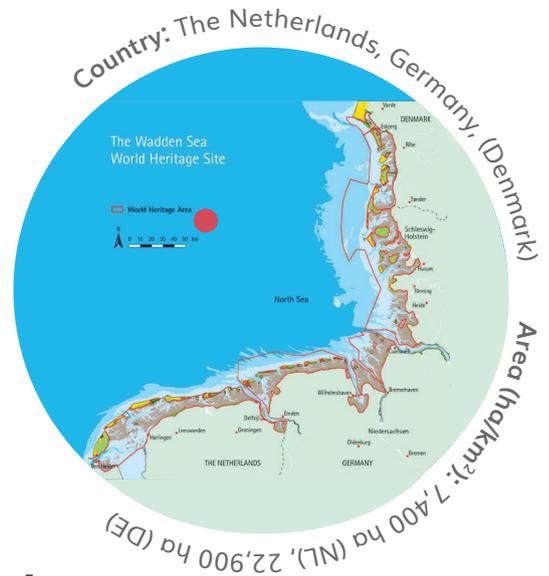




Wadden Sea/Ems Dollard Pilot Fact Sheet

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Ecosystem type

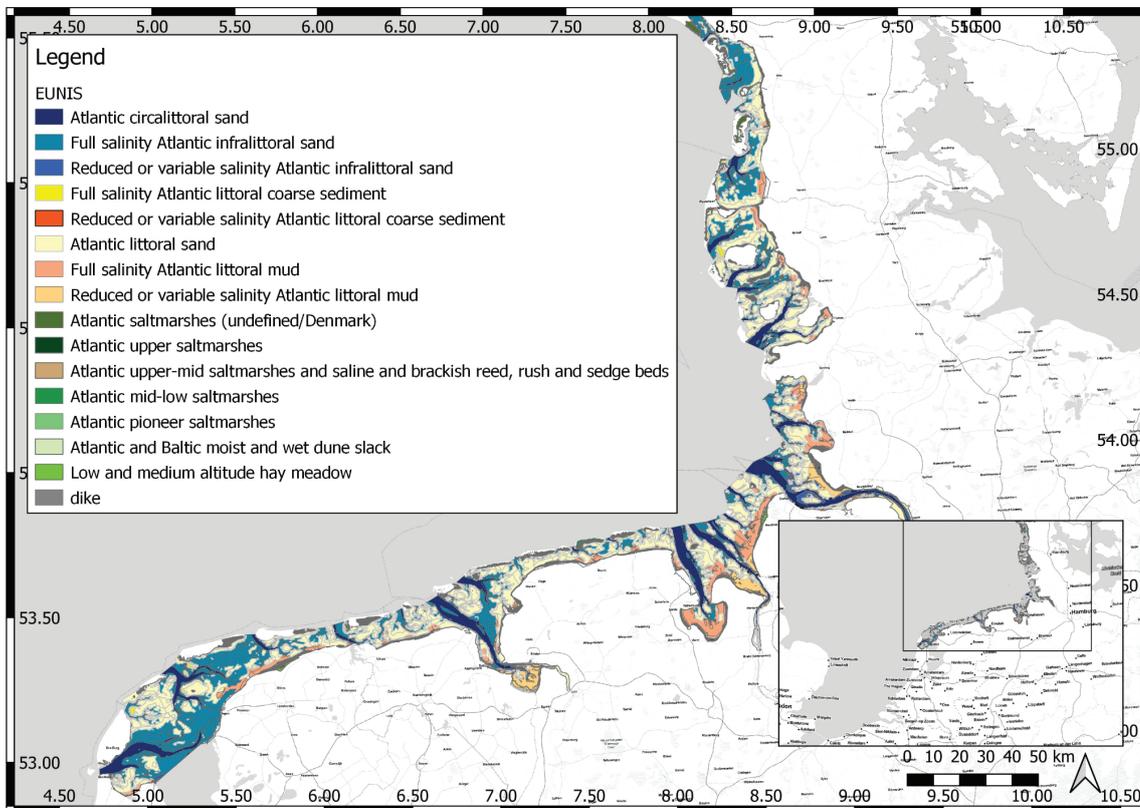
Marine involving mudflats, tidal and salt marsh, estuaries

Key habitats

The Wadden Sea is continuously shaped by wind, sand and tides. These natural processes, running uninterruptedly across the Wadden Sea, create islands, sandbanks, channels, mudflats, gullies, salt marshes and dunes.

Key species

Due to its unique composition, the Wadden Sea is one of the main hotspots of biodiversity globally. Annually it attracts 10-12 million migratory birds that are on their way to their breeding or wintering grounds. There are over 10,000 plant and animal species, such as the harbour/grey seal, plaice, sole, dab, gull, oystercatcher, redshank, blue mussel, Pacific oyster and seagrass.



Organisation responsible for the pilot

Deltares, Province of Groningen



Pressures, threats and issues

In 2009 the Wadden Sea was declared a UNESCO World Heritage Site. In general, it is a well-managed site, however, it faces a large number of threats. Some of these are on a global scale and driven by factors outside of the direct control of the management authorities (i.e. climate change).

- The warming temperature trend and extreme temperature events have led to shifts in the geographical distribution of species and a shift in depth to cooler areas, and the timing of migration and reproduction of birds.
- Alien species could potentially become invasive and alter trophic regimes and habitats of the Wadden Sea.
- Relative sea level rise, likely leading to loss of intertidal and / or supratidal habitat, and potentially complete drowning of the system.
- Navigation: construction of ports and deepening of fairways, modifying hydrodynamics, leading to dredging and disposal of sediments as part of maintenance dredging, and continuous stirring of marine sediments leading to higher turbidity levels
- Land reclamations: conversion of intertidal or supratidal land, thereby reducing ecosystem diversity, influencing tidal dynamics as well as sediment dynamics.

Factors beyond site level/scale with an impact on the pilot:

- While coastal restoration and protection activities as well as economically related activities (e.g. modifications to the estuaries) have an impact directly at the site level, major influencing factors like climate variability and sediment availability are determined on a large scale.

Expected impact of the project

Potential NbS building blocks and Ecosystem services delivered by the pilot site ecosystems

- Seagrass restoration to promote carbon sequestering and protection against coastal erosion and flooding.
- Pioneer saltmarsh by elevating the bed, mixing sediments with specific characteristics and constructing permeable structure



Eurasian oystercatcher
Haematopus ostralegus



Harbour seal
Phoca vitulina

- Flood control areas by creating a tidal inlet and submerging a landward area

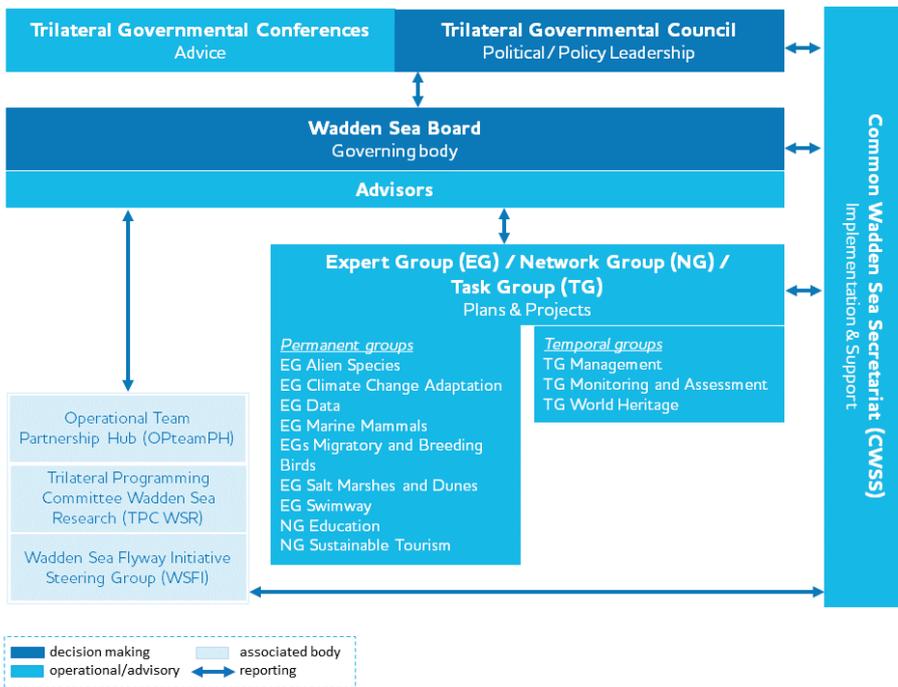
What are the major risks that the project will need to address?

- Major risks the project will need to address encompass:
 - Flooding and coastal erosion
 - Risk of coastal habitat loss

Stakeholders

As the Wadden Sea is part of three countries, it is governed on different levels. National, federal (Germany) and regional level with its regulatory framework differing in each country. Since all three countries are part of the European Union, they have to conform to EU Directives, such as the Habitats and Birds Directives and related Natura 2000 sites, the Marine Strategy Framework Directive and Water Framework Directive. In order to preserve the "biological, scenic and scientific importance of the Wadden Sea" the three countries bordering the Wadden Sea agreed to cooperate on protecting it and established the Trilateral Wadden Sea Cooperation (TWSC).

<https://www.waddensea-worldheritage.org/beyond-world-heritage>



Ministerie van Infrastructuur en Waterstaat

Ministerie van Economische Zaken en Klimaat

De Waddeneilanden

Waddenzeegemeenten

Provinces: Fryslân, Groningen, Noord Holland

Waterboards: Hunze en Aa's, Noorderzijlvest, Wetterskip
Supporting organisation: Rijkswaterstaat

Germany

Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz

Bundesamt für Naturschutz

Behörde für Umwelt, Klima, Energie und Agrarwirtschaft Hamburg

Ministerium für Energiewende, Landwirtschaft, Umwelt, Natur und Digitalisierung des Landes Schleswig-Holstein

Niedersächsisches Ministerium für Umwelt, Energie und Klimaschutz

Supporting organisations: Nationalparkverwaltung Schleswig-Holsteinisches Wattenmeer, Nationalparkverwaltung Niedersächsisches Wattenmeer, Nationalparkverwaltung Hamburger Wattenmeer

NGOs:

Wadden Sea Forum, Wadden coalitie Natuurlijk, Staatsbosbeheer

Wadden Sea Team (currently represented by Danish Ornithological Society, It Fryske Gea & WWF Germany)

Users:

Organisations with land management and natural resource management responsibilities, land/sea/wetland and natural resource users, local businesses with direct impact/dependence on the site like farmers, landowners, tourists, fishermen, residents.

Influencers:

Food industry, banks, cultural heritage, media

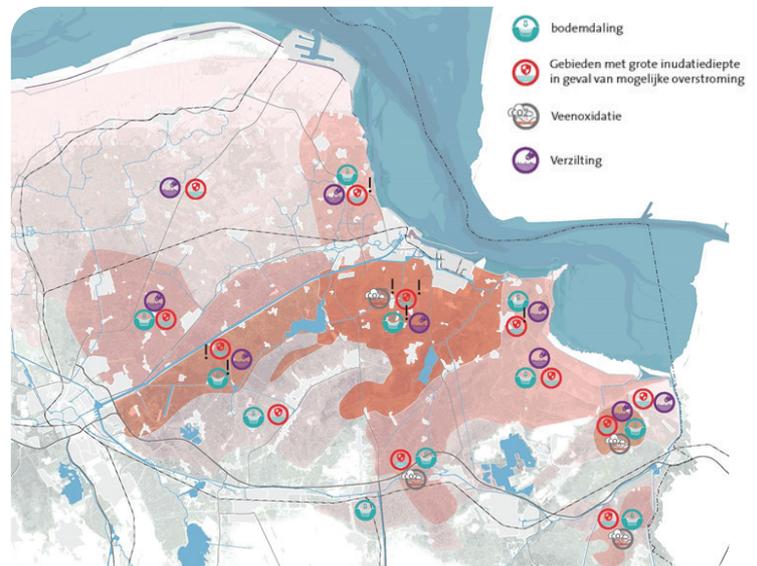
Performers/supplies:

Knowledge institutes, universities, contractors

The TWSC works with numerous stakeholders in the Wadden Sea Area as well as external organisations such as UNESCO, IUCN and other natural World Heritage sites. The following organisations however, are those which form the cooperation. They actively shape Wadden Sea conservation as members of and advisors to the Wadden Sea Board.

Netherlands

Ministerie van Landbouw, Natuur en Voedselkwaliteit



Key variables of relevance to REST-COAST

There will be a strong focus on the Ems Estuary. The key variable to environmental modelling of the impact of sea level rise on ecosystem services is morphological adaptation. The project will focus on morphological adaptation of the Ems Estuary to climate change in combination with habitat restoration. Model output will be analyzed in terms of ecosystem services, especially coastal erosion, flood risk, and changes in ecotopes.

The main question for the Eems-Dollard is: Which area can benefit from sea-level rise, regarding the amount of sediment surplus in the Ems estuary and what quality of natural habitat can be added to the estuary? Fundamental for the development of a climate adaptive coastal zone.

Additionally, the focus will be on the role of Nature-based Solutions, especially analyzing the hydrodynamic engineering capabilities of restored coastal seagrass vegetation along the German Wadden Sea and estuaries to help reduce flooding and erosion risks under climate projections involving increased sea levels and extreme weather likelihoods and intensity.

- Relevant to monitoring of biological, geo-physical, hydrological, etc
 - Habitat types and species abundance
 - Bathymetric changes and hydrodynamic parameters affecting morphological drive (sea level, waves, currents)
- Relevant socio-economic and financial aspects; reduction of peat oxidation, fresh water buffer by highering the surface water,
- Strategic steps for governmental- and local support and implementation; issues at hand; tension between interests of the agricultural sector and nature restoration,
- Mixed problems, solutions with multiple benefits.



Mudflats in the Dollard Bay (part of the Ems Estuary) at low water



Texel



Texel, sea lavender



Tidal marsh mudflat



Westerhever lighthouse