

Management of the Coastal Zone in Denmark

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Abstract

The Danish coast is very long and varied. But it is threatened by land use demands especially from housing and tourism, pollution from agriculture and a number of other things. A strong coastal act which outside the urban areas protect a 300 meter zone from any building or construction and in a 3 km wide zone only buildings and constructions with a special need of near coast location are allowed. Besides of this rather progressive general regulation the coastal zone management in Denmark is as complex as in most other countries. Thus there is a strong need for management integration.

Introduction

The scope of this contribution is to highlight the importance of an integrated approach to coastal zone management by presenting the Danish coast, threats, and its management as an example.

Natural history

Denmark is in geographical terms a peninsular with approximately 900 islands in a very shallow sea. In many areas e.g. in Kattegat, the Belt Sea and the Baltic Sea there is a sharp separation of the heavy saline and often oxygen-poor bottom water coming from the North Sea and a more brackish more oxygen-rich outflowing surface water coming from the Baltic Sea. In a way it reminds of a large shallow and productive brackish water estuary.

The peninsular and the many islands explain the high coastline to area ratio of 165 m / km² and a coastline per inhabitant of 1.4 m. No site in Denmark is more than 52 km from the coast. So the whole country can be considered as a coastal zone. Natural uplift of the northern part, and opposite in the southern part, of the country and changes in water level since last glaciation and, in the last 2-3 centuries land reclamation and coastal protection has influenced both the length and the profile of the coast.

Only on the coast of South West Jutland the tide is more than two m. But much less in the inner marine waters and negligible in the Baltic Sea. The salinity is almost oceanic - 3.6‰ in the North Sea and decrease going South through the Belt Sea to the island of Bornholm where salinity is less than 1‰.

Wind and wave exposure, currents, depth, and substrate also vary considerably. Six main coastal types may be distinguished:

I In the South West we find the tidal waters of the Wadden Sea,

II The straight coast along the West Coast of Jutland formed by waves and strong currents,

III The coasts in the Northern part of the inner seas marked by land-upheaval,

IV The coasts in the Southern part of the inner seas marked by the natural uplift,

V Valley fjords and closed fjord complexes,

VI The rocky shores of the island of Bornholm.

Large stretches of the Danish coastal landscape are being formed by natural processes alone. This is not common in Danish landscapes today where almost all other landscapes are heavily used and formed by man.

The natural coastline of 8,500 km is the most coherent and largest nature area in Denmark. The varied areas with shallow water protected from waves and usually free from ice-cover during winter are important for large numbers of migratory wintering and moulting birds. 28 species of water-birds appear regularly in concentrations classified as being of international importance and thus classified as Danish responsibility species.

Besides the richness in biological and geological values the coastal zone has many cultural values as well. These are partly valuable by their often very long history, by their amenity in the cultural coastal landscape or simply because they, like fisheries, inform about still existing interplay between man and his environment and between land and sea.

Terminology

The Coast may be defined as the line where the sea meets the land. This is not just a line but a belt or a zone of a certain width e.g. between the highest and the lowest water level mark. The width of the zone cannot be defined once and for ever, it depends on the purpose. 'As yet there is no satisfactory and commonly accepted method of defining and classifying coastal zones.'

Working with physical planning, the level of scale may operate with much broader zones than the few meter broad littoral zones. The coastal zone contains at the seaside shallow-water areas heavily influenced of matter and energy up to several km from land. And at the land side areas it contains ecosystems influenced by the sea and forming coherent coastal landscapes normally up to three kilometres land ward.

Competition on area

The majority of the human population live close to the coast, where nearly all of the summer cottages and holiday and leisure facilities and a lot of technical installations are also situated.

Existing or planned build-up areas, harbours, and technical installations and summer cottages occupy one third of the total coast. 6% of the coastline consists of harbours or dikes and long stretches are influenced by constructions for coastal protection. Two thirds of the coastline appears still rather rural area with agriculture, forests or natural areas. Some of these are still dynamic coasts with active erosion or sedimentation.

The Danish coast will continue to change because of long-term changes in wind direction and sea level. These changes have a global origin, and everything points at acceleration of both instability and sea-level rise. The majority of the Danish coasts are still in a retreat, especially along the West Coast. There will for obvious reasons be an increasing pressure for coastal protection in order to safeguard investments and increasing urbanisation.

Land reclamation and coastal protection have shortened the coast by 1,162 km (14%) over the last 2-3 centuries. This has also reduced the area with shallow water within 2-m depth curve by one fifth and the number of islands by 180. Further land reclamation has almost stopped. But other threats have taken over.

An increase in competition for land for build-up areas, summer houses, industries etc. started in the 1930'ies and accelerated in the 1950'ies and the following decades. In the most densely populated urban areas industrial development and sewage outlets spoiled the recreational possibilities. Outside these areas on the other hand the strongly increased mobility made urban sprawl and development of recreation possible especially in the most attractive areas as the coastal zone.

Today urban sprawl, summer cottages and establishment of tourist facilities and disturbance from these are seen as some of the more important threats to the coastal zone.

Agriculture

Another threat is the influence of intensive modern agriculture in the hinterland as well as in the coastal zone. One problem is the effect of balance between intensification and extensivation of the agricultural production, which is threatening the salt marsh and coastal heath land either by being converted to cropland or by being overgrown by reed or willow.

By far the largest problem is however the load of nutrients that comes from the agriculture and which has drastic effect in the aquatic environment. Narrow fjords and sea bottom sheltered by thresholds are specially exposed to oxygen deficit and death of bottom organisms and eventually fish occur almost every year over large areas.

Other effects of the high nutrition load is a decrease in the distribution of bottom vegetation to the same depths as earlier, a higher concentration of phyto plancton, and a higher frequency of algae blooms, also the more exotic and eventually poisonous species.

Other threats

Compared to the two complexes of threats: land use demand for development and agriculture, the following might be of minor importance. Coastal protection (especially unauthorised private activities), shooting of waterfowls, oil pollution, disturbance from leisure activities, and afforestation or invasion of heath land by tree species are the most pronounced of these threats.

The dune area covers 3% of the national land area. This is only a tiny fraction of what was one of our main ecological problems two to three hundreds years ago: Desertification by migrating dunes stemming from overgrazing in the coastal landscapes. Strict regulation and heavy countermeasures have now reduced this process to the extent that the remaining dune areas are preserved by various means.

The dune areas are still threatened for various reasons. Colonisation of coniferous trees happens due to the dispersal of seeds from adjacent plantations. Residential housing, recreational facilities and summer houses being built in dune areas. There is room for another 20,000 summer houses (a 10% increase) within the zones already designated.

The continuation of urbanisation leads to increasing pressure in the coastal zone in many ways. Summer cottages are turned to all year-around-inhabited urban areas with an increase in

the general environmental pressure. The wish to use superfluous farm buildings, new roads, bridges, dikes in the coastal zone to bind the different parts of the country together and for servicing the summer cottage areas are all adding to this process.

The construction of wind turbines has been abounding in the coastal zone. New plans will however focus on larger turbines aggregated in dense windmill parks off shore, and thus avoid further visual disturbance of this kind in the coastal zone as such.

Coastal zone management

The first nature conservation act of 1917 made it already possible to conserve valuable areas in the coastal zone and give public access to the beaches. In 1937 this was widened to a general public access to all beaches outside the urban areas, and a general 100-m broad protection zone was introduced where all construction of buildings was forbidden. A dune-protection zone as a follow further protected the West Coast of Jutland as a follow-up on the sand-erosion abatement act from 1792. Large parts of the coastal areas are however damaged caused by insufficient management and regulation over the last 1-2 hundred years.

The possibility for regulation of building activities in the coastal landscapes was strengthened considerably by the zonation act of 1969 which stated that new buildings were no longer allowed in the rural zone, unless they had to do with agriculture or forestry. Over the years the state has acquired considerable natural areas and areas for recreation along the coast.

In recent decades quite an effort has been made in order to maintain the natural qualities of the coastal zone, among others as a part of the European Coastal Zone Strategy. Following the Ramsar-Convention 27 and according to the EC-Birddirective 111 sites have been designated as protected areas. The large majority aim to protect water-birds, and the majority of which, both in numbers and area, are situated in shallow-water marine areas.

Before being impressed by these high numbers of PA's we may add that the protection is not very strict. E.g. shooting of waterfowls is allowed within most of the protected area, and both of the two large bridges (over The Great Belt and The Sound) that have been constructed recently are passing through a previously designated bird-directive area.

In 1994 a 'Coastal Act for Changing the Planning act and the Nature Protection Act' passed the Parliament. It was thereby stated that the planning aim should be that only buildings and constructions with a special need of near coast location should be allowed in the 3-km broad zone along the coastline in all rural areas and summer cottage areas. Also any other form of new constructions that requires landfilling or coastal protection will be avoided unless they relates to transportation. New constructions for leisure and tourism will only be allowed if they are linked to tourist-political considerations and only in connection with urban areas or existing larger tourist facilities.

Needless to say, massive local resistance due to the wishes of local development often meets this restrictive administration. Improvement of accessibility to the coast is also met by counteraction from the landowners. Long stretches of coasts, both in rural and urban areas, are in this way, practically inaccessible.

The building protection zone and the dune protection zone in the Nature Protection Act are by the Coastal Act widened to 300 m along the coastline in the rural areas, whereas it is maintained at 100 m in urban and summer cottages areas. Changes of the existing state within

the zone is prohibited when it comes to buildings, planting, fencing etc. Besides of that all semi-natural land areas larger than 2,500 m² are protected by the Nature Protected Act from 1992.

The Coastal protection Act has the aims to protect the coast against flooding or wave erosion. Traditionally, the act has been administered without much consideration of nature values. Permission has been given almost every time unless it obviously has been a problem for others. But recently this attitude is changing. Permission is now only given where values are threatened within a time horizon of 25 years. Nature protection is given priority. No permission is given for protection against erosion of rural areas. Where coastal protection is renewed it should be minimised and the old constructions removed. And new constructions shall 'look good' and be technically optimised.

The Environmental Act and the Act of the Marine Environment protect the coast-near sea. At the North Sea Conference in 1987, and at a ministerial conference among the Baltic states in 1988 it was decided to aim at a 50% reduction of nitrate and phosphorous lead to the marine environment.

Since then an action plan for the aquatic environment has been in force. The purpose of the action plan is to reduce the amount of nitrate by 50% and phosphorous by 80% that is lead to the aquatic ecosystems. The action-plan has been a success when it comes to phosphorous which now are caught in the many sewage treatment plants for urban and industrial sewage that have been built.

But with nitrate there are great difficulties. Here the reduction has only been 14% of which only half comes from initiatives taken within agriculture. The main explanation for the lack of success seems to be that the husbandry, both dairy farming and pig farming have been growing since then. Therefore a supplementary Water action plan II have been endorsed in order to fulfil the target and the EU-Nitrate directive.

ICZM perspectives

In a policy paper 'Denmark and the European Plan policy' the government underlines the need for managing the coastal areas as an entity in which both the coast near land and the coast near water areas are included in an integrated management of the coastal zone. It will be a management that co-ordinates the sectorial interests across the coastline and the administrative boarders and in co-operation between authorities and the public.

Confusing and partly uncoordinated domains of legislation hamper such a coherent and integrated management. The coastline divide the management and so do the urban fringe and other administrative borderlines between sectors and levels of authorities. The Danish coastal zone is thus regulated by no less than 26 acts and a number of different systems of regulation. The administrative competence is spread out over many different sectorial areas and authorities, including not less than 7 ministries, several national agencies, 14 counties and ca. 200 municipalities.

The Planning Act is the most important but it covers only land areas. Constructions of wind turbines at sea are for instance not covered by the Planning Act. The same is true for agriculture. This is a problem for the protection of the shallow coastal ecosystems and the recreational assets. The agricultural subsidies can e.g. not be differentiated according geographically localisation within the physical planning. Therefore no special claims can be

made to the agriculture, where fragile ecosystems in the coastal zone are specially threatened by nutrients from the use of fertiliser and the spread of manure.

The management of the marine areas is primarily done by a number of governmental sector authorities. Their basis is narrowly delimited sectorial acts, which each have their own purpose. First, recently, and still rather vague, they contain formulations on environment and inter-sectorial co-ordination.

The counties primarily undertake management of the land areas and the municipalities based on the Planning Act and the acts on the environment and nature protection. The planning Act attempts, through the physical frame planning, to co-ordinate crossing sectorial borders. But the Planning Act regulates only a part of the many sectorial activities in the coastal zone. And even if it considers the near coast marine area, it only regulates land-based activities and not those at sea.

The fragmented pattern of acts and authority is however to some degree counter balanced by public hearings and voluntary co-operation among the authorities. This might however limit the citizen's possibility to influence and see through the decisions.

Based on the experience with the present coastal zone management it is obvious that there is a need for better overview and co-ordination of the legislation, the physical planning and a number of management means. There is a lack of a thorough up-to-date knowledge of the natural processes and development of area and the society in the different coastal districts. Finally, there is a need for a better interplay between the authorities and the citizens. It is interesting that a protection through management of the coastal zone in a number of other countries has succeeded actions from the citizens.

Source: <http://www.naturraadet.com/start.htm#artikler/a31.htm>