



Fundamental monitoring blueprint

VERSION: 18-03-2015 (CURRENT AND FUTURE DEVELOPMENTS MAY LEAD TO CHANGES IN THE 'CORE AND APPROACH' TEXTS)

Good data are essential for the development of knowledge and a sustainable management of the Wadden Sea area. WaLTER is developing a fundamental monitoring plan to benefit important themes in the Wadden Sea area.

This booklet provides an overview of the Thematic Reports, which will be available on the website from April 2015.

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WaLTER is funded by the Wadden Fund with additional contributions from the provinces of North Holland and Fryslân.


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Climate & Safety

CLIMATE CHANGE AND SEA LEVEL RISE INFLUENCE THE WADDEN SYSTEM AND THEREBY FLOOD SAFETY

Core

Within this century, the Wadden Sea area faces climate change and sea level rise. As a result, the system's morphology of islands, outer deltas, gullies, and mudflats will also change. This has consequences for flooding risk, as gullies become more dynamic, the erosion of mudflats increases, and wave impact along the coast becomes stronger. To a degree, mudflats can grow as sea level rises, but it is currently uncertain exactly how and at what pace such changes in the Wadden Sea area will occur.

Approach

To enable long-term predictions about the safety of the Wadden Sea area, a greater understanding is needed regarding the system's morphological and hydrodynamic processes, the capacity of mudflats to grow with climate change, and how tested and innovative means of coastal protection can be implemented. Up-to-date information concerning climate(change), the morphological status of the Wadden system, the condition of flood defenses, and flood risk levels is also necessary. A monitoring plan to address these issues is being prepared by the Dutch Wadden Delta Programme.

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Climate & Nature

CLIMATE CHANGE REQUIRES A RESILIENT WADDEN SEA

Core

In comparison to other coastal areas worldwide, the temperature of the Wadden Sea has undergone a disproportionate increase in the last 25 years. Potential impacts may include the earlier appearance of shrimps in the spring, a decrease in numbers of juvenile flatfish, and immigration of southern species of fishes and birds. In May 2014, the KNMI (Meteorological Institute) presented the current climate scenarios for the Netherlands, including higher temperatures, a faster rise in sea level, wetter winters, heavier showers, and a greater likelihood of drier summers for the coming decennia.

Approach

For many species and habitats, numbers and distributions are monitored under European legislation and trilateral agreements. In addition, under the Dutch National Adaptation Strategy, monitoring is also required to track the effects of measures taken to increase the Wadden Sea region's resilience against undesired consequences of climate change. Due to the potential impacts on the Wadden Sea's carrying capacity, a plan is being designed for the continuous quantification of primary production of microalgae (both in the water column and on the seabed) for the entire Wadden Sea area.

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Shellfish fisheries

INCREASING SUSTAINABILITY OF FISHERIES SECTOR DECREASES TENSIONS BETWEEN ECONOMIC AND NATURAL VALUES

Core

Shellfish play an important ecological role, including feeding of birds, and habitat types containing bivalves are protected under the Dutch Nature Conservancy Act. Multi-year agreements for license issuing have been established under the Saline Harvest policy (Zilte Oogst, 2005-2020), Mussel Covenant (2010-2020) and Long-Term Agreement on Manual Cockle Dredging (Meerjarenafspraken Handkokkelvisserij, 2011-2018). Current policies and phasing are partly determined from an economic perspective. Future measures will depend on policy effectiveness and the state of shellfish stocks.

Approach

All shellfish fisheries depend on a reliable stock assessment of the species in question. Current assessments of cockle, mussel, and other shellfish stocks are based on manual above and underwater surveys, and are therefore labour-intensive and costly. As well as analysing potential more efficient alternatives (based on the use of spatial patterns), the opportunities and drawbacks of new (remote sensing) techniques are also being considered, including the use of satellite images.

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Shrimp fisheries

MORE INSIGHT NEEDED INTO POSSIBLE EFFECTS OF SHRIMP FISHERIES ON THE SEABED

Core

Due to potential damage to seabed flora and fauna, and by-catch of protected fish species, shrimp fishing vessels in the Wadden Sea must carry a valid license issued under the Dutch Nature Conservancy Act. On 3rd October 2014, a negotiation agreement was signed between the fisheries sector, the Dutch Ministry of Economic Affairs, nature organisations and the northern provincial councils. With this agreement, the parties undertake to strive towards the most natural development of the Wadden Sea possible, in conjunction with a sustainable shrimp fishery.

Approach

Trawl fishing gear (including nets), as used for shrimp fishing, can impact a number of seabed attributes, including sediment composition, shear strength, and flora and fauna, all of which are essential to the structure, functioning, and biodiversity of the Wadden Sea ecosystem. An overview is being made of potential methods and assessment strategies to map these seabed properties, along with the distribution of fisheries activities and other influential factors such as tide and wave action.

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Natural values of tidal flats

MONITORING IS NECESSARY FOR MUDFLAT MANAGEMENT AND CONSERVATION OF WADING BIRDS

Core

The Wadden Sea region is recognised globally for its natural values. Conservation of these natural values is regulated under numerous frameworks including the EU Birds, Habitats, and Water Framework Directives, and the Dutch Nature and Landscape Management Subsidy Scheme. The Wadden Sea is also listed as a UNESCO World Heritage site, a Ramsar Site, an OSPAR area, and a UNESCO Man and Biosphere Reserve. Due to the numerous management frameworks, the coordination of monitoring activities and the exchange of data and information are currently suboptimal.

Approach

Many conservation measures focus on the protection of wading birds and the factors responsible for their densities and distributions in the Wadden Sea. Accurate monitoring of waders is necessary for their successful management. Existing methods are being analysed, to determine the best possible combination of techniques to unambiguously map the distribution of waders at low tide (e.g. direct observations, transmitters, and bird radar).

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Alien Species

EARLY DETECTION OF NEW ALIEN SPECIES INCREASES LIKELIHOOD OF APPROPRIATE MEASURES

Core

The introduction of alien species undermines the conservation target of the trilateral Wadden Sea cooperation, aimed at preserving the Wadden Sea ecosystem in as natural a state as possible. Successful invasions by alien species can affect native plants and animals, for example by displacement, predation, hybridisation, and introduction of pathogens. Such bio-invasions can also have negative impacts on the economy, such as higher maintenance costs for ships and harbours. Current control measures are primarily focused on preventing such introductions.

Approach

Early detection is paramount to countering invasive introductions; hence, several approaches towards an 'early warning' programme are being explored. Hereby, recent developments in the monitoring of (invasive) alien species, both nationally and in the framework of the trilateral cooperation, are being taken into consideration.

This includes an analysis of the effectiveness of inventories of species at presumed hotspots of (new) invasions, the value of molecular techniques, and the involvement of non-scientists in the signaling of new arrivals.

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Dredging

GROWING INTEREST IN RE-USE OF DREDGED MATERIAL

Core

Shipping routes and harbours in the Wadden Sea are dredged to maintain required depths. The dredged material is deposited at designated sites, which are determined according to natural changes, proximity to vulnerable habitats and progressive insight. Little is known about the impact of dredging and deposition of dredged slurry on the sediment budget and the turbidity of the Wadden Sea. There is increasing interest in the re-use of dredged material, including for the restoration of salt marshes.

Approach

Monitoring of the effects of dredging on physical processes and on particle transport in the water column and at the seabed (mudflats and gullies) is currently very limited. Through a combination of measurements from observation masts, ships, in and near harbours, and with models, current efforts aim to identify how effects of dredging and slurry deposition on the Wadden Sea can be better defined. This applies to both regular dredging activities and experimental re-use of dredged material.

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Gas and salt extraction

IMPROVED SUBSIDENCE MONITORING METHODS NEEDED TO DETERMINE POSSIBLE EFFECTS ON TIDAL AREAS

Core

Gas and salt extraction lead to subsidence deep underground, with potential effects for the exposure duration of tidal flats, and thus food availability for wading birds. Subsidence of salt marshes can lead to an increased flood risk for nests during the breeding season. Extraction under the Wadden Sea is currently permitted provided that nature is not damaged in the process, and that the accretion capacities of tidal flats and salt marshes are not exceeded. Long-term programmes are currently monitoring possible effects.

Approach

Quantifying long-term subsidence due to mineral extraction is relatively easy to carry out deep underground and at the surface of salt marshes, but more difficult at the surface of tidal areas because of the complex sediment dynamics within and between years. Current assessments are determining the scope for improved measurements of elevation and volumes of the tidal flats (e.g. satellite images, LIDAR). In addition, it is being examined how improved integration of the various monitoring components and programmes could be achieved.

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Renewable energies

AMBITION TOWARDS NEW ENERGY FORMS MOTIVATES EXPERIMENTS IN THE WADDEN SEA AREA

Core

The Wadden islands aim to be self-sufficient in terms of energy requirements by the year 2020. Many initiatives are being carried out on the mainland's coast, under the "Energy Valley" framework.

A 'Blue Energy' pilot centre is operational in Kornwerderzand on the Afsluit dike, and a tidal turbine is located in a dike overflow outlet in Den Oever. The placement of a tidal turbine in the fast-flowing Marsdiep is currently being investigated. However, the extent to which these forms of energy will affect nature and scenery is still uncertain.

Approach

Monitoring is required to supervise the switch to renewable energy in the Wadden Sea region. Assessing the effects that (small-scale) renewable energy experiments may have on natural and scenic values is necessary, in order to determine the extent to which other interests may be compromised.

Special attention is being paid to the possible shortcomings in standard monitoring, which serves as the basis for assessing any monitoring efforts of new activities related to renewable energy.

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Tourism

WADDEN SEA NATURE ATTRACTS MANY VISITORS FROM URBAN AREAS

Core

The plentiful natural and scenic values of the Wadden Sea area make it a desirable holiday destination. In the Netherlands alone, millions of tourists overnight in the Wadden Sea region every year.

Seals resting on the tidal flats are part of the attraction, along with the millions of migrating birds, which use the Wadden Sea as a rest and feeding stop-over during their journeys between the Arctic breeding grounds and African overwintering grounds. Some tourist activities can, however, lead to disturbance of wading birds and seals.

Approach

Monitoring of tourism and natural values are essential if effective policies for the development of sustainable tourism are to be established. A plan is being drawn-up to map the numbers and distributions of recreational activities in the Wadden Sea, which can also be used to study the impacts on populations of wading birds and seals. In addition to an analysis of socio-economic aspects of tourism, innovative and interactive instruments are also being developed in order to sketch a spatial representation of tourists experiences and appreciations of nature.

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Demography & Quality-of-Life

QUALITY-OF-LIFE PROBLEMS IN THE WADDEN SEA REGION DUE TO SHIFTING POPULATION STRUCTURE

Core

Based on available data on population trends and local facilities, it is clear that in various places in the Wadden Sea area quality-of-life and changes in population structures are problematic. The number of inhabitants over 65 is increasing and the number of youths is decreasing. Due to this relative vulnerability, more detailed and real-time monitoring of quality-of-life is needed, whereby differences between areas in the Wadden Sea region, and between islands and the mainland, are taken into account.

Approach

In order to sufficiently understand future developments in population structures and quality-of-life, and to enable better support of local and provincial policy-making, a "Quality-of-Life-Monitor" is being developed and tested. By including the spatial behavior (including usage of public transport connections and facilities) of inhabitants of the Wadden Sea area, the new assessment technique will ensure more insight into the relationships between daily activities and the quality-of-life for different population groups. At the same time, ideas for improving quality-of-life are being collated.

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Economic Sectors

UNDERSTANDING OF COMPETITIVE POSITIONS IS A PREREQUISITE FOR AN EFFECTIVE ECONOMIC POLICY

Core

Throughout the trilateral Wadden Sea area, differences in economic structure and developments exist between the islands, mainland, and harbour towns. Existing economic data are, however, rarely compiled and analysed at a Wadden-wide scale (national, international). International expansion and specialisation in production leads to shifts in competitive positions of businesses and areas within value chains, from raw materials to the final product and market. Understanding such competitive positions is necessary for effective economic policy.

Approach

Based on business and employment opportunity records from the Netherlands, Germany, and Denmark, new insights are being gained into the rates at which certain business activities grow, and the relative importance of different types of business activities within the trilateral Wadden economy. In addition, the (competitive) position of businesses in the Dutch Wadden Sea region relative to the (international) value chain is being evaluated and visualised, by means of a “Value Chain” monitoring pilot.

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