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## **Coastal Defence**

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and Sea Level Rise (CPSL)

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## 3.1 Coastal Defence

Coastal defence aims to safeguard coastal lowlands, their inhabitants and economic assets against the forces of the sea. It consists of coastal flood defence (protection against flooding) and coastal protection (protection against structural erosion and land loss).

This chapter concentrates on new developments in coastal defence since 2005. For a more comprehensive overview of national responsibilities and measures, the reader is referred to the 1999 and 2005 Wadden Sea Quality Status Reports and to the first report of the trilateral working group 'Coastal Protection and Sea Level Rise' (CPSL, 2001).

With respect to the organisation of coastal defence, the period since the last Quality Status Report was characterized by merging of national and regional responsible administrations. For example, a number of institutions and departments with coastal responsibilities merged into "Waterdienst" (water service) and "Deltares" in the Netherlands in 2007. In Schleswig-Holstein, the "Landesbetrieb für Küstenschutz, Nationalpark und Meeresschutz" (State Agency for Coastal Defence, National Park and Marine Conservation) was founded in 2008 by merger of three coastal institutions. The responsibility for coastal defence in the Danish Wadden Sea was transferred from the districts to the four newly founded municipalities in the region. For coordination, the municipalities founded a common secretariat in 2008.

Major developments with relevance for coastal defence in the Wadden Sea since 2005 have been the publication of the fourth report on climate change by IPCC in 2007 (see Oost *et al.*, 2009), the adoption of a Directive on the Assessment and Management of Flood Risks (Flood Directive) by the European Union in 2007 (see Oost *et al.*, 2009), and the continuing work of the trilateral working group on "Coastal Protection and Sea Level Rise" (CPSL).

The EU-Flood Directive prescribes the member states to conduct a number of actions with respect to (coastal and inland) flood risk management). Based upon a preliminary assessment of flood risks (including climate change aspects), the states shall define areas with a potential significant flood risk by the end of 2011. For these areas, flood hazard and flood risk maps shall be established by the end of 2013. Finally, by the end of 2015, flood risk management plans shall be established.

The hazard maps delineate the risk areas that could potentially be flooded with low, medium and

high probability. Member States may decide that, for coastal areas where an adequate level of protection is in place, the preparation of flood hazard maps shall be limited to the scenario "floods with a low probability, or extreme event scenarios". The risk maps include vulnerability indicators like number of inhabitants and land utilization types. In the management plans, the EU member states shall establish appropriate objectives and measures for the management of flood risks. The plans shall take into account relevant aspects such as costs and benefits as well as the environmental objectives of the Water Framework Directive. Finally, the management plans shall address all aspects of flood risk management (Figure 1), focusing on prevention, protection, preparedness, and taking into account the characteristics of the particular river basin or coastal stretch (*i.e.*, tailor-made solutions). In consequence, the Directive does not only focus on technical protective measures, but considers non-structural efforts to reduce the vulnerability against flooding (*i.e.*, prevention by spatial planning, see below) as well.

The trilateral expert group CPSL was established in 1999 as an output of the 8<sup>th</sup> Trilateral Governmental Conference on the protection of the Wadden Sea. The group was installed with the merit to investigate the possible effects of enhanced sea level rise and, on the basis of this study, develop proposals for sustainable coastal protection. The solutions should, in the long term, help maintaining the existing safety standards and anticipate the expected impacts of sea level rise. At the same time, they should, at least, not

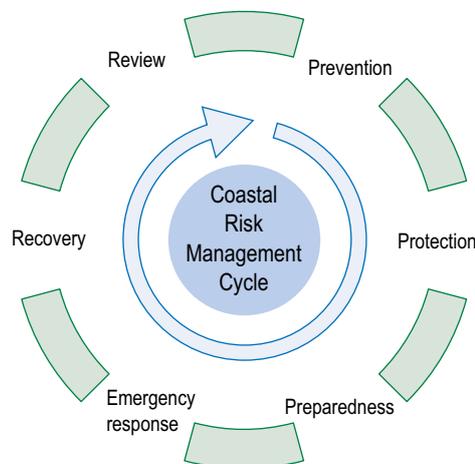


Figure 1:  
The coastal risk management cycle (adopted from Hofstede 2007)

be negative for natural assets, such as natural dynamics and habitat quality.

In a first phase (1998 – 2001), the CPSL established a common understanding of the Wadden Sea (geomorphology, biology and coastal protection). For three sea level rise scenarios, the impact upon physical, biological, and socio-economic parameters was investigated. Further, a first screening of possible coastal protection measures to secure present safety standards in the future was conducted. The results were published in a report (CPSL, 2001), and presented at the 9th Trilateral Governmental Conference in 2001. Recognizing the high topicality and exigency of sustainable strategies, the ministers decided to continue the work of CPSL.

In this second phase (2002 – 2005), the expert group conducted ad-hoc feasibility studies of seven promising and/or important options to reduce coastal risks: "spatial planning", "sand nourishment", "dune management", "salt marsh management", "mussel beds and sea grass fields", and "sea dikes". In its report (CPSL, 2005), the group established, amongst others, two recommendations on spatial planning and sand nourishment. At the 10<sup>th</sup> Trilateral Governmental Conference in 2005, the delegations as well as invited NGOs welcomed the report, and agreed to seriously consider the recommendations within the revision of the Wadden Sea Plan in the forthcoming period. Further, it was decided that competent authorities (coastal protection, nature conservation and spatial planning) will support the continuation of the CPSL work group with the following tasks: 1) to initiate a study on the feasibility of coastal spatial

plans and measures that consider climate change, and 2) to investigate the possibilities of a study on the feasibility and effects of sand nourishment to balance the sediment deficit of the Wadden Sea tidal basins under increased sea level rise. These studies that may support the implementation of the Flood Directive in the Wadden Sea region are in progress. The results will be presented at the 11<sup>th</sup> Trilateral Governmental Conference in March 2010 (CPSL, 2010).

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