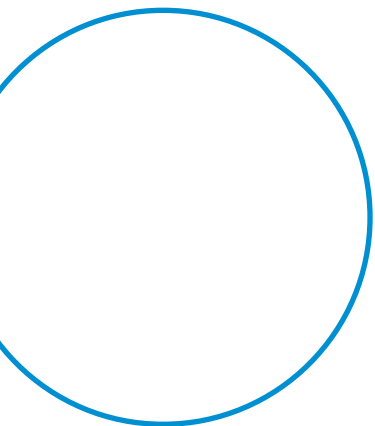
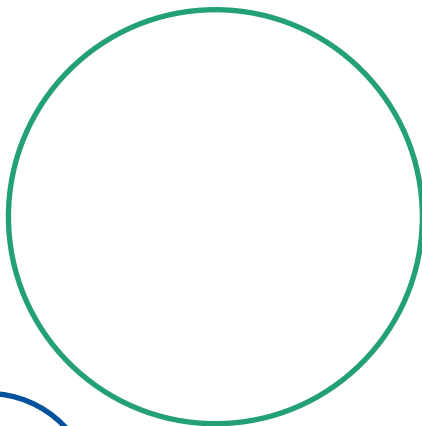
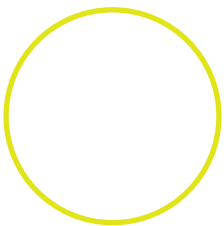
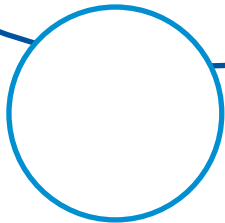
In 2013 the Swedish Energy Agency detailed the areas of national interest for energy production and energy distribution. 27 areas with a total area of approximately 4,000 sq km were highlighted as areas of national interest for wind power at sea. Criteria for the highlighted areas were: a wind speed of at least 8 m/s, a connected area of at least 15 sq km and a sea depth of at most 35 metres.

No areas have been reported as being of national interest for sea-wave power. There is also currently a lack of systematic resource mapping that can form the basis for a possible future investigation of which areas might be identified as particularly interesting for sea-wave power.

National interest claims for sea-based wind power according to Chapter 3 of the Environmental Code

-  National interest for wind power at sea
-  Plan area

Infrastructure



Importance to the community

Infrastructure is defined as facilities for the transportation of goods, passengers and services, as well as for the transmission of energy and information. This chapter addresses the transport infrastructure for roads, rail and aviation. The infrastructures for energy and shipping are addressed in their own respective sections. There are also communication cables in the sea.

The transport infrastructure enables connection and communication within and between regions and countries. There are currently two permanent links over the sea: the Öland Bridge and the Öresund Link. The latter serves both road and rail traffic. There are eleven civil aviation airports with air services that are located near the sea.

Actors

The Swedish Transport Administration is responsible for the long-term planning of the transport system for all modes of transport, as well as for the construction, operation and maintenance of national roads and railways. The Swedish Transport Agency is responsible for regulations, and it provides licenses and monitors compliance. The responsibility for public transport in each county rests with a public county traffic body, which is often a region, a county council, or a county council and municipalities in collaboration through a local federation. International connection require cooperation between Sweden and its neighbours. The Öresund Link is owned by the Öresund Bridge Consortium which, in turn, is owned jointly by the Swedish and Danish States. Air Navigations Services of Sweden (LFV) operates air traffic services for airlines and airports in Sweden. The Swedish Post and Telecom Authority and Svenska Kraftnät have cables on the ocean bottom.

Use of the sea

The Öland Bridge

The Öland Bridge over Kalmarsund connects Kalmar on the Swedish mainland with Färjestaden on Öland. The bridge is 6.1 km long with a vertical clearance of 36 metres and a free bridge width of 13 metres. The decision to construct the bridge was made in 1966 and the bridge was inaugurated in 1972. It is Sweden's longest bridge, if only the sections of the bridge located on Swedish territory are compared. The bridge was also the longest in Europe up until 1998. Population development on Öland changed in conjunction with the building of the bridge and parts of Öland are now part of Kalmar's commuter belt. During 2010 a total of 6.3 million vehicles passed over the bridge, a figure equivalent to 17,000 vehicles per day.

The Öresund Link

The Öresund Link is a 15.9-km long connection over and under the Öresund, between Malmö (at Limhamn) and Copenhagen (at Amager). The connection consists of a bridge – the Öresund Bridge – and a tunnel in the part closest to Denmark, due to its proximity to Kastrup Airport. The bridge is an

approximately 31-m wide diagonal cable bridge with pylons over 200 metres high. The upper level of the bridge has a vertical clearance of 57 metres over Flintrännan. An artificial island, Pepparholmen, was built for the transition from bridge to tunnel. Construction started in 1995 and the link was opened in 2000. The link consists of a motorway and a double track railway. In 2009, 11.2 million one-way journeys by train were made over the Öresund, equivalent to nearly 31,000 trips per day. Since the completion of the City Tunnel in Malmö in 2011, an Öresund train crosses the bridge every ten minutes. During 2012, approximately 6.8 million vehicles crossed the Öresund Link. This equals nearly 19,000 vehicles per day. Car traffic over the Öresund Bridge has declined somewhat in recent years, partly due to a decrease in commuting between Malmö and Copenhagen.

Airports

The eleven largest civil airports in Sweden, located near the sea, together account for around 4.5 million passengers per year. The airports are (Kallax), Umeå, Skellefteå, Gothenburg City Airport (Säve), Visby, Örnsköldsvik, Kramfors- Sollefteå, Sundsvall-Timrå (Höga Kusten Airport), Ronneby (Kallinge), Halmstad and Kalmar. Several of these airports are also military facilities – for example, Luleå, Visby and Ronneby. For air traffic to function safely, there are areas around all airports that must be kept free of obstacles. These obstacle-restricted areas are determined by the airports' flight paths. The military airports have specific requirements for remaining free of obstacles as there may also be a need for low-level flying exercises.

Infrastructure for electronic communications

Infrastructure for electronic communications is of vital significance for Sweden. This applies to both citizens as well as to various sectors in society. The Government has, as a goal, being the best in the world at using the possibilities of digitalisation. Based on this, the Government has formulated a broadband strategy that, among other things, states that 90% of all households and businesses in 2020 shall have access to broadband of 100 Mbit/s. Even if the majority of the infrastructure for electronic communications claims areas on land not affected by the future marine spatial plans, the sea is used for small but important part of the infrastructure. This applies primarily to fibre optic cables on the sea bed that connect the broadband network in Sweden with our neighbouring countries. These are used not only for communications with other countries, but also for communications between citizens and businesses within Sweden, as the Internet is global. Ocean cables are of great importance from a national perspective, and the Swedish Post and Telecom Authority is presently discussing if – and how – these should be handled as part of the system of national interests.

Apart from fibre optic ocean cables, radio links are also used for the electronic communications infrastructure. This concerns primarily land or coastal areas lying just inside the areas the marine spatial plans cover. A smaller portion of the radio links depend, however, on the areas with marine spatial planning, for example radio links between Sweden and Denmark over Öresund, as well as radio links between the mainland and Gotland. Radio

links consist of a bidirectional point-to-point connection requiring clear view in a corridor of approximately 500 metres width between radio transmitters and receivers so as not to risk being affected by disruptions as a consequence of muffling or reflections of the radio signal. Other uses of the airspace above the surface of the ocean, for example wind farms and similar constructions, can give rise to disruptions if they are erected in this clear-view corridor. There are similarities here with the risk of disruptions to military communications systems from wind farms. The possibility of co-existence between radio links over the ocean and other areas of use is quite great, if consultation occurs in the planning process.

The air above the sea is also used for other radio-based systems, for example for communications with vessels, recreational boats, navigation, lighthouses, and so on. For shipping, this is of very great significance. This use normally does not need to be planned in as regards other areas of use for the sea, nor does it have any impact on the marine environment.

Developments and trends

Either in the short or the long term, the issue of further permanent connections over or under the sea will be raised, either for the Baltic Sea or the Gulf of Bothnia.

Tunnels between Helsingborg and Helsingør

A permanent connection between Helsingborg and Helsingør has been investigated, in order to deepen integration within the Öresund region, create opportunities for larger labour and housing markets, and to relieve the burden on the Öresund Bridge and the E6 motorway. The issue has been studied within the IBU Öresund project along with a proposal for a tunnel with two separate lines. According to the proposal, one of the tunnels would run immediately south of Helsingborg and Helsingør and be used for road traffic and goods trains. The tunnel connects the motorway on the Danish side with the E4 and the E6 on the Swedish side. According to the proposal, the other tunnel will be constructed for passenger trains and will run between the centres of the two cities. The issue is being addressed in a capacity investigation that the Swedish Transport Administration is conducting.

Underground tunnel, Copenhagen-Malmö

The cities of Malmö and Copenhagen are working together on a pilot study regarding how a metro connection between the cities could create additional capacity through the Öresund and, in so doing, strengthen integration and growth in the region. The “Interreg Öresund” European regional fund is providing financial support to the project. The reason behind the connection is that daily commuting between Malmö and Copenhagen is increasing faster than the rest of the traffic over the Öresund. When the tunnel under the Fehmarn Belt is completed in 2020, the capacity of the Öresund Bridge will be stretched still further.

Permanent link to Finland via Norra Kvarken

Preconditions for a permanent link over Kvarken between Sweden and Finland in the Gulf of Bothnia in the form of a bridge/tunnel combination

have been studied in an investigation dating back to 2000. The connection would run between Replot on the Finnish side and Holmsund on the Swedish side, with a total length of 51.7 km. Various possibilities have been suggested in this context, including possibly coordinating a wind farm and a cable for current transmission with a road connection.

Permanent link to Åland and Finland

A permanent connection to Åland from Finland has recently been discussed in Finland. This would involve a connection between Mariehamn and the mainland with bridges, embankments and tunnels which, in the future, could even be adapted to serve express trains. If such a link was built, a continuation as far as Sweden could also become a possibility in the long term. The idea of a permanent link between Sweden and Finland has been put forward on several different occasions. A link between Kapellskär and Mariehamn or Grisslehamn and Eckerö was proposed in a Riksdag motion in 1990/1991.

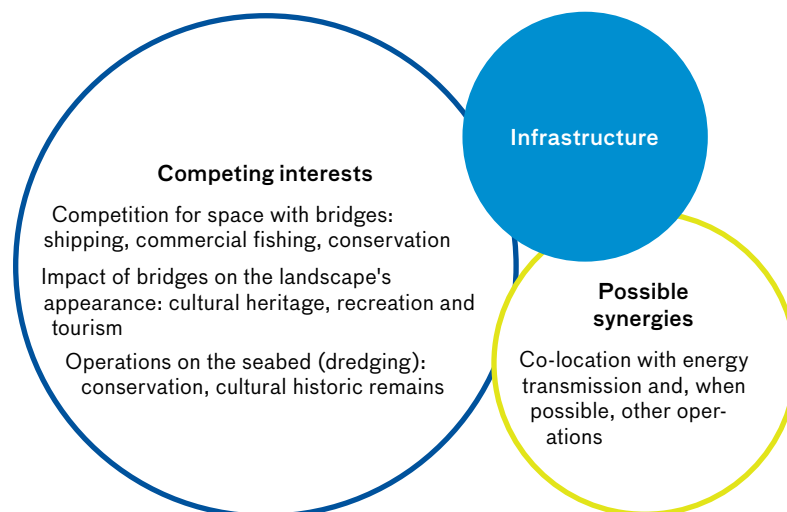
Airports

Flight paths may be altered in the future in order to cope with, for example, more environmentally-friendly solutions where incoming flights follow curved approach paths.

Infrastructure and other interests

Infrastructure such as bridges and tunnels may compete for space with other operations such as shipping, commercial fishing, and Sweden's total defence as well as cultural environment and conservation interests. Bridges normally require a limited water depth, something that might also be of interest to other sectors. Collocation possibilities for bridges may exist, for example in conjunction with energy production or the transmission of energy via cables.

Based on its requirements for obstacle-free areas, air traffic may come into conflict with parties interested in wind power at sea, but also with recreation and tourism due to noise disruptions.



National interests

Both the Öresund Link and the Öland Bridge have been highlighted as national interests. The E20 Öresund Link motorway is an important connection between Stockholm, Gothenburg and further south to Malmö and Copenhagen. The Öland Bridge – Route 137 – is of particular importance for regional and interregional traffic between Öland and the mainland.

The Swedish Traffic Administration has also earmarked future permanent connections between Helsingborg and Helsingør as being of national interest. A permanent rail link between Helsingborg and Helsingør is considered to be important primarily for goods traffic between Sweden and the continent, which is predicted to increase. A permanent road link between Helsingborg and Helsingør is important for both passenger and goods transportation between Sweden and the Continent. The future road is of particular importance for regional or interregional traffic.

All eleven airports by the sea have been highlighted by the Swedish Traffic Administration as national interests for aviation.

National interest claims for coastal airports and bridges at sea, according to Chapter 3 of the Environmental Code

✈ Airport

🌉 Bridge

Plan area

Environment and climate

Environmental impact

The construction of bridges and tunnels in the sea often happens in shallow areas, and largely near the coast or on offshore banks. Environmental impact occurs primarily through the construction of foundations and tunnels. Facilities such as tunnels, foundations and piers result in the regime of the currents changing, which in turn impacts the sea bed sediment around it over the long term. During the construction phase, sediment is disturbed on the seabed and dredging may be required; this has consequences for the natural environment (see the chapter on shipping for a description of the effects of dredging and dumping). The possible effects of construction and operation on marine life need to be investigated. During the operational phase, new constructions may constitute an obstacle to migrating species, both beneath and above the surface of the water. New constructions can, either on their own or in combination with other connecting facilities, lead to fragmentation of the landscape. Special protective measures may need to be implemented in order to reduce the occurrence of disturbing noise and light barriers.

Once the facilities are put into operation, there is a change in earlier transport patterns. Some of the transport previously conducted by air or shipping switches over to road or rail links, which affects emissions and noise. Additionally, the volume of traffic may also increase due to improved accessibility. The combined effects cannot be assessed generally, but need to be investigated individually for each infrastructure project.

Climate

The combined effects of altered transport patterns on emissions of greenhouse gases and on the climate need to be investigated for each infrastructure project.

Claims and goals

The transport infrastructure requires space above the surface, on the surface, in the water and on the seabed.

Transport policy goals

The overall goal of the transport policy is to ensure an economically efficient transport system, sustainable over the long term, for private citizens and businesses throughout the whole of Sweden. The functional goal of accessibility means that the design, function and use of the transport system is to help provide everyone with basic access to a user-friendly system of good quality, and that this will contribute to positive developments throughout the country.

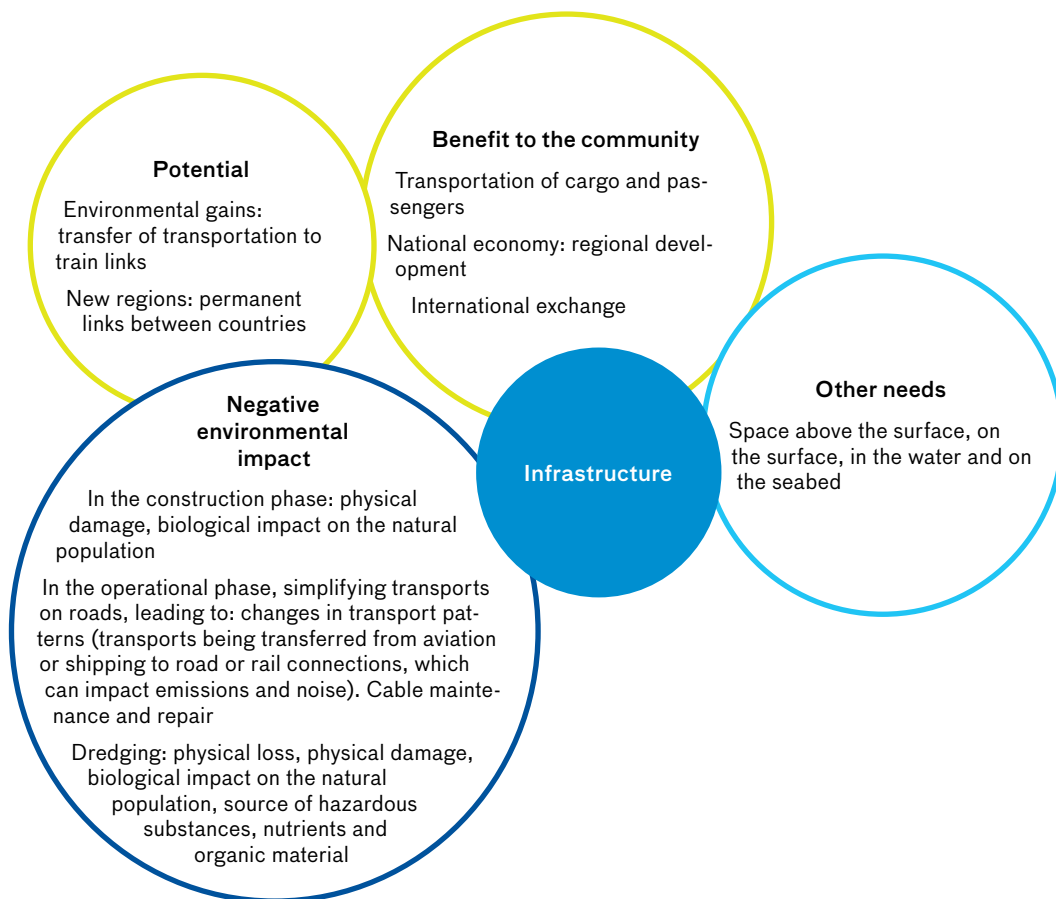
There are two functional goal specifications of particular significance for the need for roads or tunnels connecting Sweden with other countries. The first implies that the quality of industrial transportation is to be improved in order to strengthen our international competitiveness. The second implies

that accessibility is to be improved within and between regions, and between Sweden and other countries.

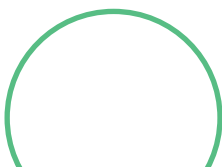
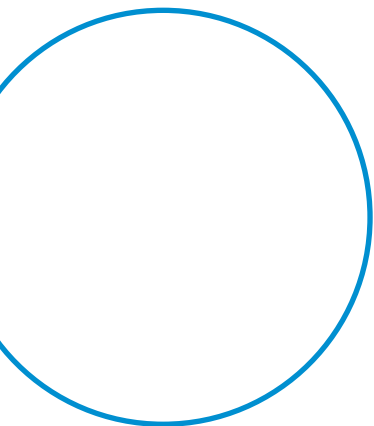
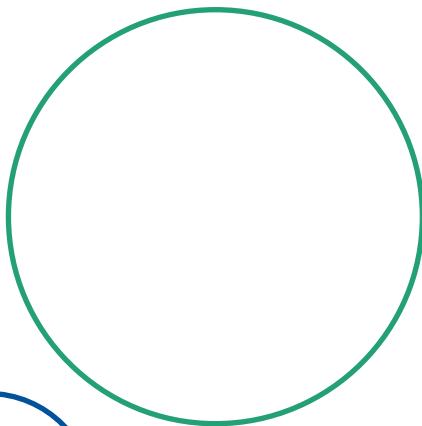
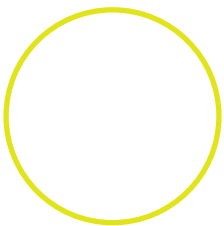
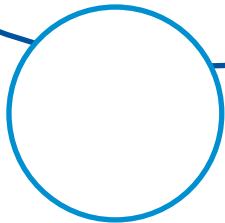
The health, environment and safety objectives imply that the design, function and use of the transport system are to contribute to the overall generation goal for the environment, and that the environmental quality objectives are achieved. One specification implies that the transport sector is to help achieve the Reduced Climate Impact environmental quality objective by gradually improving the energy efficiency of the transport system and by breaking the dependency on fossil fuels.

Planning relevance

Bridges and tunnels for roads and train tracks can come into conflict with other interests, especially conservation, shipping, recreation and tourism. Civil and military airports can primarily come into conflict with wind power.



Extraction and storage of materials



Importance to the community

An increasing number of cases indicate that the economic and regional political significance of this sector for job opportunities and utilisation of resources is growing. There is, however, no comprehensive report detailing the sector's combined economic significance and its importance in terms of employment.

Actors

The Geological Survey of Sweden (SGU) is the specialist agency for issues concerning, rock, soil and groundwater in Sweden. The agency conducts marine geological surveying that provides data for the planning, use and protection of our coastal and marine areas. SGU is also the supervisory authority for the extraction of sand, gravel and stone at sea and is a referral body in other cases. Sand and gravel are extracted by municipalities or private companies. The Swedish Aggregates Producers Association is a trade association whose member companies produce materials for building and construction purposes.

Use of the sea

The scope of marine-related activities in Sweden concerned with the extraction and storage of materials is expected to increase. Potential areas of interest for the extraction and storage of materials primarily involve minerals, oil and natural gas, formations suitable for carbon dioxide storage, shale gas, sand and gravel.

Sand and gravel

An alternative to natural gravel found on land is to utilise sand and gravel occurring at sea, and increased marine extraction may be an option in the future. According to mapping that has been carried out, there are ten potential areas that from an extraction perspective may be suitable for marine sand and gravel extraction. SGU considers two types of marine deposits to be suitable for extraction: larger, active, wave-washed gravel deposits located some distance from the coast, and discharge areas within the sand transport system. An example of the first type of deposit is the wave-washed cape around the Klippbanken shallows in Hanö Bay. Examples of the second type are the discharge slope of Sandhammarbanken to the east and the Disken shallows in the Öresund.

In Sweden there is currently one license for (marine) sand, gravel and stone extraction, granted to the municipality of Ystad, which over ten years from April 2011 may extract a total of 340,000 m³ sand, gravel and stone within a specified area for beach nourishment at Ystads Sandskog and Löderups Strandbad.

Oil and gas

Extraction of oil and natural gas currently occurs in the Baltic Sea on the Polish and Russian continental shelves; on the Latvian continental shelf a formation near the border with the Swedish economic zone is being investigated. SGU has indicated the Dalders structure on the most south-easterly part of the Swedish continental shelf as an area of interest for oil and gas.

In Sweden, one company was granted a license in 1969 to investigate oil and gas in the southern Baltic Sea. The Government has subsequently extended the license nine times. In 2007, the company applied for permission to carry out test drilling in a geologic structure (Dalders) situated in the most south-easterly part of the Swedish continental shelf area. In 2009, however, the Government decided to reject the application for an extension, taking the Baltic Sea's environment into consideration.

Exploration for, and extraction of, shale gas is in progress in several countries around the southern Baltic Sea. On the Swedish continental shelf, conditions for shale gas extraction are thought to exist at Bornholm Gatt and off the south-west coast of Skåne. Since the operation is a complicated one that impacts the environment, SGU considers it very unlikely that the extraction of shale gas at sea will come about in the foreseeable future.

Ore

Occurrences of ore in the primary rock of the seabed may, like ferro-manganese nodules, possibly constitute mineral resources with a future value. Nodules occur in the surface layer of fine sediment beds in the northern Baltic Sea and in the Gulf of Bothnia. The distribution of ferro-manganese nodules on the Swedish continental shelf has yet to be mapped.

Carbon dioxide storage

One way to reduce large-scale emissions of carbon dioxide into the atmosphere is to separate and store it in bedrock. There are several techniques for this. They are collectively known as CCS (Carbon Capture and Storage) techniques.

It is the local geology of the area that provides the preconditions for carbon dioxide storage. The majority of Swedish bedrock is not suitable for carbon dioxide storage due to entirely too low porosity and storage capacity, but in certain parts of Sweden there is bedrock that could be suitable. Potential areas for carbon dioxide storage, where the bedrock consists of younger sedimentary rock types, can be found in the south-east Baltic Sea, the marine area off the south-west coast of Skåne, and a small area in the south-west Kattegat near the border with Denmark.

Developments and trends

Processing operations

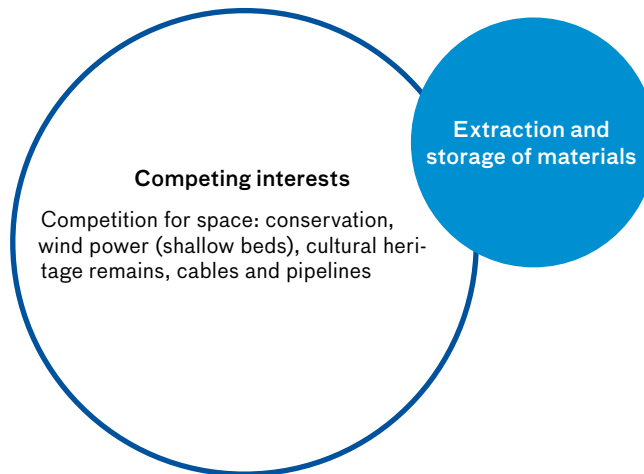
There is an increasing industrial interest in using sand, gravel and stone obtained from the continental shelf. This is happening in the light of gravel eskers and other glacial river deposits on land having great significance as regards extraction of drinking water, and the fact that the extraction of natural gravel on land is to decrease in line with the environmental goals decided upon by the Riksdag.

Carbon dioxide storage

New regulations that allow the geological storage of carbon dioxide under the seabed entered into force on 1 March 2014. Sweden has no national research programmes for CCS and currently has no existing or proposed CCS installations.

Extraction and storage of materials, and other interests

Potential areas for the extraction of natural gravel often coincide with shallow soft beds with a high natural value, which can be classed as protected marine areas.



Environment and climate

Environmental impact

Changes to seabeds in connection with extraction of sand

The extraction of natural gravel from the seabed means that sediment and its associated benthic fauna and flora is removed, which apart from the immediate negative impact on the seabed can also have negative effects on bird and fish populations that normally feed on these resources. Disruptions in egg-laying can occur in spawning fish who find themselves in such areas. Recovery of benthic fauna and flora normally occurs a few months or years after extraction, but there is considerable variation between the different types of habitat.

The International Council for the Exploration of the Sea (ICES) and many of its member states have designed guidelines for how, for example, extraction activities are to be conducted with minimal environmental impact.

Erosion

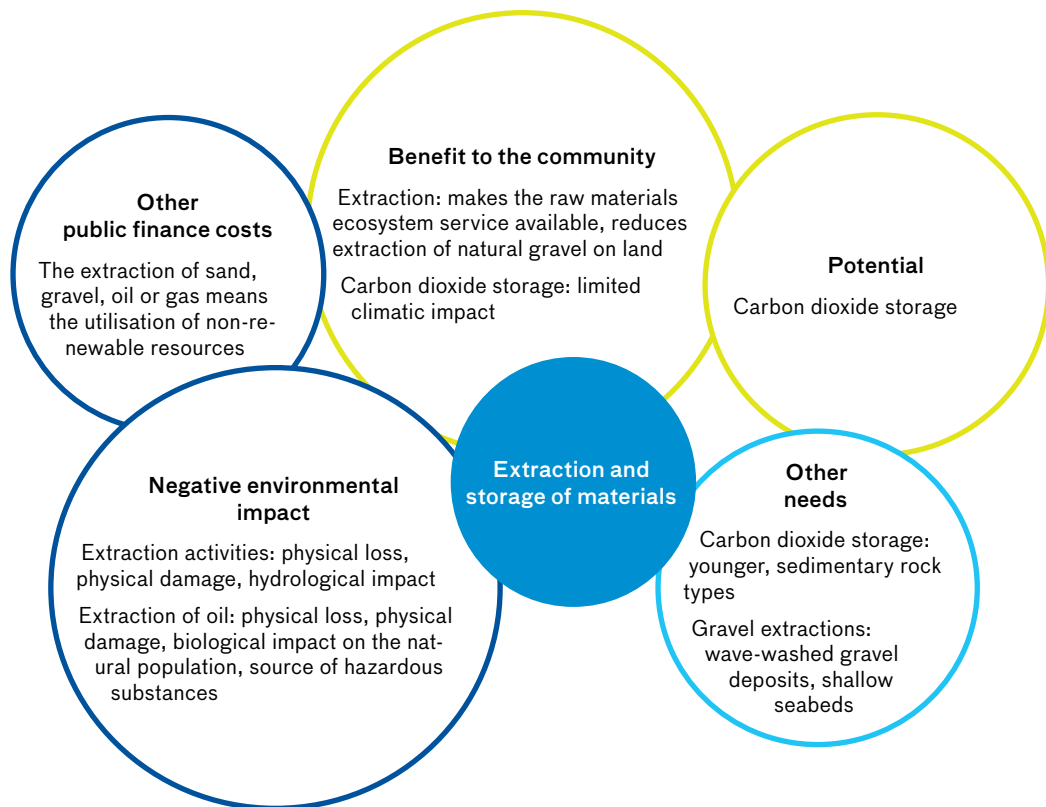
Extraction of marine sand and gravel can also lead to various physical changes in the coastal zone and cause the loss of shorelines, reduce natural protection against coastal erosion and affect current and seabed conditions. When extracting marine sand, measures should be taken to minimise the risk of the formation of depressions (seabed areas deeper than their surroundings) in which there is a risk of a lack of oxygen in the water on the seabed.

Carbon dioxide storage

Safe handling and assessment of environmental and health risks is a key issue in the introduction of large-scale carbon dioxide storage. The greatest environmental and health impact in connection with this is carbon dioxide leaks, which may possibly lead to marine acidification. According to the EU Directive on the geological storage of carbon dioxide, a geological formation may only be selected as a storage location if there is no significant risk of leakage, and if in any case no significant environmental or health impacts are likely to occur.

Climate

Carbon dioxide storage has a positive effect on the climate since a reduced concentration of carbon dioxide in the atmosphere can counteract the global warming under way.



Planning relevance

Extraction of materials from the seabed, and possibly also large-scale carbon dioxide storage, could conflict with other interests and conservation in particular.

Claims and goals





Resources of many different kinds can be found on Sweden's continental shelf, but there is currently hardly any extraction activity and SGU has not highlighted any areas of national interest. On the other hand, the agency has defined areas that could be considered to be of major importance from a national perspective. Deposits and areas of interest involve minerals, oil and natural gas, formations suitable for carbon dioxide storage, and shale gas as well as sand and gravel.

Environmental quality objectives

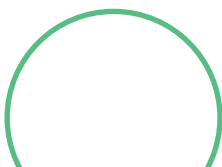
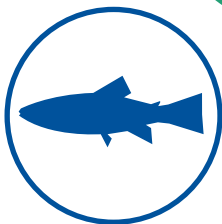
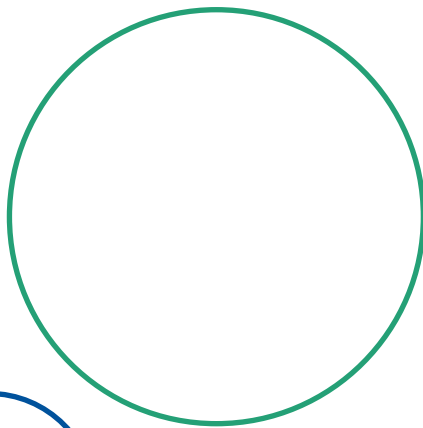
The EU objective is to have 12 carbon dioxide storage demonstration facilities in Europe by 2015 in order to counteract ongoing global warming; this is in line with the Reduced Climate Impact environmental quality goal. Extraction of marine sand and gravel relates to the Good-Quality Groundwater environmental quality goal, since it is an alternative to extraction of equivalent resources on land. A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos and A Rich Animal and Plant Life also relate to the marine extraction of materials.

Areas of interest for extraction of sand, oil and gas, and carbon dioxide storage

Source: SGU 2013

-  Areas of interest for carbon dioxide storage
-  Areas of interest for extraction of sand
-  Areas of interest for extraction of oil/gas
-  Plan area

Research and environmental monitoring



Examining marine activities

For marine spatial planning and management, knowledge within the natural and social sciences is required. Through research and environmental monitoring, knowledge is developed that can form a basis for planning work. Research and environmental monitoring provide information regarding the effects of the activities of various sectors, and whether various measures help to achieve the goals set. The requirement for data for marine research may come into conflict with other parties interested in using the sea, for example confidentiality within Sweden's total defence.

During 2013, at the Government's request, the Swedish Agency for Marine and Water Management and the Swedish Environmental Protection Agency reviewed the level of knowledge within Baltic Sea research. The project was conducted at Stockholm University and is part of a larger body of work that will compile the results of environmental research and knowledge gaps regarding the Baltic Sea.

The Swedish environmental monitoring documents the condition of the environment and changes affecting it. Sweden has a well-developed system for monitoring the country's environmental status. This involves both national and regional environmental monitoring, which includes benthic and pelagic habitats. A fundamental part of environmental monitoring is carried out by environmental analysis, with long-term data collection and annual scientific evaluations aimed at describing the condition of the environment and its development. Based on the environmental analysis, threats and effects of national and international impact factors can be assessed, proposals for actions worked out, and effects of actions decided upon can be monitored.

The length of the Swedish series of measurements is, in many cases, globally unique. The environmental monitoring is intended to show how the environmental quality objectives are being achieved and is to be adapted to relevant legislation. The work to design and prioritise environmental policy is based on the results of the environmental monitoring.

Actors

Universities and colleges

Marine research is currently being conducted at several Swedish universities; some of these activities are briefly described below. This includes both the social and natural sciences; in many cases, cross-border collaborations are in progress. Several interim programmes within environmental monitoring are carried out by divisions at the universities.

Havsmiljöinstitutet, the Swedish Institute for the Marine Environment, is a national centre tasked with providing a broad image of the current environmental situation in Swedish marine areas. Its operations are a collaboration between Umeå University, Stockholm University, Linnaeus University, and the University of Gothenburg. The Institute contributes analyses, syntheses and information, and has a role as knowledge broker between researchers, government agencies and decision-makers. Within environmental monitoring, the Institute contributes syntheses of collected data and interdisciplinary environmental analysis, which forms the foundation for an annual description of conditions in the ocean and their development.

Research into fish and fishing, as well as aquaculture, is being conducted at the Swedish University of Agricultural Sciences (SLU). Research into fish and fish ecol-

ogy is being conducted by Umeå University. The Center for Fish and Wildlife Research (CFW) is a collaboration between SLU and Umeå University. There is also a national centre of excellence for aquaculture, which operates through a collaboration between SLU and the University of Gothenburg.

Research into population genetics, with a major focus on fish and the effects of human activities such as fishing and fish farming, is being conducted at Stockholm University. Research into the marine food chain, the impact from human activity, and climate changes are in progress at Umeå, Stockholm, and Lund Universities. Biogeochemistry of significance for the oxygen situation as a nutrient balance is also studied there. Luleå University of Technology provides supplementary studies of marine geochemistry, especially metals and transition elements.

The Västra Götaland region, Chalmers University of Technology and the University of Gothenburg have proposed a development of collaboration and research within existing marine knowledge environments. This involves research areas such as marine management, maritime operations and maritime technology, marine biotechnology, marine energy, marine foodstuffs and tourism and recreation.

Södertörn University is the only institution in Sweden where scientific research and higher education are conducted in the field of marine archaeology.

Research and development concerning marine-based energy production is being conducted at several universities and colleges, including Chalmers University of Technology, Uppsala University and the Blekinge Institute of Technology.

Government agencies

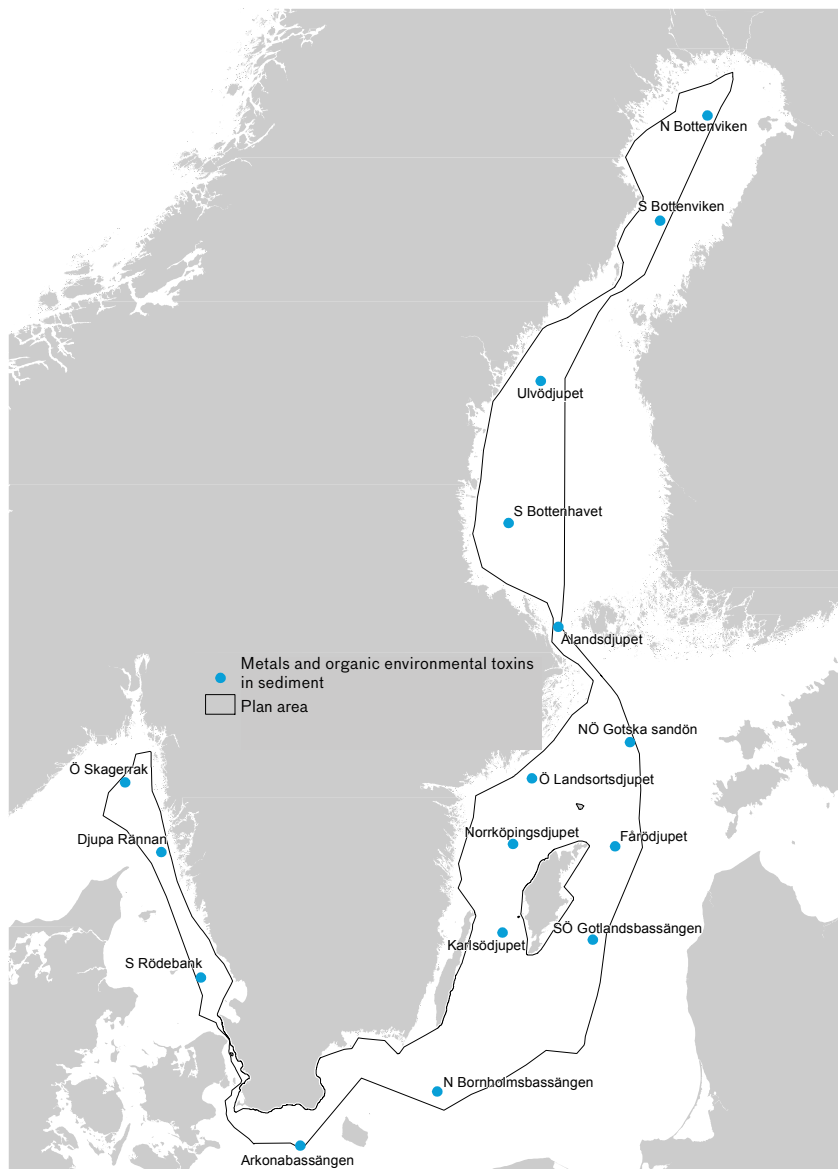
The Swedish Agency for Marine and Water Management and the Swedish Environmental Protection Agency are conducting the national environmental monitoring programme. The Swedish Agency for Marine and Water Management is responsible for all monitoring of aquatic environments apart from that concerned with environmental toxins, for which the Swedish Environmental Protection Agency is responsible. Together, the two agencies coordinate regional monitoring, which is otherwise carried out by the county administrative boards.

The Geological Survey of Sweden (SGU) has been conducting marine geological mapping of Swedish marine areas since the 1960s. Its work also involves continual investigations in connections with various facilities and projects that interfere with the seabed.

The Swedish Agency for Marine and Water Management is the agency responsible for the implementation and coordination of the fishing data collection programme that Sweden is conducting as part of the EU Data Collection Framework. The Swedish Agency for Marine and Water Management, the Swedish University of Agricultural Sciences and the Swedish Board of Agriculture collate and analyse biological and economic data from commercial fishing, recreational fishing, aquaculture and from the fish processing industry.

The Swedish Maritime Administration is the national agency responsible for mapping the depth of Swedish waters, including the major lakes Vänern, Vättern, Mälaren and Hjälmaren. The mandate of the Swedish Maritime Administration also includes responsibility for monitoring research and innovations within the shipping sector.

The Swedish Meteorological and Hydrological Institute, SMHI, conducts research encompassing marine environments, marine prognoses, marine climate and marine processes. Large parts of the Institute's work are conducted as part of national and international research projects, in collaboration with other institutes, agencies or universities.



Locations for the sampling of metals and organic environmental toxins in sediment.

© NaturalEarth, Lantmäteriet, HaV compilation

Water conservation associations and coastal water associations

All those conducting activities that risk impacting the environment are bound by Sweden's Environmental Code to monitor their environmental impact. This can involve, for example, examining the effect that a company's sewage has on a given coastal region.

Monitoring is conducted in order to discover evidence of environmental toxins, seaweed, algae, fish, and phytoplankton or to ascertain the level of nutrients in the water. It is common for those whose activities have an impact in a particular aquatic area to form an association – a water conservation association or coastal water association, for example – so that they can coordinate their monitoring efforts.

Oceanographic research

The oceanographic unit at SMHI conducts research and development within physical oceanography and marine biogeochemistry. The research makes use of field observations, remote sensing, data assimilation and numeric modelling. The research encompasses many time scales – from the production of short-term prognoses for temperature, salt content, currents, waves, water levels, ice range and distribution prognoses in the event of oil leaks, to understanding the impact of climate changes on the sea and the ecosystem. Geographically, focus is on the Kattegat, the Skagerrak, the North Sea and the Arctic Ocean.

As part of the EU-financed “Sea meets Land” project, SMHI has developed a new oceanographic model covering the entire Swedish marine area. The previous oceanographic model, BaltiX, is now called NEMO-Nordic.

Oceanographic and climatology research are also being conducted at Stockholm University and the University of Gothenburg.

Monitoring of marine sediment

At the request of the Swedish Environmental Protection Agency, SGU has identified 16 locations suitable for national monitoring and follow-up of sediment contents, and consequently also the aquatic environments' environmental toxin and nutrient contents. Sediment sampling has been conducted at the locations every five years.

Research into fish and fishing, and monitoring of stock

Research conducted at the Swedish University of Agricultural Sciences and Umeå University aims to improve knowledge of aquatic ecosystems and the ecosystem-based management of the sea and fishing resources. This research is to provide answers as to how ecosystems in seas, lakes and streams are affected by fishing, construction and eutrophication, and how aquatic ecosystems can be utilised in a sustainable manner in a future climate. Research is being conducted in close interaction with a continuous environmental analysis. Long-term collection of data from aquatic ecosystems is the basis for much of the research. Research concerning fundamental biological issues and analysis methods contributes to the environmental analysis.

Annual surveys and assessments of a number of commercial fish stocks are being conducted as part of a data collection programme for fishing. At the request of the Swedish Agency for Marine and Water Management, the Swedish University of Agricultural Sciences conducts the majority of the programme, which encompasses data collection through trawling surveys, the taking of samples on board fishing vessels and samples of landed catches in harbours, and the analysis and processing of data. The collection is coordinated regionally between the EU member states operating in the fishing waters in question; as far as Sweden is concerned, this entails collaboration within the Baltic Sea and North Sea regions.

Environmental monitoring

Stopping biodiversity loss is something that has been highlighted both nationally and internationally as being important for maintaining functional ecosystems. Variation at the genetic level is the foundation for all biodiversity, and its significance for the ability of species to adapt, and for the function of the ecosystems, is becoming all the more obvious. Genetic variation within a species can play an important role in the vitality of species and in the resilience of the ecosystems. To understand the effects of human activities, such as fishing and fish farming, biodiversity needs to be monitored at the genetic level.

For only a few Swedish marine species (sea trout, salmon, and herring, for example) is there relatively good knowledge of natural genetic patterns. Genetic monitoring programmes for these species can be developed through the use of data collection projects and data banks that already exist. Species where no genetic knowledge currently exists, but for which another type of regular monitoring occurs, are also suitable for genetic monitoring (for example, *Monoporeia affinis*).

The level of knowledge of the propagation of underwater noise is currently very low. Joint monitoring systems are being discussed within both Ospar and HELCOM. Our knowledge will thus grow with time so that underwater noise can be taken into consideration in marine spatial planning.

Marine geological examination

Marine geological mapping provides data for planning and the protection of our coastal and marine areas, and information on background levels of nutrients and pollutants, in addition to explaining where and how natural processes affect ecological conditions. Sediment samples and chemical analyses of fine material are conducted in order to monitor the occurrence of and changes to existing pollutants and their effects. Geological sampling also provides information regarding oxygen conditions and the prevalence of oxygen-free seabeds. Marine geological surveying can also be used for monitoring changes caused by physical interference on the seabed, for example during mineral and gravel extraction, construction activities, dredging and trawling.

Marine geological surveying of Swedish marine areas provides data for the production of easy-to-understand information concerning Swedish seabeds. The measurements are conducted from vessels and the results are calibrated and checked with the help of sediment sampling and photography of the seabed. The collected basic material is then accessible in databases. Sediment echo sounder data is collected to supplement the information about the state of the seabed as reported in the regional marine geological map and nautical charts.

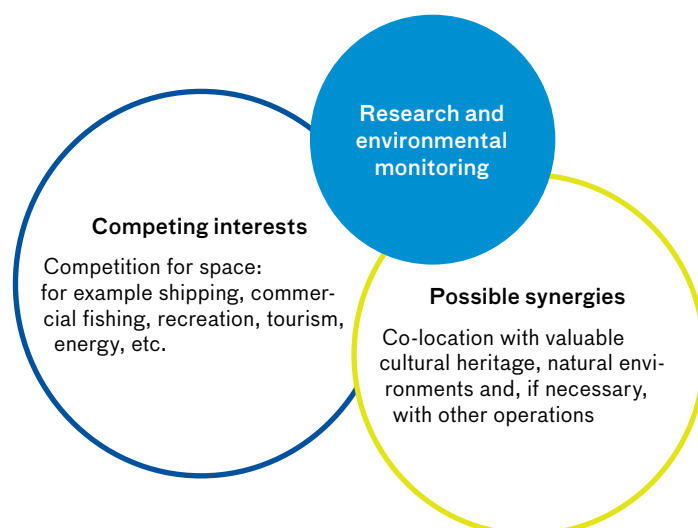
Marine geological surveying has also been conducted for areas off the coasts of Västernorrland, Uppland, Blekinge and Skåne, as well as the Kalmar Sund and the Kattegat. The data now being produced thus primarily supports the municipal coastal water planning process.

Hydrographic surveys and shipping

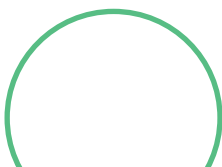
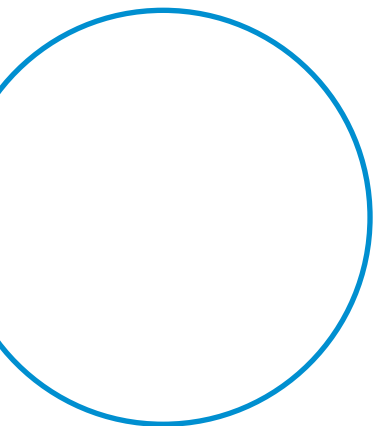
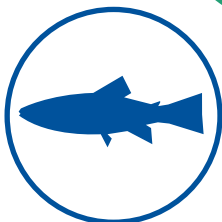
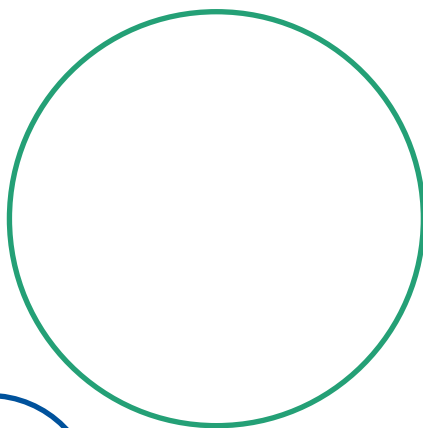
There is a need for knowledge regarding the landscape in coastal and marine areas is great. The Swedish Maritime Administration owns and operates five vessels for hydrographic surveys, and it conducts surveys mainly based on the needs of merchant shipping. The Swedish Maritime Administration measures water depth primarily to safeguard existing shipping lanes. This means that the surveys are concentrated in areas where larger vessels operate. The Swedish Maritime Administration also regularly conducts control measurements of certain lanes and conducts surveys in connection with dredging in the larger harbours.

Planning relevance

Results from research and environmental monitoring are needed as data for planning purposes. Specific marine space is required for conducting certain investigations.



Environmental protection



International and European environmental protection

Convention on biodiversity

Sweden has signed and ratified the Convention on Biological Diversity (CBD), which is the result of the 1992 top-level UN meeting on the environment and sustainable development in Rio de Janeiro, Brazil. The convention states that every country has a responsibility to preserve diversity in genes, species and ecosystems.

Being party to the Convention implies a commitment to preserving biodiversity and natural resources, and utilising them in a sustainable manner. The Convention has been incorporated into Swedish conservation work through sixteen national environmental quality objectives. This also means that Sweden has committed to protect at least 10 per cent of its coastal marine areas by 2020, especially those that are important for biodiversity and ecosystem services. The network of protected areas is to be efficiently managed, ecologically representative and interconnected.

Marine Strategy Framework Directive

The 2008 EU Marine Strategy Framework Directive aims to maintain or achieve a good environmental status in marine environments throughout the entire EU. Through the Directive, the EU member states have committed to taking measures so that a good environmental status will prevail in their respective marine areas by no later than 2020. As far as Sweden is concerned, this applies to the Swedish parts of the North Sea (the Skagerrak and Kattegat) and the whole of the Baltic Sea. The Directive was introduced into Swedish legislation in 2010 through the Marine Environmental Ordinance (SFS 2010:341), which applies to all marine waters and underlying earth layers from the coast and in the whole of Sweden's exclusive economic zone. In a similar manner, the EU Water Framework Directive aims to preserve and improve aquatic environments in the Community and has been incorporated into Swedish legislation through the Water Quality Management Ordinance (SFS 2004:660). The Marine Environmental Ordinance and the Water Quality Management Ordinance overlap each other in coastal zones.

The member states are to assess the status of the marine environment, develop programmes for monitoring and take any necessary measures. According to the Marine Environmental Ordinance, the Swedish Agency for Marine and Water Management is to establish the conditions under which a good environmental status prevails, provide information regarding environmental quality standards and indicators according to the Environmental Code, and decide on programmes of measures for the management areas the North Sea and the Baltic Sea. The programmes of measures are to include the measures that need to be taken in order to fulfil the environmental quality standards. The Swedish Agency for Marine and Water Management has drafted 11 environmental quality standards with associated indicators.

In addition to this, good environmental status is a general environmental quality standard for the North Sea and the Baltic Sea. In 2012, the Swedish Agency for Marine and Water Management established what was to characterise good environmental status in the North Sea and the Baltic Sea. This

was done with consideration for the descriptors (environmental theme areas) stated in the Marine Strategy Framework Directive, as well as criteria and method standards for good environmental status in marine waters. The Swedish Agency for Marine and Water Management has, however, adapted the design of the criteria based on the conditions that prevail in Swedish marine areas.

Protected areas

Marine habitats requiring comprehensive, long-term protection can become protected areas, according to rules found in the Environmental Code and other statutes.

National parks

With the support of the Riksdag, the Government may declare an area of land or water belonging to the State a national park, in accordance with the Environmental Code. The aim of a national park is to preserve a large, interconnected area of a certain kind of landscape in its natural state. The Swedish Environmental Protection Agency may – following consultation with the relevant county administrative board, municipality and the Swedish Agency for Marine and Water Management – prescribe regulations concerning care and management, in addition to restrictions in the right to use the land or water within the national park. Examples of measures that can be prohibited include water-skiing, anchoring boats, putting down buoys and mooring boats on land.

So far, the Kosterhavet national park in the Skagerrak/Kattegat is the only example of a pure marine national park. The aim is to keep a distinctive, species-rich marine and archipelago area and adjacent land areas in an essentially unaltered condition. Furthermore, there are another six national parks by the sea with marine areas of varying different sizes: Haparanda Archipelago, Skuleskogen near the High Coast, Ängsö in the Stockholm Archipelago, Gotska Sandön, Blå Jungfrun in Kalmarsund and Stenshuvud on the east coast of Skåne.

Nature reserves

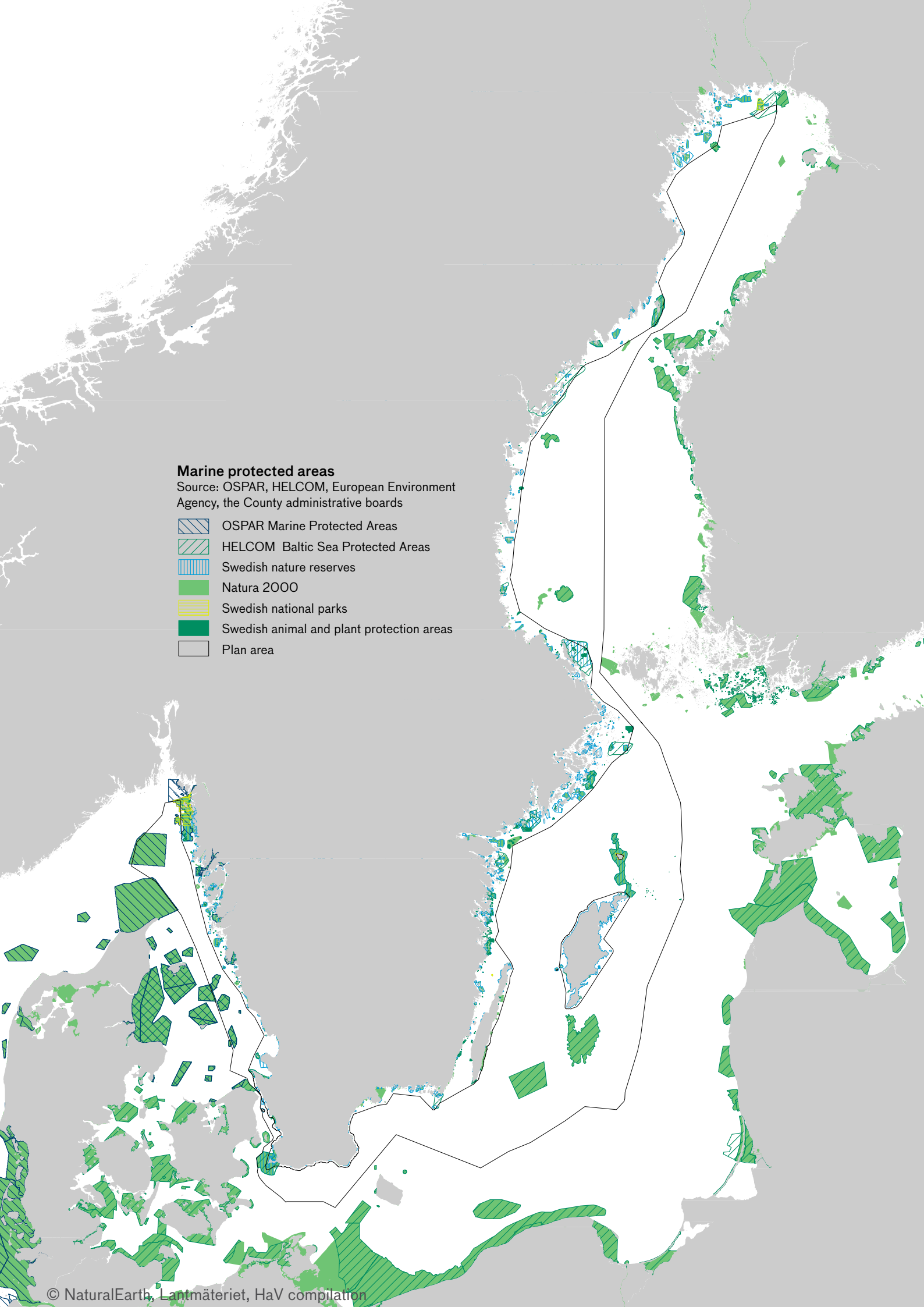
A county administrative board or municipality may declare an area of land or water to be a nature reserve in accordance with the Environmental Code in order to preserve biodiversity, to care for and preserve valuable habitats, or to satisfy the need for recreational areas. An area may also be declared a nature reserve if it is needed to protect, restore or to create new valuable habitats or habitats of species warranting protection. For an area to be considered a marine nature reserve, its protection must have a marine purpose, and a description must be provided of the marine values in question and how this purpose is to be achieved.

Natura 2000 areas

Natura 2000 areas are designated in accordance with the Environmental Code pursuant to two EU directives - the Birds Directive and the Habitats Directive. The aim of Natura 2000 is to contribute to the preservation of biodiversity from a joint EU perspective. As protection for a Natura 2000 area ensues through the area being listed by the Government, the designation is a form of protection in itself. At the same time, a Natura 2000 area can be protected via other regulations in the Environmental Code and this also applies within Sweden's exclusive economic zone.

Biotope protection areas in marine environments

The Government can prescribe regulations that all easily recognisable areas of a certain type in the country, or part of the country, constitute biotope protection ar-



eas. In marine environments, this protection refers to small aquatic areas that due to their particular qualities are valuable habitats for threatened animal or plant species, or are otherwise particularly worthy of protection. According to common practice, biotope protection areas can extend up to approximately 20 hectares.

A government agency or municipality may decide that an area is to constitute a biotope protection area. The county administrative board may, according to the Area Protection Act, establish biotope protection areas in order to protect, for example, eelgrass meadows, reefs of the cold-water coral *Lophelia pertusa*, shallow bays and biogenic reefs.

Protection areas through regional marine environment conventions

Sweden has committed itself to protecting the marine areas highlighted as part of the HELCOM Convention, the Baltic Sea Protected Areas (BSPA) and the Marine Protected Areas (MPA) defined in the OSPAR Convention for the North-East Atlantic.

These areas have no legal protection as such, but Sweden has chosen areas that, in the majority of cases, are protected as Natura 2000 areas. BSPA High Coast is Sweden's largest BSPA and constitutes only a very small part of the Natura 2000 area. Between 2008-2011, the Swedish Environmental Protection Agency, with extensive local support, took the initiative to produce management plans for the High Coast and other similar places.

Coastal protection areas

The provisions regarding shore protection in the Environmental Code are intended to safeguard the long-term access of citizens to shore areas through the legal right of access to private land, and preserve good living conditions for animal and plant life. Shore protection covers areas of land and water up to 100 metres from the shoreline and also includes underwater environments. A county administrative board may, in an individual case, decide to extend the shore protection to a maximum of 300 metres, if this is required to satisfy the purpose of the shore protection.

It is not permitted, for example, to erect new buildings within shore protection areas. The shore protection is general and applies to all coasts, lakes and watercourses regardless of size and regardless of whether the nature is particularly worthy of protection. However, shore protection may be differentiated in some counties.

	Number of areas with marine acreage	Marine acreage covered by the protection type (km ²)	Net area (km ²) without overlapping areas
MPA – National park	1	380	380
MPA – Nature reserve/ Conservation area	42	2,644	2,644
MPA – Natura 2000 The Habitats Directive (with marine habitats)	315	9,002	6,840
Other national parks	6	81	3
Other nature reserves/ Conservation areas	478	2,419	706
Other Natura 2000 Habitats Directive	81	46	10
Natura 2000 The Birds Directive	134	4,598	35
Animal and plant protection areas (birds and seals)	487	296	110

Animal and plant protection areas

If special protection is required for a species of animal or plant within a certain area, over and above the provisions of the Species Protection Ordinance (SFS 2007:845) or the fishing legislation, the county administrative board or municipality may, pursuant to the Environmental Code, decide on "animal and plant protection areas". Animal and plant protection areas in marine areas primarily involve bird and seal protection areas where entry is prohibited at certain times of the year.

Marine protected areas

The marine protected areas for 2012 are described in the table by number and acreage. There are overlaps between the different forms of protection. In the account of the net acreage, the overlaps have been excluded. Biotope protection areas are currently lacking from marine environments.

The marine area protection according to MPA – National park, nature reserve and Natura 2000 areas cover approximately 9,900 km², or approximately 6.3 percent of the marine area nationally. The equivalent figure for all protection areas in marine environments is 10,700 km² or 6.9 per cent of marine areas. This can be compared with the requirements to achieve the goal set in Nagoya in 2010: that by 2020, at least 10 per cent of coastal and marine areas that are important for biodiversity and ecosystem services are to be protected.

The geographical distribution of the marine protected areas is greatest near the coast. Only a few protected areas can be found more than 3–4 nautical miles from the baseline (the trawling boundary) and these are almost exclusively Natura 2000 areas with marine habitats. The same applies to protected areas in the exclusive economic zone. For the remaining protection areas in marine environments, the number of areas is also greater nearest the coast.

The OSPAR and HELCOM marine environment conventions

Sweden has contributed 10 areas to the OSPAR network of marine protected areas (MPA). Within Sweden's part of the OSPAR area, the percentage of protected areas is 17.5 per cent. The largest areas are Bratten (1,209 km²) and Kosterfjorden-Väderöfjorden (535 km²) in the Skagerrak/Kattegat. Sweden has contributed to HELCOM's network of marine protected areas (BSPA) by protecting 28 areas. The largest areas are Höga kusten (1,520 km²) and Gräsö-Singöarkipelagen (662 km²) in the Gulf of Bothnia, and Stora Midsjöbanken (984 km²), Kopparstenarna-Gotska Sandön-Salvorevområdet (605 km²) and Hoburgs bank (1,227 km²) in the Baltic Sea. In the Kattegat there is an overlap between the OSPAR and the HELCOM areas. Within Sweden's part of the HELCOM area, 4.9 per cent is protected.

Size distribution

In addition to the geographic distribution, the size of the protected areas is also significant. In order to be able to maintain vital populations of species, a certain size is required. It is therefore important to create larger interconnected areas rather than a larger number of small, more widespread areas. The majority of the Natura 2000 areas are amongst the smallest areas. Over 200 marine Natura 2000 areas are less than 5 km².

Developments and trends

The county administrative boards have produced a prognosis for planned protection areas in marine environments. The combined acreage of new planned protection areas in marine environments equivalent to marine national parks, marine nature reserves or Natura 2000 areas with marine habit, is approximately 1,300 km². The

majority, equal to almost 80 per cent of the planned protection, are planned in the Gulf of Bothnia.

If the planned marine protected areas are realised, a further 0.83 per cent of the marine environment would be protected. A total of 7.2 per cent of marine areas would be protected by 2020. The distribution of the planned protection areas follows previous patterns in terms of water depths, meaning that they still consist predominately of shallower areas.

The need for further protective measures

If the goal of at least 10 per cent of the marine environment being protected by 2020 is to be achieved, Sweden will need to protect more marine areas than those already planned. It is also key that planned areas actually protect the natural values that they are intended to protect. However, the lack of knowledge regarding marine biodiversity and the lack of reliable maps make it difficult to evaluate and follow up on the status of natural values.

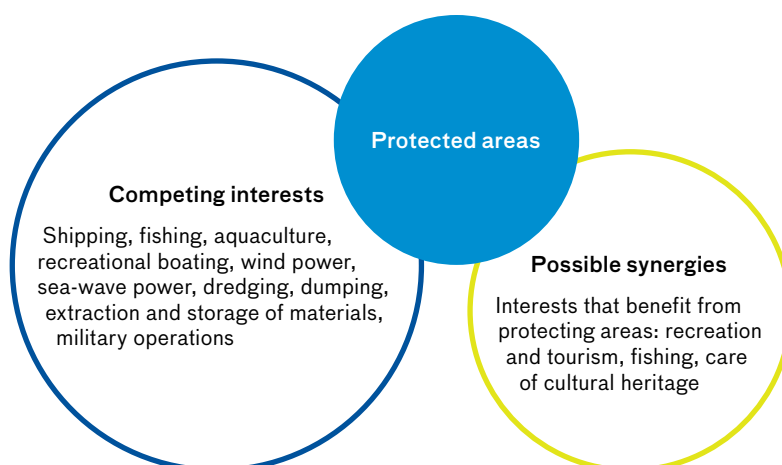
The factors that threaten biodiversity are many and complex, and this makes it extra difficult to implement protection measures. In certain cases a protection area can be the best solution to achieve the preservation goal set, but other measures may still be required.

The development of new protected marine areas is one possible measure that could be included in programmes of measures in accordance with the Marine Environmental Ordinance, and at the same time be incorporated into and described in marine spatial plans. This demands proper coordination of the work on the programmes of measures and marine spatial planning, at both a national and regional level.

Actors

The Swedish Agency for Marine and Water Management is responsible for marine protection areas, together with the Swedish Environmental Protection Agency. The Swedish Environmental Protection Agency alone is responsible for a general system survey of protection areas, for national lists and registers of protected areas, and for acquiring and managing the areas of land and water that the State purchases for conservation purposes. The Swedish Environmental Protection Agency also approves infringement claims, and is responsible for the coordination of property investigation, border work, valuation and negotiation.

The Swedish Environmental Protection Agency and the Swedish Agency for Marine and Water Management are responsible within their respective areas of responsibility (land and water respectively) for producing general advice, manuals, guidelines and



Representativeness

The percentage of marine protection areas is greater in the Skagerrak/Kattegat than in the Baltic Sea and the Gulf of Bothnia. In certain sea basins more than 30 per cent of the marine environment is protected, while only just over 1 per cent is protected in other marine areas. The results also show that shallow coastal areas are protected to a greater degree than deep offshore areas.





In several counties, the shallower areas in photic zones are protected to a significantly greater extent than deeper areas. It is only in two counties that areas deeper than 60 metres are protected to any significant extent.

Only in the Skagerrak, the northern Kattegat, the Arkona Sea and the southern Öresund, and Norra and Södra Kvarnen does protection exceed 10 per cent of the marine area. Large parts of the marine area of the Gulf of Bothnia and the Baltic Sea are covered by less than 3 per cent protected areas.

Shallow areas are, to a large extent, more protected than deep areas. Coastal areas are important areas for fish spawning and growth, at the same time as they are of interest to water-based recreation pursuits. Furthermore, knowledge of natural values can be better in these areas as they are easier to examine. Less than 2 per cent of the deeper areas have protection.

Percentage protection in the respective sea basins

Summary: The Swedish Agency for Marine and Water Management

-  > 10% protected marine area
-  6 – 10% protected marine area
-  3 – 6% protected marine area
-  < 3% protected marine area

other instructional material. They are also responsible for coordinating national inventories and investigations and for other development work, and have the right to appeal certain decisions in accordance with Chapter 7 of the Environmental Code.

The county administrative boards are responsible for the marine protection areas in their counties; they both select them and then manage them. The municipality is, however, responsible for any protection areas that it has itself authorised, and for the long-term management of these areas.

Protected areas and other interests

Protected areas can come into conflict with many other activities that can threaten biodiversity and the purpose of the protection. This applies particularly to some recreation and tourism, for example ferry and cruise traffic and other boat traffic, commercial shipping, fishing, aquaculture, wind power, dredging and dumping, extraction and storage of materials and defence operations. There are particular risks when various types of environmental impacts are combined; this strengthens the impact, creating "cumulative effects".

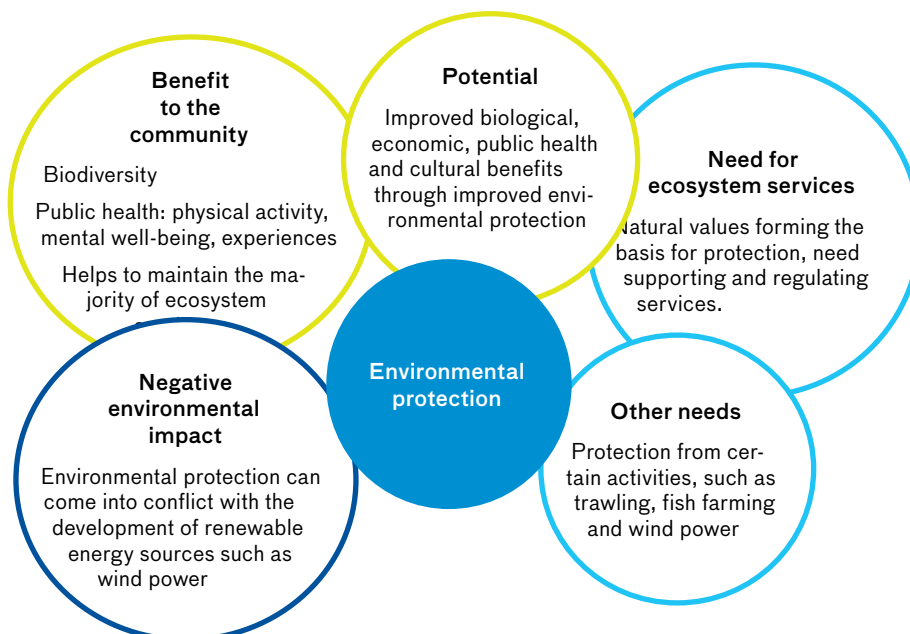
Claims and goals

The protection of marine areas encompasses spaces above and on the surface of the water, areas in the water and on the seabed, depending on the species or habitats to be protected. This also includes protection from activities such as trawling, fish farming and wind power.

Environmental quality objectives

Environmental quality objectives, which have been established by the Government, provide guidance in the application of the Environmental Code in respect of the assessment of what is implied by sustainable development. Eutrophication and environmental toxins are addressed in the Zero Eutrophication and A Toxin-Free Environment environmental quality objectives. The A Balanced Marine Environment and Flourishing Coastal Areas and Archipelagos environmental quality objectives address environmental issues concerning the sea, coast and archipelagos, and cover a great number of interim objectives that describe problems and set environmental status goals. "Rich diversity of plant and animal life" means that biodiversity is to be preserved in coastal areas and in the sea.

In February 2014 the Government decided on new interim objectives within the environmental objective system. This includes prioritising marine protection areas and increasing them to at least 570,000 hectares by 2020.



Planning relevance



The need for protection of marine environments is a fundamental planning issue, which needs to be balanced against the interests of several different sectors.

National interests

According to Chapter 3 of the Environmental Code, areas of land and water are to be used for the purpose or purposes for which the areas are most suited as regards their character, situation and existing needs. Areas that are of national interest for conservation, cultural heritage care or recreation are to be protected from measures that could tangibly harm the natural or cultural heritage.

The geographic management provisions found in Chapter 4 of the Environmental Code details the areas which, in their entirety, are of national interest due to their natural and cultural values. They provide protection for the archipelagos and coastal areas from the border with Norway to Forsmark, for the High Coast in Ångermanland, for Norrbotten's archipelago and coastal areas, and for Öland and Gotland.

National interest claims for conservation.

-  National interest claims for conservation, according to Chapter 3 of the Environmental Code
-  Plan area

The image features a large, light blue circle at the top left, containing the text "Risks and other influential factors". Below this circle, a smaller blue circle is connected to the main circle's edge. Further down, there are several other circles of varying sizes and colors: a yellow circle, a large green circle, a medium blue circle, and a small green circle. The background is white.

Risks and other
influential factors

Importance to the community

“Risks and influential factors” means that there are risks for accidents and other incidents at sea that can have harmful consequences for people and the environment. To be able to handle these risks and prevent other impacts on the marine environment, knowledge needs to be constructed regarding the current and future risk of accidents; there also needs to be preparedness and equipment for to take action should an accident occur. This also involves impacting other sectors of society in order to reduce the impact on the marine environment.

The sea is of significance, including as a transport route for several activities within the community. Shipping plays a dominant role in Swedish foreign trade; it accounts for over 90 per cent of foreign transportation. Domestic transportation by sea is also significant. The major risks are those concerned with accidents in shipping, such as collisions. Such accidents can lead to the discharge of oil, chemicals or other hazardous substances and the subsequent negative effects.

Environmentally hazardous substances can end up in the water via discharge from land. Risks can also arise due to the leakage of harmful substances that are already in the sea. This can happen, for example, with fibre embankments, which contain industrial waste comprising harmful substances. It could also involve waste or ammunition and chemical weapons dumped in the sea.

Interference with harbours or transport at sea can affect opportunities to maintain important social functions. The social costs of safety work within various areas have been calculated, but the economic significance has not been studied from a marine perspective.

Actors

In Sweden, the agency responsible for a particular operation is also responsible for its functioning in the event of a crisis. The Swedish Civil Contingencies Agency (MSB) is responsible for accident prevention issues, crisis preparedness and civil defence, and supplies data that provides an overall description of accidents, crises and safety work. Their task includes coordinating and strategically directing Sweden's preparedness regarding oil pollution and supporting municipalities' preparatory work. MSB is also the agency responsible for implementing the EU Floods Directive in Sweden, in close collaboration with the county administrative boards. MSB is also to assist the Government Offices with data and information in conjunction with serious accidents and crises.

The responsibility for leading and coordinating national emergency services at sea is divided between several central agencies, the county administrative boards and the municipalities. The Swedish Maritime Administration is responsible for air and sea rescue within Sweden's territorial waters and exclusive economic zone. The Coast Guard takes care of environmental clean-up or rescue at sea and assists in air and sea rescues. The municipalities are responsible for rescue services on land, in harbours and in canals. The municipalities and the Swedish State have agreed on fixing the boundaries. The county administrative boards may have a coordinating role between the municipality and State rescue services in the event of a major accident, and is also the agency responsible in the event of an accident involving radioactive discharges from a nuclear technology facility. The Swedish Radiation Safety Authority, however, has overall responsibility within radiation and nuclear safety. MSB has access to reinforcements for both emergency services and environmental clean-up in connection with oil and chemical spills, and also acts as coordinating agency at the national level.

Risks at sea

Handling risks and reducing the impact on the sea

Issues regarding risks and influential factors deal with accident prevention, crisis preparedness and civil defence, and apply to measures taken before during and following an accident or crisis. Issues that concern the sea include, for example, environmental rescue at sea and sea rescues. The preparedness of the community needs to be developed in order to prevent accidents and crises and to reduce vulnerability when they do occur. This presupposes that attention is paid to risks in the construction, operation, and phase-out of marine facilities, for example wind farms. It also involves coordination of the various parties involved, following up on and evaluating the community's crisis management work and ensuring that training and exercise are carried out.

Sea rescue

In the majority of cases, sea rescue efforts are due to vessels colliding or running aground, as well as medical transport from vessels. In 2011, 1,030 sea rescues were conducted. As a general rule, most sea rescues are carried out close to the coast in the summer between June to August, i.e., the boating season, with a clear peak in July.

Discharges of oil and oil products

In connection with handling an oil discharge, the course of events can be divided into three phases: discovery, combating, and cleanup. The municipalities and the Swedish Coast Guard are responsible for combating the discharge. Clean-up is regulated by environmental legislation and is primarily an environmental issue. Cleanup efforts at sea involves efforts following the discharge of oil or other hazardous substances into the sea. Approximately 45 million tonnes of oil and oil products are transported to and from Swedish ports per year. The international trend is that crude oil is transported in vessels as large as possible. However, the largest tankers have largely stopped calling in Sweden, a reduction of around 80 per cent, while there is an equivalent increase for medium-size vessels. Greater amounts of goods handled increases the level of risk, and the consequences are more serious in the event of accidents involving bigger vessels. During 2001–2008, there were 910 reported shipping accidents in the Baltic Sea, primarily vessels running aground and collisions. Even sunken, leaking wrecks entail a risk of oil discharges.

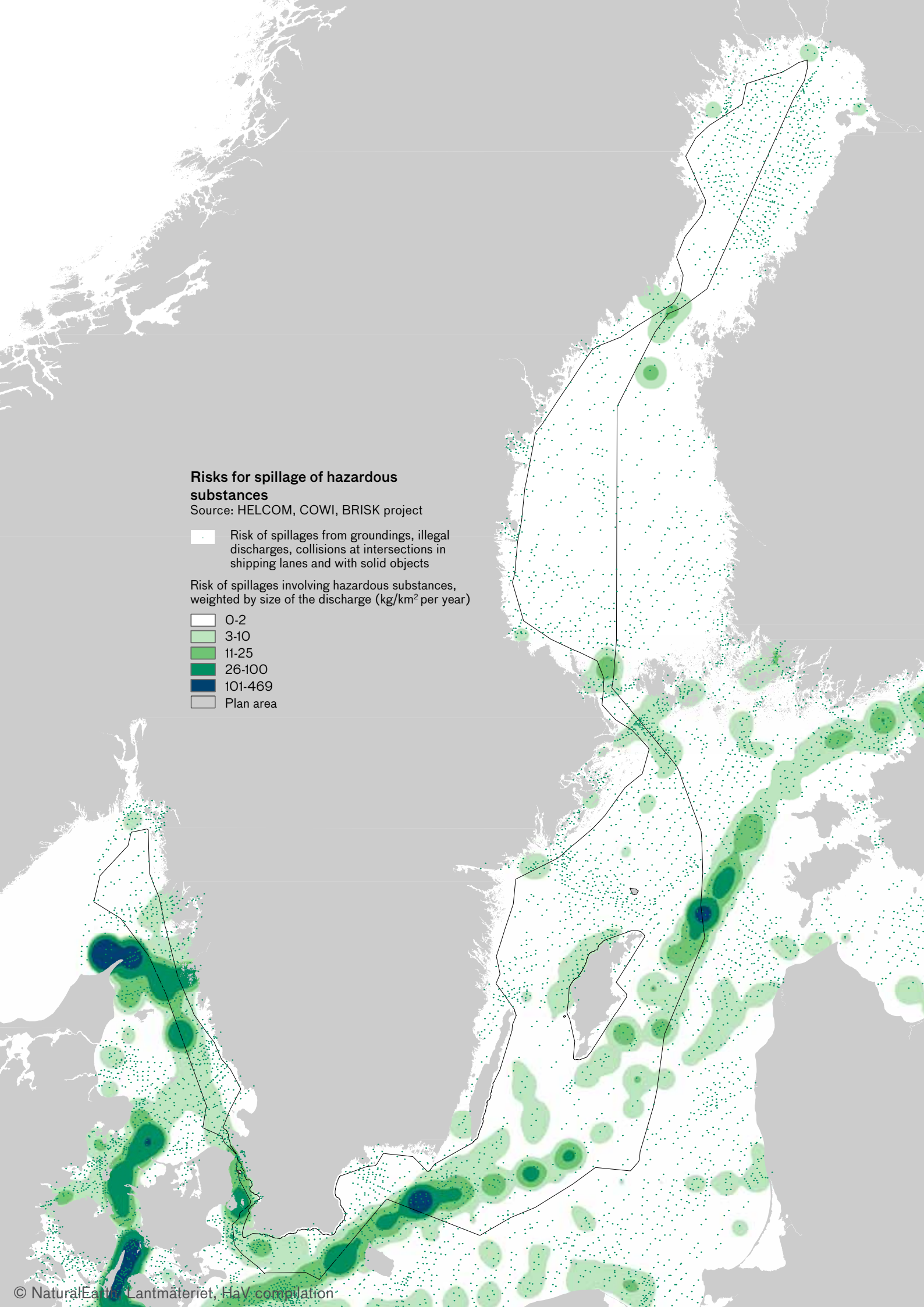
Discharges of other harmful substances

Approximately 4 million tonnes of chemicals and other environmentally hazardous substances are transported to and from Swedish ports per year. The risk of serious consequences in the event of a discharge of chemicals may be less than it is for oil, since most chemicals constitute a less serious environmental hazard. However, the consequences depend on the type of chemicals and where the discharge occurs. This type of discharge is more cost- and resource-intensive than an oil discharge.

In certain areas, there are environmentally hazardous substances that impact whether activities can be developed there. For example, there are around 23,000 barrels of mercury in the sea at Sundvallsbukten. Mines and dumped chemical weapons from the two world wars also constitute a risk to mankind and the environment. Even sunken, leaking wrecks entail a risk of chemical discharges.


Discharges at coolant intake points

A discharge of oil or other harmful substances in the vicinity of a coolant intake point used by a nuclear power plant or the major petroleum industries could entail major risks for these facilities. Any stoppage due to a discharge of hazardous substances ad-









Risks for spillage of hazardous substances

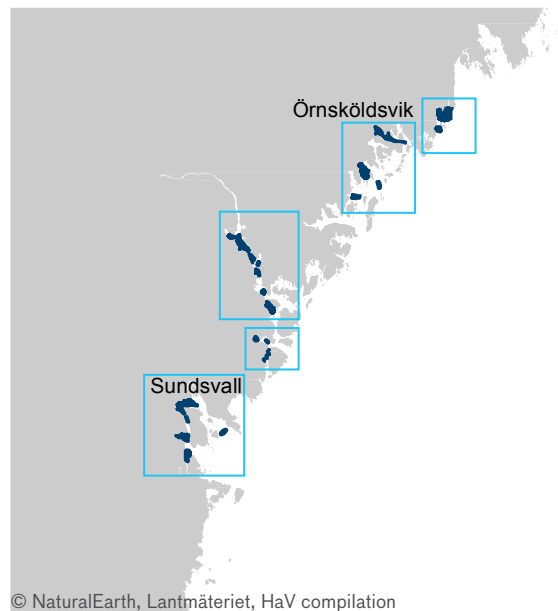
Source: HELCOM, COWI, BRISK project

 Risk of spillages from groundings, illegal discharges, collisions at intersections in shipping lanes and with solid objects

Risk of spillages involving hazardous substances, weighted by size of the discharge (kg/km² per year)

-  0-2
-  3-10
-  11-25
-  26-100
-  101-469
-  Plan area

Major industrial residues, in the form of polluted sediment, can be found, above all, along the coast of the Bothnian Sea. The map shows the areas for SGU's investigation of fibre embankments in Väster-norrland County.



adjacent to a coolant intake point could result in major costs to the community. There is also a certain risk in connection with shipping of radioactive material.

Sediment banks

Polluted sediment banks can primarily be found along the coast of the Bothnian Sea. Pollutants from the pulp industry accumulate into large deposits on the seabed there, in the form of fibre embankments and fibre-rich sediment. More than 250 environmentally harmful substances have been identified in the fibre embankments, including high levels of PCB and DDT, along with heavy metals such as arsenic, mercury, lead and cadmium.

The need to sanitise polluted sediment in the Bothnian Sea may increase as the fibre embankments are neither physically nor chemically stable. There is a risk that environmental toxins can spread to deeper areas, where they can be taken up by benthic organisms and carried further upward in the food chain.

Land uplift means that the polluted seabeds that currently lie under water will, in the long term, lie above the water surface and be subjected to erosion in the form of waves and wind, and this implies a risk of the pollution spreading. The problems with polluted sediment in coastal areas will thus not lessen over time, but will probably worsen.

Activities

Operators of wind farms at sea and similar facilities have a responsibility to prevent accidents. Risks should be considered during construction, operation and phase-out of wind farm facilities, for example in connection with the sea transportation that the industry generates; any requirements for the facility to be located at a safe distance from other operations also need to be studied.

Risk areas for marine accidents

The risks of environmental impact resulting from oil or chemical leaks at sea can be linked to accident statistics with regard to geographical distribution. Even if accidents have occurred along the whole of the Swedish coast, the accident risk is often related to the number of vessels in a particular area. The majority of sea traffic follows the major routes through the Baltic Sea; in particular, the deep water route for large tankers south and east of Gotland is used regularly. The areas, according to MSB, that are more likely to be affected by accidents are the more congested sections of the

Öresund and the entrance lanes into the various harbours.

The risks of accidents at sea have also been assessed within the BRISK (Sub-regional risk of spill of oil and hazardous substances in the Baltic Sea) project. According to BRISK, the major risks within Swedish marine areas can be found at Svenska Björn, north-east of Öland's southern shallows, and at Bornholmsgattet and in the Öresund. 38,000 vessels pass through the Öresund every year, and this intensity of traffic in such a tight geographic area is of course a risk in itself. Around 51,000 vessels pass through Bornholmsgattet every year. With its intersecting and connecting lanes this means that Bornholmsgattet, according to BRISK, is the most intensely trafficked area in the Baltic Sea, and the location where the likelihood of a serious accident is greatest.

MSB has been commissioned by the Government to produce a national risk assessment with an EU perspective. An initial report described the risk of oil discharges, transport stoppages and major transport accidents, as well as floods.

Developments and trends

Factors that may affect crisis management work in the future are climate change and rising sea levels. Other challenges are that oil transportation is expected to increase substantially in the coming years, and that the development of wind and sea-wave power will make new demands of how rescue services at sea are handled. If discharges occur, conservation interests – and possibly cultural heritage – can be affected. Other interests that can be affected are recreation, tourism, and commercial fishing; furthermore, residential areas along the coast can also be affected by discharges.

Environment and climate

Environmental impact

The environmental impact of accidents is significantly local, in several respects, but normally limited as regards society's total environmental impact. The environmental consequences of an accident or a fire with a discharge of chemicals depend on a number of factors, for example the properties of the substance, the extent of the emission, the location of the accident, the weather conditions, how long the incident lasts and how it is handled.

In Sweden, hundreds of facilities handle large quantities of chemicals. Furthermore, large amounts of chemical substances – primarily petroleum products – are transported every day. The largest tanker currently trafficking the Baltic Sea has a cargo of 150,000 tonnes. Between 1998 and 2008, exports from the Russian ports in the Gulf of Finland quintupled.

Digital Miljöatlas (Digital Environmental Atlas) provides information regarding various types of shore areas along the Swedish coast and the major lakes. The BRISK project has identified the risk areas with the highest probability of accidents that could lead to pollution in Sweden's marine areas. Calculations of the risk areas are based on the conditions in 2008 and against a future risk scenario in 2020. A systematic review of the future risk scenario for oil accidents in Sweden's marine areas has been conducted as part of the ongoing work with Sweden's oil strategy.

Climate

If society does not adapt to the changing climate to a sufficient degree, then the climate changes will probably give rise to more and more serious, accidents and crises. Insufficient climate adaptation could also cause stoppages and disruptions to important social functions. Climate change is potentially one of the major challenges

that society will face in the future. Working to ensure that society adapts to a changed climate is therefore an overriding challenge within risk management.

In the long term, climate change may lead to rising sea levels, which may require investments in preventative measures, for example larger barriers and embankments to protect cities. Another effect of climate change is increased shore erosion, which can lead to a need for beach nourishment measures. There is also a risk of more extreme weather situations with more, and more intense, storms.

Goals and strategies

Safety goals

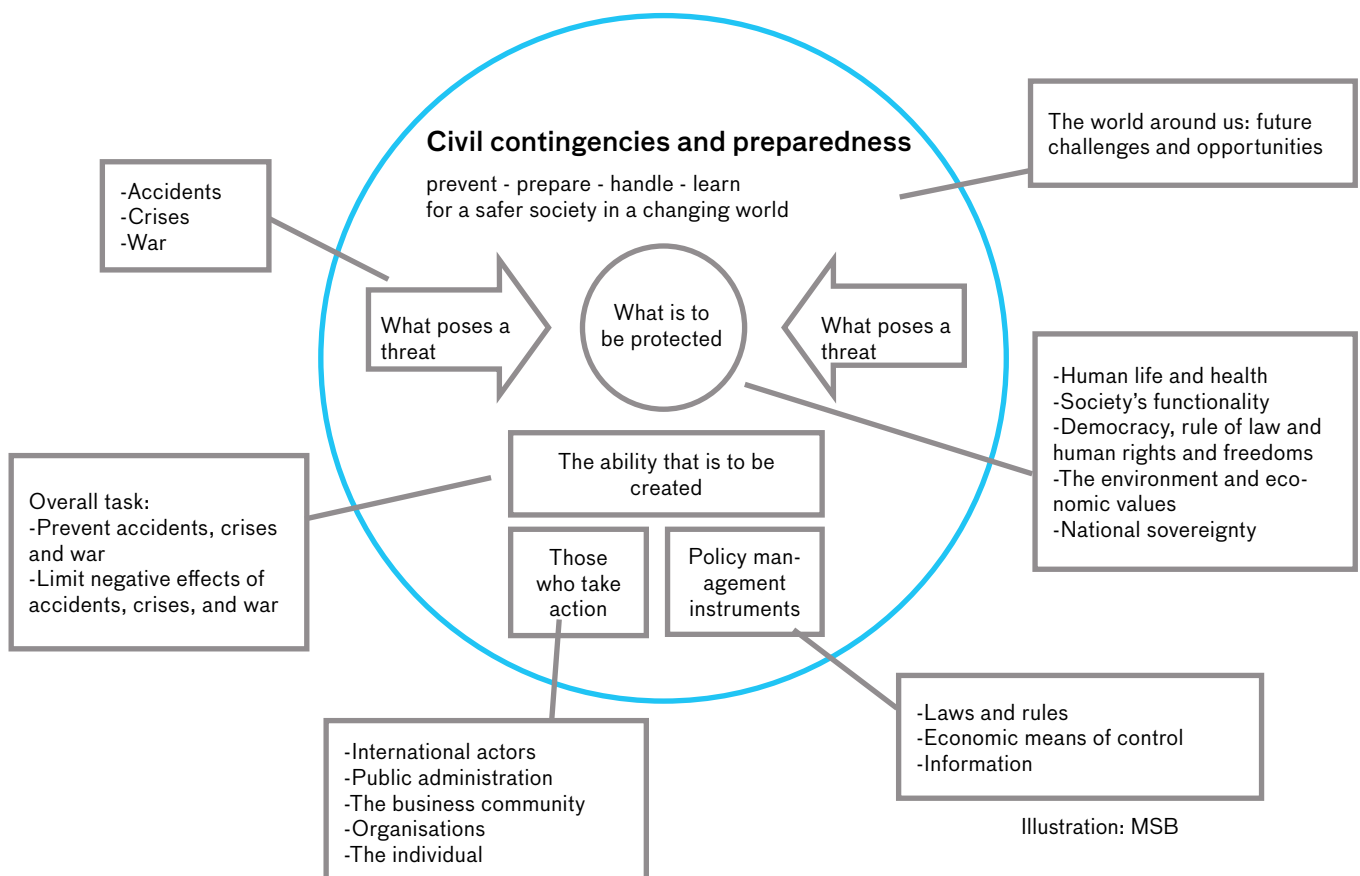
The Government has formulated the following objectives for Sweden's safety:

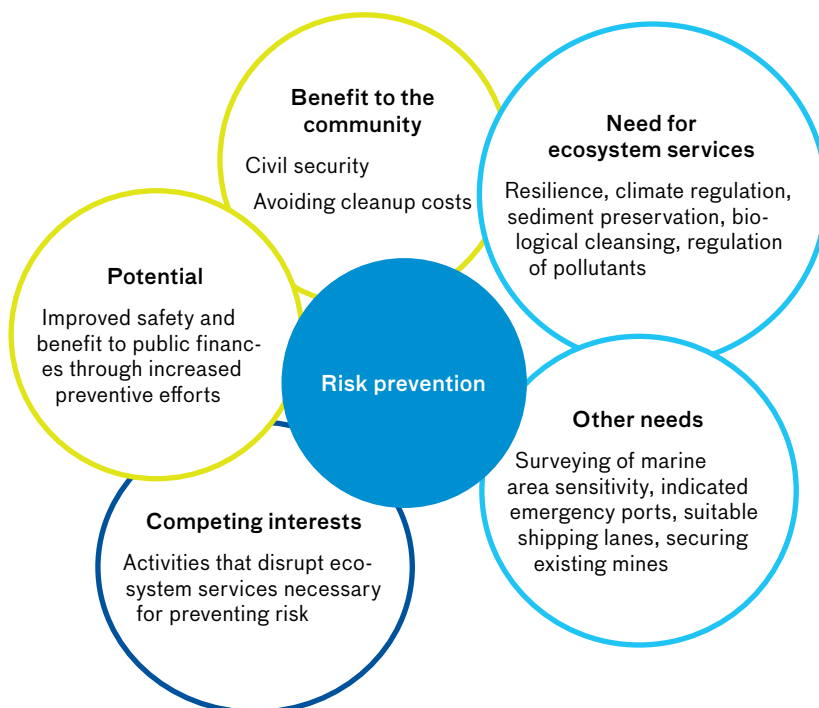
- to safeguard the lives and health of the population,
- to safeguard the functionality of society,
- to safeguard our ability to maintain our fundamental values, such as democracy, justice and human rights and freedoms.

Based on the objectives for our safety, the Government has specified the following objectives for society's crisis preparedness:

- reduce the risk and consequences of serious disruptions, crises and accidents,
- safeguard the health and personal safety of children, women and men,
- prevent or limit damage to property or the environment.

MSB is currently working on an overall plan in respect of civil contingencies and preparedness.





Environmental quality objectives

Risks and security related with the sea are primarily connected with the Reduced Climate Impact, Toxin-Free Environment, A Safe Radiation Environment, A Balanced Marine Environment and Flourishing Coastal Areas and Archipelagos environmental quality objectives.

Strategies

MSB has produced an overall national strategy for the protection of important social functions, which shall help reduce the risks, vulnerabilities and consequences of serious incidents in the community. Energy provision, transportation and health and medical care are examples of important social functions.

Joint work is currently under way to produce a Swedish strategy for chemical, biological, radiological, nuclear and explosive substances, called CBRNE. Sweden's oil strategy, which is part of the overall CBRNE strategy (the final version of which was to be delivered in the spring of 2014) will present strategic objectives for Swedish oil protection from a holistic perspective, before, during and following an incident.

Each county administrative board is to develop a plan for the management of flood risks no later than 2015. The plan is to include objectives for management of flood risks.

A climate adaptation strategy has been produced for the Baltic Sea within the EU's BaltAdapt project, which focused on the marine and coastal environment and addressed adaptation to the climate changes in a coherent manner for the entire region.

Planning relevance

The protection of human life, health, property and the environment are issues that concern many interested parties, for example those involved in sea transportation and electricity production, as well as environmental protection if accidents occur. Risks need to be considered together with other factors at the planning stage and should be balanced against the various sectors and their particular interests in marine areas.

The image features a large blue circle at the top containing the text "Legal prerequisites". Below it, a smaller blue circle is connected to the large one by a thin blue line. Further down, there are several other circles: a yellow one, a green one, a blue one containing the symbol "§", and another green one. The circles are arranged in a descending, staggered pattern.

Legal
prerequisites

§

Fundamental legal prerequisites for marine spatial planning

In its marine spatial planning, Sweden must adhere to certain legal prerequisites. Both international and European law provide opportunities, as well as restrictions, where the planning of various activities at sea is concerned. The United Nations Convention on the Law of the Sea regulates the rights and obligations of countries in their utilisation of marine natural resources, and contains environmental guidelines. The Convention has been signed by approximately 165 states and the EU, including all Baltic Sea and North Sea states. Sweden ratified the Convention in 1996.

A number of areas are regulated in the Convention, such as the calculation of exclusive economic zones, how the continental shelf is to be divided, shipping and transport, exploitation, environmental protection and research. The Convention also states how disputes are to be resolved. International and regional agreements concerning the sea, like EU and national law, are based on the principles established in international law and the Convention on the Law of the Sea. The Convention therefore forms the basis for national legislation that applies to utilisation of the sea.

The marine areas for which Sweden is to produce marine spatial plans are divided up into different zones, calculated from baselines. In the spring of 2011, an investigation was appointed to review Sweden's marine borders (Havsgränsutredningen, dir 2011:41). The investigation was to do things such as review the Swedish baselines and the various maritime borders with the aim of giving the precision that modern technology allows. Furthermore, proposals were also to be made regarding the introduction of a contiguous zone around Sweden's coasts. The investigation was to report its proposals no later than 31 December 2014. The text below describes the various zones and gives brief details regarding the regulation that applies within each respective zone.

Sweden's marine territory

Internal and territorial waters

The breadth of a coastal nation's marine area is calculated from the baselines, which can either follow the form of the coast or be straight lines. The latter are used when the coast is very irregular or when there are islands along the coast. The baselines are drawn through connecting points out at the furthest extent of the lower water line with each other. Sweden's marine territory consists of domestic and territorial waters. All water inside the baseline is classed as internal water and the sea, up to 12 nautical miles from the baseline, is defined as territorial water in accordance with the Act concerning the Territorial Waters of Sweden (SFS 1966:374) and the Proclamation on the Measuring of the Territorial Waters of Sweden (SFS 1966:375). In these waters, Sweden has an essentially unrestricted right to act and to regulate various activities and measures, albeit with a limitation in respect of the right of other states to innocent passage.

A number of Swedish laws may be applicable in marine areas and out into territorial waters, such as the Environmental Code and its associated ordinances, the Planning and Building Act, fishing legislation, the Heritage Conservation Act, regulations regarding sea traffic and public shipping lanes, and regulations in respect of natural gas, electricity power lines and pipelines.

Contiguous zone and the Swedish Exclusive Economic Zone

Contiguous zone

According to the Convention on the Law of the Sea, a coastal state may establish a contiguous zone that extends no more than 24 nautical miles outside the baseline. Within this zone, the coastal state may exercise all necessary controls to prevent infringements of national laws concerned with: customs duty, taxation, immigration, healthcare and the protection of archaeological and historical discoveries. Sweden does not yet have a contiguous zone, but the Government and several Government-appointed investigations have assessed that there is a need to establish such a zone. The aforementioned marine border investigation has the task of submitting proposals regarding the establishment of a contiguous zone around Sweden's coasts.

Exclusive Economic Zone

A country's exclusive economic zone may extend no more than 200 nautical miles from the baseline. According to the Convention on the Law of the Sea, the coastal state has sovereign rights to research, utilise, preserve and manage living and non-living natural resources, both in the water, the seabed and its foundations. In addition to this, there are rights to construct and use artificial islands and other facilities, conduct marine research and protect the marine environment. Other states have the freedom to carry out shipping and overflight, to lay underwater cables and pipelines and to use the seas for any other legitimate use in connection with these freedoms.

According to the Exclusive Economic Zone Act (1992:1140) and the Exclusive Economic Zone Ordinance (1992:1226), Sweden's exclusive economic zone includes the marine areas outside of the territorial border prescribed by the Government. This means that the Swedish exclusive economic zone encompasses the sea from the territorial border to the centre line of the sea in relation to its neighbouring states.

The Exclusive Economic Zone Act refers in turn to the Environmental Code, the Fishery Act, ballast legislation and the Act (SFS 1980:424) on measures against pollution from vessels.

The continental shelf

All states have the right to the continental shelf as regards natural resources, i.e., the right to extract minerals and non-living materials.

According to the Continental Shelf Act (1966:314), the continental shelf refers to the seabed and its foundations within public waters, and within the marine areas outside of Sweden's territorial border set by the Government in accordance with the Convention on the Continental Shelf, which implies the whole of the exclusive economic zone. Permission is required to conduct research on the continental shelf, to extract natural resources from it, and to lay cables and pipelines.

Activities and interests within Sweden's marine areas

Within Sweden's marine areas, many different activities and interest may become possible. In many cases some form of permission, authorisation or dispensation is required to conduct an operation or carry out a measure, both within Swedish territorial waters and also within the Swedish exclusive economic zone. Furthermore, there is the opportunity to establish various forms of protective areas. This is a consequence of both international conventions and EU law, and of national legislation. Marine spatial planning has to be based on the opportunities and restrictions that these regulations provide; the marine spatial plans will constitute a form of guidance, for example in dispensation cases or when various management measures are undertaken.

The EU directives in the environmental field that have the greatest significance for

marine spatial planning are the Marine Strategy Framework Directive, the Habitats Directive, the Birds Directive, the Water Framework Directive and the two directives that regulate environmental assessments and environmental impact assessments. In addition to these, the EU Common Fisheries policy, Transport, Shipping and Energy Policies will also be important. However, the point of departure will always be the rights and obligations connected with the Convention on the Law of the Sea. A marine spatial plan can thus never restrict an activity or an interest over and above what is stated in the Convention on the Law of the Sea.

The following is an overview of the regulations applicable for the respective activities and interests.

Cultural heritage

As of 1 January 2014, a new cultural heritage law that aims to protect and preserve Sweden's cultural heritage is in effect. The criteria for what is to be considered ancient remains are unchanged, but a time limit has been introduced that restricts the public protection of ancient remains. Remains that can be assumed to have come into existence – or in the question of vessel remains, have sunk – in 1850 or later are no longer covered by public protection of ancient remains, but can be declared ancient remains by the count administrative board if there are particular reasons with regard to its cultural historical value.

These provisions apply within Swedish territorial waters. A coastal state that has established a contiguous zone has the option to protect archaeological and historical discoveries and remains within the contiguous zone as well, in a similar manner to those within the territorial border. As mentioned above, an investigation is under way that will be submitting proposals regarding the introduction of one such contiguous zone in Sweden. One of the aims behind the introduction of such a zone is thus to protect the valuable cultural heritage that is to be found, above all, in the Baltic Sea.

The Environmental Code is also a starting point for preserving the cultural heritage. A valuable, culturally enriched aquatic environment can be protected as a cultural reserve in accordance with the Environmental Code. The municipalities are responsible for cultural heritage issues, also based on the provisions of Planning and Building Act.

Fishing

According to the Convention on the Law of the Sea, coastal states may, as a general rule, fish in the exclusive economic zone. This matter, however, is now completely under the auspices of the EU, who regulate commercial fishing as part of the Common Fisheries Policy (CFP). Sweden can, in some cases, make demands for more far-reaching preservation measures than those established in the CFP. Within territorial waters and the exclusive economic zone, Sweden can undertake preservation measures that apply only to Swedish fishing vessels, provided that they are not less stringent than the EU regulations, and that they are in line with the EU's objectives. Within territorial waters, national preservation rules that also affect the fishing vessels of another nation can also be introduced, under certain conditions.

Sweden and the EU have special agreements regarding Denmark, Norway and Finland and mutual access for fishing inside the countries' territorial waters. As a result of the above, there is therefore little scope for Sweden to, for example, restrict fishing in the exclusive economic zone through marine spatial planning. For non-commercial fishing, national legislation applies.

Aquaculture

Aquaculture is included in the EU's Common Fisheries Policy with overall objectives to ensure that fishing and aquaculture activities are environmentally sustainable in the long term. According to the basic regulations of the Common Fisheries Policy (EC 1380/2013), member states are to draft a multi-year national strategy plan for the development of aquaculture activities in their territories. Aquaculture is otherwise regulated by national law. In practice, aquaculture occurs primarily near the coast.

In order to conduct aquaculture, as with the release and moving of fish, crustaceans and molluscs, and the marking out of aquaculture facilities, permission is required in accordance with fisheries legislation. Aquaculture operations require permission in accordance with the Fishing, Aquaculture and Fisheries Ordinance (SFS 1994:1716) and the Environmental Code. Fish farming is an environmentally hazardous activity due to the effect on the balance of nutrients in the aquatic environment, the risk of escaped fish, and the spread of diseases in the surrounding waters.

Shipping

Within territorial waters, the coastal state has sovereignty, with the exception of the rights of other states to innocent passage, in accordance with the Convention on the Law of the Sea. Within internal waters, however, other states do not have the right to free passage. The coastal state has limited options for legislation in order, for example, to protect the marine environment within the economic zone, which is governed by the norms and standards of the International Maritime Organization, IMO. It is therefore impossible to close a marine area to shipping, unless approved by the IMO. However, the whole of Sweden's exclusive economic zone has already been declared by the IMO to be a particularly sensitive sea area (PSSA) and should therefore be kept free from activities that place a burden on the marine environment. Through the Marine Strategy Framework Directive, Sweden has the opportunity, in connection with planning its economic zone, to make demands of other EU states' vessels, even if the demands go further than the norms established by the International Convention for the Prevention of Pollution from Ships (MARPOL) or the IMO.

For shipping within Sweden's territorial water and economic zone, international rules of the road at sea apply. These are incorporated into Swedish legislation through the Maritime Traffic Ordinance (SFS 1986:300) and the Swedish Transport Agency's regulations regarding rules of the road at sea.

The Swedish Maritime Code (SFS 1994:1009) contains rules regarding vessels' nationality, registration, responsibilities, etc. The Establishment, Enlargement and Closure of Public Navigation Channels and Public Ports Act (SFS 1983:293) is also to be observed. Ports are also largely subject to licensing, according to the Environmental Code.

The Act (SFS 1980:424) on measures against pollution from vessels contains prohibitions against pollution from vessels and regulates the receipt of harmful substances from vessels, a vessel's construction, and supervisory and other measures to prevent or limit pollution from vessels. The Act aims to ensure that shipping has as little environmental impact as possible.

Defence

As regards foreign states conducting military exercises in the Swedish exclusive economic zone, it is difficult to limit these by environmental legislation. Within Swedish territory, the examination of permit applications in accordance with the Environmental Code may be possible in relation to, for instance, military practice areas.

According to the Environmental Code, land and water areas of importance for Sweden's total defence shall, as far as is possible, be protected against measures that can obviously counteract defence interests. If an area is of national interest for several incompatible purposes, the defence interest, according to the Environmental Code, has precedence if the area is required for a defence facility. According to the Public Access to Information and Secrecy Act (SFS 2009:400), confidentiality applies to information concerning Sweden's defence, if it can be assumed that the country's defence or national security would be compromised or damaged should the information become public knowledge. This applies, for example, to landscape information regarding military geographic conditions, permanent defence facilities used in war situations and locations where signals intelligence is conducted.

The Protection Act (SFS 2010:305) regulates reinforced protection for buildings, areas and other objects against sabotage, espionage and the disclosure of confidential information concerning Sweden's total defence. Unauthorised personnel may not enter aquatic areas of significance for special defence that have been classed as protected objects. The prohibition can be linked with the banning of depictions, descriptions or measurements, for example, the prohibition of investigative work in accordance with the Minerals Act (SFS 1991:45).

According to the Act on Protection of Landscape Information (SFS 1993:1742), which regulates location-oriented information regarding conditions on or beneath the ground surface and under lake and seabeds, permission is required for hydrographic surveys, photography from aircraft, the establishment of databases with landscape information, and for the dissemination of aerial photographs.

Energy

Wind and sea-wave power

Construction of wind farms in Sweden's EEZ requires permission, according to the Exclusive Economic Zone Act. When the permit application is examined, certain parts of the Environmental Code are also applied. According to the Environmental Code, wind farms located within Sweden's territorial water require permission as an environmentally hazardous facility and as an aquatic operation. Sea-wave power is also subject to licensing, according to the Environmental Code. Permission can also be required, according to the Continental Shelf Act, for the investigation of seabeds where wind or sea-wave power facilities and their associated power lines are planned, and for the burying of underwater cables. This applies within both Swedish territory and the exclusive economic zone.

Pipelines and cables

Both the Exclusive Economic Zone Act and the Continental Shelf Act can be applied with regard to the laying out of pipelines and cables within the exclusive economic zone. Other states have a far-reaching right to lay out and manage pipelines and cables within the Swedish exclusive economic zone, albeit after permit examination. If the lines/cables continue into or are placed in Swedish territory, then the Natural Gas Act (SFS 2005:403), the Certain Pipelines Act (SFS 1978:160) or the Electricity Act (SFS 1997:857) and associated ordinances may be applicable instead. With the laying of submarine cables, or if work needs to be carried out in the water, permission for the aquatic operation may be required in some cases, in accordance with the Environmental Code.

Infrastructure

Planning must be carried out and a building permit obtained before the construction of buildings and facilities can commence, in accordance with the Planning and Building Act. The municipalities are responsible for structure plans, local plans and

building permits, which are primarily of importance for land areas and coastal water but extend out to the territorial border.

As regards infrastructure such as road or rail bridges and tunnels in the sea that connect to land areas, planning is normally preceded by a road or rail plan, in accordance with the Roads Act (SFS 1971:948) or the Railway Construction Act (SFS 1995:1649) respectively.

Extraction and storage of materials

According to the Continental Shelf Act, the right to research the continental shelf and to extract its natural resources belongs to the state. Extracting natural resources such as oil, gas, minerals, gravel and sediment, for example, requires permission. Permission can also be required for the platforms used in the extraction of oil and gas.

For the storage of carbon dioxide within Swedish territory and its exclusive economic zone, EU Directive 2009/31/EC on the geological storage of carbon dioxide – the CCS (Carbon Capture and Storage) Directive – applies. The Directive gives member states the right to decide the areas in which such storage may be conducted, including the right to prohibit storage within a certain area or within the whole territory and exclusive economic zone. Geological storage of carbon dioxide requires permission and is examined in accordance with the Environmental Code.

Marine research

According to the Convention on the Law of the Sea, a coastal state has the right to regulate research both within the exclusive economic zone and on the continental shelf. For example, permission is generally required in accordance with the Environmental Code and the Exclusive Economic Zone Act for foreign research vessels to conduct research within Swedish territorial waters and within the Swedish exclusive economic zone.

Environmental protection

Within the economic zone, the coastal state has good opportunities to establish protected areas in order to restrict or prohibit utilisation of natural resources, or to restrict commercial activities such as gas and oil extraction or the construction of wind and wave farms. For example, Sweden can also indicate areas within its EEZ that are to be protected by virtue of the Natura 2000 provisions. Over and above the protection afforded to Natura 2000 areas, Sweden has the option to declare an area a national park, nature reserve or biotope protection area within Swedish territorial waters. Within these areas, certain types of activities or actions can be restricted or banned completely. In certain cases, dispensation or permit examination may be possible.

Risks (accidents) and other influential factors

The Civil Protection Act (SFS 2003:778) aims to protect human life, health, property and the environment in a satisfactory and equivalent manner across the whole country. The Act regulates environmental rescue at sea. The Ordinance on Flood Risks (SFS 2009:956) aims to reduce the negative consequences of flooding and in so doing safeguard human health and protect the environment, our cultural heritage and economic activities.

Dumping

According to the Convention on the Law of the Sea, dumping may not occur in an Exclusive Economic Zone or on the continental shelf without the consent of the coastal state. Both the Baltic Sea Convention (HELCOM) and the Oslo-Paris Convention (OSPAR) recommend prohibitions, with certain exceptions. These provisions constitute regional supplementations to the global London Convention (the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter) and associated minutes from 1996. Waste may not be dumped within Sweden's territorial waters or economic zone. Dispensation can, however, be granted in individual cases, which are examined in accordance with the Environmental Code.

Private water

In accordance with Chap. 4, §10 of the Environmental Code, the marine spatial plans are to cover Sweden's exclusive economic zone (EEZ) and all areas, in Swedish territorial waters within one nautical mile of the baseline, that are not part of private property.

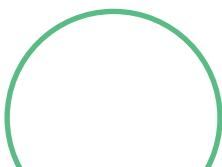
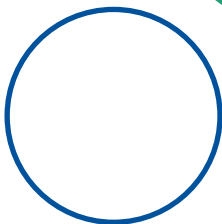
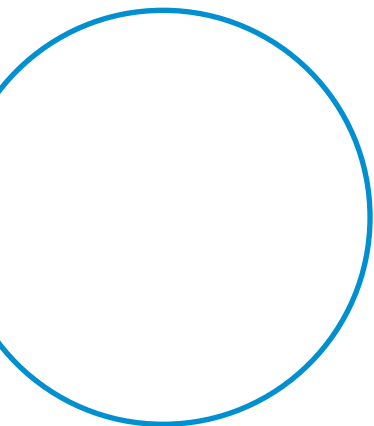
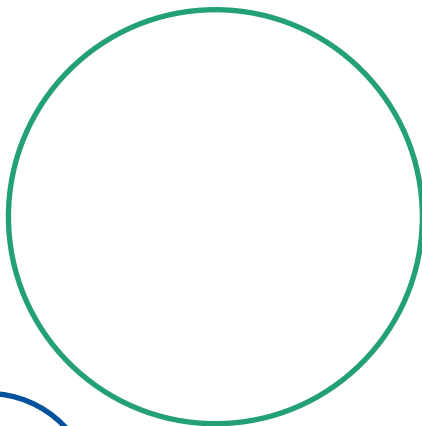
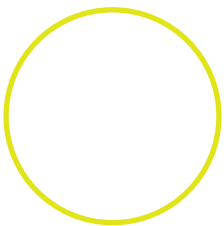
Section 1 of the Public Water Areas (Boundaries) Act (SFS 1950:595) differentiates between water areas in the sea that are public (public water) and the water belonging to real estate (private water). Among other things, all water inside a depth contour of at most three meters belongs to real estate. In the event the base line is drawn on the shoreline and it is an issue of very shallow conditions, it cannot be ruled out that there is real estate that extends out into the planning area.

As mentioned above, however, marine spatial plans will not encompass real estate. On the other hand, in rare cases, there may be real estate that borders the marine spatial plan area.

In the judgment of the marine spatial planning investigation, there are no individual rights linked to the possession of real estate to take into consideration in connection with marine spatial planning, since it begins one nautical mile (1,852 meters) from the baseline. The plans will not be binding and can only, in certain cases, have indirect effects in relation to private waters.

Provisions on the protection of property can be found in Chap. 2, § 15 of the Swedish Constitution. Everyone's property is made safe from the community restricting the use of things such as land, except when it is required to satisfy important public interests. If the community restricts use, and this happens in such a way that current land use within the affected portion of a piece of real estate is made considerably more difficult, or if damage occurs that is significant in relation to the value of the affected portion of the real estate, the person so affected shall be guaranteed compensation. The compensation shall be determined according to the principles indicated in the law. In connection with the restriction of use of things such as land that occur for reasons relating to safeguarding health, to safeguarding the environment or to security, the provisions of law on the issue of compensation shall apply. As regards restrictions from the standpoint of environmental protection, the provisions are found in Chap. 31 of the Environmental Code. The existence of real estate that extends out into the planning areas has not been charted, but is likely to be very limited. As the marine spatial plans will only be guiding, the issue of compensation is estimated not to come to the fore. Individuals affected will be kept informed through the marine spatial planning process.

International matters



Coordination between countries

The view of the sea as an economic growth resource is increasingly clearly emphasized, both globally and within Sweden and its immediate surroundings. Marine-related activities are expected to expand substantially over the next 20 years, which increases the demand on marine space and resources. Technological developments are finding new ways to utilise the resources and new operational areas are arising as a result. Competition is increasing with a growing number of interested parties and new claims on the sea. However, many sectors have not developed long-term strategic plans, which makes it difficult to predict growth, and space requirements, in more detail.

In order to manage and structure utilisation of marine resources, and to control the growing pressure from interested parties, more and more countries are introducing some form of marine spatial planning. Examples of this can be found in China, Vietnam, Australia and the United States. Within Europe, the Netherlands, Belgium, Norway and Germany have produced first-generation marine spatial plans. England, Scotland and Lithuania have also made good progress in their marine spatial planning work.

So far, standpoints have been adopted for every case, interest and country. In light of the increasing pressure over the use of the sea, there is a need for a holistic view, a better knowledge base and better coordination between countries. Sustainable development in our marine areas can be facilitated by more coordinated marine spatial planning between countries. The environmental impact needs to be minimised while social benefits in all other aspects are maximised.

The EU Strategy for the Baltic Sea Region

The aim of the EU Strategy for the Baltic Sea Region, adopted during Sweden's presidency in 2009, is to meet the common challenges that countries in the Baltic Sea region face today. Similar strategies exist for other marine areas in Europe. The implementation of the strategies is financed within the framework for existing EU support. The strategy has three overriding objectives: Save the Sea, Increase Prosperity, and Connect the Region. These objectives can be related to marine spatial planning in various ways. To support the achievement of the objectives there is a specific action plan, which states that marine spatial plans are to be in place by 2020.

Save the Sea

The EU Strategy for the Baltic Sea Region is to create consensus regarding how the Baltic Sea's resources are to be used and managed in a sustainable and efficient manner without being consumed. A healthy sea creates job opportunities within tourism and fishing, and contributes to regional prosperity. To achieve the objective, measures are to be taken to expedite the work to stop eutrophication, safeguard shipping, protect threatened species and prevent the spreading of hazardous chemicals.

Connect the Region

The EU Strategy for the Baltic Sea Region is to enable closer collaboration that will re-integrate the Baltic Sea region following its political and historical divisions. This involves integrating road and rail networks and linking together the energy markets in the Baltic Sea region; it involves people meeting and collaborating, for example on research projects; and it means the strategy will be used as a platform for closer collaboration aimed at counteracting cross-border crime in the Baltic Sea region.

Increase prosperity

The EU Strategy for the Baltic Sea Region shall contribute to increased prosperity in the region by investing to stimulate an increased exchange of knowledge, research and innovation, and by levelling out social and economic gaps in the region.

In their decision, the ministers responsible within HELCOM have confirmed the objective that marine spatial plans are to be in place by 2020, but also that the countries involved shall have legislation in place no later than 2017. The development of marine spatial planning is included in the Baltic Sea Action Plan, which HELCOM adopted in 2007; principles for marine spatial planning have been developed within this work. HELCOM has adopted a schedule for the work to be carried out by the joint work group, with a focus on the marine spatial planning between HELCOM and Vasab since 2010. Cross-border projects such as PartiSEAP are being conducted to support the work.

Sweden's neighbours

Sweden's marine areas cover a total of roughly 130,000 km², of which its territorial waters are approximately 70,000 km² and the exclusive economic zone is 60,000 km². Sweden's marine area borders on Denmark, Estonia, Finland, Latvia, Lithuania, Norway, Poland, Russia and Germany. The exclusive economic zone is bordered by the centre line in the ocean for all neighbouring countries. In the Öresund and the Sea of Åland there is no exclusive economic zone, since the territorial waters meet at the centre line with Denmark and Finland respectively. Sweden's marine areas are bigger than those of all their neighbours, with the exception of Norway.

Denmark

Use of the sea

Denmark's marine areas cover a total of nearly 100,000 km², of which its territorial waters are 40,000 km² and the exclusive economic zone 60,000 km². The State of Denmark owns and is responsible for its territorial waters, fishing territory and continental shelf. The responsibility for granting permits has been delegated to the Danish coastal authority. Various ministries are responsible for sectors such as fishing, the extraction of raw materials, energy production, coastal protection and maritime safety. Denmark is the country in the Baltic Sea region that uses the marine area most intensively. Its main areas of use are shipping, fishing and energy. The first sea-based wind farms in the Baltic Sea region were built in Denmark.

Marine spatial planning

There is no specific law regulating marine spatial planning in Denmark. Sea-based activities are regulated by a large number of sectoral laws; the responsibility for the sea and coast is divided up between various sectors and administrative levels. There are as yet no marine spatial plans in Denmark, but as far as research is concerned, a non-binding, cross-border strategic plan encompassing Pommerska bukten has been developed. During 2010, a marine political strategy, in which the need for marine spatial planning was emphasised, was approved by the government. During 2013, scenarios for marine spatial planning in Denmark have been discussed by national actors.



Sweden

Finland

Norway

Aland

**Sweden and neighbouring
countries**

— Exclusive Economic
Zone boundary

Russia

Estonia

Latvia

Denmark

Denmark

Lithuania

Russia

Germany

Poland

Estonia

Use of the sea

Estonia's marine areas cover a total of around 36,000 km², of which its internal waters account for just over 25,000 km² and its territorial waters for just over 11,000 km². Estonia's marine areas border Russia, Finland, Sweden and Latvia. The border for Estonia's and Russia's economic zones is disputed. The marine areas, including territorial and internal waters, belong to the State. The Ministry of Finance is responsible for shipping lanes and ports, and grants permits, for example for sea-based wind farms. Other ministries are responsible for protected areas, fishing, defence and cultural heritage. The sea is mainly used for shipping, fishing, port operations, cable-laying, the extraction of gravel and sand, national defence and recreation. There is a growing interest in the construction of sea-based wind farms.

Marine spatial planning

In 2012 the Estonian government adopted a marine policy for 2011–2020. One of the objectives is to plan Estonian marine areas and resolve ongoing conflicts by 2020. The largest conflicts have arisen between sea-based wind farms on the one hand and fishing and shipping on the other. This is also the major driving force behind marine spatial planning in Estonia. Work has started on two marine spatial plans for the marine areas around Hiiumaa and Pärnuviken, both of which are within Estonia's territorial waters. These are county plans administered at the regional level, and the intention is that they will be adopted in 2016. The main aim is to plan the long-term usage of the sea through a public process, with consideration for economic, social, cultural and environmental interests and needs.

Finland

Use of the sea

Finland's marine areas cover a total of 83,000 km², of which its territorial waters are 54,000 km² and its exclusive economic zone is 29,000 km². These areas border Sweden, Estonia and Russia. The territorial waters come under the auspices of the coastal municipalities, which are responsible for the management of their respective sections. The State of Finland is responsible for the administration of the exclusive economic zone. Compared with other countries in the Baltic Sea region, the sea is used with low intensity in the northern part of the Finnish marine area and with moderate intensity in the southern part. The main current areas of usage are shipping, fishing, recreation and environmental protection. Shipping is very active between Helsinki and Tallinn, as well as to the Russian ports along the Gulf of Finland. Energy extraction may be developed in the future.

Marine spatial planning

There is no specific law regulating marine spatial planning in Finland. Land and water planning are based on the Land Use and Building Act (SFS 132:1999). Municipalities and regional associations have planning mandates for their marine areas in territorial waters. There is no planning for the EEZ and the Convention on the Law of the Sea is implemented through national legislation. Regional plans, which are drafted by the regional associations, are

the most relevant form of plans for marine spatial planning. At present, 9 regional plans are in the process of being drafted for coastal areas, 15 have been ratified and 3 are awaiting ratification. No municipal plans have been drafted especially for marine areas, but several plans cover marine areas.

Latvia

Use of the sea

Latvia's marine areas, including the Gulf of Riga, cover a total of 28,000 km². They border Lithuania, Estonia and Sweden, but the border with Lithuania is not firmly established. The marine areas are owned by the State and the responsible authorities are the ministers for the respective sectors. The competence of the municipalities regarding their management and planning of the coastal zone is currently under discussion. Usage of Latvia's marine areas is currently low. The main areas of usage are shipping, fishing, tourism, sand extraction, defence, scientific monitoring and conservation. In the future, there may be an increased interest in wind farms in the open seas off of Courland. Oil extraction may be an alternative, but this is hindered by the uncertainty regarding the border with Lithuania.

Marine spatial planning

There is currently no marine spatial planning in Latvia, but the law on territorial development planning from 2011 and other laws note that there is a need for such. Marine spatial planning is to commence in 2014, and the work is to be conducted by the Latvian Institute of Aquatic Ecology in collaboration with the Latvian Marine Administration. A future marine spatial plan will be decided upon by the government. There are proposals for seven marine protected areas – marine biotopes with great significance in territorial waters – which are part of the Natura 2000 network.

Lithuania

Use of the sea

Lithuania's marine areas cover nearly 9,000 km², of which the EEZ accounts for approximately 6,000 km². They border Latvia, Russia and Sweden. Klaipeda is the most important port for passengers and cargo, and it is of great importance to Lithuania's economy. Extensive fishing is conducted and the sea is abundant in Baltic herring, sprat, cod and salmon. Important fish spawning grounds can be found near the shore zone.

Marine spatial planning

The marine area is owned by the State. Lithuania has extended its land-based spatial planning law to also cover the sea. Parliamentary decisions are required at every planning phase. The land and sea areas are dealt with in a document – the overall strategy for Lithuanian territory. Lithuania is on the way to deciding on the overall direction of its marine spatial plan, which will then be integrated into the land-based spatial plan. Certain issues require specific cross-border attention. Lithuania's marine areas at the border with Sweden's economic zone contain chemical weapons that were dumped there during the Second World War. There is also a biosphere area in the southern part of the sea that adjoins the Russian border at Kaliningrad, the Curonian Spit.

Norway

Use of the sea

Norway's EEZ covers nearly 800,000 km² and its territorial waters cover nearly 150,000 km². Norway's marine area borders Sweden, Denmark, the United Kingdom, Iceland and Russia. Norway's Ministry of Climate and Environment has overall responsibility for environmental conditions in its marine areas. Various ministries, through specific legislation, have responsibility for the sea within their respective sectors. Norwegian marine areas are used intensively for the industries that are most important to the Norwegian economy: fishing, shipping, aquaculture and oil, as well as for environmental protection. In the future, usage may increase due to sea-based wind farms.

Marine spatial planning

There is no specific legislation for marine spatial planning which, instead, is firmly established in parliamentary reports and government declarations. The aim of marine spatial planning in Norway is to safeguard ecosystem-based management of the marine environment in order to enable sustainable use in the form of fishing, shipping and the extraction of oil, while preserving the ecosystems. There are overall management plans for all of Norway's marine areas - the Barents Sea and Lofoten Islands, the Norwegian Sea and the North Sea, the most recent of which were adopted in 2013. The marine spatial plan for the Barents Sea and Lofoten Islands was established in 2006 and revised in 2011; the marine spatial plan for the Norwegian Sea was established in 2009.

Poland

Use of the sea

Poland's marine areas cover a total of over 33,000 km², of which the EEZ accounts for approximately 23,000 km². They border Sweden, Denmark, Germany and Russia. The border with Denmark at Bornholm is not firmly established. The sea is administered by the State, and by the ministry responsible for issues concerning the maritime economy. At a regional level, there are maritime administrations in Szczecin, Słupsk and Gdynia. Sea usage is currently at a relatively low level. The main areas of usage are shipping, fishing, conservation, coastal tourism, coastal protection, technical infrastructure, defence and the extraction of gravel and minerals. In the future, aquaculture and care of the cultural environment may develop, along with energy extraction from wind and sea-wave power, and the extraction of shale gas.

Marine spatial planning

Marine spatial planning is regulated through its law concerning marine areas, from 1991. Provisions regarding spatial planning regulate the planning of the marine areas and adjacent coastal areas. The main driving force behind marine spatial planning in Poland is the concern over spatial conflicts between industrial use of the sea and traditional areas of usage, and increasing conservation demands. Marine spatial plans regulate the usage of marine areas, public investments, and development of transport and technical infrastructure as well as protection of the environment and Poland's cultural heritage. There are three non-binding marine spatial plans that have been drafted as pilot studies within the BaltSeaPlan project: Gdanskbukten (Gdansk Bay), concerning over 400 km² of domestic waters, Pommerska bukten, concerning over 14,000 km² of territorial waters and the exclusive economic zone,

and Södra Midsjöbanken, concerning 1,750 km² within the exclusive economic zone.

Russia

Use of the sea

Russia's marine areas in the Baltic Sea encompass two separate sections, one in the Gulf of Finland and one connected to Kaliningrad Oblast. The Russian part of the Gulf of Finland covers just about 12,000 km², which consists primarily of territorial waters. The sea area at Kaliningrad Oblast also covers about 12,000 km², of which the EEZ accounts for around 7,000 km². Russia's marine areas border Finland (in the Gulf of Finland) and Estonia. Adjacent to Kaliningrad Oblast they border Lithuania, Sweden and Poland. National authorities are responsible for the administration of the marine areas. The main areas of usage are shipping, defence, underwater cables and pipelines, fishing, the extraction of minerals, recreation, tourism and environmental protection.

Marine spatial planning

The term "marine spatial planning" is not used within legislation in Russia. The sea falls under the supervision of the federal authorities. For maritime activities there are separate sectoral laws. Federal laws deal with Russia's continental shelf, economic zone, territorial and internal waters. There are no marine spatial plans; marine-oriented research, however, is in progress. Certain marine areas are subject to protection of Russia's natural and cultural heritage.


Germany

Use of the sea

Germany's EEZ in the Baltic Sea covers a total of 4,500 km². Germany's marine areas border Denmark, Sweden and Poland. The German Federal Ministry of Transport, Building and Urban Development is responsible for establishing marine spatial plans. The German marine area is used intensively but there is also a large proportion (around 43 per cent) of protected areas. The main current areas of usage are commercial shipping, recreational boat traffic, fishing, sea-based wind power, cables, gas pipelines, sand and gravel extraction, research and defence. Shipping is expected to increase in the future, along with the number of sea-based wind farms, cable connections and gas pipelines.

Marine spatial planning

Marine spatial planning is based on the federal spatial planning law from 2004. Driven by a planned large-scale development of renewable energy, Germany decided to implement marine spatial planning in two regions: Schleswig-Holstein (North Sea) and Mecklenburg-Vorpommern (Baltic Sea). Important issues include: shipping lanes, the positioning of cables and pipelines, wind power zones and areas reserved for scientific research. An updating process is currently in progress. An important issue that has been addressed in the planning work is how sea-based energy is to be transmitted via cables to land. Electricity network plans with identified locations for electrical transmission – called "ports" – are now in place. Where such places will be situated in the future is expected to become a subject of discussion with neighbouring countries.

The image features a large blue circle at the top left containing the text "Deficiencies in the data". Below this circle is a smaller blue circle. To the left of the smaller blue circle is a yellow circle. To the right of the smaller blue circle is a large green circle. Below the smaller blue circle is a blue circle containing a question mark. At the bottom center is a small green circle. At the bottom left is a large blue circle. The background is white.

Deficiencies
in the data

?

Marine ecosystems and their condition

Marine environments

In Sweden there is no national programme for mapping and taking inventories of marine habitats. In recent years, however, many different methods for producing area-specific habitat information in the sea have been developed, and the requirements that the EU's directives impose result in the need for efficient monitoring of the status and propagation of the marine environments to be developed.

Knowledge of the sensitivity of living environments to various forms of use needs to be improved—including cumulative effects—in order to identify potential conflicts between planned activities and preservation.

Benthic fauna

Surveys of the demographic qualities of benthic populations are largely lacking. Species on certain seabeds and of certain sizes are either imperfectly monitored or not monitored at all. There is also uncertainty regarding indicators for habitats and ecosystems, as well as for biodiversity.

Fish

The significance of the combined effects of various factors on fish is largely unknown. Knowledge regarding possible fish catches needs to be improved in order to attain good environmental status. There is also a need to increase knowledge of the structure of the populations of exploited fish species. Knowledge is also insufficient regarding the existence of recruitment areas for various species in the sea, and where species migrate to in estuarial water-courses.

In the southern Baltic Sea and around Gotland there is no coastal environmental monitoring of fish communities. For the Bothnian Sea and the Bay of Bothnia there is basically no data collection equivalent to that for the open waters of the Baltic Sea. At the species level, there is no data, above all for whitefish. A system for tracking the spread of non-native fish species and their effects on the surrounding ecosystems – for example, when rainbow trout escape from sea-based fish farms – is also lacking.

Birds

Knowledge levels regarding birds that breed in the marine environment varies. For wintering sea birds there are long series of inventories for coastal waters and archipelagos, but in general nothing for offshore areas. Inventories of animals such as the long-tailed duck have been done, however, for Hoburgs bank and Midsjöbankarna, in connection with which it was noted that both long-tailed duck and eider have decreased considerably. For the population of auks in the Baltic Sea there is no information regarding their distribution at sea outside of the breeding season. This is troublesome, bearing in mind that sea-based wind power, for example, can be a negative factor for these species.

The state of the marine environment

The amount of leakage from most polluted areas is often not known. Methods for investigating this change over time. One problem can be the lack of discharge data from small and medium-sized operations, while the reliability of emissions data from larger environmentally hazardous operations subject to licensing is regarded as good.

There are currently no assessment grounds for pollutants in sediment and their physical impact along the coast. Compiled information regarding fish spawning areas, biological conditions and hydrology – used in assessing suitability for aquatic operations and for dumping – are also lacking.

The level of knowledge concerning the discharge of nutrients from private sewage is unclear. There is a lack of knowledge regarding how forestry measures affect leakages of nitrogen and phosphorus from woodland into watercourses and oceans. Knowledge is also lacking with regards to the transportation of nutrients and metals from small estuarial watercourses. There is no information regarding the amount of metals that leak out from acidic sulphate soils, or the degree to which the fish populations have been affected as a result.

Cultural heritage

The knowledge base for the cultural heritage is lacking since only a small part of the sea has been inventoried. Information about the sea has been collected sporadically by skin divers and through investigations conducted prior to development projects. Vessel remains represent a very large part of our cultural heritage at sea and are relatively obvious, while other remains, for example prehistoric settlements and harbours, are more difficult to identify. Many divers keep their own registers – of varying quality – of sunken vessels.

Recreation and tourism

One factor of uncertainty is that there is no uniform definition of recreation and tourism, or for maritime tourism and how activities should be measured. One reason why it is difficult to obtain an overall picture is that many different operators are involved, which makes comparison difficult. The sector also covers many different activities and perspectives. Studies that only measure economic values such as employment and turnover risk ignoring all the other factors that affect the ecosystems.

Commercial fishing

The distribution of important fish habitats is currently poorly mapped and needs to be developed. Basic information regarding depth and seabed conditions is only available for parts of the marine spatial plan areas, which makes the construction of knowledge about fish habitats difficult. Knowledge regarding quantitative connections between human activities, including shore exploitation, and the capacity and sensitivity of fish habitats is also lacking in general and needs to be improved.

Better information is needed as regards coastal fishing catches and their distribution, both to satisfy the interests of those involved in fishing and in order to minimise the risks of fish populations and habitats being negatively affected.

There is a need for detailed trend analyses of fishing and fish-related activities, including spatial aspects, as well as for tools for assessing and predicting the movements of the fishing fleet, in relation to any physical obstacles. Methods for the management and presentation of uncertainties in the spatial information regarding fish and fishing also need to be developed so they can be used in marine spatial planning.

Aquaculture

Knowledge is lacking about how the environment is affected by different types of farming and feedstuffs, for example through nutrient leakage. There is a lack of systematic mapping of abiotic conditions for aquaculture in the Baltic Sea and the Gulf of Bothnia, or for areas suitable for aquaculture outside coastal waters.

Shipping

There is great uncertainty around the future of shipping. One factor of uncertainty is how the expected increase in cargo transportation at sea will be affected by the Sulphur Directive that enters into force in 2015. Another factor of uncertainty concerning cargo traffic is the prevailing lack of capacity in the rail network.

Defence

There is no access to information regarding, for example, pollutants within the Armed Forces' firing ranges at sea.

Energy

There is uncertainty concerning quantitative information regarding the technical potential for sea-wave power.

Extraction and storage of materials

The various parts of the marine geological knowledge base are of different ages and the quality varies from area to area. Knowledge concerning the overall effect of the impact of sea waves and currents on the seabed is very rough, or completely lacking. There is also a lack of a coherent account of existing and planned facilities in Swedish marine areas.

Environmental protection

The knowledge base regarding marine natural values and ecosystems is largely lacking. The offshore banks have been inventoried, but deeper areas are largely unmapped as regards natural values. Older inventories were often conducted using different methodologies and need to be supplemented. In general, access to detailed information regarding the depth and character of seabeds is lacking. Data is often protected by confidentiality regulations. Knowledge of ocean currents and seabed currents is deficient. There is a major lack of knowledge regarding the distribution of non-native species and ecological effects.

Risks and other influential factors

There is currently no good detailed picture as regards what sea transport patterns for hazardous cargo look like. Coast Guard surveillance is not comprehensive, which means that the number of small discharges may be higher than estimated.

An aerial photograph of a coastal landscape, showing a mix of blue water, light-colored sandy or silty flats, and dark, winding channels or ditches. A large white circle is positioned in the upper left quadrant, partially obscuring the landscape. The text 'Analysis' is written in a blue serif font within this circle.

Analysis

Discussion and Swedish Agency for Marine and Water Management conclusions based on previous chapters. The three coordinating county administrative boards – Kalmar, Västernorrland and Västra Götaland – have contributed to this analysis.



Methodology

Ecosystem services

The term “ecosystem services” describes the direct and indirect contributions of the ecosystems to the well-being of humanity. This represents an attempt to describe ecosystems from a human perspective and to clarify our dependence on the natural world.

Ecosystem services are often divided into four categories: supporting, regulating, provisioning and cultural.

Previous chapters in this current status description, along with the data on which the report is based, largely describe each of the interests relating to the sea separately. The direction of the analysis work has been to produce an overall, holistic picture and to describe the connection between the different interests and their connections to the ecosystems, based on the ecosystem services concept.

The basis for the analysis can thus be found in the previous chapters, which in themselves are largely based on sector reports from a number of government agencies, and the regional reports that the coastal county administrative boards have drafted. The introductory assessment that the Swedish Agency for Marine and Water Management developed with the Marine Strategy Framework Directive (report 2012:19, God havsmiljö 2020) forms the basis for describing ecosystem conditions and the state of the environment.

During its work on the current status description, the Swedish Agency for Marine and Water Management conducted a two-day analysis workshop together with the three coordinating county administrative boards of Kalmar, Västernorrland and Västra Götaland Counties. Operations and marine ecosystem services were analysed based on their division into the four categories of ecosystem services described in God havsmiljö 2020:

Supporting (biogeochemical processes, primary production, food web dynamic, biodiversity, habitat, resilience)

Regulating (climate-regulating, sediment-preserving, reduced eutrophication, biological purification, regulation of pollutants)

Provisioning (foodstuffs, raw materials, genetic resources, chemicals, embellishments, energy, spaces and waterways)

Cultural (recreation, aesthetic values, science and education, cultural heritage, inspiration, natural heritage)

The workshop resulted in a number of tables that show possible synergies and competing interests at sea. The conclusions formulated in this chapter are based on the descriptions presented earlier in the report, and the results from the analysis workshop.

The report's descriptions of the conditions and interests includes both areas that the marine spatial plans will cover and neighbouring coastal areas, as well as relevant factors on land. In this analysis chapter, on the other hand, focus is placed on the areas that will be covered by the national marine spatial plans.

Needs and claims

All interested parties making demands of marine resources are connected in some way with marine spatial planning. The descriptions of the various interested parties shows a great number of different needs. Some of them are of a spatial nature. They refer to needs for a specific area on or in the seabed, in a column of water, on or above the surface. Spatial requirements might even

concern a given distance from the coast or other requirements for proximity and accessibility, for example to ports. Other needs, such as maritime activities, are of a more qualitative nature. These needs refer to the existence of a given ecosystem service, or a given property of the sea, such as water of a certain quality or the like.

Different interests have different needs for the four categories of ecosystem services: supporting, regulating, provisioning and cultural. Certain interests only need certain geophysical conditions and can manage without good water quality – shipping and energy production, for example, which can utilise the marine space regardless of how the ecosystems are functioning. On the other hand, fishing is clearly dependent on three of the four ecosystem services (supporting, regulating and provisioning).

Upon closer examination, the needs description becomes more complex, since there are also indirect needs for the ocean's ecosystem services. For example, biodiversity is one of the preconditions for a living coastal culture, which in turn can be a prerequisite for tourism and regional development. Environmental protection that preserves biodiversity can thereby contribute to economic development.

Goal conflicts and goal synergies

There are many national and international objectives that concern marine activities and interests. The most obvious development objectives can be found amongst the newer uses of the sea, such as tourism, where the goal is to double activities between 2010 and 2020, and wind power, where the goal is to produce 10 TWh of energy at sea by 2020. Traditional marine activities – shipping, fishing and defence – have less expansive objectives. On the other hand, trends like the estimated doubling of foreign sea transportation of cargo by 2050 could come into conflict with other objectives – environmental, for example.

The majority of objectives contain references to both economic benefits and ecological sustainability. Balancing interests and finding the best overall long-term solution will be a fundamental issue within marine spatial planning. This includes balancing between various types of objectives relating respectively to benefits and problems in the sea, and benefits and problem on land.

Collaborative and competing interests

Balance between interests needs to be handled within marine spatial planning as regards both possible synergy effects and conflicts of interest. Different sectoral interests may clash with each other, for example when they relate to the same area. But there may also be synergy effects, so that different interests benefit from each other. A time dimension also comes into play here, in which coordination between different interests can make it possible to avoid potential conflicts of interest.

For example, it is of value to cultural environmental interests that the living coastal landscape is looked after and developed by the local population and local industry. Activities such as commercial fishing, shipping, aquaculture and

energy extraction can be a prerequisite for this to actually happen. The fact that certain marine environments are protected for conservation reasons can be of benefit to commercial fishing, as there will be protected areas that can function as spawning and growth areas for fish. Defence interest can mean that marine areas are not accessible to other operations, albeit during specific time periods.

At the same time, there are genuine conflicts of interest. For example, it is not possible to unite interest in extracting natural resources from under the seabed with the preservation of a certain type of benthic fauna in the same location. It is the task of marine spatial planning to highlight such situations and to suggest ways of resolving them. Within the marine spatial plan this can happen through one interest being given precedence over another, or that another suitable means is employed to handle the conflict of interests.

Marine spatial planning does not have all the tools needed to resolve certain issues. Some issues may be regulated by EU law or by international conventions and agreements, for example on commercial fishing and shipping. Marine spatial planning, however, can indicate suitable amendments and provide information for positions and negotiation. The international dimension is also important, since many countries utilise the same marine areas and the same ecosystems. This applies especially in the Baltic Sea.

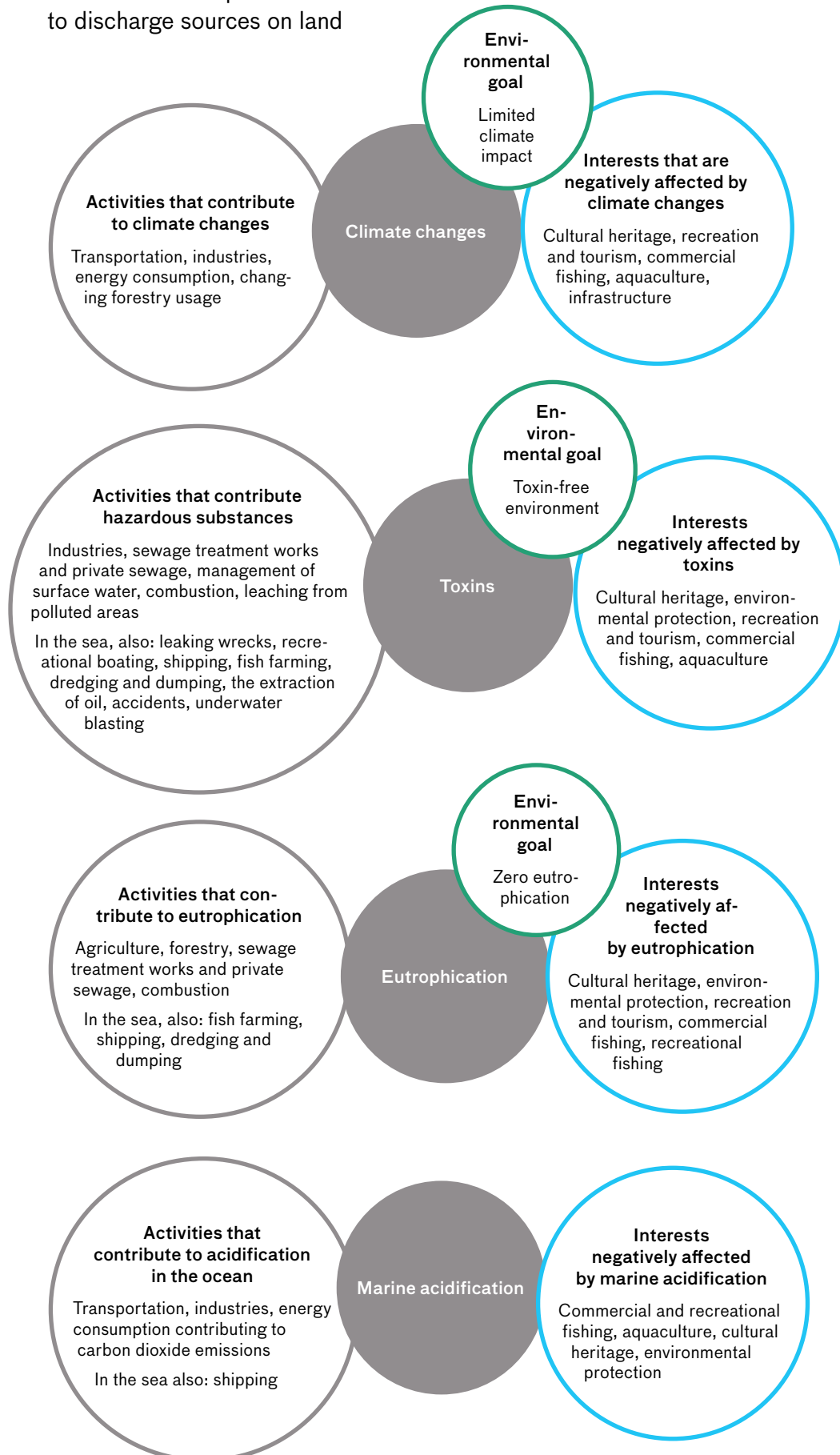
Environmental status and land-based discharge sources

The sea has a great biodiversity which contributes to various types of ecosystem services – services which, in turn, contribute to the general welfare of mankind. We currently face several marine environmental challenges. Discharges of pollutants, eutrophication and unsustainable fishing, as well as the intensive utilisation of marine areas, are major environmental problems. Nutrients come from operations on land such as agricultural and forestry, municipal sewage works and private sewage, surface water from urban areas and roads, and industries as well as through atmospheric deposits. Future climatic changes are currently considered unavoidable; these will be factors that change the conditions in the marine environment.

Sources of discharges on land therefore affect the sea to a great degree, which is a circumstance that needs to be addressed in marine spatial planning. However, there are limited opportunities to influence these problems through marine spatial planning. These problems relate to the national environmental quality objectives decided upon by the Riksdag: Reduced Climate Impact, Toxin-Free Environment and Zero Eutrophication. Furthermore, there is marine acidification related to the increased carbon dioxide content of the atmosphere. The greatest impact comes from industries and energy consumption, and from transport both on land and at sea. The problem is relatively unresearched and does not currently relate directly to any of the environmental quality objectives. Research and investigations on the subject are under way.

Counteracting and adapting society to climate change and reducing acidification, toxins and eutrophication in the sea are not things that can primarily be solved through marine spatial planning, since the major impacts result from activities on land. To this end, interaction between various management measures is required.

Environmental impact related
to discharge sources on land



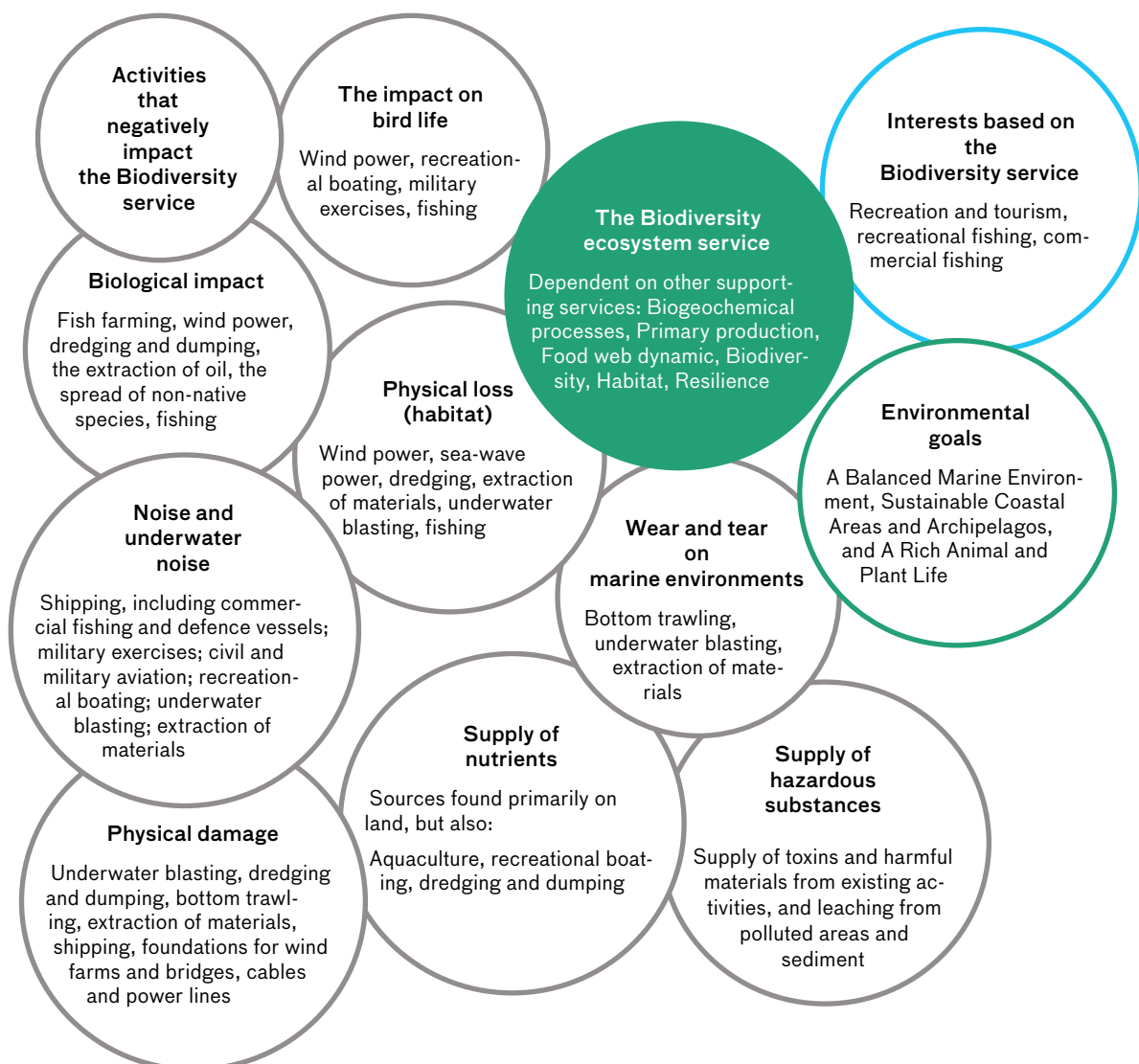
Ecosystem services

During the analytical work, the Biodiversity, Good Water Quality, Provisionings and Recreation ecosystem services have emerged as being particularly relevant in relation to synergies and competing interests.

The Biodiversity supporting ecosystem service

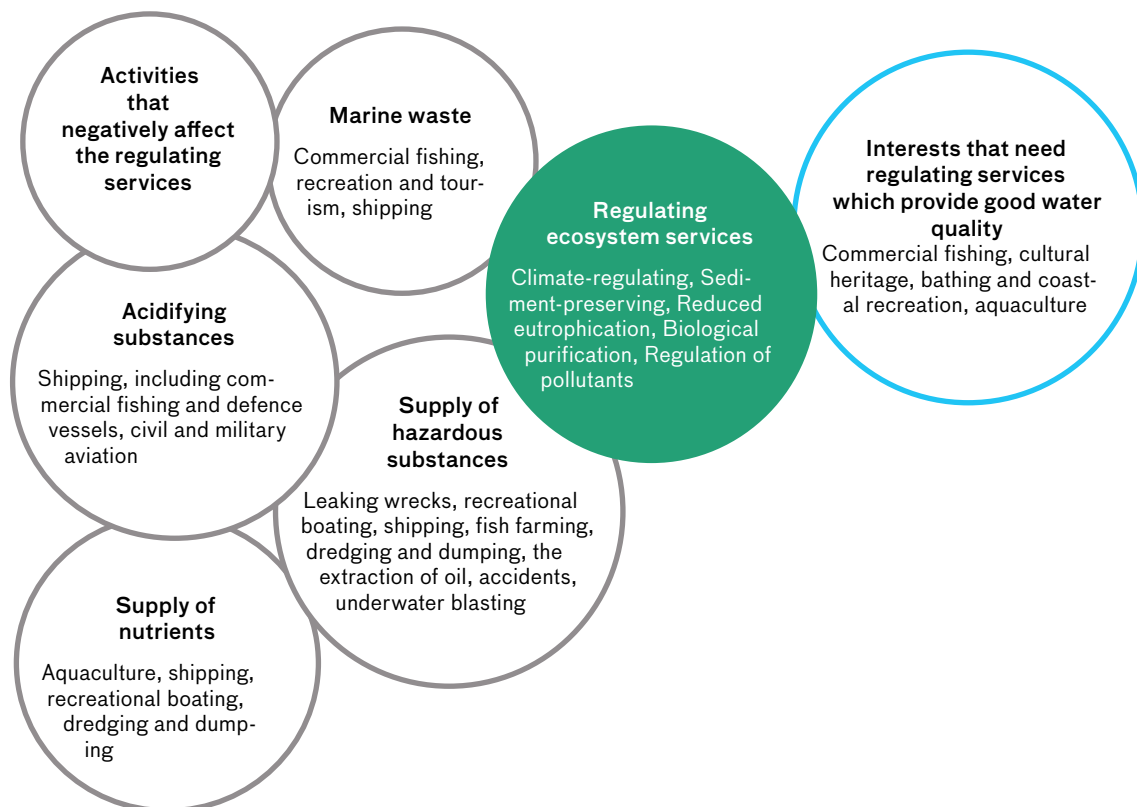
Biodiversity, which is included in the supporting ecosystem services category, is strongly linked to the A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos and A Rich Diversity of Plant and Animal Life environmental quality objectives. These environmental quality objectives are considered to be the ones that marine spatial planning has the greatest chance to impact.

Biodiversity is dependent on several other ecosystem services, including the regulating ones, which marine spatial planning has limited opportunities to impact. Much of the direct impact on biodiversity, however, occurs locally through physical damage, wear and tear, and noise. Here, marine spatial planning has great opportunities to contribute to a solution. Balancing will be needed between local impact and benefits from a broader perspective.



The Regulating ecosystem services that provide good water quality
Commercial and recreational fishing, like aquaculture, are dependent on regulating ecosystem services that provide good water quality; both fish and shellfish need pure water to live and to be consumed as foodstuffs. Recreation and tourism also need clean water; it is difficult to enjoy a sea covered in algal blooms. Cultural historical remains in the sea may be affected by changing conditions in the sea water resulting from environmental toxins and climate changes.

The vast majority of impacts that negatively affect the regulating ecosystem services come from discharge sources on land. Marine spatial planning can, however, help reduce the risks for activities at sea that can be a source of pollutants and hazardous substances.

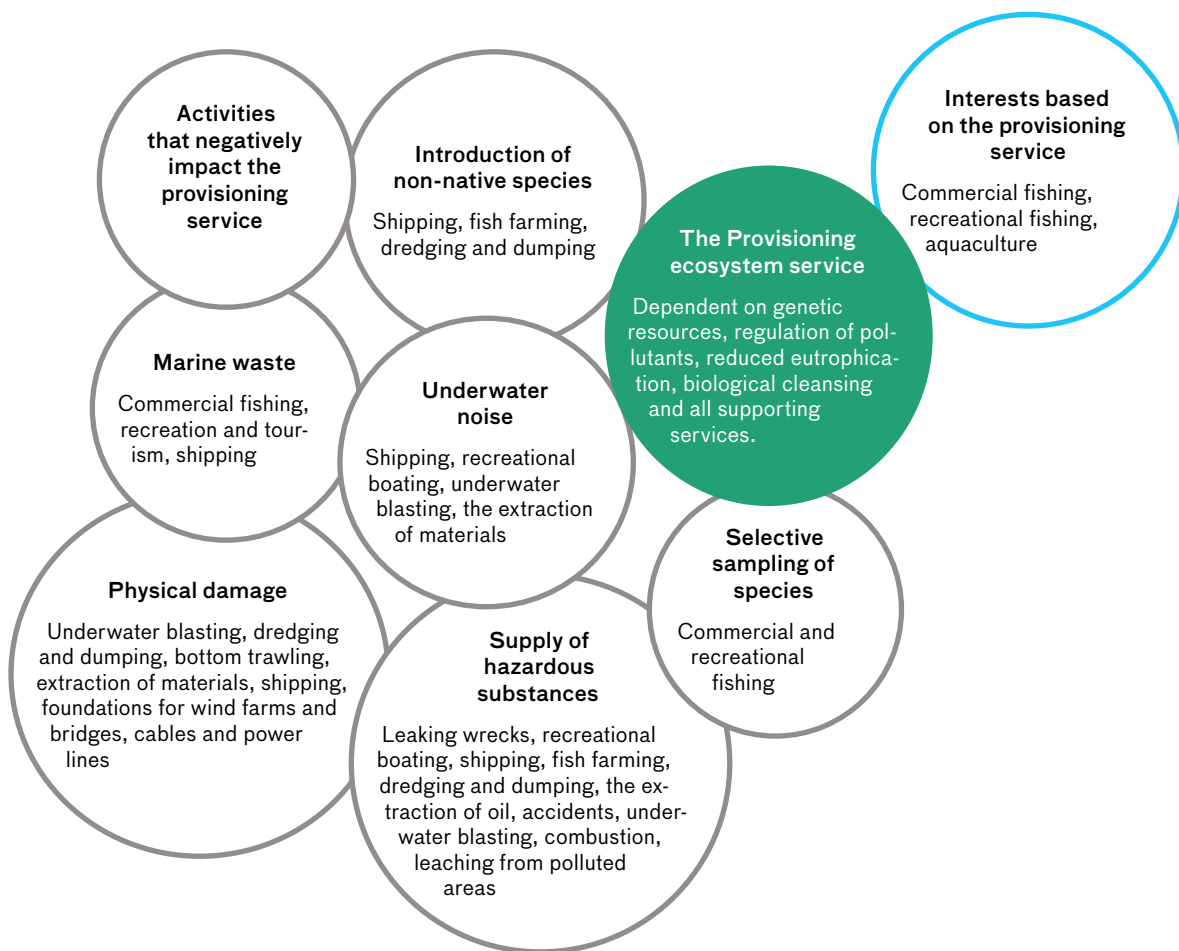


The Provisioning ecosystem service

Commercial fishing, recreational fishing and aquaculture are based on the provisioning ecosystem service. These activities also have a negative impact on the ecosystem service.

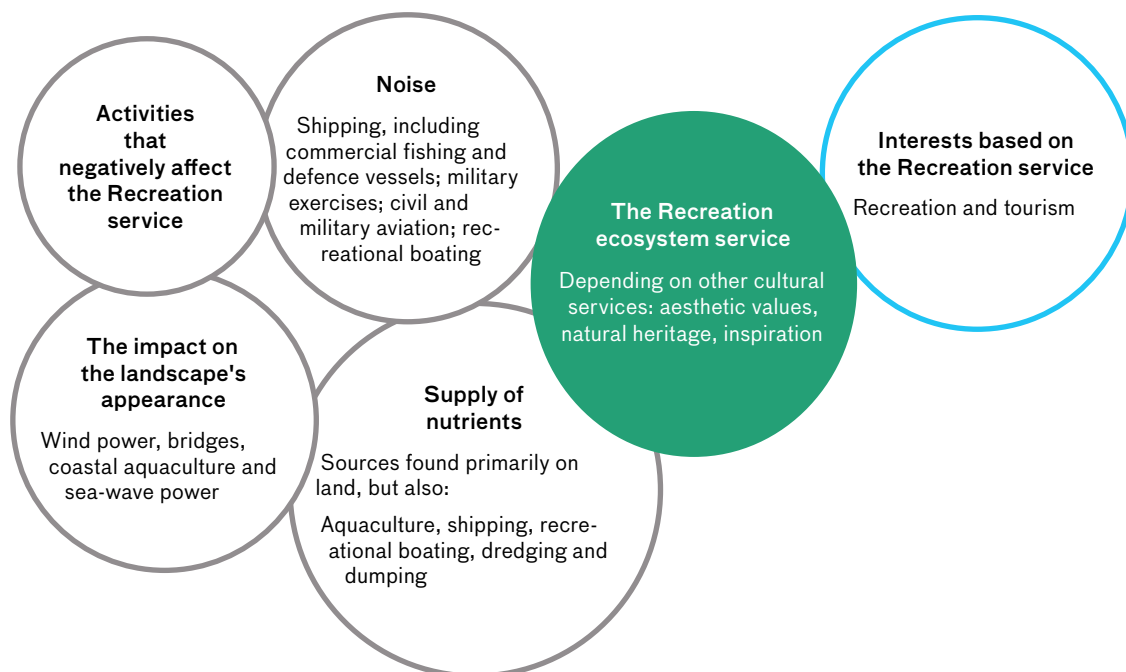
Local impacts on habitats and species can be caused by activities which, for example, cause physical damage and create noise underwater. Activities that contribute to an impact of this kind include shipping, military operations and permanent installations. Negative impact on sensitive areas can be reduced through careful consideration of location in the marine spatial planning process. The level of knowledge of the propagation of underwater noise is currently very low. Joint monitoring systems are being discussed within both Ospar and HELCOM. Our knowledge will thus grow with time so that underwater noise can be taken into consideration in marine spatial planning.

The selective sampling of species, the supply of hazardous substances and the introduction and redistribution of non-native species can have a far-reaching impact, which is why these conflicts cannot be solved locally through the separation of claims.



The Recreation cultural ecosystem service

The utilisation of the sea has shaped our coastal communities and is a part of our cultural heritage. The cultural aspect makes up a large part of our valuation of the sea. Places for recreation are attractive destinations; recreation and tourism are dependent on what nature gives us in the form of cultural heritage, natural heritage and aesthetic values. Competing interests and synergy opportunities exist both with other sectors and within the recreation and tourism sector. Recreational boating, for example – a part of recreation and tourism – can affect the Recreation service negatively as a result of noise. Disturbance in the form of impact on the appearance of the landscape can be reduced through balanced localisation within our marine spatial planning.



Space

Many of the potential conflicts of interests in marine areas concern space: different interests and activities that, quite simply, do not fit within the same area. These conflicts may occur in or on the seabed, in a column of water, or on or above the ocean surface. But there are also many interests that work well together and these can provide positive synergy effects.

In the future, even more claims may be made to utilise marine spaces. At present, it is difficult to estimate how great claims coming further on will be. Innovations and technological developments within various operational areas can make future utilisation of the sea's resources possible in several ways. For example, research is under way within the field of marine biotechnology.

Possible spatial conflicts and synergies in and on the seabed

There are many different claims regarding use of the seabed, at the same time as natural values are strongly linked with it. Shallow seabeds and offshore banks are of particular interest, for example for the construction of wind farms and the extraction of sand. But offshore banks are also some of the areas with the greatest natural values. Activities that damage the seabed in various ways come into conflict with high natural values at the same location, for example bottom trawling. Cultural historical remains also risk being damaged. For natural values and cultural values on the seabed, synergy effects can be achieved through the protection of areas with several types of high values.

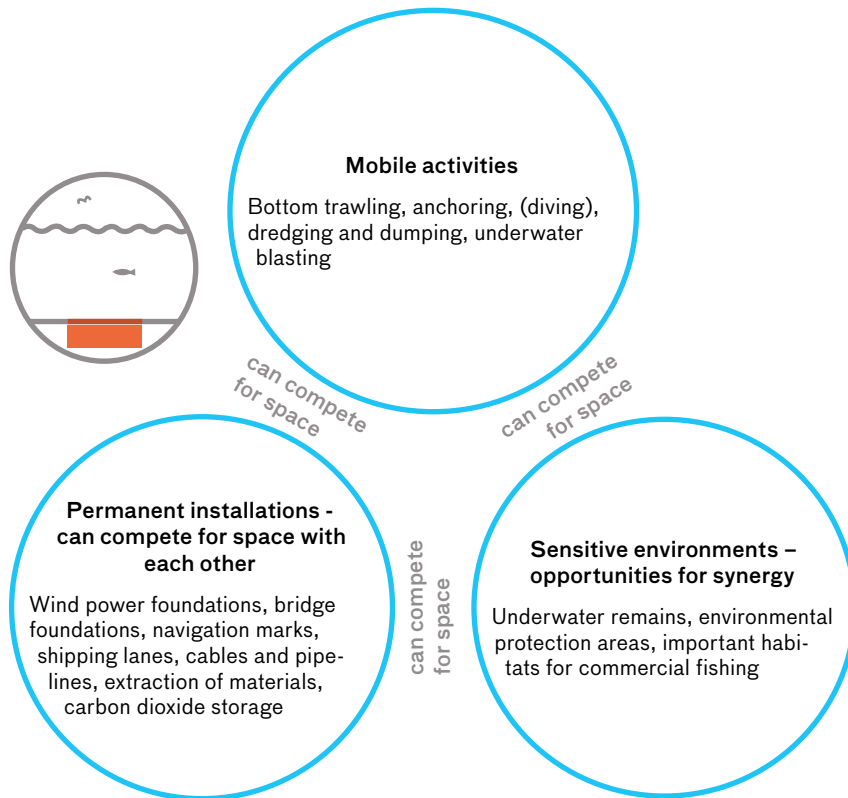
Marine spatial planning presents great opportunities to influence the localisation of permanent installations.

Possible spatial conflicts and synergies in the water column

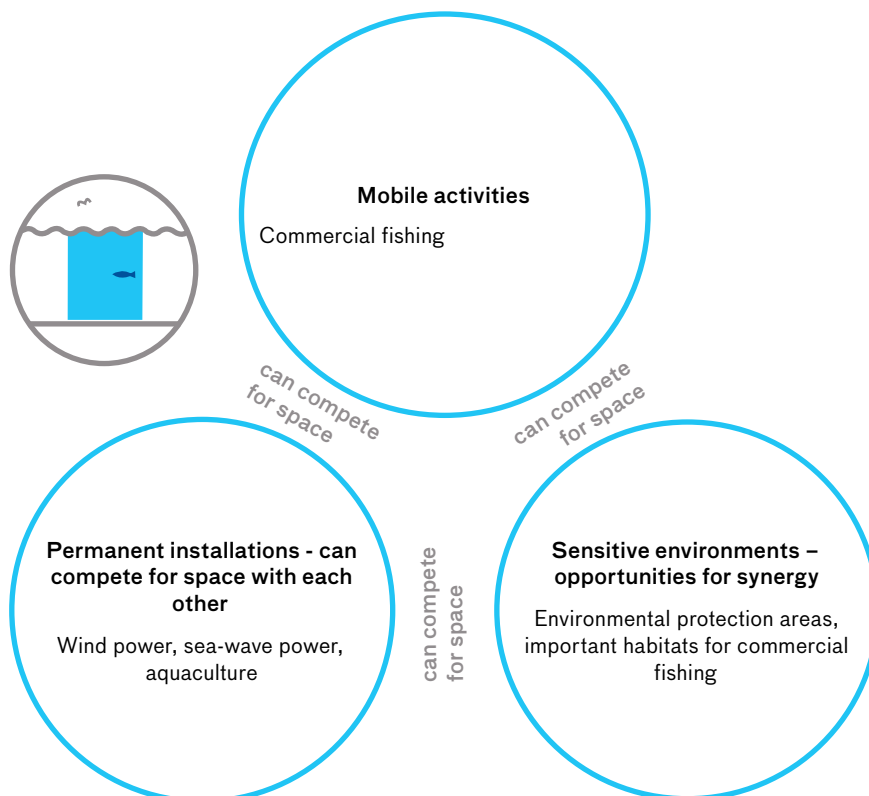
Many of the claims that take up space on the seabed and the sea surface also use space in columns of water, but activities that specifically make use of marine spaces are commercial fishing, aquaculture and energy production. These interests cannot usually share the same space(s). They risk coming into conflict with the natural values that exist in the column of water.

Marine spatial planning has great opportunities to influence the localisation of aquaculture and energy production facilities.

Possible spatial conflicts and synergies in and on the seabed



Possible spatial conflicts and synergies in the water column



Possible spatial conflicts and synergies on the ocean surface

On the surface of the water, all shipping, including recreational boating, commercial fishing and military activities, should get on with each other and be able to share the space with permanent installations such as wind and wave farms, bridges and aquaculture. Permanent installations can compete with mobile activities for space, constituting risks for them.

Since several of the mobile activities are governed by international agreements and conventions, marine spatial planning has a limited mandate to allocate space for them. Marine spatial planning can more directly influence the localisation of permanent installations. There are, however, major opportunities to present suitable changes as regards mobile activities.

Possible space conflicts and synergies above the ocean surface

Conflicts above the surface of the water primarily concern the impact of wind farms on civil and military aviation, and Armed Forces signals intelligence operations. Wind farms can also affect birds and bats.

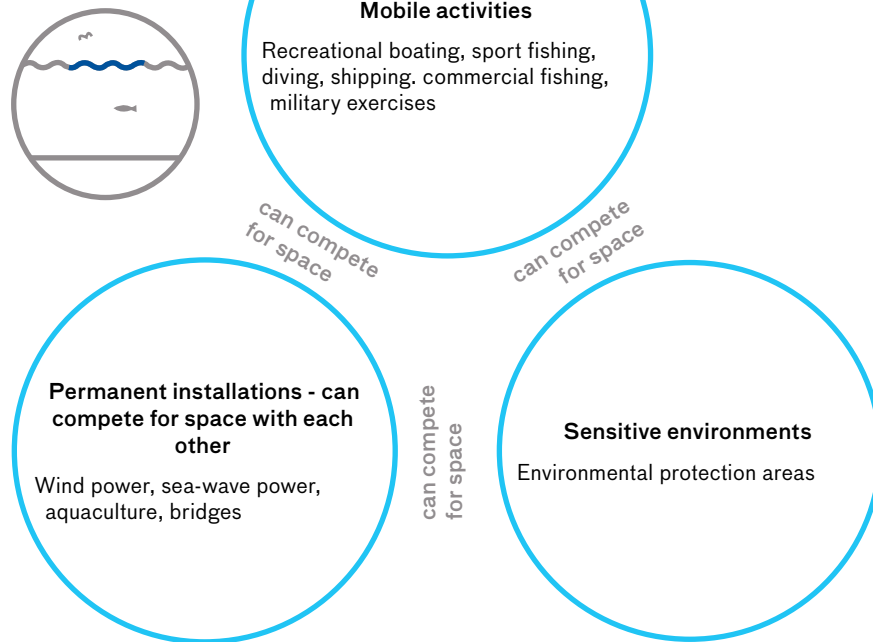
Marine spatial planning presents great opportunities to influence the localisation of wind farms.

Impact on the landscape's appearance

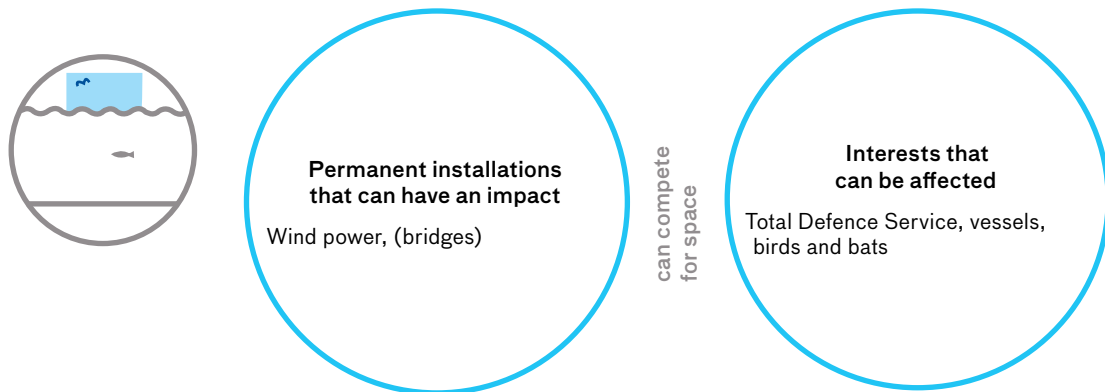
Conflicts that concern the appearance of the landscape involve cultural heritage and the needs of recreation and tourism for unspoiled surroundings. Tall installations such as wind farms can be seen from a great distance; this has a huge impact on the appearance of the landscape. Aquaculture and sea-wave power facilities affect the appearance of the landscape within a much smaller area and are not as visible from a distance, but coastal facilities can affect cultural heritage and recreation and tourism.

Facilities on the coastline are not included in the Swedish state's national marine spatial planning; on the other hand, the localisation of sea-based facilities is.

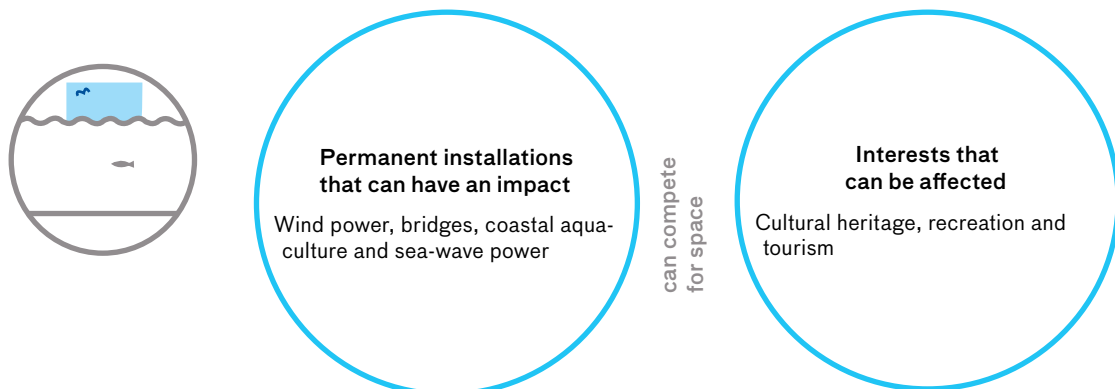
Possible spatial conflicts and synergies on the ocean surface



Possible space conflicts and synergies above the ocean surface



Impact on the landscape's appearance



Conclusions

Based on the descriptions of the current situation and the analysis, the Swedish Agency for Marine and Water Management draws the following conclusions. Geographical conclusions are presented in the chapter entitled Analysis.

Conclusions regarding potential goal conflicts and goal synergies

- Sustainable development is an explicit goal for the majority of sector interests. Cross-sectoral interpretation of what this means for Sweden's marine resources, in terms of securing economic and social sustainability within the scope of ecological sustainability, is a fundamental issue in marine spatial planning.
- Goal conflicts may exist in terms of the respective benefits on land or at sea, for example the extraction of natural gravel on land as opposed to extraction at sea.
- Maintaining the ecosystem services of the sea is a prerequisite for the majority of marine activities and the benefits they provide to society. Safeguarding ecosystem services based on the needs of different interested parties has the potential to increase their benefits to society. At the same time, some maritime activities can have a negative effect on environmental goals and ecosystem services. Marine spatial planning therefore has a role to contribute, based on its mandate, to the development of ecosystem services and the prevention of negative effects on the same.

Conclusions regarding collaborative and competing interests

- Within marine spatial planning, the short-term and long-term benefits resulting from various interests and activities should be analysed with reference to the ecosystem services that the sea provides. Blue growth presupposes vigorous ecosystems.
- In certain geographical areas there are specific needs for marine spatial planning in order to help balance the benefit and impact brought about by the various interested parties concerned.

Conclusions regarding the marine spatial planning mandate and opportunities

- Marine spatial planning presents great opportunities to influence the localisation of permanent installations and protected areas.
- Many marine activities are controlled by international agreements, such as shipping regulations and the EU common fisheries policy. Even if marine spatial planning has a limited direct mandate with regard to regulating marine activities, there are major opportunities to suggest suitable amendments to existing management and regulations. The marine spatial plans, which are being produced from a holistic perspective of the sea, will indicate Sweden's position and form a basis for negotiation.

Geographic conclusions

There are several differences between the three marine spatial planning areas: the Gulf of Bothnia, the Baltic Sea and Skagerrak/Kattegat: conditions, environmental status, and how they are used. The most obvious distinctive features are summarised here.

Specific to the Skagerrak/Kattegat

- Almost oceanic conditions provide great variety of species, especially in the Skagerrak
- Great pressure on recreation and tourism
- Nearly half of Sweden's maritime employees
- Leads Sweden within fish processing and trade/farming of shellfish
- The largest portion of Sweden's commercial fishers and fishing vessels
- Intensive shipping expected to grow substantially, Sweden's two largest ports are here
- Major risks for oil leaks that quickly reach land
- Marine waste a problem owing to winds and currents

Specific to the Gulf of Bothnia

- Low salt content, which impacts occurrence of species
- Ice coverage, which impacts shipping and weakens sea-wave power, but provides opportunities for winter tourism
- Land uplift, which impacts species and biotopes and leads to the loss of underwater cultural heritage
- Small-scale fishing, salmon streams of significance for marine salmon and salmon trout populations in the entire Baltic Sea and out into the Skagerrak/Kattegat
- Long tradition of industry, which yielded high environmental toxin levels along the coast
- Shipping strongly connected to the mining and forestry industries

Specific to the Baltic Sea

- Small percentage of protected areas
- Rising sea levels and erosion are problems in Skåne
- Great pressure on recreation and tourism around Stockholm and Skåne, Öland and Gotland
- Major problems with eutrophication and lack of oxygen on the seabed
- Intensive shipping that is expected to increase substantially
- Major risks for oil leaks
- Rich cultural heritage under water, primarily in the form of vessel remains and settlements from the Paleolithic
- Fish population under pressure

- Many of the environmental problems found in marine areas are caused by activities on land, an issue that cannot be resolved through marine spatial planning. On the other hand, activities and burdens from the land contribute to the environmental situation in the ocean, and are thus factors that must be taken into consideration in marine spatial planning.

Conclusions relevant for ongoing planning

- Sweden has large marine areas and in several of them there are currently no spatial conflicts, however, some require detailed planning. This applies to areas that are used for multiple sectoral interests, and to areas that are particularly vulnerable and/or where there is a high risk factor.
- The need for marine spatial planning stems from a growing pressure on the utilisation of marine resources combined with major environmental problems, and from our neighbours' plans for the adjacent marine areas.
- Despite a deficient knowledge base, planning must be commenced using the knowledge that is available.
- The systematic development of knowledge and mapping of marine natural values is necessary for ecosystem-based marine spatial planning.
- Appropriate skills to work in a sectorally integrated and forward-looking manner with a holistic perspective of national planning need to be developed at several levels.
- Cross-border issues need to be coordinated with our neighbours at an early stage in the planning process.
- Marine spatial planning in the Baltic Sea is more complex internationally speaking since there are several neighbouring countries to consider. More countries planning increased usage in adjacent marine areas entails a need to analyse cumulative effects.
- From an ecosystem perspective, Sweden should strive in its marine spatial planning to reach consensus with our neighbours in respect of marine conditions and the utilisation of marine resources.
- Potential areas to be studied in greater detail have been identified. The areas to be studied in greater detail may need to be prioritised with regard to the production of data, and they may need to be planned in a greater degree of detail than other marine areas.

Potential areas for more detailed analysis in the Skagerrak/Kattegat, Baltic Sea and Gulf of Bothnia

The Swedish marine area is the largest in the Baltic Sea region. Claims by global and local shipping, energy production (including cables and pipelines for energy transmission), defence, fishing and aquaculture, and recreation and tourism as well as environmental protection and care of the cultural environment all meet here. In large parts of the ocean, these demands can be satisfied without conflicts between the competing interests. In certain areas, however, conflicts of interest arise concerning use of the same areas. In general, the coastal areas and archipelagos close to the growing metropolitan regions – Stockholm, Gothenburg and Malmö – are attractive areas, which leads to pressure on their nearby shores and seas being high, and increasing. The same does not apply to the same extent to coastal areas with lower populations.

The following areas have been identified as potentially requiring more detailed analysis, based on data from the coastal county administrative boards and their regional reports, and from an overall GIS analysis built on a compilation of national interest claims and protected areas. On the whole, the county administrative boards have conducted overhauls based on area utilization rate and any spatial conflicts, as well as vulnerability and risk factor.

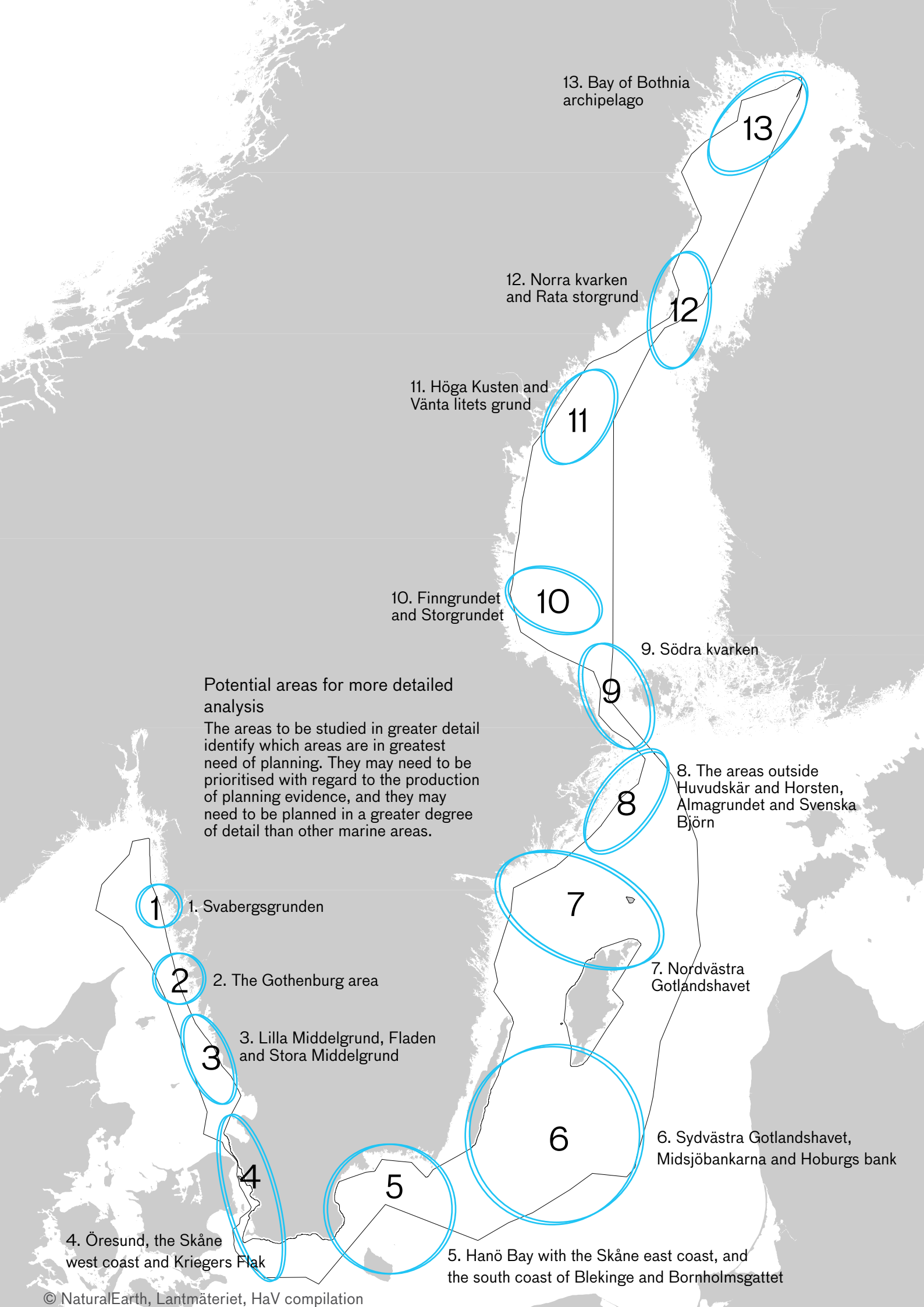
The intent is to narrow down which areas are in greatest need of planning. They may need to be prioritised as regards the production of data, and they may need to be planned in a greater degree of detail than other marine areas.

The Skagerrak/Kattegat

In the regional reports drafted by the county administrative boards, several specific issues are highlighted as existing and potential conflicts of interest in the Skagerrak/Kattegat: a future increase in shipping, Armed Forces areas of interest, the effects of commercial and recreational fishing on high natural values, and planned wave and wind farms in areas with natural values. Several areas located outside of the marine spatial plan area are also described: the impact of military operations on high natural values in Gullmarn, a conflict between shipping and habitats in Idefjorden, and increased shipping through the Öresund, since shipping traffic entails risks for other interests within the North Sea. There is a great deal of pressure on recreation and tourism along the whole of the marine spatial plan's coastal area. Three of the areas highlighted in the regional report on the North Sea are presented below.

1. Svabergsgrunden

Svabergsgrunden is located off the coast of the well-known fishing town Smögen, on the west coast of Sweden, where the currents from the Kattegat and the Skagerrak meet. The shallows are a westerly outpost in the current that runs up the Swedish west coast, carrying with it the larvae of various organisms. As the shallows contain a great variety of different types of seabeds at different depths, there are habitats to suit most species. The area has a very high level of biodiversity. When inventories were taken in 2009 and 2010, several very rare species were found. Species new to science were also discovered in these shallows. Fishing here is not particularly intensive due to the undulating seabed, but the area is important for cage fishing of crayfish and lobster. The major potential conflict is due to the fact that the shallows are also interesting for the



13. Bay of Bothnia archipelago

13

12. Norra kvarken and Rata storgrund

12

11. Höga Kusten and Vänta litets grund

11

10. Finngrundet and Storgrundet

10

9. Södra kvarken

9

Potential areas for more detailed analysis

The areas to be studied in greater detail identify which areas are in greatest need of planning. They may need to be prioritised with regard to the production of planning evidence, and they may need to be planned in a greater degree of detail than other marine areas.

8. The areas outside Huvudskär and Horsten, Almagrundet and Svenska Björn

8

7. Nordvästra Gotlandshavet

7

6. Sydvästra Gotlandshavet, Midsjöbankarna and Hoburgs bank

6

5. Hanö Bay with the Skåne east coast, and the south coast of Blekinge and Bornholmsgattet

5

4. Öresund, the Skåne west coast and Kriegers Flak

4

3. Lilla Middelgrund, Fladen and Stora Middelgrund

3

2. The Gothenburg area

2

1. Svabergsgrunden

1

construction of both wave and wind power. Here there is also a possible conflict of interest with the Armed Forces' exercising and firing range. According to the county administrative board, Svabergsgrunden is a prioritised location for establishing a marine protected area.

Interests

Recreational fishing, defence, energy and environmental protection.

2. The Gothenburg area

Gothenburg is home to Sweden's largest port and there are several national interests and other interests in the area: commercial fishing, defence, recreation and natural and cultural values. There is intensive traffic in these waters, connected with the intensive utilisation of the coast. In Kungälv, Öckerö and Gothenburg there are areas that have been highlighted for both wind and sea-wave power. Several of the competing interests are located outside of the marine spatial plan area, in the archipelago, but the connection between land and sea is accentuated by the strong shipping interest. A great deal of recreational boat traffic on the way to Denmark can be found near Gothenburg. A future increase in shipping may have a major impact on already intensively utilised areas, such as the Gothenburg archipelago.

Interests

Recreation and tourism, commercial fishing, shipping, defence, energy and environmental protection.

3. Lilla Middelgrund, Fladen and Stora Middelgrund

The three offshore banks are covered by Natura 2000, but both commercial and recreational fishing occur here.

In Stora Middelgrund and in its vicinity there are strong conservation, commercial fishing and recreation interests. Comprehensive commercial and recreational fishing is conducted in the area. There is also diving. South of Stora Middelgrund there is a spawning area for cod. Furthermore, the area is of national interest as regards wind power, and a permit was granted in 2008 for the construction of over 100 wind power stations. In the Danish EEZ there is an area designated as being of interest for gravel extraction.

There are shipping lanes on both sides of the banks, and vessels carrying hazardous goods frequent the area.

Interests

Recreation and tourism, commercial fishing, shipping, energy, the extraction of materials, and environmental protection.

The Baltic Sea

The Baltic Sea marine spatial plan area borders several other countries that have interests in the border zone. The Baltic Sea has a small proportion of protected areas and there is pressure on its fish population. There is great pressure on recreation and tourism in certain areas. Shipping is expected to increase substantially, which means an increased risk of oil discharges. Here we present five areas assembled through GIS analysis of overlapping interests, as well as through the county administrative

boards' preliminary identification of areas with planning needs.

4. Öresund, Skåne's west coast and Kriegers Flak

The Öresund is Sweden's most trafficked shipping lane; there is frequent ferry traffic across the sound, growing commercial traffic to and from various Baltic ports, and recreational boating. This is a high-risk area as regards shipping accidents.

The Öresund Bridge provides a road and rail link connecting Sweden and Denmark. The area between Helsingborg and Helsingør is of interest for additional permanent connections, as is the area between Malmö and Copenhagen. Flights arriving at Kastrup Airport also affect the vicinity. The Lillgrund wind farm is located south of the Öresund Bridge. In the southern part of the Öresund there are several pipelines to Denmark.

Öresund has several areas of national interest for conservation and recreation. There is a pair of nature reserves in the northern part of the sound, and a larger area near Falsterbo. The latter is also a Natura 2000 area. Kullaberg and its adjacent coastal area is of national interest, in accordance with Chapter 4 of the Environmental Code, in which the interests of tourism are especially noted.

There is a no-fishing zone at the northern end of the Öresund. Several areas within the sound are of national interest as regards fishing. North of the Öresund, and at Falsterbo, there are areas of interest as regards carbon dioxide storage. Areas of interest with regard to the extraction of sand can be found in the northern part of the Öresund, and around Falsterbo. At Falsterbo there is an area that is of national interest as regards defence.

Kriegers Flak is an offshore bank in the Swedish EEZ on the border with Denmark and Germany. The area has been highlighted as being of national interest for both fishing and wind power.

Interests

Recreation and tourism, commercial fishing, aquaculture, shipping, defence, energy, infrastructure, the extraction and storage of materials, and environmental protection.

5. Hanö Bay, with Skåne's east coast, Blekinge's south coast and Bornholmshavet

Skåne's east coast is of national interest, in accordance with Chapter 4 of the Environmental Code, in which the interests of tourism are especially noted. Stenshuvud National Park can be found in Hanö Bay. Trolling for salmon is common in Hanö bay; Morrumsån – a salmon breeding ground – flows into Hanö Bay. Blekinge's archipelago is home to several fish farms.

In Hanö Bay there are designated areas of national interest as regards shipping, wind power, defence, fishing, conservation and recreation. Vessels with hazardous goods frequent the area, and there is also recreational boat traffic in Hanö Bay. Bornholmshavet encompasses both Swedish and Danish waters and, with its intensively trafficked lane, is a high-risk area for shipping accidents. Both civil and military aviation use Ronneby Airport. In the eastern part of Hanö Bay there is an area of interest for the extraction of sand. A number of pipelines can be found on the seabed between Blekinge and Poland.

In Hanöbukten there is an application to establish one of the world's largest wind

farms at sea, while a large part of the marine area is designated as an area of national interest for defence.

Interests

Recreation and tourism, commercial fishing, aquaculture, shipping, defence, energy, infrastructure, the extraction of materials and environmental protection.

6. Sydvästra Gotlandshavet, Midsjöbankarna and Hoburgs bank

This area borders Poland, Russia, Lithuania and Latvia, and encompasses the major offshore banks Hoburgs Bank and Norra and Södra Midsjöbanken as well as the surrounding marine areas. Hoburgs Bank and Norra Midsjöbanken are Natura 2000 areas. Hoburgs Bank has a unique, highly unusual substrate composition; like Norra Midsjöbanken, it hosts unique plant and animal life. The sea and coast around Öland and Gotland are of national interest for recreation, in accordance with Chapter 4 of the Environmental Code.

There are national interest claims for shipping, fishing defence and wind power. Södra Midsjöbanken is affected by an area of interest for the extraction of sand. There are areas of interest for the storage of carbon dioxide, and for the extraction of oil and gas on the border with neighbouring economic zones. Neighbouring countries are also interested in the extraction of oil and gas. The Nord Stream gas pipeline is located within this area.

The offshore banks are surrounded by heavily trafficked shipping lanes, with high-risk areas for shipping accidents, in which shipping of hazardous goods also occurs. There are also dumping locations for gas and ammunition in the area.

Interests

Recreation and tourism, commercial fishing, shipping, defence, energy, the extraction and storage of materials, and environmental protection.

7. Nordvästra Gotlandshavet

North of Gotland is the Gotska Sandön national park and the Gotska Sandön-Salvorenv Natura 2000 area, which extends from eastern Fårö via Salvorenv, Sando Bank and Gotska Sandön to the Kopparstenarna shoal several kilometers north of Gotska Sandön. The area is also a marine nature reserve. There are areas of national interest in accordance with Chapter 4 of the Environmental Code both on the mainland, and at Gotska Sandön and on Fårö and Gotland. There is a great amount of recreational boating traffic, and shipping lanes designated as national interests run through here.

Shipping lanes in towards Lake Mälaren and towards Nynäshamn run through the area outside of Landsort. A strong increase in vessel traffic is expected over the next few years, with a new shipping lane further into Lake Mälaren and the new port in Norvik near Nynäshamn. The shipping lane to Oxelösund Harbour is also heavily trafficked. Transport of hazardous cargo to and from the harbours could entail risks to the surrounding areas.

There are national interest claims for recreation, conservation, wind power, defence, fishing and shipping. There is an area of interest for the extraction of sand near Fårö.

Weapons and waste have been dumped in Landsort Deep. There are also areas where there is a risk of mines that have been left behind.

Interests

Recreation and tourism, commercial fishing, shipping, defence, energy, the extraction of materials, environmental protection and risk areas (environmentally hazardous objects).

8. The areas outside Huvudskär and Horsten, Almagrundet and Svenska Björn

The area is affected by national interests for recreation, conservation, commercial fishing, wind power, defence and shipping, as well as by national interests according to Chapter 4 of the Environmental Code for the coastal area and the archipelago. In the northern part there is a large area designated as a national interest for the cultural environment just inside the border of the marine spatial planning area.

There are several shoal areas of high natural value in the area. There are major shipping lanes here, one of which goes right through the shoal area by Svenska Björn lighthouse, which has also been designated as a national interest for wind power. The shipping lanes comprise a source of risk for oil discharges.

The natural values consist, among other things, of living environments for scaups, fish and seals. Large numbers of seabirds are found in the offshore area by Svenska Björn. Close by the marine spatial planning area there are several areas in the form of nature reserves, Natura 2000 and the like. A nature reserve is being planned around Horsten; south of it, a large marine national park is being planned that will link several protected areas together.

Boating life is intense; every year there are several regattas that affect Sweden's territorial waters and exclusive economic zone near Almagrundet, and the area off Horsten.

The Swedish Defence Forces have interests in places such as Svenska Högarna and off Huvudskär.

Interests

Cultural environment, recreation, shipping, defence, energy and environmental protection.

Gulf of Bothnia

The low salt content of the Gulf of Bothnia affects the marine ecosystems of this area and which species are found here. Land uplift contributes to a great diversity of biotopes and species in marine habitats. The Gulf of Bothnia lacks cultural environments in the form of settlements and similar traces of human activity owing to land rise. As with the other marine areas, on the other hand, there are vessel remains of cultural historical interest. Fishing is more or less small-scale. Shipping is linked to the mining and forestry industries. The "winter aspect" is important here, since shipping is affected by ice conditions in the winter and new operations, such as sea-wave power, can be made more difficult by the ice. Also characteristic of the marine spatial plan are the historical industrial discharges that have resulted in numerous polluted areas with high levels of environmental toxins along the coast. Five areas are presented here that have been identified by the Gulf of Bothnia's county administrative boards (nine smaller areas within five larger areas are described here).

9. Södra kvarken

This area constitutes a narrow passage between Sweden and Åland with several offshore banks, including the Grundkallegrund offshore bank which has high natural

values. Shipping to and from the Gulf of Bothnia passes Södra kvarken, which means an increased risk of collisions. South of Södra kvarken is the sea approach to the Furusund lane, a route with heavy traffic such as passenger ships to and from Finland and the Baltic.

There are several known wrecks along the coast and further out to sea. The coast and archipelago around Gräsö have high natural, cultural and outdoor values, and are partially protected in the form of nature reserves, Natura 2000 areas and a large BSPA area that also extends south of the marine spatial plan areas. The coastal area is of national interest, in accordance with Chapter 4 of the Environmental Code. At Öregrund and Östhammar there is an area where the appearance of the landscape is protected. The area off Singö has very high natural values for sea birds and other marine life owing to the untouched state of the area.

The Fennoskan underwater cable runs through the area, from Forsmark in Uppsala county to Finland. The Roten firing range in Stockholm county, which is of national interest from a defence point of view, covers primarily the Baltic Sea marine spatial plan area, but also extends into the Gulf of Bothnia.

Interests

Cultural heritage, recreation and tourism, shipping, defence, energy and environmental protection.

10. Finngrundet and Storgrundet

The Finngrundet and Storgrundet offshore banks have high natural values. Finngrundet is protected as three Natura 2000 areas (its western, northern and eastern banks) and as a BSPA areas (eastern bank). The area is of interest as regards commercial fishing.

Finngrundet is of national interest for energy production and there have been plans to construct wind farms on its eastern and western banks. There are permits for the construction of 70 wind power plants on Storgrundet. Finngrundet is an area of national interest to shipping. Shipping traffic passes by Storgrundet on its way to and from ports in the Söderhamn region. Finngrundet's eastern bank has been designated a potential area for the extraction of gravel.

Interests

Cultural heritage, commercial fishing, shipping, energy, the extraction of materials and environmental protection.

11. Höga Kusten and Vänta litets grund

Höga kusten – the High Coast – is a UNESCO world heritage site and the coastal area is of national interest, in accordance with Chapter 4 of the Environmental Code. The national interests for conservation, recreation and an unspoiled coast cover the coastal area and part of the marine spatial plan area. The area is sensitive to actions that might harm the High Coast's high values within recreation and cultural environment. Ulvödjupet – the deepest point in the Gulf of Bothnia – has high natural values, and Vänta litets grund has been highlighted as a Natura 2000 area due to its high natural values. The shallows are of interest as regards commercial fishing.

The Armed Forces has a training area and firing range within the area. Along the coast there is a shipping lane that is classed as a national interest. Dumped military material can be found on the seabed in the vicinity of Vänta litets grund. An estimated 23,000 barrels of mercury have been dumped outside the Bay of Sundsvall.

Interests

Cultural heritage, recreation and tourism, commercial fishing, shipping, defence, environmental protection and risk areas (environmentally hazardous objects).

12. Norra kvarken and Rata storgrund

As with Södra Kvarken, many vessels pass through Norra Kvarken, a relatively narrow passage that lies just south of Holmöarna. The area is very shallow and the risk of collisions is great. The shallow conditions, and the fact that the area constitutes a threshold between the Bay of Bothnia and the Bothnian Sea, mean that the area has high natural values. The Holmöarna archipelago, which borders the area, is a nature reserve due to its high values for recreation and natural and cultural environment. Holmöarna and its surroundings have also been highlighted as areas of national interest as regards commercial fishing. There are plans for wind farms and cable-laying around Holmöarna. There are also visions of a future permanent connection between Umeå and Vaasa in Finland.

The Rata storgrund offshore bank has some high natural values and at the same time is of interest in respect of wind power. Ratan, a historic village on the coast, is of national interest for cultural environment and could be affected by the establishment of wind power facilities at sea. Across the shallows there is an area of national interest to shipping. There are several known cultural historic remains near both Norra kvarken and Rata storgrund.

Interests

Cultural heritage, recreation and tourism, commercial fishing, shipping, energy, infrastructure and environmental protection.

13. Bay of Bothnia archipelago

In the shallow area outside Luleå Archipelago are Marakellen and Klockgrundet, two areas of national interest for energy production. A consultation process has been conducted regarding wind power developments. The shallows are important due to their high natural values. Shipping to and from Luleå passes the areas, and the archipelago is sensitive to activities that affect its cultural and recreation values. The area encompassing Svalans grund and Falkens grund has been designated a potential area for the extraction of gravel. Parts of the area overlap the risk area of the land-based Tåme firing range.

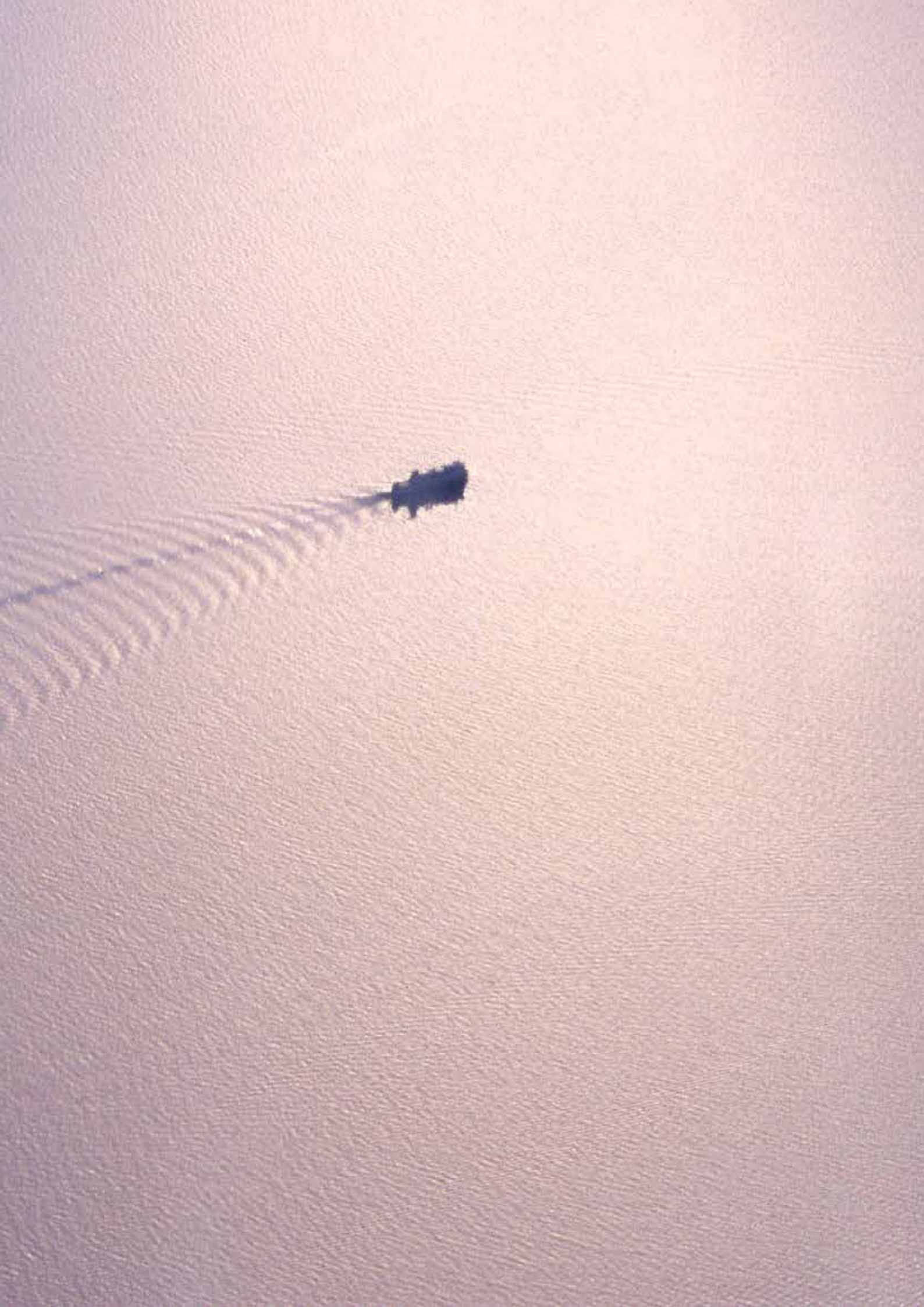
Haparanda Archipelago also has high natural values and at the same time is of interest as regards wind power. A consultation process has been conducted regarding wind power developments. On the Finnish side, right on the border, there are far-reaching plans for a sea-based wind farm with a total of 14 wind power plants. Haparanda archipelago is covered by a BSPA area. As with Luleå Archipelago, there are high cultural and recreation values in the area.

Interests

Cultural heritage, recreation and tourism, shipping, defence, energy, extraction of materials, and environmental protection.

Marine spatial planning

This part of the current status description describes the context of our marine spatial planning and the planning process.

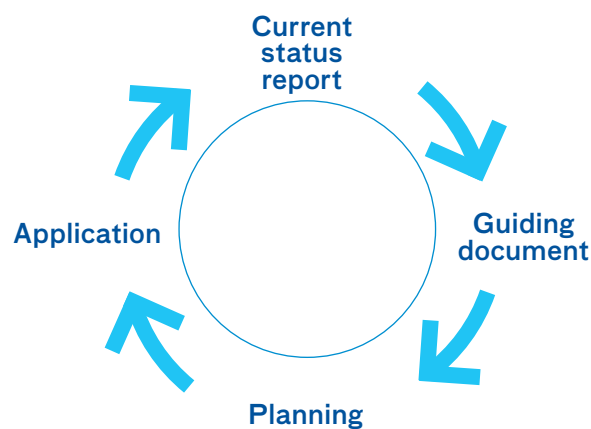


The coming planning process

Marine spatial planning is a time-consuming process that takes several years. Marine spatial plans will be drafted for the Gulf of Bothnia, the Baltic Sea and the Skagerrak/Kattegat. The planning can be described in cycles, where the marine spatial plans are the result of the planning processes. The objective is that marine spatial planning should be open and have broad participation, both nationally and as regards our neighbours. The marine spatial plans will become guidance documents to be applied in decisions concerning the sea.

The current status report is the first step in a planning cycle and constitutes the starting point for the coming planning process. The next step is drafting a guiding document for the purpose of creating clarity concerning the continued process, and of formulating planning goals. The purpose is also to allow outside interests to influence the agency's ongoing planning work. Preconditions for planning, objectives, and strategies and principal subject areas to be handled within their respective marine spatial plans, as well as the working process and an overall time schedule, will be described within the guiding document.

At the same time as the guiding document is being drafted, proposals regarding delimitation of the environmental assessment will also be made. The intent is that the guiding document and the proposals regarding the scope of the environmental assessment will be circulated for comments over a six-month period, so that all interested parties have the opportunity to submit their viewpoints. When the guiding document has been worked up and prepared, it will form the starting point for the respective marine spatial plans.



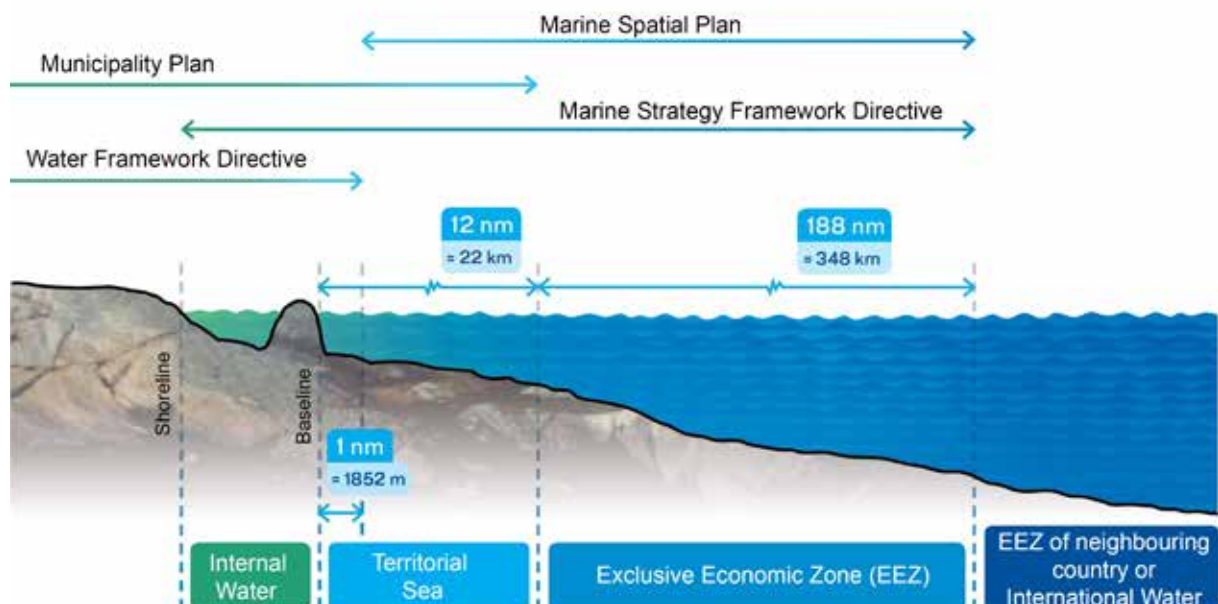
Municipal marine spatial planning

Marine spatial planning, in its capacity as new governmental planning, will impose requirements on coordination, primarily with municipal spatial planning. The need for coordination and sharing basis for knowledge is general, but especially important in the areas where the plans overlap. For the knowledge and planning bases that concern the coastal zone, it is primarily the municipalities and county administrative boards that are responsible for producing, systematising and supplying data for the marine spatial plans. Further out to sea it is primarily the task of the national agencies to produce data.

The marine spatial plans will only cover the area lying one nautical mile outside the baseline. However, what happens in the coastal zone and the coastal municipalities has an effect on marine spatial planning. Many of the activities affecting the sea occur on land, primarily in coastal zones where the municipal plans are of great importance along with the Water Framework Directive and the Marine Strategy Framework Directive.

In accordance with the Planning and Building Act., the planning of the municipalities extends out over all the territorial waters – that is, 12 nautical miles from the baseline. To that can be added actions taken in accordance with the Water Quality Management Ordinance out to 1 nautical mile outside the baseline, and those taken in accordance with the Marine Environmental Ordinance, that extends inland. The exclusive economic zone runs from the border of Sweden's territorial waters and a maximum of 200 nautical miles out from the baseline. The national marine spatial plans will extend from one nautical mile outside of the baseline and cover both territorial waters and Sweden's exclusive economic zone.

A general observation of the treatment of the sea in the master plans of the coastal municipalities in the Gulf of Bothnia, Skagerrak/Kattegat and Baltic Sea suggests that there are many interests that overlap each other, but that clear standpoints are rarely reported and balancing of these interests against each other is often put off for the future. Areas near land and in the coastal zone are addressed in the plans more often than the areas further out in territorial waters. Standpoints are sometimes adopted between the different interested parties, but consequences are not investigated until projects are about to become a reality. From a marine spatial planning perspective, it would be an advantage if strategies were drafted for larger geographical areas than just individual municipalities.



The blue zone marks the overlap between national marine spatial plans and municipal plans in territorial waters. Outside this lies the exclusive economic zone.



The Skagerrak/Kattegat

Municipal plans and strategies

The North Sea's municipalities report on the coastal zone in detail in their master plans as regards housing, aquaculture, small boat harbours, industry and environmental status. The open seas are addressed to a lesser extent. National interests for conservation and cultural care compete with national interests for the development of heavy industry, shipping, wind power and infrastructure. Sotenäs and Kungälv have proposed possible areas for sea-wave power, and Kungälv, Öckerö, Gothenburg and Falkenberg have proposed areas for sea-based wind power. Roughly half of the municipalities state that sea-based wind power is not on the agenda or is not appropriate.

For the municipalities in Bohuslän, the sea has been an important resource that has provided work through fishing, shipping and the refining industry. Today, the significance of the traditional industries linked to the sea has diminished and been replaced by industries of the future such as recreation and tourism. New boat berths and small boat harbours are often cited as a way of making residential areas more attractive. Aquaculture is also something that is addressed in several of the master plans. The growing trend that residences

in the archipelago are being used more as weekend/holiday homes creates problems for the municipalities. The decline in residences being used year-round cannot be compensated for at the same rate, which is a real threat to the survival of the archipelago communities.

The City of Gothenburg is a large municipality where the coastal zone is treated as a recreational and residential area. The conflict of interest is obvious; the national interest in shipping extends far into the city and creates a conflict with urban development. The fishing ports in Gothenburg and Fiskebäck should, according to the municipality, constitute national interests as regards urban development.

Halland's coastal zone also has a fishing tradition, but the coastal communities are not as tightly linked to the sea. Both commercial and sport fishing are significant, however, and Varberg's negative view of sea-based wind power is motivated by the fact that the area is important for fishing. Shipping is also important in several municipalities. The North Sea municipalities in Skåne have not addressed the sea, except as regards wind power. Ängelholm and Höganäs, together with Helsingborg, have made a joint addendum implying that sea-based wind power should be avoided.

The Baltic Sea

Municipal plans and strategies

In Söderköping and Norrköping in Östergötland, there is the Sankt Anna-Missjö BSPA area, for which the county administrative board in Östergötland, together with municipalities and landowners, has drafted a cooperation plan that is to be integrated with the municipalities' master plans. The municipality of Norrtälje has worked actively with overall strategies designating marine areas that are suitable or unsuitable for various types of activities. In Gotland's master plan, the construction of wind farms is addressed both as regards location and the impact on Gotland public finances. In Torsås as well, the municipality has adopted a position regarding the marine areas that are or are not suitable for wind power. In Sölvesborg, territorial water has been addressed in the master plan, with a standpoint regarding use of the marine areas, for example concerning wind power. The master plan for Lomma grades the marine area according to values, areas for recreation and areas less suitable for blue mussel farming.

In the Regional Development Plan for the Stockholm region, RUFS 2010, several standpoints have been adopted regarding the archipelago environments. Weekend/holiday homes in coastal areas haven't become permanent residences in many communities with a growing population, which increases the demands on public transport, water and sewage, and other services. Over the long term, any additional weekend/holiday homes in areas with bridges or ferries will become permanent and must therefore be considered year-round residences. Whereas the coastal area and larger islands with links to the mainland have been developed for housing over a longer period, many islands further out in the archipelago – and islands and skerries in the outer archipelago – are almost completely undeveloped.

In Skåne, permanent international connections are planned for Helsing-

borg–Helsingør and Malmö–Copenhagen. Region Skåne has drafted a Regional Development Programme for Skåne (RUP 2009), which also addresses issues with a bearing on Skåne's marine areas. The Programme does not, however, include any strategies for marine areas.

Gulf of Bothnia

Municipal plans and strategies

The planning conditions vary for the Gulf of Bothnia's 20 coastal municipalities. Differences in land-use pressures and natural geographic conditions such as archipelagos and open sea are significant for the spatial planning of the sea. In June 2013, a majority of the municipalities had adopted their municipality-wide master plan in 2005 or later. There are currently a number of municipalities within the Gulf of Bothnia with master plans that are not up-to-date. Many of these municipalities, however, are in progress with the work on producing a new master plan. Some municipalities also have more detailed master plans that address coastal and marine areas.

For Skellefteå, Piteå, Luleå, Kalix and Haparanda, there is a joint development strategy for coast, sea and archipelago 2007-2013 (Mare Boreale) and a joint strategy for the Bay of Bothnia archipelago for 2008-2013. The municipalities in Norrbotten also have a joint wind power inquiry committee that designates marine areas to be investigated for wind power. The investigation is being used as a basis for the municipalities in designating areas that could be suitable for establishing wind farms in their master plans.

In Västerbotten County, the municipalities of Skellefteå and Umeå have marine spatial plans; in the Umeå region, Umeå, Nordmaling and Robertsfors – together with the inland municipalities of Bjurholm, Vännäs and Vindeln – have developed a joint thematic master plan for wind power that also addresses marine areas.

Due factors such as low land-use pressure within the Gulf of Bothnia's marine areas, water usage out towards the territorial border is not reported; instead, it is primarily coastal waters. Only the municipality of Kramfors makes such a report in its master plan, since military training areas cover nearly the whole marine area.

The lack of planning data and knowledge of marine values is another reason why so few municipalities report on the entire marine area. Comprehensive knowledge of the sea and its ecosystems is lacking in many areas, which will be important bear in mind in national planning.

A majority of the municipalities address wind power in their master plans or in a thematic master plan. The municipalities generally consider wind farms located right on the coast to be unsuitable. The impact on the landscape's appearance is an example of the reasons not to propose wind farms near the coast. In its thematic master plan for wind power, the municipality of Sundsvall has opposed wind power throughout the whole of its marine area.

Within the Gulf of Bothnia there are several ports significant for the transportation materials such as forestry products, iron ore and steel. Many municipalities describe in their master plans how port activities are to be developed.

Cross-border projects within marine spatial planning

Projects have been conducted within Sweden's marine spatial planning areas in various collaborative forms for many years. These projects have involved wide representation from municipalities, agencies, regions and other interested parties. International collaboration is valuable for marine spatial planning and is relevant with regard to both the development of methodology and for the production of a knowledge base. Some of the projects are described briefly below.

The Skagerrak/Kattegat

Hav möter Land

Hav möter Land ("Sea Meets Land") is a three-year, EU-financed project that has worked with climate changes, water management, coastal and marine spatial planning, boat life, environmental monitoring, and so on. The project involves 26 municipalities, regions, universities and government authorities in Sweden, Norway and Denmark. The aim is to establish common management strategies for the Kattegat-Skagerrak region within a number of specific areas.

Collaboration plan

In northern Bohuslän, the Västra Götaland county administrative board is developing its long-standing collaboration with the four coastal municipalities of Strömstad, Tanum, Sotenäs and Lysekil, as part of the Coastzone project and the Cooperation Plan for Valuable Coastal and Marine Areas in Northern Bohuslän. The joint work has involved the production of planning data that could be important for future marine spatial planning.

Blå ÖP (Blue master plan)

The four coastal municipalities in northern Bohuslän are currently working to develop a joint inter-municipal "Blue master plan". A similar collaboration is in progress between the coastal municipalities from Orust, in the north, to Kungsbacka in Halland; this is being conducted in close collaboration with the Gothenburg Region Association of Local Authorities.

Collaborations within the Baltic Sea

BaltSeaPlan

From 2009 to 2012, BaltSeaPlan worked on marine spatial planning within the scope of the EU's Maritime Policy by developing national marine strategies for the Baltic Sea region, in the light of HELCOM's marine spatial planning recommendation.

PartiSEApate

Up through 2014, PartiSEApate worked on developing models for how marine spatial planning can be realized in the Baltic Sea region. This was done through transnational inter-sector collaboration with land-sea integration, cross-border consultation, ecosystem-based strategy and participation by various actors.

BALANCE

BALANCE (Baltic Sea Management–Nature Conservation and Sustainable Development of the Ecosystem through Spatial Planning) is an EU-financed project aimed at developing marine management tools for the Baltic Sea, and is built on cross-sectoral and transnational co-operation. The project, which ran from 2005 to 2007, compiled marine data such as habitat maps and protected areas for the Baltic Sea as well as for the Kattegat and Skagerrak.

Prehab

The Prehab research project (2010-2012) developed methods for surveying biodiversity based on modelling and for assessing how various administration scenarios could affect the distribution of species and habitats. A web resource has been developed with advice for planners and administrators concerning these issues.

MARMONI

MARMONI (Innovative approaches for marine biodiversity monitoring and assessment of conservation status of nature values in the Baltic Sea) started in 2010 with the objective of evaluating innovative environmental monitoring methods with which changes in the Baltic Sea environment could be described. MARMONI's Swedish study area is Hanö Bay. The project is a collaboration between researchers and administrations in Latvia, Estonia, Finland and Sweden. The project will be completed in 2015.

Baltadapt

From 2007 to 2013, Baltadapt worked on drafting a climate adaptation strategy for the Baltic Sea region, focusing on the sea and coastline. Its aim was to increase knowledge regarding the effect of climate, to highlight the needs for adaptation, and to influence decision-makers and other responsible parties to act.

Submariner

Submariner aims to find new, environmentally-friendly business opportunities within the Baltic Sea region. Sea-wave power, algae and mussel farming, and biopharmaceutical production are some of the areas that have been studied. The project will be completed during 2014.

Projects within oil protection and risk issues

Within the field of oil protection planning, a number of projects have been conducted during the last five years: Baltic Master I and II, BRISK, EnSaCo, MIMIC and OILRISK. The projects cover issues related to oil damage protection, contingency planning, risk analysis and environmental consequences and many different actors from the majority of Baltic Sea nations have been involved. The overriding aim has been to increase knowledge about risks and consequences of accidents and discharges, as well as to improve preparation in the event of accidents.

Projects within transport and shipping

There are several projects within transport and shipping that are significant to the Baltic Sea, for example MONALISA 1.0 and MONALISA 2.0, which is currently in progress. Their purpose is to find solutions for efficient, safe, environmentally friendly shipping. Baltic Transport Outlook 2030 is another example which – as part of the Baltic Sea Region Strategy – has studied the flow of transport and the need for infrastructure planning in order to be able to make the region more accessible and competitive.

Collaborations within the Gulf of Bothnia

Plan Bothnia

The EU-financed “Plan Bothnia” pilot project, completed in 2012, focused on cross-border marine spatial planning between Sweden and Finland under the auspices of HELCOM. The planning covers the marine areas of the Bothnian Sea between the two countries and the territorial waters outside of the base-lines, as well as the exclusive economic zones. In addition to the marine area, the coastal zone, shore line and activities on land – trade, industry, and so on – are also described. A pilot plan for marine spatial planning of the Bothnian Sea was presented, focusing on developments over the next 15 years.

SeaGIS

SeaGIS (Cooperation for ecosystem-based planning of the marine environment using geographic information systems) is a Swedish-Finnish collaboration with the aim of producing a knowledge base for marine spatial planning in Norra Kvarnen. The participants are Swedish and Finnish regional bodies, agencies and higher education institutions, in close collaboration with the municipalities concerned.

The ecosystem approach

The ecosystem approach is highlighted as an important starting principle within marine spatial planning, both in the governmental investigation on marine spatial planning and in the subsequent legislation. It has its origins in the UN Convention on Biological Diversity. The ecosystem approach has had a large impact on policies concerning the usage and management of natural resources. It is also a starting point for the EU's Marine Strategy Framework Directive. The ecosystem approach can be seen as a strategy for preservation, sustainable utilisation and fair distribution of natural resources. Its application should ensure that the ecosystems are used within their limits.

Application of the ecosystem approach presupposes a holistic perspective, continual development of knowledge of the seas and their usage, application of the precautionary principle, and flexible management. It imposes requirements for participation and cooperation at several levels, and for an economic analysis of the values of the ecosystems and the services we obtain from them. The application of the ecosystem approach in marine spatial planning will be achieved through adapting the essential features of the planning process, and through environmental assessment and national economic impact assessment.

The ecosystem approach provides scope for interpretation and demands that application of the approach be concretised in certain contexts. Interpretation and concretising of the ecosystem approach in a marine spatial planning context are also preconditions that allow evaluation at a later stage of how successful the application of the ecosystem approach has been.

The Swedish Agency for Marine and Water Management has produced a report that describes how the Agency interprets the ecosystem approach in relation to marine spatial planning, and how it can be reflected in subsequent work. The report describes the principles that have been specified regarding application of the ecosystem approach:

- Common objectives and participation.
- The ability of the natural world to produce goods and services is supreme and the precautionary principle is to be applied.
- All types of knowledge should be taken into consideration.
- Value the ecosystems in relation to the national economy.
- Definitions of scope in time and space.
- Flexible and adaptive.

Environmental assessment

A strategic environmental assessment (SEA) will be conducted as part of the marine spatial planning process, for each respective marine spatial plan. The work will be integrated into the planning processes so that it can be directly linked to the planning work. The work on environmental assessment (the process) will lead to one environmental report – a “SEA document” – per marine spatial plan. The SEA document shall satisfy the requirements in Chapter 6 of the Environmental Code at the same time as it shall be easily accessible and focused on essential issues.

Environmental assessment stage

Below are listed some important elements of the environmental assessment within the first phases of the planning process. In general, it is important that these aspects can reoccur throughout the whole process (needs assessment excepted). It should not therefore be viewed as a linear, sequential process but rather as an iterative, dynamic work.

Screening

The screening entails a decision regarding whether or not requirements are imposed on an environmental assessment. Marine spatial plans fall under the plans and programmes affected by the Environmental Code's regulation of environmental assessment. The main issue with screening is therefore whether the marine spatial plans are considered to result in a significant environmental impact. The Swedish Agency for Marine and Water Management has preliminarily assessed that such is the case, and therefore intends to conduct environmental assessments within marine spatial planning.

Scope

The scope of the environmental assessments entails focus on significant environmental impacts that the plan could give rise to. In order to assimilate external viewpoints regarding the scope, a consultation is conducted in which the screening can be included. The consultation addresses which environmental objectives the plan will affect, and which concrete assessment grounds (environmentally-related planning objectives) the plan is to be assessed against. Other issues addressed in the consultation include the types of planning alternatives to be considered, and how the assessment work is to be organised.

Environmental baseline description as part of the current status description

A description of the environment's current status is an important starting point for assessing whether a plan improves it or makes it worse. The environmental baseline description shall contain an account of the environmental conditions that could be affected by the plan. The structures, functions and values of the ecosystems are to be described where possible.

The environmental description is a starting point for a description of the "zero alternative" that reports on the environmental status at a certain point in the future without the plan. The zero alternative is, above all, a reference point used to provide perspective on the opportunities to influence development by means of the plan.

National economic impact assessment

National economic impact assessments are included in the impact assessment in a planning context. Within marine spatial planning, the consequences of the marine spatial plans for society as a whole and for its various actors are to be described and evaluated. The aim of this is to make clear and visible the consequences of proposed marine spatial plans from a national economy perspective, and to contribute to the data used for deciding whether to adopt the plans.

The impact assessment work is to provide support throughout the whole planning process – that is, from data collection up through evaluation. Likewise, parties that could potentially be affected shall also be identified. The scope and scale of the impact analyses will require specific analysis.

The national economic impact assessment, together with the environmental assessment, shall be integrated into the planning work. Integrating impact assessments means that there is to be clear interaction with the planning. Integrating the impact assessments is one way of applying the ecosystem approach, since it contributes in the process to clarifying the environmental issues and the values of the ecosystem services, and it allows broad participation among those involved in managing the marine environment. It is also important for fulfilling the requirements of the Environmental Code, and for contributing to its objectives as regards sustainable development.

Environmental goals

The Swedish Parliament has decided on environmental objectives for sustainable social development. The objectives provide an overall picture of the objectives of Swedish environmental policy, and include the environmental requirements, in the form of EU legislation and international agreements, with which Sweden must comply. There are several different levels of objectives within the environmental objective system:

Generational goal

An overall generational objective that describes Sweden's collective environmental ambitions. The objective indicates the direction for social adaptation that needs to happen within a generation in order for the environmental quality objectives to be fulfilled.

Environmental quality objectives

Sixteen environmental quality objectives that together describe various environmental qualities or conditions that are to be attained. The environmental quality objectives have specifications that clarify their content and provide guidance for Sweden's environmental work.

Interim goals

A number of interim objectives that constitute steps along the way to achieving the generational objective and one or more environmental quality objectives. They show what Sweden can do and clarify where efforts need to be made. New interim objectives are being produced constantly and are decided upon by the Government. During 2012, the Government decided on an interim objective, which involves the importance of biodiversity and the value of ecosystem services becoming publicly known by 2018 at the latest, and integrated into economic standpoints, political considerations and other decisions in society where such is relevant and reasonable. In February 2014, the Government decided on five new interim objectives to bolster biodiversity and ecosystem services. One of them concerns protection of marine areas.

Of the sixteen environmental quality objectives, five are of crucial importance to marine spatial planning:

Reduced climate impact

In accordance with the United Nations Framework Convention on Climate Change, levels of greenhouse gases in the atmosphere are to be stabilised at a level so that the human impact on the climate system does not become dangerous. The objective is to be achieved in such a manner and at such a rate that biodiversity is preserved and food production safeguarded, and so as not to jeopardise other sustainable development objectives. Sweden, together with other nations, is responsible for ensuring that this global objective can be achieved. Emissions of carbon dioxide contribute to the increasing level of marine acidification, something that is attracting greater attention as an important environmental issue in international collaborations. Measures within marine spatial planning can be significant as regards the opportunity of achieving this objective.

A Non-Toxic Environment

The existence of substances in the environment that have been created or extracted by society shall not threaten human health or biodiversity. The levels of unnatural substances shall be close to zero, and their impact on human health and the ecosystems shall be negligible. Levels of naturally occurring substances shall be close to the background levels. The situation in the sea is not satisfactory, with levels of several toxic substances that are far too high and recovery times that are too long.

Zero Eutrophication

The levels of fertilising agents in the land and water shall not have any negative impact on human health or the conditions for biodiversity, or prevent the all-round use of land and water. Eutrophication is a major problem, especially in the Baltic Sea. Most sources of eutrophication are found on land.

A Balanced Marine Environment, and Flourishing Coastal Areas and Archipelagos

Sweden's marine areas shall have a long-term, sustainable, production capacity and biodiversity shall be preserved. Coasts and archipelagos shall have a high degree of biodiversity and experience value, as well as high natural and cultural values. Industry, recreation and other utilisation of the sea, coast and archipelago shall be conducted in a manner that promotes sustainable development. Especially valuable areas are to be protected against interference and disruption. Bringing about sustainable utilisation of the marine environment and its resources is central to this objective. Marine spatial planning measures that take the value of the ecosystem services into consideration could contribute to this.

A Rich Diversity of Plant and Animal Life

Biodiversity shall be preserved and utilised in a sustainable manner, now and for future generations. The species' habitats and ecosystems are to be safeguarded, along with their functions and processes. Species shall be able to survive in the long term, in vital numbers with sufficient genetic variation. People shall have access to a good natural and cultural environment with rich biodiversity, which is fundamental to health, quality of life and well-being. Several threatened species and habitats risk extinction. Marine spatial planning measures can have major importance as regards their development.

Glossary

Terms

Aquatic	Related to water or water environments.
Contiguous zone	The area outside of territorial waters and extending to a maximum of 24 nautical miles from the baseline, where a State can exercise certain rights.
Anthropogenic	Caused by humans.
BaltAdapt	An EU project that worked toward adaptation to climate changes in the Baltic Sea region.
BaltSeaPlan	EU project for integrated marine spatial planning and marine strategies within the Baltic Sea, as part of HELCOM.
Baseline	The low water line off the coast according to official nautical charts; used for calculating territorial waters and the exclusive economic zone.
Bathymetry	The physical form of underwater terrain - equivalent to topography on land.
Biotope	An area supporting certain plant or animal communities.
Bothnian Sea	A part of the Gulf of Bothnia.
Bay of Bothnia	The northernmost part of the Gulf of Bothnia.
Gulf of Bothnia	A marine spatial planning area in Sweden and the northernmost part of the entire Baltic Sea area.
Demersal	Fish that live near the seabed; for example, cod.
Demersal fishing	Fishing near the seabed; for example, bottom trawling.
Diversity	A great variety.
Cast	Fishing by hand from a boat using a line and one or more hooks, possibly baited.
Exclusive Economic Zone (EEZ)	Exclusive economic zone reaching up to 200 nautical miles from the baseline, where the coastal state has the exclusive right to develop natural resources.
Ecosystem	A limited area harbouring a certain number of groups or species of organisms in a common environment, and its physical surroundings.
Erosion	wear and tear to bedrock and soil caused by the effects of water, wind, waves or ice.
Espoo Convention	A convention regulating environmental impact assessments, adopted in Espoo, Finland in 1991.

Eutrophication	Discharges of surplus fertilising nutrients.
Photic zone	The zone where the amount of pervading sunlight is sufficient for photosynthesis.
Acidification	Land, groundwater and surface water become acidified if they are exposed to fallout from sulphurous and nitric oxides.
Refining value	Value of the goods and services that a business produces, minus the value of the raw materials, semi-manufactured goods and the like that the business buys from other businesses
The Gdansk Convention	Convention on Fishing and Conservation of Living Resources in the Baltic Sea and the Belts.
Habitat	An environment where a certain species of plant or animal can live.
UN Convention on the Law of the Sea (UNCLOS)	UN convention from 1994 regulating the nations' rights and obligations as regards utilisation of the seas.
Marine Strategy Framework Directive	Rules for all EU states with the objective that all marine areas shall have achieved good environmental status by 2020.
Helsinki Convention	Agreement between the Baltic Sea's coastal states on protecting the environment in the Baltic Sea, covering the Baltic Sea and parts of Sweden's west coast.
Hydrology	The science of water, in its broadest sense.
Hard sea bed	Sea bed consisting of rocks, boulders or smaller stones.
Internal waters	The water between land and the baseline.
Invasive species	Non-native species that can spread from one area to surrounding areas.
Continental shelf	Part of the seabed that belongs to a continental plate, defined in the UN Convention on the Law of the Sea.
Marine waste	Marine waste consists of things that people manufactured or made use of that have ended up in the sea in various ways. Both larger objects and smaller particles are included in this concept.
MASPNOSÉ	EU-financed collaboration project concerning marine spatial planning in the North Sea.
Swedish Environmental Code	Swedish framework law that aims to promote sustainable development
Environmental impact assessment	Description of the direct and indirect effects on the environment and human health of a planned activity or action.
Environmental quality standard	Regulation regarding the lowest acceptable environmental quality.

Environmental quality objectives	Objectives decided by the Swedish Parliament concerning national environmental policy.
Soft seabeds	Seabeds or substrates in marine areas consisting of soft sediment deposits.
National park	A land or water area belonging to the state can be declared a national park by the Government according to the Environmental Code.
Natura 2000	Nature areas that, from an EU perspective, are particular protection or preservation values.
Nature reserve	County administrative boards or municipalities can declare an area of land or water to be a nature reserve, in accordance with the Environmental Code, in order to protect biodiversity and habitats or to satisfy recreation requirements.
Nautical mile	Measurement of length equivalent to 1,852 metres.
Nodule	Geological term for a smaller body with a divergent mineral composition from the surrounding sediment or rock.
Nord Stream	Natural gas pipeline running between Russia and Germany through the Baltic Sea.
PartiSEApate	International collaboration project in the Baltic Sea region concerning marine spatial planning.
Pelagic fishing	Fishing for fish that live in the open seas.
Plan Bothnia	EU project for the Baltic Sea in collaboration between Sweden and Finland, and within HELCOM.
SeaGIS	Swedish-Finnish collaboration project concerning ecosystem-based planning of marine environments with the help of geographic information systems.
Ghost net	Intentionally or unintentionally lost nets or other type of fishing implements such as cages and fish traps that remain in the ocean, still catching fish. Ghost nets kill fish, birds and marine mammals. Lost fishing implements are a form of marine waste.
Territorial waters	A maximum of 12 nautical miles from the baseline.
Trolling	Fishing from a boat with bait and hand tools (tackle).
Water Framework Directive	Rules for all EU nations for the protection of lakes, watercourses, coastal waters and groundwater.
Skagerrak/Kattegat	Marine spatial planning area encompassing the Kattegat and the Skagerrak.
Baltic Sea	Both the marine area from the Bay of Bothnia to Öresund and the Danish Straits, and the marine spatial planning area covering that part of the Baltic Sea lying south of the Sea of Åland.

Abbreviations

BRISK	EU project for risk management in the Baltic Sea (Sub-regional risk of spill of oil and hazardous substances in the Baltic Sea).
BSPA	Baltic Sea Protected Area.
CBD	Convention on Biological Diversity.
CBRNE	A centre at Umeå University involved in research, exercise and training in the fields of safety and vulnerability.
CCS	Carbon Capture and Storage.
DDT	Dichlorodiphenyltrichloroethane is an insecticide that has been prohibited in most countries since the 1970s. DDT is an environmental toxin and a long-lived organic pollutant.
EEZ	Exclusive Economic Zone, from the territorial border out to 200 nautical miles maximum.
FMIS	The Swedish National Heritage Board's Archaeological Sites and Monuments database.
GFP	The EU Common Fisheries Policy.
GIS	Geographic information system.
HELCOM	Baltic Marine Environment Protection Commission.
ICES	International Council for the Exploration of the Sea.
IMO	International Maritime Organization.
MARMONI	An EU project to evaluate methods for environmental monitoring in the Baltic Sea.
MARPOL	The International Convention for the Prevention of Pollution from Ships.
MPA	Areas protected in accordance with the OSPAR convention (Marine Protected Areas).
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic (the Oslo–Paris Convention).
PCB	Polychlorinated biphenyl, a group of persistent chlorinated organic substances that build up in living organisms.

PSSA	Particular Sensitive Sea Area, a protection classification as part of the MARPOL convention.
RAIS	Risk Assessment Information System.
SECA	Control area for emissions of sulphur from sea vessels into the air.
UNESCO	United Nations Educational, Scientific and Cultural Organization, the UN organisation for education, research and culture that decides on world heritage.
VASAB	Visions and Strategies around the Baltic Sea, a collaboration concerning spatial planning between countries surrounding the Baltic Sea.

Legislation

Kulturmiljölagen	The Swedish Heritage Conservation Act (SFS 1988:950).
Marine Strategy Framework Directive	EU Directive 2008/56/EC of 17 June 2008, establishing a framework for community action in the field of marine environmental policy.
Havsmiljöförordningen	The Swedish Environmental Ordinance Act (SFS 2010:1341).
The Maritime Spatial Planning Directive	Directive 2014/89/EU of the European Parliament and the Council of 23 July 2014, establishing a framework for maritime spatial planning.
Sulphur Directive	Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC.
The CCS Directive	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide.
Floods Directive	Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks.
Birds Directive	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.
The Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, amended through Directive 2006/105/EC.
Områdesskydds förordning	Ordinance (SFS 1998:1252) on protection of areas according to the Environmental Code, etc.
Artskydds förordningen	Ordinance (SFS 2007:845) on the protection of species.
Water Framework Directive	Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy.
Vattenförvaltnings förordningen	Ordinance (SFS 2004:660) on the management of the quality of the water environment.
UN Convention on the Law of the Sea	UN Convention on the Law of the Sea of 10 December 1982.
Plan- och bygglagen	The Swedish Planning and Construction Act (SFS 2010:900).

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Review

Factual matters have been reviewed by various units within the Swedish Agency for Marine and Water Management which are responsible for certain supplementary information found in the report:

Research and Environmental goals Division

Environmental monitoring Division

Biodiversity Division

Maritime spatial planning and Maritime Affairs Division

Environmental Implementation and Enforcement Division

Fishing Regulations Division

Marine and Water Management Division

Legal Services

Photographs

Introductory picture to the “Marine ecosystems and their condition” chapter:
Andre Masslenikov

Introductory picture to the “Habitation” chapter: Andre Masslenikov

Introductory picture to the “Interested parties and preconditions” chapter:
Andre Masslenikov

Introductory picture to the “Analysis” chapter: Roel Wijtmans

Introductory picture to the “Maritime Spatial Planning” chapter: Jerker Lokrantz

Maps

Base map: Natural Earth

This report is a current status description, prior to the forthcoming national marine spatial planning. This report aims to provide an easily understandable picture of conditions as regards the utilisation of marine resources and the actors and claims on the sea, and is a starting point for the coming marine spatial planning process.

Swedish Agency for Marine and Water Management report 2015:16